

WDC LIM REPORT



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Land Information Memorandum

Sections 44A-C Local Government Official Information and Meetings Act 1987

LIM number: LM2601584

Received: 25 Sep 2026

Issued: 02 Oct 2026

Applicant

Own Real Estate
75 Forest View Road
RD 1
Kamo 0185

Site Information

Property ID: 167820

Street Address: 16 Moorey Lane (Pvt)
Whangarei 0170

Legal Description: LOT 1 DP 514603 - HAVING 1/4SH IN LOT 6 DP 514603 BEING
0.2998HA

Disclaimer

The information included in this LIM is based on a search of Council records only and there may be other information relating to the land which is unknown to the Council.

Please note that other agencies may also have information relevant to the use of the land, for example, the Northland Regional Council, Heritage New Zealand Pouhere Taonga, and Land Information New Zealand.

The applicant is solely responsible for undertaking comprehensive due diligence of this property.

Council records may not show illegal or unauthorised building or works on the property. Council has not carried out an inspection of the land or buildings for the purpose of preparing this LIM.

The LIM also includes information that identifies natural hazards known to Council. The existence of a natural hazard or potential natural hazard does not equal likelihood of that hazard occurring.

The LIM is not a risk assessment and does not quantify risk. The applicant is advised to seek further information to ensure that the land is suitable for a particular purpose.

A LIM is only valid at the date of issue as information is based only on information that was known to the Council at the time of that LIM application being made.

Further information about the property may be available in the Council records or the current Record of Title. The LIM and any attachments should be read together.

You may wish to seek independent advice to aid the understanding of any of the information included in this LIM.

Property details

- Location Map
- Aerial Photo
- Record of Title: 801470
- Deposited Plan: DP 514603

This property is subject to a Consent Notice, information attached.

- Interest Number 10906780.4 Dated – 10/12/2017

s44A(2)(aa) Information identifying special features or characteristics of the land

Information identified on a site-specific scale for this property is attached for your information.

1. Refer Consent Notice 10906780.4 dated 10/12/2017 together with Engineering Suitability Report for Revised Scheme Plan by Hawthorn Geddes engineers & architects ltd dated 04/11/2016 reference 6756 Rev. 3.
2. Refer also copies of the following reports as attached:
 - a. Flood Assessment prepared by Hawthorn Geddes engineers & architects ltd dated 21/06/2019 from BC2100069 reference 11376.
 - b. Site Suitability Report prepared by TMC Consulting Engineers dated 30/09/2020 from BC2100069 reference S1409-J03689.

s44A(2)(b) Information on private and public stormwater and sewerage drains; s44A(2)(bb) Information Council holds regarding drinking water supply to the land

No Whangarei District Council services are available in this area.

As-Built, House Connection and/or Drainage Plan for this property from the building file is attached.

- As-Built Services Plan From BC2100069

s44A(2)(c)(ca)(cb) Information relating to any rates owing in relation to the land

Information on Valuation, Rates and Water Meter location (if applicable) for the current financial year, is attached.

s44A(2)(d) Any permit, consent, certificate, notice, order or requisition affecting the land or buildings; s44A(2)(daa) Information relating to non-consented small stand-alone dwellings s44A(2)(da) Information provided under s362T of the Building Act 2004; s44A(2)(e) Certificate issued by a building certifier; s44A(2)(ea) Information notified under s124 of the Weathertight Homes Resolution Services Act 2006

Copy of Building Consent and Code Compliance Certificate issued for this property is attached as listed below:

- BC2100069 – New Dwelling
Building Consent Issued – 09/03/2021
Code Compliance Certificate Issued – 21/01/2022

Council holds no current record of a swimming pool or spa at this property.

s44(2)(f) Information relating to the use to which the land may be put and conditions attached to that use

Plan Change 4A and 4C are currently progressing through the statutory planning process and may affect how the District Plan applies to this property.

Further information is available here:

<https://www.wdc.govt.nz/Services/Planning/District-Plan/District-Plan-changes/Current-plan-changes/PC4A-and-PC4C>

As part of Plan Change 4C - Minor Improvements, the Road Hierarchy mapping in the Whangarei District Plan is proposed to be updated. The updated layer identifies road centrelines and their classifications, which in turn influence various transport and setback rules in the District Plan. The proposed mapping updates can be viewed by selecting the "District Plan Changes" tile here:

<https://gismaps.wdc.govt.nz/GISMapsGallery/>

This property is located in a Rural Production Zone.

See map attached and for more information search the property address on Council's ePlan:

<https://eplan.wdc.govt.nz/plan>

s44(2)(g) Information regarding the land which has been notified to Council by another statutory organisation

Whangarei District Council is not aware of any classification attached to the land or building/s.

s44(2)(h) Information regarding the land which has been notified to Council by a network utility operator pursuant to Building Act 1991 or Building Act 2004

Information relating to any utility service other than Councils such as telephone, electricity, gas and regional council will need to be obtained from the relevant utility operator.

Further information may be available from other authorities; Northpower; Spark; Vector Limited; etc.

S44A(3) Other information Council considers relevant to the land

Whangarei District Council recommends that all Whangarei District residents visit the Northland Regional Council website for information on Civil Defence hazard response:

<https://www.nrc.govt.nz>

This information includes Tsunami evacuation zones, maps and community response plans for flooding and extreme weather events etc.

Copies of site plan, floor plan and elevations are attached for your information.

s44B(2) Natural Hazards

This LIM includes natural hazard information held by Northland Regional Council and Whangarei District Council, however:

- There may be hazards the Councils do not have information about.
- Some hazard information may be held by other organisations.
- If a hazard is not mentioned in this LIM, it does not necessarily mean the hazard does not exist.

Information about a single hazard (such as flooding, erosion, or land instability) may be included in more than one part of this report. Please check all relevant sections to ensure you have a complete understanding of the hazard.

District Plan Information about Natural Hazards

The Whangarei Operative District Plan identifies this property as being in the following:

- Flood Susceptible Area

Refer to map attached.

Information about what this means, including District Plan rules that apply to this property, can be found in Part 2 - District-Wide Matters under Hazards and Risks - Natural Hazards:

<https://www.wdc.govt.nz/ePlanNaturalHazards>

The flood susceptible area maps provide a trigger layer for provisions to manage the risk of flooding in the Operative District Plan. These provisions are currently subject to Plan Change 1 - Natural Hazards (PC1).

This property is mapped under PC1 as **River Flooding**. The Whangarei District Council notified PC1 on 31 May 2023. The Plan Change introduces new provisions relating to natural hazards to the District Plan, including updated hazard maps and rules for land use, development, and subdivision in hazard susceptible areas.

As of 4 December 2024 the Decision Version PC1 rules have legal effect and must be considered in addition to the provisions relating to the flood susceptible area mapping in the Operative District Plan.

Refer to map attached and for more information on the proposed plan change please visit:

<https://www.wdc.govt.nz/PlanChanges>

Building Act Information about Natural Hazards

No Building Act Information about natural hazards applies to this property.

Flooding

Flooding occurs when rainfall exceeds the capacity of the river, land or urban stormwater systems to hold the water. In steep terrain or around rivers, floods can be fast-moving; in low-lying areas and wetlands, floods can cause ponding.

In coastal areas, storm surges can cause flooding affecting land.

Northland Regional Council has modelled the flood risk across Te Taitokerau Northland and maintains a monitoring and forecasting programme to predict flooding. However, the absence of flooding information contained in this report does not exclude the possibility of site flooding, including from local depressions or overland flow paths on nearby properties.

River flood maps

Modelling by Northland Regional Council identifies a River Flood Hazard for this property.

A river flood occurs when a river, lake or stream overflows its banks due to excessive rain. The duration and intensity (volume) of rainfall in the catchment area of the river determine the severity of a river flood. Other factors include soil water saturation due to previous rainfall, and the terrain surrounding the river system. In flatter areas, floodwater tends to rise more slowly and be shallower, and it often remains for days. In hilly or mountainous areas, floods can occur within minutes after a heavy rain, drain very quickly, and cause damage due to debris flow.

To determine the probability of river flooding, models consider past precipitation, forecasted precipitation, current river levels, as well as soil and terrain conditions. Flood risk will increase with climate change with the forecast increase in rainfall. Northland Regional Council's flood hazard models include predicted climate change impacts.

Draft river flood reports

Northland Regional Council are continuing with their flood hazard modelling programme to improve the information about the potential for flooding in the region. The reports on these models are not currently published as they are going through peer review and quality checks, however they are available upon request from the Northland Regional Council.

The following reports are available:

- Whangārei Catchment Upgrade and Options Model. Project objectives include providing an appropriate modelling capability for catchment management, asset management and flood risk management. The completed model as well as the Whangārei urban areas detailed level which is closely related to the drainage system management. The report was prepared April 2023 by EWaters and updated in 2025
- Report on the Northern Wairoa Rainfall, Tidal and Storm-Surge Model is designed to simulate rainfall-induced flooding, tidal influences, and storm surge effects for the Northern Wairoa catchment, with a focus on the Dargaville area. The model has been calibrated using multiple flood events at all river gauge locations within the catchment. The report was prepared in September 2025 by Submergent Limited for Northland Regional Council.

In 2019 - 2021 Northland Regional Council undertook regionwide flood modelling to model catchments not covered by the priority rivers programme. The flood extent shown on the maps are produced at a catchment scale and is not intended to depict specific flooding details for individual properties. We recommend obtaining site-specific engineering assessments to assess flood risk. The regionwide flood hazard maps are available on the Northland Regional Council Natural Hazards Map viewer <https://www.nrc.govt.nz/environment/natural-hazards-portal/hazard-maps/advanced-hazard-map-viewer/>

The regionwide flood hazard maps include the following flood hazard zones:

- *River Flood Hazards Zone - Regionwide models (10 year extent)*. Flood extent for the most common scenario - a flood with a 10% chance of happening in any year.
- *River Flood Hazards Zone - Regionwide models (50 year extent)*. The extent of a flood that has a 2% annual probability of happening.
- *River Flood Hazards Zone - Regionwide models (100 year extent CC)*. The extent of a flood that has a 1% annual probability of happening, taking the effects of climate change into account.

Northland Regional Council are continuing with their flood hazard modelling programme and as at October 2025 currently has draft flood models for Whangārei, Kerikeri, Northern Wairoa, Waima and Punakitere, Catchments. These models are not currently published as they go through peer review and quality checks. Flood hazards for these catchments can be requested from Northland Regional Council.

Surveyed and observed flood levels

Northland Regional Council records flood levels during flood and storm events which provides evidence of lands that are effected by flooding.

Surveyed River Flood Levels are available on the Northland Regional Council Natural Hazards Maps viewer.

<https://www.nrc.govt.nz/environment/natural-hazards-portal/hazard-maps/advanced-hazard-map-viewer/>

Information about observed Coastal Flood Levels is available on the Northland Regional Council's website.

<https://www.nrc.govt.nz/media/jtmbbgr1/historicobservedcoastalfloodlevelsnorthland2017.pdf>

Flood susceptible lands

Prior to undertaking flood modelling and mapping, Northland Regional Council identified land that could be susceptible to flooding based largely on soil type. This information should only be used where flood hazard modelling and maps are not available (upper Kaihu, upper Kerikeri and upper Rotokakahi and upper Waitangi, Waima and Punakitere catchments).

Flood susceptible land information is available on the Northland Regional Council Natural Hazards Maps viewer.

<https://www.nrc.govt.nz/environment/natural-hazards-portal/hazard-maps/advanced-hazard-map-viewer/>

River Flood Hazard Technical Reports

1. Scope of report:	Whangārei Catchment (Catchment M01)
2. Report Title:	Design Modelling Whangarei Catchment (M01)
3. Report date:	May 2021
4. Report prepared by:	Water Technology
5. Report commissioned by:	Northland Regional Council
6. Purpose of the report:	This report documents the calibration and design modelling methodology for Whangarei Catchment (M01), noting that this catchment was calibrated to the July 2020 flood event.
7. Where or how to access report:	River modelling technical reports https://www.nrc.govt.nz/resource-library-summary/research-and-reports/river-modelling-technical-reports/

Stormwater Catchment and Flood Management

This property has been identified as having information available under Stormwater Catchment and Flood Management, see map attached.

Overland flow paths provide indicative routes of where the surface stormwater may flow during rainfall events and the direction of this flow. Depression storage areas/surface depression ponding areas provide an indicative extent of ponding that may occur if the outlet to the ponding area is blocked or where the outlet capacity is exceeded, for example, if a pipe is either blocked or the design capacity of the pipe is exceeded during a rainfall event.

The Overland Flow Paths are a useful indicator of flow direction and location of where ponding will occur frequently during smaller events and before larger flooding may occur in major rainfall events.

The Overland Flow Path information was developed using LiDAR (Light Detection and Ranging) data. If the landform had changed since the LiDAR data was collected, the indicative Overland Flow Paths and depression ponding areas may not be accurate.

Climate change could make the natural hazard worse by increasing the amount and intensity of rain, which means more water could flow over land and follow these paths, leading to a higher risk of flooding.

Whangārei Stormwater Planning - Overland Flow Paths and Depression Storage Areas district wide report by Morphem Environmental Ltd, dated 4 October 2019, provided a technical overview of the scope, methodology, issues and limitations of the mapped Overland Flow Paths and indicative extent of surface depression areas.

The report can be viewed under the Whangārei Overland Flow Paths and Depression Storage Area section on our Natural Hazards web page: <https://www.wdc.govt.nz/NaturalHazards>

Refer disclaimer with the mapped OLFP and ponding
<https://geo.wdc.govt.nz/portal/sharing/rest/content/items/73a86bc1bfed41a3baf4842efbcf9ae1/data>

Land Instability

Whangarei District Council holds indicative information on land stability hazard for Whangārei. Information on land stability.

A landslide is defined as the downslope movement of a mass of earth, rock or debris under the influence of gravity. Whangārei District is susceptible to landslides due to a combination of steep topography, subtropical climate and the underlying geology which includes weak or expansive soil, weak rock and highly weathered, clay rich soils. Landslides are often triggered by intense or prolonged rainfall (as well earthquakes, loss of vegetation cover, leaky water infrastructure and earthworks) which will increase with the effects of climate change.

It is not possible to identify all potential or actual landslides or land instability. The absence of information in this section does not necessarily indicate the absence of a landslide risk.

‘Landslide susceptibility’ is the relative likelihood of future landsliding occurring based on underlying properties compared with surrounding areas. It does not indicate the size or frequency of potential landslides, or the potential for landslides to cause damage or loss.

This LIM includes maps which indicate Landslide Susceptibility in relation to this property and its surrounds - is **Low**. These maps are based on a district wide study entitled ‘Landslide Susceptibility Assessment for Whangarei District Council, October 2022.

These maps are a generalisation of available data, and do not represent site specific assessment. They are not intended to be viewed or relied upon on a property-level scale.

The Whangarei District Council may require site-specific investigations before granting future subdivision or building consent for the property, the level of investigation or assessment would depend on the level of stability risk of the area the property is in.

Technical report

1. Report Title:	Landslide Susceptibility Assessment for Whangarei District Council
2. Report date:	October 2022
3. Report prepared by:	Tonkin & Taylor Ltd
4. Report commissioned by:	Whangarei District Council
5. Purpose of the report:	The purpose and outcomes of this analysis and mapping is to: Provide a landslide susceptibility assessment and map that covers the Whangārei District and follows on from the landslide susceptibility assessment and mapping done previously but covered discrete areas of the district only.
6. Scope of report:	Whangārei District
7. Where or how to access report:	You can find the above report under the Land Instability section on our Natural Hazards webpage. Additional reports that may be relevant to Land Instability are also available at: https://www.wdc.govt.nz/NaturalHazards

Liquefaction

This property is located within an area classified as Liquefaction vulnerability category:

- **Undetermined** and can be viewed on the Council Hazard viewer:

<https://www.wdc.govt.nz/HazardsGISMap>

Please note: To view the liquefaction layer your map scale must be greater than 1:5000.

Liquefaction is a natural process where earthquake shaking increases water pressure in the ground in granular soils, resulting in temporary loss of soil bearing capacity. Liquefaction commonly leads to buildings 'sinking' on their foundations during the shaking - in line with that experienced in the 2011 Canterbury earthquakes.

Climate change is expected to cause sea level rise, and in turn an elevation of groundwater levels. Elevated ground water levels are likely to increase liquefaction susceptibility, but the extent of the increase has not been quantified by the report, nor Whangarei District Council.

Whangarei District Council commissioned Tonkin and Taylor Ltd to complete a district wide Liquefaction Vulnerability Study in August 2020. The report identifies and analyses the risk of liquefaction to help inform decisions about future development of land and buildings.

You can find the report under the Liquefaction section on our Natural Hazards web page:

<https://www.wdc.govt.nz/NaturalHazards>

Tsunami

Tsunami are a series of waves, typically created by submarine or coastal earthquakes, landslides (including underwater landslides) and offshore submarine volcanic eruptions. Tsunami may travel hundreds of kilometres an hour and pass by unnoticed at sea, but slow down and grow as they move to shallow water, causing significant damage when they make landfall.

This property is located in an area identified as **Green Zone - Safe Area**

With funding from the Natural Hazards Commission Northland Civil Defence and Emergency Management have modelled the tsunami risk and created Tsunami Evacuation Zone and Safe Zone map:

<https://experience.arcgis.com/experience/912cac3d84b64d55abe97b68e4980d94>

Technical Report for Tsunami Evacuation Zone and Safe Zone map

1. Scope of report	Regional
2. Report Title:	Tsunami Inundation Modelling for Evacuation Planning in Northland
3. Report date:	2024
4. Report prepared by:	Orca Consulting
5. Report commissioned by:	Natural Hazards Commission
6. Purpose of the report:	The objective of this study was to produce tsunami inundation and evacuation zones for the Northland region that are compliant with guidelines set forth in the document 'Tsunami Evacuation Zones: Director's Guidelines for Civil Defence Emergency Management Groups' (MCDEM, 2016). To define these zones, numerical modelling was undertaken to determining the extents of the tsunami inundation zones for the Northland Region. The study used a Level 3/Level 4 modelling approach (as defined in MCDEM 2016) whereby a physics based numerical model was used to model the evolution of the tsunami from source through to inundation. The study used multiple sources, both local and distant.
7. Where or how to access report	A copy is available upon request from Northland Regional Council

Erosion and Landslide

Erosion is any movement of soil, rocks or sand, under the influence of wind, water or gravity. Landslides are a type of erosion. A landslide is the downslope movement of a mass of earth, rock or debris under the influence of gravity. Te Taitokerau Northland is susceptible to landslides due to its steep topography, subtropical climate, and underlying geology. Landslides are often triggered by intense or prolonged rainfall (as well as earthquakes, loss of vegetation cover, leaky water infrastructure and earthworks), which will increase with the effects of climate change. Climate change is expected to increase erosion in Te Taitokerau Northland.

Northland Regional Council has modelled the region's relative risk of erosion and sediment loss to water and these have been published as Erosion and Sediment Risk at this link -

<https://experience.arcgis.com/experience/bf65abc23bc144e2a32cd1efd6094167>

The maps are based on a predictive model created using a range of information, including LiDAR (remote sensing technology that uses lasers to create 3D maps), soil and geology type, slope and climate data. The maps are designed as a tool to help landowners manage risks to water quality as a result of sediment loss to water - they provide an assessment of the relative risk of erosion and risk of sediment reaching waterways across Northland.

The maps do not provide a geotechnical assessment of land suitability for subdivision or built development, nor do they quantify the likelihood of future landslides or slips.

Technical Reports for erosion prone land

1. Scope of report	Regional
2. Report Title:	Northland's Landscape Driven Erosion Map: A Resources for Decision-Makers and Communities
3. Report date:	2025
4. Report prepared by:	Land and Water Science
5. Report commissioned by	Northland Regional Council
6. Purpose of the report:	This report was created for people across Northland-farmers, council staff, iwi and hapū, community leaders, and planners-who want to better understand a new regional tool called the Sediment-Process Attribute Layer, or S-PAL. S-PAL does not replace older soil or geology maps. Instead, it builds on those valuable foundations by adding a new layer of information made possible through modern datasets.
7. Where or how to access report	Northland Regional Council website: https://www.nrc.govt.nz/media/tr4ng33q/northlands-landscape-driven-erosion-map-lws-2025.pdf

1. Scope of report	Regional
2. Report Title:	The S-PAL Framework: Technical User Guide for Erosion Susceptibility Assessment and Mitigation
3. Report date:	2026
4. Report prepared by:	Land and Water Science
5. Report commissioned by	Northland Regional Council
6. Purpose of the report:	This User Guide explains how to use the S-PAL v 2.0 Framework to identify land that is prone to erosion across Northland. S-PAL stands for Sediment-Process Attribute Layers - a system that combines detailed maps and measurements to show where the land is most likely to erode and shed sediment into waterways.
7. Where or how to access report	Northland Regional Council website: https://www.nrc.govt.nz/media/qkofckd2/northland-erosion-and-sediment-risk-map-technical-user-guide-11jan2026.pdf

Draft subsidence report

Northland Regional Council have commissioned work into subsidence regions. The available report is Northland Region InSAR and Differential LiDAR Study. This report presents an analysis of surface deformation across the Northland region between January 2019 and August 2021 using InSAR (Interferometric Synthetic Aperture Radar), a technique for mapping ground deformation using space-borne radar images of the Earth's surface. This report was prepared in June 2026 by Harvey Geoscience.

Drought

Drought in Te Taitokerau Northland is a complex hazard to define and detect, and its impacts vary from one area to the other.

Technical Report for Northland Drought Assessment

1. Scope of report	Regional
2. Report Title:	Droughts in Northland: A Local and Regional Analysis
3. Report date:	2024
4. Report prepared by:	National Institute of Water and Atmosphere
5. Report commissioned by:	Northland Regional Council
6. Purpose of the report:	Analysis of the development, occurrence and severity of droughts in Northland Region.
7. Where or how to access report	Envirolink website: Droughts in Northland: A local and regional analysis https://www.envirolink.govt.nz/assets/Envirolink/2403-NLRC240-Droughts-in-Northland-A-Local-and-Regional-Analysis.pdf

In September 2024 the Ministry for the Environment and NIWA published national climate projections.

Droughts are expected to become more frequent and more severe in Te Taitokerau Northland by 2090.

Volcanic, Geothermal and Earthquake

There are many processes associated with volcanic eruptions, and these can be hazardous when they interact with people and/or infrastructure. The type and intensity of volcanic process will vary from volcano to volcano. There are two areas of past local volcanic activity in Northland, at Puhipuhi-Whangārei and at Kaikohe-Bay of Islands. While climate change does not affect volcanic eruptions, it can affect the risk from volcanic hazards such as lahars (volcanic mudflows) because of the forecast changes in rainfall.

