



Our Reference: 10575.1 (FNDC)

2 March 2026

Resource Consents Department
Far North District Council
JB Centre
KERIKERI

Dear Sir/Madam

RE: Proposed Subdivision at 121 Redcliffs Road, Kerikeri – Breadon & Cook Ltd

I am pleased to submit application on behalf of Breadon & Cook Limited, for a proposed subdivision of land at 121 Redcliffs Road, Kerikeri, zoned Rural Production. The application is a restricted discretionary activity.

The application fee of \$5,038 has been paid separately via direct credit.

Regards

Lynley Newport
Senior Planner
THOMSON SURVEY LTD

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of [Form 9](#)). Prior to, and during, completion of this application form, please refer to [Resource Consent Guidance Notes](#) and [Schedule of Fees and Charges](#) — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Consent representative to discuss this application prior to lodgement?

Yes No

2. Type of consent being applied for

(more than one circle can be ticked):

- Land Use
- Fast Track Land Use*
- Subdivision
- Consent under National Environmental Standard
(e.g. Assessing and Managing Contaminants in Soil)
- Other (please specify) _____
- Discharge
- Change of Consent Notice (s.221(3))
- Extension of time (s.125)

**The fast track is for simple land use consents and is restricted to consents with a controlled activity status.*

3. Would you like to opt out of the fast track process?

Yes No

4. Consultation

Have you consulted with Iwi/Hapū? Yes No

If yes, which groups have you consulted with?

Who else have you consulted with?

For any questions or information regarding iwi/hapū consultation, please contact Te Hono at Far North District Council, tehonosupport@fndc.govt.nz

8. Application site details

Location and/or property street address of the proposed activity:

Name/s:	as per item 5 above	
Site address/ location:	121 Redcliffs Road	+
	KERIKERI	+
	_____	Postcode
Legal description:	Lot 3 DP 108139	Val Number: _____
Certificate of title:	NA60C/189	

Please remember to attach a copy of your Certificate of Title to the application, along with relevant consent notices and/or easements and encumbrances (search copy must be less than 6 months old)

Site visit requirements:

Is there a locked gate or security system restricting access by Council staff? Yes No

Is there a dog on the property? Yes No

Please provide details of any other entry restrictions that Council staff should be aware of, e.g. health and safety, caretaker's details. This is important to avoid a wasted trip and having to re-arrange a second visit.

_____ _____ _____

9. Description of the proposal

Please enter a brief description of the proposal here. Please refer to Chapter 4 of the *District Plan, and Guidance Notes*, for further details of information requirements.

Subdivision in the Rural Production to create four additional lots in two stages, as a restricted discretionary activity.	+
_____ _____	

If this is an application for a Change or Cancellation of Consent Notice conditions (s.221(3)), please quote relevant existing Resource Consents and Consent Notice identifiers and provide details of the change(s), with reasons for requesting them.

10. Would you like to request public notification?

Yes No

11. Other consent required/being applied for under different legislation

(more than one circle can be ticked):

- Building Consent
- Regional Council Consent (ref # if known)
- National Environmental Standard Consent
- Other (please specify)

12. National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health:

The site and proposal may be subject to the above NES. In order to determine whether regard needs to be had to the NES please answer the following:

Is the piece of land currently being used or has it historically ever been used for an activity or industry on the Hazardous Industries and Activities List (HAIL)? Yes No Don't know

Is the proposed activity an activity covered by the NES? Please tick if any of the following apply to your proposal, as the NESCS may apply as a result? Yes No Don't know

Subdividing land

Disturbing, removing or sampling soil

Changing the use of a piece of land

Removing or replacing a fuel storage system

13. Assessment of environmental effects:

Every application for resource consent must be accompanied by an Assessment of Environmental Effects (AEE). This is a requirement of Schedule 4 of the Resource Management Act 1991 and an application can be rejected if an adequate AEE is not provided. The information in an AEE must be specified in sufficient detail to satisfy the purpose for which it is required. Your AEE may include additional information such as written approvals from adjoining property owners, or affected parties.

Your AEE is attached to this application Yes

14. Draft conditions:

Do you wish to see the draft conditions prior to the release of the resource consent decision? Yes No

If yes, please be advised that the timeframe will be suspended for 5 working days as per s107G of the RMA to enable consideration for the draft conditions.

15. Billing Details:

This identifies the person or entity that will be responsible for paying any invoices or receiving any refunds associated with processing this resource consent. Please also refer to Council's Fees and Charges Schedule.

Name/s: (please write in full)

BREADON & COOK LTD

Email:

Phone number:

Postal address:

(or alternative method of service under section 352 of the act)

Fees Information

An instalment fee for processing this application is payable at the time of lodgement and must accompany your application in order for it to be lodged. Please note that if the instalment fee is insufficient to cover the actual and reasonable costs of work undertaken to process the application you will be required to pay any additional costs. Invoiced amounts are payable by the 20th of the month following invoice date. You may also be required to make additional payments if your application requires notification.

15. Billing details continued...

Declaration concerning Payment of Fees

I/we understand that the Council may charge me/us for all costs actually and reasonably incurred in processing this application. Subject to my/our rights under Sections 357B and 358 of the RMA, to object to any costs, I/we undertake to pay all and future processing costs incurred by the Council. Without limiting the Far North District Council's legal rights if any steps (including the use of debt collection agencies) are necessary to recover unpaid processing costs I/we agree to pay all costs of recovering those processing costs. If this application is made on behalf of a trust (private or family), a society (incorporated or unincorporated) or a company in signing this application I/we are binding the trust, society or company to pay all the above costs and guaranteeing to pay all the above costs in my/our personal capacity.

Name: (please write in full)

BREADON & COOK LTD

Signature:

(signature of bill payer)

Date 27/02/26.

MANDATORY

16. Important Information:

Note to applicant

You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.

You may apply for 2 or more resource consents that are needed for the same activity on the same form.

You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application

Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.

A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

Privacy Information:

Once this application is lodged with the Council it becomes public information. Please advise Council if there is sensitive information in the proposal. The information you have provided on this form is required so that your application for consent pursuant to the Resource Management Act 1991 can be processed under that Act. The information will be stored on a public register and held by the Far North District Council. The details of your application may also be made available to the public on the Council's website, www.fndc.govt.nz. These details are collected to inform the general public and community groups about all consents which have been issued through the Far North District Council.

17. Declaration

The information I have supplied with this application is true and complete to the best of my knowledge.

Name (please write in full)

BREADON & COOK LTD

Signature

Date 27/02/26.

by electronic means

See overleaf for a checklist of your information...

Checklist

Please tick if information is provided

- Payment (cheques payable to Far North District Council)
- A current Certificate of Title (Search Copy not more than 6 months old)
- Details of your consultation with Iwi and hapū
- Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- Applicant / Agent / Property Owner / Bill Payer details provided
- Location of property and description of proposal
- Assessment of Environmental Effects
- Written Approvals / correspondence from consulted parties
- Reports from technical experts (if required)
- Copies of other relevant consents associated with this application
- Location and Site plans (land use) AND/OR
- Location and Scheme Plan (subdivision)
- Elevations / Floor plans
- Topographical / contour plans

Please refer to Chapter 4 of the District Plan for details of the information that must be provided with an application. Please also refer to the RC Checklist available on the Council's website. This contains more helpful hints as to what information needs to be shown on plans.

Breadon & Cook Ltd

Far North District Plan

PROPOSED SUBDIVISION

121B Redcliffs Road, Kerikeri

**PLANNING REPORT AND ASSESSMENT
OF ENVIRONMENTAL EFFECTS**

**Thomson Survey Ltd
Kerikeri**

1.0 INTRODUCTION

1.1 The Proposal

The applicants propose to carry out a subdivision of their property on Redcliffs Road, Kerikeri to create five lots (four additional), in two stages. Lots 1-4 are proposed to be 2-2.25ha in area, with the large balance Lot 5 of 65.912ha. Stage 1 will consist of Lot 3 and balance, with the remaining Lots 1, 2 & 4 created in Stage 2.

All the smaller lots are vacant sites. Lot 5 contains the property's existing built development which includes two existing dwellings with ancillary buildings. Access to those existing dwellings is directly off Redcliffs Road. Access to the four smaller lots is proposed to come of an existing newly formed crossing and appurtenant right of way, to the southwest of the other crossing.

Internal to the site, Lot 3 will be accessed via right of way over existing well formed access. Lots 1, 2 & 4 will be accessed by right of way following a route through large Lot 5, tracking down through a valley, across an existing crossing and looping around to lots' boundaries.

As part of the subdivision application, earthworks are required for the construction of rights of way and new vehicle crossings (some already in existence). Volumes have been estimated (conceptually) as a little over total 10,000m³ volume (refer to Section 9 of the Subdivision Site Suitability Report in Appendix 4). As provided for by Rule 13.6.8 of the Operative District Plan, consent for excavation/filling associated with site works is incorporated into this subdivision application.

Refer to Appendix 1 for copies of the Scheme Plans.

1.2 Scope of this Report

This assessment and report accompanies the Resource Consent Application and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent under the District Plan for a subdivision as a restricted discretionary activity. The name and address of the owner of the property is contained in the Form 9 Application form.

2.0 PROPERTY DETAILS

Location:	121B Redcliffs Road, Kerikeri. Location Plan is attached in Appendix 2.
Legal description:	Lot 3 DP 108139
CT:	NA60C/189, with an area of 75.412ha, dated 1985 (copy attached in Appendix 3).

3.0 SITE DESCRIPTION

3.1 Physical characteristics.

The property is on the left hand side of Redcliffs Road as you drive up slope after crossing the one lane bridge at the base of the hill. There is a double width (new) concrete crossing to the site's appurtenant right of way access, recently registered on the title. There is another crossing into the site further up the slope, providing access to the two existing residential dwellings to remain within the large balance Lot 5.

Other than those dwellings, and some ancillary buildings associated with them, the site is vacant farm land. There are existing farm tracks, paddock partitions (fencing), and stock water supply and reticulation infrastructure in place.

The property is zoned Rural Production in both the Operative and Proposed District Plans. No high or outstanding landscape or natural features are identified within the site. The property is not within the coastal environment.

The site contains pockets of exotic species vegetation, including a row of trees along a ridgeline within Lot 5.

Soils within the site are mapped as being at best LUC class 4e. The site is mapped as being within a "kiwi present" area. It is also within a vast area mapped as a Treaty Settlement Area of Interest. This is a non district plan layer with no rules or information requirements attached.

The site contains no mapped heritage or cultural or archaeological sites and contains no areas of indigenous vegetation or habitat of any note.

The land is not mapped as erosion prone and is not mapped as a HAIL site. Some of the water courses tracking through the site are mapped as potentially prone to flooding, within

narrow constraints on either side of the water courses. The proposed lots are nowhere in the vicinity of such water courses.

The site is not serviced by Council 3 waters services. Frontage to the property is via Council maintained public road, sealed surface.

Refer to the Subdivision Site Suitability Report in Appendix 4 for additional site information.

3.2 Legal Interests

The Title is not subject to any legal interests that affect the proposed subdivision. It has appurtenant water supply rights dating back to 1986 and the more recent appurtenant right of way and services easement, registered in 2024.

3.3 Consent History

The property files show the following:

BP503604, issued in 1972 for garage/storage shed;

BP822417, issued in 1976 for additions to dwelling, bedroom, lounge and laundry;

BP63592, issued in 1979 – extensions to shearing shed.

4.0 SCHEDULE 4 – INFORMATION REQUIRED IN AN APPLICATION

Clauses 2 & 3: Information required in all applications

<i>(1) An application for a resource consent for an activity must include the following:</i>	
<i>(a) a description of the activity:</i>	Refer Sections 1 and 5 of this Planning Report.
<i>(b) an assessment of the actual or potential effect on the environment of the activity:</i>	Refer to Section 6 of this Planning Report.
<i>(b) a description of the site at which the activity is to occur:</i>	Refer to Section 3 of this Planning Report.
<i>(c) the full name and address of each owner or occupier of the site:</i>	This information is contained in the Form 9 attached to the application.
<i>(d) a description of any other activities that are part of the proposal to which the application relates:</i>	Refer to Sections 3 and 5 of this Planning Report for existing activities within the site. The application is for subdivision.
<i>(e) a description of any other resource consents required for the proposal to which the application relates:</i>	No other consents are required other than that being applied for pursuant to the Far North Operative District Plan.
<i>(f) an assessment of the activity against the matters set out in Part 2:</i>	Refer to Section 7 of this Planning Report.

<p><i>(g) an assessment of the activity against any relevant provisions of a document referred to in section 104(1)(b), including matters in Clause (2):</i></p> <p><i>(a) any relevant objectives, policies, or rules in a document; and</i> <i>(b) any relevant requirements, conditions, or permissions in any rules in a document; and</i> <i>(c) any other relevant requirements in a document (for example, in a national environmental standard or other regulations).</i></p>	<p>Refer to Sections 5 & 7 of this Planning Report.</p>
<p>(3) An application must also include any of the following that apply:</p>	
<p><i>(a) if any permitted activity is part of the proposal to which the application relates, a description of the permitted activity that demonstrates that it complies with the requirements, conditions, and permissions for the permitted activity (so that a resource consent is not required for that activity under section 87A(1)):</i></p> <p><i>(b) if the application is affected by section 124 or 165ZH(1)(c) (which relate to existing resource consents), an assessment of the value of the investment of the existing consent holder (for the purposes of section 104(2A)):</i></p> <p><i>(c) if the activity is to occur in an area within the scope of a planning document prepared by a customary marine title group under section 85 of the Marine and Coastal Area (Takutai Moana) Act 2011, an assessment of the activity against any resource management matters set out in that planning document (for the purposes of section 104(2B)).</i></p>	<p>Refer sections 3 and 5. The site is vacant.</p> <p>There is no existing resource consent. Not applicable.</p> <p>The site is not within an area subject to a customary marine title group. Not applicable.</p>

Clause 4: Additional information required in application for subdivision consent

<p>(4) An application for a subdivision consent must also include information that adequately defines the following:</p>	
<p><i>(a) the position of all new boundaries:</i> <i>(b) the areas of all new allotments, unless the subdivision involves a cross lease, company lease, or unit plan:</i> <i>(c) the locations and areas of new reserves to be created, including any esplanade reserves and esplanade strips:</i> <i>(d) the locations and areas of any</i></p>	<p>Refer to Scheme Plans in Appendix 1.</p>

<p>existing esplanade reserves, esplanade strips, and access strips: (e) the locations and areas of any part of the bed of a river or lake to be vested in a territorial authority under section 237A: (f) the locations and areas of any land within the coastal marine area (which is to become part of the common marine and coastal area under section 237A): (g) the locations and areas of land to be set aside as new roads.</p>	
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Clause 5: Additional information required for application for reclamation – not applicable.

Clause 6: Information required in assessment of environmental effects

<i>(1) An assessment of the activity's effects on the environment must include the following information:</i>	
<i>(a) if it is likely that the activity will result in any significant adverse effect on the environment, a description of any possible alternative locations or methods for undertaking the activity:</i>	Refer to Section 6 of this planning report. The activity will not result in any significant adverse effect on the environment.
<i>(b) an assessment of the actual or potential effect on the environment of the activity:</i>	Refer to Section 6 of this planning report.
<i>(c) if the activity includes the use of hazardous installations, an assessment of any risks to the environment that are likely to arise from such use:</i>	Not applicable as the application does not involve hazardous installations.
<i>(d) if the activity includes the discharge of any contaminant, a description of— (i) the nature of the discharge and the sensitivity of the receiving environment to adverse effects; and (ii) any possible alternative methods of discharge, including discharge into any other receiving environment:</i>	The subdivision does not involve any discharge of contaminant.
<i>(e) a description of the mitigation measures (including safeguards and contingency plans where relevant) to be undertaken to help prevent or reduce the actual or potential effect:</i>	Refer to Section 6 of this planning report.
<i>(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:</i>	Refer to Section 8 of this planning report. No affected persons are identified.
<i>g) if the scale and significance of the activity's effects are such that</i>	No monitoring is required as the scale and significance of effects does not warrant any.

<i>monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:</i>	
<i>(h) if the activity will, or is likely to, have adverse effects that are more than minor on the exercise of a protected customary right, a description of possible alternative locations or methods for the exercise of the activity (unless written approval for the activity is given by the protected customary rights group).</i>	No protected customary right is affected.

Clause 7: Matters that must be addressed by assessment of environmental effects (RMA)

<i>(1) An assessment of the activity's effects on the environment must address the following matters:</i>	
<i>(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:</i>	Refer to Sections 6 and 8 of this planning report and also to the assessment of objectives and policies in Section 7.
<i>(b) any physical effect on the locality, including any landscape and visual effects:</i>	Refer to Section 6. The proposed activity will have no adverse, effects on the physical environment and landscape and visual amenity values.
<i>(c) any effect on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity:</i>	Refer to Section 6.0. The proposal will not result in adverse effects in regard to habitat and ecosystems.
<i>(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural value, or other special value, for present or future generations:</i>	Refer to Section 6, and above comments
<i>(e) any discharge of contaminants into the environment, including any unreasonable emission of noise, and options for the treatment and disposal of contaminants:</i>	The subdivision will not result in the discharge of contaminants, nor any unreasonable emission of noise.
<i>(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or hazardous installations.</i>	The subdivision site is not subject to natural hazards and does not involve hazardous installations.

5.0 COMPLIANCE ASSESSMENT**5.1 Weighting of the Plans**

The proposal is subject to the Proposed District Plan (PDP) process, whereby the PDP was publicly notified on 27th July 2022. The site is zoned Rural Production under the PDP. When the PDP was first notified there were a number of rules which were identified as having immediate legal effect. As such, an assessment of the relevant rules and related objectives and policies of the PDP form part of this application.

In regard to the weighting of the Plans, submissions and further submissions have closed (including those to Variation 1) and hearings have been completed. Decisions on submissions have yet to be notified. I have not identified any rules in the PDP, relevant to this proposal that had immediate legal effect from July 2022, and as such this application gives no weight to any PDP rules.

5.2 Operative District Plan Zoning

The property is zoned Rural Production. No Resource features apply. The subdivision standards applying in the zone are contained in Table 13.7.2.1 as shown below.

TABLE 13.7.2.1: MINIMUM LOT SIZES

(i) RURAL PRODUCTION ZONE

Controlled Activity Status (Refer also to 13.7.3)	Restricted Discretionary Activity Status (Refer also to 13.8)	Discretionary Activity Status (Refer also to 13.9)
The minimum lot size is 20ha.	1. Subdivision that complies with the controlled activity standard, but is within 100m of the boundary of the Minerals Zone; 2. The minimum lot size is 12ha; or 3. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 4,000m ² and there is at least 1 lot in the subdivision with a minimum lot size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 4. A maximum of 5 lots in a subdivision (including the parent lot) where the minimum size of the lots is 2ha, and where the subdivision is created from a site that existed at or prior to 28 April 2000;	1. The minimum lot size is 4ha; or 2. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 2,000m ² and there is at least 1 lot in the subdivision with a minimum size of 4ha, and provided further that the subdivision is of sites which existed at or prior to 28 April 2000, or which are amalgamated from titles existing at or prior to 28 April 2000; or 3. A subdivision in terms of a management plan as per Rule 13.9.2 may be approved.

The creation of five lots of greater than 2ha, where the title is older than April 2000, is a restricted discretionary subdivision activity pursuant to option 4 above (in bold). The proposal creates five lots and the title is dated 1985, therefore meets the requirements of option 4. The subdivision is therefore regarded as a Restricted Discretionary subdivision activity.

Zone Rules:

I have not identified any zone rule breaches.

District Wide Rules:

The site is not subject to chapters 12.1 or 12.2 (landscape and indigenous vegetation).

In regard to Chapter 12.3 Soils and Minerals, the total volume of excavation/filling for the construction of the main access D, E and F, along with vehicle entrances, will exceed the permitted volume of 5,000m³, if done within the same 12 month period. There will be no cut/fill face with average height exceeding the permitted height. Rule 13.6.8 of the Subdivision Chapter of the ODP provides for excavation and/or filling consent to be deemed part of the subdivision consent. The Subdivision Site Suitability Report, Section 9, addresses Earthworks.

Chapter 12.4 (Natural Hazards) is not relevant in regard to coastal hazards given the site is not located on the coast. Rule 12.4.6.1.2 Fire Risk to Residential Units is met in that the required 20m separation distance can be achieved between a future residential unit and bush line of any area of trees.

The proposal is not subject to Chapter 12.5 (Heritage) as there are no heritage or cultural resources mapped for the site, nor Chapter 12.7 (Waterbodies) as there are no qualifying waterbodies from which setback is required, particularly in regard to the proposed additional smaller lots along Range Road frontage. No works is proposed in any indigenous wetland.

An assessment of the proposal against Chapter 15.1.6C.1.1 to 11 has been carried out, with no breaches identified.

Rule 15.1.6C.1.1(a) – private access is all via direct crossings to Redcliffs Road and the crossings are existing. Part (b) only applies to urban zones. Parts (c) and (d) are complied with. Similarly, part (e) is complied with. Rule 15.1.6C.1.3 can be complied with in regard to any required passing bays. There is no footpath so Rule 15.1.6C.1.4 does not apply.

Rule 15.1.6C.1.5 specifies vehicle crossing standards and new crossings into the additional lots can be formed to these standards.

Rule 15.1.6C.1.7 can be complied with. Rule 15.1.6C.1.8(a) is not applicable as no legal road width widening is required. Redcliffs Road is Council maintained public road (sealed) and is to standard (part (b)). Part (c) does not apply as the site has only one frontage. I do not believe there to be any road encroachment, so part (d) does not apply.

No other district wide rules in the ODP are applicable.

The application remains a restricted discretionary subdivision activity overall. The excavation/filling consent being sought as part of the subdivision defaults to restricted discretionary activity status (total volume being less than 20,000m³ and average height of cut/fill faces compliant with the rule). Therefore, the overall activity status for the application does not alter, and remains restricted discretionary.

5.2 Proposed District Plan (PDP) Assessment

There are certain rules that have been identified in the PDP as having immediate legal effect and that may affect the category of activity under the Act. These include:

Rules HS-R2, R5, R6 and R9 in regard to hazardous substances on scheduled sites or areas of significance to Maori, significant natural areas or a scheduled heritage resource.

There are no scheduled sites or areas of significance to Maori, significant natural areas or any scheduled heritage resource on the site, therefore these rules are not relevant to the proposal.

Heritage Area Overlays – N/A as none apply to the application site.

Historic Heritage rules and Schedule 2 – N/A as the site does not have any identified (scheduled) historic heritage values.

Notable Trees – N/A – no notable trees on the site.

Sites and Areas of Significance to Maori – N/A – the site does not contain any site or area of significance to Maori.

Ecosystems and Indigenous Biodiversity – Rules IB-R1 to R5 inclusive.
No indigenous vegetation clearance is proposed.

Subdivision (specific parts) – only subdivision provisions relating to land containing Significant Natural Area or Heritage Resources have immediate legal effect. The site contains no scheduled or mapped Significant Natural Areas or Heritage Resources.

Activities on the surface of water – N/A as no such activities are proposed.

Earthworks – Only some rules and standards have legal effect. These are Rules EW-R12 and R13 and related standards EW-S3 and ES-S5 respectively. EW-R12 and associated EW-S3 relate to the requirement to abide by Accidental Discovery Protocol if carrying out earthworks and artefacts are discovered. EW-R13 and associated EW-S5 refer to operating under appropriate Erosion and Sediment Control measures. Earthworks will be required to give effect to the subdivision is the formation of access and crossings. This can be carried out in compliance with the above referenced rules/standards.

Signs – N/A – signage does not form part of this application.

Orongo Bay Zone – N/A as the site is not in Oronga Bay Zone.

There are no zone rules in the PDP with immediate legal effect that affect the proposal's activity status.

6.0 ASSESSMENT OF ENVIRONMENTAL EFFECTS

The assessment of environmental effects below includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment, as required by Clause 2(3)(c) of Schedule 4 of the Act.

A restricted discretionary activity is described in s87A of the Act, clause (3).

Proposed subdivision

If an activity is described in this Act, regulations (including any national environmental standard), a plan, or a proposed plan as a restricted discretionary activity, a resource consent is required for the activity and—

(a) **the consent authority's power to decline a consent, or to grant a consent and to impose conditions on the consent, is restricted to the matters over which discretion is restricted** (whether in its plan or proposed plan, a national environmental standard, or otherwise); and

(b) if granted, the activity must comply with the requirements, conditions, and permissions, if any, specified in the Act, regulations, plan, or proposed plan.

It is also subject to s104C of the Act:

(1) When considering an application for a resource consent for a restricted discretionary activity, a consent authority must consider **only** those matters over which—

(a) A discretion is restricted in national environmental standards or other regulations;

(b) It has restricted the exercise of its discretion in its plan or proposed plan;

(3) if it grants the application, the consent authority may impose conditions under section 108 **only** for those matters over which –

(a) A discretion is restricted in national environmental standards or other regulations;

(b) It has restricted the exercise of its discretion in its plan or proposed plan.

The subdivision meets the restricted discretionary number/size of lots specified in Table 13.7.2.1. Far North District Plan lays out in 13.8.1, the matters to which it restricts its discretion in determining whether to grant consent to a restricted discretionary activity, and then lays out the matters to which it will restrict its discretion when considering whether to impose conditions.

13.8.1 SUBDIVISION WITHIN THE RURAL PRODUCTION ZONE

..... In considering **whether or not to grant consent** on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters:

(i) for applications under 13.8.1(a):

- effects on the natural character of the coastal environment for proposed lots which are in the coastal environment.

(ii) for applications under 13.8.1(b) or (c):

- effects on the natural character of the coastal environment for proposed lots which are in the coastal environment;
- effects of the subdivision under (b) and (c) above within 500m of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;
- effects on areas of significant indigenous flora and significant habitats of indigenous fauna;
- the mitigation of fire hazards for health and safety of residents.

In considering **whether or not to impose conditions** on applications for restricted discretionary subdivision activities the Council will restrict the exercise of its discretion to the following matters:

(1) the matters listed in 13.7.3;

(2) the matters listed in (i) and (ii) above

In the case of this application, the application is lodged pursuant to 13.8.1(c), and therefore clause (ii) applies:

-
- effects on the natural character of the coastal environment for proposed lots which are in the coastal environment;

The property is not within the coastal environment.

- effects of the subdivision under (b) and (c) above within 500m of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;

There is a marginal strip along the stream in the valley to the south west of the application site. The Conservation zoned land does not have a boundary with the application site, as there is an intervening rural property. However, the Conservation zone is approximately 330m from the application site. Similarly, there is Conservation zoned marginal strip approximately 380m to the north east of the northern most corner of Lot 5. Because of the separation distance and, in one instance an intervening property, I do not consider that the proposal will have any effect at all on land administered by the Department Conservation.

- effects on areas of significant indigenous flora and significant habitats of indigenous fauna;

There are no areas of significant indigenous flora or significant habitats of indigenous fauna within the application site.

- the mitigation of fire hazards for health and safety of residents.

There are no areas of bush from which separation distance is required.

In summary, there are no grounds for the Council to refuse consent.

In determining conditions of consent, the following AEE is offered.

6.1 Allotment Sizes and Dimensions

All lots are all in excess of 2ha, have been shown to be able to provide for future residential development, and are of an appropriate size and dimension for such development, easily accommodating a 30m x 30m square building envelope complying with setback requirements.

6.2 Property Access

It is proposed that the two existing dwellings will continue to share their existing entrance off Redcliffs Road. This crossing is in excess of double width, with splays and culvert. It is an existing legally established crossing with no intensification/increased use proposed.

The balance of Lot 5, and Lots 1-4 are all to utilise a newly constructed double width crossing further down slope (south). The application site has existing appurtenant right of way over this crossing and right of way, as indicated on the scheme plan. This is an expansive double width, splayed and culverted concreted crossing.

The right of way is well formed to a width in excess of 5m. The same/similar formation and surfacing continues over area 'A' and 'C'/'B'. The SSSR's Section 8.2 Table 17 summarises

proposed rights of way specifications. Right of way 'D' is not yet formed, but will be, to the standard specified in Table 17. Similarly rights of way 'E' and 'F', serving fewer lots than 'D', will be formed to the standard outlined in Table 17.



Existing access within 'C' to right of picture, looking east

The Subdivision Site Suitability Report (SSSR) contains concept RoW plans in its Appendix A. Table 18 of the SSSR specifies crossing specifications into the lots.

6.3 Excavation and/or Filling

Earthworks is required for the construction of rights of way and new vehicle crossings into new lots, noting some crossings already exist. The SSSR in Appendix 4 addresses earthworks in its Section 9. The right of way cut volume is estimated at just over 7,000m³; with fill volume estimated at 3,400m³. The work may not all be within the same 12 month period, given the intention to stage the subdivision, however in the interests of completeness, consent is sought for these earthworks as part of the subdivision consent, as provided for by Rule 13.6.8 of the Plan.

Excess 'cut' can be disposed of elsewhere on the site, which is zoned Rural Production. The SSSR contains general earthworks recommendations and addresses Erosion and Sediment Control. The report recommends silt fences along the downslope face of rights of ways; temporary sediment retention pond(s); and clean and/or dirty water diversion bunds. The specifics of an Erosion and Sediment Control Plan could be a condition of consent.

6.4 Natural and Other Hazards

Refer to the Subdivision Site Suitability Report in Appendix 4. This includes a Geotechnical Assessment in its Section 4, and a Natural Hazards Assessment in its Section 9. The report notes that at time of writing there were no obvious indications of major deep-seated instability and the risk of that occurring was low.

Slope analysis was carried out for the steeper Lots 3 & 4, with the latter passing. Lot 3, on the other hand resulted in a potential failure, indicating a factor of safety below the minimum requirement for residential development. This is if the slope is left in its existing condition. The report recommends, therefore, that a consent notice be applied to Lot 3 whereby further specific geotechnical investigation, slope stability analysis and detailed design of a stability

control structure is provided at building consent stage. The other lots do not require such a consent notice.

The report goes on to suggest a practicable solution for stability control, summarised as cantilever or soldier pile wall below a proposed development footprint. With such a protective measure in place a building would be able to be established without a s72 notice under the Building Act.



Looking north along building area within Lot 3.



Looking east from Lot 4's likely house site

In regard other hazards the report concluded no mitigation was required and effects on the environment less than minor.

The property is not listed as a HAIL site by Northland Regional Council [source: NRC online maps], or on Far North Maps.

6.5 Water Supply

There is no Council reticulated water supply available to the property and the Council can impose its standard requirement in regard to potable and fire fighting water supply for Lots 1-4. It is not considered necessary for Lot 5 given it is a balance farm lot. Refer also to Section 7 of the SSSR in Appendix 4.

6.6 Stormwater Disposal

Refer to the SSSR in Appendix 4, specifically Section 6 of that report. Lots 1-4 are vacant land, with 2ha lots proposed. The SSSR examines a future concept for Lots 1 and 2, of 300m² roof area and 200m² driveway; and for Lots 3 & 4 of 300m² roof area and 965m² and 1021m² respectively for driveway. This results in future impermeable surface coverage of less than 6% in all cases – well within the permitted threshold of 15%.

Lot 5 will contain the access, along with existing built development but because of its overall large area, the coverage will be less than 2% of total site area.

The SSSR discusses concept attenuation models, both for roof runoff tanks and on-lot discharge. In separate section 6.5, the SSSR discusses stormwater management for the internal roading. It is proposed to modify the existing farm pond structure to act as a stormwater attenuation pond which can be fed by gravity flows.

In summary the proposal, and future development of lots, will not create adverse stormwater runoff effects.

6.7 Sanitary Sewage Disposal

Refer to Section 5 of the SSSR in Appendix 4. The wastewater treatment and disposal systems associated with the two existing dwellings are expected to be within proposed Lot 5's boundaries. The existing system for the western dwelling was measured within the boundaries with adequate offset, and the other dwelling is not near any proposed new boundary.

