

22 March 2023

332 WAINUI ROAD

MILLDALE

GEOTECHNICAL COMPLETION REPORT

WFH Properties Limited

AKL2019-0182AM Rev. 1

AKL2019-0182AM		
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14 December 2022	A	Initial draft for internal review
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	Name	Signature	Position
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1 INTRODUCTION

In accordance with our instructions, this Geotechnical Completion Report has been prepared for WFH Properties Limited as part of the documentation to be submitted to Auckland Council following earthworks to form the development.

This report covers the construction period November 2021 to March 2023 and is intended to be used for certification purposes for new lots (listed below) created from SECT 15 SO 503979 as follows:

- 30 new residential lots numbered 1 to 30;
- 3 new jointly owned access lots numbered 6000 to 6002;
- 1 new accessway lot numbered Lot 7000;
- 1 new road in lot 8000 and portions of Wainui Road in Lot 8001 and Lot 8002;

The 332 Wainui Road development is located off Wainui Road, Milldale. As can be seen from the as-built plans, 27 of the lots have been affected by filling as part of the earthworks operations to a maximum depth of approximately 5.0 metres.

Construction of this subdivision has been undertaken in general accordance with;

- Auckland Council's Resource Consent number SUB60359409/LUC60359408 and Engineering Approval letter ref. ENG60382266
- Auckland Council's Building Consent BCO10342869 for cantilever timber pole retaining walls numbered Retaining Wall 01
- Auckland Council's Building Consent BCO10348690 for gabion retaining wall
- NZS4431:2022
- Auckland Council's Code of Practice for Land Development and Subdivision, Chapter 2 - Earthworks and Geotechnical, Version 2.0, July 2022
- Woods consented drawing set referenced P18-276-(001-700), dated December 2020
- CMW Geosciences' Geotechnical Works Specification referenced AKL2019-0182AD, Rev. 0, dated 22 January 2020
- CMW Geosciences' Geotechnical Investigation Report referenced AKL2019-0182AB, Rev. 1, dated 27 March 2020
- CMW Geosciences' Retaining Wall Design Report referenced AKL2019-0182AG, Rev. 0, dated 2 October 2020
- CMW Geosciences' Gabion Wall Design Report referenced AKL2019-0182AH, Rev. 0, dated 21 December 2020

For the construction of these stages of the development, the following roles were fulfilled as defined in NZS 4402:2002 and the Ministry for the Environment Contaminated Land Management Guidelines:

- Geotechnical Designer: CMW Geotechnical NZ Limited
- Certifier: CMW Geotechnical NZ Limited
- Recognised Laboratory: CMW Geotechnical NZ Limited
- Contractor: March Cato Developments Ltd

As CMW has fulfilled the roles of both earth fills Certifier and Geotechnical Designer, this report has been prepared as a combined report covering both of these aspects of the project work.

2 DESCRIPTION OF WORKS

March Cato commenced work across the development in early December 2021 with earthworks operations across site. Cut material was sourced from the southern portion and placed as engineered fill across the northern area. During earthworks, unsuitable materials were encountered across site. These materials varied significantly and contained mixtures of organics, hardfill, concrete and other waste. Existing unsuitable fill was progressively undercut and stockpiled to be exported from site.

Earthworks continued through January and February 2022 which consisted of cut/fill operations with localised undercuts to remove unsuitable material. Formation of the cul-de-sac commenced which required undercuts up to 2m below existing ground levels. Utility trenching was undertaken progressively during this time as the adjacent sections of the road were undercut and remediated.

Stripping works continued throughout March 2022 as fill operations extended northwards. Lime stabilisation was used in localised areas where fill was unable to be conditioned. Alluvial material associated with the existing northern gully feature was undercut and subsoil drains were installed prior to backfilling. In late March 2022 the northern portion was stripped and prepared for the construction of the reinforced earth (RE) batter.

Construction of the RE slope along the northern boundary of site commenced in early April 2022 which involved formation of a 1.0m deep stability undercut with associated subsoil drainage and installation of geogrid between engineered fill lifts. Ongoing cut/fill operations continued throughout April and May 2022 across the rest of the site.

Earthworks operations had slowed significantly by the start of June 2022 as conditioning fill became increasingly difficult due to winter weather conditions. Attention turned to civil works around site. Installation of stormwater service lines and construction of the timber pole cantilever retaining wall commenced in early June 2022 and continued throughout the rest of the month. In mid-June 2022 the gabion outfall structure was constructed at the base of the existing northern gully.

Civil works continued through July and August 2022 with minor earthworks being undertaken where possible using lime-stabilised fill. In early August, construction of the gabion wall around the northern gully commenced which was completed in early September 2022.

Through September and October roading aggregates were laid and kerbing of Road 01 was completed. The final section of earthworks in the north-western corner of site was completed which consisted of localised undercuts of uncontrolled fill to maximum depths of 1.5m.

Throughout November and early December, lots were trimmed to final subgrade and topsoiled. Installation of the Geoweb was undertaken along the northern fill batter of Lots 18 to 22 included. A small section of Geoweb was also installed across the northern batter of Lot 17.

Works were complete by March 2023 with final topsoiling of lots, line marking on the roads and fencing.

The main items of plant used by March Cato Developments Ltd included:

- 3 x 20T Excavators;
- 1 x 13T Excavator;
- 1 x 8T Excavator;
- 1 x 5T Excavator;
- 2 x 9T Dumpers;
- 1 x Smooth Drum Roller;
- 1 x Padfoot Compactor;
- 1 x Tractor + Discs;
- 1 x Water Cart.

3 GEOTECHNICAL QUALITY CONTROL

3.1 Site Observations

During the works site visits were typically undertaken several times each week to assess compliance with NZS 4431 and project specific design recommendations and specifications.

Site visits were carried out to observe and confirm compliance relating to:

- Adequate topsoil stripping;
- Fill areas prior to the placement of fill materials to ascertain that all organic, and soft inorganic subsoils and existing, uncertified fills had been removed;
- Installation of underfill drains but excluding road under-channel drains;
- Backfilling of underfill drains;
- Excavation and backfilling of sewer and stormwater trenches;
- Subsoil drain connections to outlets and flushing at the completion of the works (yet to be completed);
- Construction of cantilever pole retaining walls including ground conditions, pile size, spacing and depth;
- Construction of gabion retaining walls including founding ground conditions, basket typology and arrangement, installation of drainage; and
- Placement and compaction of engineered fills.

3.2 Compaction Control

Compaction of engineered earth fills was controlled by undrained shear strength measured by handheld shear vane calibrated using the NZGS 2001 method and by air voids as defined by NZS4402.

General Fills

The criteria for undrained shear strength were a minimum single value of 110 kPa and minimum average of any 10 consecutive tests of 140 kPa.

The criteria for air voids were a maximum single value of 12% and maximum average of any 10 consecutive tests of 10%.

Service Line Backfills

Stormwater and wastewater lines and manhole surrounds. The criteria for undrained shear strength were a minimum average of any 10 consecutive tests of 100 kPa. The criteria for air voids were a maximum average of any 10 consecutive tests of 12%. Testing frequency was as required.

Where hardfill was used within these lines, a Clegg Impact Value of >25 was adopted.

Vane shear strength, water content and in situ density tests were carried out on all areas of the filling to at least the frequency required by the project specification.

While these tests showed on occasions that the contractor was struggling to achieve the required compaction standards with the prevailing site and soil conditions, to the best of our knowledge, all areas of fill were re-worked as necessary. Subsequent testing confirmed compliance with the specification.

4 EVALUATION OF COMPLETED EARTHWORKS

4.1 Natural Hazards

The LT Plans depict the extents of a series of zones that contain limitations intended to ensure that future building and/ or earthworks on the lots is undertaken in a manner that does not lead to buildings being subject to any of the natural hazards described in Section 71(3) of the Building Act, i.e. erosion, falling

debris, subsidence, slippage, and inundation. Consideration of the inundation hazard was outside the scope of CMW's brief and has been assessed by others. The applied zones include:

- **Specific Design Zones (retaining)** - intended to protect the retaining walls from undermining at the toe that could lead to instability;
- **Specific Design Zones (slope)** – intended to protect building development from long term creep effects on or adjacent to steep slopes and to protect the slopes from inappropriate loading or undermining. This zone provides a buffer between land that is suitable for NZS3604-type (Light Timber Framed Building) foundations and No Build / Planting zones.
- **Specific Design Zone (Reinforced Earth Slope)** – intended to protect building development from long term creep effects above steep slopes and to protect the slopes from inappropriate loading. These zones also contain geogrids and geoweb anchors which should be protected from building development.
- **No Build Zones (Planting Covenant)** – intended to protect vegetation and to ensure that stability conditions are not able to be compromised by development in areas outside the building platforms on the affected lots.

Full descriptions of the restrictions associated with each of these zones are presented in our Opinion on Suitability in **Appendix A**. Additional information is also provided in some of the following sections.

4.2 Liquefaction

The liquefaction risk for the lots on this development has been assessed as follows:

- Review of Auckland Council GIS maps confirms the damage category to be: Unlikely.
- In accordance with MBIE/NZGS guidance¹ the liquefaction susceptibility of the soils at this site was assessed with respect to geological age and compositional (soil fabric and density) criteria during initial investigations. Our assessment was described in our Geotechnical Investigation Report referenced in Section 1 above and found a very low risk.

4.3 Land Stability and Erosion Control

The subdivision scheme layout includes a batter slope along the northern boundary to form level terraces for building platforms. The batters are largely below the residential lots with maximum gradients of 1(v) in 2.0(h) as depicted on the as-built drawings.

Design of the works to provide appropriate stability conditions that meet regulatory requirements for the land within the development, including the batters, has led to the construction of reinforced earth (RE) slopes with associated subsoil drainage and Geoweb facing.

Stability conditions for finished ground profiles have been assessed under a range of groundwater conditions which satisfy ultimate limit state design criteria. The soil parameters for the analyses were selected from extensive investigation undertaken at the site and from experience in this terrain. We consider that the stability results are satisfactory for all building platform areas, and we are therefore satisfied that these areas are not subject to the natural stability hazards described in the Building Act.

On all steep land, including on engineered batter slopes, surface stability can be compromised by indiscriminate disposal of stormwater onto the ground surface and/ or by removal of vegetation.

Building and landscape designers must ensure that all runoff from solid surfaces is directed into the stormwater system. It is also important that care is paid to the disposal of stormwater during construction so that concentrated discharges (e.g. from unconnected spouting) are not directed towards steep ground.

Depths of mulch and topsoil applied to sloping areas should be limited to less than 150mm to minimise the risks of saturation leading to localised slumping on batter face. Wherever practical on such land, and

¹ Earthquake Geotechnical Engineering Practice, Module 3: Identification, assessment and mitigation of liquefaction hazards", (November 2021)

particularly on steep batters, existing vegetation and grass cover should be well maintained. Any vegetation cleared beyond the immediate area of building platforms for temporary construction purposes should be replanted or replaced as soon as possible. The roots of an established vegetation cover can serve to bind the surface soils while the foliage can reduce rain infiltration and soil saturation, resulting in better resistance to erosion and shallow slumping.

4.4 Reinforced Earth Slopes

As noted above, reinforced earth (RE) slopes have been formed with horizontal layers of geogrid embedded near the face to limit creep movement of steep slopes. Geogrids extend up to 2m behind the slope face and are buried at least 500mm from the finished surface.

The RE slopes have been finished with a cellular confinement system (Geoweb) to stabilise the topsoil on the slope faces. This system employs a series of ground anchors and tendons above the crest of the slope to keep the web in place. These are approximately 1m back from the batter face at 800mm centres.

4.5 Retaining Walls

A cantilever timber pole retaining wall has been constructed on the eastern boundaries of lots 1 and 8 in the location shown on the appended As-built Plans. The wall reaches a maximum height of approximately 2.4 metres and was designed by CMW Geosciences and the construction was observed by this consultancy.

A Gabion wall has also been constructed surrounding the stormwater outfall situated on lot 7001 in the northern portion of site, indicated on the appended A-built Plans. The wall reaches a maximum retained height of approximately 2.m and was designed by CMW Geosciences Limited.

Descriptions of the building and earthworks restrictions within the vicinity of these walls (Specific Design Zones – retaining) are contained in our Opinion on Suitability in **Appendix A**.

4.6 No Build Zones

No build / planting covenants areas have been included upslope of the lots neighbouring the northern motorway. Areas within the planting covenant contain uncertified landscape fill and steep gradients in places and have not been engineered to improve both stability conditions or the potential for load induced settlement.

4.7 Fill Induced Settlement

On the basis of the extensive undercutting of unsuitable fills, relatively minor magnitude of fill depths on this site, together with the elapsed time since it was placed, we consider that remaining post-construction settlements will be within code limits, apart from no build areas where unsuitables were not undercut as noted in Section 4.6 above.

4.8 Service Line Trenches

As part of the civil works, sanitary sewer and stormwater services were trenched throughout the development as shown on the appended Woods Stormwater and Sanitary Sewer As-built Plans.

As is normal on all subdivisions, building developments involving foundations within a 45-degree zone of influence from pipe inverts will require engineering input. The Auckland Council drawing referenced SW22 provided in **Appendix B** extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision depicts their requirements for stormwater pipes. Details for water and wastewater pipes are available in the Watercare COP1 - General Requirements and Procedures. The majority of lots are known to have service trenches within the lots as shown on the appended stormwater and wastewater as-built plans. The resulting restrictions are presented in our Opinion on Suitability in **Appendix A**.

4.9 Subsoil Drains and Groundwater

The appended Woods as-built plan shows the positions of subsoil drains and their outlets that were installed during the earthworks as described in the following sub-sections.

Descriptions of restrictions associated with these drains and outlets are contained in our appended Opinion on Suitability in **Appendix A**.

4.9.1 Underfill Drains

These drains were installed at the bases of fills to assist with the earthworks operations by capturing seepages at the cleared ground level. They require no specific maintenance and while their ongoing function is not critical to stability conditions, but they provide ongoing control of groundwater levels and pore water pressure relief so their ongoing function should not be compromised by future works.

Typically these drains comprise punched draincoils surrounded by drainage gravel. Specific design details are provided in the project reports and specifications. If drain depths are unclear at specific locations, they can be estimated from the depths of fills depicted on the as-built plans.

4.9.2 Groundwater

Groundwater levels beneath the engineered fills can be expected to be controlled by the underfill drains and should therefore typically be deeper than 2m, subject to seasonal variations.

In areas of natural ground, based on our work to date we anticipate groundwater levels remaining well below the depth of influence of anticipated earthworks and foundation works for NZS 3604 type dwellings.

4.10 Road Subgrades

Penetration resistance testing was carried out on the road subgrades during construction and the results of this testing were forwarded to Woods Limited for pavement remedial design. Where soft ground with low equivalent CBR values was identified it was generally undercut and replaced with engineered fill. All road subgrade areas were subsequently lime/ cement stabilised to achieve appropriate CBR values.

4.11 Design of Shallow Foundations

4.11.1 Bearing Capacity

Once bulk earthworks and top-soiling of the building platforms had been completed, our staff drilled hand auger boreholes on platforms in natural ground to determine representative finished ground conditions and hence evaluate likely foundation options for future building development. Our assessments of bearing capacity for the design of shallow foundations on each building platform are contained in our Opinion on Suitability in **Appendix A**.

As also detailed in our Opinion on Suitability, some lots in natural (cut) ground have lower bearing capacities than the 300kPa required by the definition of NZS 3604 “good ground”. However, this will not necessarily alter the form or cost of foundations on these lots, depending on development proposals.

If higher geotechnical ultimate bearing capacities are required than have been specified, further specific site investigation and design of foundations should be carried out prior to Building Consent application.

4.11.2 Foundation Settlements

At the bearing pressures specified above and subject to the design requirements for soil expansiveness provided below, differential settlement of shallow foundations for buildings designed in accordance with NZS 3604 (including the 600mm subfloor fill depth limit) should be within code limits.

4.11.3 Soil Expansiveness Classification

Seasonal shrinking and swelling results in vertical surface ground movement which can cause significant cracking of floor slabs and walls. NZS 3604:2011² excludes from the definition of 'good ground', soils with a liquid limit of more than 50% and a linear shrinkage of more than 15% due to their potential to shrink and swell as a result of seasonal fluctuations in water content. For soils exceeding these limits, NZS 3604 has historically referenced AS 2870³ for foundation design advice. However, the November 2019 update of Acceptable Solution B1/AS1⁴ provides amendments to NZS 3604 that define a method for testing and classifying the soils and provides foundation designs for specific, simple house configurations across the range of expansive soil conditions.

Nevertheless, there is evidence⁵ indicating that the use of the B1/AS1 method of assessment of expansiveness may be inaccurate.

Testing of samples obtained from the site was carried out by Road Test, an IANZ registered Testing Authority to provide the geotechnical parameters required for our assessment as presented in Table 1.

Type of Test	Test Method	Quantity
Water Content	NZS4402 – 1986 2.1	4
Liquid Limit	NZS4402 – 1986 2.2	4
Linear shrinkage	NZS4402 – 1986 2.6	4

Certificates for the test results outlined above are presented in **Appendix F**.

Test results were used in conjunction with visual-tactile assessment of the site soils and BRANZ Report SR120A⁶ to determine expansive site Classes as defined in AS 2870, "Residential Slabs and Footings – Construction". Resulting classifications are provided in the Statement of Suitability in **Appendix A**.

The expansive soil hazard is addressed by a combination of design that is appropriate for the expansive Class described in our Opinion on Suitability in **Appendix A**, together with care during site preparation for foundations and diligent maintenance of plantings near the foundations.

Site Preparation

There have been many instances of concrete floors and/ or foundations that have been poured on dry, desiccated subgrades in summer months on expansive soils and have undergone heaving and cracking requiring extensive repairs or even complete house re-builds once the soil moisture contents have returned to higher levels. In some instances, perimeter foundations have been appropriately treated but floor slabs have been poured on dry ground. Infiltration of moisture via pipe bedding has then occurred.

Foundation contractors need to be made aware of the extreme damage potentially caused by these circumstances and the need to maintain appropriate moisture contents in both the footings and building platform subgrade between the time of excavation and the pouring of concrete.

Remedial actions that may be appropriate include combinations of platform protection with a hard fill layer, pouring of a blinding layer of concrete in footing bases and soaking of the building platform with sprinklers for an extended period.

² Standards New Zealand (2011) Timber-framed buildings, NZS 3604:2011, NZ Standard

³ Standards Australia Limited (2011) *Residential slabs and footings*, AS 2870-2011, Australian Standard, NSW

⁴ Ministry of Business, Innovation and Employment (2019) *Acceptable Solutions and Verification Methods for NZ Building Code Clause B1 Structure, B1/AS1, Amendment 19*

⁵ Rogers, N., McDougall, N., Twose, G., Teal, J. & Smith, T. (2020) The Shrink Swell Test: A Critical Analysis, *NZ Geomechanics News*, Issue 99, pages 66-80.

⁶ Fraser Thomas Limited (2008) - Addendum Study Report (BRANZ SR120A), Soil Expansivity in the Auckland Region – Final Report

Site Maintenance

Landowners must be mindful that either the planting or removal of high water demand plants where their roots may extend close to footings (i.e. within a lateral distance of 1.5 times the mature tree height) can cause settlement or heave damage.

4.11.4 Site (Seismic) Class

Our assessments of NZS 1170.5 site Class(es) is provided in our Opinion of Suitability and the Summary Table, both in **Appendix A**.

4.12 Topsoil Depths

Topsoil depths have been checked by the drilling of a borehole in the approximate centre of the building platform on a representative sample of lots. The results are considered indicative for each lot, but may be subject to variations. Topsoil depths were found to be between 20 and 220mm on this stage of the development.

Site specific findings are contained in the appended Suitability Statement Summary (**Appendix A**). However, it is possible that further levelling works have been undertaken since our investigations and accordingly, we strongly recommend that lot purchasers complete their own checks of topsoil depths.

5 CLOSURE

Additional important information regarding the use of your CMW report is provided in the ‘*Using your CMW Report*’ document attached to this report.

This report has been prepared for use by WFH Properties Limited in relation to the 332 Wainui Road Milldale project in accordance with the scope, proposed uses and limitations described in the report. Should you have further questions relating to the use of your report please do not hesitate to contact us.

Although regular site visits have been undertaken for observation, for providing guidance and instruction and for testing purposes, the geotechnical services scope did not include full time site presence. To this end, our Opinion on Suitability in **Appendix A** and our Suitability Statement in **Appendix B** also rely on the Contractors’ work practices and assumes that when we have not been present to observe the work, it has been completed to high standards and in accordance with the drawings, instructions and consent conditions provided to them.

Similarly, they assume that all as-built information and other details provided to the Client and/ or CMW by other members of the project team are accurate and correct in all respects.

Where a party other than WFH Properties Limited seeks to rely upon or otherwise use this report, the consent of CMW should be sought prior to any such use. CMW can then advise whether the report and its contents are suitable for the intended use by the other party.

USING YOUR CMW GEOTECHNICAL REPORT

Geotechnical reporting relies on interpretation of facts and collected information using experience, professional judgement, and opinion. As such it generally has a level of uncertainty attached to it, which is often far less exact than other engineering design disciplines. The notes below provide general advice on what can be reasonably expected from your report and the inherent limitations of a geotechnical report.

Preparation of your report

Your geotechnical report has been written for your use on your project. The contents of your report may not meet the needs of others who may have different objectives or requirements. The report has been prepared using generally accepted Geotechnical Engineering and Engineering Geology practices and procedures. The opinions and conclusions reached in your report are made in accordance with these accepted principles. Specific items of geotechnical or geological importance are highlighted in the report.

In producing your report, we have relied on the information which is referenced or summarised in the report. If further information becomes available or the nature of your project changes, then the findings in this report may no longer be appropriate. In such cases the report must be reviewed, and any necessary changes must be made by us.

Your geotechnical report is based on your project's requirements

Your geotechnical report has been developed based on your specific project requirements and only applies to the site in this report. Project requirements could include the type of works being undertaken; project locality, size and configuration; the location of any structures on or around the site; the presence of underground utilities; proposed design methodology; the duration or design life of the works; and construction method and/or sequencing.

The information or advice in your geotechnical report should not be applied to any other project given the intrinsic differences between different projects and site locations. Similarly geotechnical information, data and conclusions from other sites and projects may not be relevant or appropriate for your project.

Interpretation of geotechnical data

Site investigations identify subsurface conditions at discrete locations. Additional geotechnical information (e.g. literature and external data source review, laboratory testing etc) are interpreted by Geologists or Engineers to provide an opinion about a site specific ground models, their likely impact on the proposed development and recommended actions. Actual conditions may differ from those inferred to exist due to the variability of geological environments. The actual interface between materials may be far more gradual or abrupt than assumed based on the facts obtained. Nothing can be done to change the actual site conditions which exist, but steps can be taken to reduce the impact of unexpected conditions. Interpretation of factual data can be influenced by design and/or construction methods. Where these methods change review of the interpretation in the report may be required.

Subsurface conditions can change

Subsurface conditions are created by natural processes and then can be altered anthropically or over time. For example, groundwater levels can vary with time or activities adjacent to your site, fill may be placed on a site, or the consistency of near surface conditions might be susceptible to seasonal changes. The report is based on conditions which existed at the time of investigation. It is important to confirm whether conditions may have changed, particularly when large periods of time have elapsed since the investigations were performed.

Interpretation and use by other design professionals

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a geotechnical report. To help avoid misinterpretations, it is important to retain the assistance of CMW to work with other project design professionals who are affected by the contents of your report. CMW staff can explain the report implications to design professionals and then review design plans and specifications to see that they have correctly incorporated the findings of this report.

Your report's recommendations require confirmation during construction

Your report is based on site conditions as revealed through selective point sampling. Engineering judgement is then applied to assess how indicative of actual conditions throughout an area the point sampling might be. Any assumptions made cannot be substantiated until construction is complete. For this reason, you should retain geotechnical services throughout the construction stage, to identify variances from previous assumption, conduct additional tests if required and recommend solutions to problems encountered on site.

A Geotechnical Engineer, who is fully familiar with the site and the background information, can assess whether the report's recommendations remain valid and whether changes should be considered as the project develops. An unfamiliar party using this report increases the risk that the report will be misinterpreted.

Environmental Matters Are Not Covered

Unless specifically discussed in your report environmental matters are not covered by a CMW Geotechnical Report. Environmental matters might include the level of contaminants present of the site covered by this report, potential uses or treatment of contaminated materials or the disposal of contaminated materials. These matters can be complex and are often governed by specific legislation.

The personnel, equipment, and techniques used to perform an environmental study can differ significantly from those used in this report. For that reason, our report does not provide environmental recommendations. Unanticipated subsurface environmental problems can have large consequences for your site. If you have not obtained your own environmental information about the project site, ask your CMW contact about how to find environmental risk-management guidance.

Appendix A: Statement of Professional Opinion on Suitability of Land for Building Construction

STATEMENT OF PROFESSIONAL OPINION ON SUITABILITY OF LAND FOR BUILDING CONSTRUCTION

Development: 332 Wainui Road Subdivision Development
Developer: WFH Properties Limited
Location: Milldale

I, Chris Ritchie, of CMW Geotechnical NZ Limited, Auckland, hereby confirm that:

1. As a Chartered Engineering Geologist experienced in the field of geotechnical engineering, I am a Geo-professional as defined in clause 1.2.2 of NZS 4404:2010 and was retained by the Developer as the geo-professional on the above development.
2. The extent of preliminary investigations carried out to date are described in the CMW Geosciences Geotechnical Investigation Report referenced AKL2019-0182AB Rev. 1, dated 27 March 2020. The conclusions and recommendations of this document have been re-evaluated in the preparation of this report. The extent of my inspections during construction, and the results of all tests and/ or evaluations carried out are as described in my Geotechnical Completion Report dated 22 March 2023.
3. My certification of the earth fills placed on this site is contained in **Appendix B**.
4. In my professional opinion, not to be construed as a guarantee, I consider that:

- (a) The completed earthworks take into account land slope and foundation stability considerations on the building platform areas, but as shown on the appended as built plans, areas on Lots 8 to 16 have gradients steeper (or directly above) than 1(v) in 4(h) (and generally up to 1(v) in 2(h)). Accordingly, restrictions incorporating **Specific Design Zones (Slope)** have been applied directly below the No Build / Land Covenant Zone on Lots 8 to 16 inclusive as depicted on the LT Plans.

No building construction and no cuts of any depth should take place within the designated **Specific Design Zone (Slope) areas** unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. The endorsement will need to consider the implications of the proposals on the global stability of the Northern Motorway batter.

This limitation also applies to long term landscaping works, including any proposed minor cuts either on or near batter toes to be retained by new landscaping walls that might not normally require engineering, and to landscaping fills on or immediately above the batter slopes.

- (b) **Specific Design Zone (Reinforced Earth Slope) areas** have been applied to Lots 17 to 22 as encompassing or directly above reinforced earth slopes. No building construction and no earthworks (i.e. cut or fills of any depth) should take place within the designated **Specific Design Zone (Reinforced Earth Slope) areas** unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. The endorsement will need to consider the implications of the proposals on the global stability of the slope, soil creep on the buildings, foundations and retaining walls.

The geogrids associated with the reinforced earth slope are not expected to be encountered by development on these lots. However, should any geogrids be exposed or damaged, the work must be observed and certified by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report. Geoweb anchors may be encountered if excavations are carried out within 1m of the crest of these slopes. Should these be exposed or damaged, the work must be observed and certified by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report.

This limitation also applies to long-term landscaping works, including landscaping fills on or immediately above the batter slopes

- (c) **Specific Design Zone (Retaining) areas** have been applied on Lots 1 and 8 for the protection of the function of the retaining walls as depicted on the as-built plans. The retaining walls on this stage of the development were designed for:
- o A maximum of 0 kPa surcharge load and 0° toe slope for Case 1 walls (Lots 1 and 8), and;
 - o A maximum of 0 kPa surcharge load and 5° toe slope for Case 2 walls (Lot 8).

No building construction and no earthworks (i.e. cut or fills) should take place within these Specific Design Zones that exceed these design limits on the walls unless endorsed by a Chartered Professional Engineer experienced in geomechanics and familiar with the contents of this report who consider the stability implications of the earthworks and/ or building proposals on the retaining walls.

- (d) **No Build / Land Covenant Zone** areas defined on Lots 8-16 inclusive are designated no-build zones on the basis of potential for instability and/ or because of the presence of planting areas.

No building construction and no earthworks may take place in these areas.

- (e) The function of the subsoil drains installed beneath Lots 18 to 23 and 30 inclusive as shown on the as-built plans must not be impaired by any building development or landscaping works. Any bored or driven piles must be positioned to avoid damaging the draincoils. Where any subsoil drain is intercepted by building works, it must be reinstated under the direction of a Chartered Professional Engineer to ensure the integrity of the subsoil drainage system.
- (f) A geotechnical ultimate bearing capacity of 300 kPa may be assumed for shallow foundation design on the building platforms of Lots 1 to 30 inclusive.

If for any reason higher geotechnical bearing capacities are required, further specific site investigation and design of foundations should be carried out prior to Building Consent application.

