

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)
- Other (please specify) _____
- Discharge
- Change of Consent Notice (s.221(3))
- Extension of time (s.125)

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

3. Would you like to opt out of the Fast Track Process?

Yes No

4. Consultation

Have you consulted with Iwi/Hapū? Yes No

If yes, which groups have you consulted with?

Who else have you consulted with?

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

5. Applicant Details

Name/s:

Mark and Michaela Coulson

Email:

Phone number:

Postal address:

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

6. Address for Correspondence

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

Name/s:

Anna Bensemam: Baseline Group Marlborough

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:

Mark and Michaela Coulson

Property Address/
Location:

25 Mahutonga Avenue

Beachlands

Auckland

Postcode

2018

8. Application Site Details

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

Name/s:	Mark and Michaela Coulson		
Site Address/ Location:	3 Fantail Rise		
	Kerikeri		
			Postcode 0294
Legal Description:	Lot 30 DP 494309	Val Number:	
Certificate of title:	723047		

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.

The applicant seeks land use consent to establish a dwelling with associated earthworks on the site as a restricted Discretionary activity under the Operative Plan.

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

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

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

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

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

- Subdividing land
- Disturbing, removing or sampling soil
- Changing the use of a piece of land
- Removing or replacing a fuel storage system

13. Assessment of Environmental Effects:

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

Your AEE is attached to this application Yes

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) Shanaghan Construction 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)

JOSHUA SHANAGHAN

Signature:

(signature of bill payer)

MANDATORY

Date 6/12/2024

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)

Anna Bensemann

Signature:



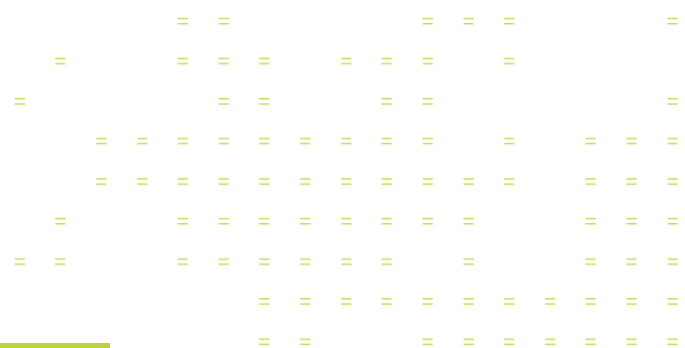
Date 06-Dec-2024

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

Checklist (please tick if information is provided)