The SSSR assumes that the proposed new lots may comprise up to a five bedroom dwelling with a peak occupancy of eight people. This equates to a maximum total daily wastewater generation of 160litres/day per/per person on each proposed lot. The report recommends an appropriate land disposal system, with primary disposal area of 427m² laid parallel to the natural contours and a conservative 50% reserve field if utilising secondary treatment (noting the Regional Plan only requires 30%). All of Lots 1-4 can readily accommodate such disposal and reserve disposal areas.

The report provides a summary of concept wastewater design and assesses environmental effects. It also assesses proposed future systems against the criteria in the Regional Plan for compliance (Table 20 of Appendix C of the Site Suitability Report).

Whilst the report bases its assessment on secondary treatment and can confirm compliance with permitted activity thresholds on that basis, it may also be possible for future lot owners to install primary treatment. This should be a decision for a future lot owner at time of building consent, where a TP58 Site Suitability report can be provided and compliance against the Regional Plan assessed for the specific design being proposed.

6.8 Energy Supply & Telecommunications

Energy supply and telecommunications are not a requirement of rural subdivisions. The Council can impose its standard consent notice as follows:

Electricity supply is not a condition of this consent and power has not been reticulated to the boundary of the lot. The lot owner is responsible for the provision of a power supply to operate the on-site aerobic wastewater treatment plant and any other device which requires electrical power to operate.

Notwithstanding this, power infrastructure runs along Redcliffs Road, with both existing dwellings having power connections.

6.9 Easements for any purpose

The scheme plan(s) attached in Appendix 1 show both a Memorandum of Easements and a Proposed Easement. The latter is shown 'B' and is proposed only. It would provide additional width for existing physically formed access to Lots 3 and 5 but may not be required, hence being "proposed" easement only.

The Memorandum of Easements shows A and C-F inclusive for rights of way and services, over Lot 5 (the large balance lot) in favour of various of the small lots, as required.

6.10 Preservation and enhancement of heritage resources (including cultural), vegetation, fauna and landscape, and land set aside for conservation purposes

The ODP states:

Where any proposed allotment contains one or more of the following:

- (a) a Notable Tree as listed in Appendix 1D;*
- (b) an Historic Site, Building or Object as listed in Appendix 1E;*
- (c) a Site of Cultural Significance to Maori as listed in Appendix 1F;*
- (d) an Outstanding Natural Feature as listed in Appendix 1A;*
- (e) an Outstanding Landscape Feature as listed in Appendix 1B;*
- (f) an archaeological site as listed in Appendix 1G;*
- (g) an area of significant indigenous vegetation or significant habitats of indigenous fauna, as defined in Method 12.2.5.6.*

The continued preservation of that resource, area or feature shall be an ongoing condition for approval to the subdivision consent.

The application contains none of the above. As such there is no resource, area or feature requiring protection or preservation.

The application site is within a kiwi present area and the norm for sites in a kiwi present area is to include a requirement that any dogs or cats kept on the lots must be kept inside and/or securely kennelled or enclosed (dogs) at night in order to reduce the risk of predation on kiwi. Lot 5 is a functioning farm and will require the ability to have working dogs present.

6.11 Access to Reserves and waterways

There are no qualifying waterbodies to which public access is required. The subdivision does not adversely affect waterbodies.

6.12 Land use compatibility (reverse sensitivity)

The property supports two existing residential dwellings. The proposal will provide for the introduction of four more. The area is characterised by a mixture of rural and residential land uses, not unusual in the district's Rural Production Zone. Land across the road has been subdivided but not yet built on. Land to the south has been subdivided and not yet built on. Land further south again, closer to Kerikeri, supports numerous residential units.

In summary, I do not believe providing for further intensification (as a restricted discretionary activity under the ODP) will create adverse reverse sensitivity effects in regard to residential living in a 'productive land' environment.

There is a quarry 700m south, across the road and over a hill, and which I am not sure is still functioning given the recent subdivision of some of the land on which it is located. There is another small scale farm quarry from which material is intermittently taken. This is over 650m away, also over and down a hill, not visible from any of the proposed new lots. In short I do not believe the presence of either "quarry" presents any reverse sensitivity issues.

6.13 Proximity to Airports

The site is not near any airport.

7.0 STATUTORY ASSESSMENT

In accordance with Section 104(1)(b) of the Act, the following documents are considered relevant to the application.

7.1 National Policy Statements & Standards

I have not identified any National Policy Statement relevant to the proposal, nor any National Environmental Standard. No natural inland wetlands or water bodies are affected, the site has not historically been used for any HAIL activity, there is no indigenous vegetation clearance or protection proposed, and the soils are not 'highly productive land' by definition.

7.2 Regional Policy Statement for Northland (RPS)

I do not consider the proposal to be inconsistent with any relevant objectives and policies in the RPS for Northland. The proposed lots will result in additional built development, but the proposal does not result in any material loss in productivity and does not result in reverse sensitivity effects.

The site is not subject to hazard. The site is not coastal and has no high or outstanding natural character or landscape values, and no heritage/cultural values.

The proposal does not, in my opinion, create any undue reverse sensitivity effects.

7.3 Regional Plan (Appeals Version)

The subdivision does not result in any breaches of rules in the Regional Plan. The allowable area of exposed earth at any one time is 5,000m² and it is estimated that this will be exceeded if all works on rights of ways is done within a single 12 month period. However, it is likely that the works will be spread over more than one 12 month period given the intent to stage the development. Alternatively (or in addition), the works will be carried out in such a way that there is never more than 5,000m² of exposed earth at any one time, such that consent from the regional council would not be required. If the consent holder chooses to carry out all the works within a single 12 month period, and to do the works such that there is more than 5,000m² of exposed earth, then they will need to obtain the consent of the Regional Council. This can be added as a statutory advice note to the consent.

7.4 District Plan Objectives and Policies

I consider the subdivision to be consistent with the subdivision objectives and policies in Chapter 13. In particular I consider the proposal to be consistent with Objective 13.3.1 which provides for (enables) subdivision in a way that promotes sustainable management of natural and physical resources; and Objective 13.3.2 and associated Policy 13.4.1, which seek to ensure that the subdivision of land is appropriate and carried out in a manner that does not compromise air, water, soil or ecosystems, and that avoids, remedies or mitigates any adverse effects.

The Rural Production zone is an enabling zone, providing for a variety of activities subject to avoiding, remedying or mitigating adverse effects and compatibility with the amenity values of rural areas and rural production activities. I consider the proposed subdivision to be consistent with the zone's objectives and policies.

OBJECTIVES

13.3.1 To provide for the subdivision of land in such a way as will be consistent with the purpose of the various zones in the Plan, and will promote the sustainable management of the natural and physical resources of the District, including airports and roads and the social, economic and cultural well being of people and communities.

13.3.2 To ensure that subdivision of land is appropriate and is carried out in a manner that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and that any actual or potential adverse effects on the environment which result directly from subdivision, including reverse sensitivity effects and the creation or acceleration of natural hazards, are avoided, remedied or mitigated.

The subdivision is consistent with both the above objectives. It promotes sustainable management of the natural and physical resources of the District and provides for the applicants' social and economic well being. It is an appropriate subdivision that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and adverse effects are minimal.

13.3.3 To ensure that the subdivision of land does not jeopardise the protection of outstanding landscapes or natural features in the coastal environment.

Proposed subdivision

13.3.4 To ensure that subdivision does not adversely affect scheduled heritage resources through alienation of the resource from its immediate setting/context.

The property has no outstanding landscape values, and is not within the coastal environment. There are no 'scheduled heritage resources' identified in the District Plan on the property.

13.3.5 To ensure that all new subdivisions provide a reticulated water supply and/or on-site water storage and include storm water management sufficient to meet the needs of the activities that will establish all year round.

On-site water supply and on-site stormwater management can be achieved.

13.3.7 To ensure the relationship between Māori and their ancestral lands, water, sites, wahi tapu and other taonga is recognised and provided for and associated

Policy 13.4.11 That subdivision recognises and provides for the relationship of Māori and their culture and traditions, with their ancestral lands, water, sites, wahi tapu and other taonga and shall take into account the principles of the Treaty of Waitangi.

There are no 'scheduled' sites of significance to Māori affecting the property. The proposal is low density. The site is not known to have any special habitat values and there are no substantial waterbodies.

13.3.8 To ensure that all new subdivision provides an electricity supply sufficient to meet the needs of the activities that will establish on the new lots created.

13.3.9 To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).

13.3.10 To ensure that the design of all new subdivision promotes efficient provision of infrastructure, including access to alternative transport options, communications and local services.

Power supply is not a requirement of rural subdivision.

POLICIES

13.4.1 That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on: (a) natural character, particularly of the coastal environment; (b) ecological values; (c) landscape values; (d) amenity values; (e) cultural values; (f) heritage values; and (g) existing land uses.

I believe the subdivision has less than minor impact on the relevant matters listed in the above policy.

13.4.2 That standards be imposed upon the subdivision of land to require safe and effective vehicular and pedestrian access to new properties.

13.4.3 That natural and other hazards be taken into account in the design and location of any subdivision.

13.4.4 That in any subdivision where provision is made for connection to utility services, the potential adverse visual impacts of these services are avoided.

13.4.5 That access to, and servicing of, the new allotments be provided for in such a way as will avoid, remedy or mitigate any adverse effects on neighbouring property, public roads (including State Highways), and the natural and physical resources of the site caused by silt runoff, traffic, excavation and filling and removal of vegetation.

Access to the site is off Council maintained public road. Rights of way and crossings into each lot can be constructed to the required standard. The site is not subject to hazards.

13.4.6 That any subdivision proposal provides for the protection, restoration and enhancement of heritage resources, areas of significant indigenous vegetation and significant habitats of indigenous fauna, threatened species, the natural character of the coastal environment and riparian margins, and outstanding landscapes and natural features where appropriate.

There is no indigenous bush on the property. The site is located within a kiwi present area. Accordingly all dogs and cats will be kept inside at night. Working dogs must be allowed to continue to be kept on the large balance lot as this will continue to be farmed. The property is not located within the coastal environment. No known heritage resources exist on or close to the application site. The site does not contain any outstanding natural landscape or features.

13.4.8 That the provision of water storage be taken into account in the design of any subdivision.

Future lots will be responsible for their own on-site water storage.

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to s6 matters.....

s6 matters are discussed elsewhere in this report. The subdivision does not adversely affect the character of the Rural Production Zone in regard to s6 matters, or any of those matters listed in 13.4.13.

13.4.14 That the objectives and policies of the applicable environment and zone and relevant parts of Part 3 of the Plan will be taken into account when considering the intensity, design and layout of any subdivision.

The Objectives and Policies of the Rural Production Zone have been considered in the design and layout of the subdivision and I consider the subdivision to be consistent with those objectives and policies.

8.6.3.1 To promote the sustainable management of natural and physical resources in the Rural Production Zone.

The proposal creates four 2ha lots in the Rural Production Zone, a scenario provided for in the District Plan. It leaves a large balance grazing lot. There are no areas of indigenous flora on the property that will be affected by the subdivision. I believe that this proposal represents sustainable management for the zone.

8.6.3.2 To enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic, and cultural well being and for their health and safety.

The proposal provides for lot owners to enjoy and experience rural living in reasonably close proximity to urban amenities.

Proposed subdivision

8.6.3.3 *To promote the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.*

The proposal does not adversely affect amenity values of the zone. The site contains no highly productive land.

8.6.3.4 *To promote the protection of significant natural values of the Rural Production Zone.*

The property does not contain any significant natural areas or indigenous biodiversity.

8.6.3.6 *To avoid, remedy or mitigate the actual and potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) within the Rural Production Zone and on land use activities in neighbouring zones.*

8.6.3.7 *To avoid remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources.*

The proposal is not a land use activity. I have not identified any likely conflicting land uses that cannot be mitigated.

8.6.3.8 *To enable the efficient establishment and operation of activities and services that have a functional need to be located in rural environments.*

This policy relates to land use activities, not subdivisions. N/A.

8.6.3.9 *To enable rural production activities to be undertaken in the zone.*

Rural production activities can continue to be undertaken following the subdivision.

8.6.4.1 *That the Rural Production Zone enables farming and rural production activities, as well as a wide range of activities, subject to the need to ensure that any adverse effects on the environment, including any reverse sensitivity effects, resulting from these activities are avoided, remedied or mitigated and are not to the detriment of rural productivity.*

The site is in grazing. This use can continue on the balance lot. Areas within the proposed smaller lots, not utilised for buildings or hardstand, will remain available for low density livestock grazing should the lot owner wish to. I do not see the proposal adversely impacting on the underlying site's productive capability.

8.6.4.2 *That standards be imposed to ensure that the offsite effects of activities in the Rural Production Zone are avoided, remedied or mitigated.*

Again, this policy is directed at land uses, not subdivisions.

8.6.4.4 *That the type, scale and intensity of development allowed shall have regard to the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.*

The proposed subdivision scale and intensity meets restricted discretionary subdivision standards and is consistent with the requirements and expectations of the District Plan.

8.6.4.5 *That the efficient use and development of physical and natural resources be taken into account in the implementation of the Plan.*

I believe the proposal represents efficient use and development of the physical and natural resources.

Proposed subdivision

8.6.4.7 That although a wide range of activities that promote rural productivity are appropriate in the Rural Production Zone, an underlying goal is to avoid the actual and potential adverse effects of conflicting land use activities.

8.6.4.8 That activities whose adverse effects, including reverse sensitivity effects, cannot be avoided remedied or mitigated are given separation from other activities.

8.6.4.9 That activities be discouraged from locating where they are sensitive to the effects of or may compromise the continued operation of lawfully established existing activities in the Rural Production zone and in neighbouring zones.

Refer to earlier comments in regard to reverse sensitivity. I believe any potential adverse effects can be readily avoided, remedied or mitigated. The proposal is not increasing the risk of reverse sensitivity issues to the local area. The proposal will not prevent existing lawfully established activities from continuing to operate.

Objectives and policies relevant to excavation and/or filling are also relevant:

Objective

12.3.3.3 To avoid, remedy or mitigate adverse effects associated with soil excavation or filling.

Policies

12.3.4.4 That soil excavation and filling, and mineral extraction activities be designed, constructed and operated to avoid, remedy or mitigate adverse effects on people and the environment.

The excavation and filling associated with the formation of access will be carried out in such a way so as to avoid, remedy or mitigate any adverse effects on people or the environment.

7.2 Proposed District Plan Objectives and Policies

The property is zoned Rural Production under the PDP. An assessment of the proposal against the zone's Objectives and Policies follows:

RPROZ-O1

The Rural Production zone is managed to ensure its availability for primary production activities and its long-term protection for current and future generations.

The proposal does not impact unduly on the availability of land for primary production. The land does not contain good quality soils and is effectively unsuitable for horticultural use, with arable use limited to low density grazing. This use can continue.

RPROZ-O2

The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.

This objective is in a zone chapter, not subdivision, and is aimed at 'activities'.

RPROZ-O3

Land use and subdivision in the Rural Production zone:

- a. *protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;*

Proposed subdivision

-
- b. *protects primary production activities from reverse sensitivity effects that may constrain their effective and efficient operation;*
 - c. *does not compromise the use of land for farming activities, particularly on highly productive land;*
 - d. *does not exacerbate any natural hazards; and*
 - e. *is able to be serviced by on-site infrastructure.*

There is no highly productive land within the site. Any primary production activity within the site and on adjacent sites will not be constrained as a result of the proposal. The site is not subject to hazards. New lots will be fully on site self serviced.

RPROZ-O4

The rural character and amenity associated with a rural working environment is maintained.

The subdivision will not adversely impact on rural character and amenity.

RPROZ-P1

Enable primary production activities, provided they internalise adverse effects onsite where practicable, while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production zone.

The proposal is not for a primary production activity. Not applicable.

RPROZ-P2

Ensure the Rural Production zone provides for activities that require a rural location by:

- a. *enabling primary production activities as the predominant land use;*
- b. *enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.*

Activity based policy. Not applicable.

RPROZ-P3

Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

Refer to earlier comments in regard to reverse sensitivity.

RPROZ-P4

Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:

- a. *a predominance of primary production activities;*
- b. *low density development with generally low site coverage of buildings or structures;*
- c. *typical adverse effects such as odour, noise and dust associated with a rural working environment; and*
- d. *a diverse range of rural environments, rural character and amenity values throughout the District.*

The subdivision is a low-density development, consistent with the level of density provided for by the ODP. The area is not dominated by high intensity agriculture or horticultural use – which are the type of uses that can generate reverse sensitivity issues if not managed. I believe the proposal will maintain the rural character and amenity of the area.

Proposed subdivision

RPROZ-P5

Avoid land use that:....

N/A. Activity is not a land use.

RPROZ-P6

Avoid subdivision that:

- a. *results in the loss of highly productive land for use by farming activities;*
- b. *fragments land into parcel sizes that are no longer able to support farming activities, taking into account:*
 1. *the type of farming proposed; and*
 2. *whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.*
- c. *provides for rural lifestyle living unless there is an environmental benefit.*

The subdivision will not result in the loss of highly productive land. The site does not possess any special habitat, landscape or natural values. Strictly speaking, however, the proposal cannot be consistent with part (c) of RPROZ-P6, as no specific environmental 'benefit' is proposed.

RPROZ-P7

Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application: ...

The proposal does not require consent under the PDP's zone provisions and is not a land use activity in any event, so the policy is of limited relevance.

Subdivision objectives and policies:

SUB-O1

Subdivision results in the efficient use of land, which:

- a. *achieves the objectives of each relevant zone, overlays and district wide provisions;*
- b. *contributes to the local character and sense of place;*
- c. *avoids reverse sensitivity issues that would prevent or adversely affect activities already established on land from continuing to operate;*
- d. *avoids land use patterns which would prevent land from achieving the objectives and policies of the zone in which it is located;*
- e. *does not increase risk from natural hazards or risks are mitigated and existing risks reduced; and*
- f. *manages adverse effects on the environment.*

I believe that the proposed subdivision is more consistent than not with the zone's objectives and policies, and any relevant district wide objectives and policies. I believe it will result in the efficient use of land.

SUB-O2

Subdivision provides for the:

- a. *Protection of highly productive land; and*
- b. *Protection, restoration or enhancement of Outstanding Natural Features, Outstanding Natural Landscapes, Natural Character of the Coastal Environment, Areas of High Natural Character, Outstanding Natural Character, wetland, lake and river margins, Significant Natural Areas, Sites and Areas of Significance to Māori, and Historic Heritage.*

The site contains none of the above.

Proposed subdivision

SUB-O3

Infrastructure is planned to service the proposed subdivision and development where:

- a. there is existing infrastructure connection, infrastructure should provided in an integrated, efficient, coordinated and future-proofed manner at the time of subdivision; and*
- b. where no existing connection is available infrastructure should be planned and consideration be given to connections with the wider infrastructure network.*

There is no planned infrastructure for the wider area. On-site infrastructure can be utilised for wastewater, stormwater and potable water supply.

SUB-O4

Subdivision is accessible, connected, and integrated with the surrounding environment and provides for:

- a. public open spaces;*
- b. esplanade where land adjoins the coastal marine area; and*
- c. esplanade where land adjoins other qualifying waterbodies.*

The site is rural and is not adjoining, nor contain, any qualifying waterbodies. It is not coastal and there are no nearby public open spaces.

SUB-P1

Enable boundary adjustments that:...

Not applicable.

SUB-P2

Enable subdivision for the purpose of public works, infrastructure, reserves or access.

Not applicable.

SUB-P3

Provide for subdivision where it results in allotments that:

- a. are consistent with the purpose, characteristics and qualities of the zone;*
- b. comply with the minimum allotment sizes for each zone;*
- c. have an adequate size and appropriate shape to contain a building platform; and*
- d. have legal and physical access.*

The subdivision is more consistent than not, with the purpose and qualities of the zone, largely because it is low overall density, maintains character, and the site contains no highly productive land. Whilst the proposed lots do not 'comply' with the PDP's minimum lot sizes for the zone, the lots are nonetheless able to provide for building platforms. They have / can have legal and physical access.

SUB-P4

Manage subdivision of land as detailed in the district wide, natural environment values, historical and cultural values and hazard and risks sections of the plan

The subdivision does not adversely impact on natural environmental values, nor historical and cultural values. The site is not subject to hazards.

SUB-P5

Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to

Proposed subdivision

Not applicable.

SUB-P6

Require infrastructure to be provided in an integrated and comprehensive manner by:

- a. demonstrating that the subdivision will be appropriately serviced and integrated with existing and planned infrastructure if available; and*
- b. ensuring that the infrastructure is provided is in accordance the purpose, characteristics and qualities of the zone.*

This is a rural area with no planned infrastructure improvements on the part of the Council. Future lot owners will be responsible for on-site infrastructure of wastewater, stormwater and potable water.

SUB- P7

Require the vesting of esplanade reserves when subdividing land adjoining the coast or other qualifying waterbodies.

Not applicable.

SUB-P8

Avoid rural lifestyle subdivision in the Rural Production zone unless the subdivision:

- a. will protect a qualifying SNA in perpetuity and result in the SNA being added to the District Plan SNA schedule; and*
- b. will not result in the loss of versatile soils for primary production activities.*

Part (a) cannot be met (by any development) because there are no 'qualifying SNA's'. Part (b), however, is readily met because there are no versatile soils to be lost.

SUB-P9

Avoid subdivision rural lifestyle subdivision in the Rural Production zone and Rural residential subdivision in the Rural Lifestyle zone unless the development achieves the environmental outcomes required in the management plan subdivision rule.

The subdivision is not a management plan subdivision.

SUB-P10

To protect amenity and character by avoiding the subdivision of minor residential units from principal residential units where resultant allotments do not comply with minimum allotment size and residential density.

Not applicable.

SUB-P11

Manage subdivision to address the effects of the activity requiring resource consent including (but not limited to) consideration of the following matters where relevant to the application:

- a. consistency with the scale, density, design and character of the environment and purpose of the zone;*
- b. the location, scale and design of buildings and structures;*
- c. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; or the capacity of the site to cater for on-site infrastructure associated with the proposed activity;*
- d. managing natural hazards;*
- e. Any adverse effects on areas with historic heritage and cultural values, natural features and landscapes, natural character or indigenous biodiversity values; and*

-
- f. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

The subdivision does not require consent under the PDP so the above policy is of limited relevance. Notwithstanding this, relevant matters in SUB-P11 have been considered.

8.0 NOTIFICATION ASSESSMENT & CONSULTATION

8.1 S95A Public Notification Assessment

A consent authority must follow the steps set out in s95A to determine whether to publicly notify an application for a resource consent. Step 1 specifies when public notification is mandatory in certain circumstances. None of these circumstances apply. Step 2 of s95A specifies the circumstances that preclude public notification. Neither circumstance exists therefore public notification is not precluded and Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances. The application is not subject to a rule or national environmental standard that requires public notification. This report and AEE concludes that the activity will not have, nor is it likely to have, adverse effects on the environment that are more than minor. In summary public notification is not required pursuant to Step 3 of s95A.

8.2 S95B Limited Notification Assessment

A consent authority must follow the steps set out in s95B to determine whether to give limited notification of an application for a resource consent, if the application is not publicly notified pursuant to s95A. Step 1 identifies certain affected groups and affected persons that must be notified. No such group or persons exist in this case. Step 2 of s95B specifies the circumstances that preclude limited notification. Neither circumstance applies and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified, in this case being any identified pursuant to s95E. The s95E assessment below concludes that there are no affected persons to be notified.

8.3 S95D Level of Adverse Effects

The AEE in this report assesses effects on the environment and concludes that these will be no more than minor, therefore no public notification is required.

8.4 S95E Affected Persons

A person is an 'affected person' if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). A person is not an affected person if they have provided written approval for the proposed activity.

The size and layout of the proposed lots is consistent with the zone's restricted discretionary activity threshold. I do not consider any adjacent properties to be affected by the creation of built development on four additional lots. I have not identified any affected persons in regard to adjacent properties.

There are no identified Sites of Significance to Māori within or in the vicinity of the property, and no archaeological sites. The site is not coastal. With less than minor effects on any habitat, including water bodies, and no impact on DOC's ability to manage its resources, it has not been considered necessary to consult with DOC.

9.0 PART 2 MATTERS

5 Purpose

(1)The purpose of this Act is to promote the sustainable management of natural and physical resources.

The proposal is considered to have had adequate regard to Part 2 matters. I believe the proposal fulfils the Purpose in s5.

6Matters of national importance

(a)the preservation of the natural character of the coastal environment (including the coastal marine area), wetlands, and lakes and rivers and their margins, and the protection of them from inappropriate subdivision, use, and development:

(b)the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:

(c)the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna:

(d)the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:

(e)the relationship of Māori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga:

(f)the protection of historic heritage from inappropriate subdivision, use, and development:

(g)the protection of protected customary rights:

(h)the management of significant risks from natural hazards.

The site is not within the coastal environment and there are no known wetlands, lakes or rivers affected by the proposal. The site does not have any outstanding landscape values. There is no significant indigenous bush on the property. No public access is required to any lake or river. There are no culturally significant areas on or near the application site, and no identified heritage values. There are no significant risks from natural hazards.

7 Other matters

(a)kaitiakitanga:

(aa) the ethic of stewardship:

(b)the efficient use and development of natural and physical resources:

(ba)the efficiency of the end use of energy:

(c)the maintenance and enhancement of amenity values:

(d)intrinsic values of ecosystems:

(e)[Repealed]

(f)maintenance and enhancement of the quality of the environment:

(g)any finite characteristics of natural and physical resources:

(h)the protection of the habitat of trout and salmon:

(i)the effects of climate change:

(j) the benefits to be derived from the use and development of renewable energy.

In regard to "other matters" (s7), I see (c) the maintenance and enhancement of amenity values; (d) intrinsic values of ecosystems; and (f) maintenance and enhancement of the quality of the environment as having relevance. All lots are large enough to provide for house sites and on-site services. The proposal represents the efficient use and development of resources. It has minimal, if any, adverse effect on amenity values or the intrinsic values of ecosystems.

8 Treaty of Waitangi

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development, and protection of natural and physical resources, shall take into account the principles of the Treaty of Waitangi (Te Tiriti o Waitangi).

I have not identified anything in the proposal that gives offence to, or is contrary to, s8.

10.0 CONCLUSION

The proposed subdivision is of a type and density considered consistent with the surrounding environment. The proposal is consistent with the intent of both the Operative and Proposed District Plans.

No significant adverse effects will arise from the activity. There has been no need to consider alternatives. All effects can be appropriately and adequately avoided, remedied or mitigated such that the proposal will result in less than minor effects on the environment. No affected persons have been identified and limited notification is not required.

The relevant provisions of Part 2 of the Act have been addressed. The proposal is considered consistent with the objectives and policies of relevant planning provisions in National Policy Statements and the Regional Policy Statement.

It is requested that the Council give favourable consideration to the application and grant approval, subject to appropriate conditions, under delegated authority.



Lynley Newport
Senior Planner
THOMSON SURVEY LTD

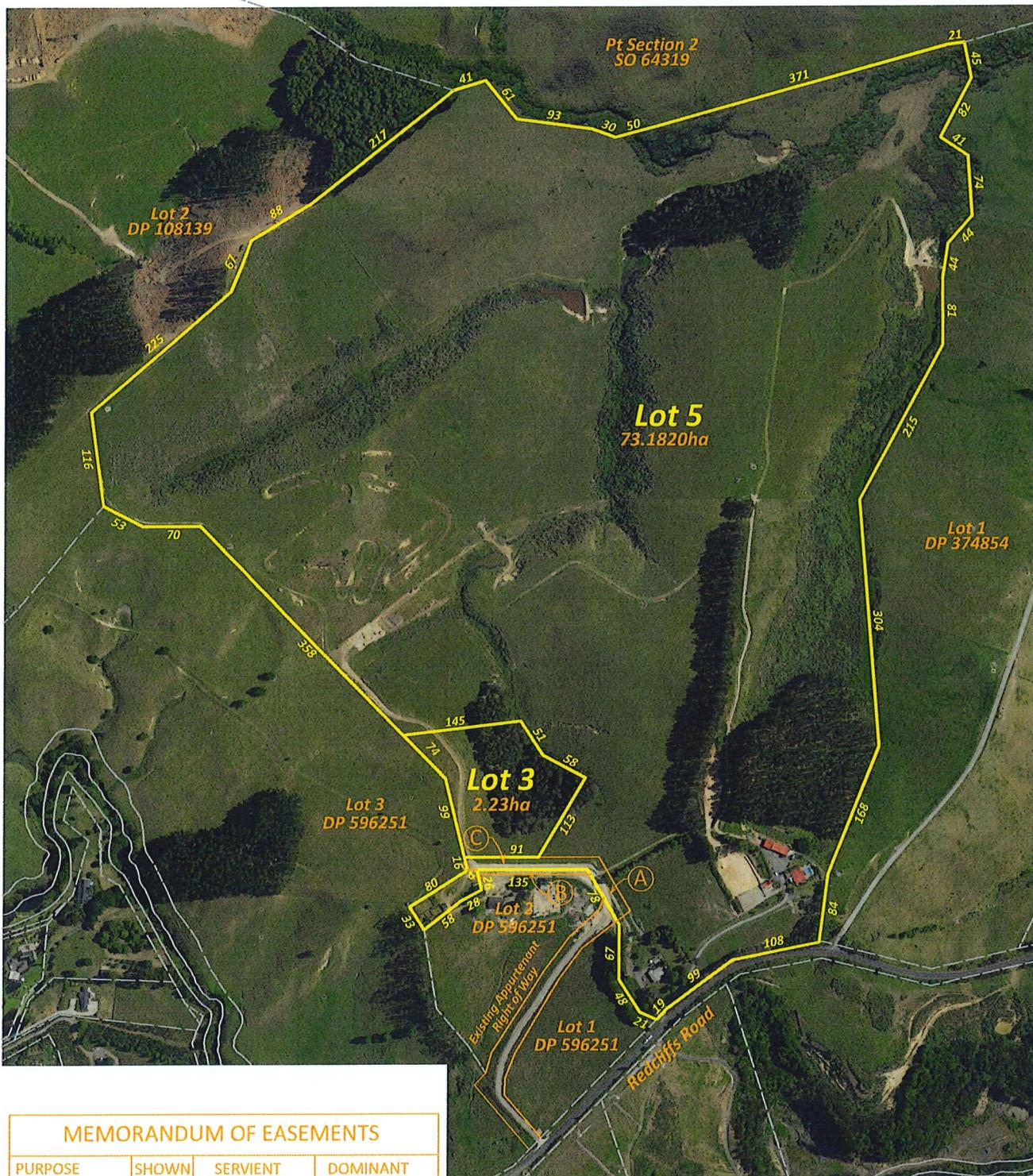
Dated 2nd March 2026

11.0 LIST OF APPENDICES

Appendix 1	Scheme Plan(s)
Appendix 2	Locality Plan
Appendix 3	Record of Title & Relevant Instruments
Appendix 4	Subdivision Site Suitability Engineering Report

Appendix 1

Scheme Plan(s)



MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(A)	LOT 5 HEREON	LOT 3 HEREON
	(C)	LOT 5 HEREON	LOT 3 HEREON

PROPOSED EASEMENT

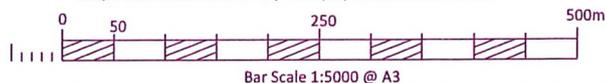
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(B)	LOT 2 DP 596251	LOTS 3 & 5 HEREON

STAGE 1

Local Authority: Far North District Council
 Comprised in: NA60C/189
 Total Area: 75.4120ha
 Zoning: Rural Production
 Resource features: NIL