- (g) The site (seismic) subsoil class for each lot has been assessed in accordance with NZS1170.5:2004 Clause 3.1.3 from borelogs that included measurements of geotechnical properties. Our assessment is that all lots are Class C- shallow soil.
- (h) The expansive site Class for all lots has been assessed as AS2870 Class M (Moderate) to H1 (Highly). We recommend that building designers note on the Building Consent drawings the need to maintain appropriate moisture levels across building subgrades and in footing excavations (as described in Section 4.11.3 of the Geotechnical Completion Report) for reference by foundation contractors.
- (i) No building development should take place within the 45 degree zone of influence of stormwater or sewer line or manhole inverts unless endorsed by specific design 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 pipes and trench backfills. A copy of drawing SW22 extracted from Chapter 4 of the Auckland Council Code of Practice for Land development and Subdivision this document is provided in **Appendix B** for clarification. Details for water and wastewater pipes are available in the Watercare COP1 - General Requirements and Procedures.

- (j) On the basis of the earth fill certification and subject to the geotechnical limitations, restrictions and recommendations contained in clauses 4(a), 4(b), 4(c), 4(d), 4(e), 4(f), 4(g), 4(h) and 4(i) above:
- (i) The filled and natural ground is generally suitable for residential buildings constructed in accordance with NZS 3604 and the requirements of AS2870 for the appropriate expansive soil class.
 - (ii) Where shallow foundations are appropriate, design may be carried out in accordance with AS 2870 (Class M to H2 as specified for each lot) or alternately, a specific foundation and structural design may be undertaken by a Chartered Professional Engineer.
5. Road subgrades have been formed with appropriate regard for slope stability and settlement risks.
6. The esplanade reserve area in Lot 7001 has been formed with appropriate regard for slope stability risks.

The following table summarises the conditions on each of the residential lots.

For and on behalf of CMW Geosciences



Chris Ritchie

Associate Engineering Geologist CMEngNZ, PEngGeol

Table 2: GCR Summary Table

Condition	Specific Design Zone (Slope) – Geotechnical Land Covenant Area (refer LT Plans)	Specific Design Zone (Reinforced Slope) – Geotechnical Land Covenant Area (refer LT Plans)	Specific Design Zone (Retaining) – Geotechnical Land Covenant Area (refer LT Plans)	No Built Zone – Land Covenant Area (refer to LT Plan)	Subsoil Drains Present	Geotechnical Ultimate Bearing Capacity (kPa)	NZS 1170.5 Site (seismic) Class	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
GCR SOPO Clause	4(a)	4(b)	4(c)	4(d)	4(e)	4(f)	4(g)	4(h)	4(i)	
Lot number										
1			F			300	C	H1		220
2						300	C	H1		220
3						300	C	H1		20
4						300	C	H1		20
5						300	C	H1		60
6						300	C	H1		60
7						300	C	H1		200
8			G	Q		300	C	H1		150
9	H			R		300	C	H1		150
10	I			S		300	C	H1		120
11	J			T		300	C	H1	●	120
12	K			U		300	C	H1	●	130
13	L			V		300	C	H1	●	130
14	M			W		300	C	H1	●	70
15	N			X		300	C	H1	●	70
16	O			Y		300	C	H1	●	90
17		BA				300	C	H1	●	90
18		BB			●	300	C	M		90
19		BC			●	300	C	M	●	110
20		BD			●	300	C	M	●	110

Table 2: GCR Summary Table

Condition	Specific Design Zone (Slope) – Geotechnical Land Covenant Area (refer LT Plans)	Specific Design Zone (Reinforced Slope) – Geotechnical Land Covenant Area (refer LT Plans)	Specific Design Zone (Retaining) – Geotechnical Land Covenant Area (refer LT Plans)	No Built Zone – Land Covenant Area (refer to LT Plan)	Subsoil Drains Present	Geotechnical Ultimate Bearing Capacity (kPa)	NZS 1170.5 Site (seismic) Class	AS2870 Expansive Class	Service Lines Restrictions	Indicative Topsoil Depth (mm)
GCR SOPO Clause	4(a)	4(b)	4(c)	4(d)	4(e)	4(f)	4(g)	4(h)	4(i)	
21		BE			●	300	C	M	●	100
22		BF			●	300	C	M	●	100
23						300	C	H1	●	90
24						300	C	H1	●	90
25						300	C	H1		100
26						300	C	H1	●	100
27						300	C	H1		100
28						300	C	H1		180
29						300	C	H1		200
30					●	300	C	H1		200

Appendix B: Statement of Suitability of Engineered Fill for Lightweight Structures

STATEMENT OF SUITABILITY OF ENGINEERED FILLS FOR LIGHTWEIGHT STRUCTURES

To: Auckland Council
Development: 332 Wainui Road Development
Land Title(s): SECT 15 SO 503979
Location: 332 Wainui Road, Upper Orewa
Resource Consent Nos: LUC60359408
Developer: WFH Properties Limited
Geotechnical Designer: Chris Ritchie of CMW Geotechnical NZ Limited
Certifier: Chris Ritchie of CMW Geotechnical NZ Limited

This Statement of Suitability is provided as an appendix to the CMW Geosciences Geotechnical Completion Report referenced in the page footer below, that also contains all as-built plans, geotechnical works specification, test results and test inspection records relevant to the work completed.

1. I, Chris Ritchie, confirm that I am qualified as a certifier as defined in NZS4431:2022.
2. During this work, I was retained as certifier and I or my certifier's representative undertook inspections and testing as documented in the Geotechnical Completion Report.
3. I am satisfied that the engineered fill shown in the attached as-built survey was placed, compacted and tested in accordance with the attached specification and that all variations and non-compliances have been documented in the Geotechnical Completion report.
4. Based on the information available, I certify that, to the best of my knowledge, the intent of the geotechnical designer (as presented in the design, drawings and Geotechnical Works Specification) has been achieved.
5. This certification does not remove the necessity for normal inspection and design of foundations as would be made in natural ground.

For and on behalf of CMW Geosciences



Chris Ritchie
Associate Engineering Geologist CMEngNZ, PEngGeol

Appendix C: Drawings

Title	Reference No.	Date	Revision
Draft Title Plan	LT 581992	23/02/2023	
Woods – Final Subgrade Surface Asbuilt Plan	P18-276-00-1000-AB	17/03/2023	2
Woods – Cut and Fill Asbuilt Plan (Sheets 1-3)	P18-276-00-1110-AB	17/03/2023	2
Woods – Timber Retaining Wall Asbuilt Plan	P18-276-00-1300-AB	21/03/2023	2
Woods – Gabion Retaining Wall Asbuilt Plan	P18-276-00-1301-AB	21/03/2023	1
Woods – Subsoil Asbuilt Plan	P18-276-1200-AB	21/03/2023	1
Woods – Remediated Areas	P18-276-1400-AB	24/02/2023	1
Woods – Stormwater Asbuilt Plan (Sheets 1 – 4)	P18-276-3000-AB	21/03/2023	1
Woods – Wastewater Asbuilt Plan (Sheets 1 - 3)	P18-276-4000-AB	21/03/2023	1
Auckland Council SW Pipe & MH Construction Clearance Requirements	SW22	1/11/2015	2



Title Plan - LT 581992

Survey Number LT 581992
Surveyor Reference P18-276 - 332 Wainui Road
Surveyor Jessica Deborah Smyth
Survey Firm Wood & Partners Consultants Ltd
Surveyor Declaration

Survey Details

Dataset Description Lot 1 to 30, 6000 to 6002, 7000, 7001, 8000, 8001 and 8002 Being a Subdivision of Section 15 SO 503979

Status Initiated

Land District North Auckland

Submitted Date

Survey Class Class A

Survey Approval Date

Deposit Date

Territorial Authorities

Auckland Council

Comprised In

RT 813338

Created Parcels

Parcels	Parcel Intent	Area	RT Reference
Lot 1 Deposited Plan 581992	Fee Simple Title	0.1152 Ha	1088307
Lot 2 Deposited Plan 581992	Fee Simple Title	0.0549 Ha	1088308
Lot 3 Deposited Plan 581992	Fee Simple Title	0.0550 Ha	1088309
Lot 4 Deposited Plan 581992	Fee Simple Title	0.0549 Ha	1088310
Lot 5 Deposited Plan 581992	Fee Simple Title	0.0550 Ha	1088311
Lot 6 Deposited Plan 581992	Fee Simple Title	0.0549 Ha	1088312
Lot 7 Deposited Plan 581992	Fee Simple Title	0.0549 Ha	1088313
Lot 8 Deposited Plan 581992	Fee Simple Title	0.0847 Ha	1088314
Lot 9 Deposited Plan 581992	Fee Simple Title	0.0582 Ha	1088315
Lot 10 Deposited Plan 581992	Fee Simple Title	0.0735 Ha	1088316
Lot 11 Deposited Plan 581992	Fee Simple Title	0.0737 Ha	1088317
Lot 12 Deposited Plan 581992	Fee Simple Title	0.0579 Ha	1088318
Lot 13 Deposited Plan 581992	Fee Simple Title	0.0512 Ha	1088319
Lot 16 Deposited Plan 581992	Fee Simple Title	0.0546 Ha	1088322
Lot 17 Deposited Plan 581992	Fee Simple Title	0.0557 Ha	1088323
Lot 18 Deposited Plan 581992	Fee Simple Title	0.0541 Ha	1088324
Lot 19 Deposited Plan 581992	Fee Simple Title	0.0481 Ha	1088325
Lot 20 Deposited Plan 581992	Fee Simple Title	0.0519 Ha	1088326
Lot 21 Deposited Plan 581992	Fee Simple Title	0.0500 Ha	1088327
Lot 22 Deposited Plan 581992	Fee Simple Title	0.0556 Ha	1088328
Lot 23 Deposited Plan 581992	Fee Simple Title	0.0537 Ha	1088329
Lot 24 Deposited Plan 581992	Fee Simple Title	0.0600 Ha	1088330
Lot 25 Deposited Plan 581992	Fee Simple Title	0.0550 Ha	1088331

Title Plan - LT 581992

Created Parcels

Parcels	Parcel Intent	Area	RT Reference
Lot 26 Deposited Plan 581992	Fee Simple Title	0.0511 Ha	1088332
Lot 27 Deposited Plan 581992	Fee Simple Title	0.0525 Ha	1088333
Lot 28 Deposited Plan 581992	Fee Simple Title	0.0775 Ha	1088334
Lot 29 Deposited Plan 581992	Fee Simple Title	0.0500 Ha	1088335
Lot 30 Deposited Plan 581992	Fee Simple Title	0.0499 Ha	1088336
Lot 6000 Deposited Plan 581992	Fee Simple Title	0.0696 Ha	Multiple
Lot 6001 Deposited Plan 581992	Fee Simple Title	0.0358 Ha	Multiple
Lot 6002 Deposited Plan 581992	Fee Simple Title	0.0136 Ha	Multiple
Lot 7001 Deposited Plan 581992	Fee Simple Title	0.2028 Ha	1088337
Lot 7000 Deposited Plan 581992	Vesting on Deposit for Accessway	0.0215 Ha	
Lot 8000 Deposited Plan 581992	Vesting on Deposit for Road	0.3110 Ha	
Lot 8001 Deposited Plan 581992	Vesting on Deposit for Road	0.0192 Ha	
Lot 8002 Deposited Plan 581992	Vesting on Deposit for Road	0.0762 Ha	
Lot 14 Deposited Plan 581992	Fee Simple Title	0.0504 Ha	1088320
Lot 15 Deposited Plan 581992	Fee Simple Title	0.0633 Ha	1088321
Area B Deposited Plan 581992	Easement		
Area C Deposited Plan 581992	Easement		
Area DA Deposited Plan 581992	Easement		
Area EA Deposited Plan 581992	Easement		
Area F Deposited Plan 581992	Covenant - Land		
Area G Deposited Plan 581992	Covenant - Land		
Area H Deposited Plan 581992	Covenant - Land		
Area I Deposited Plan 581992	Covenant - Land		
Area J Deposited Plan 581992	Covenant - Land		
Area K Deposited Plan 581992	Covenant - Land		
Area L Deposited Plan 581992	Covenant - Land		
Area M Deposited Plan 581992	Covenant - Land		
Area N Deposited Plan 581992	Covenant - Land		
Area O Deposited Plan 581992	Covenant - Land		
Area Q Deposited Plan 581992	Covenant - Land		
Area R Deposited Plan 581992	Covenant - Land		
Area S Deposited Plan 581992	Covenant - Land		
Area T Deposited Plan 581992	Covenant - Land		
Area U Deposited Plan 581992	Covenant - Land		
Area V Deposited Plan 581992	Covenant - Land		
Area W Deposited Plan 581992	Covenant - Land		
Area X Deposited Plan 581992	Covenant - Land		
Area DC Deposited Plan 581992	Easement		
Area Y Deposited Plan 581992	Covenant - Land		
Area DB Deposited Plan 581992	Easement		



Title Plan - LT 581992

Created Parcels

Parcels	Parcel Intent	Area	RT Reference
Area BA Deposited Plan 581992	Covenant - Land		
Area BB Deposited Plan 581992	Covenant - Land		
Area BC Deposited Plan 581992	Covenant - Land		
Area BD Deposited Plan 581992	Covenant - Land		
Area BE Deposited Plan 581992	Covenant - Land		
Area BF Deposited Plan 581992	Covenant - Land		
Area EB Deposited Plan 581992	Easement		
Total Area		<hr/> 2.5271 Ha	

Schedule / Memorandum

Land Registration District

North Auckland

Survey Number

LT 581992

Territorial Authority (the Council)

Auckland Council

Schedule of Easements in Gross

Last Edited: 03 Feb 2023 07:56:02

<u>Purpose</u>	<u>Shown</u>	<u>Burdened Land</u> <u>(Servient Tenement)</u>	<u>Grantee</u>
Right to drain water	B	Lot 7001	Auckland Council
	C	Lot 15	NZTA
	DA	Lot 16	NZTA
	DC	Lot 16	NZTA
	DB	Lot 16	NZTA
	EA	Lot 17	NZTA
	EB	Lot 17	NZTA
Right to convey telecommunications	Lot 6000	Lot 6000	Chorus New Zealand Limited
	Lot 6001	Lot 6001	Chorus New Zealand Limited
	Lot 6002	Lot 6002	Chorus New Zealand Limited
Right to convey electricity, gas	Lot 6000	Lot 6000	Vector Limited
	Lot 6002	Lot 6002	Vector Limited
	Lot 6001	Lot 6001	Vector Limited

Amalgamation Conditions

Last Edited: 30 Nov 2022 18:40:01

That Lot 6000 Hereon (legal access) be held as to ten undivided one-tenth shares by the owners of Lots 1 to 10 Hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.

That Lot 6001 Hereon (legal access) be held as to six undivided one-sixth shares by the owners of Lots 24 to 29 Hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.

That Lot 6002 Hereon (legal access) be held as to three undivided one-third shares by the owners of Lots 21 to 23 Hereon as tenants in common in the said shares and that individual Records of Title be issued in accordance therewith.

Schedule of Existing Easements to be Surrendered

Last Edited: 30 Nov 2022 18:41:01

<u>Purpose</u>	<u>Shown</u>	<u>Burdened Land</u> <u>(Servient Tenement)</u>	<u>Creating Document Reference</u>
Right of Way	Area A SO 503979	Section 15 SO 503979	T 5394299.1
Right to convey electricity	Area C SO 503979, Area E SO 503979, Area F SO 503979	Section 15 SO 503979	E 5331252.8

Covenants to be Revoked

Last Edited: 02 Dec 2022 08:42:59

<u>Shown</u>	<u>Creating Document Reference</u>
Area B SO 503979, Area G SO 503979, Area L SO 503979, Area M SO 503979, Area D SO 503979	GN 5331252.4

Schedule / Memorandum

Land Registration District

North Auckland

Survey Number

LT 581992

Territorial Authority (the Council)

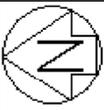
Auckland Council

Notes

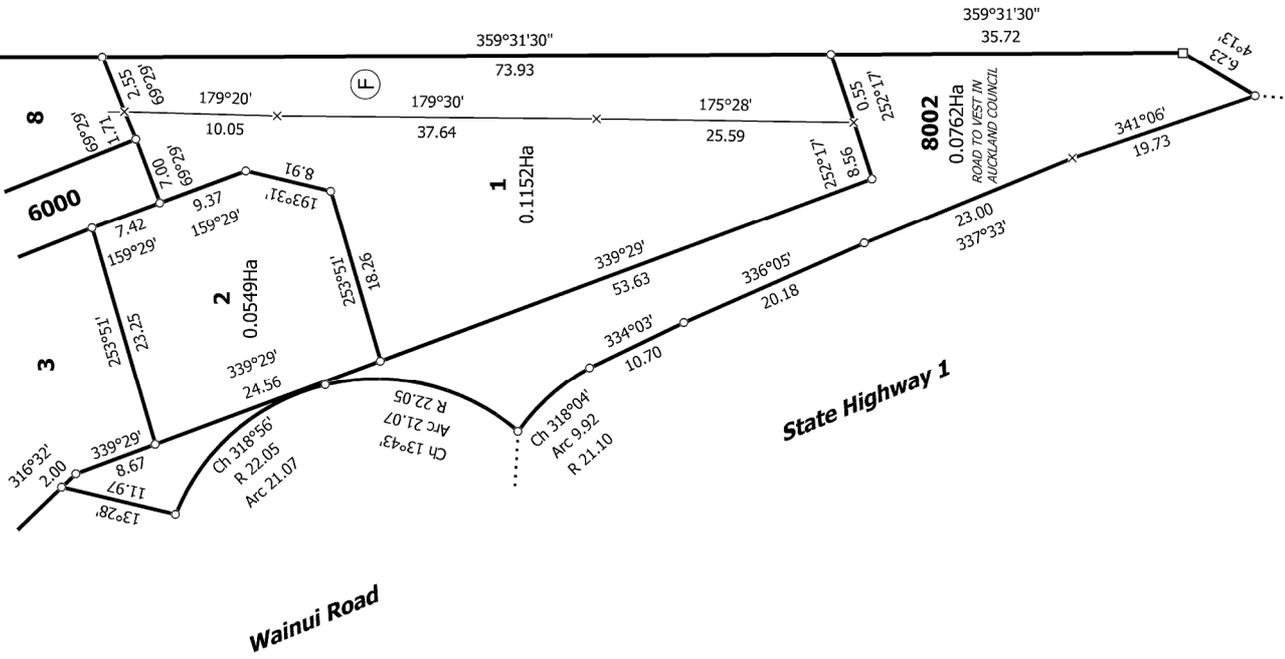
Last Edited: 03 Feb 2023 07:40:46

Areas BA to BF, DB, EB & F to O hereon are subject to land covenant - specific design area.

Areas Q to Y, DA & C hereon are subject to land covenant - no build zone.



State Highway 1



Diag. CE

T 1/6

Title Plan
LT 581992
DRAFT

Surveyor: Jessica Deborah Smyth
Firm: Wood & Partners Consultants Ltd

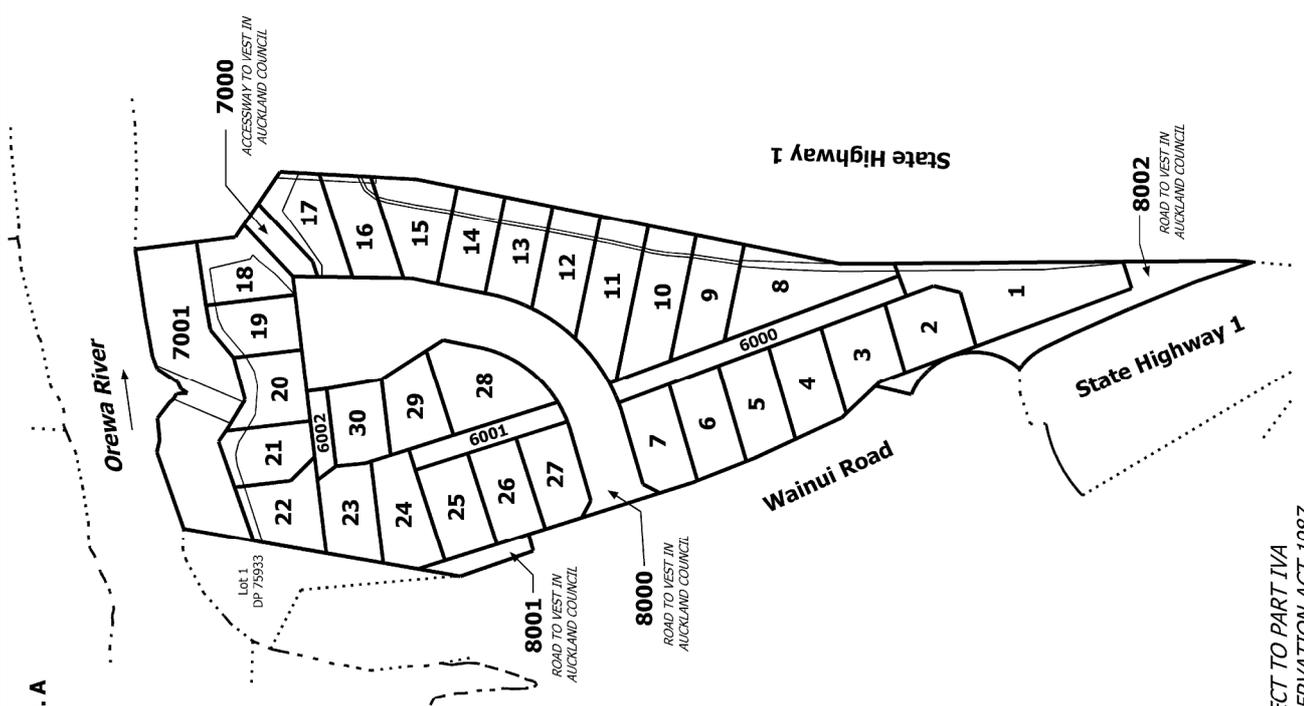
Lot 1 to 30, 6000 to 6002, 7000, 7001, 8000, 8001 and 8002 Being a Subdivision
of Section 15 SO 503979

SUBJECT TO PART IVA
CONSERVATION ACT 1987

Land District: North Auckland

Digitally Generated Plan
Generated on: 03/02/2023 06:21 am Page 6 of 11

Diag. A



Orewa River

State Highway 1

Wainui Road

State Highway 1

7000

7001

8001

8000

8002

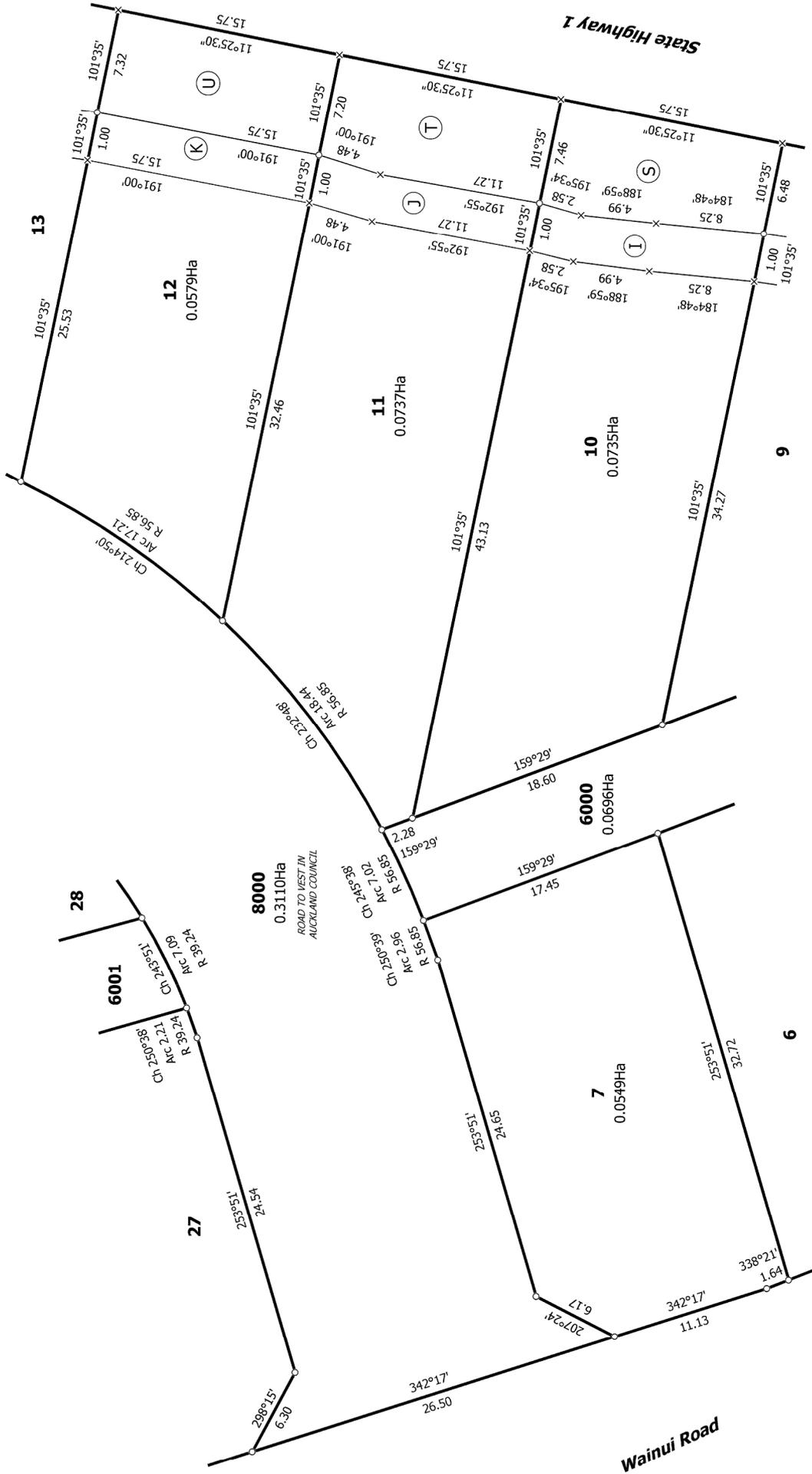
Lot 1
DP 75833

ACCESSWAY TO WEST IN
AUCKLAND COUNCIL

ROAD TO WEST IN
AUCKLAND COUNCIL



Diag. CC



SUBJECT TO PART IVA CONSERVATION ACT 1987

Land District: North Auckland

Digitally Generated Plan

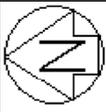
Generated on: 03/02/2023 06:21 am Page 8 of 11

Lot 1 to 30, 6000 to 6002, 7000, 8000, 8001 and 8002 Being a Subdivision of Section 15 SO 503979

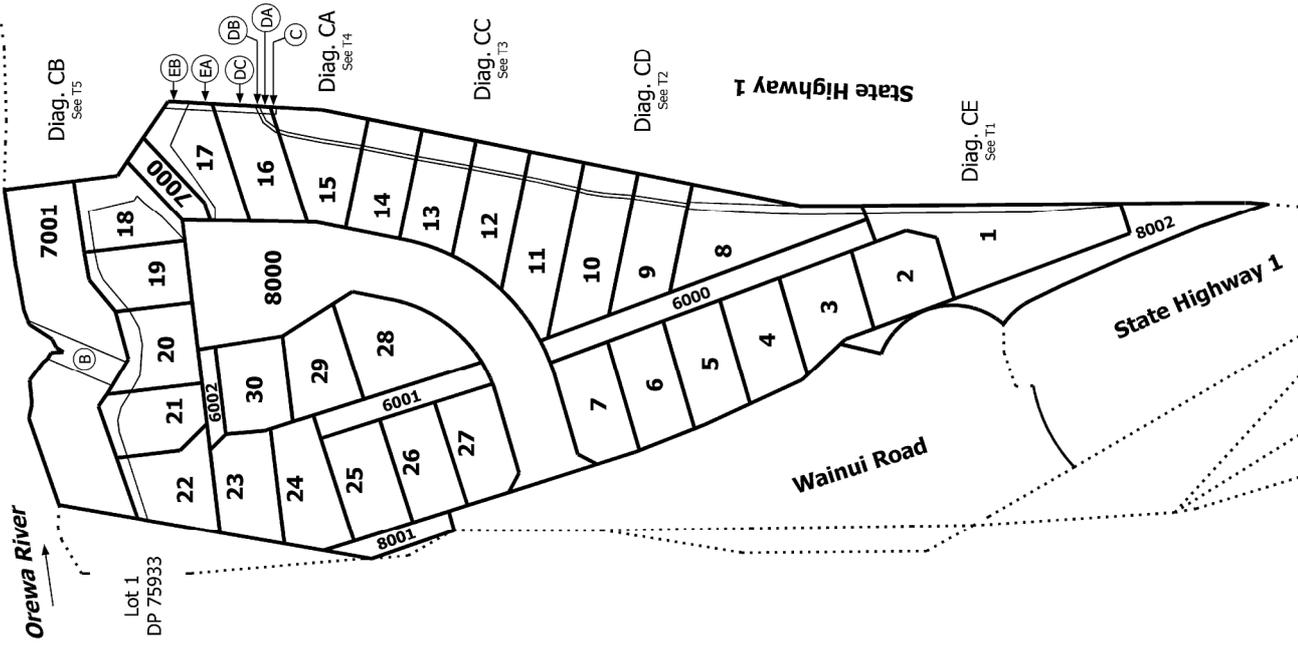
Surveyor: Jessica Deborah Smyth
Firm: Wood & Partners Consultants Ltd

