

Our Reference: 10760.1 (FNDC)

3 February 2026

Resource Consents Department  
Far North District Council  
JB Centre  
KERIKERI

Dear Sir/Madam

**RE: Proposed Subdivision at 235 Ness Road, Waipapa – J Hoult**

I am pleased to submit application on behalf of Jason Hoult, for a proposed subdivision to create one additional lot on a property at Ness Road, Waipapa, zoned Rural Production. The application is a discretionary activity.

The application fee of \$3,044 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):

- |   |   |
|---|---|
| <input type="radio"/> Land Use  | <input type="radio"/> Discharge                           |
| <input type="radio"/> Fast Track Land Use*  | <input type="radio"/> Change of Consent Notice (s.221(3)) |
| <input checked="" type="radio"/> Subdivision  | <input type="radio"/> Extension of time (s.125)           |
| <input type="radio"/> Consent under National Environmental Standard<br>(e.g. Assessing and Managing Contaminants in Soil) |   |
| <input type="radio"/> Other (please specify) _____  |   |

*\*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](mailto:tehonosupport@fndc.govt.nz)*

## 5. Applicant details

Name/s:

Jason Hoult

Email:

Phone number:

Postal address:

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

Have you been the subject of abatement notices, enforcement orders, infringement notices and/or convictions under the Resource Management Act 1991?  Yes  No

If yes, please provide details.


## 6. Address for correspondence

Name and address for service and correspondence (if using an Agent write their details here)

Name/s:

Lynley Newport

Email:

Phone number:

Postal address:

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

All correspondence will be sent by email in the first instance. Please advise us if you would prefer an alternative means of communication.

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## 7. Details of property owner/s and occupier/s

Name and Address of the owner/occupiers of the land to which this application relates (where there are multiple owners or occupiers please list on a separate sheet if required)

Name/s:

J D and V J Hoult

Property address/  
location:

as per item 5 above

Postcode 295

## 8. Application site details

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

Name/s:	J D and V J Hoult		
Site address/ location:	235 Ness Road		
	Waipapa		
	Postcode 295		
Legal description:	Lot 1 DP 493878	Val Number:	
Certificate of title:	721179		

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.

PLEASE PHONE _____
_____
_____

## 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 to create one additional lot in the Rural Production Zone, as a 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)

Jason Desmond Hoult

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)

Jason Desmond Hoult

**Signature:**

(signature of bill payer)

**Date** 02-Feb-2026

**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](http://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)

Jason Desmond Hoult

**Signature**

**Date** 02-Feb-2026

*A signature is not required if the application is made 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.

# Jason Hoult

## PROPOSED SUBDIVISION PURSUANT TO FNDC OPERATIVE DISTRICT PLAN

235 Ness Road, Waipapa

## PLANNER'S REPORT & ASSESSMENT OF ENVIRONMENTAL EFFECTS



Thomson Survey Ltd  
Kerikeri

### 1.0 INTRODUCTION

#### 1.1 The Proposal

The applicant proposes to subdivide their property to create two (one additional) lots of 4.34ha and 4.227ha, where the latter is the vacant additional lot. Access to the site is off Ness Road – a sealed Council road. Proposed Lot 1 with existing built development will retain its

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existing access arrangements, while new proposed Lot 2 will have its own (new) crossing off Ness Road, approximately 60m north of the existing house entrance.

No new easements are required. Existing easements, affecting Lot 1 only, will carry over onto that lot.

The proposed vacant lot will not have access to any Council 3 waters reticulated services and will be reliant on on-site water supply; wastewater treatment and disposal; and stormwater management. A Site Suitability Report supports this application.

A copy of the scheme plan(s) is attached in Appendix 1 and location map in Appendix 2.

## **1.2 Scope of this Report**

This assessment and report accompanies the Resource Consent Application made by the applicant, and is provided in accordance with Section 88 and Schedule 4 of the Resource Management Act 1991. The application seeks consent to subdivide an existing site to create one additional lot, as a discretionary activity.

The information provided in this assessment and report is considered commensurate with the scale and intensity of the activity for which consent is being sought. Applicant details are contained within the Application Form 9.

## **2.0 PROPERTY DETAILS**

Location: 235 Ness Road, Waipapa

Legal description & RT's: Lot 1 DP 493878; held in Record of Title 721179, copy attached in Appendix 3.

## **3.0 SITE DESCRIPTION**

### **3.1 Site Characteristics**

The site is zoned Rural Production in the Operative District Plan (ODP) and Horticulture in the Proposed District Plan (PDP). No resource features apply in either the ODP or PDP.

The site is located on the west side of Ness Road (20m legal Council road, sealed surface), near the end of that road.

The site is currently in grazing. The site is flat to rolling ground, with a more defined slope at the back of the property to the west. The property is bisected by a gully with water course, forming a physical break between two parts of one property, lending itself to being split into those two segments for future use.

There is an existing dwelling and ancillary buildings within proposed Lot 1 with driveway off Ness Road as well as a shared driveway down Lot 1's southern boundary. There is no other built environment. The property has fencing and stock water reticulation in place.



**Looking west from end of Lot 2's leg-in. The gully watercourse is visible before the remainder of land to be within new Lot 2 is across the watercourse and culminating at the mature trees.**



**Looking east across Lot 1's front paddock, towards Ness Road at tree line**

LUC maps show the property with two distinct LUC soil classes, LUC Class 3 on eastern portion, and LUC Class 4 on western portion (*Far North Maps, Soil layer*). The land is not erosion prone.

There are no features as mapped in the Regional Policy Statement for Northland, or the PDP, that affect the ability to subdivide or develop the property. The property lies within a large area notated as potentially having kiwi present. There are no areas of indigenous vegetation or habitat.

The Far North Maps' Historic Site layer does not show any heritage or cultural features present on the site.

### 3.2 Legal Interests

The property is subject to a water supply right in gross in favour of the Kerikeri Irrigation Company. This is shown A on the scheme plan in Appendix 1. This and existing easement B, will carry over onto Lot 1's new title.

The property is also subject to a privately imposed Land Covenant and subsequent variation.

Easements and instruments relevant to the subdivision form part of Appendix 3.

### 3.3 Consent History

The property file shows the following:

BC-2007-1174, issued in 2007 for the dwelling and garage;

RC-2160189-RMASUB, issued in 2015, creating the application site (by way of boundary adjustment subdivision).

## 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>	No other activities are part of the proposal. The application is for subdivision pursuant to the FNDC's ODP.
<i>(e) a description of any other resource consents required for the proposal to which the application relates:</i>	None are required.
<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 and 7 of this Planning Report.</p>
<p><i>(3) An application must also include any of the following that apply:</i></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 to section 5.</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>
<p><i>(4) An application for a subdivision consent must also include information that adequately defines the following:</i></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 6: Information required in assessment of environmental effects**

<p>(1) An assessment of the activity's effects on the environment must include the following information:</p>	
<p>(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:</p>	<p>Refer to Section 6 of this planning report. The activity will not result in any significant adverse effect on the environment.</p>
<p>(b) an assessment of the actual or potential effect on the environment of the activity:</p>	<p>Refer to Section 6 of this planning report.</p>
<p>(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:</p>	<p>Not applicable as the application does not involve hazardous installations.</p>
<p>(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:</p>	<p>The subdivision does not involve any discharge of contaminant.</p>
<p>(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:</p>	<p>Refer to Section 6 of this planning report.</p>
<p>(f) identification of the persons affected by the activity, any consultation undertaken, and any response to the views of any person consulted:</p>	<p>Refer to Section 8 of this planning report. No affected persons have been identified.</p>
<p>g) if the scale and significance of the</p>	<p>No monitoring is required as the scale and significance of the</p>

<i>activity's effects are such that monitoring is required, a description of how and by whom the effects will be monitored if the activity is approved:</i>	effects do not warrant it.
<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 site has no high or outstanding landscape or natural character 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. The subdivision has no effect on ecosystems or habitat.
<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. The site has no aesthetic, recreational, scientific, historical, spiritual or cultural values that I am aware of, that will be adversely affected by the act of subdividing.
<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 hazard. The proposal does not involve hazardous installations.

## 5.0 ACTIVITY STATUS

### 5.1 Operative District Plan

The site is zoned Rural Production and has no resource features.

**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. The minimum lot size is 12ha; or 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 <sup>2</sup> 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; Option 5. N/A as the proposal does not utilise remaining rights.	<b>1. The minimum lot size is 4ha;</b> or 2. A maximum of 3 lots in any subdivision, provided that the minimum lot size is 2,000m <sup>2</sup> 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. Option 4 N/A

The Title is younger than April 2000 and lots are 4ha in area or greater. The subdivision is therefore a **discretionary** subdivision activity.

Other Rules:

#### **Zone Rules:**

The proposal does not result in any breaches of Rural Production Zone rules. The land is vacant.

#### **District Wide Rules:**

Chapter 12.1 Landscapes and Natural Features does not apply as there is no landscape or natural feature overlay applying to the site.

*Subdivision*

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Chapter 12.2 Indigenous Flora and Fauna does not apply as no clearance of indigenous vegetation is proposed.

Chapter 12.3 Soils and Minerals does not apply/ is complied with. Only minor subdivision earthworks will be required for access, highly unlikely to breach the zone's permitted activity thresholds.

Chapter 12.4 Natural Hazards does not apply as the site is not subject to any coastal hazard as currently mapped in the Operative District Plan (the only hazards with rules). There are no areas of bush from which a 20m buffer is required.

Rules in Chapters 12.5, 5A and 5B Heritage do not apply as the site contains no heritage values or sites, no notable trees, no Sites of Cultural Significance to Maori and no registered archaeological sites. The site is not within any Heritage Precinct.

Chapter 12.7 Waterbodies: the watercourse within the gully is ephemeral. It is neither a river or a lake as defined in the ODP, therefore Rule 12.7.6.1.1 does not apply. Similarly Rule 12.7.6.1.2 does not apply because it is not a continually flowing 'smaller river', nor a wetland in excess of 1ha. Rule 12.7.6.1.4 has been considered and it is possible to achieve a minimum 30m setback for any on site wastewater system to be within Lot 2 (noting that such a system is able to be located outside of the 30m x 30m square building envelope specified in the Plan). It should be noted that the Subdivision Site Suitability Report accompanying the application confirms that Lot 2 can accommodate an on site wastewater system in compliance with the Regional Plan as well.

Chapter 12.8 Hazardous Substances does not apply as the activity being applied for is not a hazardous substances facility.

Chapter 12.9 does not apply as the activity does not involve renewable energy.

Chapter 14 Financial Contributions (esplanade reserve) is not relevant as there is no qualifying water body, no any lot of less than 4ha.

Chapter 15.1 Traffic, Parking and Access

Rules in Chapter 15.1.6A are not considered relevant to the proposal. This is because the traffic intensity rules apply to land use activities, not subdivisions. Similarly rules in Chapter 15.1.6B (parking requirements) also relate to proposed land use activities, not subdivisions. Notwithstanding this, no breaches of either traffic intensity, or parking, rules have been identified.

Chapter 15.1.6C (access) is the only part of Chapter 15.1 relevant to a subdivision. I have not identified any breaches. Ness Road is sealed council road, to the appropriate standard. Access to the additional lot can be formed to the required standard.

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In summary, I have not identified any land use breaches, and the subdivision remains a discretionary subdivision activity.

## 5.2 Proposed District Plan

The FNDC publicly notified its PDP on 27<sup>th</sup> July 2022. Whilst the majority of rules in the PDP will not have legal effect until such time as the FNDC publicly notifies its decisions on submissions, there are certain rules that have been identified in the PDP as having immediate legal effect and that may therefore need to be addressed in this application and 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. The only earthworks required to give effect to the subdivision is related to access. This can be carried out in compliance with the above referenced rules/standards.

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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**

### **6.1 Allotment Sizes and Dimensions**

The proposed lots are large, with one already developed and the other able to accommodate a 30m x 30m square building envelope. The proposed additional lot is considered suitable for residential development and pastoral (productive) land use.

The Subdivision Site Suitability Report (SSSR) in Appendix 4 confirms that the proposed additional lot is suitable for its intended use in regard to civil engineering matters.

### **6.2 Natural and Other Hazards**

The site is not mapped as being subject to any hazard. The SSSR contains a natural hazard assessment in its section 8. The only potential natural hazard affecting the site is overland flow paths, flooding and inundation. Potential effects during development can be mitigated by means of swales and check dams and by directing flows into ponds to reduce flow velocities and peak discharge, resulting in effects that are less than minor.

The site is not subject to any natural hazard associated with erosion; landslip; rockfall; alluvion; avulsion; unconsolidated fill; soil contamination; subsidence; fire hazard or sea level rise.

### **6.3 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 the proposed additional lot.

### **6.4 Energy Supply & Telecommunications**

Power and phone is not a requirement for rural subdivision. Council can impose a consent notice advising a future lot owner that the provision of power and telecoms to the lot boundaries was not a requirement of the subdivision and remains the responsibility of the lot owner.

### **6.5 Stormwater Disposal**

Refer to the SSSR in Appendix 4, specifically Section 6 of that report. This confirms that impermeable coverage on each lot will readily comply with the zone's permitted activity

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threshold, estimated future coverage at 4.24% for existing development to be within Lot 1, and 2.48% for the vacant additional lot. The report includes stormwater management concept for the proposed vacant lot and its access, along with consent stormwater attenuation. These concepts can be refined at building consent stage.

The proposed leg-in access to a building site within Lot 2 drains in two opposite directions. The eastern 150m<sup>2</sup> drains back to Ness Road, whilst the western 598m<sup>2</sup> drains towards the west. Attenuation of flow is proposed through swale or pond.

The Subdivision Site Suitability Report contains an assessment against the Regional Plan's Stormwater Rule C.6.4.2, showing no consent is required – refer to Appendix C, Table 14.

## **6.6 Sanitary Sewage Disposal**

Refer to Section 5 of the SSSR in Appendix 4. For the purposes of feasibility the report considered a five bedroom / 8 occupant scenario for the additional lot. The report verifies that onsite wastewater treatment to secondary aerated treatment level is possible on the lot in compliance with the Regional Plan's permitted standard, and also states that at time of building consent a primary treatment solution may also be considered for lot development.

The SSSR contains a Wastewater Assessment of Environmental Effects in its Appendix C, Table 13.

## **6.7 Easements for any purpose**

The property will remain subject to existing easements (including in gross) as shown on the scheme plan. No new easements are required - refer Appendix 1.

## **6.8 Property Access**

Access to Lot 1 on the scheme plan will remain as is. This has two crossings, both formed to standard. It is proposed to provide separate crossing and leg-in access to proposed Lot 2 approximately 60m north of the existing house's access. There is excellent visibility in both directions.

Internal to Lot 2, the formation of driveway will be the responsibility of a future lot owner. A legal width of 7.5m has been provided in order to readily accommodate a 3m metal carriageway driveway, or two metal strips, depending on what a future lot owner wishes to construct.

## **6.9 Earthworks**

Minor earthworks will be required at time of subdivision to construct a new crossing. This can readily meet requirements of both the ODP and PDP.

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## 6.10 Building Locations

The presence of the gully and watercourse within that gully, plus slope factor, results in some limitations as to where a future building might be located within new Lot 2. However, there remains a minimum 30m x 30m envelope within which to accommodate a building with no requirement for minimum floor level. It should also be noted that a future lot owner may choose to instead build across the gully, provided a suitable crossing is constructed. There are numerous potential house sites elsewhere on the site. The SSSR simply proves feasibility for a building on the east side of the gully. It does not suggest this is the only place a building can go.

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

### Vegetation, fauna and landscape

The site has no resource feature overlays. It contains no features mapped in the Regional Policy Statement (or PDP) as having any high or outstanding landscape or natural values and there are no mapped biodiversity wetlands. The site contains no areas of significant indigenous vegetation. The property is mapped as 'kiwi present'. The title is not subject to any restriction on the keeping of cats and dogs. I believe no restriction is necessary. An Advice Note can advise that any cats or dogs on the lots should be kept inside at night, or at most a consent notice condition applying to all lots saying the same thing could be applied.

### Heritage/Cultural

The site does not contain any historic sites, nor any archaeological sites. Neither does the site contain any Sites of Cultural Significance to Maori (as scheduled in the ODP or PDP).

## 6.12 Soil

The soils on the property are a mixture of LUC 4 and LUC 3. The proposed boundary between the lots is effectively also the boundary between these two LUC classes. The LUC 3 soils remain with Lot 1 and existing built development, with the LUC 4 soils in proposed Lot 2. In any event, low density grazing (the current use of the land), can continue on both lots. The proposal does not have more than minor effects on the life supporting capacity of soil.

## 6.13 Access to, and protection of, waterbodies

There is no qualifying water body along which, or around which, public access is required to be provided. Water quality will not be adversely impacted by the act of subdivision. On site wastewater treatment and disposal systems can be established in compliance with permitted activity standards in the Regional Plan.

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#### **6.14 Land use compatibility (reverse sensitivity)**

The proposal is consistent with rural character where residential living is interspersed with larger holdings. I do not believe this subdivision unduly increases any risk of reverse sensitivity effects arising.

#### **6.15 Proximity to Airports**

The site is outside of any identified buffer area associated with any airport.

#### **6.16 Natural Character of the Coastal Environment**

The site is not within the coastal environment.

#### **6.17 Energy Efficiency and renewable Energy Development/Use**

The proposal has not considered energy efficiency. This is an option for future lot owners

#### **6.18 National Grid Corridor**

The National Grid does not run through the application site.

#### **6.19 Effects on Rural Character and Amenity**

The lots are rural in nature/character. The size of the lots means that rural amenity will be maintained. In my opinion, the proposal will have no adverse effects on rural character.

#### **6.20 Cumulative and Precedent Effects**

##### Cumulative Effect:

The proposal will create one additional lot, easily able to internalise potential effects of any future built development. The proposal does not create an adverse cumulative effect.

##### Precedent Effect:

Precedent effects are a matter for consideration when a consent authority is considering whether or not to grant a consent. Determining whether there is an adverse precedent effect is, however, generally reserved for non complying activities, which this is not. In any event, the proposed subdivision does not set an adverse precedent effect and does not threaten the integrity of the ODP or those parts of the PDP with legal effect.

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## 7.0 STATUTORY ASSESSMENT

### 7.1 Operative District Plan Objectives and Policies

Objectives and policies relevant to this proposal are considered to be primarily those listed in Chapter 8.6 (Rural Production Zone); and 13 (Subdivision), of the District Plan. These are listed and discussed below where relevant to this proposal.

#### Subdivision Objectives & 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*

This is an enabling objective. The Rural Production Zone is predominantly, but not exclusively, a working productive rural zone. The site is currently 8.567ha in area and is utilised for grazing. It has not historically supported any horticulture crops, likely because of soil and climate limitations. The current grazing use can continue on the new lots, i.e. there is still grass available for grazing. The creation of 4ha rural lots, with frontage to Council maintained public road is considered a sustainable use of the land.

*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 Assessment of Environmental Effects and supporting report conclude that the proposed subdivision is appropriate for the site and that the subdivision can avoid, remedy or mitigate any potential adverse effects.

Objectives 13.3.3 and 13.3.4 refer to outstanding landscapes or natural features; and scheduled heritage resources; and to land in the coastal environment. The site exhibits none of these features.

*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.*

The additional lot will be required to be self sufficient in terms of on-site water storage and appropriate stormwater management. The supporting Site Suitability Report confirms this is achievable.

*13.3.6 To encourage innovative development and integrated management of effects between subdivision and land use which results in superior outcomes to more traditional forms of subdivision, use and development, for example the protection, enhancement and restoration of areas and features which have particular value or may have been compromised by past land management practices.*

Subdivision

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This objective is likely intended to encourage Management Plan applications, and does not have a lot of relevance to this proposal.

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

And related Policy

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

The site is not known to contain any sites of cultural significance to Maori, or wahi tapu. The subdivision will have minimal, if any, impact on water quality. I do not believe that the proposal adversely impacts on the ability of Maori to maintain their relationship with ancestral lands, water, sites, wahi tapu and other taonga.

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.

The provision of power is not a requirement for rural allotments.

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.

The subdivision has not considered energy efficiency, however, a future lot owner will be able to consider a building site with a northerly orientation and abundant access to sunlight. The subdivision has access off Council road.

Objective 13.3.11 is not discussed further as there is no National Grid on or near the subject site.

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.

Subdivision

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The values outlined above, where relevant to the proposal, have been discussed earlier in this report. I believe regard has been had to items (a) through (g) in the design of the subdivision.

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

*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 both lots is off Ness Road via separate entrances (existing and proposed). All crossings either are already, or will be, to Council standard. a shared private accessway. There will be minor works required to construct the new entrance. This will not entail any removal of indigenous vegetation and works can be subject to sediment control measures. On site wastewater treatment and disposal and stormwater management is achievable.

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

The site is not identified as being subject to any hazard that impacts on location of future built development.

*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.*

Power and telecommunications are not a requirement for rural allotments.

*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.*

The site does not contain any heritage resources. There are no areas of indigenous vegetation affected. The site is not in the coastal environment. The site contains no outstanding landscape or natural features.

Policy 13.4.7 is not relevant as there is no qualifying water body to which esplanade requirements apply.

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

This is discussed earlier. Each lot will require on-site water supply and storage.

Policies 13.4.9 and 13.4.10 are not discussed further. The former relates to bonus development donor and recipient areas, which are not contemplated in this proposal; whilst the latter only applies to subdivision in the Conservation Zone.

13.4.12 That more intensive, innovative development and subdivision which recognises specific site characteristics is provided for through the management plan rule where this will result in superior environmental outcomes.

The application is not lodged as a Management Plan application.

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**. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:

(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;

(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;

(c) providing for, through siting of buildings and development and design of subdivisions, legal public right of access to and use of the foreshore and any esplanade areas;

(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2 and in particular Section 2.5 and Council's "Tangata Whenua Values and Perspectives" (2004);

(e) providing planting of indigenous vegetation in a way that links existing habitats of indigenous fauna and provides the opportunity for the extension, enhancement or creation of habitats for indigenous fauna, including mechanisms to exclude pests;

(f) protecting historic heritage through the siting of buildings and development and design of subdivisions.

(g) achieving hydraulic neutrality and ensuring that natural hazards will not be exacerbated or induced through the siting and design of buildings and development.

S6 matters (National Importance) are addressed later in this report.

In addition:

(a) The proposal creates rural lots of 4ha or larger, and provides for an appropriate type and scale of activity for the zone;

(b) The proposal is in an area not displaying high or outstanding natural values;

(c) The site contains no significant indigenous vegetation;

(d) The site is not within the coastal environment;

(e) The proposal enables the maintenance of amenity and rural character values;

(f) The proposal is not believed to negatively impact on the relationship of Maori with their culture;

(g) There are no identified heritage values within the site; and

(h) The site is not subject to any natural hazards that would limit future development.

I consider the proposal to be consistent with Policy 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.

Subdivision

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The subdivision has had regard to the underlying zone's objectives and policies – see below.

13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following: (a) development of energy efficient buildings and structures; (b) reduced travel distances and private car usage; (c) encouragement of pedestrian and cycle use; (d) access to alternative transport facilities; (e) domestic or community renewable electricity generation and renewable energy use

The subdivision layout has taken the above matters into account.