Earthquakes occur when stress that has built up along a fault - a break in the Earth's crust - is suddenly released. Earthquakes can cause ground shaking, fault rupture, permanent ground movement, subsidence or lateral spreading, liquefaction, landslides, rock falls and tsunamis. Although climate change does not affect earthquakes, it can make some of the problems earthquakes cause, such as subsidence, liquefaction, and landslides, more likely or more severe. This is because climate change affects rainfall and groundwater, which play roles in these hazards.

While the earthquake risk in Northland is low, there have been earthquakes recorded in the region.

Northland Regional Council does not have a map of volcanic, geothermal or earthquake risk but did commission information on volcanic hazards as part of the review of natural hazards information for Northland region. This information relates to region-wide studies and may not reflect the on-site situation or natural hazard investigations and mitigation done on a site-specific property level.

Technical Report for earthquake information

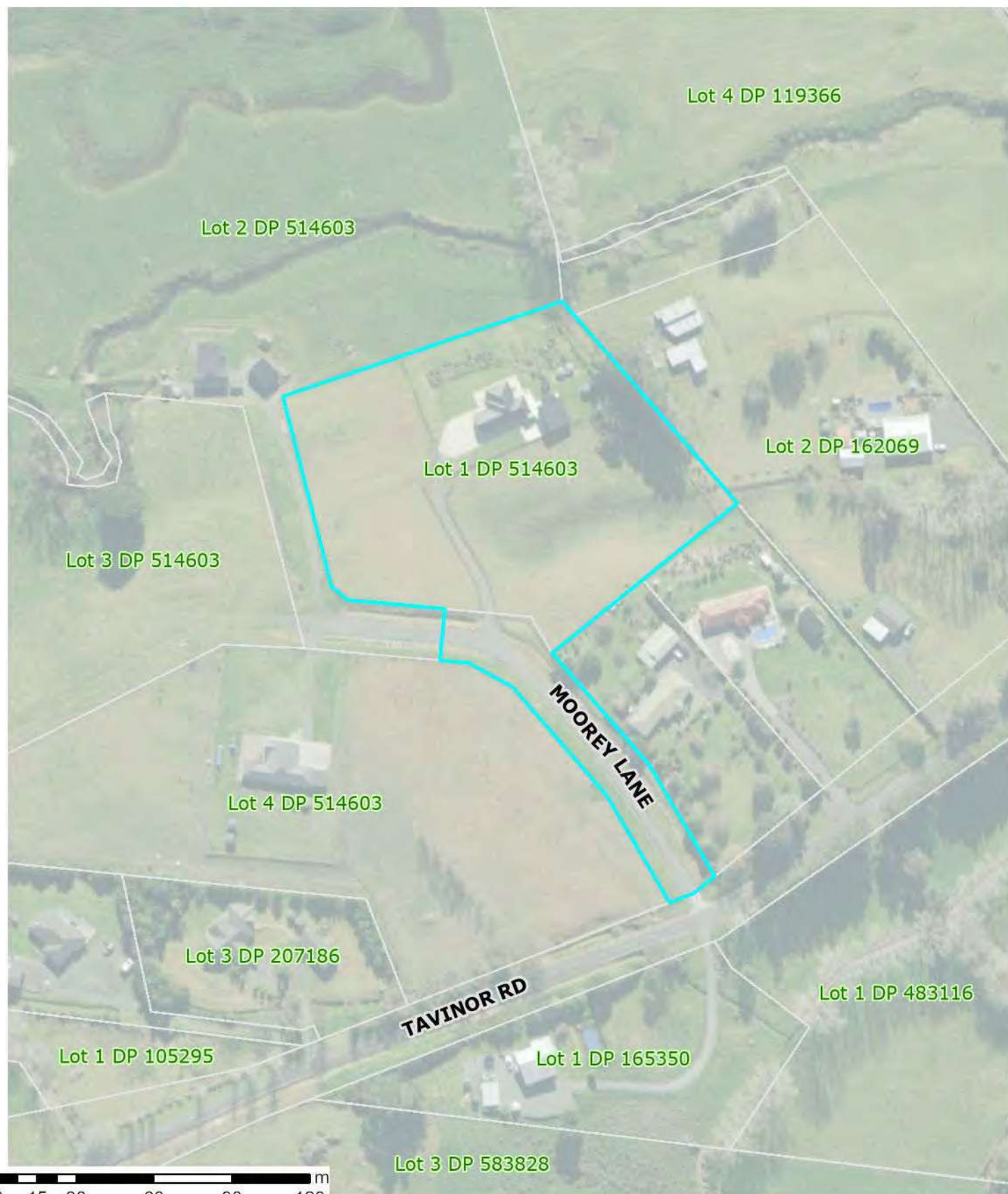
1. Scope of report	Regional
2. Report Title:	A review of natural hazards information for Northland region Section 2.0 Seismic Hazards
3. Report date:	2004
4. Report prepared by:	Institute of Geological & Nuclear Sciences Limited
5. Report commissioned by:	Northland Regional Council and Whangarei District Council
6. Purpose of the report:	The aim of this report is to assemble and present a review of existing information on natural hazards, including earthquakes. The report identifies gaps and possible future work. Please note sections on flooding and erosion prone land have been superseded by more recent work and modelling.
7. Where or how to access report:	Northland Regional Council Website https://www.nrc.govt.nz/media/2itixwuo/naturalhazards.pdf

Signed for and on behalf of Council:



Sophia Shaw
Property Information Officer

Property Map



New Subdivisions

- Proposed Pre-223
- 223 Certificate

New subdivisions: Proposed as accepted, pre-223 and 223 Certificate with set Conditions.

Land Parcel boundaries are indicative only and are not survey accurate. Area measurement is derived from the displayed geometry and is approximate. True accurate boundary dimensions can be obtained from LINZ survey and title plans

2 October 2026
Scale 1:2,000



Aerial Photography



This map includes New Zealand's most current publicly owned aerial imagery and is sourced from the LINZ Data Service.

2 October 2026

Scale 1:2,000



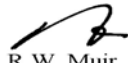
The information displayed is schematic only and serves as a guide. It is made available in good faith but its accuracy or completeness is not guaranteed. Parcel Information is provided by LINZ Data Service, licensed for reuse under CC BY 4.0. Other data sources: Eagle Technology, Land Information New Zealand, GEBCO, Community maps contributors, Whangarei District Council, Sourced from the LINZ Data Service and licensed for reuse under the CC BY



**RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD**

**Guaranteed Search Copy issued under Section 60 of the Land
Transfer Act 2017**




R.W. Muir
Registrar-General
of Land

Identifier **801470**
Land Registration District **North Auckland**
Date Issued 30 January 2018

Prior References
NA135C/36

Estate Fee Simple
Area 1.4524 hectares more or less
Legal Description Lot 1 Deposited Plan 514603
Registered Owners
Emilene Jardene Bowen and Murray Stewart Gamlin

Estate Fee Simple - 1/4 share
Area 2998 square metres more or less
Legal Description Lot 6 Deposited Plan 514603
Registered Owners
Emilene Jardene Bowen and Murray Stewart Gamlin

Interests

Appurtenant hereto are electricity and water supply rights specified in Easement Certificate B958941.10 - 22.2.1989 at 1:44 pm

The easements specified in Easement Certificate B958941.10 are subject to Section 309 (1) (a) Local Government Act 1974

Appurtenant hereto are electricity and water supply rights specified in Easement Certificate B958941.11 - 22.2.1989 at 1:44 pm

The easements specified in Easement Certificate B958941.11 are subject to Section 309 (1) (a) Local Government Act 1974

Land Covenant in Easement Instrument 7189977.3 - 15.1.2007 at 9:00 am

Subject to Section 241(2) Resource Management Act 1991 (affects DP 514603)

10906780.4 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 30.1.2018 at 11:43 am (affects Lot 1 DP 514603)

Subject to a right to convey computer media, electricity and telecommunications over part Lot 1 marked C on DP 514603 created by Easement Instrument 10906780.6 - 30.1.2018 at 11:43 am

Appurtenant to Lot 1 DP 514603 herein is a right to convey water created by Easement Instrument 10906780.6 - 30.1.2018 at 11:43 am

Some of the easements created by Easement Instrument 10906780.6 are subject to Section 243 (a) Resource Management Act 1991 (See DP 514603)

Subject to a right (in gross) to convey electricity, telecommunications and computer media over part Lot 1 marked C on DP 514603 and over Lot 6 DP 514603 in favour of Northpower Limited and Northpower Fibre Limited created by Easement Instrument 10906780.7 - 30.1.2018 at 11:43 am

The easements created by Easement Instrument 10906780.7 are subject to Section 243 (a) Resource Management Act 1991

Land Covenant in Easement Instrument 10906780.8 - 30.1.2018 at 11:43 am (affects Lot 1 DP 514603)

Land Covenant in Easement Instrument 10906780.9 - 30.1.2018 at 11:43 am (affects Lot 1 DP 514603)

Land Covenant in Easement Instrument 10906780.10 - 30.1.2018 at 11:43 am (affects Lot 1 DP 514603)

11881516.3 Mortgage to Westpac New Zealand Limited - 9.10.2020 at 11:54 am

Title Plan - DP 514603

Survey Number DP 514603
Surveyor Reference 26124 Jackson
Surveyor Sarah Rose Pascoe
Survey Firm Simpson Shaw Surveyors
Surveyor Declaration I Sarah Rose Pascoe, being a licensed cadastral surveyor, certify that:
 (a) this dataset provided by me and its related survey are accurate, correct and in accordance with the Cadastral Survey Act 2002 and the Rules for Cadastral Survey 2010, and
 (b) the survey was undertaken by me or under my personal direction.
 Declared on 09 Jan 2018 01:38 PM

Survey Details

Dataset Description Lots 1-4 and 6 being a subdivision of Lot 5 DP 207186
Status Deposited
Land District North Auckland
Submitted Date 09/01/2018
Survey Class Class B
Survey Approval Date 09/01/2018
Deposit Date 30/01/2018

Territorial Authorities

Whangarei District

Comprised In

CT NA135C/36

Created Parcels

Parcels	Parcel Intent	Area	CT Reference
Lot 1 Deposited Plan 514603	Fee Simple Title	1.4524 Ha	801470
Lot 6 Deposited Plan 514603	Fee Simple Title	0.2998 Ha	Multiple
Lot 4 Deposited Plan 514603	Fee Simple Title	2.2517 Ha	801473
Area A Deposited Plan 514603	Easement		
Area B Deposited Plan 514603	Easement		
Area C Deposited Plan 514603	Easement		
Area D Deposited Plan 514603	Land Covenant		
Area E Deposited Plan 514603	Easement		
Area G Deposited Plan 514603	Easement		
Esplanade Strip F Deposited Plan 514603	Esplanade Strip		
Lot 3 Deposited Plan 514603	Fee Simple Title	3.2757 Ha	801472
Lot 2 Deposited Plan 514603	Fee Simple Title	13.9717 Ha	801471
Total Area		21.2513 Ha	

Schedule / Memorandum

Land Registration District

North Auckland

Survey Number

LT 514603

Territorial Authority (the Council)

Whangarei District

Memorandum of Easements

Last Edited: 28 Aug 2017 15:49:42

<u>Purpose</u>	<u>Shown</u>	<u>Servient Tenement</u>	<u>Dominant Tenement</u>
Right of Way	B	Lot 2	Lot 3
Right to convey computer media, electricity, telecommunications	A, B	Lot 2	Lot 3, Lot 4
	C	Lot 1	Lot 2, Lot 3, Lot 4
Right of Way	A	Lot 2	Lot 3

Schedule of Easements

Last Edited: 09 Aug 2017 10:51:28

<u>Purpose</u>	<u>Shown</u>	<u>Servient Tenement</u>	<u>Dominant Tenement</u>
Right to convey water	B, E	Lot 2	Lot 4
	G	Lot 2	Lot 1

Memorandum of Easements in Gross

Last Edited: 30 Nov 2017 10:22:46

<u>Purpose</u>	<u>Shown</u>	<u>Servient Tenement</u>	<u>Grantee</u>
Right to convey electricity, computer media, telecommunications	B, A	Lot 2	Northpower Ltd & Northpower Fibre Ltd
	Lot 6	Lot 6	Northpower Ltd & Northpower Fibre Ltd
	C	Lot 1	Northpower Ltd & Northpower Fibre Ltd

Notes

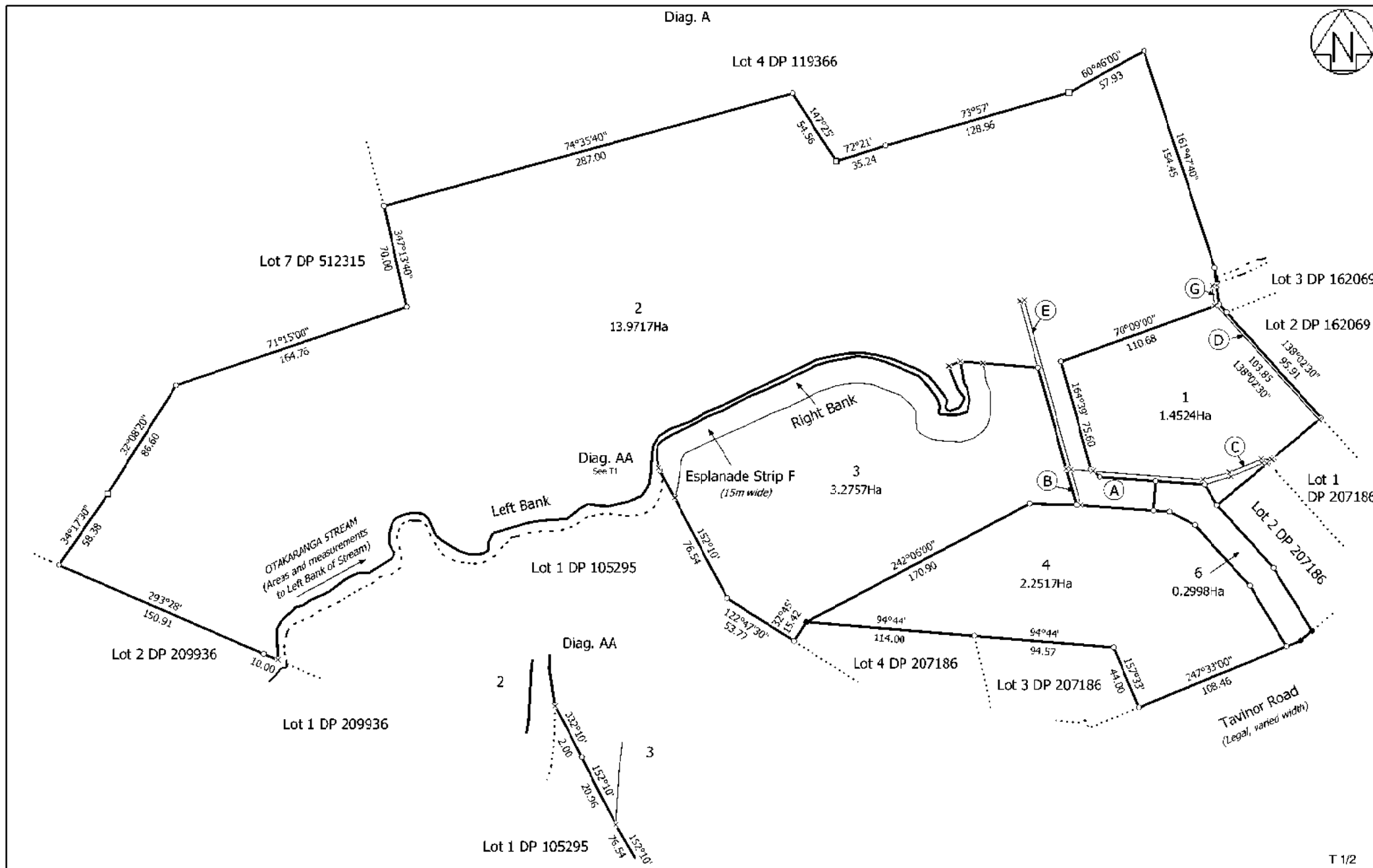
Last Edited: 21 Aug 2017 11:08:09

Area D is to be subject to a Land Covenant

Amalgamation Conditions

Last Edited: 07 Sep 2017 14:31:35

That Lot 6 (Private Road) be held as to 4 undivided one fourth shares by the owners of Lots 1 - 4 hereon as tenants in common in the said shares and that individual certificates of title be issued in accordance therewith. See LINZ ref 1419104



Land District: North Auckland

Lots 1-4 and 6 being a subdivision of Lot 5 DP 207186

Surveyor: Sarah Rose Pascoe
Firm: Simpson Shaw Surveyors

Title Plan
DP 514603

Deposited on: 30/01/2018

Digitally Generated Plan

Generated on: 15/02/2016 11:25am Page 3 of 4

**CONSENT NOTICE PURSUANT TO SECTION 221
RESOURCE MANAGEMENT ACT 1991**

IN THE MATTER of the Resource Management Act
1991 ("the Act")

AND

IN THE MATTER a subdivision consent as evidenced by
Deposited Plan No 514603

AND

IN THE MATTER of a Consent Notice issued pursuant to
Section 221 of the Act by the
Whangarei District Council ("the
Council")

IT IS HEREBY CERTIFIED that the following conditions, to be complied with on a continuing basis by the subdividing owner and subsequent owners, were imposed by the Council as conditions of approval for the subdivision as effected by Land Transfer Plan 514603 ("the Plan")

1. The following conditions are to be complied with on a continuing basis by the subdividing owner and subsequent owners of Lots 1 - 4 and a consent notice pursuant to Section 221 of the Resource Management Act 1991 shall be registered specifying the following conditions:

Lot 1

- i) No development shall occur in Land Covenant Area D, which should continuously be planted with flax.

Lots 1 - 4

- i) Any development shall comply with the restrictions and recommendations (building construction, wastewater and stormwater management and access) identified in the Hawthorne Geddes Engineers & Architects Ltd engineering suitability report reference 6756 Rev. 3 dated 4/11/2016 as approved by Council, a copy of which is held in Council under References SD1600222 and P124827), unless an alternative engineering report prepared by a suitably experienced Chartered Professional Engineer is approved in writing by Council, including any built development within the defined building areas.
- ii) Upon construction of any habitable dwelling, sufficient water supply for firefighting purposes is to be provided by way of tank storage or other approved means, and that this water supply be accessible by firefighting appliances in accordance with Council's Environmental Engineering Standards 2010 and more particularly with the 'NZFS Fire Fighting Code of Practice SNZ PAS 4509:2008'. Demonstration of achievement of an

Rgj

alternative means of compliance with this standard will be considered to satisfy this requirement but note that written approval from the NZ Fire Service is required.

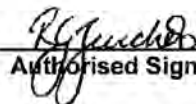
- iii) The owner shall be responsible to ensure that any further development of the site including building sites, earthworks, drainage works, effluent disposal fields & vehicle access formations will be undertaken in such a manner that will not result in the obstruction or diversion of any existing overland flow path unless a specific design has been done by an IQP or Chartered Professional Engineer which mitigates potential adverse flooding effects on any neighbouring properties created by the obstruction or diversion and is approved in writing by the Senior Environmental Engineering Officer.

Note Overland flow paths are to be assessed in accordance with Section 4.9 of Council's Environmental Engineering Standards 2010 Edition and are to be certified by an IQP/CPEng.

- iv) The registered proprietors for the time being shall bring to the attention of future purchasers that no conventional telecommunications connections have been provided as part of the subdivision works, and it is intended that wireless or satellite technology be utilised if/when a telecommunications connection is required.
Installation of such a connection will be the sole responsibility of the lot owner when a connection is required.

DATED at ~~WHANGAREI~~ this 10th day of ~~DECEMBER~~ 2017.

SIGNED by WHANGAREI DISTRICT
COUNCIL pursuant to the authority of
the Council given pursuant to the Local
Government Act 2002 and the Resource
Management Act 1991



Authorised Signatory



In reply please quote: 6756 Rev. 3

04 November 2016

Kairuri Properties Ltd
Otaika Valley Rd
RD 10
Whangarei 0170

Attention: Kevin Jackson

PROPOSED SUBDIVISION OF LOT 5 DP 207186, TAVINOR ROAD
ENGINEERING SUITABILITY REPORT FOR REVISED SCHEME PLAN

Purpose

It is proposed to subdivide the above property to create four new Lots. The purpose of this report is to provide an engineering assessment for the latest scheme plan.

We prepared suitability in 2009 for a different scheme. A revised scheme plan has been prepared by Simpson Shaw Surveyors (Ref. 26124-25, dated 21 September 2016, Rev C). The main difference between the scheme plans is that the public road to vest is now a private road and the southern boundary of Lot 2 has been moved to the south of the stream.

This report supersedes our previous report of 21 December 2009.

Site Description

The property is an irregular shaped area of some 21.3ha within a broad valley. The southern property boundary with Tavinor Road is some 130m long.

From the road frontage is a relatively level terrace some 100m across. Ground level reduces by about 2m to an essentially flat terrace some 30m across. A second drop of around 2.5m is down to a lying flood plain more than 50m wide. Otakaranga Stream meanders through this flood plain flowing from west to east.

On the northern side of the low-lying flood plain is a hummocky slope with gradients averaging less than 5H:1V. Locally the slopes are up to 2.5H:1V. This slope continues several hundred metres horizontally above the property.

At the time of our investigation most of the property was grass pasture. The stream is choked with willows in some sections.



Proposal

The proposal is to create four residential Lots of between 1.44ha and 13.95ha. A private road some 130m long will be constructed to provide access to all four Lots. A pan handle is proposed to provide access for Lots 2 and 3.

Geotechnical Investigation

The Whangarei Geological Map (Geology of the Whangarei Urban Area; GNS Geological Map 26, 1:25,000) indicates the valley is underlain by "*Alluvium comprising undifferentiated gravel sand and mud. Slopes on either side of the valley comprise Whangai Formation (grey to white siliceous mudstone, commonly shattered and sheared*".

Boreholes drilled on the slopes on the northern side of the valley are consistent with weathered mudstone of the Whangai Formation.

A total of seven boreholes were drilled. Boreholes BH1 and BH2 were drilled on the flat terraces on proposed Lots 1 and 3. These two boreholes encountered similar soils. This comprised low plasticity grey-brown-to-grey-white clayey silt. These soils graded to sandy silt below 2m. Shear vane strength were typically greater than 100kPa.

Groundwater was not encountered on completion of the investigation. We would expect groundwater levels across the relatively level valley to be similar to the stream level. During a recent inspection we observed a wet depression close to the house site on proposed Lot 1. The slopes along the northern boundary may have elevated groundwater levels during winter which is expected to at a depth of at least 1m.

Boreholes have been drilled at two potential house sites at the base of the slope on proposed Lot 2. Boreholes on the slope encountered weathered mudstone soil profile. This comprises light grey, high plasticity stiff-to-very-stiff clayey silt to depths of between 1m and 2.5m. This overlies yellow-brown-to-grey brown low plasticity silts. These soils are typically very stiff with shear vane strengths of greater than 100kPa. It is inferred that the Scala Penetrometer refused (20 blows/100m) on mudstone at depths of between 2m and 4m.