Title Plan
LT 581992
DRAFT

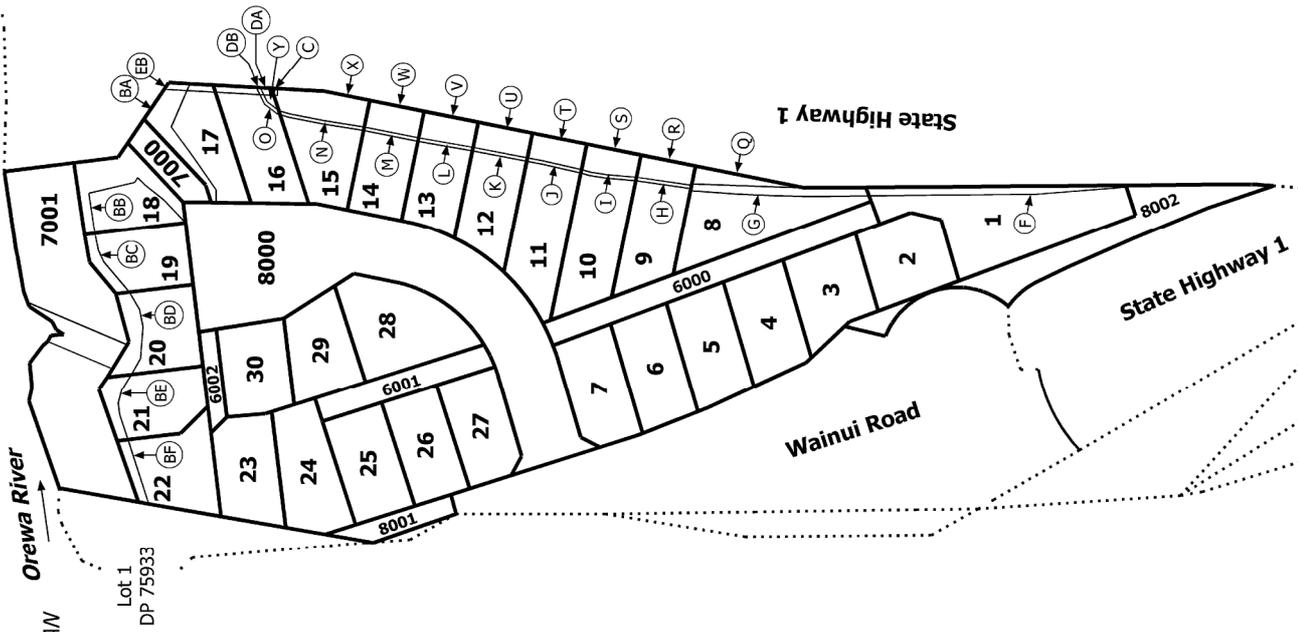
T 3/6



Diag. C
EASEMENT PLAN



Diag. B
COVENANT PLAN



Title Plan
LT 581992
DRAFT

Surveyor: Jessica Deborah Smyth
Firm: Wood & Partners Consultants Ltd

Lot 1 to 30, 6000 to 6002, 7000, 7001, 8000, 8001 and 8002 Being a Subdivision
of Section 15 SO 503979



DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND:

MAJOR CONTOUR	— 10 —
MINOR CONTOUR	- - - - -
LOT BOUNDARIES	— — — — —
STAGE BOUNDARY	— — — — —

- NOTES:**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION
 - LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946
 - CONTOURS ARE AT 0.25m INTERVALS
 - BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR	NN	13/12/22
2 ISSUED FOR GCR FINAL	KR	14/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	
APPROVED	KR	

N

332 WAINUI ROAD

**FINAL SURFACE ASBUILT
OVERALL LAYOUT**

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: Kendall Reid
 Licenced Cadastral Surveyor

Date: 17/03/2023

Name: KENDALL REID

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1000-AB	

Document No. C:\1205\ENERGY\DATA\WP-PEN-APP-01\18-276-332 WAINUI ROAD_147\DRAWINGS\SURV\B18-276-1000-AB FINAL SURFACE.DWG



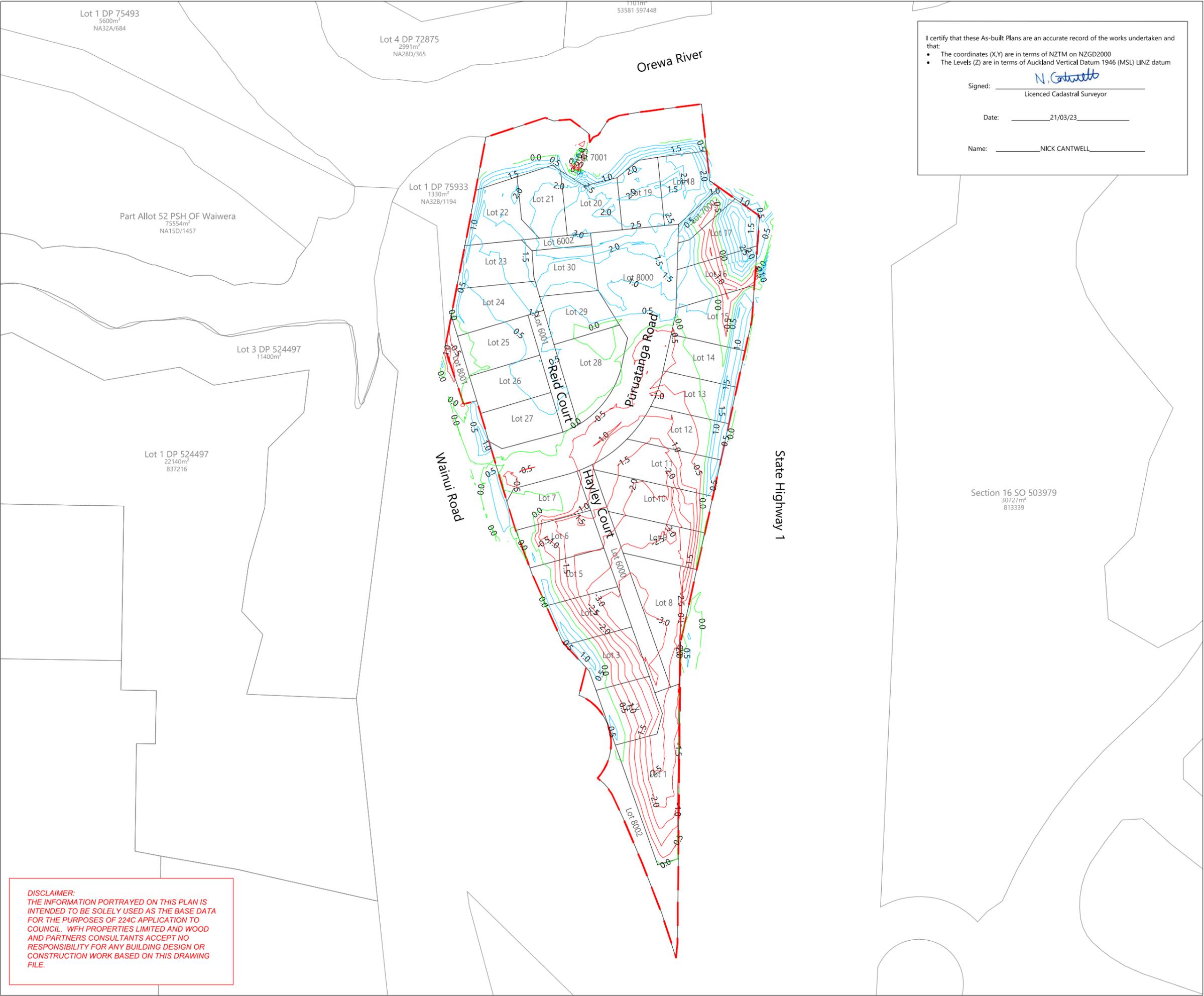
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
 Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL



DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND:

ZERO CONTOUR	
CUT CONTOUR	
FILL CONTOUR	
LOT BOUNDARY	
STAGE BOUNDARY	

- NOTES:**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION
 - LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946
 - CONTOURS ARE AT 0.5m INTERVALS
 - BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL
 - PLANS HAVE BEEN REVIEWED BY CMW GEOSCIENCE
 - PLANS SHOULD BE READ IN CONJUNCTION WITH GCR

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR	NN	13/12/22
2 ISSUED FOR GCR FINAL	NC	21/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	CMW	
DRAWN	EC	
CHECKED	NC	
APPROVED	KR	



332 WAINUI ROAD

CUT AND FILL ASBUILT

SHEET 1 OF 3

ORIGINAL TO FINAL SURFACE

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1110-AB	



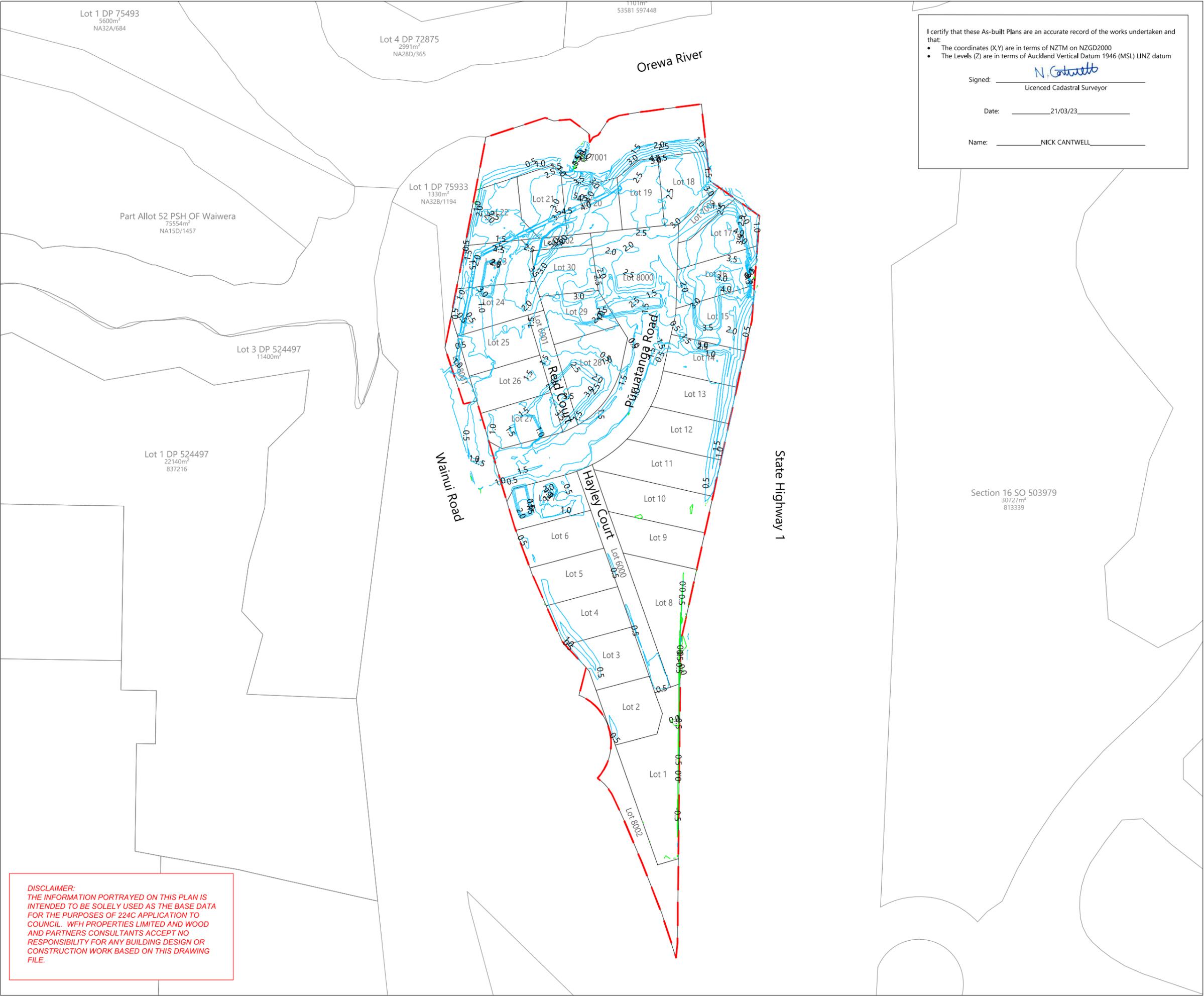
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
 Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL



LEGEND:

ZERO CONTOUR	
CUT CONTOUR	
FILL CONTOUR	
LOT BOUNDARY	
STAGE BOUNDARY	

- NOTES:**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION
 - LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946
 - CONTOURS ARE AT 0.5m INTERVALS
 - BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL
 - PLANS HAVE BEEN REVIEWED BY CMW GEOSCIENCE
 - PLANS SHOULD BE READ IN CONJUNCTION WITH GCR

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR	NN	13/12/22
2 ISSUED FOR GCR FINAL	NC	21/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	CMW	
DRAWN	EC	
CHECKED	NC	
APPROVED	NC	

WFH
PROPERTIES

332 WAINUI ROAD

CUT AND FILL ASBUILT

SHEET 2 OF 3

LOWEST TO FINAL SURFACE

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1111-AB	

DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

Document No. C:\1205\ENERGY\DATA\WP-PEN-APP-01\18-276-332 WAINUI ROAD_147\DRAWING\SSURV\AB\18-276-1110-AB CUT FILL CONTOURS.DWG



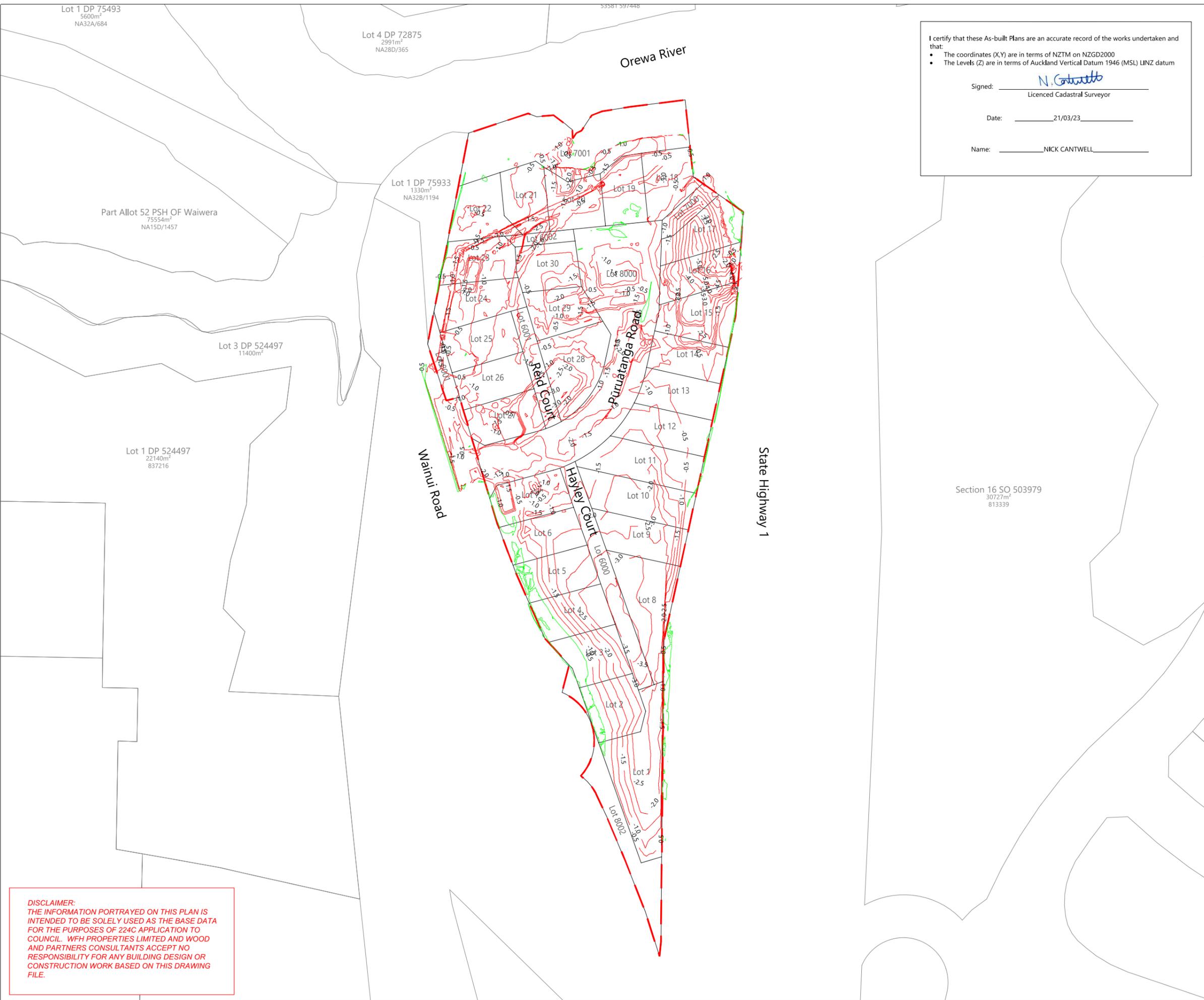
I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
 Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL



LEGEND:

ZERO CONTOUR	
CUT CONTOUR	
FILL CONTOUR	
LOT BOUNDARY	
STAGE BOUNDARY	

- NOTES:**
- COORDINATES SHOWN ARE IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION
 - LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946
 - CONTOURS ARE AT 0.5m INTERVALS
 - BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL
 - PLANS HAVE BEEN REVIEWED BY CMW GEOSCIENCE
 - PLANS SHOULD BE READ IN CONJUNCTION WITH GCR

REVISION DETAILS		BY	DATE
1	ISSUED FOR GCR	NN	13/12/22
2	ISSUED FOR GCR FINAL	NC	21/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	CMW	
DRAWN	EC	
CHECKED	NC	
APPROVED	NC	



332 WAINUI ROAD

CUT AND FILL ASBUILT

SHEET 3 OF 3

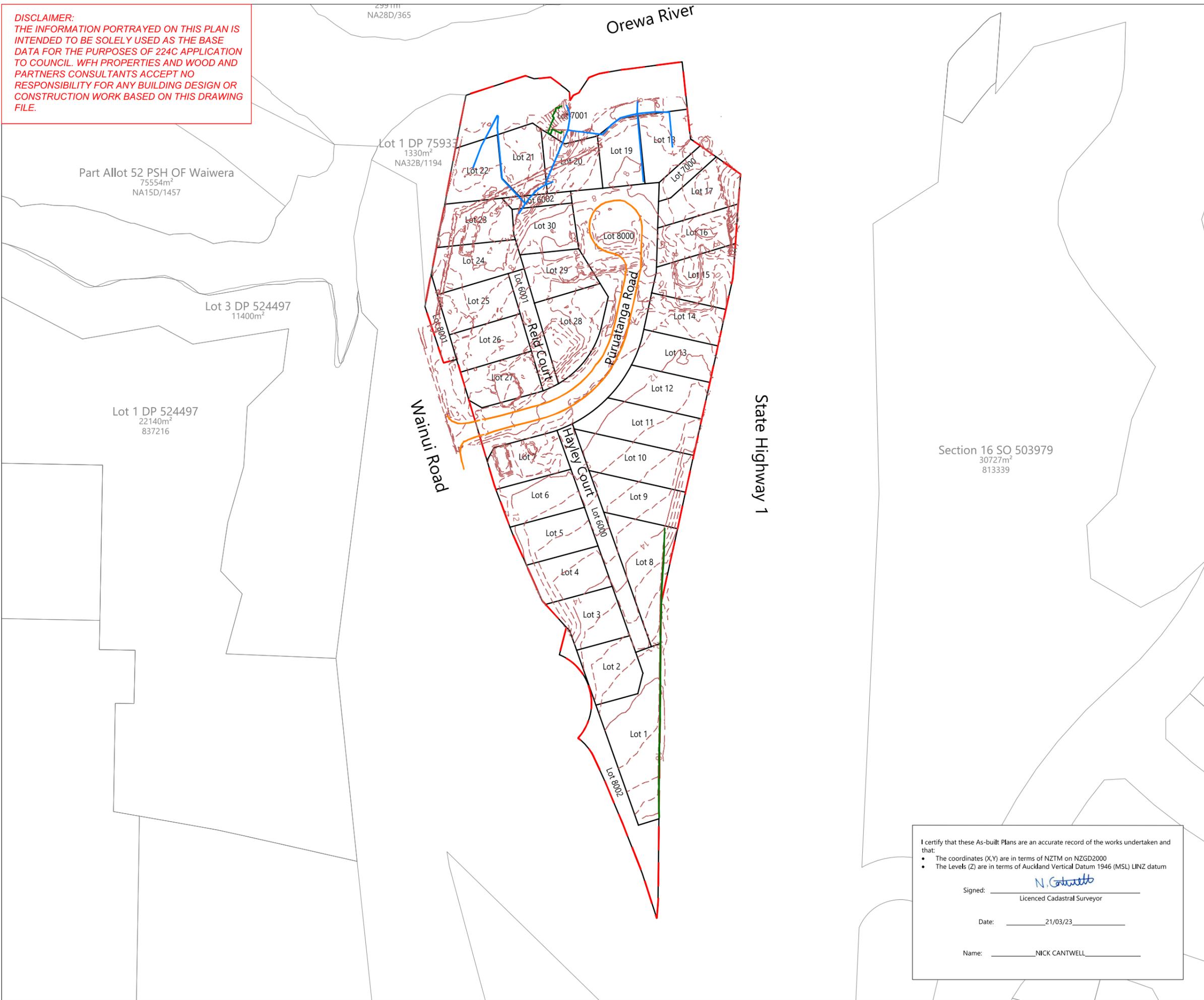
ORIGINAL TO LOWEST SURFACE

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1:1500 @ A3	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1112-AB	

DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

Document No. C:\1205\ENERGY\DATA\WP-PEN-APP-01\18-276-332 WAINUI ROAD_147\DRAWING\SSURV\AB\18-276-1110-AB CUT FILL CONTOURS.DWG

DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.



- NOTES**
1. COORDINATES (X,Y) ARE IN TERMS OF NZTM ON NZGD2000
 2. LEVELS (Z) ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946 (MSL) LINZ DATUM
 3. ALL DATA SUPPLIED BY CONTRACTOR
 4. CONTOURS ARE ARE OF LOWEST SURFACE AND AT 0.5m INTERVALS
 5. LOT BOUNDARIES SUBJECT TO FINAL SURVEY
 6. SURVEY PLANS HAVE BEEN REVIEWED BY CMW GEOSCIENCE
 7. PLANS SHOULD BE READ IN CONJUNCTION WITH GCR

LEGEND

- STAGE BOUNDARIES
- LOT BOUNDARIES
- UNDERFILL DRAINS
- ROAD UNDERCHANNEL
- RETAINING WALL DRAINAGE
- CONTOURS MAJOR
- CONTOURS MINOR

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR FINAL	NC	21/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	
APPROVED	KR	



332 WAINUI RD

**SUBSOILS
 ASBUILT PLAN
 OVERALL LAYOUT**

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
 Licenced Cadastral Surveyor

Date: 21/03/23

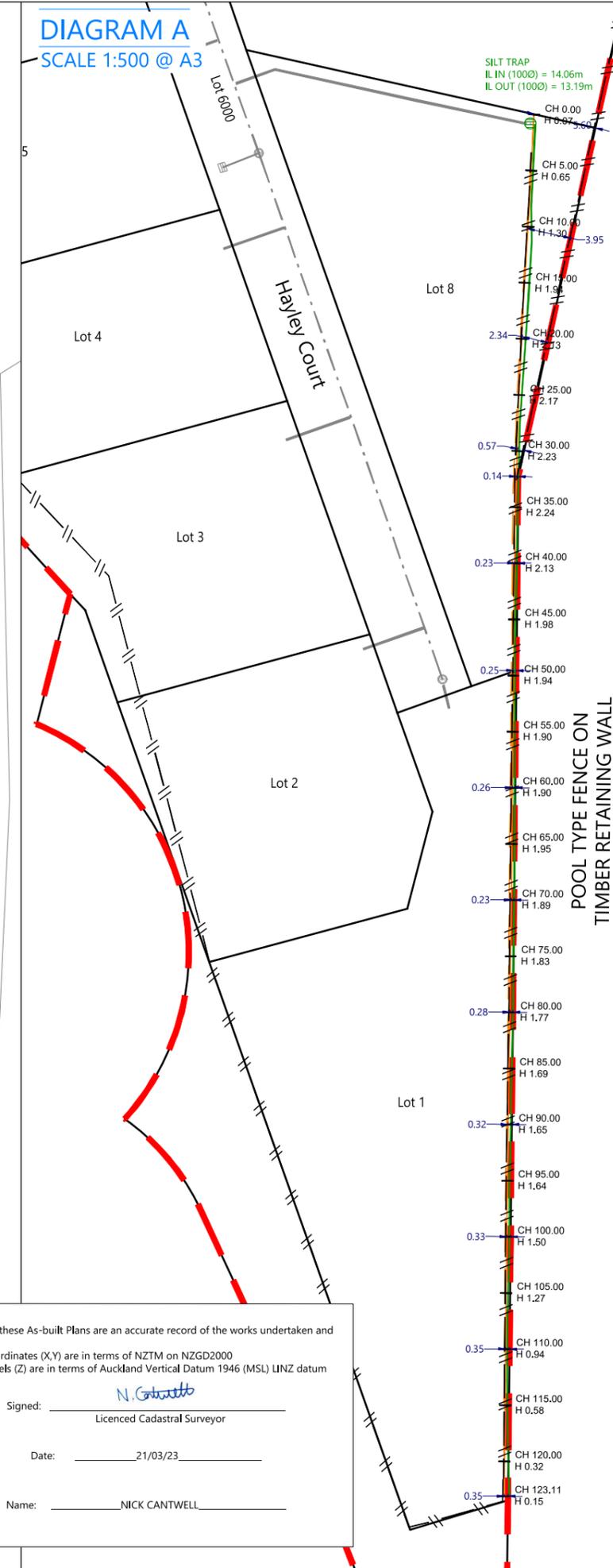
Name: NICK CANTWELL

STATUS	ISSUED FOR ASBUILT	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-1200-AB	

LAYOUT PLAN
SCALE 1:1500 @ A3



DIAGRAM A
SCALE 1:500 @ A3



State Highway 1

POOL TYPE FENCE ON
TIMBER RETAINING WALL

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) UNZ datum

Signed: N. Cantwell
Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND

STAGE BOUNDARY	
BOTTOM OF TIMBER WALL	
TOP OF TIMBER WALL	
CHAINAGE	
LOT BOUNDARY	
FENCE	
SUBSOIL DRAINCOIL	
RETAINING WALL CESSPIT	
STORMWATER NETWORK	
BOUNDARY DIMENSION (TOP OF WALL TO BDY)	
GAMBION WALL BASKET	

NOTES

- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH AUCKLAND COUNCIL BUILDING CONSENT REFERENCE BCO10342869.
- COORDINATES ARE SHOWN IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
- LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
- ASBUILT DATA FOR ALL PRIVATE RETAINING WALL DRAINAGE HAS BEEN SUPPLIED BY THE CONTRACTOR.
- UNLESS SHOWN OTHERWISE, ALL PRIVATE SUBSOIL DRAINAGE IS 1100 POLYETHYLENE PERFORATED COIL DRAIN.
- UNLESS SHOWN OTHERWISE, ALL PRIVATE SW DRAINAGE IS 1000 uPVC SN16 PIPE.
- UNLESS SHOWN OTHERWISE, ALL PRIVATE & PUBLIC SILT TRAPS ARE 300mm x 300mm.