Policy 13.4.16 is not considered relevant as it only relates to the National Grid.

In summary, I believe the proposal to be more consistent than not with the above Objectives and Policies.

Rural Production Zone Objectives and Policies

Objectives:

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

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.

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

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.

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.

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

And policies

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

Subdivision

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

8.6.4.3 That land management practices that avoid, remedy or mitigate adverse effects on natural and physical resources be encouraged.

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.

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.

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.

Objective 8.6.3.5 and Policy 8.6.4.6 are not considered relevant as they are solely related to Kerikeri Road.

The proposed subdivision promotes an efficient use and development of the land (Objective 8.6.3.2). Amenity values can be maintained (8.6.3.3). Reverse sensitivity effects are not considered to be a significant risk (Objectives 8.6.3.6-8.6.3.9 inclusive and Policies 8.6.4.8 and 8.6.4.9).

Policy 8.6.4.7 anticipates a wide range of activities that promote rural productivity, and the underlying goal is to avoid any actual and potential adverse effects of conflicting land use activities. I believe in the case of this proposal, given the site's location, and the existing and proposed land uses around it, that additional adverse reverse sensitivity effects are unlikely. The additional lot does not contain highly versatile soils.

The proposal provides for sustainable management of natural and physical resources (8.2.4.1). Off site effects can be avoided, remedied or mitigated (8.6.4.2 and 8.6.4.3). Amenity values can be maintained and enhanced (8.6.4.4). The proposal enables the efficient use and development of natural and physical resources (8.6.4.5).

In summary, I believe the proposal to be consistent with the objectives and policies as cited above.

## **7.2 Proposed District Plan Objectives and Policies**

An assessment against the relevant objectives and policies in the Subdivision section of the Proposed District Plan (PDP) follows:

Subdivision

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**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.

**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.

**SUB-O3** Infrastructure is planned to service the proposed subdivision and development where:

- a. there is existing infrastructure connection, infrastructure should be 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.

**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 water bodies

I consider the subdivision to achieve the objectives of the relevant zone, and district wide provisions. Local character is not affected; significant additional reverse sensitivity issues will not result; risk from natural hazards will not be increased. Adverse effects on the environment are considered to be less than minor and not requiring mitigation (SUB-O1).

The overall site contains an area of LUC Class 3 soils, meeting the definition of 'highly productive land'. However, the additional lot being created does not contain such soils, and at over 4ha in area will continue to be used for primary production use (grazing) except for a small area supporting a future residence. The site contains no ONF's or ONL's, nor any areas of high or outstanding natural character. There are no wetlands affected and no lakes or rivers, nor Sites and Areas of Significance to Maori and no Historic Heritage areas. There are no areas of significant indigenous vegetation (SUB-O2).

The proposal is consistent with SUB-O3 and SUB-O4 does not apply.

**SUB-P1**

Enable boundary adjustments that:

Not relevant – application is not a boundary adjustment.

**SUB-P2**

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

Not relevant – application does not involve public works, infrastructure, reserves or access lots.

**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 results in lots that are consistent with the Horticulture Zone discretionary minimum lot size even though the land has never been considered suitable for supporting productive horticultural use, likely because of poorer quality soils and climate factors. The allotments will be of a size that is consistent with the purpose, characteristics and qualities of the zone, where the expectation is for limited residential use on productive holdings (in this case grazing as opposed to horticulture crops). The lots can accommodate building platforms and 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 has had regard to all the matters listed, where relevant.

**SUB-P5**

Manage subdivision design and layout in the General Residential, Mixed Use and Settlement zone to provide for safe, connected and accessible environments by.....:

Not relevant. The site is not zoned any of the zones referred to.

**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 in accordance the purpose, characteristics and qualities of the zone.

The subdivision is rural with no nearby Council administered or operated infrastructure except for the road.

**SUB- P7**

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

No qualifying water body and no lot less than 4ha in area.

**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.

Not relevant. Site is not zoned Rural Production in the PDP.

**SUB-P9**

Avoid subdivision [sic] rural lifestyle subdivision in the Rural Production zone and Rural residential

Subdivision

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subdivision in the Rural Lifestyle zone unless the development achieves the environmental outcomes required in the management plan subdivision rule.

Not relevant as the site is not zoned Rural Production or Rural Lifestyle in the PDP.

**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 relevant. No minor residential units exist.

**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 resource consent under the PDP. Notwithstanding that, the subdivision has considered the above matters, where relevant.

In summary I believe the proposed subdivision to be consistent with the PDP's objectives and policies in regard to subdivision.

The site is zoned Horticulture in the Proposed District Plan.

**Objectives**

**HZ-O1**

The Horticulture zone is managed to ensure its long-term availability for horticultural activities and its longterm protection for the benefit of current and future generations.

**HZ-O2**

The Horticulture zone enables horticultural and ancillary activities, while managing adverse environmental effects on site.

**HZ-O3**

Land use and subdivision in the Horticulture zone:

- a. avoids land sterilisation that reduces the potential for highly productive land to be used for a horticulture activity;
- b. avoids land fragmentation that comprises the use of land for horticultural activities;
- c. avoids any reverse sensitivity effects that may constrain the effective and efficient operation of

Subdivision

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primary production activities;

- d. does not exacerbate any natural hazards;
- e. maintains the rural character and amenity of the zone;
- f. is able to be serviced by on-site infrastructure.

The site has not ever proven to be productive in terms of any horticultural crops. Notwithstanding this, at over 4ha in area, each lot is of sufficient area to enable residential living as well as some limited productive use (HZ-O1 and O2). Should a future lot owner wish to continue with grazing on the lots, they can. Should a future lot owner wish to pursue a horticultural activity they can, albeit there are limitations to this being a likely viable option. The subdivision does not exacerbate natural hazards, maintains the rural character and amenity of the zone and is able to be serviced by onsite infrastructure (HZ-O3).

**Policies**

**HZ-P1**

Identify a Horticulture zone in the Kerikeri/Waipapa area using the following criteria:

- a. presence of highly productive land suitable for horticultural use;
- b. access to a water source, such as an irrigation scheme or dam able to support horticultural use; and
- c. infrastructure available to support horticultural use.

This policy applies to the consent authority, not an individual property owner. Information is provided with this application that would suggest the Council has not necessarily been accurate or successful in its determination of the location of its Horticulture Zone.

**HZ-P2**

Avoid land use that: ....

Not relevant as the application is a subdivision, not a land use.

**HZ-P3**

Enable horticulture and associated ancillary activities that support the function of the Horticulture zone, where:

- a. adverse effects are contained on site to the extent practicable; and
- b. they are able to be serviced by onsite infrastructure.

Not relevant as the subdivision does not include a horticulture or associated ancillary activity.

**HZ-P4**

Ensure residential activities are designed and located to avoid, or otherwise mitigate, reverse sensitivity effects on horticulture activities, including adverse effects associated with dust, noise, spray drift and potable water collection.

The application does not include residential activities, but does provide for one more residential use on a new lot. This can be accommodated well inside any of its boundaries, creating minimal, if any, reverse sensitivity effects on production activities on adjacent land – primarily grazing.

**HZ-P5**

Manage the subdivision of land in the Horticulture zone to:

- a. avoid fragmentation that results in loss of highly productive land for use by horticulture and other farming activities;
- b. ensure the long-term viability of the highly productive land resource to undertake a range of horticulture uses;
- c. enable a suitable building platform for a future residential unit; and
- d. ensure there is provision of appropriate onsite infrastructure.

The lots are larger than the discretionary minimum lot size applying in the zone. The proposal does not fragment highly productive land. The proposal is consistent with parts (c) & (d).

**HZ-P6**

Encourage the amalgamation or boundary adjustments of Horticulture zoned land where this will help to make horticultural activities more viable on the land.

This is not considered a viable or practical alternative.

**HZ-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:

- a. whether the proposal will increase production potential in the zone;
- b. whether the activity relies on the productive nature of the soil;
- c. consistency with the scale and character of the rural environment;
- d. location, scale and design of buildings or structures;
- e. for subdivision or non-primary production activities:
  - i. scale and compatibility with rural activities;
  - ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;
  - iii. the potential for loss of highly productive land, land sterilisation or fragmentation
- f. at zone interfaces:
  - i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
  - ii. the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;
- g. the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;
- h. the adequacy of roading infrastructure to service the proposed activity;
- i. Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;
- j. 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 any consent under the PDP and the above policy is therefore of limited relevance. I consider the subdivision to maintain rural character and amenity and the lots are suitable for their intended use.

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**7.3 Part 2 Matters****5 Purpose**

- (1) *The purpose of this Act is to promote the sustainable management of natural and physical resources.*
- (2) *In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while—*
- (a) *sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
  - (b) *safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
  - (c) *avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The proposal provides for peoples' social and economic well being, and for their health and safety, while sustaining the potential of natural and physical resources, safeguarding the life-supporting capacity of air, water, soil and the ecosystems; and avoiding, remedying or mitigating adverse effects on the environment.

**6 Matters of national importance**

*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 recognise and provide for the following matters 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 Maori 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 does not exhibit the features listed above.

**7 Other matters**

*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 have particular regard to—*

- (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.

Regard has been had to any relevant parts of Section 7 of the RMA, "Other Matters". These include 7(b), (c), (d), (f) and (g). Proposed layout and lot size, along with appropriate waste water and stormwater management, will ensure the maintenance of amenity values and the quality of the environment. The proposal has had regard to the 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).*

The principles of the Treaty of Waitangi have been considered and it is believed that this proposed subdivision does not offend any of those principles.

In summary, it is considered that all matters under s5-8 inclusive have been adequately taken into account.

#### **7.4 National Policy Statement – Highly Productive Land**

The National Policy Statement for Highly Productive Land (NPS HPL) is relevant given that (a) the site is zoned Rural Production (under the ODP – the only plan with legal effect in regard to zoning); and (b) the application site is mapped as containing LUC 3 soils. On 15<sup>th</sup> January 2026, the NPS HPL was amended such that territorial authorities need not apply the NPS to a resource consent application for subdivision on LUC 3 land for any activity other than rural lifestyle. There is no definition of rural lifestyle. Primary production is defined as including grazing. The LUC 3 soils are all within proposed Lot 1 with existing residential development, and grazing. Vacant Lot 2 will also support grazing, i.e. both lots are capable of primary production use.

I am guided by the Council's current hearings process in regard to a Rural Lifestyle zone being proposed for the district, whereby the minimum lot size is proposed to be 2ha (staff recommendation following hearing of submissions). A lot in excess of 4ha, supporting grazing is not, therefore, rural lifestyle.

I consider that the Council need not apply the NPS in this instance. In any event, the LUC 3 soils are not fragmented or sterilised as a result of this subdivision.

## 7.5 Other National Policy Statements and National Environmental Standards

### NES Freshwater

Future development within the vacant lot can avoid any freshwater body.

### NES Assessing and Management Contaminants in Soil to Protect Human Health

To my knowledge the land has not historically supported any activity to which the NES CS applies.

### NPS Indigenous Biodiversity

The site contains minimal, if any, indigenous vegetation. No clearance is required. I consider the proposal is consistent with the NPS IB.

## 7.6 Regional Policy Statement

The Regional Policy Statement for Northland contains objectives and policies related to infrastructure and regional form and economic development. These are enabling in promoting sustainable management in a way that is attractive for business and investment. The proposal is consistent with these objectives and policies.

### **Objective 3.6 Economic activities – reverse sensitivity and sterilisation**

*The viability of land and activities important for Northland's economy is protected from the negative impacts of new subdivision, use and development, with particular emphasis on either:*

*(a) Reverse sensitivity for existing:*

*(i) Primary production activities; .....*

The associated Policy to the above Objective is **Policy 5.1.1 – Planned and coordinated development.**

*Subdivision, use and development should be located, designed and built in a planned and co-ordinated manner which: ....*

*(c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects; ...*

*(e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;*

*(f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and ...*

Policy 5.1.1 seeks to ensure that subdivision in a primary production zone does not “materially reduce the potential for soil-based primary production on land with highly versatile soils, or if

---

they do, the net public benefit exceeds the reduced potential for soil-based primary production activities”.

This has been discussed at length elsewhere in this planning report. The subdivision does not “materially reduce the potential for soil-based primary production on land with highly versatile soils”.

### **5.1.3 Policy – Avoiding the adverse effects of new use(s) and development**

Avoid the adverse effects, including reverse sensitivity effects of new subdivision, use and development, particularly residential development on the following:

(a) Primary production activities in primary production zones (including within the coastal marine area);.....

In regard to this subdivision, it is considered that no additional adverse reverse sensitivity issues are likely to arise as a result.

## **8.0 s95A-E 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. No such circumstances exist. Step 2 of s95A specifies the circumstances that preclude public notification. No such circumstance exists and Step 3 of s95A must be considered. This specifies that public notification is required in certain circumstances. No such circumstance exists. 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. None exist in this instance. Step 2 of s95B specifies the circumstances that preclude limited notification. No such circumstance exists and Step 3 of s95B must be considered. This specifies that certain other affected persons must be notified. The application is not for a boundary activity and the s95E assessment below concludes that there are no affected persons to be notified. There is no requirement to limited notify the application pursuant to Step 3.

### **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.

---

## 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 activity is a discretionary activity and within the expected outcomes of subdivision and development of the Rural Production Zone. Built development can occur within the proposed new lot in compliance with all bulk and location rules applying to the zone. The proposal does not unduly increase reverse sensitivity effects. No dispensation is being sought in terms of access standards and supporting reports indicate that development can occur on the lot with no off-site adverse effects. I have reached the conclusion that the proposal will not have any minor or more than minor effects on adjacent properties.

The site does not contain any heritage or cultural sites or values and no areas of significant indigenous vegetation. The site is not accessed off state highway. No pre lodgement consultation has been considered necessary with tangata whenua, Heritage NZ, Department of Conservation or Waka Kotahi / NZTA.

## 9.0 CONCLUSION

The site is considered suitable for the proposed subdivision. Effects on the wider environment are no more than minor. The proposal is not considered contrary to the relevant objectives and policies of the Operative and Proposed District Plans, and is considered to be consistent with relevant objectives and policies of National and Regional Policy Statements. Part 2 of the Resource Management Act has been had regard to. There is no District Plan rule or national environmental standard that requires the proposal to be publicly notified. No affected persons have been identified.

It is requested that the Council give favourable consideration to this application and grant consent.



Signed  
**Lynley Newport,**  
**Senior Planner**  
**Thomson Survey Ltd**

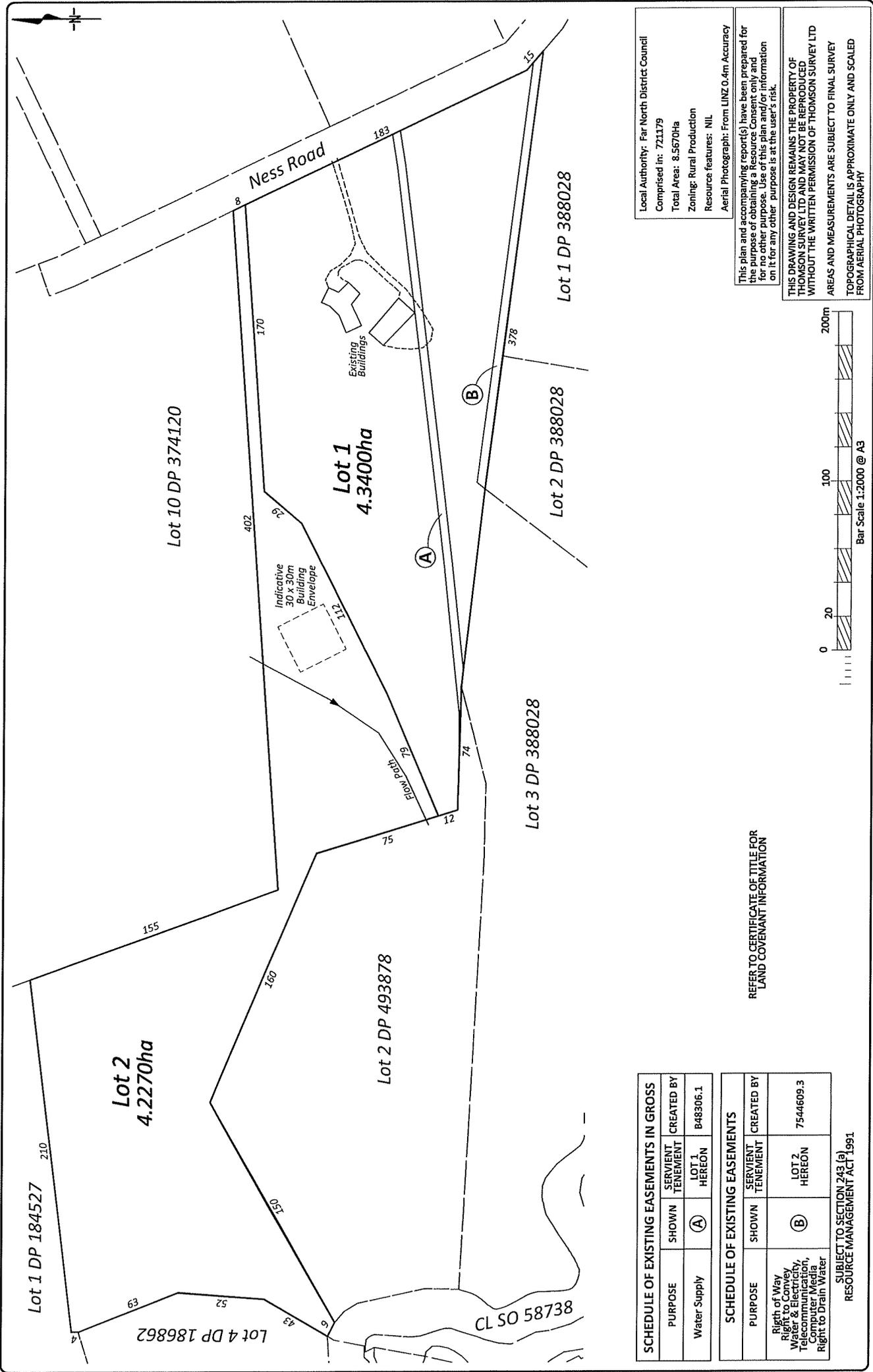
Dated 3<sup>rd</sup> February 2026

## **10.0 LIST OF APPENDICES**

- Appendix 1** Scheme Plan(s)
- Appendix 2** Location Plan
- Appendix 3** Records of Title & Relevant Instruments
- Appendix 4** Subdivision Site Suitability Report

## **Appendix 1**

Scheme Plan(s)



**SCHEDULE OF EXISTING EASEMENTS IN GROSS**

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
Water Supply	(A)	LOT 1 HERON	B48306.1

**SCHEDULE OF EXISTING EASEMENTS**

PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
Right of Way Right to Convey Right to Electricity, Telecommunications, Computer Media, Right to Drain Water	(B)	LOT 2 HERON	7544609.3

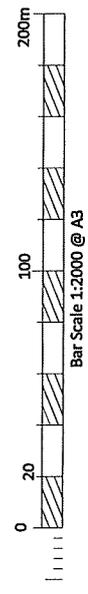
SUBJECT TO SECTION 243 (a)  
RESOURCE MANAGEMENT ACT 1981

REFER TO CERTIFICATE OF TITLE FOR  
LAND COVENANT INFORMATION

Local Authority: Far North District Council  
Complied in: 721179  
Total Area: 8.5670Ha  
Zoning: Rural Production  
Resource features: NIL  
Aerial Photograph: From LINZ 0.4m Accuracy

This plan and accompanying report(s) have been prepared for the purpose of obtaining a Resource Consent only and for other purposes. Use for any other purpose is at the user's risk.

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**THOMSON SURVEY LIMITED**  
REGISTERED SURVEYORS, PLANNERS & LAND DEVELOPMENT CONSULTANTS

315 Kerikeri Rd  
P.O. Box 372 Kerikeri  
Email: kerikeri@survey.co.nz  
Ph: (09) 4077560  
www.survey.co.nz

**Proposed Subdivision of Lot 1 DP 493878**  
235 Ness Road, Waipapa  
PREPARED FOR: J & V Hoult

Name	Date	ORIGINAL SHEET SIZE
Survey		A3
Design		
Drawn	EM 03.04.25	1:2000
Approved		
Rev	KY 10.12.25	

Surveyors Ref. No: **10760**



SCHEDULE OF EXISTING EASEMENTS IN GROSS			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
Water Supply	(A)	LOT 1 HEREON	B48306.1

SCHEDULE OF EXISTING EASEMENTS			
PURPOSE	SHOWN	SERVIENT TENEMENT	CREATED BY
Right of Way Right to Convey Water & Electricity, Telecommunication, Computer Media Right to Drain Water	(B)	LOT 2 HEREON	7544609.3

SUBJECT TO SECTION 243 (b) 1991  
RESOURCE MANAGEMENT ACT

REFER TO CERTIFICATE OF TITLE FOR  
LAND COVENANT INFORMATION

Local Authority: Far North District Council  
Comprised In: 721179  
Total Area: 8.5670Ha  
Zoning: Rural Production  
Resource Features: NIL  
Aerial Photograph: From LINZ 0.4m Accuracy

This plan and accompanying report(s) have been prepared for the purpose of providing information for the user's risk and for no other purpose. Use of this plan and/or information on it for any other purpose is at the user's risk.

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**THOMSON SURVEY LIMITED**  
REGISTERED SURVEYORS, PLANNERS & LAND DEVELOPMENT CONSULTANTS

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

## Proposed Subdivision of Lot 1 DP 493878

235 Ness Road, Waipapa  
PREPARED FOR: J & V Hoult

Survey	Name	Date	ORIGINAL SCALE	SHEET SIZE
Design	EM	08.04.25	1:2000	A3
Approved	KY	10.12.25		
Rev				

10760 Scheme 20251210

Surveyors Ref. No: **10760**

## **Appendix 2**

### Location Plan



## **Appendix 3**

Records of Title & Relevant Instruments



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



  
R. W. Muir  
Registrar-General  
of Land

**Identifier** 721179  
**Land Registration District** North Auckland  
**Date Issued** 14 March 2016

**Prior References**  
299164

---

**Estate** Fee Simple  
**Area** 8.5670 hectares more or less  
**Legal Description** Lot 1 Deposited Plan 493878

**Registered Owners**  
Jason Desmond Hoult and Virginia Jody Hoult

---

**Interests**

Subject to Section 8 Mining Act 1971

Subject to Section 168A Coal Mines Act 1925

Subject to a water supply right (in gross) over part marked B on DP 493878 in favour of Kerikeri Irrigation Company Limited created by Gazette Notice B483806.1 - 22.11.1985 at 10:27 am

Land Covenant in Transfer 7045195.7 - 26.9.2006 at 9:00 am

7536666.1 Variation of Land Covenant 7045195.7 - 11.9.2007 at 9:00 am

Subject to a right of way, a right to transmit electricity, telecommunications and computer media, a right to convey water and right to drain water over part marked C on DP 493878 created by Easement Instrument 7544609.3 - 18.9.2007 at 9:00 am

Appurtenant hereto are rights of way, rights to transmit electricity, telecommunications and computer media, rights to convey water and rights to drain sewage created by Easement Instrument 7544609.3 - 18.9.2007 at 9:00 am

The easements created by Easement Instrument 7544609.3 are subject to Section 243 (a) Resource Management Act 1991

Appurtenant hereto is a right to convey electricity created by Easement Instrument 10281019.5 - 19.1.2016 at 12:47 pm

Appurtenant hereto is a right to convey electricity created by Easement Instrument 10281019.7 - 19.1.2016 at 12:47 pm

12740672.1 Mortgage to ANZ Bank New Zealand Limited - 16.6.2023 at 3:50 pm



B483806.1 GN

Approvals  
 SCHEDULE OF EASEMENTS REQUIRED FOR  
 WATER SUPPLY PURPOSES.