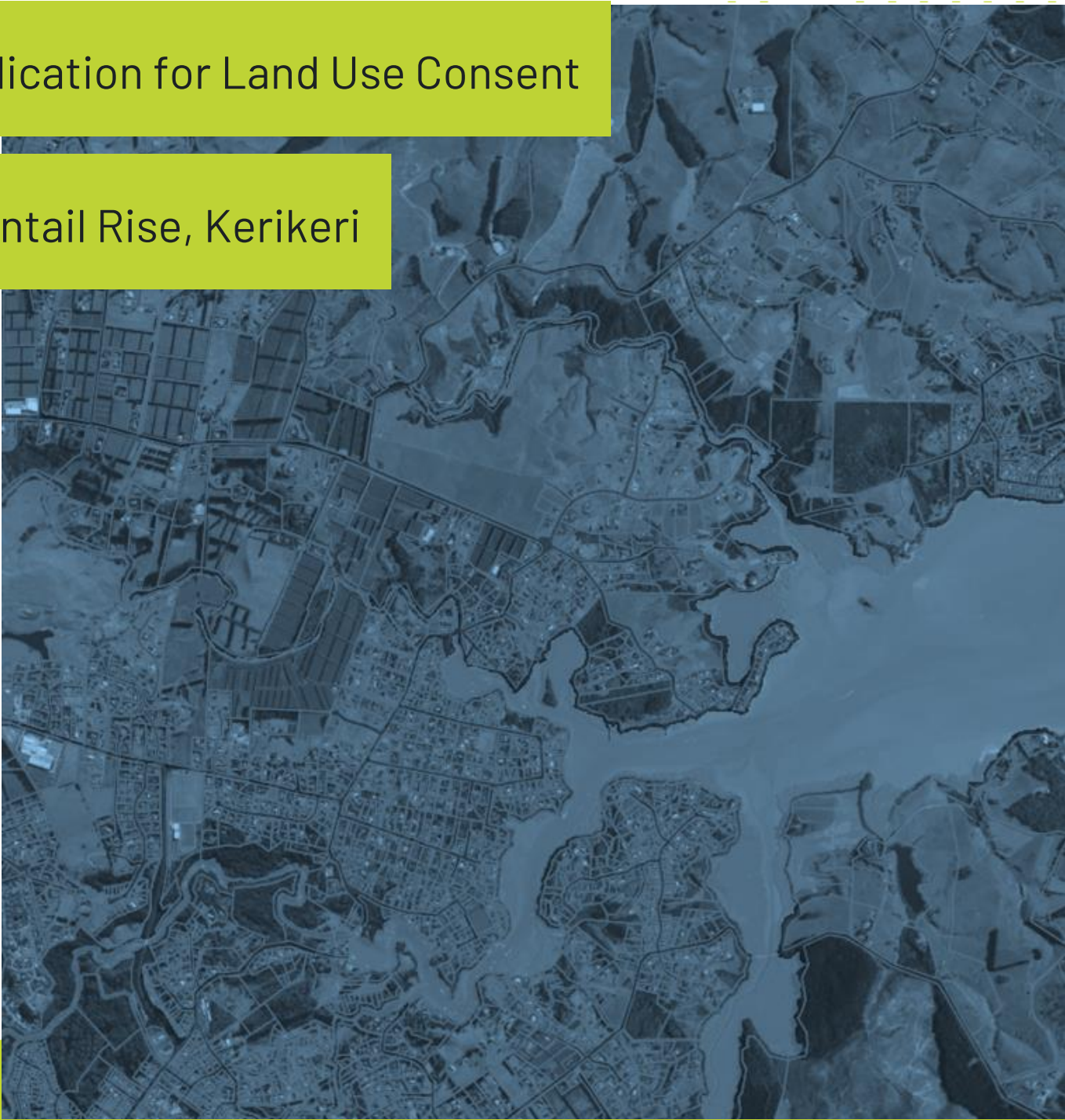
- Payment (cheques payable to Far North District Council)
- A current Certificate of Title (Search Copy not more than 6 months old)
- Details of your consultation with Iwi and hapū
- Copies of any listed encumbrances, easements and/or consent notices relevant to the application
- Applicant / Agent /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

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



Application for Land Use Consent

3 Fantail Rise, Kerikeri



CLIENT

Mark and Michaela Coulson

ADDRESS

3 Fantail Rise, Kerikeri

REFERENCE

BLM2044

Report Information

Reference: BLM2044

Title: Application for Land Use Consent

Client: Mark and Michaela Coulson

Filename: 241126.WB.3 Fantail Rise.Application

Version: 1

Date: **6/12/2024**

Prepared by: Anna Bensemann



Reviewed by: Sally Elford



CHRISTCHURCH OFFICE

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E info@blg.co.nz

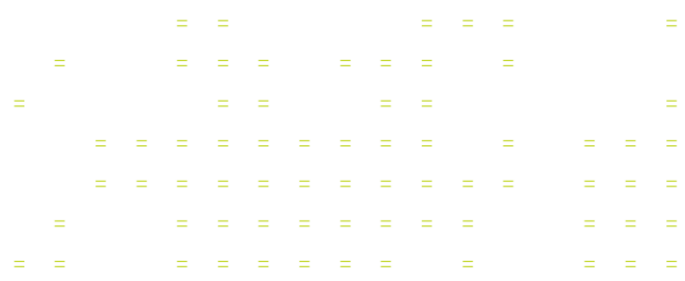
A 54 Manchester Street
Christchurch 8011