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR	JS	13/12/22
2 ISSUED FOR GCR FINAL	KR	21/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	
APPROVED	NC	

WOODS.CO.NZ



332 WAINUI ROAD

TIMBER RETAINING WALL ASBUILT PLAN

STATUS	ISSUED FOR ASBUILT	REV
SCALE	AS SHOWN	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1300-AB	



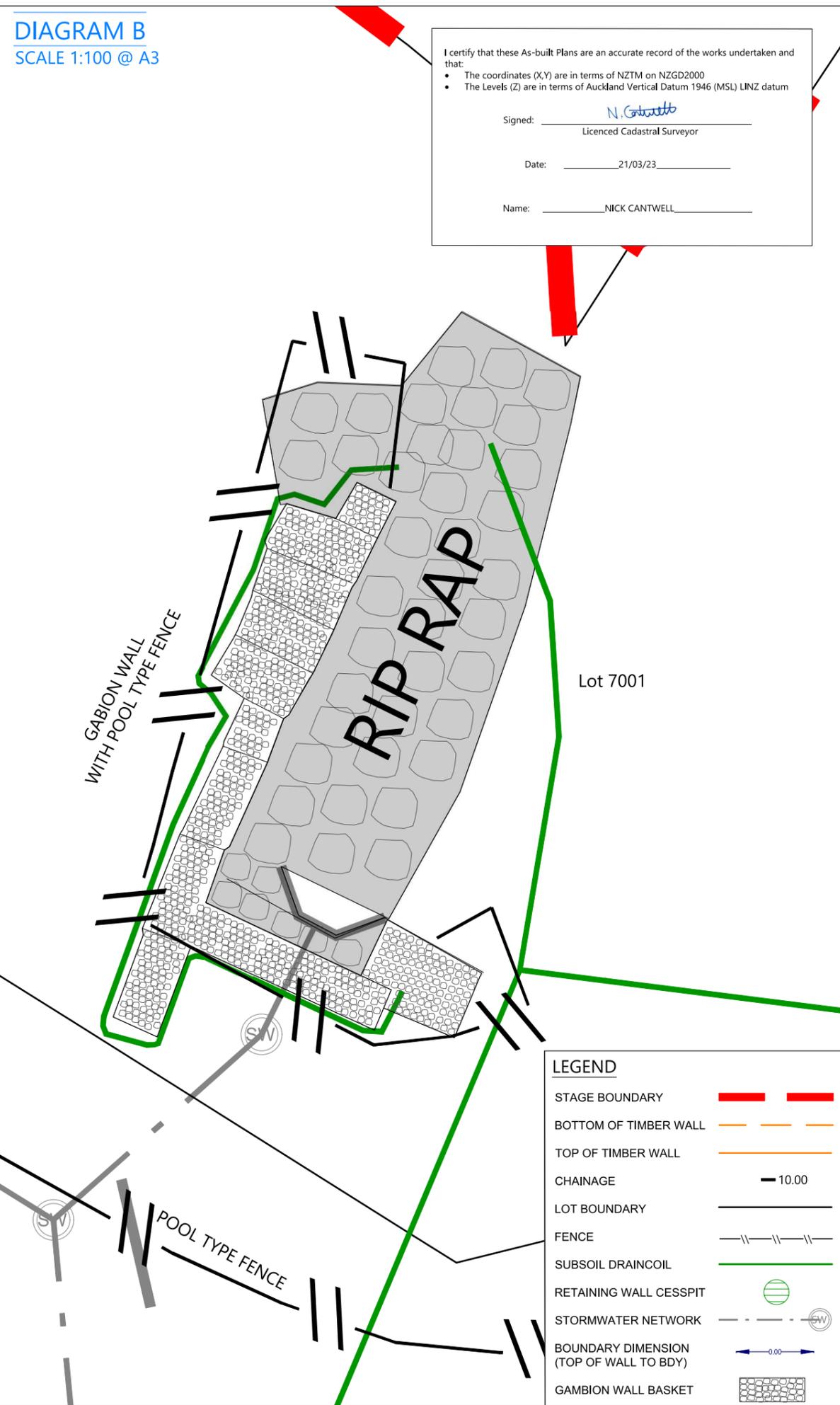
Document No. C:\1205\ENERGY\DATA\WP-PEN-APP-01\18-276-00-1300-AB WALLS.DWG

LAYOUT PLAN
SCALE 1:1500 @ A3



DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES LIMITED AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

DIAGRAM B
SCALE 1:100 @ A3



I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000
- The Levels (Z) are in terms of Auckland Vertical Datum 1946 (MSL) LINZ datum

Signed: N. Cantwell
Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL



- NOTES**
- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH AUCKLAND COUNCIL BUILDING CONSENT REFERENCE BCO10348690.
 - COORDINATES ARE SHOWN IN TERMS OF NEW ZEALAND TRANSVERSE MERCATOR (NZTM) PROJECTION.
 - LEVELS SHOWN ARE IN TERMS OF AUCKLAND VERTICAL DATUM 1946.
 - ASBUILT DATA FOR ALL PRIVATE RETAINING WALL DRAINAGE HAS BEEN SUPPLIED BY THE CONTRACTOR.
 - UNLESS SHOWN OTHERWISE, ALL PRIVATE SUBSOIL DRAINAGE IS 1100 POLYETHYLENE PERFORATED COIL DRAIN.
 - UNLESS SHOWN OTHERWISE, ALL PRIVATE SW DRAINAGE IS 1000 uPVC SN16 PIPE.
 - UNLESS SHOWN OTHERWISE, ALL PRIVATE & PUBLIC SILT TRAPS ARE 300mm x 300mm.

REVISION DETAILS	BY	DATE
1 ISSUED FOR GCR	JS	13/12/22
2 ISSUED FOR GCR FINAL	NC	21/03/23

SURVEYED	WOODS	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	
APPROVED	NC	



332 WAINUI ROAD
GABION RETAINING WALL
ASBUILT PLAN

STATUS	ISSUED FOR ASBUILT	REV
SCALE	AS SHOWN	2
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-1301-AB	

Document No. C:\125\ENERGY\DATA\WP-PEN-APP-01\18-276-332 WAINUI ROAD_147\DRAWINGS\SSURV\AB\18-276-1300-AB WALLS.DWG

DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF DISCUSSION. WFH PROPERTIES LTD AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND

LOT BOUNDARIES 

UNDERLYING BOUNDARIES 

REMIEDIATED AREA 

UNDERLYING GAZETTED AREA 

GAZETTE NOTICE 5394299.1 SUMMARY

The parts of the land within land marked B, M, D, L, and G on SO Plan 503979 are subject to the building restrictions contained in Gazette Notice 5331252.4 as imposed under Section 236 Public Works Act 1981.

REVISION DETAILS	BY	DATE
1 ISSUED FOR INFORMATION	KR	24/02/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED		
DRAWN	EC	
CHECKED	CMW	
APPROVED	KR	



N



332 WAINUI RD

REMIEDIATED
AREAS

STATUS	AS-BUILT	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-1400-AB	



SCHEDULE OF COORDINATES

STORMWATER LOT CONNECTONS

Lot #	Easting (m)	Northing (m)
LOT 01	1748636.78	5948112.79
LOT 02	1748635.01	5948117.89
LOT 03	1748628.45	5948136.65
LOT 04	1748622.55	5948153.53
LOT 05	1748616.6	5948170.22
LOT 06	1748611.39	5948184.78
LOT 07	1748605.85	5948200.28
LOT 08	1748618.29	5948166.38
LOT 09	1748612.94	5948181.36
LOT 10	1748607.37	5948196.93
LOT 11	1748616.76	5948218.12
LOT 12	1748626	5948230.16
LOT 13	1748632.17	5948244.29
LOT 14	1748634.88	5948258.23
LOT 15	1748637.57	5948270.31
LOT 16	1748638.46	5948285.61
LOT 17	1748639.2	5948295.89
LOT 18	1748633.78	5948301.73
LOT 19	1748622.47	5948303.07
LOT 20	1748596.16	5948326.13
LOT 21	1748580.47	5948328.62
LOT 22	1748580.1	5948328.98
LOT 23	1748579.16	5948298.89
LOT 24	1748581.06	5948282.64
LOT 25	1748582.72	5948268.26
LOT 26	1748556.14	5948231.74
LOT 27	1748557.84	5948226.34
LOT 28	1748586.78	5948257.01
LOT 29	1748582.91	5948270.15
LOT 30	1748580.39	5948294.6

PSH OF Waiwera
5554m²
15D/1457

Lot 3 DP 524497
11400m²

Lot 1 DP 524497
22140m²
837216

Lot 4 DP 72875
2991m²
NA28D/365

Lot 1 DP 75933
1330m²
NA32B/1194

53581 597448

Orewa River

SHEET 3001

SHEET 3002

SHEET 3003

Wainui Road

State Highway 1

Section 16 SO 503979
30727m²
813339



LEGEND

STORMWATER MANHOLE	
STORMWATER CESSPIT	
NEW STORMWATER	
EXISTING STORMWATER	
RETAINING WALL DRAINAGE	
STAGE BOUNDARY	
WINGWALL OUTLET	

- NOTES**
- LOT CONNECTIONS ARE 100mm DIA uPVC.
 - ALL NEW MANHOLES ARE REINFORCED CONCRETE.
 - LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS

NO	DESCRIPTION	BY	DATE
1	ISSUED FOR INFORMATION	NC	21/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	09 308 9229
APPROVED	NC	WOODS.CO.NZ



332 WAINUI RD
STORMWATER ASBUILT
OVERALL LAYOUT
SHEET 1 OF 4

STATUS	AS-BUILT	REV
SCALE	1 : 1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-3000-AB	

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: N. Cantwell
Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: N. Cantwell
 Licenced Cadastral Surveyor

Date: 21/03/23

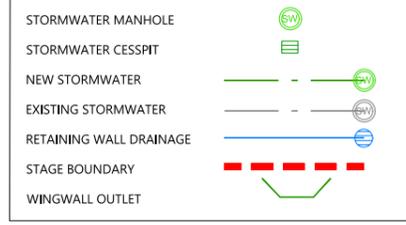
Name: NICK CANTWELL

SCHEDULE OF COORDINATES

STORMWATER LOT CONNECTONS

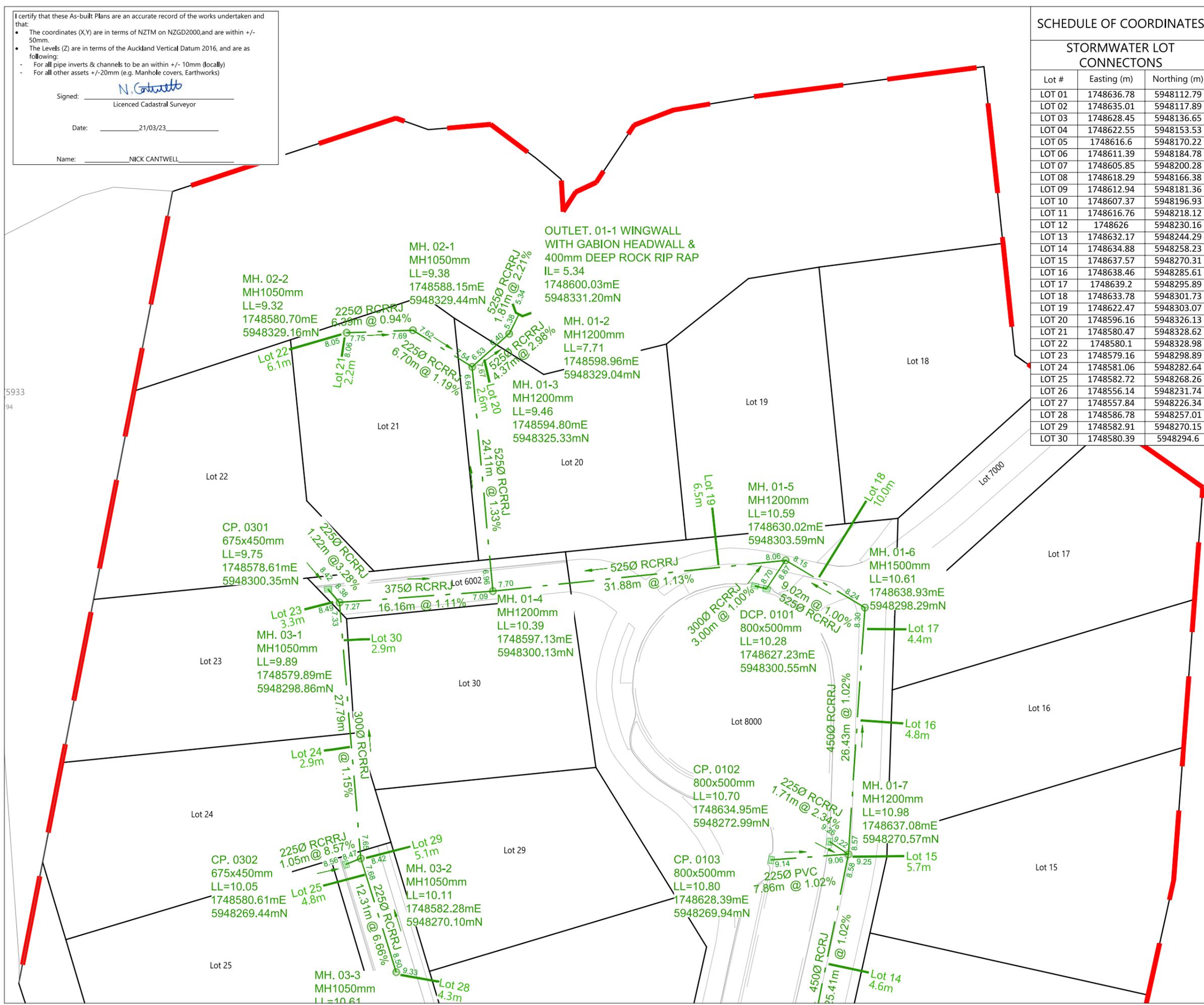
Lot #	Easting (m)	Northing (m)
LOT 01	1748636.78	5948112.79
LOT 02	1748635.01	5948117.89
LOT 03	1748628.45	5948136.65
LOT 04	1748622.55	5948153.53
LOT 05	1748616.6	5948170.22
LOT 06	1748611.39	5948184.78
LOT 07	1748605.85	5948200.28
LOT 08	1748618.29	5948166.38
LOT 09	1748612.94	5948181.36
LOT 10	1748607.37	5948196.93
LOT 11	1748616.76	5948218.12
LOT 12	1748626	5948230.16
LOT 13	1748632.17	5948244.29
LOT 14	1748634.88	5948258.23
LOT 15	1748637.57	5948270.31
LOT 16	1748638.46	5948285.61
LOT 17	1748639.2	5948295.89
LOT 18	1748633.78	5948301.73
LOT 19	1748622.47	5948303.07
LOT 20	1748596.16	5948326.13
LOT 21	1748580.47	5948328.62
LOT 22	1748580.1	5948328.98
LOT 23	1748579.16	5948298.89
LOT 24	1748581.06	5948282.64
LOT 25	1748582.72	5948268.26
LOT 26	1748556.14	5948231.74
LOT 27	1748557.84	5948226.34
LOT 28	1748586.78	5948257.01
LOT 29	1748582.91	5948270.15
LOT 30	1748580.39	5948294.6

LEGEND



NOTES

- LOT CONNECTIONS ARE 100mm DIA uPVC.
- ALL NEW MANHOLES ARE REINFORCED CONCRETE.
- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
- ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.



REVISION DETAILS	BY	DATE
1 ISSUED FOR INFORMATION	NC	21/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	09 308 9229
APPROVED	NC	WOODS.CO.NZ

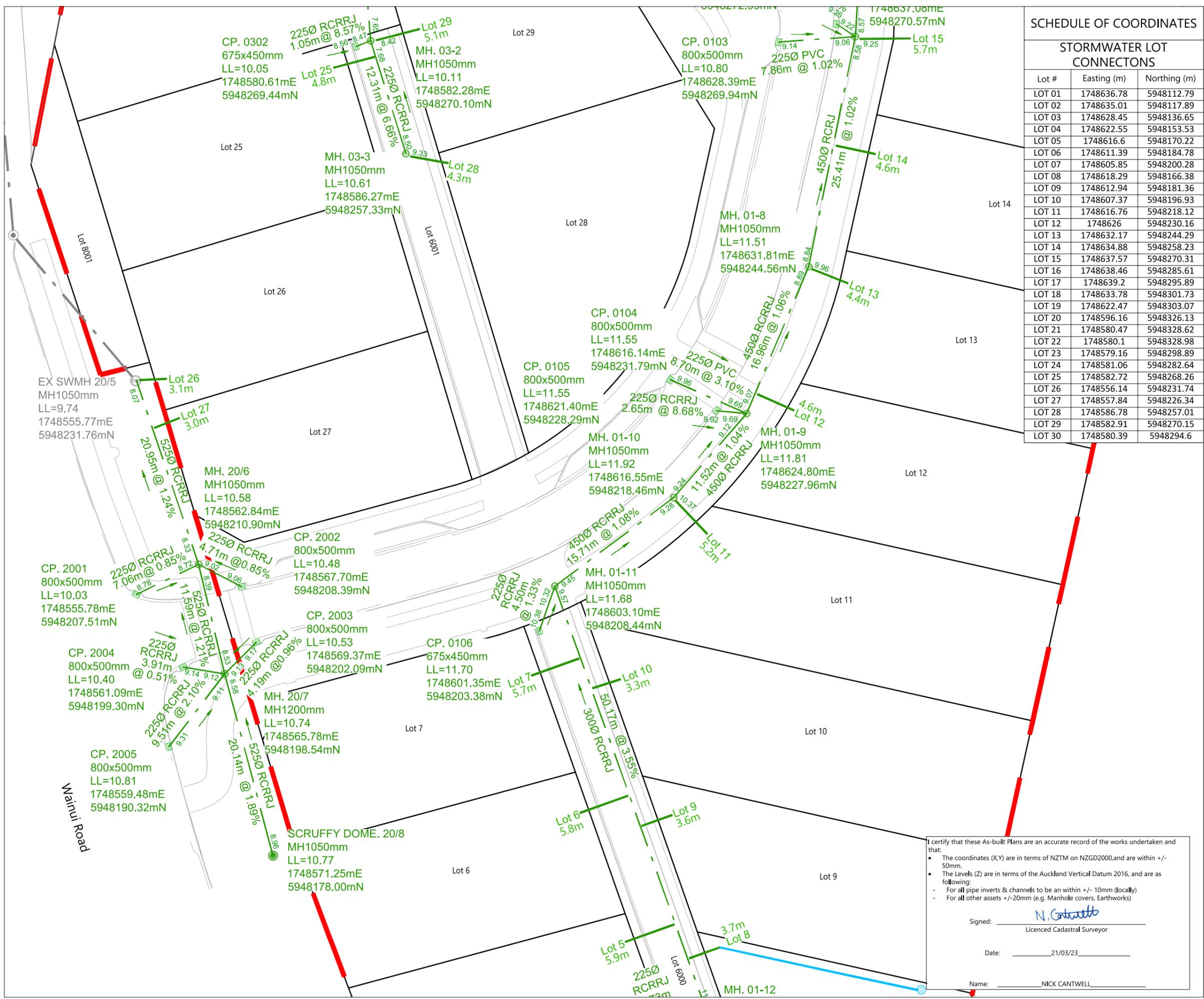
N

332 WAINUI RD

STORMWATER ASBUILT
SHEET 2 OF 4

STATUS	AS-BUILT	REV
SCALE	1 : 400 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-3001-AB	





SCHEDULE OF COORDINATES		
STORMWATER LOT CONNECTONS		
Lot #	Easting (m)	Northing (m)
LOT 01	1748636.78	5948112.79
LOT 02	1748635.01	5948117.89
LOT 03	1748628.45	5948136.65
LOT 04	1748622.55	5948153.53
LOT 05	1748616.6	5948170.22
LOT 06	1748611.39	5948184.78
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LOT 14	1748634.88	5948258.23
LOT 15	1748637.57	5948270.31
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LOT 25	1748582.72	5948268.26
LOT 26	1748556.14	5948231.74
LOT 27	1748557.84	5948226.34
LOT 28	1748586.78	5948257.01
LOT 29	1748582.91	5948270.15
LOT 30	1748580.39	5948294.6

LEGEND	
STORMWATER MANHOLE	
STORMWATER CESSPIT	
NEW STORMWATER	
EXISTING STORMWATER	
RETAINING WALL DRAINAGE	
STAGE BOUNDARY	
WINGWALL OUTLET	

- NOTES**
- LOT CONNECTIONS ARE 100mm DIA uPVC.
 - ALL NEW MANHOLES ARE REINFORCED CONCRETE.
 - LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	NC	21/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	09 308 9229
APPROVED	NC	WOODS.CO.NZ



332 WAINUI RD

STORMWATER ASBUILT
SHEET 3 OF 4

I certify that these As-built Plans are an accurate record of the works undertaken and that:

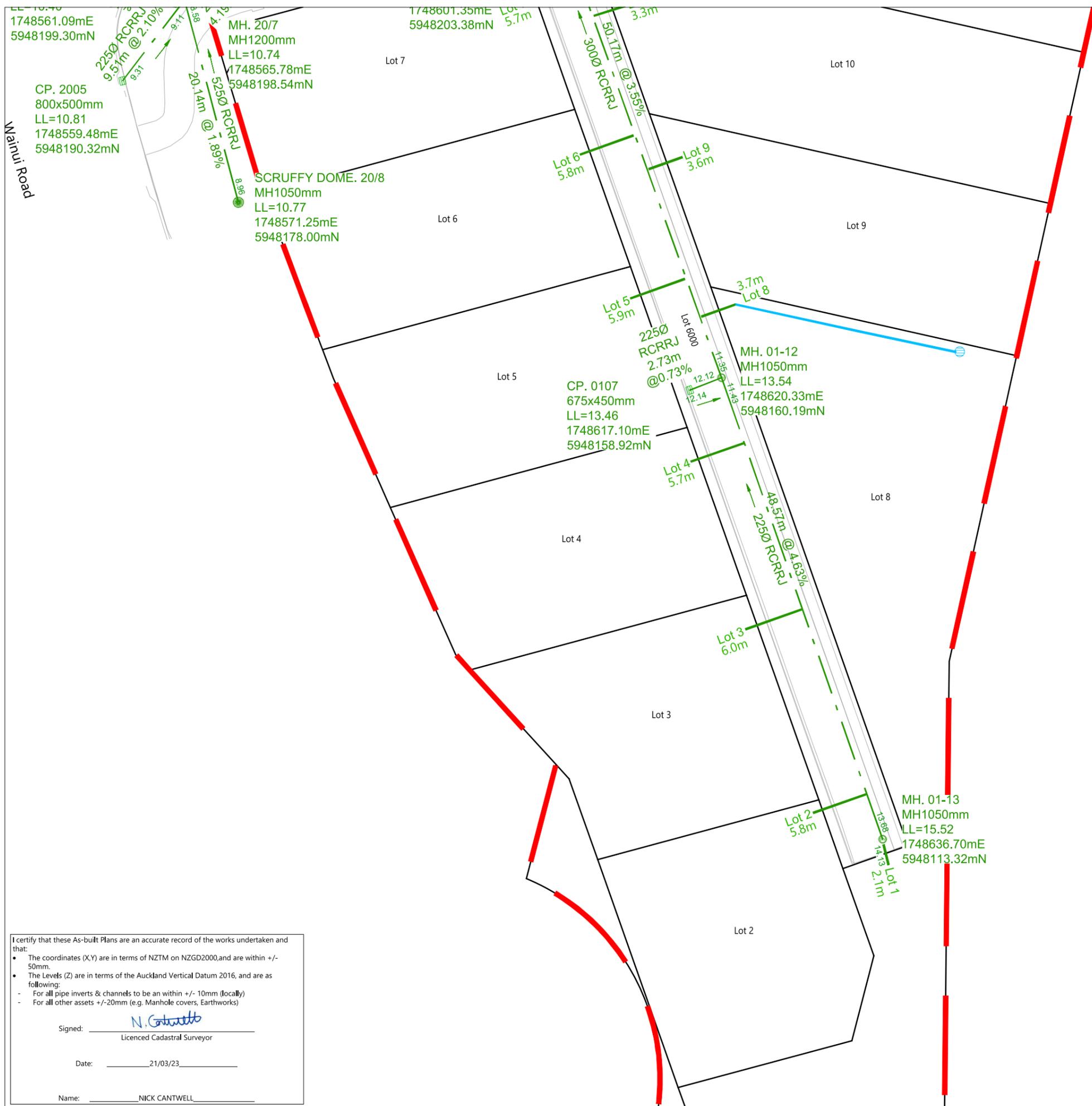
- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed: N. Cantwell
Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL

STATUS	AS-BUILT	REV
SCALE	1 : 400 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-3002-AB	



SCHEDULE OF COORDINATES

STORMWATER LOT CONNECTONS		
Lot #	Easting (m)	Northing (m)
LOT 01	1748636.78	5948112.79
LOT 02	1748635.01	5948117.89
LOT 03	1748628.45	5948136.65
LOT 04	1748622.55	5948153.53
LOT 05	1748616.6	5948170.22
LOT 06	1748611.39	5948184.78
LOT 07	1748605.85	5948200.28
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LOT 21	1748580.47	5948328.62
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LOT 24	1748581.06	5948282.64
LOT 25	1748582.72	5948268.26
LOT 26	1748556.14	5948231.74
LOT 27	1748557.84	5948226.34
LOT 28	1748586.78	5948257.01
LOT 29	1748582.91	5948270.15
LOT 30	1748580.39	5948294.6

LEGEND

STORMWATER MANHOLE	
STORMWATER CESSPIT	
NEW STORMWATER	
EXISTING STORMWATER	
RETAINING WALL DRAINAGE	
STAGE BOUNDARY	
WINGWALL OUTLET	

- NOTES**
- LOT CONNECTIONS ARE 100mm DIA uPVC.
 - ALL NEW MANHOLES ARE REINFORCED CONCRETE.
 - LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY AND LINZ APPROVAL.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	NC	21/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	NC	
DRAWN	EC	
CHECKED	NC	
APPROVED	NC	



332 WAINUI RD

STORMWATER ASBUILT
SHEET 4 OF 4

STATUS	AS-BUILT	REV
SCALE	1 : 400 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-3003-AB	

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

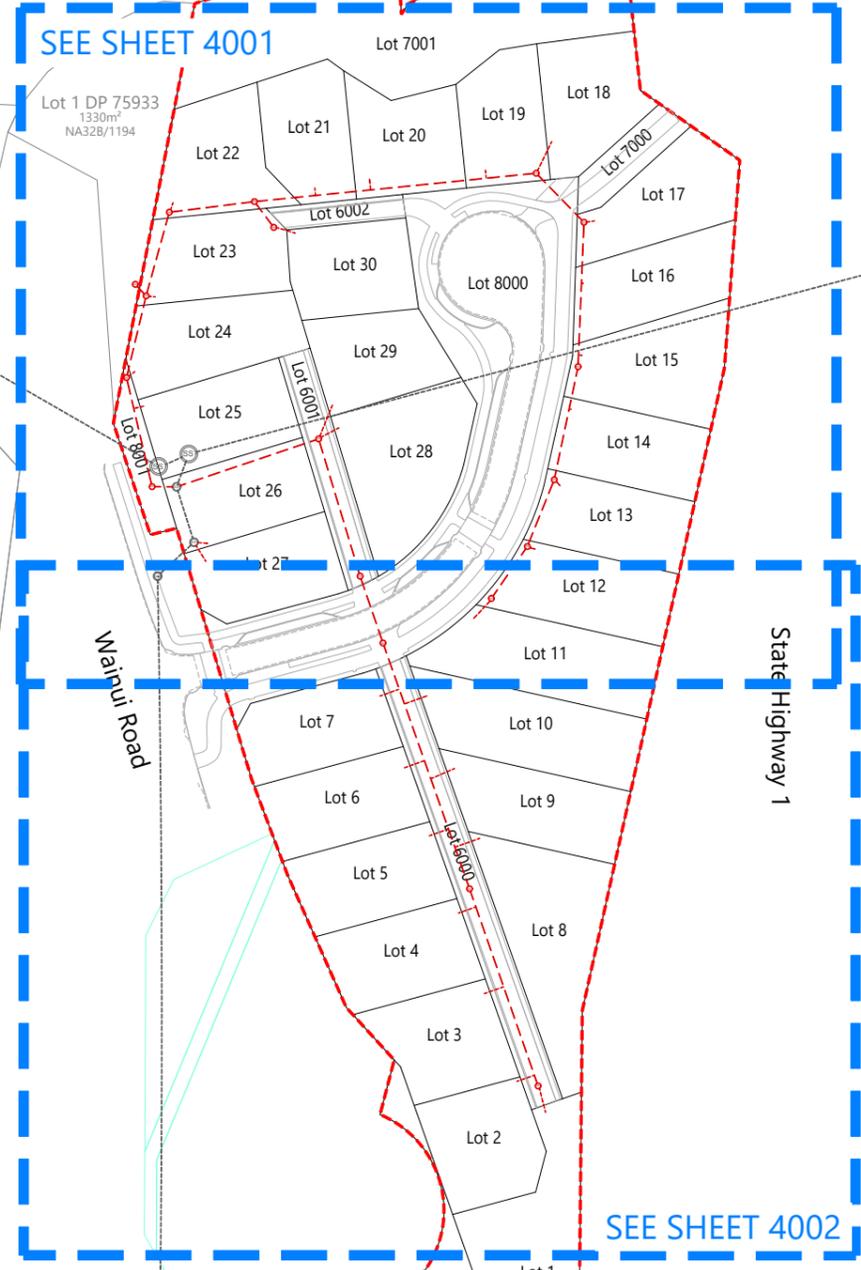
Signed: N. Cantwell
Licenced Cadastral Surveyor

Date: 21/03/23

Name: NICK CANTWELL

Lot 1 DP 75493

SCHEDULE OF COORDINATES			
WASTEWATER LOT CONNECTONS			
Lot No	Easting (m)	Northing (m)	Length (m)
LOT 1	1748635.64	5948109.80	5.2
LOT 2	1748629.53	5948116.35	4.0
LOT 3	1748622.59	5948134.97	4.4
LOT 4	1748617.13	5948152.06	3.9
LOT 5	1748610.94	5948168.46	4.3
LOT 6	1748605.69	5948182.91	4.4
LOT 7	1748600.48	5948198.12	4.2
LOT 8	1748621.71	5948167.94	5.5
LOT 9	1748616.33	5948182.74	5.4
LOT 10	1748610.47	5948198.16	5.0
LOT 11	1748620.39	5948214.60	5.0
LOT 12	1748633.44	5948229.31	1.0
LOT 13	1748638.72	5948242.73	1.1
LOT 14	1748641.07	5948258.95	0.2
LOT 15	1748643.41	5948270.38	0.6
LOT 16	1748643.68	5948285.69	0.2
LOT 17	1748646.06	5948298.93	1.6
LOT 18	1748636.99	5948315.81	6.8
LOT 19	1748622.88	5948309.71	1.6
LOT 20	1748598.28	5948307.77	2.2
LOT 21	1748586.65	5948305.95	1.6
LOT 22	1748556.54	5948302.80	1.5
LOT 23	1748552.83	5948282.81	1.3
LOT 24	1748548.47	5948266.97	1.6
LOT 25	1748550.32	5948259.62	1.9
LOT 26	1748563.91	5948230.52	1.9
LOT 27	1748563.53	5948226.67	4.3
LOT 28	1748591.68	5948254.99	4.3
LOT 29	1748590.40	5948259.88	7.1
LOT 30	1748582.51	5948296.35	4.0