SHOWN	DESCRIPTION	CT	AREA
(F)	PT. SEC 55 BLK XII KAEO S.D.	51 D   223	34.89 m <sup>2</sup>

THIS PLAN IS CONCURRENT WITH  
 SO's 59383, 59385, 59386

VI KERIKERI.  
 S.D.

1  
 DP 36440

SEE DIAGRAM 'B'

PT 2  
 DP 36440

APPROVED AS TO EASEMENT BOUNDARIES

FOR  
 DISTRICT COMMISSIONER OF WORKS.

Total Area 34.89 m<sup>2</sup>

Comprised in CT 51 D | 223 (PT)

I, Robert John Donaldson of Kerikeri registered surveyor and holder of an annual practising certificate for who may act as a registered surveyor pursuant to the proviso to section 33 (2) of the Surveyors Act 1966) hereby certify that this plan has been made from surveys executed by me or under my directions, and that both plan and survey are correct and have been made in accordance with the Survey Regulations 1972.

Dated at Kerikeri this 16<sup>th</sup> day of May 1985 Signature *R. J. Donaldson*

Field Book T620 p. 14-22 Traverse Book 1022 p. 167-169

Reference Plans

Examined *Malcolm Perry* Correct *M. L. L. L.*

Approved as to Survey

Chief Surveyor

Deposited this day of 19

District Land Registrar

File 1061 'D' 03/92  
 Received JUN 1985  
 Instructions

SO 59384

55 EB  
 03 EB  
 MENT

SEC 55

DP 36440

SUPPLY  
 MENT  
 vide)

(F)

SO 59385

XII KAEO

VI KERIKERI.

DIAGRAM 'B'  
 NOT TO SCALE

ER

LOCAL AUTHORITY BAY OF ISLANDS COUNTY  
 Surveyed by R. J. DONALDSON & ASSOC  
 Scale 1:2000 Date FEB 1985

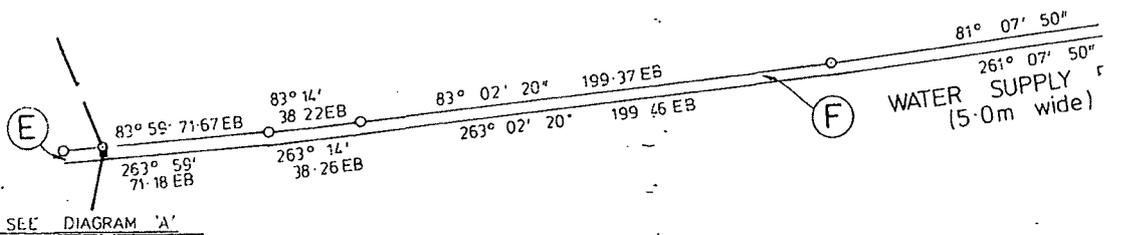
888 600 m N

XII KAEO S.D.

SEC 55  
CT 510 | 223  
J.B & J.A. VICKERS.

888 400 m N

PT SEC 66

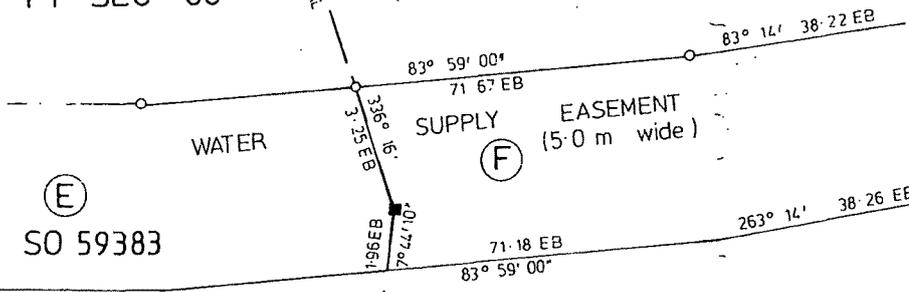


SEC DIAGRAM 'A'

888 200 m N

PT SEC 66

SEC 55



(E)

SO 59383

(F)

61° 07' 290'  
WA.  
E  
(5.0)

DIAGRAM 'A'

NOT TO SCALE

261° 291'

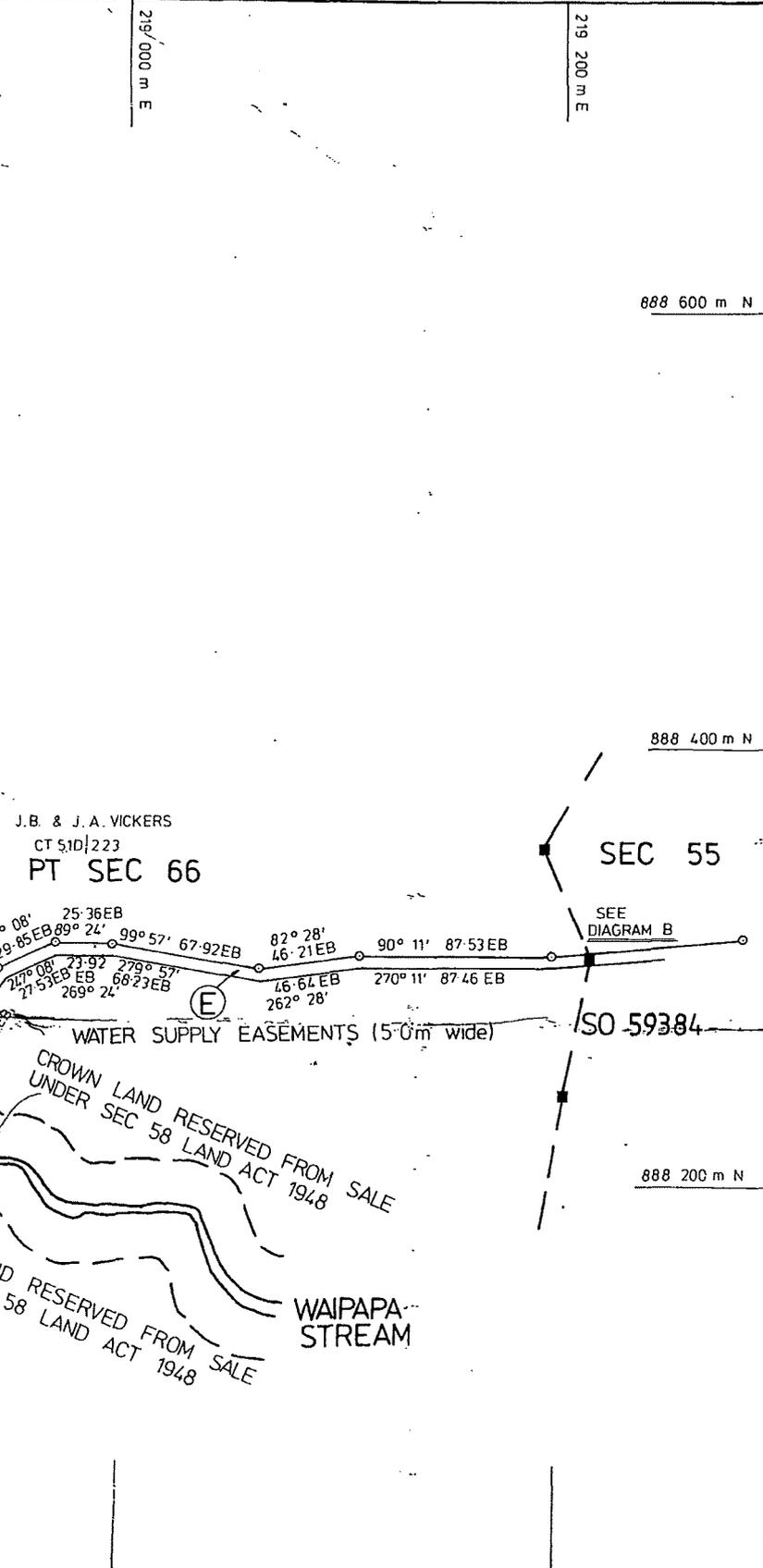
219.400 m E

219.600 m E

LAND DISTRICT NORTH AUCKLAND  
SURVEY BLK. & DIST. XII KAEO & VI KERIKERI  
NZMS SHEET N<sup>o</sup>.

EASEMENTS REQUIRED FOR W  
SUPPLY PURPOSES.





J.B. & J.A. VICKERS  
CT 51D|223  
PT SEC 66

SEC 55

WATER SUPPLY EASEMENTS (5.0m wide)  
CROWN LAND RESERVED FROM SALE UNDER SEC 58 LAND ACT 1948  
VD RESERVED FROM SALE 58 LAND ACT 1948  
WAIPAPA STREAM

Approvals.

**SCHEDULE OF EASEMENTS FOR WATER SUPPLY PURPOSES.**

SHOWN	DESCRIPTION	C.T.   GAZETTE	AREA
(A)	PT CROWN LAND RESERVED FROM SALE, SEC. 58 LAND ACT 1948		139m <sup>2</sup>
(B)			114 m <sup>2</sup>
(C)	PT SEC 66 BLK XII KAEŌ S.D.	CT 51D 223	75m <sup>2</sup>
(D)	PT CROWN LAND RESERVED FROM SALE SEC 58 LAND ACT 1948		231m <sup>2</sup>
(E)	PT SEC 66 BLK XII KAEŌ S.D.	CT 51D 223	1621 m <sup>2</sup>
(F)	PT WAIPAPA STREAM BED		11m <sup>2</sup>
			<b>2191m<sup>2</sup></b>

THIS PLAN IS CONCURRENT WITH  
SO 59384 - SO 59386

APPROVED AS TO EASEMENT BOUNDARIES

DISTRICT COMMISSIONER OF WORKS.

Total Area 2191m<sup>2</sup>

Comprised in CT 51D|223. (PT.)

*Robert John Donaldson* of Kerikeri, registered surveyor and holder of an annual practising certificate (or who may act as a registered surveyor pursuant to the proviso to section 33 (2) of the Surveyors Act 1966) hereby certify that this plan has been made from surveys executed by me or under my directions, and that both plan and survey are correct and have been made in accordance with the Survey Regulations 1972.  
Dated at Kerikeri this 16<sup>th</sup> day of May 1985 Signature *R.J. Donaldson*

Field Book 7620 p.14-22 Traverse Book 1022 p/167-169

Reference Plans

Examined *Malcolm Peary* Correct *M. Peary*

Approved as to Survey

Chief Surveyor

Deposited this ... day of ... 19 ...

District Land Registrar

File 1061 C 03/92  
Received 5 JUL 92  
Instructions

SO 59383

ER LOCAL AUTHORITY BAY OF ISLANDS COUNTY  
Surveyed by R. J. DONALDSON & ASSOC  
Scale 1:2000 Date FEB. 1985

216 800 m E

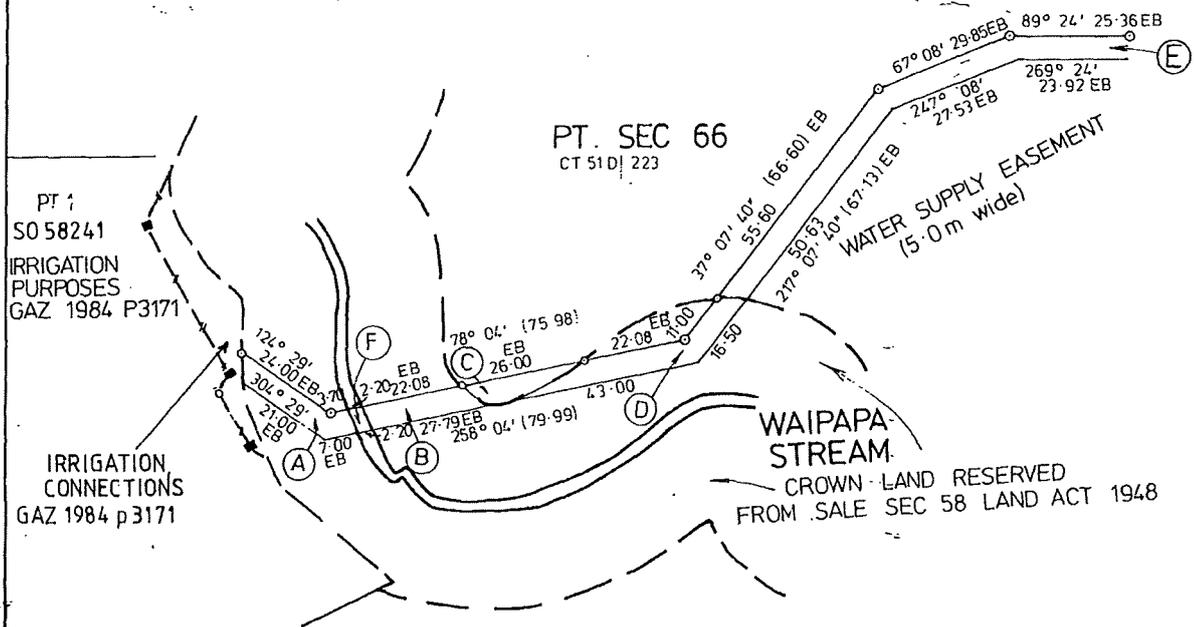
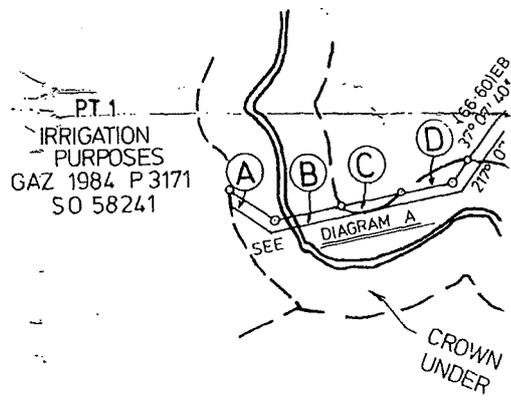
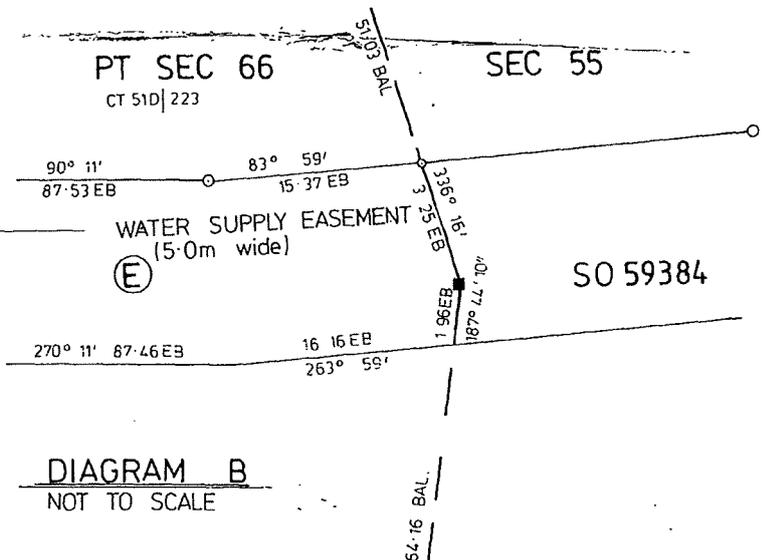


DIAGRAM A  
SCALE 1:1000



LAND DISTRICT NORTH AUCKLAND  
 SURVEY BLK. & DIST. XII KAE0  
 NZMS SHEET NO.

EASEMENTS REQUIRED FOR V  
 SUPPLY PURPOSES.



Extract from N.Z. Gazette, 3 October 1985, No. 185, page 4313

*Declaring a Water Supply Pipeline Easement, in Gross Acquired for Irrigation Purposes in Block XII, Kaeo Survey District, Bay of Islands County*

PURSUANT to section 20 of the Public Works Act 1981, the Minister of Works and Development declares that, an agreement between J. B. and J. A. Vickers, as registered proprietors, and the Crown dated the 23rd day of October 1984 and held in the office of the District Commissioner of Works at Auckland, having been entered into, a water supply pipeline easement in gross, over the land described in the Schedule hereto subject to the rights and imposing the conditions contained in the said agreement is hereby acquired for irrigation purposes and shall vest in the Crown on the 3rd day of October 1985.

SCHEDULE

NORTH AUCKLAND LAND DISTRICT

ALL those pieces of land described as follows:

Area m <sup>2</sup>	Being
3489	Part Section 55, Block XII, Kaeo Survey District; marked "F" on S.O. Plan 59384.
75	Part Section 66, Block XII, Kaeo Survey District; marked "C" on S.O. Plan 59383.
1621	Part Section 66, Block XII, Kaeo Survey District; marked "E" on S.O. Plan 59383.

As shown on the plans marked as above mentioned and lodged in the office of the Chief Surveyor at Auckland.

Dated at Wellington this 27th day of September 1985.

J. R. BATTERSBY,  
for Minister of Works and Development.

(P.W. 64/1/1/1: Ak. D.O. 50/12/52/6/1)

10/1

C.T. 51D/223

NOTED  
10/12/85  
g/w

RECORDED IN REGISTERED DEEDS

13

[10.27 22.NOV85 B 483806.]

PARTICULARS ENTERED IN REGISTER  
LAND REGISTRY AUCKLAND  
ASST. LAND REGISTRAR



51 D / 223



7

Approved by Registrar-General of Land under No. 2002/6055

**Easement instrument to grant easement or profit à prendre, or create land easement**  
Sections 90A and 90F, Land Transfer Act 1952

**EI 7544609.3 Easemen**

Cpy - 01/01, Pgs - 004, 17/09/07, 15:00



DocID: 312976263

Land registration district

North Auckland

Grantor

Surname(s) must be underlined.

DBH KERIKERI PROPERTIES LIMITED

Grantee

Surname(s) must be underlined.

DBH KERIKERI PROPERTIES LIMITED

Grant\* of easement or profit à prendre or creation or covenant

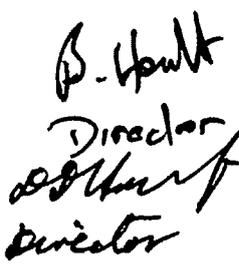
The Grantor, being the registered proprietor of the servient tenement(s) set out in Schedule A, grants to the Grantee (and, if so stated, in gross) the easement(s) or profit(s) à prendre set out in Schedule A, or creates the covenant(s) set out in Schedule A, with the rights and powers or provisions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

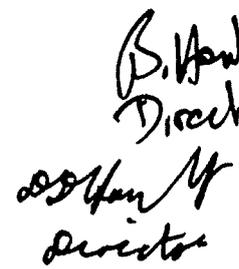
Dated this

day of

20 07

Attestation

 Director Director	Signed in my presence by the Grantor
	Signature of witness Witness to complete in BLOCK letters (unless legibly printed) Witness name Occupation Address
Signature [common seal] of Grantor	Address

 Director Director	Signed in my presence by the Grantee
	Signature of witness Witness to complete in BLOCK letters (unless legibly printed) Witness name Occupation Address
Signature [common seal] of Grantee	Address

Certified correct for the purposes of the Land Transfer Act 1952.

[Solicitor for] the Grantee

\*If the consent of any person is required for the grant, the specified consent form must be used

Approved by Registrar-General of Land under No. 2002/6055  
**Annexure Schedule 1**

Easement instrument

Dated

2007

Page

2

of

3

pages

**Schedule A**

(Continue in additional Annexure Schedule if required.)

Purpose (nature and extent) of easement, profit, or covenant	Shown (plan reference)	Servient tenement (Identifier/CT)	Dominant tenement (Identifier/CT or in gross)
A right of way, right to transmit electricity, telecommunications and computer media, A right to convey water, a right to drain water	<p>(A) and (H) on Deposited Plan 388028</p> <p>(B) on Deposited Plan 388028</p> <p>(C) on Deposited Plan 388028</p>	<p>Lot 2 on Deposited Plan 388028 CT 352339</p> <p>Lot 1 on Deposited Plan 388028 CT 352338</p> <p>Lot 21 on Deposited Plan 369948 CT 283796</p>	<p>Lot 3 on Deposited Plan 388028 CT 352340 and Lot 21 Deposited Plan 369948 CT 283796</p> <p>Lot 2 on Deposited Plan 388028 CT 352339</p> <p>Lot 3 on Deposited Plan 388028 CT 352340</p> <p>Lot 21 on Deposited Plan 369948 CT 283796</p> <p>Lots 1, 2 and 3 on Deposited Plan 388028 CT 352338, CT 352339 and CT 352340</p>

**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 specific classes of easement are those prescribed by the Land Transfer Regulations 2002 and/or the Ninth Schedule of the Property Law Act 1952.

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

~~[Memorandum number, registered under section 155A of the Land Transfer Act 1952].~~

~~[the provisions set out in Annexure Schedule 2].~~

**Covenant provisions**

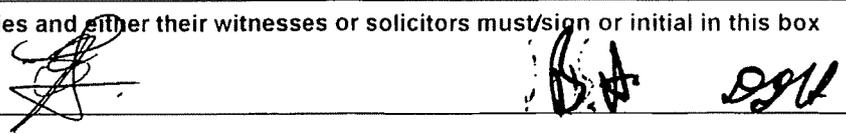
Delete phrases in [ ] and insert memorandum number as required.  
 Continue in additional Annexure Schedule if required.

The provisions applying to the specified covenants are those set out in:

~~[Memorandum number, registered under section 155A of the Land Transfer Act 1952]~~

~~[Annexure Schedule 2].~~

All signing parties and either their witnesses or solicitors must sign or initial in this box



**Annexure Schedule**

Insert type of instrument  
"Mortgage", "Transfer", "Lease" etc

Easement

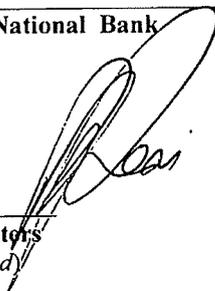
Dated 2007

Page 3 of 3 pages

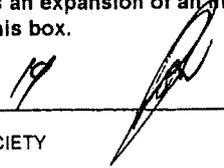
(Continue in additional Annexure Schedule, if required.)

**Continuation of "estate or interest"**

ANZ National Bank Limited the mortgagee under and by virtue of Mortgage 6713626.5 consents to the within written Easement Certificate.

<p>ANZ National Bank Limited by its Attorney</p> <p>KAPUA KATRINA GARDINER</p> <p></p> <p>Signature of Transferor</p>	<p>Signed in my presence by ANZ National Bank Limited as mortgagee</p> <p>Signature of Witness</p> <p></p> <p>Witness to complete in BLOCK letters (unless typewritten or legibly stamped)</p> <p>Witness name: <b>Witness: Pauline Ann Peri</b> Occupation: <b>Bank Officer</b> Address: <b>Auckland</b></p>
--	---

If this Annexure Schedule is used as an expansion of an instrument, all signing parties and either their witnesses or solicitors must sign or initial in this box.