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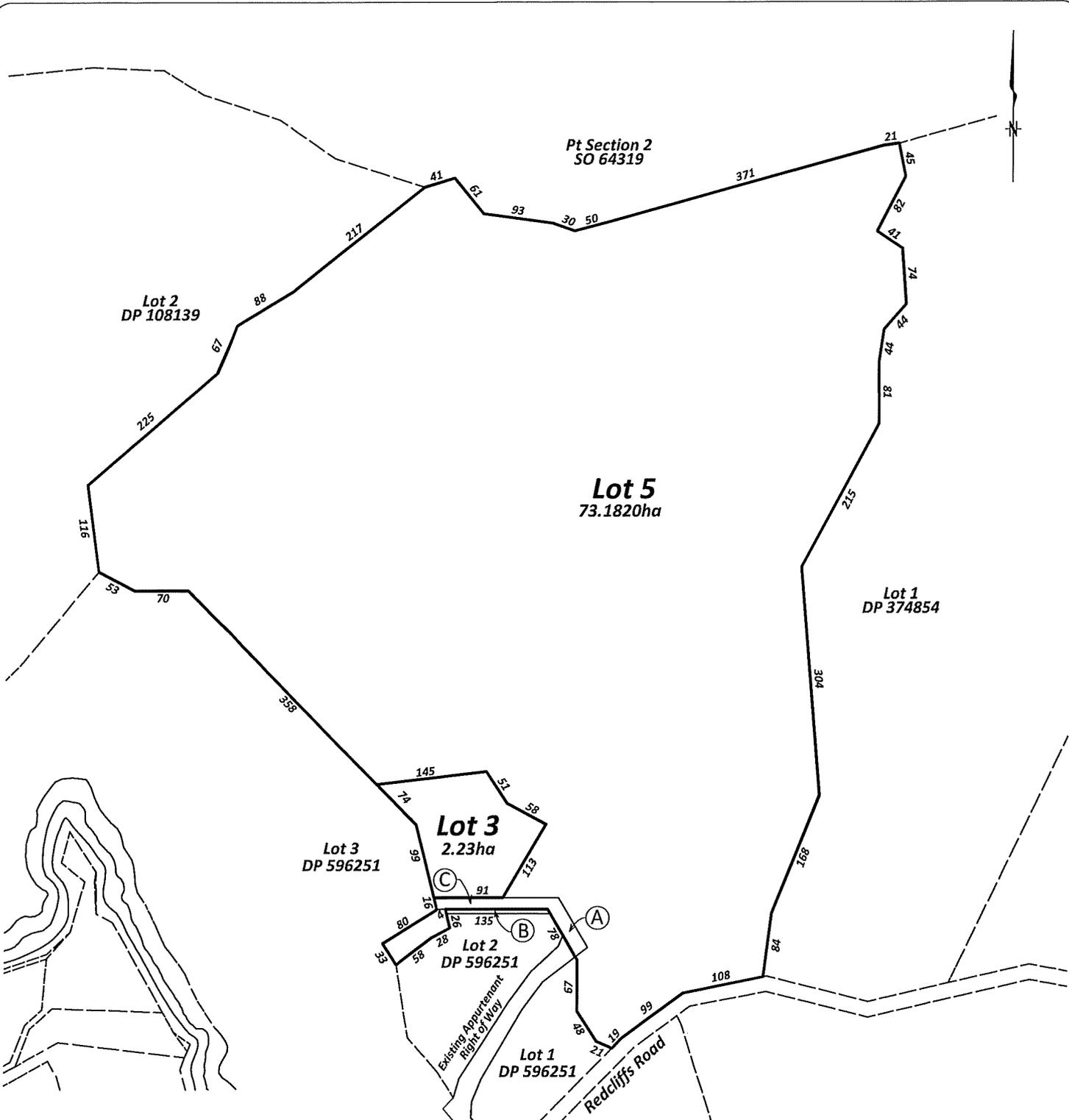
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 P.O. Box 372 Kerikeri
 Email: kerikeri@tsurvey.co.nz
 Ph: (09) 4077360
 www.tsurvey.co.nz

Registered Land Surveyors, Planners & Land Development Consultants

**PROPOSED SUBDIVISION OF
 LOT 3 DP 108139 & EASEMENT OVER
 LOT 2 DP 596251**
 REDCLIFFS ROAD, KERIKERI
 PREPARED FOR: T. TEIXEIRA

Name	Date	ORIGINAL SCALE	SHEET SIZE
Survey		1:5000	A3
Design			
Drawn	KY 19.06.25		
Approved			
Rev	KY 03.02.26		
10575 Scheme 20260203			

Surveyors Ref. No:
10575
 Sheet 1 of 1



MEMORANDUM OF EASEMENTS

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(A)	LOT 5 HEREON	LOT 3 HEREON
	(C)	LOT 5 HEREON	LOT 3 HEREON

PROPOSED EASEMENT

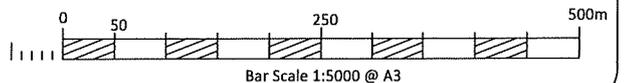
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(B)	LOT 2 DP 596251	LOTS 3 & 5 HEREON

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Approved		A3
Rev	KY 03.02.26	
10575 Scheme 20260203		

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 Sheet 1 of 1



MEMORANDUM OF EASEMENTS

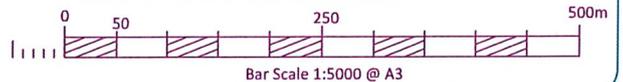
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RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(A)	LOT 5 HEREON	LOTS 1, 2 & 4 HEREON
	(D)	LOT 5 HEREON	LOTS 1, 2 & 4 HEREON
	(E)	LOT 5 HEREON	LOT 4 HEREON
	(F)	LOT 5 HEREON	LOTS 1 & 2 HEREON

STAGE 2

Local Authority: Far North District Council
 Comprised in: Lot 5 (Stage 1)
 Total Area: 73.1820ha
 Zoning: Rural Production
 Resource features: NIL

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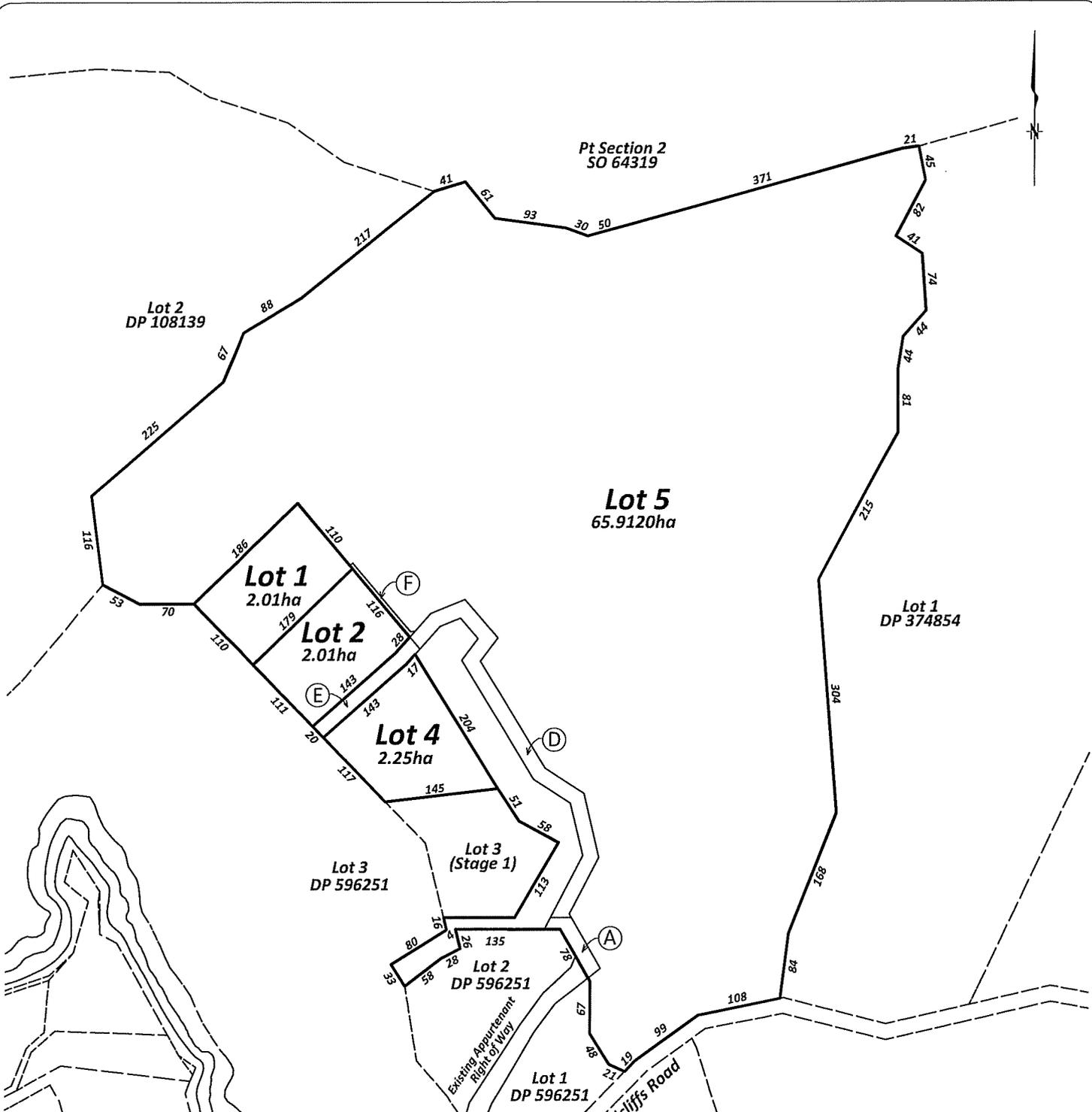
PROPOSED SUBDIVISION OF LOT 5 (STAGE 1)
 REDCLIFFS ROAD, KERIKERI
 PREPARED FOR: T. TEIXEIRA

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Survey		SCALE
Design		SHEET SIZE
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Approved		
Rev	KY 03.02.26	
10575 Scheme 20260203 Stage 2		

Surveyors Ref. No:

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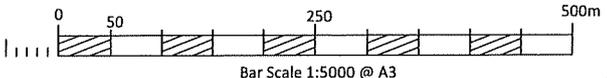
MEMORANDUM OF EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(A)	LOT 5 HEREON	LOTS 1, 2 & 4 HEREON
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Approved		
Rev	KY 03.02.26	
10575 Scheme 20260203 Stage 2		

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 Sheet 1 of 1



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	(C)	LOT 5 HEREON	LOT 3 HEREON
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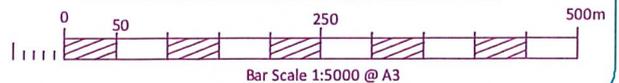
PROPOSED EASEMENT

PURPOSE	SHOWN	SERVIENT TENEMENT	DOMINANT TENEMENT
RIGHT OF WAY, TELECOMMUNICATIONS & ELECTRICITY	(B)	LOT 2 DP 596251	LOTS 3 & 5 HEREON

Local Authority: Far North District Council
 Comprised in: NA60C/189
 Total Area: 75.4120ha
 Zoning: Rural Production
 Resource features: NIL

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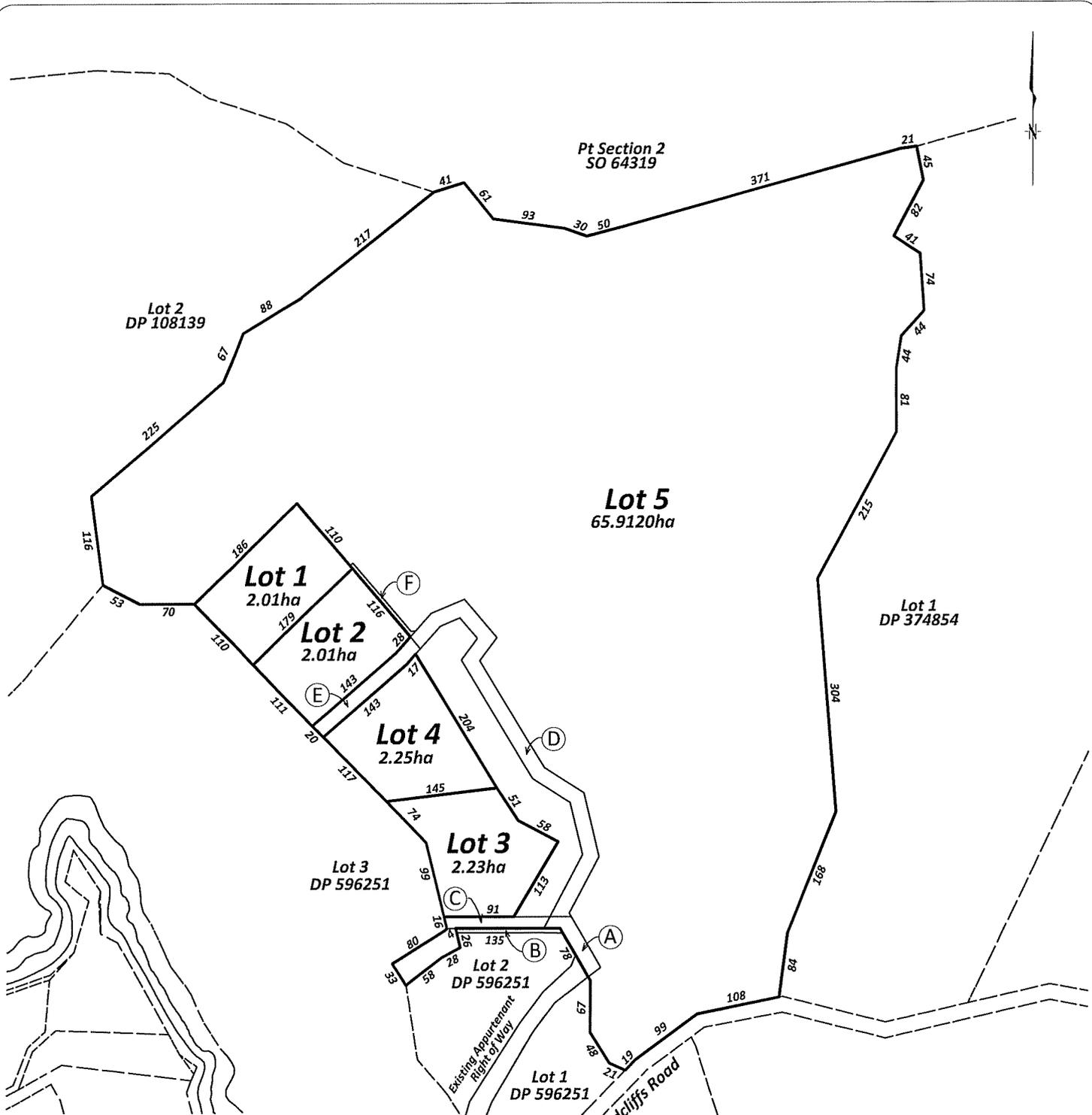
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 PREPARED FOR: T. TEIXEIRA

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Rev			

10575 Scheme 20250619

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10575
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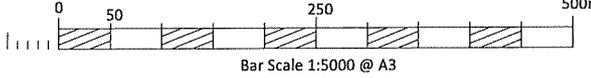
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	(D)	LOT 5 HEREON	LOTS 1, 2 & 4 HEREON
	(E)	LOT 5 HEREON	LOT 4 HEREON
	(F)	LOT 5 HEREON	LOTS 1 & 2 HEREON

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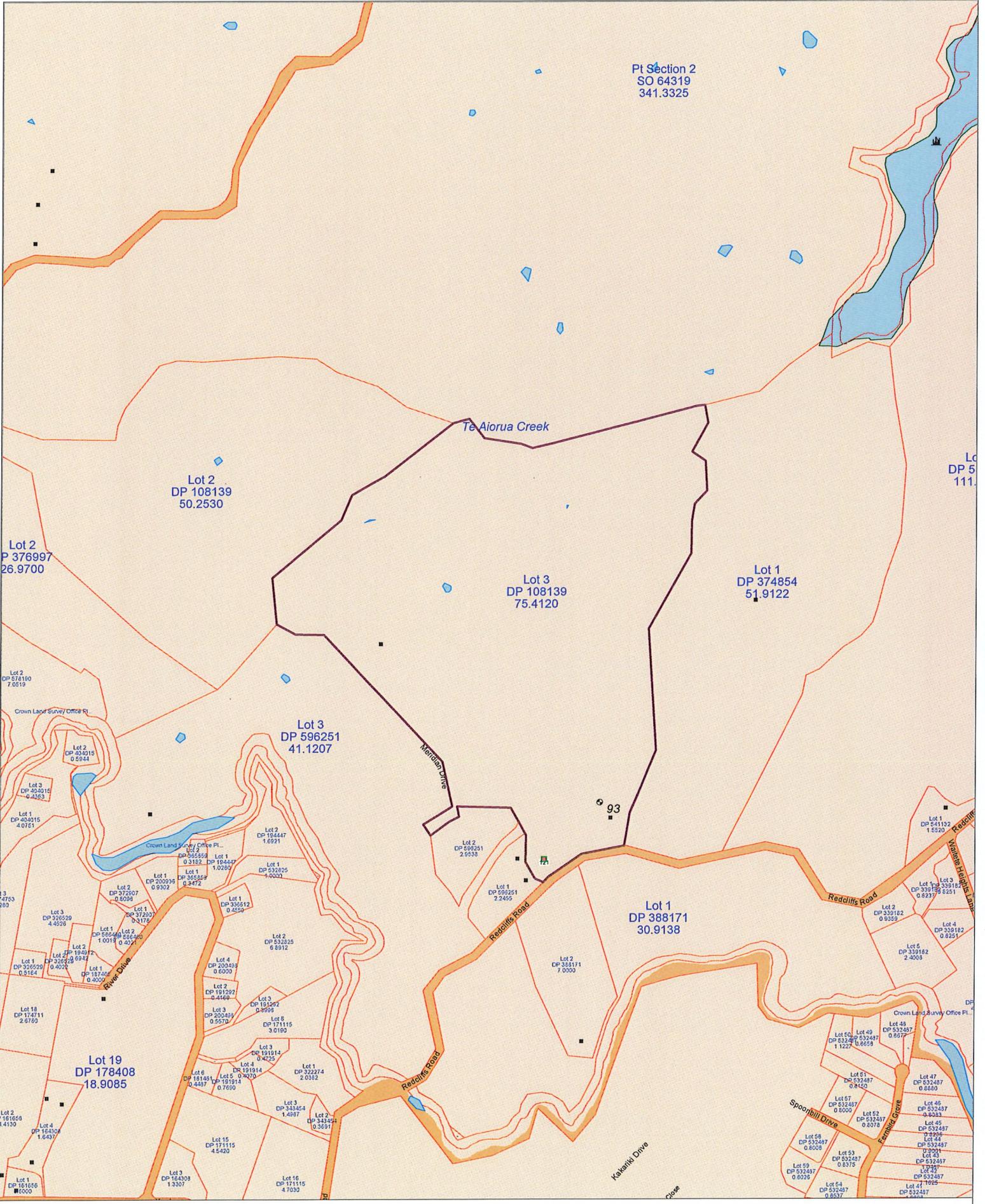
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Drawn	KY 19.06.25	1:5000	A3
Approved			
Rev			

10575 Scheme 20250619

Surveyors Ref. No:
10575
 Sheet 1 of 1

Appendix 2

Locality Plan



Pt Section 2
SO 64319
341.3325

Lot 2
DP 108139
50.2530

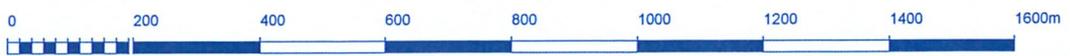
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Lot 1
DP 374854
51.9122

Lot 3
DP 596251
41.1207

Lot 1
DP 388171
30.9138

Lot 19
DP 178408
18.9085



QuickMap
Custom Software Ltd

Any person wishing to rely on the information shown on this map must independently verify the information
Scale 1:12000 Topographical and Cadastral map derived from LINZ data. Printed: 27-Feb-2026 02:31.

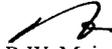
Appendix 3

Record of Title & Relevant Instruments



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




R. W. Muir
Registrar-General
of Land

Identifier NA60C/189
Land Registration District North Auckland
Date Issued 25 November 1985

Prior References
NA50C/441

Estate Fee Simple
Area 75.4120 hectares more or less
Legal Description Lot 3 Deposited Plan 108139
Registered Owners
Breadon & Cook Limited

Interests

Subject to Section 8 Mining Act 1971
Subject to Section 168A Coal Mines Act 1925
Appurtenant hereto are water supply rights specified in Easement Certificate B559069.5 - 21.7.1986 at 9:37 am
C561333.1 Mortgage to ASB Bank Limited - 26.1.1994 at 9:54 am
10481108.1 Variation of Mortgage C561333.1 - 2.8.2016 at 9:12 am
Appurtenant hereto is a right of way, right to convey electricity, telecommunications and a right to convey water created by Easement Instrument 12951730.3 - 17.5.2024 at 11:57 am
The easements created by Easement Instrument 12951730.3 are subject to Section 243 (a) Resource Management Act 1991

View Instrument Details



Instrument No 12951730.3
Status Registered
Date & Time Lodged 17 May 2024 11:57
Lodged By Thompson, Emma Jane
Instrument Type Easement Instrument



Affected Records of Title	Land District
1152196	North Auckland
1152197	North Auckland
1152198	North Auckland
NA60C/189	North Auckland

Annexure Schedule Contains 2 Pages.

Grantor Certifications

- I certify that I have the authority to act for the Grantor and that the party has the legal capacity to authorise me to lodge this instrument
- I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument
- I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply
- I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period
- Mortgage C561333.1 does not affect the burdened land, therefore the consent of the Mortgagee is not required
- I certify that the Mortgagee under Mortgage 6489651.2 has consented to this transaction and I hold that consent

Signature

Signed by Emma Jane Thompson as Grantor Representative on 17/05/2024 11:52 AM

Grantee Certifications

- I certify that I have the authority to act for the Grantee and that the party has the legal capacity to authorise me to lodge this instrument
- I certify that I have taken reasonable steps to confirm the identity of the person who gave me authority to lodge this instrument
- I certify that any statutory provisions specified by the Registrar for this class of instrument have been complied with or do not apply
- I certify that I hold evidence showing the truth of the certifications I have given and will retain that evidence for the prescribed period

Signature

Signed by Emma Jane Thompson as Grantee Representative on 17/05/2024 11:52 AM

*** End of Report ***

EASEMENT INSTRUMENT TO GRANT EASEMENT OR PROFIT À PRENDRE
Section 109 Land Transfer Act 2017

Grantor

MERIDIAN FARM LIMITED

Grantee

**MERIDIAN FARM LIMITED
 BREADON & COOK LIMITED**

Grant of Easement or Profit à prendre

The Grantor being the registered owner of the burdened land set out in Schedule A grants to the Grantee (and, if so stated, in gross) the easement(s) or profit(s) à prendre set out in Schedule A, with the rights and powers or provisions set out in the Annexure Schedule(s).

Schedule A

Continue in additional Annexure Schedule, if required

Purpose (Nature and extent) of easement; or profit	Shown (plan reference)	Burdened Land (Record of Title)	Benefited Land (Record of Title) or in gross
Right of Way Right to convey electricity and telecommunications Right to convey water	Marked A on Deposited Plan 596251	Lot 3 Deposited Plan 596251 (RoT 1152198)	Lots 1 and 2 Deposited Plan 596251 (RoT 1152196, 1152197) and Lot 3 Deposited Plan 108139 (RoT NA60C/189)

Easements or profits à prendre rights and powers (including terms, covenants and conditions)

Delete phrases in [] and insert memorandum number as required; continue in additional Annexure Schedule, if required

Unless otherwise provided below, the rights and powers implied in specified classes of easement are those prescribed by the Land Transfer Regulations 2018 and/or Schedule 5 of the Property Law Act 2007

The implied rights and powers are hereby [varied] ~~negative~~ [added to] or ~~substituted~~ by:

[Memorandum number _____, registered under section 209 of the Land Transfer Act 2017]

[the provisions set out in Annexure Schedule B]

Insert instrument type

Easement Instrument

Continue in additional Annexure Schedule, if required

SCHEDULE B

All the rights and powers implied in the Right of Way Easement are those set out in the Fifth Schedule of the Land Transfer Regulations 2018 (the "Regulations") and the Fifth Schedule of the Property Law Act 2007 (the "Act") but as modified below. Where there is a conflict between the Act or the Regulations, the Regulations shall prevail. Where there is a conflict between the Regulations and the modifications below, the modifications shall prevail.

Easements granting the Right of Way over easement area A on Deposited Plan 596251

1. In the event the said right of way is required to vest as road, the registered owner/s for the time being of the benefited land HEREBY CONSENTS and if required shall when called upon execute a consent to the vesting and further if required, surrender of the right of way easement herein. In the event there is a mortgage or mortgages registered over the benefited land, the registered owner for the time being of the benefited land will obtain their mortgagee's consent to the said vesting and if required, the said surrender.

Appendix 4

Subdivision Site Suitability Engineering Report



geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

121B REDCLIFFS ROAD, KERIKERI

BREADON & COOK LTD

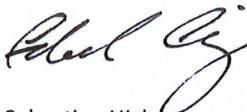
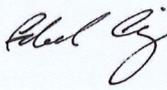
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Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer
Approved	Edward Collings Managing Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons) 
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TABLE OF CONTENTS

1	INTRODUCTION	5
1.1	PROPOSAL.....	5
2	DESKTOP APPRAISAL	5
2.1	EXISTING RETICULATED NETWORKS	6
2.2	HYDROLOGICAL SETTING.....	6
2.3	MAPPED FLOOD HAZARD.....	7
3	SITE WALKOVER SURVEY	7
4	GEOTECHNICAL ASSESSMENT	7
4.1	GEOLOGICAL SETTING.....	7
4.2	GROUND INVESTIGATION.....	8
4.3	GEOTECHNICAL DESIGN PARAMETERS.....	9
4.4	SITE SUBSOIL CLASS	9
4.5	SEISMIC HAZARD	9
4.6	SITE STABILITY.....	10
4.7	SOIL EXPANSIVITY	12
4.8	LIQUEFACTION POTENTIAL.....	13
4.9	FOUNDATIONS	13
5	WASTEWATER ASSESSMENT	14
5.1	EXISTING WASTEWATER SYSTEMS	14
5.2	CONCEPT FUTURE DEVELOPMENT AND WASTEWATER GENERATION VOLUME.....	14
5.3	TREATMENT STANDARD AND SYSTEM.....	15
5.4	SOIL LOADING RATE	15
5.5	CONCEPT LAND DISPOSAL SYSTEM.....	15
5.6	SUMMARY OF CONCEPT WASTEWATER DESIGN	17
5.7	ASSESSMENT OF ENVIRONMENTAL EFFECTS	17
6	STORMWATER ASSESSMENT	18
6.1	IMPERVIOUS SURFACES AND ACTIVITY STATUS	18
6.2	STORMWATER MANAGEMENT CONCEPT	18
6.3	DESIGN STORM EVENT	19
6.4	CONCEPT ATTENUATION MODEL	19
6.5	INTERNAL ROADING STORMWATER MANAGEMENT	21
6.6	STORMWATER QUALITY	23
7	POTABLE WATER & FIRE FIGHTING.....	24
8	INTERNAL ROADING AND VEHICLE CROSSINGS	24
8.1	TRAFFIC INTENSITY FACTOR AND HOUSEHOLD EQUIVALENTS.....	24



8.2	RIGHT OF WAY.....	25
8.3	VEHICLE CROSSINGS.....	25
9	EARTHWORKS	26
9.1	EARTHWORK VOLUMES	26
9.2	GENERAL EARTHWORKS RECOMMENDATIONS	26
9.3	EROSION AND SEDIMENT CONTROL.....	27
10	NATURAL HAZARD ASSESSMENT	27
11	LIMITATIONS	28
	APPENDIX A	29
	APPENDIX B.....	30
	APPENDIX C.....	31
	APPENDIX D	33
	APPENDIX E.....	34

1 INTRODUCTION

This Subdivision Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Breadon & Cook Ltd as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

Our scope of works has been undertaken to assist with Resource Consent application in relation to the proposed subdivision of a rural property at 121B Redcliffs Road, Kerikeri, the 'site'. Specifically, this assessment provides a civil and geotechnical engineering assessment for the management of natural hazards, wastewater, stormwater, potable water and firefighting, internal access and associated earthwork requirements.

The purpose of this report, if adopted in practice will enable new building sites with less than minor effects on the environment as a result of the proposed activities outlined below.

1.1 Proposal

A proposed scheme plan was presented to Geologix at the time of writing, prepared by Thomson Survey Ltd¹ and reproduced as Drawing No. 010, within Appendix A. It is understood the Client proposes to subdivide the legal title Lot 3 DP 108139 to create four rural residential lots and a balance lot. The above assumptions are summarised in Table 1.

Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts. Where alterations of the referenced scheme plans are proposed Geologix should be consulted.

Table 1: Summary of Proposed Scheme

Proposed Lots	Size Range	Purpose
1	2.01 ha	New rural residential
2	2.01 ha	New rural residential
3	2.25 ha	New rural residential
4	2.23 ha	New rural residential
5	65.912 ha	Balance

Access to the proposed new lots will be established from Redcliffs Road.. A specific traffic engineering assessment and/ or road safety assessment is outside the scope of this report.

2 DESKTOP APPRAISAL

The site is located to the north of Kerikeri Township, with the subdivision formed within a single parent title legally described as Lot 3 DP 108139. The proposal has existing appurtenant easement over Lot 2 DP 596251.

¹ Thomson Survey Ltd, Proposed Scheme Plans Ref. 10565, dated 19 June 2025.

The site covers a combined total site area of approximately 75.412 ha and is mostly utilised as rural pasture, generally interspersed with occasional mature tree cover and an existing residential development to the southern corner of the parent title and proposed balance lot.

Topographically the site is generally formed over narrow ridgelines and moderate slopes primarily with an easterly to northerly aspect over the proposed new lots and flattening to gradual gradients to the north.

The site is generally consistent with the surrounding land uses.

2.1 Existing Reticulated Networks

The site is generally not benefitted by reticulated networks. This report has been prepared with the basis of the proposal being self-sufficient for 3 water servicing.

2.2 Hydrological Setting

Desktop GIS information available from NIWA² has been reviewed to understand the sites hydrological setting. The developed understanding is summarised as Figure 1 and Table 2 below.

Figure 1: NIWA Hydrological Flow Path Explorer



² NIWA Hydrological Flow Path Explorer V2

Table 2: Summary of Influencing Surface Water Features

Feature	Influencing	Location/ Comments
Overland Flow Paths	Yes	Subdivision area drains to a gully and overland flow path prior to a stream
Streams/ Rivers	Yes	The subdivision area drains into a stream order 1, forming an ephemeral body, that flows north away from the site
Wetlands	No	Geologix not made aware at time of writing.
Coastal Marine Area (CMA)	No	Not applicable

2.3 Mapped Flood Hazard

The site is covered by the Northland Regional Council (NRC) 2-dimensional flood hazard model. The mapped GIS data does not indicate widespread flood potential to influence the site. Minor flooding is expected to be contained within the overland flow path and stream channel beds.

Downstream of the property mapped flood potential is generally contained within an incised gully until discharge to the CMA approximately 375 m downstream of the property boundary.

3 SITE WALKOVER SURVEY

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the available LiDAR dataset. The proposed building envelopes of lots 1 and 2 are proposed on generally moderately sloping topography steepening through lots 3 and 4 within a bowl-shaped feature.
- The site is defined to the south by Redcliffs Road, and is bound by similar pasture or rural properties in all directions.
- Surface water features are consistent with the information presented within Section 2 of this report.
- Two existing residential developments were identified within the proposed balance lot 5.