At the time of our investigation in 2008, we identified an area of uncontrolled fill. A review of aerial photographs since this time indicates additional uncontrolled fill. The approximate extent of uncontrolled fill shown on the attached site plan is based on aerial photographs and it is possible other areas have been filled.

Stability Assessment

The house sites on Lot 2 are at the base of the hummocky slopes on the northern side of the stream. This hummocky terrain is considered to indicate evidence of previous slope movement and marginal stability. In its current form the slope is not suitable for residential building development.

We recommend that building sites on these Lots be created by constructing a level fill platform at the base of the slope. This platform will essentially buttress the slope and improve stability of the slopes directly adjacent. The building platforms are shown on the attached cross-sections.

The building platforms shown on the attached plan for Lots 1, 3 and 4 are essentially level terraces more than 30m across and are not subject to instability.

We note that a significant area of fill is located within proposed Lots 3 and 4. This fill is not suitable for building. The buildable area excludes this area of fill.

Earthworks

The identified house sites on Lot 2 are on fill platforms. Fill may be obtained by shaping the slopes behind (above) the house sites to no steeper than 4H:1V. A typical cross-section for platforms at the house sites for either site is shown on the attached drawing.

Fill should be placed in accordance with the following requirements:

- Prior to commencing any cut or filling works topsoil should be stripped from the site and stockpiled for re-use at the completion of the bulk earthworks. Stripping should remove any organic or otherwise unsuitable material. We note most topsoil has previously been removed in the area to be developed.
- Prior to commencing filling works all uncontrolled fill should be removed from the area being developed. The subgrade shall be inspected by an engineer to confirm controlled fill or natural ground has been exposed.

Additional undercutting or subsurface investigation may be required at this time to confirm the quality of any remaining underlying fill.

- Fill should be spread and compacted at optimum moisture content in layers not exceeding 250mm loose thickness. Fill may require conditioning (wetting or drying) to meet the required specification.

Fill should be tested by in accordance with the following specification:

Cohesive (Clay) Fill

Shear vane testing:	> 140kPa average over 10 tests
	> 110kPa single value
Air voids testing:	< 10% average over 10 tests
	< 12% single value

Frequency

Fill testing should be completed at the following minimum frequencies:

- 1 test per each 0.5m lift per fill area worked

Ground Conditions for Foundations

Boreholes have been drilled at possible house sites on proposed Lots 1 – 3. The materials encountered in the boreholes area assessed as suitable for building in accordance with NZS 3604 terms of bearing capacity but are moderately-to-highly expansive. Specific engineering will be required for expansive soil conditions.

Given the historic and more recent uncontrolled fill, we recommend further investigation for Lots 1, 3 and 4 prior to building to confirm these areas are not underlain by fill.

Stormwater Disposal

Lots

In accordance with the WDC EES 2010, stormwater attenuation is not required where a residential Lot area exceeds 1ha and the impervious coverage is less than 5% (for residential development). Therefore attenuation is not required for any of the proposed Lots. If the future proposed impervious area on any Lot were to exceed 5%, which is considered unlikely, attenuation would then be required on that Lot for the excess area.

Stormwater disposal for the Lots shall be to land via a diffuse discharge swale. Diffuse swales are to be located down slope of the impervious areas within the lot boundaries and are to follow the contours of the land. In accordance with the WDC EES 4.12.2, the acceptable rate of dispersed discharge is less than 2l/s/m. Based on this rate it is calculated that a 1m (minimum) length of diffuse swale will be required for every 20m² of unattenuated impervious area on the site, discharging to the diffuse swale.

Private Road and ROW

Stormwater attenuation and treatment will be required to address the runoff generated by the private road and ROW. It is proposed to collect this runoff utilising two separate roadside attenuation swales with controlled discharges to the WDC roadside drain alongside Tavinor Road from the private road, and via a diffuse swale towards the Otakaranga Stream from the ROW serving Lot 3.

The attenuation swales have been designed to address the runoff generated by a 20% AEP (5-year ARI) and a 1% AEP (100-year ARI) storm event with an allowance of 20% for climate change, limiting the proposed additional impervious area runoff to 80% of the pre-development runoff rate in accordance with WDC EES 2010.

The road and ROW areas were modelled in HydroCAD adopting modified rational method (1:2 rise:fall) for pre- and post-development with storm event established from HIRDS v3.

For details of runoff coefficients, refer to the attached HydroCAD report summary sheets. The pre-development has been defined as 525m² for the ROW and 1575m² for the road, both of grass with a hydrological soil type C.

The pre-development runoff rates were defined by applying a 20% AEP and a 1% AEP storm events with a 60 min duration and then limiting peak flow to 80%. The resulting pre-development peak flows are calculated as 2.3l/sec for the 20% AEP storm event and 5.6l/sec for the 1% AEP for the ROW and 7.0l/sec for the 20% AEP storm event and 16.7l/sec for the 1% AEP for the road. These have been used as the upper limits for controlled runoff post-development peak flows.

The ROW has been modelled with a total area of 525m², allowing 300m² for a 6m wide ROW 50m in length, 75m² for the 1.5m wide length of filter strip and 150m² for the 3m wide length of attenuation swale. The road has been modelled with a total area of 1575m², allowing 900m² for a 6m wide ROW 150m in length, 225m² for the 1.5m wide length of filter strip and 450m² for the 3m wide length of attenuation swale. For the purpose of runoff generation calculations, the swale areas have been assumed as impervious surfaces, along with the sealed road and ROW areas. All runoff from the road and ROW are to shed towards the swales.

Both swales are to be 400mm deep with a 600m base width and 3:1 sides. The swale to the ROW will be 50m in length and the road swale will be 150m. Discharges from the two swales will be via a two staged orifice outlet, with the 20% AEP event controlled through an orifice at the base level of the swale and the 1% AEP event controlled by the overflow. Refer to the attached HydroCAD report summary sheets and drawings for details for the construction requirements and discharge controls. Longitudinal gradients shall be no greater than 0.75% to retain compliant storage volumes.

The post-development peak flows for the ROW are calculated as 2.3l/sec with a 84min critical duration for a 20% AEP storm event with a 20% allowance for climate change effects and as 5.5l/sec with a 126min critical duration for a 1% AEP storm event with a 20% allowance for climate change effects. The post-development peak flows for the road are calculated as 6.5l/sec with a 99min critical duration for a 20% AEP storm event with a 20% allowance for climate change effects and as 16.2l/sec with a 123min critical duration for a 1% AEP storm event with a 20% allowance for climate change effects.

In accordance with the WDC EES 4.12.2 and the acceptable rate of dispersed discharge of less than 2l/s/m, the diffuse swale for the controlled ROW discharges will be a minimum of 3m in length.

Stormwater Treatment

The primary source of contaminants from the development is associated with the private road and ROW. Treatment to the runoff is proposed by utilising a grass filter strip along the edge of the sealed road or ROW surface. The filter strips have been designed in accordance with ARC TP10. A 1.5m wide filter strip will be required along the full length of the road and ROW to treat the associated runoff. Refer to the attached calculations.

Flooding

We have undertaken an assessment of the peak flood flows using ARC TP108 methodology and Regional Flood Estimation technique. The catchment is approximately 10km² and extends some 8km to the slopes of Maungatapere.

The geology of the catchment is predominantly (~80%) heavy clay with the upper catchment (>20%) volcanic. The catchment is over half pasture with the remainder in forestry and bush. We have conservatively estimated an SCS CN value of 84 for the catchment.

Based on the above we have calculated a time of concentration for the catchment of around 6 hours. The peak flood flow is estimated for a 100-year storm event to be around 100m³/s using TP108. The regional flood estimation gives a peak flood value of around 75m³/s $\pm$ 30%, which gives an upper bound peak flood flow of 100m³/s. The two methods give a similar estimate for peak flows in a 100-year event. The TP108 method indicates the peak flow to be around 58m³/s for a 10-year ARI event.

Survey data has been provided by Simpson Shaw Surveyors. The stream channel is approximately 10m wide at the road crossing and some 1m – 1.8m deep.

We have estimated flood levels for the cross section using HydroCad. We have assumed that the channel is relatively blocked with a Manning's 'n' value of around 0.045 – 0.06. The land either side of the channel is grass pasture with a Manning's 'n' value estimated at 0.035.

Our analysis indicates the 100-year flood level is around 1m above the left hand (northern) bank. The 10-year flood level is estimated at around RL 95.9m or 600mm above the bank level. Flow velocities in the channel are less than 1.5m/s.

Existing ground levels for proposed Lots 1, 3 and 4 are above this flood level. The building site on proposed Lot 2 shall be raised at least 1.5m above the northern stream bank to provide adequate freeboard.

On-Site Effluent Treatment and Disposal Assessment

All Lots require on-site treatment and disposal systems. Individual on-site systems installed during building development are proposed on each Lot.

We have undertaken assessment of on-site disposal based on the permitted activity rules of the Regional Water and Soil Plan (RWSP) for Northland. The RWSP permitted activity rules list a number of items that have to be complied with based on the level of treatment (either primary; conventional septic tank or secondary; such as aerated systems).

AS/NZS 1547 provides Site and Soil Evaluation (SSE) procedures for subdivisions to meet the performance based objectives of the standard. The purpose of the SSE is to identify public health, environmental and regulatory factors that could impinge on the location of disposal systems. In addition an evaluation of site and soil characteristics to determine feasible options for design and sizing of the disposal system is required.

Procedures for the SSE include a desktop study, Site and Soil Check (SSC), and detailed site and soil assessment.

The following information was reviewed as part of the desktop study:

- WDC aerial photographs show that the property is mostly grass pasture with a significant stream in the centre of the site. The GIS hazard maps indicate that the flood plain either side of the stream is subject to flooding.
- The Whangarei Geological Map (Geology of the Whangarei Urban Area; GNS Geological Map 26, 1:25,000) indicates the valley is underlain by alluvium comprising undifferentiated gravel sand and mud. The drainage characteristics of this can be highly variable.

Slopes on either side of the valley comprise Whangai Formation (grey to white siliceous mudstone, commonly shattered and sheared. This soil type is typically poorly drained and stability sensitive).

- The expected available areas (EAA) for discharge of treated effluent from this desktop study are on relatively flat to gently sloping ground adjacent to the proposed building sites, above the flood susceptible area.

The EEA are more than 30m from the stream which complies with the permitted activity rules for surface water separation.

We have undertaken a SSC and the following items are addressed as set out in the standard:

- (a) We have assessed the likely volume of water based on a typical four-bedroom dwelling with extra wastewater producing appliances such as a dishwasher. The water supply is most likely to be roof water collected in a tank. The expected volume of discharge for this type of dwelling is 1020 litres/day.
- (b) The EAA for discharge on Lot 2 will be on the gentle slopes (5H:1V) above and at the rear of the proposed house sites.

The EAA for discharge on Lots 1, 3 and 4 will be on the relatively flat terrace around the house.

- (c) The exiting land use in the EAA is pasture with evidence of previous cropping. These areas will be retired from grazing as the new lots are developed. There is an area of fill on proposed Lot 4 that is not suitable for effluent disposal.
- (d) The potential effect of discharging effluent treated to a high standard, at a low application rate and with suitable buffer/separation is considered negligible.
- (e) There are no specific water quality objectives for this catchment. The RWSP has generic water quality objectives but does not monitor this stream. Based on monitoring undertaken in other catchments with pastoral activities, we would expect that the water quality would be marginal with respect to the objectives.

The EAA is currently used for grazing. Retiring this land and the land adjacent to the stream from grazing is likely to have a significant positive effect of water quality.

- (f) Downstream of the site, the catchment of the Otakaranga Stream to the confluence with Otaika Stream is almost exclusively grazed pasture. We consider there are no environmental features of significance close to the site within the catchment.

- (g) N/A - a stream is within the site and is discussed in (e) and (f) above.
- (h) Subject to our recommendations above the risk of erosion and instability of slopes adjacent to the EAA is adequate.
- (i) The slopes along the northern boundary may have elevated groundwater levels during winter at a depth of around 1m. We expect winter groundwater levels across on Lots 1 and 3 may also be at less than 1.5m depth.

The depth of groundwater will preclude the use of primary treated (septic tank) effluent to shallow trenches. Secondary treatment with disposal by pressure compensated dripper irrigation (PCDI) is recommended for all lots.

Topsoil is severely pugged in places as a result of stock destroying the soil fabric of the topsoil. The recommended disposal option will have a positive effect on the hydraulic and treatment capacity of the topsoil.

- (j) The soils underlying the EAA on Lot 2 are likely to be poorly drained. As noted above, conventional disposal trenches are not recommended.
- (k) To reduce the likelihood of the treated effluent contaminating adjacent land or water, we recommend limiting on-site disposal to PCDI applied at a conservative rate to maximise nutrient removal by the soil and plants.

PCDI disposal requires a high standard of effluent treatment to prevent clogging of the drippers. In addition a high level of treatment will reduce the contaminant load to the disposal field. Wastewater treatment systems should be capable of treating effluent to the following improved secondary standard:

- Biological Oxygen Demand (BOD₅) <20mg/l
- Total suspended Solids (TSS) <30mg/l

To further mitigate the effects of on-site disposal, we recommend maximising separation between the disposal fields and the stream.

- (l) It is not expected that construction machinery will work in the vicinity of the EEA.
- (m) Permitted activity rules require systems have on-going monitoring and maintenance by an appropriately qualified person.

We have undertaken a soil assessment based on the results of the geotechnical investigation. The soils encountered on Lots 1, 3 and 4 are classified as imperfectly drained or category 4 soils in accordance AS/NZS 1547. The EAA will be on relatively flat ground or slopes less than 5H:1V. For this soil type a design irrigation rate (DIR) of 3.5 mm/day is recommended in AS/NZS 1547.

The soils encountered on Lot 2 are less permeable and are categorised as poorly drained light clay or category 5 soils in accordance with AS/NZS 1547. Furthermore, slopes on the EAA could have a gradient of up to 5H:1V. A DIR of 3mm/day is recommended for this soil type. There is a significant length of slope above the EAA so it is important to provide surface cut-off drains above the disposal area to reduce the hydraulic loading.

An indicative effluent disposal area has been sized based on a four bedroom home with tank water supply and upmarket fixtures producing some 1020 litres of effluent per day (based on AS/NZS 1547 design flows). We estimate that the disposal area of around 340m² is required on Lots 1 and 2 and around 300m² on Lots 3 and 4. Reserve areas of 30% of the total application area will need to be set aside; an additional 100m². Disposal areas are shown on these Lots with clearances to adjacent water courses and boundaries.

The following is a summary of the design requirements for Building Consent.

- Improved secondary treatment plant
- PCDI disposal system
- Minimum separation between disposal field and stream of 30m
- DIR for Lot 2 – 3mm/day, DIR for Lots 1, 3 and 4 – 3.5mm/day
- 30% reserve area
- Maintenance agreement to be included with building consent

Table 1 below sets out the requirements of the RWSP permitted activity rules and shows how these rules can be complied with.

RWSP Permitted Activity Requirement	Means of Compliance
Separation between the lowest point of the disposal system and groundwater.	Groundwater more than 600mm below surface
Minimum treatment levels for primary and secondary treated effluent.	Recommended treatment levels less than rule
Separation between the disposal and reserve area and groundwater bores.	No bores nearby – n/a
Separation between the disposal and reserve and any surface water.	Refer plan
Distribution of the effluent	Recommended PCDI
Design of the system in accordance with principles and procedures outlined in AS/NZS 1547:2000 'On-Site Domestic Wastewater Management'.	Typical disposal field shown on plan. Building Consent to be based on the recommendations
No surface runoff of any contaminants from the disposal area.	Mitigation measures referred to above to reduce risk contaminant loading and increase soil treat/plant uptake
No more than minor contamination of ground or surface water beyond the disposal system or boundary.	
The average volume of effluent discharged < 3m ³ /day.	Preliminary design suggest typical single house will have peak flow of around 1m ³ /day
The maximum volume of effluent discharge < 6m ³ /day.	
A reserve area is allowed for and set aside.	Shown on plan
Maintenance of the treatment and disposal system.	Building Consent should include maintenance agreement

Conclusions

We have undertaken an assessment of a proposed 4-Lot subdivision at Tavinor Rd, Otaika Valley. This included a geotechnical investigation with hand augered boreholes, stability assessment and hydrological calculations of flooding for the existing stream, stormwater management and on-site effluent disposal.

The investigation has identified stability-sensitive land over a significant area at the northern part of the property. Recommendations are made for development and provision of stable building sites.

An area of fill has been identified on Lots 3 and 4. This fill is not suitable for building and the buildable area shown on the scheme plan reflects this.

Stormwater treatment with grass filter strips is proposed for the private road.

An assessment of flood levels indicates all house sites will be above potential flood level for 100-year ARI events.

Recommendations are provided for on-site wastewater treatment and design to comply with the RWSP. We consider that these recommendations provide an appropriate level of mitigation of the effects of on-site disposal.

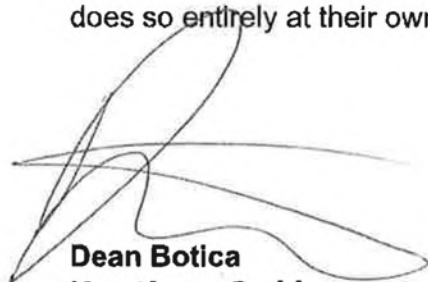
In terms of Section 106 of the Resource Management Act, and subject to our recommendations:

- (a) the land in respect of which a consent is sought, or any structure on the land, is not and is not likely to be subject to material damage by erosion, falling debris, subsidence, slippage, or inundation from any source; and
- (b) any subsequent use that is likely to be made of the land is not likely to accelerate, worsen, or result in material damage to the land, other land, or structure by erosion, falling debris, subsidence, slippage or inundation from any source; and
- (c) sufficient provision has been made for legal and physical access to each allotment to be created by the subdivision.

Therefore, we conclude that the property is suitable for residential subdivision.

Limitation

This report has been prepared solely for the benefit of our client Kairuri Properties Ltd and the Whangarei District Council in relation to the resource consent application for which this report has been prepared. The comments in it are limited to the purpose stated in this report. No liability is accepted by Hawthorn Geddes engineers & architects ltd in respect of its use by any other person, and any other person who relies upon any matter contained in this report does so entirely at their own risk.



Dean Botica
Hawthorn Geddes
engineers & architects ltd

Encl: Drawings – Sheets C101 – C104 (4x A3 pages)
Borelogs (7x A4 pages)
WDC Form EES SEW-1 (5x A4 pages)
HydroCAD Summary Report (10x A4 pages)
Stormwater Treatment Calculations (2x A4 pages)

WHANGAREI DISTRICT COUNCIL

Forum North • Private Bag 9023 • Whangarei 0148 • New Zealand
Telephone (09) 430 4200 • 0800 WDC INFO • Facsimile (09) 438 7632
Website <http://www.wdc.govt.nz> • mailroom@wdc.govt.nz

Form EES-SEW1

On-Site Wastewater Disposal Investigation/Site Evaluation Checklist for Resource Consent Application

This form is to be read in conjunction with AS/NZS 1547:2000 (or any amendments as applicable), and, in particular with Part 4: Means of Compliance

PART A – Contact Details

1 Applicant

Name: Kauriri Properties Ltd

Property Address: Tavinor Road

Lot/DP Number: Lot 5 DP 207186

2 Consultant/Site Evaluator

Site Evaluator Name: Dean Botica

Company Name: Hawthorn Geddes engineers and architects ltd

Postal Address: PO Box 575, Whangarei

Business Phone: 09 438 7139..... Fax:

Mobile: Email: db@hgcs.co.nz

IQP Registered²⁵ (see note below):

☒ Yes ☐ No (If no, details of suitably registered IQP who will countersign the report are to be supplied below)

Name of IQP who is countersigning report:

Company Name:

Postal Address:

Business Phone: Fax:

Mobile: Email:

²⁵ It is a requirement that the Evaluator be IQP registered to carry out on-site effluent investigations/designs. If not, then evaluation/design will need to be countersigned by a suitably registered IQP.

PART B – Site and Soil Evaluation

1 Desk Study

Requirements (tick appropriate box)

Please complete **all** options (if more than one option applies to land under consideration, please clarify with supporting information).

WDC Requirement	Applies to Lot(s)	Comments
1 Hazard maps/GIS hazard layer – stability		
Low instability risk		Not mapped
Medium instability risk		
High instability risk		
2 GIS hazard layer – effluent on slope stability		
Low disposal potential		Not mapped
Moderate disposal potential		
High disposal potential		
3 GIS hazard layer – effluent suitability		
Medium unsuitability	All Lots	
High unsuitability		
4 GIS hazard layer – flood susceptibility		
Is flood susceptible		
Is partially flood susceptible	Lots 1 – 3	Only in low-lying areas
Is not flood susceptible		
5 GIS land resource layer – streams		
Are there streams on or adjacent to land under investigation?	☒ Yes	Lots 2 and 3
	☐ No	
6 GIS land resources layer – aquifers at risk		
Is land situated over or adjacent to aquifer?	☐ Yes	
	☒ No	All Lots
7 annual rainfall (HIRDS)	1200	

Important Note

It is to be noted that **all** information obtained off WDC GIS/Hazard Maps is to be taken as a guide **only**.

All information obtained from the above sites is to be confirmed by a specific site investigation as localised conditions could vary substantially. However, should the above data checks indicate the potential for a hazard/non-complying activity etc, this **must** be further investigated to confirm/deny the indicated situation.

2 Consultant/Site Evaluator

a) Determination of Soil Category (refer table 4.1.1 AS/NZS 1547:2000) (tick appropriate box)

Soil Category	Structure	Applies to Lot(s)	Comments
1 Gravels & Sands	Structureless (massive)		
2 Sandy Loams	Weakly Structured		
	Massive		
3 Loams	High/Moderate Structured		
	Weakly Structured or Massive		
4 Clay Loams	High/Moderate Structured		
	Weakly Structured		
	Massive	Lots 1, 3 and 4	Based on logs
5 Light Clays	Strongly Structured		
	Moderately Structured	Lot 2	Based on logs
	Weakly Structured or Massive		
6 Medium to heavy clays	Strongly Structured		
	Moderately Structured		
	Weakly Structured or Massive		

Notes

Refer 4.1.A4 – Soil Assessment AS/NZS 1547:2000 for assessment criteria.

Details of the method used to determine soil type etc are to be clearly stated, along with positions of boreholes/test pits etc clearly marked on a site plan. Borelogs are to be provided. Photos should be included.

The site plan also clearly show the intended area for effluent disposal, along with any site features such as drains, water bores, overland flows etc, along with separation distance achieved.