**The ANZ National Bank Limited**

**CERTIFICATE OF NON-REVOCATION OF POWER OF ATTORNEY**

I, **KAPUA KATRINA GARDINER**, Manager Lending Services of Auckland in New Zealand, certify that:

1. By Deed dated 28 June 1996 deposited in the Land Registry Offices situated at:

Auckland	as No.	D.016180	Hokitika	as No.	105147
Blenheim	as No.	186002	Invercargill	as No.	242542.1
Christchurch	as No.	A.256503.1	Napier	as No.	644654.1
Dunedin	as No.	911369	Nelson	as No.	359781
Gisborne	as No.	G.210991	New Plymouth	as No.	433509
Hamilton	as No.	B.355185	Wellington	as No.	B.530013.1

The National Bank of New Zealand Limited appointed me its attorney with the powers and authorities specified in that Deed.

2. On 26 June 2004 The National Bank of New Zealand Limited was amalgamated with ANZ Banking Group (New Zealand) Limited to become ANZ National Bank Limited and the rights, powers and property covered by the Deed have become the rights, powers and property of ANZ National Bank Limited (as the amalgamated company) under Part XIII of the Companies Act 1993.
3. On 18 August 2006 Arawata Investments Limited and Philodendron Investments Limited (**Amalgamating Companies**) among other companies, amalgamated with ANZ National Bank Limited to become ANZ National Bank Limited. Accordingly, on that date ANZ National Bank Limited (as the amalgamated company) succeeded to all the property, rights, powers, privileges, liabilities and obligations of each of the Amalgamating Companies under Part XIII of the Companies Act 1993.
4. At the date of this certificate, I am a Manager Lending Services, Auckland Lending Services Centre of The National Bank of New Zealand, part of the ANZ National Bank Limited.
5. At the date of this certificate, I have not received any notice of the revocation of that appointment by the winding-up or dissolution of the ANZ National Bank Limited or otherwise.

**SIGNED** by the abovenamed )  
Attorney at Auckland on this )  
11<sup>th</sup> day of September 2007 )

  
KAPUA KATRINA GARDINER

## **Appendix 4**

### Subdivision Site Suitability Report



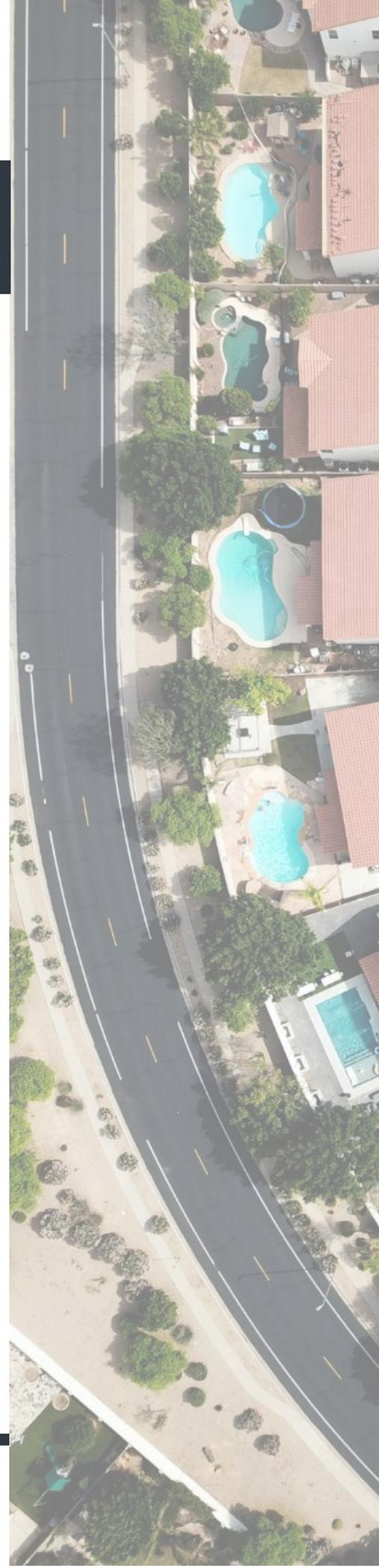
**geologix**  
consulting engineers

# SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

235 NESS ROAD, LOT 1 DP 493878

JASON HOULT

**C0662-S-01-R01**  
**JANURY 2026**  
**REVISION 2**



## DOCUMENT MANAGEMENT

<b>Document Title</b>	Subdivision Site Suitability Engineering Report
<b>Site Reference</b>	235 Ness Road, LOT 1 DP 493878
<b>Client</b>	Jason Houtt
<b>Geologix Reference</b>	C0661-S-01
<b>Issue Date</b>	January 2026
<b>Revision</b>	02
<b>Prepared</b>	Olivia Hext Chartered Professional Engineer, CPEng, CMEngNZ
<b>Reviewed</b>	Edward Collings Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
<b>File Reference</b>	<i>Z:\Geologix Files\Projects\C0600-C0699\C0662N - 235 Ness Road, Waipapa\06 - Reports\C0662N-S-01-R02.docx</i>

## REVISION HISTORY

Date	Issue	Prepared	Approved
September 2025	First Issue	OH	EC
January 2026	Second Issue – Revised Scheme Plan	EC	EC



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## 1 INTRODUCTION

This Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for Jason Hoult 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 the rural property (Lot 1 DP 493878) at 235 Ness Road, Waipapa, the 'site'. Specifically, this assessment addresses engineering elements of wastewater, stormwater, water supply requirements to provide safe and stable building platforms with less than minor effects on the environment as a result of the proposed activities outlined in Section 1.1.

Access to and within the site will be addressed by others, but an assessment of the stormwater runoff affects will consider this access.

### 1.1 Proposal

A proposed concept scheme plan was presented to Geologix at the time of writing, prepared Thomson Survey<sup>1</sup> and provided within Appendix A as a separate drawing. It is understood the Client proposes to subdivide the site to subdivide the existing property to create two new residential lots, one with the existing dwelling and access, and a second proposed lot. The above is outlined 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.

*Table 1: Summary of Proposed Scheme*

Proposed Lots	Size	Purpose
1	4.34 Ha	Existing Residential
2	4.227 Ha	New Residential

Site access will be provided from Ness Road at the existing access point for Lot 1, and at the northeastern corner, as a new access point for Lot 2. All access and internal roading is outside the scope of this report.

## 2 DESKTOP APPRAISAL

The site is located at 235 Ness Road. The existing property has a residential dwelling with adjacent farm use type structure, both with shared existing access from Ness Road. Topographically the site area located on flat and rolling ground, with a more defined slope at the back of the property to the west. The time of writing, we did not have a detailed survey model of the site.

The entire site area, except for existing structures is currently in pasture with rough grass and occasional vegetation.

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<sup>1</sup> Thomson Survey Ltd, Scheme Plan Ref. 10760, dated 10 December 2025.

A detailed review of existing watercourses and overland flow paths is presented as Section 3. In brief, the site is intersected by multiple small ditches, draining downslope to a main watercourse that runs from north to south, intersecting the property in two.

## 2.1 Existing Reticulated Networks

Far North District Council (FNDC) GIS mapping indicates that no existing 3 water infrastructure or reticulated networks are present within Ness Road or the site boundaries. This report has been prepared with the goal of the subdivision being self-sufficient for the purpose of wastewater, stormwater, and potable water management.

## 2.2 Geological Setting

Available geological mapping<sup>2</sup> indicates the site to be mainly underlain by Late Miocene to Pliocene-aged Kerikeri Volcanic Group soils of the Bay of Islands Volcanic Field, described as basalt lava, volcanic plugs and minor tuff.

# 3 SURFACE WATER FEATURES AND OVERLAND FLOWPATHS

During our site walkover and desktop appraisal of the supplied topographic data, Geologix have developed an understanding of the surface water features and overland flow paths influencing the site.

## 3.1 Surface Water Features

The site is split by a flow path that runs from north to south, with a number of other small flow paths feeding into this one from the site. The majority of the site flows directly to this flow path, either within the property or indirectly through the property to the south. The western portion of the site is somewhat cut-off from the eastern portion by this flow path and is a higher elevation also. The flow path continues to the south west, then joining the much larger flow path that is a tributary of Waipapa Stream.

There is a flood hazard identified at the downstream watercourse, approximately 150m from the south-western boundary, as can be seen from Figure 1. This hazard is identified as a Priority River Flood Hazard zone, for 10, 50 and 100yr extent.

---

<sup>2</sup> <https://data.gns.cri.nz/geology/>



Figure 1. NRC Natural Hazard Maps, 10, 50, 100yr Flood Extent

### 3.2 Sensitive Receptors

Based on GIS data, national topographic maps and site data provided at the time of writing there are no sensitive wetland receptors within or close to the site boundaries.

### 3.3 Overland Flow Paths

Clearly defined flow paths are present through and around the site. There is a main overland flow path that crosses the access to the site, west of the existing dwelling, that then travels north to south/southwest, crossing through the southern site boundary before heading southwest to join the main flow path, continuing south to join the Waipapa Stream. This OLFP can also be seen in Figure 1 above.

## 4 GROUND INVESTIGATION

A site-specific walkover survey and intrusive ground investigation was undertaken by Geologix on 1 August 2025 and for this revised scheme plan on 12 January 2026. The ground investigation was scoped to confirm the findings of the above information and to provide parameters for wastewater assessment. The ground investigation comprised:

- A total of four hand augered boreholes designated HA01 to HA04, inclusive formed within suitable areas of wastewater disposal fields with a target depth of 1.2 m below ground level (bgl). See Drawing No. 101 for location of the boreholes.

#### 4.1 Site Walkover Survey

A visual walkover survey of the property confirmed:

- Topography data supplied is in general accordance with that outlined in Section 2 and observed site conditions. Suitable building envelopes<sup>3</sup> can be formed on gently sloping to sloped land <18° on the new proposed lot. The site is bound in all directions by similar farming or rural lifestyle block properties.
- Ness Road also includes a well-formed and maintained grass swale, and the existing access has a culvert installed to maintain this conveyance.
- One main residential dwelling and an adjacent shed or farm structure, along with suitable access to Ness Road are present within the site boundary.
- Existing and well defined natural stormwater flow path is present on site, and was flowing during the site walkover. This also has a number of low lying areas adjacent to it, that whilst are not located within the mapped flood hazard, should be considered unsuitable for building.

#### 4.2 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 guidelines<sup>4</sup>. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 101 within Appendix A. Strata identified during the ground investigation can be summarised as follows:

- **Topsoil encountered to depths of 0.35 m bgl.** Described as generally dark brown organic silt, moist and of low plasticity.
- **Kerikeri Volcanic Group Residual Soils to depths >1.2 m bgl.** Exploratory holes recorded a consistent sequence of dark grey, reddish brown and brown clayey or sandy silt of low plasticity and moist becoming light orange, grey or white with depth. Due to the proximity to sensitive environments and considering the edge of potentially volcanic hill features, we have adopted a conservative soil category for this site.

A summary of the above strata horizons and wastewater properties is presented as Table 2.

*Table 2: Summary of Ground Investigation*

Hole ID	Proposed Lot	Hole Depth	Topsoil Depth	Groundwater	Wastewater Category
HA01	1	1.2 m	0.35 m	NE	6 – slow draining
HA02	1	1.2 m	0.35 m	NE	6 – slow draining
HA03	2	1.2 m	0.3 m	NE	6 – slow draining
HA04	2	1.2 m	0.2 m	NE	6 – slow draining

<sup>3</sup> Measuring 30 m x 30 m according to FNDC District Plan Rule 13.7.2.2.

<sup>4</sup> New Zealand Geotechnical Society, *Field Description of Soil and Rock*, 2005.

## 5 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprised a ground investigation to ascertain a lot-specific wastewater disposal classification for concept design of suitable systems for a 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.

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 people<sup>5</sup>. This considers the uncertainty of potential future Building Consent designs. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms or other similar spaces maybe considered a potential bedroom by the Consent Authority.

### 5.1 Existing Wastewater Systems

An existing wastewater system is present within proposed lot 1 and is entirely contained within the proposed lot boundary. The system appeared to be functioning adequately at the time of inspection.

### 5.2 Wastewater Generation Volume

In lieu of potable water infrastructure servicing the site, roof rainwater collection within on-lot tanks has been assumed for this assessment. The design water volume for roof water tank supply is estimated at 160 litres/ person/ day<sup>6</sup>. This assumes standard water saving fixtures<sup>7</sup> being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage.

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

### 5.3 Treatment 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.

It is recommended within the concept solution provided that to meet suitable minimum treated effluent output, secondary treatment systems are accounted for across the site. The concept solution is detailed further in the following sections.

---

<sup>5</sup> TP58 Table 6.1.

<sup>6</sup> TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.

<sup>7</sup> Low water consumption dishwashers and no garbage grinders.



In the Building Consent design phase, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required should specifically controlled zones such as the prescribed offsets of this report are encroached upon. Moreover, a primary treatment solution may also be considered for the Lot development, provided that the system complies with the proposed Northland Regional Plan. Specifically, controlling rules include:

- Rule C.6.1.3 (6), discharge of wastewater from primary systems is to slopes less than 10°.
- Rule C.6.1.3 (9.a), 100 % reserve disposal area where the wastewater has received primary treatment.
- Table 9, exclusion areas and setback distances for primary treated domestic type wastewater.

No specific treatment system design restrictions and manufacturers are currently in place. However, the developer will be required to specify the treatment system proposed at Building Consent.

#### 5.4 Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that 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 and covered with minimum 150 mm mulch and planted with specific evapotranspiration species with a minimum of 80 % species canopy cover or subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Site-won topsoil during development from building and/ or driveways footprints may be used in the area of land disposal systems to increase minimum thicknesses. Specific requirements of the land disposal system include the following which have been complied with for this report.

*Table 3: Disposal Field Design Criteria*

Design Criteria	Site Conditions
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies
On shallower slopes >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, all disposal fields sited on slopes <10 °.
On all terrain irrigation lines should be laid along contours.	Concept design complies
Disposal system situated no closer than 600 mm (vertically) from the winter groundwater table (secondary treated effluent).	Concept design complies
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

#### 5.4.1 Soil Loading Rate

Based on the results of the ground investigation, conservatively the shallow soils are inferred to meet the drainage characteristics of TP58 Category 6. This transposes to NZS1547 Category 5. For a PCDI system, a soil loading rate of 3 mm/ day is recommended within NZS1547 Table 5.2 and TP58 Table 9.2.

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 (TP58 Table 9.2, note 3) to adopt 3mm/day SLR.

The proposed concept design adopts 3.0mm /day SLR, utilising a 50% reserve disposal field area.

#### 5.4.2 Disposal Areas

The sizing of wastewater system disposal areas is a function of soil drainage, the loading rate and topographic relief. For each proposed lot a primary and reserve disposal field is required as follows. The recommendations below are presented on Drawing No. 101.

- **Primary Disposal Field.** A minimum PCDI primary disposal field of 427 m<sup>2</sup> laid parallel to the natural contours.
- **Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or tertiary treatment systems. This concept design allows additional capacity with a 214 m<sup>2</sup> reserve disposal area to be laid parallel to the natural contours.

Topography at the proposed wastewater disposal fields has been measured as ranging from gentle sloping to a maximum of 12 °. Surface water cut-off drains are not considered necessary to meet the provisions of NRP rule C.6.1.3 as the slope shallows to a maximum of 8°. In addition, no Discharge Consent is required. These requirements should be reviewed at the Building Consent stage.

### 5.5 Summary of Concept Wastewater Design

Based on the above design assumptions a concept wastewater design is presented as Table 4 and presented schematically upon Drawing No. 101. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans.

Table 4: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Design generation volume	160 litres/ person/ day
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder <sup>1</sup>
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 6, NZS1547 Category 5
Soil Loading Rate	3 mm/ day
Primary disposal field	Surface/ subsurface laid PCDI, min. 427 m <sup>2</sup>
Reserve disposal field	Surface/ subsurface laid PCDI, min. 50 % or 214 m <sup>2</sup>
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Cut off drains not required. Stormwater management discharges downslope of all disposal fields.

1. Unless further water saving measures are included.

## 5.6 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.

The scale of final development is unknown at the time of writing and building areas, impervious areas including driveways, ancillary buildings, landscaped gardens, and swimming pools may reduce the overall area for on-site wastewater disposal. For the purpose of this report the above features are likely to be included within a designated 30 x 30 m square building site area as required by FNDC District Plan Rule 13.7.2.2.

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, ground investigation, walkover inspection and Drawing No. 101, 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

Considering the nature of rural subdivision and residential development, increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as roads or future on-lot buildings and driveways.

### 6.1 Impervious Surfaces and Activity Status

A summary of the impervious areas of the proposed lots is provided as Table 5 below which has been developed from our observations and the provided Scheme Plan. For the proposed

lots, this has been taken as conceptual maximum probable development of typical rural residential scenarios.

The activity status reflected in Table 5 is with respect to Operative FNDC Plan Section 8.6.5.1.3 only. Considering this, all proposed lots, Lot 1, and Lot 2 are considered **Permitted Activity**.

Table 5. Site Areas, Pervious and Impervious with Activity Status

Surface	Proposed Lot 1		Proposed Lot 2	
<b>Existing Condition</b>	<b>(85,670m<sup>2</sup>)</b>			
Roof	778 m <sup>2</sup>	0.91 %	0 m <sup>2</sup>	0 %
Driveway + Parking	1,060 m <sup>2</sup>	1.24 %	0 m <sup>2</sup>	0 %
Right of Way	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %
Total impervious	1,838 m <sup>2</sup>	2.15 %	0m <sup>2</sup>	0 %
<b>Proposed Condition</b>	<b>(43,400m<sup>2</sup>)</b>		<b>(42,270 m<sup>2</sup>)</b>	
Roof	778 m <sup>2</sup> (Existing)	1.79 %	300 m <sup>2</sup> (Concept)	0.71 %
Driveway + Parking	1060 m <sup>2</sup> (Existing)	2.44 %	748 m <sup>2</sup> (Concept)	1.77 %
Right of Way	0 m <sup>2</sup>	0 %	0 m <sup>2</sup>	0 %
Total impervious	1,838 m <sup>2</sup>	4.24 %	1,048 m <sup>2</sup>	2.48 %
<b>Activity Status</b>	<b>Permitted</b>		<b>Permitted</b>	

## 6.2 Stormwater Management Concept

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.** The proposed application includes subdivision formation only, with no on-lot specific development at this stage. However, a conservative model of probable future on-lot attenuation discharging to suitably sized dispersion devices has been developed for this concept assessment considering the variation of scale in typical rural residential developments. The probable future development concept includes up to 300 m<sup>2</sup> potential roof area and up to 748 m<sup>2</sup> potential driveway or parking areas for the proposed new Lot.

Utilising the natural contour and gravity flows, stormwater discharges from concept driveway areas can be directly routed through the site to attenuation devices, before discharging to the overland flow paths and watercourses present in the site (to the west) and to Ness Road to the east. These areas will drain through grassed swales and associated easements, and attenuation has been provided as outlined Section 6.4 and



Drawing No. 101. This is subject to detailed design at the Building Consent stage which can be covered a condition of consent.

### 6.3 Design Storm Event

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model<sup>8</sup>. 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 2023.

Noting the risk of flood hazard downstream of the site as discussed in Section 3, this assessment has been modelled to provide stormwater attenuation up to and including 80 % of the pre-development condition for the 1 % AEP storm event which is recommended for the site including any future activities to comply with FNDC Engineering Standard Table 4-1.

This provides additional conservatism over the 10 % AEP pre-development requirement to comply with NRP Rule C6.4.2(2) and also with the Operative District Plan 13.7.3.4 (a). Attenuation modelling under this scenario avoids exacerbating downstream flooding and provides for sufficient flood control as presented in the FNDC Engineering Standards.

Furthermore, the Table 4-1 stipulates that flow attenuation controls reduce the post-development peak discharge to 80 % of the pre-development condition for the 50 % and 20% AEP storm event. To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The results are summarised in 6.4 with calculations provided in full in Appendix D.

Outlet dispersion devices have been designed to manage the 1% AEP event to reduce scour and erosion at discharge locations. These are detailed further in Section 6.4.3 of this report.

### 6.4 Concept Stormwater Attenuation

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 provided. In this case the concept limits the post-development peak discharge to 80% of the pre-development condition for the 1% AEP storm event. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards<sup>9</sup> to provide a suitable concept attenuation design to limit post-development peak flows to 80% of pre-development conditions. The proposed devices with the concept design are listed below:

- Roof Runoff Tanks (refer to Table 6)
- Attenuation Ponds for RoW runoff (refer to Table 8)

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<sup>8</sup> NIWA High Intensity Rainfall Data System, <https://hirds.niwa.co.nz>.

<sup>9</sup> FNDC Engineering Standards 2023, Version 0.6, Issued May 2023.

#### 6.4.1 Concept Attenuation of Roof Area

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. 400 within Appendix A.

Table 6: Summary of Concept Stormwater Attenuation – Roof Tanks

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
<b>Future Concept Development (Lot 2)</b>			
Potential buildings	0 m <sup>2</sup>	300 m <sup>2</sup>	Detention within roof water tanks
Potential driveways	0 m <sup>2</sup>	748 m <sup>2</sup>	Off-set detention in roof water tanks
<b>Total</b>	<b>0 m<sup>2</sup></b>	<b>1048 m<sup>2</sup></b>	

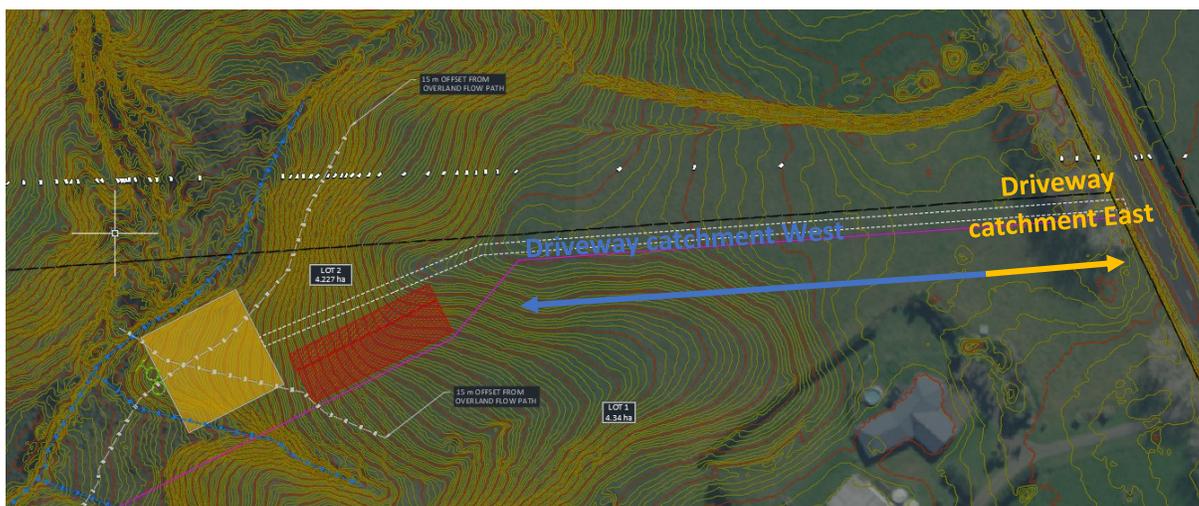
Table 7: Probable Future Development Attenuation Concept - Tanks

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
<b>Proposed Lot 2 (new impervious building only)</b>				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	317 l/s	4.11 l/s	4.79 l/s	7.13 l/s
80 % pre-development peak flow	2.54 l/s	3.28 l/s	NA	5.70 l/s
Post-development peak flow	6.19 l/s	8.02 l/s	9.36 l/s	13.92 l/s
Total Storage Volume Required	1,812 litres	2,346 litres	2,740 litres	4,075 litres
Concept Summary:	<ul style="list-style-type: none"> <li>- Attenuation storage calculation accounts for no offset flow driveway (not indicated explicitly indicated in summary above. Refer Appendix D for calcs in full)</li> <li>- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage.</li> <li>- 2 x 25,000 litre tanks is sufficient for attenuation (4,075 l) + domestic water storage (45,925 l)</li> <li>- 1 % AEP attenuation (in isolation) requires a 86 mm orifice 0.41 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.</li> </ul>			

Calculations to support the concept design are presented as Appendix D to this report. As above, it is recommended that this concept design is refined at the Building Consent stage once final development plans are available.

