Te Kaunihera o Te Hiku o te Ika
Far North District Council

Office Use Only
Application Number:

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 Schedule 4). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

Have you met with a council Resource Consent representative to discuss this application prior to lodgement? ◯ **Yes** ✔ **No**

2. Type of Consent being applied for

(more than one circle can be ticked):

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

5. Applicant Details

Name/s: Arthur Cottle

Email:

Phone number: Work

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

Postcode

6. Address for Correspondence

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

Name/s: Donaldsons Surveyors

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.

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: Arthur Cottle

Property Address/ Location:

Postcode

8. Application Site Details

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

Name/s: Aruthur Cottle

Site Address/ Location: 2000 State Highway 10
Kerikeri

Postcode

Legal Description: Lot 2 DP 102334 **Val Number:**

Certificate of title: RT NA56C/28

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

Site visit requirements:

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

Is there a dog on the property? ◯ **Yes** ✔ **No**

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

9. Description of the Proposal:

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

Proposed land use for Commercial purposes

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** Enter BC ref # here (if known)
- ◯ **Regional Council Consent (ref # if known)** Ref # here (if known)
- ◯ **National Environmental Standard consent** Consent here (if known)
- ◯ **Other (please specify)** Specify 'other' here

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**
- ✔ **Changing the use of a piece of land**
- ◯ **Disturbing, removing or sampling soil**
- ◯ **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**

13. Draft Conditions:

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

If yes, do you agree to extend the processing timeframe pursuant to Section 37 of the Resource Management Act by 5 working days? ✔ **Yes** ◯ **No**

14. 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) Donaldsons Surveyors Ltd

Email:

Phone number:

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

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

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) Micah Donaldson

Signature:
(signature of bill payer

Date 04-Jun-2026

MANDATORY

15. Important Information:

Note to applicant
You must include all information required by this form. The information must be specified in sufficient detail to satisfy the purpose for which it is required.
You may apply for 2 or more resource consents that are needed for the same activity on the same form.
You must pay the charge payable to the consent authority for the resource consent application under the Resource Management Act 1991.

Fast-track application
Under the fast-track resource consent process, notice of the decision must be given within 10 working days after the date the application was first lodged with the authority, unless the applicant opts out of that process at the time of lodgement.
A fast-track application may cease to be a fast-track application under section 87AAC(2) of the RMA.

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

15. Important information continued...

Declaration

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

Name: **(please write in full)** Micah Donaldson

Signature: MD **Date** 04-Jun-2026

A signature is not required if the application is made by electronic means

Checklist (please tick if information is provided)

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

Donaldson's Surveyors Limited

90 Kerikeri Road - PO Box 211
Kerikeri 0245 - Northland - New Zealand

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DONALDSONS
REGISTERED LAND SURVEYORS

8694
4 June 2026

N. Cowley & J. Graham
Planning Division
Far North District Council
Private Bag 752
Kaikohe

Dear Nicola & Jo,

PROPOSED LAND USE ACTIVITIES
A. COTTLE, 2000 STATE HIGHWAY 10, KERIKERI

We hereby submit this application for Resource Consent to undertake a Land Use Activity within the Rural Production Zone. The proposal is assessed as a Non-Complying Activity under various rules of the operative District Plan.

This application is accompanied by the following supporting documentation:

- Application form & deposit $2625
- Planning Report
- Land Use Plan
- Record of Title
- Copy of RC 2200337
- Engineers Traffic Report
- Engineers Entrance Design – draft

Yours faithfully,

Micah Donaldson
MNZIS - Assoc.NZPI
DONALDSONS
Registered Land / Engineering Surveyors and Development Planners

NZIS REGISTERED PROFESSIONAL SURVEYOR

CSNZ THE CONSULTING SURVEYORS OF NEW ZEALAND
A DIVISION OF THE NEW ZEALAND INSTITUTE OF SURVEYORS

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DONALDSONS
REGISTERED LAND SURVEYORS

PLANNING REPORT

PROPOSED LAND USE ACTIVITY

MULTIPLE UNITS IN RURAL PRODUCTION ZONE

A. COTTLE, 2000 STATE HIGHWAY 10, KERIKERI

Date: 4 June 2026 Reference: 8694

CONTENTS

INTRODUCTION

The applicant seeks a new resource consent to regularise an expired consent, and to vary Condition 3 of RC 2200337 to provide an alternative arrangement for the entrance construction.

The proposal is assessed as a Non-Complying Activity within the Rural Production Zone.

This application should be read in conjunction with the information previously submitted under RC 2200337. Accordingly, this report focuses on updated and relevant planning matters, and is prepared in reliance on the accompanying Traffic Impact Assessment.

SITE DESCRIPTION

The property's legal reference:

Appellation: Lot 2 DP-102334
Registered Owner: Arthur Cottle
Record of Title: NA56C/28
Total Area: 3.0750 ha

The property is located at 2000 State Highway 10, Kerikeri.

The site comprises an established rural holding with a commercial & residential function. Development has occurred progressively over a number of years, both under earlier planning frameworks that provided more permissive activity status and through subsequent resource consent approvals.

The existing vehicle access onto State Highway 10 is in generally good condition; however, it does not meet the current standards required by RC 2200337. The access is shared with the adjoining property, Lot 1 DP 102334, which is subject to an approved 11-lot subdivision under RC 2230147. That consent includes a condition requiring a new T-Intersection entrance and road vesting.

The applicant and the adjoining landowner (consent holder of RC 2230147) intend to utilise the same entrance under one coordinated design. Both parties plan to defer construction for a period of three years. Accordingly, this application for a **new consent** introduces a **new condition**, to establish effective mitigation measures alongside the State Highway that will better control traffic and improve safety at the point of entry while the entrance remains in its current form.

The following covers the assessment of effects associated with overall land use activity RC 2200337.

FAR NORTH DISTRICT PLAN

The property is located in the Rural Production zone under the provisions of the Far North District Plan and is not located within any outstanding landscape.
Natural hazard overlays include flooding within the immediate extents of Whiriwhiritoa Stream which forms the southern boundary.

All applicable rules under the Rural Production zone remain unchanged from that approved under RC 2200337 in 2020.
The application continues to seek approval to breach the same previously consented rules:

8.6.5.4.1 Residential Intensity,
8.6.5.1.3 Stormwater Management
8.6.5.1.11 Scale of Activities,
15.1.6A.2.1 Traffic Intensity
15.1.6C.1.1 Private Accessway in All Zones.

Consent is also required for a Controlled Activity under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health.

Subject RC 2200337 concluded that adverse effects will be no more than minor. In particular:

a) While the proposal results in a level of development that exceeds that anticipated within the Rural Production Zone, the existing character of the site and surrounding environment has been taken into account. On balance, any resulting effects on character and amenity are considered to be no more than minor.

b) The site is well screened by existing vegetation in all directions. The proposed dwellings are of a modest scale (approximately 5 metres in height), with only minor earthworks proposed and no vegetation clearance. As such, landscape and visual effects are assessed as less than minor.

c) The proposal is not expected to result in any adverse social, economic, or cultural effects.

d) The development represents an efficient use of natural and physical resources, noting the absence of identified protected flora, fauna, or significant ecological values on the site.

e) Any potential adverse effects associated with the development and servicing of the site can be appropriately avoided, remedied, or mitigated through the recommended conditions of consent, consent notices, and compliance with Council Engineering Standards and Guidelines.

Positive Effects
The proposal will generate positive effects, including:
a) The provision of additional housing in Kerikeri, contributing to housing supply and supporting social and economic wellbeing.

District Plan Objectives and Policies
The following objectives and policies of the District Plan are considered relevant:

- *8.3.1 – Sustainable management of natural and physical resources*
- *8.3.2 – Protection of the life-supporting capacity of soils*
- *8.3.3 – Management of adverse and cumulative effects*
- *8.3.4 – Protection of significant indigenous vegetation and habitats*
- *8.3.5 – Protection of outstanding natural features and landscapes*
- *8.3.6 – Avoidance of land use conflicts*
- *8.3.7 – Maintenance and enhancement of rural amenity values*
- *8.3.9 – Enabling rural production activities*
- *8.3.10 – Enabling compatible activities within the rural environment*
- *8.4.2 – Enabling activities where adverse effects can be managed*
- *8.4.5 – Avoidance of reverse sensitivity and incompatible land uses*
- *8.4.7 – Efficient use of natural and physical resources*
- *8.4.8 – Management of intensity, scale, and cumulative effects in the rural environment*

Assessment Against Objectives and Policies

The relevant objectives and policies primarily seek to protect the values of the rural environment, including the life-supporting capacity of soils, natural features and landscapes, and rural amenity, while avoiding reverse sensitivity effects and ensuring compatibility of land uses.

The proposal involves additional residential development within the Rural Production Zone and, as such, does not fully align with the anticipated outcomes for the zone. However, this must be assessed in the context of the site and the receiving environment.

The site is already highly modified and subject to existing resource consents, including approvals for residential units and storage buildings. It does not exhibit significant values in terms of productive soils, natural features, or landscape qualities.

The request to defer the upgrade of the entrance and instead provide temporary mitigation is considered reasonable and practical in the circumstances. The existing access has been operating effectively under current traffic volumes associated with the established land uses, with no identified safety or operational issues arising.

The traffic engineering assessment has noted safety concerns that exist currently and in fact would have continued to exist post-construction of the entrance. This safety issue related to the unauthorised use of the metalled area that spans the edge of the state highway formation, being used as a rest area and truck stop. **The proposal introduces a new mitigation measure that will stop those unauthorised uses by way of erecting "flexible guide posts".**

It is also relevant to note that subsequent to the original consent being granted, NZ Transport Agency has undertaken significant upgrades to State Highway 10 in the vicinity of the site. These works include the installation of a roundabout and associated lane widening, which have materially improved the safety and efficiency of the transport network.

In particular, the presence of the roundabout has altered traffic behaviour in a positive manner by reducing vehicle speeds as drivers approach and exit the intersection. This results in a more controlled traffic environment compared to the previous free-flow conditions that existed at the time of the earlier consent. Lower approach speeds and improved traffic management reduce the risk profile of the site access and enhance overall safety for vehicles entering and exiting the property.

These existing and proposed changes contribute to a safer and more predictable operating environment for the existing access, supporting the appropriateness of deferring the entrance upgrade**. A deferred timeframe is requested at 3 years with the right to extend subject to reassessment.**

In terms of reverse sensitivity (Policy 8.4.5), the surrounding environment is characterised by a mix of rural, rural residential, commercial, and industrial activities, rather than a predominantly productive rural landscape. Accordingly, the potential for reverse sensitivity effects is considered to be low.

Policy 8.4.8 requires careful consideration of the intensity, scale, and type of development, as well as cumulative effects. In this case, the site does not contain identified significant ecological or landscape values, and the proposal represents an extension of an established activity, indicating a functional need for its location. Given the mixed-use nature of the surrounding environment and the limited presence of productive rural land, cumulative effects arising from non-rural activities are not expected to be significant.

Summary
While the proposal is not fully consistent with the Rural Production Zone, it is considered, on balance, to be not contrary to the relevant objectives and policies of the operative District Plan.

The six additional units authorised under RC 2200337 have now been constructed, and their associated effects are therefore established and fall within existing use rights under section 10 of the Resource Management Act 1991.

Since the original consent was granted, upgrades by NZ Transport Agency Waka Kotahi—including the installation of a roundabout and road widening—have improved traffic safety and reduced vehicle speeds in the vicinity of the site. This results in a safer and more controlled access environment than previously existed.

The applicant offers additional mitigation measures to improve traffic safety with the use of flexible guide posts.

Overall, the proposal represents a reasonable and appropriate outcome in the context of the site and its surroundings.

RESOURCE MANAGEMENT ACT 1991

ASSESSMENT OF ENVIRONMENTAL EFFECTS

The following assesses the environmental effects of the proposed activity in accordance with the Resource Management Act 1991 (RMA). The activity under consideration involves the establishment of a land use activity. Below is an examination of the potential environmental impacts and adherence to regulatory standards.

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.

Sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations:
The proposal provides a practical and cost-effective housing solution and storage needs for community members. The proposal promotes the sustainable use and development of physical resources without cause to unreasonable adverse environmental effects. The proposal will not compromise the ability of natural and physical resources to meet the reasonably foreseeable needs of future generations.

Safeguarding the life-supporting capacity of air, water, soil, and ecosystems
The scale of the activity is modest to this transition zone, where higher density development is supported, and will not adversely affect ecological values, air quality, soil resources, water resources, or the wider environmental capacity of the site.

Appropriate servicing is being provided to ensure the safe management of water supply, wastewater, and stormwater, and no adverse effects on the life-supporting capacity of air, water, soil, or ecosystems are anticipated. Accordingly, the proposal is consistent with the sustainable management purpose of the Act.

Avoiding, remedying, or mitigating adverse effects on the environment
The proposal is of a scale that is consistent with the established pattern within the locality.
Potential effects including traffic generation, servicing requirements, and site utilisation, are expected to be negligible or less than minor. The proposal does not give rise to any significant adverse effects on neighbouring properties or the wider rural environment, where the lands use has already been approved under earlier resource consent resolution. The proposal introduces new mitigation measures to improve entry safety, and safety of the wider state highway (described in detail in the attached Traffic Engineering assessment). As such, adverse effects on the environment are appropriately avoided, remedied, or mitigated.

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:

A river feature is present along the southern boundary of the site and therefore constitutes a matter of national importance under Section 6(a) of the Act. The proposal mitigate development effects utilising setbacks for buildings, stormwater detention for impermeable surface discharge, and wasterwater treatment that upholds industry guidelines under TP 58.

The development does not involve works within the river margins, does not cause drainage modification, vegetation clearance, or activities that would adversely affect the rivers ecological values, hydrological function, or natural character. The proposal is located within an already modified area of the site, therefore does not result in any significant expansion or modification to access formation footprint, and no direct impact into the river itself.

Stormwater infrastructure provides attenuation and treatment of runoff prior to discharge and ensures that stormwater generated from additional impermeable surfaces is appropriately managed. Accordingly, the proposal is not anticipated to adversely affect water quality, hydrology, or the ecological functioning.

Given this resource consent is an assessment to a previously approved activity, aspects such as open space and landscaping are I context with the underlying approval.
Adverse effects in this regard are considered to be less than minor.

(b) the protection of outstanding natural features and landscapes from inappropriate subdivision, use, and development:
There are no identified Outstanding Natural Features or Outstanding Natural Landscapes affected by the proposal.
The site contains appropriate open space, mature specimen trees, established landscaping, and natural vegetation associated with the gully and river embankment. The proposal will not materially alter the visual character of the site or surrounding rural landscape. Accordingly, adverse effects on any outstanding natural feature or landscape values are not anticipated.

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

The proposal does not involve the removal of significant indigenous vegetation, earthworks within ecologically sensitive areas, or disturbance of habitats supporting indigenous fauna. Existing vegetation associated with the site's will be retained.

Stormwater runoff from the development will continue to be managed through the established on-site detention and treatment system, ensuring that adverse effects on downstream ecological values are avoided. The proposal therefore does not adversely affect significant indigenous vegetation or significant habitats of indigenous fauna, and effects in this regard are considered less than minor.

(d) the maintenance and enhancement of public access to and along the coastal marine area, lakes, and rivers:
The proposal does not involve land adjoining the coastal marine area, or lakes, nor does it affect any existing or potential public access to these environments. The subject river is not wide enough (ave. >3m) to constitute public access considerations.
Accordingly, this matter is not applicable to the proposal.

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

The Ngāti Rehia Hapu Management Plan identifies key concerns regarding water quality and the fragmentation of indigenous vegetation, which the hapū are committed to protecting and enhancing. The proposal does not directly conflict with these concerns, as it involves no vegetation clearance or significant earthworks. Effluent disposal meets higher treatment standards through secondary treatment, and the site's soil characteristics provide effective soakage, thereby minimising potential impacts. There will also be no effect on fisheries.

Ngāti Rehia has acknowledged that they are not inherently opposed to development but emphasize that any development must not adversely affect their heritage, culture, or the environment. The subject site is highly modified and the proposed use mimics the already consent activities approved on the site.
Overall, the site is not in proximity to any identified cultural heritage sites as listed in the district plan or features of likely significance. On this basis, and the fact the site is already entirely developed, the proposal is considered to have negligible environmental and cultural impact and aligns with the objective of preserving the existing environment while enabling appropriate development.

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

There are no known historic heritage sites.

(g) the protection of protected customary rights.

There are no known customary rights to consider.

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.

The proposal enables efficient use of land that is appropriately zoned for a wide variety of land use activities, and by optimising the development potential of an established site in a manner consistent with the wider environment.
The proposal effectively provides additional residential accommodation within the Kerikeri area, contributing modestly to local housing availability as it avoids the need for those family members to find accommodation elsewhere. Significant positive outcomes are therefore evident. Such living arrangements assists in reducing broader housing demand pressures while enabling occupants to remain within the local community.
The presence of multiple independent households on-site also generates ongoing local economic contribution through day-to-day expenditure on goods and services, thereby supporting social and economic wellbeing outcomes. Overall, the proposal represents an efficient, low-intensity form of rural residential development that aligns with the intended character and function of the zone.

The site's easy contour allows for optimised passive solar gain and potential renewable energy use, promoting sustainable living and reducing long-term energy costs for future residents. The applicant has demonstrated a commitment to effective stormwater management and climate change adaptation measures, further reinforcing the sustainability and resilience of the development.

Overall, the development strikes an appropriate balance between environmental, social, and economic considerations, supporting the growth and housing needs of the region while maintaining the character and integrity of the existing environment.

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

The proposal is not considered to contradict the Treaty of Waitangi's interpretations.
The subject site contains no identified sites of cultural significance, and the proposal does not affect any Treaty interests. Section 8 obligations are acknowledged but do not impact the lawful use of the land.

ASSESSMENT OF THE ACTIVITY AGAINST SECTION 104(1)(B)

Section 104(1)(b)
any relevant provisions of—

(i) a national environmental standard:
(ii) other regulations:
(iii) a national policy statement:
(iv) a New Zealand coastal policy statement:
(v) a regional policy statement or proposed regional policy statement:
(vi) a plan or proposed plan;

Under various headings, the application covers all relevant provisions including, the Far North District Plan, National Environmental Standards, and Regional Policy Statement. There are no other relevant provisions.

An application must also include an assessment of the activity's effects on the environment that –

(a) *includes the information required by clause 6*
(b) *address the matters specified in clause 7; and*
(c) *includes such detail as corresponds with the scale and significance of the effects that the activity may have on the environment.*

CLAUSE 6

(1) An assessment of the activity's effects on the environmental must include the following information:

(a) *if it is likely that the activity will result in any significant adverse effects on the environment, a description of any possible alternative locations or methods for undertaking the activity:*

The proposed land use presents no significant adverse effects, and effects are well managed.

(b) *an assessment of the actual or potential effects on the environment of the activity.*

The actual physical effects meets the permitted activity standards; as it defines and existing approved consent.

(c) *if the activity includes the use of hazardous substances and installations, an assessment of any risk to the environment that are likely to arise from such use.*

There are none.

(d) *if the activity includes the discharge of any contaminants, 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:

Wastewater is the only discharge and this is in accordance with industry standards.

(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 effects:*

There are no issues to address.

(f) *identification of the persons affected by the activity and consultation undertaken, and any response to the views of any person consulted:*

The proposal upholds the zones objectives and policies, therefore on that basis there are no affected parties.

(g) *if the scale and significance of the 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:*

No monitoring appears necessary.

(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).*

No concern.

(2)
A requirement to include information in the assessment of environmental effects is subject to the provisions of any policy statement or plan.

This is covered under the heading 'Northland Regional Policy Statement' below.

CLAUSE 7
7 Matters that must be addressed by assessment of environmental effects

(1) An assessment of an activity's effects on the environment must address the following matters:

(a) any effect on those in the neighbourhood and, where relevant, the wider community, including any social, economic, or cultural effects:

The proposal is considered to promote the zone guidelines and surrounding land use activities, without any unreasonable effects to concern the wider community including social and economic or cultural aspects.

(b) any physical effects on the locality, including any landscape, and visual effects.

No concern.

(c) Any effects on ecosystems, including effects on plants or animals and any physical disturbance of habitats in the vicinity.

The land use does not result in any habitat disturbance.

(d) any effect on natural and physical resources having aesthetic, recreational, scientific, historical, spiritual, or cultural values, or other special value, for present and future generations:

The values outlined are not seen to be depleted in this instance.

There is no influence on Fisheries.

(e) any discharge of contaminants in to the environment, including any unreasonable emissions of noise, and options for the treatment and disposal of contaminants:

There are none associated with the proposal.

(f) any risk to the neighbourhood, the wider community, or the environment through natural hazards or the use of hazardous substances or hazardous installations.

To the best of our knowledge there are no concerns.

Summary

Clause 6 & 7 – Fourth Schedule RMA Assessment (Section 104D Gateway Test)
Pursuant to section 104D of the Resource Management Act 1991, where a proposal is classified as a Non-Complying Activity, it may only be granted consent if it satisfies either or both of the tests under section 104D(1). If neither gateway test is met, consent must be declined.

In this case, it is considered that the proposal satisfies the requirements of section 104D(1), as:

- The proposal is not contrary to the relevant objectives and policies of the District Plan; and
- The actual and potential adverse effects of the activity are no more than minor, as determined under earlier resolution RC 2200337.

Accordingly, the proposal passes the section 104D gateway test and may be considered under section 104B of the Act.

Assessment of Precedent in this Case
The application proposes to legalise the previously approved six one-bedroom residential units on the site. While located within the Rural Production Zone, the site is not representative of a typical rural production environment.
The site has previously been granted consent for one main dwelling and six one-bedroom residential units, and a number of large storage sheds, therefore already highly modified and developed for residential & commercial purposes. It exhibits limited rural production characteristics and does not function as a productive rural site in any meaningful sense.

The proposed development involves minimal earthworks and no vegetation removal. Furthermore, the site is located within a mixed-use environment, surrounded by rural residential, commercial, and industrial activities

Precedent Effects
On balance, the proposal is considered to be of a unique nature in the context of the Rural Production Zone, given the existing level of modification, prior consents, and the surrounding land use pattern. It is therefore considered that granting consent would not give rise to adverse precedent effects.

Northland Regional Policy Statement

The Northland Regional Policy Statement presents foundation development guidelines for the northland region.

PART 3: OBJECTIVES

3.4 Indigenous ecosystems and biodiversity
Safeguard Northland's ecological integrity by:
a) Protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna;
b) Maintaining the extent and diversity of indigenous ecosystems and habitats in the region; and
c) Where practicable, enhancing indigenous ecosystems and habitats, particularly where this contributes to the reduction in the overall threat status of regionally and nationally threatened species.

6.1.1 Policy – Regional and district plans
Regional and district plans shall:
(a) Only contain regulation if it is the most effective and efficient way of achieving resource management objective(s), taking into account the costs, benefits and risks;
(b) Be as consistent as possible;
(c) ***Be as simple as possible****;*
(d) Use or support good management practices;
(e) Minimise compliance costs and enable audited self-management where it is efficient and effective;
(f) Enable subdivision, use and development that accords with the Regional Policy Statement; and
(g) Focus on effects and where suitable use performance standards.

The activity is technically an existing situation and therefore does not adversely affect natural vegetation or waterways.

The proposal is not seen to clash with the Regional Policy Statement and therefore should be assessed under Resource Consent on an enabling basis.

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

(a) Is guided by the 'Regional Form and Development Guidelines' in Appendix 2;

5.1.1 Policy – Planned and coordinated development

Part A) Regional form and development guidelines
New subdivision, use and development should:
(a) Demonstrate access to a secure supply of water;

No concern, the substantial roof area provides excellent catchment for potable supplies.

(b) Demonstrate presence or capacity or feasibility for effective wastewater treatment;

Onsite wastewater disposal design and construction have been implement, these operate without concern.

(c) If of an urban or residential nature connect well with existing development and make use of opportunities for urban intensification and redevelopment to minimise the need for urban development in greenfield (undeveloped) areas;

This is not urban or residential.

(d) If of an urban or residential nature provide, where possible, opportunities to access a range of transport modes;

Not applicable.

(e) If of a community-scale, encourage flexible, affordable and adaptable social infrastructure that is well located and accessible in relation to residential development, public transport services and other development;

Not applicable.

(f) Recognise the importance of and provide for parks, in regards to medium and large-scale residential and residential / mixed use development.

Not applicable.

(g) If of a residential nature be, wherever possible, located close to or sited in a manner that is accessible to a broad range of social infrastructure;

The situation has been considered appropriate to this environment.

(h) Be directed away from regionally significant mineral resources and setback from their access routes to avoid reverse sensitivity effects;

There are no known nearby regionally significant mineral resources.

(i) Be designed, located and sited to avoid adverse effects on energy transmission corridors and consented or designated renewable energy generation sites (refer to 'Regional form and infrastructure' for more details and guidance);

There are no subject energy transmission corridors, or renewable energy sites.

(j) Be designed, located and cited to avoid significant adverse effects on transportation corridors and consented or designated transport corridors;

There are no known adverse effects on transportation corridors, and NZTA have provided support.

(k) Be directed away from 10-year and 100-year flood areas and high risk coastal hazard areas (refer to 'Natural hazards' for more details and guidance);

Flooding does occur alongside the stream, however all buildings are set well back, not to be an issue.

The sites impermeable surface cover upholds existing use rights as they were all approved by either building consent or resource consent.

(l) Seek to maintain or improve outstanding landscape and natural character values and provide for the protection of significant historic and cultural heritage from inappropriate subdivision, use and development (refer to 'Land, Water and Common Resources' for more details and guidance);

There are no outstanding landscapes.

(m) Protect significant ecological areas and species, and where possible enhance indigenous biological diversity (refer to 'Maintaining and enhancing indigenous ecosystems and species' for more details and guidance);

There is no impact on significant ecological areas.

(n) Maintain and improve public access to and along the coastal marine area, lakes and rivers;

Not applicable.

(o) Avoid or mitigate adverse effects on natural hydrological characteristics and processes (including aquifer recharge), soil stability, water quality and aquatic ecosystems, including through low impact design methods where appropriate;

No concerns.

(p) Adopt, where appropriate, sustainable design technologies such as the incorporation of energy-efficient (including passive solar) design, low-energy street lighting, rain gardens, renewable energy technologies, rainwater storage and grey water recycling techniques;

Not applicable.

(q) Be designed to allow adaptation to the projected effects

No concern.

(r) Consider effects on the unique tangata whenua relationships, values, aspirations, roles and responsibilities with respect to the site of development;

Tangata whenua are protective of waterways and water quality and the proposal as an consented situation does not undermine those aspirations.

(s) Encourage waste minimisation and efficient use of resources (such as through resource-efficient design and construction methods);

No concern.

(t) Take into account adopted regional / sub-regional growth strategies;

No concern.

(u) Where appropriate, encourage housing choice and business opportunities, particularly within urban areas.

This supports the activity.

(b) Is guided by the 'Regional Urban Design Guidelines' in Appendix 2 when it is urban in nature;

Not applicable.

(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;

The very nature of the wider environment is certainly diverse and this supports the activity.

(d) Is integrated with the development, funding, implementation, and operation of transport, energy, water, waste, and other infrastructure;

No concerns.

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

Overall, there is no change to the sites actual use.

(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

No concern, there is no reduction to soil-based primary production.

(g) Maintains or enhances the sense of place and character of the surrounding environment except where changes are anticipated by approved regional or district council growth strategies and / or district or regional plan provisions.

The proposal does not change the sense of place, already exhibiting a defined commercial theme that the proposal is compatible with.

(h) Is or will be serviced by necessary infrastructure.

The site is serviced with all necessary infrastructure.

NATIONAL POLICY STATEMENT FOR HIGHLY PRODUCTIVE LAND 2022

Highly productive land is to be protected for use in land based primary production, both now and for future generations, and is to be recognised as a resource with finite characteristics and long term values for land based primary production.

1.3 Interpretation
Highly productive land – means land that has been mapped in accordance with clause 3.4 and is included in an operative regional policy statement as required by clause 3.5 (but see cluse 3.5(7) for what is treated as highly productive land before the maps are included in an operative regional policy statement and cluse 3.5(6) for when land is rezoned and therefore ceases to be highly productive land).

The proposal does not result in any adverse effects on versatile soils. The site has class 3 soils (3w2); however, it relates to an already established (as-built) development and therefore this consent does not undermine versatile soils. The application seeks to regularise an existing consent rather than introduce any additional land disturbance or change in land use. Accordingly, there is no further impact on the soil resource beyond that which has already occurred.

NATIONAL POLICY STATEMENT For Freshwater Management 2020

Part 1
1.3 Fundamental concept – Te Mana o te Wai
(1) Te Mana o te Wai is a concept that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. It protects the mauri of the wai. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment, and the community.

Objectives and Policies
2.1
The objective of this National Policy Statement is to ensure that natural and physical resources are managed in a way that priorities:
(a) first, the health and wellbeing of water bodies and freshwater ecosystems
(b) second, the health needs of people (such as drinking water)
(c) third, the ability of people and communities to provide for their social, economic and cultural wellbeing, now and in the future.

2.2
Policy 3
Freshwater is managed in an integrated way that considers the effects of the use and development of land on a whole-of-catchment basis, including the effects on receiving environments.

Policy 4
Freshwater is managed as part of New Zealand's integrated response to climate change.

Policy 6
There is no further loss of extent of natural inland wetlands, their values are protected, and their restoration promoted.

Policy 9
The habitats of indigenous freshwater species are protected.

3.5 Integrated management
(1) Adopting an integrated approach ki uta ki tai, as required by Te Mana o te Wai, requires that local authorities must:
(a) recognise the interconnectedness of the whole environment, from the mountains and lakes, down the rivers to lagoons, estuaries and to the sea.

(b) recognise interactions between freshwater, land, water bodies, ecosystems, and receiving environments.

(c) manage freshwater, and land use and development, in catchments in an integrated and sustainable way to avoid, remedy, or mitigate adverse effects, including cumulative effect on the health and well-being of water bodies, freshwater ecosystems, and receiving environments.

(d) Encourage the co-ordination and sequencing of regional or urban growth.
The national policy statement presents strong incentives for development to 'avoid' actual or potential effects that would compromise wetlands, or the natural components linked to waterways.

As described above, the proposal does not result in any adverse environmental effects, as it relates to an already established (as-built) development. The application seeks to regularise an existing consent rather than introduce any additional land disturbance or change in land use. Accordingly, there is no further impact on freshwater beyond that which has already occurred.

PROPOSED DISTRICT PLAN

The property is located in the Light Industrial zone under the Proposed District Plan.

The district's Light Industrial zone complements the Heavy Industrial zone and facilitates a range of activities which contribute to the district's economic well being. The Light Industrial zone provides for a range of industrial activities that are unlikely to produce offensive or objectionable environmental effects but may generate some adverse effects, including those associated with odour, dust or noise.

Objectives

LIZ-O1

The Light Industrial zone is utilised for the efficient operation of light industrial activities and is managed to ensure its long-term protection, including from:

a. land fragmentation;
b. land sterilisation; and
c. reverse sensitivity effects.

LIZ-O3

Enable land use and subdivision in the Light Industrial zone where there is adequacy and capacity of available or programmed development infrastructure to support it.

The site is already developed and serviced, and the proposal does not place any significant additional demand on infrastructure beyond what has previously been authorised and established.

In this regard, the scale and nature of the activity is consistent with the capacity of the surrounding network, including transportation, access, and servicing infrastructure. No additional infrastructure upgrades over and above that already offered, are required to accommodate the proposal, and any potential effects are able to be appropriately managed through conditions.

Accordingly, the proposal is considered to be consistent with the intent of enabling development in locations where infrastructure capacity is available and adequate to support the activity.

LIZ-P6

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. consistency with the scale, density, design and character of the light industrial environment and purpose of the zone;

The proposal is consistent with the scale, density, design, and character of the Light Industrial Zone. Any potential reverse sensitivity effects arising from the residential activities are considered to be adequately managed through a good separation distance and isolation from wider industrial style activities.
In addition, the storage business activities undertaken within the sheds onsite are low-impact in nature and do not give rise to reverse sensitivity effects. These activities are compatible with residential use and therefore consistent with the intended function of the zone.

b. the location, scale and design of buildings or structures, outdoor storage areas, parking and internal roading;

These internal site components were designed and approved under RC 2200337 and have since been constructed and are operating as intended, with no identified issues.

c. for non-industrial activities:
i. scale and compatibility with industrial activities;
ii. potential reverse sensitivity effects on industrial activities.

As an existing use there is no concern, and effects have been appropriately managed.

d. at zone interfaces:
i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
ii. any adverse effects on the character and amenity of adjacent zones.

No concerns.

e. the adequacy and capacity of available or programmed development infrastructure to accommodate the proposed activity; including:
i. opportunities for low impact design principles;
ii. management of three waters infrastructure and trade waste such as industrial by-products.

No concerns.

f. managing natural hazards;

No concerns.

g. the adequacy of roading infrastructure to service the proposed activity;

No concerns.

h. any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity; and

No concerns.

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

No concerns.

The site is within the Light Industrial Zone of the Proposed District Plan (PDP). While the PDP provides useful guidance, it has limited legal effect as a draft plan and does not override existing resource consents or lawfully established activities.

The site is already fully developed, it does not increase infrastructure demand or materially change existing effects.

The proposal is consistent with the relevant objectives and policies of the Light Industrial Zone, with reverse sensitivity effects appropriately managed through separation from surrounding industrial activities and the low-impact nature of the on-site storage use. All site layout and infrastructure have been previously approved and are already constructed, with no identified issues relating to infrastructure, hazards, heritage, cultural values, or the environment.
The proposed bond relates solely to securing the future completion of the entrance upgrade works. No physical construction or ground disturbance is authorised or proposed as part of this application itself. Accordingly, there are no earthworks or archaeological effects arising directly from this consent.

Any future construction works undertaken to give effect to the entrance upgrade will be subject to standard statutory requirements at the time of implementation, including compliance with the protocols of Heritage New Zealand in the event that archaeological material is encountered or works occur in an area of potential archaeological sensitivity.

UPDATED DRAFT CONDITIONS

Pursuant to Section 108, 108AA of the Act, this consent is issued subject to the following conditions:

The activity shall be carried out in accordance with the approved plans attached to this consent with the Council's "Approved Stamp" affixed to them, as follows:
a. ~~'Topographic Survey of~~ **Land Use Activities on** Lot 2 DP 102334', prepared by Donaldsons Registered Land Surveyors, referenced ~~7321~~ 8694, dated ~~17/10/2018~~ April 2026.
b. 'Site Features Plan' prepared by Haigh Workman, referenced 17 111, dated 25/09/2019.

This consent must also be carried out in general accordance with the following supporting document:
a. Traffic Assessment Report (DIGI TRAFF CONSULTING), dated 22 June 2026)

2. Prior to the commencing any physical site works, a construction management plan shall be submitted to and approved by the Council. The plan shall contain information on, and site management procedures, for the following:

a. The timing of building demolition and construction works, including hours of work, key project and site management personnel.

b. The transportation of demolition and construction materials from and to the site and associated controls on vehicles through sign-posted site entrance / exits and the loading and unloading of materials.

c. The excavation works, including retaining structures and any necessary dewatering facilities.

d. Control of dust and noise on-site and any necessary avoidance or remedial measures.

e. Prevention of earth and other material being deposited on surrounding roads from vehicles and remedial actions should it occur.

f. Publicity measures and safety measures, including signage, to inform adjacent landowners and occupiers, pedestrians and other users or Road

g. Erosion and sediment control measures to be in place for the duration of the works.

3. The consent holder shall upgrade the existing crossing place CP148A in accordance with NZTA Diagram E and approval letter dated 21 February 2019 (LUD 118267) Upon completion of the upgrade work, the consent holder shall provide confirmation to Council that NZTA is satisfied with the work and an updated s91 notice has been issued for CP148A.

4. The consent holder shall provide formed and metalled shared access to 3m finished metalled carriageway width to service the proposed units. The formation is to consist of a minimum of 200mm of compacted hard fill plus a GAP 30 or GAP 40 running course and is to include water table drains and culverts as required to direct and control stormwater runoff.

5. In conjunction with the construction of any building requiring a wastewater disposal system the lot owner shall obtain a Building Consent and install the wastewater treatment and effluent disposal system in general accordance with the report prepared by High Workman Ltd and submitted with Resource Consent 2200337. The wastewater disposal and reserve disposal areas are not to be located within the 1:100-year flood plain as shown on the FNDC and NRC flood hazard maps within the application.
Where a wastewater treatment and effluent disposal system is proposed that differs from that detailed in the above-mentioned report, a new TP 58 / Site and Soil Evaluation Report will be required to be submitted, and Council's approval of the new system must be obtained, prior to its installation.

6. Prior to the construction of any building the consent holder shall install a stormwater detention pond with a flow attenuated outflow to limit 10% AEP run-off from the site to the pre-development levels as detailed in the report prepared by High Workman and submitted with Resource Consent 2200337. All storm water originating from new roofs, paved surfaces and tank overflow is to be piped to, and discharged into, the detention pond located on the lot.

Detailed drawings of the proposed detention pond and outfall structure to the Whiriwhiritoa Stream are to be submitted for Council approval prior to works commencing. The outfall structure is to be designed such that no blockage or scouring of the stream occurs during discharge periods.

7. Prior to occupation of the dwellings the consent holder shall provide a water collection system with sufficient supply for fire fighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509:2008. A building consent is required for this work.

8. The owner shall preserve the vegetation screening on Lot 2 DP 102334 and shall not without the prior written consent of the Council and then only in strict compliance with any conditions imposed by the Council, cut down, damage or destroy any of such trees or bush. The owner shall be deemed to be not in breach of this prohibition if any of such trees or bush shall die from natural causes not attributable to any act or default by or on behalf of the owner or for which the owner is responsible.

9. If evidence of contamination which has not been previously identified is discovered during earthworks, the consent holder shall immediately cease works in the area. Details of any unexpected contamination and contingency measures shall be provided to the Team Leader, RMA Compliance, Far North District Council.

10. Erosion and sediment control measures shall be carried out in accordance with the "Guideline Document 2016/005, Erosion and Sediment Control Guide for Land Disturbing Activities in the Auckland Region, Incorporating Amendment 1", dated June 2016 and prepared by Auckland Council.

11. Excavation works shall not commence at the site until all the environmental controls have been put in place.

12. Exposed excavated areas shall be kept to a minimum at all times to minimise the risk of erosion due to stormwater runoff.

13. The consent holder shall control any dust in accordance with the "Good Practice Guide for Assessing and Managing Dust" dated November 2016 and prepared by the Ministry for the Environment.

14. All excavated soil removed from the property is to be transported in a covered truck with sealed tailgate and be disposed of at facility licensed to accept the relevant level of contamination.

15. All soil stockpiles shall be located within an area of sediment and erosion controls and shall be covered by an impermeable layer if left overnight and when rain is anticipated during the working day.

16. Any materials imported to the site shall meet the "Cleanfill Definition" as outlined in the document titled "A Guide to the Management of Cleanfills" dated January 2002 and prepared by the Ministry for the Environment.

17. As an alternative to undertaking the entrance upgrade works required by Condition 3, the Consent Holder may install flexible guideposts, or similar physical delineation devices, along the eastern edge of the State Highway carriageway. These devices shall extend from the northern end of the existing formal shared access throat to the commencement of the constructed footpath at the Bunnings entrance.
A design plan detailing the proposed delineation measures shall be submitted to NZTA for approval prior to installation.
This condition shall remain valid for a period of three (3) years from the date of resource consent approval. The Consent Holder may apply to Council for an extension of this period, which shall be subject to assessment and approval through the resource consent process.

CONCLUSION

Overall, this application seeks to regularise an existing, already constructed development through a fresh resource consent, together with the introduction of a new condition to defer construction of the entrance upgrade.

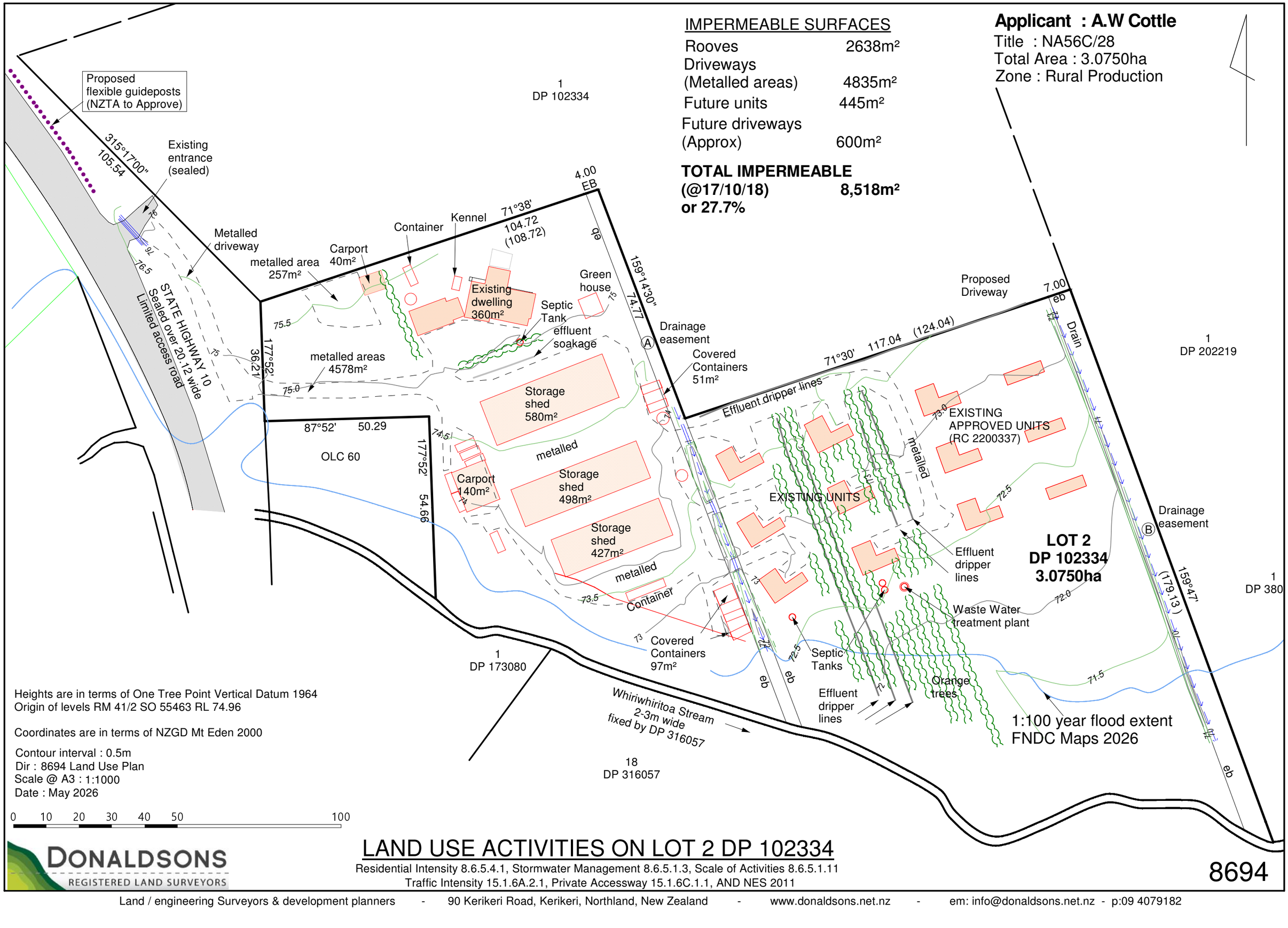
The proposal is retrospective in nature and does not introduce any new or unanticipated effects beyond those already established on the site. The development has been lawfully established under previous consents and continues to operate in a manner consistent with its existing use rights and surrounding land use context.

The transport environment has materially improved since the original consent was granted, following significant upgrades to the State Highway undertaken by NZ Transport Agency Waka Kotahi, including the installation of a roundabout and associated road widening. These improvements have enhanced traffic management, reduced vehicle speeds, and increased overall safety and efficiency in the vicinity of the site access.

The applicant offers an additional consent condition to mitigate effects caused by unauthorised use of the metalled area adjoining the site entrance.
In this context, the improved road environment supports the request to defer construction of the entrance upgrade for a period of three years.

Having regard to the actual and potential effects, relevant District Plan objectives and policies, and the established nature of the development, the proposal is considered acceptable. It is not contrary to the objectives and policies of the District Plan, and the adverse effects are less than minor. Accordingly, the application is appropriate for approval.

Micah Donaldson
ASSOC.NZPI
DONALDSONS
Land / Engineering Surveyors and Development Planners
NZIS
REGISTERED PROFESSIONAL SURVEYOR



LAND USE ACTIVITIES ON LOT 2 DP 102334

Residential Intensity 8.6.5.4.1, Stormwater Management 8.6.5.1.3, Scale of Activities 8.6.5.1.11
Traffic Intensity 15.1.6A.2.1, Private Accessway 15.1.6C.1.1, AND NES 2011

DONALDSONS
REGISTERED LAND SURVEYORS

8694

Land / engineering Surveyors & development planners - 90 Kerikeri Road, Kerikeri, Northland, New Zealand - www.donaldsons.net.nz - em: info@donaldsons.net.nz - p:09 4079182

Quickmap Title Details

Information last updated as at 24 May 2026

RECORD OF TITLE
DERIVED FROM LAND INFORMATION NEW ZEALAND
FREEHOLD

Identifier **NA56C/28**

Land Registration District **North Auckland**

Date Issued 16 January 1985

Prior References

NA28C/985

Type Fee Simple

Area 3.0750 hectares more or less

Legal Description Lot 2 Deposited Plan 102334

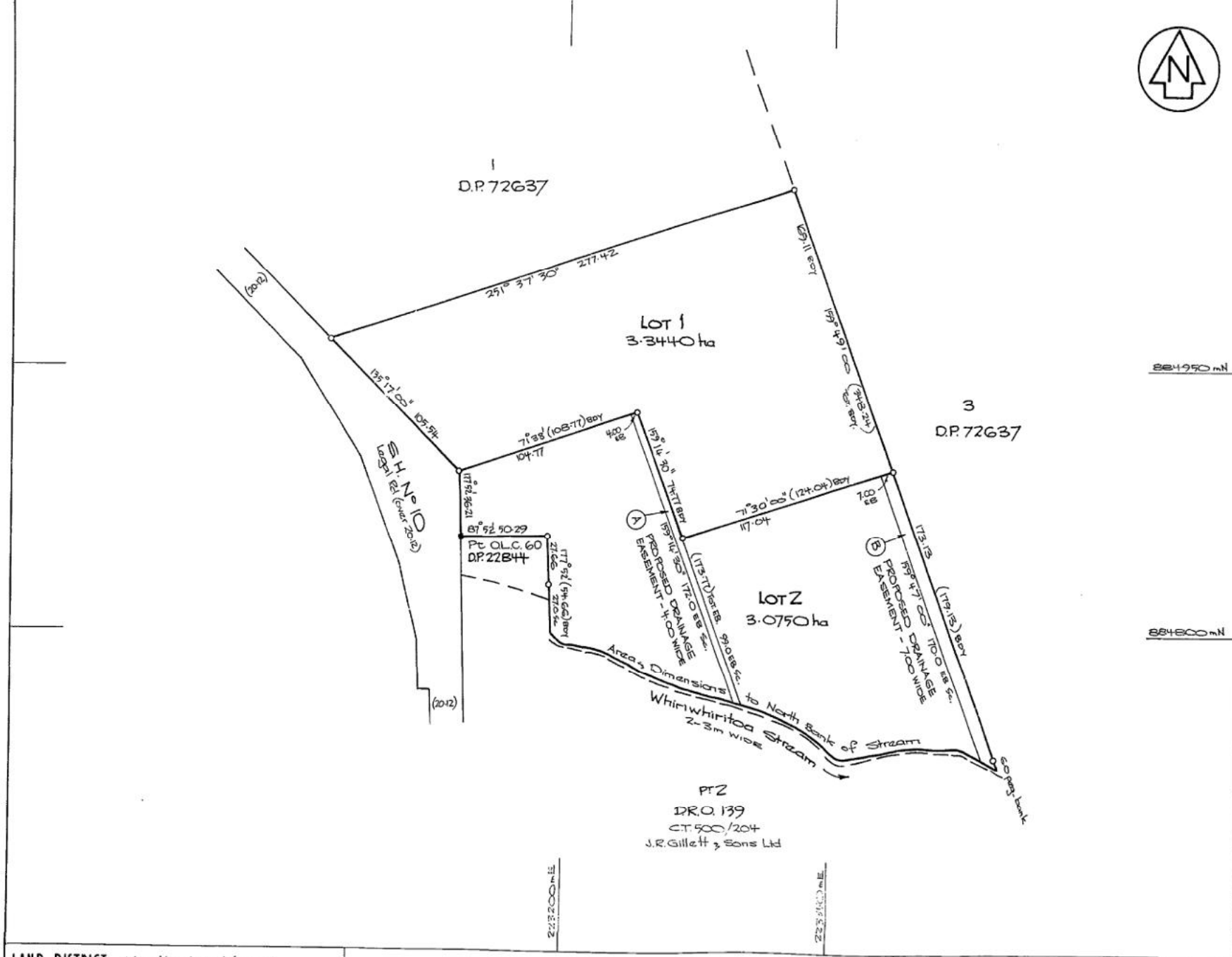
Registered Owners

Arthur William Cottle

573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining State Highway to be a limited access road - 31.1.1979 at 10.51 am

Subject to a water drainage right over parts marked A and B on DP 102334 specified in Easement Certificate B695154.1 - 9.7.1987 at 9.00 am

6027671.5 Mortgage to ANZ Banking Group (New Zealand) Limited - 2.6.2004 at 9:00 am



Approvals Approved

Registered Owner

Pursuant to a resolution of the Bay of Islands County Council passed on the 21st day of March 1983 approving pursuant to Section 309 of the Local Government Act 1974 this survey plan and certifying that the survey plan is in accordance with a consent granted under Part IV of the Town and Country Planning Act 1977 the Common Seal of the Bay of Islands County Council was hereto affixed in the presence of:-

Chairman

County Clerk

PROPOSED EASEMENTS

Purpose	Shown	Serv. Ten.	Dom. Ten.
DRAINAGE	(A)	Pt Lot 2, HEREON	Lot 1 HEREON
DRAINAGE	(B)	Pt Lot 2, HEREON	Lot 1 HEREON

New C.T. Allocated:
Lot 1, C.T. 56C/27 — Lot 2, C.T. 56C/28

We, J.R. Gillett & Sons Ltd, registered proprietors of the land in certificate of title 500/204 agree to the definition of the boundary with certificate of title 28C/985 shown hereon and consent to the issue of a certificate of title in accordance therewith.

Total Area 6.4190 ha

Comprised in C.T. 28C/985 (ALL)

I, David Dawson Rayburn of Whangarei
Registered Surveyor and holder of an annual practising certificate hereby certify that this plan has been made from Surveys executed by me or under my direction; that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1966
Dated at Whangarei this 27th day of May 1983 Signature

Field Book p. Traverse Book p.

Reference Plans

Examined D. A. Table Correct

Approved as to Survey

22/6/1984 for Chief Surveyor

Deposited this 16th day of January 1985

District Land Registrar

File Received Instructions

DP 102334

LAND DISTRICT North Auckland
SURVEY BLK.& DIST. X Kerikeri
NZMS SHEET No. P05/5.1

LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2, D.P. 72637

LOCAL AUTHORITY Bay of Islands County
Surveyed by Rayburn & Bryant
Scale 1:1500 Date May 1983

Printed by Starline Inserts Ltd Auckland New Zealand.
W. N. Hawker Surveyor-General, Department of Lands and Survey Wellington

DIGITRAFF

DEFINE THE FUTURE, TODAY

PREPARED BY DIGITRAFF LTD

Traffic Assessment Report

Interim Vehicle Crossing Operation

Prepared for Geologix Consulting Engineers Ltd

22 May 2025

Revision History

Rev	Date	Description	Prepared By
A	20 May 2026	Initial Draft for Review	Reza Khorasani
A	22 May 2026	Final	Reza Khorasani
B	3 June 2026	Final	Reza Khorasani

Disclaimer

This report has been prepared by DigiTraff solely for the use of Geologix Consulting Engineers Ltd in connection with the specific project and purpose described herein. The findings, opinions, and recommendations are based on information available at the time of preparation and reflect the professional judgement of the authors as at that date, without accounting for any subsequent changes in conditions or circumstances.

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1. Introduction

DigiTraff Ltd has been commissioned by Geologix Consulting Engineers Ltd to prepare a Traffic Assessment (TA) on the interim operation of the existing access point at the site located at 2000 State Highway 10 (SH10), Waipapa, Northland. The access point at the subject site is shared with two other adjoining properties being 1998 State Highway 10 (Part OLC 60) and 2006 State Highway 10, Waipapa (Lot 1, DP 164804). It is proposed to use this access at its current layout and condition until the completion of the proposed subdivision of the Lot 1 where the access point will be upgraded to a priority T-intersection which will permanently.

The existing access point has been the subject of a number of engineering and consenting processes over recent years. The access currently operates in a non-compliant condition and has not been upgraded to the Diagram E geometric design standard previously required by NZTA as a condition of the approved development on Lot 2. A new intersection layout, different from the Diagram E standard, is now proposed as part of the Lot 1 subdivision, which will permanently replace the existing access arrangement for all three sites. A detailed history of the access point, the previous upgrade requirements, and the proposed new layout is provided in Section2.3 of this report.

1.3 Scope of Assessment

This assessment covers the existing shared access point and its effect on the safety and operation of the SH10 and road users during the interim period from the present day until the completion of the proposed subdivision of Lot 1 and the construction of the new T-intersection on SH10. The assessment has been conducted against the requirements of the Appendix 5B Accessway Standards and Guidelines (2007 PPM) and the Access onto the State Highway from Private Property Planning Policy Manual (2025 PPM) as the primary applicable guideline, with sight distance calculations referenced to the Austroads Guide to Road Design Part 4A. The assessment determines whether the existing access, in its current non-compliant condition, can operate during the defined interim period without significant adverse effect on the safety and operational efficiency of SH10 and its users, and identifies the mitigation measures required to support acceptable interim operation.

2. Site Location and Description

The three sites subject to this assessment are located on the eastern side of State Highway 10 at Waipapa, in the Far North District of Northland. Waipapa is a small locality immediately north of Kerikeri, characterised by a mix of rural production, light commercial, and residential land uses along the SH10 corridor. The subject sites collectively occupy the eastern road frontage of SH10 for a distance of approximately 280m between the Waipapa Road/Twin Coast Discovery Highway roundabout to the north and the Kahikatearoa Lane intersection to the south.

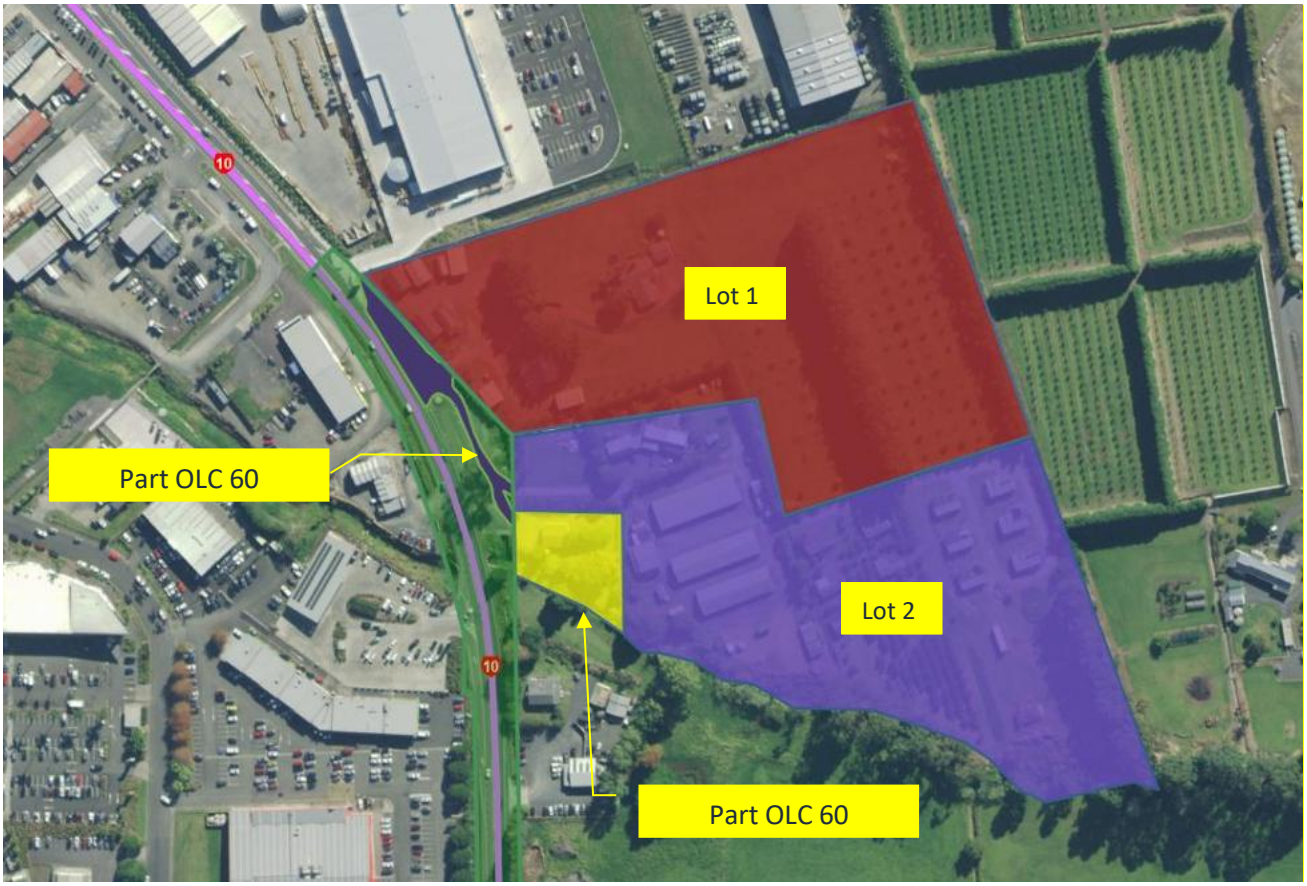

***Figure 1**: Location of three site in relation to SH10.*

2.3 Site Development History

2.3.1 Lot 1 (DP 164804) — SH10, Waipapa

Lot 1 currently accommodates three activities: one residential dwelling, a house haulage yard, and the Westervelt Owhaoko honey business. The haulage yard and honey business both generate Heavy Commercial Vehicle movements through the existing access at the western boundary of the site. All three activities will be removed upon commencement of the Lot 1 subdivision works, after which the site will be developed as ten light industrial lots under the proposed district plan Light Industrial zoning, as described in the Engineering Outcomes assessment (Document 5) dated August 2022.