On-Site Evaluation Continued

b) Site Characteristics for Proposed Disposal Area: (if there is a marked difference between sites, please fill in a separate form for each site and clearly note which site the assessment applies to) (tick appropriate box)

Details	Applies to site(s)
---------	--------------------

1 Flooding potential to proposed field and reserve field

Fields will not flood, or	All Lots
Fields will flood in:	
20% AEP event	
5% AEP event	
1% AEP event	

2 Surface water separation to proposed field and reserve field

Main/reserve disposal field comply with NRC rules	All Lots
Main/reserve disposal field do NOT comply with NRC rules	

3 Winter groundwater separation to proposed field and reserve field

Main/reserve disposal field comply with NRC rules	All Lots
Main/reserve disposal field do NOT comply with NRC rules	

4 Slope of ground of proposed field and reserve field

Description

5 Shape of ground of proposed field and reserve field

☐ Waxing divergent	☐ Linear divergent	☐ Waning divergent
☐ Waxing planar	☒ Linear planar (Lots 1, 3 and 4)	☐ Waning planar
☐ Waxing convergent	☐ Linear convergent	☐ Waning convergent

Comments: Lot 2 disposal is to undulating land.....

6 Intended water supply source	Applies to site(s)
Public supply	
Rainwater	All Lots
Bore	

7 Proposed method of disposal and recommended Daily Loading Rate (DLR)

Description:

Secondary Treatment to Pressure Compensated Dripper Irrigation (PCDI).....

Peak Loading factored in? ☐ Yes ☒ No

Comments:

8 Site Exposure	Description	Applies to Site(s)
Site(s) aspect	North – Lots 1, 3 and 4 South – Lot 2	
Predominant wind direction	SW	
Presence of shelter belts	Lots 1 and 4	
Presence of topographical features or structures	Lots are contained in wide west-east gully	All Lots

9 Proximity of water bores (include adjacent properties)

N/A

10 Visible evidence of slip/instability

Lot 2 – large area of instability at north of proposed Lot

11 Total suitable area available for type of effluent disposal proposed

More than 1000m²

12 Setback areas proposed (if any)

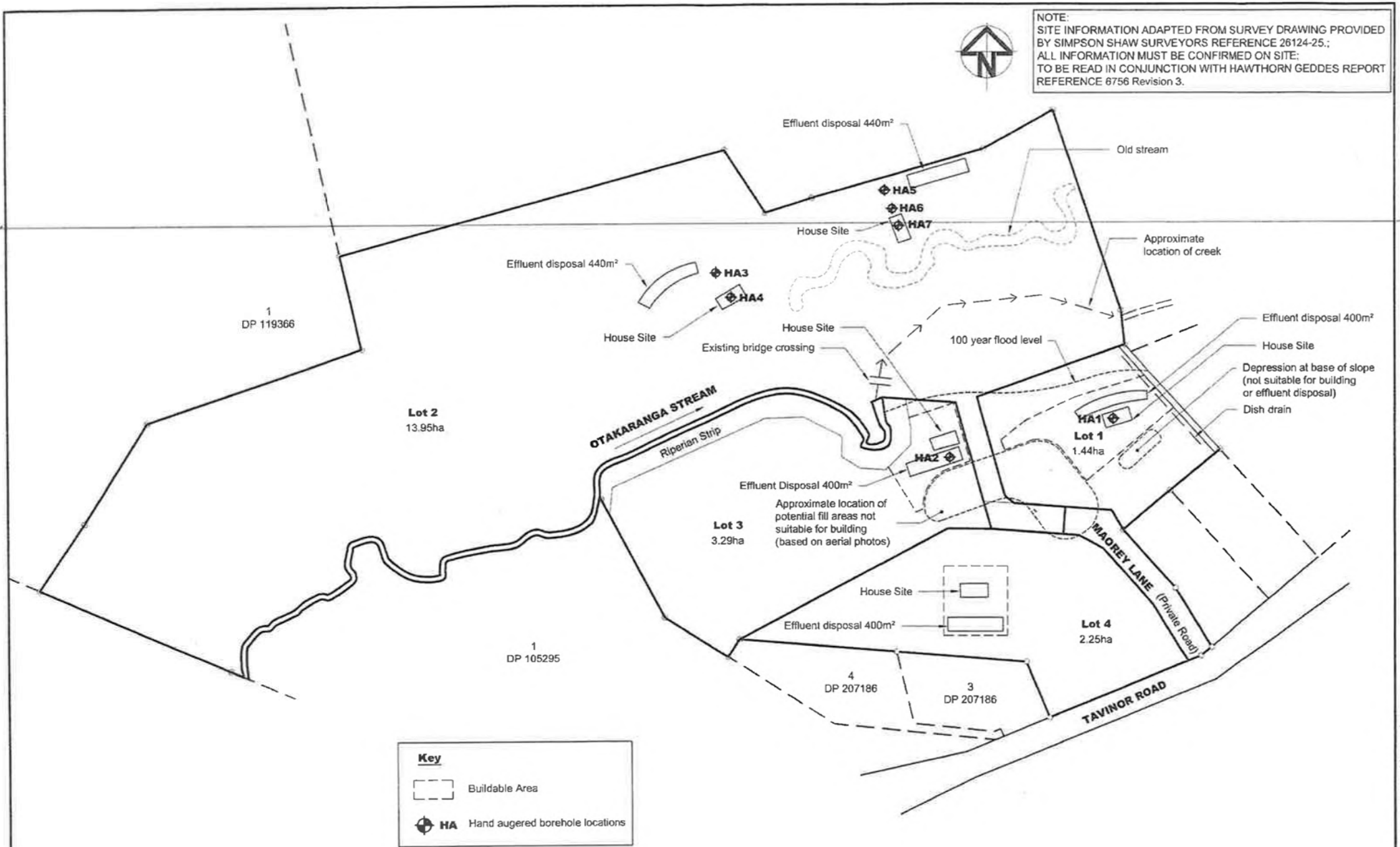
15m from surface water

Notes

- 1 If the WDC hazard maps/GIS indicate a flooding susceptibility on the site being evaluated, an on-site evaluation is to be carried out to determine the effects from 20%, 5% and 1% AEP storm events. This evaluation is to include all calculations to substantiate conclusions drawn. If necessary, include a detailed contour plan and photos.
- 2 NRC Water and Soil plan defines surface water as 'All water, flowing or not, above the ground. It includes water in continually or intermittently flowing rivers, artificial watercourses, lakes and wetlands, and water impounded by structures such as dams or weirs but does not include water while in pipes, tanks, cisterns, nor water within the Coastal Marine area'. By this definition, separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from any overland flow paths and/or swale drains etc or Resource Consent will be required from NRC. Surface water is to be clearly marked on each site plan, showing the extent of a 1% AEP storm event, and detailing separation distances to main/reserve disposal areas.
- 3 Positions of the test borehole(s) to be shown, and borelogs to be provided. Separation (complying with NRC rules) is to be maintained by both the proposed disposal and reserve areas from winter groundwater levels or Resource Consent will be required from NRC. If the investigation is done outside of the winter period, allowance is to be made in determining the likely winter level.
- 4 Slopes of ground are to be compared with those recommended maximums for type of system proposed (refer Appendix 4.2B AS/NZS 1547:2000). Designs exceeding those maximums will require specific design to justify the proposal, and may also need Resource Consent from NRC.
- 5 Shape of ground is important as it will determine whether there is potential for concentrated overland flows from the upper slopes and also if effluent might be concentrated at base of slope of leeching occurs. Refer Figure 4.1B2 AS/NZS 1547:2000.
- 6 The proposed system (for residential developments) should be sized to accommodate an average three-bedroom house with five people. Site in holiday areas need to take peak loading into effect in determining daily volumes. The design must state what DLR was used to determine area necessary (including reserve area). If ground conditions are marginal for type of disposal proposed, then a soil permeability test utilising the constant head method is to be carried out across the proposed disposal area. Refer Appendix 4.1F AS/NZS 1547:2000.
- 7 The site aspect is important as a north-facing site that is not sheltered from wind and sun by shelterbelts or other topographical features or structures will perform far better than a south-facing site on the lee of a hill that is shaded from wind and sun etc.
- 8 If any effluent disposal area (including reserve area) proposed has or is adjacent to areas that show signs of instability, then a full report from CPEng (Geotech) will be required to justify the viability of the area for effluent disposal.
- 9 If there are any water bores on the subject property or adjacent properties then a site plan will be required showing bore positions in relation to any proposed effluent field(s).
- 10 If setback areas are proposed to mitigate effects, the extent and position(s) need to be shown on a site plan.



NOTE:
SITE INFORMATION ADAPTED FROM SURVEY DRAWING PROVIDED
BY SIMPSON SHAW SURVEYORS REFERENCE 26124-25.;
ALL INFORMATION MUST BE CONFIRMED ON SITE:
TO BE READ IN CONJUNCTION WITH HAWTHORN GEDDES REPORT
REFERENCE 6756 Revision 3.



Key

[Dashed line] Buildable Area

[Symbol with 'HA'] Hand augered borehole locations

USE WRITTEN DIMENSIONS. DO NOT SCALE FROM DRAWING.

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Hawthorn Geddes
engineers & architects ltd

7 Selwyn Avenue
Whangarei 0110
PO Box 575
Whangarei 0140

Phone: 09 435 7139
Fax: 09 430 0711
email: hg@hgeddes.co.nz
Web: hawthorngeddes.co.nz

CLIENT **KAIRURI PROPERTIES LTD**

PROJECT **PROPOSED SUBDIVISION
TAVINOR ROAD
SITE PLAN**

RESOURCE CONSENT				SCALE @ A3 1:2500
DRAWN	TA	NOV 2016	PROJECT No	6756
CHECK				
APPROVED: JAMES BLACKBURN				SHEET C101
REV: REVISION DETAILS				
BY	ISSUED FOR CLIENT COMMENT	TA	09/01/16	REV R1
REV		BY	DATE	

4/11/2016 11:08:41 a.m. DWG 6756 161103 C01-C03.dwg



Whangarei District Council
Private Bag 9023, Te Mai
Whangarei 0143
Ph:0-9-430 4200
Email: mailroom@wdc.govt.nz

Rates LIM Report

As at: Friday, 2 October, 2026

Property Number 167820
Legal Description LOT 1 DP 514603 - HAVING 1/4SH IN LOT 6 DP 514603 BEING 0.2998HA
Assessment Number 0037017007
Address 16 Moorey Lane (Pvt) Whangarei 0170
Record of Title(s) 801470
Land Value \$435,000
Capital Value \$940,000
Date of Valuation 01-July-2024
Effective Date (used for rating purposes) 01-July-2025
Meter Location

Rates Breakdown (up to 30 June 2027)

Rates Charge	Charge Total
Regional Rescue Services	11.09
Uniform Annual General Charge	996.00
Regional Land and Freshwater Management	121.63
General Residential - Lifestyle	1,340.67
Stormwater	124.00
Regional Flood Infrastructure	43.11
Regional Economic Development	15.31
Regional Whangarei Transport Rate	29.70
Regional Emergency & Hazard Management	58.36
Regional Pest Management	110.40
Regional Council Services	214.35
Regional Sporting Facilities	7.94
Annual Charge Total	\$3,072.56

Opening Balance as at 01/07/2026 **\$-116.63**

Rates Instalments	Total
20/07/2026 Instalment	\$768.56
20/10/2026 Instalment	\$768.00
20/01/2027 Instalment	\$768.00
20/04/2027 Instalment	\$768.00
Rates Total	\$3,072.56

Balance to Clear **\$2,635.83**

Form 5

Building Consent No: BC2100069

Section 51, Building Act 2004

Issued: 9 March 2021

Project Information Memorandum No: PM2000227

The Building

Street address of building: 16 Moorey Lane (Pvt)
Whangarei 0170

Legal description of land where building is located: LOT 1 DP 514603
LLP: 129545

Building name: N/A

Location of building within site/block number: N/A

Level/unit number: N/A

The Owner

M S Gamlin
E J Bowen
685 Otaika Valley Road
RD 10
Whangarei 0170

Phone number: N/A

Mobile number: 021714320

Facsimile number: N/A

Email address: emilenebowen@hotmail.com

Website: N/A

Street address/registered office: 16 Moorey Lane (Pvt)
Whangarei 0170

First point of contact for communications with Council/building consent authority

Contact Person

A1 Homes Northland
PO Box 183
Ruakaka 0151

Phone number: 4330200

Mobile number: 0212707775

Facsimile number: N/A

Email address: a1northland@a1homes.co.nz

Website: N/A

Building Work

The following building work is authorised by this consent:

New Dwelling

This building consent is issued under section 51 of the Building Act 2004. This building consent does not relieve the owner of the building (or proposed building) of any duty or responsibility under any other Act relating to or affecting the building (or proposed building).

This building consent also does not permit the construction, alteration, demolition, or removal of the building (or proposed building) if that construction, alteration, demolition, or removal would be in breach of any other Act.

This building consent is subject to the following conditions:

Section 90 Building Act 2004

Section 90 Building Act 2004 Inspections by Building Consent Authorities applies. This building consent is subject to the condition that agents authorised by the building consent authority are entitled at all times during normal working hours or while work is being done to inspect land on which building work is being or is proposed to be carried out and building work that has been or is being carried out on or off the building site and any building.

Nominated Inspections are carried out to ensure that the building work is in accordance with the building consent. Completed Inspections will be classified as pass, or pass subject to remedial work or failed status.

The nominated inspections required are listed in Appendix A.

Compliance Schedule

A compliance schedule is not required for the building.

Attachments

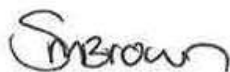
1. Appendix A.
2. Information on how to proceed with the building work.
3. The Project Information Memorandum for the building work covered by this building consent.

Documentation Required for Code Compliance Certificate

1. Copies of all Records of Work from Licensed Building Practitioners used on the project.
2. Producer statement construction (PS3) is to be submitted by a certifying drain layer for the construction of the on-site wastewater treatment and disposal system and confirming that the work complies with the approved building consent documents.
In addition, the following documentation is also required:
 - Commissioning statement
 - As built drainage plan
 - Maintenance agreement
 - Certificate of Compliance (Electrical)
3. Producer statement construction review (PS4) CM2 is to be submitted by the engineer for observation soil conditions Ribraft slab & on-site wastewater treatment and disposal system confirming work complies with the design approved under this building consent.
4. The electrician is required to submit an energy works certificate certifying that all electrical installations meet the requirements of Clause G9 (Electricity) of the New Zealand Building Code and the Electrical Regulations.

Additional Information

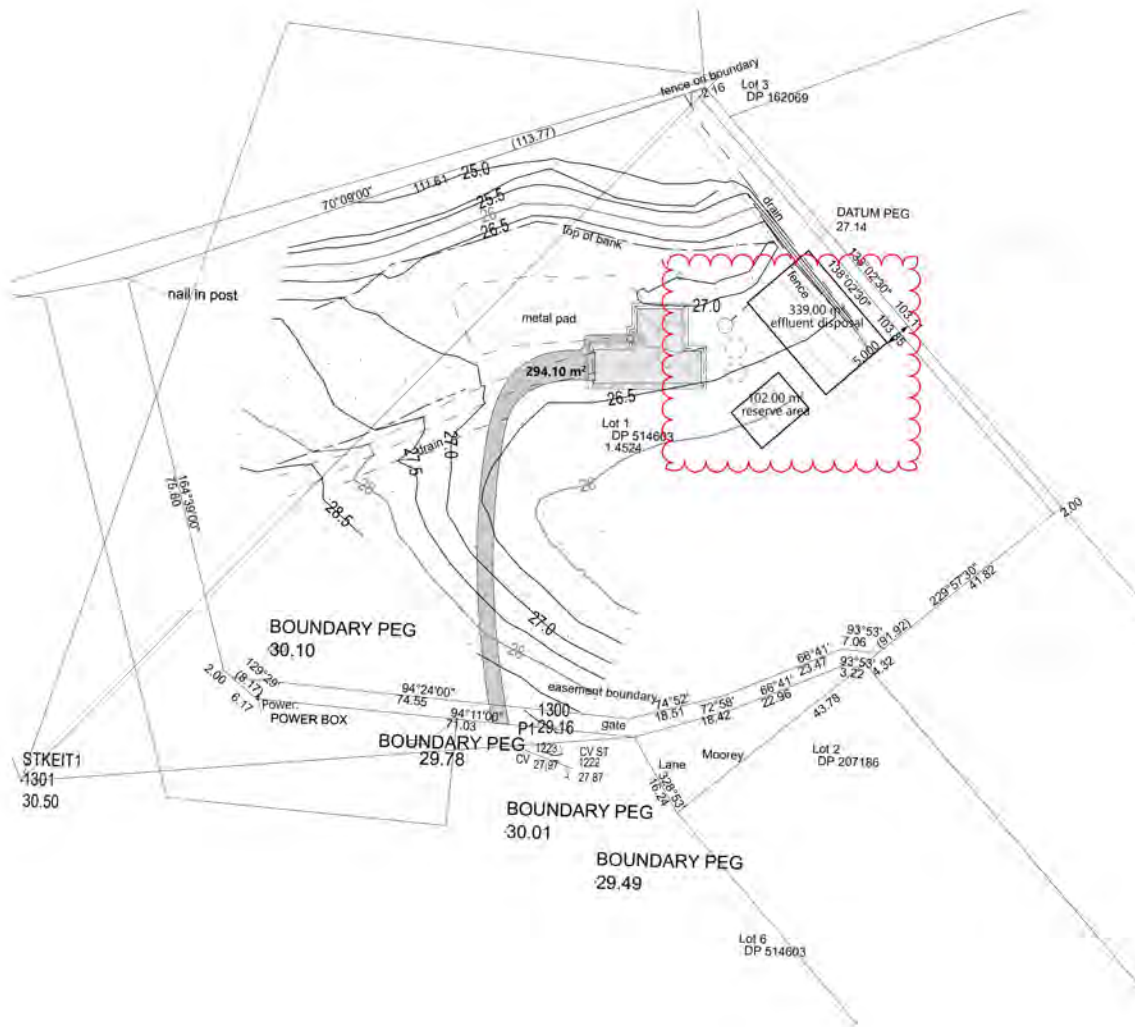
1. The applicant must control dust nuisance created by any site or building works.
2. Toilet facilities must be provided within reasonable distance of the construction site. Ground discharge is no longer acceptable.
3. Lapsing of building consent. For the purposes of S52(b) of the Building Act 2004, the period after which this consent will lapse if the building work to which it relates does not commence will be 12 months from the date of issue.



Stephanie Brown
Support Assistant – Building Processing
On behalf of Whangarei District Council

9 March 2021

Date



Cautionary Notes:
BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:
Before building is erected on site, all rubbish, noxious matter and organic matter shall be removed from the area to be covered by the building. Ensure final building platform & finished ground have an even fall away from building to ensure water not be allowed to accumulate in buildings subfloor. Any fill to be dry & approved by engineer & compacted down in accordance with NZS.3604.2011

Contractor to

- confirm ground has adequate bearing to comply with NZS 3604: 2011, except in the case of SED design, or when using Firth RibRaft Floor System (refer RibRaft manual).
- locate all service connections points on site prior to commencement of works. Check invert levels or pipes and manholes.
- confirm plumbing route and fixture positions on site prior to commencement of works.
- locate all electrical and water services on site.
- confirm on site all boundary bearings, lengths & peg locations on site prior to commencement of works, to ensure house position is correct.

Sediment Control:

- No building work will be started on this project until the construction of an approved stormwater outfall has been completed for this proposed Lot
- All erosion and sediment control structures are to be inspected and maintained daily
- Prevent any backfill or debris from washing onto Council or neighbouring properties
- All ground cover vegetation outside the immediate building area to be preserved during the building phase
- All erosion and sediment control measures are to be installed prior to commencement of earthworks
- Stockpiles of clay and materials are to be covered with impervious sheeting
- Roof water downpipes to be connected to the main stormwater system as soon as roof sheathing & spouting is installed

NZBC F5:
Construction and Demolition Hazards
Acceptable Solution F5/AS1

1.0 Work-Site Barriers
1.0.1 The necessity for barriers will depend mainly on the site location.
The need will be greater in areas with high levels of pedestrian traffic (i.e. in Central Business Districts), than in industrial or rural areas.
Barriers are not necessary for domestic dwellings up to 2 storeys above ground level unless specific hazards exist.
At all work-sites hazard evaluation will take account of:
1. Pedestrian counts adjacent to the site.
2. Car parking adjacent to the site.
3. Location of neighbouring buildings.
4. Presence of neighbouring work-sites or recreation areas.
5. Proximity to schools or early childhood centres.
6. Proximity to housing.
7. The depth of a water hazard.
8. The period of time for which ponded water will be present.
9. The accessibility and 'visibility' of the site.

1.0.2 If a work-site is not completely enclosed, and unauthorised entry by children is likely, it is acceptable for specific hazards to be fenced only when workers are absent from the immediate vicinity.

1.1 Site fences and hoardings
1.1.1 Fences and hoardings shall extend at least 2.0 m in height from ground level on the side accessible to the public.

1.1.2 An acceptable fence may be constructed with galvanised chainlink netting having a maximum sized grid of 50 mm x 50 mm. Post spacing shall be a maximum of 2.5 m, and the gap between the bottom of the fence and ground no greater than 100 mm.

Finished Floor Level (FFL) shall be:
a) For sites level with or above the road, no less than 150 mm above the road crown on at least one cross-section through the building and roadway
b) For sites below the road, no less than 150 mm above the lowest point on the site boundary

A potable water supply system shall be-
(a) protected from contamination; and
(b) installed in a manner which avoids the likelihood of contamination within the system and the water main; and
(c) installed using components that will not contaminate the water.

Lot: 1
DP: 514603
Site Area: 1.4524 ha
Gross Plan Area: 194.47 m² (incl. covered alresco & entry)
Site Coverage: 1.3 % (20% maximum)
Maximum Building Ht: 10m
Territorial Authority: Whangarei District Council
Planning Zone: Rural Production



DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional.