DISCLAIMER:
 THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND	
NEW SANITARY SEWER MANHOLE	
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
STAGE BOUNDARY	

- NOTES**
- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 - ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - LOT CONNECTIONS ARE TWO-DIMENSIONAL LENGTHS.
 - PIPE LENGTHS ARE THREE-DIMENSIONAL LENGTHS TO ALLOW FOR THE PRACTICAL EFFECT OF THE GRADE.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS	BY	DATE
1 ISSUED FOR INFORMATION	EC	10/03/23

SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	JS	
APPROVED	JS	

N

332 WAINUI RD
WASTEWATER ASBUILT
OVERALL LAYOUT
SHEET 1 OF 3

I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be an within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

Signed:
 Licensed Cadastral Surveyor

Date: 10 March 2023

Name: Jessica Smyth

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-4000-AB	

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND	
NEW SANITARY SEWER MANHOLE	
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
STAGE BOUNDARY	

- NOTES**
- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 - ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - LOT CONNECTIONS ARE TWO-DIMENSIONAL LENGTHS.
 - PIPE LENGTHS ARE THREE-DIMENSIONAL LENGTHS TO ALLOW FOR THE PRACTICAL EFFECT OF THE GRADE.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS		BY	DATE
1	ISSUED FOR INFORMATION	EC	10/03/23

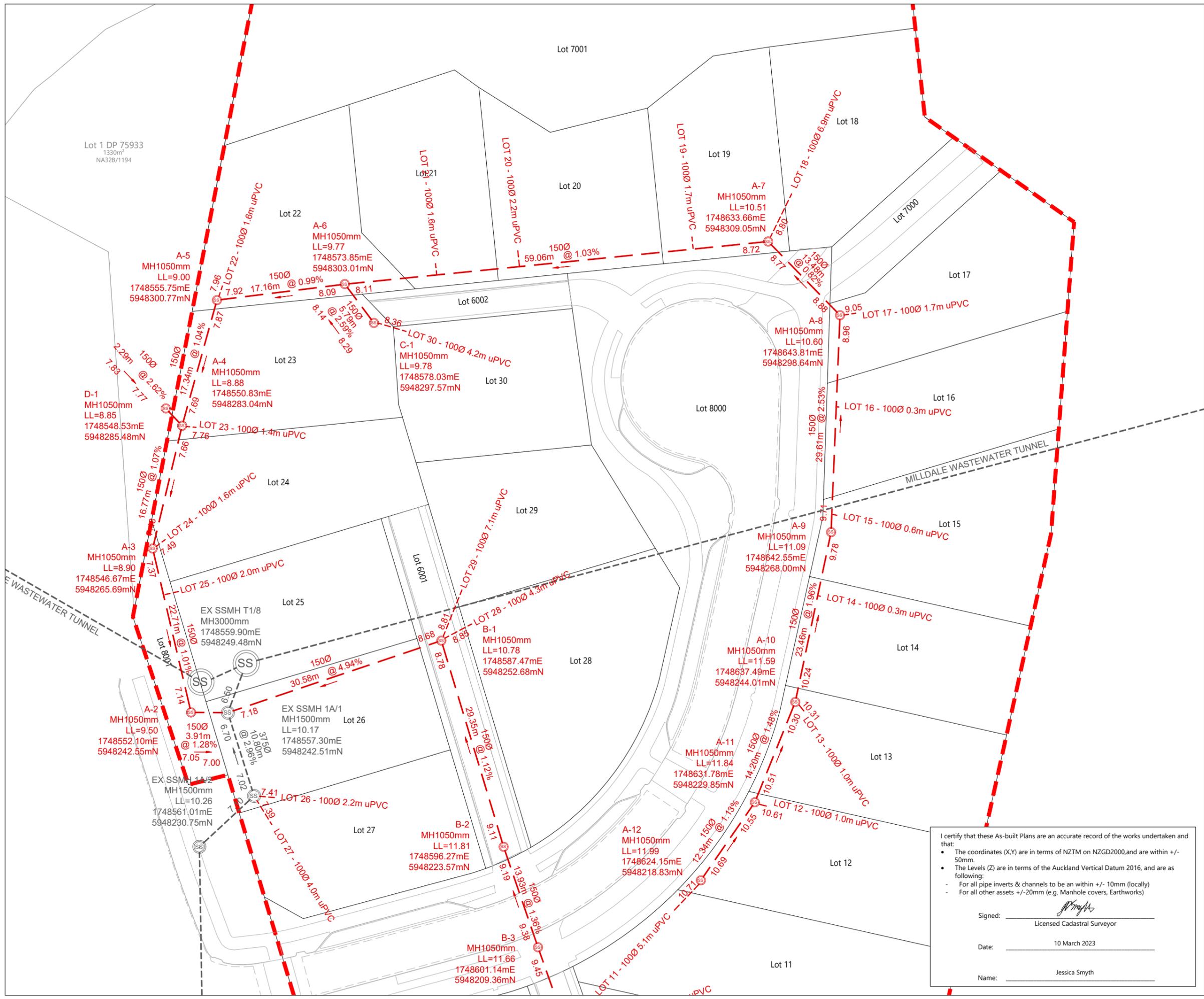
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	JS	
APPROVED	JS	

N

332 WAINUI RD

WASTEWATER ASBUILT
SHEET 2 OF 3

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-4001-AB	



I certify that these As-built Plans are an accurate record of the works undertaken and that:

- The coordinates (X,Y) are in terms of NZTM on NZGD2000, and are within +/- 50mm.
- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/- 20mm (e.g. Manhole covers, Earthworks)

Signed: Licensed Cadastral Surveyor

Date: 10 March 2023

Name: Jessica Smyth

DISCLAIMER:
THE INFORMATION PORTRAYED ON THIS PLAN IS INTENDED TO BE SOLELY USED AS THE BASE DATA FOR THE PURPOSES OF 224C APPLICATION TO COUNCIL. WFH PROPERTIES AND WOOD AND PARTNERS CONSULTANTS ACCEPT NO RESPONSIBILITY FOR ANY BUILDING DESIGN OR CONSTRUCTION WORK BASED ON THIS DRAWING FILE.

LEGEND	
NEW SANITARY SEWER MANHOLE	
NEW SANITARY SEWER	
EXISTING SANITARY SEWER MANHOLE	
EXISTING SANITARY SEWER	
LOT BOUNDARIES	
STAGE BOUNDARY	

- NOTES**
- LOT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 - ALL PIPE AND MH DIAMETERS ARE INTERNAL, AND SHOWN IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
 - LOT CONNECTIONS ARE TWO-DIMENSIONAL LENGTHS.
 - PIPE LENGTHS ARE THREE-DIMENSIONAL LENGTHS TO ALLOW FOR THE PRACTICAL EFFECT OF THE GRADE.
 - ASBUILT DATA HAS BEEN SOURCED FROM A COMBINATION OF WOODS SURVEY MEASURED DATA AND CONTRACTOR RECEIVED DATA.

REVISION DETAILS	BY	DATE
1 ISSUED FOR INFORMATION	EC	10/03/23

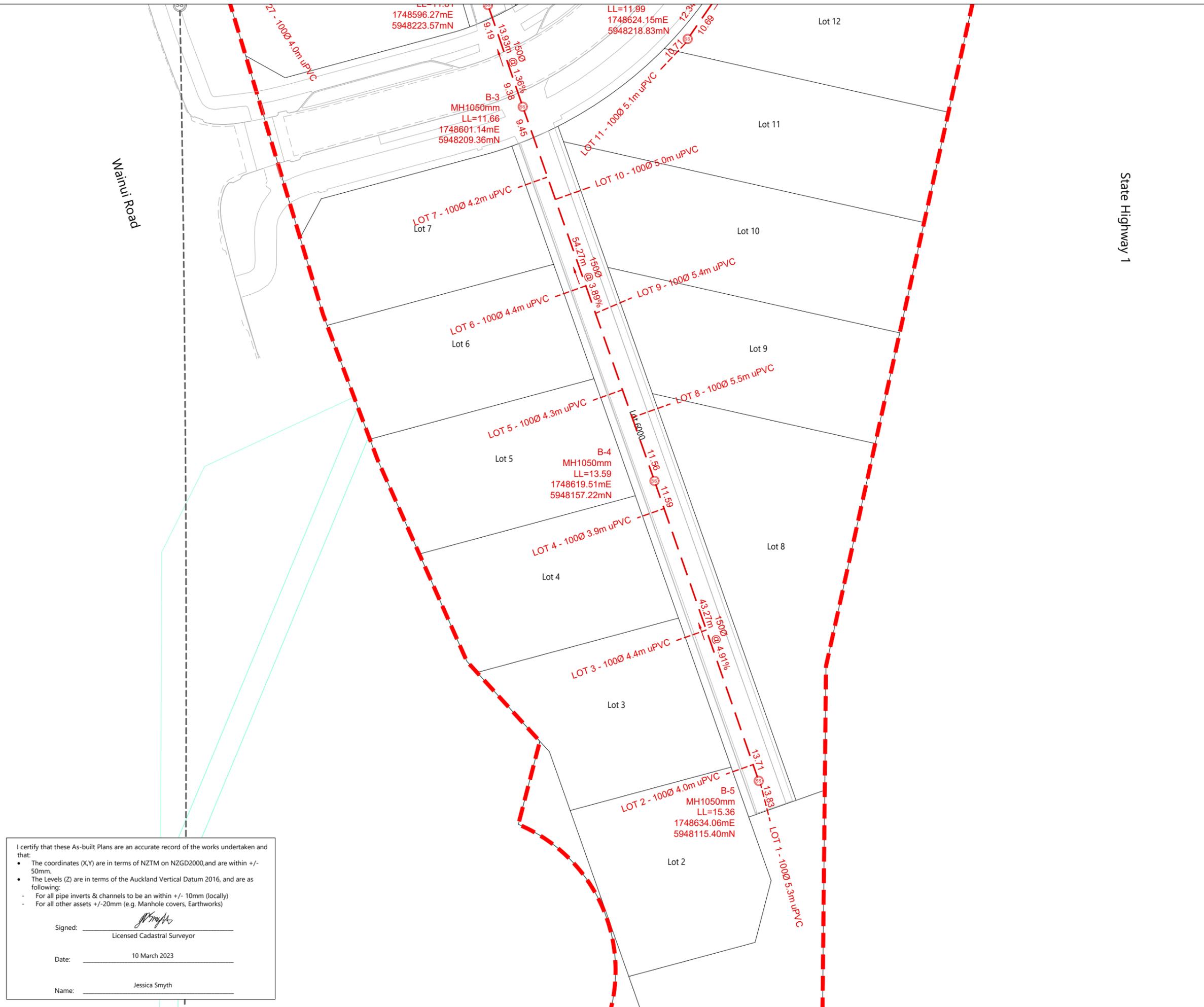
SURVEYED	WOODS	WOODS Ltd LEVEL 1 BUILDING B 8 NUGENT STREET, GRAFTON AUCKLAND 1023 09 308 9229 WOODS.CO.NZ
DESIGNED	WOODS	
DRAWN	EC	
CHECKED	JS	
APPROVED	JS	

N

332 WAINUI RD

WASTEWATER ASBUILT
SHEET 3 OF 3

STATUS	ISSUED FOR INFORMATION	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-00-4002-AB	



I certify that these As-built Plans are an accurate record of the works undertaken and that:

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- The Levels (Z) are in terms of the Auckland Vertical Datum 2016, and are as following:
 - For all pipe inverts & channels to be within +/- 10mm (locally)
 - For all other assets +/-20mm (e.g. Manhole covers, Earthworks)

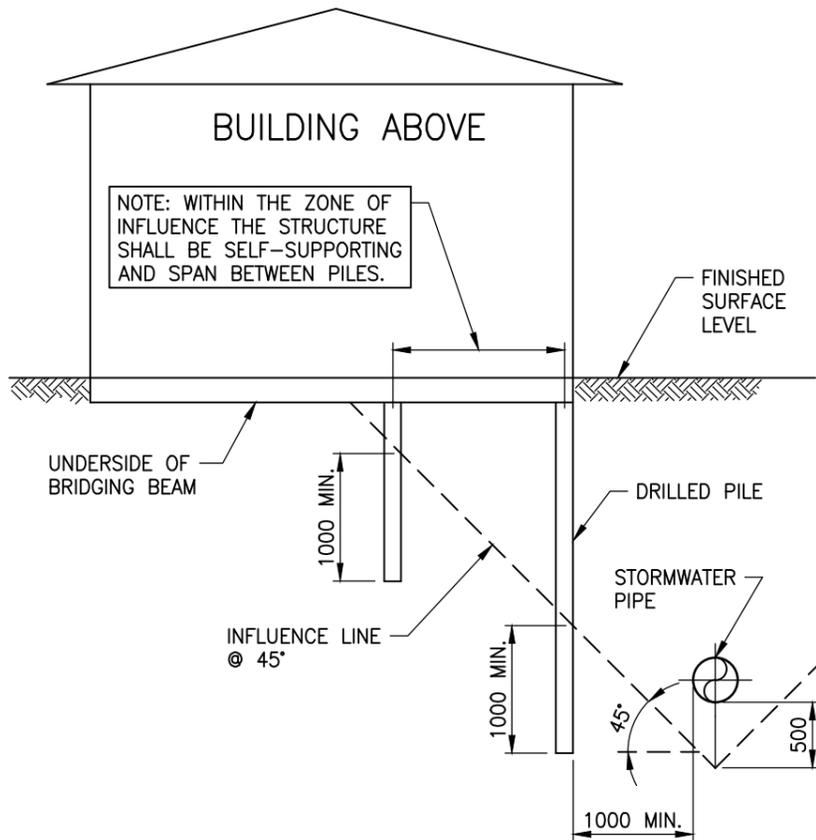
Signed: Licensed Cadastral Surveyor

Date: 10 March 2023

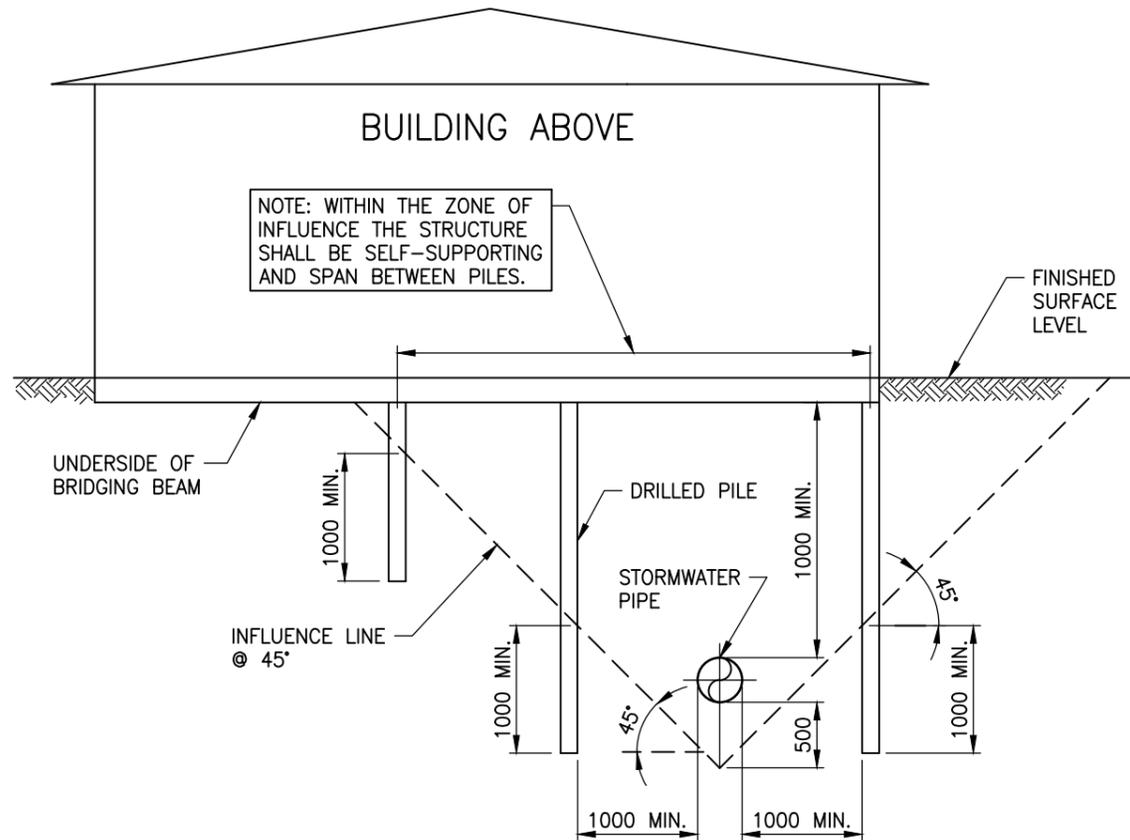
Name: Jessica Smyth

GENERAL NOTES:

1. THE INFORMATION ON THIS PAGE IS INTENDED TO SHOW EXAMPLES OF TYPICAL SCENARIOS AND SHALL BE USED FOR GENERAL GUIDANCE PURPOSES ONLY. SIGNIFICANT VARIATIONS ON A SITE-BY-SITE BASIS ARE TO BE EXPECTED AND IT IS IN NO WAY IMPLIED THAT MEETING ANY OF THESE REQUIREMENTS WILL GUARANTEE APPROVAL.
2. REQUIREMENTS FOR FOUNDATION DESIGN, ETC. APPLY TO BOTH SIDES OF THE PIPE.
3. NO DRIVEN PILES ARE PERMITTED WITHIN 10m OF BRICK STORMWATER STRUCTURES, OR WITHIN 5m OF ALL OTHER STORMWATER STRUCTURES.
4. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL FOR DRIVEN PILES IN PARTIALLY DRILLED HOLES, WITHIN THE 5m-10m ZONE.
5. PILES THAT MAY BE REQUIRED TO RESIST HORIZONTAL FORCES WILL REQUIRE SPECIFIC DESIGN.
6. PILE/FOOTING LOCATION POINT MUST BE BELOW 45° "ZONE OF INFLUENCE".
7. ALL MANHOLES SHALL HAVE 24 HOURS UNOBSTRUCTED ACCESS.
8. MANHOLES IN BASEMENTS, OR IN LOCATIONS WHERE SUFFICIENT CLEARANCE IS UNAVAILABLE, ARE NOT PERMITTED.
9. ALL PIPE BUILDOVERS WILL REQUIRE APPROVAL BY AUCKLAND COUNCIL.
10. REFER TO SECTION 4.3.23 OF THE SWCoP FOR PIPE BUILDOVER REQUIREMENTS.
11. FOR MANHOLES GREATER THAN 4m DEEP OR LARGER THAN 1200mm DIA. SPECIFIC DESIGN (INCLUDING CLEARANCE REQUIREMENTS) IS REQUIRED.



BUILD CLOSE



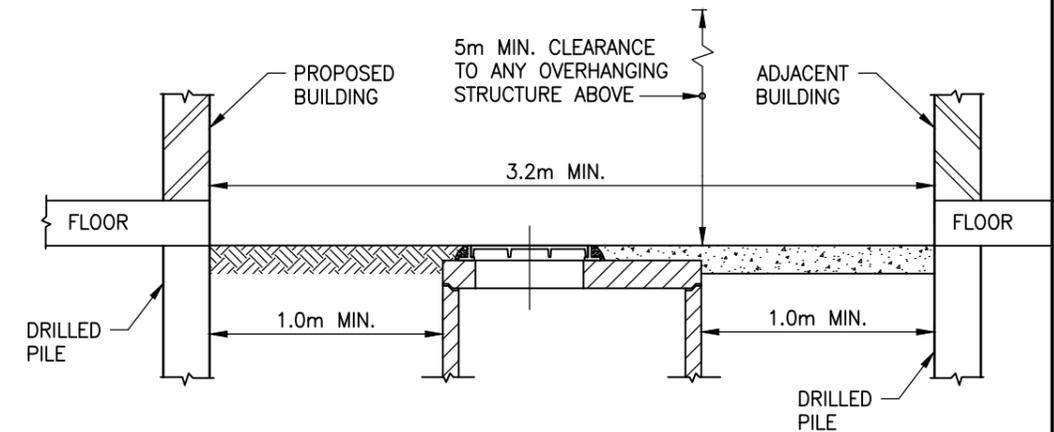
BUILD OVER

"BUILD CLOSE" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. SPECIFIC APPROVAL IS REQUIRED FROM AUCKLAND COUNCIL IF BUILDING IS ADJACENT TO PIPES LARGER THAN 375mm INTERNAL DIAMETER, OR GREATER THAN 2.0m DEEP.
3. BUILDING SHALL GENERALLY BE OUTSIDE ALL OVERLAND FLOW PATHS AND FLOODPLAINS. SEE SECTION 4.3.5.6 AND 4.3.5.7 OF THE SWCoP FOR FURTHER DETAILS.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.

"BUILD OVER" NOTES:

1. OUTSIDE ZONE OF INFLUENCE, NORMAL FOUNDATION REQUIREMENTS APPLY.
2. THE DETAIL APPLIES TO STORMWATER PIPES 375mm NOMINAL DIAMETER OR LESS.
3. BRIDGING OVER PIPES LARGER THAN 375mm NOMINAL DIAMETER IS GENERALLY NOT ALLOWED.
4. PILES SHALL BE CONSTRUCTED TO A DEPTH OF 1.0m BELOW INFLUENCE LINE.
5. BRIDGING IS GENERALLY NOT ALLOWED OVER PIPES WHERE CLEAR VERTICAL SEPARATION DISTANCE FROM TOP OF PIPE TO UNDERSIDE OF BRIDGING BEAM IS LESS THAN 1.0m.



MANHOLE CONSTRUCTION CLEARANCE

PLOT DATE 12/8/2015 11:54 AM I:\AENVA\Projects\AED04840 AC CoP Ch1\04 Deliverables\Drawings\AC-STD-SW22.dwg

STORMWATER CODE OF PRACTICE
STANDARD DETAILS
REVISION: 2
REV DATE: 1 NOVEMBER 2015
CAD FILENAME: AC-STD-SW22.DWG

AUCKLAND COUNCIL
STORMWATER PIPE AND MANHOLE CONSTRUCTION CLEARANCE REQUIREMENTS
MANHOLES NEAR BUILDINGS AND BUILDING CLOSE OVER PIPES

ENVIRONMENTAL-SW	ORIGINAL SCALE SCALE: N.T.S.	A3
	DRAWING SET SWCoP	SHEET 1 OF 1
	DRAWING No. SW22	REV 2

Appendix D: Field Test Data



LF11 Rev.15 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Auckland Laboratory
 CMW Geotechnical NZ Limited
 11/63, Arrenway Drive, Rosedale, NZ 0632
 PO Box 300206, Albany, Auckland, NZ 0752
 Phone: +64 (09) 4144 632

Project: 332 Wainui Road
Project No: AKL2019-0182
Location: Wainui Road
Report No: AKL2019-0182LAA Rev.1
Report Date: 22/12/2022
Client: Fulton Hogan Land Development Limited
Client Address: PO Box 501, Silverdale, 0944

Test Methods: NZS 4407 2015 Test 3.1 \diamond
 NZS 4407 2015 Test 4.2
 NZGS: August 2001

Notes: Solid Density: Assumed
 Solid Density Data Source: N/A
 Testing Locations Selected By: CMW Field Staff
 \diamond Only samples <2.0mm will be considered for endorsed testing
 ① Blade size of 19mm used.



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

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*	Soil Description*	Solid Density (t/m ³) *	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments	
					Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m ³)	Oven Calculated Air Voids (%) *		
18/01/2021	N1	Refer to site plan	Blended ROCK/CLAY	2.70	2327	2327	181	206	215	215	204	1.90	1.44	32.4	0	300	24.8	1.52	6		
	N2	Refer to site plan	Blended ROCK/CLAY	2.70	2327	2327	147	181	UTP	UTP	164+	1.75	1.44	21.2	16	300	19.0	1.47	18		
	N3	Refer to site plan	Blended ROCK/CLAY	2.70	2327	2327	95	74	114	104	97	1.58	0.98	61.4	4	300	44.4	1.09	11		
19/01/2022	N4	Culvert backfill	Blended CLAY/ROCK	2.70	2327	2327	141	215	169	199	181	1.71	1.20	42.1	5	300	40.7	1.21	6		
	N5	CH68	Blended CLAY/ROCK	2.70	2327	2327	138	135	215	141	157	1.93	1.46	31.7	0	300	33.5	1.44	-2		Retest of N2
20/01/2022	N6	Roadbox CH99	Blended CLAY/ROCK	2.70	2327	2327	215	144	138	160	164	1.91	1.44	32.4	0	300	29.6	1.47	2		
	N7	Roadbox CH77	Blended CLAY/ROCK	2.70	2327	2327	215	172	184	197	197	1.98	1.58	25.3	1	300	21.1	1.64	5		
25/01/2022	N8	Roadbox turnstile	Blended CLAY/ROCK	2.70	2327	2327	215	215	135	184	187	1.74	1.21	44.3	2	300	34.5	1.30	7		
	N9	Roadbox turnstile	Blended CLAY/ROCK	2.70	2327	2327	187	172	163	141	166	1.75	1.12	56.2	-5	300	34.3	1.30	7		
1/02/2022	N10	Refer to site plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.97	1.52	29.8	-1	300	27.3	1.54	1		
	N11	Refer to site plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	169	204	1.93	1.48	30.6	0	300	27.1	1.52	2		
3/02/2022	N12	Refer to site plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.79	1.36	32.2	6	300	29.1	1.39	8		
	N13	Refer to site plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.80	1.40	28.8	8	300	22.2	1.47	13		
14/02/2022	N14	Roadbox backfill	Blended CLAY/ROCK	2.70	2327	2327	169	215	215	203	201	1.77	1.34	31.7	8	300	28.5	1.37	10		
	N15	Roadbox backfill	Blended CLAY/ROCK	2.70	2327	2327	147	190	175	181	173	1.89	1.28	47.7	-8	300	27.7	1.48	4		
28/02/2022	N16	Lot 17	Blended CLAY/ROCK	2.70	2327	2327	138	156	172	181	162	1.71	1.21	41.3	5	300	36.3	1.26	8		
	N17	Lot 17	Blended CLAY/ROCK	2.70	2327	2327	169	187	163	150	167	1.83	1.39	31.2	5	300	38.1	1.32	1		
	N18	Lot 17	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.97	1.56	26.0	1	300	25.2	1.57	2		
11/03/2022	N19	Lot 28	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.88	1.47	28.1	4	300	22.7	1.54	8		
	N20	Lot 28	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.84	1.41	30.0	5	300	22.8	1.49	11		
	N21	Lot 27	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.91	1.53	25.1	5	300	22.5	1.56	7		
16/03/2022	N22	Lot 29	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.89	1.47	28.6	3	300	22.8	1.54	8		
	N23	Lot 30	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.87	1.42	32.2	2	300	21.0	1.55	10		
15/03/2022	N24	* No data or site plan for this point																			
	N25	* No data or site plan for this point																			
	N26	* No data or site plan for this point																			

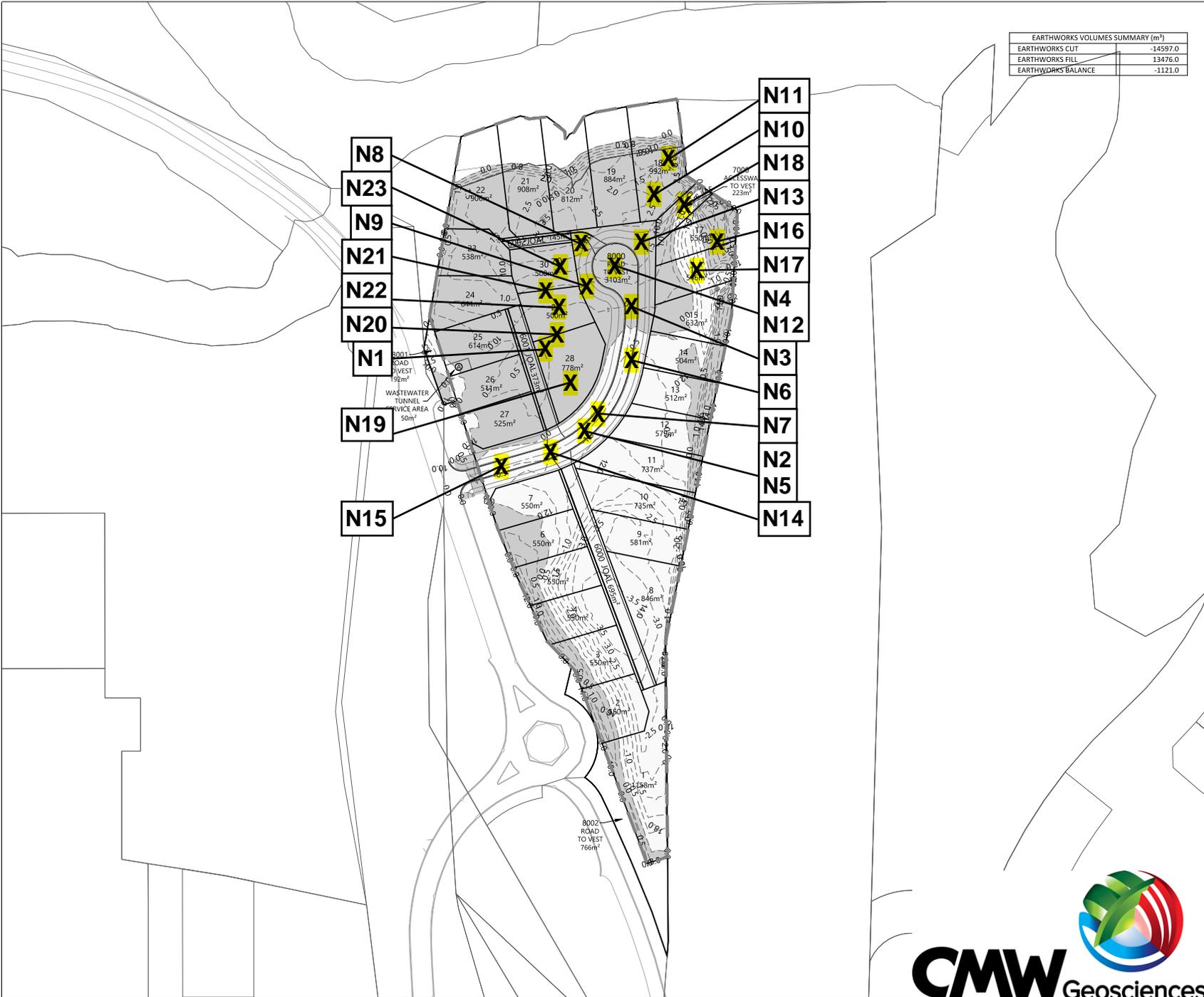
This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.754 to 2.611 t/m³ are not accredited and are outside the laboratories scope of accreditation.