2.3.2 Lot 2 (DP 102334) — 2000 SH10, Waipapa

The development history of Lot 2 spans the period from 2012 to the present and is the most documented of the three sites. The earliest traffic assessment for the site was prepared by Haigh Workman Civil and Structural

Consultants in September 2012 (Document 8), establishing the baseline traffic generation characteristics of the then-existing activities — one residential dwelling, 60 self-storage lockup units, and 5 one-bedroom chalets. That assessment was updated in November 2012 (Document 6) following a Section 92 request from the Far North District Council, to incorporate a concrete fabrication component that had not been included in the original September 2012 report. Both assessments established that the 0.4 Traffic Intensity Factor per unit for self-storage sheds — derived from an actual traffic count at a 60-unit facility at Mill Lane — was the appropriate rate to apply and confirmed that the combined daily traffic movements were within the 60 TIF per day permitted threshold under the Far North District Plan. An actual traffic count at the site driveway conducted as part of these assessments recorded an average of 55 one-way vehicle movements per day over a seven-day period.

Legal advice obtained by the Far North District Council in August 2012 confirmed that the site is located on a Limited Access Road and identified NZTA as a potential affected party for any resource consent where traffic effects on SH10 were more than minor. The legal advice also noted that while the self-storage activity does not neatly fit any Traffic Intensity Factor category in the District Plan, the bulk warehousing subcategory under Industry was the closest available match, and that an expert traffic report would be required to determine whether the actual traffic effects met the threshold for notifying NZTA.

Lot 2 currently accommodates one residential dwelling, 60 self-storage lockup units, 12 one-bedroom chalets and visitor accommodation units, and a concrete fabrication yard for concrete paver production. The number of accommodation units increased from the 5 units recorded in the 2012 assessments to the current 12 units prior to the 2019 NZTA approval process, though the specific consenting history for this increase in accommodation units is not documented in the reviewed documents.

In February 2019, NZTA issued a conditional approval (LUD 118267, Document 3) for a further 6 additional visitor accommodation units on the site, requiring the existing access at CP148A to be upgraded to the Diagram E standard of the 2007 NZTA Planning Policy Manual before those additional units could open. The Diagram E upgrade required the provision of 15-metre bellmouth turning radii, widening of the SH10 carriageway to 6.0 metres from the centreline for a distance of 60 metres on each side of the access, 1:10 tapers to the edge of seal, mountable headwalls on the culverts beneath the access, and relocation of the existing fence line to achieve a Safe Intersection Sight Distance of 170 metres. These requirements were incorporated as Condition 3 of Resource Consent RC 2200337, granted by the Far North District Council in March 2020. The Diagram E upgrade was never constructed, and Resource Consent RC 2200337 lapsed in March 2025 without being given effect to.

The current active resource consent application for Lot 2 is RC 2230147. During the Section 92 process for that application, the Far North District Council forwarded NZTA's position on the access design to the applicant in May 2023. NZTA's response stated that the site is complex, that their standard design templates are not suited to the site topography and existing environment, and that a modified bespoke design will be required. NZTA further stated that there is a risk that neither party may be able to agree on a design, and that issuing the resource consent before the detailed design is agreed presents a significant risk to the development. NZTA's position therefore requires the detailed design of the access to be agreed with Waka Kotahi prior to the resource consent being finalised.

2.3.3 Part OLC 60 — 1998 State Highway 10, Waipapa

Part Old Land Claim 60 is a separate legal title at 1998 State Highway 10, Waipapa, occupied by the Waipapa Gospel Hall and Church. The crossing place CP148 on SH10 is associated with this site. Part OLC 60 does not have its own independent direct crossing of the SH10 road boundary — its access point is located within the eastern portion of the SH10 road parcel, from which it connects via Cottle Way running parallel to the SH10 carriageway within the road reserve to the shared access throat at the western boundary of Lot 1 at 2006

State Highway 10. Part OLC 60 has no reasonably practicable alternative access to another road. Under Section 5 of the 2025 NZTA Planning Policy Manual, it is therefore entitled to at least one crossing place. The new side road to be provided as part of the Lot 1 subdivision will satisfy this entitlement by connecting Part OLC 60 to the new public subdivision road vested in the council, replacing the existing Cottle Way arrangement.

2.4 Existing Transport Environment

2.4.1 Surrounding Road Network

The site has a frontage to State Highway 10. The stretch of State Highway 10 in front of the site is a two-lane undivided carriageway with a posted speed limit of 70 kilometres per hour. The highway is designated as a Limited Access Road at this location, forming part of the Northland regional road network connecting the Kerikeri township to Paihia and the wider Bay of Islands area to the north. The stretch of SH10 in the immediate vicinity of the site has a curved horizontal alignment and level vertical alignment, with a very wide shoulder of greater than 2.0 metres and lane widths of 3.5 metres in both directions, as observed and also recorded in the MegaMaps corridor data.

Approximately 280 metres north of the site access, SH10 intersects with Waipapa Road and the Twin Coast Discovery Highway at a roundabout. This roundabout was formerly a priority intersection and was upgraded as part of the SH10 Waipapa Improvements[1], with construction completed in 2021. Approximately 370 metres south of the site access, SH10 meets Kahikatearoa Lane at an uncontrolled T-intersection.

The road parcel at this location is significantly wider than in adjacent sections of the highway to the north and south. This wider road parcel extends along the frontage of all three subject sites and accommodates stormwater infrastructure — including manholes and utility connections — constructed as part of a stormwater project in the vicinity[2]. The wider road parcel creates a strip of land between the eastern edge of the SH10 carriageway and the western property boundaries of the three sites, which sits within the legal road reserve but outside the formed carriageway. This strip of road reserve forms part of the existing access arrangement for Lot 2 at 2000 State Highway 10 and Part OLC 60 at 1998 State Highway 10, as described in the following section.

The land use context along this section of SH10 is classified as Rural Town in the MegaMaps corridor data, reflecting the mixed rural and commercial character of the Waipapa locality. Two parameters from the MegaMaps data are of particular significance to this assessment. The first is the recorded operating speed of 63 kilometres per hour. This is materially lower than the 80 kilometres per hour default 85th percentile operating speed assumed under the NZTA Planning Policy Manual, which applies the convention of adding 10 km/h to the posted speed limit. The lower measured operating speed reflects the real-world influence of the nearby Waipapa Road roundabout 280 metres to the north, which causes approaching vehicles to decelerate, and the semi-commercial character of the Waipapa locality. This is further supported by a site visit conducted by Geologix on 15 May 2025, during which operating speeds of 57 km/h southbound and 60 km/h northbound were observed while driving the corridor — consistent with the MegaMaps figure and confirming that vehicles on this stretch of SH10 are travelling materially below the 80 km/h default assumption.

The second significant parameter is the access density of 10 to less than 20 per kilometre, which confirms that this section of SH10 already operates with a high number of direct property access points. This density

[1] SH10 Waipapa Corridor Improvements | NZ Transport Agency Waka Kotahi
[2] SH10-Waipapa-Corridor-Improvements-information-sheet-July-2020.pdf

reinforces the importance of consolidating the three existing crossing places serving the subject sites into a single, formally designed intersection rather than maintaining multiple separate access points.

***Figure 2**: Location of Stormwater Manhole and Connections on SH10 road parcel.*

2.4.2 Traffic Volumes

The traffic volume on SH10 at the site location has been assessed using two sources. The first is the State Highway Traffic Monitoring data for count station ID 01000015, located on SH10 at Springbank Road, approximately 1 kilometre south of Waimate North Road. This station records traffic on both lanes using a non-continuous dual loop configuration, with heavy vehicles comprising 6.8% of the total volume. The annual average daily traffic counts recorded at this station are set out in Table X below.

***Table 1:** Annual Average Daily Traffic — SH10 Count Station 01000015*

Year	2020	2021	2022	2023	2024
AADT	7,419	7,971	8,017	8,417	8,669

The recorded counts show a consistent upward trend, increasing by approximately 1,250 vehicles per day between 2020 and 2024, equivalent to an average annual growth of around 310 vehicles per day over that period. The most recent recorded count of 8,669 vehicles per day in 2024 is considered the most reliable baseline for this assessment.

The second source is the MegaMaps corridor data for this specific location, which records an AADT band of 6,000 to less than 12,000 vehicles per day. For the purposes of this assessment, a current AADT of 9,504 vehicles per day has been adopted from the MegaMaps data, as it represents a more current and site-specific estimate. This figure is broadly consistent with the growth trajectory evident in the count station data and is considered conservative and appropriate for design purposes.

At the adopted AADT of 9,504 vehicles per day, SH10 at this location falls within the 5,000 to 10,000 vehicles per day volume band. This is significant for the purposes of this assessment, as the 2025 NZTA Planning Policy Manual applies desirable access spacing standards to highways within this volume range — a threshold that was not triggered under the 2007 Planning Policy Manual, which only applied equivalent standards above 10,000 vehicles per day."

2.4.3 Crash History

A search of the NZ Transport Agency Waka Kotahi (NZTA) Crash Analysis System (CAS) was undertaken for a corridor along State Highway 10 (SH10) extending from the site access point northward to the roundabout at the intersection of Waipapa Road and the Twin Coast Discovery Highway, and approximately 370 metres southward to the Kahikatearoa Lane intersection. This search corridor spans approximately 650 metres and covers the 10-year period from 2016 to 2026, satisfying the minimum 10-year crash history requirement stipulated in the 2025 NZTA Planning Policy Manual.

A total of 17 crashes were recorded within the search corridor during this period, comprising one fatal, one serious, four minor, and eleven non-injury crashes. Notably, none of these crashes occurred in the vicinity of the existing site access, as illustrated in the **Figure 3** below.

It is also noted that following the completion of the SH10 corridor upgrade in 2021, seven crashes were recorded, consisting of three non-injury and four minor crashes. This represents a shift in crash severity distribution post-upgrade, with no fatal or serious crashes recorded in that period.

The complete crash dataset is presented in Appendix A, with a summary provided in the tables below.

Figure 3: *Crash Found in Vicinity of the Site*

2.4.4 Walking and Cycling

There are no dedicated pedestrian footpaths or cycle lanes along the SH10 frontage at the subject site. The MegaMaps corridor data does not record any active travel infrastructure along this section of SH10. The shoulder width of greater than 2.0 metres provides some informal space for pedestrians and cyclists, though this is not a designated facility.

2.4.5 Public Transport

There is no public transport service operating along SH10 at the Waipapa locality.

2.5 Access to State Highway 10

2.5.1 Formation of the Existing Access Point

The existing access point serving the three subject sites is a shared private accessway located on the eastern side of State Highway 10 at Waipapa, Northland. The access connects SH10 to three separate legal titles — Lot

1 (DP 164804) at 2006 State Highway 10, Lot 2 (DP 102334) at 2000 State Highway 10, and Part Old Land Claim 60 (Part OLC 60) at 1998 State Highway 10 — and represents the only connection between these three properties and the public road network. The access is registered under three separate crossing place notices on SH10, being CP148, CP148A, and CP149, all of which physically share a single access throat onto the state highway at the same location on the western boundary of Lot 1 at 2006 State Highway 10.

The access arrangement for Lot 2 at 2000 State Highway 10 and Part OLC 60 at 1998 State Highway 10 differs from a conventional private accessway in that neither property accesses SH10 via a direct crossing of the road boundary. Instead, the access points for both properties are located on the eastern portion of the SH10 road parcel — within the wider road reserve strip described above — rather than on their own western boundaries. From these points, Cottle Way runs northward parallel to SH10 within the road parcel, utilising the area between the SH10 carriageway and the western boundaries of Lot 2 and Part OLC 60, before connecting to the main crossing point on the western boundary of Lot 1 at 2006 State Highway 10, from which vehicles access SH10 via the existing access throat.

2.5.2 Changes to the Road Parcel Area in Front of Lot 1 — Post-2019

A significant change in the physical condition of the wider eastern road parcel area fronting Lot 1 at 2006 State Highway 10 has been observed through aerial imagery review and observation findings of the site visit conducted by the Geologix. Prior to 2019, the area within the SH10 road parcel between the northern end of the existing access and the northern boundary of the road parcel frontage to Lot 1 was characterised by natural vegetation and green ground cover. Following the completion of the stormwater project and the construction of manholes and utility connections along this section of the road parcel (between 2019 and 2022, this natural vegetation has been progressively removed. By the time of the site visit in May 2026, the entire area of the eastern road parcel fronting the Lot 1 boundary — from the northern end of the existing access to the end of the road parcel boundary — had been gravelled and cleared of all-natural vegetation.

Aerial imagery and site visit observations indicate that an informal access from the House Haulage yard at 2006 State Highway 10 is present within this gravelled area, providing a connection from the Haulage Yard to the SH10 road reserve that is separate from and additional to the formal crossing place. Given the width of the gravelled road reserve area and its gravelled surface, this area is also considered to be potentially being used as a rest area by truck drivers.

3. Lot1 Subdivision and Access Upgrade

3.1 Subdivision of Lot 1

There is a plan to subdivide Lot 1 into ten lots for light industrial use, as assessed in the Assessment of Traffic Effects report prepared by Engineering Outcomes in August 2022. All existing activities on Lot 1 — the residential dwelling, house haulage yard, and Westervelt Owhaoko honey business — will be removed prior to or during subdivision works. The ten lots will all access a new public road to be vested in the council, which in turn will connect to SH10 via the new T-intersection.

The subdivision site is currently zoned Rural Production under the operative district plan and Light Industrial under the recently notified proposed district plan. The traffic assessment prepared by Engineering Outcomes estimated that at full development with light industrial uses at the maximum permitted gross floor area of 200 square metres per lot, the subdivision would generate approximately 100 vehicle movements per day or 10 during the weekday afternoon peak hour. Under a mixed-use scenario including two retail or restaurant activities, movements could reach approximately 200 vehicle movements per day or more. SIDRA intersection modelling in that assessment confirmed that the new T-intersection would have adequate capacity during weekday afternoon peak hours to at least 2047 under the industrial-only scenario, and at least adequate capacity with manageable delays under the mixed-use scenario.

It is important to note that the traffic assessment prepared by Engineering Outcomes considered only the traffic generated by the Lot 1 subdivision in estimating the volumes that would use the new T-intersection. The existing traffic generated by Lot 2 at 2000 State Highway 10 and Part OLC 60 at 1998 State Highway 10 — both of which will access SH10 exclusively via the new T-intersection once Cottle Way is removed — was not included in the traffic generation estimates or the SIDRA intersection capacity modelling. In particular, the 12 visitor accommodation units currently operating on Lot 2, together with the 60 self-storage lockup units, the residential dwelling, and the concrete fabrication yard, generate a combined estimated traffic volume of approximately 169 vehicles per day that was not accounted for in the Engineering Outcomes assessment. The traffic generation from all three sites and its implications for the new T-intersection are addressed in Section 4.7 of this report.

The new T-intersection will be a give-way controlled T-intersection located on the eastern side of SH10, approximately 15 metres north of the existing access throat at the western boundary of Lot 1 at 2006 State Highway 10. The intersection has been designed with turn treatments for both directions of travel.

A component of the new access arrangement is the provision of a new internal side road connecting from the new public subdivision road to serve Lot 2 at 2000 State Highway 10 and Part OLC 60 at 1998 State Highway 10. This side road will replace the existing shared access arrangement known as Cottle Way, which currently operates within the eastern portion of the SH10 road parcel running parallel to the carriageway between the access points of Lot 2 and Part OLC 60 and the existing access throat at the western boundary of Lot 1. Upon completion of the new side road and its connection to the new public subdivision road, the existing Cottle Way access route within the road parcel will be decommissioned and the gravelled access surface within the road reserve will be removed.

3.2 Proposed Interim Operation of the Existing Access

The subdivision of Lot 1 and the construction of the new T-intersection represent the permanent and final resolution of the access arrangement for all three sites. However, the construction of the new intersection is subject to the completion of the consenting process for the Lot 1 subdivision, the agreement of the detailed bespoke intersection design with Waka Kotahi, and the physical completion of the subdivision works. Until all of these steps are completed, the existing access at the western boundary of Lot 1 at 2006 State Highway 10

will continue to operate in its current condition — a non-compliant, un-upgraded access that has not been brought to the Diagram E standard previously required by NZTA.

The central subject of this Traffic Impact Assessment is therefore the period between the present day and the completion of the Lot 1 subdivision and new T-intersection — referred to throughout this report as the interim period. During the interim period, the existing access will continue to serve all three sites: Lot 1 at 2006 State Highway 10 with its current activities of residential dwelling, haulage yard, and honey business; Lot 2 at 2000 State Highway 10 with its residential dwelling, 60 self-storage units, 12 visitor accommodation chalets, and concrete fabrication yard; and Part OLC 60 at 1998 State Highway 10 with the Waipapa Gospel Hall and Church.

Three distinct conditions of the access are relevant to establishing the context and scope of this assessment. The first is the current condition of the access as it exists — the existing non-compliant layout that has not been upgraded to the Diagram E standard. The second is the Diagram E standard that was formally conditioned by NZTA and the Far North District Council but was never constructed — this represents the minimum geometric standard that NZTA previously determined was necessary for this access and forms the engineering benchmark against which the current condition is assessed throughout this TIA. The third is the new T-intersection, which is referenced in this assessment not as a subject of assessment, but solely to define the end point of the interim period. The design, capacity, and geometric compliance of the new T-intersection are matters for the detailed design process and the Lot 1 subdivision consent and are not assessed in this TIA.

The interim period assessed in this report exists only because the existing access is committed to be permanently replaced by the new T-intersection upon completion of the Lot 1 subdivision. It is this commitment to a permanent compliant replacement that provides the basis for assessing whether the existing non-compliant access can continue to operate in the meantime. The acceptability of interim operation is therefore entirely conditional on the Lot 1 subdivision proceeding to completion and the new T-intersection being constructed. If the subdivision does not proceed, is abandoned, or is significantly delayed beyond a timeframe acceptable to Waka Kotahi, the justification for interim operation of the existing access in its current non-compliant condition falls away entirely. In that event, the access must be upgraded to the Diagram E standard as the minimum geometric condition that NZTA previously determined was necessary and appropriate for this access — and this TIA must not be relied upon as a justification for the continued operation of the non-compliant access in the absence of a committed and progressing subdivision programme.

The purpose of this assessment is therefore specific and bounded. It determines whether the existing access, assessed against the Diagram E benchmark, can operate during the defined interim period without significant adverse effect on the safety and operational efficiency of SH10 and its users, and identifies the specific conditions under which interim operation is considered acceptable for that defined period only. This assessment does not constitute approval of interim operation, which remains a determination for Waka Kotahi as the Road Controlling Authority for SH10 and the approving authority for the LAR crossing places. Rather, it provides the engineering basis and supporting evidence upon which Waka Kotahi's evaluation of interim operation can be informed, consistent with the pre-approval engagement process required by the 2025 NZTA Planning Policy Manual and the specific requirements communicated by Waka Kotahi

3.3 Traffic Generation from the Existing Access

The traffic generation from the existing access point has been estimated based on the activities listed in the NZTA approval letter dated 21 February 2019, which provides the most recent formally documented list of activities using the access across all three crossing places. The trip generation rates applied to each activity are those established in the two traffic engineering reports prepared by Haigh Workman Civil and Structural Consultants for the site — the original report dated 7 September 2012, and the updated report dated 5 November 2012. Those rates were derived from an actual traffic count conducted at a comparable 60-unit self-storage facility at Mill Lane over a seven-day period, and from a driveway count at the subject site which

recorded 383 events over seven days — averaging 55 one-way movements per day across all activities present at that time.

The following **Table 2** presents the trip generation calculation for each activity across all three crossing places, with the rates.

Table 2: *Updated Trip Generation Calculation Reflecting Current Activities*

Crossing Place	Site	Activity	Rate	One-Way vpd	Two-Way vpd
CP148A	Lot 2 — 2000 SH10	Residential dwelling	10 vpd/dwelling	10	20
CP148A	Lot 2 — 2000 SH10	12 accommodation units (current)	3 TIF/unit/day	36	72
CP148A	Lot 2 — 2000 SH10	80 self-storage lockup units	0.4 TIF/unit/day	32	64
CP148A	Lot 2 — 2000 SH10	Concrete fabrication yard	2 vpd flat rate	2	4
CP148A Subtotal				80	160
CP149	Lot 1 — 2006 SH10	Residential dwelling	10 vpd/dwelling	10	20
CP149	Lot 1 — 2006 SH10	House haulage yard (storage — low daily use)	Conservative estimate	3–5	6–10
CP149	Lot 1 — 2006 SH10	Westervelt Owhaoko honey business (admin only)	Conservative estimate	2–5	4–10
CP149 Subtotal				15–20	30–40
CP148	Part OLC 60 — 1998 SH10	Waipapa Gospel Hall and Church (weekend only)	Conservative estimate	5–10	10–20
CP148 Subtotal				5–10	10–20
Total — quantified activities only				90	180
Total — including conservative estimates for unquantified activities				100–110	200–220

The estimated total traffic generation of approximately 100 to 110 one-way vehicle movements per day — equivalent to approximately 200 to 220 two-way vehicle movements per day — is assessed against the applicable thresholds of both NZTA Planning Policy Manuals as follows:

Table 3: *Threshold Assessment*

Standard	Document	Threshold	Estimated Total	Assessment
Diagram C	2007 PPM	1–30 ecm/day (one-way)	100–110 one-way vpd	Not applicable — exceeds Diagram C threshold
Diagram E	2007 PPM	31–100 ecm/day (one-way)	100–110 one-way vpd	At upper boundary of Diagram E range — confirms Diagram E as minimum applicable standard

Standard	Document	Threshold	Estimated Total	Assessment
Treat as intersection	2007 PPM	Greater than 100 ecm/day (one-way)	100–110 one-way vpd	At or marginally exceeding threshold
Access Type C	2025 PPM	Less than 50 vpd (two-way)	200–220 two-way vpd	Not applicable — exceeds Access Type C threshold
Access Type E	2025 PPM	50 to 250 vpd (two-way)	200–220 two-way vpd	Within Access Type E range — confirms Access Type E as minimum applicable standard
Formal intersection design	2025 PPM	Greater than 250 vpd (two-way)	200–220 two-way vpd	Below threshold for existing activities — formal intersection not required for current use

The estimated traffic generation from the existing activities confirms that the Diagram E standard under the 2007 PPM and Access Type E under the 2025 PPM represent the minimum applicable design requirements for the existing access in its current condition. This is consistent with and confirms the determination made by NZTA in the 2019 approval letter. It should be noted that once the Lot 1 subdivision is complete and all three sites direct their traffic through the new T-intersection, the combined generation including the Lot 1 subdivision traffic will exceed the 250 vpd threshold under the 2025 PPM, at which point a formal intersection design is required — as addressed in Section 4.7 of this report.

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4. Assessment of the Existing Access Point

4.3 Assessment Againt Planning Policy Manual

4.3.1 Alternative Access Options

Both guidelines require consideration of whether alternative access from a local road is practicable before approving direct state highway access. The 2025 PPM is more explicit, stating that local road access should be utilised as a priority where available. None of the three sites has a practicable alternative access to a local road and the existing direct access point to SH10 is the only practicable arrangement for all three sites.

4.3.2 One Network Framework Classification

The 2007 PPM does not reference the ONF classification. While Section 8.3 of the 2025 PPM requires the ONF classification to be considered as it may influence the viability of an access location and design. SH10 at this location is classified as a Primary Collector under the NZTA ONRC Map[3].

4.3.3 Traffic Volumes and Access Type Classification

Both guidelines classify accessways by traffic volume and HCV use. The 2007 PPM uses one-way equivalent car movements per day, and the 2025 PPM uses two-way vehicles per day.

The SH10 AADT at the site location has been established from two sources, the State Highway Traffic Monitoring[4] and MegaMaps[5]. The State Highway Traffic Monitoring count station ID 01000015 in 2024 shows the AADT of 8,669 vpd on both lanes with heavy vehicles comprising 6.8% of the total volume. The MegaMaps corridor data records an estimated AADT of 9,504 vpd. The 2024 count station figure of 8,669 vpd is adopted as the primary AADT for this assessment as it is the most recent measured value.

HCV movements at the existing access are confirmed as more than once per week from the concrete fabrication yard at Lot 2 and the house haulage yard at Lot 1. The estimated traffic generation from the existing access is approximately 100 to 110 one-way equivalent car movements per day and 200 to 220 two-way vpd. Under the 2007 PPM Table App5B/4, the confirmed HCV use and access volume of 100 to 110 one-way ecm/day places the access within the Diagram E classification.

Under the 2025 PPM Table 9-1, access type is determined by sequential elimination. A formal intersection design is not required as the access volume of 200 to 220 two-way vpd is below the 250 vpd threshold. Access Type C is excluded as the access volume exceeds 50 vpd and HCV movements occur more than once per week. Access Type E therefore applies as the residual category under Table 9-1. This is confirmed by Figure 8-1 of the 2025 PPM, where plotting the Major AADT of 8,669 vpd against the Minor AADT of approximately 1200 to 220 vpd places the access within the Access Type E zone.

Therefore, both guidelines confirm Diagram E and Access Type E as the applicable design standard for the existing access.

[3] One Network Road Classification
[4] State highway traffic monitoring – annual average daily traffic
[5] MegaMaps - 2024

4.3.4 Sight Distance

The existing access point has been assessed for Safe Intersection Sight Distance (SISD) and Minimum Gap Sight Distance (MGSD) in accordance with Appendix 5B of the 2007 PPM and the Access onto the State Highway from Private Property 2025 PPM. Both guidelines state that the assumed 85th percentile operating speed is 10 km/h above the posted speed limit. The posted speed limit on SH10 is 70 km/h and based on this assumption the 85th percentile operating speed of 80 km/h is the default value for determining sight distances.

However, considering the curved alignment of SH10 in front of the site, its proximity to the adjacent Twin Coast Discovery Highway roundabout approximately 280 metres to the north, and the number of intersections and access points along this section, a lower operating speed was observed during the site visit conducted by Geologix on 15 May 2026, being 57 km/h southbound and 60 km/h northbound. In addition, the MegaMaps corridor data records an operating speed of 63 km/h at this location, which is lower than the 80 km/h default 85th percentile operating speed assumed under both PPM guidelines. For the purposes of assessing sight distances, the required sight distance has been checked under three speeds: the 85th percentile default speed of 80 km/h, the site visit measured operating speed of 60 km/h, and the MegaMaps operating speed of 63 km/h.

4.3.4.1 Safe Intersection Sight Distance (SISD)

SISD is the minimum sight distance that should be provided on the major road at any intersection or access point to allow a driver waiting at the access to safely observe approaching traffic and complete the entry manoeuvre. The required and available SISD are listed in **Table 4**. The available SISD at the existing access point are 137 metres on the northbound and 230 metres on the southbound. **Figure 4** to **Figure 8** illustrate the SISD on the northbound and southbound of SH1.

The available northbound SISD of 137 metres and southbound SISD of 230 metres are both sufficient to meet the required SISD determined under the site visit operating speed of 60 km/h and the MegaMaps operating speed of 63 km/h under both the 2007 PPM and 2025 PPM. At the 85th percentile default speed of 80 km/h, the required SISD of 181 metres under the 2025 PPM and 170 metres under the 2007 PPM exceeds the available northbound sight distance of 137 metres. However, this required distance is based on an operating speed of 80 km/h which is significantly higher than both the observed site visit speed and the MegaMaps recorded speed at this location. The southbound available SISD of 230 metres exceeds the required distance under all speed scenarios and all sources assessed.

Table 4: *Required Safe Intersection Sight Distance*

Source	Speed Input	Speed Value (km/h)	Required Distance (m)	Available SISD Northbound (m)	Available SISD Southbound (m)
2007 PPM Table App5B/1	85th percentile speed (posted 70 km/h)	80	170	137	230
	Site visit operating speed (rounded)	60	113		
	MegaMaps Operating Speed	63	121		
2025 PPM Table 8-1	85th percentile speed (posted 70 km/h)	80	181		
	Site visit operating speed (rounded)	60	123		
	MegaMaps Operating Speed	63	131		
Austroads Part 4A Table 3.2	Site visit operating speed (rounded)	60	123		
	Desing Speed	80	181		
	MegaMaps Operating Speed	63	131		

Figure 4: *Available SISD on Northbound SH10*

Figure 5: *Driver view on Southbound of SH10 Towards Access Point*

Figure 6*: Available SISD on Southbound SH10*

***Figure 7**: Driver view on Northbound of SH10 Towards Access Point*

4.3.4.2 Minimum Gap Sight Distance (MGSD)

Minimum Gap Sight Distance is the minimum visibility required for a driver at the access to identify an acceptable gap in SH10 traffic to safely complete an entry manoeuvre. The critical movement at this access is the right turn from the access onto SH10, which requires drivers to identify a sufficient gap in both northbound and southbound traffic simultaneously. Given the absence of an acceleration lane, both right turn and left turn exit movements require a critical acceptance gap of 5 seconds, producing identical required MGSD values for both exit movements.

The available MGSD at the access are shown in **Figure 8** and **Figure 10** being 236 metres for the right turn from SH10 into the site and left turn from the access onto SH10, and 189 metres for the right turn from the access onto SH10. The available MGSD exceeds the required distance under all three speed scenarios and all movement types assessed, confirming that the existing access meets the MGSD requirement under both the 2007 PPM and 2025 PPM frameworks at the site visit measured operating speed, the MegaMaps operating speed, and the 85th percentile default speed.

***Table 5**: Required Minimum Gap Sight Distance Required on SH10 - Austroads Part 4A.*

Movement	Speed Input	Speed Value (km/h)	Required MGSD Distance (m)	Available MGSD Distance (m)
Right turn from SH10 into site	85th percentile speed (posted 70 km/h)	80	89	236
	Site visit operating speed (rounded)	60	67	
	MegaMaps Operating Speed	63	70	
Right turn from access onto SH10	85th percentile speed (posted 70 km/h)	80	111	189
	Site visit operating speed (rounded)	60	83	
	MegaMaps Operating Speed	63	88	
Left turn from access onto SH10	85th percentile speed (posted 70 km/h)	80	111	236
	Site visit operating speed (rounded)	60	83	
	MegaMaps Operating Speed	63	88	

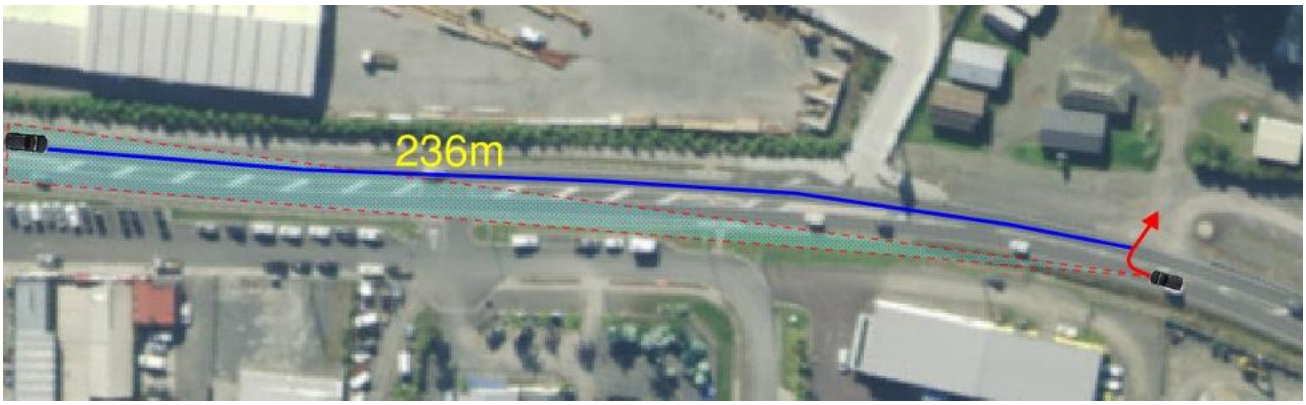


Figure 8: *Available MGSD for vehicle on Northbound SH10 making right turn into the site.*

Figure 9*: Driver View on Northbound SH10 Turning Right to the Access*

Figure 10: *Available MGSD for vehicle at the access point turning right and left onto the SH10.*

Figure 11: Driver view at the access point towards south

Figure 12: Driver view at the access point towards north

4.3.5 Accessway spacing

4.3.5.1 Spacing to Intersections

Both guidelines require a minimum separation between an access point and adjacent intersections to avoid interference with the functional area of the intersection where normal braking and accelerating takes place. The 2007 PPM Table App5B/3 requires a recommended minimum spacing of 100 metres between an accessway and the nearest intersection at a posted speed of 70 km/h. The 2025 PPM Table 8-2 requires a desirable spacing of 235 metres on the major road at a posted speed of 70 km/h, which is a significantly more stringent requirement than the 2007 PPM minimum.

The existing access is located approximately 280 metres south of the Twin Coast Discovery Highway roundabout to the north and approximately 370 metres north of the Kahikatearoa Lane intersection to the south which meets required spacings in both guidelines.

4.3.5.2 Spacing Between Accessways

Both guidelines require a minimum separation between adjacent access points to prevent compounding of conflict zones and to allow sufficient distance for vehicles to safely decelerate, stop, and manoeuvre between access points. The 2007 PPM Table App5B/3 requires a recommended minimum spacing of 40 metres between accessways at a posted speed of 70 km/h. The 2025 PPM Table 8-3 requires a desirable spacing of 220 metres between access locations on a highway carrying 5,000 to 10,000 vpd at a posted speed of 70 km/h, which is significantly higher.

The existing access throat is located approximately 55 metres south of the access on the adjacent property to the north. Considering the formation of the site boundary of the three sites in relation to SH10 and given the location of the existing stormwater manholes and guardrail which limit the accessibility of the frontage, the existing access is located at the most southerly point of the available boundary area which is shown in **Figure 13**. The existing access was previously assessed as compliant with the 2007 PPM minimum spacing of 40 metres, and the adjacent northern access was also developed and assessed under the 2007 PPM prior to September 2026, at which time the 40-metre minimum spacing was the applicable standard. The existing access meets the 2007 PPM minimum spacing of 40 metres to the adjacent northern access. Under the 2025 PPM however, the actual spacing of 55 metres falls significantly short of the desirable 220 metres, representing a shortfall of 165 metres.

Figure 13: *Location of Access in Relation to the Manhole and Guardrail*

As described in 2.5.2 of this report, following the completion of the stormwater project and the construction of manholes and utility connections along the eastern SH10 road parcel between 2019 and 2022, the natural vegetation in this area was progressively removed. By the time of the site visit in May 2026, the entire area of the eastern road parcel fronting the Lot 1 boundary had been gravelled and cleared of all-natural vegetation. Aerial imagery and site visit observations indicate that an informal access from the house haulage yard at 2006 State Highway 10 is present within this gravelled area, providing a connection from the haulage yard to the SH10 road reserve that is separate from and additional to the existing formal access. While no specific information or confirmation has been provided by the client regarding the usage or purpose of this informal access, its presence has been identified and is assessed for spacing compliance. As shown in **Figure 14** the approximate current location of the informal access has approximately 16 metres separation from the adjacent northern access — 24 metres short of the 2007 PPM minimum of 40 metres and 204 metres short of the 2025 PPM desirable standard of 220 metres.

Figure 14: *Spacing Distances from Access at Adjacent Site*

4.3.6 Accessway Form and Design

The 2007 PPM and 2025 PPM both require the accessway design to be fit for purpose. The applicable standard for this access is Diagram E under the 2007 PPM and Access Type E under the 2025 PPM which is shown in **Figure 15**. Both standards require the same core geometric dimensions for a 70 km/h posted speed environment with frequent HCV use: bellmouth radii of 15m, carriageway width of 6.0m minimum from the centreline, shoulder widening distance of 60m each side with 1:10 tapers to the edge of seal, sealed surface from the carriageway to the legal boundary, and a gate recessed sufficiently to allow vehicles to stop clear of the highway traffic lanes. The assessment of each consideration from Section 8.8 of the 2025 PPM against the current condition of the existing access is provided below.

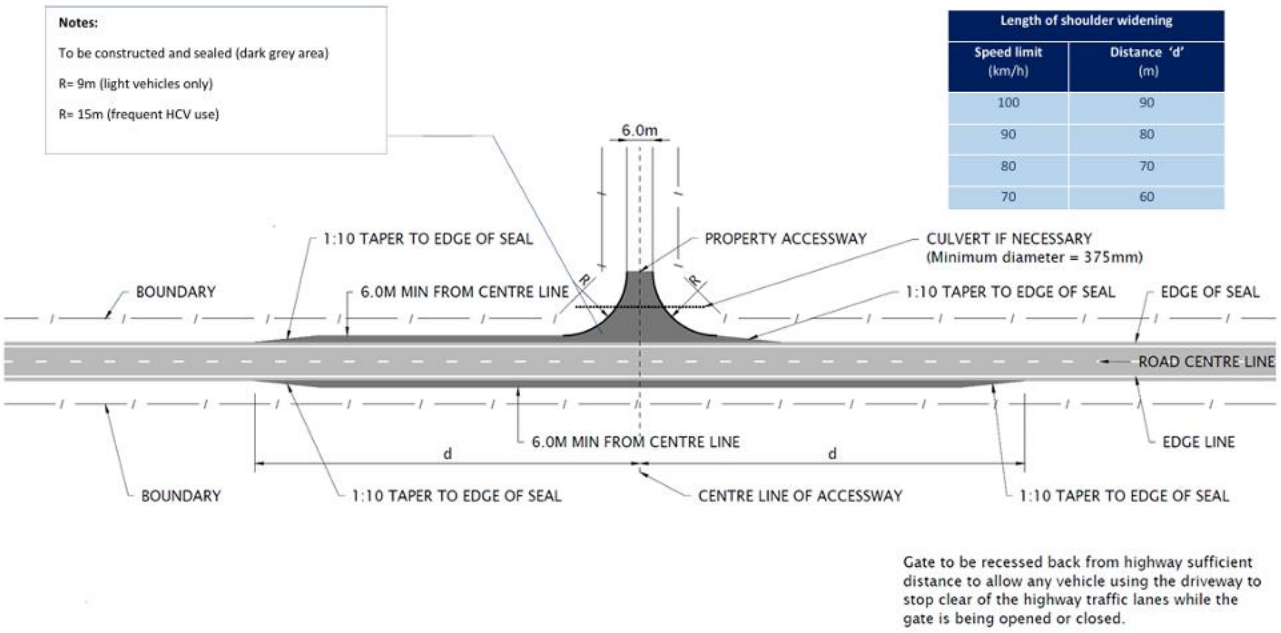


***Figure 15**: Access Type E: High volume rural road access requirements.*

4.3.7 Type of Traffic and HCV Us

An access with frequent HCV use requires to be designed to R 15m bellmouth radii under both Diagram E and Access Type E. The existing access has not been formally constructed to this standard. However, the available area within the eastern SH10 road parcel in front of the access provides an ample swept path area that allows HCV trucks to enter and exit the site without difficulty, as confirmed by the site visit observations and the aerial imagery. The available manoeuvring area within the road parcel effectively compensates for the absence of formally constructed bellmouth radii in practical terms, though it does not constitute compliance with the geometric standard.

4.3.8 Volume and Frequency of Traffic

The estimated traffic generation from the existing access is approximately 100 to 110 one-way vehicle movements per day and 200 to 220 two-way vehicle movements per day, as established in Section 4.7 of this report. No crashes have been recorded at the existing access point during the 10-year CAS search period from 2016 to 2026, which is consistent with the relatively low traffic volumes using the access and supports the conclusion that the access has been operating without significant adverse safety effects during this period.

4.3.9 Access Seal Widths

Both Diagram E and Access Type E require the access to be sealed from the SH10 carriageway edge to the legal boundary line, with 1:10 tapers to the edge of seal on both sides. The existing access and the eastern SH10 road parcel area is currently not sealed. The access surface is gravel from the edge of the SH10 carriageway through the road parcel area and into the properties, which does not meet the sealing requirement of either standard. The approach gradient at the access is level, which is consistent with the Diagram E and Access Type E requirements and requires no grade correction to the sight distance assessment.

4.3.10 Shoulder Widening and Carriageway Width

Diagram E and Access Type E both require the SH10 carriageway to be widened to a minimum of 6.0m from the centreline for a distance of 60m each side of the access at the 70 km/h posted speed, with 1:10 tapers to the edge of seal. This widening serves two purposes: to provide sufficient width for a vehicle waiting to turn right into the access while allowing through traffic to pass on the left without crossing the centreline, and to provide a deceleration area for vehicles turning left into the access.

For the southbound approach, there is approximately 30 metres of area from the endpoint of the adjacent site access to the south that acts as a widened shoulder, providing sufficient lateral clearance for through traffic to safely bypass a left-turning vehicle without braking suddenly or crossing the centreline. While this existing condition partially compensates for the absence of a formally constructed left turn taper, it falls short of the required 60-metre taper length under both standards.

For the right turn approach, the section of SH10 in front of the site has a lane width of 3.5 metres plus the end of a flush median treatment providing approximately 6.0 metres of trafficable lane width, which meets the minimum 6.0 metres from the centreline requirement of both Diagram E and Access Type E. The trafficable lane width which is shown in **Figure 16**. This available width provides sufficient trafficable space for through vehicles to pass a stationary right-turning vehicle on the left without being forced to brake suddenly or cross the centreline into opposing traffic.

Figure 16: *Trafficable Lane Width on Northbound in front of the access.*

4.3.11 Pedestrian and Cyclist Provision

There are no pedestrian or cyclist facilities in the vicinity of the site. The existing access provides no pedestrian crossing delineation, no accessible route across the access throat, and no traffic calming measures.

4.3.12 Gravel Egress

The 2025 PPM Section 8.8 requires accessways to be designed to minimise gravel being tracked onto the state highway. The existing access and the eastern road parcel area are entirely unsealed, with a gravel surface

confirmed by aerial imagery and site visit observations. Gravel tracking onto the SH10 sealed carriageway surface is a confirmed condition at this access and does not meet the 2025 PPM requirement. The 2007 PPM does not contain an equivalent explicit requirement, though the Diagram E requirement for sealing to the boundary line would address this issue if implemented.

4.3.13 Crash History at the Access

As described in Section2.4.3, no crashes have been recorded at the existing access point during the 10-year CAS search period from 2016 to 2026. This finding is relevant to the overall assessment of whether the existing access in its current non-compliant condition has created significant adverse safety effects during the interim period. The absence of recorded crashes at the access, combined with the relatively low traffic volumes and the lower operating speeds observed at this location, supports the conclusion that the access has been operating without significant adverse safety effects to date, notwithstanding its geometric non-compliance with the Diagram E and Access Type E standards.

4.4 Access onto limited access roads (LARs)

The 2007 PPM does not contain a dedicated section on LAR requirements. However, Appendix 5B.2 explicitly states that Transit will generally refuse to authorise a crossing place on a Limited Access Road if it does not comply with the sight distance standards — making the LAR status of SH10 directly relevant to compliance under the 2007 PPM framework.

The 2025 PPM Section 5 requires all accessways onto a LAR to be authorised by NZTA through a Section 91 Crossing Place Notice. Each parcel with legal access to a LAR and no reasonably practicable alternative legal access to another road is entitled to at least one accessway, and NZTA can specify the location and design of that accessway. Where access from a local road is practicable, NZTA is unlikely to approve access to the LAR. NZTA seeks to minimise the number of accessways and encourages rationalisation and combination of accessways where practicable.SH10 in front of the existing access point has been identified as a Limited Access Road according to the NZTA Limited Access Roads Map. This confirmation is material to both the 2007 and 2025 PPM assessments — under the 2007 PPM it triggers the requirement for full compliance with the sight distance standards as a condition of crossing place authorisation, and under the 2025 PPM it triggers the full LAR approval framework including the Section 91 Crossing Place Notice requirement.

SH10 in front of the existing access point has been identified as a Limited Access Road according to the NZTA Limited Access Roads Map[6]. None of the three sites — Lot 1 at 2006 SH10, Lot 2 at 2000 SH10, and Part OLC 60 at 1998 SH10 — has a reasonably practicable alternative legal access to another road. Each site is therefore entitled to at least one accessway under Section 5 of the 2025 PPM. No local road access is available to any of the three sites, and direct SH10 access is therefore the only practicable arrangement. The three sites currently share a single physical access throat, which is consistent with the rationalisation principle of the 2025 PPM, though the three separate crossing place notices and the informal unauthorised access represent matters requiring formalisation. The sight distance assessment results are provided in Section4.3.4 of this report.

[6] Limited Access Roads

5. Summary and Conclusions

This Traffic Impact Assessment has been prepared behalf of Geologix Consulting Engineers Ltd to assess the interim operation of the existing shared access point serving Lot 1 at 2006 State Highway 10, Lot 2 at 2000 State Highway 10, and Part Old Land Claim 60 at 1998 State Highway 10, Waipapa, Northland, during the period from the present day until the completion of the proposed subdivision of Lot 1 and the construction of the new give-way controlled T-intersection on SH10 which will permanently replace the existing access arrangement for all three sites.

The assessment has been conducted under both the Appendix 5B Accessway Standards and Guidelines (2007 PPM) and the Access onto the State Highway from Private Property Planning Policy Manual (2025 PPM), with the 2025 PPM as the primary applicable guideline. The assessment has evaluated the existing access against the required Diagram E standard under the 2007 PPM and the Access Type E standard under the 2025 PPM, which represent the minimum geometric design standards applicable to this access given the confirmed traffic volumes, frequent HCV use, and the LAR status of SH10 at this location.

Given that the type and number of activities on all three sites have not changed since the existing access arrangement was established, the traffic generated from the access has remained consistent and does not affect the capacity and operational efficiency of SH10.

Mitigation Measures

The following mitigation measures are required to be implemented to address the identified deficiencies and support the acceptable interim operation of the existing access:

- If it is confirmed that the house haulage yard is using the gravelled area within the SH10 road parcel as an informal access point rather than the existing formal access from Lot 1, this informal access must be closed and decommissioned and all vehicle movements from the house haulage yard must be limited to the existing formal access point from Lot 1.

- The gravelled SH10 road parcel fronting Lot 1 presents three specific safety and operational issues.

    - The area has been observed to be potentially used informally by heavy vehicles as a parking or rest area without Waka Kotahi designation or approval.

    - The informal use of the area as a rest area also presents a risk of blockage of the access from Lot 1 and Lot 2 to the formal shared access point by parked vehicles.

    - The presence of the gravelled area means that vehicle movements into and out of the shared access are not physically limited to the formal shared access point, creating additional uncontrolled conflict points between vehicles entering and exiting the site, SH10 through traffic, and any vehicles parked in the gravelled area.

  To address both issues, it is recommended that flexible guideposts or similar physical delineation devices be installed along the western edge of the SH10 road parcel, positioned close to the edge of the SH10 carriageway from the northern end of the existing formal shared access throat northward to the beginning of the constructed footpath at the southern part of the access to the Bunnings site, at specified intervals to limit all entering and exiting movements to the formal shared access point while maintaining the required access width for all authorised vehicles. The type, spacing, and exact location of the flexible guideposts must be confirmed with and approved by Waka Kotahi prior to installation.

Based on this assessment, the existing access is considered capable of continuing to operate during the interim period without significant adverse effect on the safety and operational efficiency of SH10 and its users, subject to the implementation of the mitigation measures identified above. This conclusion is conditional on the Lot 1 subdivision proceeding to completion and the new T-intersection being constructed. If the subdivision does not proceed or is abandoned, this assessment must not be relied upon as justification for the continued operation of the non-compliant access, and the access must be upgraded to the Diagram E standard as the minimum acceptable geometric condition.

Appendix 1
Traffic Count Data

Coded crash id	Crash identifier	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	Crash year	Movement	Movement codes categories	Posted speed limit
1531417	2026372764	Minor Crash	0	0	1	2	2026	KA	Merging	70
1510790	2025356726	Non-Injury Crash	0	0	0	7	2025	MO	Manoeuvring	70
1433620	2024294552	Non-Injury Crash	0	0	0	2	2024	CB	Lost Cntl/Str Rd	70
1387133	2024285625	Minor Crash	0	0	1	3	2024	CC	Lost Cntl/Str Rd	80
1346338	2023257320	Minor Crash	0	0	1	2	2023	LB	One Turns Right	50
1332505	2022244751	Minor Crash	0	0	2	2	2022	FD	Rear End Crash	70
1296528	2021215275	Non-Injury Crash	0	0	0	2	2021	FD	Rear End Crash	70
1265614	2020171955	Non-Injury Crash	0	0	0	2	2020	DF	Lost Cntl Bend	50
1177505	201950080	Serious Crash	0	2	4	1	2019	BA	Head On Crash	70
1194399	201959565	Non-Injury Crash	0	0	0	1	2019	QG	Misc	70
1193295	201958489	Non-Injury Crash	0	0	0	2	2019	QG	Misc	70
1186652	201897383	Non-Injury Crash	0	0	0	5	2018	AO	Overtaking	70

Coded crash id	Crash identifier	Crash severity	Fatal injury count	Serious injury count	Minor injury count	Non-injury count	Crash year	Movement	Movement codes categories	Posted speed limit
1176436	201850751	Non-Injury Crash	0	0	0	2	2018	GD	Same Drn Turning	70
1105596	201700306	Fatal Crash	1	0	1	0	2017	JA	Xing One Turning	70
1117591	201731190	Non-Injury Crash	0	0	0	1	2017	CB	Lost Cntl/Str Rd	70
1080407	201632282	Non-Injury Crash	0	0	0	2	2016	GD	Same Drn Turning	70
1079270	201631133	Non-Injury Crash	0	0	0	2	2016	FD	Rear End Crash	70

Appendix 2

Assessment Against Appendix 5B – Accessway standards and guidelines (2007) and Access onto The State Highway from Private Property (2025) of Planning Policy Manual

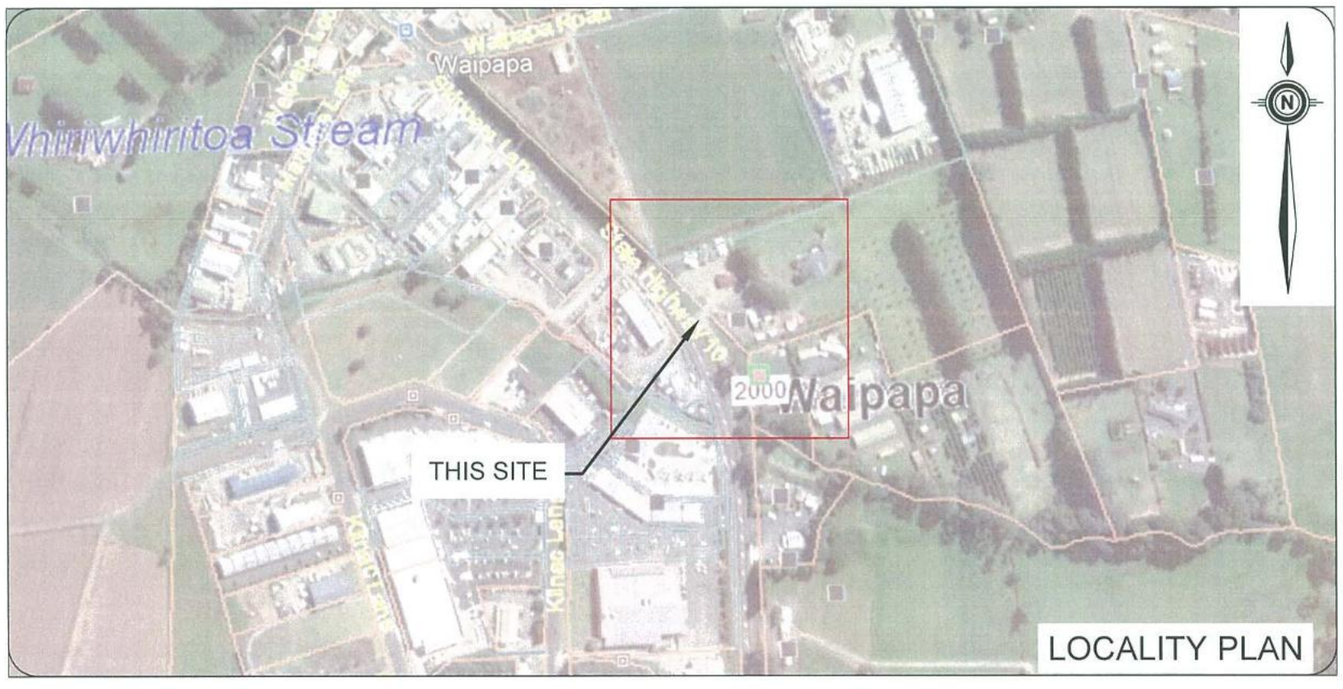
#	Standard	2025 PPM Reference	2007 PPM Reference	Assessment
1	LAR Requirements	Section 5	App5B.1 (item only)	SH10 in front of the access identified as LAR per NZTA Limited Access Roads Map.
2	Alternative Access	Section 8.2	App5B.1 (item only)	No alternative direct SH10 access is available.
3	ONF Classification	Section 8.3	Not present	Primary Collector
4	Traffic Volumes and Access Type	Section 8.4 / Table 9-1	App5B.4 / Table App5B/4	Both guidelines confirm Diagram E and Access Type E as the applicable design standard for the existing access.
5	Traffic Speeds	Section 8.5	Not explicit	
6	Sight Distance — SSD	Austroads AGRD Part 4A	Austroads ref only	
7	Sight Distance — ASD	Austroads AGRD Part 4A	Austroads ref only	
8	Sight Distance — SISD	Section 8.6 / Table 8-1	App5B.2 / Table App5B/1	
9	Sight Distance — MGSD	Section 3 (Safe System)	Not explicit	
10	Sight Distance Grade Corrections	Austroads AGRD Part 4A	App5B.2 / Table App5B/2	
11	Accessway Spacing to Intersections	Section 8.7.1 / Table 8-2	App5B.3 / Table App5B/3	
12	Spacing Between Accessways	Section 8.7.2 / Table 8-3	App5B.3 / Table App5B/3	

#	Standard	2025 PPM Reference	2007 PPM Reference	Assessment
13	Number of Access Points	Section 5 and 8.2	App5B.1 (item)	
14	Geometric Design — Bellmouth Radii	Section 9.2 / Access Type E	App5B.4 / Diagram E	
15	Geometric Design — Carriageway Width	Section 9.2 / Access Type E	App5B.4 / Diagram E	
16	Geometric Design — Shoulder Widening	Section 9.2 / Access Type E	App5B.4 / Diagram E	
17	Geometric Design — Taper	Section 9.2 / Access Type E	App5B.4 / Diagram E	
18	Geometric Design — Surface Sealing	Section 9.2 / Access Type E	App5B.4 / Diagram E	
19	Geometric Design — Culvert and Headwalls	Section 8.8 / Access Type E	App5B.4 / Diagram E	
20	Geometric Design — Gate Position	Section 8.8	App5B.4 / Diagram E	
21	Pedestrian and Cyclist Provision	Section 8.8	App5B.1 (item only)	
22	Gravel Tracking Prevention	Section 8.8	Not present	
23	Stormwater Management	Section 8.8	Not present	
24	Trip Generation	Section 8.9	App5B.5 / Table App5B/5	
25	Crash Effects and Safety Record	Section 8.1 (item)	App5B.6 / Tables App5B/6 and 7	
26	Safe System Framework	Section 3	Not present	

Vehicle Crossing Upgrade

2000 State Highway 10, Waipapa

For Arthur Cottle



Index

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Job No. 17 111

For Approval

February 2021

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM LAND INFORMATION NEW ZEALAND (LINZ).

Issue	Date	Revision
A	16/09/2019	FIRST ISSUE
B	17/02/2021	SIGHT LINES RE-DRAWN

DWG Sight Distances On Aerial Photography Background

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 16/09/2019

Drawn YZ | Checked JM | Approved JM

File X:\17 JOBS\17 111 ARTHUR COTTLE\WARKWORTH DRAWINGS\CAD\17 111 AUTHOR COTTLE TV.DWG

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Project 2000 State Highway 10, Waipapa
Lot 2 DP 102334

Client Arthur Cottle

Project No. 17 111 | RC no.

DWG No. P2

Sheet No. 1 of 2

Plotted By Asanka Meththa at 17/02/2021 12:30:07 PM

NOTES:

1. LOT BOUNDARIES AND AERIAL PHOTO INFORMATION TAKEN FROM LAND INFORMATION NEW ZEALAND (LINZ).

1 DP 102334 Ti Toki Farms Ltd

1 DP 164804

1 DP 153739

2 DP 102334 A W Cottle

END OF KERB AND CHANNEL FORMING PART OF ROUNDABOUT WORKS

EXISTING EDGE OF SEAL

PROPOSED EDGE OF SEAL

43.00

34.5

REGRADE AND MARRY INTO EXISTING ENTRANCE

ACCESS FOR SUBJECT SITE

87°52'

50.29

EDGE LINE

20.00 AT 1:10

R9.00

R9.00

MHA1 3000Ø

1350Ø

MHA1 3000Ø

1:10 TAPER TO EDGE OF SEAL (APPROX. 5m)

GAURD RAIL

metal driveway

Origin of levels: RM 41/2 SO 55463 RL 74.96 (OTP 1964)

OLC 60 DP 22844

6.00

6.00

EXISTING EDGE OF SEAL

1600Ø

EDGE LINE

300Ø

300Ø

300Ø

300Ø OF PVC CULVERT FORMING PART OF ROUNDABOUT WORKS

KERB & CHANNEL FORMING PART OF ROUNDABOUT WORKS

EDGE LINE PRIOR TO ROUNDABOUT WORKS

KERB & CHANNEL TIE-IN

INLET LEVEL AT TIE-IN APPROX. 0.9m BELOW EDGE OF SEAL

MOUNTABLE HEADWALL TO BE REMOVED

15.00 AT 1:10

PROPOSED 300Ø PVC CULVERT TIE INTO EXISTING (CONSTANT GRADE THROUGHOUT)

1 DP 153144

CONNECT 2X100 AND 1X150 PVC PIPES

PROPOSED MH 1050Ø

SHOULDER WIDENING

STATE HIGHWAY 10

north edge box culvert for Whirlwhiritoa Stream

15.00 AT 1:10

300Ø

CARRIAGEWAY MEDIAN

Skippers Lane

48.00

SEC 14 Blk X Kerikeri

46.00

PROPOSED MH 1050Ø

EXISTING CULVERT Ø300mm I.L APPROX. 1.2m BELOW EDGE OF SEAL

3 DP 508155

3 DP 508155

stream

ESP A DP 508155

1 DP 41379

LEGEND:

- EXISTING CULVERT
- EDGE OF SEAL
- PROPERTY FENCE
- PROPOSED CULVERT
- PROPOSED WIDENING
- TELECOM PLINTH
- EXISTING STORM WATER
- POWER POLE
- MANHOLE

Issue	Date	Revision
A	16/09/2019	AGREED CROSSING FOLLOWING SITE INSPECTION ON 11/9/2020

DWG Modified Diagram E Crossing

Scale 1:500 @A3 (5 2.5 0 5 10 15 m) Date 16/09/2019

Drawn YZ Checked JM Approved JM

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Project No. 17 111

RC no.