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LOCATION PLAN

Design: A1 Drawn: AW Check: AG/UP LBP: CH
Wind: HIGH Earthq: 1 Exposure: C Snow: NO Climate: 1

Scale: 1:1000
Rev: 2
Date: 26/02/2021
Call 0800 A1homes
214663
www.A1homes.co.nz

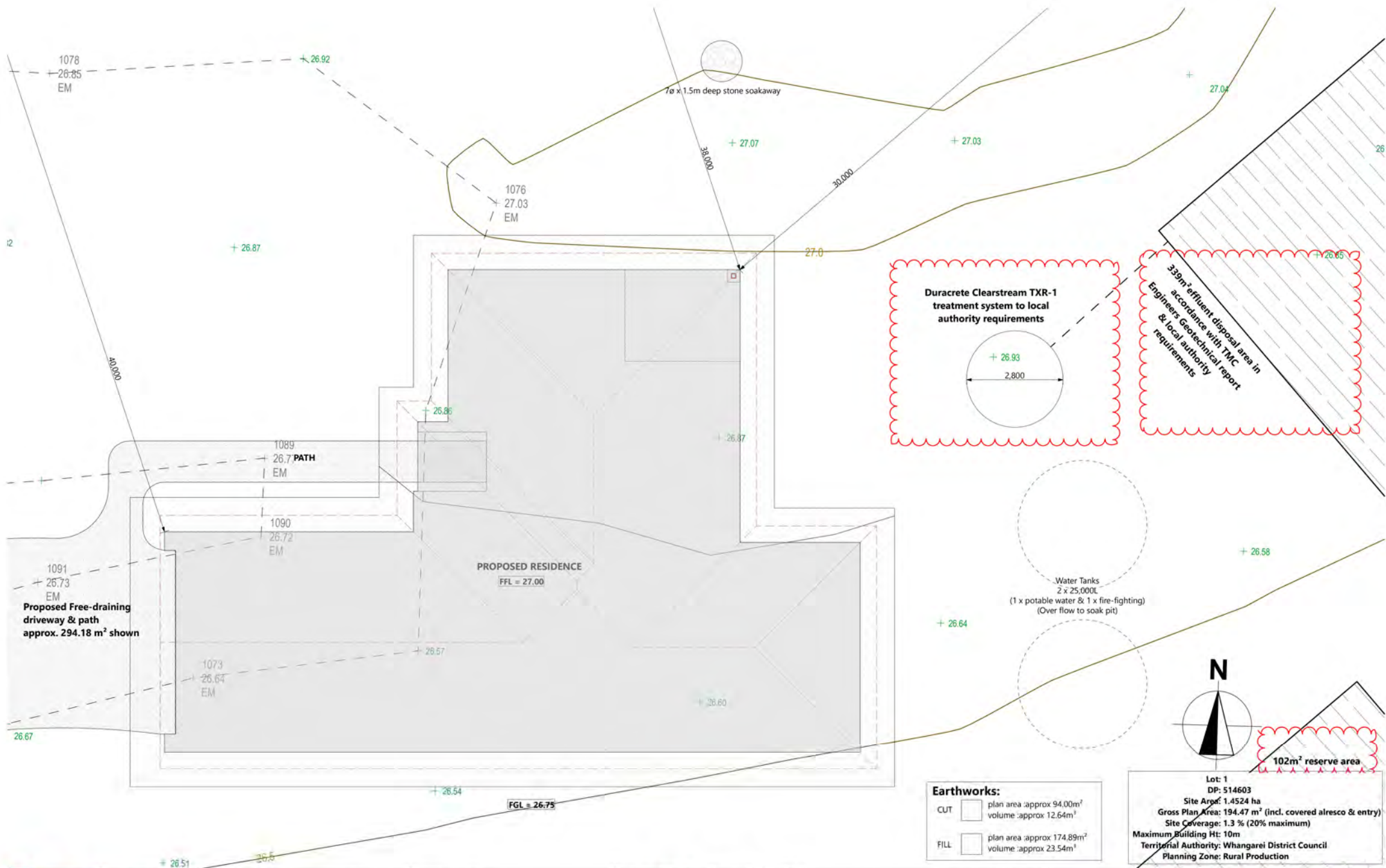
Client Details:
Emilene Bowen & Murray Gamlin
Address:
16 Moorey Lane
Otaika

Job no: P0725

KH174

BC2100069
APPROVED
02/03/2021

WHANGAREI DISTRICT COUNCIL BCA



FLOOR FINISHES:

Carpet
Family
Master Bedroom
Hall
Bedroom 2
Bedroom 3
Bedroom 4
W/R
Storage

Vinyl
Bath
Ens.
Entry
Kitchen
Dining

Concrete
Garage
Laundry

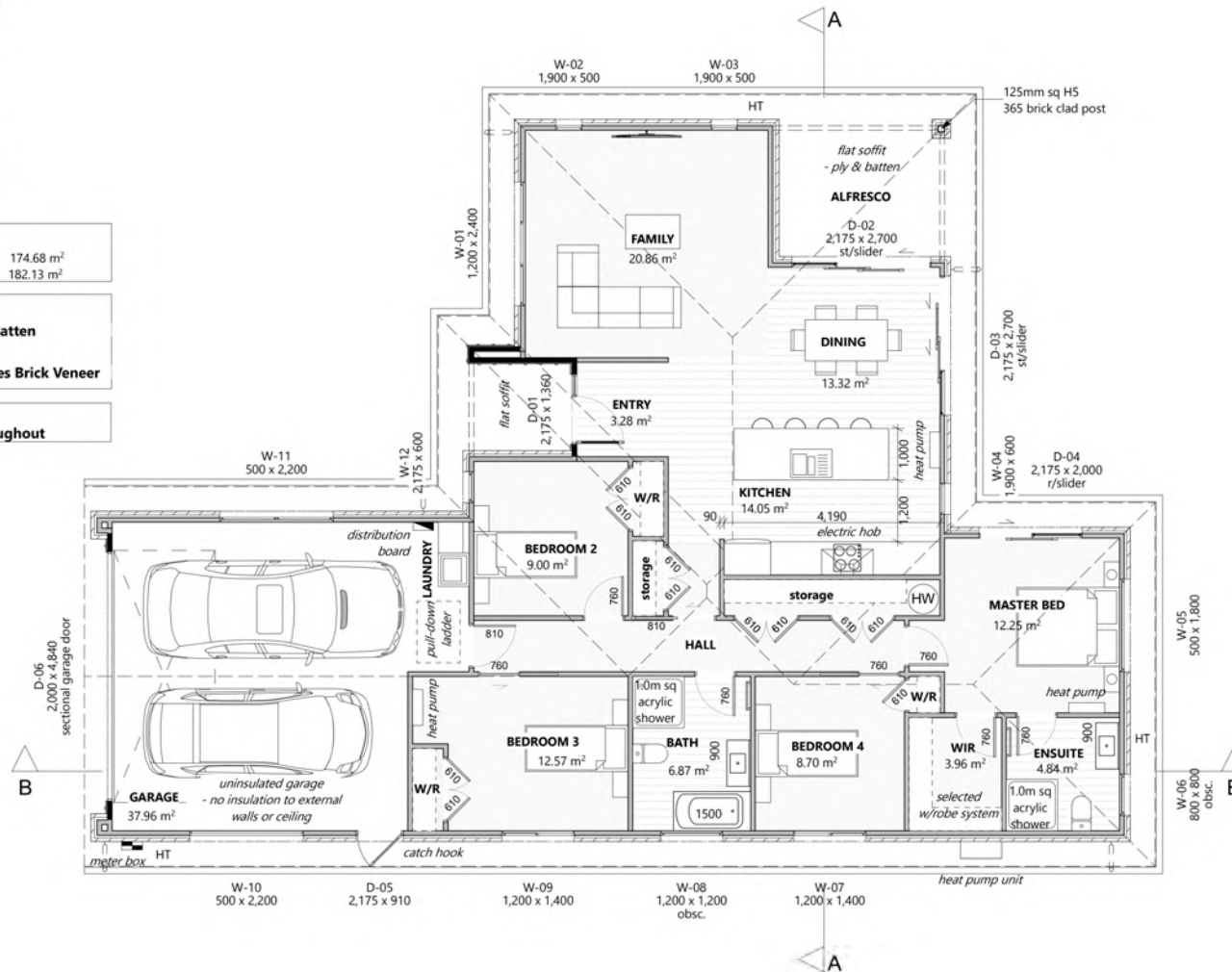
FLOOR AREAS:
o/frame area = 174.68 m²
o/brick area = 182.13 m²

CLADDING KEY:

Ply & Batten

70 Series Brick Veneer

Note:
2420 stud ht. throughout



Cautionary Notes:

Always cross reference the foundation plan with the framing plan prior to setting out

Joinery sizes shown are box sizes & are preliminary only.
Site measure and confirm all joinery sizes, reporting to designer any changes,
PRIOR to ordering joinery. No liability shall be held by designer for incorrect supply of joinery.

Refer to all written dimensions, DO NOT scale off drawings.

Construction Notes:

Electric hobs with vented r/hood.
Polybutylene water supply pipes.
Hot water supply pipes shall be thermally insulated to comply with H1/AS1 5.0
Mains pressure 180L HWC with tempering valve & seismic restraint in accordance with NZBC: 2004 section G12.
The delivered hot water temperature at any sanitary fixture used for personal hygiene shall not exceed 55°C

Tapered edge joints in ceilings
To reduce the risk of cracks caused by substrate movement, back-blocking of tapered edge joints is required in the following situations.
• When timber battens have been used:
Any area containing 3 or more tapered joints
• When steel battens have been used:
Any area containing 6 or more tapered joints

Please confirm layout & fittings of kitchen & bathrooms etc before foundation commences

Separation between electric hob and the Gib lined wall:
Cut out for hob: min. 55mm from back of bench top.
Overhead clearances: not less than 650mm from hob surface to range hood
Side clearances: Where dimension to any vertical combustible surface is less than 150 mm, surface shall be protected to a min. height of 150 mm above hob for full dimension (width or depth) of cooking surface area.
Protection of combustible surfaces: 5mm thick ceramic tiles or graphic glass is suitable to protect 10mm Gib board.

G3/AS1

1.1.3 Food preparation surfaces shall be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, and tiles are examples of suitable materials for these surfaces.

1.6 Wall linings

Wall linings adjacent to appliances and facilities shall have surfaces that can be easily maintained in a hygienic condition. Stainless steel, decorative high pressure laminate, tiles, wallboards with painted or applied impervious coatings or films, are examples of suitable materials for these surfaces.



	DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional. COPYRIGHT: Any and all drawings commissioned remain the property of A1 Homes Limited, including all copyright and similar rights subsisting in those drawings, and are solely for use as described on the drawings, and may not be used for any other purpose or reproduced in whole or in part without written permission obtained from A1 Homes Limited.	GROUND FLOOR PLAN				Scale: 1:100	Sheet no:	10	Client Details: Emilene Bowen & Murray Gamlin	Job no: P0725	BC2100069 APPROVED 02/03/2021  KH174 WHANGAREI DISTRICT COUNCIL BCA
		Design: A1		Drawn: AW	Check: AG/UP	LBP: CH	Date: 26/02/2021				
		Wind:	Earthq:	Exposure:	Snow:	Climate:		Call 0800 A1homes 214663 www.A1homes.co.nz		16 Moorey Lane Otaika	
		HIGH	1	C	NO	1					

General Notes:

Any encroachments shown are to be confirmed by a registered surveyor prior to commencement of foundations. No liability shall be held by designer with this confirmation.

Cautionary Notes:

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Construction Notes:

Glazing in accordance with NZS 4223:2008/2016 plus amendments
All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery excluding garage

Aluminium joinery head heights to be 2.175m

Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

NZBC D1/AS1 Access Routes:

Concrete (min 150mm below FFL) or H5 timber step to all access points (owners care)

Acceptable Slip Resistance for Walking Surfaces:

- Portland cement concrete
- Broomed (Class 5 or 6) or wood float finish (Class U2)

Concrete surface finishes complying with NZS 3114.

Coated and sand/grit impregnated

The sand/grit, which is sprinkled over the complete surface of the final paint coating, should be a hard angular material such as silica sand or calcined bauxite. The particle size should not be less than 0.2 mm so that it is not submerged by the coating and not greater than about 2-3 mm so that it remains tightly bound to the surface.

Exposed aggregate finish

crushed aggregate

Asphaltic concrete

Concrete pavers

Dry press concrete

Interlocking concrete block paving to NZS 3116.

Anti-slip tapes

will normally require regular replacement to remain effective. To ensure foot contact, tapes should be placed at right angles to the line of travel and be spaced at no more than 150 mm centres.

Foundation:

Engineered Raft Foundation

Wall Cladding:

Ply & Batten Cladding
70 Series Brick Veneer

Roof Cladding:

22.5° pitch, NZS Colorsteel Corrugated profile

Fascia and Spouting:

Continuous 180 Colorsteel fascia
Continuous 1/4 round spouting
Marley PVC 80mmØ round downpipes

Joinery:

APL Residential suite Aluminium joinery



North Elevation



East Elevation

BUILDING ENVELOPE RISK MATRIX		
ALL ELEVATIONS		
Risk Factor	Risk Severity	Risk Score
Wind zone (per NZS 3604)	High risk	1
Number of storeys	Low risk	0
Roof/wall intersection design	Low risk	0
Eaves width	High risk	2
Envelope complexity	Medium risk	1
Deck design	Low risk	0
Total Risk Score:		4



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ELEVATIONS

Designer: A1	Drawn: AW	Check: AG/UP	LBP: CH	Date: 26/02/2021
Wind: HIGH	Earthq: 1	Exposure: C	Snow: NO	Climate: 1

Scale: 1:100

Rev:

Sheet no:

12

Client Details:

Emilene Bowen & Murray Gamlin

Address:

16 Moorey Lane
Otaika

Call 0800 A1homes

214663

www.A1homes.co.nz

Job no: PO725



WHANGAREI DISTRICT COUNCIL BCA

General Notes:

Any encroachments shown are to be confirmed by a registered surveyor prior to commencement of foundations. No liability shall be held by designer with this confirmation.

Cautionary Notes:

BUILDING CONTRACTOR TO ASSESS SITE TO ENSURE DAYLIGHTING & BUILDING RESTRICTIONS ARE COMPLIED WITH.
NO LIABILITY FOR ENCROACHMENT SHALL BE HELD BY DESIGNER IF SITE IS NOT SURVEYED BY A REGISTERED SURVEYOR PRIOR TO COMMENCEMENT OF FOUNDATIONS.

Construction Notes:

Glazing in accordance with NZS 4223:2008/2016 plus amendments
All glazing low-e clear float except for obscure glass to bathrooms & wc
Double glazing to all window and door joinery excluding garage

Aluminium joinery head heights to be 2175mm

Refer to floor plan for door & window sizes. Joinery schedule & sizes to be confirmed by pre-cut manufacturer & joinery fabricator PRIOR to manufacture by way of communication via e-mail, phone or other.

NZBC D1/AS1 Access Routes:

Concrete (min 150mm below FFL) or H5 timber step to all access points (owners care)

Acceptable Slip Resistance for Walking Surfaces:

- Portland cement concrete
- Broomed (Class 5 or 6) or wood float finish (Class U2)

Concrete surface finishes complying with NZS 3114.

Coated and sand/grit impregnated

The sand/grit, which is sprinkled over the complete surface of the final paint coating, should be a hard angular material such as silica sand or calcined bauxite. The particle size should not be less than 0.2 mm so that it is not submerged by the coating and not greater than about 2-3 mm so that it remains tightly bound to the surface.

Exposed aggregate finish

crushed aggregate

Asphaltic concrete

Concrete pavers

Dry press concrete

Interlocking concrete block paving to NZS 3116.

Anti-slip tapes

will normally require regular replacement to remain effective. To ensure foot contact, tapes should be placed at right angles to the line of travel and be spaced at no more than 150 mm centres.

Foundation:

Engineered Raft Foundation

Wall Cladding:

Ply & Batten Cladding
70 Series Brick Veneer

Roof Cladding:

22.5° pitch, NZS Colorsteel Corrugated profile

Fascia and Spouting:

Continuous 180 Colorsteel fascia
Continuous 1/4 round spouting
Marley PVC 80mmØ round downpipes

Joinery:

APL Residential suite Aluminium joinery



West Elevation



South Elevation

BUILDING ENVELOPE RISK MATRIX		
ALL ELEVATIONS		
Risk Factor	Risk Severity	Risk Score
Wind zone (per NZS 3604)	High risk	1
Number of storeys	Low risk	0
Roof/wall intersection design	Low risk	0
Eaves width	High risk	2
Envelope complexity	Medium risk	1
Deck design	Low risk	0
Total Risk Score:		4



DO NOT scale off drawings. Cross reference all drawings. Any discrepancies MUST be clarified with the designer immediately before commencing works or ordering. NO construction or site works are to commence until Building Consent becomes unconditional.

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ELEVATIONS

Designer: A1	Drawn: AW	Check: AG/UP	LBP: CH	Date: 26/02/2021
Wind: HIGH	Earth: 1	Exposure: C	Snow: NO	Climate: 1

Scale: 1:100

Rev:

Sheet no:

13

Client Details:

Emilene Bowen & Murray Gamlin

Address:

16 Moorey Lane
Otaika

Call 0800 A1homes
214663
www.A1homes.co.nz

Job no: PO725



WHANGAREI DISTRICT COUNCIL BCA

Hawthorn Geddes engineers & architects ltd



In reply please quote: 11376

21 June 2019

Sue Woods

via email: susanwoods@outlook.co.nz

cc Chris McCluskey

via email: desgn.composites@gmail.com

Lot 1 Morrey Lane Flood Assessment

The purpose of this letter is to provide advice on flooding at the above address.

WDC GIS Maps indicate the site is partially susceptible to flooding.

Hawthorn Geddes prepared a report titled Proposed Subdivision of Lot 5 DP 207186, Tavinor Road Engineering Suitability Report for Revised Scheme Plan dated 4 November 2016, Ref. 6756 Rev3. This report included a flood assessment and advised that the 100-year flood level is around 1m above the left hand (northern) bank. The 10-year flood level is estimated at around RL 95.9m or 600mm above the bank level. The report also noted that existing ground levels for proposed Lots 1, 3 and 4 are above this flood level.

Based on this assessment it is our opinion that in terms of Section 71 of the Building Act:

- (a) the land on which the building work is to be carried out is not subject nor likely to be subject to inundation; and
- (b) the building work is not likely to accelerate, worsen, or result in inundation on that land on any other property.

Limitation

This letter has been prepared solely for the benefit of our client Sue Woods and the Whangarei District Council in relation to the building consent application for which this letter has been prepared. The comments in it are limited to the purpose stated in this letter. No liability is accepted by Hawthorn Geddes engineers & architects ltd in respect of its use by any other person, and any other person who relies upon any matter contained in this letter does so entirely at their own risk.

Yours faithfully,

Dean Botica
Hawthorn Geddes
engineers & architects ltd

7 Selwyn Avenue
Whangarei 0110
09 438 7139

hg@hgcs.co.nz

Civil, Structural, Environmental and Geotechnical Engineers
Registered Architects and Project Managers



BC2100069
APPROVED
02/03/2021

WHANGAREI DISTRICT COUNCIL BCA

21A The Grange
Warkworth 0910
09 283 3428

hawthorngeddes.co.nz



Job# S1409-J03689

**16 Moorey Lane
Otaika**

Site Suitability Report



30 September 2020

TMC Consulting Engineers Ltd.
41 Norfolk Street
PO Box 252
Whangarei
Phone: (09) 438 8699
www.tmcengineers.co.nz

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02/03/2021

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TMC Consulting Engineers Ltd.

Site Suitability Report

Geotechnical Investigation and Assessment Report for Proposed Residential Dwelling,
at:
Lot 1 DP 514603, 16 Moorey Lane, Otaika

Prepared by:



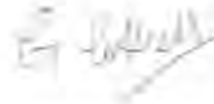
Cole Anderson
BE (Hons)

Reviewed by:



Kurt Davies
BEng Tech. (Civil)

Approved for Release by:



Gareth Cottrell
CMEngNZ, CPEng, IntPE (NZ), MCGI

Date:	30 September 2020
Reference:	S1409-J03689
Client:	Emilene Bowen
Status:	FINAL
Revision:	NA
Revision Date:	NA

BC2100069
APPROVED
02/03/2021

WHANGAREI DISTRICT COUNCIL BCA

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EXECUTIVE SUMMARY

Report Applicability and Plan Review

- Specifically, on this site, this report is provided to accord solely with the Client development proposal and the information made available to TMC at the time of report writing.
- We strongly recommend that TMC be engaged to undertake a review of both this report and finalised plans (when available), to confirm appropriateness and alignment with the recommendations provided therein, or otherwise.

Ground Conditions

- The investigated proposed building site consists of dense SILT, stiff to very stiff Silty CLAY and very stiff Clayey SILT, with up to approximately 50 mm TOPSOIL overlying.
- The soils are assessed as Insensitive, Normal to Sensitive and in terms of expansiveness are classified as CLASS H, Highly Expansive.
- Groundwater was encountered at a depth of 2.4 m bgl within Borehole 2.
- The site is not currently mapped for stability risk. Provided that all the recommendations of this report and previous reports are implemented and subject to satisfactory TMC Development Review we conclude that the site stability risk is low.
- The northern area of the property is mapped for flood risk. Refer Section 6.6.

Foundations and Retaining

See Section 7

Reinforced Concrete Raft Type Slab on Engineered Fill

- Allowable bearing capacity 100 kPa.
- For shallow foundations in expansive soils:
 - The detailed design of the foundations will determine the final foundation depths, etc. and provide an appropriate embedment depth to minimise ground swelling and shrinkage effects in alignment with the soil expansivity class.
 - Embedment into competent materials and as above, etc. to be checked and approved by the Inspecting Engineer.
- Retaining walls should be designed and constructed in accordance with Section 7.2.

Construction

- All works must be undertaken in accordance with the Health and Safety at Work Act 2015.
- All services at and adjacent to the site including for site access must be both identified, and the locations confirmed by the Development Designer prior to the commencement of any construction, site development works, etc.
- It is strongly recommended that no construction works are undertaken until the appropriate Consent / Approvals, etc. have been granted.
- All earthworks should be undertaken in accordance with both the District and Regional rules.
- Site Specific Earthworks Requirements are provided in Section 7.5.2.
- Stormwater run-off from the development should be appropriately controlled and managed on-site both in accordance with the New Zealand Building Code and as per Council requirements.

On-Site Wastewater Management

Secondary Treatment to Pressure Compensated Drip Irrigation

- The proposed wastewater system meets both the design guidelines and recommended separation distances specified in both: AS/NZS 1547:2012 On-Site Domestic Wastewater Management and the Regional rules.
- Provided that all the recommendations of this report are followed TMC believe on reasonable grounds that on-site treated wastewater effluent disposal on this property will have no adverse effect on the environment.
- On-going regular maintenance and management of the proposed on-site system in accordance with the Manufacturers' requirements and this report will be required to ensure that the system operates effectively at all times.

1. INTRODUCTION

This Site Suitability Report (SSR) has been prepared by TMC Consulting Engineers Ltd. (TMC) for Emilene Bowen (the "Client") in accordance with instructions received from them with regard to the above property, and in accordance with the short form agreement dated 10 September 2020.

The purpose of TMC's work was to evaluate the surface and subsurface conditions at the site by undertaking a geotechnical investigation to determine the suitability of the site for the proposed development including on-site wastewater management.

This report presents the results of the geotechnical investigation, describes the existing conditions, details any identifiable geological hazards affecting the site and provides geotechnical recommendations against the requirements of NZS3604:2011 where appropriate. On-site wastewater recommendations are provided in accordance with; AS/NZS 1547, AS/NZS 1546 and the Regional Rules.

The geotechnical assessment is based on site conditions as observed during the site walkover and site investigation fieldworks carried out by TMC on 16 September 2020.