This report replaces the reports numbered AKL2019-0182LAA Rev.0

Created By: AMS Date: 25/01/2022
 Checked By: RS Date: 22/12/2022
 Authorised Signatory: JLM Date: 22/12/2022

EARTHWORKS VOLUMES SUMMARY (m³)	
EARTHWORKS CUT	-14597.0
EARTHWORKS FILL	13476.0
EARTHWORKS BALANCE	-1121.0



LEGEND:

- — — — — EXTENT OF EARTHWORKS
- — — — — UNDERLYING LOT BOUNDARIES
- - - - - CUT / FILL CONTOURS (0.5m)
- █ FILL
- █ CUT



REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	03/02/20

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED		
APPROVED		WOODS.CO.NZ

N

MILDALE
Engineering & Construction

332 WAINUI ROAD

PROPOSED CUT-FILL PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-120-EW	



Document No. C:\1205\ENERGY\DATA\WP-PR-APP-01\18-276-120-EW\DRAWINGS\18-276-120-EW-CUT-FILL.DWG



LF14 Rev.13 Dynamic Cone Penetration (DCP) Test Report

NZS 4402: 1988 Test 6.5.2

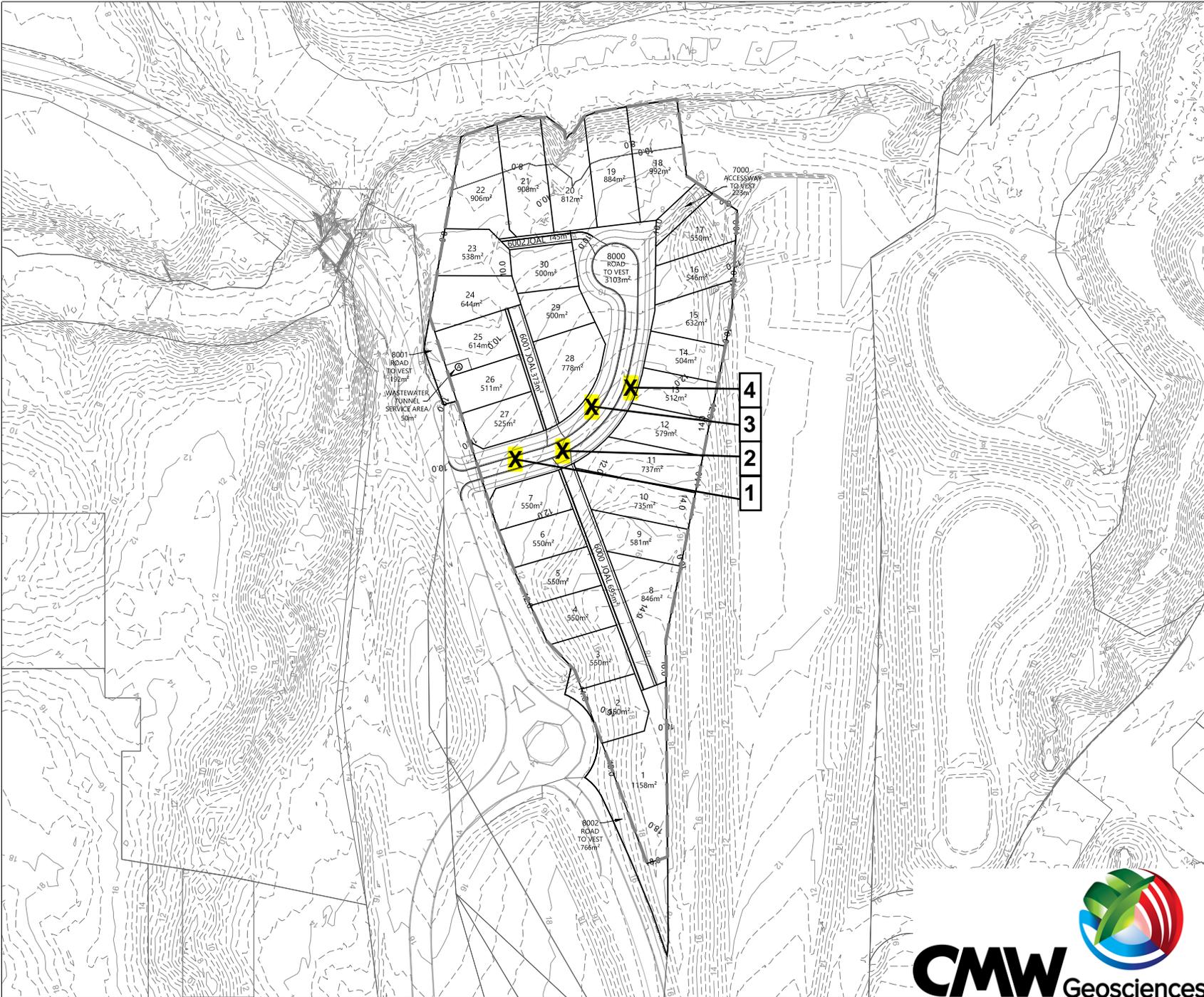
Project:	Milldale 332 Wainui Road	Auckland Laboratory
Project No:	AKL2019-0182	CMW Geosciences (NZ) Ltd Partnership
Location:	Wainui Road	11/63, Arrenway Drive, Rosedale, NZ 0632
Report No:	AKL2019-0182LAB Rev.0	PO Box 300206, Albany, Auckland, NZ 0752
Test Date:	17/03/2022	Phone: +64 (09) 4144 632
Tested By:	SDM	Testing Locations Selected By: CMW Field Staff
Client:	Fulton Hogan Land Development Limited	 <p>Test results indicated as not accredited are outside the scope of the laboratory's accreditation</p> <p>* Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation</p>
Client Address:	15 Sir William Pickering Drive, Burnside, Christchurch 8053	
CBR Test Calculation:	Austrad (2010)	

Test No	1	2	3	4
Test Location	Road 1	Road 1	Road 1	Road 1
Chainage & Offset	CH24	CH40	CH60	CH80

Material & Layer										
SG/Pre Stabilised CLAY 330mm below surface										
Depth (mm)	Blow Count	Equiv CBR*								
0 - 100	17	20+	12	20+	13	20+	13	20+		
100 - 200	6	13	5	10	8	18	15	20+		
200 - 300	4	8	4	8	8	18	7	15		
300 - 400	2	4	3	6	5	10	15	20+		
400 - 500	1	2	6	13	7	15	10	20+		
500 - 600	3	6	6	13	7	15	8	18		
600 - 700	1	2	6	13	16	20+	12	20+		
700 - 800	3	6	9	20	10	20+	10	20+		
800 - 900	2	4	10	20+			8	18		
900 - 1000	3	6	13	20+			8	18		

Material & Layer										
Depth	Blow Count	Equiv CBR*								
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by: JLM	Date: 17/03/2022	<p>This report should only be reproduced in full</p> <p>*Equivalent CBR values calculated using AUSTRROADS (2010) Guide to Pavement Technology Part 2, Figure 5.3, For Fine Grained Cohesive Soils, and are relevant to fine grained cohesive soils only.</p> <p>Page 1 of 2</p>
Checked by: RS	Date: 26/07/2022	
Authorised Signatory: JLM	Date: 27/07/2022	



- LEGEND:**
- — — — — EXTENT OF EARTHWORKS
 - — — — — UNDERLYING LOT BOUNDARIES
 - — — — — MAJOR CONTOUR (2m)
 - - - - - MINOR CONTOURS (0.5m)



REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	03/02/2020

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED		
APPROVED		WOODS.CO.NZ

N

MILLDALE
Engineering & Planning

332 WAINUI ROAD

EXISTING CONTOUR PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-100-EW	



Document No. C:\123\ENERGY\DATA\WP-EP-APP-01\18-276-100-EW\11\ROAD_147\DRAWINGS\18-276-100-EW-CARTWORKS.DWG



LF11 Rev.15 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Auckland Laboratory
 CMW Geosciences (NZ) Ltd Partnership
 11/63, Arrenway Drive, Rosedale, NZ 0632
 PO Box 300206, Albany, Auckland, NZ 0752
 Phone: +64 (09) 4144 632

Project: Milldale 332 Wainui Road
Project No: AKL2019-0182
Location: Wainui Road
Report No: AKL2019-0182LAC Rev.0
Report Date: 26/07/2022
Client: Fulton Hogan Land Development Limited
Client Address: 15 Sir William Pickering Drive, Burnside, Christchurch 8053

Test Methods: NZS 4407 2015 Test 3.1 ◊
 NZS 4407 2015 Test 4.2
 NZGS: August 2001

Notes: Solid Density: Assumed
 Solid Density Data Source: N/A
 Testing Locations Selected By: CMW Field Staff
 ◊ Only samples <2.0mm will be considered for endorsed testing
 ① Blade size of 19mm used.



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

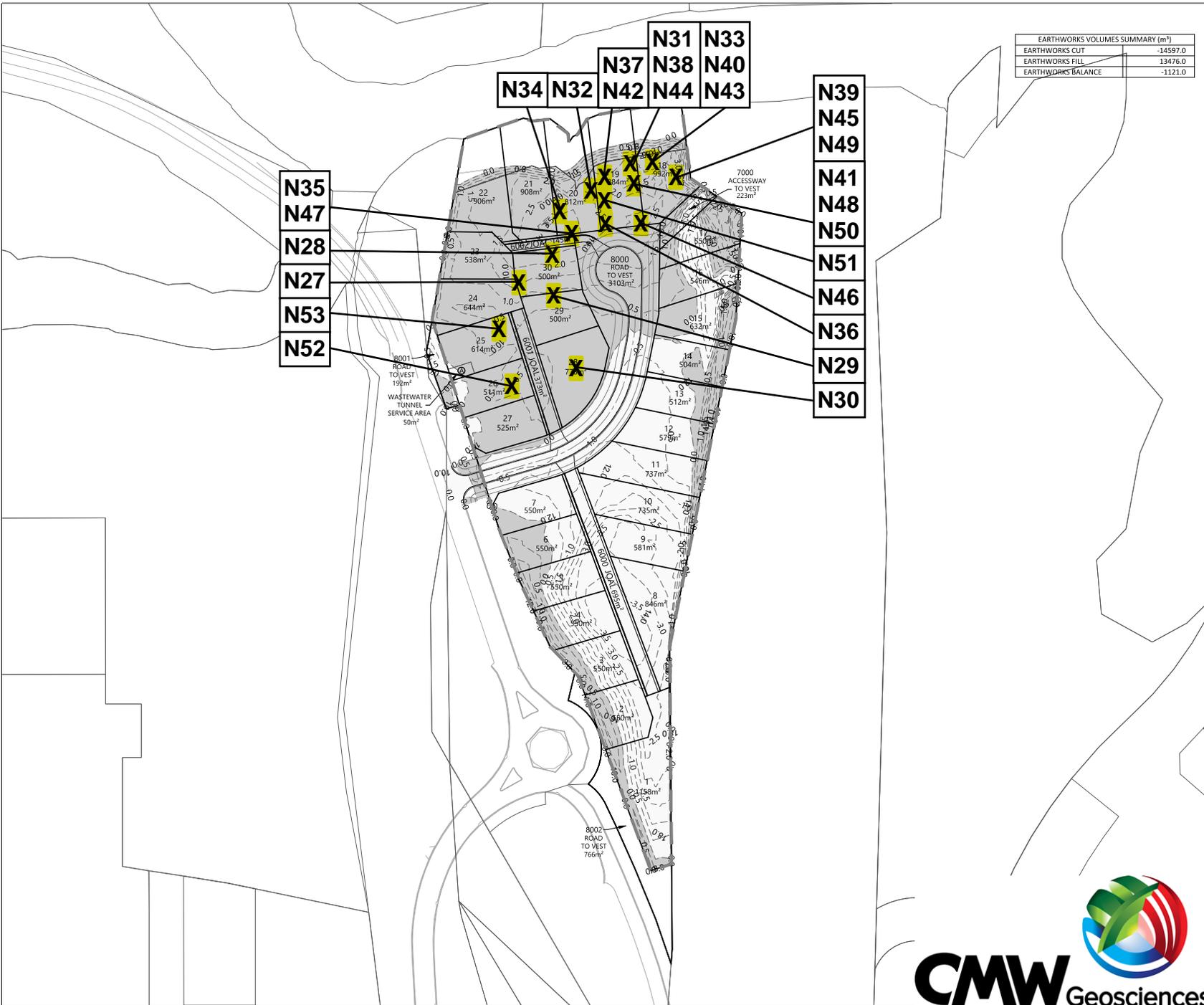
Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Solid Density (t/m ³)*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Test Area	RL/Details			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)**	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m ³)	Oven Calculated Air Voids (%)*	
30/03/2022	N27	Lot 30	-	Blended CLAY/ROCK	2.70	2327	2327	199	156	215	117	172	1.81	1.33	35.8	3	300	25.3	1.45	10	
	N28	Lot 30	-	Blended CLAY/ROCK	2.70	2327	2327	172	215	172	190	187	1.88	1.43	31.3	2	300	35.9	1.38	-1	
	N29	Lot 29	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.92	1.48	29.5	1	300	23.3	1.56	6	
	N30	Lot 28	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.91	1.52	25.6	5	300	24.4	1.53	6	
4/04/2022	N31	Shear Key Undercut	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	206	213	1.85	1.44	28.9	5	300	28.9	1.43	5	
	N32	Shear Key Undercut	-	Blended CLAY/ROCK	2.70	2327	2327	141	147	199	153	160	1.81	1.38	31.7	5	300	26.8	1.43	9	
	N33	General Fill Area	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	172	206	202	1.85	1.45	27.8	6	300	24.8	1.48	8	
	N34	General Fill Area	-	Blended CLAY/ROCK	2.70	2327	2327	181	215	215	215	207	1.85	1.42	30.8	4	300	21.4	1.53	11	
	N35	General Fill Area	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	199	187	204	1.83	1.38	32.6	4	300	23.4	1.48	11	
	N36	Shear Key 1st Grid	7.1	Blended CLAY/ROCK	2.70	2327	2327	199	169	181	193	186	1.92	1.42	35.4	-3	300	49.6	1.28	-11	
	N37	Shear Key 1st Grid	7.2	Blended CLAY/ROCK	2.70	2327	2327	190	203	199	184	194	1.87	1.42	31.6	3	300	47.7	1.26	-7	
	N38	Shear Key 1st Grid	7.2	Blended CLAY/ROCK	2.70	2327	2327	141	169	215	215	185	1.81	1.35	33.9	4	300	23.2	1.47	12	
7/04/2022	N39	Shear Key Fill Area	Grid 5	Blended CLAY/ROCK	2.70	2327	2327	172	193	203	215	196	1.78	1.32	34.5	5	300	28.7	1.38	9	
	N40	Shear Key Fill Area	Grid 4	Blended CLAY/ROCK	2.70	2327	2327	215	215	172	206	202	1.75	1.26	38.5	4	300	31.5	1.33	9	
	N41	Shear Key Fill Area	Grid 5	Blended CLAY/ROCK	2.70	2327	2327	193	184	187	199	191	1.73	1.22	41.2	4	300	30.7	1.32	10	
	N42	Shear Key Fill Area	Grid 4	Blended CLAY/ROCK	2.70	2327	2327	178	169	98	209	164	1.84	1.39	32.7	3	300	28.5	1.43	6	
6/04/2022	N43	Shear Key Grid 2	-	Blended CLAY/ROCK	2.70	2327	2327	215	178	150	160	176	1.83	1.31	39.6	0	300	34.1	1.36	3	
	N44	Shear Key Grid 2	-	Blended CLAY/ROCK	2.70	2327	2327	166	187	181	199	183	1.87	1.35	38.5	-2	300	36.8	1.37	-1	
	N45	Shear Key Grid 2	-	Blended CLAY/ROCK	2.70	2327	2327	172	181	187	184	181	1.85	1.34	38.0	0	300	36.2	1.36	1	
11/04/2022	N46	Lot 18	-	Blended CLAY/ROCK	2.70	2327	2327	153	144	117	141	139	1.73	1.15	51.0	-1	300	38.2	1.25	6	
	N47	Lot 20	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	196	196	206	1.83	1.33	37.9	0	300	29.3	1.42	6	
	N48	Lot 19	-	Blended CLAY/ROCK	2.70	2327	2327	215	181	203	193	198	1.77	1.25	41.8	1	300	32.6	1.34	7	
8/04/2022	N49	Shear Key Lot 18	Grid 6	Blended CLAY/ROCK	2.70	2327	2327	158	215	175	184	183	1.76	1.24	42.3	2	300	34.9	1.30	6	
	N50	Shear Key Lot 19	Grid 6	Blended CLAY/ROCK	2.70	2327	2327	193	190	181	163	182	1.76	1.27	38.7	4	300	31.1	1.34	9	
3/05/2022	N51	Shear Key Lot 19	Grid 6	Blended CLAY/ROCK	2.70	2327	2327	107	172	181	187	162	1.67	1.13	48.3	4	300	33.4	1.25	12	
	N52	Lot 26	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	104	187	1.81	1.30	39.0	1	300	32.9	1.36	5	
	N53	Lot 25	-	Blended CLAY/ROCK	2.70	2327	2327	215	215	147	193	193	1.85	1.32	39.8	-1	300	37.7	1.34	0	

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.754 to 2.611 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: JLM Date: 1/04/2022
 Checked By: RS Date: 26/07/2022
 Authorised Signatory: JLM Date: 27/07/2022



EARTHWORKS VOLUMES SUMMARY (m ³)	
EARTHWORKS CUT	-14597.0
EARTHWORKS FILL	13476.0
EARTHWORKS BALANCE	-1121.0

LEGEND:

- EXTENT OF EARTHWORKS
- UNDERLYING LOT BOUNDARIES
- CUT / FILL CONTOURS (0.5m)
- █ FILL
- █ CUT



REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	03/02/20

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED		
APPROVED		WOODS.CO.NZ

332 WAINUI ROAD

PROPOSED CUT-FILL PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-120-EW	



Document No. C:\1205\ENERGY\DATA\WP-PR-APP-01\18-276-120-EW\DRAWINGS\ENR\18-276-120-EW-CUT-FILL.DWG



LF11 Rev.15 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Auckland Laboratory
 CMW Geotechnical NZ Limited
 11/63, Arrenway Drive, Rosedale, NZ 0632
 PO Box 300206, Albany, Auckland, NZ 0752
 Phone: +64 (09) 4144 632

Project: 332 Wainui Road
Project No: AKL2019-0182
Location: Wainui Road
Report No: AKL2019-0182LAD Rev.0
Report Date: 14/05/2022
Client: Fulton Hogan Land Development Limited
Client Address: PO Box 501, Silverdale 0944

Test Methods: NZS 4407 2015 Test 3.1 ◊
 NZS 4407 2015 Test 4.2
 NZGS:August 2001

Notes: Solid Density: Assumed
 Solid Density Data Source: N/A
 Testing Locations Selected By: CMW Field Staff
 ◊ Only samples <2.0mm will be considered for endorsed testing
 ① Blade size of 19mm used.



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

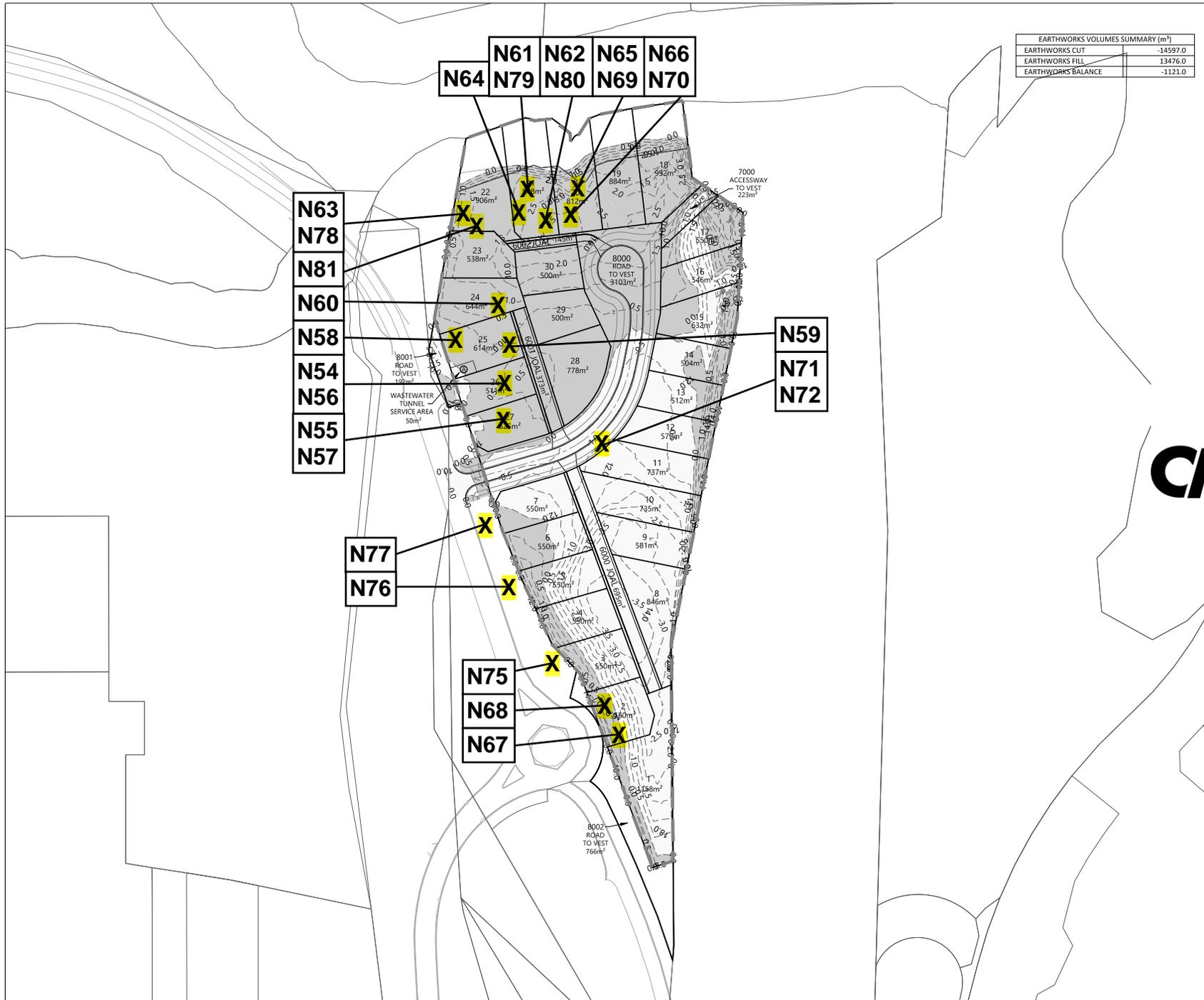
Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*	Soil Description*	Solid Density (t/m ³)*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data							Comments	
					Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)**	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m ³)		Oven Calculated Air Voids (%)*
28/04/2022	N54	Lot 26	Blended CLAY/ROCK	2.70	2327	2327	83	95	102	126	102	1.77	1.23	43.2	1	300	39.6	1.27	3	
	N55	Lot 27	Blended CLAY/ROCK	2.70	2327	2327	101	141	144	147	133	1.81	1.28	41.2	0	300	38.4	1.31	2	
29/04/2022	N56	Lot 26	Blended CLAY/ROCK	2.70	2327	2327	144	153	169	156	156	1.82	1.28	42.1	-1	300	39.6	1.30	0	
	N57	Lot 27	Blended CLAY/ROCK	2.70	2327	2327	141	144	156	153	149	1.80	1.26	43.5	-1	300	39.7	1.29	1	
6/05/2022	N58	Lot 25	Blended CLAY/ROCK	2.70	2327	2327	172	187	215	215	197	1.71	1.15	48.1	2	300	41.7	1.20	5	
	N59	Lot 24	Blended CLAY/ROCK	2.70	2327	2327	175	215	206	181	194	1.71	1.17	46.5	3	300	40.9	1.21	6	
	N60	Lot 25	Blended CLAY/ROCK	2.70	2327	2327	215	215	169	209	202	1.85	1.29	43.5	-4	300	44.1	1.28	-4	
14/05/2022	N61	Lot 21	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	203	212	1.81	1.30	38.5	2	300	39.7	1.29	1	
	N62	Lot 21	Blended CLAY/ROCK	2.70	2327	2327	215	196	209	212	208	1.81	1.30	39.8	0	300	39.1	1.30	1	
13/05/2022	N63	Lot 22	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	206	213	1.73	1.22	42.3	4	300	36.7	1.27	7	
	N64	Lot 21	Blended CLAY/ROCK	2.70	2327	2327	215	215	181	199	203	1.80	1.33	35.4	4	300	33.2	1.35	5	
24/05/2022	N65	Lot 19, 5th Grid, Gully Backfill	Blended CLAY/ROCK	2.70	2327	2327	206	215	215	215	213	1.74	1.23	41.2	3	300	39.0	1.25	5	
	N66	Lot 20 Gully Backfill	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.79	1.32	35.7	4	300	38.9	1.29	2	
25/05/2022	N67	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	181	193	215	215	201	1.64	1.16	41.9	9	300	34.9	1.22	12	
	N68	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	169	160	163	184	169	1.63	1.17	40.2	10	300	33.8	1.22	13	
17/05/2022	N69	Lot 20, 3rd Grid in Gully	Limed CLAY	2.70	2327	2327	160	169	153	147	157	1.65	1.05	56.8	1	300	51.4	1.09	4	
	N70	Lot 20, 3rd Grid in Gully	Limed CLAY	2.70	2327	2327	150	172	156	166	161	1.65	1.06	56.3	1	300	50.7	1.09	4	
22/06/2022	N71	1/9-1/10, 2m to 1/9, 0.4 BFSL	Blended CLAY/ROCK	2.70	2327	2327	46	52	46	46	48	1.64	1.02	59.9	1	300	67.9	0.97	-2	
	N72	1/9-1/10. 0.6m to 1/9, at FSL	Blended CLAY/ROCK	2.70	2327	2327	31	49	64	28	43	1.61	1.01	59.2	3	300	62.4	0.99	2	
29/08/2022	N73	Roadbox Undercut Backfill CH10	Blended CLAY/ROCK	2.70	2327	2327	153	129	184	150	154	1.82	1.23	47.9	-4	300	49.4	1.22	-5	
	N74	Roadbox Undercut Backfill CH5, 0.5m BSG	Blended CLAY/ROCK	2.70	2327	2327	153	156	184	138	158	1.88	1.39	35.2	0	300	45.2	1.29	-6	
1/09/2022	N75	Berm Backfill	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	156	200	1.75	1.32	32.5	8	300	27.3	1.37	12	
	N76	Berm Backfill	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.82	1.38	31.6	5	300	29.1	1.41	7	
	N77	Berm Backfill	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	160	201	1.78	1.33	34.2	5	300	28.1	1.39	9	
9/09/2022	N78	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	175	205	1.81	1.34	35.5	3	300	33.8	1.35	4	
	N79	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	172	190	198	1.80	1.34	34.1	5	300	32.8	1.35	6	
	N80	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	181	206	204	1.86	1.39	33.8	2	300	37.3	1.35	0	
	N81	Refer to Site Plan	Blended CLAY/ROCK	2.70	2327	2327	215	215	215	215	215	1.80	1.32	36.2	3	300	34.9	1.34	4	