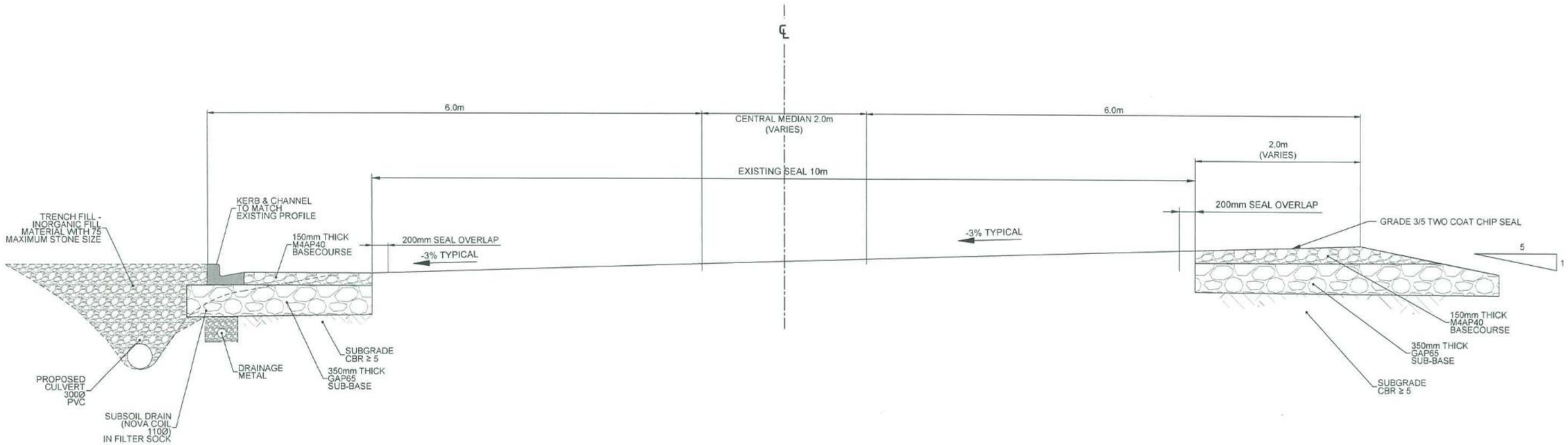
DWG No. P3

Sheet No. 2 of 2

Plotted By Asanka Meththa at 17/02/2021 12:30:18 PM

NOTES:

1. CONTRACTOR TO BE RESPONSIBLE FOR LOCATING AND PROTECTING BURIED SERVICES.
2. CONTRACTOR TO BE RESPONSIBLE FOR ALL EARTHWORKS EROSION AND SEDIMENTATION CONTROL MEASURES TO SATISFACTION OF NRC MONITORING OFFICER.
3. ALL SURPLUS AND WASTE MATERIALS TO BE REMOVED FROM SITE.
4. SUBGRADE TO BE PROOF ROLLED. ANY SOFT SPOTS OR WEAK GROUND TO BE BROUGHT TO ATTENTION OF ENGINEER AND REPLACED WITH COMPACTED HARDFILL.
5. CONCRETE TO BE CURED FOR MIN. 3 DAYS.
6. EARTHWORKS AREAS TO BE RE-GRASSED ON COMPLETION. CONTRACTOR TO BE RESPONSIBLE FOR ACHIEVING 85% GRASS STRIKE COVERAGE.
7. ANY DAMAGE TO EXISTING KERB AND CHANNEL OR SEAL TO BE REPAIRED AT CONTRACTORS COST.
8. ALL WORKS TO BE IN ACCORDANCE WITH COUNCIL ENGINEERING STANDARDS.
9. SLIP FORMED CONCRETE TO BE 25MPa AT 28 DAYS



Issue	Date	Revision
A	21/01/2021	FIRST ISSUE
B	16/02/2021	ADDED KERB AND CHANNEL DETAILS

DWG TYPICAL CROSS SECTION

Scale 1:50mm @A3 (1 0.25 0 1 1 1.5 m) Date 17/02/2021

Drawn AM Checked TA Approved TA

File X:\17 JOBS\17 111 Arthur Cottle\Warkworth Drawings\CAD\17 111 Author Cottle TV.dwg

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Client Arthur Cottle

Project No. 17 111 RC no.

DWG No. **DE1**

Sheet No. **1** of **1**

Plotted By Asanka Meththa at 17/02/2021 12:29:39 PM

Onsite Wastewater System

2000 State Highway 10, Waipapa

Lot 2 DP 102334

for

Arthur Cottle

Haigh Workman reference: 17 111
Resource Consent Number: 2200337-RMALUC

June 2020

Phone: +64 9 407 8327 • Fax: +64 9 407 8378 • info@haighworkman.co.nz • www.haighworkman.co.nz

PO BOX 89 • 6 FAIRWAY DRIVE • KERIKERI 0245 • NEW ZEALAND

Revision History

Revision Nº	Issued By	Description	Date
A	Emily Collings	For Building Consent	10 June 2020

Prepared by	Reviewed by	Approved by
		
Emily Collings	**Tom Adcock**	**John Papesch**
Environmental Engineer MSc (Environmental Engineering) MEngNZ	Senior Civil Engineer BEng (Civil) MEngNZ	Senior Civil Engineer / Director BE (Civil) NZCE, CMEngNZ, CPEng

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Executive Summary

Haigh Workman Ltd was commissioned by Arthur Cottle to complete a wastewater report for six proposed residential units at 2000 State Highway 10, Waipapa.

The site is currently developed with a dwelling, cottage, storage sheds and residential units which have existing wastewater management.

It is understood the proposed residential units are to be one bedroom. This report concludes the following for Wastewater Design:

- As per FNDC Land Use Consent (2200337-RMALUC), *the wastewater disposal and reserve disposal areas are not to be located within the 1:100-year flood plain as shown on the FNDC and NRC flood hazard maps within the application*;
- Wastewater generation is estimated to be a consistent daily flow of 1,920 L/day with peak flows of up to 2,880 L/day;
- A *TechTreat* secondary wastewater treatment system with flow balancing tank is proposed to discharge 2 m^3/day;
- A water meter is proposed;
- The treatment plant be maintained to the manufacturer's specifications;
- Effluent be pumped to dripperlines to the south west of the proposed development;
- Effluent disposal be by at least 640 metres length of approved dripperline (combination line spacings, as detailed);
- Dripperline irrigation tubing (UniBioline or similar) be 1.6 L/hour emitters installed to the manufacturer's specifications;
- Disposal field be dosed to three blocks;
- 30 % reserve area (192 m^2) be left undeveloped;
- Stormwater be managed upslope of the disposal field by interception drains;
- The on-site wastewater system be arranged in general accordance with the enclosed site plan.

1 Introduction

Haigh Workman (Haigh Workman Ltd) was commissioned by Arthur Cottle (the Client) to complete a wastewater report for 2000 State Highway 10, Waipapa (the "site"). This report presents the factual information available during the appraisal and interpretation of data obtained to provide an onsite wastewater system design for the proposed development.

1.1 Existing Development

The site currently comprises an existing dwelling (BP-638468) and cottage (BC-2015-413-0) to the north west of the property, with associated garage, carport and areas of hardstanding (driveway, car parking, etc). To the south of the dwelling in the west of the property, there are three large consented storage sheds within a metalled yard.

Six existing one-bedroom residential units are situated at the centre of the site. Each has a carport and small area of grassed outdoor space. The existing wastewater disposal fields for these units comprise surface dripperlines throughout the orchard trees interspersed through the area and along site boundaries.

1.2 Proposed Development

It is understood the client intends to place a further six residential units to the east of the site, within an area currently maintained as grass. Land Use Consent (2200337-RMALUC) has been granted for the proposed development.

This report is for Building Consent and considers the wastewater aspects of the proposed development. Should the proposed development vary from the Approved Plans, further investigation and/or amendments to the recommendations made in this report may be required.

1.3 Applicability

This report has been prepared for the use of Arthur Cottle with respect to the particular brief outlined to us. This report is to be used by our Client and their Consultants and may be relied upon when considering environmental advice. The information and opinions contained within this report shall not be used in other context for any other purpose without prior review and agreement with Haigh Workman Ltd.

2 Site Details and Description

Site Address: 2000 State Highway 10, Waipapa

Legal Description: Lot 2 DP 102334

Site Area: 30,750 m^2

2.1 Site Description

Situated approximately 3.2 km to the north west of Kerikeri town centre, the site comprises a total land area of approximately 30,750 m² and is irregular in plan shape. The site is a commercially/residentially developed lifestyle block of '*Rural Production'* zoned land. It is bordered by State Highway 10 to the west, Whiriwhiritoa Stream to the south and Rural Production land to the north and east.

Existing development (dwelling, cottage, storage sheds and residential units) are generally on the mid portion of the site (refer *Donaldsons Topographic Survey of Lot 2 DP 102334*). The remainder of the site is predominantly covered by grass. Well-defined open drains exist through the centre of the site and on the eastern site boundary. These are protected by a drainage easements (A and B).

Topographically, the site is gently sloped south, towards the Whiriwhiritoa Stream. Slope angles are generally less than 5 degrees.

2.2 Consent Notices

The Certificate of Title (NA56C/28) has no conditions relating to Wastewater.

Land Use Consent (2200337-RMALUC), condition 5 states;
'In conjunction with the construction of any building requiring a wastewater disposal system the lot owner shall obtain a Building Consent and install the wastewater treatment and effluent disposal system in general accordance with the report prepared by High Workman Ltd and submitted with Resource Consent 2200337. The wastewater disposal and reserve disposal areas are not to be located within the 1:100-year flood plain as shown on the FNDC and NRC flood hazard maps within the application.

Where a wastewater treatment and effluent disposal system is proposed that differs from that detailed in the above-mentioned report, a new TP 58 / Site and Soil Evaluation Report will be required to be submitted, and Council's approval of the new system must be obtained, prior to its installation'.

3 Geology

Sources of Information:

- Institute of Geological & Nuclear Sciences (GNS) 1:250,000 Geological Map 2, 2009: "*Geology of the Whangarei area*";
- NZMS 290 Sheet P 04/05, 1: 100,000 scale, 1982: *"Rock Types. Whangaroa - Kaikohe";*
- NZMS 290 Sheet P 04/05, 1: 100,000 scale, 1980: *"Soils. Whangaroa - Kaikohe".*

The site is indicated to be directly underlain by soils of the Undulating Terraces and Lowlands comprising Waipapa Clay (YF). Soil deposits at the site are typically described and categorised as imperfectly to very poorly drained.

The published geology map for the area indicates the base geology as *Alluvium ($A1_2$): mud, sand and gravel with minor peat, forming river bed and flood plain deposits up to 10 m above stream or sea level, in places forming a thin (1 - 3 m) veneer over rugged surfaces of lava flows ($F6_1$, $F6_2$); unconsolidated to very soft. Un-weathered.*

GNS Mapping show the site to be underlain by Basalt (Pvb) of the Kerikeri Volcanic Group, typically described as '*Basalt lava, volcanic plugs and minor tuff*'. Adjacent to the south of the site alluvial soils (eQa) of the Tauranga Group are identified, described as '*Poorly to moderately unconsolidated mud, sand, gravel and peat or lignite of alluvial, swamp and estuarine origin*'.

Figure 1 – NZMS 290 Sheet P04/05 - Soils

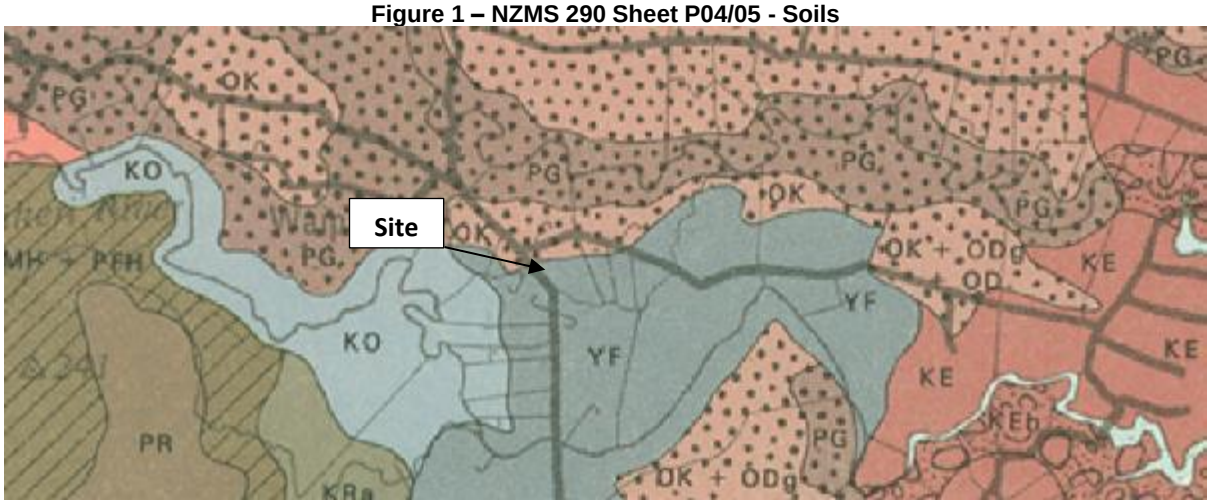


Figure 2 – NZMS 290 Sheet P04/05 - Rock

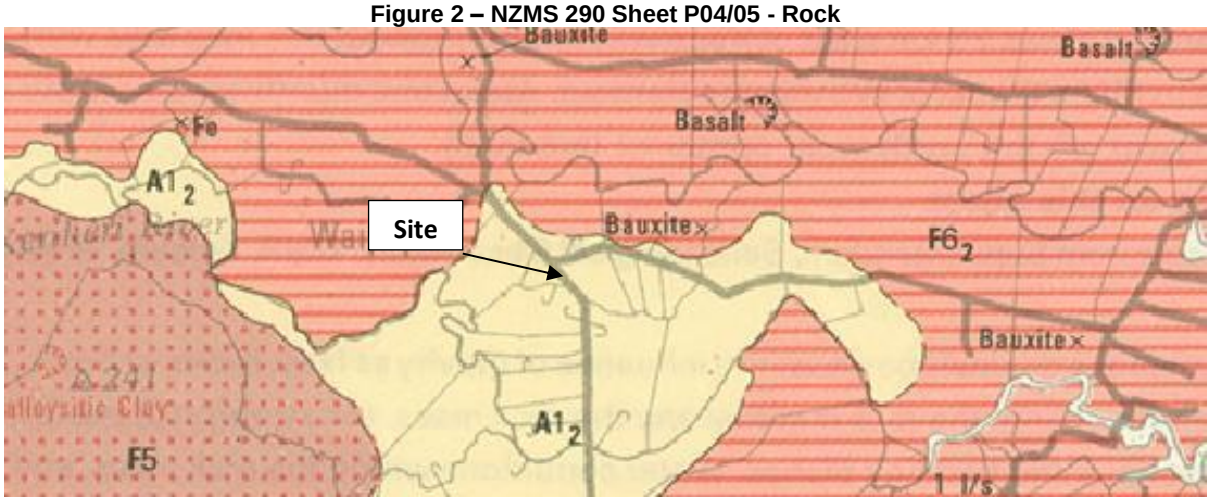
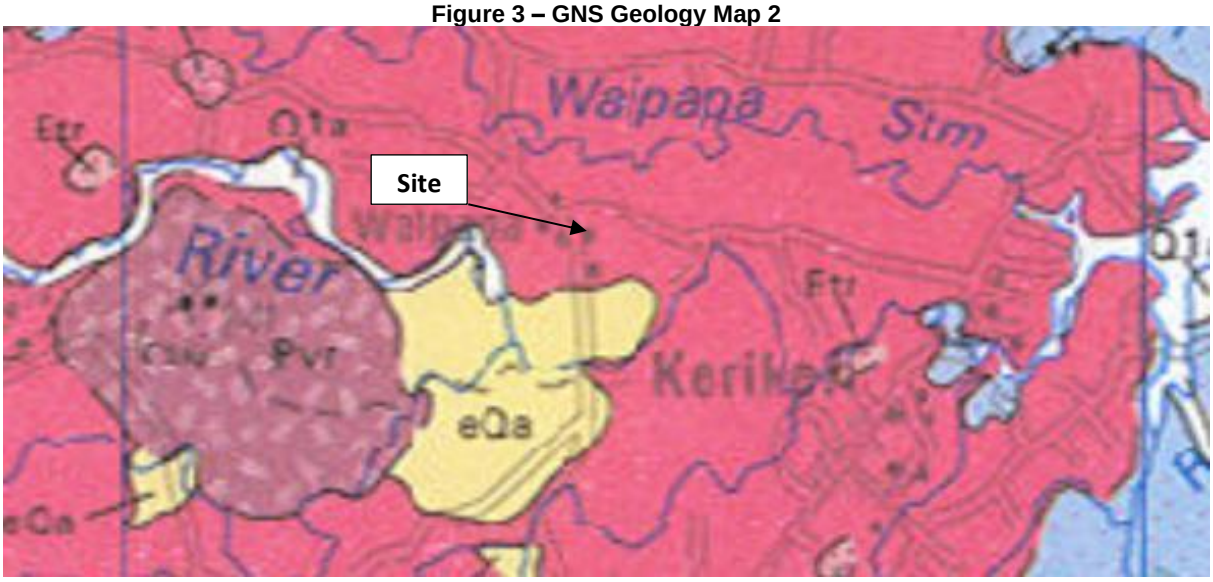


Figure 3 – GNS Geology Map 2



4 Fieldwork

4.1 Subsurface Investigations

Soils investigations were conducted on 30 July 2019 and comprised the drilling of a hand auger borehole (BH1), located to the south west of the proposed development area to a depth of 1.1 m below ground level (bgl). A borehole log is presented within Appendix C. The soil was found to comprise 200 mm of topsoil underlain by grey moist silty clay becoming clay at 0.6 m bgl. The winter groundwater level was recorded as 0.90 m bgl.

4.2 Visual Inspection

A further visual inspection was carried out on 6 May 2020.

During the field inspection an area of recent fill was identified to the south of the proposed development (shown on Drawing No. 03). This area was approximately 18 m wide and the client informed it may be temporary.

The topography and soil type suggest that rainfall generally soaks into the ground. In extreme events runoff is expected to occur as sheet flow towards the south and entering Whiriwhiritoa Stream on the southern boundary.

There are two drainage easements onsite, both leading into Whiriwhiritoa Stream to the south; one navigates the centre of the property and the second follows the extent of the eastern boundary.

Visually, there was no evidence of waterlogging and saturated soils across the site, such as water tolerant vegetation. There were no signs of erosion within the site. Springs, wells and other water source features were not noted during the Haigh Workman site walkover.

Note, a Land Information Memorandum (LIM) report has not been included within the scope of works and is not subject to this review.

5 Wastewater

5.1 Existing Wastewater Treatment and Disposal

Wastewater from existing residential structures is currently managed appropriately on-site;

- The existing dwelling and cottage to the north has a septic tank and effluent soakage system within private garden;
- The six existing accommodation units undergo a combination of primary and secondary treatment, with two septic tanks and a treatment plant. The secondary treatment and dripperline disposal area for the existing six cabins was designed by Haigh Workman in 2012 and adopted design occupancy of 2 persons per unit, a design flow of 170 L per person and an irrigation rate of 3 mm/day which required a disposal area of 680 m^2, plus a 30 % reserve of 204 m^2. Effluent is disposed via dripperlines which are laid amongst citrus trees and along the northern site boundary. The dripperlines occupy an area of approximately 1,198 m^2.

Existing wastewater systems are identified on Drawing No. 02.

Effluent from the proposed six additional residential units are to undergo separate on-site wastewater treatment and disposal.

5.2 Proposed Wastewater Generation

We refer to the ARC publication TP58 Third Edition *'On-Site Wastewater Systems: Design and Management Manual'*.

It has been confirmed by the client that the proposed accommodation units are to be one bedroom. In reference to TP58 Section 6.3.1, it is recommended that the design occupancy of two people be adopted per unit, equating to an additional 12 persons on the property.

We adopt TP58's recommended per capita flowrate of 160 L/p/d for a house supplied with roof-water and fitted with standard wastewater fixtures.

We therefore assess the design flowrate as, 160 x 12 = 1,920 L/d. Peak flows of up to 2,880 L/day can be anticipated.

A water meter is proposed to monitor water usage.

5.3 Proposed Treatment System

The proposed treatment system is to service the six proposed residential units.

The treatment system may be suitably located to the south of the proposed units; this positioning will allow gravity drainage. The invert level at the treatment system inlet should be not less than 0.5 m below finished floor level. The system should be setback a minimum of 3 m from buildings. Access for maintenance should be made available.

To comply with permitted activity Rule C.6.1.3.2), flow balancing is proposed so that no more than 2 m^3/day is discharged. A 5,000 L balance tank can balance peak flows from the six cabins.

The client proposes a *TechTreat Aerated Wastewater Treatment System* which has been On-site Effluent Tested (OSET). The system is to meet the quality output of AS/NZS 1546.3:2003 and be capable of producing effluent having

less than 20 g/m³ of BOD_5 and 30 g/m³ TSS. We recommend the treatment plant is sized to cater for a consistent flow of 2,000 L/day.

The treatment plant is to be installed to the manufacturer's specification and a commissioning certificate is to be provided as is standard practice. A maintenance agreement is also to be entered into as part of the Code of Compliance application.

5.4 Disposal Area

5.4.1 *Loading Rate*

The available geological records show the site to be underlain by residual soils. The site is underlain by soils of the Undulating Terraces and Lowlands comprising Waipapa Clay (YF) typically described as '*imperfectly to very poorly drained*'.

Shallow soils comprise silty clays up to 0.5 m bgl, underlain by clays. A conservative soil type has been selected. Soils are categorised as AS/NZS 1547 Soil Category 5, being poorly drained light clays, or respectively TP58 Soil Category 6 slowly draining clays. These soil types can be expected to sustain an aerial loading rate of 2 to 3 mm/day.

A loading rate of 3 mm/day has been opted for, taking into account:

- Existing dripperlines are loaded at this rate and have no problems;
- Conservative soil type;
- Gentle slope of disposal field;
- Established vegetation at disposal field;
- Good exposure to wind and sun.

Based on a rate of 3 mm/day, this proposal will require 1,920/3 = 640 m² area of disposal field. This equates to 640 metres of UniBioline or similar approved irrigation tubing laid at 1.0 m spacing.

A 30% reserve area (192 m^2) should remain undeveloped.

5.4.2 *Proposed Location*

The proposed effluent disposal field and reserve area locations are shown on Haigh Workman Drawing No. 03. Ground slopes in this location vary from 0.5° to 3°.

Setbacks

It is proposed to install the dripperline disposal field to the south west of the proposed development, towards existing units. The disposal field should be setback a minimum of 3 m from buildings (and a minimum of 1.5 m from legal site boundaries). The area of fill on site is understood to be temporary and should not be utilised for wastewater disposal, unless subject to investigation.

The proposed stormwater detention basin on the east of the site will remain empty (not a pond), only filling during heavy rain. The disposal area should have a minimum setback distance of 5 m from the basin.

In the proposed location the disposal and reserve areas are outside the NRC mapped 100 year flood hazard area, as per the Land Use Consent requirements.

Dripperlines

The site is suitable for surface or subsurface trickle irrigation systems.

The proposed disposal area is currently partially planted with citrus trees and partially grassed. It is proposed that 240 m of dripperlines are surface laid beneath existing orchard trees. Beneath trees, 1 m dripperline spacings are appropriate. The dripperlines should be covered with a minimum of 100 mm of bark mulch. Additionally, it is proposed that 400 m^2 area of subsurface dripperlines be buried beneath grass and installed at 0.5 m line spacing to achieve effective wastewater distribution. Laterals should be increased accordingly e.g. 800 m length dripperline at 0.5 m line spacing beneath lawn. Planting is recommended to aid evaporation beneath lawn, a list of suitable species are included in Appendix E.

Table 5.1. shows the proposed disposal field arrangement.

Dripperlines should be 1.6 L/hr emitters (UniBioline or similar approved).

Table 5.1. Proposed Dripperline Arrangement.

Dosing Block:	**1**	**2**	**3**
Surface/Subsurface:	Surface	Subsurface	Subsurface
Location:	Beneath existing orchard trees	Buried beneath grass	Buried beneath grass
Planting:	Existing citrus trees	Evapotranspiration plants recommended	Evapotranspiration plants recommended
Area:	240 m^2	200 m^2	200 m^2
Line spacing:	1 m	0.5 m	0.5 m
Length of Dripperline:	240 m	400 m	400 m
Emitter centres:	0.3 m	0.5 m	0.5 m
No. Emitters:	= 240/0.3 = 800	= 400/0.5 = 800	= 400/0.5 = 800

The total proposed length of dripperline in this arrangement Is 1,040 m.

Dosing Blocks

Due to the size of the disposal field, it should be split into three blocks, dosed by an indexing valve. The proposed layout would be best suited to three dosing blocks; one surface, two subsurface, as per Table 5.1.

Interception Drain

An interceptor drain shall be constructed as depicted, to ensure surface water run-off is directed to the detention basin and away from the disposal field.

Appendix A - Drawings

Drawing No.	Title	Scale
01	Haigh Workman Ltd – Site Location Plan	1:5,000
02	Haigh Workman Ltd – Site Features Plan	1:1,000
03	Haigh Workman Ltd – Wastewater Management Plan	1:500
04	Haigh Workman Ltd – Disposal Field Layout and Interception Drain Design	NTS
-	*Donaldsons Topographic Survey of Lot 2 DP 102334*	-

NTS: Not to Scale

NOTES:

SITE BOUNDARY

WATER COURSE(S)

SITE BOUNDARIES, SITE FEATURES, EASEMENTS FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321.

Issue	Date	Revision
A	30/05/2020	WASTEWATER REPORT

DWG Site Location Plan

Scale 1:5000 @A3 — 50 25 0 50 100 150 m — Date 30/05/2020

Drawn CJ — Checked EJC — Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - WW REPORT.DWG

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Civil & Structural Engineers
6 Fairway Drive
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E: info@haighworkman.co.nz

Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client Arthur Cottle

Project No. 17 111 — RC no. 2200337-RMALUC

DWG No. **01**

Sheet No. **01** of **04**

Plotted By Emily Collings at 10/06/2020 4:29:08 PM

Issue	Date	Revision
A	30/05/2020	WASTEWATER REPORT

DWG Site Features Plan

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 30/05/2020

Drawn EJC Checked TMA Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - WW REPORT.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client Arthur Cottle

Project No. 17 111 RC no. 2200337-RMALUC

DWG No. **02**

Sheet No. **02** of **04**

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NOTES:

- SITE BOUNDARY
- PROPOSED DEVELOPMENT
- EXISTING DRAINS
- EXISTING EFFLUENT DISPOSAL FIELDS
- PROPOSED DISPOSAL FIELD
- PROPOSED CUT-OFF DRAIN
- BH1 HAIGH WORKMAN HAND AUGERED BOREHOLE
- STORMWATER CATCHMENT FOR DETENTION BASIN

SITE BOUNDARIES, SITE FEATURES, EASEMENTS FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321

MINIMUM SECONDARY TREATMENT PLANT SETBACKS:

- INVERT LEVEL AT INLET - NOT LESS THAN 0.5 m BELOW FLOOR LEVEL
- BUILDINGS - 3 m
- BOUNDARIES - 1.5 m
- EASILY ACCESSIBLE FOR MAINTENANCE.

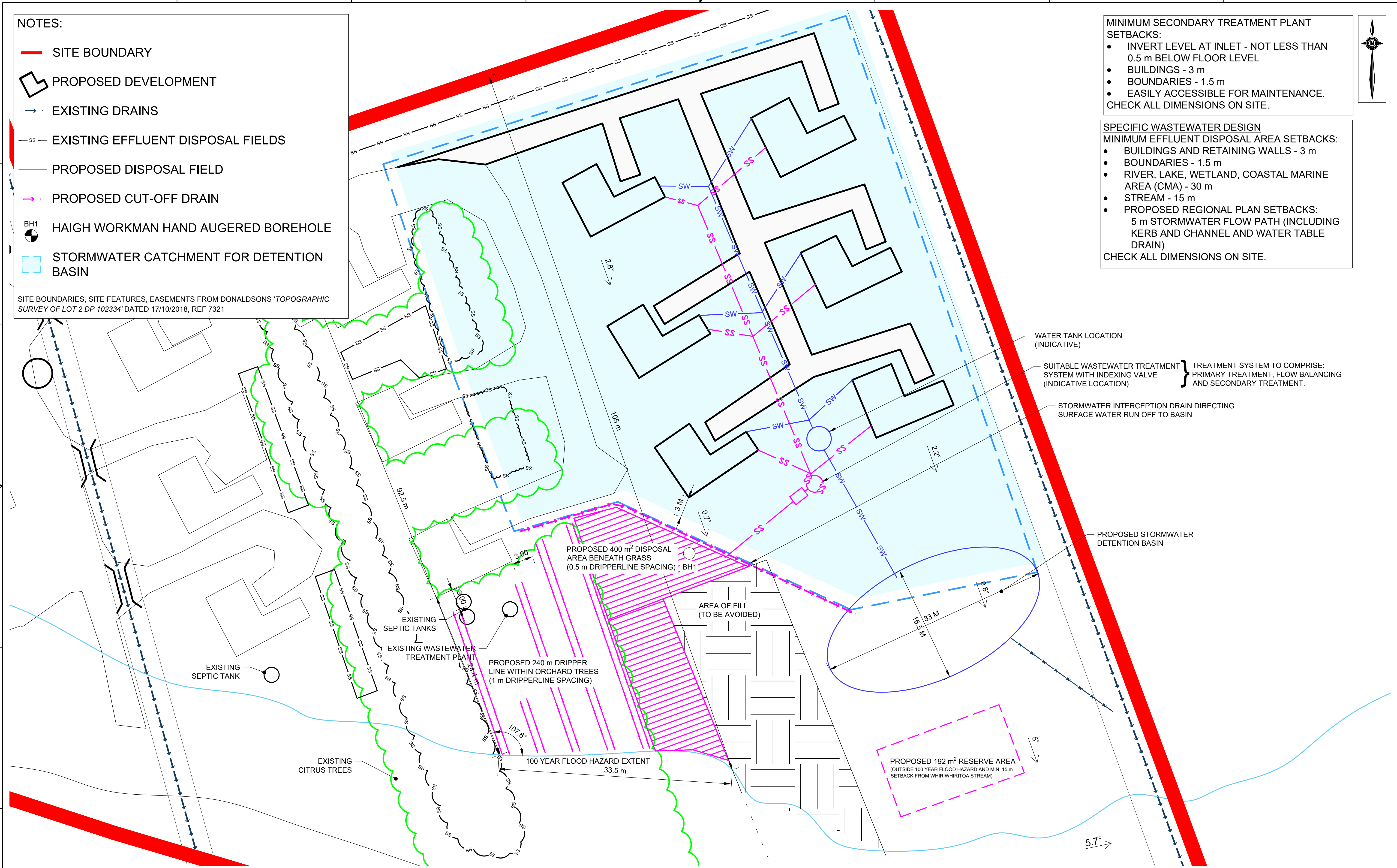
CHECK ALL DIMENSIONS ON SITE.

SPECIFIC WASTEWATER DESIGN

MINIMUM EFFLUENT DISPOSAL AREA SETBACKS:

- BUILDINGS AND RETAINING WALLS - 3 m
- BOUNDARIES - 1.5 m
- RIVER, LAKE, WETLAND, COASTAL MARINE AREA (CMA) - 30 m
- STREAM - 15 m
- PROPOSED REGIONAL PLAN SETBACKS:
  5 m STORMWATER FLOW PATH (INCLUDING KERB AND CHANNEL AND WATER TABLE DRAIN)

CHECK ALL DIMENSIONS ON SITE.



Issue	Date	Revision
A	30/05/2020	WASTEWATER REPORT

DWG Wastewater Management Plan

Scale 1:500 @A3 | Date 25/09/2019

Drawn EJC | Checked CJ | Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - WW REPORT.DWG

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Project: 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client: Arthur Cottle

Project No. 17 111 | RC no.

DWG No. 03

Sheet No. 03 of 04

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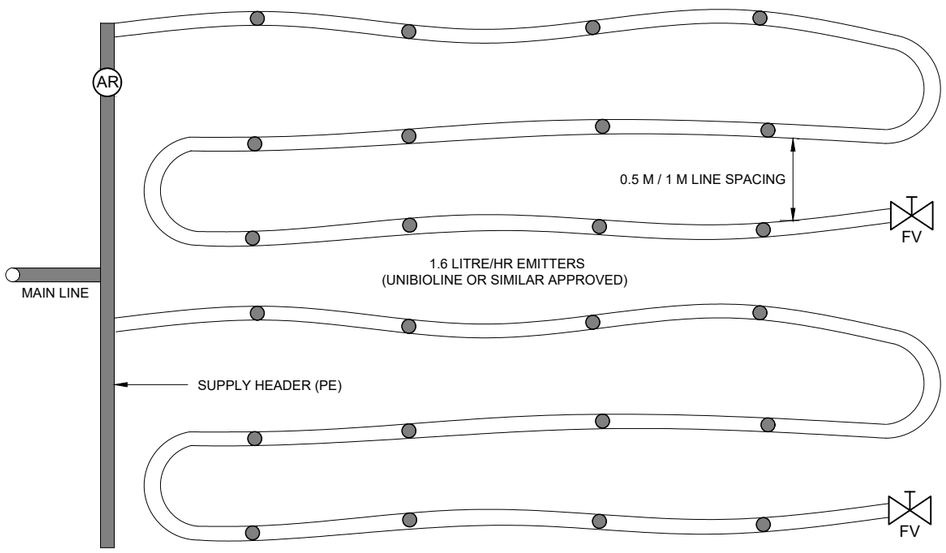
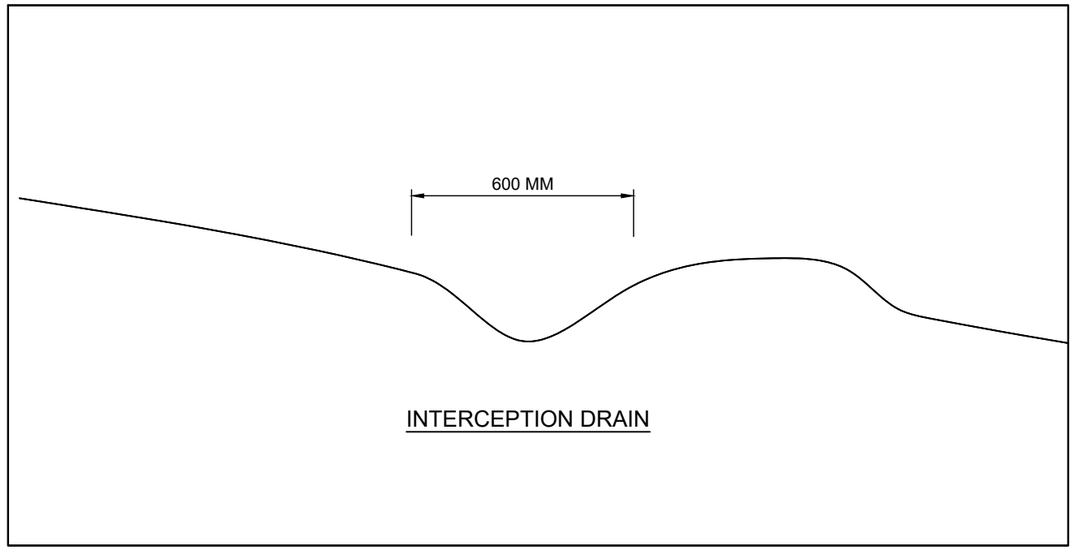


TYPICAL FIELD LAYOUT



INTERCEPTION DRAIN

LEGEND:

AR — AIR / VACUUM RELEASE VALVE

FV — FLUSHING VALVE

NOTE:

BENEATH LAWN, *EFFECTIVE DISTRIBUTION IS BEST ACHIEVED USING CLOSELY SPACED LINES AND EMITTERS (E.g. 0.5 m or 0.3 m) AND USE VERY CONSERVATIVE LOADING RATES OF LESS THAN 3 mm.*

THE LAND DISPOSAL AREA AND/OR LINEAR LENGTH OF IRRIGATION LINES ARE TO BE ADJUSTED WHEN THE LINE SPACING IS VARIED FROM 1.0 m (TP58).

NOTE:

THE EFFLUENT DISPOSAL AREA WILL NEED TO BE PROTECTED USING AN INTERCEPTION DRAIN UP-SLOPE OF THE DISPOSAL AREA.

Issue	Date	Revision
A	30/05/2020	WASTEWATER REPORT

DWG: Disposal Field Layout and Interception Drain Design

Scale | Date 30/05/2020

Drawn EJC | Checked TMA | Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - WW REPORT.DWG

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Project: 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client: Arthur Cottle

Project No. 17 111 | RC no. 2200337-RMALUC

DWG No. **04**

Sheet No. **04** of **04**

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IMPERMEABLE SURFACES

Roofs	2638m²
Driveways (Metalled areas)	4835m²
Future units	445m²
Future driveways (Approx)	600m²
TOTAL IMPERMEABLE (@17/10/18) or 27.7%	8,518m²

1
DP 102334

315°17'00"
105.54
Existing entrance (sealed)
Metalled driveway
STATE HIGHWAY 10
Sealed over 20.12 wide
Limited access road
metalled area 257m²
Carport 40m²
Container
Kennel
71°38'
104.72
(108.72)
4.00 EB
eb
159°14'30"
74.77
Green house
Existing dwelling 360m²
Septic Tank
effluent soakage
Drainage easement
Covered Containers 51m²
Proposed Driveway
7.00 eb
71°30'
117.04
(124.04)
Drain
1
DP 202219
177°52'
36.21
metalled areas 4578m²
Storage shed 580m²
Effluent dripper lines
Containers
6 units future development 445m²
87°52'
50.29
OLC 60
177°52'
54.66
metalled
Carport 140m²
Storage shed 498m²
Storage shed 427m²
metalled
Container
Relocatable buildings 296m²
metalled
Effluent dripper lines
LOT 2
DP 102334
3.0750ha
Drainage easement
159°47'
(179.13)
Relocatable buildings 149m²
Waste Water treatment plant
Covered Containers 97m²
Septic Tanks
Effluent dripper lines
Orange trees
1:100 year flood extent NRC map
1
DP 380472
1
DP 173080
Whiriwhiritoa Stream
2-3m wide
fixed by DP 316057
18
DP 316057

Applicant : A.W Cottle
Title : NA56C/28
Total Area : 3.0750ha
Zone : Rural Production

Heights are in terms of One Tree Point Vertical Datum 1964
Origin of levels RM 41/2 SO 55463 RL 74.96

Coordinates are in terms of NZGD Mt Eden 2000

Contour interval : 0.5m
Dir : Drawing001
Scale @ A3 : 1:1000
Date : 17/10/2018

0 10 20 30 40 50 100

DONALDSONS
REGISTERED LAND SURVEYORS

TOPOGRAPHIC SURVEY OF LOT 2 DP 102334

7321

Land / engineering Surveyors & development planners - 90 Kerikeri Road, Kerikeri, Northland, New Zealand - www.donaldsons.net.nz - em: info@donaldsons.net.nz - p:09 4079182

Appendix B – Site Evaluation Checklist, Producer Statement, Assessment of Environmental Effects and System Maintenance Schedule

FAR NORTH DISTRICT COUNCIL
Appendix E TP58
On-site Wastewater Disposal Site Evaluation
Investigation Checklist

Part A –Owners Details

1. Applicant Details:

Applicant Name	*Arthur Cottle*
Company Name	*NA*
Property Owner Name(s)	*Arthur William Cottle*

Nature of Applicant*	*Owner*

*(*i.e. Owner, Lessee, Prospective Purchaser, Developer)*

2. Consultant / Site Evaluator Details:

Consultant/Agent Name	*Haigh Workman*			
Site Evaluator Name	*Emily Collings*			
Postal Address	*PO Box 89*			
	Kerikeri			
Phone Number	Business	*09 407 8327*	Private	
	Direct Dial	*09 283 5916*	Fax	
Name of Contact Person	*Emily Collings*			
E-mail Address	*emily@haighworkman.co.nz*			

3. Are there any previous existing discharge consents relating to this proposal or other waste discharge on this site?

Yes	✓	No	

If yes, give Reference Numbers and Description
Dwelling and existing units have existing effluent disposal.

4. List any other consent in relation to this proposal site and indicate whether or not they have been applied for or granted
If so, specify Application Details and Consent No.
(e.g. Land Use, Water Take, Subdivision, Earthworks, Stormwater Consent)

Landuse Consent - 2200337-RMALUC
Report is for Building Consent

Part B- Property Details

1. Property for which this application relates:

Physical Address of Property	*2000 State Highway 10, Waipapa*
Territorial Local Authority	**FAR NORTH DISTRICT COUNCIL**
Regional Council	**NORTHLAND REGIONAL COUNCIL**
Legal Status of Activity	Permitted: ✓ Controlled: Discretionary:
	C.6.1.3
Relevant Regional Rule(s) (Note 1)	
Total Property Area (m²)	*30,750*
Map Grid Reference of Property If Known	

2. Legal description of land (as shown on Certificate of Title)

Lot No.	*2*	DP No.	*102334*	CT No.	*NA56C/28*
Other (specify)					

Please ensure copy of Certificate of Title is attached. ✓

PART C: Site Assessment - Surface Evaluation

(Refer TP58 - Sn 5.1 General Purpose of Site Evaluation and Sn 5.2.2(a) Site Surface Evaluation)

Note: Underlined terms defined in Table 1, attached

Has a relevant property history study been conducted?

Yes		No	✓

If yes, please specify the findings of the history study, and if not please specify why this was not considered necessary.

Not part of scope. Review of Property File.
Site inspection and observations.
Discussion with property owner.

1. Has a Slope Stability Assessment been carried out on the property?

Yes		No	✓

If No, why not?

The site has gentle slopes.

If Yes, please give details of report (and if possible, please attach report):

Author	
Company/Agency	
Date of Report	
Brief Description of Report Findings:	

2. Site Characteristics (See Table 1 attached):

Provide descriptive details below:
Performance of Adjacent Systems:
No problems known. Property owner reported existing TechTreat is working well.
Estimated Rainfall and Seasonal Variation:
1,400 mm per year. 800 mm winter, 600 mm summer.
Vegetation / Tree Cover:
Grass with some orchard trees.
Slope Shape: (Please provide diagrams)
Proposed disposal area generally slopes towards the south.
Slope Angle:
Average slope approx. 0.5 - 5 degrees at proposed disposal area.
Surface Water Drainage Characteristics:
Sheet flow following natural site contours to Whiriwhiritoa Stream.
Flooding Potential: YES/NO
Yes.
If yes, specify relevant flood levels on appended site plan, I.e. one in 5 years and/or 20 year and/or 100 year return period flood level, relative to disposal area.
10 and 100 year flooding downslope of disposal field (shown on Drawings).
Surface Water Separation:
To be at least 5 m from stormwater detention basin.
To be protected by upslope cut off drain.
10 and 100 year flood hazard as per RC 2200337-RMALUC
Site Characteristics: or any other limitation influencing factors
10 and 100 year flooding downslope of disposal field.
Limited space available outside flood plain.

3. Site Geology

Alluvium ($A1_2$) underlain by Basalt (Pvb)

Geological Map Reference Number	*NZMS Rock type and GNS geology map 2 (Whangarei)*

4. What Aspect(s) does the proposed disposal system face? (please tick)

North		**West**	
North-West		**South-West**	
North-East		**South-East**	
East		**South**	✓

5. Site clearances (Indicate on site plan where relevant)

Separation Distance from:	Treatment Separation Distance	Disposal Field Separation Distance	Minimum Separation Distance	Regulation
Boundaries	*>1.5*	*>1.5*	1.5	NRC
Surface water, drains	*>5*	*>5*	5	NRC
Groundwater	*NA*	*0.8*	0.6	NRC
Stands of Trees/Shrubs	*NA*	*Within orchard trees (and grass)*	NA	-
Wells, water bores	*>20*	*>20*	20 m	NRC
Embankments/retaining walls	*NA*	*NA*	3 m	TP58
Buildings	*>3*	*>3*	3 m	TP58
Rivers, lakes, streams, ponds	*>15*	*>15*	15 m	NRC
Coastal Marine Area (CMA)	*>30*	*>30*	30 m	FNDC

PART D: Site Assessment - Subsoil Investigation

(Refer TP58 - Sn 5.1 General Purpose of Site Evaluation, and Sn 5.2.2(a) Site Surface Evaluation and Sn 5.3 Subsurface Investigations)

1. Please identify the soil profile determination method:

Test Pit		Depth_____m	No of Test Pits	
Borehole	✓	Depth *1.1* m	No of Bore Holes	*1 (BH1, 2019)*
Other (specify):				

Soil Report attached?

Yes	✓	No	

2. Was fill material intercepted during the subsoil investigation?

Yes	*Fill beside proposed disposal field*	No	✓

If yes, please specify the effect of the fill on wastewater disposal

3. Percolation testing (mandatory and site specific for trenches in soil type 4 to 7)

Please specify the method

Test Report Attached?	Yes		No	✓

4. Are surface water interception/diversion drains required?

Yes	✓	No	

If yes, please show on site plan

4a Are subsurface drains required?

Yes		No	✓

If yes, please provide details

5. Please state the depth of the seasonal water table:

Winter	*0.9* m	Measured	✓	Estimated	
Summer	*1.2* m	Measured		Estimated	✓

6. Are there any potential storm water short circuit paths?

Yes		No	✓	Please tick

If the answer is yes, please explain how these have been addressed

7. Based on results of subsoil investigation above, please indicate the disposal field soil category
(Refer TP58 Table 5.1)

Is Topsoil Present?	*Yes*	If so, Topsoil Depth?	*0.2* (m)

TP58 Soil Category	Description	Drainage	Tick One
1	Gravel, coarse sand	Rapid draining	
2	Coarse to medium sand	Free draining	
3	Medium-fine & loamy sand	Good drainage	
4	Sandy loam, loam & silt loam	Moderate drainage	
5	Sandy clay-loam, clay loam & silty clay-loam	Moderate to slow drainage	
6	Sandy clay, non-swelling clay & silty clay	Slow draining	✓
7	Swelling clay, grey clay, hardpan	Poorly or non-draining	

Reasons for placing in stated category

Soil map classification, soil colour and texture from borehole investigation.

PART E: Discharge Details

1. Water supply source for the property:

Rainwater (roof collection)	✓
Bore/well	
Public supply	

2. Calculate the maximum daily volume of wastewater to be discharged, unless accurate water meter readings are available

(Refer TP58 Table 6.1 and 6.2)

Number of Bedrooms	*1 * 6 = 6 one-bedroom units*			
Design Occupancy	*2 * 6 = 12*			(Number of People)
Per capita Wastewater Production	140	160✓	180	(tick) (Litres per person per day)
Other - specify	200	220		
Total Daily Wastewater Production	*1,920*			(litres per day)

3. Do any special conditions apply regarding water saving devices

a) Full Water Conservation Devices?	Yes		No	✓
b) Water Recycling - what %?	%			

If you have answered yes, please state what conditions apply and include the estimated reduction in water usage

4. Is Daily Wastewater Discharge Volume more than 2,000 litres:

Yes	
No	✓

5. Gross Lot Area to Discharge Ratio:

Gross Lot Area	*30,750*	m^2
Total Daily Wastewater Production	*1,920 (proposed) + existing*	Litres per day
Lot Area to Discharge Ratio	*>3*	

7. Does this proposal comply with the Northland Regional Council Gross Lot Area to Discharge Ratio of greater than 3?

Yes	✓	No	

8. Is a Northland Regional Council Discharge Consent Required?

Yes		No	✓

PART F: Primary Treatment *(Refer TP58 Section 7.2)*

1. Please indicate below the no. and capacity (litres) of all septic tanks including type (single/dual chamber grease traps) to be installed or currently existing: If not 4500 litre, duel chamber, explain why not

Number of Tanks	Type of Tank	Capacity of Tank (Litres)
	Total Capacity	

2. Type of Septic Tank Outlet Filter to be installed?

PART G: Secondary and Tertiary Treatment

(Refer TP58 Section 7.3, 7.4, 7.5 and 7.6)

1. Please indicate the type of additional treatment, if any, proposed to be installed in the system: (please tick)

Secondary Treatment	✓ *TechTreat*		
Home aeration plant			
Commercial aeration plant			
Intermediate sand filter			
Recirculating sand filter			
Recirculating textile filter			
Clarification tank			
Tertiary Treatment			
Ultraviolet disinfection			
Chlorination			
Other		Specify	

PART H: Land Disposal Method

(Refer TP58 Section 8)

1. Please indicate the proposed loading method: (please tick)

Gravity	
Dosing Siphon	
Pump	✓

2.High water level alarm to be installed in pump chambers?

Yes ✓	No

If not to be installed, explain why

3. If a pump is being used, please provide the following information:

Total Design Head	*Refer supplier information*	(m)
Pump Chamber Volume		(Litres)
Emergency Storage Volume		(Litres)

4. Please identify the type(s) of land disposal method proposed for this site: (please tick)
(Refer TP58 Sections 9 and 10)

Surface Dripper Irrigation	✓		
Sub-surface Dripper irrigation	✓		
Standard Trench			
Deep Trench			
Mound			
Evapo-transpiration Beds			
Other		Specify	

5. Please identify the loading rate you propose for the option selected in Part H, Section 4 above, stating the reasons for selecting this loading rate:

Loading Rate	*3*		(Litres/m²/day)
Disposal Area	Design	*640*	(m²)
Min required	Reserve	*192*	(m²)

Explanation *(Refer TP58 Sections 9 and 10)*

Loading rate adopted for secondary treated effluent in category 6 soils refer table 9.2 in TP58.

6. What is the available reserve wastewater disposal area *(Refer TP58 Table 5.3)*

Reserve Disposal Area (m²)	*192*
Percentage of Primary Disposal Area (%)	*30*

7. Please provide a detailed description of the design and dimensions of the disposal field and attach a detailed plan of the field relative to the property site:

Description and Dimensions of Disposal Field:

Refer TP58 report.					
1,040 m dripperlines proposed.					
Proposed to be installed both surface (beneath orchard trees) and subsurface (beneath lawn). 1 m line					
spacing is proposed beneath orchard trees, whereas 0.5 m line spacing is proposed beneath lawn for even					
distribution of wastewater.					
Plan Attached?	*Yes*	✓	*No*		*(Please tick)*

If not, explain why not

PART I: Maintenance & Management

(Refer TP58 Section 12.2)

1. Has a maintenance agreement been made with the treatment and disposal system suppliers?

Yes		No	✓	(Please tick)

Name of Suppliers

TBC

PART J: Assessment of Environmental Effects

1. Is an assessment of environmental effects (AEE) included with application?

(Refer TP58 section 5. Ensure all issues concerning potential effects addressed)

Yes	✓	No		(Please tick)

If Yes, list and explain possible effects

PART K: Is Your Application Complete?

1. In order to provide a complete application you have remembered to:

Fully Complete this Assessment Form	✓
Include a *Location Plan* and *Site Plan* (with Scale Bars)	✓
Attach an Assessment of Environmental Effects (AEE)	✓

1. Declaration

I hereby certify that, to the best of knowledge and belief, the information given in this application is true and complete.

Name	*Emily Collings*	Signature	EJCollings
Position	*Environmental Engineer, MEngNZ*	Date	10/06/2020

Note:
Any alteration to the site plan or design after approval will result in non compliance.

Building Code Clause(s) G13

PRODUCER STATEMENT – PS1 – DESIGN

(Guidance on use of Producer Statements (formerly page 2) is available at www.engineeringnz.org)

ISSUED BY: Haigh Workman Limited (Job number: 17 111)
(Design Firm)

TO: Arthur Cottle
(Owner/Developer)

TO BE SUPPLIED TO: Far North District Council
(Building Consent Authority)

IN RESPECT OF: Onsite wastewater system
(Description of Building Work)

AT: 2000 State Highway 10
(Address)

Town/City: Waipapa **LOT** 2 **DP** 102334 **SO**
(Address)

We have been engaged by the owner/developer referred to above to provide:

A design for an onsite wastewater system in accordance with technical publication TP58

(Extent of Engagement)

services in respect of the requirements of Clause(s) G13 of the Building Code for:

☒ All or ☐ Part only (as specified in the attachment to this statement), of the proposed building work.

The design carried out by us has been prepared in accordance with:

☐ Compliance Documents issued by the Ministry of Business, Innovation & Employment or
(verification method/acceptable solution)

☒ Alternative solution as per the attached schedule technical publication TP58

The proposed building work covered by this producer statement is described on the drawings titled:

2000 State Highway 10, Waipapa and numbered 17 111;
together with the specification, and other documents set out in the schedule attached to this statement.

On behalf of the Design Firm, and subject to:
(i) Site verification of the following design assumptions site verification of the soil types
(ii) All proprietary products meeting their performance specification requirements;

I believe on reasonable grounds that a) the building, if constructed in accordance with the drawings, specifications, and other documents provided or listed in the attached schedule, will comply with the relevant provisions of the Building Code and that b), the persons who have undertaken the design have the necessary competency to do so. I also recommend the following level of construction monitoring/observation:

☐ CM1 ☐ CM2 ☐ CM3 ☐ CM4 ☐ CM5 (Engineering Categories) or ☐ as per agreement with owner/developer (Architectural)

I, John Papesch am: ☒ CPEng 224301 # ☐ Reg Arch # #
(Name of Design Professional)

I am a member of: ☒ Engineering New Zealand ☐ NZIA and hold the following qualifications: BE (Civil) CMEngNZ
The Design Firm issuing this statement holds a current policy of Professional Indemnity Insurance no less than $200,000*.
The Design Firm is a member of ACENZ: ☐

SIGNED BY John Papesch (Signature)
(Name of Design Professional)

ON BEHALF OF Haigh Workman Limited Date 10/06/2020
(Design Firm)

Note: This statement shall only be relied upon by the Building Consent Authority named above. Liability under this statement accrues to the Design Firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the Building Consent Authority in relation to this building work, whether in contract, tort or otherwise (including negligence), is limited to the sum of $200,000.*

This form is to accompany **Form 2 of the Building (Forms) Regulations 2004** for the application of a Building Consent.

GUIDANCE ON USE OF PRODUCER STATEMENTS

Producer statements were first introduced with the Building Act 1991. The producer statements were developed by a combined task committee consisting of members of the New Zealand Institute of Architects, Institution of Professional engineers New Zealand (now Engineering New Zealand), Association of Consulting Engineers New Zealand in consultation with the Building Officials Institute of New Zealand. The original suit of producer statements has been revised at the date of this form as a result of enactment of the Building Act (2004) by these organisations to ensure standard use within the industry.

The producer statement system is intended to provide Building Consent Authorities (BCAs) with reasonable grounds for the issue of a Building Consent or a Code Compliance Certificate, without having to duplicate design or construction checking undertaken by others.

PS1 Design Intended for use by a suitably qualified independent design professional in circumstances where the BCA accepts a producer statement for establishing reasonable grounds to issue a Building Consent;

PS2 Design Review Intended for use by a suitably qualified independent design professional where the BCA accepts an independent design professional's review as the basis for establishing reasonable grounds to issue a Building Consent;

PS3 Construction Forms commonly used as a certificate of completion of building work are Schedule 6 of NZS 3910:2013 or Schedules E1/E2 of NZIA's SCC 2011[2]

PS4 Construction Review Intended for use by a suitably qualified independent design professional who undertakes construction monitoring of the building works where the BCA requests a producer statement prior to issuing a Code Compliance Certificate.

This must be accompanied by a statement of completion of building work (Schedule 6).

The following guidelines are provided by ACENZ, Engineering NZ and NZIA to interpret the Producer Statement.

Competence of Design Professional

This statement is made by a Design Firm that has undertaken a contract of services for the services named, and is signed by a person authorised by that firm to verify the processes within the firm and competence of its designers.

A competent design professional will have a professional qualification and proven current competence through registration on a national competence based register, either as a Chartered Professional Engineer (CPEng) or a Registered Architect.

Membership of a professional body, such as Engineering New Zealand (formerly IPENZ) or the New Zealand Institute of Architects (NZIA), provides additional assurance of the designer's standing within the profession. If the design firm is a member of the Association of Consulting Engineers New Zealand (ACENZ), this provides additional assurance about the standing of the firm.

Persons or firms meeting these criteria satisfy the term "suitably qualified independent design professional".

*Professional Indemnity Insurance

As part of membership requirements, ACENZ requires all member firms to hold Professional Indemnity Insurance to a minimum level.

The PI Insurance minimum stated on the front of this form reflects standard, small projects. If the parties deem this inappropriate for large projects the minimum may be up to $500,000.

Professional Services during Construction Phase

There are several levels of service which a Design Firm may provide during the construction phase of a project (CM1-CM5 for Engineers[3]). The Building Consent Authority is encouraged to require that the service to be provided by the Design Firm is appropriate for the project concerned.

Requirement to provide Producer Statement PS4

Building Consent Authorities should ensure that the applicant is aware of any requirement for producer statements for the construction phase of building work at the time the building consent is issued as no design professional should be expected to provide a producer statement unless such a requirement forms part of the Design firm's engagement.

Attached Particulars

Attached particulars referred to in this producer statement refer to supplementary information appended to the producer statement.

Refer Also:

1 Conditions of Contract for Building & Civil Engineering Construction NZS 3910: 2013

2 NZIA Standard Conditions of Contract SCC 2011

3 Guideline on the Briefing & Engagement for Consulting Engineering Services (ACENZ/IPENZ 2004)

4 PN Guidelines on Producer Statements

www.acenz.org.nz
www.engineeringnz.org
www.nzia.co.nz

ENVIRONMENTAL EFFECTS, MITIGATION MEASURES

A. Assessment of Environmental Effects

Impact on Surface Water (incl. flood times) *Minor*

Impact on Ground Water *Minor*

Impact on Soils *Minor*

Impact on Amenity Values *Minor*

B Public Health Issues:

Should access to the disposal area be discouraged? *Yes*

Will odour effects be greater than usual? *No*

Will noise effects be greater than usual? *No*

C. Mitigation Measures

Has conservative approach been taken in choosing system design capacity? *Yes, loading rate considered*

Is system design robust (cope with fluctuations of load, climate)? *Yes*

Is level of treatment high? *Medium – final treatment within soil*

Protection against failure storage, alarms? *Alarms*

Is hydraulic loading rate conservative? *Yes, loading rate considered*

Is distribution area protected from hydraulic overload (interception drains)? *Yes*

Will soil type enhance treatment? *Yes*

Are desired separation distances attainable? (to surface water, groundwater, bores) *Yes*

Is the reserve area adequate? *Yes, 30%*

ON-SITE DOMESTIC WASTEWATER MANAGEMENT
Advice to Home Owner/Occupier

Home owner and occupiers are legally responsible to keep their onsite wastewater system in good working order. The following schedule gives advice on the use and maintenance of the system.