4 GEOTECHNICAL ASSESSMENT

4.1 Geological Setting

Available geological mapping³ indicates the site to be directly underlain by Waipapa Group parent rock described as massive to thin bedded, lithic volcanoclastic metasandstone and argillite, with tectonically enclosed basalt, chert and siliceous argillite. This geology typically comprises a cohesive residual soil layer commonly with a deep weathering profile.

³ Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 1, Kaitaia, 1996.

4.2 Ground Investigation

A site walkover survey and intrusive ground investigation was undertaken by Geologix on 22 July 2024. The ground investigation was scoped to ascertain a soil loading category and to provide geotechnical parameters for this assessment. The ground investigation comprised:

- Four hand augered boreholes designated HA01 to HA04 inclusive, scheduled for a target depth of 5.0 m below ground level (bgl).
- Two hand augered boreholes designated HA05 and HA06 over shallow lots 1 and 2 for wastewater categorisation only with a scheduled depth of 1.2 m bgl.
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling.

4.2.1 Ground Conditions

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines⁴. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 200 within Appendix A.

Strata identified during the ground investigation can be summarised as follows:

- **Topsoil to depths of 0.2 to 0.3 m bgl.** The overlying topsoil was described as a dark brown organic silt.
- **Waipapa Group residual soils to depths >1.2 to >5.1 m bgl.** The shallow residual soil was typically cohesive, described as silty clay. The unit was similarly orange, grey and with some black specs. Generally the horizon was moist and of high plasticity.

The unit was generally very stiff to hard with 55 No. in-situ field vane tests within HA01 to HA04 recording corrected vane shear strengths ranging from 131 to >203 kPa. The lower soil strengths were recorded at depth where potential groundwater softening occurs.

- **Groundwater.** Groundwater was encountered locally within HA02 at 3.3 m bgl.

A summary of ground investigation data is presented below as Table 3.

Table 3: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Topsoil Depth	Fill Depth	Groundwater ²	Greywacke Residual Soil	Wastewater Category ⁴
HA01	3	5.1 m	0.2 m	NE	NE	>5.1 m	6 – slow draining
HA02	3	5.0 m	0.3 m	NE	3.3 m	>5.0 m	6 – slow draining
HA03	4	5.0 m	0.2 m	NE	NE	>5.0 m	6 – slow draining
HA04	4	5.0 m	0.2 m	NE	NE	>5.0 m	6 – slow draining
HA05	2	1.2 m	0.2 m	NE	NE	>1.2 m	6 – slow draining
HA06	1	1.2 m	0.2 m	NE	NE	>1.2 m	6 – slow draining

⁴ New Zealand Geotechnical Society, *Field Description of Soil and Rock*, 2005.

1. All depths recorded in m bgl unless stated. 2. Groundwater measurements taken on day of drilling. 3. NE – Not Encountered. 4. Wastewater category in accordance with Auckland Council TP58⁵.

4.3 Geotechnical Design Parameters

Geotechnical design parameters are presented in Table 4 below. They have been developed based on our ground investigation, the results of in-situ testing and experience with similar materials.

Table 4: Geotechnical Effective Stress Parameters

Geological Unit	Unit Weight, kN/m ³	Effective Friction Angle, °	Effective Cohesion, kPa	Undrained shear strength, kPa
Residual Greywacke Soil	18	32	5	130

4.4 Site Subsoil Class

The site has been designated as Site Subsoil Class C according to the provisions of NZS1170:2004⁶.

4.5 Seismic Hazard

New Zealand Standard NZS1170.5:2004 Clause 2.1.4 specifies that to meet the requirements of the New Zealand Building Code, design of structures is to allow for two earthquake scenarios:

1. *Ultimate Limit State (ULS) shall provide for... "avoidance of collapse of the structural system...or loss of support to parts... damage to non-structural systems necessary for emergency building evacuation that renders them inoperable".*
2. *Serviceability Limit State (SLS) are to avoid damage to... "the structure and non-structural components that would prevent the structure from being used as originally intended without repair after the SLS earthquake...".*

The seismic hazard in terms of Peak Ground Acceleration (PGA) has been assessed based on the NZGS Module 1⁷. Table 2 presents the return periods for earthquakes with ULS and SLS 'unweighted' PGAs and design earthquake loads for the corresponding magnitude. The PGAs were determined using building Importance Level (IL) 2, defined by NZS1170.5:2004. Reference should be made to the structural designer's assessment for the final determination of building importance level.

⁵ Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.

⁶ NZS1170.5:2004, Structural Design Actions Part 5: Earthquake Actions Clause 3.1.3.

⁷ New Zealand Geotechnical Society, Earthquake Geotechnical Engineering Practice, Module 1, November 2021, Appendix A, Table A1.



Table 5: Summary of Seismic Hazard Parameters

Limit State	Effective Magnitude	Return Period (years)	Unweighted PGA
ULS	6.5	500	0.19 g
SLS	5.8	25	0.03 g

4.6 Site Stability

At the time of writing, no obvious indications of major deep-seated instability were identified at the site, and the risk of such deep-seated instability developing as a result of the development proposal is low. Within the scope of this ground investigation Geologix have undertaken a computer modelled slope stability analysis through a critical section of proposed lots 3 (Section B) and 4 (Section A) incorporating the proposed building sites. The cross-section alignments are presented on Drawing No. 200 within Appendix A and developed ground model as Appendix E.

The slope was analysed within propriety software Slide 2 Version 9.02, developed by RocScience Inc. The purpose of the stability assessment was to:

- Ensure the proposed building sites are geotechnically feasible.
- Provide a working ground model in relation to site stability refined according to observed conditions and the results of this ground investigation.
- Develop an understanding of natural hazard risk with any specific geotechnical stability requirements.
- Inform the requirements of Consent and further engineering works at the Building Consent stage.

Limit equilibrium stability analysis was adopted in the analysis to express the results as a Factor of Safety (FS). When $FS = 1.0$, the represented mechanism is in equilibrium with the disturbing, active forces equal to the resisting, stabilising forces. A lower FS indicates that instability could occur under the modelled scenario whereas a higher FS demonstrates a margin of safety in respect of stability. Minimum FS criteria have been developed for use in residential development by Auckland Council⁸ which are widely adopted in the Far North region. Modelling three separate event scenarios the accepted minimum FS are summarised as follows:

- Minimum FS = 1.5 for static, normal groundwater conditions.
- Minimum FS = 1.3 for elevated groundwater conditions (storm events).
- Minimum FS = 1.0 for dynamic, ULS seismic events.

⁸ Auckland Council, Code of Practice for Land Development and Subdivision, Section 2 Earthworks and Geotechnical Requirements, Version 1.6, September 2013.

4.6.1 Stability Analysis Results

Slope stability analysis results are presented in full as Appendix C and summarised below as Table 6.

Table 6: Summary of Stability Analysis Results

Profile	Scenario	Global Min.	Development Footprint (min FS)	Result
Section A Lot 3	Static ¹	1.385	<1.5	Fail, requires ground support and further design at Building Consent stage.
	Elevated GW ²	1.073	<1.3	
	Seismic ³	0.883	<1.0	
Section B Lot 4	Static	>1.5	>1.5	Pass
	Elevated GW	>1.3	>1.3	
	Seismic	>1.0	>1.0	

1. Static, normal groundwater minimum FS = 1.5 2. Static, elevated groundwater minimum FS = 1.3 3. Dynamic, seismic conditions minimum FS = 1.0

4.6.2 Stability Analysis Conclusions

The developed slope stability model is considered to be a reasonable representation of the observed conditions on site. Adopting a single unit model within our analysis, potential failure planes are indicated over the entire slope face. In relation to Section A, within proposed lot 3 the potential failure planes indicate a factor of safety below the minimum requirement for residential development. The slope in its existing condition therefore presents an instability potential if left unmitigated. It is recommended that this lot includes a title notice for further specific geotechnical investigation, slope stability analysis and detailed design of a stability control structure at the time of Building Consent. Concept stability control measures for this lot are outlined in Section 4.6.3 below.

Section B within proposed lot 4 is over a shallower slope profile and as such, the potential failure planes meet adequate factors of safety for residential development. No further geotechnical stability control measures are required to form a residential building free from potential natural hazards.

The scope of our ground investigation included conventional hand tool boreholes formed to a maximum depth of 5.0 m bgl. Over the depth of this ground investigation a consistently very stiff to hard residual soil layer was encountered. However the full depth of the layer was not profiled over this depth. It is expected that residual soils extend to a depth of 5 to 10 m bgl.

Proposed Lots 1 and 2 were excluded from stability modelling due to the shallow nature of the slope profile over these lots which complies with FNDC Definitions of instability potential.

4.6.3 Stability Control

The slope stability analysis indicates that the building site within proposed lot 3 will require protection to negate a Section 72 notice under the Building Act 2004 for potential natural hazards comprising slippage.

Detailed modelling and/ or design of stabilising structures is outside of the scope of our engagement at this time. Due to the conceptual nature of the future building assumptions it is recommended that a title notice is applied and further geotechnical assessment is undertaken at the Building Consent stage. Taking into account the stability model and above assumptions, we believe a practicable solution for stability control can be summarised as described below subject to further geotechnical analysis at the Building Consent stage.

- **Cantilever or soldier pile wall below proposed development footprint;** to increase the FS within the proposed building structural footprint. A new structure could comprise either a timber pole wall or an in-ground, soldier pile wall. The latter is generally installed flush with the existing ground profile and rely upon a row of stiff vertical inclusions (timber, steel, or reinforced concrete) to resist the destabilising forces. Stability analysis confirms that any structure wall will need to account for the potential evacuation and loss of support of residual soils on the passive / downslope side of the wall and specific geotechnical stability control parameters including stabilising shear force and embedment depth.

Due to the depth of residual soils which were not fully profiled within 5 m bgl it is recommended that a specific geotechnical investigation at the time of Building Consent allows for deep ground investigation. Fully profiling the depth and strength of residual soils and preparing a multi-unit model is expected to reduce the depth of potential failure planes.

4.7 Soil Expansivity

Clay soil may undergo appreciable volume change in response to changes in moisture content and be classed as expansive. The reactivity and the typical range of movement that can be expected from potentially expansive soils underlying any given building site depends on the amount of clay present, the clay mineral type, and the proportion, depth, and distribution of clay throughout the soil profile. Clay soils typically have a high porosity and low permeability causing moisture changes to occur slowly and produce swelling upon wetting and shrinkage upon drying. Apart from seasonal moisture changes (wet winters and dry summers) other factors that can influence soil moisture content include:

- Influence of garden watering and site drainage.
- The presence of mature vegetation.
- Initial soil moisture conditions at the time of construction.

Based on our experience with residual Greywacke soils, laboratory analysis within the strata on other projects in the local area and site observations, the shallow soils are conservatively expected to meet the requirements of a highly expansive or Class H soil type. In accordance with AS2870:2011⁹ and New Zealand Building Code¹⁰, Class H or Highly Expansive soils

⁹ AS2870, *Residential Slabs and Footings*, 2011.

¹⁰ New Zealand Building Code, *Structure B1/AS1 (Amendment 19, November 2019)*, Clause 7.5.13.1.2.



typically have a soil stability index (I_{ss}) range of 3.8 to 6.5% and a 500-year design characteristic surface movement return (y_s) of 78 mm.

If any shallow foundations are proposed within the development and to ensure the foundation designs comply with the Building Code requirements a quantification of the expansive soil class assumptions can be made by geotechnical laboratory analysis. It is recommended that this is undertaken during detailed design once final development levels are known.

4.8 Liquefaction Potential

Liquefaction occurs when excess pore pressures are generated within loose, saturated, and generally cohesionless soils (typically sands and silty sands with <30 % fines content) during earthquake shaking. The resulting high pore pressures can cause the soils to undergo a partial to complete loss of strength. This can result in settlement and/or horizontal movement (lateral spread) of the soil mass.

The Geologix ground investigation and laboratory analysis indicates the site to be predominantly underlain by fine-grained, Greywacke residual soils. Based on the materials strength and consistency, and our experience with these materials, there is no liquefaction potential / risk in a design level earthquake event.

4.9 Foundations

Provided that the recommendations of this report are adhered to, in particular in regard to proposed lot 3 where further geotechnical investigation, stability analysis and design of a retaining structure is undertaken at the Building Consent stage by a Chartered Professional (Geotechnical) Engineer then the following recommendations are considered appropriate.

4.9.1 *Shallow Foundations*

It is recommended that non-engineered fill, any underlying soft spots ($S_u < 60$ kPa) and any other unsuitable or deleterious materials (such as relic foundations, driveway hardstanding etc.) are sub-excavated and replaced with suitably selected and compacted materials such as GAP65 hard fill.

Based on the natural formation having an average undrained shear strength of >100kPa and founding either upon a 300 mm layer of compacted GAP65 on hard fill for ground bearing floor slabs and/ or natural undisturbed soils then it is expected that either shallow standard raft or strip footing foundations can be adopted for these lots. Such foundations may be designed by a professional structural engineer adopting an Ultimate Bearing Capacity of 300kPa for a highly expansive soil type and a geotechnical reduction factor of 0.5.

4.9.2 *Pile Foundations*

All piles should be taken down through any non-engineered fill to terminate a minimum of 3x pile diameters, (3B) into Greywacke residual soils below any zone of influence of the site slope. It is recommended that a piled foundation solution is subject to specific engineering



design by a professional structural engineer, adopting the parameters outlined in Table 7 for end-bearing piles and ignoring skin friction over the influences detailed above.

Table 7: Deep Piled Foundation Geotechnical Parameters

Strata	Geotechnical Design Parameters	
Weathered Residual Soil	Ultimate end-bearing capacity	900 kPa/ m ²
	ULS design end-bearing capacity	450 kPa/ m ²
	SLS design end-bearing capacity	300 kPa/ m ²
	Ultimate skin friction	50 kPa
	ULS design skin friction	25 kPa
	SLS design skin friction	16 kPa

5 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprises a ground investigation and establishment of minimum wastewater treatment and disposal to cater for probable future rural residential development. Relevant design guideline documents adopted include:

- Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.
- NZS1547:2012, On-site Domestic Wastewater Management.

5.1 Existing Wastewater Systems

Wastewater treatment and disposal systems associated with the two existing dwellings are expected to be within proposed Lot 5's boundaries. The existing system and associated disposal fields for the western dwelling were measured within the boundaries of proposed Lot 5 with adequate offset and the other dwelling is not near any proposed new boundary.

5.2 Concept Future Development and Wastewater Generation Volume

The concept rural residential developments within this report assume that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people¹¹. This considers the uncertainty of potential future Building Consent design. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms, or other similar spaces may be considered a potential bedroom by the Consent Authority.

The design water volume for roof water tank supply is estimated at 160 litres/ person/ day¹². This assumes standard water saving fixtures¹³ being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage within a development specific wastewater design by a suitably qualified professional.

¹¹ TP58 Table 6.1.

¹² TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.

¹³ Low water consumption dishwashers and no garbage grinders.



For the concept wastewater design a total daily wastewater generation of 1,280 litres/ day is anticipated per proposed lot.

5.3 Treatment Standard and System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy according to final development plans. No specific treatment system design restrictions and manufacturers are currently in place. Future developers will be required to elect a treatment system and provide system specifications at Building Consent.

It is recommended that to meet suitable minimum treated effluent output quality, secondary treatment systems are accounted for within future developments. Secondary treatment has been elected to provide compliance as a permitted activity of the proposed Northland Regional Plan considering the site topography, surface water features and disposal characteristics.

In Building Consent design, considering final disposal field topography and proximity to controlling site features, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required. Similarly, primary systems may be appropriate with adequate engineering design.

5.4 Soil Loading Rate

Based on the results of the ground investigation, conservatively the shallow soils are generally inferred to meet the drainage characteristics of TP58 Category 6, slowly draining, described as sandy clay, non-swelling clay and silty clay. This correlates to NZS1547 Category 5, poorly drained, described as light clays. For a typical PCDI system, a soil loading rate of 3 mm/ day is recommended within NZS1547 Table 5.2.

To achieve the above SLR, technical guidance documents require the following compliance within the final design.

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 50 % reserve disposal field area.

5.5 Concept Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that suitably treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid, covered with minimum 150 mm mulch and planted with specific evapotranspiration species to provide a minimum of 80 % species canopy cover. Alternatively, lines could be subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Clean, inert site-won topsoil sourced during

development from building and/ or driveways footprints may be used in the land disposal system to increase minimum thicknesses.

Specific requirements of a concept land disposal system to be confirmed during Building Consent include the following.

Table 8: Disposal Field Design Criteria

Design Criteria	Site Conditions and Compliance
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies, refer Drawing No. 510.
On shallower slopes >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, proposed wastewater disposal fields are proposed on land >10 ° and require cutoff drains.
On all terrain irrigation lines should be laid along contours.	Concept design complies, refer Drawing No. 510.
Disposal system situated no closer than 600 mm (vertically) from the winter groundwater table for secondary treated effluent.	Concept design complies, groundwater not encountered within 3.3 m of the ground surface within our investigation.
Separation from surface water features such as stormwater flow paths (including road and kerb channels), rivers, lakes, ponds, dams, and natural wetlands according to Table 9, Appendix B of the NRP.	Concept design complies. Wastewater disposal fields can be designed to accommodate setbacks from on-site and adjacent surface water features.
Secondary treated effluent disposal is to be set at the 20-year ARI (5 % AEP) flood inundation height.	Concept design complies, no mapped flood hazard within the proposed lots up to the 100-year ARI (1 % AEP) event.

5.5.1 Concept Disposal Field Sizing

The sizing of wastewater system disposal areas is a function of the design peak flow volumes, the SLR and topographic relief. For each proposed lot a concept primary and reserve disposal field is required as follows, to be refined at the Building Consent stage. The recommendations below are presented on Drawing No. 500.

- **Concept Primary Disposal Field.** A minimum PCDI primary disposal field of 427 m² laid parallel to the natural contours.
- **Concept Reserve Disposal Field.** A minimum reserve disposal field equivalent to 50 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems. It is recommended each proposed lot provides a 214 m² reserve disposal area.
- **Available Disposal Field Area.** For concept design, the available disposal field area outside of applicable offsets has been indicated on Drawing No. 500. Available disposal field areas are summarised as Table 9.

Table 9: Summary of Required and Available Disposal Field Areas

Lot	Required Primary & Reserve Field Area	Available Area
1	641 m ²	12,873 m ²
2	641 m ²	17,882 m ²

3	641 m ²	14,060 m ²
4	641 m ²	13,780 m ²

5.6 Summary of Concept Wastewater Design

Based on the above concept design assumptions a summary of the concept wastewater design is presented as Table 10. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans by a suitably qualified professional.

The concept design has been prepared with no Discharge Consent requirement. These requirements should be reviewed at the Building Consent stage and may be subject to an alternative solution.

Table 10: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Concept Design generation volume	160 litres/ person/ day – 1,280 litres/ day/ lot
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder ¹
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 6, NZS1547 Category 5
Soil Loading Rate	3 mm/ day
Concept primary disposal field size	Surface/ subsurface laid PCDI. Min. 427 m ²
Concept reserve disposal field size	Surface/ subsurface laid PCDI. Min. 50 %, or 214 m ²
Concept Disposal Field Level	Sited above 5 % AEP event.
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Concept Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Contour drains required. Stormwater management discharges downslope of all disposal fields.

1. Unless further water saving measures are included.

5.7 Assessment of Environmental Effects

An Assessment of Environmental Effects (AEE) is required to address two aspects of wastewater disposal. These include the effect of treated wastewater disposal for an individual lot and the cumulative or combined effect of multiple lots discharging treated wastewater to land as a result of subdivision.

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme plan, ground investigation, walkover inspection and Drawing No. 500, a site-specific AEE is presented as Appendix C to demonstrate the proposed wastewater disposal concept will have a less than minor effect on the environment.

6 STORMWATER ASSESSMENT

Increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as future roof, driveway and/ or internal roading.

6.1 Impervious Surfaces and Activity Status

The proposed activity has been assessed as a **Permitted Activity**. A summary of this is provided as Table 11 below which has been developed from our observations and AutoCAD drawings in lieu of specific survey. This has been taken as conceptual, maximum probable development of typical rural residential scenarios.

Table 11: Summary of Impervious Surfaces

Parameter	Area						Lot 3 DP108139
Lot		1	2	3	4	5	
Existing Lot Area	m ²	0	0	0	0	0	754120
Proposed Lot Area	m ²	20100	20100	22500	22300	659120	
Existing							
Impervious	m ²	0	0	1021	965	10933 ¹	12919
							1.71 %
Future (Concept)							
Roof	m ²	300	300	300	300	671	
	%	1.49	1.49	1.33	1.35	0.10	
Driveway	m ²	200	200	965	1021	6261	
	%	1.00	1.00	4.29	4.58	0.95	
RoW	m ²	0	0	0	0	4001	
	%	0.00	0.00	0.00	0.00	0.61	
Total	m ²	500	500	1265	1321	10933	
	%	2.49	2.49	5.62	5.92	1.66	
Activity Assessment							
Threshold	15 %	3015m ²	3015m ²	3375m ²	3345m ²	98868m ²	
Permitted		Yes	Yes	Yes	Yes	Yes	

Notes:

10,933 m² comprises 6261 m² existing gravelled tracks, 671 m² existing structures, 759 m² existing gravel track in RoW A, 1198 m² existing gravel track in RoW C and 2,044 m² existing gravel track in RoW E.

6.2 Stormwater Management Concept

Based on the assessments within Table 11, the proposed development meets the provisions of a Permitted Activity. The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development (New Rural Residential Lots 1 and 2).** The proposed application includes subdivision formation only and not lot specific residential development at this stage. As such a conservative model of probable future on-lot development has been developed for this assessment considering variation of scale in

typical rural residential development. The probable future on-lot development concept includes up to 300 m² potential roof area and up to 200 m² potential driveway or parking areas.

The concept has been prepared with attenuation provided within roof water tanks as combined retention/ detention systems.

- **Probable Future Development (New Rural Residential Lots 3 and 4).** The probable future on-lot development concept includes up to 300 m² potential roof area only at the concept stage, considering that the existing gravel track would be utilised as driveway from the Right of Way based upon the proposed house sites being placed adjacent to the track. Additional driveway area will need to be justified and subject to appropriate detailed design at the building consent stage.

The concept has been prepared with attenuation provided within roof water tanks as combined retention/ detention systems.

- **Subdivision Development.** Increased runoff from subdivision development is expected and additional attenuation is proposed to avoid an adverse environmental effect.

The concept adopts a single stormwater pond within the balance, proposed lot 5. The stormwater pond shall be subject to specific engineering design at the EDA stage and has conceptually been modelled adopting gravity flows.

6.3 Design Storm Event

It has been identified that development of the site poses an increase to flooding hazard on the downstream properties. Therefore, in order to provide flow attenuation and flood control in compliance with FNDC Engineering Standard Table 4-1, the concept design attenuates the post-development stormwater runoff peak discharge to 80 % of the pre-development condition for the 1 % AEP storm event. The calculation results are summarised this section and provided in full in Appendix D.

Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge. These are detailed further in Section 5.4 of this report.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model¹⁴. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities, in accordance with FNDC Engineering Standards 2023¹⁵.

6.4 Concept Attenuation Model

Based on the design storm events indicated above and the corresponding modelling results (in Appendix D) an attenuation concept to suit the maximum storage requirement has been

¹⁴ NIWA High Intensity Rainfall Data System, <https://hirds.niwa.co.nz>.

provided. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

6.4.1 Roof Runoff Tanks

Conceptual storage and outlet requirements within the tanks are included in Appendix D and a typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards¹⁵ to provide a suitable attenuation design to limit post-development peak flows to 80 % of pre-development conditions.

Table 12: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP		Flow Attenuation: 20 % AEP		Flood Control: 10 % AEP		Flow Attenuation: 1 % AEP	
Regulatory Compliance	FNDC Engineering Standards Table 4-1		FNDC Engineering Standards Table 4-1		NRC Proposed Regional Plan		FNDC Engineering Standards Table 4-1	
Criteria	80 % Pre-development		80 % Pre-development				80 % Pre-development	
Applicable Lots	1 & 2	3 & 4	1 & 2	3 & 4	1 & 2	3 & 4	1 & 2	3 & 4
Pre-development peak flow (l/s)	5.35	3.21	6.93	4.16	8.1	4.86	12.05	7.23
80 % pre-development peak flow (l/s)	4.28	2.57	5.55	3.33	-	-	9.64	5.78
Post-development peak flow (l/s)	0.8	2.57	1.03	3.33	2.83	4.86	1.8	5.78
Total Storage Volume Required (m ³)	7.801	2.367	10.25	3.08	5.159	2.776	18.375	5.388
Concept Summary, Lots 1 & 2:	<p>- Attenuation storage calculation accounts for offset flow from future driveway. Refer Appendix D for calcs in full).</p> <p>- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage.</p> <p>- 1 x 20,000 litre tank is sufficient for attenuation (18,375 l)</p> <p>- 1% AEP attenuation in isolation requires a 36 mm orifice 0.87 m below overflow (within 2x linked 25,000 litre tanks). However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.</p>							

¹⁵ FNDC Engineering Standards 2021, Version 0.6, Issued May 2023.



Concept
Summary,
Lots 3 & 4:

- Attenuation storage calculation accounts for proposed concept roof area only as increase of impervious surfaces above existing, considering placement of building platforms adjacent to existing gravelled track. Refer Appendix D for calcs in full).
- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage.
- 1 x 6,000 litre tank is sufficient for attenuation (5,388 l)
- 1 % AEP attenuation in isolation requires a 87 mm orifice 0.26 m below overflow (within a standard 25,000 litre tank). However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.

6.4.2 On-Lot Discharge

The direct discharge of rainwater tank overflow in a concentrated manner can cause scour and erosion in addition to saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point with suitable dispersion devices downslope of proposed building footprints and wastewater disposal fields.

It is recommended that the conceptually sized dispersion devices are subject to specific assessment at the Building Consent stage to limit scour and erosion from tank overflows.

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the design storm event peak flows from the attenuation tank and including minimum 100 mm dia. PVC piping. A concept dispersion pipe or trench length is presented in Table 13. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data and TR2013/018 document.

Table 13: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity (at spreader orifices)	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
300 m ² (roof area only)	0.87 m/s	0.1 m	0.15 m	7.65 m	20 mm @ 150 mm c/c	Above ground dispersion device or in-ground dispersion trench.

6.5 Internal Rooding Stormwater Management

It is recommended that once Resource Consent has been granted that the proposed subdivision attenuation devices are revisited in a detailed design phase to specifically size and provide construction details.

It is proposed to modify the existing farm pond structure to act as a stormwater attenuation pond which can be fed by gravity flows, refer Drawing No. 411. Existing contours and concept road modelling indicate that proposed Rights of Way D, E and F can achieve gravity flows to the pond. The stormwater pond shall provide attenuation of proposed new Right of Way surfaces to less than 80 % of the pre-development condition for the design storm event (1 % AEP).

A summary of increased surfaces, runoff from the pre-development condition and storage requirement is presented below as Table 14 and Table 15.

Table 14: Summary of Increased Impermeable Surfaces

Item	Pre-development Pervious	Pre-development Impervious	Post development Pervious	Post development Impervious	Difference in Impervious
Catchment 1					
RoW D, E & F	0 m ²	0 m ²	0 m ²	3828 m ²	+3828 m ²
Pervious	155590 m ²	0 m ²	151762 m ²	0 m ²	0
Total	155590 m ²	0 m ²	151762 m ²	3828 m ²	+3828 m ²
<ol style="list-style-type: none"> 1. Refer to Drawing 410 for catchment definition. 2. Measured from 1 m NRC LiDAR model, subject to confirmation during detailed design phase. 3. Based on concept modelled roading surfaces including carriageway and shoulders. 					

6.5.1 Runoff Modelling

Based on the above areas, the following increased runoff for the associated storm events has been calculated by our conceptual model. The concept design criteria is presented as follows:

- **Pond 1** – Attenuation of RoW areas within catchment 1, providing attenuation of peak flow to 80% of 1 % AEP storm event with provision of climate change.

Table 15: Summary of Increased Runoff from to Ponds

Model	Storm Event	Condition	Peak Flow	Comments
Pond 1	1 % AEP	Pre-development	92.22 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	73.78 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	159.44l/s	
		Storage Requirement	51.395m ³	Subject to Specific Engineering Design
		Post development Attenuated	73.78 l/s	Achieves target

6.5.2 Stormwater Pond Concept

Based on the above calculation, the existing farm pond shall be modified to become a wet pond to provide attenuation of new road surfaces to the above design criteria. The concept pond design shall be advanced by specific engineering design during the EDA stage based on



the above and available information according to Auckland Council GD01¹⁶ and FNDC Engineering Standards 2023.

Preliminary design criteria presented within GD01 are summarised as follows. It is important to note that the concept design does not present the level of rigour required for construction and the preliminary model shall be advanced by specific engineering design to prepare construction drawings backed by a Producer Statement.

- Pond to be formed with storage above a designated wet level which could be taken as the existing static level in the pond or a lowered level.
- Inlet piping and rip-rap from roading sized to accommodate the 1 % AEP peak flows from the RoW area subject to specific engineering design.
- Outlet from pond via scruffy dome manhole with orifice inlet and RCP pipeline to rip-rap outlet downstream of pond or by specifically engineered weir.
- No specific forebay but treatment achieved through gravity flow inlets (grassed swales) and grass/ vegetation in the base of the pond.
- Spillway constructed to provide controlled management above the design storm. According to GD01, spillway shall have an invert level of 100 mm above the design storm event storage height.
- 300 mm freeboard above the design storm event (200 mm above the spillway invert) to road carriageway.
- Pond sized to achieve shallow pond depth where possible to increase safety in design considering rural residential setting.
- Geotechnical analysis of existing pond embankment to determine suitability and any improvement measures to accommodate RoW roading and water attenuation.

The above measures are indicated, on the drawing set included within Appendix A. It is recommended that all stormwater infrastructure is subject to specific engineering design at the EPA stage.

6.6 Stormwater Quality

The proposed application is for a rural residential subdivision. The key contaminant risks in this setting include:

- Sediments and minor contaminants washed from impervious surfaces.
- Leaf matter, grass, and other organic debris.

¹⁶ Auckland Council Guideline Document 2017/001, *Stormwater Management Devices in the Auckland Region*, December 2017, *Incorporating Amendment 2*.

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. Stormwater quality will be provided by:

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Rainwater tank for potable use onsite only to be filled by roof runoff.
- Room for sedimentation (minimum 150 mm according to Auckland Council GD01) within the base of the stormwater attenuation pond and roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards roading swale drains where possible.
- Grassed swale drains from rainwater inception (road surfaces) to discharge point.

The risk of other contaminants being discharged out of the site boundaries (hydrocarbons, metals etc.) as a result of the proposed activities once stormwater has been processed through the above measures that will affect the downstream water quality is considered low.

7 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within this development or within the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 12.

On-lot roof water supply tanks to be used for firefighting purposes. Specific analysis and calculation for firefighting is outside the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

8 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works.

8.1 Traffic Intensity Factor and Household Equivalents

According to Appendix 3A of the Operative District Plan, providing for one standard residential unit per lot, each accounting for up to 10 traffic movements per unit per day the following Traffic Intensity Factor (TIF) and Household Equivalents have been calculated.

Table 16: Summary of Existing Vs Proposed TIF

Location	Existing TIF	Proposed TIF
RoW A	20	60
RoW B & C	20	20
RoW D	0	30
RoW E	0	20
RoW F	0	10

8.2 Right of Way

New private access rights of way will provide internal access to proposed Lots 1-4, some of which will be shared with Lot 1 DP 596251 and Lot 3 DP 596251, and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan and FNDC Engineering Standards Table 3-16, as summarised in Table 17. Proposed RoWs A and C are existing formed roads.