MARLBOROUGH OFFICE

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E marlborough@blg.co.nz

A Unit 7, 68 Seymour Street
Blenheim 7201



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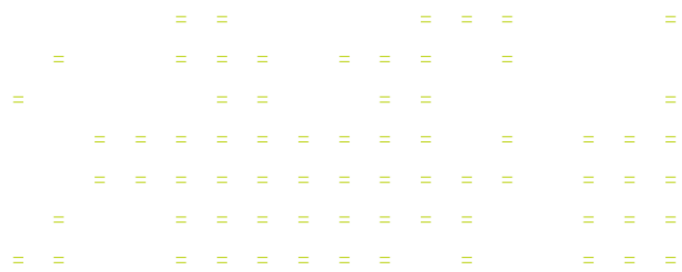
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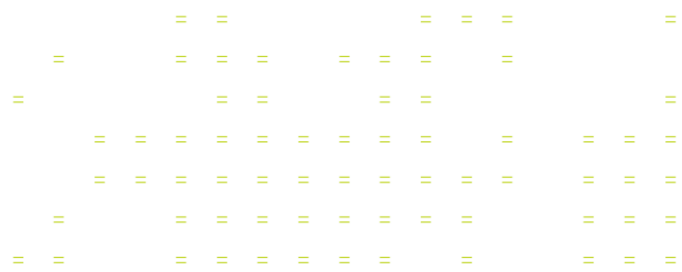
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Appendix 1: Record of Title

Appendix 2: Site and Building Plans

Appendix 3: Stormwater Engineering Report

Appendix 4: Geotechnical and Onsite Wastewater Discharge Engineering Report



1 Summary of application details

1.1 Report purpose

This report is an application for land use consent, including an assessment of the actual and potential effects on the environment, to construct a new dwelling at 3 Fantail Rise, Kerikeri. This application has been prepared in accordance with Schedule 4 of the Resource Management Act 1991 ('RMA' or 'the Act').

Applicant: Mark John Coulson, Michaela Denise Coulson and New Zealand Family Trust Services Limited

Land Owner: Mark John Coulson, Michaela Denise Coulson and New Zealand Family Trust Services Limited

Owner's Address: 25 Mahutonga Avenue, Beachlands, Auckland

Site Address: 3 Fantail Rise, Kerikeri

Legal Description: Lot 30 DP 494309

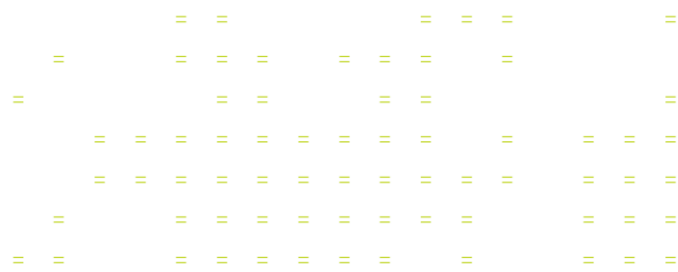
Record of Title: 723047

Site Area: 8,009 m²

District Plan Zoning: *Operative Far North District Plan (the Operative Plan)*
Coastal Living Zone

Proposed Far North District Plan (the Proposed Plan)
Rural Lifestyle Zone

Proposed Activity: The applicant seeks land use consent to establish a dwelling with associated earthworks on the site as a **restricted discretionary** activity under the Operative Plan.



2 Application site and surrounding environment

2.1 Application site

The application site is located at 3 Fantail Rise, Kerikeri, on the corner with Blue Penguin Drive. It is legally described as Lot 30 DP 494309 and contained in Record of Title 723047, which is attached as Appendix 1 to this application. The application site has a total area of 8,009 m².

The site is vacant and contains pasture with perimeter fencing. The site has gentle slopes on the northwestern side of the site with a slope down to Blue Penguin Drive.

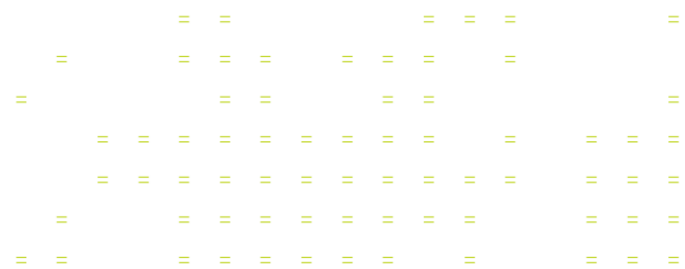
The site includes a consent notice (instrument number 10388614.2), which sets out (among other matters) all buildings are to be located within a specific building envelope. The application site is shown in Figure 1 below.