1. **Use of the System**

   For the onsite wastewater system to work well there are some good habits to encourage and some bad habits to avoid:

   1.1 In order to reduce sludge building up in the tank:

   (i) Scrape all dishes to remove fats, grease etc, before washing.
   (ii) Keep all possible solids out of system.
   (iii) Don't use a garbage grinder unless the system has been specifically designed to carry the extra load.
   (iv) Don't put sanitary napkins, other hygiene products or disposable nappies into the system.

   1.2 In order to keep bacteria working in the tank and in the land-application area:

   (i) Use biodegradable soaps.
   (ii) Use a low-phosphorus detergent.
   (iii) Use a low-sodium detergent in dispersive soil areas.
   (iv) Use detergents in the recommended quantities.
   (v) Don't use powerful bleaches, whiteners, nappy soakers, spot removers and disinfectants.
   (vi) Don't put chemicals or paint down drain.

   1.3 Conservation of water will reduce the volume of effluent disposed to the land-application area, make it last longer and improving its performance. Conservation measures could include:

   (i) Installation of water-conservation fittings.
   (ii) Taking showers instead of baths.
   (iii) Only washing clothes when there is a full load.
   (iv) Only using the dishwasher when there is a full load.

   1.4 Avoid overloading the system by spacing out water use evenly. For example, not doing all the washing on one day and by not running the washing machine and dishwasher at the same time.

2. Maintenance

2.1 The primary wastewater-treatment unit (septic tank) will need to:

(i) Be desludged regularly i.e. every 3 to 5 years, or when scrum and sludge occupy 2/3 of the volume of the tank (or first stage of a two-stage system).
(ii) Be protected from vehicles.
(iii) Have any grease trap cleaned out regularly.
(iv) Have the vent and/or access cover of the septic tank kept exposed.
(v) Have the outlet filter inspected and cleaned.

2.2 The land-application area needs protection as follows:

(i) Where surface water diversion drains are required by the design, these need to be kept clear to reduce the risk of stormwater runoff entering the effluent soakage area.
(ii) No vehicles or stock should be allowed on trenches or beds.
(iii) Deep rooting trees or shrubs should not be grown over absorption trenches or pipes.
(iv) Any evapotranspiration areas should be designed to deter pedestrian traffic.
(v) The baffles or valves in the distribution system should be periodically (monthly or seasonally) changed to direct effluent into alternative trenches or beds, if required by the design.

2.3 Evapotranspiration and irrigation areas should have their grass mowed and plants maintained to ensure that these areas take up nutrients with maximum efficiency.

2.4 For aeration treatment systems. Check equipment and:

(i) Follow the manufacturer's instructions for maintaining and cleaning pumps, siphons, and septic tank filters.
(ii) Clean disc filters or filters screens on irrigation-dosing equipment periodically by rinsing back into the primary wastewater-treatment unit.
(iii) Flush drip irrigation lines periodically to scour out any accumulated sediment.

Appendix C – Site Photographs

Figure 4 – Proposed Wastewater Disposal Area, viewed looking south west.

Figure 5 – Area of fill (not to be utilised for wastewater disposal).

Appendix D – Borehole Log

PO Box 89, 0245
6 Fairway Drive
Kerikeri, 0230
New Zealand

HAIGH WORKMAN LTD
Civil & Structural Engineers

Phone 09 407 8327
Fax 09 407 8378
www.haighworkman.co.nz
info@haighworkman.co.nz

Borehole Log - BH1

Hole Location: Refer to Site Plan

JOB No. 17 111

CLIENT:	Arthur Cottle	**SITE:**	2000 SH10, Waipapa		
Date Started:	30/07/2019	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	EC
Date Completed:	30/07/2019	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Corrected Shear Vane Strength (kPa)	Scala Penetrometer (blows/100mm)
Grassed **TOPSOIL** comprising **Silty CLAY**, greyish brown, moist to wet, stiff, medium plasticity.	0.0	T.S.					
Silty CLAY, greyish brown, moist, stiff, medium plasticity.	0.5						
CLAY with some silt, grey, moist to wet, very stiff, medium plasticity. wet saturated, ***GROUNDWATER TABLE ENCOUNTERED at 0.9 mbgl***	1.0			▽			
End of hole at 1.1 m bgl (Target Depth)	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

Scala Penetrometer: 0 5 10 15 20

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil. Bgl = Below ground level.
Groundwater identified at 0.8 m bgl.
Shear Vane and Scala penetrometer testing not undertaken.

Average Soil Sensitivity -

Appendix E – Evapotranspiration Plants

SUITABLE PLANTS FOR EVAPO-TRANSPIRATION SYSTEMS

Native Shrubs and Trees

Coprosma	*Coprosma propinqua*
Hebe	*Hebe*
Manuka	*Leptospermum Scoparium*
Weeping Mapou	*Myrsine Divaricata*
Flax (fast)	*Phormium Tenax*
Pokaka (slow)	*Elaeocarpus Hookerianus*
Cabbage Tree (fast)	*Cordyline Australias*
Rangiora (fast)	*Brachyglottis Repanda*
Lacebark (fast)	*Hoheria Populnea*
Ribbonwood (fast)	*Plagianthus Regius*
Poataniwha	*Melicope Simplex*
Heketara	*Olearia Rani*
Poataniweta	*Carpodetus Serratus*
Kohuhu (fast)	*Pittosporum Tenufolium*

Grasses

Jointed Twig Sedge	*Baumea Articulata*
Longwood Tussock	*Carex Comans*
Pukio	*Carex Secta*
Toetoe (use native species- not invasive Pampas Grass)	*Cortaderia Fulvida*
Umbrella Sedge	*Cyperus Ustulatus*
Oioi	*Leptocarpus Similis*
Hooksedge	*Uncinia Unciniata*

Introduced Species

Canna Lilies, Taro, Aralia, Fuschia, Philodendrons, and Begonias

NORTHLAND REGIONAL COUNCIL

CARING FOR NORTHLAND AND ITS ENVIRONMENT

WHANGAREI: 36 Water Street, Private Bag 9021, Whangarei; Phone 09 438 4639, Fax 09 438 0012.

OPUA: Unit 10, Industrial Marine Park, Opua; Phone 09 402 7516, Fax 09 402 7510.

DARGAVILLE: 61B Victoria Street, Dargaville; Phone 09 439 3300, Fax 09 439 3301.

KAITAIA: 192 Commerce Street, Kaitaia; Phone 09 408 6600, Fax 09 408 6601.

Freephone: 0800 002 004 Environmental Hotline: 0800 504 639 Website: www.nrc.govt.nz

Appendix F – Certificate of Title

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA56C/28**
Land Registration District	**North Auckland**
Date Issued	16 January 1985

Prior References
NA28C/985

Estate	Fee Simple
Area	3.0750 hectares more or less
Legal Description	Lot 2 Deposited Plan 102334

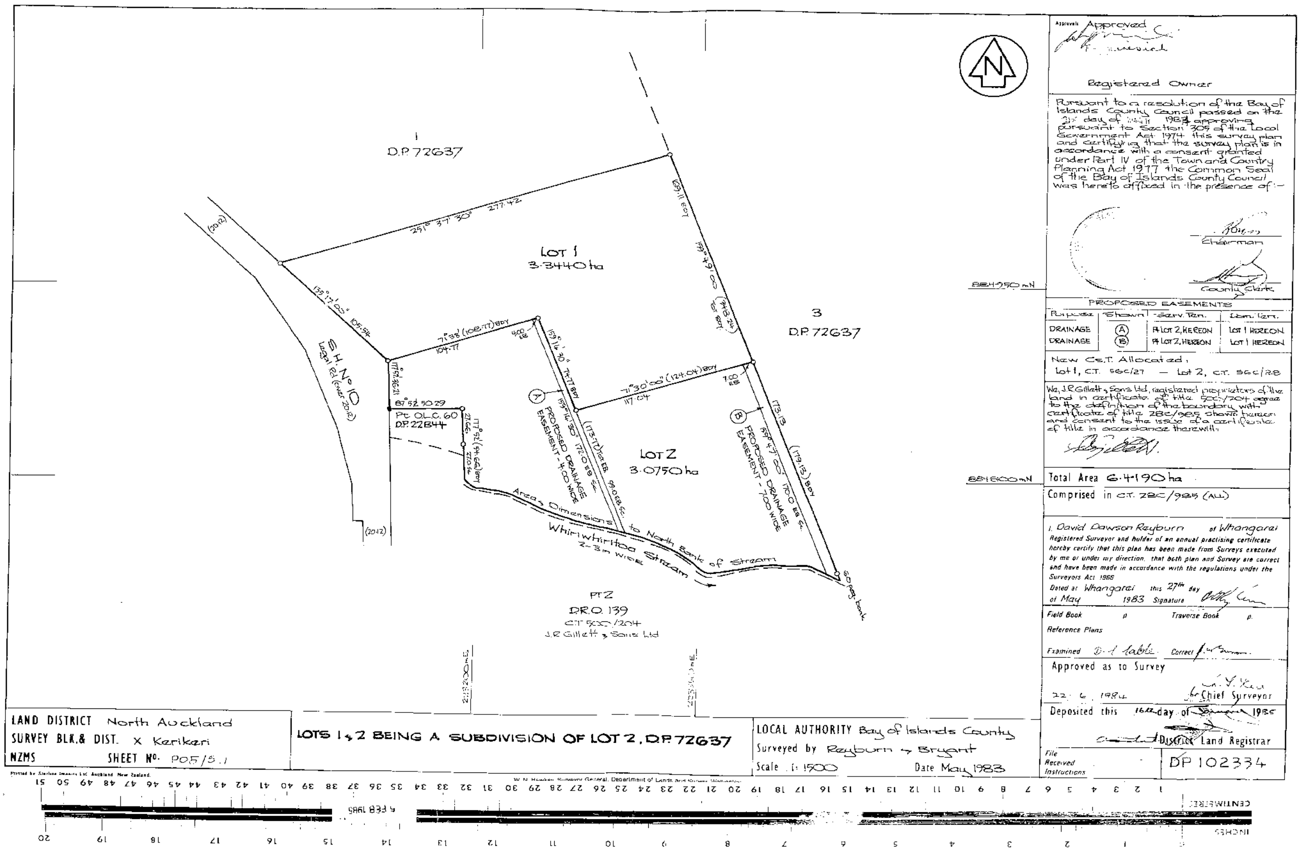
Registered Owners
Arthur William Cottle

Interests

573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining State Highway to be a limited access road - 31.1.1979 at 10.51 am

Subject to a water drainage right over parts marked A and B on DP 102334 specified in Easement Certificate B695154.1 - 9.7.1987 at 9.00 am

6027671.5 Mortgage to ANZ Banking Group (New Zealand) Limited - 2.6.2004 at 9:00 am


LOT 1
3.3440 ha
LOT 2
3.0750 ha
1
D.P. 72637
3
D.P. 72637
Pt O.L.C. 60
D.P. 22844
PT 2
D.R.O. 139
C.T. 505/204
J.R. Gillett & Sons Ltd
S.H. No 10
Whiriwhiritoa Stream
PROPOSED DRAINAGE EASEMENT - 4.00 WIDE
PROPOSED DRAINAGE EASEMENT - 7.00 WIDE
Area & Dimensions to North Bank of Stream
Approved
Registered Owner
Pursuant to a resolution of the Bay of Islands County Council passed on the 21 day of ... 1983 approving pursuant to Section 305 of the Local Government Act 1974 this survey plan and certifying that the survey plan is in accordance with a consent granted under Part IV of the Town and Country Planning Act 1977 the Common Seal of the Bay of Islands County Council was hereto affixed in the presence of:-
Chairman
County Clerk
PROPOSED EASEMENTS
DRAINAGE A Pt LOT 2, HEREON LOT 1 HEREON
DRAINAGE B Pt LOT 2, HEREON LOT 1 HEREON
New C.s.T. Allocated: Lot 1, C.T. 56C/27 — Lot 2, C.T. 56C/28
We, J.R. Gillett & Sons Ltd, registered proprietors of the land in certificate of title 505/204 agree to the definition of the boundary with certificate of title 28C/985 shown hereon and consent to the issue of a certificate of title in accordance therewith.
Total Area 6.4190 ha
Comprised in C.T. 28C/985 (All)
I, David Dawson Rayburn of Whangarei Registered Surveyor and holder of an annual practising certificate hereby certify that this plan has been made from Surveys executed by me or under my direction, that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1986
Dated at Whangarei this 27th day of May 1983 Signature
Approved as to Survey
22. 6. 1984 for Chief Surveyor
Deposited this 16th day of ... 1985
District Land Registrar
DP 102334
LAND DISTRICT North Auckland
SURVEY BLK.& DIST. X Kerikeri
NZMS SHEET No. P05/5.1
LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2, D.P. 72637
LOCAL AUTHORITY Bay of Islands County
Surveyed by Rayburn & Bryant
Scale 1:1500
Date May 1983

Detailed Site Investigation (DSI) for land at 2000 State Highway 10 Waipapa

391 Waipapa Road, Kerikeri

For

Arthur Cottle

Haigh Workman Reference: 17 111

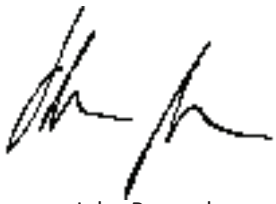
September 2019

Phone: 0800 424 447 • info@haighworkman.co.nz • www.haighworkman.co.nz

Kerikeri • Whangarei • Warkworth • Takapuna

Revision History

Revision Nº	Issued By	Description	Date
A	Catherine Johnson	First Issue	3 September 2019

Prepared by	Reviewed by	Approved by
		
Catherine Johnson	Edward Collings	John Papesch
Geoenvironmental Engineer	**Senior Geoenvironmental Engineer**	**Senior Civil Engineer**
CEnvP, MEngNZ, MSc (Env Science)	CEnvP, MEngNZ, MPhys (Geo)	MEngNZ, BE (Civil)

Report Checklist

Summary of report type and sections presented within this document. Items present are indicated by 'X'.

Report Type (As set out in MFE Contaminated Land Management Guideline No. 1: 2011)

Preliminary Site Investigation Report	☐
Detailed Site Investigation Report	☒
Remediation Action Plan	☐
Site Validation Report	☐

Report Sections

Executive Summary	☒
Scope of Work	☒
Site Identification	☒
Site History	☒
Site Condition and Surrounding Environment	☒
Geology and Hydrology	☒
Sampling and Analysis Plan and Sampling Methodology	☒
Field Quality Assurance and Quality Control (QA/QC)	☒
Laboratory QA/QC	☒
Data Evaluation QA/QC	☒
Basis for Guideline Values	☒
Results	☒
Site Characterisation	☒
Remedial Actions	☐
Validation	☐
Site Management Plan	☐
Ongoing Site Monitoring	☐
Conclusions and Recommendations	☒

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Executive Summary

This investigation has been performed for a piece of land at 2000 State Highway 10, Waipapa (the 'site'). Historic use of the land for horticulture subjects the site to assessment under the Hazardous Activities and Industries List (HAIL) and Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations (NES-CS), under HAIL code A10.

It is understood the client proposes to construct six additional one-bedroom visitor accommodation units on the site, as depicted on the proposed plan enclosed in Appendix A. These units are to be used as rental accommodation, both short and long term.

The designated 'liveable area'/ 'proposed development area', associated with the proposed units is to undergo land use change following development. In accordance with the NES-CS, contaminated land assessment is required with the change of land use. For the purpose of this investigation, a conservative area of 6,000 m^2 has been allocated as detailed on Drawing No. 17111/01 and 04 enclosed.

The site is zoned as *Rural Production* by FNDC. For the purpose of contaminated land assessment, the final land-use scenario for the development will be Standard Residential with up to 10 % produce.

Through a detailed desktop study of available information to Haigh Workman, sampling visit and site inspection, and the interpretation of analytical test results for the site the investigation has revealed:

- Following analytical testing, contamination has not been identified; no samples exceeded the relevant adjusted SCS for Heavy Metals or Organochlorine Pesticides. There is not considered to be a human health risk by the development proposal under assessment.
- There are no proposed earthworks at this stage of the subdivision application, therefore the activity complies with earthworks controls set by FNDC, NRC and NES-CS.
- It is considered that the consent can be granted for the proposed works, with no conditions relating to contaminated land.
- Any future soil disturbance volumes must be assessed and abide by the rules set out in Section 11 of this report.

1 Introduction

Haigh Workman Limited (Haigh Workman) was commissioned by Arthur Cottle (the Client) to undertake a Detailed Site Investigation (DSI) for piece of land undergoing land use change at 2000 State Highway 10, Waipapa (the 'site').

Historic use of the land for horticulture subjects the site to assessment under the Hazardous Activities and Industries List (HAIL) and Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations[1] (NES-CS).

1.1 Proposed Development

It is understood the client proposes to construct six additional one-bedroom visitor accommodation units on the site, as depicted on the proposed plan enclosed in Appendix A of this report (Donaldsons Registered Land Surveyors - *Topographic Survey of Lot 2 DP 102334*, 17/10/2018, ref: 7321). These dwellings are to be used as rental accommodation, both short and long term.

1.2 Land-use and Exposure Scenario

An assessment of the land-uses and exposure scenarios has been conducted in accordance with Ministry for Environment (MfE) Contaminated Land Management Guidelines (CLMG), Methodology for Deriving Contaminants for the Protection of Human Health (Methodology) and the NES-CS.

The designated 'liveable area' associated with the proposed units is to undergo land use change following development. In accordance with the NES-CS, contaminated land assessment is required with the change of land use. For the purpose of this investigation, a very conservative area of 6,000 m^2 has been allocated as detailed on Drawing No. 17111/01 and 04 enclosed.

Far North District Council (FNDC) mapping identifies the site to reside within the Rural Production zone. For the purpose of contaminated land assessment, the final land-use scenario for the development will be Standard Residential with up to 10 % produce. Taking into account the intensity of the development, and assessment of existing residential units (used as short and long term rental accommodation) it was deemed most appropriate to allocate a standard exposure scenario over a rural scenario.

1.3 Scope of Work

The purpose of this investigation was to determine the risk to human receptors at the site arising from historical activities. The scope of works conducted by Haigh Workman comprise:

- Research, compile and review available desk study information.
- Site mapping and sample collection appropriate to the Conceptual Site Model (CSM) and rationale presented within this report;
- Laboratory analysis of priority contaminants of surface and subsurface horizons and interpretation of data obtained, and;
- Preparation of this report with site specific geoenvironmental recommendations.

[1] Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011

2 Site Description

Published historical and GIS data has been reviewed in detail and a summary of relevant information pertaining to the site is provided in this section. Historical aerial photography is presented within Appendix B and relevant site photography in Appendix C.

2.1 Identification

Address:	2000 State Highway 10, Waipapa
Legal Description:	Lot 2 DP 102334
Co-ordinates:	NZ Topo AV28 8383 0342 NZTM E1683830/ N6103416
Total Site Area:	30,750 m^2
Area under Investigation	6,000 m^2 (conservative 'liveable area' associated with the development)
Area under Investigation - subject to HAIL	6,000 m^2 (understood to have been horticulture)

A site location plan is presented as Drawing No. 17111/01 within Appendix A.

2.2 Site Setting

Situated approximately 3.2 km to the north west of Kerikeri town centre, the site comprises an irregularly shaped piece of former horticultural land.

An existing dwelling is situated to the north west of the property, with associated areas of hardstanding (driveway, car parking etc.) and private gardens. To the south of the dwelling in the west of the property, there are three large storage sheds within a metalled yard.

Six one-bedroom visitor accommodation units are situated to the central east of the site. Each has a carport and small area of grassed outdoor space. The existing wastewater disposal fields for these units are situated in dripper lines throughout the remaining orchard trees interspersed through the area. It is proposed by the client to place a further six units to the adjacent east of this development, within an area currently maintained as grass. For the purpose of this investigation, this area is referred to as the proposed development site, and 'liveable area'.

The site boundaries are predominantly vegetated, with some vegetated shelter belts to the north east and north of the property.

Whiriwhiritoa Stream follows the southern site boundary, flowing to the east. Topographically the site is generally flat, with a gentle gradient to the south towards the stream.

Surrounding land is mixed light commercial and orchard to the south west and north, and farmland to the east and south. State Highway 10 (SH10) is situated to the west of the site. Waipapa commercial/ industrial estate is to the adjacent west of SH10.

3 Site History

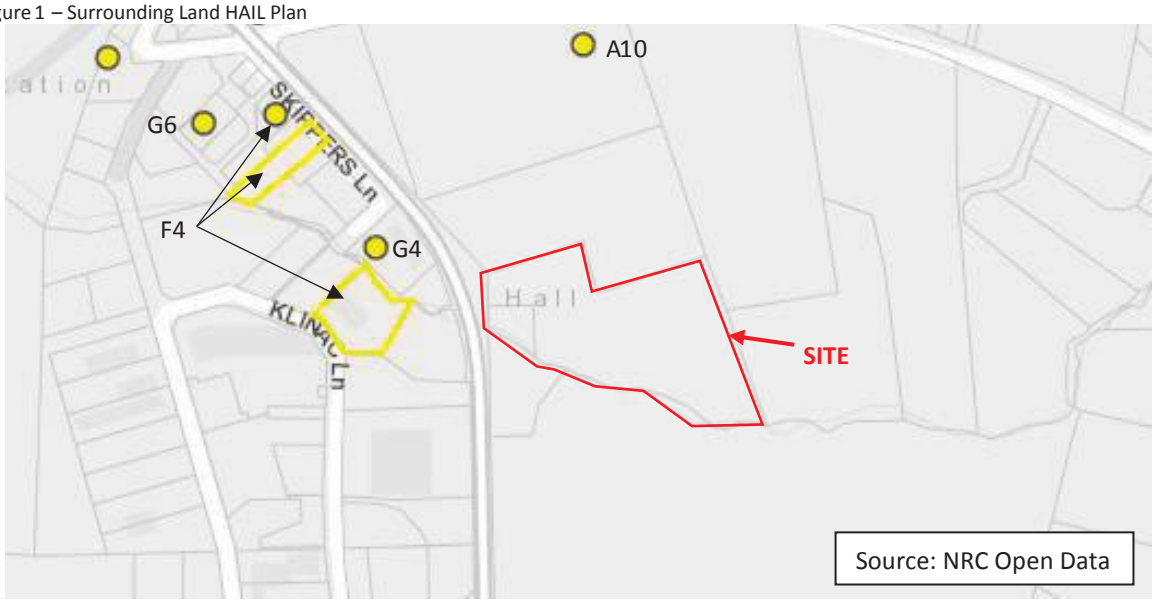
Table 3-1 and Figure 1 outline a summary of HAIL codes identified during the desk study and site walkover survey relevant to the site and surrounding land (up to 250 m).

Table 3-1 – HAIL Code Definitions

HAIL Code	Activities	Common Contaminants
On-site		
A10	*Persistent pesticide bulk storage or use including sport turfs, market gardens, orchards, glass houses or spray sheds.*	*Arsenic, lead, copper, mercury; wide range of organic compounds including acidic herbicides, organophosphates, and organochlorines (e.g. endosulfan on golf and bowling greens).*
Off-site (within 250 m)		
F4	*Motor vehicle workshops.*	*Hydrocarbons including PAHs, solvents, and metals contained in waste oil*
G4	*Scrap yards including automotive dismantling, wrecking or scrap metal yards.*	*Metals, petroleum hydrocarbons (particularly lube oils), solvents used for cleaning, and PCBs*
G6	*Waste recycling or waste or wastewater treatment.*	*Depends on type of waste – biological hazards (bacteria, viruses), metals, PAHs, semi- volatile organic compounds, and solvents.*

Source: CLMG Schedule B:2004.

Figure 1 – Surrounding Land HAIL Plan



Taking into account the distance from the site, the identified surrounding HAIL activities are not considered to pose a risk to the site.

On-site wastewater disposal systsems, such as those which are present onsite (situated to the north of the site, and to the adjacent west of the proposed development site) are categorised under HAIL code G6 '*waste recycling or waste or wastewater treatment*'. The existing system is to be retained but should the system be decomissioned in the future, contaminated land assessment may be required should the owner

wish to re-use or redevelop that area of the site. At this stage, the wastewater disposal area is not considered a risk to the receptors on-site as it is not changing use.

3.1 Ownership & Site Uses

A summary of historical site ownership and uses is provided in Table 3-2. Where applicable, relevant HAIL codes and commonly arising contaminants are listed derived with reference to CLMG Schedule B[2], ANZSIC:2006[3] and AS 4482.1:2005[4] and site-specific research by Haigh Workman. Relevant Certificate of Title documents are provided within Appendix H.

Table 3-2 – Historical Site Ownership & Uses

		Comments	
Date	**Ownership**	**Land Use**	**HAIL Code**
Historic Title: NA625/81 (Ninety one acres and thirty perches more or less being Lots 2 and 3 on a plan deposited in the Land Registry Office of Auckland as No. 22952 and being a portion of Old Land Claim No. 60 situated in Block X of the Kerikeri Survey District)			
21/05/1931	Arthur E White (Waipapa farmer).	Pasture#.	-
2/01/1940	Walter H Knight (farmer).		
22/07/1947	Robert Jurisich (Waipapa farmer).		
02/09/1957	Mabel Jurisich (Waipapa widow and administrator).		
13/07/1966	Brian L Jurisich (Waipapa farmer).		
13/07/1966	Cancelled as to Lot 3 Plan 22952.		
22/04/1969	Transfer of the residue to Leonard R T.	Pasture#.	-
Historic Title: NA9A/1306 (Part Lot 2 DP 22952, 33.1336 ha) (81 acres 3 roads 20 perches more or less being Lot 3 DP 22952 and part of Old Land Claim No. 60.			
13/07/1966	Brian L Jurisich (Waipapa farmer).	Pasture#.	-
30/01/1970	John R K Delamain (of Donnellys Crossing, farmer) & Brenda Delamain.	Orchard#.	A10
25/09/1974	Cancelled as to Lots 1 - 5 Plan 72637 and new CoT issued 28C/984 - 988 (inclusive).		
Historic Title: NA28C/985 (Lot 2 DP 72637 and being part of Old Land Claim No. 60, 6.3820 ha)			
25/09/1974	John R K Delamain (Kerikeri farmer) & Brenda Delamain.	Orchard#.	A10
17/09/1975	John A Jurisich (builder) & Patricia M Jurisich.		
16/01/1985	Cancelled as to Lot 1 & 2 Plan 102334 and new titles issued - 56C/27 and 56C/28.		
Current Title: NA56C/28 (Lot 2 DP 102334, 3.0750 ha)			
16/01/1985	Lots 1 & 2 being a Subdivision of Lot 2 DP 72637.		

[2] Ministry for Environment, *Contaminated Land Management Guidelines Schedule B: Hazardous Activities and Industries List (HAIL) with Hazardous Substances,* 2004
[3] Australian and New Zealand Standard Industrial Classification, 2006
[4] Australian Standard, *Guide to the Investigation and Sampling of Sites with Potentially Contaminated Soil Part1: Non-Volatile and Semi-Volatile Compounds,* 2005

16/01/1985	John A Jurisich (builder) & Patricia M Jurisich.	Orchard, becoming light commercial and residential#.	A10 / NA
08/02/1989	Frances M Brosnan & Patricia J Foreman (Kerikeri Orchardists).		
20/07/1994	Frances M Brosnan (Kerikeri Orchardist)		
02/06/2004	Arthur W Cottle & Janice M Cottle.		
23/07/2017 - Present	Arthur W Cottle.		

Sources: # - Historical aerial photography (see Appendix B).

3.1.1 Historical Photography

A review of relevant available aerial photography and historic site photography is included in Table 3-3. Referenced historical aerial photography is presented as Appendix B.

Table 3-3 – Historical Aerial and Land Photography Review

Date of image	Review
1953, 1959 & 1968	• Site is being utilised as pasture, with the stream running along the southern vegetated boundary as present day. • It is considered the site itself remains undeveloped. A built structure is situated just outside of the south western site boundary. • Surrounding land also comprises grassed fields bound by occasional vegetation, considered of pasture use.
1970, 1977, 1979, 1980, 1981 & 1982	• Site considered to be most likely agricultural use or horticulture use. The visible lines are likely to be tractor or crop rows, but could be the early stages of an orchard. Hedges are visible along boundaries and intersecting the site. • Orchards are developing within surrounding land, with horticulture visible to the south and beyond SH10 to the North West. Industrial/ commercial development is taking place to the east of SH10, and to the north of Waipapa Road; residential and commercial.
2000, 2002 & 2003	• Orchard covers nearly all of the site with vegetated shelter belts at regular intervals across the property, and an area of grass situated down slope of the area under investigation in this report. A small area of built structures to the north west of the site (considered to be dwelling and shed). • Waipapa commercial estate is well established to the west, the residential estate to the north has expanded, and orchard remains in neighbouring land to the east and south. Further horticulture has developed within the vicinity of neighbouring land to the north east. The Petrol Filling Station (PFS) on the corner of Waipapa Road and SH10 to the North West is present.
2007	• Orchard has been removed from slightly less than half of the western portion of the site. • Two large sheds have been erected directly south of the aforementioned built structures. One is completed and one has been half constructed. • The vegetated shelter belt aligned north to south in the centre of the proposed development area has been reduced. • A small unit is visible to the central north of the site, just inside the area of orchard.

2009 & 2012	• The proposed development area has been cleared of orchard and replaced with pasture/ grass land. • Three units are now present situated centrally within the property, aligned from north to south. • Both large sheds have been constructed.
2013	• A fourth unit has been erected in the central north east of the property. • The footings for a third large rectangular shed have been established to the south of the existing structures in the west of the site.
2015	• A fifth unit and associated driveway has been constructed. • The third large rectangular shed has been partially constructed.
2016, 2017, 2018	• A sixth unit has been constructed to the west of the proposed development area. • The third large shed has been completed. • Surrounding land remains commercial to the west, residential and commercial to the north and horticultural to the east and south.

Source: Haigh Workman archives, Google Earth Pro, FNDC and Retrolens5.

Aerial photography review suggests surrounding land has been subject to activities defined by the HAIL. The closest HAIL activities are situated in the adjacent northern and eastern lots, utilised for horticulture (A10). Waipapa commercial estate is situated beyond the State Highway to the east, and some commercial to the north including a PFS.

Taking into account the topography, lateral distance, and shelter belts, it is considered contamination from these sources at the site is highly unlikely.

[5] www.retrolens.nz

4 Consents and Permits

Haigh Workman conducted a detailed review of the available property file and the FNDC GIS database. A summary of relevant information pertaining to building permits, licences, resource consents and complaints are presented.

Consents, permits and complaints history were available within the property file, as summarised in Table 4-1. No complaints have been recorded within the property file.

Table 4-1 – Relevant Permits/Licenses/Consents

Date(s)	Permit No. & Legal Description	Proposed Works	Compliance Record
Building Applications			
21/07/1988	BP-638468. Lot 2 DP 102334.	Two dwellings.	Building Permit applied for by F M Brosnan, and approved by FNDC.
21/06/1990	BP-852392. Lot 2 DP 102334.	Garage (59.4 m^2).	Building Permit applied for by F M Brosnan & Ms P J Foreman, and approved by FNDC.
05/07/1990	BP-852415. Lot 2 DP 102334.	Carport.	Building Permit applied for by F M Brosnan & Ms P J Foreman, and approved by FNDC.
30/10/2006	BC-2006-1265-0. Lot 2 DP 102334.	Extension to existing dwelling.	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
30/10/2006	BC-2007-293-0. Lot 2 DP 102334.	Free standing fuel heater (Kiwi Rad Kent).	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
09/03/2009	BC-2005-419-0. Lot 2 DP 102334.	Implement shed/ packhouse (560 m^2).	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
09/03/2009	BC-2005-419-1.	Implement shed/ packhouse	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
14/10/2010	BC-2005-1261-0. Lot 2 DP 102334.	Storage building (504 m^2).	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
14/10/2010	BC-2005-1261/1.	Storage building.	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
2011	BC-2011-1500. Lot 2 DP 102334.	Unconsented dwellings and shed.	Field Advice Note from FNDC regarding un-consented building work at the site.
June 2012	BC-2012-369. Lot 2 DP 102334.		
12/04/2016	BC-2010-1565-0. Lot 2 DP 102334.	Storage building (414 m^2).	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.

12/04/2016	BC-2010-1565-1. Lot 2 DP 102334.	Storage building. Year first constructed 2015.	Code of Compliance Certificate (CCC) applied for by A W Cottle & J M Cottle, and approved by FNDC.
08/03/2017	BC-2015-413-0. Lot 2 DP 102334.	Freestanding addition to existing dwelling with two bedrooms, games room, wood burner and carport.	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
08/03/2017	BC-2015-413-1. Lot 2 DP 102334.	Freestanding addition to existing dwelling with 2 bedrooms, games room, wood burner and carport. First constructed 2017.	Code of Compliance Certificate (CCC) applied for by A W Cottle, and approved by FNDC.
July 2018	BC-2012-244. Lot 2 DP 102334.	Boat Shed and 3 Free Standing Holiday Accommodation Built without a Building Consent	Request for further information issued by FNDC to client.
2018	COA-2018-4141-0. Lot 2 DP 102334.	Construction of a new timber implement shed without obtaining a building consent.	Cancelled.
Planning & Resource Consents			
-	No details recorded in property file.		
Monitoring			
-	No details recorded in property file.		

5 Environmental Setting

A review of available GIS data held by local (FNDC) and territorial (Northland Regional Council (NRC)) authorities was conducted in relation to flooding, discharges and waste management.

5.1 Flooding and Hydrology

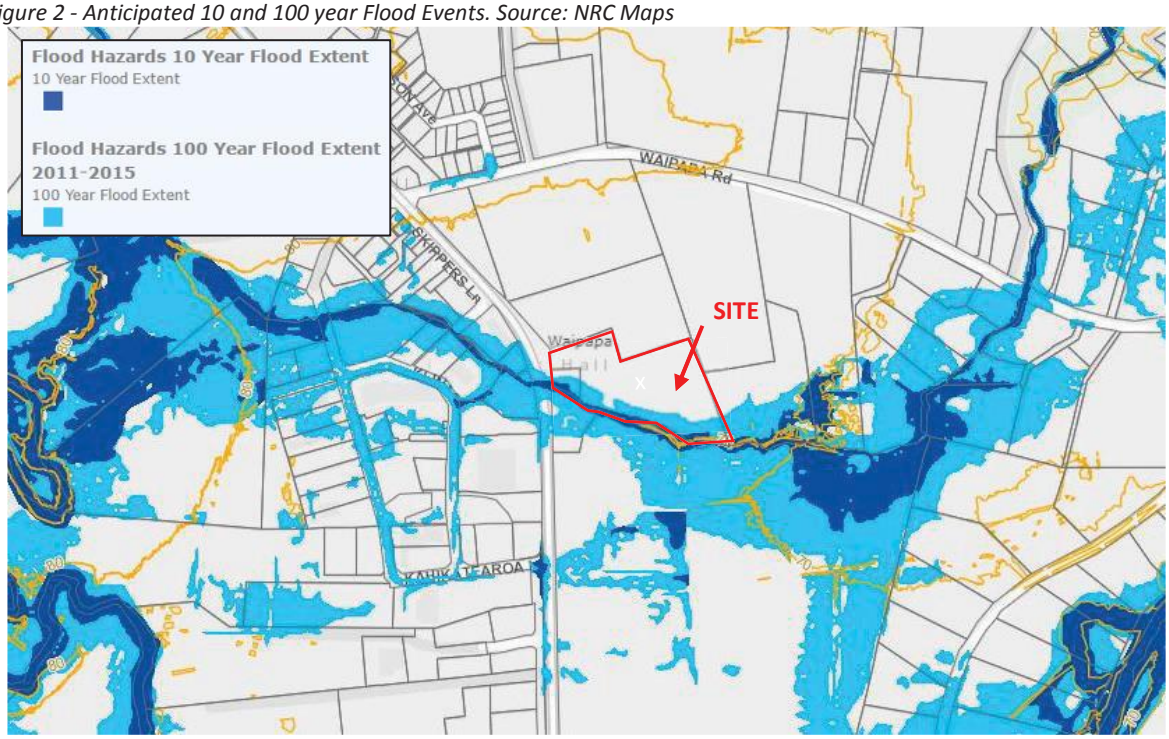
Table 5-1 provides a summary of the potential flood risks and existing known hydrological sources.

Table 5-1 – Summary of Potential Flooding and Hydrological Occurrences

	Presence/ Location	Comments
Watercourses within 500 m (Classified and Unclassified)	Whiriwhiritoa Stream follows the southern site boundary.	The watercourse converges and forms into Waipapa Stream, flowing to the east into the Pickmere Channel.
Surface Water Features within 250 m (Ponds, lakes etc)	None known.	
Flood Risk	The southern boundary of the site is identified to be at risk of flooding from the 10 and 100 year storm events. The proposed development area is not identified to be at risk of flooding, situated > 50 m outside of the flood risk zone.	NRC and FNDC GIS databases indicate the site as an area inside that modelled for anticipated maximum flood levels for both 10 and 100 year storm events, (including provisions for climate change).
Flood Susceptibility	Low.	Geology mapping indicates the site to be underlain by alluvial soils. Appropriate surface water management must be designed to ensure the lower elevations of site are suitably protected from run-off.
Private wells within 1 km	26 no. private wells - of which seven are inactive, and 19 active. The closest is situated approx. 50 m north of the site (LOC. 201278).	The recorded private wells are for mixed purposes including domestic, monitoring and exploration. The closest private well is recorded as for domestic purposes. Formed in 1986 to a depth of 21.70 m with static groundwater at 1.20 m. The borehole is within the adjacent Lot 1 DP 102334.

Source Protection Zones within 500 m	None recorded on GIS system. The Main Northland Aquifer underlies the site.	Aquifers are generally protected water sources and as such no preferential contamination pathway (proposed piling etc) should be opened up to aquifers.

Figure 2 - Anticipated 10 and 100 year Flood Events. Source: NRC Maps



5.2 Discharges and Waste Management

Relevant information is summarised in Table 5-2 relating to waste management and discharges to land, air and water within the vicinity of the site.

Table 5-2 – Summary of Discharges and Waste Management

	Presence/ Location	Comments
Materials and/ or Wastes Associated with the Site	None.	No visible and/or olfactory evidence of ground contamination recorded during the site inspection.
Hydrocarbon Storage within 500 m	One Liquefied Petroleum Gas (LPG) above ground vessel with associated electric vaporiser, situated to the south eastern corner of 391 Waipapa Road, approx. 180 m to the north of the nearest site boundary.	Stored within an open shelter and upon a concrete hard standing. If accidentally emitted into the environment, the LPG will vaporise when not under pressure, and therefore will not cause a risk to neighbouring land users or ecological systems, including water.

	Off-site fuel storage approximately 400 km north west at BP PFS.	Not considered to pose a risk to the site due to distance.
Product Spill/ Loss History within 1 km	None recorded.	
Recorded Discharges to Land, Air and Water	None recorded.	
Landfilling/ Tipping on or within 250 m	None recorded.	The site Is well maintained and no stockpiled waste was identified during the inspection.
Waste Management Facilities within 1 km	None recorded.	
Ground Gas Risk	Low to moderate	No site-specific ground gas risk assessment is warranted.

6 Geology & Site Characteristics

6.1 Published Geology

The site is indicated to be directly underlain by soils of the Undulating Terraces and Lowlands comprising Waipapa Clay (YF). Soil deposits at the site are typically described and categorised as imperfectly to very poorly drained.

The published geology map for the area indicates the base geology as *Alluvium (Al_2): mud, sand and gravel with minor peat, forming river bed and flood plain deposits up to 10 m above stream or sea level, in places forming a thin (1 - 3 m) veneer over rugged surfaces of lava flows (F61, F62); unconsolidated to very soft. Un-weathered.*

GNS Mapping show the site to be underlain by Basalt (Pvb) of the Kerikeri Volcanic Group, typically described as '*Basalt lava, volcanic plugs and minor tuff*'. Adjacent to the south of the site alluvial soils (eQa) of the Tauranga Group are identified, described as '*Poorly to moderately unconsolidated mud, sand, gravel and peat or lignite of alluvial, swamp and estuarine origin'*.

Figure 3 – Published Geology (NZMS 290 Sheet P04/05) - Soils

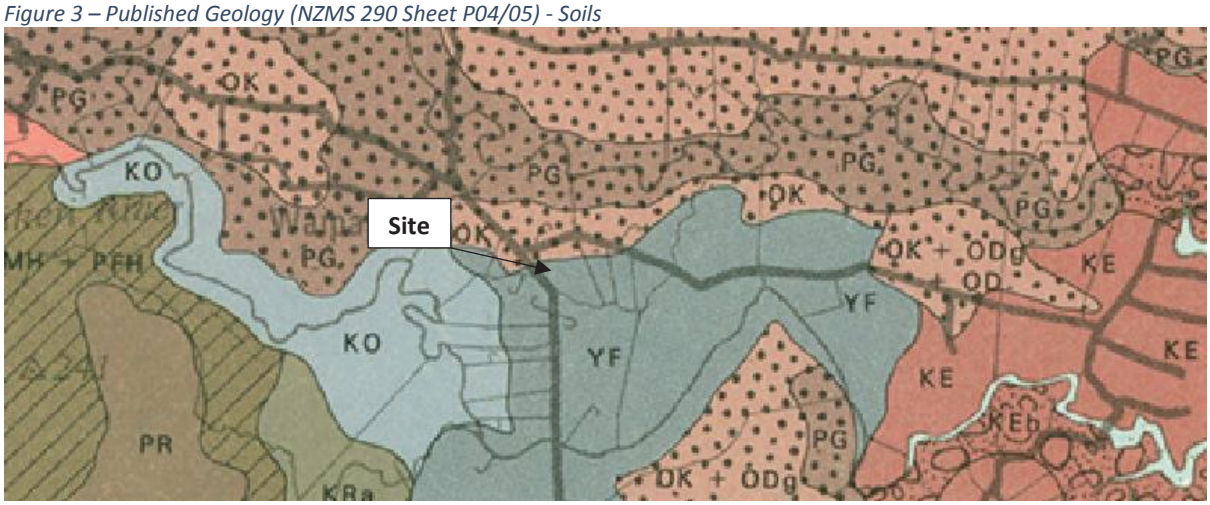


Figure 4 – Published Geology (NZMS 290 Sheet P04/05) - Rocks

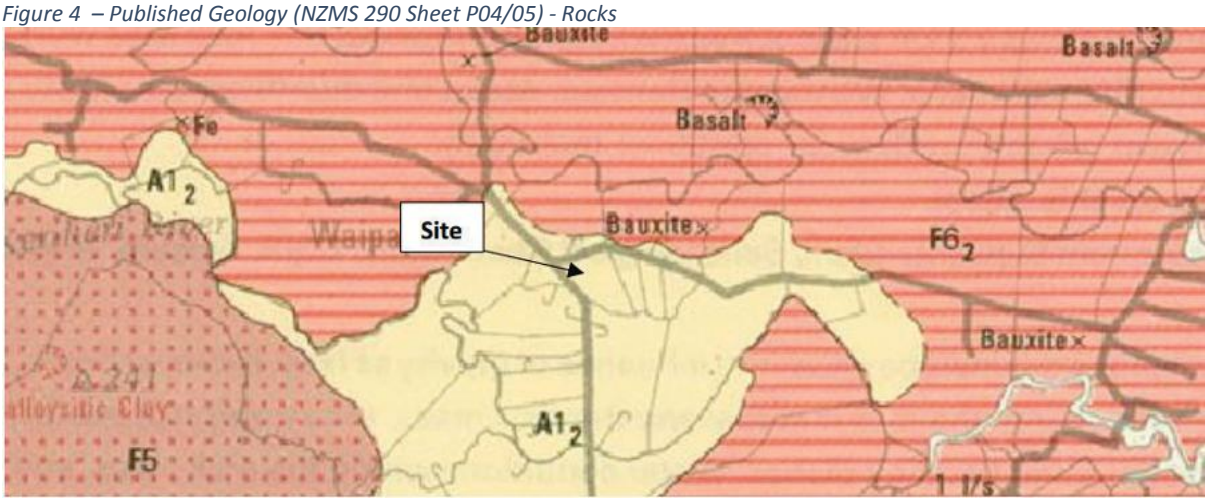
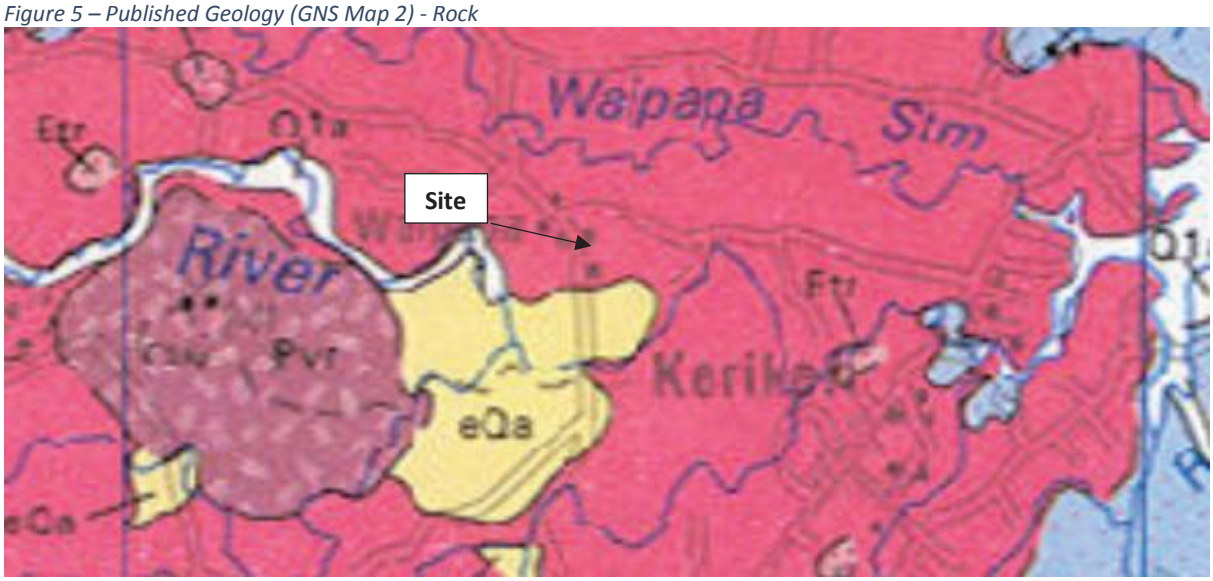


Figure 5 – Published Geology (GNS Map 2) - Rock



6.2 Visual Inspection

Based upon a site walkover inspection conducted by Haigh Workman and information contained on geological plans, it is considered that the soils directly underlying the site typically comprise a layer of natural soils derived from alluvial deposits.

Grassed topsoil and shallow natural soils were noted to be mainly silty clays. Made ground soils were only identified within four samples;

- Samples ES8, ES22, ES23 and ES24 were all retrieved within burn piles used to burn natural felled materials from the property. Visually charcoal and some ash were present, but there were no unnatural odours or staining.

Patches of grass were occasionally bare directly beneath vegetation (due to the shade created) or within areas regularly accessed such as alongside the gravel driveway. Asides from this the grassed surface coverings and existing vegetation showed no signs of stress, discolouration or deterioration except from that from the aforementioned natural burn sites. To support this assumption, samples were retrieved within all soft surface types.

A temporary container unit was to the north western corner of the investigation area. There were no permanent structures within the investigation area. There were no materials stored on the site and no identifiable sources of contamination were recorded.

A drain follows the extent of the eastern boundary leading into Whiriwhiritoa Stream to the south.

The topography and soil type suggest that rainfall generally soaks into the ground. In extreme events runoff is expected to occur as sheet flow towards the south and entering Whiriwhiritoa Stream on the southern boundary. A defined stormwater flow path was visible to the south of the investigation area, as identified on enclosed Drawing No. 02. The land in this region dipped and navigated towards the drain on the eastern site boundary, as photographed in Appendix B.

Visually there was minimal evidence of waterlogging and saturated soils across the site, with only one small area of grass to the western side of the investigation area demonstrating wet surface soils. Site

investigations were undertaken during the winter months following a period of heavy rainfall, and it is considered this area to be the result of recent weather events.

Shallow soils represented good draining properties, and there were minimal signs of erosion within the site. Springs, wells and other ground water source features were not noted during the Haigh Workman site walkover survey.

A Land Information Memorandum (LIM) report has not been included within the scope of works and is not subject to this review. It would be reasonable to obtain for any further information about the area that may be recorded on the local authority GIS database which could otherwise cause restrictions or highlight land hazards that may be raised at the time of building development.

7 Preliminary Conceptual Site Model

Based on the desk study findings, a combined Preliminary Conceptual Site Model (PCSM) and conceptual exposure model has been developed for the proposed future exposure scenario of Standard Residential with 10 % produce.

The PCSM summarises the understanding of the surface and sub-surface features, the potential contaminant sources, transport pathways and receptors in order to assess potential contaminant linkages. In assessing the likely primary contaminants present at the site, reference has been made to CLMG Schedule B[6] and the Methodology.

A qualitative risk assessment has also been made of the likelihood of any potential contaminant linkage and significance. The PCSM is presented schematically as Drawing No. 17111/03 within Appendix A.

In summary, the PCSM has identified the following potential contaminant linkages which could result in an unacceptable risk to human and/or ecological receptors:

- Ingestion, inhalation of dust, dermal contact and plant uptake of potential heavy metals and chemicals (including organochlorine pesticides) in shallow soils associated with historic land uses (orchard), considered to pose a moderate to high risk to site end-users, construction workers, adjacent land users and proposed landscaping.
- Possible leachable heavy metals and chemicals in shallow soils, posing a moderate risk to controlled waters via migration (specifically the nearby Stream and underlying Main Northland Aquifer).

7.1 Data Integrity

This desk study has been collated from information provided by and within interviews with the Client, the property file held by FNDC, available online GIS databases, aerial mapping, site photography and Haigh Workman archives. These sources provide a high level of confidence in the desk study and PCSM at this stage.

[6] Ministry for Environment, *Contaminated Land Management Guidelines Schedule B: Hazardous Activities and Industries List (HAIL) with Hazardous Substances,* 2004

8 Fieldwork

Haigh Workman scoped a contaminated land ground investigation in accordance with CLMG and NES-CS. The investigation was designed to comply with Rule 8(2) of the NES-CS. Fieldworks were conducted by a Suitably Qualified and Experienced Practitioner (SQEP), as follows:

- The site works took place on 30 July 2019 and comprised the sampling of topsoil and shallow soils from 18 locations to retrieve 24 samples from a maximum depth of 0.10 m below ground level (bgl) across the area under investigation.

8.1 Access Constraints

During the fieldwork access was made available to Haigh Workman across the whole of the site.

8.2 Sampling and Analysis Quality Objectives

Objectives of the derived sampling regime were to:

- Sample all artificial and natural strata which may come into contact with receptors identified within the PCSM.
- Provide general coverage of the site, in particular areas subject to HAIL in accordance with CLMG No. 5, Appendix B;
- Provide sufficient analytical laboratory data to conduct statistical analysis on any contaminant over the relevant threshold value for the designated final land-use, and;
- Determine the accuracy and reliability of the sampling and laboratory analysis techniques through duplicate sampling.

8.3 Sampling Methodology & Analysis Plan

Minor ground disturbance for sampling activities was conducted as a permitted activity under NES-CS regulation 8(2), where soil sampling is defined within regulation 5(3) to *'determine whether or not it is contaminated, and if it is, the amount and kind of contamination'.* Any adverse effects from sampling activities are considered to be minor.

The PCSM and desk study formed the basis of the systematic sampling plan. The procedures and principals outlined in CLMG No. 5[7] were followed when determining sample quantities and locations. CLMG No. 5 Appendix B provides calculations to determine the number of samples when forming a grid and the associated reliability of data at 95 % confidence level. Based on a HAIL area of 6,000 m^2 a minimum of 15 samples are required on a 19.6 m grid. As 18 sampling locations were utilised for this investigation, it is considered adequate sampling activities have been undertaken.

Soil sample rationale for the detailed investigation is presented in Table 8-1.

[7] Ministry for Environment, *Contaminated Land Management Guidelines No.* (Ministry for Environment) *5*, 2011

Table 8-1 – Sampling Rationale

Sample ID	Rationale	Testing Suite	Depth of Samples (m bgl)
ES1 - ES3 & ES7 - ES15, ES19 - ES21	Samples retrieved following guidance in MfE for a non-judgemental systematic grid sampling pattern across the proposed development and allocated liveable area. This is to achieve a reliable site coverage and to isolate any potential hotspots and/ or resulting levels of historic pesticide and/ or chemical application.	• NES Heavy Metals • Organochlorine Pesticides*	0.00 - 0.10
ES22 - ES24	Samples retrieved judgementally following guidance in MfE to isolate the identified natural burn sites.	• NES Heavy Metals • Organochlorine Pesticides*	0.00 - 0.10
ES4 - ES6 & ES16 - ES18	Duplicate samples obtained as required by MfE to determine accuracy and reliability of heavy metal testing, for quality assurance and control. Number of duplicates equivalent to 1 duplicate sample per 10 samples.	• NES Heavy Metals	As per primary sample

* - Not a priority contaminant, analysis undertaken on select samples.

Sampling locations are presented on Drawing No. 17 111/04 within Appendix A. The grid and sample locations were measured out on site by hand from known boundary positions.

8.3.1 Sampling Methods and Field Quality Assurance and Quality Control (QA/QC)

Sampling holes were formed utilising a 100 mm diameter hand auger and/ or a stainless steel trowel. Between samples, the equipment was decontaminated by brushing, spraying with clean potable water and rinsing with high purity de-ionised water.

Appropriate Personal Protective Equipment (PPE) was used by Haigh Workman staff including disposable nitrile gloves, highly visible vest and steel toe capped boots.

Samples were immediately sealed and labelled within appropriate sample jars:

- Glass jars with sealed metal lids for composite testing.

Samples were stored and transported to Hill Laboratories in Hamilton within cool-boxes. Temperatures were maintained by frozen cool packs. Records of fieldworks and quality control including sample records and chain of custodies are included within Appendix E.

8.3.2 Laboratory QA and QC

Selected samples of shallow natural soils were scheduled and tested for the primary contaminants under subcontract with R J Hill Laboratories Limited, an IANZ[8] and NZS/ISO/IEC17025:2018[9] accredited laboratory incorporating the aspects of ISO 9000:2015[10] relevant to testing laboratories.

Records of laboratory quality assurance and quality control are presented in Appendix E of this report. The results of soil analysis including testing methodologies as received from the laboratory, are presented in Appendix F.

Information on the overall variability or precision of both the sampling technique and the analytical laboratory was performed by duplicate analysis. Duplicate samples were retrieved in accordance with CLMG No. 5 Section 3.9.1.

Retrieving a duplicate sample involves two samples being obtained from the same sampling location (primary and duplicate samples), placed in separate containers and sent to the laboratory under different names. A single duplicate sample was collected for every 10 samples. The sample results can then be compared to assess whether they comply with an acceptable percentage difference (30 to 50 %). The results of duplicate variance analysis are presented in Table 9-3.

[8] International Accreditation New Zealand which represents New Zealand in the International Laboratory Accreditation Cooperation (ILAC).
[9] New Zealand Standard, General Requirements for the Competence of Testing and Calibration Laboratories, 2018.
[10] ISO9000: Quality Management Systems.

9 Results of Chemical Testing

9.1 Data Evaluation (QA/QC)

Laboratory test data was reviewed by Haigh Workman for completeness and consistency.

For each analyte, the results were evaluated against the relevant exposure scenario SCS presented within the *Methodology*, reproduced by Haigh Workman and included as Appendix G.

Statistical analysis was not undertaken as no samples exceeded the relevant SCS.

9.2 Basis for Guideline Values

The exposure scenario for the investigation, forms one of the five recorded in the *Methodology.* The laboratory results can be compared directly to published SCS values for the Standard Residential with 10 % produce as Regulation 7(2) of the NES-CS is satisfied.

SCS values within this report have derived from the *Methodology* publication, summarised by Haigh Workman in Appendix G. Where a contaminant is listed within the *Methodology* as having No Limit (NL), a SCS of 10,000mg/kg has been applied.

All results have been compared to national background threshold levels for non-volcanic soils as outlined in Auckland Council Technical Publication (TP153)[11].

9.3 Rationale for Composite Analysis

Analytical testing of samples obtained during the Haigh Workman ground investigation were tested in accordance with Section 3.6.4 of MFE CLMG No. 5, 2011 '*Site Investigation and Analysis of Soil*'. Composite sampling is defined within this document as '*collecting individual samples from different locations and bulking and mixing an equal mass of the samples (called sub-samples) together to form one composite sample'*.

A site with a history of horticulture is well suited for composite sampling, characterised by land where '*low-concentration, uniform contamination is present and can be confirmed by site history*'.

Relevant guidance within MFE CLMG No.5 regarding composite analysis includes the following;

- A reliable and comprehensive site history has been compiled for the site, so areas of hot spots or broad-scale contamination are known;
- No more than four sub-samples should be used to make up the composite;
- Sub-samples must be taken from areas with similar history (similar contaminants and contaminant distribution);
- Compositing must be undertaken in the laboratory, and original samples retained for possible retesting;

[11] Auckland Regional Council Technical Publication No. 153, *Background Concentrations of Inorganic Elements in Soils from the Auckland Region',* October 2001, reprinted April 2002.

- When comparing composite results against guideline values, **the SCS guideline value must be adjusted by dividing the value by the number of sub-samples in the composite**:

$$Adjusted\ Guideline\ Value\ (SCS) = \frac{Guideline\ Value}{Number\ of\ subsamples\ in\ composite}$$

9.4 Results

The chemical analysis results and screening criteria are summarised in this section. Samples presented were derived from composites of three samples, retrieved from depths up to 0.10 m bgl.

Samples were retrieved as follows;

- Eighteen primary samples (total of six composites) and two duplicates (total of two composites) were retrieved from the investigation.

All samples were analysed for NES Heavy metals in composites of three. Two composites were also analysed for Organochlorine pesticides, and the pH of the primary samples was also determined.

9.4.1 NES Heavy Metals and pH

Table 9-1 summarises the results and associated assessment criteria SCS. The composite duplicate samples have not been included in the results table, but presented in Table 9.4.