### 6.4.2 Concept Attenuation of Driveway Area

The proposed right of way is split between two catchments, with a high point along the northeastern portion, water in this area will flow to Ness Road to the east and the other to the west towards the flow path through the site.



Below and within Appendix D, are the calculations to support the attenuation and required offset for the new impervious area within the driveway. The concept driveway has been split into sections, based on the discharge catchment, and the proposed locations for attenuation devices. These devices have been conceptually sized for the 1% AEP to demonstrate feasibility but will require detailed design to be submitted prior to construction.

We also note that where ponds are proposed as the form of attenuation, this may be modified through detailed design to better reflect the design of the proposed driveway. Storage may be able to be accommodated within specifically designed swales with check dam structures.

Table 8. Summary of Concept Stormwater Attenuation – Concept Driveway

Item	Pre-development Impervious Area	Post-development Impervious Area	Proposed Concept Attenuation Method
<b>Future Concept Development (Driveway)</b>			
Right of Way East	0 m <sup>2</sup>	150 m <sup>2</sup>	Swale or pond
Right of Way West	0 m <sup>2</sup>	598 m <sup>2</sup>	Swale or pond
<b>Total</b>	<b>0 m<sup>2</sup></b>	<b>748 m<sup>2</sup></b>	

Table 9. Probable Future Development Attenuation Concept – Concept Driveway

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
<b>Proposed Driveway East (150 m<sup>2</sup>)</b>				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	1.59 l/s	2.05 l/s	2.40 l/s	3.56 l/s
80 % pre-development peak flow	1.27 l/s	1.64 l/s	NA	2.85 l/s
Post-development peak flow	2.58 l/s	3.34 l/s	3.90 l/s	5.80 l/s
Total Storage Volume Required	597 litres	772 litres	902 litres	1,341 litres
Concept Summary:	- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design storage. Regulatory requirements are to consider an orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary and should be provided with detailed design.			

Table 10. Probable Future Development Attenuation Concept – Concept Driveway

Design Parameter	Flow Attenuation: 50 % AEP (80 % of pre dev)	Flow Attenuation: 20 % AEP (80 % of pre dev)	Flood Control: 10 % AEP	Flood Control: 1 % AEP (80 % of pre dev)
<b>Proposed Driveway West (598 m<sup>2</sup>)</b>				
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	FNDC Engineering Standards Table 4-1
Pre-development peak flow	6.32 l/s	8.18 l/s	9.56 l/s	14.21 l/s
80 % pre-development peak flow	5.06 l/s	6.55 l/s	NA	11.37l/s
Post-development peak flow	10.29 l/s	13.32 l/s	15.55 l/s	23.12 l/s
Total Storage Volume Required	2,379 litres	3,079 litres	3,595 litres	5,347 litres
Concept Summary:	- Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design storage. Regulatory requirements are to consider an orifice/s to control the 50 %, 20 % and 1 % AEP events specifically. We note this may vary and should be provided with detailed design.			

#### 6.4.3 On-Lot Discharge

The direct discharge of water tank overflow in a concentrated manner can cause scour and erosion in addition to excessive saturation of shallow soils. Roof water will be captured in detention tanks and used for drinking water supply needs. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point



downslope of proposed building footprints and wastewater disposal fields. A concept design accommodating this is presented within Appendix A on Drawing No. 101.

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 as Table 11. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data. Typical details of these options are presented within Appendix A as Drawing No. 401.

*Table 11. summary of Concept Dispersion Devices*

Concept Impervious Area to Tank	Velocity at single spreader orifices	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
<b>Proposed Lot 2</b>						
300 m <sup>2</sup>	0.92 m/s	0.1 m	0.15 m	4.35 m	20 mm, spaced at 150 mm intervals	Above ground dispersion device or in-ground dispersion trench.

## 6.5 Subdivision Development Management

It is recommended that at the access point/ vehicle crossing to Lot 2 a 375mm minimum diameter RCP culvert is installed to comply with published FNDC Engineering Standards.

## 6.6 Stormwater Quality

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

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

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. However, additional measures of stormwater filtration have been adopted due to the proximity to sensitive surface water receptors. 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 points.
- All grassed swales with check dams to increase stormwater quality subject to specific engineering design.
- Energy dissipation devices subject to specific engineering design installed at discharge point of all attenuation ponds, and tank overflows.

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 Ness Road 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.

Lot 1 has existing potable water supply from tanks and will not be assessed under this application.

The volume of potable water supply on proposed Lot 2 should consider the required stormwater detention volume identified within Table 7. On this property a second tank may be required for sufficient potable water volumes.

Furthermore, the absence of potable water infrastructure and fire hydrants within Ness Road require provision of the on-lot roof water supply tanks to be used for firefighting purposes, if required. Specific analysis and calculation for firefighting is outside the scope of this report and may require specialist input.

Supply for firefighting and all access to the site for firefighting personnel and equipment should be made in accordance with SNZ PAS4509:2008.

## 8 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 Plan<sup>10</sup>, Northland Regional Council (NRC) Proposed Regional Plan for Northland<sup>11</sup> and Regional Water and Soil Plan for Northland. Following our ground investigation and considering the measures presented in this report, a summary of the proposed activities against defined natural hazards is presented as Table 12.

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<sup>10</sup> Operative District Plan Rule 13.7.3.2.

<sup>11</sup> Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.

Table 12: 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	Potential effects during development mitigated by means of swales & check dams and by directing flows into ponds to reduce flow velocities and peak discharge; resultant effects are less than minor.
Landslip	NA	No mitigation required, less than minor.
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.*

## 9 LIMITATIONS

This report has been prepared for Jason Hault Limited 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.



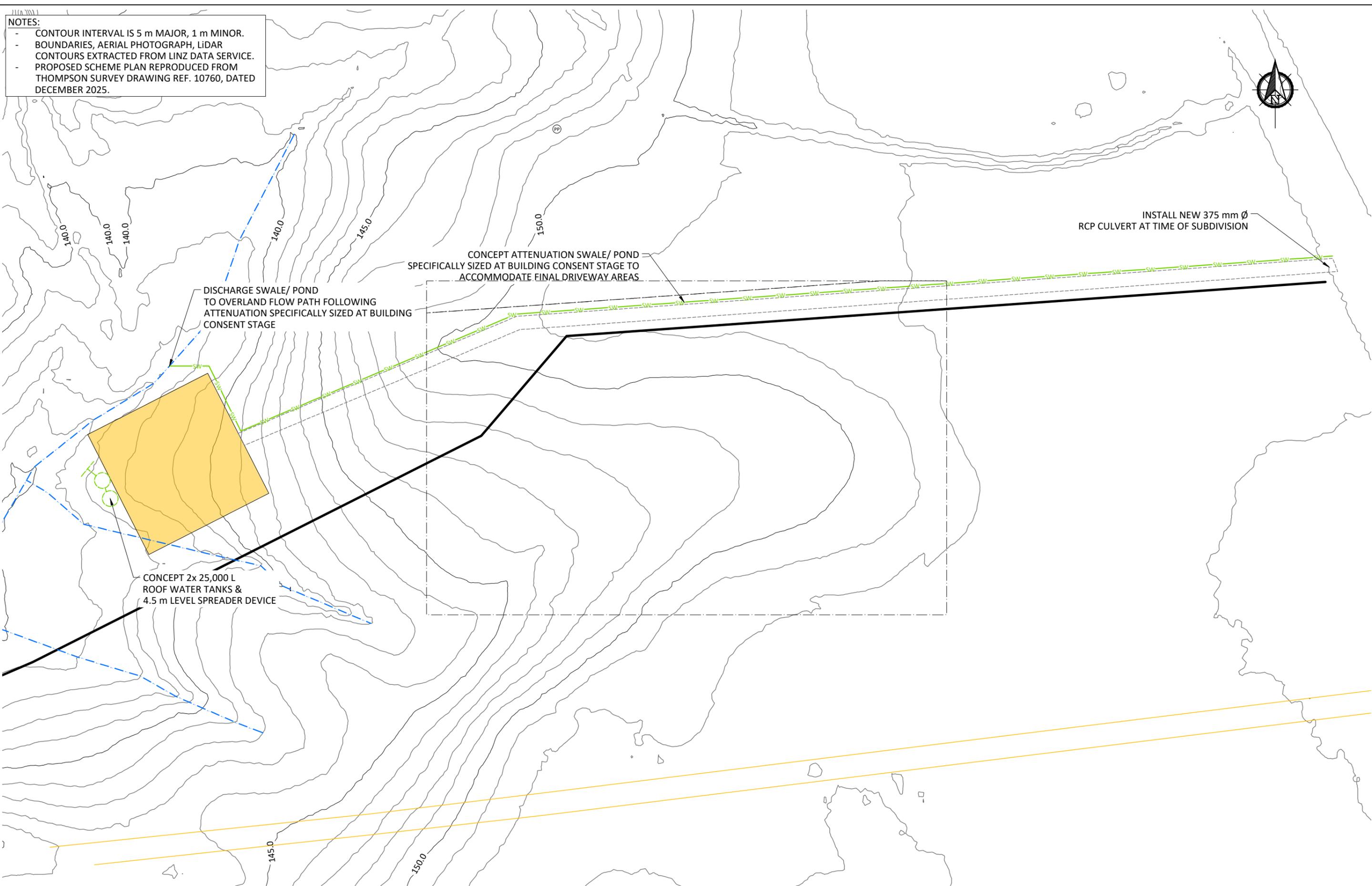
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## APPENDIX A

### Drawings



**NOTES:**  
 - CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR.  
 - BOUNDARIES, AERIAL PHOTOGRAPH, LIDAR  
 CONTOURS EXTRACTED FROM LINZ DATA SERVICE.  
 - PROPOSED SCHEME PLAN REPRODUCED FROM  
 THOMPSON SURVEY DRAWING REF. 10760, DATED  
 DECEMBER 2025.



INSTALL NEW 375 mm Ø  
RCP CULVERT AT TIME OF SUBDIVISION

CONCEPT ATTENUATION SWALE/ POND  
SPECIFICALLY SIZED AT BUILDING CONSENT STAGE TO  
ACCOMMODATE FINAL DRIVEWAY AREAS

DISCHARGE SWALE/ POND  
TO OVERLAND FLOW PATH FOLLOWING  
ATTENUATION SPECIFICALLY SIZED AT BUILDING  
CONSENT STAGE

CONCEPT 2x 25,000 L  
ROOF WATER TANKS &  
4.5 m LEVEL SPREADER DEVICE



DRAWN	SIGNED	DATE							
EC	EC	01/26							
VERIFIED	SIGNED	DATE							
SH	SH	01/26							
APPROVED	SIGNED	DATE							
EC	EC	01/26	B	01/26	SECOND ISSUE - REVISED SCHEME PLAN	EC	EC		
			A	07/25	FIRST ISSUE	EC	EC		
			REV.	DATE	REVISION DETAILS	BY	APP.		

JASON HOULT

235 NESS ROAD  
WAIPAPA  
FAR NORTH  
LOT 1 DP 493878

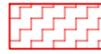
POTABLE WATER & STORMWATER  
PLAN FOR  
SUBDIVISION RESOURCE CONSENT

STATUS: FINAL				
NOT FOR CONSTRUCTION				
SCALE: 1:750		SHEET SIZE: A3		
PROJECT NO. C0662N	TYPE: RC	CLASS:	SHEET NO. 400	REV. A

**NOTES:**

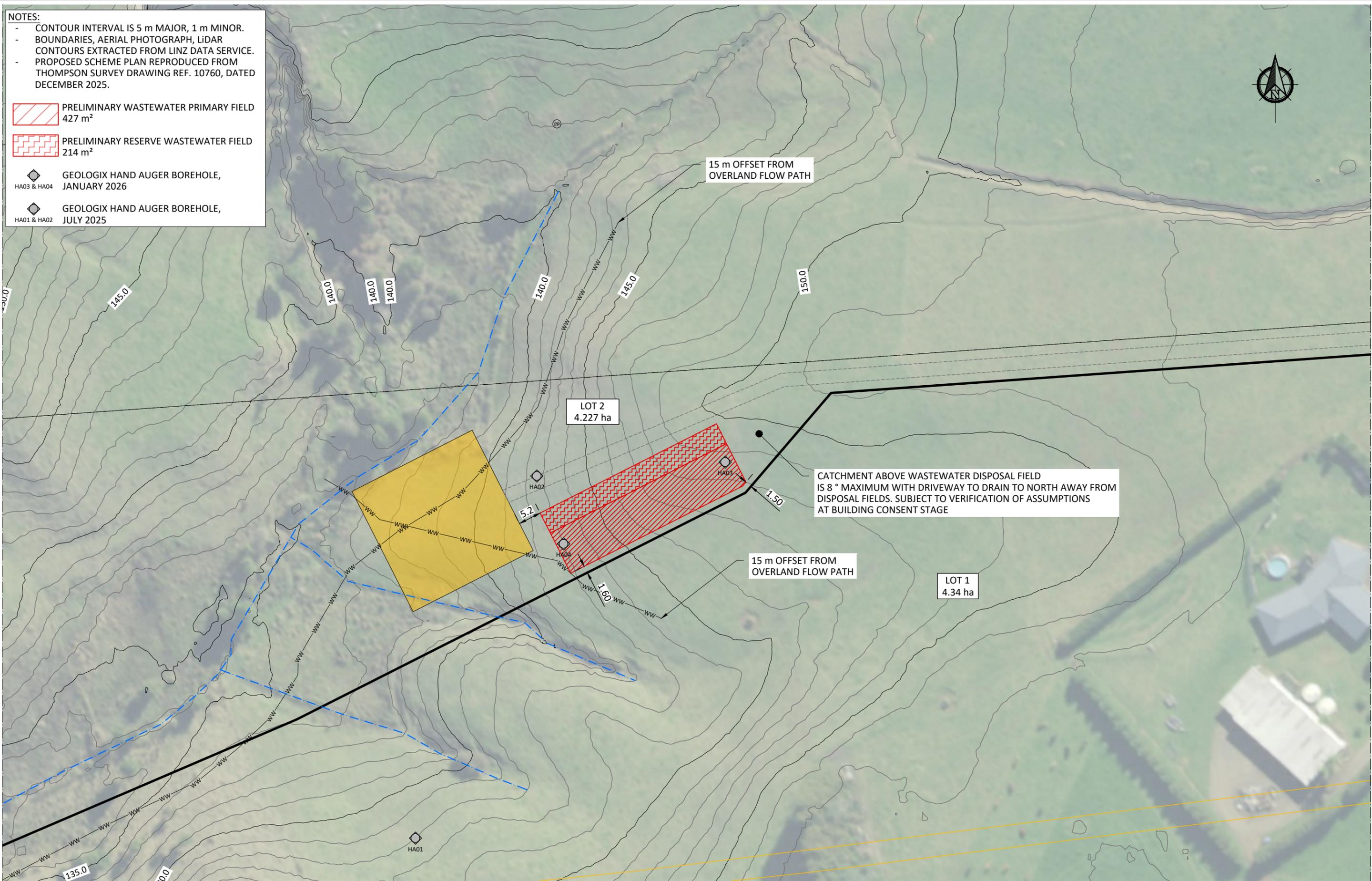
- CONTOUR INTERVAL IS 5 m MAJOR, 1 m MINOR.
- BOUNDARIES, AERIAL PHOTOGRAPH, LIDAR CONTOURS EXTRACTED FROM LINZ DATA SERVICE.
- PROPOSED SCHEME PLAN REPRODUCED FROM THOMPSON SURVEY DRAWING REF. 10760, DATED DECEMBER 2025.

 PRELIMINARY WASTEWATER PRIMARY FIELD  
427 m<sup>2</sup>

 PRELIMINARY RESERVE WASTEWATER FIELD  
214 m<sup>2</sup>

 GEOLOGIX HAND AUGER BOREHOLE,  
HA03 & HA04, JANUARY 2026

 GEOLOGIX HAND AUGER BOREHOLE,  
HA01 & HA02, JULY 2025



DRAWN	SIGNED	DATE	CLIENT
EC	EC	01/26	JASON HOULT
VERIFIED	SIGNED	DATE	PROJECT
SH	SH	01/26	235 NESS ROAD WAIPAPA FAR NORTH LOT 1 DP 493878
APPROVED	SIGNED	DATE	DRAWING TITLE
EC	EC	01/26	WASTEWATER SITE PLAN FOR SUBDIVISION RESOURCE CONSENT
REV.	DATE	REVISION DETAILS	STATUS
B	01/26	SECOND ISSUE - REVISED SCHEME PLAN	FINAL
A	07/25	FIRST ISSUE	NOT FOR CONSTRUCTION
			SCALE
			1:750
			SHEET NO.
			A3
			PROJECT NO.
			C0662N
			TYPE
			RC
			CLASS.
			SHEET NO.
			500
			REV.
			A

CLIENT:	JASON HOULT	PROJECT:	235 NESS ROAD WAIPAPA FAR NORTH LOT 1 DP 493878	DRAWING TITLE:	WASTEWATER SITE PLAN FOR SUBDIVISION RESOURCE CONSENT	STATUS:	FINAL NOT FOR CONSTRUCTION
SCALE:	1:750	SHEET NO.:	A3	PROJECT NO.:	C0662N	TYPE:	RC
CLASS.:		SHEET NO.:	500	REV.:	A		



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## APPENDIX B

### Engineering Borehole Records

# INVESTIGATION LOG

HOLE NO.:  
**HA01**

CLIENT: Jason Hoult  
PROJECT: 235 Ness Road, Waipapa

JOB NO.:  
**C0662N**

SITE LOCATION: West of Ness Road

START DATE: 01/08/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2025

CONTRACTOR: Internal

RIG: 50mm Hand Auger

DRILLER: FS

LOGGED BY: FS

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		150	200	Values	
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.  0.2m - 0.4m: Becoming dark grey.		0.2	TS																
Clayey SILT; dark grey. Moist; low plasticity. 0.4m - 0.6m: Becoming light orange.		0.4	TS																
0.6m - 1.0m: White streaks appear.		0.6	TS																
1.0m - 1.2m: Light orange streaks appear.		1.0	TS																
End Of Hole: 1.20m		1.2	TS																
		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.:  
**HA02**

CLIENT: Jason Hoult  
PROJECT: 235 Ness Road, Waipapa

JOB NO.:  
**C0662N**

SITE LOCATION: West of Ness Road

START DATE: 01/08/2025

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2025

CONTRACTOR: Internal

RIG: 50mm Hand Auger

DRILLER: FS

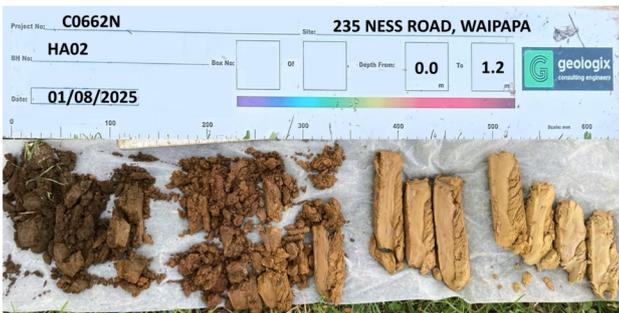
LOGGED BY: FS

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		150	200	Values	
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0 - 0.2	TS																
Clayey SILT; dark grey. Moist; low plasticity.		0.2 - 0.6	TS																
Clayey SILT; white. Moist; low plasticity.		0.6 - 1.2	TS																
End Of Hole: 1.20m		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





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# HAND AUGER & DCP LOG

Project Ref: C0662N

Client: Jason Hoult

Project Name: 235 Ness Road, Waipapa

Hole ID: **HA04**

Project Location: 235 Ness Road, Waipapa

Date: 12-01-2026

Hole Position:

Logged By: CA Approved: AW

DEPTH (M)	MATERIAL DESCRIPTION (SEE CLASSIFICATION AND SYMBOLGY SHEET FOR DETAILS)	LEGEND	SAMPLE	VANE SHEAR STRENGTH (KPA)							PEAK	RESIDUAL	SCALA PENETROMETER	GROUND WATER
				25	50	75	100	125	150	175			(Blows/100mm)	
0	Fine sandy SILT, with trace rootlets, trace gravel; brown; moist friable. Gravel is fine, sub-rounded, [TOPSOIL]. 0.2 m													0
	Fine sandy SILT, with trace gravel; brown mottled reddish brown. Very stiff; moist; low plasticity. Gravel is fine to medium, sub-rounded, [KERIKERI VOLCANICS]. 0.6 m													
1	SILT, with trace gravel; reddish brown. Very stiff; moist; low plasticity. Gravel is fine, sub-rounded, [KERIKERI VOLCANICS]. 1.2 m													1
	Terminated at 1.2 m													
2														2
3														3
4														4
5														5

Remarks:

- 1. Hand Auger terminated at target depth of 1.20m bgl.

# SYMBOLS and ABBREVIATIONS USED ON TEST HOLE LOGS

## PROPORTIONAL TERMS

Term	Proportion
trace	0 to 10%
some	10 to 20%
-y or -ey	20 to 35%
and	35 to 50%

## GRADATION TERMS

Term	Description
well graded	Good representation of all particle sizes from largest to smallest.
poorly graded	Limited representation of grain sizes - further divided into: <u>Uniformly Graded</u> : Most particles about the same size. <u>Gap Graded</u> : Absence of one or more intermediate sizes.

## MOISTURE DESCRIPTION

Term	Description
dry	No moisture
moist	No free water on hands when remoulding
wet	Weakened by moisture, free water on hands when handling
saturated	darkened in colour and free water is present on the sample

## SOIL PLASTICITY for FINE-GRAINED SOILS

Term	Description
high plasticity	Can be moulded or deformed over a wide range of moisture contents without cracking or showing any tendency to change volume.
medium plasticity	Can be moulded over a wide range of moisture contents however will crack at low moisture contents.
low plasticity	Can be moulded in fingers when moist however crumbles.
non plastic	Has no ability to be moulded at any moisture content, may show quick or dilatant behavior.