1.1 CLIENT SUPPLIED INFORMATION

In preparing this SSR, we have also reviewed the following documentation:

Document Type	Reference
Engineering Suitability Report (ESR)	Hawthorn Geddes. (04/11/2016). <i>Proposed Subdivision of Lot 5 DP 207186, Tavinor Road Engineering Suitability Report for Revised Scheme Plan</i> . Job Reference: 6756 Rev 3.
Site Plan	Design Composites Ltd. (31/05/2019). <i>Proposed New House, Lot 1, Moorey Lane, Tavinor Road, Whangarei, Proposed Site Plan</i> .
Floor Plan	A1 Homes. (23/09/2020). <i>Floor Plan</i> . Job Ref: Bowen & Gamlin KH170a

This report is provided based solely on our fieldwork assessment and information currently provided to TMC.

Therefore, we strongly recommend as follows:

- i. Should any additional relevant information become available then TMC must be contacted to ensure that this report and the recommendations contained therein are appropriate, and;
- ii. Once the final plans for the proposed development is known, that the plans be reviewed by TMC, to;
 - Verify that the recommendations contained in this report remain valid, and;
 - That with regard to geotechnical and wastewater aspects only, that the proposed foundation and wastewater design both aligns satisfactorily with the recommendations provided in the TMC SSR and is appropriate.

2. DEVELOPMENT PROPOSAL

The Client provided plans show that an approximate 180-190 m² single-level, lightweight residential dwelling is to be constructed within the northern portion of the property.

We understand that the dwelling is to be supported on a reinforced concrete raft type slab.

Refer; 'Site Plan' attached in the appendices.

3. SITE DESCRIPTION

The property (legally described as Lot 1 DP 514603) is located to the north of Moorey Lane in Otaika. The property is sized at approximately 14,524 m² and is irregular in shape.

The property is currently accessed via a farm gate adjacent to the northern side of Moorey Lane.

The property entrance is located at a relative high point on the property. The ground slopes downwards away from the southern boundary at gentle grades, estimated 5 – 10 degrees. The central portion of the property is relatively flat. There is a lower lying 'marshy' area within the south-eastern quarter of the property.

The proposed building platform is located near the top of a natural terrace, towards the northern end of the property. This platform has previously been prepared for construction of a dwelling, with a thin layer of hardfill placed over the surface. There is also a historic gravel driveway which leads from the building platform back towards the south-western corner of the property. The driveway and building platform have since overgrown with pasture. There is a natural slope to the north of the proposed building platform which slopes downwards to the north, up to 10 degrees, towards the lowest lying area on the property.

The Otakaranga Stream runs near the northern boundary, approximately 15 m at its closest point from the northern corner of the property boundary. There is an open drain that runs adjacent to the eastern boundary, on the eastern side of the wire fence which runs along this area.

The property is covered in pasture with some plants consistent with wetland areas covering the 'marshy' area to the south-east and the low area near the northern corner of the property. A row of large mature trees is located along the eastern boundary.

No above ground structures were evident on the property.

Stormwater flows by general sheet flow behaviour towards the Otakaranga Stream to the north.

The walkover of the proposed building site undertaken at the time of the site fieldworks provided no evidence of recent or historic ground movement on or adjacent to the site. Slopes that were in excess of approximately 20-25 degrees on the hillside further to the north of the property showed signs of soil creep and shallow rotational slips.

A review of Google Earth imagery indicates that some uncontrolled fill has been placed in an area around the south-western corner of the property, consistent with the sloping ground in this area. This fill appears to have been placed around the time the road for Moorey Lane was constructed, circa late 2016 to early 2018. The existing flat building platform and driveway appears to have been cut circa early 2018. Anecdotal evidence from the Landowner indicates that the platform was only stripped of topsoil and a very thin layer of hardfill placed over the area with no soil filling taking place. We understand from the Client supplied documentation that a building consent appears to have been granted but has subsequently lapsed.

A B4UDig query revealed that there is 400V underground power cable which enters the property near the south-western corner of the property.

The assessment of existing site structures has not been included in TMC's investigation brief.

All service locations, depths, etc. will need to be confirmed by the Development Designer prior to the design of the foundations, etc. and construction works. Design to allow both for any disturbance or surcharge on the services and comply with Asset Owners off-set, etc. requirements.

4. GEOLOGY AND NATURAL HAZARDS

4.1 GEOLOGY

Local geology at the property is shown and described on the GNS Science New Zealand Geology Web Map, Scale 1:250,000, as; Tauranga Group Alluvium (eQa) within the southern portion and Tauranga Group Alluvial/Colluvial Deposits (Q1a) within the northern portion of the property.

Tauranga Group Alluvium (eQa) is described as: Partly consolidated mud, sand, gravel and peat or lignite of alluvial, colluvial, lacustrine, swamp and estuarine origins. Tauranga Group Alluvial/Colluvial Deposits (Q1a) is described as: Unconsolidated to poorly consolidated mud, sand, gravel and peat deposits of alluvial, colluvial and lacustrine origins, refer; 'GNS Science Website.' It is noted that the proposed building platform is within the mapped Tauranga Group Alluvial/Colluvial Deposits (Q1a).

The soils map of the area indicates that the southern portion of the property is within an area of Kara Silt Loam (KR), and the northern portion is within an area of Whakapara Mottled Clay Loam (WFm). It is noted that the proposed building site is within the mapped area of Whakapara Mottled Clay Loam. Sutherland, C. F.; Cox, J. E.; Taylor, N. H.; Wright, A. C. S. 1980: Soil map of Hukerenui-Whangarei area (sheets Q06/07, R06/07), North Island, New Zealand. Scale 1:100,000 N.Z. Soil Bureau Map 187.

4.2 NATURAL HAZARDS

Site Stability

At the time of report writing, TMC are unaware of any mapped stability hazards associated with the property.

Flooding

The Northland Regional Council (NRC) GIS Natural Hazards Map identifies an area within the northern portion of the property to be within the; 10, 50- and 100-year River Flood Extent Hazard Zones.

The majority of the property is mapped within 'Recent Soils' Flood Susceptible Land according to the NRC GIS Hazards Maps. We note that this is not a mapped flood hazard zone and that this mapping is based on soil type / behaviour and not actual flooding potential. The southern portion of the property is outside of this mapped zone.

The Whangarei District Council (WDC) GIS Hazards Map identifies majority of the property to be within the Flood Susceptible hazard zone. We note from comparing the mapping shape this appears to be based on the above NRC 'Recent Soils' zone. The southern portion of the property is also outside of this mapped zone.

4.3 POTENTIAL ACID SULPHATE SOILS

We note from recent soil mapping undertaken in the Whangarei region that the Tauranga Group soils has been identified to contain potential Acid Sulphate Soil Risk.

These soils, where present, can generate acidic groundwater and may require consideration with regard to land drainage and selection of building materials for buried structures.

In addition, we have referred to the following associated documentation and information:

- Opus Acid Sulphate Soil guidance document available from WDC

In summary of these ground conditions and proposals, TMC conclude and recommend with sole regard to the geotechnical aspects as follows:

- Based on the;
 - Ground conditions encountered and observed during the fieldworks,
 - Site topography, and
 - Site development proposal and engineering.
- In general, TMC do not anticipate there to be a substantial potential Acid Sulphate Soil Risk.
- All provided that these ground conditions and proposed engineering are confirmed at the; design review, site cut inspection and subsequent construction stages, or otherwise.

5. FIELDWORKS INVESTIGATION SUMMARY

The purpose of the following intrusive fieldworks investigation was to provide information on the general soil profile, the variability, relative density and strength of soils together with any observed groundwater levels within the proposed building site area.

TMC undertook a shallow ground investigation comprising two hand auger boreholes (BH) of 50 - 75 mm diameter to depths of 2.1 and 3.0 m below ground level (bgl).

An additional borehole (BH5) was drilled to a depth of 0.9 m to determine soil and groundwater conditions for the proposed effluent disposal field at the Client proposed location.

Scala Penetrometer tests (SP) were undertaken commencing from ground level adjacent to the boreholes to a depth of 1.5 m. SP tests were restarted in the base of the boreholes to depths ranging between 2.9 m to 3.8 m to assess the strength and consistency of the strata beyond the depth of the boreholes.

Two further SP tests were carried out to a depth of 0.9 m to determine if homogeneous and uniform soil conditions exist across the building site.

Refer, 'Borehole Logs & Scala Penetrometer Data' attached in the appendices.

Approximate locations of the BH and SP tests are shown on the 'Site Plan' attached.

In cohesive materials, in-situ hand undrained shear vane tests were carried out at 0.3 m depth intervals in accordance with the New Zealand Geotechnical Society (NZGS), Guidelines for Hand

Held Shear Vane Testing, August 2001, and classified in accordance with the NZGS Field Classification Guidelines; Table 2.10, December 2005.

Classification of the recovered soil borehole arisings was carried out in accordance with the "Field Description of Soil and Rock", NZGS, December 2005.

6. FINDINGS AND CONCLUSIONS

6.1 GROUND CONDITIONS

The ground conditions encountered during the shallow ground investigation have been interpreted from the BH logs, shear vane and Scala Penetrometer testing undertaken.

The natural subsurface conditions encountered are considered to be generally consistent with the published geological information.

The investigated proposed building site consists of dense SILT, stiff to very stiff Silty CLAY and very stiff Clayey SILT, with up to approximately 50 mm TOPSOIL overlying, refer: 'BH Logs' attached.

The Hawthorn Geddes report identified low plasticity grey-brown to grey-white Clayey SILT in the investigation carried out within the subject property, which is considered consistent with TMC's findings.

It should be noted that actual ground conditions may vary across the investigated development site, and in some locations may differ from those described.

6.2 SOIL SHEAR STRENGTHS

Shear vane dial readings (corrected) of the soil tested in the Boreholes ranges from 68 kPa (11 kPa remoulded) to in excess of 199 kPa.

Where measurable, the average of peak and remoulded shear strength ratio for the site soils investigated ranged between 1.6 to 6.0 indicating that these soils are of a range; Insensitive, Normal to Sensitive as per the NZGS Guidelines.

The Hawthorn Geddes report states that shear vane strength was typically greater than 100 kPa. This is consistent with TMC's findings.

6.3 EXPANSIVE SOILS

Due to recent changes in the NZ building code, and in the absence of soil sampling and laboratory testing by third-parties, we have been advised by Whangarei District Council to classify sites where no laboratory tests to confirm otherwise have been undertaken, as a minimum; CLASS H, Highly Expansive in terms of AS2870:2011.

If required, TMC can arrange the above sampling and testing laboratory testing at an additional cost. However, we cannot guarantee that the analysis of the laboratory test results will provide a lesser classification of soil expansivity, and even so, if any proposed re-classification will be acceptable to the Council.

It is noted that the Hawthorn Geddes report classifies the soils as moderately to highly expansive. However, no soil testing has been carried out to confirm this.

Reworking or exposure of these soils during wet weather or winter months can damage these soils resulting in much lower bearing capacities, the potential for seasonal shrinkage / swelling and slab cracking.

These soils do not meet the NZS3604:2011 definition of 'Good Ground'. Foundations / structures will therefore need to be designed accordingly and care must be taken when both planning and undertaking the site earthworks.

Refer, 'Notes' attached in appendix and report Section 7.

6.4 GROUNDWATER

Groundwater was encountered at a depth of approximately 2.4m bgl in BH 2 during the site fieldworks.

Hawthorn Geddes did not encounter groundwater in their intrusive investigations. However, they note that elevated groundwater levels are expected along the slopes along the northern boundary during winter.

Groundwater levels may rise during wet winter conditions or following periods of heavy or prolonged rainfall / other events.

Use of drainage control measures may be required depending on weather conditions and timing of the construction works, etc.

6.5 SCALA PENETROMETER TEST RESULTS

Scala Penetrometer test values in terms of (number of blows /100mm ground penetration) were noted commencing adjacent to, and at the base of BH: 1-2 and two other locations. This testing was undertaken to provide an indicative allowable bearing capacity of the site soils encountered with depth and to determine any uniformity in ground conditions across the investigated site, refer; 'Scala Penetrometer Resistance Test Results' attached in the report appendices.

The blow counts: 10 blows being the highest and 2 blows being the lowest.

In general terms of soil bearing capacity, NZS3604:2011 for the Construction of Timber-Framed Buildings defines 'Good Ground' as having an allowable bearing capacity of at least 100 kPa: indicatively 5 blows per 100 mm.

6.6 NATURAL HAZARDS

Site Stability

The property is not currently mapped for stability risk.

Local geology at the proposed building site as both mapped and as investigated is: Tauranga Group (Q1a).

The site soils encountered are also considered to be generally consistent with the published geological information.

Based on our experience and recent soil stability mapping undertaken in the Northland Region with the: Tauranga Group (Q1a), indicative soil instability potential ranges are as follows:

Low <10°; Medium 10-23° and High >23°.

The proposed building site slope is relatively flat, less than 5 degrees, and to be formed to level.

A review of historical aerial photography commencing from 1942 provides no clear evidence of previous instability at the property, refer; 'Retrolens Historical Image Resource Website.'

No recent or historic ground movement was evident at the proposed building site or in the immediate surrounds at the time of the fieldwork investigation.

No evidence of ground movement was provided by the fieldworks and ground investigation testing.

It is noted that the Hawthorn Geddes proposed Subdivision report states that the building site as shown on their report Site Plan is not subject to instability.

We have therefore provided our foundation recommendations to align with both the soil instability ranges and the above observations.

Please refer also, report Sections: 'Foundations', 'Earthworks' and 'Stormwater and Drainage'.

Flooding

According to the NRC GIS Hazard Maps, an area adjacent to the northern boundary is mapped within the; 10, 50 and 100 year flood extent hazards. It is noted that the proposed building site is located outside of this hazard area.

The NRC GIS Hazards Maps also map the site within a 'Recent Soils' Flood Susceptible land zone. The WDC GIS Hazard Maps also show this same area as 'Flood Susceptible'.

However, we understand that the NRC database contains both more accurate and the most recent hazard mapping data.

We note as follows from the NRC indicative data set for Northland Flood Susceptible Land:

Category 1 – RECENT SOILS

Soils on the banks of rivers and in narrow valleys where floodwaters are moving and where sand and silt have been and continue to be deposited by floodwaters.

- WfM Whakapara mottled clay loam

In addition to the above, the NRC dataset documentation states that:

- The objective of publishing these indicative data is to alert people to a potential hazard, enabling any decisions on the development or use of the land to be made having due regard to the risks involved.
- The data does not attempt to differentiate on the grounds of probability of the land being flooded, that is, the data does not distinguish between land that is likely to flood frequently and land that may only flood on rare occasions. That sort of detail is the subject of ongoing investigation and where the information is available it will be held in the relevant District Council's Hazards Database.
- Due to the scale of mapping, there will be some land within the areas so defined that may well be free from flooding, just as there will be land outside of the areas defined as flood-susceptible that is subject to flooding. The data from which these data has been derived

has been surveyed and recorded at a scale of 1:50,000. The data should not be enlarged or used at any more detailed scale.

'Recent Soils': Summary

At the time of report writing, the available Hazard Mapping does not show the proposed building site within any Coastal Flood or River Flood Hazard area.

We note that the above NRC mapping is based on soil type / behaviour and not on an actual measured flood level, and NRC refer land developers to the relevant District Council hazards database.

We understand that the NRC database contains both more accurate and the most recent hazard mapping data.

Hawthorn Geddes Report

The Hawthorn Geddes Subdivision report has included a flood assessment using ARC TP108 methodology. The results of this assessment indicate that the 100-year flood level is around 1m above the northern bank, while the 10-year flood level is estimated around 600mm above the northern bank level. It is also stated that the existing ground level for the subject building area is above these flood levels.

The HG Report also has a Site Plan that shows a suitable building area on this Lot.

Summary

Once the final arrangement, design, details, etc. of the proposed development have been finalised, an Engineer familiar with both the site and contents of this report should be engaged to review the plans and advise accordingly.

Provided that all the recommendations of this report and previous reports are implemented and subject to satisfactory TMC Development Review, with regard to the Building Act 2004; Sections 71-72, we believe on reasonable grounds that;

- i. The land on which the building work is to take place is neither subject to, nor likely to be subject to inundation, subsidence and slippage; and
- ii. The building work itself is not likely to accelerate, worsen or result in inundation, subsidence or slippage of that land or any other property.

Based on the above, the unmapped status of the property, the existing Client proposal and subject to satisfactory TMC Development Review we assess the proposed building site to have a Low Instability risk.

In the statement provided above, the 'land' referred to applies to that of the proposed building footprint.

7. RECOMMENDATIONS

7.1 FOUNDATIONS

7.1.1 General

Foundations may be designed in accordance with NZS 3604:2011, AS2870:2011 and the NZ Building Code or may be Specific Engineering Design (SED) with all design allowing for a Highly Expansive soil parameter.

The final depth of foundations, etc. may be governed by structural loads. This aspect can be addressed during the foundation design process.

From the site soil investigation and assessment, the following bearing capacity values are considered appropriate for design purposes for the foundation:

Ultimate Bearing Capacity	300 kPa
Allowable Bearing Capacity (F.O.S =3)	100 kPa

Based on the information provided to TMC at the time of report writing we understand that the new dwelling is to be on a reinforced concrete raft type slab.

A description of the foundation follows.

7.1.2 Reinforced Concrete Raft Type Slab on Engineered Fill

It is recommended that the slab is placed on a minimum 100 mm layer of Engineer approved compacted hardfill that also extends a minimum of 1.0 m out beyond the building footprint. The depth of the above hardfill layer is to be confirmed by Structural Engineer during the detailed design process.

For filling to form a final subgrade for the slab, it is recommended that clean, well graded compacted hardfill is used such as; GAP 20 to GAP 65, or as otherwise approved by the Engineer.

For shallow foundations in expansive soils:

- The detailed design of the foundations will determine the final foundation depths, etc. and provide an appropriate embedment depth to minimise ground swelling and shrinkage effects in alignment with the soil expansivity class.
- Embedment into competent materials and as above, etc. to be checked and approved by the Inspecting Engineer.

7.1.3 Foundations Adjacent to or Above Services

Subsequent to confirmation of all services by Development Designer:

Foundations / structures adjacent to or above any underground services such as Council sanitary sewer, stormwater lines and other assets must be supported on piles to both a design specification and embedment to meet both the Council / Asset owners and Design Engineers requirements.

Foundations within the line of influence from the services should comprise bored piles that both extend to well below the invert level of the pipe and with side clearances to the pipe in accordance with the above requirements.

If driven piles are to be used, these must be pre- drilled to the level of the pipe invert prior to driving to the design sets, and / or as per the Council / Asset Owners requirements.

The bearing capacities provided above are considered appropriate for bridging pile design.

7.2 RETAINING STRUCTURES

7.2.1 General

For any proposed retaining structures on site, we recommend as follows.

Retaining structures will need to be designed by a Chartered Professional Engineer and constructed in a safe manner.

Factors of safety and surcharge loadings appropriate to the conditions should be in accordance with "Retaining Wall Design Notes – Ministry of Works Department, NZ, Issue C: July 1973".

Due consideration to surcharges, retained heights and levels, etc. must be undertaken for each retaining structure throughout the design process. In addition, retaining design will need to be in accordance with Council surcharge requirements by boundaries.

All retaining walls / structures should be constructed with appropriate toe drainage and should be backfilled to within 0.3m of their full height with lightly tamped, free draining granular backfill material. Toe drainage: Proprietary perforated pipe drain / strip drain should be installed at a basal location behind all retaining walls to provide appropriate drainage and avoid the risk of a build-up of hydrostatic pressures / water levels.

All drainage should be connected into an approved stormwater disposal system, or as otherwise appropriate.

Subsequent to construction of retaining structure(s), a programme of regular monitoring must be initiated to assess the continuance of both effective retention and drainage functions. Thereafter, if necessary, any maintenance required can be undertaken to ensure fully effective drainage, function, etc.

7.2.2 Soil and Design Parameters

Soil and design parameters for wall types are provided in the Table below.

Retaining Wall Type	Investigated Soil Parameters		Design Parameters and Notes
Timber Pole	Soil cohesion $c' =$	0	Passive resistance in front of the retaining wall poles can be determined using Broms Method generally assuming an undrained shear strength $C_u = 100$ kPa.
	Internal soil friction angle $\phi =$	30°	
	Soil density $\gamma =$	18 kN/m^3	
Cantilevered: Free Standing or Propped	As Above		For design, soil pressures may be determined for active pressure conditions using a K_a value of no less than 0.3
Rigid Retaining	As Above		For the design of retaining walls integrated into the building structure which are relatively rigid and unyielding, soil pressures should be determined for at-rest pressure conditions using an earth pressure coefficient K_0 of no less than 0.5

Table: Soil and retaining design parameters

7.3 CONSTRUCTION RISK MANAGEMENT

Any and all works including (but not limited to); design, construction, operations and maintenance must be undertaken in accordance with the Health and Safety at Work Act 2015.

The Development Designer will need to confirm the locations of all on-site / adjacent services including for site access prior to the commencement of design / any construction works, etc.

Any open excavations should be fenced off or covered, and/or access restricted as appropriate.

With all excavation and construction work there is a risk of collapse. Whenever ground conditions are suspect, bad weather conditions are forecast or when there is a risk of damage to adjacent property, excavations should all be carried out in a "hit and miss" pattern and / or temporary ground support, cover protection used.

The Contractor is responsible for determining the width of each excavation to suit his plant and construction programme.

Cut faces should not be left unsupported. Similarly, cut faces should not be left uncovered for any length of time, especially during periods of rain.

The Contractor is responsible at all times for ensuring that all necessary precautions are taken to protect all aspects of the works, adjacent structures and services, etc.

7.4 CONSTRUCTION INSPECTIONS

It is increasingly common for the Building Consent Authorities' (BCA) to require a Producer Statement; PS4, this is an important document. The purpose of the PS4 is to confirm the Engineers' professional opinion to the BCA that aspects of a building's design comply with the Building Code, or that elements of construction have been completed satisfactorily in accordance with the approved Building Consent (BC).

If you require TMC to issue a PS4 we will need to carry out inspection of the work at the key construction stages as per the BC and Council requirements.

Specific designs / SED will likely require an Engineer to inspect that aspect of the work and confirm satisfactory completion.

During construction, site inspections also allow the timely provision of solutions and recommendations should any engineering problems arise.

Prior to works commencement, the Engineer should be contacted to confirm the construction methodologies, inspection and testing frequency.

Upon satisfactory completion of all the inspected work aspects, TMC would then be in a position to issue the PS4 as required by Council.

We require at least 48 hours' notice for site inspections.

To request a PS4 from TMC: ensure all works have been completed and checked, all documentation complete. Send an email to: office@tmcengineers.co.nz ensuring the subject line has: "PS4 request", followed by the "property address".

7.5 EARTHWORKS

7.5.1 General

All earthworks should be undertaken in accordance with both the District and Regional rules.