Table 9-1 – Summary of Soil Concentrations - NES Heavy Metals & pH

Analyte	Range of Results	Adjusted SCS	TP153 Non- Volcanic Range	No. of samples > SCS	No. of samples > TP153
	(mg/kg)				
Heavy Metals					
Arsenic	< 2	6.67#	0.4 - 12	0	0
Boron	< 20	NL/ 3,333#	2 - 45	0	0
Cadmium	0.13 - 0.25	1#	< 0.1 - 0.65	0	0
Chromium (III)	23 - 38	NL/ 3,333#	2 - 55	0	0
Chromium (IV)	< 0.4	153.3#		0	0
Copper	11 - 26	NL/ 3,333#	1 - 45	0	0
Lead	11.6 - 14.8	70#	< 5 - 65	0	0
Mercury	0.57 - 0.87	103.3#	< 0.03 - 0.45	0	All above the predicted background levels
pH (pH Units)					
pH	5.8 - 7.9	< 5 - > 9	N/A	0	N/A

Table based on a standard residential with upto 10 % produce end-use; SCS – Soil Contaminant Standard; NL – No Limit; # - SCS derived by dividing original SCS by number of samples in a composite test. **NOTE:** results reported for lead and mercury are total recoverable, not inorganic.

NOTE: TP153 Non-Volcanic Soils - sourced from Table 3 of TP153:2001 Background Concentrations of Inorganic Elements in Soils from the Auckland Region

9.4.2 Organochlorine Pesticides

Two composite soil samples (comprising three samples each) were tested for organochlorine pesticides. Pesticides are not considered to be priority contaminants, but may be present as spray residue. Testing

was scheduled to confirm residual levels following historic spraying. These were distributed across the site to achieve a broad coverage of land.

Table 9-2 – Summary of Soil Concentrations - Organochlorine Pesticides

Determinand	Range of Results	SCS (composites of 3)	No. of Samples > SCS	Samples Exceeding the SCS
Organochlorine Pesticides (mg/kg dry weight, unless specified)				
Aldrin	< 0.015 - < 0.017	130#	0	N/A
alpha-BHC	< 0.015 - < 0.017	266.67#	0	
beta- BHC	< 0.015 - < 0.017	10#	0	
Gamma- BHC (Lindane)	< 0.015 - < 0.017	19#	0	
Total Chlordane (cis and trans)	< 0.04	0.57#	0	
Endosulfan	< 0.015 - < 0.017	1.33#	0	
Endrin	< 0.015 - < 0.017	6.33#	0	
Heptachlor	< 0.015 - < 0.017	4.33#	0	
Heptachlor epoxide	< 0.015 - < 0.017	23.33#	0	
Hexachlorobenzene	< 0.015 - < 0.017	7#	0	
Methoxychlor	< 0.015 - < 0.017	106.67#	0	
Dieldrin	< 0.015 - < 0.017	0.87#	0	
Total Reported DDT Isomers	< 0.09 - < 0.1	23.33#	0	

Table based on a standard residential with upto 10 % produce end-use; SCS – Soil Contaminant Standard; # - SCS derived by dividing original SCS by number of samples in a composite test.

9.5 Laboratory QA/QC

Two duplicate composite samples (comprising three individual samples each) were analysed for the purpose of quality assurance and quality control in this investigation.

When comparing results for the primary and duplicate samples, acceptable relative differences are of less than 30 to 50 %, depending on the analyte.

A summary of applying this equation to the duplicate results is included within **Error! Reference source not found.**, following the equation;

$$Relative\ Percentage\ Difference = \frac{(Primary\ Result - Duplicate\ Result)}{Mean\ Result} x100$$

All but one result recorded acceptable relative difference values of less than 50 %.

Composite ES1 - ES3 (primary) and ES4 - ES6 (duplicate) exceeded the accepted 50 % relative difference recording 58.1 % for copper. It is considered that this variability is not due to sampling or testing techniques, but likely due to the variable presence of copper in soils across these composite samples.

Copper was shown to be below the approved human health limit and within the accepted predicted background range for all samples retrieved from the site, and therefore not a risk to the final end-use. Therefore this relative difference is not considered to have an effect on the actual findings.

Table 9-3 - Summary of Relative Difference

Analyte	Relative Difference (%)			
	ES1, ES2, ES3 (primary)	ES4, ES5, ES6 (duplicate)	ES13, ES14, ES15 (primary)	ES16, ES17, ES18 (duplicate)
Arsenic	0		0	
Boron	0		0	
Cadmium	1.3		0	
Trivalent Chromium (III)	33.9		27.6	
Hexavalent Chromium (VI)	0		0	
Total Recoverable Chromium	30.3		23.7	
Copper	58.1		6.9	
Lead	6.6		9	
Mercury	15.2		3.6	
Within Acceptable Limits	**No**		**Yes**	

9.6 Site Characterisation

9.6.1 Standard Residential with 10 % Produce Scenario

Following analytical testing, it can be concluded that contamination has not been identified within the area under investigation. No samples exceeded the relevant adjusted SCS for Heavy Metals or Organochlorine Pesticides.

There is not considered to be a human health risk within the investigation area for the exposure scenario of Standard Residential with 10 % produce.

9.6.2 Background Concentrations

As the NES-CS does not apply to a piece of land which has a DSI demonstrating contaminants in or on the site are at, or below, background concentrations, the soil test results have also been compared to background levels. Background levels have been sourced from Auckland TP153:2001 Table 3.

All heavy metals except for Mercury (Hg) recorded concentrations within the published background concentrations for non-volcanic soils (TP153) when tested. It should be noted that mercury is not a risk to human health at the site, being well below the human health guideline limits, rather when compared to predicted background levels in soil Hg shows a marginal elevation.

Mercury can be found in some pesticides and fertilisers but this is a relatively insignificant source in the New Zealand environment, and therefore the environmental impacts of Hg from this source are limited. It is not considered to be a contributor for this site as no pesticides recorded concentrations above the limit of detection when tested, and there are no records of any storage or mixing to have taken place at the property.

It is considered that the marginal Hg elevation is not the result of on-site activities, but from non-point source migration. Mercury is naturally emitted into the atmosphere (i.e. from volcanoes, the weathering of rocks, forest fires, soil dust, and from the ocean, etc.) and unnaturally by human activities (i.e. the

burning of fossil fuels and waste, crematoriums etc.). Mercury moves freely throughout the earth's atmosphere in a complex combination of transformations and transport depositing onto both land and water[12]. The soils across the site show uniform levels of mercury (0.57 - 0.87 mg/kg) which is in keeping either with natural background levels, or with atmospheric deposition of the element.

As a result of the mercury readings, we are unable to implement Section 9(5) of the NES-CS without a site specific assessment of background levels. Therefore the land remains covered by the NES-CS at this stage.

9.6.3 Groundwater

Groundwater was encountered during the investigation at 0.9 m bgl, during a hand augered borehole to a depth of 1.1 m (enclosed in Appendix D of this report). This is understood to be the winter ground water level.

9.6.4 Leachability

Leachability testing was not conducted as no samples exceeded the relevant SCS.

[12] Technical Report - *Mercury inventory for New Zealand: 2009*, Prepared for the Ministry for the Environment by Leila Chrystall and Andrew Rumsby, Pattle Delamore Partners Limited, August 2009.

10 Revised Conceptual Site Model

The PCSM has been revised in light of the ground investigation and the chemical analysis results.

The revised CSM has identified **no** potential pollutant linkages which could result in an unacceptable risk (classified as greater than 'low') to identified receptors on the PCSM within the area of site subject to this investigation.

11 Regulatory Requirements

It is considered that the proposed works fall within the jurisdiction of FNDC, NRC and of the NES-CS:2011.

11.1.1 District Plan Assessment

At present the site is zoned 'Rural Production' by the FNDC District Plan. According to rule 12.3.6.1.1 of the district plan excavation and/or filling activities are a permitted activity not requiring resource consent provided:

*Excavation and/or filling, excluding mining and quarrying, on any site in the **Rural Production Zone** or Kauri Cliffs Zone is permitted, provided that:*

a) it does not exceed 5,000 m^3 in any 12 month period per site; and

b) it does not involve a continuous cut or filled face exceeding an average of 1.5m in height over the length of the face i.e. the maximum permitted average cut and fill height may be 3m.

Filling in any zone shall meet the following standards:

a) *The fill material shall not contain putrescible, pollutant, inflammable or hazardous components, and;*

b) *The fill shall not consist of material other than soil, rock, stone, aggregate, gravel, sand, silt or demolition materials, and;*

c) *The fill material shall not comprise more than 5 % vegetation (by volume) of any load.*

11.1.2 NES-CS

As the site is categorised under the HAIL, the requirement for resource consent is triggered and managed by the NES-CS:2011;

8(3) (c) The volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2.

8(3) (d)(ii) Soil must not be taken away in the course of the activity, except that for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year.

The NES-CS describe a '*piece of land*' as the piece of land that has had, currently has, or most likely has had activities listed on the HAIL. This equates conservatively to the total area under investigation in this report; 6,000 m^2. Table 11-1 summaries the allowable soil disturbance limits, removal limits and proposed works;

Table 11-1 - Soil disturbance and removal

HAIL Area (m^2)	FNDC	NES-CS		Proposed disturbance (m^3)	Proposed removal (m^3)
	Excavation and/or filling (m^3)	Allowable disturbance (m^3)	Allowable removal (m^3)		
6,000	5,000 annually	300	60	0	0

At this stage of the application no earthworks are proposed. Therefore the activity complies with earthworks controls set by the NES-CS. This should be reassessed at the time of future Building Consent.

It is considered that the consent can be granted for the proposed works, with no conditions relating to contaminated land. Any future soil disturbance volumes must be assessed and abide by the rules set out in Section 11 of this report.

12 Limitations

This report has been prepared for the use of Arthur Cottle with respect to the particular brief outlined to us. This report is to be used by our Client and their Consultants and may be relied upon when considering contaminated land advice. The information and opinions contained within this report shall not be used in any other context for any other purpose without prior review and agreement by Haigh Workman Ltd.

If any of the assumptions outlined in Section 1 are incorrect, then amendments to the recommendations made in this report may be required. The comments and opinions presented in this report are based on the findings of the desk study, ground conditions encountered during an intrusive sampling visit performed by Haigh Workman and the results of tests carried out within one or more laboratories. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation.

Any diagram or opinion on the possible configuration of strata, contamination or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between sampling points should be undertaken if deemed necessary.

It should be noted that ground gas and groundwater levels may vary due to seasonal fluctuations, tidal flows and/or other effects.

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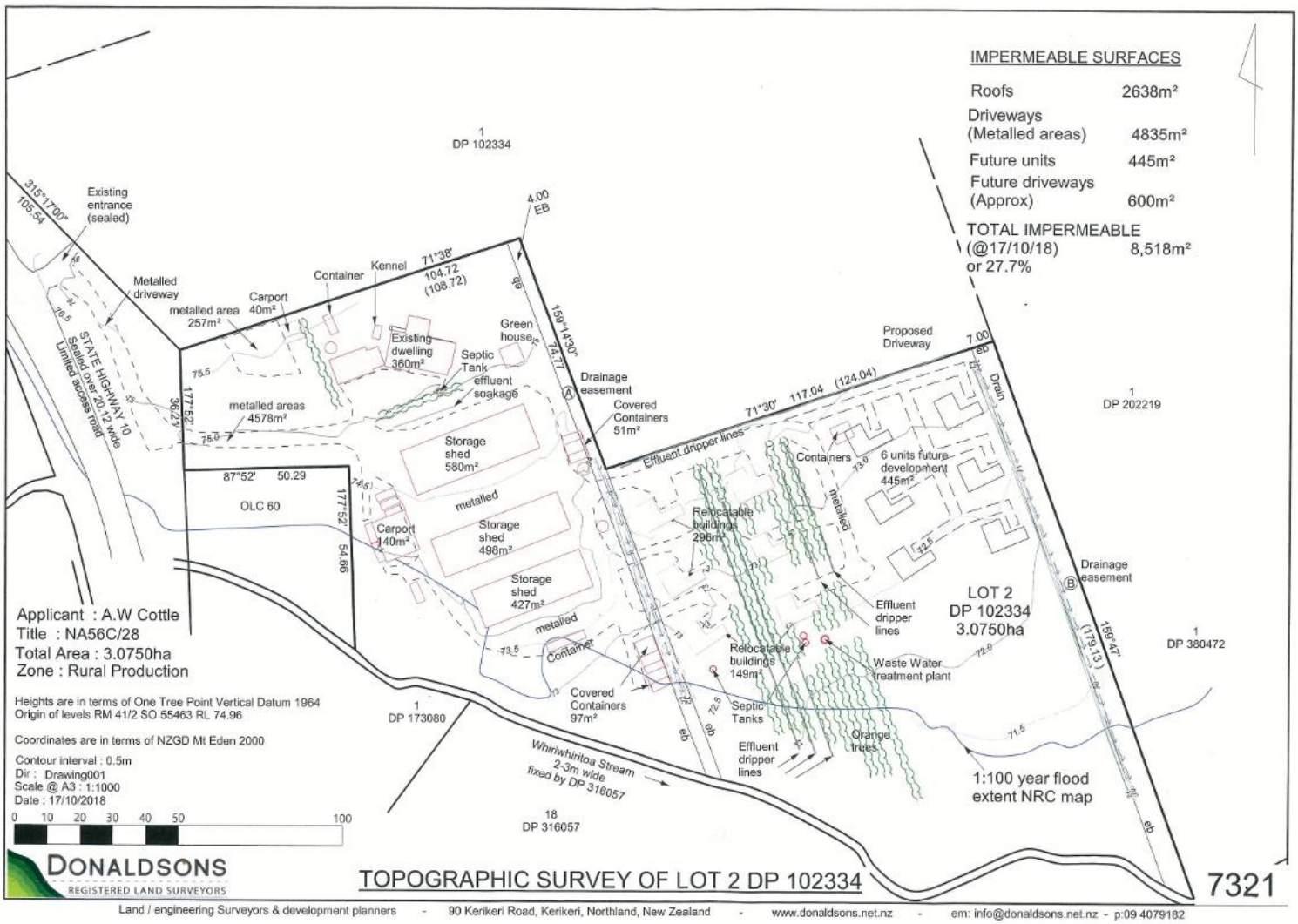
Appendix A – Drawings

Drawing No.	Drawing Title	Scale
17111/01	Site Location Plan	1:5,000
17111/02	Site Features	1:1000
17111/03	Preliminary Conceptual Site Model (PCSM)	NTS
17111/04	Sampling Location Plan	1:500
-	Donaldsons Registered Land Surveyors. *Topographic Survey of Lot 2 DP 102334*. Ref 7321, dated 17/10/2018.	As shown

NTS: Not to Scale



DONALDSONS
REGISTERED LAND SURVEYORS

TOPOGRAPHIC SURVEY OF LOT 2 DP 102334

7321

Land / engineering Surveyors & development planners - 90 Kerikeri Road, Kerikeri, Northland, New Zealand - www.donaldsons.net.nz - em: info@donaldsons.net.nz - p:09 4079182

NOTES:

- SITE BOUNDARY
- WATER COURSE(S)
- AREA OF SITE UNDER INVESTIGATION (THE 'LIVEABLE AREA') 6,000 M^2

SITE BOUNDARIES AND AERIAL PHOTOGRAPH TAKEN FROM NORTHLAND REGIONAL COUNCIL (NRC) ONLINE GIS SYTSTEM

Issue	Date	Revision
A	03/09/2019	FIRST ISSUE

DWG Site Location Plan

Scale 1:5000 @A3 (50 25 0 50 100 150 m) Date 03/09/2019

Drawn CJ Checked EC Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - DSI DRAWING SET.DWG

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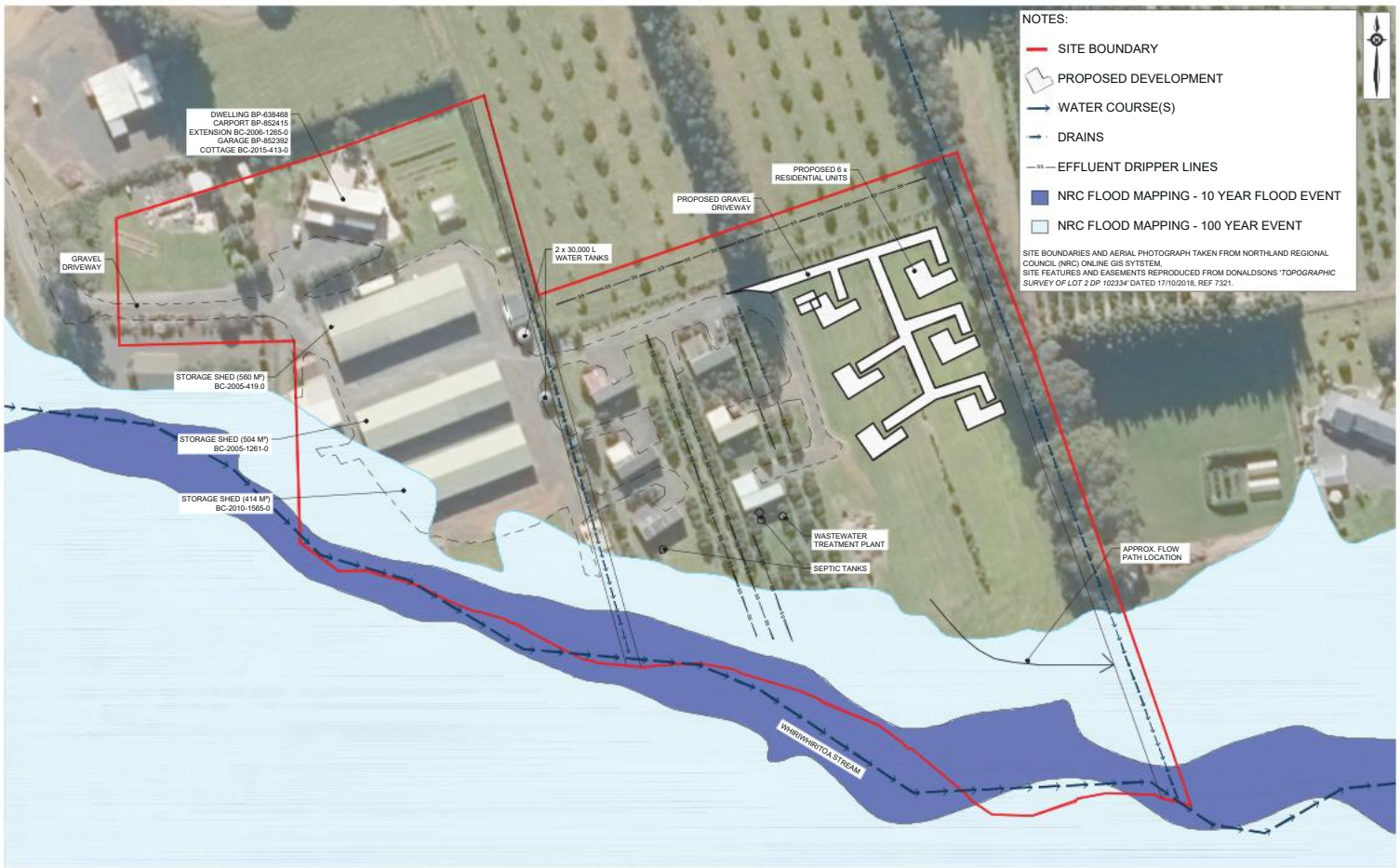
Client Arthur Cottle

Project No. 17 111 RC no.

DWG No. **17 111/01**

Sheet No. **01** of **04**

Plotted By Catherine Johnson at 3/09/2019 8:26:34 a.m.



Issue	Date	Revision
A	03/09/2019	FIRST ISSUE

DWG Site Features Plan

Scale 1:1000 @A3 (10 5 0 10 20 30 m) Date 03/09/2019

Drawn CJ Checked EC Approved JP

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Project No. 17 111 RC no.

DWG No. 17 111/02

Sheet No. 02 of 04

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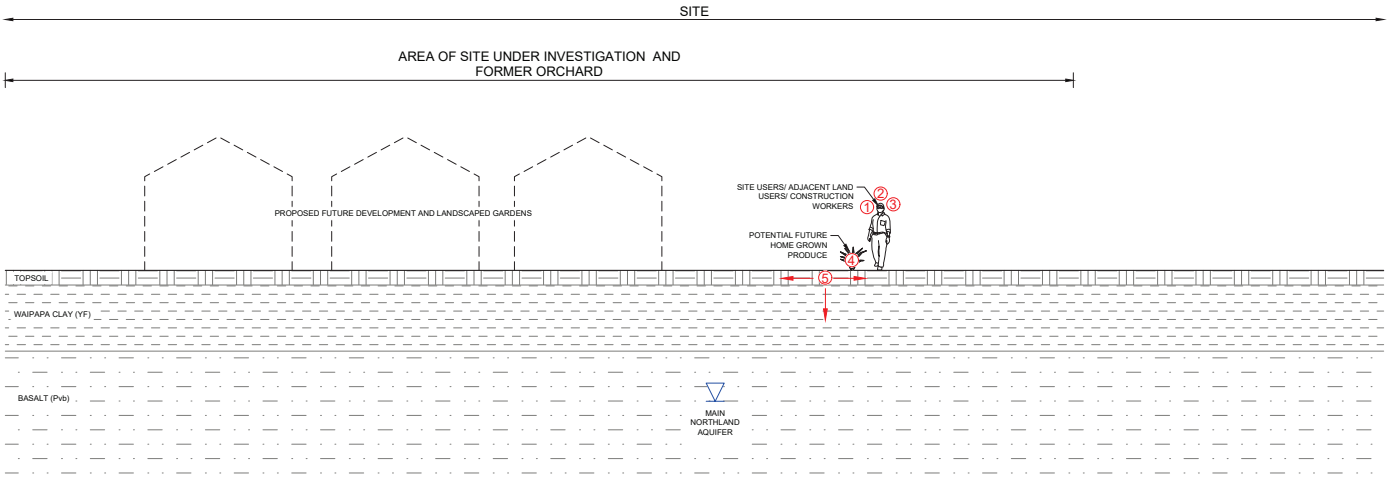

Contamination Souce	Contamination Pathway	Receptors	Likelihood of Significant Pollutant Linkage
Potential heavy metals and pesticides (including organochlorine pesticides) in topsoil and/ or shallow natural soils associated with historic land uses (orchards).	1 Direct and indirect ingestion 2 Dermal contact 3 Inhalation of contaminated particles/ dust 4 Plant uptake	Site end users, adjacent land users, construction workers and proposed landscaping.	Moderate to high.
Possible leachable heavy metals and pesticides (including organochlorine pesticides) in topsoil and/ or shallow soils.	5 Migration	The underlying Main Northland Aquifer and nearby watercourse.	Moderate.

NOTES:

HAIL Code A10: *Persistent pesticide bulk storage or use including sport turfs,* ***market gardens, orchards, glass houses or spray sheds.***

Commonly associated contaminants to A10: *arsenic, lead, copper, mercury; wide range of organic compounds including acidic herbicides, organophosphates, and organochlorines (e.g. endosulfan on golf and bowling greens)* (sourced from mfe hail contaminants information sheet)

Issue	Date	Revision
A	03/09/2019	FIRST ISSUE

DWG Preliminary Conceptual Site Model (PCSM)

Scale 1:NTS @A3 | Date 03/09/2019

Drawn CJ | Checked EC | Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - DSI DRAWING SET.DWG

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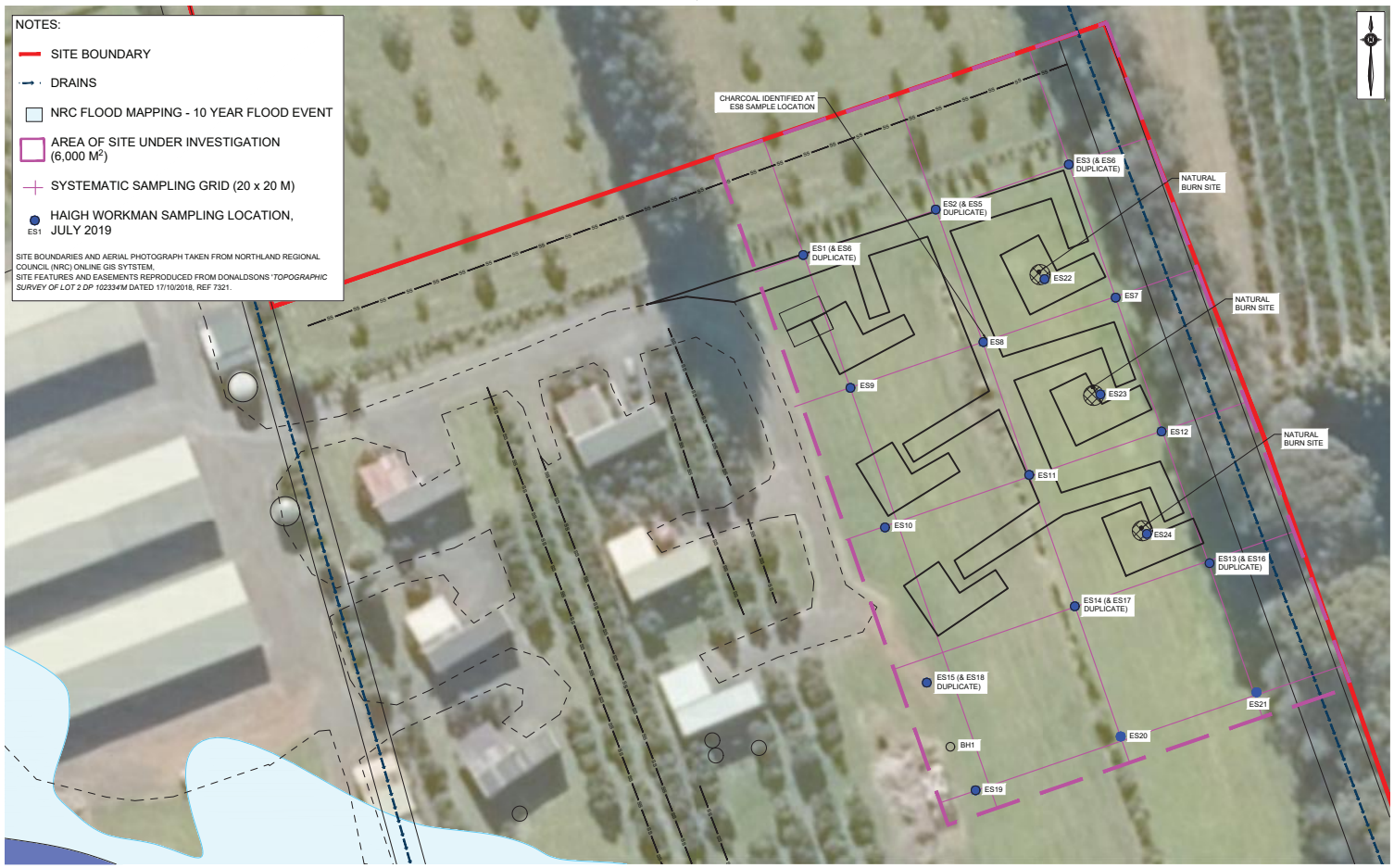
Project No. 17 111 | RC no.

DWG No. **17 111/03**

Sheet No. **03** of **04**

Plotted By Catherine Johnson at 3/09/2019 8:26:41 a.m.



Issue	Date	Revision
A	03/09/2019	FIRST ISSUE

DWG Sampling Location Plan

Scale 1:500 @A3 | Date 03/09/2019

Drawn CJ | Checked EC | Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - DSI DRAWING SET.DWG

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Project No. 17 111 | RC no.

DWG No. 17 111/04

Sheet No. 04 of 04

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Appendix B – Historical Aerial Photographs

Figure 6 - Historic Aerial Photograph - 1953 (Source: Retrolens)

Figure 7 - Historic Aerial Photograph - 1959 (Source: Haigh Workman Archives)

Figure 8 - Historic Aerial Photograph - 1968 (Source: Haigh Workman Archives)

Figure 9 - Historic Aerial Photograph - 1970 (Source: Haigh Workman Archives)

Figure 10 - Historic Aerial Photograph - 1977 (Source: Haigh Workman Archives)

Figure 11 - Historic Aerial Photograph - 1977 (Source: Retrolens)

Figure 12 - Historic Aerial Photograph - 1979 (Source: Retrolens)

Figure 13 - Historic Aerial Photograph - 1980 (Source: Haigh Workman Archives)

Figure 14 - Historic Aerial Photograph - 1981 (Source: Retrolens)

Figure 15 - Historic Aerial Photograph - 1982 (Source: Haigh Workman Archives)

Figure 16 - Historic Aerial Photograph - 2000 (Source: FNDC Online GIS)

Figure 17 - Historic Aerial Photograph - 2002 (Source: FNDC Online GIS)

Figure 18 - Historic Aerial Photograph - 2003 (Source: Google Earth Pro and Quick Map Overlay)

Figure 19 - Historic Aerial Photograph - 2007 (Source: Google Earth Pro and Quick Map Overlay)

Figure 20 - Historic Aerial Photograph - 2009 (Source: Google Earth Pro and Quick Map Overlay)

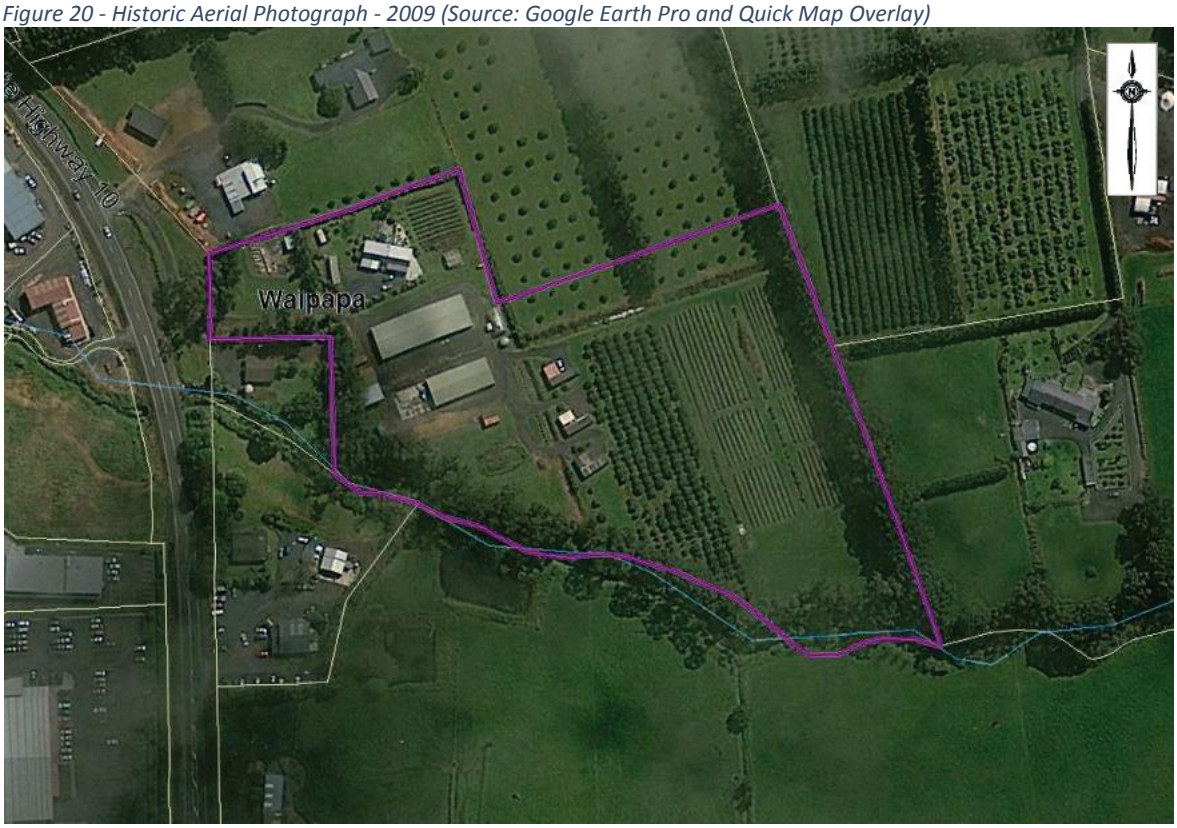

Figure 21 - Historic Aerial Photograph - 2012 (Source: Google Earth Pro and Quick Map Overlay)

Figure 22 - Historic Aerial Photograph - 2013 (Source: Google Earth Pro and Quick Map Overlay)

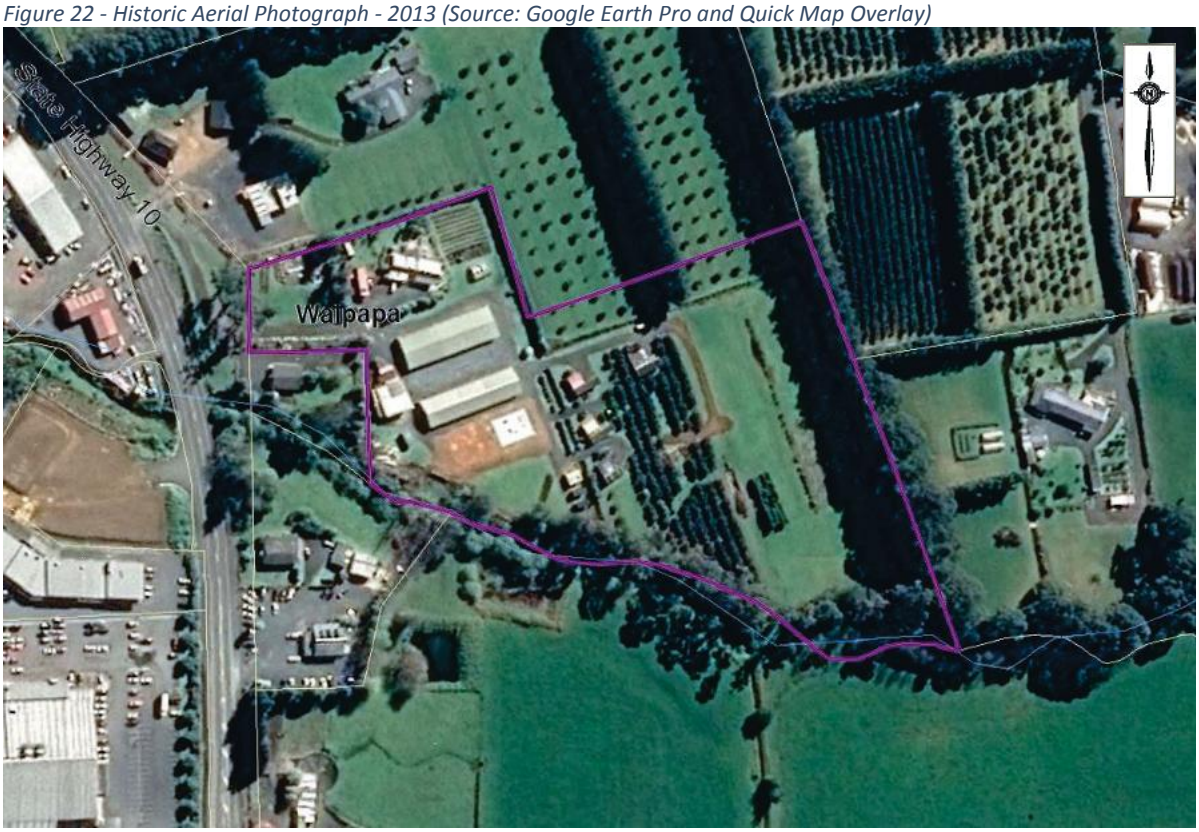

Figure 23 - Historic Aerial Photograph - 2015 (Source: FNDC Online GIS)

Figure 24 - Historic Aerial Photograph - 2013 (Source: Google Earth Pro and Quick Map Overlay)

Figure 25 - Historic Aerial Photograph - 2016 (Source: Google Earth Pro and Quick Map Overlay)

Figure 26 - Historic Aerial Photograph - 2017 (Source: Google Earth Pro and Quick Map Overlay)

Figure 27 - Historic Aerial Photograph - March 2018 (Source: Google Earth Pro and Quick Map Overlay)

Figure 28 - Historic Aerial Photograph - March 2018 (Source: Google Earth Pro and Quick Map Overlay)

Appendix C – Site Photography

Site Inspection & Sampling Visit - 30 July 2019

Figure 29 - Taken from the south eastern site corner towards area under investigation

Figure 30 - Area under investigation, looking north

Figure 31 - Containers currently situated to the north west of the area

Figure 32 - Western half of area, looking south

Figure 33 - Drain following the eastern site boundary, flowing into the Stream

Figure 34 - Whiriwhiritoa Stream following the southern site boundary

Figure 35 - Taken from southern site boundary looking north into site

Figure 36 - Central strip of felled materials and natural burn pile

Figure 37 - Typical surface covering

Figure 38 - Typical sample set up

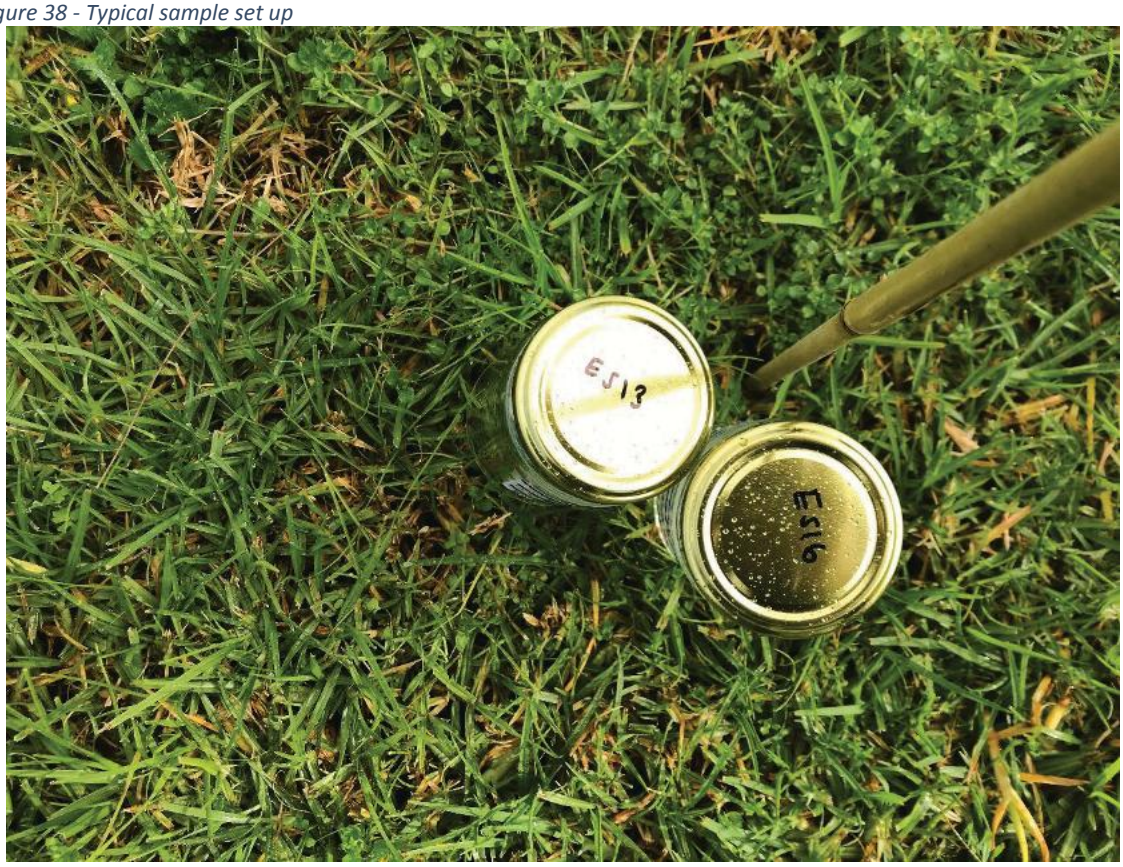

Figure 39 - Natural burn piles along the east. Looking north.

Figure 40 - Sample location in burn pile

Figure 41 - Sample ES24 Location

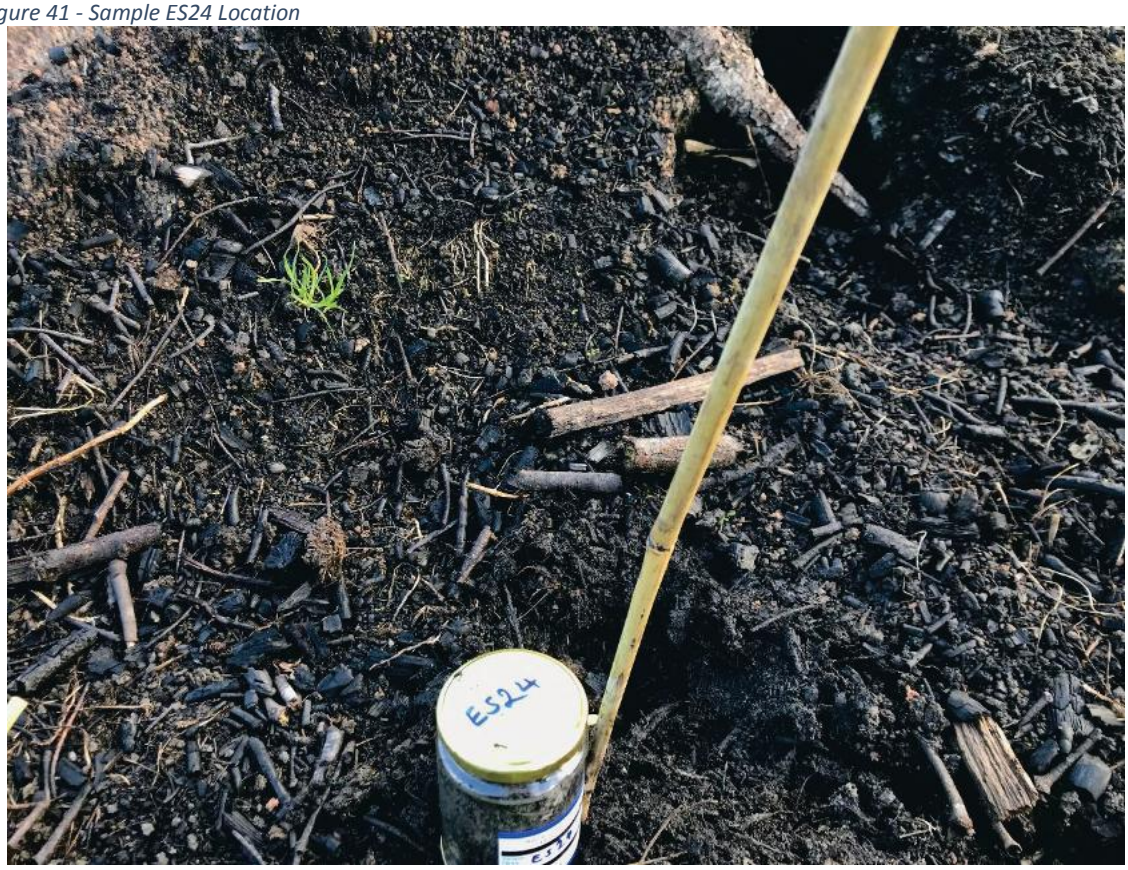

Figure 42 - Borehole soil

Figure 43 - Existing residential units on site

Figure 44 - Existing residential units on site

Appendix D – Sampling Logs

HAIGH WORKMAN LTD
Civil & Structural Engineers

P O Box 89, 0245
6 Fairway Drive,
Kerikeri, New Zealand

Phone 09 407 8327
Fax 09 407 8378
info@haighworkman.co.nz

Sample Hole Log

Job No.:	17 111	**Samples:**	ES1 - ES24
Client:	Arthur Cottle	**Date:**	30/07/2019
Location:	2000 State Highway 10 Waipapa	**Time:**	09:00 - 12:00
Method:	100 mm diameter Auger	**Logged:**	CJ
Conditions:	Fine with showers	**Checked:**	EJC

Sample No.	Soil Description	Depth (m bgl)	Sampling Time	Sample Point Location	Comments
ES1 (&ES4 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:00	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES2 (&ES5 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:05	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES3 (&ES6 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:10	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES7	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:35	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES8	MADE GROUND comprising slightly gravelly sandy SILT. Gravel is of charcoal.	0 - 0.15	10:30	Sampled in natural burn pile .	No olfactory evidence of contamination. Charcoal and ash idenfitied.
ES9	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:40	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES10	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:45	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES11	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:50	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES12	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	10:55	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES13 (&ES16 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:00	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.

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Kerikeri, New Zealand

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info@haighworkman.co.nz

Sample Hole Log

Job No.:	17111	**Samples:**	ES1 - ES24
Client:	Arthur Cottle	**Date:**	30/07/2019
Location:	2000 State Highway 10 Waipapa	**Time:**	09:00 - 12:00
Method:	100 mm diameter Auger	**Logged:**	CJ
Conditions:	Fine with showers	**Checked:**	EJC

Sample No.	Soil Description	Depth (m bgl)	Sampling Time	Sample Point Location	Comments
ES14 (& ES17 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:05	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES15 (&ES18 duplicate)	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:10	Sampled on the edge of a grassed mound.	No visual or olfactory evidence of contamination.
ES19	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:15	Sampled on the edge of a grassed mound.	No visual or olfactory evidence of contamination.
ES20	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:20	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES21	Grassed TOPSOIL comprising silty CLAY. Greyish brown, moist to wet, plastic.	0 - 0.15	11:25	Sampled in grass within the systematic grid pattern.	No visual or olfactory evidence of contamination.
ES22	MADE GROUND comprising slightly gravelly sandy SILT. Gravel is of charcoal.	0 - 0.15	10:30	Sampled in natural burn pile .	No olfactory evidence of contamination. Charcoal and ash idenfitied.
ES23	MADE GROUND comprising slightly gravelly sandy SILT. Gravel is of charcoal.	0 - 0.15	10:30	Sampled in natural burn pile .	No olfactory evidence of contamination. Charcoal and ash idenfitied.
ES24	MADE GROUND comprising slightly gravelly sandy SILT. Gravel is of charcoal.	0 - 0.15	10:30	Sampled in natural burn pile .	No olfactory evidence of contamination. Charcoal and ash idenfitied.

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New Zealand

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Borehole Log - BH1

Hole Location: Refer to Site Plan

JOB No. 17 111

CLIENT:	Arthur Cottle	**SITE:**	2000 SH10, Waipapa		
Date Started:	30/07/2019	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	EC
Date Completed:	30/07/2019	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Corrected Shear Vane Strength (kPa)	Scala Penetrometer (blows/100mm)
Grassed **TOPSOIL** comprising **Silty CLAY**, greyish brown, moist to wet, stiff, medium plasticity.	0.0	T.S.					0 5 10 15 20
Silty CLAY, greyish brown, moist, stiff, medium plasticity.	0.5						
CLAY with some silt, grey, moist to wet, very stiff, medium plasticity. wet saturated, ***GROUND WATER TABLE ENCOUNTERED***	1.0			▽			
End of hole at 1.1 m bgl (Target Depth)	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil. Bgl = Below ground level.
Groundwater identified at 0.8 m bgl.
Shear Vane and Scala penetrometer testing not undertaken.

Average Soil Sensitivity -

Appendix E – Laboratory QA/QC

Hill Laboratories
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PRE-REGISTERED REQUEST

R J Hill Laboratories Limited
28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

T 0508 HILL LAB (44 555 22)
T +64 7 858 2000
E mail@hill-labs.co.nz
W www.hill-laboratories.com

Client
Name Haigh Workman Limited 217580

Address

Phone *Mobile* *Fax*

Email

Third Party System *Third Party Contact Id*

Client Reference 17 111

Quote No 98034 *Order No*

Charge To Default

Pre-reg Ref: hwl;1398;2019-07-29T21:58:08.602Z

Date Recv 31-Jul-2019 11:58 am by Joe Varey

Job Number: **221 6882**

Primary Contact
Name Collings, Emily 250206

Address
Kerikeri

Phone *Mobile* *Fax*

Email emily@haighworkman.co.nz

Third Party System *Third Party Contact Id*

Submitted By
Name Collings, Emily 250206

Address
Kerikeri

Phone *Mobile* *Fax*

Email emily@haighworkman.co.nz

Third Party System *Third Party Contact Id*

ADDITIONAL INFORMATION

Tues 30 July, Fine weather. 10am - 12 noon

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
1	ES1	30-Jul-2019 10:07	Env.S.Soil	Comp25, Comp33
2	ES4	30-Jul-2019 10:07	Env.S.Soil	Comp26
3	ES2	30-Jul-2019 10:12	Env.S.Soil	Comp25
4	ES5	30-Jul-2019 10:12	Env.S.Soil	Comp26
5	ES3	30-Jul-2019 10:17	Env.S.Soil	Comp25
6	ES6	30-Jul-2019 10:18	Env.S.Soil	Comp26
7	ES8	30-Jul-2019 10:33	Env.S.Soil	Comp27, Comp33
8	ES7	30-Jul-2019 10:36	Env.S.Soil	Comp27, Comp33
9	ES9	30-Jul-2019 10:40	Env.S.Soil	Comp27
10	ES12	30-Jul-2019 10:44	Env.S.Soil	Comp28
11	ES11	30-Jul-2019 10:47	Env.S.Soil	Comp28
12	ES10	30-Jul-2019 10:52	Env.S.Soil	Comp28, Comp34

No.	Sample Name	Sample Date/Time	Sample Type	Tests Required
13	ES14	30-Jul-2019 10:58	Env.S.Soil	Comp29, Comp34
14	ES17	30-Jul-2019 10:58	Env.S.Soil	Comp30
15	ES13	30-Jul-2019 11:19	Env.S.Soil	Comp29
16	ES16	30-Jul-2019 11:19	Env.S.Soil	Comp30
17	ES18	30-Jul-2019 11:25	Env.S.Soil	Comp30
18	ES15	30-Jul-2019 11:25	Env.S.Soil	Comp29
19	ES21	30-Jul-2019 11:29	Env.S.Soil	Comp32
20	ES20	30-Jul-2019 11:33	Env.S.Soil	Comp32
21	ES24	30-Jul-2019 11:33	Env.S.Soil	Comp31, Comp34
22	ES23	30-Jul-2019 11:34	Env.S.Soil	Comp31
23	ES22	30-Jul-2019 11:34	Env.S.Soil	Comp31
24	ES19	30-Jul-2019 11:38	Env.S.Soil	Comp32
25	Composite of ES1, ES2, and ES3	30-Jul-2019 14:17	Env.S.Soil	NESmetals
26	Composite of ES4, ES5, and ES6	30-Jul-2019 14:18	Env.S.Soil	NESmetals
27	Composite of ES8, ES7, and ES9	30-Jul-2019 14:18	Env.S.Soil	NESmetals
28	Composite of ES12, ES11, and ES10	30-Jul-2019 14:19	Env.S.Soil	NESmetals
29	Composite of ES14, ES13, and ES15	30-Jul-2019 14:19	Env.S.Soil	NESmetals
30	Composite of ES17, ES16, and ES18	30-Jul-2019 14:19	Env.S.Soil	NESmetals
31	Composite of ES24, ES23, and ES22	30-Jul-2019 14:19	Env.S.Soil	NESmetals
32	Composite of ES21, ES20, and ES19	30-Jul-2019 14:20	Env.S.Soil	HoldCold
33	Composite of ES1, ES8, and ES7	30-Jul-2019 14:20	Env.S.Soil	OCPsc
34	Composite of ES10, ES14, and ES24	30-Jul-2019 14:20	Env.S.Soil	OCPsc

Client Supplied Results

Sample	Activity Code	Result
1	gpsLat	-35.2088056464799
1	gpsLong	173.92251227720405
2	gpsLat	-35.208976116442784
2	gpsLong	173.9225591263523
3	gpsLat	-35.20876986972775

Client Supplied Results

Sample	Activity Code	Result
3	gpsLong	173.92277896737897
4	gpsLat	-35.208864045537226
4	gpsLong	173.92276275341382
5	gpsLat	-35.208696342397104
5	gpsLong	173.92297737169562
6	gpsLat	-35.20883209906394
6	gpsLong	173.92295548074057
7	gpsLat	-35.20897000365873
7	gpsLong	173.92307076793386
8	gpsLat	-35.20896187988479
8	gpsLong	173.92304206407928
9	gpsLat	-35.209089051678866
9	gpsLong	173.92277796949858
10	gpsLat	-35.20907846094837
10	gpsLong	173.9231890266954
11	gpsLat	-35.2090493090962
11	gpsLong	173.92316700456195
12	gpsLat	-35.20923639790239
12	gpsLong	173.92270002014243
13	gpsLat	-35.20935519663996
13	gpsLong	173.9231532836499
14	gpsLat	-35.209315718193345
14	gpsLong	173.92297196075972
15	gpsLat	-35.20933389860594
15	gpsLong	173.92326618670612
16	gpsLat	-35.20921311505629
16	gpsLong	173.92308389989986
17	gpsLat	-35.20943528342931
17	gpsLong	173.92286367774173
18	gpsLat	-35.209523452885705
18	gpsLong	173.9227517296391
19	gpsLat	-35.20953021324105
19	gpsLong	173.92342452839898
20	gpsLat	-35.20945573352164
20	gpsLong	173.92306644205476
24	gpsLat	-35.20951535181661
24	gpsLong	173.92284740034748

Hill Laboratories
TRIED, TESTED AND TRUSTED

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Private Bag 3205
Hamilton 3240 New Zealand

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W www.hill-laboratories.com

Job Information Summary

Client:	Haigh Workman Limited	**Lab No:**	2216882
Contact:	Catherine Johnson	**Date Registered:**	31-Jul-2019 1:25 pm
	C/- Haigh Workman Limited	**Priority:**	High
	PO Box 89	**Quote No:**	98034
	Kerikeri 0245	**Order No:**	
		Client Reference:	17 111
		Add. Client Ref:	
		Submitted By:	Emily Collings
		Charge To:	Haigh Workman Limited
		Target Date:	13-Aug-2019 4:30 pm

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
1	ES1 30-Jul-2019 10:07 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples; Composite Environmental Solid Samples
2	ES4 30-Jul-2019 10:07 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
3	ES2 30-Jul-2019 10:12 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
4	ES5 30-Jul-2019 10:12 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
5	ES3 30-Jul-2019 10:17 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
6	ES6 30-Jul-2019 10:18 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
7	ES8 30-Jul-2019 10:33 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples; Composite Environmental Solid Samples
8	ES7 30-Jul-2019 10:36 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples; Composite Environmental Solid Samples
9	ES9 30-Jul-2019 10:40 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
10	ES12 30-Jul-2019 10:44 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
11	ES11 30-Jul-2019 10:47 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
12	ES10 30-Jul-2019 10:52 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples; Composite Environmental Solid Samples
13	ES14 30-Jul-2019 10:58 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples; Composite Environmental Solid Samples
14	ES17 30-Jul-2019 10:58 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
15	ES13 30-Jul-2019 11:19 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
16	ES16 30-Jul-2019 11:19 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
17	ES18 30-Jul-2019 11:25 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
18	ES15 30-Jul-2019 11:25 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
19	ES21 30-Jul-2019 11:29 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
20	ES20 30-Jul-2019 11:33 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples

Samples

No	Sample Name	Sample Type	Containers	Tests Requested
21	ES24 30-Jul-2019 11:33 am	Soil	GSoil300	Composite Environmental Solid Samples; Composite Environmental Solid Samples
22	ES23 30-Jul-2019 11:34 am	Soil	GSoil300	Composite Environmental Solid Samples
23	ES22 30-Jul-2019 11:34 am	Soil	GSoil300	Composite Environmental Solid Samples
24	ES19 30-Jul-2019 11:38 am	Soil	GSoil300	Latitude point; Longitude point; Composite Environmental Solid Samples
25	Composite of ES1, ES2, and ES3 30-Jul-2019 2:17 pm	Soil	OrgComp	National Environmental Standards Metals; pH
26	Composite of ES4, ES5, and ES6 30-Jul-2019 2:18 pm	Soil	OrgComp	National Environmental Standards Metals
27	Composite of ES8, ES7, and ES9 30-Jul-2019 2:18 pm	Soil	OrgComp	National Environmental Standards Metals; pH
28	Composite of ES12, ES11, and ES10 30-Jul-2019 2:19 pm	Soil	OrgComp	National Environmental Standards Metals; pH
29	Composite of ES14, ES13, and ES15 30-Jul-2019 2:19 pm	Soil	OrgComp	National Environmental Standards Metals; pH
30	Composite of ES17, ES16, and ES18 30-Jul-2019 2:19 pm	Soil	OrgComp	National Environmental Standards Metals
31	Composite of ES24, ES23, and ES22 30-Jul-2019 2:19 pm	Soil	OrgComp	National Environmental Standards Metals; pH
32	Composite of ES21, ES20, and ES19 30-Jul-2019 2:20 pm	Soil	OrgComp	National Environmental Standards Metals; pH
33	Composite of ES1, ES8, and ES7 30-Jul-2019 2:20 pm	Soil	OrgComp	Organochlorine Pesticides Screening in Soil
34	Composite of ES10, ES14, and ES24 30-Jul-2019 2:20 pm	Soil	OrgComp	Organochlorine Pesticides Screening in Soil

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	25-32
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	25-32
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	25, 27-29, 31-32
National Environmental Standards Metals		0 - 20 mg/kg dry wt	25-32
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082). Tested on as recieved sample	0.010 - 0.06 mg/kg dry wt	33-34
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	25-34
Extraction of Exchangeable Hexavalent Chromium	0.01M KH_2PO_4 Extraction.	-	25-32
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	25-32
Composite Environmental Solid Samples	Individual sample fractions mixed together to form a composite fraction.	-	1-24
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-32
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	25-32
Total Recoverable Cadmium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.10 mg/kg dry wt	25-32
Trivalent Chromium	Calculation Total Recoverable Chromium - Exchangeable Hexavalent Chromium.	0 mg/kg dry wt	25-32

Sample Type: Soil			
Test	**Method Description**	**Default Detection Limit**	**Sample No**
Hexavalent Chromium in Environmental Solids	Phosphate buffer extraction, colorimetry.	0.4 mg/kg dry wt	25-32
Total Recoverable Chromium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-32
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-32
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	25-32
Total Recoverable Mercury	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.10 mg/kg dry wt	25-32
pH	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH.	0.1 pH Units	25, 27-29, 31-32

Appendix F – Analytical Test Results

Hill Laboratories
TRIED, TESTED AND TRUSTED

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28 Duke Street Frankton 3204
Private Bag 3205
Hamilton 3240 New Zealand

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W www.hill-laboratories.com

Certificate of Analysis

Client:	Haigh Workman Limited	**Lab No:**	2216882	SPv2
Contact:	Catherine Johnson	**Date Received:**	31-Jul-2019	
	C/- Haigh Workman Limited	**Date Reported:**	07-Aug-2019	
	PO Box 89	**Quote No:**	98034	
	Kerikeri 0245	**Order No:**		
		Client Reference:	17 111	
		Submitted By:	Emily Collings	

Sample Type: Soil

Sample Name:	ES1 30-Jul-2019 10:07 am	ES4 30-Jul-2019 10:07 am	ES2 30-Jul-2019 10:12 am	ES5 30-Jul-2019 10:12 am	ES3 30-Jul-2019 10:17 am
Lab Number:	2216882.1	2216882.2	2216882.3	2216882.4	2216882.5
Individual Tests					
Latitude point*	-35.2088	-35.2090	-35.2088	-35.2089	-35.2087
Longitude point*	173.9225	173.9226	173.9228	173.9228	173.9230

Sample Name:	ES6 30-Jul-2019 10:18 am	ES8 30-Jul-2019 10:33 am	ES7 30-Jul-2019 10:36 am	ES9 30-Jul-2019 10:40 am	ES12 30-Jul-2019 10:44 am
Lab Number:	2216882.6	2216882.7	2216882.8	2216882.9	2216882.10
Individual Tests					
Latitude point*	-35.2088	-35.2090	-35.2090	-35.2091	-35.2091
Longitude point*	173.9230	173.9231	173.9230	173.9228	173.9232

Sample Name:	ES11 30-Jul-2019 10:47 am	ES10 30-Jul-2019 10:52 am	ES14 30-Jul-2019 10:58 am	ES17 30-Jul-2019 10:58 am	ES13 30-Jul-2019 11:19 am
Lab Number:	2216882.11	2216882.12	2216882.13	2216882.14	2216882.15
Individual Tests					
Latitude point*	-35.2090	-35.2092	-35.2094	-35.2093	-35.2093
Longitude point*	173.9232	173.9227	173.9232	173.9230	173.9233

Sample Name:	ES16 30-Jul-2019 11:19 am	ES18 30-Jul-2019 11:25 am	ES15 30-Jul-2019 11:25 am	ES21 30-Jul-2019 11:29 am	ES20 30-Jul-2019 11:33 am
Lab Number:	2216882.16	2216882.17	2216882.18	2216882.19	2216882.20
Individual Tests					
Latitude point*	-35.2092	-35.2094	-35.2095	-35.2095	-35.2095
Longitude point*	173.9231	173.9229	173.9228	173.9234	173.9231

Sample Name:		ES19 30-Jul-2019 11:38 am	Composite of ES1, ES2, and ES3 30-Jul-2019 2:17 pm	Composite of ES4, ES5, and ES6 30-Jul-2019 2:18 pm	Composite of ES8, ES7, and ES9 30-Jul-2019 2:18 pm	Composite of ES12, ES11, and ES10 30-Jul-2019 2:19 pm
Lab Number:		2216882.24	2216882.25	2216882.26	2216882.27	2216882.28
Individual Tests						
Latitude point*		-35.2095	-	-	-	-
Longitude point*		173.9228	-	-	-	-
Dry Matter	g/100g as rcvd	-	65	63	66	65
pH*	pH Units	-	5.7	-	7.6	5.8
National Environmental Standards Metals						
Total Recoverable Arsenic	mg/kg dry wt	-	< 2	< 2	< 2	< 2
Total Recoverable Boron	mg/kg dry wt	-	< 20	< 20	< 20	< 20
Total Recoverable Cadmium	mg/kg dry wt	-	0.13	0.15	0.25	0.19
Trivalent Chromium*	mg/kg dry wt	-	38	27	27	23
Chromium (hexavalent)*	mg/kg dry wt	-	< 0.4	< 0.4	< 0.4	< 0.4
Total Recoverable Chromium	mg/kg dry wt	-	38	28	28	23
Total Recoverable Copper	mg/kg dry wt	-	20	11	25	15
Total Recoverable Lead	mg/kg dry wt	-	13.1	14.0	14.8	11.6

Sample Type: Soil						
Sample Name:		ES19 30-Jul-2019 11:38 am	Composite of ES1, ES2, and ES3 30-Jul-2019 2:17 pm	Composite of ES4, ES5, and ES6 30-Jul-2019 2:18 pm	Composite of ES8, ES7, and ES9 30-Jul-2019 2:18 pm	Composite of ES12, ES11, and ES10 30-Jul-2019 2:19 pm
Lab Number:		2216882.24	2216882.25	2216882.26	2216882.27	2216882.28
National Environmental Standards Metals						
Total Recoverable Mercury	mg/kg dry wt	-	0.73	0.85	0.74	0.87

Sample Name:		Composite of ES14, ES13, and ES15 30-Jul-2019 2:19 pm	Composite of ES17, ES16, and ES18 30-Jul-2019 2:19 pm	Composite of ES24, ES23, and ES22 30-Jul-2019 2:19 pm	Composite of ES1, ES8, and ES7 30-Jul-2019 2:20 pm	Composite of ES10, ES14, and ES24 30-Jul-2019 2:20 pm
Lab Number:		2216882.29	2216882.30	2216882.31	2216882.33	2216882.34
Individual Tests						
Dry Matter	g/100g as rcvd	63	63	60	65	60
pH*	pH Units	5.9	-	7.9	-	-
National Environmental Standards Metals						
Total Recoverable Arsenic	mg/kg dry wt	< 2	< 2	< 2	-	-
Total Recoverable Boron	mg/kg dry wt	< 20	< 20	< 20	-	-
Total Recoverable Cadmium	mg/kg dry wt	0.20	0.20	0.24	-	-
Trivalent Chromium*	mg/kg dry wt	33	25	24	-	-
Chromium (hexavalent)*	mg/kg dry wt	< 0.4	< 0.4	< 0.4	-	-
Total Recoverable Chromium	mg/kg dry wt	33	26	24	-	-
Total Recoverable Copper	mg/kg dry wt	14	15	26	-	-
Total Recoverable Lead	mg/kg dry wt	12.7	13.9	11.6	-	-
Total Recoverable Mercury	mg/kg dry wt	0.83	0.86	0.57	-	-
Organochlorine Pesticides Screening in Soil						
Aldrin	mg/kg dry wt	-	-	-	< 0.015	< 0.017
alpha-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.017
beta-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.017
delta-BHC	mg/kg dry wt	-	-	-	< 0.015	< 0.017
gamma-BHC (Lindane)	mg/kg dry wt	-	-	-	< 0.015	< 0.017
cis-Chlordane	mg/kg dry wt	-	-	-	< 0.015	< 0.017
trans-Chlordane	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Total Chlordane [(cis+trans)* 100/42]	mg/kg dry wt	-	-	-	< 0.04	< 0.04
2,4'-DDD	mg/kg dry wt	-	-	-	< 0.015	< 0.017
4,4'-DDD	mg/kg dry wt	-	-	-	< 0.015	< 0.017
2,4'-DDE	mg/kg dry wt	-	-	-	< 0.015	< 0.017
4,4'-DDE	mg/kg dry wt	-	-	-	< 0.015	< 0.017
2,4'-DDT	mg/kg dry wt	-	-	-	< 0.015	< 0.017
4,4'-DDT	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Total DDT Isomers	mg/kg dry wt	-	-	-	< 0.09	< 0.10
Dieldrin	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endosulfan I	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endosulfan II	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endosulfan sulphate	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endrin	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endrin aldehyde	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Endrin ketone	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Heptachlor	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Heptachlor epoxide	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Hexachlorobenzene	mg/kg dry wt	-	-	-	< 0.015	< 0.017
Methoxychlor	mg/kg dry wt	-	-	-	< 0.015	< 0.017

Analyst's Comments

Samples 25-31 Comment:
It should be noted that the results reported for lead and mercury are total recoverable, not inorganic as specified by the NES standards. This should be kept in mind when interpreting these results.