## CONSISTENCY of COARSE-GRAINED SOILS

Consistency	Blow Count N
very loose	< 4
loose	4 to 10
compact	10 to 30
dense	30 to 50
very dense	> 50

Notes: SPT/DCPT 'N' values are 'raw' field blow counts, measured for 300 mm (12 inch) of penetration.

## CONSISTENCY of FINE-GRAINED SOILS

Consistency	Blow Count N	Undrained Shear Strength Su (kPa [psf])	
very soft	< 2	< 12 [250]	Easily exudes between fingers when squeezed
soft	2 to 4	12 to 25 [250 to 500]	Easily intended by fingers
firm	4 to 8	25 to 50 [500 to 1000]	Can be intended by strong finger or thumb pressure
stiff	8 to 16	50 to 100 [1000 to 2000]	Cannot be intended by thumb pressure
very stiff	16 to 30	100 to 200 [2000 to 4000]	Can be intended by thumb nail
hard	> 30	> 200 [4000]	Difficult to intend by thumb nail

## SAMPLE TYPES

SYMBOL	Description
AS	Auger Sample
CC	Continuous Core Sample
DC	Drill Cuttings
GS	Grab Sample
SS	SPT Spoon Sample
TS	Thin-walled / Shelby Sample
WS	Water Sample

## SLOPE DESCRIPTION

Term	Slope Angle
flat	< 4°
gentle	4° to 15°
moderate	16° to 26°
mod-steep	27° to 35°
steep	> 35°

## GROUNDWATER LEVEL SYMBOLS

SYMBOL	Description
▼	Measured in a piezometer or well
▽	Inferred water level based on observations during investigation



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## APPENDIX C

### Assessment of Environmental Effects and Assessment Criteria



Table 13: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement <sup>2</sup>	FNDC Separation Requirement	Site Assessment <sup>3</sup>
<b>Individual System Effects</b>			
Flood Plains	Above 5 % AEP	NR	Complies according to available GIS data and visual assessment.
Stormwater Flowpath <sup>4</sup>	5 m	NR	Complies, see annotations on Drawing No. 101.
Surface water feature <sup>5</sup>	15 m	15 m (3x feature area in ha)	Complies.
Coastal Marine Area	15 m	30 m	Complies, see annotations on Drawing No. 101.
Existing water supply bore.	20 m	NR	Complies. None recorded within or within 20 m of the site boundaries.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Ok – chosen disposal areas are gently sloping to <20 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	<b>TP58</b>	<b>NZS1547</b>	
<b>Cumulative Effects</b>			
Biological Oxygen Demand		≤20 g/m <sup>3</sup>	Complies – secondary treatment.
Total Suspended Solids		≤30 g/m <sup>3</sup>	Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m <sup>3</sup>	15 – 75 g/m <sup>3</sup>	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m <sup>3</sup>	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m <sup>3</sup>	Complies – secondary treatment.
<b>Conclusion: Effects are less than minor on the environment.</b>			
<ol style="list-style-type: none"> <li>1. AEE based on proposed secondary treated effluent.</li> <li>2. Northland Regional Plan Table 9.</li> <li>3. Based on the recommendations of this report and Drawing No. 101.</li> <li>4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.</li> <li>5. River, lake, stream, pond, dam, or natural wetland.</li> </ol>			
AEP Annual Exceedance Probability.			
NR No Requirement.			



Table 14: Proposed Northland Regional Plan Stormwater Assessment Criteria, to rule C.6.4.2

Assessment Criteria	Comments
1) the discharge or diversion is not from: a) a public stormwater network, or b) a high-risk industrial or trade premises	Complies
2) the diversion and discharge does not cause or increase flooding of land on another property in a storm event of up to and including a 10 percent annual exceedance probability, or flooding of buildings on another property in a storm event of up to and including a one percent annual exceedance probability	Complies, attenuation will be provided on site to 80% of pre-development level.
3) where the diversion or discharge is from a hazardous substance storage or handling area: a) the stormwater collection system is designed and operated to prevent hazardous substances stored or used on the site from entering the stormwater system, or b) there is a secondary containment system in place to intercept any spillage of hazardous substances and either discharges that spillage to a trade waste system or stores it for removal and treatment, or c) if the stormwater contains oil contaminants, the stormwater is passed through a stormwater treatment system designed in accordance with the Environmental Guidelines for Water Discharges from Petroleum Industry Sites in New Zealand (Ministry for the Environment, 1998) prior to discharge	Complies. Site is residential.
4) where the diversion or discharge is from an industrial or trade premises: a) the stormwater collection system is designed and operated to prevent any contaminants stored or used on the site, other than those already controlled by condition 3) above, from entering stormwater unless the stormwater is discharged through a stormwater treatment system, and b) any process water or liquid waste stream on the site is bunded, or otherwise contained, within an area of sufficient capacity to provide secondary containment equivalent to 100 percent of the quantity of any process water or liquid waste that has the potential to spill into a stormwater collection system, in order to prevent trade waste entering the stormwater collection system	Complies. Site is residential.
5) the diversion or discharge is not into potentially contaminated land, or onto potentially contaminated land that is not covered by an impervious area	Complies.
6) the diversion and discharge does not cause permanent scouring or erosion of the bed of a water body at the point of discharge	Complies, specifically sized discharge devices are provided from all on-lot devices and RoWs.
7) the discharge does not contain more than 15 milligrams per litre of total petroleum hydrocarbons	Complies. Site is residential.
8) the discharge does not cause any of the following effects in the receiving waters beyond the zone of reasonable mixing: a) the production of conspicuous oil or grease films, scums or foams, of floatable or suspended materials, or b) a conspicuous change in the colour or visual clarity, or c) an emission of objectionable odour, or	Complies.



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- d) the rendering of fresh water unsuitable for consumption by farm animals, or 163
  - e) the rendering of fresh water taken from a mapped priority drinking water abstraction point (refer I Maps | Ngā mahere matawhenua) unsuitable for human consumption after existing treatment.
-



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## APPENDIX D

### Stormwater Calculations

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (Lot 2)		
Date:	8 January 2026	REV 2	<b>50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>

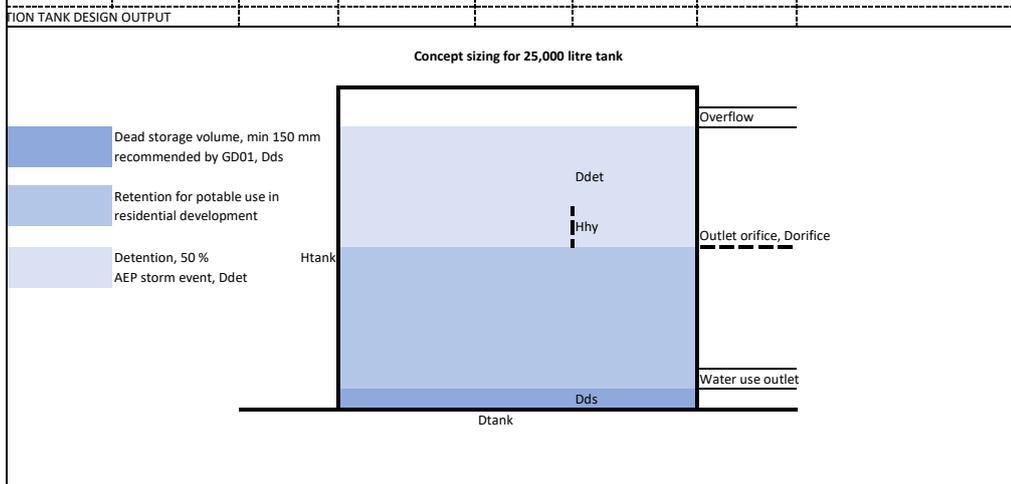
DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER 2023 FNDC ENGINEERING STANDARDS).  
 PRE-DEVELOPMENT RUNOFF IS FACTORED BY 80% TO SUIT FNDC STANDARDS  
 RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0					
IMPERVIOUS C	0	0		OFFSET	0		
EX. PERVIOUS	300	0.59	Pasture, Type C				
				Pervious			
<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	64.5	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	77.40	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, Qpa, l/s	80% OF PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	64.50	1.2	77.40	6.19	3.17	2.54	Critical duration (time of concentration) for the catchments is 10min
20	48.10	1.2	57.72	4.62	2.36	1.89	
30	40.40	1.2	48.48	3.88	1.99	1.59	
60	29.70	1.2	35.64	2.85	1.46	1.17	Pre-dev calculated on Intensity without CC factor
120	21.40	1.2	25.68	2.05	1.05	0.84	
360	12.10	1.2	14.52	1.16	0.59	0.48	
720	8.10	1.2	9.72	0.78	0.40	0.32	
1440	5.19	1.2	6.23	0.50	0.26	0.20	
2880	3.16	1.2	3.79	0.30	0.16	0.12	
4320	2.31	1.2	2.77	0.22	0.11	0.09	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre-Qoff, l/s	SELECT. TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	0.00	6.192	3.17	3.17	3.02	1812.45	select largest required storage, regardless of duration, to avoid overflow
20	0.00	4.6176	2.36	3.17	1.45	1735.62	
30	0.00	3.8784	1.99	3.17	0.71	1272.87	
60	0.00	2.8512	1.46	3.17	No Att. Req.	0.00	
120	0.00	2.0544	1.05	3.17	No Att. Req.	0.00	
360	0.00	1.1616	0.59	3.17	No Att. Req.	0.00	
720	0.00	0.7776	0.40	3.17	No Att. Req.	0.00	
1440	0.00	0.49824	0.26	3.17	No Att. Req.	0.00	
2880	0.00	0.30336	0.16	3.17	No Att. Req.	0.00	
4320	0.00	0.22176	0.11	3.17	No Att. Req.	0.00	



SPECIFICATION			
TOTAL STORAGE REQUIRED	1.812 m <sup>3</sup>	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.57 m	No. of Tanks	1
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	25025 litres		
REQUIRED STORAGE HEIGHT, Ddet	0.18 m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.33 m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00317 m <sup>3</sup> /s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.09 m		
AREA OF ORIFICE, Aorifice	3.84E-03 m <sup>2</sup>		
ORIFICE DIAMETER, Dorifice	70 mm		
VELOCITY AT ORIFICE	1.88 m/s	At max. head level	

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	1235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (Lot 2)		
Date:	8 January 2026	20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT	

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	0	0	
IMPERVIOUS C	0	0		PERVIOUS	0	0	
EX. PERVIOUS	300	0.59	Pasture, Type C	TOTAL	300	TYPE C	
<b>TOTAL</b>	<b>300</b>	<b>TYPE C</b>					

**RAINFALL INTENSITY, 20% AEP, 10MIN DURATION**

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	83.5	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	100.2	mm/hr	

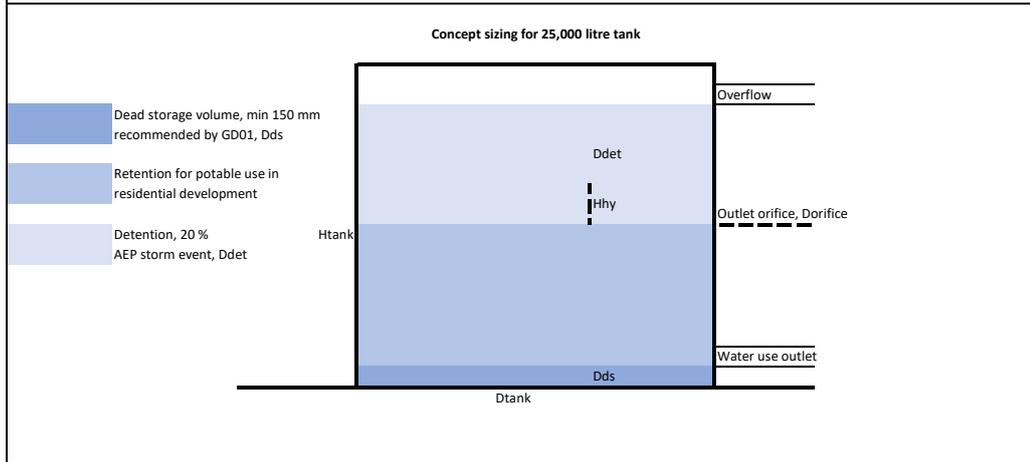
**PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS**

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpa, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	83.50	1.2	100.20	8.02	4.11	3.28	Critical duration (time of concentration) for the catchments is 10min
20	62.40	1.2	74.88	5.99	3.07	2.45	
30	52.40	1.2	62.88	5.03	2.58	2.06	
60	38.60	1.2	46.32	3.71	1.90	1.52	Pre-dev calculated on Intensity without CC factor
120	27.90	1.2	33.48	2.68	1.37	1.10	
360	15.80	1.2	18.96	1.52	0.78	0.62	
720	10.60	1.2	12.72	1.02	0.52	0.42	
1440	6.79	1.2	8.15	0.65	0.33	0.27	
2880	4.15	1.2	4.98	0.40	0.20	0.16	
4320	3.03	1.2	3.64	0.29	0.15	0.12	

**ATTENUATION ANALYSIS, VARIOUS DURATIONS**

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	8.02	4.11	4.11	3.91	2346	select largest required storage, regardless of duration, to avoid overflow
20	0.00	5.99	3.07	4.11	1.88	2262	
30	0.00	5.03	2.58	4.11	0.92	1665	
60	0.00	3.71	1.90	4.11	No Att. Req.	0	
120	0.00	2.68	1.37	4.11	No Att. Req.	0	
360	0.00	1.52	0.78	4.11	No Att. Req.	0	
720	0.00	1.02	0.52	4.11	No Att. Req.	0	
1440	0.00	0.65	0.33	4.11	No Att. Req.	0	
2880	0.00	0.40	0.20	4.11	No Att. Req.	0	
4320	0.00	0.29	0.15	4.11	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	2.346 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57 m	No. of Tanks 2
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	25025 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.23 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.38 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00411 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.12 m	
AREA OF ORIFICE, Aorifice	4.37E-03 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	75 mm	
VELOCITY AT ORIFICE	2.14 m/s	At max. head level

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	1235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (Lot 2)	<b>10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW</b>	
Date:	8 January 2026 REV 2		

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	0	0	
IMPERVIOUS C	0	0			0	0	
EX. PERVIOUS	300	0.59	Pasture, Type C		0	0	
	0	0		Pervious	0	0	
<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>300</b>		<b>TYPE C</b>

**RAINFALL INTENSITY, 10% AEP, 10MIN DURATION**

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	97.5	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	117.0	mm/hr	

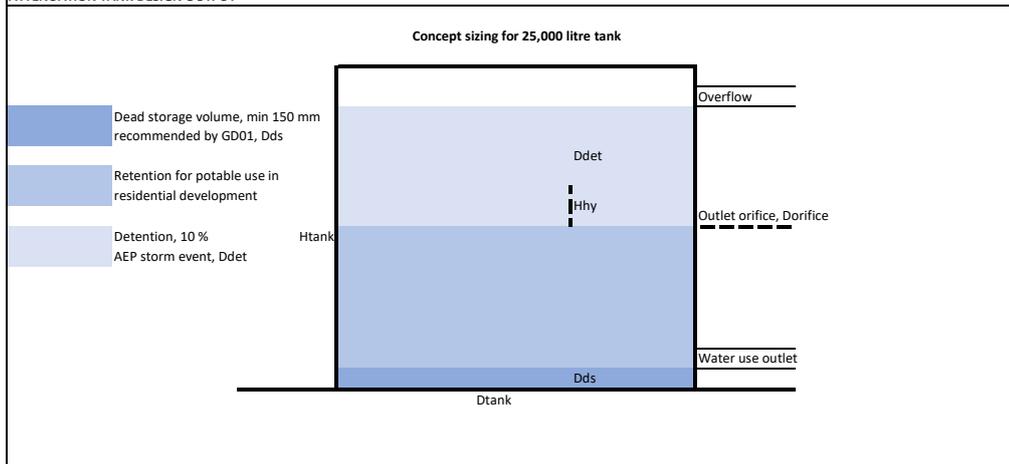
**PRE AND POST-DEVELOPMENT RUNOFF, 10%AEP WITH CC, VARIOUS DURATIONS**

DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	COMMENTS
10	97.50	1.2	117.00	9.36	4.79	Critical duration (time of concentration) for the catchments is 10min
20	72.90	1.2	87.48	7.00	3.58	
30	61.30	1.2	73.56	5.88	3.01	Pre-dev calculated on Intensity without CC factor
60	45.20	1.2	54.24	4.34	2.22	
120	32.70	1.2	39.24	3.14	1.61	
360	18.60	1.2	22.32	1.79	0.91	
720	12.40	1.2	14.88	1.19	0.61	
1440	7.99	1.2	9.59	0.77	0.39	
2880	4.88	1.2	5.86	0.47	0.24	
4320	3.57	1.2	4.28	0.34	0.18	

**ATTENUATION ANALYSIS, VARIOUS DURATIONS**

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	9.36	4.79	4.79	4.57	2740	select largest required storage, regardless of duration, to avoid overflow
20	0.00	7.00	3.58	4.79	2.20	2646	
30	0.00	5.88	3.01	4.79	1.09	1964	
60	0.00	4.34	2.22	4.79	No Att. Req.	0	
120	0.00	3.14	1.61	4.79	No Att. Req.	0	
360	0.00	1.79	0.91	4.79	No Att. Req.	0	
720	0.00	1.19	0.61	4.79	No Att. Req.	0	
1440	0.00	0.77	0.39	4.79	No Att. Req.	0	
2880	0.00	0.47	0.24	4.79	No Att. Req.	0	
4320	0.00	0.34	0.18	4.79	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	2.740 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57 m	No. of Tanks 1
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	25025 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.27 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.42 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00479 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.14 m	
AREA OF ORIFICE, Aorifice	4.72E-03 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	78 mm	
VELOCITY AT ORIFICE	2.32 m/s	At max. head level

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	1235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (Lot 2)	<b>1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	
Date:	8 January 2026 REV 2		

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

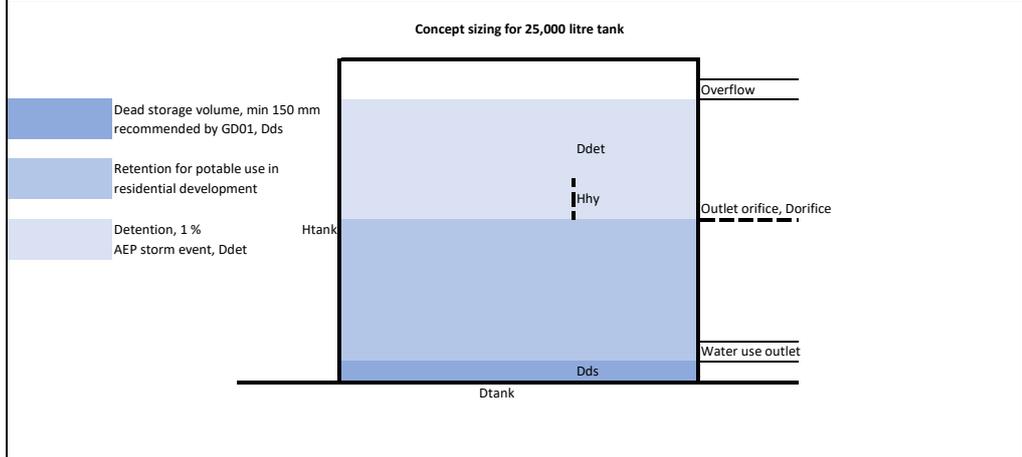
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO TANK	300	0.96	ROOF
IMPERVIOUS B	0	0		OFFSET	0	0	
IMPERVIOUS C	0	0			0	0	
EX. PVIOUS	300	0.59	Pasture, Type C		0	0	
	0	0		PVIOUS	0	0	
<b>TOTAL</b>	<b>300</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>300</b>	<b>TYPE C</b>	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	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	174.0	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	145.00	1.2	174.00	13.92	7.13	5.70	Critical duration (time of concentration) for the catchments is 10min
20	109.00	1.2	130.80	10.46	5.36	4.29	
30	91.90	1.2	110.28	8.82	4.52	3.61	
60	68.00	1.2	81.60	6.53	3.34	2.67	Pre-dev calculated on Intensity without CC factor
120	49.40	1.2	59.28	4.74	2.43	1.94	
360	28.20	1.2	33.84	2.71	1.39	1.11	
720	18.90	1.2	22.68	1.81	0.93	0.74	
1440	12.20	1.2	14.64	1.17	0.60	0.48	
2880	7.49	1.2	8.99	0.72	0.37	0.29	
4320	5.49	1.2	6.59	0.53	0.27	0.22	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	0.00	13.92	7.13	7.13	6.79	4075	select largest required storage, regardless of duration, to avoid overflow
20	0.00	10.46	5.36	7.13	3.33	4002	
30	0.00	8.82	4.52	7.13	1.69	3048	
60	0.00	6.53	3.34	7.13	No Att. Req.	0	
120	0.00	4.74	2.43	7.13	No Att. Req.	0	
360	0.00	2.71	1.39	7.13	No Att. Req.	0	
720	0.00	1.81	0.93	7.13	No Att. Req.	0	
1440	0.00	1.17	0.60	7.13	No Att. Req.	0	
2880	0.00	0.72	0.37	7.13	No Att. Req.	0	
4320	0.00	0.53	0.27	7.13	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



SPECIFICATION			
TOTAL STORAGE REQUIRED	4.075 m <sup>3</sup>	Select largest storage as per analysis	
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank	
TANK DIAMETER, Dtank	3.57 m	No. of Tanks	1
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank	
TANK MAX STORAGE VOLUME, Vtank	25025 litres		
REQUIRED STORAGE HEIGHT, Ddet	0.41 m	Below overflow	
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum	
TOTAL WATER DEPTH REQUIRED	0.56 m		
SELECTED TANK OUTFLOW, Qout, l/s	0.00713 m <sup>3</sup> /s	Selected tank outflow	
AVERAGE HYDRAULIC HEAD, Hhy	0.20 m		
AREA OF ORIFICE, Aorifice	5.75E-03 m <sup>2</sup>		
ORIFICE DIAMETER, Dorifice	86 mm		
VELOCITY AT ORIFICE	2.83 m/s	At max. head level	

Project Ref:	C0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>		
Project Address:	235 Ness Road, Waipapa	<b>50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>		
Design Case:	PROPOSED DEVELOPMENT (DRIVE EAST)			
Date:	8 January 2026	REV 2		