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.754 to 2.611 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: PM Date: 9/05/2022
 Checked By: RS Date: 14/10/2022
 Authorised Signatory: JLM Date: 28/10/2022



EARTHWORKS VOLUMES SUMMARY (m³)	
EARTHWORKS CUT	-14597.0
EARTHWORKS FILL	13476.0
EARTHWORKS BALANCE	-1121.0

- LEGEND:**
- EXTENT OF EARTHWORKS
 - UNDERLYING LOT BOUNDARIES
 - CUT / FILL CONTOURS (0.5m)
 - FILL
 - CUT



CMW Geosciences



REVISION DETAILS		BY	DATE
1	ISSUED FOR CONSENT	NC	03/02/20

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED		
APPROVED		WOODS.CO.NZ

N

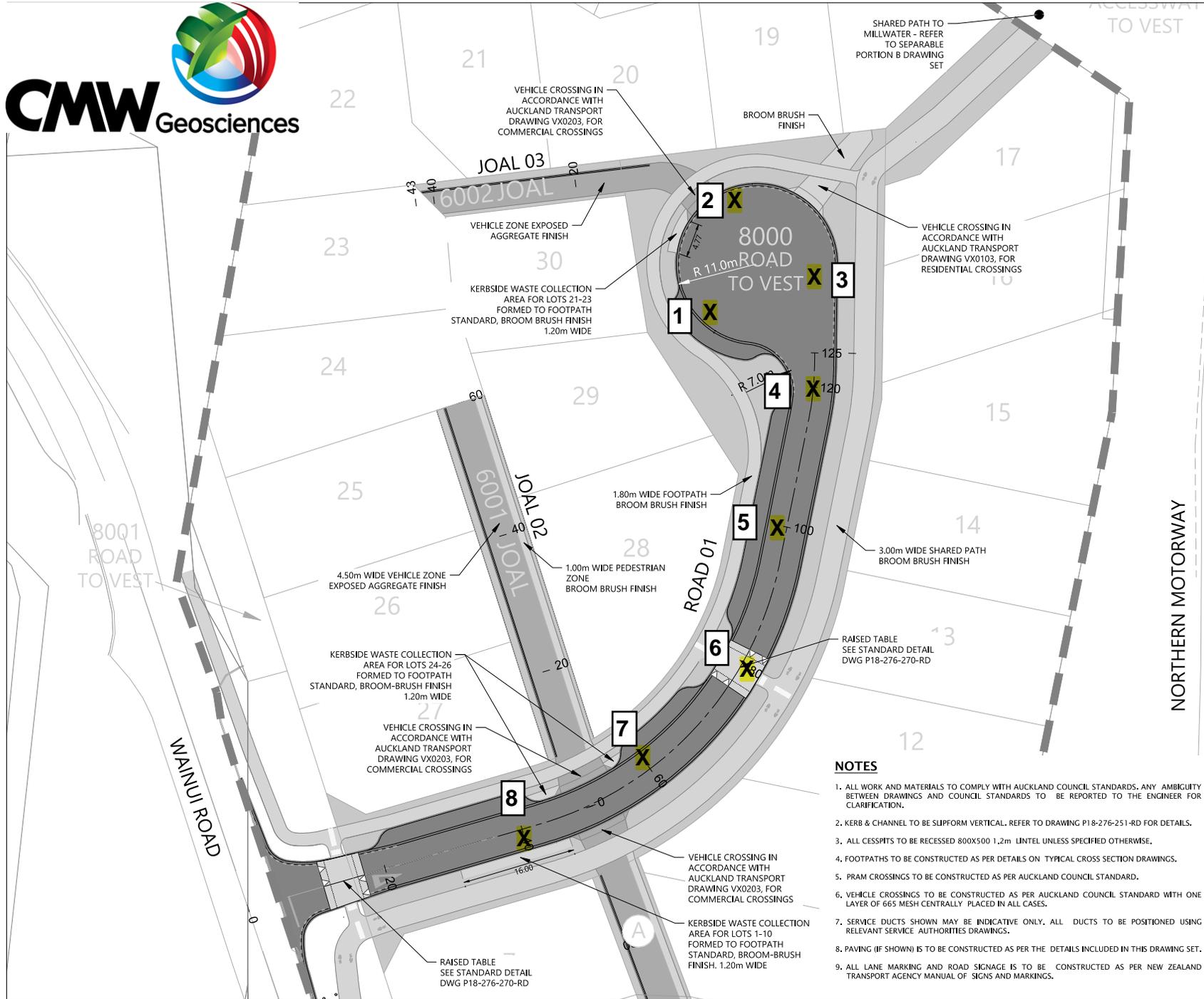
MILLDALE
Geotechnical Engineering

332 WAINUI ROAD

PROPOSED CUT-FILL PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-120-EW	

Document No. C:\1205\ENERGY\DATA\WP-PR-20\18-276-120-EW\DRAWINGS\18-276-120-EW-1-CUT-FILL.DWG



LEGEND:

- EXTENT OF WORKS
- PROPOSED LOT BOUNDARIES
- UNDERLYING LOT BOUNDARIES
- PROPOSED CONTOURS
- CENTRELINE
- CHAINAGES
- JOAL
- PROPOSED CARRIAGEWAY
- FOOTPATH
- 3.0m WIDE SHARED PATH
- BERM
- RESERVE
- TACTILE PAVERS



REVISION DETAILS		BY	DATE
3	SHARED PATH REALIGNED	NC	07/10/21
4	VC, SUP FINISH & SHARED	RV	DEC 21
	PATH POSITION AMENDED		
A	ISSUED FOR CONSTRUCTION	NC	MAY 2022

SURVEYED	WOODS	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED	TR	
APPROVED	TR	WOODS.CO.NZ

332 WAINUI ROAD

ROADING LAYOUT PLAN
SHEET 2 OF 2

STATUS	ISSUED FOR CONSTRUCTION	REV
SCALE	1:500 @ A3	A
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-202-RD	

- NOTES**
- ALL WORK AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS. ANY AMBIGUITY BETWEEN DRAWINGS AND COUNCIL STANDARDS TO BE REPORTED TO THE ENGINEER FOR CLARIFICATION.
 - KERB & CHANNEL TO BE SLIPFORM VERTICAL. REFER TO DRAWING P18-276-251-RD FOR DETAILS.
 - ALL CESSPITS TO BE RECESSED 800X500 1.2m LINTEL UNLESS SPECIFIED OTHERWISE.
 - FOOTPATHS TO BE CONSTRUCTED AS PER DETAILS ON TYPICAL CROSS SECTION DRAWINGS.
 - PRAM CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD.
 - VEHICLE CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD WITH ONE LAYER OF 665 MESH CENTRALLY PLACED IN ALL CASES.
 - SERVICE DUCTS SHOWN MAY BE INDICATIVE ONLY. ALL DUCTS TO BE POSITIONED USING RELEVANT SERVICE AUTHORITIES DRAWINGS.
 - PAVING (IF SHOWN) IS TO BE CONSTRUCTED AS PER THE DETAILS INCLUDED IN THIS DRAWING SET.
 - ALL LANE MARKING AND ROAD SIGNAGE IS TO BE CONSTRUCTED AS PER NEW ZEALAND TRANSPORT AGENCY MANUAL OF SIGNS AND MARKINGS.

Document No. C:\1325\HARDY\DATA\WIP\WIP-APP\A3\P18-276-332_WAINUI ROAD_143\DRAWINGS\ENG01_EPAV18-276-202-RD-ROADING PLAN.DWG

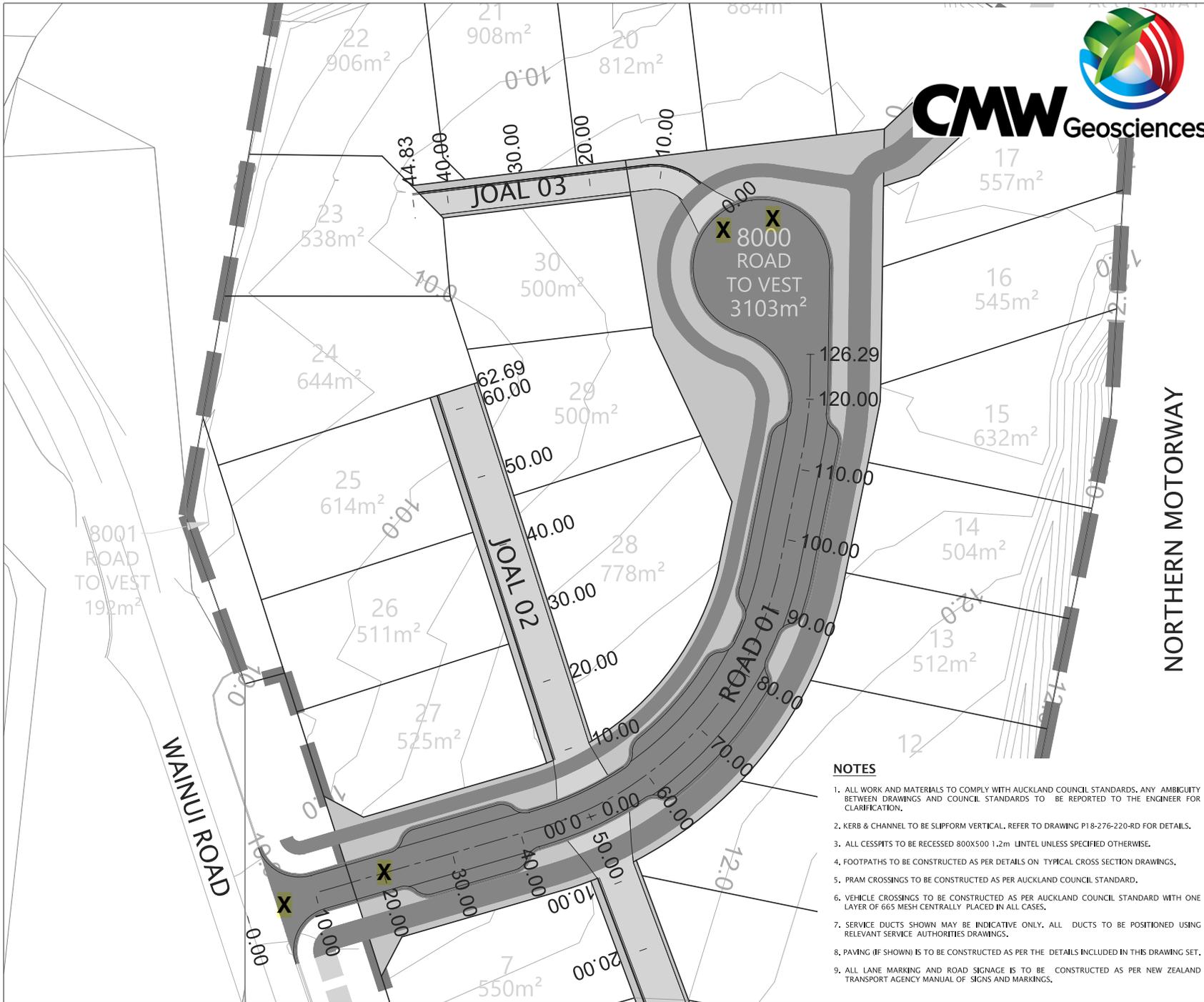


LF14 Rev.14 **Dynamic Cone Penetration (DCP) Test Report**
NZS 4402: 1988 Test 6.5.2

Project:	Milldale 332 Wainui Road	Auckland Laboratory CMW Geotechnical NZ 11/63, Arrenway Drive, Rosedale, NZ 0632 PO Box 300206, Albany, Auckland, NZ 0752 Phone: +64 (09) 4144 632
Project No:	AKL2019-0182	
Location:	Wainui Road	
Report No:	AKL2019-0182LAF Rev.0	
Test Date:	25/08/2022	Testing Locations Selected By: CMW Field Staff
Tested By:	SDM	 <p>Test results indicated as not accredited are outside the scope of the laboratory's accreditation</p> <p>* Equivalent CBR Values are not accredited and are outside the scope of the laboratory's accreditation</p>
Client:	Fulton Hogan Land Development Limited	
Client Address:	PO Box 501, Silverdale, 0944	
CBR Test Calculation:	Austrroads (2010) (fine grained cohesive)	

Test No	1		2		3		4			
Test Location	Cul de sac soft spots		Cul de sac soft spots		Road 1		Road 1			
Chainage & Offset	-		-		CH20 1.2m L of C		CH5 1.2m R of C			
Material & Layer	SG-CLAY Pre Stab		SG-CLAY Pre Stab		SG-CLAY Pre Stab		SG-CLAY Pre Stab			
Depth (mm)	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100	2	4	0	0	2	4	0	0		
100 - 200	3	6	1	2	2	4	3	6		
200 - 300	2	4	4	8	1	2	3	6		
300 - 400	4	8	6	13	2	4	3	6		
400 - 500	4	8	4	8	2	4	2	4		
500 - 600	9	20	5	10	3	6	2	4		
600 - 700	10	20+	5	10	4	8	2	4		
700 - 800			6	13	2	4	3	6		
800 - 900			4	8	5	10	1	2		
900 - 1000			5	10	5	10	1	2		
Test No										
Test Location										
Chainage & Offset										
Material & Layer										
Depth	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*	Blow Count	Equiv CBR*
0 - 100										
100 - 200										
200 - 300										
300 - 400										
400 - 500										
500 - 600										
600 - 700										
700 - 800										
800 - 900										
900 - 1000										

Created by: JLM	Date: 29/08/2022	<p>This report should only be reproduced in full</p> <p>* Equivalent CBR values are taken from Fig 5.3, Austrroads Guide to Pavement Technology, Part 2: Pavement Structural Design, Austrroads 2010. Values are relevant to fine grained soils only.</p> <p>Page 1 of 2</p>
Checked by: RS	Date: 14/10/2022	
Authorised Signatory: JLM	Date: 28/10/2022	



CMW Geosciences

LEGEND:

- EXTENT OF WORKS
- PROPOSED LOT BOUNDARIES
- UNDERLYING LOT BOUNDARIES
- PROPOSED CONTOURS
- CENTRELINE
- CHAINAGES
- PROPOSED SHARED PATH
- JOAL
- PROPOSED CARRIAGEWAY
- FOOTPATH
- BERM
- RESERVE



REVISION DETAILS		BY	DATE
1	ISSUED FOR CONSENT	NC	21/05/2020

SURVEYED	-	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	NC	
DRAWN	NC	
CHECKED	MB	
APPROVED	MB	

N

WFH
PROPERTIES

332 WAINUI ROAD

**ROADING LAYOUT PLAN
SHEET 3 OF 3**

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-202-RD	

NOTES

1. ALL WORK AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS, ANY AMBIGUITY BETWEEN DRAWINGS AND COUNCIL STANDARDS TO BE REPORTED TO THE ENGINEER FOR CLARIFICATION.
2. KERB & CHANNEL TO BE SLIPFORM VERTICAL, REFER TO DRAWING P18-276-220-RD FOR DETAILS.
3. ALL CESSPITS TO BE RECESSED 800X500 1.2m LINTEL UNLESS SPECIFIED OTHERWISE.
4. FOOTPATHS TO BE CONSTRUCTED AS PER DETAILS ON TYPICAL CROSS SECTION DRAWINGS.
5. PRAM CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD.
6. VEHICLE CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD WITH ONE LAYER OF 665 MESH CENTRALLY PLACED IN ALL CASES.
7. SERVICE DUCTS SHOWN MAY BE INDICATIVE ONLY. ALL DUCTS TO BE POSITIONED USING RELEVANT SERVICE AUTHORITIES DRAWINGS.
8. PAVING (IF SHOWN) IS TO BE CONSTRUCTED AS PER THE DETAILS INCLUDED IN THIS DRAWING SET.
9. ALL LANE MARKING AND ROAD SIGNAGE IS TO BE CONSTRUCTED AS PER NEW ZEALAND TRANSPORT AGENCY MANUAL OF SIGNS AND MARKINGS.

Document No. C:\1205\BIBO\DATA\WFA-EN-APP-20\18-276-332 WAINUI ROAD_1410.DRAWING\ENGP18-276-202-RD - ROADING PLAN.DWG

LF11 Rev.17 Soil Field Density NDM Direct Transmission with VSS Report (Cohesive Soils)

Auckland Laboratory
CMW Geotechnical NZ Limited
11/63, Arrenway Drive, Rosedale, NZ 0632
PO Box 300206, Albany, Auckland, NZ 0752
Phone: +64 (09) 4144 632

Project: 332 Wainui Road
Project No: AKL2019-0182
Location: Wainui Road
Report No: AKL2019-0182LAH Rev.0
Report Date: 17/02/2023
Client: Fulton Hogan Land Development Limited
Client Address: PO Box 501, Silverdale 0944

Test Methods: NZS 4407 2015 Test 3.1 ◊
NZS 4407 2015 Test 4.2
NZGS:August 2001

Notes: Solid Density: Assumed
Solid Density Data Source: N/A
Testing Locations Selected By: CMW Field Staff
◊ Only samples <2.0mm will be considered for endorsed testing
① Blade size of 19mm used.



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

Measurements marked * are not accredited and are outside the scope of the laboratories accreditation

Date Sampled	Sample No.	Test Location*		Soil Description*	Solid Density (t/m ³)*	Vane ID		In-situ Vane Shear Strengths					Field and Laboratory Testing Data								Comments
		Test Area	RL/Depth			Head #	Blade # ①	Test 1 (kPa)	Test 2 (kPa)	Test 3 (kPa)	Test 4 (kPa)	Ave.	Gauge Wet Density (t/m ³)**	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Gauge Air Voids (%)	Gauge Probe Depth (mm)	Oven Water Content (%)	Oven Dry Density (t/m ³)	Oven Calculated Air Voids (%) *	
22/10/2022	N82	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	187	184	190	153	179	1.86	1.42	31.1	3	300	30.6	1.43	4	
	N83	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	199	190	215	98	176	1.86	1.40	32.5	2	300	28.0	1.45	6	
	N84	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	215	215	187	181	200	1.85	1.39	33.3	2	300	29.5	1.43	5	
	N85	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	184	215	215	215	207	1.95	1.49	30.4	-1	300	27.4	1.53	1	
	N86	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	172	203	215	215	201	1.95	1.52	27.9	1	300	28.4	1.52	1	
	N87	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	190	114	150	212	167	1.80	1.30	38.2	2	300	28.4	1.40	8	
26/10/2022	N88	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	141	160	172	184	164	1.75	1.23	41.9	3	300	36.0	1.28	6	
	N89	Pond Backfill	-	Blended Clay/Rock	2.70	2327	2327	138	160	144	150	148	1.73	1.18	46.6	1	300	35.1	1.28	8	
9/09/2022	N90	A8-A9	at FSL	Blended Clay/Rock	2.70	2327	2327	83	74	71	77	76									No Sample Taken
	N91	A11-A10	at FSL	Blended Clay/Rock	2.70	2327	2327	215	199	166	129	177	1.78	1.29	38.3	3	300	24.9	1.43	12	
	N92	A11-A12	-	Blended Clay/Rock	2.70	2327	2327	215	215	215	215	215	1.74	1.24	40.5	4	300	28.2	1.36	11	
	N93	A12-A13	-	Blended Clay/Rock	2.70	2327	2327	215	215	215	215	215	1.76	1.25	40.1	3	300	30.2	1.35	9	
	N94	A14-A15	-	Blended Clay/Rock	2.70	2327	2327	52	71	58	64	61									No Sample Taken
27/10/2022	N95	Refer to Site Plan	-	Blended Clay/Rock	2.70	2327	2327	215	215	156	172	190	1.77	1.28	39.0	3	300	40.4	1.26	2	
	N96	Refer to Site Plan	-	Blended Clay/Rock	2.70	2327	2327	138	160	132	150	145	1.80	1.40	28.3	8	300	28.9	1.39	8	
	N97	Refer to Site Plan	-	Blended Clay/Rock	2.70	2327	2327	160	147	166	172	161	1.80	1.25	44.5	-2	300	38.3	1.30	2	
2/11/2022	N98	Lot 75	-	Blended Clay/Rock	2.70	2327	2327	181	199	215	215	203	1.77	1.26	40.5	2	300	34.0	1.32	6	
	N99	Refer to Site Plan	-	Blended Clay/Rock	2.70	2327	2327	104	110	215	110	135									No Sample Taken
	N100	Refer to Site Plan	-	Blended Clay/Rock	2.70	2327	2327	83	104	80	120	97									No Sample Taken
5/11/2022	N101	Lot 15	-	Blended Clay/Rock	2.70	3449	3449	231	231	231	224	229	1.78	1.28	38.7	3	300	35.3	1.31	5	
	N102	Lot 14	-	Blended Clay/Rock	2.70	3449	3449	231	231	205	214	220	1.79	1.28	39.9	2	300	37.3	1.30	3	
7/11/2022	N103	Lot 10	-	Blended Clay/Rock	2.70	3449	3449	231	231	231	205	225	1.86	1.39	34.0	2	300	34.6	1.38	1	
	N104	Lot 11	-	Blended Clay/Rock	2.70	3449	3449	231	231	178	188	207	1.86	1.38	34.8	1	300	35.4	1.38	0	
	N105	Lot 12	-	Blended Clay/Rock	2.70	3449	3449	231	231	UTP	UTP	231+	1.83	1.35	35.8	2	300	35.2	1.36	2	

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.754 to 2.611 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: RS Date: 1/11/2022
Checked By: RS Date: 17/02/2023
Authorised Signatory (KTP): JLM Date: 17/02/2023

EARTHWORKS VOLUMES SUMMARY (m³)	
EARTHWORKS CUT	-14597.0
EARTHWORKS FILL	13476.0
EARTHWORKS BALANCE	-1121.0



LEGEND:

- EXTENT OF EARTHWORKS
- UNDERLYING LOT BOUNDARIES
- CUT / FILL CONTOURS (0.5m)
- FILL
- CUT



REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	03/02/20

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED		
APPROVED		WOODS.CO.NZ

N

MILLDALE
Engineering & Construction

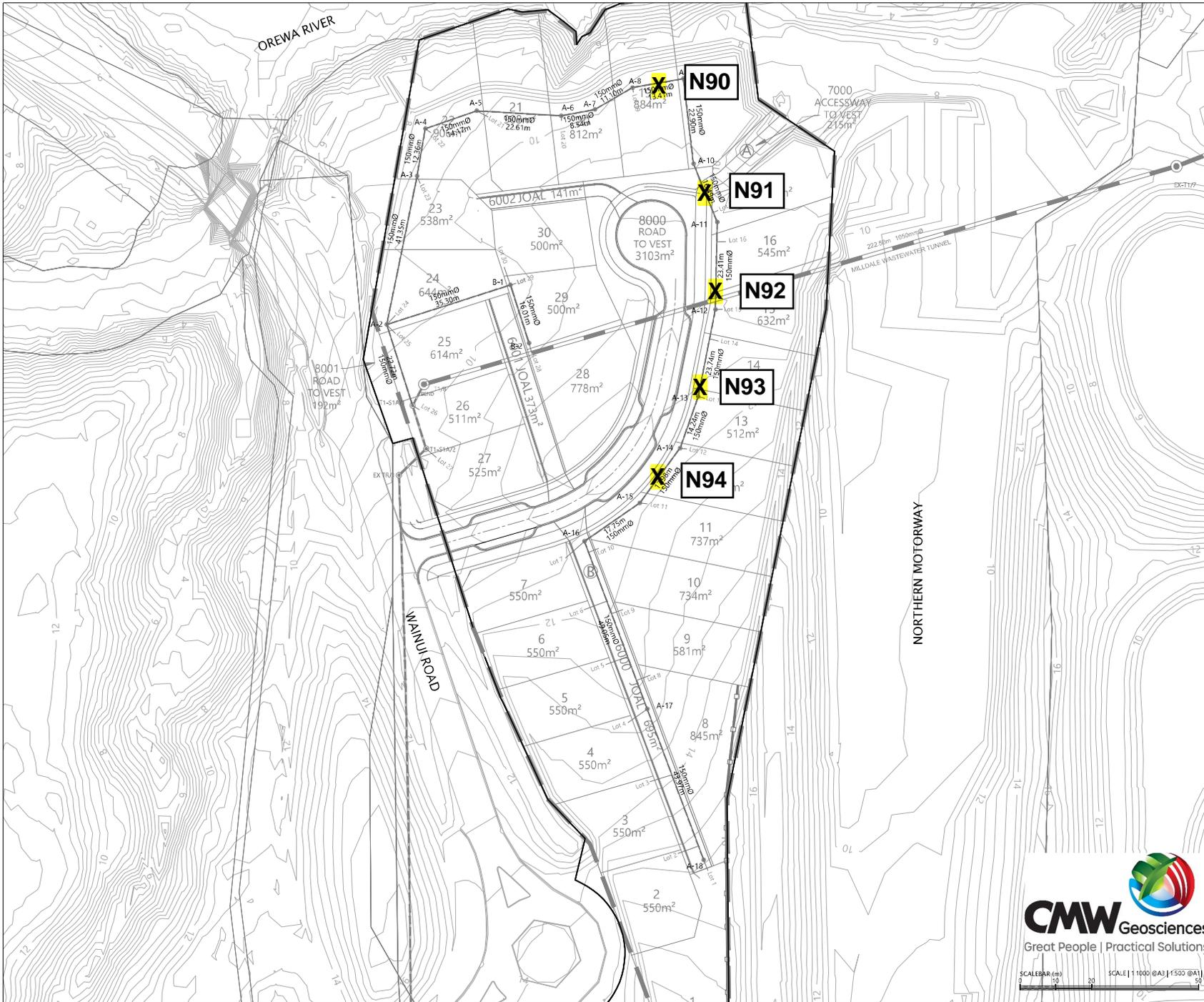
332 WAINUI ROAD

PROPOSED CUT-FILL PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-120-EW	



Document No. C:\123\ENERGY\DATA\APP-APP-01\18-276-120\DRAWINGS\18-276-120-EW - EARTHWORKS.DWG



LEGEND

PROPOSED SANITARY SEWER LINE	
EXISTING SANITARY SEWER LINE	
DESIGN CONTOUR	
TIMBER POLE WALL	
SITE BOUNDARY	

- NOTES**
1. ALL WORKS AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS AND WATERCARE STANDARDS.
 2. ALL PIPE CROSSINGS UNDER ROADS TO BE HARDFILL BACKFILLED.
 3. ALL SW AND SS 100mm DIA. LOT CONNECTIONS ARE TO BE EXTENDED AND CAPPED OFF 1.0m BELOW THE FINISHED GROUND SURFACE AND 1.0m WITHIN THE LOT BOUNDARY UNLESS SHOWN OTHERWISE.
 4. ALL CESSPITS ARE TO BE STANDARD 800mm X 500mm MAX Q "TASMAN GRATE" WITH PRECAST 1200mm "VS" LINTEL AS PER DRAWING 390 UNLESS SHOWN OTHERWISE.
 5. THE CONTRACTOR IS TO PEG MANHOLES AND CHECK FINISHED EARTHWORKS LEVELS (MH LID LEVELS) PRIOR TO ORDERING MANHOLES.
 6. PIPE GRADES ON THE LONG SECTIONS ARE CALCULATED FROM MANHOLE CENTRE TO MANHOLE CENTRE. THIS MAY RESULT IN CREEP (ON STEEP SITES PARTICULARLY) AND THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT LASER LEVELS ARE SET TO COMPENSATE FOR THIS.
 7. STORMWATER PIPE EMBEDMENT TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARD DRAWING SW01 & 03.
 8. LOT CONNECTIONS TO BE INSTALLED AS PER AUCKLAND STANDARD DRAWING SW01.

REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	21/05/2020

SURVEYED	-	332 WAINUI ROAD WAINUI AUCKLAND
DESIGNED	NC	
DRAWN	NC	
CHECKED	MIS	
APPROVED	MIS	
	WOODS.CO.NZ	

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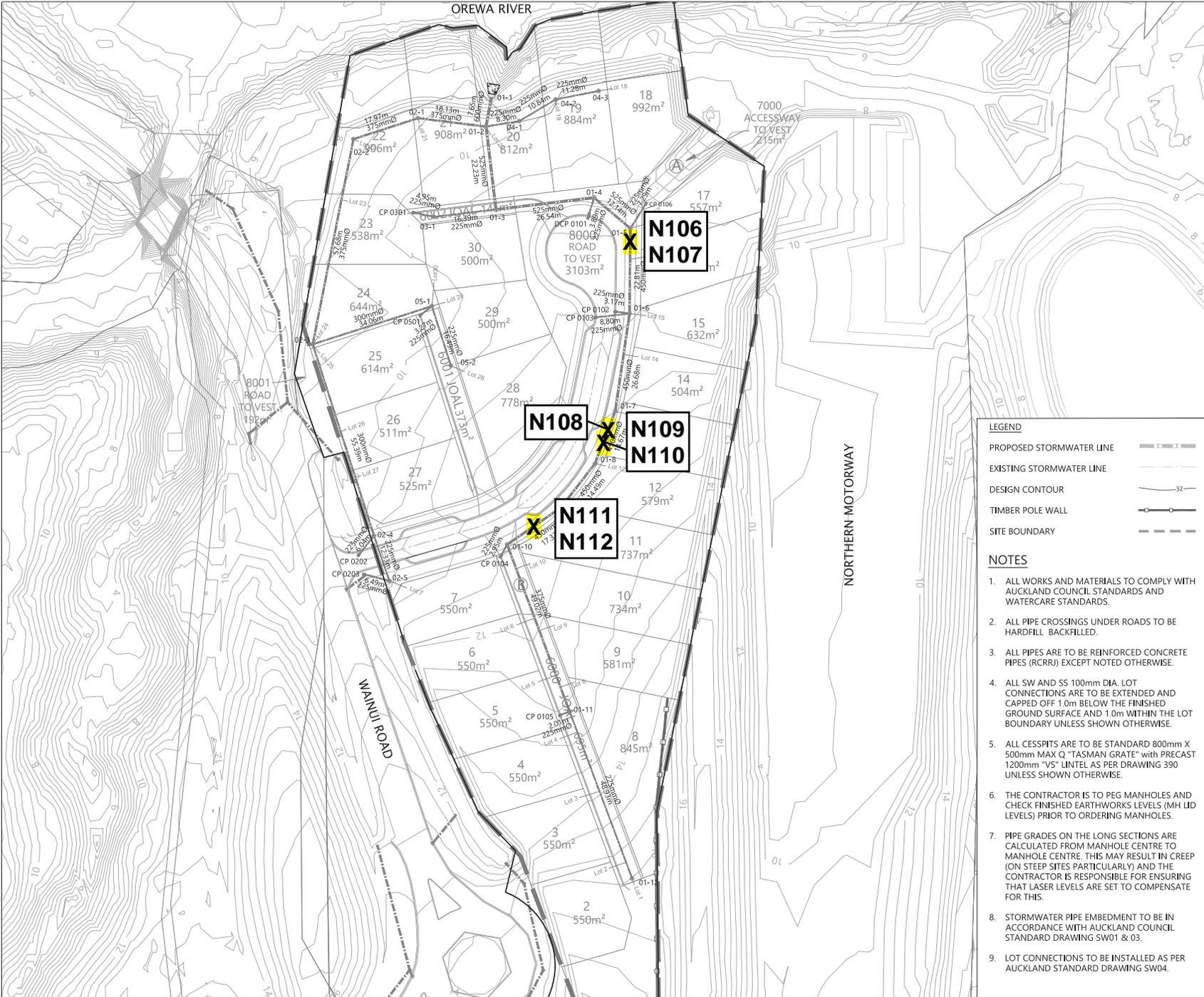
332 WAINUI ROAD

WASTEWATER LAYOUT PLAN
SHEET 1 OF 3

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-400-DR	

CMW Geosciences
 Great People | Practical Solutions

SCALE BAR (m) 0 10 20 SCALE | 1:1000 @A3 | 1:500 @A1



LEGEND

- PROPOSED STORMWATER LINE
- EXISTING STORMWATER LINE
- DESIGN CONTOUR
- TIMBER POLE WALL
- SITE BOUNDARY

- NOTES**
- ALL WORKS AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS AND WATERCARE STANDARDS.
 - ALL PIPE CROSSINGS UNDER ROADS TO BE HARDFILL BACKFILLED.
 - ALL PIPES ARE TO BE REINFORCED CONCRETE PIPES (RCRR) EXCEPT NOTED OTHERWISE.
 - ALL SW AND SS 100mm DIA. LOT CONNECTIONS ARE TO BE EXTENDED AND CAPPED OFF 1.0m BELOW THE FINISHED GROUND SURFACE AND 1.0m WITHIN THE LOT BOUNDARY UNLESS SHOWN OTHERWISE.
 - ALL CESSPITS ARE TO BE STANDARD 800mm X 500mm MAX Q "TASMAN GRATE" WITH PRECAST 1200mm "VS" LINTEL AS PER DRAWING 390 UNLESS SHOWN OTHERWISE.
 - THE CONTRACTOR IS TO PEG MANHOLES AND CHECK FINISHED EARTHWORKS LEVELS (MIL LID LEVELS) PRIOR TO ORDERING MANHOLES.
 - PIPE GRADES ON THE LONG SECTIONS ARE CALCULATED FROM MANHOLE CENTRE TO MANHOLE CENTRE. THIS MAY RESULT IN CREEP (ON STEEP SITES PARTICULARLY) AND THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT LASER LEVELS ARE SET TO COMPENSATE FOR THIS.
 - STORMWATER PIPE EMBEDMENT TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARD DRAWING SW01 & 03.
 - LOT CONNECTIONS TO BE INSTALLED AS PER AUCKLAND STANDARD DRAWING SW04.



SCALE BAR (m) 0 10 20 30
 SCALE 1:1000 @A3 | 1:500 @A1

REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	21/05/2020

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI AUCKLAND
DRAWN	NC	
CHECKED	WBS	
APPROVED	WBS	WOODS.CO.NZ



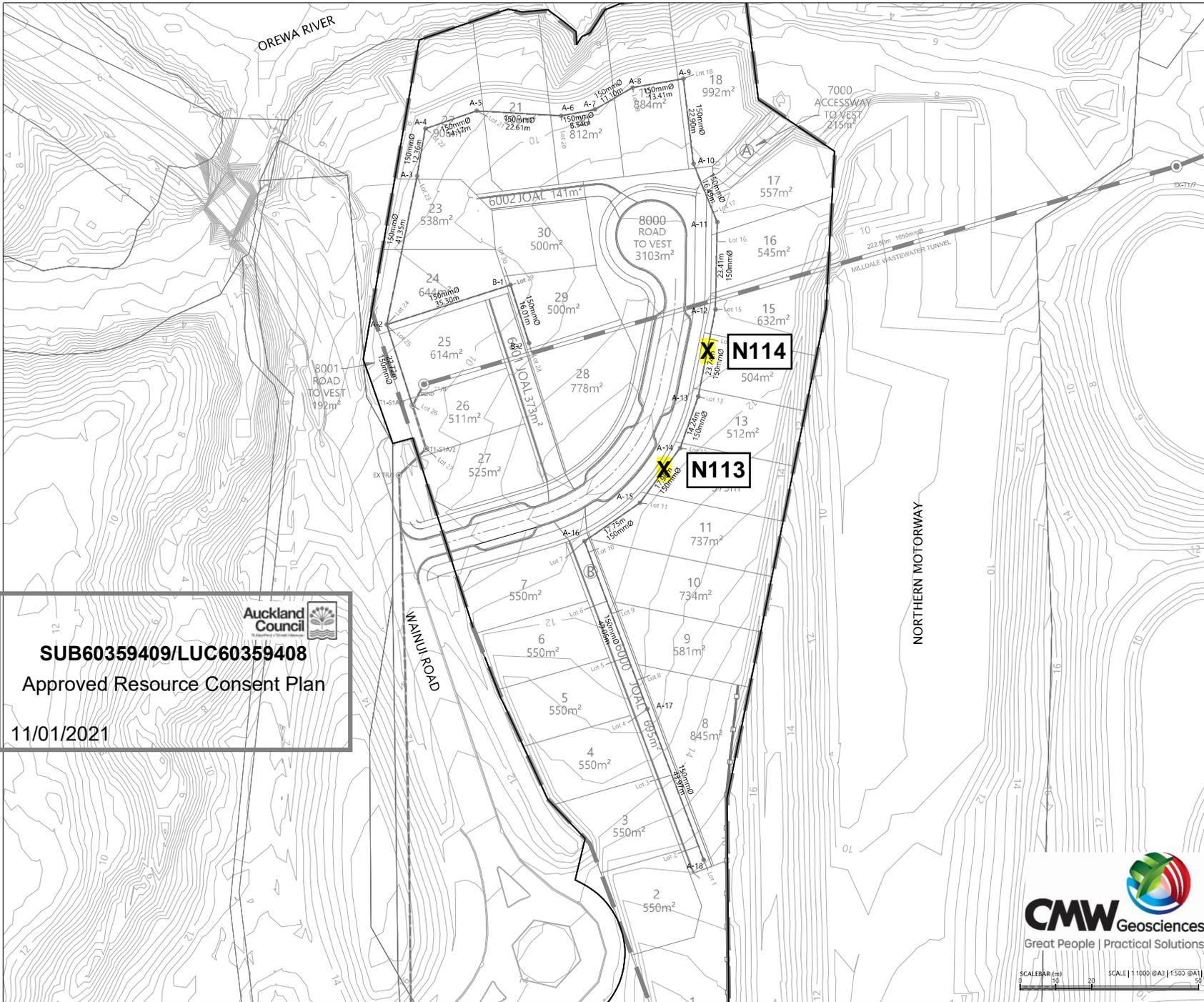
332 WAINUI ROAD

STORMWATER LAYOUT PLAN
 SHEET 1 OF 3

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-300-DR	



Document No. C:\1325\ENERGY\DATA\WAI-EPH-APP-01\PIB-276-332_WAINUI ROAD_14\CDRAWING\ENR\PIB-276-300-DR - STORMWATER LAYOUT PLAN.DWG



Auckland Council
SUB60359409/LUC60359408
 Approved Resource Consent Plan
 11/01/2021

LEGEND

PROPOSED SANITARY SEWER LINE	
EXISTING SANITARY SEWER LINE	
DESIGN CONTOUR	
TIMBER POLE WALL	
SITE BOUNDARY	

- NOTES**
- ALL WORKS AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS AND WATERCARE STANDARDS.
 - ALL PIPE CROSSINGS UNDER ROADS TO BE HARDFILL BACKFILLED.
 - ALL SW AND SS 100mm DIA. LOT CONNECTIONS ARE TO BE EXTENDED AND CAPPED OFF 1.0m BELOW THE FINISHED GROUND SURFACE AND 1.0m WITHIN THE LOT BOUNDARY UNLESS SHOWN OTHERWISE.
 - ALL CESSPITS ARE TO BE STANDARD 800mm X 500mm MAX Q "TASMAN GRATE" WITH PRECAST 1200mm "VS" LINTEL AS PER DRAWING 390 UNLESS SHOWN OTHERWISE.
 - THE CONTRACTOR IS TO PEG MANHOLES AND CHECK FINISHED EARTHWORKS LEVELS (MH LID LEVELS) PRIOR TO ORDERING MANHOLES.
 - PIPE GRADES ON THE LONG SECTIONS ARE CALCULATED FROM MANHOLE CENTRE TO MANHOLE CENTRE. THIS MAY RESULT IN CREEP (ON STEEP SITES PARTICULARLY) AND THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT LASER LEVELS ARE SET TO COMPENSATE FOR THIS.
 - STORMWATER PIPE EMBEDMENT TO BE IN ACCORDANCE WITH AUCKLAND COUNCIL STANDARD DRAWING SW01 & 03.
 - LOT CONNECTIONS TO BE INSTALLED AS PER AUCKLAND STANDARD DRAWING SW01.

REVISION DETAILS	BY	DATE
1 ISSUED FOR CONSENT	NC	21/05/2020

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED	MIS	
APPROVED	MIS	WOODS.CO.NZ

WFH PROPERTIES

332 WAINUI ROAD
 WASTEWATER LAYOUT PLAN
 SHEET 1 OF 3

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-400-DR	

CMW Geosciences
 Great People | Practical Solutions

SCALE BAR (m) 0 10 20 SCALE | 1:1000 @ A3 | 1:500 @ A1



LF12 Rev.16 **Aggregate Field Density NDM - Backscatter Report**

Auckland Laboratory
 CMW Geotechnical NZ Limited
 11/63, Arrenway Drive, Rosedale, NZ 0632
 PO Box 300206, Albany, Auckland, NZ 0752
 Phone: +64 (09) 4144 632

Project: 332 Wainui Road
Project No: AKL2019-0182
Location: Wainui Road
Report No: AKL2019-0182LAJ Rev.0
Report Date: 21/12/2022
Client: Fulton Hogan Land Development Limited
Client Address: PO Box 501, Silverdale 0944

Test Methods: NZS 4407:2015 Test 3.1 ◊
 NZS 4407:2015 Test 4.3
 ◊ Only samples <2.0mm will be considered for endorsed testing

Notes: Solid Density: Assumed
 Soild Density Data Source: N/A
 Testing Locations Selected By: CMW Field Staff



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

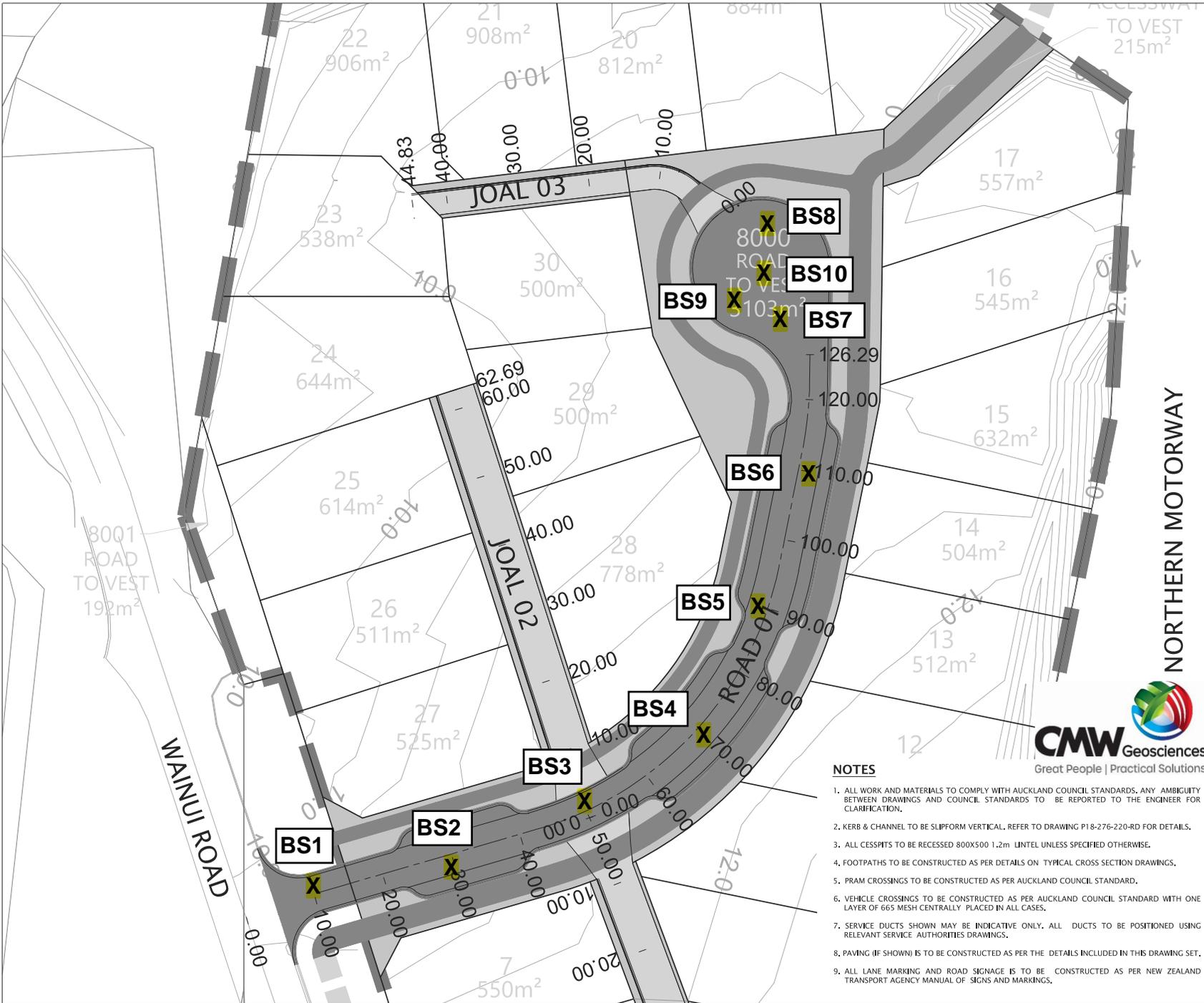
Measurements marked * are not accredited and are outside the laboratory's scope of accreditation

Date Sampled	Sample No.	Test Location*		Material Details						Field and Testing Data					Comments
		Test Area	RL/Depth	Material*	Quarry	Material Data Source	OMC* (%)	MDD* (t/m ³)	SD* (t/m ³)	Gauge Wet Density (t/m ³) **	Gauge Dry Density (t/m ³)	Gauge Water Content (%)	Calculated Compaction (%) *	Calculated Total Voids (%) *	
16/12/2022	BS1	CH10	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.39	2.25	6.0	102	17	
	BS2	CH30	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.45	2.31	6.2	105	15	
	BS3	CH50	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.43	2.30	5.7	105	15	
	BS4	CH70	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.37	2.24	5.9	102	17	
	BS5	CH90	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.44	2.31	5.3	105	15	
	BS6	CH110	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.41	2.28	6.1	103	16	
	BS7	CH130	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.44	2.32	5.0	106	14	
	BS8	CH150	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.39	2.26	5.9	103	17	
	BS9	CH170	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.38	2.26	5.6	103	17	
	BS10	Cul de Sac Centre	Basecourse	TNZ40	Drury Quarry	Stevenson Report #45195T, Test#225623, Ref#976	5.50	2.20	2.71	2.37	2.25	5.3	102	17	

This report should only be reproduced in full.

** Gauge Wet Densities outside of the calibrated range of 1.754 to 2.611 t/m³ are not accredited and are outside the laboratories scope of accreditation.

Created By: RS Date: 21/12/2022
 Checked By: RS Date: 22/03/2023
 Authorised Signatory (KTP): JLM Date: 22/03/2023



LEGEND:

- EXTENT OF WORKS
- PROPOSED LOT BOUNDARIES
- UNDERLYING LOT BOUNDARIES
- PROPOSED CONTOURS
- CENTRELINE
- CHAINAGES
- PROPOSED SHARED PATH
- JOAL
- PROPOSED CARRIAGEWAY
- FOOTPATH
- BERM
- RESERVE



REVISION DETAILS		BY	DATE
1	ISSUED FOR CONSENT	NC	21/05/2020

SURVEYED	-	332 WAINUI ROAD
DESIGNED	NC	WAINUI
DRAWN	NC	AUCKLAND
CHECKED	MB	
APPROVED	MB	WOODS.CO.NZ



- NOTES**
- ALL WORK AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS. ANY AMBIGUITY BETWEEN DRAWINGS AND COUNCIL STANDARDS TO BE REPORTED TO THE ENGINEER FOR CLARIFICATION.
 - KERB & CHANNEL TO BE SLIPFORM VERTICAL, REFER TO DRAWING P18-276-220-RD FOR DETAILS.
 - ALL CESSPITS TO BE RECESSED 800X500 1.2m LINTEL UNLESS SPECIFIED OTHERWISE.
 - FOOTPATHS TO BE CONSTRUCTED AS PER DETAILS ON TYPICAL CROSS SECTION DRAWINGS.
 - PRAM CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD.
 - VEHICLE CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD WITH ONE LAYER OF 665 MESH CENTRALLY PLACED IN ALL CASES.
 - SERVICE DUCTS SHOWN MAY BE INDICATIVE ONLY. ALL DUCTS TO BE POSITIONED USING RELEVANT SERVICE AUTHORITIES DRAWINGS.
 - PAVING (IF SHOWN) IS TO BE CONSTRUCTED AS PER THE DETAILS INCLUDED IN THIS DRAWING SET.
 - ALL LANE MARKING AND ROAD SIGNAGE IS TO BE CONSTRUCTED AS PER NEW ZEALAND TRANSPORT AGENCY MANUAL OF SIGNS AND MARKINGS.

332 WAINUI ROAD

ROADING LAYOUT PLAN
SHEET 3 OF 3

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:500 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-202-RD	



LF13 Rev.11 IMPACT HAMMER TESTING REPORT

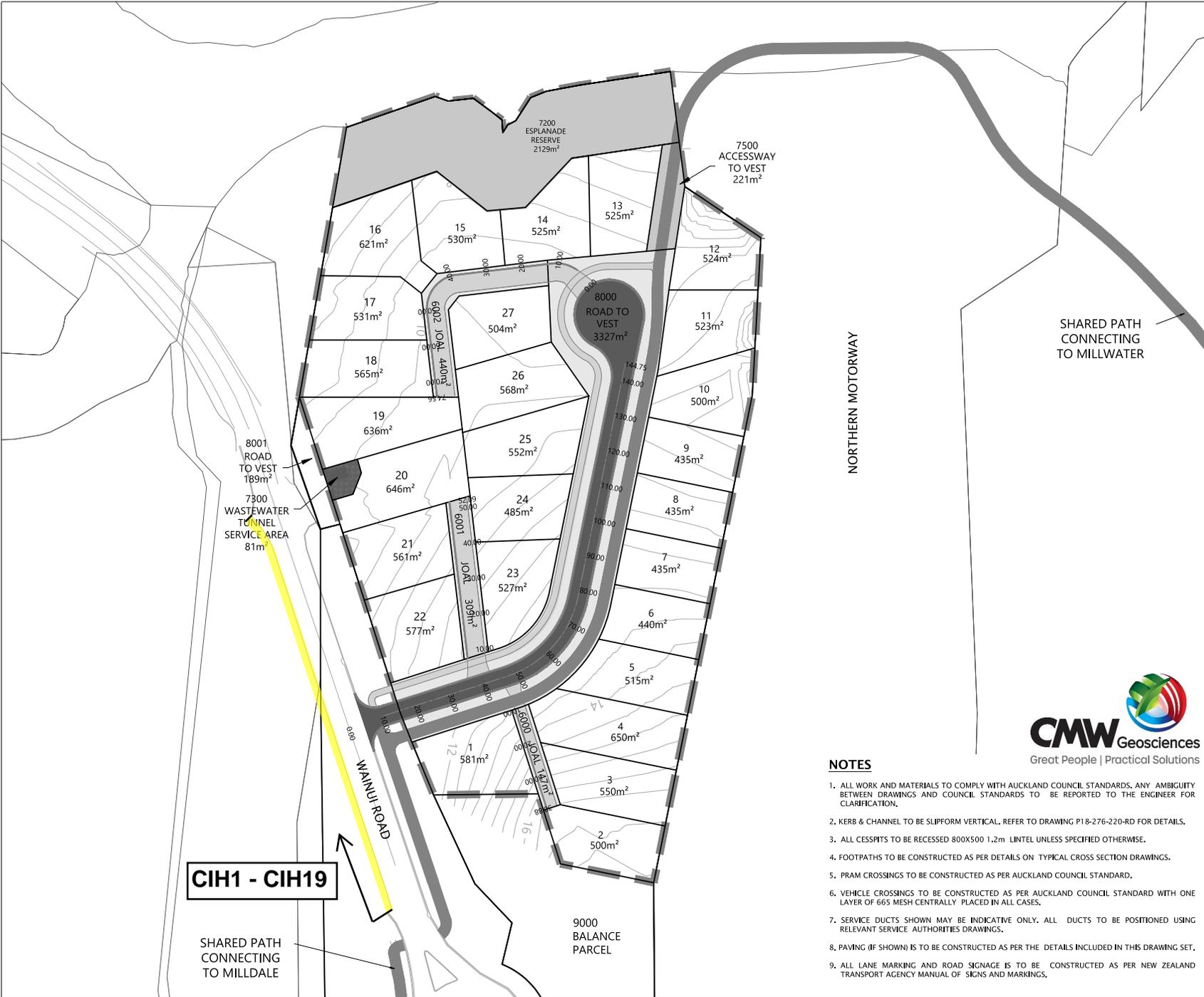
TEST STANDARD: ASTM D5874:2016 FIELD PROCEDURE A.

Project:	332 Wainui Road	Auckland Laboratory CMW Geotechnical NZ Limited 11/63, Arrenway Drive, Rosedale, NZ 0632 PO Box 300206, Albany, Auckland, NZ 0752 Phone: +64 (09) 4144 632
Project No:	AKL2019-0182	Testing Locations Selected By: CMW Field Staff
Location:	Wainui Road	
Report No:	AKL2019-0182LAK Rev.0	Measurements marked * are not accredited and are outside of the scope of the laboratory's accreditation
Report Date:	2/03/2023	
Client:	Fulton Hogan Land Development Limited	
Client Address:	PO Box 501, Silverdale 0944	

Test No:	Date Tested:	Test Location*	Impact Hammer No	Material**	Impact Value (IV)**	Inferred ^① CBR %	Notes
CIH1	21/02/2023	Wainui Road Widening	CIH05	TNZ40	73	373	
CIH2	21/02/2023	Wainui Road Widening	CIH05	TNZ40	100	700	
CIH3	21/02/2023	Wainui Road Widening	CIH05	TNZ40	53	197	
CIH4	21/02/2023	Wainui Road Widening	CIH05	TNZ40	73	373	
CIH5	21/02/2023	Wainui Road Widening	CIH05	TNZ40	44	136	
CIH6	21/02/2023	Wainui Road Widening	CIH05	TNZ40	54	204	
CIH7	21/02/2023	Wainui Road Widening	CIH05	TNZ40	70	343	
CIH8	21/02/2023	Wainui Road Widening	CIH05	TNZ40	60	252	
CIH9	21/02/2023	Wainui Road Widening	CIH05	TNZ40	51	182	
CIH10	21/02/2023	Wainui Road Widening	CIH05	TNZ40	48	161	
CIH11	21/02/2023	Wainui Road Widening	CIH05	TNZ40	37	96	
CIH12	21/02/2023	Wainui Road Widening	CIH05	TNZ40	46	148	
CIH13	21/02/2023	Wainui Road Widening	CIH05	TNZ40	62	269	
CIH14	21/02/2023	Wainui Road Widening	CIH05	TNZ40	54	204	
CIH15	21/02/2023	Wainui Road Widening	CIH05	TNZ40	68	324	
CIH16	21/02/2023	Wainui Road Widening	CIH05	TNZ40	66	305	
CIH17	21/02/2023	Wainui Road Widening	CIH05	TNZ40	74	383	
CIH18	21/02/2023	Wainui Road Widening	CIH05	TNZ40	81	459	
CIH19	21/02/2023	Wainui Road Widening	CIH05	TNZ40	93	605	

** Measurements with a maximum particle size > 37.5mm are outside of the scope of ASTM D5874:2016 Field Procedure A. Impact Values on such materials are not accredited and are outside of the scope of the laboratory's accreditation.

Created By:	RS	Date:	2/03/2023	This report should only be reproduced in full
Checked By:	RS	Date:	22/03/2023	① Inferred CBR Calculation: CBR= IV ² x0.07
Authorised Signatory (KTP):	JLM	Date:	22/03/2023	Page 1 of 2



LEGEND:

- EXTENT OF WORKS
- PROPOSED LOT BOUNDARIES
- UNDERLYING LOT BOUNDARIES
- PROPOSED CONTOURS
- CENTRELINE
- CHAINAGES
- PROPOSED SHARED PATH
- JOAL
- PROPOSED CARRIAGEWAY
- FOOTPATH
- BERM
- RESERVE



REVISION DETAILS		BY	DATE
1	ISSUED FOR CONSENT	SM	28/03/2019

SURVEYED	-	332 WAINUI ROAD
DESIGNED	SM	WAINUI
DRAWN	SM	AUCKLAND
CHECKED	JW	
APPROVED		WOODS.CO.NZ



- NOTES**
- ALL WORK AND MATERIALS TO COMPLY WITH AUCKLAND COUNCIL STANDARDS. ANY AMBIGUITY BETWEEN DRAWINGS AND COUNCIL STANDARDS TO BE REPORTED TO THE ENGINEER FOR CLARIFICATION.
 - KERB & CHANNEL TO BE SLIPFORM VERTICAL. REFER TO DRAWING P18-276-220-RD FOR DETAILS.
 - ALL CESSPITS TO BE RECESSED 800X500 1.2m LINTEL UNLESS SPECIFIED OTHERWISE.
 - FOOTPATHS TO BE CONSTRUCTED AS PER DETAILS ON TYPICAL CROSS SECTION DRAWINGS.
 - PRAM CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD.
 - VEHICLE CROSSINGS TO BE CONSTRUCTED AS PER AUCKLAND COUNCIL STANDARD WITH ONE LAYER OF 665 MESH CENTRALLY PLACED IN ALL CASES.
 - SERVICE DUCTS SHOWN MAY BE INDICATIVE ONLY. ALL DUCTS TO BE POSITIONED USING RELEVANT SERVICE AUTHORITIES DRAWINGS.
 - PAVING (IF SHOWN) IS TO BE CONSTRUCTED AS PER THE DETAILS INCLUDED IN THIS DRAWING SET.
 - ALL LANE MARKING AND ROAD SIGNAGE IS TO BE CONSTRUCTED AS PER NEW ZEALAND TRANSPORT AGENCY MANUAL OF SIGNS AND MARKINGS.

CIH1 - CIH19

332 WAINUI ROAD

ROADING LAYOUT PLAN

STATUS	ISSUED FOR CONSENT	REV
SCALE	1:1000 @ A3	1
COUNCIL	AUCKLAND COUNCIL	
DWG NO	P18-276-200-RD	

Appendix E: Laboratory Test Data