Summary of Methods

The following table(s) gives a brief description of the methods used to conduct the analyses for this job. The detection limits given below are those attainable in a relatively clean matrix. Detection limits may be higher for individual samples should insufficient sample be available, or if the matrix requires that dilutions be performed during analysis.
Unless otherwise indicated, analyses were performed at Hill Laboratories, 28 Duke Street, Frankton, Hamilton 3204.

Sample Type: Soil

Test	Method Description	Default Detection Limit	Sample No
Environmental Solids Sample Drying*	Air dried at 35°C Used for sample preparation. May contain a residual moisture content of 2-5%.	-	25-31
Environmental Solids Sample Preparation	Air dried at 35°C and sieved, <2mm fraction. Used for sample preparation. May contain a residual moisture content of 2-5%.	-	25-31
Soil Prep Dry & Sieve for Agriculture	Air dried at 35°C and sieved, <2mm fraction.	-	25, 27-29, 31
National Environmental Standards Metals*		0 - 20 mg/kg dry wt	25-31
Organochlorine Pesticides Screening in Soil	Sonication extraction, SPE cleanup, dual column GC-ECD analysis (modified US EPA 8082). Tested on as recieved sample	0.010 - 0.06 mg/kg dry wt	33-34
Dry Matter (Env)	Dried at 103°C for 4-22hr (removes 3-5% more water than air dry) , gravimetry. (Free water removed before analysis, non-soil objects such as sticks, leaves, grass and stones also removed). US EPA 3550.	0.10 g/100g as rcvd	25-31, 33-34
Extraction of Exchangeable Hexavalent Chromium*	0.01M KH_2PO_4 Extraction.	-	25-31
Total Recoverable digestion	Nitric / hydrochloric acid digestion. US EPA 200.2.	-	25-31
Composite Environmental Solid Samples*	Individual sample fractions mixed together to form a composite fraction.	-	1-18, 21-23
Total Recoverable Arsenic	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-31
Total Recoverable Boron	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	20 mg/kg dry wt	25-31
Total Recoverable Cadmium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.10 mg/kg dry wt	25-31
Trivalent Chromium*	Calculation Total Recoverable Chromium - Exchangeable Hexavalent Chromium.	0 mg/kg dry wt	25-31
Hexavalent Chromium in Environmental Solids*	Phosphate buffer extraction, colorimetry.	0.4 mg/kg dry wt	25-31
Total Recoverable Chromium	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-31
Total Recoverable Copper	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	2 mg/kg dry wt	25-31
Total Recoverable Lead	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.4 mg/kg dry wt	25-31
Total Recoverable Mercury	Dried sample, sieved as specified (if required). Nitric/Hydrochloric acid digestion, ICP-MS, screen level. US EPA 200.2.	0.10 mg/kg dry wt	25-31
pH*	1:2 (v/v) soil : water slurry followed by potentiometric determination of pH.	0.1 pH Units	25, 27-29, 31

These samples were collected by yourselves (or your agent) and analysed as received at the laboratory.

Samples are held at the laboratory after reporting for a length of time depending on the preservation used and the stability of the analytes being tested. Once the storage period is completed the samples are discarded unless otherwise advised by the client.

Ara Heron BSc (Tech)
Client Services Manager - Environmental

Appendix G – Soil Contaminant Standards

Haigh Workman Limited
Generic Assessment Criteria/Soil Contaminant Standards

Revision: 7 **Date:** 2 November 2018

Parameter	Rural Residential/ Lifestyle Block (mg/kg, unless otherwise stated)			Standard Residential (mg/kg, unless otherwise stated)			High Density Residential (mg/kg, unless otherwise stated)	Recreational (mg/kg, unless otherwise stated)	Commercial / Industrial (Outdoor) (mg/kg, unless otherwise stated)	Note
	No Produce	10% Produce	25% Produce	No Produce	10% Produce	25% Produce				
Metals/Metalloids										
Arsenic	21	17	17	24	20	17	45	80	70	[1],[2]
Boron	NL	NL	NL	NL	NL	NL	NL	NL	NL	[3]
Cadmium	110	3	0.82	110	3	0.82	230	400	1300	
Chromium (III)	NL	NL	NL	NL	NL	NL	NL	NL	NL	[3],[4]
Chromium (VI)	770	460	290	770	460	290	1500	2700	6300	
Copper	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Lead (Inorganic)	250	210	160	250	210	160	500	880	3300	
Mercury (Inorganic)	510	310	200	510	310	200	1000	1800	4200	
Other Inorganics										
pH	<5 or >9			<5 or >9			<5 or >9			
Total Sulphate	2400			2400			2400			[5]
Water-Soluble Sulphate	0.5g/l			0.5g/l			0.5g/l			[5]
Organics										
PAHs	Potency equivalency factor only - see separate sheet for selected individual PAH GACs									
Acenaphthene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Acenaphthylene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Anthracene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Benzo(a)anthracene	0.1									[6]
Benzo(a)pyrene	11	8	6	12	10	7	24	40	35	[7]
Benzo(b)fluoranthene	0.1									[6]
Benzo(k)fluoranthene	0.1									[6]
Benzo(g,h,i)perylene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Chrysene	0.01									[6]
Dibenzo(a,h)anthracene	1	1	1	1	1	1	1	1	1	[6]
Fluoranthene	0.01									[6]
Fluorene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Indeno(1,2,3-c,d)pyrene	0.1									[6]
Naphthalene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Phenanthrene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Pyrene	NL	NL	NL	NL	NL	NL	NL	NL	NL	
Other Organics										
Σ DDT	120	70	45	120	70	45	240	400	1000	
Dieldrin	22	2.6	1.1	22	2.6	1.1	45	70	160	[9]
PCP	55	55	55	55	55	55	110	150	360	
Dioxin (TCDD)	0.18ug/kg	0.15ug/kg	0.12ug/kg	0.18ug/kg	0.15ug/kg	0.12ug/kg	0.35ug/kg	0.60ug/kg	1.4ug/kg	[10]
Dioxin (Dioxin like PCBs)	0.16ug/kg	0.12ug/kg	0.09ug/kg	0.16ug/kg	0.12ug/kg	0.09ug/kg	0.33ug/kg	0.52ug/kg	1.2ug/kg	[10]
Organic Matter	35%									[16]
Total Nitrogen	1%									
Ammonium-Nitrate	LOD									
Sulphate	50									
Total Organic Carbon	3% w/w									
Carbon: Nitrogen Ratio	25%									
Others										
TOC	3%w/w			3%w/w			3%w/w			[11]
Calorific Value	2MJ/kg			2MJ/kg			2MJ/kg			[12]
Asbestos (ACMs)	0.01 % w/w						0.04 % w/w	0.02 % w/w	0.05 % w/w	[15]
Asbestos (Loose/Free Fibres)	0.001 % w/w									[15]

Parameter	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Carcinogen	Note
Organochlorine Pesticides				
Aldrin	390	18	**Yes**	[14]
Alpha-Hexachlorocyclohexane (BHC)	800	36	**Yes**	[14]
Beta-Hexachlorocyclohexane (BHC)	30	1.3	**Yes**	[14]
Gamma-Hexachlorocyclohexane (BHC) - Lindane	57	2.5	**Yes**	[14]
Chlordane (cis and trans)	1.7	7.5	**Yes**	[14]
Endosulfan	4	7000	No	[13],[14]
Endrin	19	250	No	[14]
Heptachlor	13	63	**Yes**	[14]

Heptachlor Epoxide	70	33	**Yes**	[14]
Hexachlorobenzene	21	96	**Yes**	[14]
Methoxyclor	320	4100	No	[14]
Organonitro and Phosphorus Pesticides				
Acetochlor	1300	16000	No	[14]
Alachlor	9.7	41	**Yes**	[14]
Atrazine	2.4	10	**Yes**	[14]
Azinphos-methyl	190	2500	No	[14]
Captan	240	1000	**Yes**	[14]
Carbaryl	6300	82000	No	[14]
Carbofuran	320	4100	No	[14]
Chlorothalonil	180	740	**Yes**	[14]
Chlorpyrifos	63	820	No	[14]
Chlorpyrifos-methyl	630	8200	No	[14]
Cyanazine	65	2.7	**Yes**	[14]
Cyfluthrin	1600	21000	No	[14]
Cyhalothrin	320	4100	No	[14]
Cypermethrin	630	8200	No	[14]
Deltamethrin (including Tralomethrin)	470	6200	No	[14]
Diazinon	44	570	No	[14]
Dichlorvos	1.9	7.9	**Yes**	[14]
Dimethoate	13	160	No	[14]
Diphenylamine	1600	21000	No	[14]
Diuron	130	1600	No	[14]
Fluometuron	820	11000	No	[14]
Flusilazole	44	570	No	[14]
Fluvalinate	630	8200	No	[14]
Haloxyfop-methyl	3.2	41	No	[14]
Hexazinone	2100	27000	No	[14]
Linuron	130	1600	No	[14]
Metalaxyl (Mefonoxam)	3800	49000	No	[14]
Methamidophos	3.2	41	No	[14]
Metolachlor	9500	120000	No	[14]
Metribuzin	1600	21000	No	[14]
Molinate	130	1600	No	[14]
Myclobutanil	1600	21000	No	[14]
Naled	160	2300	No	[14]
Norflurazon	2500	33000	No	[14]
Oxadiazon	320	4100	No	[14]
Oxyflurorfen	190	2500	No	[14]
Paclobutrazol	820	11000	No	[14]
Parathion (ethyl and methyl)	380	4900	No	[14]
Pendimethalin	2500	33000	No	[14]
Permethrin	3200	41000	No	[14]
Prochloraz	3.6	15	**Yes**	[14]
Prometryn	250	3300	No	[14]
Propachlor	820	11000	No	[14]
Propanil	320	4100	No	[14]
Propazine	1300	16000	No	[14]
Propiconazole	820	11000	No	[14]
Quizalofop-ethyl	570	7400	No	[14]
Simazine	4.5	19	**Yes**	[14]
TCMTB	1900	25000	No	[14]
Terbacil	820	11000	No	[14]
Terbufos	2	29	No	[14]
Terbutryn	63	820	No	[14]
Thiobencarb	63	820	No	[14]
Trifluralin	91	420	**Yes**	[14]
Vinclozolin	1600	21000	No	[14]

NL - No limit; LOD - Limit of Detection

Footnotes

[1] Different rural residential and residential exposure durations result in different SCSs because non-threshold substance SCS derivation uses age-adjusted exposure rates.

[2] Derived values are less than 99th percentile of national dataset of background concentrations and therefore take the 99th percentile value.

[3] No limit - the derived value exceeds 10,000mg/kg, a concentration that is unlikely to be exceeded in practice. SGV of 16,112mg/kg for rural residential with 25% produce.

[4] Chromium III is not considered to pose a significant risk to human health.

[5] Sulphate is not considered to pose a potential risk to human health under normal circumstances - this GAC applies to construction cases only and is set at the upper limit for DS-1 Design Sulphate Class concrete.

[6] Figure represents Potency Equivalency Factor for each analyte. Calculations of site specific GAC should be calculated based upon the results of laboratory analysis and guidance presented within MFE Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health 2011 Section 6.8.2.

[7] Benzo(a)pyrene GAC values to be used for surrogate marker approach to other PAH analytes; SCS for other PAHs to be compared with the equivalent BaP concentration calculated as the sum of each of the detected concentrations of the nine PAHs identified in the GAC table. Different rural residential and residential exposure durations result in different SCSs because non-threshold substance SSV derivation uses age-adjusted exposure rates.

[8] See separate GAC pages for TPH values

[9] SCS for dieldrin also applies to aldrin separately, or to the sum of aldrin and dieldrin where both are present.
[10] Consideration should be given to investigating dioxins for PCP concentrations in excess of 0.3mg/kg.
[11] TOC content itself does not represent a potential risk to human health. This GAC is provided for indicative assessment of disposal options, in the case that off-site landfill of soil is required. This GAC is specified at the 'Inert' waste threshold and should be considered as for information purposes only.
[12] Calorific value is not an indication of direct human health risk but may be useful in assessment of the potential fire risk posed by made ground or natural soils containing elevated concentrations of potentially combustible organic matter.
[13] No GAC is currently in use by New Zealand for Endosulfan. GAC is derived from Soil Remediation Circular:2009 released by Dutch Ministry of Housing. Under MfE Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values the Dutch guidelines are considered as international risk-based guidelines, protective of both human and ecological receptors.
[14] No GAC is currently in use by New Zealand for individual pesticides/herbicides. GAC is derived from Regional Screening Level Summary Table: November 2015 released by US EPA. Under MfE Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values the US EPA guidelines are considered as international risk-based guidelines, protective of human receptors only.
[15] GAC for asbestos is based upon guidance presented within BRANZ 2017 New Zealand Guidelines for Assessing and Managing Asbestos in Soil. Table 5 - Soil guideline values for asbestos in New Zealand.
[16] In light of no standards in New Zealand for listed organics outside of drinking water the GAC for selected organics in soil have been derived from research conducted by Haigh Workman Ltd. In particular standards have been derived from the following documents. Hills Laboratories Publication Technical Notes: Laboratory Tests for Soil Sulphur in Pastoral Soils; Rajendram et al. Total Sulphur: A Better Predictor of Sulphur Deficiency in Pastoral Soils (2008); Hills Laboratories Publication Technical Paper 3: Soil Tests and Interpreatation.

Appendix H – Certificate of Title Documents

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA56C/28**
Land Registration District	**North Auckland**
Date Issued	16 January 1985

Prior References
NA28C/985

Estate	Fee Simple
Area	3.0750 hectares more or less
Legal Description	Lot 2 Deposited Plan 102334

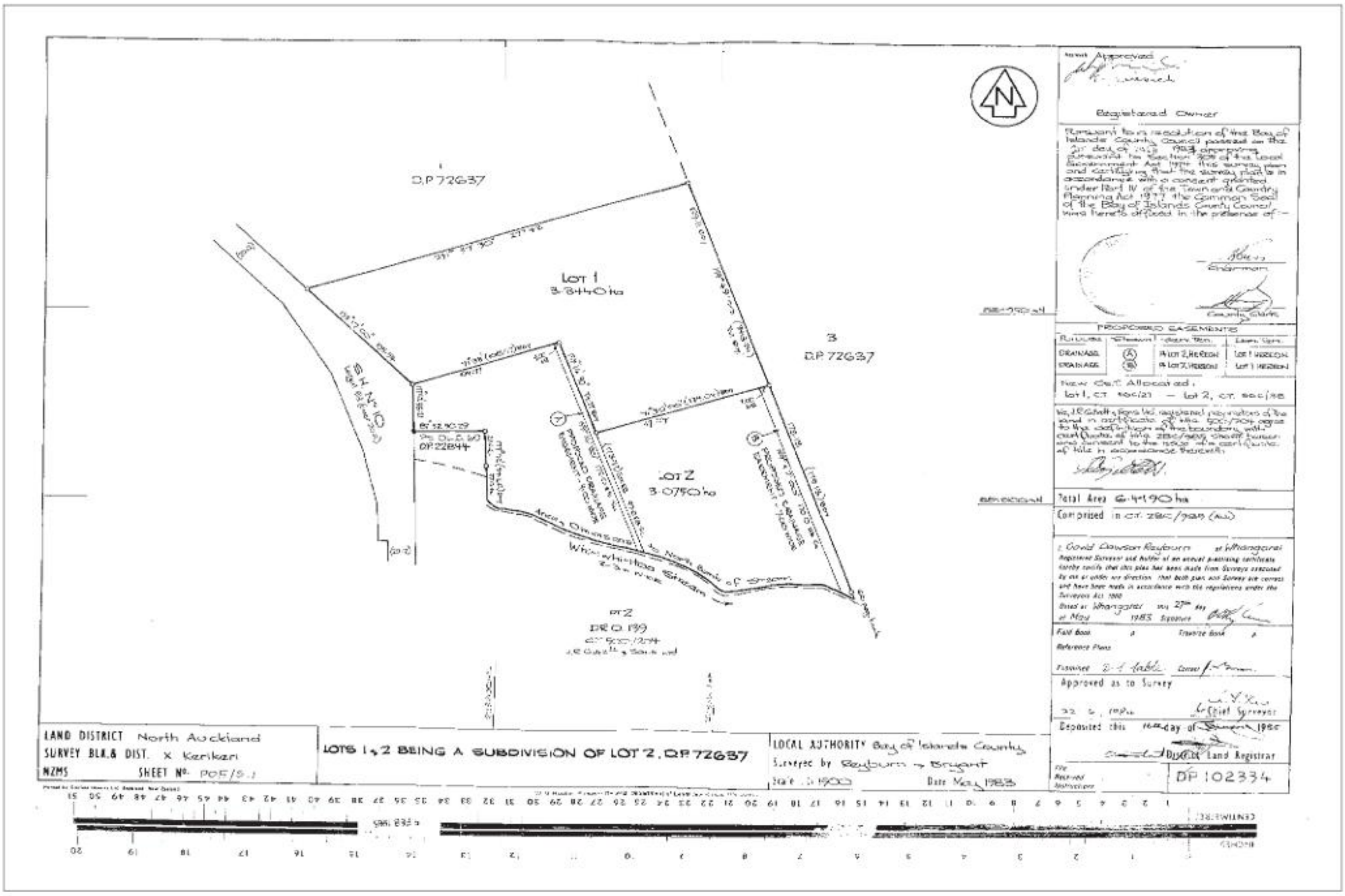
Registered Owners
Arthur William Cottle

Interests

573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining State Highway to be a limited access road - 31.1.1979 at 10.51 am

Subject to a water drainage right over parts marked A and B on DP 102334 specified in Easement Certificate B695154.1 - 9.7.1987 at 9.00 am

6027671.5 Mortgage to ANZ Banking Group (New Zealand) Limited - 2.6.2004 at 9:00 am


D.P. 72637
LOT 1
3.3440 ha
3
D.P. 72637
LOT 2
3.0750 ha
S.H. No 10
DP 22844
Whai-whai-tiaa Stream
PT 2
DRO 139
LAND DISTRICT North Auckland
SURVEY BLK.& DIST. X Kerikeri
LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2, DP 72637
LOCAL AUTHORITY Bay of Islands County
Surveyed by Rayburn & Bryant
Date May 1983
Registered Owner
PROPOSED EASEMENTS
Total Area 6.4190 ha
Approved as to Survey
Chief Surveyor
District Land Registrar
DP 102334

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD

Historical Search Copy

R.W. Muir
Registrar-General
of Land

Constituted as a Record of Title pursuant to Sections 7 and 12 of the Land Transfer Act 2017 - 12 November 2018

Identifier	**NA56C/28**
Land Registration District	**North Auckland**
Date Issued	16 January 1985

Prior References
NA28C/985

Estate	Fee Simple
Area	3.0750 hectares more or less
Legal Description	Lot 2 Deposited Plan 102334

Original Registered Owners
Frances Mary Brosnan

Interests

573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining State Highway to be a limited access road - 31.1.1979 at 10.51 am

Subject to a water drainage right over parts marked A and B on DP 102334 specified in Easement Certificate B695154.1 - 9.7.1987 at 9.00 am

C628449.3 Mortgage to The National Bank of New Zealand Limited - 20.7.1994 at 2.58 pm

6027671.3 Discharge of Mortgage C628449.3 - 2.6.2004 at 9:00 am

6027671.4 Transfer to Arthur William Cottle and Janice May Cottle - 2.6.2004 at 9:00 am

6027671.5 Mortgage to ANZ Banking Group (New Zealand) Limited - 2.6.2004 at 9:00 am

10854904.1 Transmission to Arthur William Cottle as survivor(s) - 26.7.2017 at 2:53 pm

References
Prior C/T 28C/985

Transfer No.
N/C. Order No. B.370233.2

Land and Deeds 69

REGISTER

No. 56C/28

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 16th day of January one thousand nine hundred and eighty five under the seal of the District Land Registrar of the Land Registration District of NORTH AUCKLAND

WITNESSETH that JOHN ANTOHNY JURISICH of Kerikeri builder and PATRICIA MARION JURISICH his wife are

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 3.0750 hectares more or less being Lot 2 Deposited Plan 102334 and being part Old Land Claim 60

DISTRICT LAND REGISTRAR N.L. AUCKLAND

Assistant Land Registrar

Interests at Date of Issue -

620342.1 Mortgage to Rural Banking and Finance Corporation of New Zealand - 4.8.1976 at 9.07 o'c and subsequently varied 4.12.1978 at 9.08 o'c (see 736159.1) and on 4.6.1981 at 9.00 o'c (see 975993.1)

706892.2 Mortgage to Bank of New Zealand - 5.7.1977 at 9.02 o'c

573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining state highway to be a limited access road - 31.1.1979 at 10.51 o'c

A.L.R.

B.382449.2 Variation of terms of Mortgage 620342.1 - 18.2.1985 at 12.05 oc.

A.L.R.

B.431328.1 Variation of terms of Mortgage 620342.1 - 3.7.1985 at 9.01 o'c

A.L.R.

B.528662.1 Mortgage to The Rural Banking and Finance Corporation of New Zealand - 24.4.1986 at 9.01 o'c

A.L.R.

B.528662.2 Memorandum of Priority making Mortgage B.528662.1 a second mortgage and Mortgage 706892.2 a third mortgage - 24.4.1986 at 9.01 o'c

A.L.R.

Measurements are Metric

B.695154.1 Easement Certificate affecting Lots on Plan 102334

Nature	Servient Land	Dominant Land
Drainage	part 2 marked A (CT 56C/28)	herein
Drainage	part 2 marked B	herein

- 9.7.1987 at 9.00 o'c

ENTERED IN ERROR

A.L.R.

B.695154.1 Easement Certificate affecting Lots on Plan 102334

Nature	Servient Land	Dominant Land
Water Drainage	part herein marked A	1 (CT 56C/27)
Water Drainage	part herein marked B	1

- 9.7.1987 at 9.00 o'c

A.L.R.

B.950083.3 Transfer to Frances Mary Brosnan and Patricia Joan Foreman both of Kerikeri orchardists as tenants in common in equal shares - 8.2.1989 at 2.25 o'c

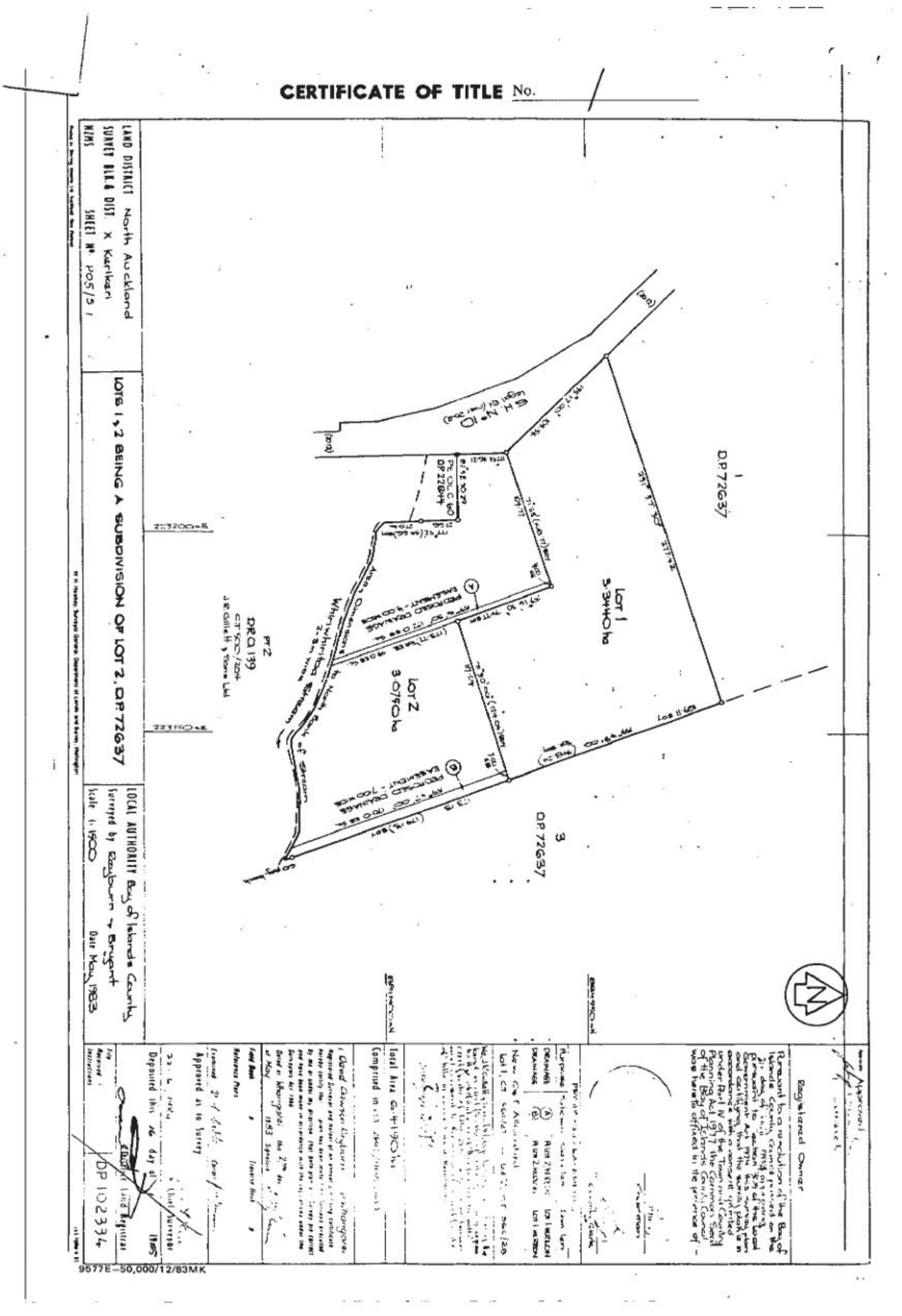
A.L.R.

B.950083.4 Mortgage to The Rural Banking and Finance Corporation of New Zealand - 8.2.1989 at 2.25 o'c

DISCHARGED 2017

A.L.R.

SEE OVER.....


CERTIFICATE OF TITLE No.
LAND DISTRICT North Auckland
SURVEY BLK & DIST. X Kurikari
SHEET No. P05/5.1
LOTS 1, 2 BEING A SUBDIVISION OF LOT 2, DP 72637
LOCAL AUTHORITY Bay of Islands County
Surveyed by Rayburn & Bryant
Date May 1983
LOT 1
3.3440 ha
LOT 2
3.0750 ha
DP 72637
PT 2 DP 9139
Registered Owner
Total Area 6.4190 ha
Approved as to Survey
Deposited this
DP 102334
9577E-50,000/12/83MK

56C/28

B.978781.1 Variation of terms of Mortgage B.950083.4 - 13.4.1989 at 11.10 oc

A.L.R.

C.628449.2 Transfer to Frances Mary Brosnan of Kerikeri orchardist - 20.7.1994 at 2.58 oc

A.L.R.

C.628449.3 Mortgage to The National Bank of New Zealand Limited - 20.7.1994 at 2.58 oc

A.L.R.

References
Prior C/T 9A/1306

Transfer No.
N/C. Order No. 308526.2

CANCELLED
DUPLICATE DESTROYED

Land and Deeds 69

REGISTER

No. 28C/985

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 25th day of September one thousand nine hundred and seventy-four under the seal of the District Land Registrar of the Land Registration District of NORTH AUCKLAND

WITNESSETH that JOHN ROYAL KEITH DELAMAIN of Kerikeri farmer and BRENDA DELAMAIN his wife as tenants in common in equal shares are

seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 6.3820 hectares more or less being Lot 2 Deposited Plan 72637 and being part Old Land Claim No 60

Plan 102334 lodged 13.4.84

DISTRICT LAND REGISTRAR NORTH AUCKLAND, N.Z.

Assistant Land Registrar

167226.1 Mortgage to Australia and New Zealand Banking Group Limited - 9.9.1974 at 11.26 o'clock

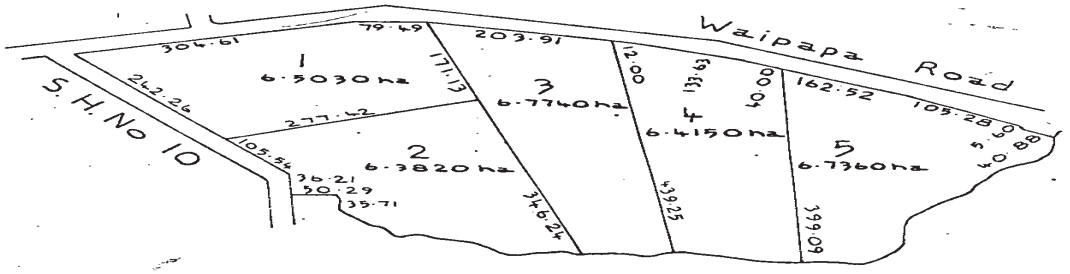
A.L.R.

191141.2 Transfer to John Anthony Jurisich of Kerikeri builder and Patricia Marion Jurisich his wife - 17.9.1975 at 10.50 o'clock

for A.L.R.

OVER:

X Kerikeri SD



Measurements are Metric

DP 72637

28C/985

191141.3 Mortgage to John Royal Keith Delamain and Brenda Delamain in shares - 17.9.1975 at 10.50 o'c.

for A.L.R.

620342.1 Mortgage to Rural Banking and Finance Corporation of New Zealand - 4.8.1976 at 9.37 o'c

for A.L.R.

706892.2 Mortgage to Bank of New Zealand - 5.7.1977 at 9.02o'c

for A.L.R.

736159.1 Variation of terms of Mortgage 620342.1 - 4.12.1978 at 9.08 o'c

A.L.R.

573901.1 Gazette Notice declaring adjoining state highway as a limited access road - 31.1.1979 at 10.51 o'c

A.L.R.

975993.1 Variation of Mortgage 620342.1 - 4.6.1981 at 9.00 o'c

A.L.R.

B.247774.1 Notice relating to subdivision on limited access road pursuant to Section 158 of the Public Works Act 1981 - 16.12.1983 at 12.24 o'c

A.L.R.

B.370233.1 Certificate of Compliance pursuant to Section 306 (1)(f)(i) Local Government Act 1974 (affects plan 102334) - 16.1.1985 at 1.44 o'c

A.L.R.

B.370233.2) Cancelled as to Lot 1 and 2
O.N.C.T.) Plan 102334 and new titles
16.1.1985) issued - 56C/27
56C/28

A.L.R.

CANCELLED
DUPLICATE DESTROYED

COMPUTER FREEHOLD REGISTER
UNDER LAND TRANSFER ACT 1952

Historical Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **NA9A/1306**
Land Registration District **North Auckland**
Date Issued 13 July 1966

Cancelled

Prior References
NA625/81

Estate	Fee Simple
Area	33.1336 hectares more or less
Legal Description	Part Lot 2 Deposited Plan 22952

Original Proprietors
John Royal Keith Delamain and Brenda Delamain

Interests

For historic memorials see paper image of title. Cancelled

7866941.1 Departmental Dealing to convert and cancel the within title into Landonline - 3.7.2008 at 9:00 am

References
Prior C/T. 625/81

Transfer No.
N/C. Order No. A.161104

Land and Deeds 69

No. 9A/1306

PART - CANCELLED
NOT
TO BE CONVERTED
REGISTER

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT

This Certificate dated the 13th day of JULY one thousand nine hundred and sixty-six under the seal of the District Land Registrar of the Land Registration District of North Auckland

WITNESSETH that BRIAN LEO JURISICH of Waipapa, farmer

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial underwritten or endorsed hereon) in the land hereinafter described, delineated with bold black lines on the plan hereon, be the several admeasurements a little more or less, that is to say: All that parcel of land containing 81 acres 3 roods 20 perches more or less being Lot 3 Deposited Plan22952 and part of Old Land Claim No.60.

ASSISTANT LAND REGISTRAR

A.161105 Mortgage to Her Majesty the Queen
Produced 13.8.1966 at 9.01 a.m. and entered 10.8.1966 at 10.50 o'c. A.L.R. 16862

DISCHARGE
Produced 30.1.1967

A.167221 Mortgage to Mabel Jurisich, Doreen Fay Thomas and Merlene Mary Frost (contributory) Produced 10.8.1966 at 10 50 o'c. A.L.R. 16862

DISCHARGE
Produced 30.1.1967

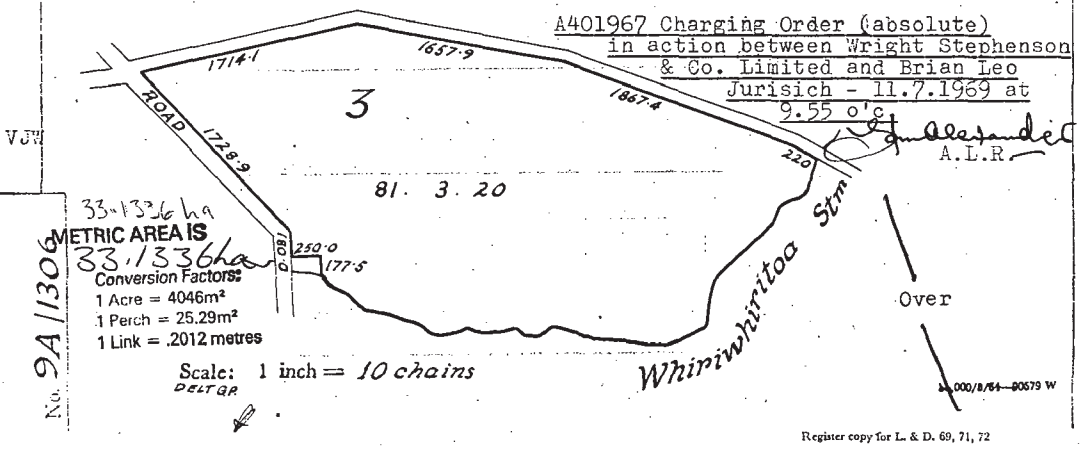
A.161106 Mortgage to Her Majesty The Queen
Produced 13.8.1966 at 9.01 a.m. and entered 10.8.1966 at 10.50 o'c. A.L.R. 16862

DISCHARGE
Produced 30.1.1967

X Kerikeri SD

Variation of terms of Mortgage A161106 29.8.1968 at 12.05oc
A.L.R

A401967 Charging Order (absolute) in action between Wright Stephenson & Co. Limited and Brian Leo Jurisich - 11.7.1969 at 9.55 o'c
A.L.R



33·1336 ha
METRIC AREA IS 33.1336ha
Conversion Factors:
1 Acre = 4046m²
1 Perch = 25.29m²
1 Link = .2012 metres

Scale: 1 inch = 10 chains
DELT QR

No. 9A/1306

4,000/8/64—80579 W

Register copy for L. & D. 69, 71, 72

9A/1306

167225.1 167225.2

A443580 Transfer to John Royal Keith Delamain of Donnellys Crossing, Farmer and Brenda Delamain his wife as tenants in common in equal shares - 30.1.1970 at 9.00 o'c

A.L.R.

A443581 Mortgage to Her Majesty the Queen - 30.1.1970 at 9.00 o'c

DISCHARGED 9/9/1974 A.L.R.

A.L.R.

A443582 Mortgage to Her Majesty the Queen - 30.1.1970 at 9.00 o'c

DISCHARGED 9/9/1974 A.L.R.

A.L.R.

Variation of ~~the~~ Mortgage A443582 17689
21.7.1970 at 12.10 o'c.

A.L.R. 6683

167226.1 Mortgage to Australia and New Zealand Banking Group Limited — 9-9-1974 at 11.26 o'c.

ALR.

308526.1 ~~to~~ Transfer dedicating Lots 6 and 7 Plan 72637 herein as ~~road~~ and for a public road — 25-9-1974 at 9.06 o'c.

ALR.

308526.2F ONCT 25-9-1974) Cancelled as to Lots 1-5 (inc) Plan 72637 herein and new CsT issued. 28C/984 - 988 (inc)

ALR.

PART CANCELLED

Duplicate Destroyed

A. 624417 Caveat against Transfer 308526.1 by District Land Registrar - 2/4/1975 at 2 o'c

Commissioner ALR

[Land and Deeds—4.
[Form B

NEW ZEALAND.

Reference: Vol. 615 , Folio 144
Transfer No.
Application No.
Order for N/C No. C.12259

Register-book,
Vol. 625 , folio 81

CERTIFICATE OF TITLE UNDER LAND TRANSFER ACT.

This Certificate, dated the twenty first day of May one thousand nine hundred and thirty one under the hand and seal of the District Land Registrar of the Land Registration District of AUCKLAND **Witnesseth** that ARTHUR EDWARD WHITE of Waipapa Farmer

is seised of an estate in fee-simple (subject to such reservations, restrictions, encumbrances, liens, and interests as are notified by memorial under written or endorsed hereon, subject also to any existing right of the Crown to take and lay off roads under the provisions of any Act of the General Assembly of New Zealand) in the land hereinafter described, as the same is delineated by the plan hereon bordered green, be the several admeasurements a little more or less, that is to say: All ~~that~~ those parcels of land containing together ninety one acres and thirty perches more or less being Lots Two (2) and Three (3) on a plan deposited in the Land Registry Office at Auckland as No. 22952 and being portion of Old Land Claim No. 60 situated in Block X of the Kerikeri Survey District.

91 . 0 . 30
0 . 3 . 20 - A 85182
90 . 1 . 10

W. Williams
Assistant ~~District~~ Land Registrar.

Outstanding Interest registered in the Deeds Register Office at Auckland;
Mortgage No. 328677 (R422/350) Arthur Edward White to The State Advances Superintendent. Discharged 1964
Asst. Land Regr.

Mortgage No 227676 Arthur Edward White to Robert Hugh ... produced 21/11/1934 at ...
DISCHARGE PRODUCED

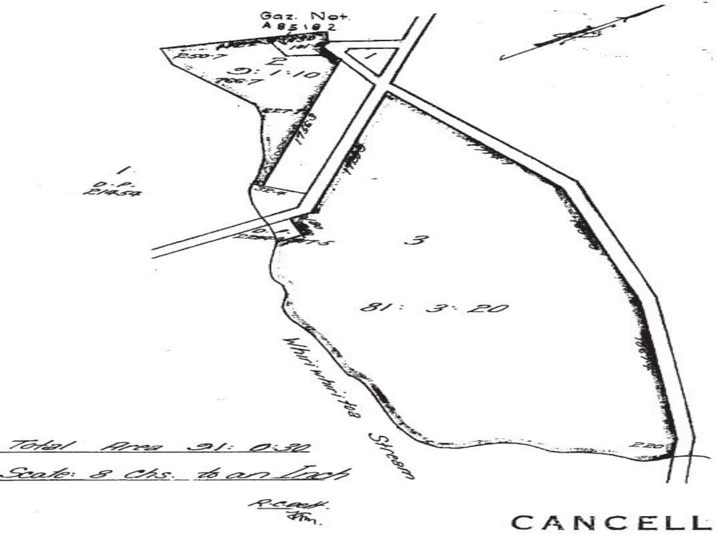
Mortgage No 237698 Arthur Edward White to Frank ... Limited produced 25/9/1935 ...
DISCHARGE PRODUCED

No 8919 ... 5-8-1938
Asst. Land Regr.

No. 10195 Order of the Court of Review under The Mortgagors and Lessees Rehabilitation Act, 1936. Entered 25/11/1938 at 2 o'c
Asst. Land Regr.

Transfer No 317694 Arthur Edward White to Walter Henry Knight of Kerikeri Farmer produced 22-1-1940 at 10.34 o'c.
A.L.R.

Mortgage No 262275 Walter Henry Knight to The State Advances Corporation of New Zealand produced 22-1-1940 at 10.30 o'c
DISCHARGE Produced
A.L.R.



CANCELLED.

625/81

CANCELLED.

Mortgage No. [illegible] Walter [illegible] Knight to Arthur Edw[illegible] [illegible]
22-1-1940 at 10.38 [illegible]

DISCHARGE Produced 24/2/[illegible] [illegible]

[illegible] A.L.R.

Mortgage No. 2622 [illegible] of Mortgage No. 262276 Arthur Edw[illegible] to Robert Hugh Boyd — produced 22-1-1940 at 10 [illegible]

DISCHARGE Produced

[illegible] A.L.R.

Transfer 419211 Walter Henry Knight to Robert Jurisich of Waipapa, farmer, Produced 22.7.1947 at 11.30 o'c.

[illegible] A.L.R.

Transfer 714439 of Mortgage 262276 to Donald James McConnell of Horeke, farmer as Executor Entered 6/10/1953 at 3-0 o'c.

[illegible] A.L.R.

Z 82618 Transmission to Mabel Jurisich of Waipapa, widow as administratrix. Entered 2.9.1957 at 11.34 o'c

[illegible] A.L.R.

A.85182 Gazette Notice taking part for a substation and vesting in the Bay of Islands Electric Power Board. Entered 24/6/1965 at 12.14 o'c

[illegible] A.L.R.

A.161483 7-9-1965 { Cancelled as to the land in Gazette Notice A.85182 and [illegible] 66/1449

[illegible] A.L.R.

A.161103 Transfer of the part, lot 3 Plan 22952 to Brian Leo Jurisich of Waipapa, farmer Produced 13-7-1966 at 9.01

[illegible] A.L.R.

A161104 13-7-1966 } Cancelled as to lot 3 Plan 22952 and new C.T. issued.
9A/1306

[illegible] A.L.R.

A384539 Transfer of the residue to Leonard Roy Hansen. 22-4-1969 at 9.30 o'c
16D/521

[illegible] A.L.R.

Cancelled

Engineering Report for Proposed Development
2000 State Highway 10 Waipapa
for
Arthur Cottle

Haigh Workman reference 17 111

October 2019

Phone: +64 9 407 8327 • Fax: +64 9 407 8378 • info@haighworkman.co.nz • www.haighworkman.co.nz

PO Box 89 • 6 Fairway Drive • Kerikeri 0245 • New Zealand

Revision History

Revision Nº	Issued By	Description	Date
A	Catherine Johnson	For Resource Consent Application	17 October 2019
B	Tom Adcock	Amendments to wastewater & water supply	11 December 2019

Prepared by	Reviewed by	Approved by
		
Catherine Johnson **Geoenvironmental Engineer** CEnvP, MEngNZ, MSc (Env Science)	Tom Adcock **Senior Civil Engineer** BEng (Civil), MEngNZ	John Papesch **Senior Civil Engineer/ Director** MEngNZ, BE (Civil)

TABLE OF CONTENTS

TABLES

FIGURES

Executive Summary

Haigh Workman Ltd (Haigh Workman) was commissioned by Arthur Cottle (the Client) to undertake an engineering assessment for proposed development at 2000 State Highway 10, Waipapa (the site). The site is currently developed and utilised for a mixed commercial and residential end-use. It is understood the client proposes to construct six additional one-bedroom visitor accommodation units on the site.

A proposed development plan by Donaldsons Registered Land Surveyors entitled, Topographic Survey of Lot 2 DP 102334, 17/10/2018, Ref: 7321 was made available to us at the time of writing.

According to the Far North District Council (FNDC) District Plan the site is zoned as 'Rural Production'.

Geology

According to available geological plans and the Haigh Workman walkover survey, the underlying geology across the site comprises superficially deposited alluvial, swamp and estuarine deposits underlain by the Kerikeri Group basalt flows. The soil type is Waipapa Clay typically described and categorised as imperfectly to very poorly drained.

Natural Hazards

Northland Regional Council (NRC) and FNDC GIS databases indicate flood waters from the Whiriwhiritoa Stream extending across the southern site boundary during 10 and 100 year storm events. As the proposed development is outside the current predicted flood zone area, there are no restrictions to finished floor levels.

Whilst geotechnical assessment is not included in the scope of this report, we recommend site specific geotechnical investigation as part of the Building Consent Process.

Stormwater

The site has a gentle slope angle (typically 5°) draining to the Whiriwhiritoa Stream on the southern site boundary.

Existing impermeable surface coverage for the current development (23.8 %) and the total following development of the six accommodation units including driveways and parking (27.3 %) exceed the permitted and controlled activity rules of the FNDP, forming a Discretionary Activity under Rule 8.6.5.4.

Following review of available property file documents, it was understood that all existing structures have been consented except for two of the cabins and associated gravel driveway (refer to Drawing No. 02 enclosed). Therefore, stormwater neutrality will be implemented for the six proposed new cabins and their associated driveways, plus the unconsented existing two cabins and driveway.

The additional runoff will be attenuated back to pre-development levels via a detention basin for storm events with a 10 % Annual Exceedance Probability (AEP) + Climate Change (CC). The basin has been designed to accept runoff from an area of 5,000 m^2 including proposed driveways and the area of unconsented driveway, roof areas from the 6 proposed units (or tank overflows in the case of roof water collection) and surrounding grassed areas (refer to area shaded on Drawings 03.).

The proposed development and existing unconsented units result in a 29.7 L/s increase in peak stormwater runoff. This can be fully attenuated using a 47.5 m^3 detention basin having a surface area of 435 m^2, a 220 mm depth and a 200 mm diameter outlet orifice.

Earthworks

Earthworks to complete the development are estimated at 215 m^3 of excavation with a disturbed area 1,080 m^2 and fall well below the District and Regional Plan permitted activity threshold.

Water Supply

Water supply will be from stored rainwater collected from roofs in standard water tanks.

The existing six units are supplied from two 30,000 L roof water collection tanks connected to the storage sheds. The storage capacity will be increased by the addition of a third 30,000 L tank.

The existing water tanks are greater than 90 m from the furthest proposed unit, therefore additional water storage is required or a 100 mm pipe delivery pipe with a fire coupling extended to within 90 m of the units. We recommend the property owner contacts the Fire Service to agree arrangements for providing an adequate on-site firefighting supply.

On-site Effluent Disposal

The wastewater disposal system for residential development will need to take into account the poorly draining soil type.

A typical wastewater system can be anticipated to comprise:

- A 640 m^2 dripper irrigation wastewater disposal field with a 30 % reserve area
- Based upon the results of the intrusive investigation, soil Category 6 should be adopted as defined within TP58 which can be expected to sustain a land loading rate of 3 mm/day. This being the same rate used for the design of the existing system serving the current dwelling units.
- Dripper irrigation lines may be either buried or surface mounted and covered with 100 mm of bark mulch and densely vegetated with suitable plants for evapo-transpiration systems
- We recommend the treatment system is sized to cater for a consistent daily flow of 1,920 litres/ day, and a peak three-day flow of 2,880 litres/day.

1 Introduction

Haigh Workman Ltd (Haigh Workman) was commissioned by Arthur Cottle (the client) to undertake an engineering assessment for a proposed development at 2000 State Highway 10, Waipapa (the 'site').

The site comprises **Rural Production** zoned land and is currently developed and utilised for a mixed commercial and residential end-use.

1.1 Proposed Development

It is understood the client proposes to construct six additional one-bedroom visitor accommodation units on the site, as depicted on the proposed plan enclosed in Appendix A of this report (Donaldsons Registered Land Surveyors - *Topographic Survey of Lot 2 DP 102334*, 17/10/2018, ref: 7321). These dwellings are to be used as rental accommodation, both short and long term.

1.2 Objective and Scope

The purpose of this investigation was to determine the suitability of the proposed work with regard to natural hazard management, earthworks required for the development, stormwater and wastewater management requirements and water supply.

The scope of works conducted by Haigh Workman comprise:

- Establishment of the geological and environmental setting of the site via review of available geological and topographical mapping and on-site investigations;
- Preparation of this report with site specific environmental, civil and water management recommendations; including engineering and site suitability recommendations for the proposed development regarding earthworks, stormwater management and neutrality, flood hazard, wastewater, water supply and firefighting with specific regard to current Rules and Regulations.

1.3 Further Investigations

Haigh Workman have undertaken a Detailed Site Investigation (DSI) under the Hazardous Activities and Industries List (HAIL) and Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations (NES-CS). (Report ref: 17 111 dated 3rd September 2019).

The report concluded:

- Historic use of the land for horticulture subjects the site to assessment under the Hazardous Activities and Industries List (HAIL) and Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations (NES-CS), under HAIL code A10.
- Following an in-depth desk study, in addition to a site investigation including soil sampling and analytical testing, it was concluded that there is no risk to human health from the proposed works.
- All future soil disturbance must be assessed and abide by the rules of the NES-CS. This is detailed further in Section 4 of this Suitability Report.

2 Site Description

2.1 Site Identification

Address:	2000 State Highway 10, Waipapa
Legal Description:	Lot 2 DP 102334
Co-ordinates:	NZ Topo AV28 8383 0342 NZTM E1683830/ N6103416
Total Site Area:	30,750 m^2

A site location plan is presented as Drawing No. 01 within Appendix A.

2.2 District Plan Zoning

Far North District Council (FNDC) mapping identifies the site to reside within the **Rural Production** zone.

2.3 Site Setting

Situated approximately 3.2 km to the north west of Kerikeri town centre, the site comprises an irregularly shaped piece of former horticultural land.

An existing dwelling is situated to the north west of the property, with associated areas of hardstanding (driveway, car parking etc.) and private gardens. To the south of the dwelling in the west of the property, there are three large storage sheds within a metalled yard.

Six one-bedroom visitor accommodation units are situated to the central east of the site. Each has a carport and small area of grassed outdoor space. The existing wastewater disposal fields for these units are situated in surface dripper lines throughout the remaining orchard trees interspersed through the area and along site boundaries. It is proposed by the client to place a further six units to the adjacent east of this development, within an area currently maintained as grass.

The site boundaries are predominantly vegetated, with some vegetated shelter belts to the north east and north of the property.

Whiriwhiritoa Stream follows the southern site boundary, flowing to the east. Topographically the site is generally flat, with a gentle gradient to the south towards the stream.

Surrounding land is mixed light commercial and orchard to the south west and north, and farmland to the east and south. State Highway 10 (SH10) is situated to the west of the site. Waipapa commercial/ industrial estate is to the adjacent west of SH10.

3 Geology

3.1 Published Geology

The site is indicated to be directly underlain by soils of the Undulating Terraces and Lowlands comprising Waipapa Clay (YF). Soil deposits at the site are typically described and categorised as imperfectly to very poorly drained.

The published geology map for the area indicates the base geology as *Alluvium (Al_2): mud, sand and gravel with minor peat, forming river bed and flood plain deposits up to 10 m above stream or sea level, in places forming a thin (1 - 3 m) veneer over rugged surfaces of lava flows (F61, F62); unconsolidated to very soft. Un-weathered.*

GNS Mapping show the site to be underlain by Basalt (Pvb) of the Kerikeri Volcanic Group, typically described as '*Basalt lava, volcanic plugs and minor tuff*'. Adjacent to the south of the site alluvial soils (eQa) of the Tauranga Group are identified, described as '*Poorly to moderately unconsolidated mud, sand, gravel and peat or lignite of alluvial, swamp and estuarine origin*'.