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 2023 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, m2	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATIO	150	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0					
IMPERVIOUS C	0	0					
EX. PERVIOUS	150	0.59	Pasture, Type C				
				Pervious			
<b>TOTAL</b>	<b>150</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>150</b>	<b>TYPE C</b>	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION			
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	64.5	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	77.40	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, Qpa, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	64.50	1.2	77.40	2.58	1.59	1.27	Critical duration (time of concentration ) for the catchments is 10min
20	48.10	1.2	57.72	1.92	1.18	0.95	
30	40.40	1.2	48.48	1.62	0.99	0.79	
60	29.70	1.2	35.64	1.19	0.73	0.58	Pre-dev calculated on Intensity without CC factor
120	21.40	1.2	25.68	0.86	0.53	0.42	
360	12.10	1.2	14.52	0.48	0.30	0.24	
720	8.10	1.2	9.72	0.32	0.20	0.16	
1440	5.19	1.2	6.23	0.21	0.13	0.10	
2880	3.16	1.2	3.79	0.13	0.08	0.06	
4320	2.31	1.2	2.77	0.09	0.06	0.05	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECT. TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	2.58	1.59	1.59	0.99	596.62	select largest required storage , regardless of duration, to avoid overflow
20	0.00	1.924	1.18	1.59	0.34	406.05	
30	0.00	1.616	0.99	1.59	0.03	54.67	
60	0.00	1.188	0.73	1.59	No Att. Req.	0.00	
120	0.00	0.856	0.53	1.59	No Att. Req.	0.00	
360	0.00	0.484	0.30	1.59	No Att. Req.	0.00	
720	0.00	0.324	0.20	1.59	No Att. Req.	0.00	
1440	0.00	0.2076	0.13	1.59	No Att. Req.	0.00	
2880	0.00	0.1264	0.08	1.59	No Att. Req.	0.00	
4320	0.00	0.0924	0.06	1.59	No Att. Req.	0.00	

Project Ref:	C0662N		<b>STORMWATER RUNOFF CALCULATIONS</b>				
Project Address:	235 Ness Road, Waipapa						
Design Case:	PROPOSED DEVELOPMENT (DRIVE EAST)		20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT				
Date:	8 January 2026	REV 2					
DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.							
RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.							
<b>PRE DEVELOPMENT CATCHMENT PARAMETERS</b>				<b>POST DEVELOPMENT CATCHMENT PARAMETERS</b>			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATION	150	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0			0	0	
EX. PERVIOUS	150	0.59	Pasture, Type C		0	0	
				Pervious	0	0	
<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>	
<b>RAINFALL INTENSITY, 20% AEP, 10MIN DURATION</b>							
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr		83.5	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		100.2	mm/hr				
<b>PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS</b>							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q <sub>post</sub> , l/s	PRE DEV RUNOFF, Q <sub>pa</sub> , l/s	80% of PRE DEV RUNOFF, Q <sub>pre(80%)</sub> , l/s	COMMENTS
10	83.50	1.2	100.20	3.34	2.05	1.64	Critical duration (time of concentration) for the catchments is 10min
20	62.40	1.2	74.88	2.50	1.53	1.23	
30	52.40	1.2	62.88	2.10	1.29	1.03	Pre-dev calculated on intensity without CC factor
60	38.60	1.2	46.32	1.54	0.95	0.76	
120	27.90	1.2	33.48	1.12	0.69	0.55	
360	15.80	1.2	18.96	0.63	0.39	0.31	
720	10.60	1.2	12.72	0.42	0.26	0.21	
1440	6.79	1.2	8.15	0.27	0.17	0.13	
2880	4.15	1.2	4.98	0.17	0.10	0.08	
4320	3.03	1.2	3.64	0.12	0.07	0.06	
<b>ATTENUATION ANALYSIS, VARIOUS DURATIONS</b>							
DURATION, min	OFFSET FLOW, Q <sub>off</sub> , l/s	TANK INFLOW, Q <sub>in</sub> , l/s	ALLOWABLE TANK OUTFLOW, Q <sub>pre</sub> - Q <sub>off</sub> , l/s	SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	DIFFERENCE (Q <sub>in</sub> - Q <sub>out</sub> ), l/s	Required Storage, litres	select largest required storage, regardless of duration, to avoid overflow
10	0.00	3.34	2.05	2.05	1.29	772	
20	0.00	2.50	1.53	2.05	0.44	532	
30	0.00	2.10	1.29	2.05	0.04	78	
60	0.00	1.54	0.95	2.05	No Att. Req.	0	
120	0.00	1.12	0.69	2.05	No Att. Req.	0	
360	0.00	0.63	0.39	2.05	No Att. Req.	0	
720	0.00	0.42	0.26	2.05	No Att. Req.	0	
1440	0.00	0.27	0.17	2.05	No Att. Req.	0	
2880	0.00	0.17	0.10	2.05	No Att. Req.	0	
4320	0.00	0.12	0.07	2.05	No Att. Req.	0	

Project Ref:	C0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (ROW EAST)		
Date:	8 January 2026 REV 2		
		<b>10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW</b>	

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATING	150	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0		0	0	0	
IMPERVIOUS C	0	0		0	0	0	
EX. PERVIOUS	150	0.59	Pasture, Type C	0	0	0	
0	0	0		Pervious	0	0	
<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>	

**RAINFALL INTENSITY, 10% AEP, 10MIN DURATION**

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	97.5	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	117.0	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 <sub>post</sub> , l/s	PRE DEV RUNOFF, Q <sub>pre</sub> , l/s	COMMENTS
10	97.50	1.2	117.00	3.90	2.40	Critical duration (time of concentration) for the catchments is 10min
20	72.90	1.2	87.48	2.92	1.79	
30	61.30	1.2	73.56	2.45	1.51	
60	45.20	1.2	54.24	1.81	1.11	Pre-dev calculated on Intensity without CC factor
120	32.70	1.2	39.24	1.31	0.80	
360	18.60	1.2	22.32	0.74	0.46	
720	12.40	1.2	14.88	0.50	0.30	
1440	7.99	1.2	9.59	0.32	0.20	
2880	4.88	1.2	5.86	0.20	0.12	
4320	3.57	1.2	4.28	0.14	0.09	

**ATTENUATION ANALYSIS, VARIOUS DURATIONS**

DURATION, min	OFFSET FLOW, Q <sub>off</sub> , l/s	TANK INFLOW, Q <sub>in</sub> , l/s	ALLOWABLE TANK OUTFLOW, Q <sub>pre</sub> - Q <sub>off</sub> , l/s	SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	DIFFERENCE (Q <sub>in</sub> - Q <sub>out</sub> ), l/s	Required Storage, litres	
10	0.00	3.90	2.40	2.40	1.50	902	select largest required storage, regardless of duration, to avoid overflow
20	0.00	2.92	1.79	2.40	0.52	623	
30	0.00	2.45	1.51	2.40	0.06	99	
60	0.00	1.81	1.11	2.40	No Att. Req.	0	
120	0.00	1.31	0.80	2.40	No Att. Req.	0	
360	0.00	0.74	0.46	2.40	No Att. Req.	0	
720	0.00	0.50	0.30	2.40	No Att. Req.	0	
1440	0.00	0.32	0.20	2.40	No Att. Req.	0	
2880	0.00	0.20	0.12	2.40	No Att. Req.	0	
4320	0.00	0.14	0.09	2.40	No Att. Req.	0	

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	1235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (ROW EAST)		
Date:	8 January 2026 REV 2		
		<b>1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

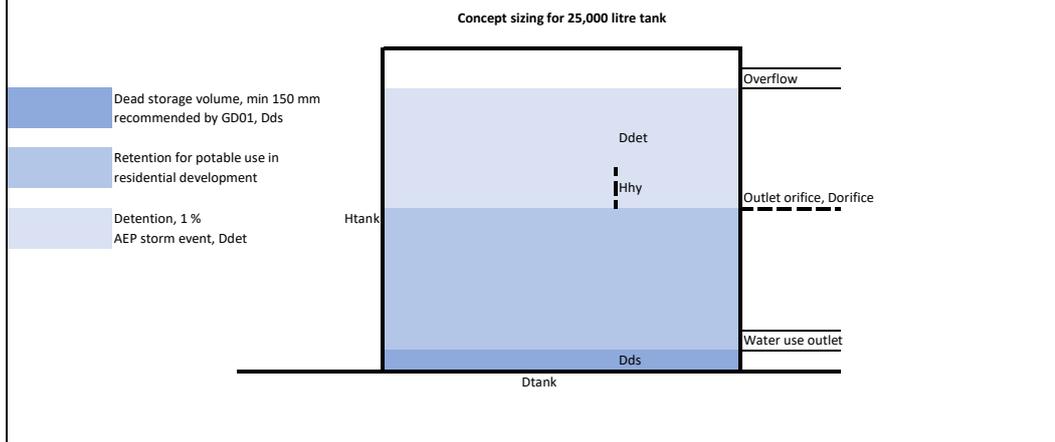
PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATING	150	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0			0	0	
EX. PVIOUS	150	0.59	Pasture, Type C		0	0	
	0	0		Pervious	0	0	
<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>600</b>	<b>TYPE C</b>	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION			
1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	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	174.0	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	145.00	1.2	174.00	5.80	3.56	2.85	Critical duration (time of concentration) for the catchments is 10min
20	109.00	1.2	130.80	4.36	2.68	2.14	
30	91.90	1.2	110.28	3.68	2.26	1.81	
60	68.00	1.2	81.60	2.72	1.67	1.34	Pre-dev calculated on intensity without CC factor
120	49.40	1.2	59.28	1.98	1.21	0.97	
360	28.20	1.2	33.84	1.13	0.69	0.55	
720	18.90	1.2	22.68	0.76	0.46	0.37	
1440	12.20	1.2	14.64	0.49	0.30	0.24	
2880	7.49	1.2	8.99	0.30	0.18	0.15	
4320	5.49	1.2	6.59	0.22	0.13	0.11	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	0.00	5.80	3.56	3.56	2.24	1341	select largest required storage, regardless of duration, to avoid overflow
20	0.00	4.36	2.68	3.56	0.80	954	
30	0.00	3.68	2.26	3.56	0.11	201	
60	0.00	2.72	1.67	3.56	No Att. Req.	0	
120	0.00	1.98	1.21	3.56	No Att. Req.	0	
360	0.00	1.13	0.69	3.56	No Att. Req.	0	
720	0.00	0.76	0.46	3.56	No Att. Req.	0	
1440	0.00	0.49	0.30	3.56	No Att. Req.	0	
2880	0.00	0.30	0.18	3.56	No Att. Req.	0	
4320	0.00	0.22	0.13	3.56	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



SPECIFICATION		
TOTAL STORAGE REQUIRED	1.341 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57 m	No. of Tanks 2
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	25025 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.13 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.28 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00356 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.07 m	
AREA OF ORIFICE, Aorifice	5.01E-03 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	80 mm	
VELOCITY AT ORIFICE	1.62 m/s	At max. head level

Project Ref:	C0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (ROW WEST)		
Date:	8 January 2026 REV 2		
		<b>50 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT</b>	

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 2023 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, m2	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATE	598	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0					
IMPERVIOUS C	0	0					
EX. PVIOUS	598	0.59	Pasture, Type C				
				Pervious			
<b>TOTAL</b>	<b>598</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>598</b>	<b>TYPE C</b>	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION		
50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	64.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	77.40	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.		

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, Qpa, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	64.50	1.2	77.40	10.29	6.32	5.06	Critical duration (time of concentration) for the catchments is 10min
20	48.10	1.2	57.72	7.67	4.71	3.77	
30	40.40	1.2	48.48	6.44	3.96	3.17	
60	29.70	1.2	35.64	4.74	2.91	2.33	Pre-dev calculated on Intensity without CC factor
120	21.40	1.2	25.68	3.41	2.10	1.68	
360	12.10	1.2	14.52	1.93	1.19	0.95	
720	8.10	1.2	9.72	1.29	0.79	0.64	
1440	5.19	1.2	6.23	0.83	0.51	0.41	
2880	3.16	1.2	3.79	0.50	0.31	0.25	
4320	2.31	1.2	2.77	0.37	0.23	0.18	

ATTENUATION ANALYSIS, VARIOUS DURATIONS							
DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECT. TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	10.2856	6.32	6.32	3.96	2378.55	select largest required storage, regardless of duration, to avoid overflow
20	0.00	7.670346667	4.71	6.32	1.35	1618.79	
30	0.00	6.442453333	3.96	6.32	0.12	217.97	
60	0.00	4.73616	2.91	6.32	No Att. Req.	0.00	
120	0.00	3.412586667	2.10	6.32	No Att. Req.	0.00	
360	0.00	1.929546667	1.19	6.32	No Att. Req.	0.00	
720	0.00	1.29168	0.79	6.32	No Att. Req.	0.00	
1440	0.00	0.827632	0.51	6.32	No Att. Req.	0.00	
2880	0.00	0.503914667	0.31	6.32	No Att. Req.	0.00	
4320	0.00	0.368368	0.23	6.32	No Att. Req.	0.00	

Project Ref:	C0662N		<b>STORMWATER RUNOFF CALCULATIONS</b>				
Project Address:	235 Ness Road, Waipapa						
Design Case:	PROPOSED DEVELOPMENT (ROW WEST)		20 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT				
Date:	8 January 2026	REV 2					
DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.							
RUNOFF COEFFICIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.							
<b>PRE DEVELOPMENT CATCHMENT PARAMETERS</b>				<b>POST DEVELOPMENT CATCHMENT PARAMETERS</b>			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATION	598	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0			0	0	
EX. PERVIOUS	598	0.59	Pasture, Type C		0	0	
				Pervious	0	0	
<b>TOTAL</b>	<b>525</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>525</b>	<b>TYPE C</b>	
<b>RAINFALL INTENSITY, 20% AEP, 10MIN DURATION</b>							
20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr		83.5	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		100.2	mm/hr				
<b>PRE AND POST-DEVELOPMENT RUNOFF, 20%AEP WITH CC, VARIOUS DURATIONS</b>							
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Q <sub>post</sub> , l/s	PRE DEV RUNOFF, Q <sub>pa</sub> , l/s	80% of PRE DEV RUNOFF, Q <sub>pre(80%)</sub> , l/s	COMMENTS
10	83.50	1.2	100.20	13.32	8.18	6.55	Critical duration (time of concentration) for the catchments is 10min
20	62.40	1.2	74.88	9.95	6.12	4.89	
30	52.40	1.2	62.88	8.36	5.14	4.11	Pre-dev calculated on intensity without CC factor
60	38.60	1.2	46.32	6.16	3.78	3.03	
120	27.90	1.2	33.48	4.45	2.73	2.19	
360	15.80	1.2	18.96	2.52	1.55	1.24	
720	10.60	1.2	12.72	1.69	1.04	0.83	
1440	6.79	1.2	8.15	1.08	0.67	0.53	
2880	4.15	1.2	4.98	0.66	0.41	0.33	
4320	3.03	1.2	3.64	0.48	0.30	0.24	
<b>ATTENUATION ANALYSIS, VARIOUS DURATIONS</b>							
DURATION, min	OFFSET FLOW, Q <sub>off</sub> , l/s	TANK INFLOW, Q <sub>in</sub> , l/s	ALLOWABLE TANK OUTFLOW, Q <sub>pre - Q<sub>off</sub></sub> , l/s	SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	DIFFERENCE (Q <sub>in</sub> - Q <sub>out</sub> ), l/s	Required Storage, litres	select largest required storage, regardless of duration, to avoid overflow
10	0.00	13.32	8.18	8.18	5.13	3079	
20	0.00	9.95	6.12	8.18	1.77	2121	
30	0.00	8.36	5.14	8.18	0.17	311	
60	0.00	6.16	3.78	8.18	No Att. Req.	0	
120	0.00	4.45	2.73	8.18	No Att. Req.	0	
360	0.00	2.52	1.55	8.18	No Att. Req.	0	
720	0.00	1.69	1.04	8.18	No Att. Req.	0	
1440	0.00	1.08	0.67	8.18	No Att. Req.	0	
2880	0.00	0.66	0.41	8.18	No Att. Req.	0	
4320	0.00	0.48	0.30	8.18	No Att. Req.	0	

Project Ref:	C0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (ROW WEST)		
Date:	8 January 2026 REV 2		
<b>10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW</b>			

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATION	598	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0			0	0	
EX. PERVIOUS	598	0.59	Pasture, Type C		0	0	
	0	0		Pervious	0	0	
<b>TOTAL</b>	<b>525</b>		<b>TYPE C</b>	<b>TOTAL</b>	<b>525</b>		<b>TYPE C</b>

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION			
10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	97.5	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	117.0	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 <sub>post</sub> , l/s	PRE DEV RUNOFF, Q <sub>pre</sub> , l/s	COMMENTS
10	97.50	1.2	117.00	15.55	9.56	Critical duration (time of concentration) for the catchments is 10min  Pre-dev calculated on Intensity without CC factor
20	72.90	1.2	87.48	11.63	7.14	
30	61.30	1.2	73.56	9.78	6.01	
60	45.20	1.2	54.24	7.21	4.43	
120	32.70	1.2	39.24	5.21	3.20	
360	18.60	1.2	22.32	2.97	1.82	
720	12.40	1.2	14.88	1.98	1.22	
1440	7.99	1.2	9.59	1.27	0.78	
2880	4.88	1.2	5.86	0.78	0.48	
4320	3.57	1.2	4.28	0.57	0.35	

ATTENUATION ANALYSIS, VARIOUS DURATIONS						
DURATION, min	OFFSET FLOW, Q <sub>off</sub> , l/s	TANK INFLOW, Q <sub>in</sub> , l/s	ALLOWABLE TANK OUTFLOW, Q <sub>pre</sub> - Q <sub>off</sub> , l/s	SELECTED TANK OUTFLOW, Q <sub>out</sub> , l/s	DIFFERENCE (Q <sub>in</sub> - Q <sub>out</sub> ), l/s	Required Storage, litres
10	0.00	15.55	9.56	9.56	5.99	3595
20	0.00	11.63	7.14	9.56	2.07	2483
30	0.00	9.78	6.01	9.56	0.22	396
60	0.00	7.21	4.43	9.56	No Att. Req.	0
120	0.00	5.21	3.20	9.56	No Att. Req.	0
360	0.00	2.97	1.82	9.56	No Att. Req.	0
720	0.00	1.98	1.22	9.56	No Att. Req.	0
1440	0.00	1.27	0.78	9.56	No Att. Req.	0
2880	0.00	0.78	0.48	9.56	No Att. Req.	0
4320	0.00	0.57	0.35	9.56	No Att. Req.	0

select largest required storage, regardless of duration, to avoid overflow

Project Ref:	IC0662N	<b>STORMWATER RUNOFF CALCULATIONS</b>	
Project Address:	1235 Ness Road, Waipapa		
Design Case:	PROPOSED DEVELOPMENT (ROW WEST)		
Date:	8 January 2026	REV 2	1 % AEP STORM EVENT, 80 % OF PRE DEVELOPMENT

DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF PREDICTED 2.1 DEGREE CLIMATE CHANGE. RESIDENTIAL DEVELOPMENT AREAS ARE BASED ON EXISTING SURVEY DATA.

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

PRE DEVELOPMENT CATCHMENT PARAMETERS				POST DEVELOPMENT CATCHMENT PARAMETERS			
ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION	ITEM	AREA, A, m <sup>2</sup>	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0		TO ATTENUATING	598	0.8	DRIVEWAY - metal
IMPERVIOUS B	0	0			0	0	
IMPERVIOUS C	0	0			0	0	
EX. PERVIOUS	598	0.59	Pasture, Type C		0	0	
	0	0		Pervious	0	0	
<b>TOTAL</b>	<b>525</b>	<b>TYPE C</b>		<b>TOTAL</b>	<b>525</b>	<b>TYPE C</b>	

**RAINFALL INTENSITY, 1% AEP, 10MIN DURATION**

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	145.0	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	174.0	mm/hr	

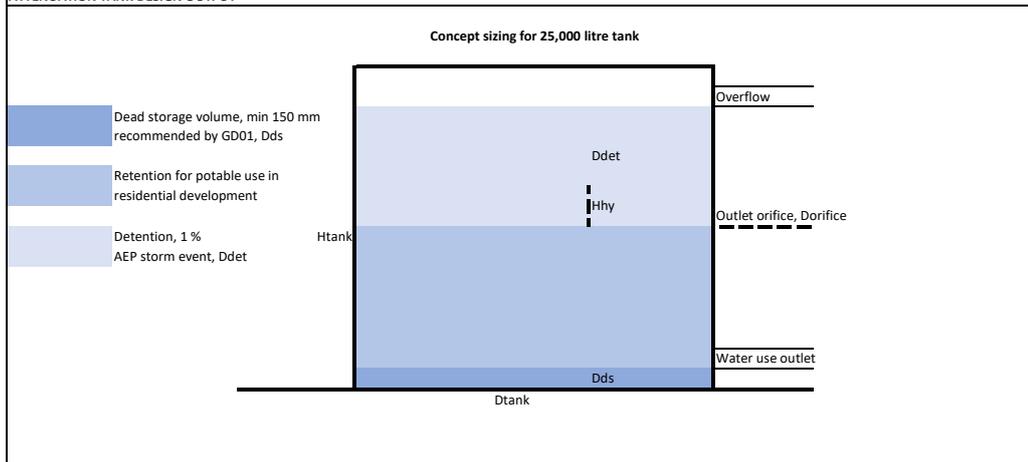
**PRE AND POST-DEVELOPMENT RUNOFF, 1%AEP WITH CC, VARIOUS DURATIONS**

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	145.00	1.2	174.00	23.12	14.21	11.37	Critical duration (time of concentration) for the catchments is 10min
20	109.00	1.2	130.80	17.38	10.68	8.55	
30	91.90	1.2	110.28	14.65	9.01	7.21	
60	68.00	1.2	81.60	10.84	6.66	5.33	Pre-dev calculated on Intensity without CC factor
120	49.40	1.2	59.28	7.88	4.84	3.87	
360	28.20	1.2	33.84	4.50	2.76	2.21	
720	18.90	1.2	22.68	3.01	1.85	1.48	
1440	12.20	1.2	14.64	1.95	1.20	0.96	
2880	7.49	1.2	8.99	1.19	0.73	0.59	
4320	5.49	1.2	6.59	0.88	0.54	0.43	

**ATTENUATION ANALYSIS, VARIOUS DURATIONS**

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW, Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	COMMENTS
10	0.00	23.12	14.21	14.21	8.91	5347	select largest required storage, regardless of duration, to avoid overflow
20	0.00	17.38	10.68	14.21	3.17	3805	
30	0.00	14.65	9.01	14.21	0.44	800	
60	0.00	10.84	6.66	14.21	No Att. Req.	0	
120	0.00	7.88	4.84	14.21	No Att. Req.	0	
360	0.00	4.50	2.76	14.21	No Att. Req.	0	
720	0.00	3.01	1.85	14.21	No Att. Req.	0	
1440	0.00	1.95	1.20	14.21	No Att. Req.	0	
2880	0.00	1.19	0.73	14.21	No Att. Req.	0	
4320	0.00	0.88	0.54	14.21	No Att. Req.	0	

**ATTENUATION TANK DESIGN OUTPUT**



**SPECIFICATION**

TOTAL STORAGE REQUIRED	5.347 m <sup>3</sup>	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5 m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.57 m	No. of Tanks 2
TANK AREA, Atank	10.01 m <sup>2</sup>	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	25025 litres	
REQUIRED STORAGE HEIGHT, Ddet	0.53 m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15 m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.68 m	
SELECTED TANK OUTFLOW, Qout, l/s	0.01421 m <sup>3</sup> /s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.27 m	
AREA OF ORIFICE, Aorifice	1.00E-02 m <sup>2</sup>	
ORIFICE DIAMETER, Dorifice	113 mm	
VELOCITY AT ORIFICE	3.24 m/s	At max. head level