In addition, we recommend that all earthworks activities be carried out in full accordance with the following technical publications, in particular:

- i. Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region June 2016 Guideline Document 2016/005.
- ii. Auckland Council; Building on small sites - Doing it right. BC5850.

Refer for downloads the above Auckland Council documentation as below:

<https://ourauckland.aucklandcouncil.govt.nz/articles/news/2017/09/auckland-council-leads-the-way-in-erosion-and-sediment-control/>

<https://www.aucklandcouncil.govt.nz/building-and-consents/understanding-building-consents-process/starting-building-renovation-work/Documents/bc5850-building-small-sites-brochure.pdf>

- iii. New Zealand Standard Code of Practice for Earthfill for Residential Development, NZS 4431:1989.
- iv. Code of Practice for Urban Land Subdivision – NZS 4404:2010, and
- v. Any other relevant publications, including any of the above as superseded.

Some general recommendations are provided below, however where possible site-specific advice should be sought from an appropriately experienced Engineer.

We strongly recommend that earthworks are not undertaken during wet or, extreme dry conditions, etc.

7.5.2 Site Specific Earthworks Requirements

We strongly recommend to the Designer of any site works that involve cutting or filling, that the proposal be discussed with an Engineer at an early design stage.

All earthworks and foundation excavations should / shall be inspected by a Chartered Professional Engineer or their Agent who is familiar with this site and the contents of this suitability report.

Preceding any site development works, a Geotechnical Engineer should be contacted to discuss the earthworks methodology, inspection requirements and testing frequency.

Engineer approved horizontal benching should be undertaken across all sloping ground prior to the placement of any fill material.

Any proposed cuts and fills up to respective heights of 1.5 m and 1.0 m should be battered back at a gradient no greater than 1V:4H.

Any proposed cuts and fills that exceed respective heights of 1.5 m and 1.0 m or a batter grade of 1V:4H should be retained by a SED retaining wall / structure.

Appropriate cut-off drains should be installed at the toe of all unretained cuts.

Any fill placement within 3.0 m of the building envelope will be subject to controlled filling operations, with fill placement inspection and testing by an Engineer.

All exposed soils should be re-grassed, planted, covered, or paved as soon as practicable to reduce the risk of erosion, scour, etc.

Measures must be taken to protect the exposed moist soils from drying out. Maintaining the natural moisture content of the subgrade soils may be achieved by fine spraying with water. An impermeable membrane or similar should be placed immediately above the subgrade after the excavation of the topsoil.

7.5.3 Site Clearance and Preparation

All deleterious material including any uncontrolled fill, vegetation, topsoil, etc. should be removed from all proposed foundation / construction areas.

If cut and / or imported materials are stockpiled on site, stockpiles must be located well clear of the works and formed in an appropriate manner so that land stability and / or existing structures, etc. are not compromised.

Wherever any deposits of soft, or other unsuitable material is encountered at the surface cut / foundation level at the building site, it should in general be undercut and replaced with Engineer approved compacted fill, or as otherwise recommended by the Engineer.

7.5.4 Temporary and Permanent Earthworks

Particular care should be taken during the construction phase with respect to excavations to form the benches for building platforms, access driveways, retaining walls, etc.

The building site should be shaped to assist in stormwater run-off. Any excavation left open should be protected and or left in a state as to not pond water. Saturating site soils may result in a reduction of bearing capacities.

Depending on the ground conditions and groundwater levels, etc. at the time of construction, temporary support may be required to stabilise any cuts that are excavated. In addition, all cuts / exposed soils should be adequately protected to prevent inclement moisture changes to the exposed soils.

7.6 STORMWATER AND DRAINAGE

7.6.1 Stormwater and Surface Water Control

Stormwater run-off from the development should be appropriately controlled and managed on-site both in accordance with the New Zealand Building Code and as per Council requirements.

The Development Designer will need to confirm the drainage proposals compliance with all of the above requirements.

Stormwater flows must not be allowed to run onto or over site slopes, or to saturate the ground so as to adversely affect slope stability or foundation conditions.

As a minimum, runoff from any higher ground should be intercepted by means of shallow surface drains or small bunds to ensure protection of the building platform from both saturation and erosion.

Water collected in interceptor drains should be diverted away from the building site to a disposal point as appropriate.

Concentrated stormwater flows from driveways, tanks, roofed and paved areas, etc. must be collected and carried in sealed pipes or drains and discharged in a controlled manner to a disposal point as appropriate.

Subsequent to drainage construction, a programme of regular monitoring must be initiated to assess the continued effectiveness of drainage function and if necessary, the instigation of any maintenance required to ensure fully effective drainage, etc.

7.6.2 Stormwater Attenuation

The WDC Environmental Engineering Standards 2010 (WDC EES) states the following with regards to stormwater attenuation:

“All stormwater run-off arising from new residential development within the Whangarei District shall be attenuated so that peak flow discharge from the post developed site(s) is limited to 80% of the pre-development levels for both primary and secondary flows unless:

- The development has individual lot sizes larger than 10,000m² (1 ha) with a proposed created impervious area such as roofs, hardstanding and driveways not exceeding 5% of the total site*
- The development lies adjacent to marine and or coastal areas with tidal influence and has direct discharge to these receiving environments*
- There is sufficient capacity for direct discharge to ground subject to suitable soil conditions and specific design.”*

Subject to Council approval, given the size of the property exceeds 10,000 m² (14,524 m²) and provided the proposed impervious areas do not exceed 5% of the total site area, stormwater attenuation will not be required.

8. ON-SITE WASTEWATER MANAGEMENT

8.1 INTRODUCTION

With regard to on-site wastewater management, this section of the report presents the results of the site assessment, the design of an on-site wastewater system to service the new development and provides recommendations in accordance with; AS/NZS 1547, AS/NZS 1546 and the Regional Rules. Finally, a statement concerning an assessment of environmental effects, is provided.

8.1.1 Proposed Development

The proposed development is described in Section 2.

8.1.2 Property Summary

Property details relevant to on-site wastewater management are summarised in the table below.

Aspect	Description / Comments
Legal Description	Lot 1 DP 514603
Area	1.45 ha
District Council	Whangarei District Council (WDC)
Council Environment	Rural Production
Property Slope	Averaging less than 5° at the indicative wastewater disposal area
Aspect	North
Existing Site Cover	Pasture
Geology	Tauranga Group – Alluvial/Colluvial Deposits (Q1a)
Site Soils	Whakapara Mottled Clay Loam
Council Services	Water reticulation - no Stormwater reticulation – no
WDC Stability Hazard	Unmapped
Potable water supply	To be provided by on-site rainwater tanks

Table: Property Details Summary

8.1.3 Basis of Design

The proposed design is based on the following information supplied by our Client at time of report writing, as below:

Client Supplied Information:	Floor Plan; provided on 23/09/2020.
-------------------------------------	-------------------------------------

The design and recommendations provided in this report are in accordance with the following documents:

- The WDC District Plan,
- The WDC Environmental Engineering Standards (WDC EES),
- AS/NZS 1547:2012 On-Site Domestic Wastewater Management,
- AS/NZS 1546:2008 On-Site Domestic Wastewater Treatment Units, and
- The Regional Rules.

A general summary of the Regional permitted activity rules for wastewater Tabulated as follows:

Feature / Aspect	Primary treated domestic type wastewater	Secondary and tertiary treated domestic type wastewater
<u>Exclusion Areas</u>		
Floodplain	5 percent annual exceedance probability	5 percent annual exceedance probability
<u>Horizontal and vertical setback distances</u>		
Property boundary	1.5 metres	1.5 metres
Buildings	3.0 metres	3.0 metres
Identified stormwater flow path (including a formed road with kerb and channel, and water-table drain) that is down-slope of the disposal area	5 metres	5 metres
River, lake, stream, pond, dam or natural wetland	20 metres	15 metres
Any ground water bores	20 metres	20 metres
Groundwater table (winter) clearance from the lowest point of the disposal field	1.2 metres (vertical)	0.6 metres (vertical)
<u>Reserve disposal field area</u>		
A reserve disposal field area equivalent to; (%) of the design disposal field area is allowed for and set aside.	100%	30%
<u>Discharge volumes</u>		
Discharge volume does not exceed:	a) three cubic metres per day, averaged over the month of greatest discharge, and b) six cubic metres per day over any 24-hour period	

Table: Summary of Regional permitted activity rules for proposed wastewater disposal fields

8.2 SITE ASSESSMENT

The following information has been provided in accordance with the requirements of both AS/NZS 1547:2012 and the Regional Rules.

8.2.1 Geology

The local geology at the property and the soils of the area are described in Section 4.1

8.2.2 Soil and Groundwater Investigation

A soil and groundwater investigation borehole was drilled to a depth of 0.9 m in the Client's desired location of the proposed wastewater effluent disposal field (Borehole 5). Boreholes 1 and 2 were also used to assess soil profile and any groundwater levels. Borehole locations are shown on the appended site plan and the Borelogs are also attached.

8.2.3 Ground Conditions: Proposed Wastewater Disposal Field

The natural subsurface conditions encountered are considered to be generally consistent with the published geological information.

The investigated site (Client proposed) consists of stiff Silty CLAY with approximately 0.3m TOPSOIL overlying, refer: 'BH Logs' attached.

8.2.4 Site Soil Classification and Topography

In terms of AS/NZS 1547:2012, site soils are assessed as a Category 5; Light Clays.

It is noted that Hawthorn Geddes have identified the soils on the subject site for subdivision as Category 4 due to predominantly SILT being encountered in their intrusive investigations. However, the TMC site-specific investigation encountered predominantly Silty CLAY, therefore Category 5 has been determined as appropriate for this site in this instance.

The slope at the location of the proposed wastewater disposal field is generally assessed as being flat, averaging less than 5°. Indicative field locations shown on the Site Plan attached.

8.2.5 Groundwater and Surface Water

No groundwater was encountered during the ground investigation in the vicinity of the proposed disposal field. It is noted that groundwater was encountered at approximately 2.4m bgl within Borehole 2.

The Otakaranga Stream runs near the northern boundary, approximately 15m from the boundary at its closest point.

There is also an open drainage channel which runs adjacent to the eastern boundary.

8.2.6 Permeation Testing

No permeation tests were carried out due to both the site topography and nature of the soils encountered in the boreholes.

8.2.7 Site Assessment: Summary

Site Assessment: Summary is presented in the table below.

Feature	Comments
Topography	Generally flat, averaging less than 5 degrees. Aspect – north facing.
Ground Cover	Pasture.
Geology	The geology and soils are noted above in Section 4.1. Investigations concur with the published information and we consider the soils to be Category 5 terms of AS/NZS 1547:2012.
Seasonal Ground Water Variations	It is unlikely that there will be seasonal variations in soil drainage that will impact negatively on the disposal system. Groundwater was not observed in Borehole 5 during the investigation.
Fill	No fill was observed in the proposed location of the wastewater effluent field.
Drainage Control	Surface water from developed areas should be collected by drains or sumps and discharged as recommended in Section 7.6.
Rock Content	No rocks or boulders were observed within the site.
Site Stability	No recent instability was observed in the area of the proposed disposal field.
Climate & Rainfall	Annual rainfall is in the order of 1400mm. Rainfall intensity is approximately 40 mm/hr for a storm with a 10% probability of occurring annually and of one-hour duration.
Lot Size	The Lot is sized at approximately 1.45 ha.

Table: Site Assessment Summary

8.3 WASTEWATER MANAGEMENT SYSTEM DESIGN

8.3.1 Proposed System

A secondary treated system disposing effluent to pressure compensated dripper lines is recommended.

This proposed system design that follows is based on:

- The site soil category,
- Plans / Client information provided at the time of report writing,
- The topography and elevation at the proposed disposal field,
- The site environment and size of the property, and
- AS/NZS1547:2012 taking into consideration the above.

8.3.2 System Design Parameters

Based on the information provided and available at the time of report writing, the wastewater system design parameters for the proposed dwelling are summarised in the Table below.

Summary of Design Parameters	
Number of bedrooms (equivalent)	4 bedrooms
Combined Occupancy Allowance*	7-person maximum occupancy
Daily Occupant Flow Allowance	145 L/person/day
Total Daily Flow Rate	1,015 L/day
Soil category	5
Design Irrigation Rate (DIR)	3 mm/day
Disposal Field Area	339 m ²
Reserve Disposal Field Area	102 m ²
Total the above Disposal Field Areas	441 m ²
Water supply	Rainwater tanks
Water Reduction reuse / Water conservation fixtures	– Standard water reduction fixtures (including automatic washing machines) and dual flush toilets – No grey-water reuse recycling proposed – No garbage grinder unit allowed for in the system design

Table: Summary of Design Parameters and Disposal Field Areas for Proposed Dwelling

Notes to the Table:

*Occupancy allowance is assessed on the number of identified bedrooms noted on the Client supplied floor plan provided at the time of report writing. The floor plan indicates 4-bedrooms. The design occupancy is derived from Table J1 of AS/NZS 1547:2012.

8.3.3 Wastewater Treatment

It is recommended that a secondary wastewater treatment system along with treated effluent disposal via a pressurised drip irrigation system be installed, all complying with the requirements of both the Regional Rules and AS/NZ1547.

In addition to the above, the basic treatment system and performance requirements are summarised as follows:

- Secondary treatment; Advanced Aerobic Treatment Plant / Packed Bed Reactor Plant or similar approved compliant system,
- Total holding capacity should comprise; a minimum 4,500 L (primary stage, pre-treatment, aeration/clarification and pump chamber),
- Emergency storage volume; > 1,015 Litres (minimum 24 hours at maximum flow), and
- Minimum system discharge quality; Secondary Level BOD5 $\leq 20 \text{ g O/m}^3$, SS $\leq 30 \text{ g/m}^3$

8.3.4 Treated Wastewater Effluent Disposal System

Shallow Irrigation

The objective of the irrigation systems' wastewater discharge to land at the disposal field(s) is to provide further treatment of the wastewater effluent via assimilation through the site soil matrix.

The areal loading rate is determined according to soil characteristics and environmental constraints, with lower loading rates being adopted as appropriate for sites' having environmental limitations.

For design purposes, based on a visual and tactile inspection of the soils, we have classified the soils as Category 5 in terms of AS/NZS 1547:2012. We have therefore used an irrigation (loading) rate of 3.0 mm/day for a secondary treated wastewater irrigation system. Refer also Table: Summary of Design Parameters for Proposed Dwelling.

The effluent drip lines should be installed in a regular 'grid' pattern as far as practicable. Drip lines should be split into rows, each row not exceeding 65 linear metres where possible, with a manual flushing valve at the end of each row. The drip lines should be placed on the ground surface with a minimum 150 mm layer of mulch or 100 mm of topsoil placed as coverage over the drip lines.

For a design flow rate of 1,015 litres/day, a total of 339 m of dripper line will be required to be installed through an effluent disposal field of area of 339 m². A further area of 102 m² is to be set aside as the minimum 30 % reserve disposal field area as required by the Regional rules.

To protect against any possible failure of the disposal field area, the reserve area should be maintained with a vegetated surface ready for the possible installation of dripline into or onto it. This contingency should allow easy rejuvenation of the effluent disposal field should operational difficulties be experienced, or a field extension be required. To protect the integrity of the disposal field areas from damage / unauthorised access, etc. we recommend that the disposal areas be adequately fenced off.

It is recommended that plants with good evapotranspiration characteristics and shallow roots are established above the dripper lines in the wastewater effluent disposal field area.

Evapotranspiration reduces subsurface loading, reducing the risk of failure of the effluent disposal system. It is recommended that plants are established at an approximate density of one per square metre; suggested planting includes shrubs, flaxes and grasses, or lawn grass for topsoil buried dripper lines to provide both evapotranspiration and nutrient removal.

A generalised planting list is available on request, send an email to: office@tmcengineers.co.nz ensuring the email subject line has: "Planting list request", followed by the "property address".

With the area available on the subject property and based on the information available to TMC at the time of report writing, it is our current opinion that a satisfactory on-site wastewater management system can be installed that will satisfy the parameters set out in AS/NZS 1547:2012 and the Regional Rules.

A producer statement should be provided by the supplier of the wastewater treatment system selected by the Owner / Developer.

8.3.5 Wastewater System Design: Summary

The wastewater system design is summarised in the Table below.

Proposed system	Secondary treatment system disposing to pressure compensated drip irrigation lines
Design Occupancy	7 persons
Water Source	On-site rainwater storage tanks (145 l/p/d)
Design Flow Rate	1,015 L/day
Site Soil Category	5 – Light Clays (AS/NZS 1547:2012)
Loading Rate	3.0 mm/day
Required Disposal Field Area	339 m ²
Required Reserve Field Area	102 m ² (30% the above)

Table: Wastewater Management System - Design Summary

8.3.6 Additional Recommendations

To protect against wastewater treatment system failure, the system must provide a contingency (buffer) of at least 24 hours' storage capacity and both a visible and audible alarm to alert the Homeowners to any possible problem(s).

In addition to the above, Homeowners can help by looking out for any advanced warning signs that the system / disposal field area is not functioning properly, in this way any system malfunction can be addressed at an early stage and not left until a more significant failure occurs.

The Manufacturers' of wastewater treatment systems supply detailed maintenance schedules. On-going regular maintenance and management of the proposed on-site system in accordance with both the Manufacturers' requirements and this report will be required to ensure that the system operates effectively at all times.

Avoidance of using cleaners and chemicals that destroy bacteria and limiting use of cleaning detergents with high sodium and phosphorus levels can assist to maintain good function within both the wastewater treatment and effluent discharge systems.

8.4 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The site receiving soils have been assessed as Category 5 in terms of AS/NZS 1547:2012. With a daily application rate of 3.0 mm/day, the soil should be capable of coping well with long-term application of treated wastewater effluent.

Similar wastewater systems operating throughout the Northland region produce no noticeable odour or noise impact on neighbours or the homeowners themselves if both installed and maintained properly.

Based on the information currently provided, our site assessment and calculations, we consider that the site is able to provide for the sustainable treatment and land application of treated domestic wastewater effluent generated from the proposed residential dwelling.

As the proposed system discharge flow does not exceed 3,000 litres/day and complies with the groundwater and surface water clearance, etc. requirements as specified in the Regional Rules, the application falls under Permitted Activities and therefore a Discharge Consent is not required.

Provided that all the recommendations of this report are followed TMC believe on reasonable grounds that on-site treated wastewater effluent disposal on this property will have no adverse effect on the environment.

LIMITATIONS

This report has been prepared solely for the use of our Client with respect to both the particular brief and specific purpose provided to TMC Consulting Engineers Ltd. (TMC), with regard to the specific project described herein. No liability or any duty of care is acknowledged or accepted for the use of any part of this report in any other context or for any other purpose, or by any other person, other party or entity.

This document is both the property and copyright © of TMC. Any unauthorised employment or reproduction, in full or part is forbidden. This report may not be read or reproduced other than in its entirety. This report does not address matters relating to the National Environmental Standard for Contaminated Sites.

The opinions, recommendations and comments given in this report are the result from the application of accepted industry methods of site investigation.

As factual evidence has been obtained solely from boreholes, shear vanes and Scala Penetrometer tests which by their nature only provide information about a relatively small volume of subsoils at that exact location, there may be special conditions pertaining to this site which have not been disclosed by the investigation and which have not been taken into account in our report.

The site investigations undertaken are based on the Client's development proposal provided to TMC at the time of report writing.

Inferences are made about the nature and continuity of subsoils away from and beyond the testing locations but cannot be guaranteed. The soil descriptions detailed on the exploratory bore logs provided are based on the field descriptions of the soils encountered.

During the processes of site development and construction, an Engineer competent to judge whether the conditions are compatible with the assumptions made in this report should examine the site. In all circumstances, if any variations in the ground conditions occur which differ from those described or are assumed to exist, and then it is essential that the matter be referred back to TMC immediately to advise accordingly.

The soil performance behaviour outlined by this report is dependent on the construction activity and actions of the builder/contractor. Inappropriate actions before or during the construction phase may cause behaviour outside the limits provided in this report.

With regard to the design of an on-site wastewater management system in this report, all concept drainage design is up to the external connection point for any new building / structures / slabs; Designs for internal plumbing or any other wastewater related work, etc. are excluded.

All future owners of this property should seek professional geotechnical advice to satisfy themselves as to its ongoing suitability for their intended use.

APPENDICES

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Plans and Mapping:
Site Plan
NRC GIS Hazard Map
WDC GIS Hazard Map
Field Investigation Data:
Borehole Logs & Scala Penetrometer Data
Client Supplied Information:
House plans
Notes:
Expansive Soils



INDICATIVE SITE PLAN

Approximate locations of soil tests.