Figure 1 – Published Geology (NZMS 290 Sheet P04/05) - Soils

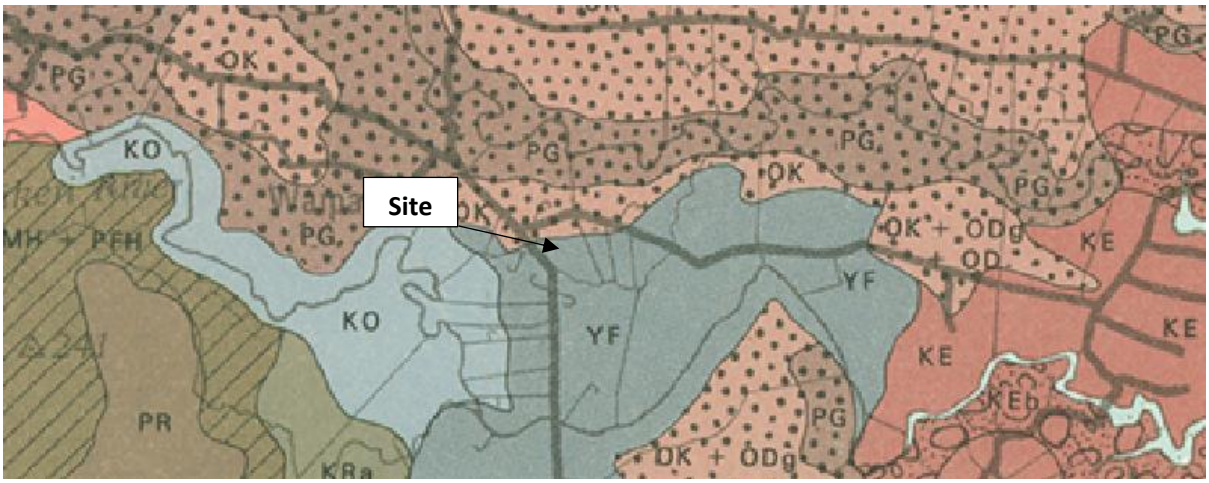


Figure 2 – Published Geology (NZMS 290 Sheet P04/05) - Rock

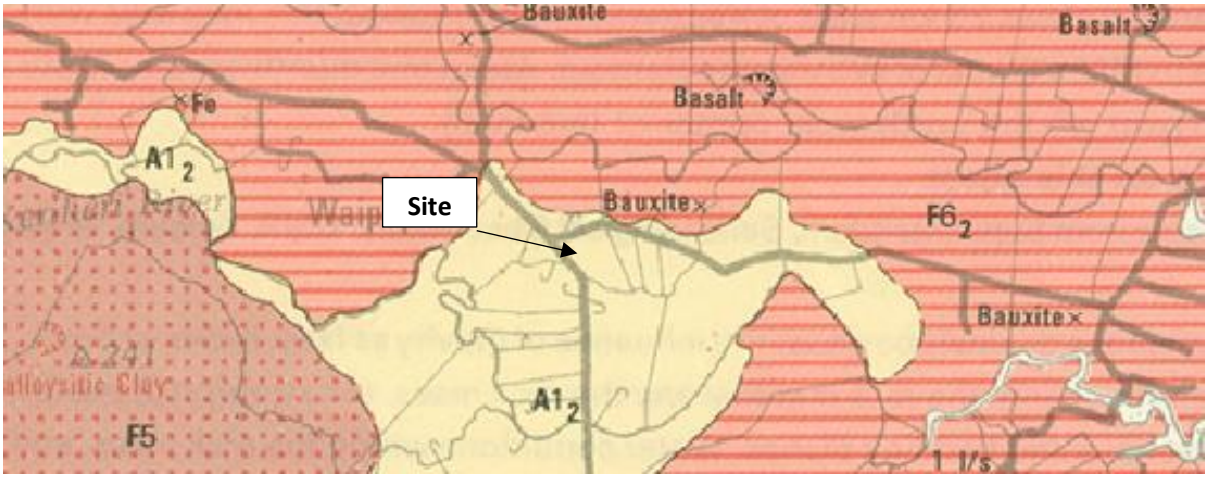
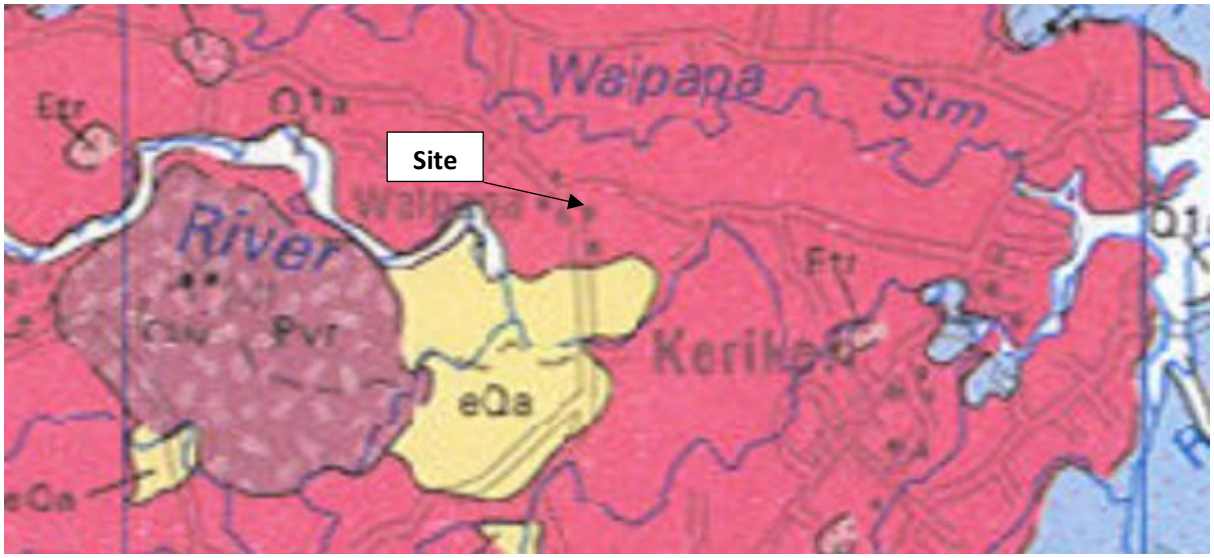


Figure 3 – Published Geology (GNS Map 2) - Rock



3.2 Visual Inspection

Further reference to the published New Zealand land inventory maps indicate superficially deposited Early to Middle Pleistocene alluvial, swamp and estuarine deposits (eQa) in areas ponded by Kerikeri Group basalt flows.

No areas of fill were identified within the development areas.

The topography and soil type suggest that rainfall generally soaks into the ground. In extreme events runoff is expected to occur as sheet flow towards the south and entering Whiriwhiritoa Stream on the southern boundary.

There are presently two drainage easements onsite, both leading into Whiriwhiritoa Stream to the south; one navigates the centre of the property and the second follows the extent of the eastern boundary.

A poorly defined stormwater flow path was visible to the south of the investigation area. The land in this region dipped and navigated towards the drain on the eastern site boundary, as photographed in Appendix B.

Visually there was minimal evidence of waterlogging and saturated soils across the site, with only one small area of grass to the western side of the investigation area demonstrating wet surface soils. Site investigations were undertaken during the winter months following a period of heavy rainfall, and it is considered this area to be of little concern.

Shallow soils represented poor draining properties, and there were minimal signs of erosion within the site. Springs, wells and other water source features were not noted during the Haigh Workman site walkover survey.

A Land Information Memorandum (LIM) report has not been included within the scope of works and is not subject to this review. It would be prudent to obtain a copy for any further information about the area that may be recorded on the local authority GIS database which could otherwise cause restrictions or highlight land hazards that may be raised at the time of building development.

3.3 Subsurface Investigations

Soils investigations conducted on 30 July 2019 comprised the drilling of a hand auger borehole (BH1), located to the south west of the proposed development area to a depth of 1.0 m below ground level (bgl). A detailed log is presented within Appendix C. The soil was found to comprise 200 mm of topsoil underlain by grey moist silty clay becoming clay at 0.6 m bgl. The ground water level was recorded as 0.90 m bgl.

The soil conditions were similar to those recorded during investigations for the existing wastewater treatment system in 2012, although the water table at that time during May was not encountered down to a depth of 1.8 m bgl.

4 Earthworks

4.1 Regulatory Framework

4.1.1 Far North District Plan (FNDP)

The District Plan rules state cut, fill and aggregate volumes are to be added together. For a Rural Production zoned property the Permitted activity rules allow for earthwork volumes of 5,000 m^3 per year.

The maximum cut/ fill depth is to be less than the 1.5 m depth specified in the permitted activity rules (12.3.6.1.1).

4.1.2 Operative Regional Water and Soil Plan (RW&SP)

The threshold volumes under the RW&SP are based on the volume of soil moved and excludes aggregate, allowing for an annual maximum earthwork volume of 5,000m^3.

4.1.3 Proposed Regional Plan

The Northland Regional Council has published an Appeals Version dated 29 July 2019 of the Proposed Regional Plan for Northland. The stormwater discharges, culvert construction, earthworks and contaminated sites sections of the plan are subject to appeal. Accordingly, both the Proposed Plan and Operative Water and Soil Plan rules need to be complied with.

Under proposed Rule C.8.3.1, the maximum permitted earthworks quantity is '*5000 square metres of exposed earth at any one time'*.

4.1.4 NES-CS

Historic use of the land for horticulture subjects the site to assessment under the Resource Management Regulations NES-CS:2011. These Rules state: *Disturbing the soil of the **piece of land** is a permitted activity while the following requirements are met:*

> *8(3) (c) The volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2.*
>
> *8(3) (d)(ii) Soil must not be taken away in the course of the activity, except that for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year.*

The NES-CS describe a '*piece of land*' as the piece of land that has had, currently has, or most likely has had activities listed on the HAIL. In reference to the aforementioned DSI Report, the area under investigation was adopted as the piece of land, equating to a conservative 6,000 m^2. This allows for 300 m^3 allowable disturbance, and 60 m^3 allowable removal from the site.

4.2 Proposed Earthworks

Minimal earthworks are involved with the proposed development, and there are currently no plans to remove soil from the site. At this stage of the application no soil movements are proposed, however taking into account the future development plans and topography, the following earthworks can be anticipated at the time of building consent;

- Topsoil will need to be stripped to a depth of approx. 200 mm, over an area of 1,080 m^2 (the total area of proposed driveway, car parking and units), equating to 215 m^3 of soil excavation.
- This 215 m^3 of topsoil is to remain on-site.
- Approx. 120 m^3 of aggregate is required to form the driveway extension (driveways and parking are approximately 600 m^2, with compacted aggregate of approx. 200 mm depth)
- Taking into account the gently sloping topography, it is considered minimal earthworks will be required for the detention pond, rather the excavated material can be re-used to build up the pond.

An assessment has been made of the proposed works in regards to the Regulatory Framework detailed above.

Table 4-1 - Proposed Earthworks and Regulatory Framework

Activity	Volume Proposed	Area Proposed	Regulatory Framework Allowance (m^3)			
			FNDP	RW&SP	Proposed Regional Plan	NES-CS
Excavate	215 m^3	1080 m^2	5,000 m^3annually (cut/fill/aggregate volumes combined)	5,000 m^3 annually	5,000 m^2 exposed at any time	300 m^3 disturbance 60 m^3 removal
Fill	As excavated					
Aggregate	120 m^3			-	-	N/A
Compliance status:			**Permitted**	**Permitted**	**Permitted**	**Permitted**

If works are undertaken in accordance with that estimated, the work will be permitted and Resource Consent will not be required under any Regulatory Framework for earthwork activities.

4.3 Earthworks Operations

A large part of the excavated soil will be topsoil which will be retained on-site. A spoil disposal site has not been finalised at this stage, but the material may be used to construct the stormwater detention basin, to re-contour low lying areas or for landscaping providing fill is outside of the flood risk zone and flow paths.

Earthworks will be carried out in accordance with Council's Engineering Standards and Guidelines and Auckland Council GD05. Provided the earthworks are carried out in good weather, the most appropriate erosion and sediment control measures are silt fences as shown on GD05 Section F1.3.

5 Natural Hazards

5.1 Regulatory Framework

Under Section 2 of the Resource management Act 1991, **natural hazard** means any atmospheric or earth or water related occurrence (including earthquake, tsunami, erosion, volcanic and geothermal activity, landslip, subsidence, sedimentation, wind, drought, fire, or flooding) the action of which adversely affects or may adversely affect human life, property, or other aspects of the environment.

Natural hazards listed in Section 71(3) of the Building Act 2004 include: erosion, falling debris, subsidence, inundation or slippage. The susceptibility of this site to these potential hazards has been assessed in Table 5.1.

Table 5-1 - Natural hazards - Section 71(3) of the Building Act 2004

Hazard	Risk
Erosion (including coastal erosion, bank erosion, and sheet erosion)	No
Falling debris (including soil, rock, snow, and ice)	No
Subsidence (vertical settlement)	Possible, subject to site specific geotechnical assessment.
Inundation (including flooding, overland flow, storm surge, tidal effects, and ponding)	No, provided building sites are kept clear of overland flow paths and the mapped flood hazard for the Whiriwhiritoa Stream
Slippage	No

The proposed building sites has no natural hazards that would warrant action under Section 71(1) of the Building Act 2004.

5.2 Flooding and Hydrology

Published environmental data relating to the site has been reviewed. An examination of FNDC and NRC online GIS databases is included below.

Flood risk at the site has been mapped by NRC to 0.2 m intervals in 10 and 100 year flood hazards (maps attached).

Table 5-2 - Surface Water Features & Flooding

	Presence/Location	Comments
Groundwater sources including springs/wells (within 500 m)	The Main Northland Aquifer underlies the site. There are 16 private wells within 1 km of the - of which two are inactive, and 14 active.	The closest is situated approx. 50 m north of the site (LOC. 201278). The recorded private wells are for mixed purposes including domestic, monitoring and exploration.
Surface Water Features (Ponds, Lakes etc)	None known.	N/A

Watercourses (within 500 m)	Whiriwhiritoa Stream follows the southern site boundary.	The watercourse converges and forms into Waipapa Stream, flowing to the east into the Pickmere Channel. The stream does not impact the proposed development, being situated approx. 90 m downslope from the nearest proposed unit.
Flood Risk Status	The southern boundary of the site is identified to be at risk of flooding from the 10 and 100 year storm events. The proposed development is not identified to be at risk of flooding, situated > 50 m upslope of the flood risk zone.	Note: The GIS mapping excludes flood water where the flood depth is less than 200mm.
Flood Susceptibility	Low - within the area undergoing development.	Habitable floor levels shall be set above the flood hazard

5.3 Flood Mapping

NRC has detailed computer aided flood hazard modelling of the catchment including in the vicinity of this site. The study and its predictions include allowance for climate change and maximum probable development. Refer to the full copy of the NRC Flood Maps Disclaimer enclosed.

Glossary of Terms

- *OTP - One Tree Point Datum. This is the local survey point datum which is in reference to mean sea level at One Tree Point (i.e. the ground levels quoted in OTP datum is the height above mean sea level).*
- *100 year ARI – Average Recurrence Interval (1% Annual Exceedance Probability)*
- *10 year ARI – Average Recurrence Interval (10% Annual Exceedance Probability)*
- *CC – Climatic Change. This allows for future increased rainfall intensity, being a 16.8 % increase in intensity over the next 100 years based upon 2.1 degrees increase in temperature*

5.3.1 Minimum Floor Level

As the proposed development is outside the current predicted flood zone area, there are no restrictions to finished floor levels.

6 Stormwater Management

6.1 Existing Conditions

6.1.1 River Catchment

The site lies within the Whiriwhiritoa Stream catchment which runs along the full extent of the southern site boundary, flowing from west to east.

The stream is a tributary to the Waipapa Stream with which it merges approx. 1.3 km to the north east of the site. The catchment upstream of the site is predominantly rural production and rural-residential lifestyle lots, and commercial close to the site.

Roof water from the three large storage sheds in the west of the site is currently collected and stored within two 30,000 L water tanks. Both tanks overflow into a drainage easement discharging to the Whiriwhiritoa Stream. These tanks supply water to the six existing residential units. Yard and driveway runoff currently discharges in a generally dispersive manner onto grassed surfaces or into the drainage easements on-site.

6.2 District Plan Provisions

6.2.1 Rural Production Stormwater Management 8.6.5.1.3

The proposed lots are zoned as Rural Production. The relevant stormwater management/ impermeable surface rule is as follows:

Permitted stormwater management activities:

8.6.5.1.3 STORMWATER MANAGEMENT

The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15 %.

Controlled stormwater management activities:

8.6.5.2.1 Stormwater Management

The maximum proportion of the gross site area covered by buildings and other impermeable surfaces shall be 20 %.

6.2.2 Impermeable Surfaces

Existing and estimated future surface coverage of the site is presented in Table 6.1. The existing impermeable surfaces have been estimated from aerial mapping.

Table 6-1 – Existing and Future Surface Coverage

Impermeable Surface	Area (m^2)
Existing Development	
Driveway (unsealed)	4558
Roof cover (combined)	2760
Total Impermeable Area (m^2)	**7318**
Impermeable Coverage (%)	**23.8**
Proposed Development	
Driveway (unsealed)	5158
Roof cover (combined)	3230
Total Impermeable Area (m^2)	**8388**
Impermeable Coverage (%)	**27.3**
Site Area	30750

Impermeable surfaces will increase by an estimated 3.5 % with the proposed development.

Both current and proposed developments exceed the permitted and controlled activity rules of the FNDP, forming a Discretionary Activity under Rule 8.6.5.4. When considering a discretionary activity application, the Council will have regard to the assessment criteria set out under Chapter 11 of the Plan. Section 6.7 provides a review of the proposed stormwater management against 11.3 assessment criteria.

6.3 Regional Water and Soil Plan for Northland

Long term stormwater management should comply with NRC permitted activity rules for stormwater discharges Rule 21.1.2(a) of the Operative Regional Water and Soil Plan for Northland;

> *For new subdivision and development, the best practicable option for on-site stormwater disposal shall be identified and incorporated into the stormwater management design to avoid or minimise changes to stormwater flows after development for the 1 in 5-year return period storm event.*

> *To help achieve the best practicable option for on-site stormwater disposal in clause (a), the following measures should be considered:*
> • *Infiltration facilities in permeable soil types;*
> • *The retention of natural stream channels;*
> • *Minimise areas of impermeable surfaces;*
> • *Stormwater detention before dispersal into waterways.*

The Operative Water and Soil Plan rule indicates stormwater attenuation should be provided for the 1 in 5-year return period storm event.

6.4 Proposed Regional Plan for Northland

Proposed Rule C.6.4.1 relates to permitted activities for stormwater discharges from a public stormwater network. Rule C.6.4.2 relates to permitted activities for other stormwater discharges and is relevant to this site. Clause 2) relates to stormwater quantity and downstream flooding affects:

2) the diversion and discharge does not cause or increase flooding of land outside the area serviced by the stormwater network up to the 10 % Annual Exceedance Probability (AEP) or flooding of buildings outside the area serviced by the network up to the 1 % AEP,

6.5 Auckland Council GD01

Reference is made to Auckland Council Stormwater Management Devices in the Auckland Region December 2017 Guideline Document 2017/001. GD01 is largely written to support the Auckland Council Unitary Plan, however, it does contain stormwater design principles that are applicable to Northland.

GD01 Section B1.7.1.3 *Design for larger storm events* states:

> Under the Auckland Unitary Plan Standards (Section E8.6) any development must ensure that the diversion and discharge does not result in, or increase, the following:
>
> - Flooding of other properties in rainfall events up to the 10 % AEP, or
> - Inundation of buildings on other properties in rainfall events up to the 1 % AEP

This is consistent with Proposed Regional Plan Rule C.6.4.1. GD01 Section B1.7.1.3 further specifies:

- Detention of 10 % AEP and 1 % AEP rainfall events is not required for developments that are located within the lower half of the catchment or for which a validated flood modelling study has shown that the development does not increase downstream flooding.

This last bullet point is applicable to this site.

6.6 Summary

The Whiriwhiritoa Stream has a catchment length of 4.5 km with the site lying 1.8 km from the downstream confluence with the Waipapa Stream, thus placing the site in the lower half of the catchment. Furthermore, the site is downstream of the Waipapa commercial area, making it beneficial to release run off from the site ahead of upstream peak passing down the catchment. Similarly, the Waipapa Stream has a catchment length of 24.5 km downstream of Lake Manuwai with the site in the lower half of the catchment being 11.3 km from the Kerikeri Inlet.

Council require stormwater detention for the 10 % AEP. Therefore the following design principles are applied to stormwater management for the proposed development:

- Direct stormwater within the site to suitable discharge points for 10 % AEP design flows
- Provide overland flow paths within the site to suitable discharge points for the 1 % AEP design flows
- Control scour, particularly at discharge points
- Improve stormwater quality where practicable
- Avoid increases in runoff from the for 10 % AEP design events

Following review of available property file documents, it was understood that all existing structures have been consented except for two of the existing cabins and associated gravel driveway (refer to Drawing No. 02 enclosed). Therefore, stormwater neutrality will be implemented for the six proposed new cabins and their associated driveways, plus the unconsented existing two cabins and driveway.

6.7 Proposed Stormwater Management

To comply with Council's anticipated requirement for stormwater attenuation, detention for the 10 % AEP is proposed:

6.7.1 Increased Site Runoff

The maximum increase in stormwater runoff from the site can be calculated using the rational formula. Typical runoff coefficients for use with the rational formula are presented in NZ Building Code E1, Table 1.

Slopes in grass generally vary between 1.75 to 8.75 %. E1 Table 2, slopes of 5 to 10 % require no adjustment of the C value. The runoff coefficients relevant to the site are:

Table 6-2 – Run-off Coefficient (C)

Surface Type	Base C	Slope adjustment	Adopted C
Unsealed Roads	0.50	None	0.50
Fully roofed and/or sealed developments	0.90	None	0.90
Gardens, lawns etc.	0.25	None	0.25

For design rainfall intensities, including an allowance for climate change, we have adopted HIRDS V4 rainfall estimates adjusted with the RCP 6.0 climate change scenario projected out to the 2081-2100 time period. This accounts for 1.63°C of warming and an associated increase in rainfall of approximately 20 %. The minimum time of concentration for surface runoff will be 10 minutes, given the relatively small footprint of the sites. Design rainfall intensities for 10 minute duration, RCP 6.0 climate change scenario are 118.2 mm/h for 10 year ARI.

Pre- and post-development peak runoff from the site is calculated for the 10 year rainfall events (refer to Table 6.4). For the purpose of stormwater design, the two unconsented cabins and associated driveway (as identified on Drawing No. 03) have been classed as Post Development.

Table 6-3 – Peak Site Runoff

Surface	Area (m^2)	C	I_{10} (mm/hr)	Q (L/s)
Pre Development				
Unsealed Roads	4073	0.5	118.2	66.87
Roofs	2600	0.9	118.2	76.83
Lawns	24077	0.25	118.2	197.63
Total	**30750**			341.33
Post Development				
Unsealed Roads	5643	0.5	118.2	92.6
Roofs	3390	0.9	118.2	100.2
Lawns	21717	0.25	118.2	178.3
Total	**30750**			**371.1**
Excess Run-Off				**29.7**

The proposed development and aforementioned unconsented areas will result in a **29.7 L/s increase** in peak stormwater runoff from the site.

6.7.2 Stormwater Quality

Residential development is not generally considered to create a long-term impact on water quality. For this development the proposed dwelling units will be surrounded by grassed surfaces. Provided concentrated flows are discharged to land, the grass will buffer runoff, trapping contaminants and sediments. Additionally, runoff is directed through a detention pond which provides further opportunity for trapping contaminants and sediments.

6.7.3 Detention Basin Design

Post development run off can be returned to that of pre-development flows via the construction of a detention basin and a 5,000 m^2 catchment area as identified on enclosed Drawing No. 03.

Haigh Workman have modelled stormwater detention within a parabolic shaped basin using a hyetograph which incorporates the 20, 30, 60 and 120 minute duration storms for the 10 % AEP.

The basin has been designed to accept runoff from an area of 5,000 m^2 including proposed driveways and the area of unconsented driveway, roof areas from the 6 proposed units (or tank overflows in the case of roof water collection) and surrounding grassed areas (refer to area shaded on Drawings 03.). The unconsented existing surfaces which fall in the catchment have only been included in the post development calculations. Run-off calculations for this catchment are detailed in Table 6-4.

Table 6-4 - Peak run-off within the 5000 m^2 catchment for Detention Basin Design

Surface	Area (m^2)	C	I_{10} (mm/hr)	Q (L/s)
Pre Development - 5,000 m^2 Catchment				
Unsealed Roads	0	0.5	118.2	0.0
Roofs	0	0.9	118.2	0.0
Lawns	5000	0.25	118.2	41.0
Total	5000			**41**
Post Development - 5,000 m^2 Catchment				
Unsealed Roads	1085	0.5	118.2	17.8
Roofs	470	0.9	118.2	13.9
Lawns	3445	0.25	118.2	28.3
Total	**5000**			**60**

The post development catchment creates 60 L/s runoff. It is required to detain 29.7 L/s to reduce flows back to the site pre-development levels. This can be achieved with a stormwater detention basin with the following features;

- An area of 435 m^2 with a minimum depth of 220 mm and stormwater detention volume of 47.5 m^3
- 200 mm diameter pipe (outlet orifice)
- Basin will be situated south of the proposed development area but north of the existing flow path
- The pond has a catchment which encompasses the whole development including roof runoff/tank overflows
- Pond overflow is to be directed into the existing drainage easement running along the eastern boundary

- The outlet into the drain shall be reinforced to prevent scour
- The basin will be grassed as it will not be permanently full of water
- This design takes advantage of existing topographical features and therefore will require minimal earthworks.

The pond detailed above can attenuate 34.2 L/s and is therefore sufficient for the proposed development and existing unconsented development. Modelled flows into and out of the stormwater detention basin are illustrated in Figures 4 and Figure 5.

Figure 4 - Hydrograph model for stormwater detention basin 10 % AEP

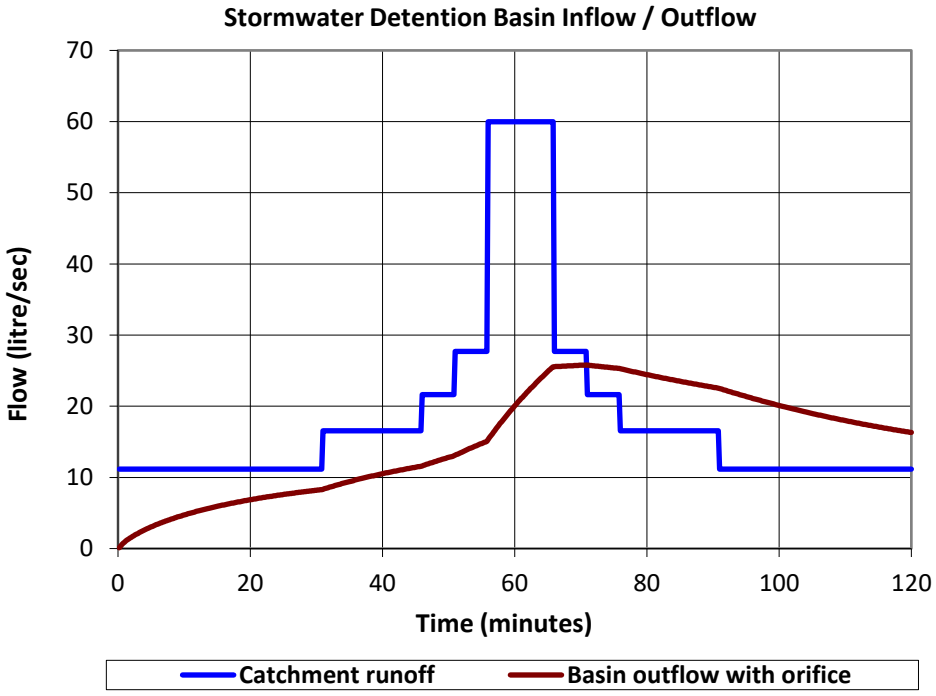
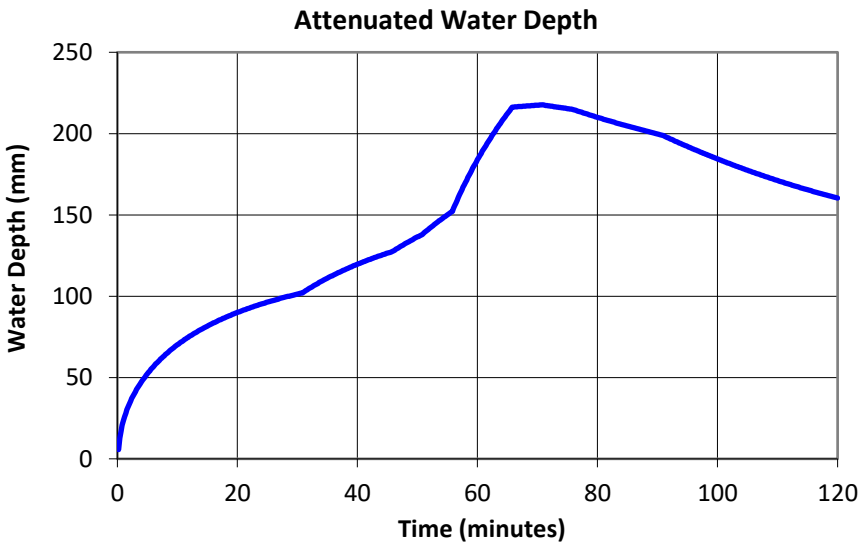


Figure 5 - Hydrograph model of attenuated water depth in stormwater detention basin 10 % AEP



6.7.4 Future Development

New impermeable surfaces on-site should be suitably graded to ensure stormwater is diverted away from building platforms and access ways, and into suitable drainage channels or appropriate areas of site.

Wastewater disposal fields should be located upstream of the stormwater discharge points.

Roof downpipes and tank overflows are to discharge in a dispersive manner to ground and be directed towards the basin. An example water storage tank solution has been detailed on enclosed Drawing No. 03, overflowing into the Stormwater Basin.

6.8 FNDC Assessment Criteria

The proposed stormwater management has been assessed against the Assessment Criteria in Section 11.3 of the Far North District Plan as follows:

Table 6-5 – FNDC Assessment Criteria 11.3

Criterion	Comment
(a) The extent to which building site coverage and impermeable surfaces result in increased stormwater runoff and contribute to total catchment impermeability and the provisions of any catchment or drainage plan for that catchment.	Additional runoff created through this development can be fully managed and attenuated back to pre-development levels.
(b) The extent to which Low Impact Design principles have been used to reduce site impermeability.	Stormwater control practices have been designed in accordance with the TP10 publication which include design principles with low impact design such as detention tanks and stormwater basins.
(c) Any cumulative effects on total catchment impermeability.	Run-off will be attenuated back to pre-development levels therefore there will be negligible impact on the total catchment impermeability.
(d) The extent to which building site coverage and impermeable surfaces will alter the natural contour or drainage patterns of the site or disturb the ground and alter its ability to absorb water.	Flow paths will be protected to ensure natural drainage patterns are not altered.
(e) The physical qualities of the soil type	Waipapa Clays (YF) overlay the site, described imperfectly to very poorly drained.
(f) Any adverse effects on the life supporting capacity of soils.	None.
(g) The availability of land for the disposal of effluent and stormwater on the site without adverse effects on the water quantity and water quality of water bodies (including groundwater and aquifers) or on adjacent sites.	There is sufficient space for on-site wastewater disposal.
(h) The extent to which paved, impermeable surfaces are necessary for the proposed activity	Proposed impermeable surfaces are in keeping with surrounding land and necessary for the proposed activity.

(i) The extent to which landscaping may reduce adverse effects of run-off.	Development is likely to be landscape planted when converted to residential, which will assist with ground soakage.
(j) Any recognised standards promulgated by industry groups	N/A
(k) The means and effectiveness of mitigating stormwater run-off to that expected by the permitted activity threshold.	Stormwater will be attenuated back to pre-development levels.
(l) The extent to which the proposal has considered and provided for climate change.	Climate change has been factored into the stormwater water management calculations.
(m) The extent to which stormwater detention ponds and other engineering solutions are used to mitigate any adverse effects.	A stormwater basin is to be constructed to mitigate the increased run off from the proposed development and unconsented existing development.

7 Water Supply

7.1 Potable Water Supply

There is no public water supply at the site. The proposed dwelling units will be dependent on roof runoff collected in water tanks. The existing six units are supplied from two 30,000 L roof water collection tanks connected to the storage sheds. The storage capacity will be increased by the addition of a third 30,000 L tank. An assessment of storage versus demand is provided at Appendix G.

The assessment concludes that for a 3-month sustained dry period averaging 47 mm/month, with the third tank being fed from the proposed 6 units, a deficit will occur during the third month. This may be overcome by moderate water conservation reducing water usage to 136 L/person/day during the last month or the supply be supplemented by tanker truck.

7.2 Firefighting

Council Engineering Standards require a water supply that is adequate for firefighting purposes. Where there is currently no reticulated water supply, then it the site is responsible for providing adequate on-site firefighting supply.

For multi-unit dwellings without a sprinkler system in a non-reticulated supply area, the New Zealand Fire Service (NZFS) Fire Fighting Water Supplies Code of Practice SNZ PAS 4509:2008 recommends for a fire fighting supply a minimum water storage capacity of 45 m^3 within 90 m of the dwelling, fitted with an adequate means for extracting the water from the tank.

The existing water tanks are greater than 90 m from the furthest proposed unit, therefore additional water storage is required or a 100 mm pipe delivery pipe with a fire coupling extended to within 90 m of the units. We recommend the property owner contacts the Fire Service to agree arrangements for providing an adequate on-site firefighting supply.

7.3 Alternative to Fire Fighting Supply

The Code (SNZ PAS 4509:2008) specifically allows for alternative methods to be used in meeting the Code requirements. Clause 4.4 of the Code states that:

- Fire engineers or similar competent persons may use alternative methods, such as those detailed in Appendix H and Appendix J to determine firefighting water supplies. To comply with this code of practice, such alternatives must be submitted for approval to the person(s) nominated by the National Commander. The person(s) so nominated will approve these cases on confirmation that the method and calculations used are correctly applied.
- Alternative methods will need to show that the calculated firefighting water supply makes allowances for tactical flow rates (that is, the amount needed above a theoretical amount to absorb the released heat for operational effectiveness).

The procedure to be followed in the case of an alternative fire-fighting supply is as follows:

- The competent person should submit a firefighting facilities checklist (FFFC), with a scale site map showing contours and proposed alternatives to Table 2 with rationale for assessment to NZFS

If the proposed supply is approved by a nominated NZFS person, Council will accept the FFFC and compliance with the Code will be achieved.

NZFS considers that a 'one size fits all' volume is not appropriate in all circumstances. There are alternatives to firefighting couplings but firefighters are not expected to lift pumps or hoses onto the top of water tanks.

8 On-site Effluent Disposal

8.1 Existing Effluent Treatment & Disposal

Effluent disposal is currently managed on-site;

- The existing dwelling to the north has a septic tank and effluent soakage system within the private garden
- The six existing accommodation units undergo a combination of primary and secondary treatment, with two septic tanks and a treatment plant. Effluent is disposed via dripper lines which are laid amongst citrus trees and along the northern site boundary.

Existing systems are identified on Drawing No. 02 appended. The secondary treatment and dripper field for the existing six cabins was designed by Haigh Workman in 2012 and adopted design occupancy of 2 persons per unit, a design flow of 170 L per person and an irrigation rate of 3 mm/day which required a disposal area of 680 m^2 plus a 30 % reserve of 204 m^2.

The system was inspected and found to be operating with no signs of malfunction. The dripper tubes occupied an area of approximately 1198 m^2.

Effluent from the proposed six additional units are also to undergo on-site wastewater treatment and disposal.

8.2 Summary of Regulatory Issues

8.2.1 Regional Plan

The discharge of sewage effluent on to land is regulated by the permitted activity rules C.6.1.3 of the Proposed Regional Plan for Northland. Table 9 specifies exclusion areas and set-back distances as follows:

Table 9: Exclusion areas and setback distances for on-site domestic wastewater systems

Feature	Primary treated domestic type wastewater	Secondary and tertiary treated domestic type wastewater	Greywater
Exclusion areas			
Floodplain	5 percent annual exceedance probability	5 percent annual exceedance probability	5 percent annual exceedance probability
Horizontal setback distances			
Identified stormwater flow path (including a formed road with kerb and channel, and water-table drain) that is down-slope of the disposal area	5 metres	5 metres	5 metres
River, lake, stream, pond, dam or natural wetland	20 metres	15 metres	15 metres
Coastal marine area	20 metres	15 metres	15 metres
Existing water supply bore	20 metres	20 metres	20 metres

Rule C.6.1.3 also includes specific conditions for effluent disposal on steeper land:

- Where the slope of the disposal area is greater than 10 degrees, use secondary treatment with irrigation lines firmly attached to the surface, and provide a minimum 10 m buffer down-slope of the lowest irrigation line. Disposal areas located within existing established vegetation must have least 80 % canopy cover
- Alternatively, irrigation lines are covered by a minimum of 100 mm of topsoil, mulch, or bark
- The slope of the disposal area must not be greater than 25 degrees

8.2.2 District Plan

The Far North District Plan contains an additional rule relating to wastewater discharges to land:

- District Plan Rule 12.7.6.1.4 specifies that effluent fields shall be located no closer than 30 m from any river, lake, wetland or the Coastal Marine Area

8.2.3 TP58

Auckland Council technical publication TP58 is accepted as a means of compliance for effluent disposal design in Northland. In addition to set-back distances from watercourses similar to Regional Plan Rule C.6.1.3, TP58 recommends that wastewater treatment plants and disposal fields be located no closer than 3.0 m from a dwelling.

The effluent disposal systems will need to be sited to avoid surface runoff and natural seepage from higher ground, or protected by using interception drains. The disposal areas may need to be mounded above the surrounding land to ensure that the lowest point in the field complies with the Regional Plan and Far North District Plan (FNDP) rules.

The following analysis ensures that future on-site wastewater disposal can comply with both the Regional and District Plan wastewater discharge rules and appropriate engineering guidelines. The analysis has assumed secondary treatment to drippers.

8.3 Design Population and System Flow Volumes

8.3.1 Design Occupancy Rating

It has been confirmed by the client that the proposed accommodation units are to be one bedroom. In reference to TP58 Section 6.3.1, it is recommended that the design occupancy of two people be adopted per unit, equating to an additional 12 people on the property.

8.3.2 Source of Water Supply

Water supply is to be sourced from tank supply. Flow reduction fittings may be used, but this cannot be assumed in assessing potential wastewater flows.

8.3.3 Design Flows

It is assumed that the proposed residential units will be designed to meet category 'C' according to TP58 Section 6.3.1, '*households with 11/5.5 or 6/3 Flush Toilet(s) and Standard Fixtures, low water use dishwasher and NO garbage grinder'.* A category C property allows for 160 litres/person/day of wastewater generation for on-site roof water tank supply.

On this basis, the design household wastewater flow is 12 x 160 litres/day = **1,920 litres per day.**

8.4 Design for Land Application System

8.4.1 Effluent Field Design Area

The available geological records show the site to be underlain by residual soils. The site is underlain by soils of the Undulating Terraces and Lowlands comprising Waipapa Clay (YF) typically described as '*imperfectly to very poorly drained'*.

Shallow soils comprise silty clays up to 0.5 m bgl, underlain by clays. For site suitability purposes a conservative soil type has been selected. Soils are categorised as AS/NZS 1547 Soil Category 5, being poorly drained light clays or respectively TP58 Soil Category 6 slowly draining clays. These soil types can be expected to sustain a land loading rate of 3 mm/day.

A loading rate of **3 mm/day** has been opted for, taking into account:

- Gentle slope of disposal fields (slopes of less than 3 degrees)
- Exposure of disposal fields
- 100 % reserve area available

Based on a rate of 3mm/day, this proposal will require 1920/3 = 640 m² area of disposal field. This equates to 640 metres of UniBioline or similar approved irrigation tubing laid at 1.0 m spacing.

8.4.2 Possible Effluent Field Locations

To ensure a suitable setback from boundaries and buildings, siting restrictions listed in Section **Error! Reference source not found.**2 of this report will need to be adhered to. In addition, effluent disposal systems will need to be sited to avoid surface runoff and natural seepage from higher ground, or protected by using interception drains as presented in TP58. Ground slopes where effluent fields are likely to be placed vary from 0.5° to 3°.

The site is suitable for surface or sub-surface trickle irrigation systems. However, taking into account the winter ground water table recorded at 0.9 m bgl, it is considered surface disposal the most appropriate for the development. Surface trickle irrigation is for land intended to be densely planted up, and should be laid at 1 m centres (total of 640 m length tubing). The dripper lines may be covered with minimum of 100 mm of bark mulch and densely vegetated with suitable plants for evapo-transpiration systems.

Access to the disposal area should be minimised by effective bordering with either vegetation or fencing.

The proposed effluent disposal field and reserve are locations are shown on Haigh Workman Drawing No. 04. In these locations both the disposal and reserve areas are outside the NRC mapped 10 year flood event area which we take to represent the current 5 % Annual Exceedance Probability (AEP) required by Regional Plan Rule C.6.1.3 Table 9). An interceptor drain shall be constructed as depicted, to ensure surface run-off is directed to the detention basin and away from the disposal field.

During the field investigations, high ground water was not observed. Should high ground water be encountered at the proposed effluent field area during detailed investigation at the time of building consent application, then above ground solutions such as raised mounds may be required.

8.4.3 Dripper Irrigation

The proposed lots are suitable for surface or sub-surface trickle irrigation systems. Both types of irrigation require the same surface area for land disposal, and tubing should include 1.6 l/hr drippers at 0.5 m spacing (UniBioline or similar).

Surface trickle irrigation is for land intended to be densely planted up, and should be laid at 1 m centres (total of 640 m length tubing laid at 1 m centres). The dripper lines may be covered with minimum of 100 mm of bark mulch and densely vegetated with suitable plants for evapo-transpiration systems.

Subsurface irrigation is for land intended to be grassed, as tubing must be laid 100 mm into topsoil. It is recommended that subsurface tubing be laid at 0.5 m centres to ensure even watering of turf.

Access to the disposal area should be minimised by effective bordering with either vegetation or fencing.

8.4.4 Reserve Area

Regional Plan rules require a reserve area of 100 % of the design area for primary treatment or 30 % of the design area for secondary treatment. A conservative reserve area of 100 % has been demonstrated on enclosed Drawing No. 04. The reserve field is required to cope with wastewater in the event of a system failure or from underestimation of daily wastewater production. Example location is indicated on site plan appended.

8.5 Design for Treatment System

8.5.1 Treatment Plant Design Sizing

The naming of a proprietary secondary treatment plant will be decided by the new owner at the building consent stage, when the position and scale of the building are known. Treatment plants must meet the requirements of AS/NZS 1546.3:2001.

The system is to meet the quality output of AS/NZS 1546.3:2003, producing effluent of less than 20 g/m^3 of 5-day biochemical oxygen demand (BOD_5) and no greater than 30 g/m^3 total suspended solids (TSS). We recommend the treatment system is sized to cater for a consistent daily flow of 1,920 litres/ day, and a peak three-day flow of 2,880 litres/day.

Since the averaged daily design flow is below 2,000 L/day discharge consent is not required.

8.5.2 Siting Requirements

Restrictions on siting of secondary treatment plants are:

- Invert level at inlet not less than 0.5 m below floor level
- Greater than 3.0 m from any house
- Greater than 1.5 m from any boundary
- Easily accessible for routine maintenance

8.6 Primary Treatment / Trench Disposal

Primary treatment using a conventional septic tank and soakage trench disposal system is not recommended for the site due to the poor ground soakage.

8.7 Construction Installation

8.7.1 Installation Requirements

Treatment plants must be installed by the plant provider to the manufacturers published specifications. The trickle irrigation tubing must be installed by the treatment plant installer.

8.7.2 Commissioning Requirements

The treatment and trickle irrigation must be tested and commissioned by the plant provider.

8.8 Management Procedures

8.8.1 Operation Maintenance Requirements

A maintenance agreement is to be entered into with the provider. Once commissioned the plant will operate automatically with alarms fitted to advise the unit occupants in the event of emergency failure.

8.8.2 Monitoring and Inspection

As part of the maintenance agreement with the plant provider, there should be at least annual inspections with written reports provided to the owner.

8.9 FNDC On-site Effluent Disposal Policy 2008

8.9.1 Likelihood of Failure/ Accidental Discharge

The likelihood of a discharge from a household secondary treatment plant is less than minor. The pipe work to and within the plant when correctly installed is robust with sealed connections and buried below ground reducing the risk of accidental damage. Only the puncture of a distribution pipe would allow treated effluent to escape in a concentrated manner.

8.9.2 Consequence of Failure/ Accidental Discharge

In the unlikely event of some form of failure/ accidental discharge, the material would have to travel in excess of 15 m over ground to reach any surface water (adopting the NRC minimum requirement of 15 m from surface water). Most, if not all, of the accidental discharge is likely to be lost to soakage over this distance and the failure should quickly become apparent.

8.9.3 Vegetation Planting

Trickle irrigation disposal systems rely on evapotranspiration from irrigated lawns or covered surface irrigated landscape planting. Where new planting is required, this must be in place prior for the evapo-transpiration process to begin functioning. A list of suitable plants is appended.

9 Applicability

This report has been prepared for our Client, Arthur Cottle, with respect to the particular brief given to us. This report is to be used by our Client and Consultants and may be relied upon by the Far North District Council (FNDC) when considering the application for the proposed works. The information and opinions contained within this report shall not be used in any other context for any other purpose without prior review and agreement by Haigh Workman Ltd.

It has been assumed in the production of this report that the site is to be redeveloped with additional low-rise residential units and associated structures. If any of these assumptions are incorrect, then amendments to the recommendations made in this report may be required.

The comments and opinions presented in this report are based on the findings of the desk study and ground conditions encountered during an intrusive site visit performed by Haigh Workman. There may be other conditions prevailing on the site which have not been revealed by this investigation and which have not been taken into account by this report. Responsibility cannot be accepted for any conditions not revealed by this investigation. Any diagram or opinion on the possible configuration of strata or other spatially variable features between or beyond investigation positions is conjectural and given for guidance only. Confirmation of ground conditions between exploratory hole locations should be undertaken if deemed necessary.

Appendix A – Drawings

Drawing No.	Title	Scale
01	Site Location Plan	1:5000
02	Site Features Plan	1:1000
03	Stormwater & Wastewater Management Plan	1:500
04	Typical Irrigation line design	NTS
-	Donaldsons Registered Land Surveyors - *Topographic Survey of Lot 2 DP 102334*, 17/10/2018, ref: 7321	As shown
-	Flood Maps Disclaimer	NA
-	Lot 2 DP 102334, 2000 State Highway 10 Waipapa Imagery/ New Zealand, 1:1000 (A3) - All levels in m OTP Waipapa DTM at 0.5m intervals	As shown
-	Lot 2 DP 102334, 2000 State Highway 10 Waipapa Imagery/ New Zealand 1:1000 (A3) - All levels in m OTP 10yr and 100yrCC Flood Extents	As shown

NTS - Not to scale

IMPERMEABLE SURFACES

Roofs	2638m²
Driveways (Metalled areas)	4835m²
Future units	445m²
Future driveways (Approx)	600m²
TOTAL IMPERMEABLE (@17/10/18) or 27.7%	8,518m²

1
DP 102334

315°17'00"
105.54
Existing entrance (sealed)
Metalled driveway
STATE HIGHWAY 10
Sealed over 20.12 wide
Limited access road
metalled area 257m²
Carport 40m²
Container
Kennel
71°38'
104.72
(108.72)
4.00 EB
eb
159°14'30"
74.77
Green house
Existing dwelling 360m²
Septic Tank
effluent soakage
Drainage easement
Covered Containers 51m²
Proposed Driveway
7.00 eb
71°30'
117.04
(124.04)
Drain
1
DP 202219
177°52'
36.21
metalled areas 4578m²
Storage shed 580m²
Effluent dripper lines
Containers
6 units future development 445m²
87°52'
50.29
OLC 60
177°52'
54.66
metalled
Carport 140m²
Storage shed 498m²
Storage shed 427m²
metalled
Container
Relocatable buildings 296m²
metalled
Effluent dripper lines
LOT 2
DP 102334
3.0750ha
Drainage easement
159°47'
(179.13)
Relocatable buildings 149m²
Waste Water treatment plant
Covered Containers 97m²
Septic Tanks
Effluent dripper lines
Orange trees
1:100 year flood extent NRC map
1
DP 380472
1
DP 173080
Whiriwhiritoa Stream
2-3m wide
fixed by DP 316057
18
DP 316057

Applicant : A.W Cottle
Title : NA56C/28
Total Area : 3.0750ha
Zone : Rural Production

Heights are in terms of One Tree Point Vertical Datum 1964
Origin of levels RM 41/2 SO 55463 RL 74.96

Coordinates are in terms of NZGD Mt Eden 2000

Contour interval : 0.5m
Dir : Drawing001
Scale @ A3 : 1:1000
Date : 17/10/2018

0 10 20 30 40 50 100

DONALDSONS
REGISTERED LAND SURVEYORS

TOPOGRAPHIC SURVEY OF LOT 2 DP 102334

7321

Land / engineering Surveyors & development planners - 90 Kerikeri Road, Kerikeri, Northland, New Zealand - www.donaldsons.net.nz - em: info@donaldsons.net.nz - p:09 4079182

NOTES:

SITE BOUNDARY

WATER COURSE(S)

SITE BOUNDARIES, SITE FEATURES, EASEMENTS FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321.

Issue	Date	Revision
A	25/09/2019	FIRST ISSUE

DWG Site Location Plan

Scale 1: 5000 @A3 — 50 25 0 50 100 150 m — Date 25/09/2019

Drawn CJ | Checked TA | Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - SUITABILITY DRAWING SET.DWG

HAIGH WORKMAN Ltd
Civil & Structural Engineers
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Kerikeri, BOI.
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F: 09 407 8378
E: info@haighworkman.co.nz

Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

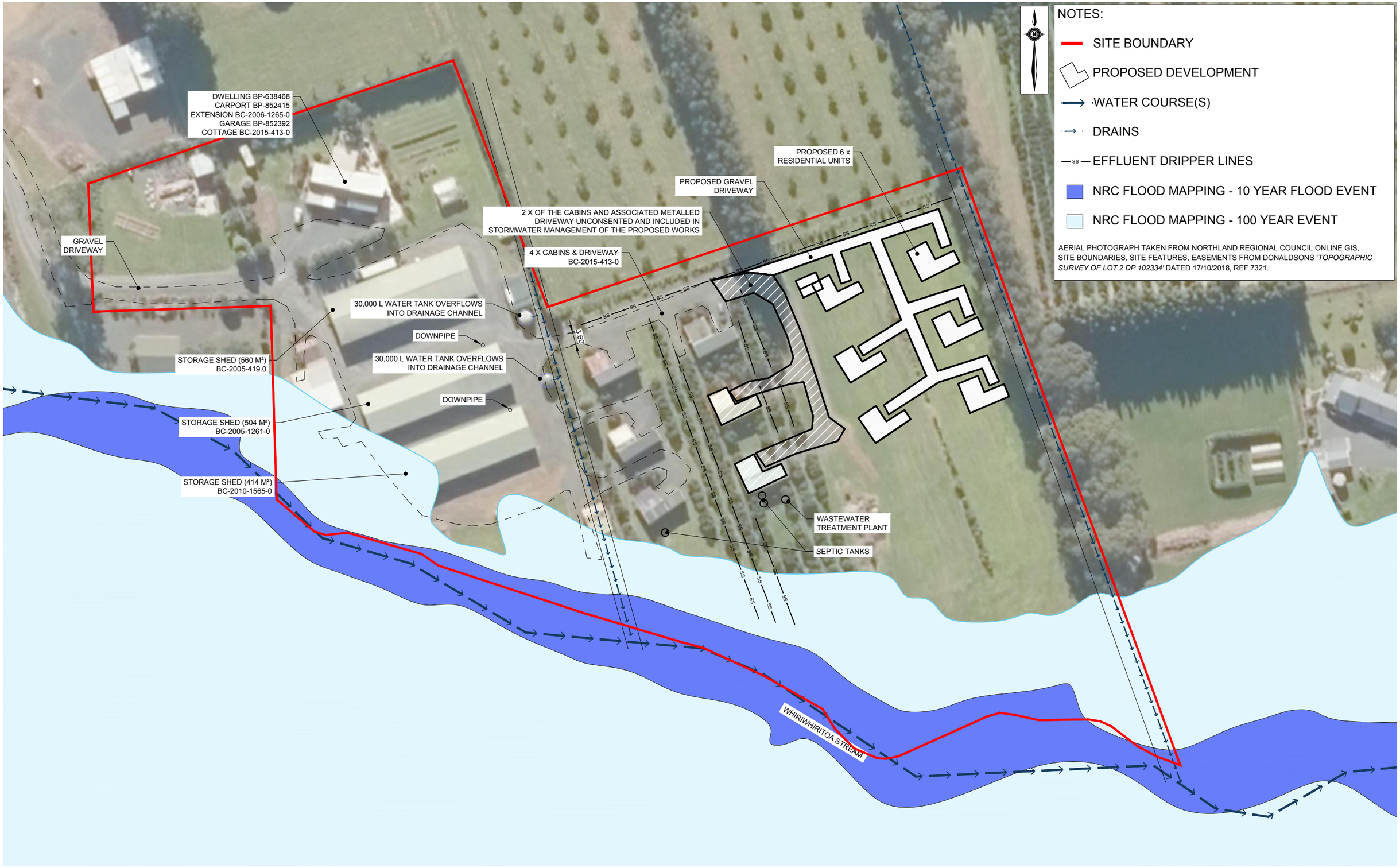
Client Arthur Cottle

Project No. 17 111 | RC no.

DWG No. **01**

Sheet No. **01** of **04**

Plotted By Catherine Johnson at 17/10/2019 5:35:51 p.m.



Issue	Date	Revision
A	25/09/2019	FIRST ISSUE

DWG Site Features Plan

Scale 1:1000 @A3 — 10 5 0 10 20 30 m — Date 25/09/2019

Drawn CJ — Checked TA — Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - SUITABILITY DRAWING SET.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client Arthur Cottle

Project No. 17 111 — RC no.

DWG No. 02

Sheet No. 02 of 04

Plotted By Catherine Johnson at 17/10/2019 5:35:54 p.m.

NOTES:

- SITE BOUNDARY
- PROPOSED DEVELOPMENT
- NON CONSENTED DEVELOPMENT INCLUDED IN STORMWATER MANAGEMENT PLAN
- DRAINS
- —ss— EXISTING EFFLUENT DRIPPER FIELDS

NOTES:

- BH1 HAIGH WORKMAN HAND AUGERED BOREHOLE
- STORMWATER CATCHMENT FOR DETENTION BASIN (5,000 M^2)

SITE BOUNDARIES, SITE FEATURES, EASEMENTS FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321.

SPECIFIC WASTEWATER DESIGN
MINIMUM EFFLUENT DISPOSAL SETBACKS:

- BOUNDARIES - 1.5 m
- BUILDINGS AND RETAINING WALLS - 3 m
- SURFACE WATER - 15 m (SECONDARY)
- COASTS, RIVERS AND LAKES - 30 m
- FOR SLOPES STEEPER THAN 10°, ALLOW 10 m DOWN SLOPE BUFFER AREA OR BURY DRIPPERLINES
- PROPOSED REGIONAL PLAN SETBACKS:
  - 5 m FROM KERB AND CHANNEL
  - 10 m WATER TABLE DRAIN

CHECK ALL DIMENSIONS ON SITE.

MINIMUM SECONDARY TREATMENT PLANT SETBACKS:

- INVERT LEVEL AT INLET - NOT LESS THAN 0.5 m BELOW FLOOR LEVEL
- BUILDINGS - 3 m
- BOUNDARIES - 1.5 m
- EASILY ACCESSIBLE FOR MAINTENANCE.

CHECK ALL DIMENSIONS ON SITE.

FIREFIGHTING REGULATNS REQUIRE WATER TANKS TO BE SITUATED NO GREATER THAN 90 M FROM DWELLINGS

30,000 L WATER TANK OVERFLOWS INTO DRAINAGE CHANNEL

30,000 L WATER TANK OVERFLOWS INTO DRAINAGE CHANNEL

EXISTING SEPTIC TANKS

EXISTING WASTEWATER TREATMENT PLANT

EXISTING SEPTIC TANK

BH1

SUITABLE WATER TANK LOCATION

SUITABLE WASTEWATER TREATMENT SYSTEM LOCATION

STORMWATER INTERCEPTION - EITHER LOW BERM 200 MM HIGH OR SWALE 200 MM DEEP DIRECTING SURFACE RUN OFF TO BASIN

SUITABLE LOCATION FOR SURFACE DRIPPER FIELD (642 M)

AVAILABLE SPACE FOR RESERVE DISPOSAL FIELDS (30 % FOR EXISTING, PLUS 30 % FOR PROPOSED)

PROPOSED DETENTION BASIN DESIGN
LENGTH: 33 M
WIDTH: 16.5
DEPTH: 220 MM IN CENTRE, TAPERING OUTWARDS TO GROUND LEVEL
OUTLET ORIFICE: 200 MM Ø
MAX STORAGE VOLUME: 47.5 M^3

200 MM Ø OUTLET ORIFICE PIPE, TO BE DIRECTED INTO REINFORCED DRAINAGE CHANNEL FOR DISCHARGE

NRC 10 YEAR FLOOD EXTENT

Issue	Date	Revision
A	25/09/2019	FIRST ISSUE

DWG Wastewater Management Plan

Scale 1:500 @A3 (5 2.5 0 5 10 15 m) Date 25/09/2019

Drawn EJC Checked CJ Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - SUITABILITY DRAWING SET.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

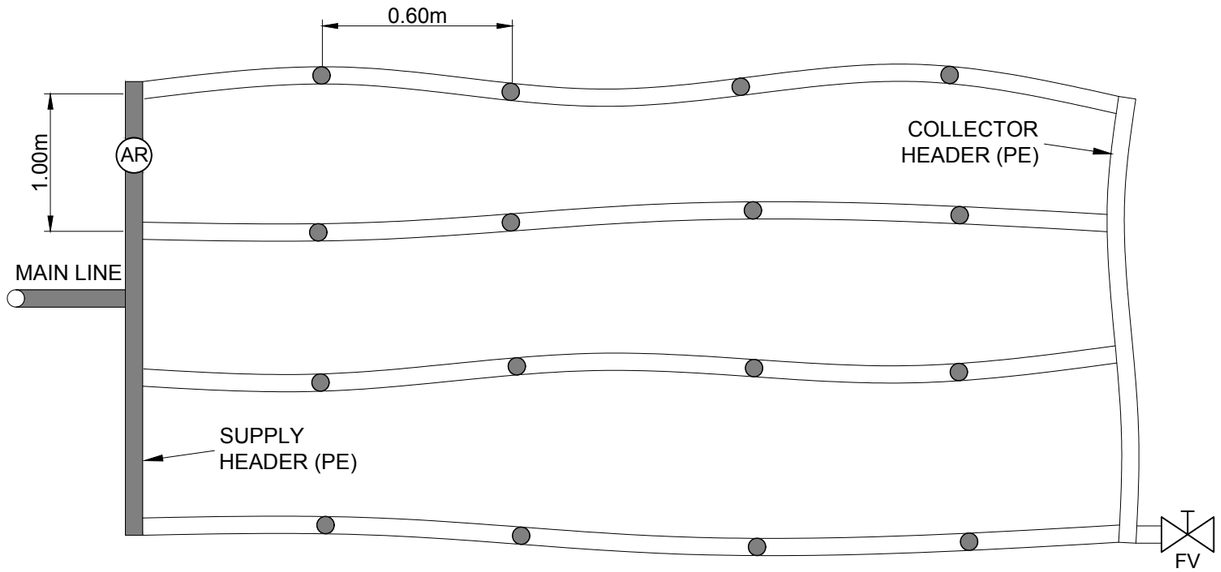
Client Arthur Cottle

Project No. 17 111 RC no.