Table 17: Summary of Proposed RoW Specification

Location	Standard	Min. Legal Width	Min. Carriageway Width	Surface Type
RoW A	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW B & C	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW D	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders. CPassing bays at 100 m c/c intervals or corners	Aggregate
RoW E	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW F	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate

The proposed RoW shall be graded with a 4 % cross fall where in aggregate to direct stormwater runoff and to comply with FNDC Engineering Standards Sheet 9.

Concept RoW plans are presented within Appendix A, complying with Austroads Standards for vertical curvature and FNDC Engineering Standards. The enclosed plans are conceptual only and shall be subject to specific engineering design prior to construction.

8.3 Vehicle Crossings

Vehicle crossings will be formed at subdivision stage. A summary of proposed vehicle crossing standards is presented as Table 18.

Table 18: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
RoW A/ D	FNDC Type 1A, Light Vehicles	1x new crossing with 4.0 m width at boundary. Curvature of radius = 5.0 m, no culvert.	Subdivision
RoW D/ F	FNDC Type 1A, Light Vehicles	1x new crossing with 3.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert.	Subdivision
Lots 1 and 4	NA	3.0 m wide access to boundary	Subdivision
Lots 2 and 3	FNDC Type 1A, Light Vehicles	1x new crossing with 3.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert.	Subdivision

RCP – Reinforced Concrete Pipe

9 EARTHWORKS

As part of the subdivision application, earthworks are required as follows:

- **Construction of the RoWs.** This is proposed by conventional cut and fill with imported GAP hard fill and/ or site-won earth fill subject to specific engineering design.
- **Construction of new vehicle crossings.** Due to the minor volume, this has been excluded from our earthwork estimates below.

9.1 Earthwork Volumes

Earthwork volumes have been conceptually sized as outlined in Table 19.

Table 19: Summary of Earthworks

Item	Area	Volume	Height (maximum)
RoW Cut Volume	5,297.1 m ²	7,045.6 m ³	3.9 m
RoW Fill Volume	4,279.8 m ²	3,437.2 m ³	3.5 m
Total Volume (Net)	9,576.9 m ²	10,482.8 m ³	(3,608.4 m ³ cut)

9.2 General Earthworks Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

To reduce the risk of instability of excavations during construction of the subdivision, it is recommended that **temporary** unsupported excavations have a maximum vertical height of 1.0 m. Excavations >1.0 m are generally not expected but should be battered at 1V:1H or 45°.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within close proximity to excavations should be undertaken in accordance with Occupational Safety and Health regulations.

All earthworks should be carried out in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

Road batters have been modelled conceptually at 1V:1H in the cut environment and 1V:2H in the fill environment. It is recommended that specific geotechnical stability assessment of the RoWs is undertaken as a condition of consent and where large batters remain that retaining walls are considered.

9.3 Erosion and Sediment Control

Specific erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. It is recommended that specific on-lot development is assessed at the time of Building Consent by the future developer. To form the subdivision the following erosion and sediment control measures are recommended:

- Silt fences along the downslope face of the RoWs.
- Temporary sediment retention pond(s).
- Clean and/ or dirty water diversion bunds.

A site specific erosion and sediment control plan shall be provided to Council at the time of EDA.

10 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan¹⁷, NRC Proposed Regional Plan for Northland¹⁸ and Regional Water and Soil Plan for Northland. A summary of the proposed activities against defined natural hazards is presented as Table 20.

Table 20: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	NA	No mitigation required, less than minor.
Overland flow paths, flooding, inundation	NA	No mitigation required, less than minor.
Landslip	NA	No mitigation required, less than minor. Provided geotechnical recommendations of this report are followed.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.
Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	No mitigation required, less than minor.

NA – Not Applicable.

¹⁷ Operative District Plan Rule 13.7.3.2.

¹⁸ Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.



11 LIMITATIONS

This report has been prepared for Breadon & Cook Ltd as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

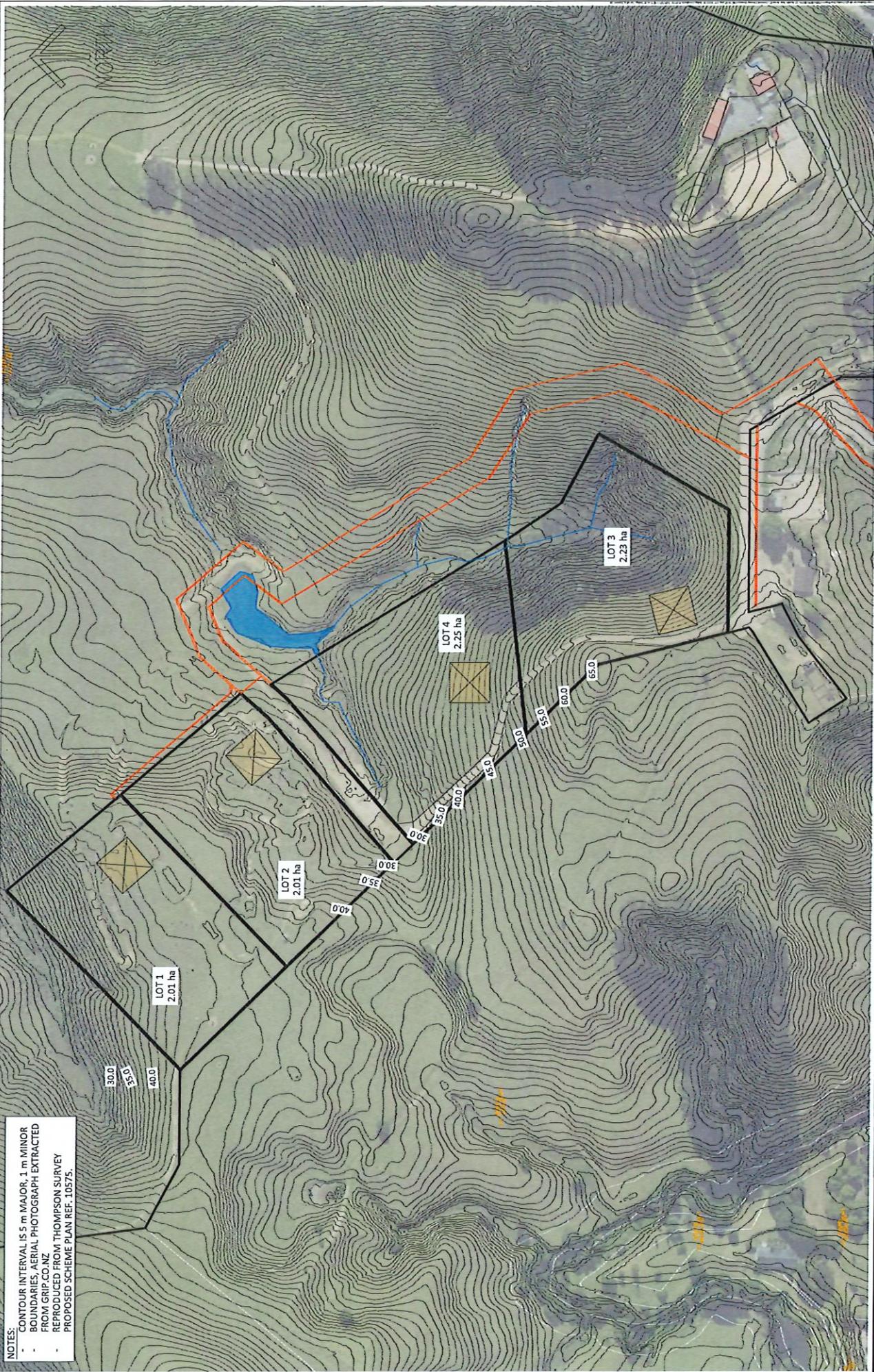
The opinions and recommendations of this report are based on plans, specifications and reports provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this report and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this report and accompanying plans.

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.



APPENDIX A

Drawings

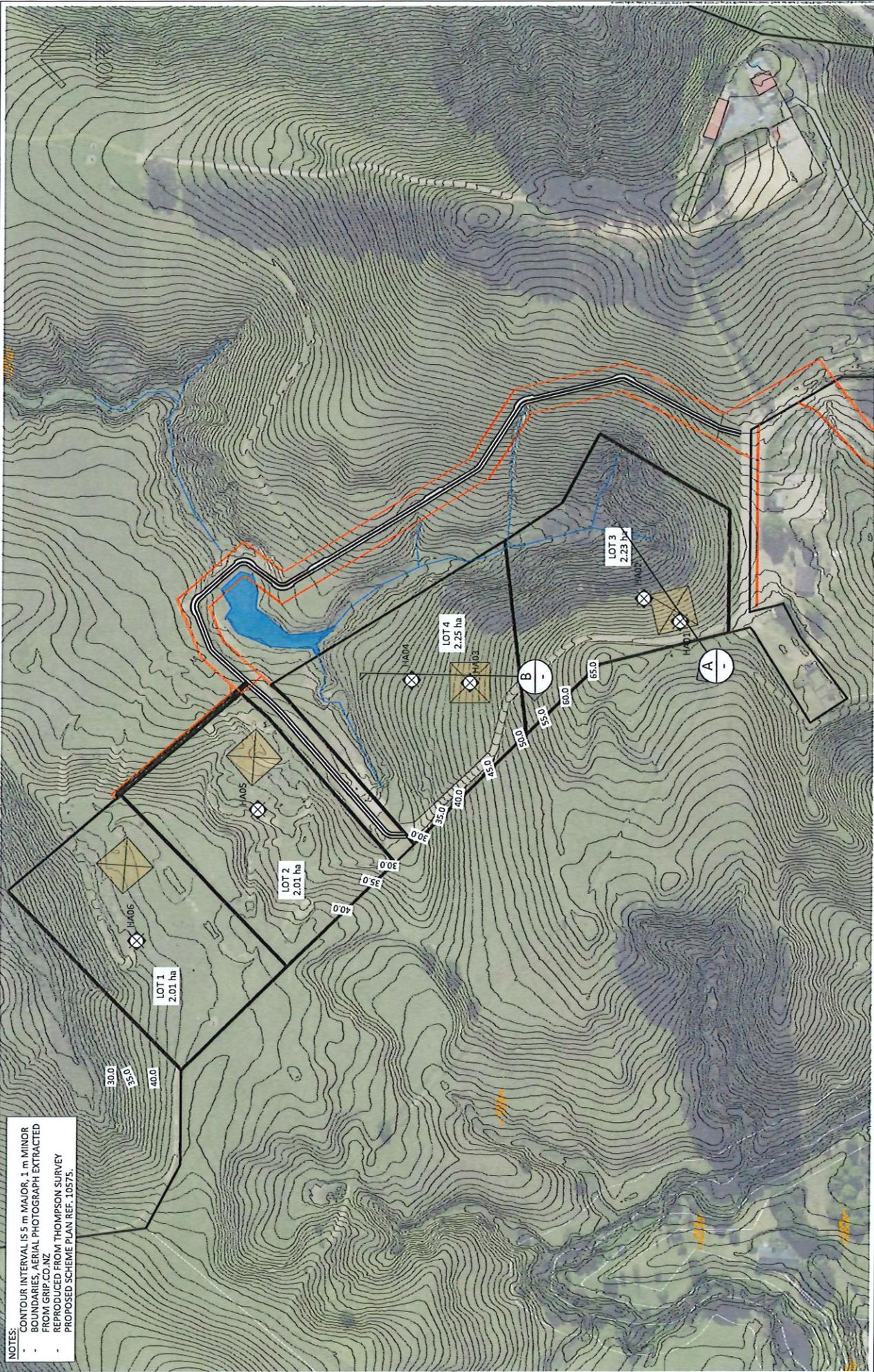


NOTES:

- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

DRAWING TITLE		FINAL	
PROJECT		NOT FOR CONSTRUCTION	
CLIENT		SCALE	SHEET NO.
BREADON & COOK LTD		1:2500	A3
PROJECT		PROJECT NO.	LOT NO.
121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138		C0667N	010
DRAWING TITLE		RC	G
PROJECT		RC	A
CLIENT		SCHEME PLAN FOR SUBDIVISION RESOURCE CONSENT	
DATE	BY	DATE	BY
06/09/25	EC	07/09/25	SH
07/09/25	SH	07/09/25	EC
07/09/25	EC	07/09/25	EC
DATE	BY	DATE	BY
07/09/25	A. LUDWIG	07/09/25	A. LUDWIG
DATE	BY	DATE	BY
07/09/25	A. LUDWIG	07/09/25	A. LUDWIG





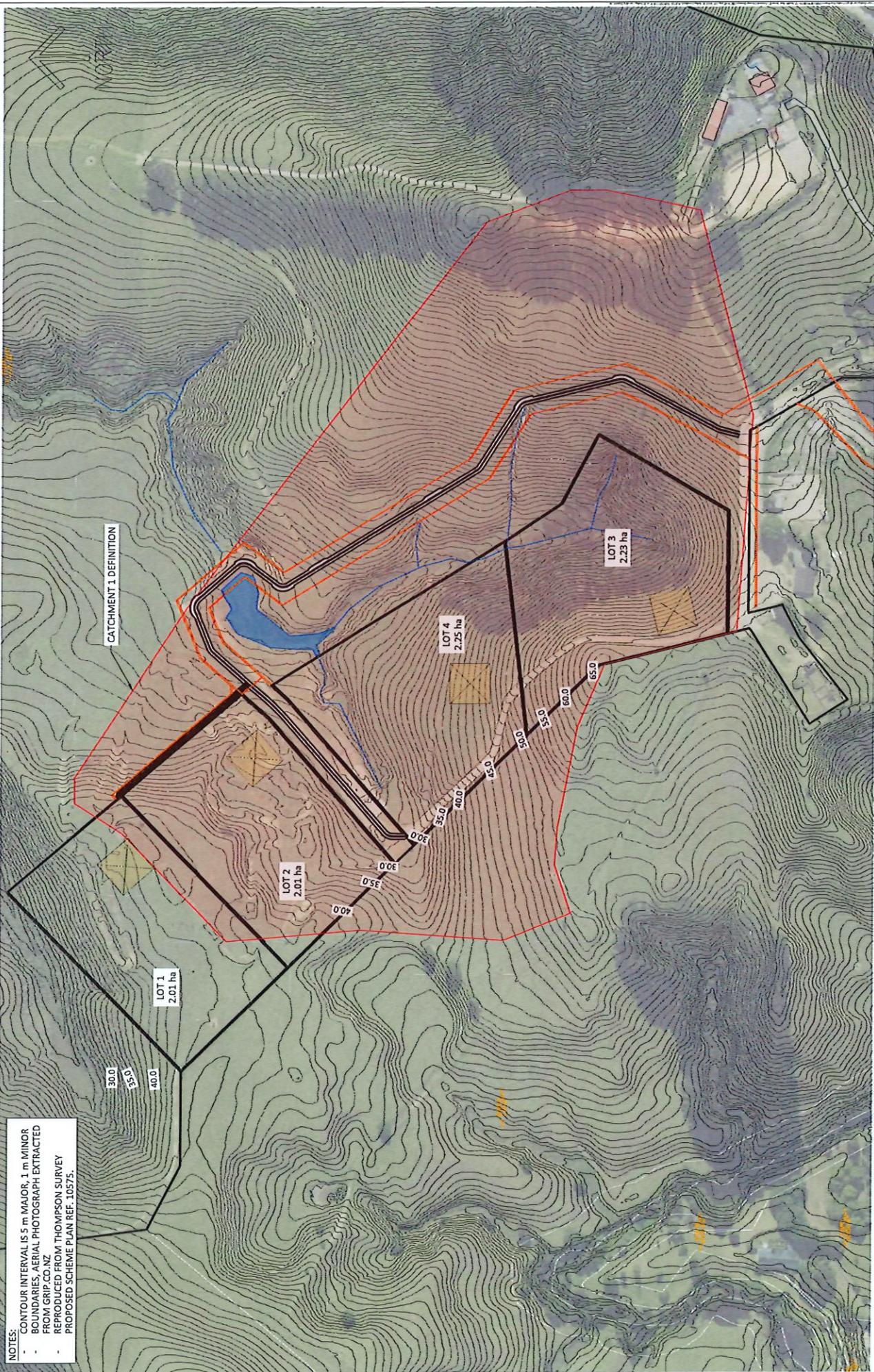
NOTES:

- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

DRAWING TITLE		FINAL	
PROJECT		NOT FOR CONSTRUCTION	
CLIENT		BREADON & COOK LTD	
PROJECT		121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138	
DRAWING TITLE		GEOTECHNICAL SITE PLAN FOR SUBDIVISION RESOURCE CONSENT	
SCALE	1:2500	TYPE	A3
PROJECT NO.	C0667N	CLASS.	RC
		SCALE	G
		DATE	200
		REV.	A

DATE	BY	CHKD	DATE
06/09/25	EC	EC	
07/09/25	SH	SH	
07/09/25	EC	EC	

geologix
consulting engineers



NOTES:

- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

CATCHMENT 1 DEFINITION

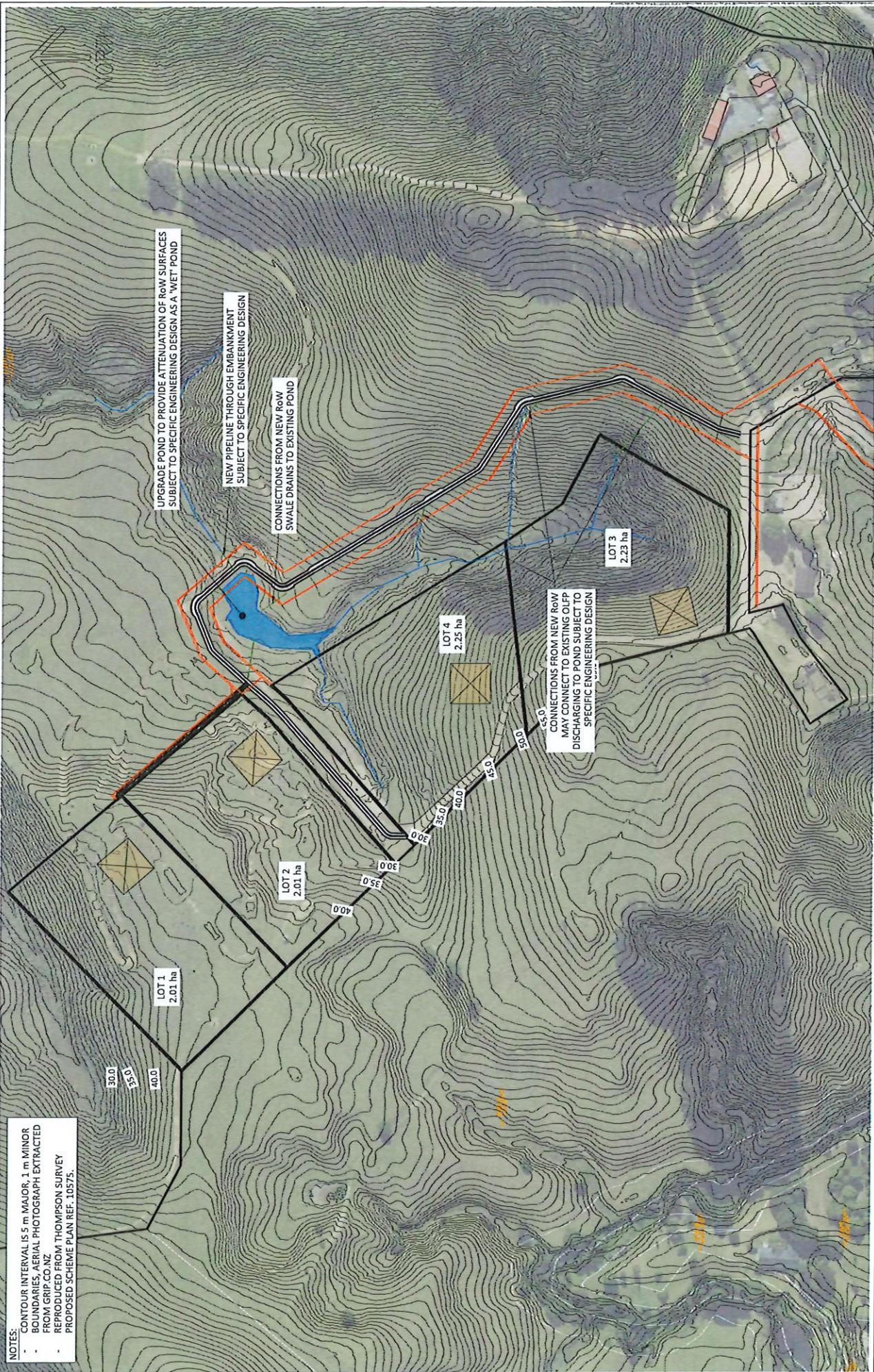
LOT 1
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LOT 2
2.01 ha

LOT 4
2.25 ha

LOT 3
2.23 ha

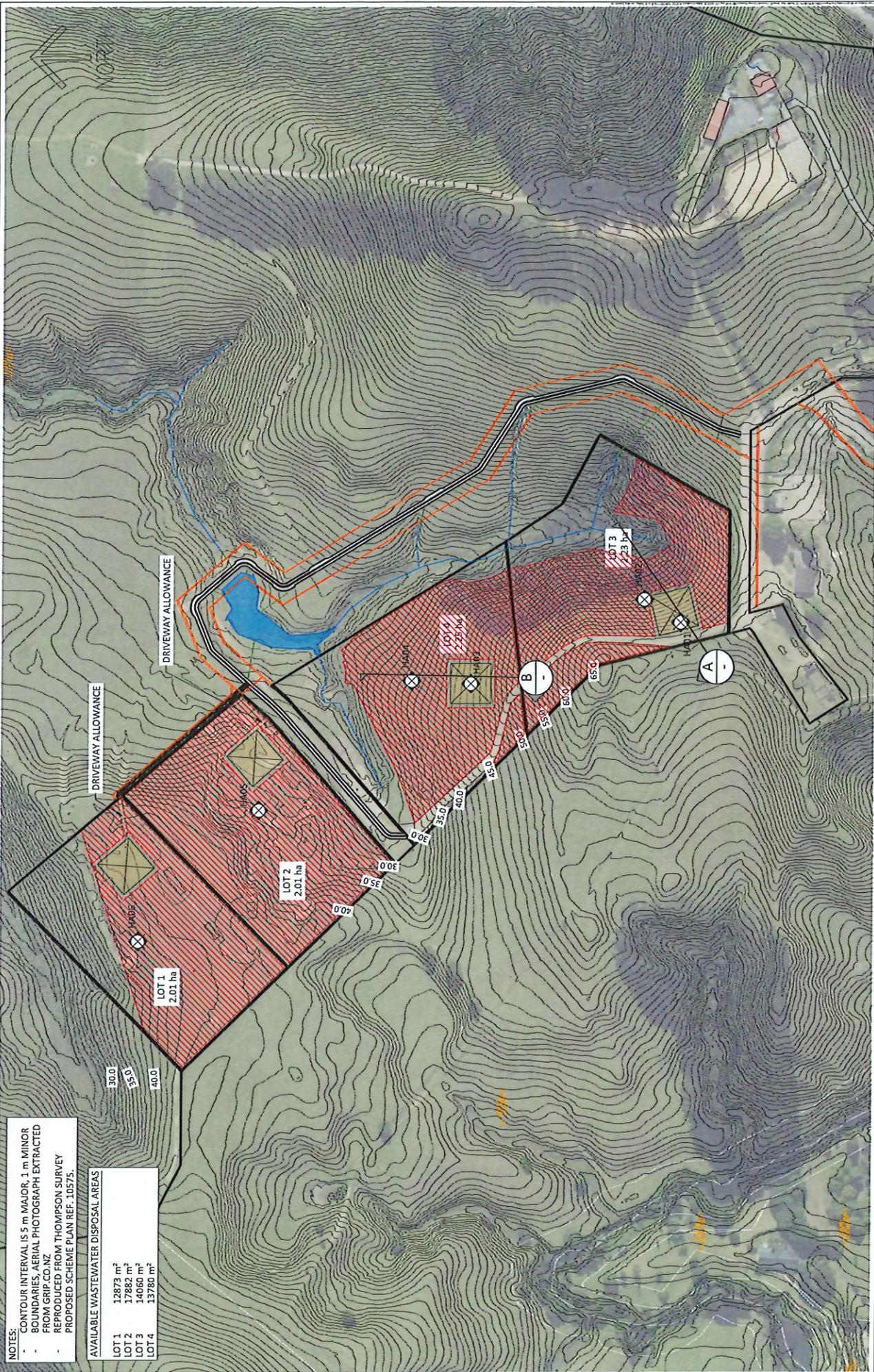
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NOTES:

- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

		DRAWN: EC 07/08/25 CHECKED: SH 07/08/25 DATE: 07/08/25 PROJECT: EC 07/08/25		CLIENT: BREADON & COOK LTD		PROJECT: 121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138		DRAWING TITLE: STORMWATER PLAN FOR SUBDIVISION WORKS RESOURCE CONSENT		PROJECT NO: C0667N SCALE: 1:2500 SHEET NO.: A3		DATE: 07/08/25 TIME: RC LOCATION: G PROJECT: 411 SHEET: A	
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NOTES:

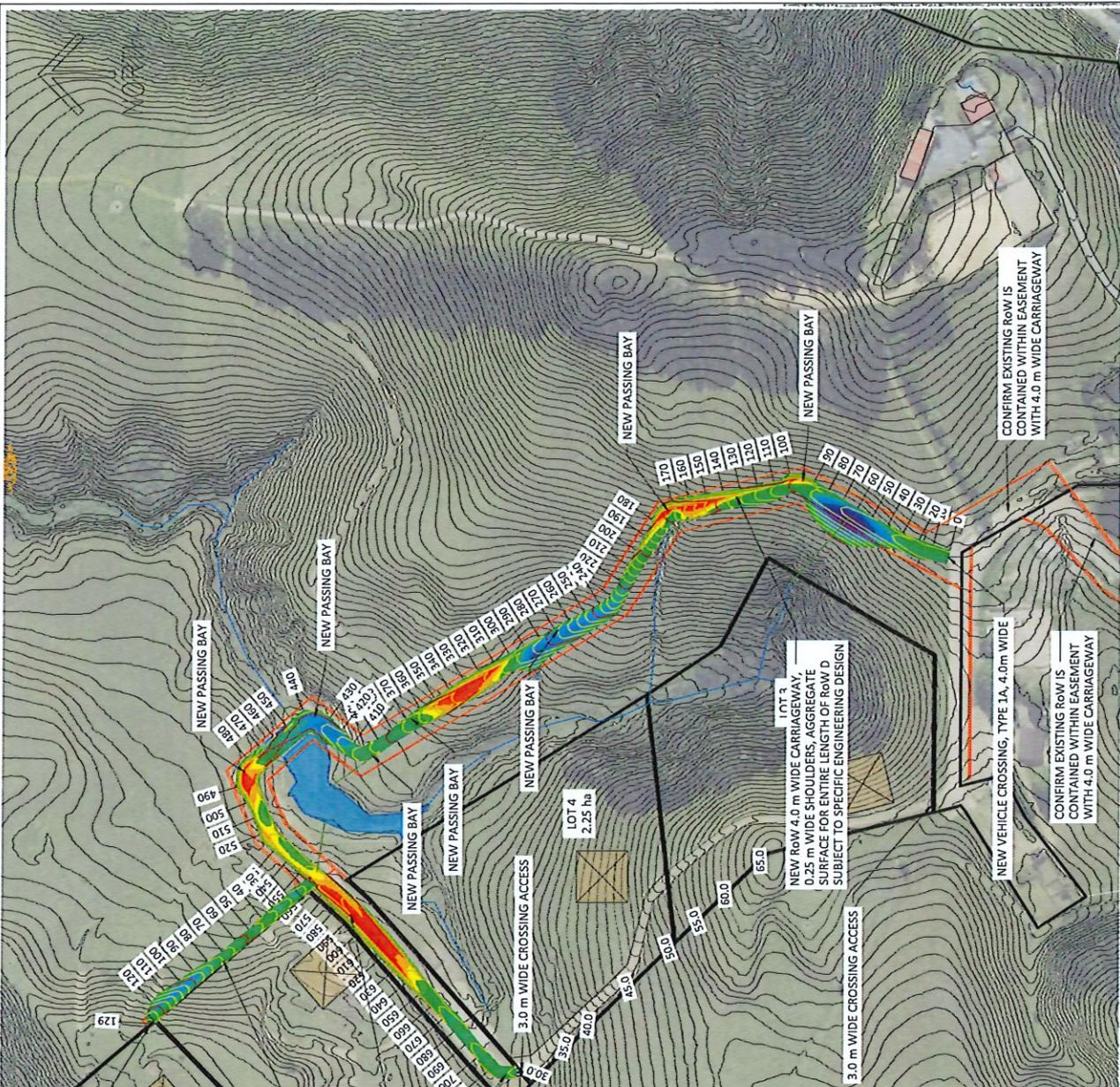
- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

AVAILABLE WASTEWATER DISPOSAL AREAS

LOT 1	12873 m ²
LOT 2	17882 m ²
LOT 3	14060 m ²
LOT 4	13780 m ²

		<table border="1"> <tr> <td>DATE</td> <td>06/08/25</td> <td>BY</td> <td>EC</td> </tr> <tr> <td>DATE</td> <td>07/09/25</td> <td>BY</td> <td>SH</td> </tr> <tr> <td>DATE</td> <td>07/09/25</td> <td>BY</td> <td>EC</td> </tr> </table>		DATE	06/08/25	BY	EC	DATE	07/09/25	BY	SH	DATE	07/09/25	BY	EC
DATE	06/08/25	BY	EC												
DATE	07/09/25	BY	SH												
DATE	07/09/25	BY	EC												
<p>BREADON & COOK LTD</p>		<p>121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138</p>													
<p>CONCEPT WASTEWATER PLAN FOR FUTURE LOT & SUBDIVISION RESOURCE CONSENT</p>		<table border="1"> <tr> <td>PROJECT NO.</td> <td>CO667N</td> <td>RC</td> <td>G</td> </tr> <tr> <td>SCALE</td> <td>1:2500</td> <td>SHEET NO.</td> <td>A3</td> </tr> <tr> <td>DATE</td> <td>07/09/25</td> <td>REV.</td> <td>1</td> </tr> </table>		PROJECT NO.	CO667N	RC	G	SCALE	1:2500	SHEET NO.	A3	DATE	07/09/25	REV.	1
PROJECT NO.	CO667N	RC	G												
SCALE	1:2500	SHEET NO.	A3												
DATE	07/09/25	REV.	1												
<p>FINAL NOT FOR CONSTRUCTION</p>		<table border="1"> <tr> <td>DATE</td> <td>07/09/25</td> <td>BY</td> <td>EC</td> </tr> <tr> <td>DATE</td> <td>07/09/25</td> <td>BY</td> <td>SH</td> </tr> <tr> <td>DATE</td> <td>07/09/25</td> <td>BY</td> <td>EC</td> </tr> </table>		DATE	07/09/25	BY	EC	DATE	07/09/25	BY	SH	DATE	07/09/25	BY	EC
DATE	07/09/25	BY	EC												
DATE	07/09/25	BY	SH												
DATE	07/09/25	BY	EC												

NOTES:
 - PROPOSED CONTOUR INTERVAL IS 1 m
 - BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
 - REPRODUCED FROM THOMPSON SURVEY
 - PROPOSED SCHEME PLAN REF. 10575.



Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m ²)	Volume (m ³)
1	Red	-4.000	-3.500	45.2	5.7
2	Red	-3.500	-3.000	253.1	76.4
3	Red	-3.000	-2.500	579.8	284.2
4	Orange	-2.500	-2.000	610.9	587.5
5	Yellow	-2.000	-1.500	722.8	921.3
6	Light Green	-1.500	-1.000	754.8	1291.9
7	Green	-1.000	-0.500	816.6	1679.0
8	Green	-0.500	0.000	1513.9	2199.6
9	Light Green	0.000	0.500	1953.0	1577.0
10	Light Blue	0.500	1.000	933.4	920.1
11	Blue	1.000	1.500	661.1	518.6
12	Blue	1.500	2.000	418.4	244.3
13	Blue	2.000	2.500	154.2	114.2
14	Blue	2.500	3.000	103.5	52.3
15	Blue	3.000	3.500	56.2	10.7

geologix
consulting engineers

BREADON & COOK LTD

121 REDCLIFFS ROAD
KERIKERI
FAR NORTH
LOT 3 DP 108138

DATE: 14/10/25
 DRAWN: EC
 CHECKED: SH
 APPROVED: EC

DATE: 14/10/25
 DRAWN: SH
 CHECKED: EC

DATE: 14/10/25
 DRAWN: EC
 CHECKED: EC

PROJECT: 121 REDCLIFFS ROAD
KERIKERI
FAR NORTH
LOT 3 DP 108138

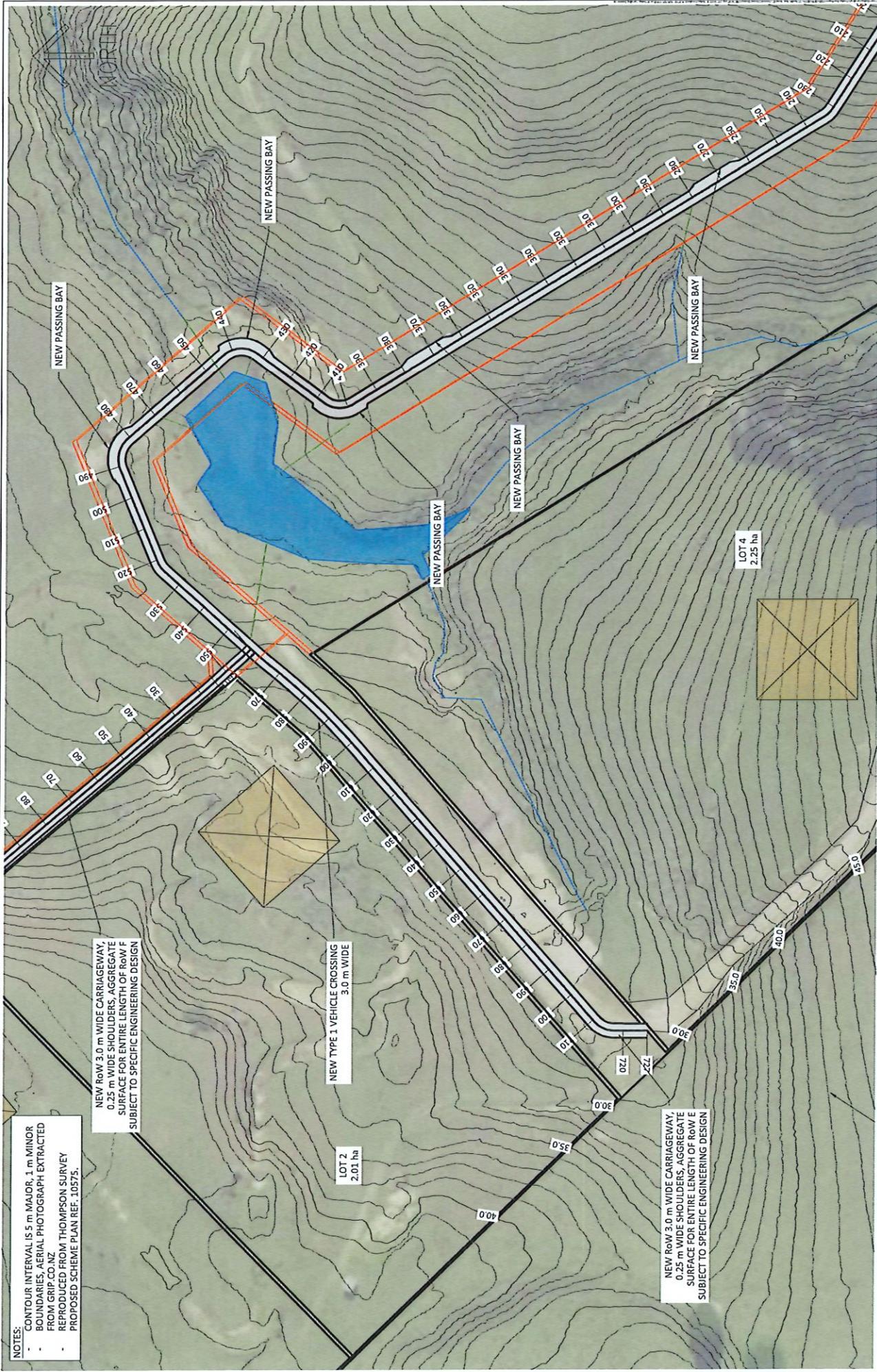
PROPOSED: EARTHWORKS PLAN
FOR
SUBDIVISION WORKS
RESOURCE CONSENT

SCALE: 1:2500
 PROJECT NO: C0667N
 SHEET NO: A3

FINAL
NOT FOR CONSTRUCTION

RC C

610 A



NOTES:

- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
- BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP CO.NZ
- REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

NEW ROW 3.0 m WIDE CARRIAGEWAY, 0.25 m WIDE SHOULDERS, AGGREGATE SURFACE FOR ENTIRE LENGTH OF ROW F SUBJECT TO SPECIFIC ENGINEERING DESIGN

NEW TYPE 1 VEHICLE CROSSING 3.0 m WIDE

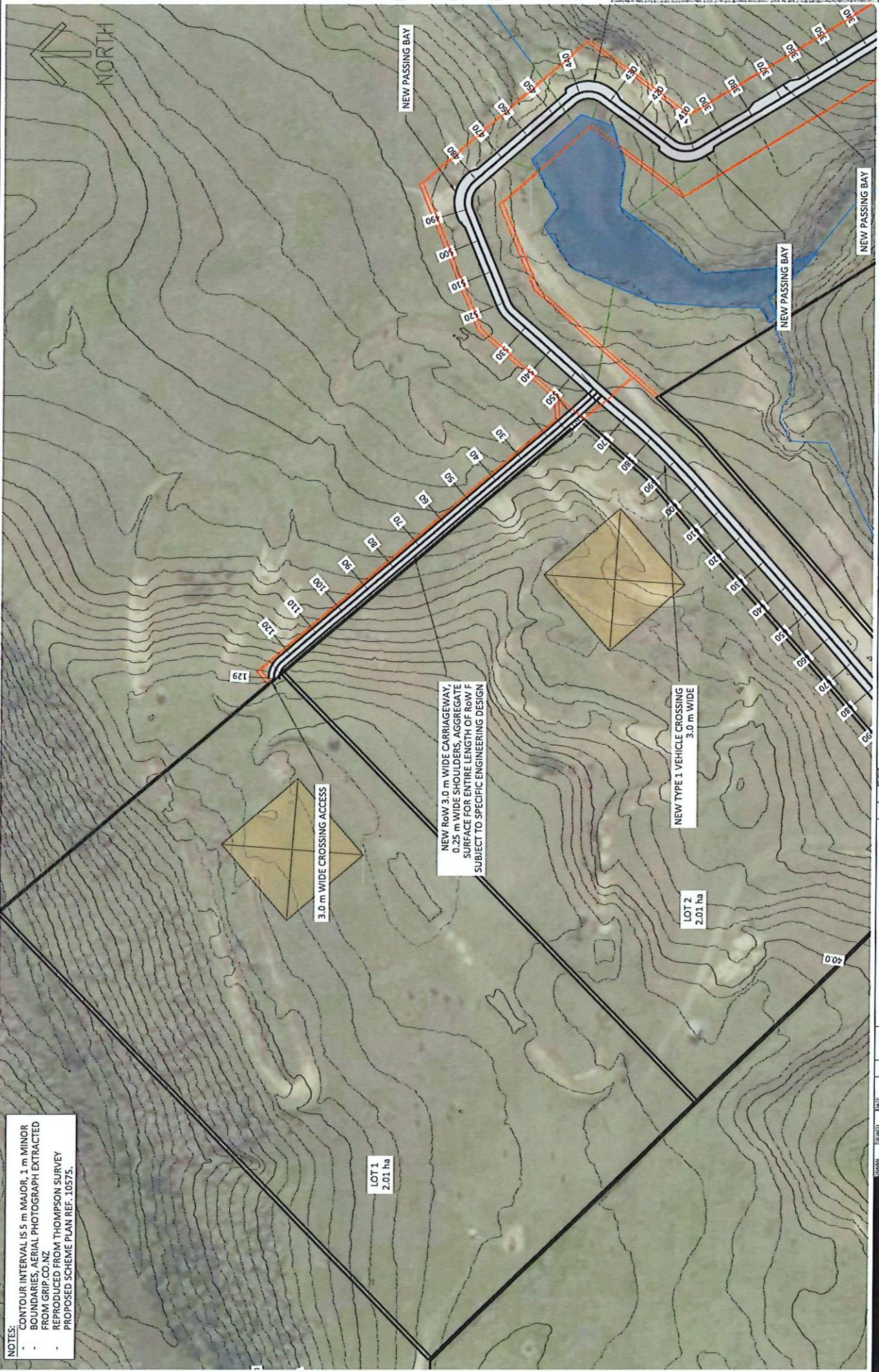
LOT 2
2.01 ha

NEW ROW 3.0 m WIDE CARRIAGEWAY, 0.25 m WIDE SHOULDERS, AGGREGATE SURFACE FOR ENTIRE LENGTH OF ROW E SUBJECT TO SPECIFIC ENGINEERING DESIGN

LOT 4
2.25 ha

<p>121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138</p>		<p>BREADON & COOK LTD</p>		<p>PRODUCT: 121 REDCLIFFS ROAD SUBDIVISION WORKS RESOURCE CONSENT</p>		<p>DATE: 07/08/25 SCALE: 1:1000 PROJECT NO.: C0667N SHEET NO.: 712 SHEET SIZE: A3</p>	
<p>DATE: 06/08/25 DRAWN: EC CHECKED: SH</p>	<p>DATE: 07/08/25 DRAWN: SH CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>	<p>DATE: 07/08/25 DRAWN: EC CHECKED: EC</p>





NOTES:
 - CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR
 - BOUNDARIES, AERIAL PHOTOGRAPH EXTRACTED FROM GRIP.CO.NZ
 - REPRODUCED FROM THOMPSON SURVEY PROPOSED SCHEME PLAN REF. 10575.

		SHOWN: EC VERIFIED: SH APPROVED: EC	DATE: 06/08/25 DATE: 07/08/25 DATE: 07/08/25	REV: A REV: B REV: C	DATE: 06/08/25 DATE: 07/08/25 DATE: 07/08/25	DRAWN: EC CHECKED: SH APPROVED: EC	PROJECT: 121 REDCLIFFS ROAD KERIKERI FAR NORTH LOT 3 DP 108138 CLIENT: BREADON & COOK LTD DRAWING TITLE: CONCEPT ROADING PLAN FOR SUBDIVISION WORKS RESOURCE CONSENT	PROJECT NO: C0667N SCALE: 1:1000 SHEET NO: A3 SHEET TOTAL: 713 A	FINAL NOT FOR CONSTRUCTION PROJECT NO: C0667N SCALE: 1:1000 SHEET NO: A3 SHEET TOTAL: 713 A
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APPENDIX B

Engineering Borehole Records



INVESTIGATION LOG

HOLE NO.:
HA01

CLIENT: Brendon & Cook LTD
PROJECT: 121B Redcliffs Road, Kerikeri

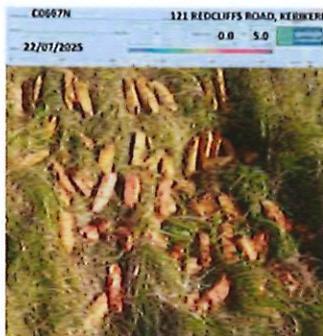
JOB NO.:
C0667N

SITE LOCATION: CO-ORDINATES: 1688042.170mE, 6105963.850mN ELEVATION: Ground START DATE: 22/07/2025 END DATE: 22/07/2025
CONTRACTOR: Internal RIG: 50mm Hand Auger DRILLER: GM LOGGED BY: GW

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)						VANE SHEAR STRENGTH (kPa) Vane: 3282				WATER			
				2	4	6	8	10	12	14	16	18	50		100	50	200
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0 - 0.2	TS														
Silly CLAY; orange. Hard to very stiff; moist; high plasticity; [Waipapa Group Soils]. 0.5m: Brown streaks present. 1.2m: Becoming orange with some grey and dark orange streaks. 2.0m: Becoming orange, dark orange and grey. 2.5m: Some pinkish streaks. 3.0m: Becoming orange, dark orange and grey.		0.2 - 5.0	TS														
End Of Hole: 5.10m		5.0															

Groundwater Not Encountered

PHOTO(S)



REMARKS

- Hand auger completed at target depth 5.1m bgl.
- Groundwater not encountered at the time of drilling.

WATER

- ▼ Standing Water Level
- ▽ Out flow
- ↖ In flow

INVESTIGATION TYPE

- Hand Auger
- Test Pit



INVESTIGATION LOG

HOLE NO.:
HA03

CLIENT: Brendon & Cook LTD
PROJECT: 121B Redcliffs Road, Kerikeri

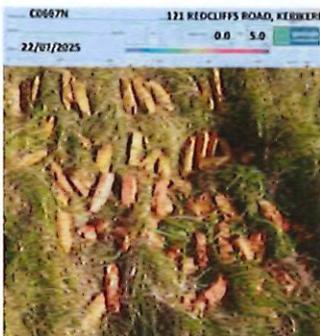
JOB NO.:
C0667N

SITE LOCATION: START DATE: 22/07/2025
CO-ORDINATES: 1687999.480mE, 6106120.690mN ELEVATION: Ground END DATE: 22/07/2025
CONTRACTOR: Internal RIG: 50mm Hand Auger DRILLER: GM LOGGED BY: GW

MATERIAL DESCRIPTION <small>(See Classification & Symbology sheet for details)</small>	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER <small>(Blows / 0mm)</small>					VANE SHEAR STRENGTH <small>(kPa)</small> Vane: 3282				WATER						
				2	4	6	8	10	12	14	16	18		50	100	150	200	Values	
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.2	TS																
Silty CLAY; orange. Hard to very stiff; moist; high plasticity; [Waipapa Group Soils]. 1.2m: Becoming grey and orange streaked. 1.4m: Becoming orange. 1.6m: Becoming grey orange streaks with black specks. 2.0m: Becoming grey with orange black mottles. 2.7m: Becoming grey with orange and black streaks. 3.2m: Becoming orange with some grey and black. 3.5m: Becoming grey. 3.8m: Becoming grey with orange and black streaks. 4.3m: Becoming grey and orange with some black.		0.4	TS																
		0.6	TS																
		0.8	TS																
		1.0	TS																
		1.2	TS																
		1.4	TS																
		1.6	TS																
		1.8	TS																
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	4.0	TS																	
	4.2	TS																	
	4.4	TS																	
	4.6	TS																	
	4.8	TS																	
End Of Hole: 5.00m		5.0	TS																

Groundwater Not Encountered

PHOTO(S)



REMARKS

1. Hand auger completed at target depth 5.0m bgl.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- Hand Auger
- Test Pit

Generated with CORE-GS by Geotec - Hand Auger - scala & vane bars - 12/08/2025 1:38:16 pm



INVESTIGATION LOG

HOLE NO.:
HA05

CLIENT: Brendon & Cook LTD
PROJECT: 121B Redcliffs Road, Kerikeri

JOB NO.:
C0667N

SITE LOCATION:

CO-ORDINATES: 1687908.210mE, 6106279.630mN

ELEVATION: Ground

START DATE: 22/07/2025

END DATE: 22/07/2025

CONTRACTOR: Internal

RIG: 50mm Hand Auger

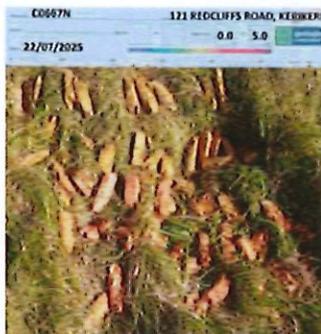
DRILLER: GM

LOGGED BY: GW

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm)										VANE SHEAR STRENGTH (kPa) Vane:				WATER	
				2	4	6	8	10	12	14	16	18	50	100	50	200	Values		
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0 - 0.2	TS																
Silty CLAY; orange. Moist; [Waipapa Group Soils].		0.2 - 0.8	TS																
0.8m: Becoming orange and some grey.		0.8 - 1.0	TS																
End Of Hole: 1.00m		1.0 - 1.2																	
		1.2 - 1.4																	

Groundwater Not Encountered

PHOTO(S)



REMARKS

- Hand auger completed at target depth 1.2m bgl.
- Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- Hand Auger
- Test Pit



INVESTIGATION LOG

HOLE NO.:

HA06

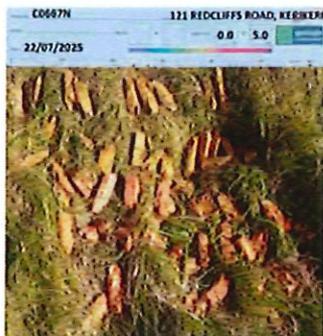
CLIENT: Brendon & Cook LTD
 PROJECT: 121B Redcliffs Road, Kerikeri

JOB NO.:
C0667N

SITE LOCATION: CO-ORDINATES: 1687812.380mE, 6106371.010mN ELEVATION: Ground START DATE: 22/07/2025
 CONTRACTOR: Internal RIG: 50mm Hand Auger DRILLER: GM END DATE: 22/07/2025
 LOGGED BY: GW

MATERIAL DESCRIPTION <small>(See Classification & Symbology sheet for details)</small>	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER <small>(Blows / 0mm)</small>									VANE SHEAR STRENGTH <small>(kPa)</small> Vane:				WATER	
				2	4	6	8	10	12	14	16	18	50	100	150	200		Values
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0 - 0.2	TS														Groundwater Not Encountered	
Silty CLAY; orange. Moist; low plasticity; [Waipapa Group Soils].		0.2 - 1.1	*															
1.1m: Becoming grey and orange streaked. End Of Hole: 1.10m		1.1 - 1.2																
		1.2 - 1.4																

PHOTO(S)



REMARKS

1. Hand auger completed at target depth 1.2m bgl.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- Hand Auger
- Test Pit



APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 21: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement ²	FNDC Separation Requirement	Site Assessment ³
Individual System Effects			
Flood plains	Above 5 % AEP	NR	Complies. Disposal field well above mapped flood hazard.
Stormwater flowpath ⁴	5 m	NR	Complies, see annotations on Drawing No. 500.
Surface water feature ⁵	15 m	15 – 30 m	Complies.
Coastal Marine Area	15 m	30 m	Complies.
Existing water supply bore.	20 m	NR	Complies.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Complies, <10 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	NZS1547	
Cumulative Effects			
Biological Oxygen Demand		≤20 g/m ³	Complies – secondary treatment.
Total Suspended Solids		≤30 g/m ³	Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m ³	15 – 75 g/m ³	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m ³	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m ³	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			
1. AEE based on proposed secondary treated effluent.			
2. Northland Regional Plan Table 9.			
3. Based on the recommendations of this report and Drawing No. 500.			
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.			
5. River, lake, stream, pond, dam, or natural wetland.			
AEP Annual Exceedance Probability.			
NR No Requirement.			



APPENDIX D

Stormwater Calculations

Project Ref:	CO667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		
Date:	29 July 2025 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

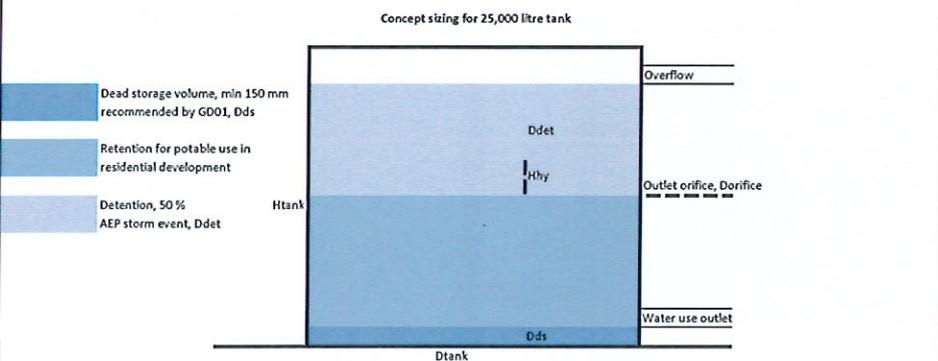
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A				TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	200	0.80	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	500	0.59	PASTURE	EX. CONSENTED	0	0	
TOTAL	500	TYPE C		TOTAL	500	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	65.3	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	78.36	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	65.30	1.2	78.36	9.75	5.35	4.28	Critical duration (time of concentration) for the catchments is 10min
20	47.30	1.2	56.76	7.06	3.88	3.10	
30	39.10	1.2	46.92	5.84	3.20	2.56	
60	27.90	1.2	33.48	4.17	2.29	1.83	Pre-dev calculated on Intensity without CC factor
120	19.60	1.2	23.52	2.93	1.61	1.28	
360	10.70	1.2	12.84	1.60	0.88	0.70	
720	6.95	1.2	8.34	1.04	0.57	0.46	
1440	4.35	1.2	5.22	0.65	0.36	0.29	
2880	2.60	1.2	3.12	0.39	0.21	0.17	
4320	1.88	1.2	2.26	0.28	0.15	0.12	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	3.48	6.27	0.80	0.80	5.47	3282	select largest required storage, regardless of duration, to avoid overflow
20	2.52	4.54	0.58	0.80	3.74	4491	
30	2.09	3.75	0.48	0.80	2.96	5320	
60	1.49	2.68	0.34	0.80	1.88	6769	
120	1.05	1.88	0.24	0.80	1.08	7801	
360	0.57	1.03	0.13	0.80	0.23	4948	
720	0.37	0.67	0.08	0.80	No Att. Req.	0	
1440	0.23	0.42	0.05	0.80	No Att. Req.	0	
2880	0.14	0.25	0.03	0.80	No Att. Req.	0	
4320	0.10	0.18	0.02	0.80	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION		
TOTAL STORAGE REQUIRED	7.801 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, D _{tank}	3.66 m	No. of Tanks 2
TANK AREA, A _{tank}	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, V _{tank}	52604 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.37 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	G001 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.52 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00080 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.19 m	
AREA OF ORIFICE, A _{orifice}	6.75E-04 m ²	
ORIFICE DIAMETER, D _{orifice}	29 mm	
VELOCITY AT ORIFICE	2.70 m/s	At max. head level

Project Ref:	CO667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		
Date:	29 July 2025 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

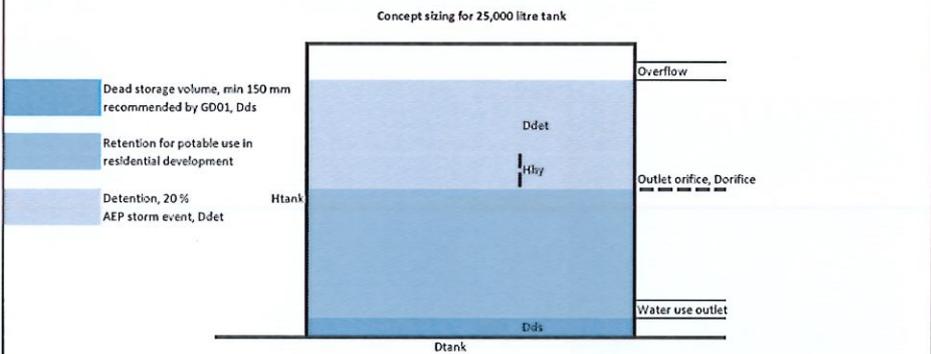
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	200	0.80	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	500	0.59	PASTURE	EX. CONSENTED	0	0	
TOTAL	500	TYPE C		TOTAL	500	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION			
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	84.6	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG. 10MIN*	20	%	
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	101.5	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	84.60	1.2	101.52	12.63	6.93	5.55	Critical duration (time of concentration) for the catchments is 10min
20	61.40	1.2	73.68	9.17	5.03	4.03	
30	50.70	1.2	60.84	7.57	4.15	3.32	
60	36.30	1.2	43.56	5.42	2.97	2.38	Pre-dev calculated on intensity without CC factor
120	25.60	1.2	30.72	3.82	2.10	1.68	
360	13.90	1.2	16.68	2.08	1.14	0.91	
720	9.11	1.2	10.93	1.36	0.75	0.60	
1440	5.71	1.2	6.85	0.85	0.47	0.37	
2880	3.42	1.2	4.10	0.51	0.28	0.22	
4320	2.47	1.2	2.96	0.37	0.20	0.16	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	4.51	8.12	1.03	1.03	7.09	4253	select largest required storage, regardless of duration, to avoid overflow
20	3.27	5.69	1.76	1.03	4.86	5832	
30	2.70	4.87	1.45	1.03	3.83	6900	
60	1.94	3.48	1.04	1.03	2.45	8823	
120	1.37	2.46	0.73	1.03	1.42	10250	
360	0.74	1.33	0.40	1.03	0.30	6489	
720	0.49	0.87	0.26	1.03	No Att. Req.	0	
1440	0.30	0.55	0.16	1.03	No Att. Req.	0	
2880	0.18	0.33	0.10	1.03	No Att. Req.	0	
4320	0.13	0.24	0.07	1.03	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	10.250 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 2
TANK AREA, Atank	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.49 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.64 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00103 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.24 m	
AREA OF ORIFICE, Aorifice	7.63E-04 m ²	
ORIFICE DIAMETER, Dorifice	31 mm	
VELOCITY AT ORIFICE	3.09 m/s	At max. head level

Project Ref:	C0667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		
Date:	29 July 2025		
	REV 1	10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW	

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).

THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.

RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

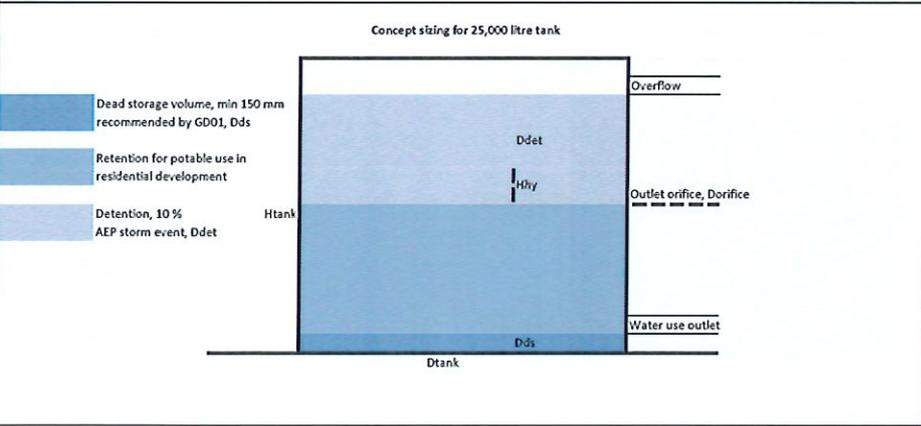
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	200	0.80	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	500	0.59	PASTURE	EX. CONSENTED	0	0	
	0	0			0	0	
TOTAL	500	TYPE C		TOTAL	500	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION			
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	98.8	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	118.6	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS						
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	COMMENTS
10	98.80	1.2	118.56	14.75	8.10	Critical duration (time of concentration) for the catchments is 10min
20	71.70	1.2	86.04	10.71	7.05	
30	59.30	1.2	71.16	8.86	5.83	
60	42.50	1.2	51.00	6.35	4.18	Pre-dev calculated on intensity without CC factor
120	30.00	1.2	36.00	4.48	2.95	
360	16.40	1.2	19.68	2.45	1.61	
720	10.70	1.2	12.84	1.60	1.05	
1440	6.73	1.2	8.08	1.01	0.66	
2880	4.03	1.2	4.84	0.60	0.40	
4320	2.91	1.2	3.49	0.43	0.29	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre-Qoff} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres
10	5.27	9.48	2.83	2.83	6.66	3995
20	3.82	6.88	3.23	2.83	4.05	4868
30	3.16	5.69	2.67	2.83	2.87	5159
60	2.27	4.03	1.91	2.83	1.25	4512
120	1.60	2.88	1.35	2.83	0.05	383
360	0.87	1.57	0.74	2.83	No Att. Req.	0
720	0.57	1.03	0.48	2.83	No Att. Req.	0
1440	0.36	0.65	0.30	2.83	No Att. Req.	0
2880	0.21	0.39	0.18	2.83	No Att. Req.	0
4320	0.16	0.28	0.13	2.83	No Att. Req.	0

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION		
TOTAL STORAGE REQUIRED	5.159 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, D _{tank}	3.66 m	No. of Tanks 2
TANK AREA, A _{tank}	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, V _{tank}	52604 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.25 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.40 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00283 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.12 m	
AREA OF ORIFICE, A _{orifice}	2.94E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	61 mm	
VELOCITY AT ORIFICE	2.19 m/s	At max. head level

Project Ref:	CO667H	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		
Date:	29 July 2025 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	200	0.80	DRIVEWAY - METAL
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	500	0.59	PASTURE	EX. CONSENTED	0	0	
	0	0			0	0	
TOTAL	500	TYPE C		TOTAL	500	TYPE C	

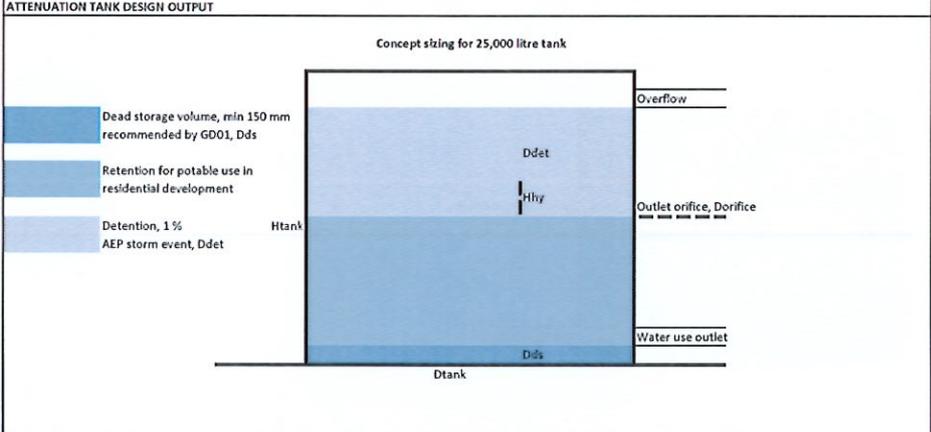
RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	147.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
1% AEP RAINFALL INTENSITY, 10 MIN WITH CC	176.4	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	147.00	1.2	176.40	21.95	12.05	9.64	Critical duration (time of concentration) for the catchments is 10min Pre-dev calculated on Intensity without CC factor
20	107.00	1.2	128.40	15.98	8.77	7.01	
30	89.00	1.2	106.80	13.29	7.29	5.83	
60	64.00	1.2	76.80	9.56	5.24	4.20	
120	45.30	1.2	54.36	6.76	3.71	2.97	
360	24.90	1.2	29.88	3.72	2.04	1.63	
720	16.30	1.2	19.56	2.43	1.34	1.07	
1440	10.30	1.2	12.36	1.54	0.84	0.68	
2880	6.19	1.2	7.43	0.92	0.51	0.41	
4320	4.48	1.2	5.38	0.67	0.37	0.29	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres
10	7.84	14.11	1.80	1.80	12.32	7369
20	5.71	10.27	1.31	1.80	8.48	10170
30	4.75	8.54	1.09	1.80	6.75	12145
60	3.41	6.14	0.78	1.80	4.35	15650
120	2.42	4.35	0.55	1.80	2.55	18375
360	1.33	2.39	0.30	1.80	0.59	12825
720	0.87	1.56	0.20	1.80	No Att. Req.	0
1440	0.55	0.99	0.13	1.80	No Att. Req.	0
2880	0.33	0.59	0.08	1.80	No Att. Req.	0
4320	0.24	0.43	0.05	1.80	No Att. Req.	0

Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min

select largest required storage, regardless of duration, to avoid overflow for event of any duration



SPECIFICATION		
TOTAL STORAGE REQUIRED	18.375 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 2
TANK AREA, Atank	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.87 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.02 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00180 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.44 m	
AREA OF ORIFICE, Aorifice	9.90E-04 m ²	
ORIFICE DIAMETER, Dorifice	36 mm	
VELOCITY AT ORIFICE	4.14 m/s	At max. head level

Project Ref:	CO667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT 3		
Date:	29 July 2025	REV 1	50 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

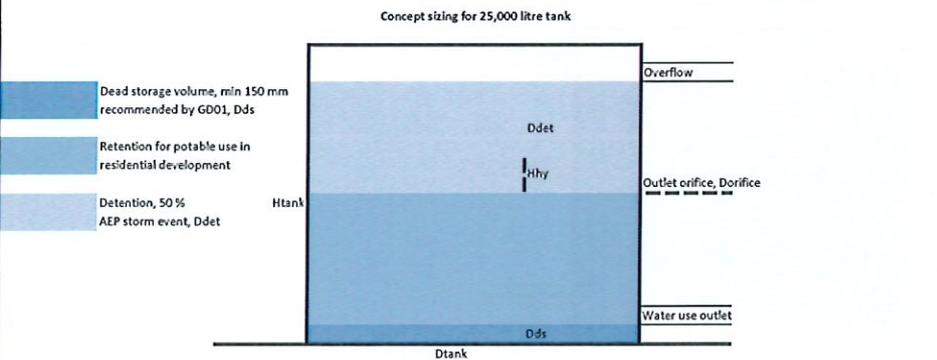
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A				TO TANK	300	0.95	ROOF
IMPERVIOUS B	0	0.8		OFFSET	0	0.80	
IMPERVIOUS C	0	0		PERVIOUS	0	0.8	
EX. PEROVIOUS	300	0.59	PASTURE	EX. CONSENTED	0	0.8	
TOTAL	300	TYPE C		TOTAL	300	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	65.3	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	78.36	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	80% of PRE DEV RUNOFF, Q _{pre(80%)} , l/s	COMMENTS
10	65.30	1.2	78.36	6.27	3.21	2.57	Critical duration (time of concentration) for the catchments is 10min
20	47.30	1.2	56.76	4.54	2.33	1.86	
30	39.10	1.2	46.92	3.75	1.92	1.54	
60	27.90	1.2	33.48	2.68	1.37	1.10	Pre-dev calculated on Intensity without CC factor
120	19.60	1.2	23.52	1.88	0.96	0.77	
360	10.70	1.2	12.84	1.03	0.53	0.42	
720	6.95	1.2	8.34	0.67	0.34	0.27	
1440	4.35	1.2	5.22	0.42	0.21	0.17	
2880	2.60	1.2	3.12	0.25	0.13	0.10	
4320	1.88	1.2	2.26	0.18	0.09	0.07	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre(80%)} - Q _{off} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres	COMMENTS
10	0.00	6.27	2.57	2.57	3.70	2220	select largest required storage, regardless of duration, to avoid overflow
20	0.00	4.54	1.86	2.57	1.97	2367	
30	0.00	3.75	1.54	2.57	1.19	2133	
60	0.00	2.68	1.10	2.57	0.11	396	
120	0.00	1.88	0.77	2.57	No Att. Req.	0	
360	0.00	1.03	0.42	2.57	No Att. Req.	0	
720	0.00	0.67	0.27	2.57	No Att. Req.	0	
1440	0.00	0.42	0.17	2.57	No Att. Req.	0	
2880	0.00	0.25	0.10	2.57	No Att. Req.	0	
4320	0.00	0.18	0.07	2.57	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION

TOTAL STORAGE REQUIRED	2.367 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, D _{tank}	3.66 m	No. of Tanks 2
TANK AREA, A _{tank}	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, V _{tank}	52604 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.11 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.26 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00257 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.06 m	
AREA OF ORIFICE, A _{orifice}	3.94E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	71 mm	
VELOCITY AT ORIFICE	1.49 m/s	At max. head level

Project Ref:	C0667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kenikiri		
Design Case:	CONCEPT FUTURE LOT 3		
Date:	29 July 2025 REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

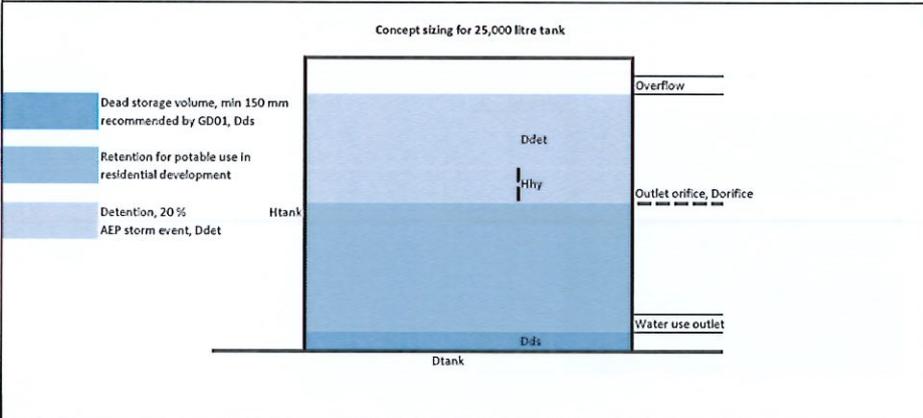
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0.8		OFFSET	0	0.80	
IMPERVIOUS C	0	0		PERVIOUS	0	0.8	
EX. FERVIOUS	300	0.59	PASTURE	EX. CONSENTED	0	0.8	
					0	0	
TOTAL	300	TYPE C		TOTAL	300	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION			
20% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	84.6	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
20% AEP RAINFALL INTENSITY, 10 MIN WITH CC	101.5	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	84.60	1.2	101.52	8.12	4.16	3.33	Critical duration (time of concentration) for the catchments is 10min Pre-dev calculated on intensity without CC factor
20	61.40	1.2	73.68	5.89	3.02	2.42	
30	50.70	1.2	60.84	4.87	2.49	1.99	
60	36.30	1.2	43.56	3.48	1.78	1.43	
120	25.60	1.2	30.72	2.46	1.26	1.01	
360	13.90	1.2	16.68	1.33	0.68	0.55	
720	9.11	1.2	10.93	0.87	0.45	0.36	
1440	5.71	1.2	6.85	0.55	0.28	0.22	
2880	3.42	1.2	4.10	0.33	0.17	0.13	
4320	2.47	1.2	2.96	0.24	0.12	0.10	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres
10	0.00	8.12	3.33	3.33	4.79	2876
20	0.00	5.89	3.02	3.33	2.57	3080
30	0.00	4.87	2.49	3.33	1.54	2771
60	0.00	3.48	1.78	3.33	0.16	566
120	0.00	2.46	1.26	3.33	No Att. Req.	0
360	0.00	1.33	0.68	3.33	No Att. Req.	0
720	0.00	0.87	0.45	3.33	No Att. Req.	0
1440	0.00	0.55	0.28	3.33	No Att. Req.	0
2880	0.00	0.33	0.17	3.33	No Att. Req.	0
4320	0.00	0.24	0.12	3.33	No Att. Req.	0

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION		
TOTAL STORAGE REQUIRED	3.080 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 2
TANK AREA, Atank	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.15 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.30 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00333 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.07 m	
AREA OF ORIFICE, Aorifice	4.48E-03 m ²	
ORIFICE DIAMETER, Dorifice	76 mm	
VELOCITY AT ORIFICE	1.69 m/s	At max. head level

Project Ref:	CO667N	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kerikeri		
Design Case:	CONCEPT FUTURE LOT 3		
Date:	29 July 2025 REV 1		
		10% AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW	

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

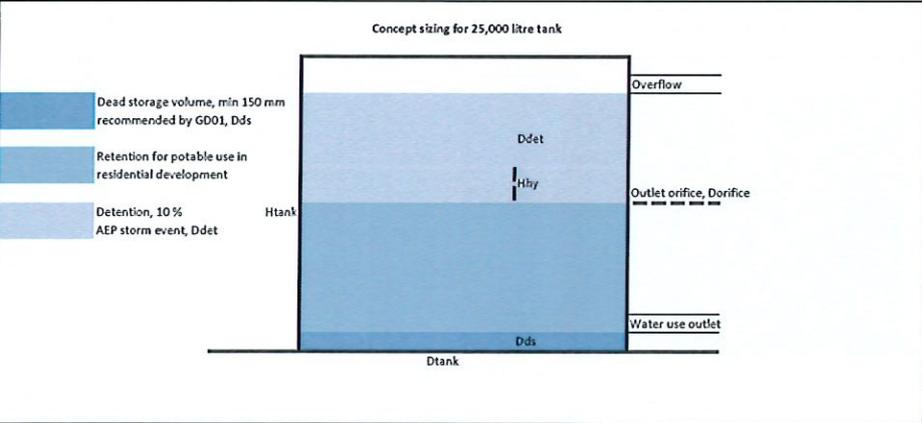
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0.8		OFFSET	0	0.80	
IMPERVIOUS C	0	0		PERVIOUS	0	0.8	
EX. PERVIOUS	300	0.59	PASTURE	EX. CONSENTED	0	0.8	
	0	0			0	0	
TOTAL	300	TYPE C		TOTAL	300	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION			
10% AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	98.8	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%	
10% AEP RAINFALL INTENSITY, 10 MIN WITH CC	118.6	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS						
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q _{post} , l/s	PRE DEV RUNOFF, Q _{pre} , l/s	COMMENTS
10	98.80	1.2	118.56	9.48	4.86	Critical duration (time of concentration) for the catchments is 10min Pre-dev calculated on Intensity without CC factor
20	71.70	1.2	86.04	6.88	4.23	
30	59.30	1.2	71.16	5.69	3.50	
60	42.50	1.2	51.00	4.08	2.51	
120	30.00	1.2	36.00	2.88	1.77	
360	16.40	1.2	19.68	1.57	0.97	
720	10.70	1.2	12.84	1.03	0.63	
1440	6.73	1.2	8.08	0.65	0.40	
2880	4.03	1.2	4.84	0.39	0.24	
4320	2.91	1.2	3.49	0.28	0.17	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q _{off} , l/s	TANK INFLOW, Q _{in} , l/s	ALLOWABLE TANK OUTFLOW, Q _{pre-Qoff} , l/s	SELECTED TANK OUTFLOW, Q _{out} , l/s	DIFFERENCE (Q _{in} - Q _{out}), l/s	Required Storage, litres
10	0.00	9.48	4.86	4.86	4.63	2776
20	0.00	6.88	4.23	4.86	2.03	2431
30	0.00	5.69	3.50	4.86	0.84	1503
60	0.00	4.08	2.51	4.86	No Att. Req.	0
120	0.00	2.88	1.77	4.86	No Att. Req.	0
360	0.00	1.57	0.97	4.86	No Att. Req.	0
720	0.00	1.03	0.63	4.86	No Att. Req.	0
1440	0.00	0.65	0.40	4.86	No Att. Req.	0
2880	0.00	0.39	0.24	4.86	No Att. Req.	0
4320	0.00	0.28	0.17	4.86	No Att. Req.	0

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION		
TOTAL STORAGE REQUIRED	2.776 m ³	Select largest storage as per analysis
TANK HEIGHT, H _{tank}	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, D _{tank}	3.66 m	No. of Tanks 2
TANK AREA, A _{tank}	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, V _{tank}	52604 litres	
REQUIRED STORAGE HEIGHT, D _{det}	0.13 m	Below overflow
DEAD STORAGE VOLUME, D _{ds}	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.28 m	
SELECTED TANK OUTFLOW, Q _{out} , l/s	0.00486 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, H _{hy}	0.07 m	
AREA OF ORIFICE, A _{orifice}	6.89E-03 m ²	
ORIFICE DIAMETER, D _{orifice}	94 mm	
VELOCITY AT ORIFICE	1.61 m/s	At max. head level

Project Ref:	CO667H	STORMWATER ATTENUATION TANK DESIGN	
Project Address:	121 Redcliffs Road, Kennerly		
Design Case:	CONCEPT FUTURE LOT 3		
Date:	29 July 2025		
	REV 1	1 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT	

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

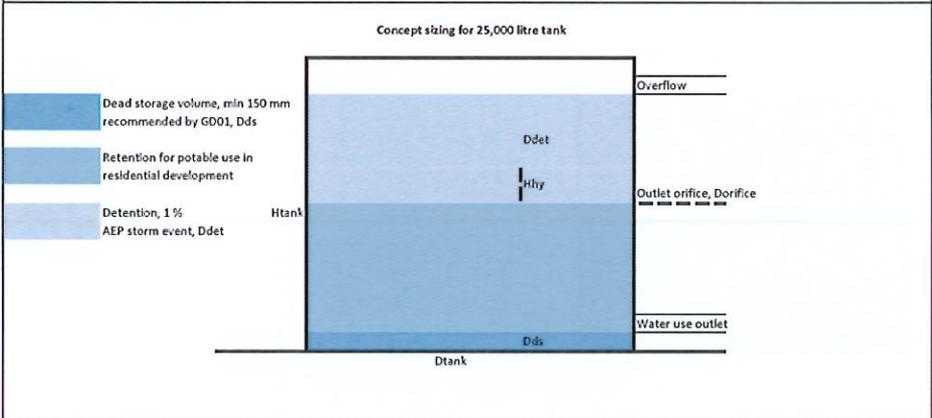
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m ²	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0.8		OFFSET	0	0.80	
IMPERVIOUS C	0	0		PERVIOUS	0	0.8	
EX. PERVIOUS	300	0.59	PASTURE	EX. CONSENTED	0	0.8	
	0	0			0	0	
TOTAL	300	TYPE C		TOTAL	300	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	147.0	mm/hr	* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.
CLIMATE CHANGE FACTOR, 2.1 DEG, 10MIN*	20	%	
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	176.4	mm/hr	

PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	147.00	1.2	176.40	14.11	7.23	5.78	Critical duration (time of concentration) for the catchments is 10min
20	107.00	1.2	128.40	10.27	5.26	4.21	
30	89.00	1.2	106.80	8.54	4.38	3.50	
60	64.00	1.2	76.80	6.14	3.15	2.52	Pre-dev calculated on Intensity without CC factor
120	45.30	1.2	54.36	4.35	2.23	1.78	
360	24.90	1.2	29.88	2.39	1.22	0.98	
720	16.30	1.2	19.56	1.56	0.80	0.64	
1440	10.30	1.2	12.36	0.99	0.51	0.41	
2880	6.19	1.2	7.43	0.59	0.30	0.24	
4320	4.48	1.2	5.38	0.43	0.22	0.18	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	14.11	5.78	5.78	8.33	4998	Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min
20	0.00	10.27	4.21	5.78	4.49	5388	
30	0.00	8.54	3.50	5.78	2.76	4972	
60	0.00	6.14	2.52	5.78	0.36	1303	select largest required storage, regardless of duration, to avoid overflow for event of any duration
120	0.00	4.35	1.78	5.78	No Att. Req.	0	
360	0.00	2.39	0.98	5.78	No Att. Req.	0	
720	0.00	1.56	0.64	5.78	No Att. Req.	0	
1440	0.00	0.99	0.41	5.78	No Att. Req.	0	
2880	0.00	0.59	0.24	5.78	No Att. Req.	0	
4320	0.00	0.43	0.18	5.78	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT



SPECIFICATION		
TOTAL STORAGE REQUIRED	5.388 m ³	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66 m	No. of Tanks 2
TANK AREA, Atank	21.04 m ²	Area of TWO tanks
TANK MAX STORAGE VOLUME, Vtank	52604 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.26 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.41 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00578 m ³ /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.13 m	
AREA OF ORIFICE, Aorifice	5.88E-03 m ²	
ORIFICE DIAMETER, Dorifice	87 mm	
VELOCITY AT ORIFICE	2.24 m/s	At max. head level

Project Ref:	CO667M	STORMWATER DISPERSION PIPE/ TRENCH	
Project Address:	121 Redcliffe Road, Kerkira		
Design Case:	CONCEPT FUTURE LOT DEVELOPMENT		
Date:	29 July 2025	REV 1	DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH

DESIGN BASED ON REFERENCED DEVELOPMENT PLANS TO PROVIDE A MINIMUM LENGTH OF ABOVE OR BELOW GROUND STORMWATER TANK OVERFLOW DISCHARGE DISPERSION DEVICE. IN GENERAL ACCORDANCE WITH MODIFIED RATIONAL METHOD AND AUCKLAND COUNCIL TR2013/018.

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAIHAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m ²
126	0	0	0	0	0
125.5	1.5	15	15	0.75	11.25
TOTALS		15	15		11.25
SLOPE, Sc		0.100	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia. m	d/D	a, rad	P, m	A, m ²	R	1:S	n	V, m/s	Q, m ³ /s	Q, l/s	
0.1	0.000	6.283	0.0000	0.0000	0.000	10	0.009	0.000	0.0000	0.000	0 % full
0.100	0.050	5.381	0.0451	0.0001	0.003	10	0.0090	0.772	0.0001	0.113	
0.100	0.100	4.996	0.0644	0.0004	0.006	10	0.0090	1.205	0.0005	0.493	
0.100	0.150	4.682	0.0795	0.0007	0.009	10	0.0090	1.552	0.0011	1.147	
0.100	0.200	4.429	0.0927	0.0011	0.012	10	0.0090	1.848	0.0021	2.066	
0.100	0.250	4.189	0.1047	0.0015	0.015	10	0.0090	2.105	0.0032	3.232	
0.100	0.300	3.965	0.1159	0.0020	0.017	10	0.0090	2.332	0.0046	4.621	
0.100	0.350	3.751	0.1266	0.0024	0.019	10	0.0090	2.532	0.0062	6.204	
0.100	0.400	3.544	0.1369	0.0029	0.021	10	0.0090	2.710	0.0080	7.951	
0.100	0.450	3.342	0.1471	0.0034	0.023	10	0.0090	2.867	0.0098	9.828	
0.100	0.500	3.142	0.1571	0.0039	0.025	10	0.0090	3.004	0.0118	11.797	50 % full
0.100	0.550	2.941	0.1671	0.0044	0.026	10	0.0090	3.122	0.0138	13.819	
0.100	0.600	2.739	0.1772	0.0049	0.028	10	0.0090	3.222	0.0159	15.852	
0.100	0.650	2.532	0.1875	0.0054	0.029	10	0.0090	3.302	0.0178	17.847	
0.100	0.700	2.319	0.1982	0.0059	0.030	10	0.0090	3.364	0.0198	19.754	
0.100	0.750	2.094	0.2094	0.0063	0.030	10	0.0090	3.405	0.0215	21.515	
0.100	0.800	1.855	0.2214	0.0067	0.030	10	0.0090	3.424	0.0231	23.063	
0.100	0.850	1.591	0.2346	0.0071	0.030	10	0.0090	3.417	0.0243	24.313	
0.100	0.900	1.287	0.2498	0.0074	0.030	10	0.0090	3.378	0.0251	25.147	
0.100	0.950	0.902	0.2691	0.0077	0.029	10	0.0090	3.289	0.0254	25.352	
0.100	1.000	0.000	0.3142	0.0079	0.025	10	0.0090	3.004	0.0236	23.594	Flowing full

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1% AEP	14.11 l/s
MAXIMUM PIPE FLOW	25.35 l/s
SUFFICIENT CAPACITY IN PIPE	YES
LONGITUDINAL SLOPE	0.100 m/m
DESIGN VELOCITY, Dv	3.424 m/s

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15 m
MANNINGS PIPE ROUGHNESS	0.009
NUMBER OF ORIFICES	52 No.
DIA. OF ORIFICE, D	20 mm
ORIFICE INTERVALS, C/C	150 mm
DISPERSION PIPE LENGTH, L	7.65 m

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031 m ²		
FLOW OUT OF 1 ORIFICE	0.000272829 m ³ /s	0.27 l/s	
FLOW OUT OF ALL ORIFICES	0.01418713 m ³ /s	14.19 l/s	DESIGN OK
VELOCITY FROM SINGLE ORIFICE	0.87 m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.1 m		
BASE WIDTH = L	7.65 m		
FLOW AREA	0.77 m ²		
WEIR FLOW	0.01427 m ³ /s	14.27 l/s	DESIGN OK
WEIR VELOCITY	0.019 m/s		

INCOMING PIPE & SPREADER SUMMARY:

INCOMING PIPE DIAMETER, m	0.100 m
SPREADER PIPE DIAMETER, m	0.150 m
MANNINGS PIPE ROUGHNESS	0.009
NUMBER OF ORIFICES	52 No.
DIA. OF ORIFICE, D	20 mm
ORIFICE INTERVALS, C/C	150 mm
DISPERSION PIPE LENGTH, L	7.65 m

HRCS V4 Intensity-Duration-Frequency Results

Station: Custom Location
 Coordinate system: WGS84
 Longitude: 178.9655
 Latitude: -35.1871

DOF Mode Parameters: c d e f g h i

Values: 0.0020279 0.0299964 -0.0174506 -0.02936619 0.2544593 -0.0117361 3.2972625
 Example: Duration (hr) ARI (yr) Rainfall Rate (mm/hr)
 24 100 3.1785383 4.6001493 10.20507839

Rainfall Intensities (mm/hr) - Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	53.7	43.2	35.6	25.4	17.9	9.7	6.33	4.24	1.7	1.3	1.1
2	0.5	47.3	39.1	27.9	19.6	10.7	6.95	4.4	2.6	1.9	1.5	1.21
5	0.2	31.4	25.7	19.3	15.6	13.9	9.11	5.7	3.4	2.5	1.9	1.59
10	0.1	24.8	20.3	15.4	12.5	12.4	8.1	4.9	3.1	2.3	1.8	1.44
20	0.05	18.3	15.1	11.5	9.2	10.1	6.4	3.9	2.5	1.8	1.4	1.11
30	0.033	15.2	12.5	9.5	7.5	9.2	5.8	3.6	2.3	1.7	1.3	1.01
40	0.025	13.3	10.9	8.2	6.5	8.2	5.2	3.3	2.1	1.5	1.1	0.84
50	0.02	11.8	9.6	7.3	5.7	7.2	4.6	2.9	1.8	1.3	1.0	0.75
60	0.017	10.5	8.5	6.6	5.0	6.5	4.2	2.7	1.7	1.2	0.9	0.68
80	0.013	9.2	7.5	5.8	4.5	5.7	3.8	2.4	1.5	1.1	0.8	0.61
100	0.01	8.1	6.7	5.1	4.1	5.1	3.5	2.2	1.4	1.0	0.7	0.56
250	0.004	5.6	4.6	3.7	2.9	3.7	2.5	1.6	1.0	0.7	0.5	0.43

Intensity standard error (mm/hr) - Historical Data

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.6	5	3.5	2.4	1.7	1.1	0.75	0.6	0.4	0.3	0.2
2	0.5	8.3	5.3	3.8	2.6	1.9	1.2	0.82	0.7	0.4	0.3	0.2
5	0.2	12	7.4	5.5	3.7	2.7	1.7	1.1	0.8	0.4	0.3	0.2
10	0.1	15	9.7	7.3	4.9	3.5	2.2	1.4	0.9	0.5	0.4	0.3
20	0.05	18	13	9.5	6.4	4.6	2.9	1.8	1.0	0.6	0.5	0.39
30	0.033	21	15	11	7.6	5.4	3.4	2.1	1.2	0.7	0.6	0.43
40	0.025	23	17	13	8.5	6.1	3.8	2.3	1.3	0.7	0.6	0.48
50	0.02	25	18	14	9.3	6.6	4.2	2.5	1.4	0.8	0.6	0.48
60	0.017	27	19	15	10	7.1	4.5	2.7	1.6	0.9	0.6	0.5
80	0.013	29	21	16	11	7.8	5	2.9	1.7	1.0	0.6	0.54
100	0.01	30	22	16	12	8.2	5.5	3.1	1.9	1.1	0.7	0.57
250	0.004	43	32	25	17	12	7.9	4.7	2.6	1.5	1.1	0.8

Rainfall Intensities (mm/hr) - RCP2.6 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.9	46.2	38.1	27.2	19.1	10.1	6.63	4.1	2.4	1.8	1.4
2	0.5	70	50.7	41.9	29.9	21	11.3	7.3	4.5	2.7	1.9	1.5
5	0.2	91	66	54.6	39.1	27.4	14.8	9.6	6	3.6	2.6	2.164
10	0.1	106	77.3	63.9	45.8	32.2	17.4	11.3	7.1	4.2	3	2.4
20	0.05	122	88.8	73.5	52.7	37.1	20.1	13.1	8.2	4.9	3.5	2.7
30	0.033	131	95.6	79.1	56.8	40	21.7	14.1	8.8	5.3	3.8	3
40	0.025	138	100	83.2	59.7	42.1	22.9	14.9	9.3	5.5	4	3.1
50	0.02	143	104	86.5	62.1	43.7	23.8	15.5	9.7	5.8	4.2	3.2
60	0.017	147	107	88.9	63.9	45.1	24.5	15.9	10	5.9	4.3	3.4
80	0.013	154	112	93	66.9	47.2	25.7	16.7	10.6	6.2	4.5	3.5
100	0.01	159	116	96.1	69.2	48.8	26.6	17.3	11	6.5	4.7	3.7
250	0.004	180	131	109	78.4	55.4	30.2	19.7	12	7.4	5.3	4.2

Rainfall Intensities (mm/hr) - RCP4.5 for the period 2031-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	64.9	47	38.8	27.7	19.4	10.4	6.7	4.2	2.5	1.8	1.4
2	0.5	71.2	51.6	42.6	30.4	21.4	11.3	7.39	4.6	2.7	1.9	1.5
5	0.2	92.7	67.2	55.5	39.8	27.9	15	9.73	6	3.6	2.6	2.166
10	0.1	108	78.7	65.1	46.7	32.8	17.7	11.5	7.1	4.2	3	2.4
20	0.05	124	90.4	74.8	53.7	37.8	20.4	13.2	8.2	4.9	3.5	2.7
30	0.033	134	97.4	80.6	57.9	40.7	22	14.3	8.9	5.3	3.8	3
40	0.025	141	102	84.7	60.9	42.8	23.2	15.1	9.4	5.6	4	3.2
50	0.02	146	106	88	63.2	44.5	24.1	15.7	9.8	5.8	4.2	3.3
60	0.017	150	109	85.6	65.1	45.8	24.9	16.2	10	6	4.3	3.4
80	0.013	157	114	88.8	68.2	48	26.1	16.9	10.6	6.2	4.5	3.5
100	0.01	162	118	93	70.5	49.7	27	17.6	11	6.5	4.7	3.7
250	0.004	183	134	111	79.8	56.4	30.7	20	13	7.5	5.4	4.3

Rainfall Intensities (mm/hr) - RCP4.5 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	64.9	47	38.8	27.7	19.4	10.4	6.7	4.2	2.5	1.8	1.4
2	0.5	71.2	51.6	42.6	30.4	21.4	11.3	7.39	4.6	2.7	1.9	1.5
5	0.2	92.7	67.2	55.5	39.8	27.9	15	9.73	6	3.6	2.6	2.166
10	0.1	108	78.7	65.1	46.7	32.8	17.7	11.5	7.1	4.2	3	2.4
20	0.05	124	90.4	74.8	53.7	37.8	20.4	13.2	8.2	4.9	3.5	2.7
30	0.033	134	97.4	80.6	57.9	40.7	22	14.3	8.9	5.3	3.8	3
40	0.025	141	102	84.7	60.9	42.8	23.2	15.1	9.4	5.6	4	3.2
50	0.02	146	106	88	63.2	44.5	24.1	15.7	9.8	5.8	4.2	3.3
60	0.017	150	109	85.6	65.1	45.8	24.9	16.2	10	6	4.3	3.4
80	0.013	157	114	88.8	68.2	48	26.1	16.9	10.6	6.2	4.5	3.5
100	0.01	162	118	93	70.5	49.7	27	17.6	11	6.5	4.7	3.7
250	0.004	183	134	111	79.8	56.4	30.7	20	13	7.5	5.4	4.3

Rainfall Intensities (mm/hr) - RCP4.5 for the period 2031-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	68.3	49.4	40.8	29.1	20.3	10.8	6.94	4.3	2.5	1.8	1.4
2	0.5	75	54.3	44.8	32	22.4	11.9	7.67	4.7	2.8	2	1.6
5	0.2	97.8	72.9	58.6	42	29.7	14.9	10.1	6.3	3.7	2.7	2.1
10	0.1	114	83.1	68.8	49.3	34.6	18.5	11.9	7.4	4.4	3.1	2.5
20	0.05	131	95.5	79.1	56.7	39.8	21.4	13.8	8.5	5.1	3.6	2.8
30	0.033	142	103	85.2	61.2	43	23.1	14.9	9.2	5.9	4.2	3.2
40	0.025	149	108	89.6	64.3	45.2	24.4	15.7	9.7	5.8	4.2	3.266
50	0.02	154	112	93	66.9	47	25.3	16.4	10	6	4.3	3.4
60	0.017	159	116	96.8	68.9	48.4	26.1	16.9	10.6	6.2	4.5	3.5
80	0.013	166	121	100	71.1	50.7	27.3	17.7	11	6.5	4.7	3.6
100	0.01	172	125	104	74.6	52.5	28.3	18.3	11.6	6.8	4.9	3.7
250	0.004	194	141	117	84.5	59.5	32.2	20.9	13	7.7	5.6	4.4

Rainfall Intensities (mm/hr) - RCP6.0 for the period 2031-2050

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	64.5	46.7	38.5	27.5	19.2	10.3	6.67	4.2	2.5	1.8	1.4
2	0.5	70.8	51.2	42.3	30.2	21.2	11.4	7.35	4.6	2.7	1.9	1.5
5	0.2	92.7	67.2	55.5	39.5	27.7	14.9	9.68	6	3.6	2.6	2.165
10	0.1	108	78.1	64.6	46.3	32.6	17.6	11.4	7.1	4.2	3	2.4
20	0.05	123	89.7	74.3	53.3	37.5	20.3	13.2	8.2	4.9	3.5	2.8
30	0.033	133	96.6	80	57.5	40.4	21.9	14.2	8.9	5.3	3.8	3
40	0.025	140	102	84	60.4	42.5	23.1	15	9.4	5.6	4	3.2
50	0.02	145	106	87.3	62.8	44.2	24	15.6	9.7	5.8	4.2	3.269
60	0.017	149	109	89.9	64.6	45.5	24.7	16.1	10	6	4.3	3.4
80	0.013	156	113	94.1	67.2	47.7	25.9	16.8	10.6	6.2	4.5	3.5
100	0.01	161	117	97.2	69.9	49.5	26.8	17.5	11	6.5	4.7	3.6
250	0.004	182	133	110	79.2	56	30.5	19.9	12	7.4	5.4	4.3

Rainfall Intensities (mm/hr) - RCP6.0 for the period 2031-2100

ARI	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	71.2	51.5	42.5	30.4	21.4	11.3	7.35	4.6	2.7	1.9	1.5
2	0.5	78.3	56.7	46.8	33.5	23.4	12.4	7.92	4.9	2.9	2	1.6
5	0.2	102	74.2	61.3	43.9	30.7	16.3	10.5	6	3.8	2.7	2.1
10	0.1	120	87.1	72	51.6	35.6	19.3	12.4	7.6	4.5	3.2	2.5
20	0.05	138	100	82.9	59.5	41.7	22.3	14.3	8.8	5.2	3.7	2.9
30	0.033	148	108	89.4	64.2	45	24.1	15.5	9.5	5.6	4	3.2
40	0.025	156</										