Client :
Emilene Bowen

Property:
16 Moorey Lane
Otaika



TMC Consulting Engineers
41 Norfolk Street
P.O.Box 252,
Whangarei
Ph: 09 3930337
Email: office@tmcengineers.co.nz

Project No :
S1409-J03689
Revision No :

Drawn :
CA

Checked :
GJC

Scale :
As shown @ A4

Date :
25/09/2020

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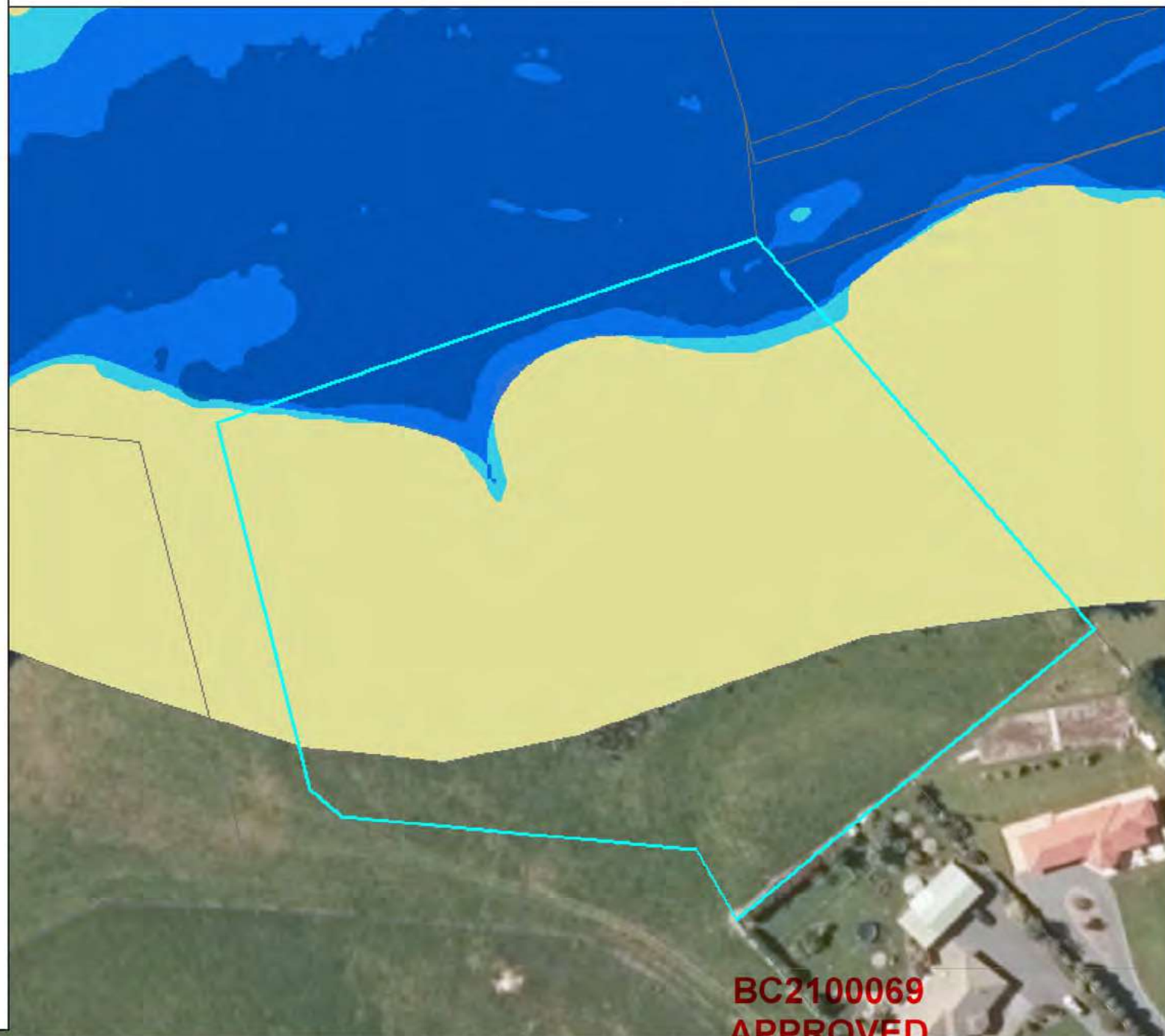
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**BC2100069
APPROVED
02/03/2021**

WHANGAREI DISTRICT COUNCIL BCA

- CEHZ 1 - uncertain
- CEHZ 1
- Coastal Erosion Hazard Zone 2 (100 years)**
- CEHZ 2 - uncertain
- CEHZ 2
- Baseline Shoreline 2014
- Surveyed Shoreline 2014
- Future Cliff Shorelines
- Historic Shorelines
- Coastal Wave Runup Hazard Zone
- Coastal Flood Hazard Zone 0 (Current)
- Coastal Flood Hazard Zone 1 (50 years)
- Coastal Flood Hazard Zone 2 (100 years)
- 10 year Flood Extent**
- 10 year Flood Extent
- 50 year Flood Extent**
- 50 year Flood Extent
- 100 year Flood Extent**
- 100 year Flood Extent
- Flood Susceptible Land**
- Estuarine Flats
- Gley Podzols
- Gley Soils
- Recent Soils
- Undulating Terraces
- Peat Flats
- Erosion Prone Land





BC2100069

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02/03/2021

WHANGAREI DISTRICT COUNCIL BCA

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NOTES:

Expansive Soils

Expansive soils are soils which experience volume changes upon wetting and drying. Expansion and swelling appears to be the dominant factor under certain conditions with fine grained soil containing considerable amounts of clay. Expansion and swelling may cause distress which is often experienced in light buildings.

In many parts of New Zealand there is a significant hazard to foundations for light buildings including homes with concrete slab floors. The volumetric expansion and contraction can cause houses and other structures to heave or settle resulting in damage that is sometimes severe. Soil movement can occur in both directions (vertical and horizontal) at different rates which results in distress and subsequent damage to the structure.

The extent of the damage varies from relatively minor brick veneer cracking and internal cracking on wall corners with attendant door and windows jamming, through to extensive and severe cracking including cracking of driveways, sidewalks, etc.

Expansive soils such as clay, claystone, mudstone, argillaceous rocks and shale all contain clay minerals. These minerals are very sensitive to changes in humidity. When expansive clayey soils get wet, these minerals absorb water molecules and consequently expand. When dry they shrink, leaving large voids in the soil which result in a reduction in bearing capacity of the soil.

Apart from seasonal moisture changes (wet winters/ dry summer), other factors can influence soil moisture such as:

- Irrigation of garden close to the dwelling foundation.
- Site drainage close to the structure.
- Plantation of large trees close to building foundations on expansive soils. A wide range of tree and shrub species have high groundwater demands during summer months. The effects of such demands on expansive soils can be substantial and can lead to differential building settlements. Accordingly, it is good housekeeping measure to ensure that high water demand species (such as gum, willow, cypress, etc.) are not planted close to buildings.
- Plumbing leaks.
- Prevalent or initial moisture conditions at construction time.

It should be also noted that the shear strength of expansive soil also changes with variations in humidity, and a stability problem may arise.

Expansive soils cause major damage to light foundations and associated structures. Heavy foundations and structures can resist the swelling uplift pressure.

Damage is dependent on the amount of movement experienced by the foundation, the non-uniformity in movement, which are all related to percentage of clay in the expansive soil, variation in moisture content, type of foundation, building construction and materials, etc.

Form 7

Code Compliance Certificate BC2100069

Section 95, Building Act 2004

Issued: 21 January 2022

The Building

Street address of building: 16 Moorey Lane (Pvt)
Whangarei 0170

Legal description of land where building is located: LOT 1 DP 514603

LLP: 129545

Building name: N/A

Location of building within site/block number: N/A

Level unit number: N/A

Current, lawfully established use: Detached Dwelling

Year first constructed: 2021

The Owner

M S Gamlin
E J Bowen
16 Moorey Lane
RD 10
Whangarei 0170

Phone number: N/A

Mobile number: 021714074

Facsimile number: N/A

Email address: emilenebowen@hotmail.com

Website: N/A

Street address/registered office: 16 Moorey Lane (Pvt)
Whangarei 0170

First point of contact for communications with the building consent authority:

Contact Person

A1 Homes Northland
PO Box 183
Ruakaka 0151

Phone number: 4330200

Mobile number: 0276333956

Facsimile number: N/A

Email address: phil.kitchen@a1homes.co.nz

Website: N/A

Building Work

Building Consent Number:

Issued by:

New Dwelling

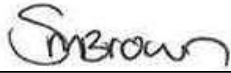
BC2100069

Whangarei District Council

Code Compliance

The building consent authority named below is satisfied, on reasonable grounds, that -

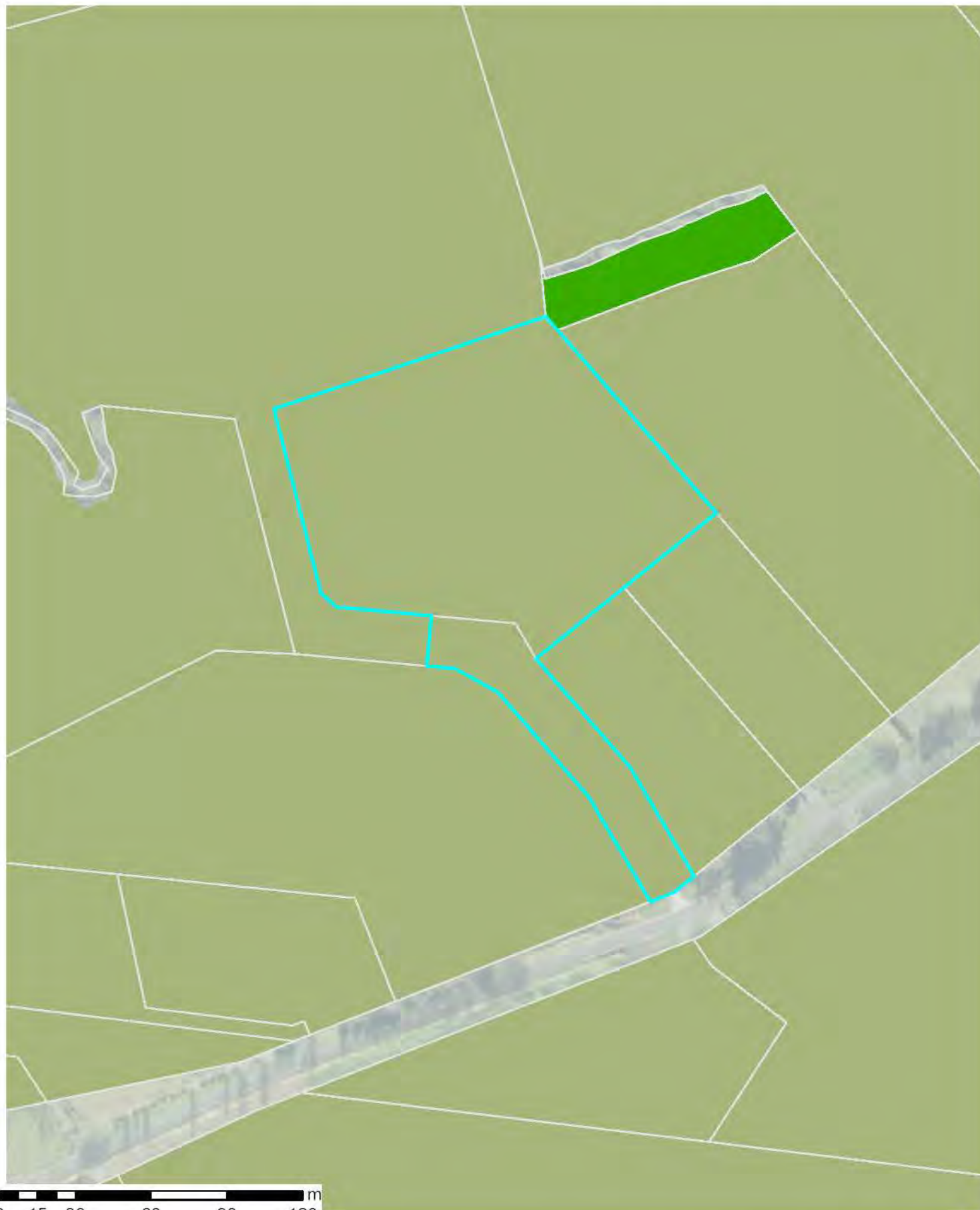
- (a) The building work complies with the building consent.



Stephanie Brown
Support Assistant – Building Processing
On behalf of Whangarei District Council

21 January 2022

Date



0 15 30 60 90 120 m





Operative District Plan – Map Legend

District-Wide Matters

Energy, Infrastructure and Transport

-  National Grid Tower
-  Northpower Tower
-  CEL-Cat1
-  National Grid Line
-  Northpower Overhead Critical Line Cel-Cat1
-  Northpower Critical Overhead Lines CEL
-  Northpower Critical Underground Lines CEL
-  Airport Runway
-  Indicative Road
-  National Road
-  Regional Road
-  Arterial Road
-  Primary Collector Road
-  Secondary Collector Road
-  Low Volume Road
-  Access Road
-  Strategic Road Protection Area
-  Strategic Railway Protection Line

Hazards and Risks

-  Coastal Hazard Area 1
-  Coastal Hazard Area 2
-  Flood Susceptible Areas
-  Mining Hazard Area 1
-  Mining Hazard Area 2
-  Mining Hazard Area 3

Historical and Cultural Values

-  Notable Tree Overlay
-  Heritage Item Overlay
-  Sites of Significance to Maori
-  Heritage Area Overlay
-  Areas of Significance to Maori

Natural Environment Values

-  Esplanade Priority Area
-  Coastal Marine Area (CMA) boundary
-  Goat Control Areas
-  Outstanding Natural Feature
-  Outstanding Natural Landscape

General District-Wide Matters

-  Airport Noise Boundary
-  Outer Control Boundary
-  Helicopter Hovering Area
-  Noise Control Boundary Overlay
-  Rail noise alert area
-  Rail vibration alert area
-  QRA Quarrying Resource Area
-  QRA Mining Area
-  QRA Buffer Area
-  QRA 500m Indicative Setback
-  Coastal Environment Overlay
-  Outstanding Natural Character Area
-  High Natural Character Area

Area Specific Matters

-  Designation
-  Precinct
-  Development Area

Residential Zones

-  Large Lot Residential Zone
-  Low Density Residential Zone
-  General Residential Zone
-  Medium Density Residential Zone

Rural Zones

-  Rural Production Zone
-  Rural Lifestyle Zone
-  Settlement Zone Residential Sub-Zone
-  Settlement Zone Centre Sub-Zone
-  Settlement Zone Industry Sub-Zone

Commercial and Mixed Use Zones

-  Local Centre Zone
-  Neighbourhood Centre Zone
-  Commercial Zone
-  Mixed Use Zone
-  Town Centre Zone
-  City Centre Zone

Industrial Zones

-  Light Industrial Zone
-  Heavy Industrial Zone

Open Space and Recreation Zones

-  Natural Open Space Zone
-  Open Space Zone
-  Sport and Active Recreation Zone

Special Purpose Zones

-  Airport Zone
-  Future Urban Zone
-  Fonterra Kauri Milk Processing SRIZ – Ancillary Irrigation Farms
-  Hospital Zone
-  Port Zone
-  Ruakaka Equine Zone
-  Shopping Centre Zone
-  Strategic Rural Industries Zone
-  Waterfront Zone

The information displayed is schematic only and serves as a guide.

It has been compiled from Whangarei District Council records and is made available in good faith, but its accuracy or completeness is not guaranteed.

The Whangarei District Council district plan GIS data was created at a specific point in time.

Land parcel information is sourced from the Land Information New Zealand (LINZ) Data Service. The LINZ land parcel information may be updated by LINZ at any time from that time, which may result in misalignments with Whangarei District Council information.

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District Plan Change 1 - Natural Hazards Flooding



PC1 - Natural Hazards

Flood Hazard Area

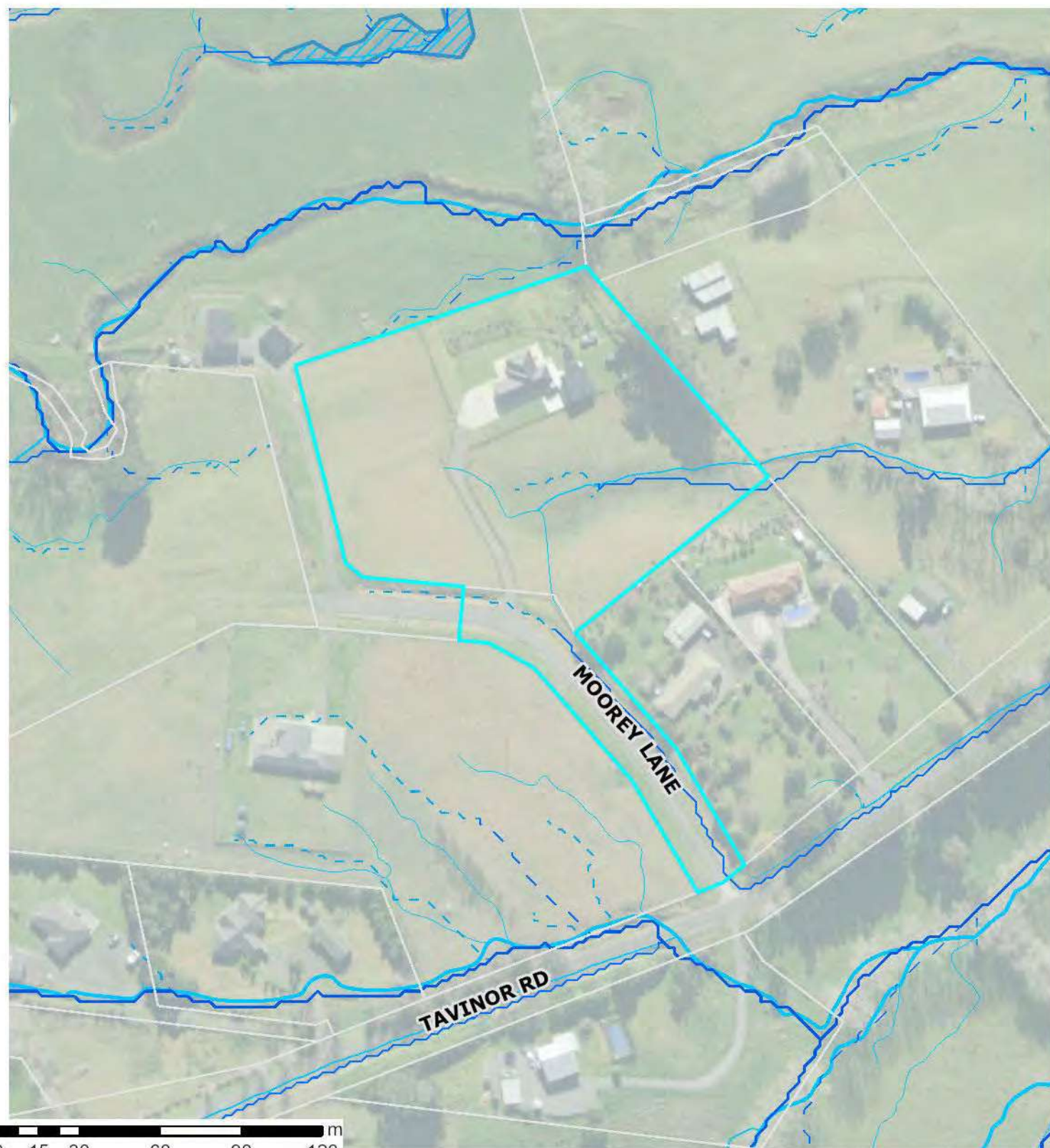
- 10 Year Flood Hazard Area
- 100 Year Flood Hazard Area

Information provided on this map forms part of Plan Change 1 – Natural Hazards.
To view the maps and see how the changes may affect the property please visit:
<https://www.wdc.govt.nz/Services/Planning/District-Plan-changes/Current-plan-changes>

2 October 2026

Scale 1:2,000





Overland Flow Paths 2021

Modelled Catchment Flowpaths 2021

- - 0.2 ha to 0.4 ha
- - 0.4 ha to 1.0 ha
- 1.0 ha to 3.0 ha
- 3.0 ha to 100.0 ha
- 100.0 ha and above

Surface Depression Ponding Areas 2021

- 0.200000 - 0.600000 m
- 0.600001 - 1.200000 m
- 1.200001 - 2.000000 m
- 2.000001 - 4.000000 m
- 4.000001 - 9.910000 m

Overland Flow Paths 2017

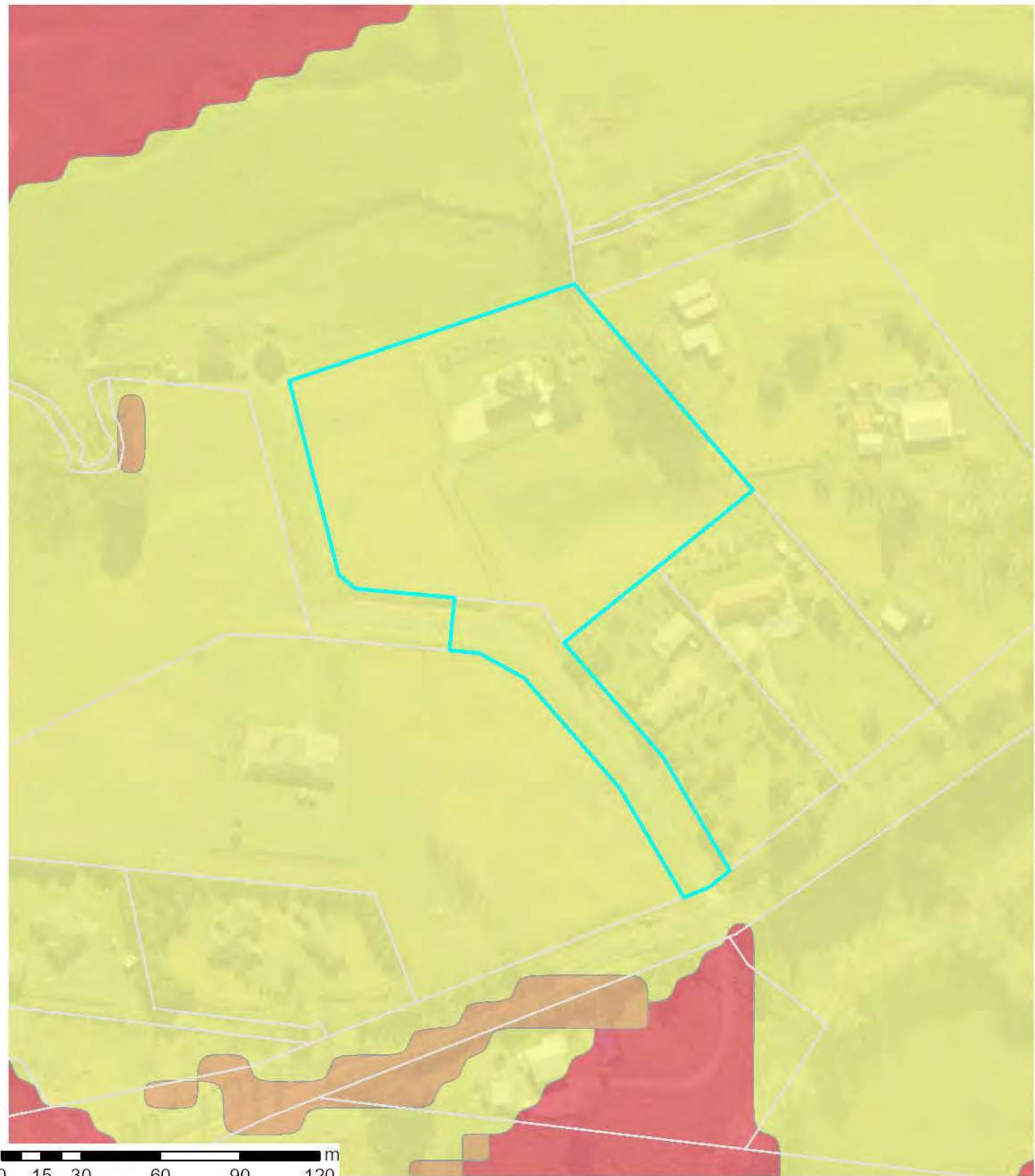
Catchment Area 2017

- 0.2 - 1.0 Ha
- 1.0 - 2.0 Ha
- 2.0 - 5.0 Ha
- > 5.0 Ha

Depression Storage Areas 2017

- Depression Storage Areas

2 October 2026
Scale 1:2,000



Landslide Susceptibility
Zone

- High
- Moderate
- Low

Whangārei District Council holds indicative information on land stability hazard for Whangārei. The Whangārei District Council may require site-specific investigations before granting future subdivision or building consent for the property, depending on the level of stability risk of the area the property is in. Tonkin + Taylor Ltd Landslide Susceptibility assessment report: <https://www.wdc.govt.nz/files/assets/public/v/2/documents/council/reports/hazard-reports/land-stability/landslide-susceptibility-technical-report.pdf>

2 October 2026
Scale 1:2,000



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