DWG No. 03

Sheet No. 03 of 04

Plotted By Merin Jose at 11/12/2019 11:57:26 AM



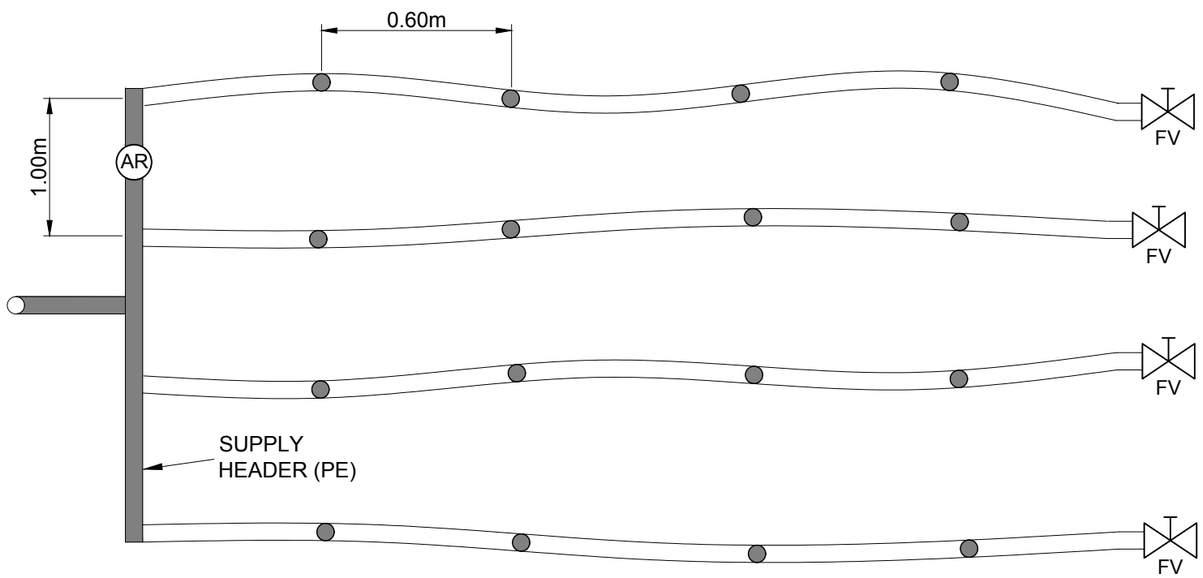
BASIC GRID LAYOUT

NOTES;

AR — AIR / VACUUM RELEASE VALVE

FV — FLUSHING VALVE

NOTE: USE UNIBIOLINE OR EQUIVALENT



FIELD LAYOUT WITHOUT A COLLECTION HEADER PIPE

Issue	Date	Revision
A	25/09/2019	FIRST ISSUE

DWG Typical Dripper Irrigation Line Design

Scale NTS | Date 25/09/2019

Drawn CJ | Checked TA | Approved JP

File Z:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - SUITABILITY DRAWING SET.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

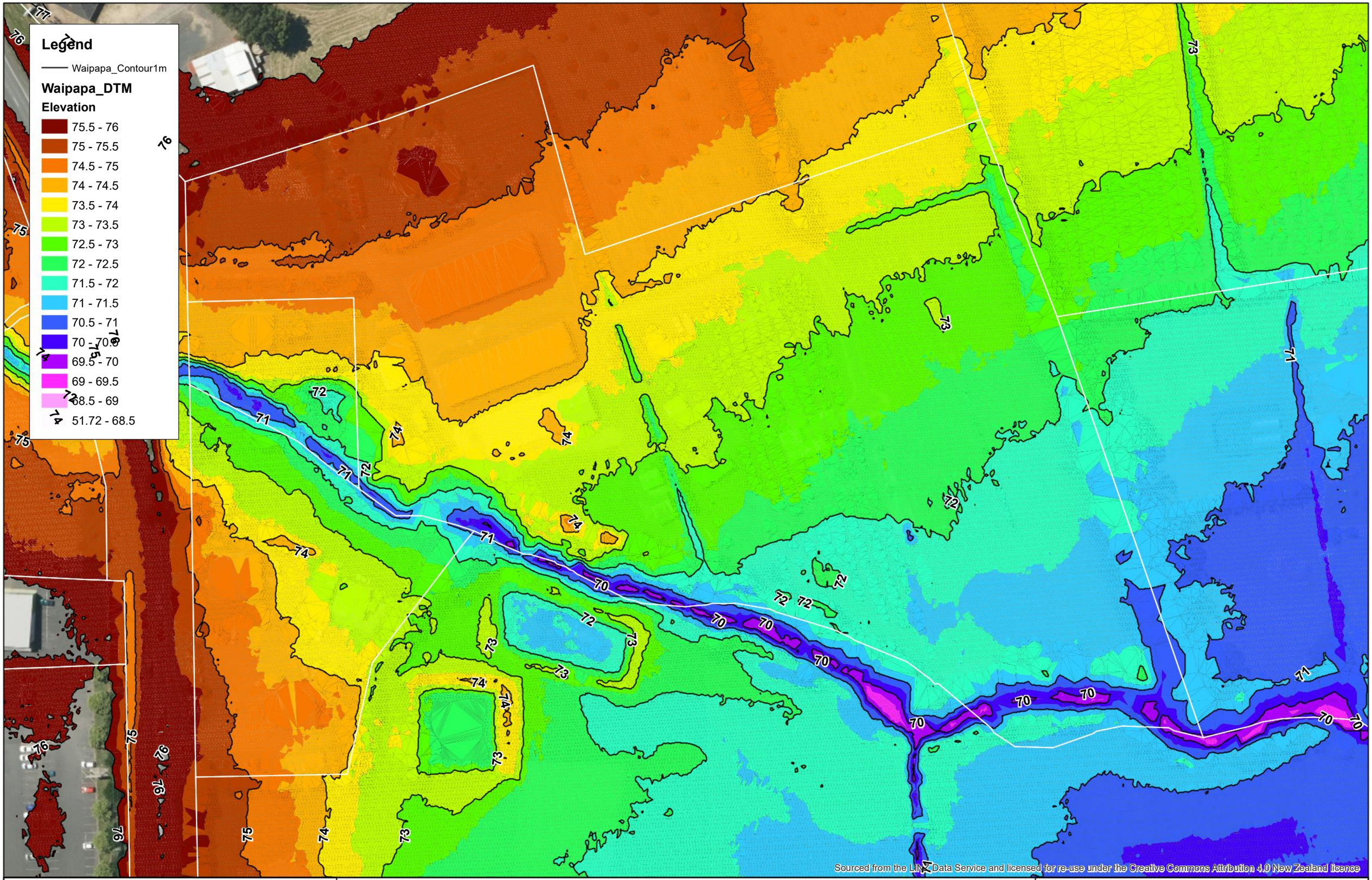
Client Arthur Cottle

Project No. 17 111 | RC no.

DWG No. **04**

Sheet No. **04** of **04**

Plotted By Catherine Johnson at 17/10/2019 5:36:04 p.m.



Northland REGIONAL COUNCIL

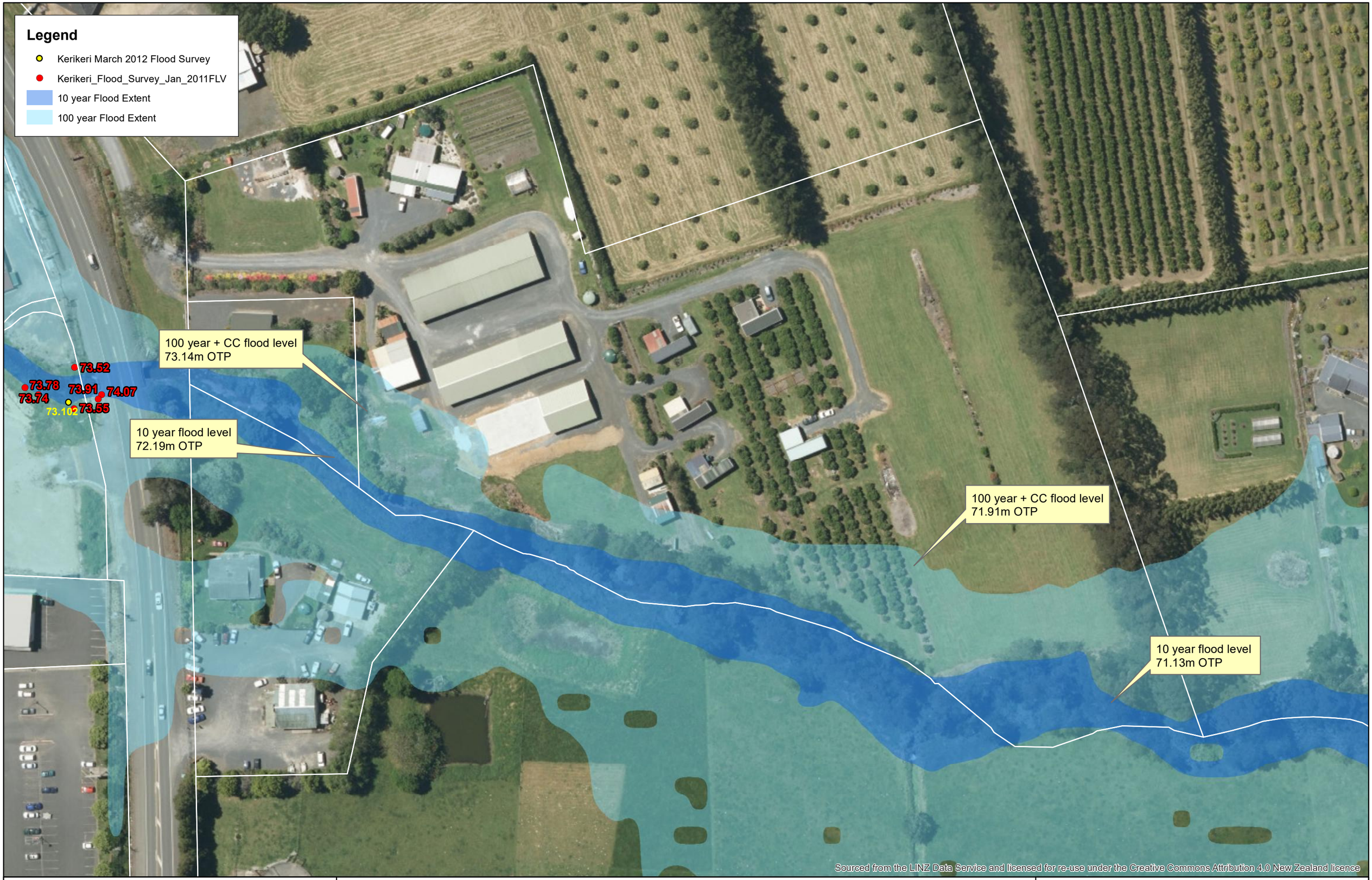
Lot 2 DP 102334, 2000 State Highway 10 Waipapa
Imagery/newzealand
1:1000 (A3) All levels in m OTP
Waipapa DTM at 0.5m intervals

0 20 40 60 m

N

W:\LandMngt\riverworks\Projects\keriwaipap\Scheme Design\DHI Scheme Simulations v6.mxd
User: victoriaro

Date Saved: 2/09/2019 3:35:51 pm



Northland REGIONAL COUNCIL

Lot 2 DP 102334, 2000 State Highway 10 Waipapa
Imagery/newzealand
1:1000 (A3) All levels in m OTP
10yr and 100yrCC Flood Extents

0 20 40 60 m

N

W:\LandMngt\riverworks\Projects\keriwaipap\Scheme Design\DHI Scheme Simulations v6.mxd
User: victoriaro

Date Saved: 2/09/2019 3:35:51 pm

Appendix B – Site Photography

Site Inspection & Sampling Visit - 30 July 2019

Figure 6 - Taken from the south eastern site corner towards proposed development area

Figure 7 - Proposed development area, looking north

Figure 8 - Containers currently situated to the north west of the area

Figure 9 - Western half of area, looking south

Figure 10 - Drain following the eastern site boundary, flowing into the Stream

Figure 11 - Whiriwhiritoa Stream following the southern site boundary

Figure 12 - Taken from southern site boundary looking north into site

Figure 13 - Central strip of felled materials and natural burn pile

Figure 14 - Existing residential units on site

Figure 15 - Existing residential units on site

Figure 16 - Existing surface wastewater disposal

Figure 17 - Existing wastewater tank

Figure 18 - One of the 30,000 L water tanks

Figure 19 - Existing overflow from water tank into drainage easement

Figure 20 - the second 30,000 L water tank and over flow into drainage easement

Figure 21 - Existing downpipes from shed roofs leading into water tanks

Appendix C – Exploratory Hole Records

PO Box 89, 0245
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Kerikeri, 0230
New Zealand

HAIGH WORKMAN LTD
Civil & Structural Engineers

Phone 09 407 8327
Fax 09 407 8378
www.haighworkman.co.nz
info@haighworkman.co.nz

Borehole Log - BH1

Hole Location: Refer to Site Plan

JOB No. 17 111

CLIENT:	Arthur Cottle	**SITE:**	2000 SH10, Waipapa		
Date Started:	30/07/2019	**DRILLING METHOD:**	Hand Auger	**LOGGED BY:**	EC
Date Completed:	30/07/2019	**HOLE DIAMETER (mm)**	50mm	**CHECKED BY:**	

Soil Description (Based on NZGS Logging Guidelines 2005)	Depth (m)	Geology	Graphic Log	Water Level	Sensitivity	Corrected Shear Vane Strength (kPa)	Scala Penetrometer (blows/100mm)
Grassed **TOPSOIL** comprising **Silty CLAY**, greyish brown, moist to wet, stiff, medium plasticity.	0.0	T.S.					
Silty CLAY, greyish brown, moist, stiff, medium plasticity.	0.5						
CLAY with some silt, grey, moist to wet, very stiff, medium plasticity. wet saturated, ***GROUND WATER TABLE ENCOUNTERED ay 0.9 mbgl***	1.0						
End of hole at 1.1 m bgl (Target Depth)	1.5						
	2.0						
	2.5						
	3.0						
	3.5						
	4.0						
	4.5						

Scala Penetrometer: 0 5 10 15 20

LEGEND

TOPSOIL | CLAY | SILT | SAND | GRAVEL | FILL

Corrected shear vane reading
Remoulded shear vane reading
Scala Penetrometer

Note: UTP = Unable to penetrate. T.S. = Topsoil. Bgl = Below ground level.
Groundwater identified at 0.8 m bgl.
Shear Vane and Scala penetrometer testing not undertaken.

Average Soil Sensitivity -

HAIGH WORKMAN
Civil & Structural Consultants

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310 Kerikeri Road, 0230
Kerikeri, New Zealand

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Fax 09 407 8378
www.haighworks.co.nz
info@haighworks.co.nz

Borehole Log

JOB No. 12086

Borehole no. BH1

Client	Arthur Cottle	Date	23-May-12
Location	Lot 2 DP 102334, 2000 State Highway 10, Waipapa		
Drilling Method: Hand Auger	Diameter: 40mm	Logged: TMA	Checked:

Soil Description	Depth	Legend	Shear Strength (kPa)	Moisture	Sample, Other Tests, Remarks.
	0.0		0 50 100 150 200		
TOPSOIL, dry, firm, brown	0.2				
CLAY, moist, soft grey	0.3				
CLAY, moist, soft, grey	0.5				
	0.6				
	1.0				
	1.5				
CLAY, drier, firm, grey					
EoB 1.8m					
	2.0				
	2.5				
	3.0				
	3.5				
	4.0				
	4.5				
	5.0				

Soils Legend

Topsoil	\\\\\\\\\\\\\\\	Fill	///////////////	Clay	----------	Silt	xxxxxxxx
Sand	.o.o.o.o.o.o.o.o	Peat	::::::::::::::::	Gravel		Rock	

Appendix D – Certificate of Title

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier	**NA56C/28**
Land Registration District	**North Auckland**
Date Issued	16 January 1985

Prior References
NA28C/985

Estate	Fee Simple
Area	3.0750 hectares more or less
Legal Description	Lot 2 Deposited Plan 102334

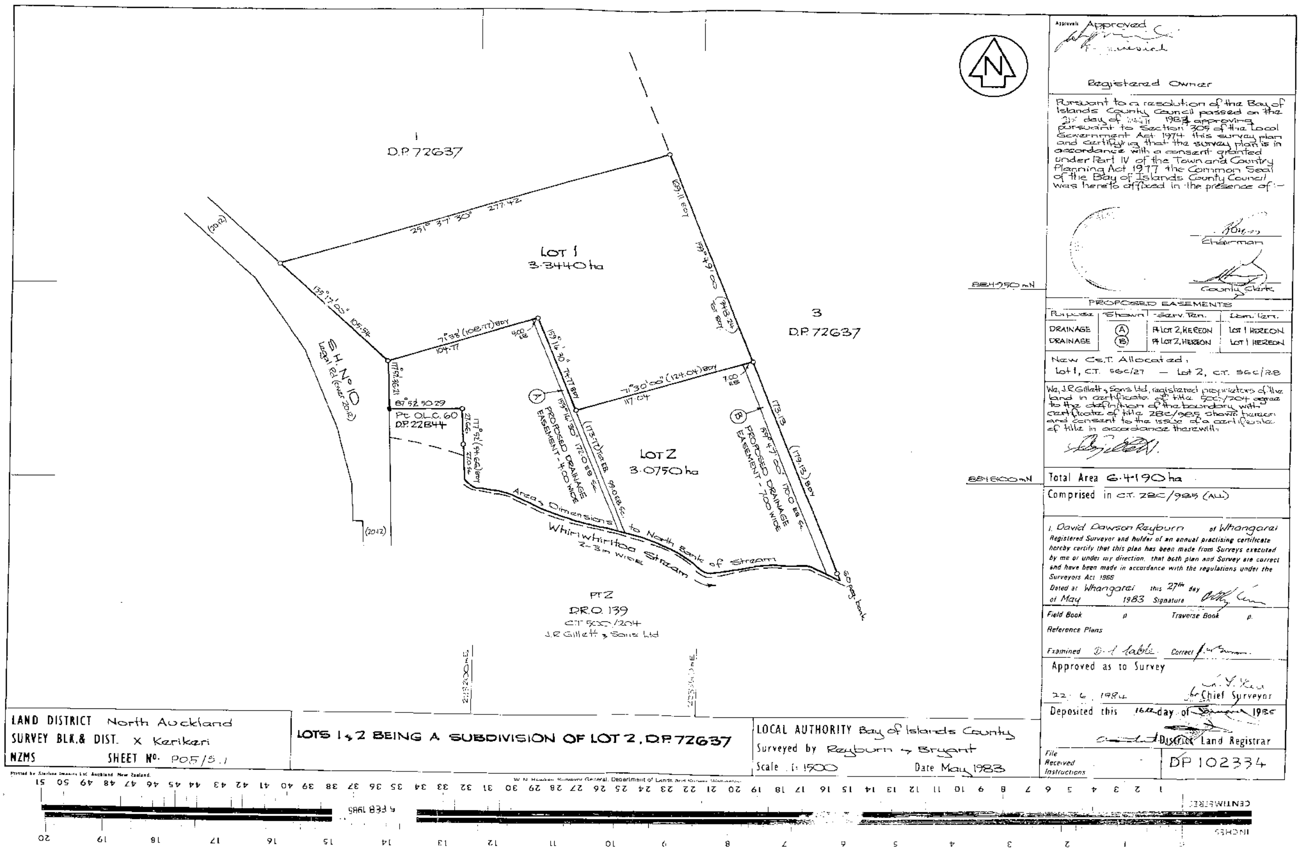
Registered Owners
Arthur William Cottle

Interests

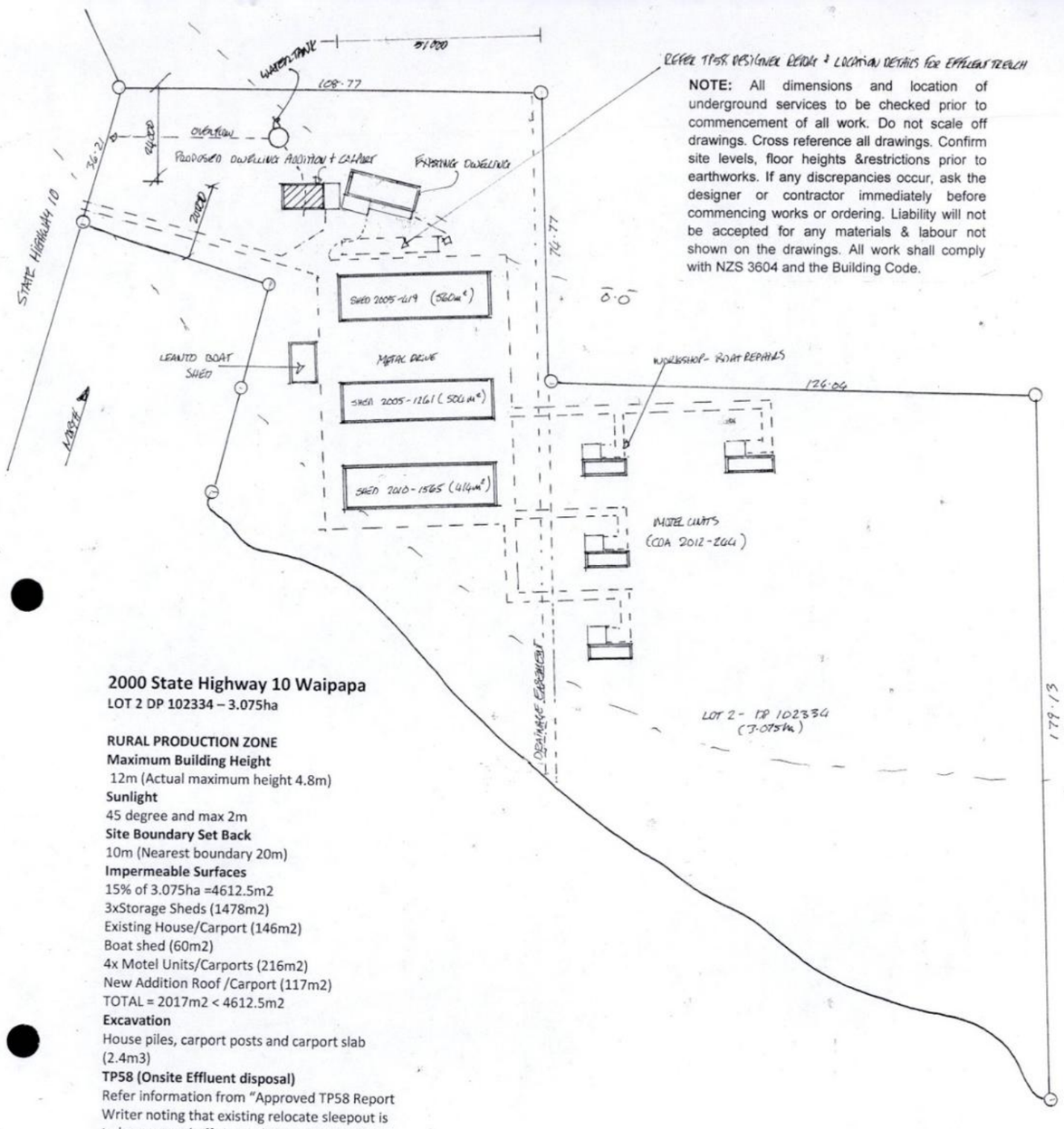
573901.1 Gazette Notice (N.Z. Gazette 23.11.1978 page 3210) declaring the adjoining State Highway to be a limited access road - 31.1.1979 at 10.51 am

Subject to a water drainage right over parts marked A and B on DP 102334 specified in Easement Certificate B695154.1 - 9.7.1987 at 9.00 am

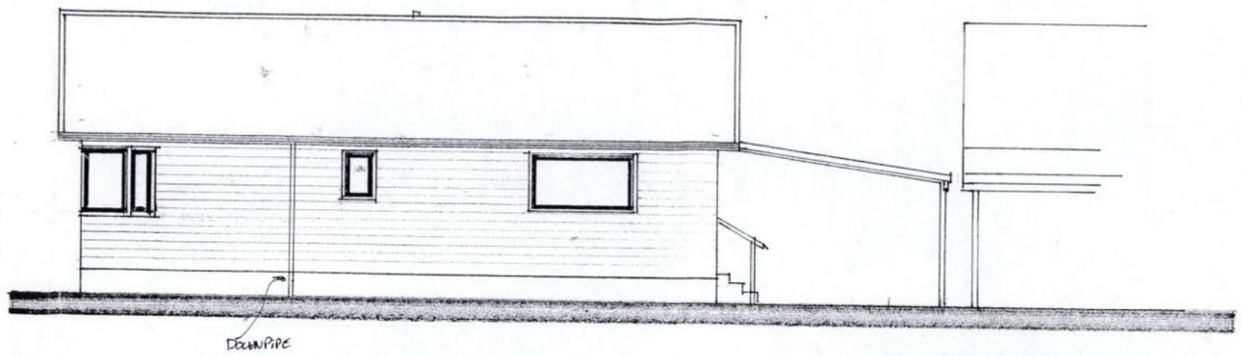
6027671.5 Mortgage to ANZ Banking Group (New Zealand) Limited - 2.6.2004 at 9:00 am


D.P. 72637
LOT 1
3·3440 ha
3
D.P. 72637
LOT 2
3·0750 ha
Pt OLC 60
D.P. 22844
S.H. No 10
PROPOSED DRAINAGE EASEMENT - 4.00 WIDE
PROPOSED DRAINAGE EASEMENT - 7.00 WIDE
Whiriwhiritoa Stream
Areas Dimensions to North Bank of Stream
PT 2
D.R.O. 139
C.T. 500/204
J.R. Gillett & Sons Ltd
Approved
Registered Owner
Pursuant to a resolution of the Bay of Islands County Council passed on the day of 1983 approving pursuant to Section 305 of the Local Government Act 1974 this survey plan and certifying that the survey plan is in accordance with a consent granted under Part IV of the Town and Country Planning Act 1977 the Common Seal of the Bay of Islands County Council was hereto affixed in the presence of:-
Chairman
County Clerk
PROPOSED EASEMENTS
DRAINAGE | A | Pt LOT 2, HEREON | LOT 1 HEREON
DRAINAGE | B | Pt LOT 2, HEREON | LOT 1 HEREON
New C.s.T. Allocated : Lot 1, C.T. 56C/27 — Lot 2, C.T. 56C/28
We, J.R. Gillett & Sons Ltd, registered proprietors of the land in certificate of title 500/204 agree to the definition of the boundary with certificate of title 28C/985 shown hereon and consent to the issue of a certificate of title in accordance therewith.
Total Area 6·4190 ha
Comprised in C.T. 28C/985 (All)
I, David Dawson Rayburn of Whangarei Registered Surveyor and holder of an annual practising certificate hereby certify that this plan has been made from Surveys executed by me or under my direction, that both plan and Survey are correct and have been made in accordance with the regulations under the Surveyors Act 1986
Dated at Whangarei this 27th day of May 1983 Signature
Field Book
Traverse Book
Reference Plans
Examined
Approved as to Survey
22. 6. 1984 for Chief Surveyor
Deposited this 16th day of 1985
District Land Registrar
DP 102334
LAND DISTRICT North Auckland
SURVEY BLK.& DIST. X Kerikeri
NZMS SHEET No. P05/5.1
LOTS 1 & 2 BEING A SUBDIVISION OF LOT 2, D.P. 72637
LOCAL AUTHORITY Bay of Islands County
Surveyed by Rayburn & Bryant
Scale 1:1500
Date May 1983

Appendix E – Proposed Dwelling Unit Typical Details



NOTE: All dimensions and location of underground services to be checked prior to commencement of all work. Do not scale off drawings. Cross reference all drawings. Confirm site levels, floor heights &restrictions prior to earthworks. If any discrepancies occur, ask the designer or contractor immediately before commencing works or ordering. Liability will not be accepted for any materials & labour not shown on the drawings. All work shall comply with NZS 3604 and the Building Code.



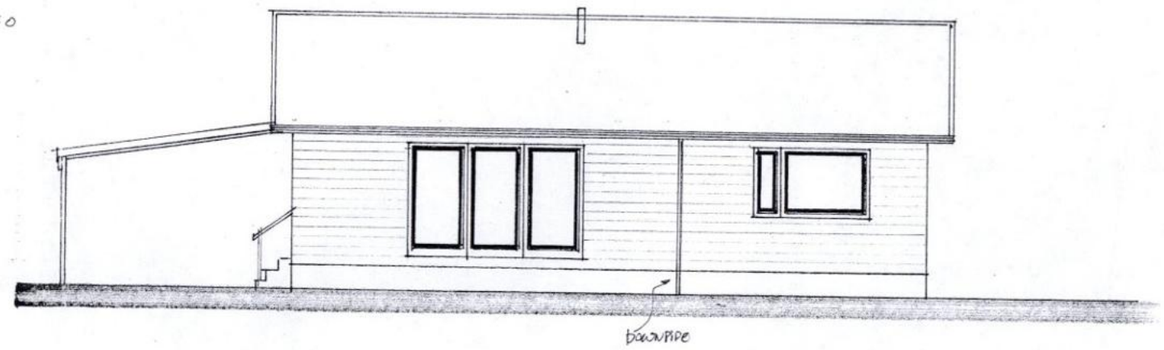
E2 Weather Tightness Risk Assessment

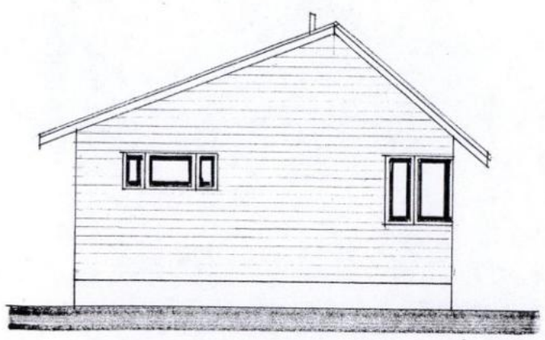
Wind Zone = High Wind Score 1
Number of Storeys = Low Score 0
Roof/Wall Junctions = Low Score 1
Eave Width = High Score 2
Envelope Complexity = Low Score 0
Decks = Low Score 0
Total = 4

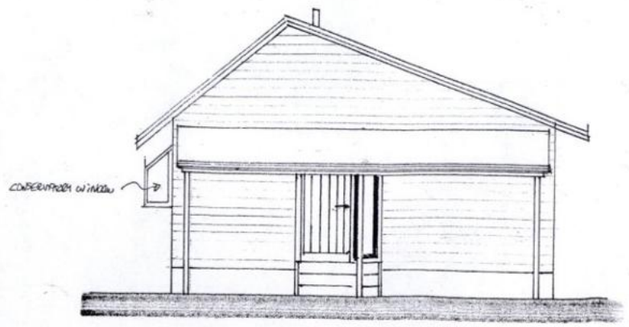
2000 State Highway 10 Waipapa

LOT 2 DP 102334 – 3.075ha

RURAL PRODUCTION ZONE
Maximum Building Height
12m (Actual maximum height 4.8m)
Sunlight
45 degree and max 2m
Site Boundary Set Back
10m (Nearest boundary 20m)
Impermeable Surfaces
15% of 3.075ha =4612.5m2
3xStorage Sheds (1478m2)
Existing House/Carport (146m2)
Boat shed (60m2)
4x Motel Units/Carports (216m2)
New Addition Roof /Carport (117m2)
TOTAL = 2017m2 < 4612.5m2
Excavation
House piles, carport posts and carport slab (2.4m3)
TP58 (Onsite Effluent disposal)
Refer information from "Approved TP58 Report Writer noting that existing relocate sleepout is to be removed off site and thus minimal if any additional loading likely.







FAR NORTH DISTRICT COUNCIL BUILDING CONSENT ISSUED

BC 2015-413 Date 13/1/15

District Plan Granting Officer:

Building Granting Officer:

Specific conditions are recorded on building consent

DWELLING ADDITION
A&J Cottle
2000 State Highway 10 Waipapa

SITE & ELEVATION PLAN
SEPT 2014 Scale 1:1000 1:75 A2

CHRISTIANSEN BUILDING SERVICES LTD
ARCHITECTUAL DESIGN & BUILDING CONSULTANTS
Ph/Fx 094078060 – markchristiansen@vodafone.co.nz
Cell 021407806 (Licensed Design/Carpentry/Site 2)
www.christiansenbuildingservices.co.nz

SHEET 1

REVISION A
NOV 2014

Appendix F – Water Supply Assessment

The existing six residential units are supplied from two 30,000 L roof water collection tanks connected to the storage sheds. The storage capacity will be increased by the addition of a further 30,000 L tank.

We assess the water storage requirements as follows:

10.1 Average Rainfall

Reference is made to NIWA 'The Climate and Weather of Northland' 3rd Edition. Table 6 (1981 – 2010) – for Kerikeri, the lowest accumulated rainfall months are November (114 mm) and February (117 mm).

Table 8 – for Kerikeri Airport the 10th percentile values (accumulated rainfalls that will normally be exceeded in nine out of ten years i.e. a 1 in 10 yr. lowest rainfall) are:

- For a 1-monthly period – Nov 24 mm, Dec 24 mm, Jan 22 mm, Feb 33 mm and Mar 3 mm
- For a 3-month period commencing – Nov 143 mm, Dec 153 mm, Jan 148 mm, Feb 221 mm and Mar 228 mm

10.2 Residential Water Demand

Council Engineering standards Design Average Daily residential demand shall be taken as 300 L/person/day for reticulated supply design.

Auckland Water Quantity Statement June 2004-May 2005 (TP300) quotes figures provided by Watercare Services Ltd., Rodney District Council and Franklin District Council, that for approximately 1.25 million people supplied with reticulated water in the Auckland Region the average use was 185 litres per capita. Given the use of roof water supply where users are generally more sparing we adopt the Watercare Services rate.

Based on 185 L/person, the combined demand for 12 accommodation units each with a design occupancy of 2 persons is 4,440 L per day or 124.3 m3/month

10.3 Roof Runoff from Storage Sheds

The existing supply is rain water collection from the storage shed roofs (total area 580 + 498 + 427 = 1,505 m^2), stored in 2 x 30,000 L storage tanks.

Collection, Q = C.I.A

Where, C = runoff coefficient, 0.9 (roofs)
I = rainfall depth (m)
A = roof area m^2

The rainfall required to match demand, I = Q/C.A = 124.3/(0.9 x 1,505) = 91.8 mm/month

10.4 Storage

Storage = demand – collection

Assuming normal monthly rainfall proceeding a dry period then the tanks will be close to full.

3 x 30,000 L tanks fed from storage shed roofs

I-month dry period

Month	Rainfall (mm/month)	Collected rainfall (m^3)	Demand (m^3)	Cumulative Storage = Collection – Demand (m^3)
0				90
1	22	29.8	124.3	-4.5

With moderate water conservation 3 x 30,000 L tanks can be expected to provide sufficient storage during a 1-month dry period.

3-month dry period

Month	Rainfall (mm/month)	Collected rainfall (m^3)	Demand (m^3)	Cumulative Storage = Collection – Demand (m^3)
0				90
1	143/3 = 47	64.4	124.3	30.1
2	143/3 = 47	64.4	124.3	- 29.8
3	143/3 = 47	64.4	124.3	- 89.7

Hence during a sustained 3-month dry period the storage will need to be supplemented/and or water conservation.

3 x 30,000 L tanks fed from storage shed roofs + proposed 6 x accommodation units

Consider a combined roof area = 1,505 + 470 = 1,975 m^2

3-month dry period

Month	Rainfall (mm/month)	Collected rainfall (m^3)	Demand (m^3)	Cumulative Storage = Collection – Demand (m^3)
0				90
1	143/3 = 47	83.5	124.3	49.2
2	143/3 = 47	83.5	124.3	8.4
3	143/3 = 47	83.5	124.3	- 32.4

For a 3-month sustained dry period averaging 47 mm/month with the third tank being fed from the proposed 6 units, a deficit will occur in the third month. This may be overcome by reducing water usage to 136 L/person/day during the last month.

Rainfall

Rainfall distribution

Northland is a narrow peninsula with no part more than 50 kilometres from the sea. This causes winds to be very moist with abundant rainfall throughout the region. Distribution patterns are related to orography: rainfalls range from about 1000 mm in low-lying coastal areas, to approximately 2000 mm at higher elevations. Figure 12 shows the distribution of median annual rainfall based on the 1981-2010 period.

Seasonal influences on rainfall distribution are also quite well defined. Table 6 lists monthly rainfall normals and percentage of annual total for the period 1981-2010 for selected stations. This table shows a clearly defined winter rainfall maximum. The north and east of the region gets 35 to 40 percent of its annual rainfall in the period June to August while stations to the south and west receive about 30 to 35 percent during these three winter months. 18 to 20 percent of Northland annual rainfall is experienced during the summer months (December to February).

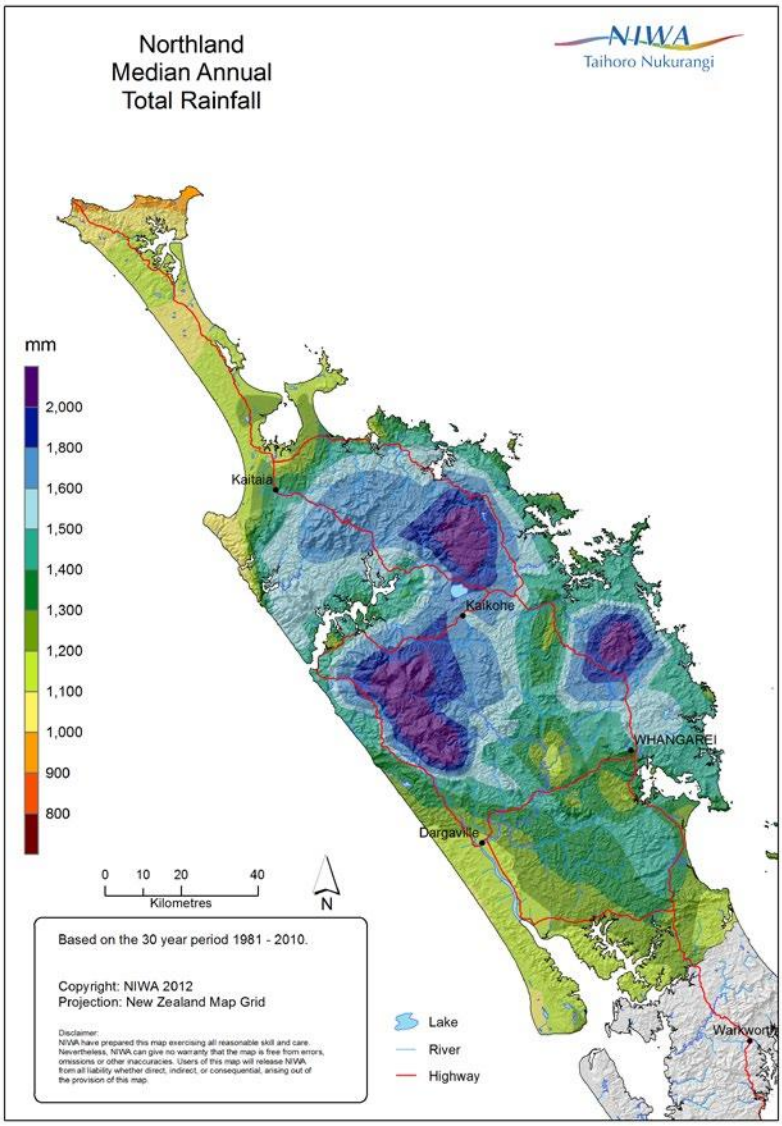


Figure 12. Northland median annual rainfall, 1981-2010.

Table 6. Monthly/annual rainfall normals (a; mm); percentage of annual total for each month (b; %).

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Cape Reinga Aws	a	58	65	56	109	96	103	128	95	85	61	57	76	988
	b	6	7	6	11	10	10	13	10	9	6	6	8	
Kaitaia Observatory	a	85	93	81	96	135	151	169	144	128	99	87	100	1367
	b	6	7	6	7	10	11	12	11	9	7	6	7	
Kaitaia Aero Ews	a	69	121	86	119	138	125	136	104	93	93	73	99	1253
	b	5	10	7	9	11	10	11	8	7	7	6	8	
Kaeo Northland	a	88	102	120	140	144	169	200	170	148	113	102	100	1596
	b	6	6	8	9	9	11	12	11	9	7	6	6	
Rawene 2	a	78	72	89	98	128	145	164	142	118	91	83	91	1299
	b	6	6	7	8	10	11	13	11	9	7	6	7	
Opononi	a	86	65	93	94	124	144	133	116	105	93	92	88	1234
	b	7	5	8	8	10	12	11	9	8	8	7	7	
Kaikohe Aws	a	110	106	109	140	139	152	188	159	124	100	96	109	1532
	b	7	7	7	9	9	10	12	10	8	6	6	7	

Table 6 continued.

Location		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Kerikeri Airport	a	122	117	138	145	154	185	205	182	162	127	114	123	1775
	b	7	7	8	8	9	10	12	10	9	7	6	7	
Russell	a	91	87	116	117	130	144	172	146	121	97	89	90	1400
	b	7	6	8	8	9	10	12	10	9	7	6	6	
Waipoua Visitor Centre	a	89	82	103	97	146	177	166	153	132	110	93	94	1443
	b	6	6	7	7	10	12	11	11	9	8	6	7	
Whangarei Airport	a	78	98	117	103	110	132	169	127	110	84	76	97	1300
	b	6	8	9	8	8	10	13	10	8	6	6	7	
Dargaville 2	a	64	69	102	107	97	121	141	109	109	82	63	74	1137
	b	6	6	9	9	9	11	12	10	10	7	6	7	

The distribution of monthly rainfall is shown in Figure 13. The 10 percentile, 90 percentile and mean values for each month are shown along with maximum and minimum recorded values for several stations.

One of the most marked characteristics of the rainfall regime in Northland is its great variability from month to month and year to year. Rainfall variability can be described by the coefficient of variation (the ratio of the standard deviation to the mean, expressed as a percentage). Table 7 gives seasonal and annual variability for stations in Northland and for selected sites in other regions for comparative purposes.

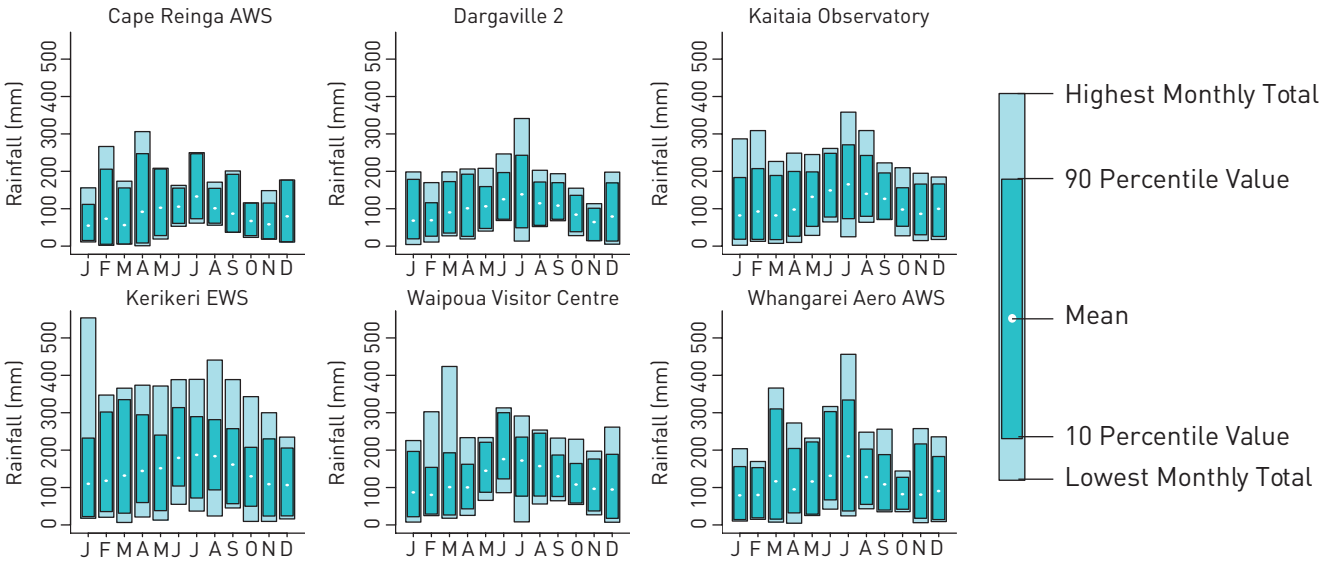


Figure 13. Monthly rainfall for selected Northland stations.

Table 7. Seasonal variability of rainfall (Coefficient of variation).

Location	Summer	Autumn	Winter	Spring
Cape Reinga	46	75	25	45
Kaitaia Observatory	41	34	24	19
Kaeo Northland	50	45	30	31
Rawene 2	42	32	29	25
Kaikohe AWS	47	45	38	33
Kerikeri EWS	46	39	28	32
Waipoua Visitor Centre	42	25	23	31
Whangarei Aero AWS	37	41	33	31
Dargaville 2	37	21	24	17
Auckland	47	24	27	25
Wellington	42	38	30	36
Christchurch	37	27	42	32
Westport	24	28	20	17

Rainfall variability over longer periods is indicated by rainfall deciles, as given in Table 8. The 10th percentile values show the accumulated rainfalls that will normally be exceeded in nine out of ten years, while the 90th percentile values indicate the accumulated falls that will normally be exceeded in only one year in ten. The table includes periods from one month to twelve months; each period over one month begins with the month stated. For example, using the table for Kaitaia, for three months it can be seen that in the three month period beginning in April, 257 mm or more of rainfall can be expected for nine years in ten, while a total of 522 mm or more should occur in only one year in ten.

Table 8. Rainfall deciles for consecutive months.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Kaitaia Observatory												
1 month												
10th	18	18	17	26	53	78	73	80	72	53	30	26
90th	183	207	189	200	198	248	271	242	196	156	166	166
3 months												
10th	114	118	192	257	301	301	301	270	221	194	159	130
90th	431	423	472	522	550	603	606	479	407	426	423	481
6 months												
10th	412	528	563	631	672	611	556	513	405	302	274	364
90th	829	894	917	981	993	947	879	790	836	770	718	755
12 months												
10th	1086	1119	1093	1102	1046	1054	993	1131	1116	1074	1035	1105
90th	1584	1569	1619	1533	1625	1652	1643	1578	1637	1609	1593	1587
Kerikeri EWS												
1 month												
10th	22	33	3	60	38	104	72	94	57	50	24	24
90th	232	302	335	295	240	314	290	282	257	208	230	206
3 months												
10th	148	221	228	305	360	385	379	298	226	166	143	153
90th	617	629	731	645	663	748	727	626	545	550	554	624
6 months												
10th	534	639	699	779	781	736	594	548	507	357	433	462
90th	1148	1222	1229	1269	1290	1188	1157	1194	1025	1045	1078	1079
12 months												
10th	1303	1334	1258	1332	1283	1231	1267	1342	1327	1275	1349	1288
90th	2175	2358	2293	2186	2162	2129	2094	2130	2128	2181	2244	2202
Whangarei Aero												
1 month												
10th	14	19	16	32	29	67	37	55	40	42	18	14
90th	156	153	310	204	222	303	334	203	188	127	217	183
3 months												
10th	122	113	165	175	229	261	253	193	156	140	108	129
90th	578	504	630	742	768	784	805	648	480	459	499	417
6 months												
10th	359	469	517	586	557	518	439	384	374	296	299	349
90th	877	1003	988	961	927	1034	948	757	720	775	803	836
12 months												
10th	955	979	966	932	879	939	831	927	953	942	937	936
90th	1642	1636	1697	1606	1732	1843	1741	1595	1586	1641	1624	1609

NOTES:

SITE BOUNDARY

WATER COURSE

SITE BOUNDARIES FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321.

Issue	Date	Revision
A	25/09/2019	FIRST ISSUE
B	19/06/2020	BASIN DESIGN DRAWINGS (D1 - D4)

DWG Site Location Plan

Scale 1:2000 @A3 (20 10 0 20 40 60 m) Date 25/09/2019

Drawn EJC Checked TMA Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - BASIN DWG.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

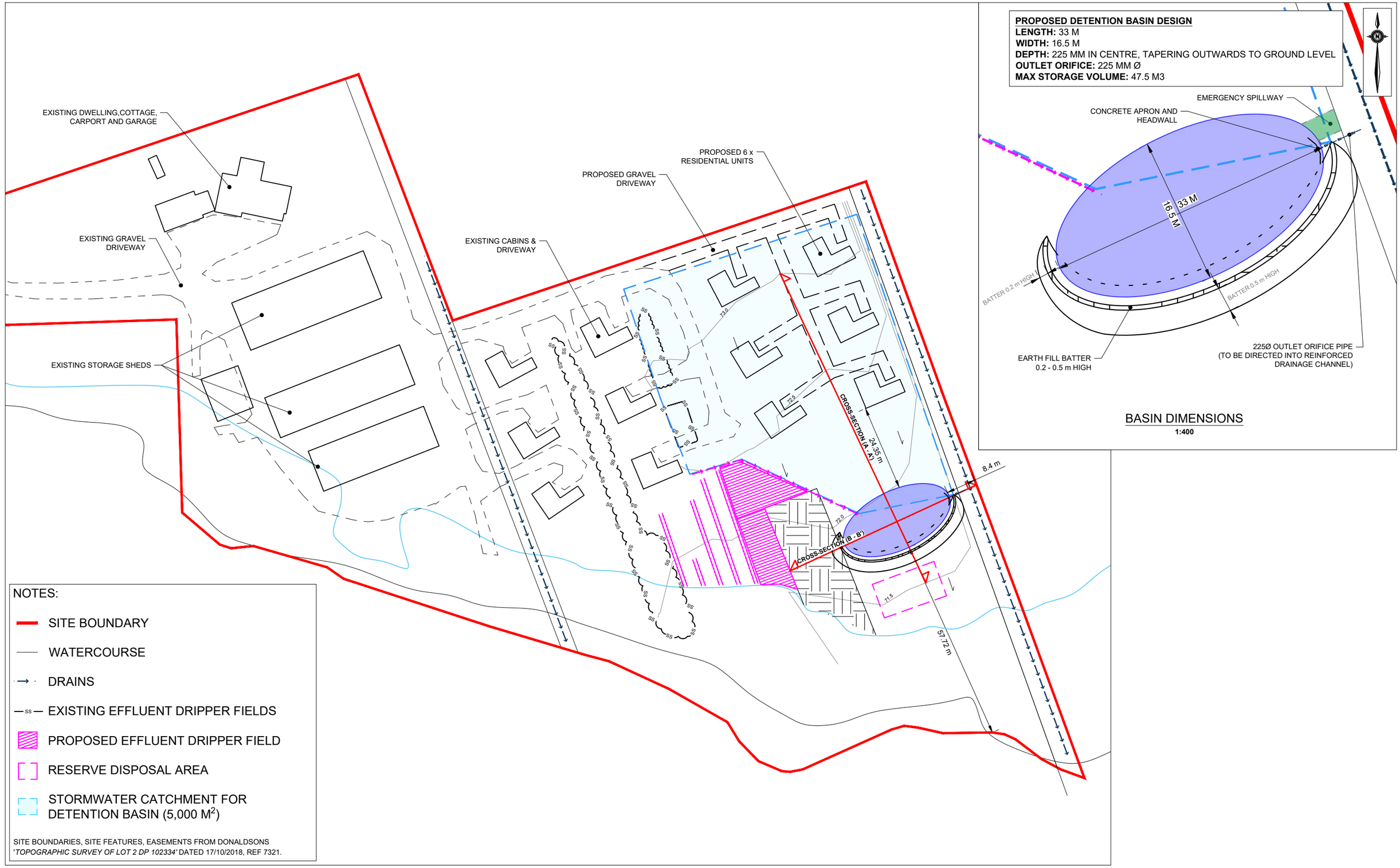
Client Arthur Cottle

Project No. 17 111 RC no.

DWG No. **D1**

Sheet No. **01** of **03**

Plotted By Emily Collings at 1/07/2020 10:34:03 AM



PROPOSED DETENTION BASIN DESIGN
LENGTH: 33 M
WIDTH: 16.5 M
DEPTH: 225 MM IN CENTRE, TAPERING OUTWARDS TO GROUND LEVEL
OUTLET ORIFICE: 225 MM Ø
MAX STORAGE VOLUME: 47.5 M3

BASIN DIMENSIONS
1:400

NOTES:

- SITE BOUNDARY
- WATERCOURSE
- DRAINS
- EXISTING EFFLUENT DRIPPER FIELDS
- PROPOSED EFFLUENT DRIPPER FIELD
- RESERVE DISPOSAL AREA
- STORMWATER CATCHMENT FOR DETENTION BASIN (5,000 M^2)

SITE BOUNDARIES, SITE FEATURES, EASEMENTS FROM DONALDSONS '*TOPOGRAPHIC SURVEY OF LOT 2 DP 102334*' DATED 17/10/2018, REF 7321.

Issue	Date	Revision
A	25/09/2019	FIRST ISSUE
B	19/06/2020	BASIN DESIGN DRAWINGS (D1 - D4)

DWG: Proposed Development Plan

Scale: 1:1000 @A3 (10 5 0 10 20 30 m) Date: 25/09/2019
Drawn: EJC Checked: TMA Approved: JP
File: X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - BASIN DWG.DWG

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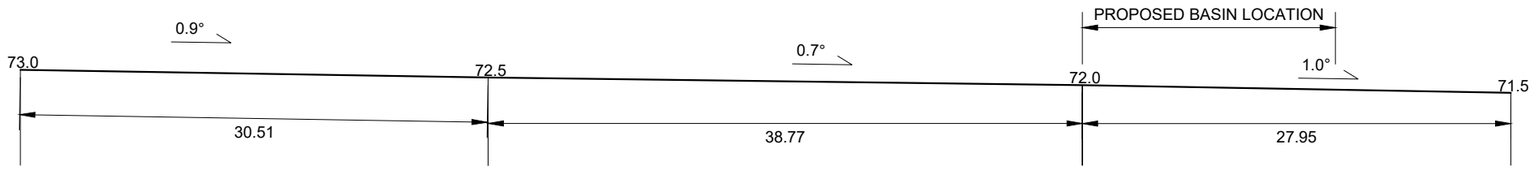
Lot 2 DP 102334
Client: Arthur Cottle
Project No.: 17 111 RC no.:

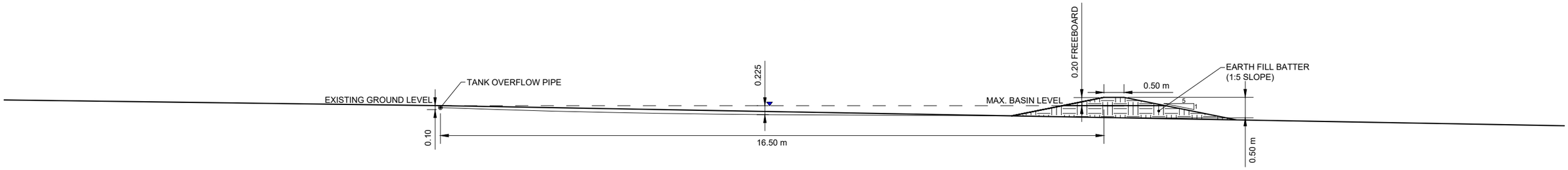
DWG No.: **D2**
Sheet No.: **02** of **03**

Plotted By Emily Collings at 1/07/2020 10:34:04 AM



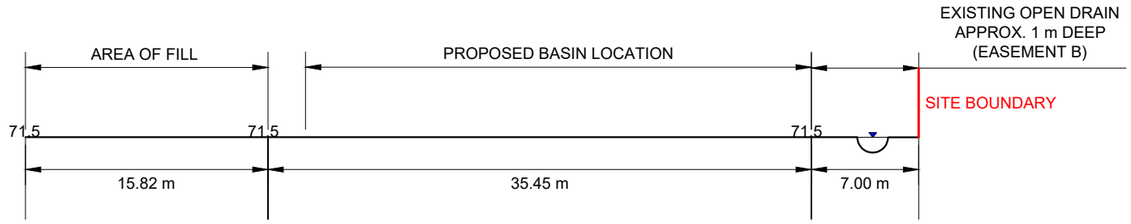
CROSS-SECTION A - A' EXISTING GROUND SLOPE

1:400



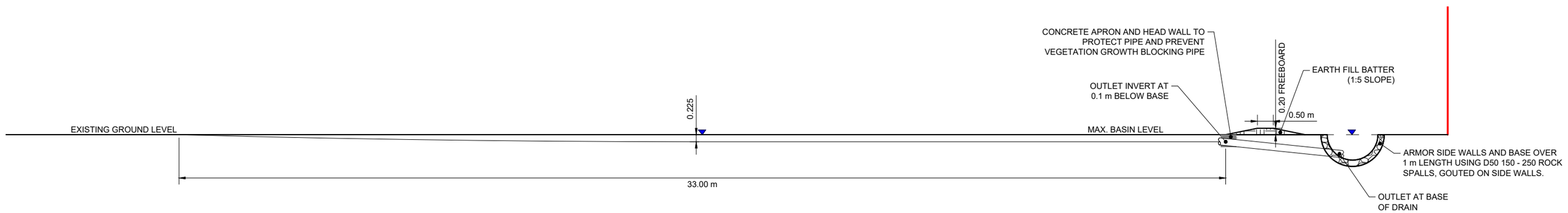
BASIN CROSS-SECTION A - A'

1:100



CROSS-SECTION B - B' EXISTING GROUND SLOPE

1:400



BASIN CROSS-SECTION B - B'

1:125

Issue	Date	Revision
B	19/06/2020	BASIN DESIGN DRAWINGS (D1 - D4)

DWG CROSS-SECTIONS AND STORMWATER BASIN DETAILS

Scale NTS | Date 25/09/2019

Drawn EJC | Checked TMA | Approved JP

File X:\17 JOBS\17 111 ARTHUR COTTLE\DRAWINGS\17 111 - BASIN DWG.DWG

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Project 2000 State Highway 10 Waipapa
Lot 2 DP 102334

Client Arthur Cottle

Project No. 17 111 | RC no.

DWG No. **D3**

Sheet No. **03** of **03**

Plotted By Emily Collings at 1/07/2020 10:34:04 AM