Project Ref:	C0662N	<b>STORMWATER DISPERSION PIPE/ TRENCH</b>	
Project Address:	235 Ness Road, Waipapa		
Design Case:	CONCEPT DEVELOPMENT	<b>DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH</b>	
Date:	8 January 2026	REV 2	

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	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m <sup>2</sup>
160	0	0	0	0	0
155	5	20	20	2.5	50
TOTALS		20	20		50
SLOPE, Sc		0.250	m/m		

**MANNINGS PIPE FLOW - INCOMING PIPE**

Dia. m	d/D	α. rad	P. m	A. m <sup>2</sup>	R	1:S	n	V. m/s	Q. m <sup>3</sup> /s	Q. l/s
0.1	0.000	6.283	0.0000	0.0000	0.000	4.0000	0.009	0.000	0.0000	0.000
0.100	0.050	5.381	0.0451	0.0001	0.003	4.0000	0.009	1.220	0.0002	0.179
0.100	0.100	4.996	0.0644	0.0004	0.006	4.0000	0.009	1.905	0.0008	0.779
0.100	0.150	4.692	0.0795	0.0007	0.009	4.0000	0.009	2.455	0.0018	1.813
0.100	0.200	4.429	0.0927	0.0011	0.012	4.0000	0.009	2.921	0.0033	3.267
0.100	0.250	4.189	0.1047	0.0015	0.015	4.0000	0.009	3.328	0.0051	5.110
0.100	0.300	3.965	0.1159	0.0020	0.017	4.0000	0.009	3.687	0.0073	7.306
0.100	0.350	3.751	0.1266	0.0024	0.019	4.0000	0.009	4.004	0.0098	9.809
0.100	0.400	3.544	0.1369	0.0029	0.021	4.0000	0.009	4.285	0.0126	12.572
0.100	0.450	3.342	0.1471	0.0034	0.023	4.0000	0.009	4.533	0.0155	15.539
0.100	0.500	3.142	0.1571	0.0039	0.025	4.0000	0.009	4.750	0.0187	18.653
0.100	0.550	2.941	0.1671	0.0044	0.026	4.0000	0.009	4.937	0.0219	21.850
0.100	0.600	2.739	0.1772	0.0049	0.028	4.0000	0.009	5.094	0.0251	25.064
0.100	0.650	2.532	0.1875	0.0054	0.029	4.0000	0.009	5.222	0.0282	28.218
0.100	0.700	2.319	0.1982	0.0059	0.030	4.0000	0.009	5.319	0.0312	31.234
0.100	0.750	2.094	0.2094	0.0063	0.030	4.0000	0.009	5.384	0.0340	34.018
0.100	0.800	1.855	0.2214	0.0067	0.030	4.0000	0.009	5.414	0.0365	36.465
0.100	0.850	1.591	0.2346	0.0071	0.030	4.0000	0.009	5.403	0.0384	38.441
0.100	0.900	1.287	0.2498	0.0074	0.030	4.0000	0.009	5.340	0.0398	39.761
0.100	0.950	0.902	0.2691	0.0077	0.029	4.0000	0.009	5.201	0.0401	40.086
0.100	1.000	0.000	0.3142	0.0079	0.025	4.0000	0.009	4.750	0.0373	37.306

**DISPERSION SPECIFICATION**

**INCOMING PIPE PROPERTIES:**

TANK OUTFLOW, 1 % AEP	4.15 l/s	HOUSE TANK OVERFLOW
MAXIMUM PIPE FLOW	40.09 l/s	
SUFFICIENT CAPACITY IN PIPE	YES	
LONGITUDINAL SLOPE	0.250 m/m	
DESIGN VELOCITY, Dv	5.414 m/s	

**LEVEL SPREADER SPECIFICATIONS:**

PIPE DIAMETER, m	0.15 m	
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	30 No.	
DIA. OF ORIFICE, D	20 mm	
ORIFICE INTERVALS, C/C	150 mm	
DISPERSION PIPE LENGTH, L	4.35 m	Adopt 6m standard pipe length minimum

**ORIFICE DESIGN FLOW CHECK:**

AREA OF SINGLE ORIFICE, A	0.00031 m <sup>2</sup>		
FLOW OUT OF 1 ORIFICE	0.000289379 m <sup>3</sup> /s	0.29 l/s	
FLOW OUT OF ALL ORIFICES	0.00868138 m <sup>3</sup> /s	8.68 l/s	DESIGN OK
VELOCITY FROM SINGLE ORIFICE	0.92 m/s		

**BROAD CRESTED WEIR DESIGN FLOW CHECK:**

FLOW DEPTH, h	0.1125 m		
BASE WIDTH = L	4.35 m		
FLOW AREA	0.49 m <sup>2</sup>		
WEIR FLOW	0.01157 m <sup>3</sup> /s	11.57 l/s	DESIGN OK
WEIR VELOCITY	0.024 m/s		

**INCOMING PIPE & SPREADER SUMMARY:**

<b>LOT 2</b>	
INCOMING PIPE DIAMETER, m	0.100 m
SPREADER PIPE DIAMETER, m	0.150 m
MANNINGS PIPE ROUGHNESS	0.009
NUMBER OF ORIFICES	30 No.
DIA. OF ORIFICE, D	20 mm
ORIFICE INTERVALS, C/C	150 mm
DISPERSION PIPE LENGTH, L	4.35 m

HIRDS V4 Intensity-Duration-Frequency Results

Site name: F Ness Road, Waipapa

Coordinate system: WGS84

Longitude: 173.8804

Latitude: -35.1757

DDF Model Parameters: c d e f g h i

Values: 0.002103 0.543437 -0.01861 -0.00338 0.252635 -0.01149 3.299974

Example: Duration (h/yr) x Rainfall Rate (mm/hr)

24 100 3.178054 4.600149 12.11001

Rainfall Intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	59	43.9	36.9	27.1	19.5	11	7.38	4.77	2.81	2.1	1.66	1.37
2	0.5	64.5	48.1	40.4	29.7	21.4	12.1	8.1	5.19	3.16	2.31	1.82	1.51
5	0.2	83.5	62.4	52.4	38.6	27.9	15.8	10.6	6.79	4.15	3.03	2.4	1.98
10	0.1	97.5	72.9	61.3	45.2	32.7	18.6	12.4	7.99	4.88	3.57	2.83	2.34
20	0.05	112	83.6	70.3	51.9	37.6	21.4	14.3	9.22	5.64	4.13	3.27	2.71
30	0.033	125	91.9	75.5	55.6	39.7	23.2	15.5	9.96	6.1	4.47	3.53	2.93
40	0.025	126	94.5	79.6	58.8	42.6	24.3	16.3	10.5	6.43	4.71	3.73	3.09
50	0.02	131	98	82.6	61	44.3	25.2	16.9	10.9	6.69	4.9	3.88	3.21
60	0.017	135	101	85	62.8	45.6	26	17.5	11.2	6.9	5.05	4	3.31
80	0.013	141	106	88.9	65.7	47.7	27.2	18.3	11.8	7.23	5.3	4.2	3.48
100	0.01	145	109	91.9	68	49.1	28.1	18.9	12.2	7.49	5.49	4.35	3.6
250	0.004	164	123	104	77	56	32.1	21.6	13.9	8.56	6.27	4.97	4.12

Intensity standard error (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	7.3	4.5	3.4	2.6	1.8	1.1	0.83	0.68	0.39	0.32	0.24	0.22
2	0.5	8	4.9	3.7	2.8	2	1.2	0.91	0.75	0.44	0.35	0.27	0.24
5	0.2	11	7.1	5.5	4	2.8	1.7	1.3	1	0.59	0.48	0.37	0.33
10	0.1	14	9.5	7.5	5.2	3.7	2.2	1.6	1.2	0.71	0.58	0.44	0.39
20	0.05	18	13	10	6.8	5	2.9	2.1	1.5	0.85	0.69	0.53	0.47
30	0.033	21	15	12	8	5.9	3.4	2.5	1.6	0.94	0.76	0.59	0.52
40	0.025	23	17	14	9	6.6	3.8	2.8	1.8	1	0.81	0.63	0.55
50	0.02	25	18	15	9.8	7.2	4.1	3	1.9	1.1	0.86	0.66	0.58
60	0.017	27	20	16	11	7.8	4.5	3.3	2	1.1	0.9	0.69	0.61
80	0.013	30	22	18	12	8.7	5	3.6	2.1	1.2	0.96	0.74	0.65
100	0.01	33	24	20	13	9.5	5.5	4	2.2	1.3	1	0.79	0.68
250	0.004	45	34	28	18	14	7.9	5.7	2.8	1.6	1.3	0.99	0.85

Rainfall Intensities (mm/hr) :: 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	63.1	47	39.5	29	20.8	11.7	7.72	4.92	2.98	2.16	1.7	1.41
2	0.5	69.2	51.6	43.3	31.8	22.9	12.8	8.5	5.41	3.28	2.38	1.88	1.55
5	0.2	89.8	67.1	56.4	41.5	29.9	16.8	11.2	7.1	4.31	3.14	2.48	2.05
10	0.1	105	78.5	66	48.7	35.1	19.8	13.1	8.37	5.09	3.71	2.93	2.42
20	0.05	120	90.1	75.9	56	40.4	22.8	15.2	9.67	5.88	4.29	3.39	2.8
30	0.033	130	97.1	81.7	60.3	43.6	24.6	16.4	10.4	6.36	4.64	3.67	3.03
40	0.025	136	102	85.9	63.4	45.9	25.9	17.3	11	6.71	4.9	3.87	3.2
50	0.02	141	106	89.2	65.9	47.6	26.9	17.9	11.4	6.98	5.09	4.02	3.32
60	0.017	145	109	91.8	67.8	49.1	27.8	18.5	11.8	7.2	5.26	4.15	3.43
80	0.013	152	114	96.1	71	51.4	29.1	19.4	12.4	7.55	5.51	4.35	3.6
100	0.01	157	118	99.3	73.4	53.2	30.1	20.1	12.8	7.82	5.71	4.52	3.73
250	0.004	177	133	112	83.2	60.4	34.2	22.9	14.6	8.94	6.53	5.16	4.27

Rainfall Intensities (mm/hr) :: 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	63.1	47	39.5	29	20.8	11.7	7.72	4.92	2.98	2.16	1.7	1.41
2	0.5	69.2	51.6	43.3	31.8	22.9	12.8	8.5	5.41	3.28	2.38	1.88	1.55
5	0.2	89.8	67.1	56.4	41.5	29.9	16.8	11.2	7.1	4.31	3.14	2.48	2.05
10	0.1	105	78.5	66	48.7	35.1	19.8	13.1	8.37	5.09	3.71	2.93	2.42
20	0.05	120	90.1	75.9	56	40.4	22.8	15.2	9.67	5.88	4.29	3.39	2.8
30	0.033	130	97.1	81.7	60.3	43.6	24.6	16.4	10.4	6.36	4.64	3.67	3.03
40	0.025	136	102	85.9	63.4	45.9	25.9	17.3	11	6.71	4.9	3.87	3.2
50	0.02	141	106	89.2	65.9	47.6	26.9	17.9	11.4	6.98	5.09	4.02	3.32
60	0.017	145	109	91.8	67.8	49.1	27.8	18.5	11.8	7.2	5.26	4.15	3.43
80	0.013	152	114	96.1	71	51.4	29.1	19.4	12.4	7.55	5.51	4.35	3.6
100	0.01	157	118	99.3	73.4	53.2	30.1	20.1	12.8	7.82	5.71	4.52	3.73
250	0.004	177	133	112	83.2	60.4	34.2	22.9	14.6	8.94	6.53	5.16	4.27

Rainfall Intensities (mm/hr) :: 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	64.2	47.8	40.1	29.5	21.2	11.8	7.81	4.97	3	2.18	1.72	1.42
2	0.5	70.4	52.5	44.1	32.4	23.3	13	8.61	5.46	3.31	2.4	1.89	1.56
5	0.2	91.4	68.3	57.4	42.2	30.4	17.1	11.3	7.18	4.35	3.17	2.5	2.06
10	0.1	107	79.9	67.2	49.5	35.7	20.1	13.3	8.47	5.14	3.74	2.95	2.44
20	0.05	123	91.8	77.3	57	41.2	23.1	15.4	9.78	5.94	4.33	3.42	2.82
30	0.033	132	98.9	83.2	61.4	44.4	25	16.6	10.6	6.43	4.69	3.7	3.05
40	0.025	139	104	87.5	64.6	46.7	26.3	17.5	11.1	6.78	4.94	3.9	3.22
50	0.02	144	108	90.8	67.1	48.5	27.3	18.2	11.6	7.05	5.14	4.06	3.35
60	0.017	148	111	93.5	69.1	50	28.2	18.8	12	7.28	5.31	4.19	3.46
80	0.013	155	116	97.9	72.3	52.3	29.5	19.7	12.5	7.63	5.57	4.4	3.63
100	0.01	160	120	101	74.8	54.1	30.6	20.4	13	7.91	5.77	4.56	3.77
250	0.004	181	136	115	84.8	61.5	34.8	23.2	14.8	9.03	6.6	5.21	4.31

Rainfall Intensities (mm/hr) :: 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	67.5	50.3	42.2	31	22.2	12.3	8.09	5.12	3.08	2.23	1.75	1.45
2	0.5	74.1	55.2	46.4	34.1	24.5	13.6	8.93	5.64	3.4	2.46	1.94	1.6
5	0.2	96.5	72	60.6	44.6	32.1	17.8	11.8	7.43	4.48	3.26	2.56	2.11
10	0.1	113	84.4	71	52.3	37.7	21	13.9	8.77	5.3	3.85	3.03	2.5
20	0.05	130	97	81.7	60.2	44.3	24.3	16	10.1	6.14	4.46	3.51	2.9
30	0.033	140	105	88	65	46.8	26.2	17.3	11	6.64	4.83	3.8	3.14
40	0.025	147	110	92.5	68.3	49.3	27.6	18.3	11.6	7	5.09	4.01	3.31
50	0.02	152	114	96.1	71	51.2	28.7	19	12	7.28	5.3	4.18	3.44
60	0.017	157	117	98.9	73.1	52.8	29.6	19.6	12.4	7.51	5.47	4.31	3.55
80	0.013	163	123	104	76.5	55.3	31	20.5	13	7.89	5.74	4.52	3.73
100	0.01	169	127	107	79.1	57.2	32.1	21.3	13.5	8.17	5.95	4.69	3.87
250	0.004	191	144	121	89.7	64.9	36.5	24.2	15.4	9.33	6.8	5.36	4.43

Rainfall Intensities (mm/hr) :: 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	63.8	47.5	39.9	29.3	21	11.8	7.78	4.95	2.99	2		

HIRDS V4 Depth-Duration-Frequency Results

SiteName: F Ness Road, Waipapa

Coordinate system: WGS84

Longitude: 173.8804

Latitude: -35.1757

DDF Model Parameters: c d e f g h i

Values: 0.002103 0.543437 -0.01861 -0.00338 0.252355 -0.01149 3.299974

Example: Duration (hARI) (yrs) Rainfall Depth (mm)

24 100 3.178054 4.600149 293.0403

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.83	14.6	18.4	27.1	39.1	66.3	88.5	111	131	153	159	165
2	0.5	10.8	16	20.2	29.7	42.9	72.7	124	152	166	175	181	188
5	0.2	13.9	20.8	26.2	38.6	55.8	94.9	127	163	199	218	230	238
10	0.1	16.2	24.3	30.6	45.2	65.4	111	149	192	234	257	271	281
20	0.05	18.6	27.9	35.2	51.9	75.2	128	172	221	271	297	314	325
30	0.033	3.5	5.5	6.7	9.3	13.8	18.8	25.9	33.9	42.9	51.9	59.9	61
40	0.025	21	31.5	39.8	58.8	85.2	146	196	252	309	339	358	370
50	0.02	21.8	32.7	41.3	61	88.5	151	203	262	321	353	372	385
60	0.017	22.4	33.6	42.5	62.8	91.2	156	210	270	331	364	384	398
80	0.013	23.5	35.2	44.5	65.7	95.4	163	220	283	347	381	403	417
100	0.01	24.2	36.4	46	68	98.7	166	227	293	360	395	418	432
250	0.004	27.4	41.1	52	77	112	192	259	334	411	452	477	495

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	1.2	1.6	1.7	2.5	3.5	6.8	9.9	15	20	22	23	25
2	0.5	1.3	1.7	1.9	2.8	3.9	7.5	11	17	22	25	26	28
5	0.2	1.8	2.5	2.7	3.9	5.5	10	15	23	30	34	35	37
10	0.1	2.2	3.2	3.7	5.2	7.2	13	19	28	35	41	42	44
20	0.05	2.8	4.2	5	7	9.6	17	25	33	42	49	50	52
30	0.033	3.2	5	5.9	8.3	11	20	29	37	46	54	55	57
40	0.025	3.5	5.5	6.7	9.3	13	22	32	39	49	58	59	61
50	0.02	3.8	6	7.3	10	14	24	35	42	52	61	62	64
60	0.017	4	6.5	7.8	11	15	26	38	44	54	64	65	67
80	0.013	4.5	7.2	8.8	12	17	29	42	47	58	68	70	71
100	0.01	4.8	7.9	9.6	14	18	32	46	49	61	72	74	75
250	0.004	6.6	11	13	20	26	46	65	62	76	90	93	93

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	10.5	15.7	19.7	29	41.7	70	92.7	118	143	156	164	169
2	0.5	11.5	17.2	21.7	31.8	45.8	76.9	102	130	157	172	180	186
5	0.2	15.2	22.4	28.2	41.5	59.9	101	134	170	207	226	238	246
10	0.1	17.5	26.2	33	48.7	70.2	119	158	201	244	267	281	290
20	0.05	20.1	30	37.9	56	80.9	137	182	232	282	309	325	336
30	0.033	21.6	32.4	40.9	60.3	87.2	148	197	251	305	334	352	363
40	0.025	22.7	34	42.9	63.4	91.7	155	207	264	322	352	371	383
50	0.02	23.5	35.3	44.6	65.9	95.3	162	215	275	335	367	386	399
60	0.017	24.2	36.3	45.9	67.8	98.2	167	222	284	346	379	399	412
80	0.013	25.3	38	48	71	103	174	233	297	363	397	418	432
100	0.01	26.2	39.3	49.6	73.4	106	181	241	308	376	411	434	448
250	0.004	29.6	44.4	56.2	83.2	121	205	274	351	429	470	496	513

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	10.5	15.7	19.7	29	41.7	70	92.7	118	143	156	164	169
2	0.5	11.5	17.2	21.7	31.8	45.8	76.9	102	130	157	172	180	186
5	0.2	15	22.4	28.2	41.5	59.9	101	134	170	207	226	238	246
10	0.1	17.5	26.2	33	48.7	70.2	119	158	201	244	267	281	290
20	0.05	20.1	30	37.9	56	80.9	137	182	232	282	309	325	336
30	0.033	21.6	32.4	40.9	60.3	87.2	148	197	251	305	334	352	363
40	0.025	22.7	34	42.9	63.4	91.7	155	207	264	322	352	371	383
50	0.02	23.5	35.3	44.6	65.9	95.3	162	215	275	335	367	386	399
60	0.017	24.2	36.3	45.9	67.8	98.2	167	222	284	346	379	399	412
80	0.013	25.3	38	48	71	103	174	233	297	363	397	418	432
100	0.01	26.2	39.3	49.6	73.4	106	181	241	308	376	411	434	448
250	0.004	29.6	44.4	56.2	83.2	121	205	274	351	429	470	496	513

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	10.7	15.9	20.1	29.5	42.3	70.9	93.7	119	144	157	165	170
2	0.5	11.7	17.5	22	32.4	46.6	78	103	131	159	173	182	187
5	0.2	15.2	22.8	28.7	42.2	60.9	102	136	172	209	228	240	247
10	0.1	17.8	26.6	33.6	49.5	71.5	119	160	203	247	270	283	292
20	0.05	20.4	30.6	38.6	57	82.3	139	184	235	285	312	328	339
30	0.033	22	33	41.6	61.4	88.8	150	199	254	309	337	355	367
40	0.025	23.1	34.6	43.7	64.6	93.4	158	210	267	325	356	374	387
50	0.02	24	35.9	45.4	67.1	97	164	218	278	339	370	390	402
60	0.017	24.8	36.8	46.4	68.8	99.7	169	225	287	349	382	402	415
80	0.013	25.8	38.7	48.9	72.3	105	177	236	301	366	401	422	436
100	0.01	26.7	40	50.6	74.8	108	184	244	312	380	415	438	452
250	0.004	30.1	45.3	57.3	84.8	123	209	278	355	434	475	500	517

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	11.2	16.8	21.1	31	44.4	73.8	97.1	123	148	161	168	174
2	0.5	12.3	18.4	23.2	34.1	48.9	81.4	107	135	163	177	186	192
5	0.2	16.1	24	30.3	44.6	64.1	107	141	178	215	235	246	254
10	0.1	18.8	28.1	35.5	52.3	75.3	126	166	210	254	277	291	300
20	0.05	21.3	31.6	40.8	60.2	84.6	146	192	243	295	321	337	347
30	0.033	23.3	34.8	44	65	93.7	157	208	263	319	348	365	376
40	0.025	24.4	36.6	46.2	68.3	98.5	166	219	277	336	367	385	397
50	0.02	25.4	38	48	71	102	172	228	288	350	382	401	413
60	0.017	26.1	39.1	49.5	73.1	106	178	235	298	361	394	414	427
80	0.013	27.3	41	51.8	76.5	111	186	246	312	379	413	436	450
100	0.01	28.2	42.3	53.5	79.1	114	193	255	324	392	428	450	464
250	0.004	31.9	47.9	60.6	89.7	130	219	291	369	448	489	515	531

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	10.6	15.8	19.9	29.3	42.1	70.5	93.3	119	144	157	164	170
2	0.5	11.7	17.4	21.9	32.2	46.3	77.6	103	131	158	172	181	187
5	0.2	15.1	22.6	28.5	42	60.5	102	135	172	208	227	239	247
10	0.1	17.7	26.5	33.4	49.2	71	120	159	202	246	269	282	291
20	0.05	20.3	30.4	38.3	56.6	81.7	138	183	234	284	311	327	338
30	0.033	21.8	32.7	41.3	61	85.9	149	198	253	307	336	354	365
40	0.025	22.9	34.4	43.4	64.1	92.7	157	209	266	324	355	373	385
50	0.02	23.8	35.7	45.1	66.6	96.3	163	217	277	337	369	388	401
60	0.017	24.5	36.7	46.4	68.6	99.3	168	224	286	348	381	401	414
80	0.013	25.6	38.4	48.6	71.8	104	176	235	299	365	399	420	434
100	0.01	26.5	39.7	50.2	74.5	108	182	243	310	378	414	436	450
250	0.004	29.9	44.9	56.8	84.2	122	207	277	354	432	473	499	515

Rainfall depths (mm) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.7	17.5	22	32.4	46.2	76.4	100	126	151	164	171	177
2	0.5	12.9	19.2	24.2	35.6	51	84.4	111	139	167	181	190	195
5	0.2	16.8	25.1	31.7	46.6	67	111	146	184	221			