HRDS V4 Depth-Duration-Frequency Results

Station: Custom Location
 Coordinate system: WGS84
 Longitude: 173.9635
 Latitude: -35.1871

DDF Model Parameters: c d e f g h i

Parameters:	c	d	e	f	g	h	i
Values:	0.00226277	0.5039964	-0.0174506	-0.00336619	0.25443563	-0.0117381	3.23726
Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)		
	24	100	3.1785583	4.60014923	247.1558935		

Rainfall depths (mm) - Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.94	14.4	17.8	17.8	25.4	35.8	58.2	75.9	95	113	128	138
2	0.5	10.9	15.8	19.5	19.5	27.9	39.2	63.9	81.4	104	125	145	145
5	0.2	14.1	20.5	25.4	25.4	36.3	51.1	83.6	109	137	164	178	186
10	0.1	16.5	23.9	29.7	29.7	42.5	60	98.2	129	161	193	210	219
20	0.05	18.9	27.4	34.1	34.1	48.9	69	113	145	186	224	243	251
30	0.033	20.3	28.5	36.7	36.7	52.7	74.4	122	160	201	242	262	275
40	0.025	21.3	31	38.5	38.5	55.4	78.2	129	169	212	255	277	290
50	0.02	22.1	32.2	40	40	57.5	81.2	134	175	221	265	288	301
60	0.017	22.8	33.1	41.2	41.2	59.2	83.7	138	181	228	272	297	310
80	0.013	23.8	34.6	43.1	43.1	61.9	87.6	144	189	239	287	311	326
100	0.01	24.6	35.8	44.5	44.5	64	90.6	149	196	247	297	323	338
250	0.004	27.7	40.4	50.3	50.3	72.5	103	170	223	282	339	369	387

Depth standard error (mm) - Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.3	1.7	1.8	1.8	2.5	3.5	6.6	9.3	14	18	21	22
2	0.5	1.4	1.8	2	2	2.7	3.8	7.3	10	16	20	23	24
5	0.2	2	2.5	2.9	2.9	3.9	5.4	10	14	22	27	31	33
10	0.1	2.5	3.3	3.9	3.9	5.2	7.1	13	18	26	33	38	40
20	0.05	3.2	4.2	5.1	5.1	6.8	9.5	17	23	31	39	45	47
30	0.033	3.6	4.6	5.6	5.6	7.5	11	20	27	34	43	49	51
40	0.025	4	5.5	6.8	6.8	9	13	22	30	37	46	53	55
50	0.02	4.3	5.9	7.4	7.4	9.8	14	24	32	39	48	56	58
60	0.017	4.6	6.4	8	8	11	15	26	35	41	50	58	60
80	0.013	5	7.1	8.9	8.9	12	17	29	39	44	54	62	64
100	0.01	5.4	7.6	9.7	9.7	13	19	31	42	46	56	65	67
250	0.004	7.3	11	14	14	18	27	44	60	57	70	80	83

Rainfall depths (mm) - RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	15.4	19.1	19.1	27.2	38.1	61.5	79.5	98.9	117	135	135
2	0.5	11.7	16.9	20.9	20.9	29.9	41.9	67.6	87.6	109	129	139	145
5	0.2	15.2	22	27.3	27.3	38.1	54.9	88.8	115	143	170	184	192
10	0.1	17.7	25.8	32	32	45.8	64.4	104	136	169	201	218	227
20	0.05	20.4	28.6	36.7	36.7	52.7	74.2	121	157	195	233	252	263
30	0.033	21.9	31.9	39.6	39.6	56.8	80	130	169	211	252	273	285
40	0.025	23	33.5	41.6	41.6	59.7	84.2	137	178	223	266	288	300
50	0.02	23.9	34.7	43.2	43.2	62.1	87.5	143	185	232	277	299	313
60	0.017	24.6	35.8	44.5	44.5	63.9	90.1	147	191	239	285	309	323
80	0.013	25.7	37.4	46.5	46.5	66.9	94.3	154	200	251	299	324	339
100	0.01	26.5	38.7	48.1	48.1	69.2	97.6	159	208	260	310	336	351
250	0.004	29.9	43.7	54.4	54.4	78.4	111	181	236	296	354	384	402

Rainfall depths (mm) - RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	15.4	19.1	19.1	27.2	38.1	61.5	79.5	98.9	117	135	135
2	0.5	11.7	16.9	20.9	20.9	29.9	41.9	67.6	87.6	109	129	139	145
5	0.2	15.2	22	27.3	27.3	38.1	54.9	88.8	115	143	170	184	192
10	0.1	17.7	25.8	32	32	45.8	64.4	104	136	169	201	218	227
20	0.05	20.4	28.6	36.7	36.7	52.7	74.2	121	157	195	233	252	263
30	0.033	21.9	31.9	39.6	39.6	56.8	80	130	169	211	252	273	285
40	0.025	23	33.5	41.6	41.6	59.7	84.2	137	178	223	266	288	300
50	0.02	23.9	34.7	43.2	43.2	62.1	87.5	143	185	232	277	299	313
60	0.017	24.6	35.8	44.5	44.5	63.9	90.1	147	191	239	285	309	323
80	0.013	25.7	37.4	46.5	46.5	66.9	94.3	154	200	251	299	324	339
100	0.01	26.5	38.7	48.1	48.1	69.2	97.6	159	208	260	310	336	351
250	0.004	29.9	43.7	54.4	54.4	78.4	111	181	236	296	354	384	402

Rainfall depths (mm) - RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.8	15.7	19.4	19.4	27.7	38.7	62.8	80.4	99.9	118	137	137
2	0.5	11.9	17.2	21.3	21.3	30.4	42.6	68.6	88.7	110	130	141	148
5	0.2	15.4	22.4	27.8	27.8	38.8	55.8	90.1	117	145	172	186	194
10	0.1	18.1	26.2	32.6	32.6	46.7	65.6	106	138	171	203	220	229
20	0.05	20.7	29.1	37.4	37.4	53.7	75.5	122	159	198	235	254	263
30	0.033	22.3	32.5	40.3	40.3	57.9	81.5	132	172	214	255	275	285
40	0.025	23.4	34.1	42.4	42.4	60.9	85.7	139	181	225	269	291	303
50	0.02	24.3	35.4	44	44	63.2	89	145	188	234	280	302	316
60	0.017	25.3	36.4	45.3	45.3	65.7	92.5	149	194	244	291	312	324
80	0.013	26.2	38.1	47.4	47.4	68.2	96.1	156	203	254	303	327	342
100	0.01	27	39.4	49	49	70.5	99.4	162	211	263	314	339	354
250	0.004	30.5	44.5	55.4	55.4	79.8	113	184	240	300	358	388	405

Rainfall depths (mm) - RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.4	16.5	20.4	20.4	29.1	40.6	64.9	83.3	103	121	130	135
2	0.5	12.5	18.1	22.4	22.4	32	44.8	71.5	92	114	134	144	150
5	0.2	16.3	23.6	29.3	29.3	42	58.8	94.2	121	150	177	191	199
10	0.1	19.1	27.7	34.4	34.4	49.3	69.1	111	143	177	210	226	241
20	0.05	21.9	31.8	39.5	39.5	56.7	79.7	128	166	205	243	262	273
30	0.033	23.9	34.9	43.2	43.2	60.9	86	139	179	222	263	284	296
40	0.025	24.8	36	44.8	44.8	64.3	90.4	146	189	234	277	299	312
50	0.02	25.7	37.4	46.5	46.5	66.9	94	152	196	243	291	311	325
60	0.017	26.5	38.5	47.9	47.9	68.9	96.9	157	203	251	298	322	335
80	0.013	27.7	40.3	50.1	50.1	71.4	104	164	212	263	318	337	351
100	0.01	28.6	41.7	51.8	51.8	74.6	108	170	220	273	324	350	364
250	0.004	32.3	47.1	58.6	58.6	84.5	119	193	250	311	370	400	417

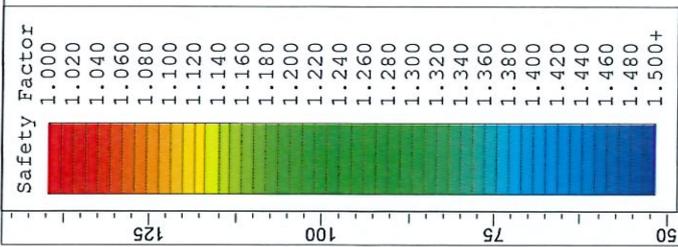
Rainfall depths (mm) - RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.7	15.6	19.3	19.3	27.5	38.5	61.9	80.1	99.5	118	137	137
2	0.5	11.8	17.1	21.1	21.1	30.2	42.3	68.2	88.2	109	130	140	146
5	0.2	15.2	22.2	27.6	27.6	38.6	55.4	85.6	116	144	171	185	193
10	0.1	17.9	26	32.3	32.3	46.3	65.1	105	137	170	203	219	228
20	0.05	20.6	29.9	37.1	37.1	53.3	75	122	158	197	235	253	261
30	0.033	22.1	32.2	40	40	57.5	80.9	131	171	213	254	274	286
40	0.025	23.3	33.8	42	42	60.4	85.1	138	180	224	267	287	300
50	0.02	24.1	35.1	43.7	43.7	62.8	88.4	144	187	233	278	301	315
60	0.017	24.8	36.2	45	45	64.6	91.1	148	193	241	287	311	325
80	0.013	26	37.8	47	47	67.6	95.4	155	202	252	301	325	341
100	0.01	26.8	38.7	48.1	48.1	69.9	98.7	161	209	260	310	334	350
250	0.004	30.3	44.2	55	55	79.2	112	183	239	298	357	386	404



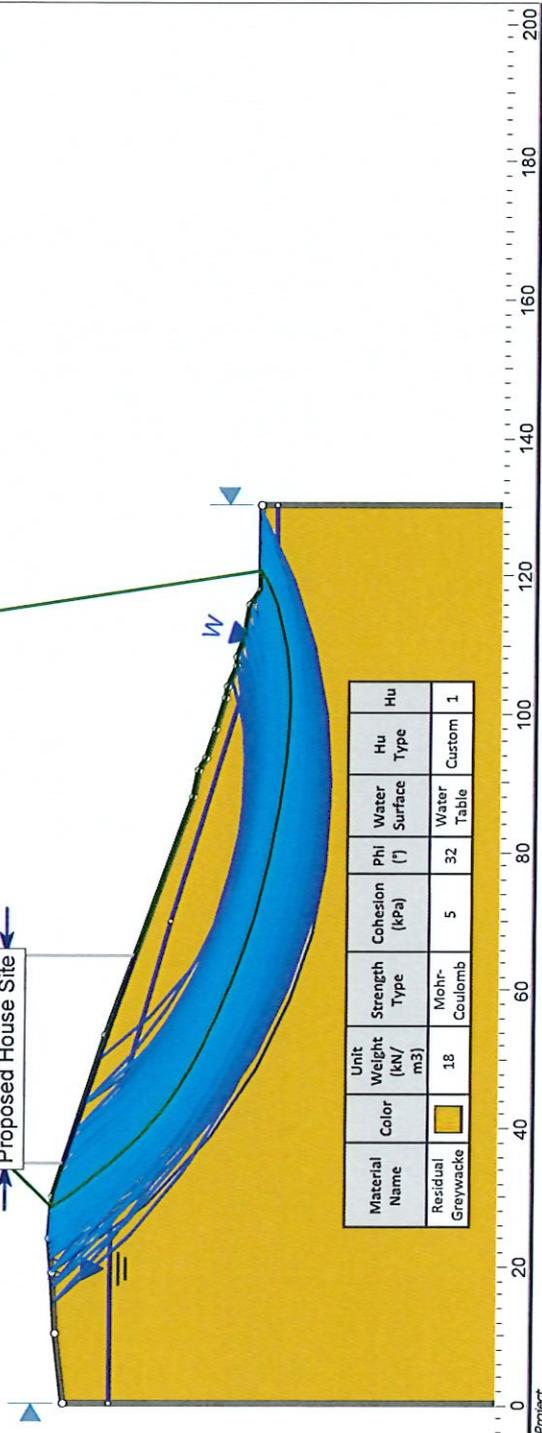
APPENDIX E

Slope Stability Analysis



1.385

Proposed House Site



Material Name	Residual	Color	Unit Weight (kN/m ³)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Hu Type	Hu
Residual Greywacke		Yellow	18	Mohr-Coulomb	5	32	Water Table	Custom	1



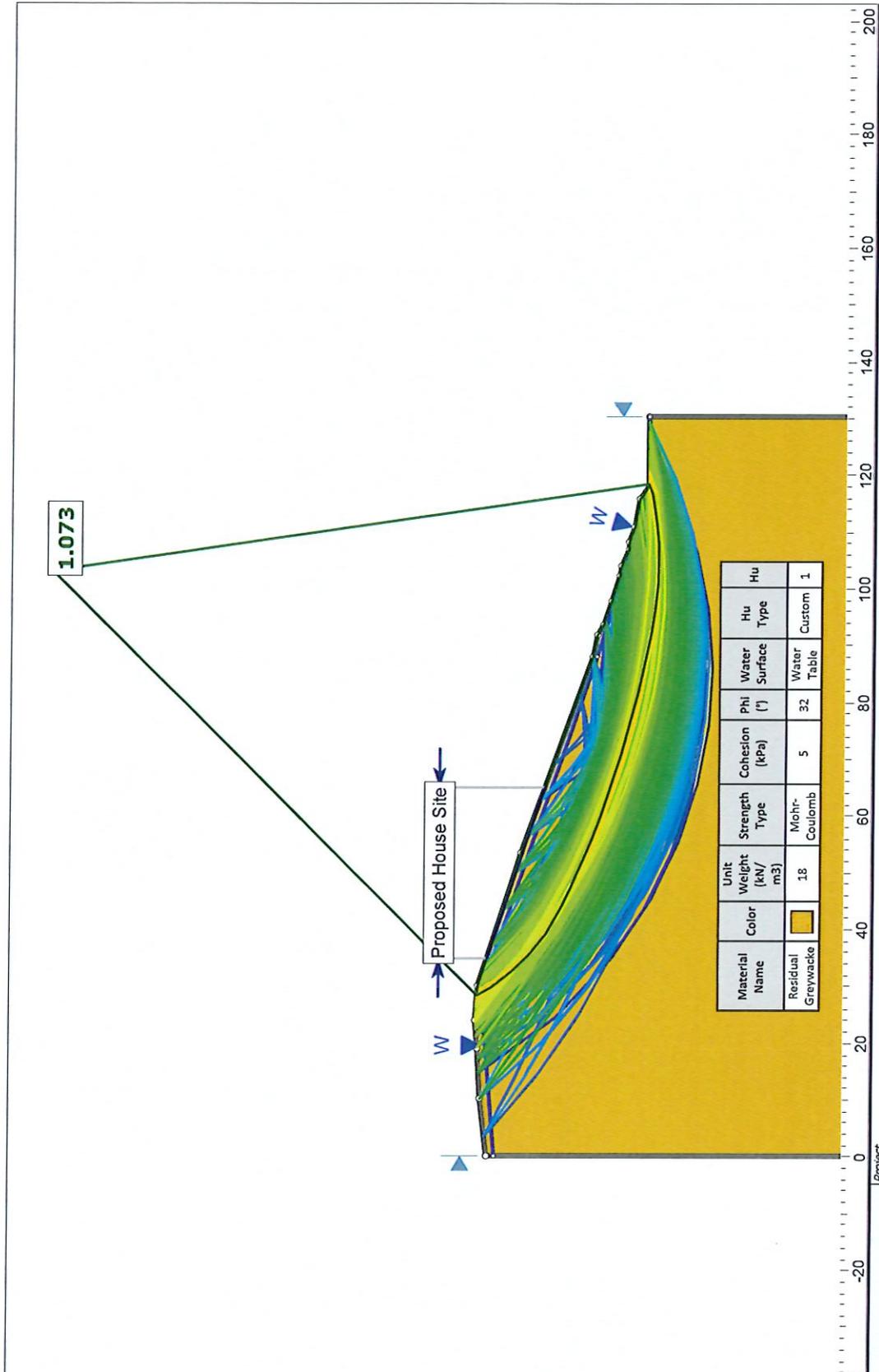
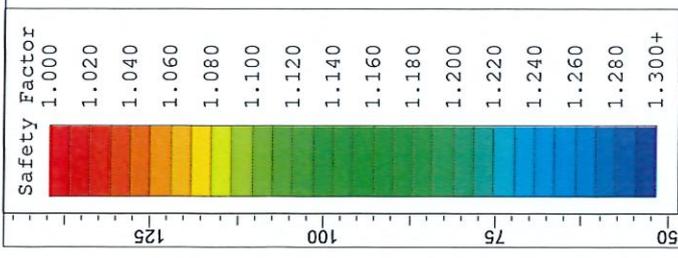
SUENTERPRET 9.03B

Project 121 Redcliffs Road, Kerikeri

Analysis Description Existing Condition Static

Drawn By EC **Scale** 1:1000 **Company** Geologix Consulting Engineers Ltd

Date 8/08/2025 **File Name** C0667N-Section A.sldm





geologix
consulting engineers

SLDENTERPRET 9.038

Project 121 Redcliffs Road, Kerikeri

Analysis Description Existing Condition Elevated GW

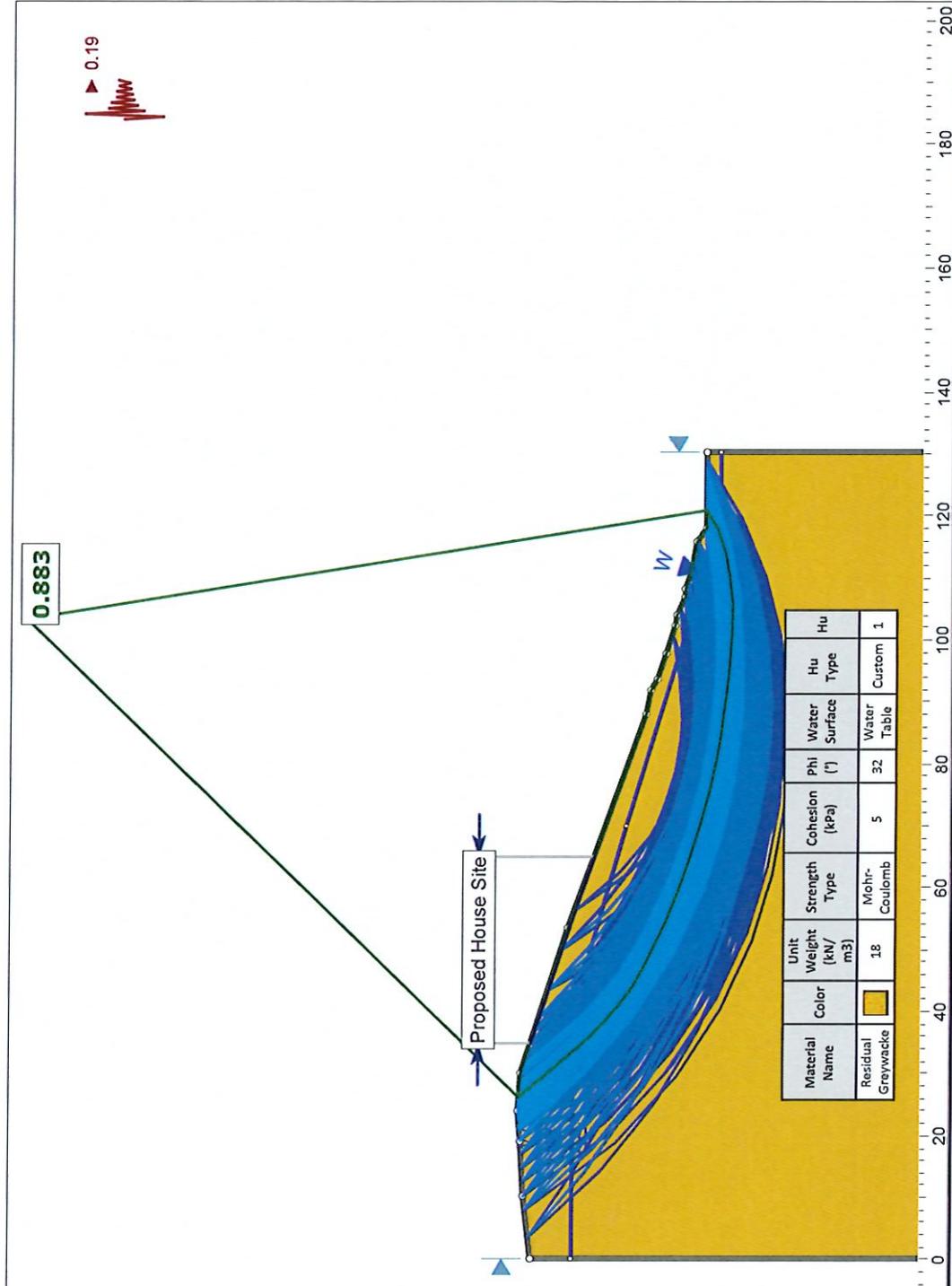
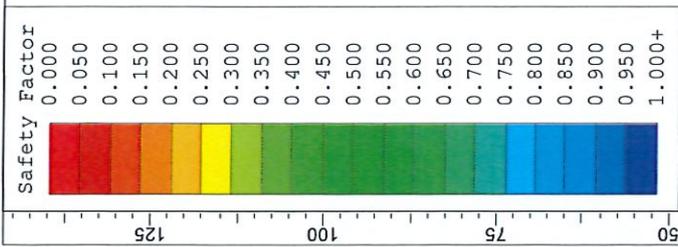
Drawn By EC

Date 8/08/2025

Scale 1:1000

Company Geologix Consulting Engineers Ltd

File Name C0667N-Section A.sldm



Material Name	Color	Unit Weight (kN/m ³)	Strength Type	Cohesion (kPa)	Phi (°)	Water Surface	Hu Type
Residual Greywacke		18	Mohr-Coulomb	5	32	Water Table	Custom 1

SLIDENTERPRET 9.038

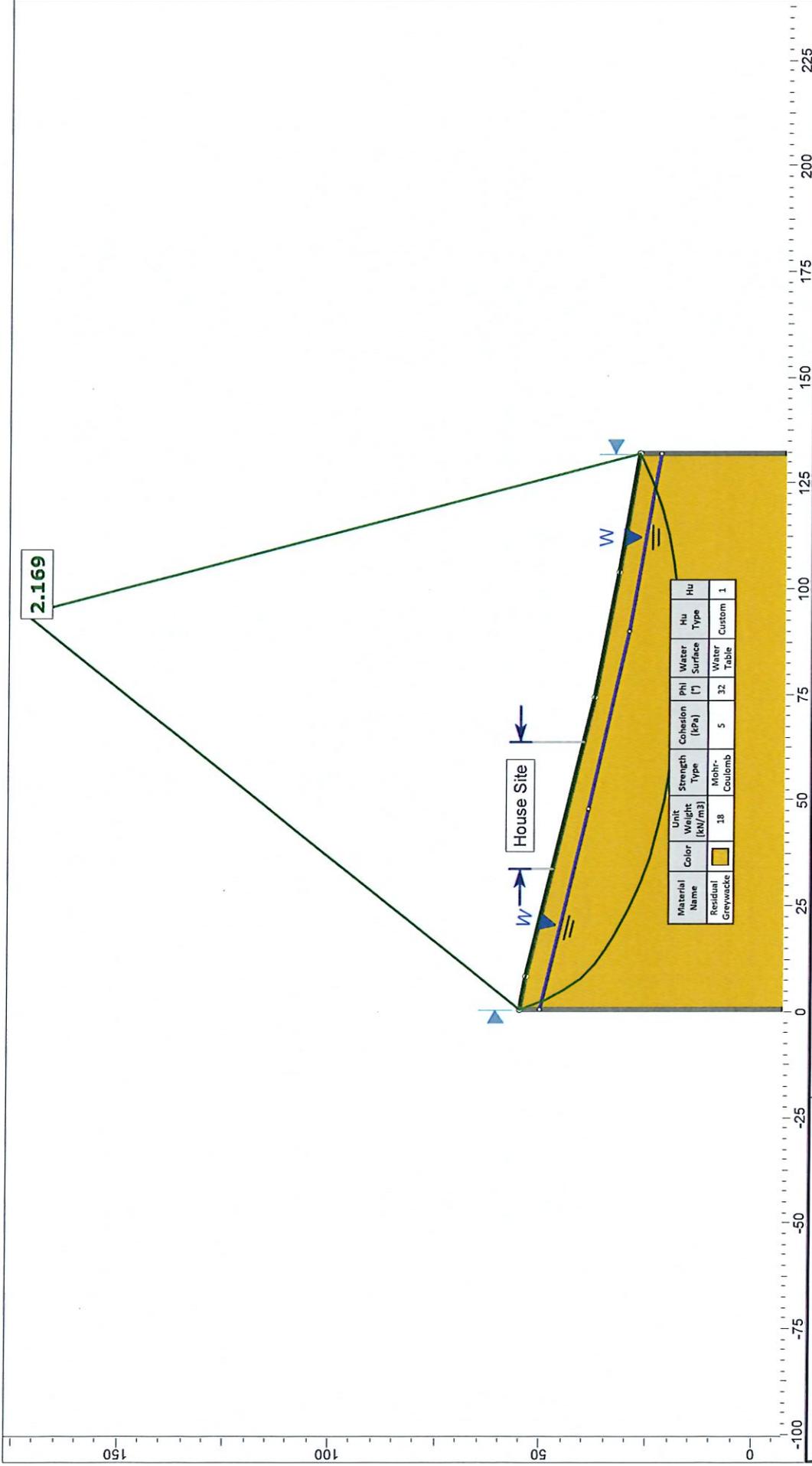
Project 121 Redcliffs Road, Kerikeri

Analysis Description Existing Condition Seismic

Drawn By EC **Scale** 1:1000 **Company** Geologix Consulting Engineers Ltd

Date 8/08/2025 **File Name** C0667N-Section A.sldm

2.169





SLIDERTERPRET 9.0.18

Project Slide2 - An Interactive Slope Stability Program

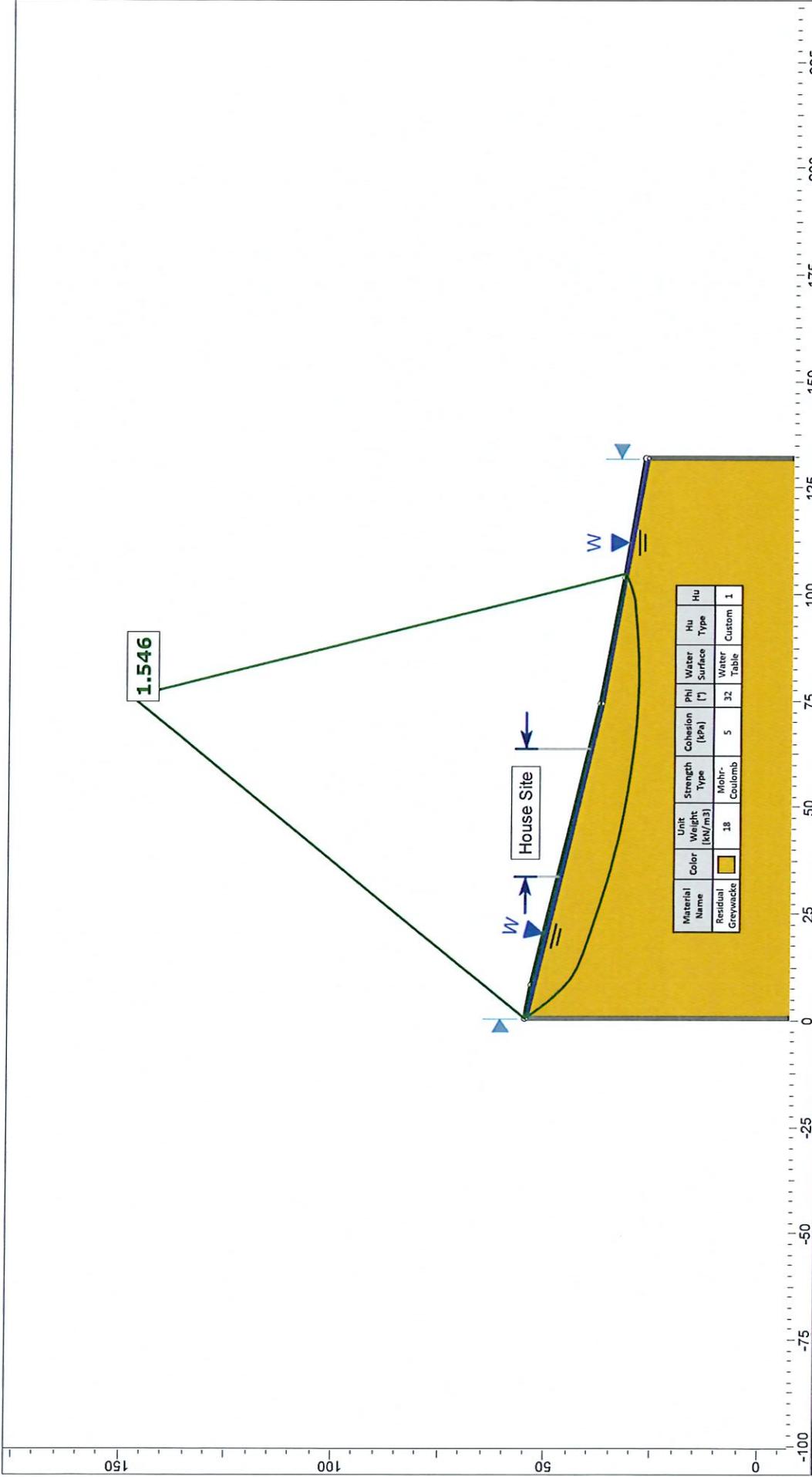
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Drawn By Company

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Scale 1:1250

File Name C0667N-Section B.slm



geologix
consulting engineers

SLIDENTERPRET 9.038

Project

Slide2 - An Interactive Slope Stability Program

Analysis Description

Group 1 Elevated GW

Drawn By

Company

Scale 1:1250

Date

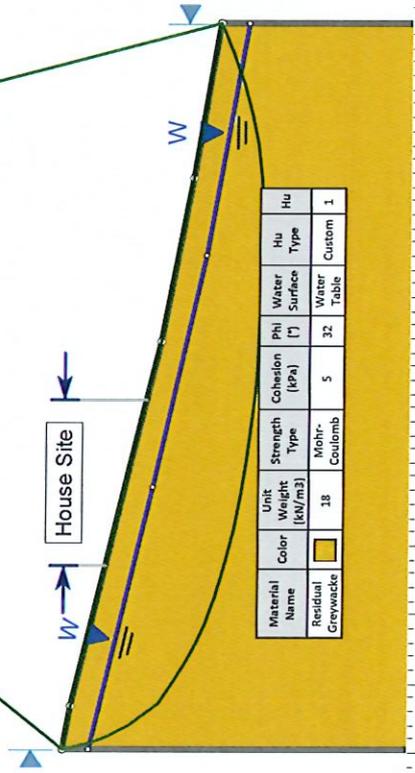
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C0667N-Section B.sldm

File Name



1.114



Material Name	Color	Unit Weight [kN/m ³]	Strength Type	Cohesion (kPa)	Phi [°]	Water Surface	Hu Type
Residual Greywacke		18	Mohr-Coulomb	5	32	Water Table	Custom 1



SLIDENTERPRET 9.D38

Project Slide2 - An Interactive Slope Stability Program

Analysis Description Group 1 Seismic

Drawn By Scale 1:1250 Company

Date 8/08/2025, 4:36:49 pm File Name C0667N-Section B.slm