Figure 1: Aerial image of application site taken from Far North aerial Maps November 2024

2.2 Surrounding area

The surrounding area consists of a range of residential activities on sites of similar scale located along Blue Penguin Drive to the east of the site. Rural farmland adjoins the site to the west. Rural horticultural land making up the hinterland of Kerikeri is present in the wider environment. Kerikeri is located approximately 5.8 km to the southwest of the application site.



3 Description of the proposed activity

It is proposed to construct a new dwelling on the site within the building envelope identified in the consent notice. A copy of the site and building plans are attached in Appendix 2.

3.1 Proposed land use

It is proposed to construct a new dwelling containing four bedrooms, a media room, and open plan kitchen/dining/living room space, and separate laundry space. The dwelling will include a double garage with internal access and a separate standalone garage. In addition, the proposal includes a pool with associated paving, and a sperate pool house containing a bathroom and storage space. Uncovered paved patio and driveway areas are also proposed. The total areas for these spaces are as follows:

Table 1 - Proposed Coverage

Type of coverage	Area (m ²)
Building coverage	413.39
Pathway coverage	345.22
Driveway Coverage	385.48
Total	1144.09

Overall, this results in a site coverage of 14.29% of the entire site.

3.2 Services

It is proposed to supply water to the new dwelling via roof water collection into storage tanks, located in the southeast corner of the consent notice building platform. It is proposed to accommodate three large storage tanks on the site, and fourth detention tank as recommended in the attached Stormwater Engineering Report (attached in Appendix 3).

It is proposed to discharge wastewater onsite via a domestic onsite wastewater treatment system located on the easter side of the building platform. It is proposed to install a secondary treatment system with 412 m² disposal field. The proposed system has been designed to comply with the Regional Plan and conditions of the Consent Notice, therefore not requiring resource consent from the Regional Authority. A copy of the Onsite Wastewater Management Report describing this system is attached in Appendix 4 (combined with the geotechnical report).

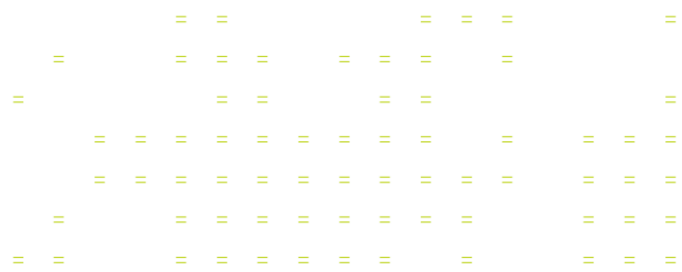
It is proposed stormwater overflow from the roof areas (not used for water supply) and from impervious hardstand areas will be collected and discharged to the road side drain on the northern/western side of Blue Penguin Drive in accordance with the design details set out in the Stormwater Engineering Report attached in Appendix 3 - this report is considered to form part of the description of the proposal.

3.3 Access

It is proposed to install a new driveway from the garage areas of the dwelling to Fantail Rise. A vehicle crossing application in accordance with the Consent Notice on the title is required and will be applied for separately to Council.

3.4 Geotechnical

A geotechnical assessment of the site is attached in Appendix 4 and includes recommendations in relation to the management of foundations for the geotechnical conditions present on the site. This report concludes that



foundations need to be up to 0.3 m into the virgin grounds on the site. The proposal will comply with this recommendation.

3.5 Earthworks

The proposal includes foundations to support the development of the dwelling, sperate garage, driveway and hard stand area, the pool shed. Works for these activities are likely to include 1,680 m³ of cut area, with maximum cuts of 1.3 m.

In addition, the inground pool will require excavations of 69 m³ and will include cut depths of up to 1.5 m to be retained by the pool structure.

The proposed onsite wastewater treatment system proposes to install a distribution field pinned on top of the ground with 200 mm of topsoil spread across the 412 m². A total of 82.4 m³ of topsoil is required and may be sourced from the excavation of the building site.

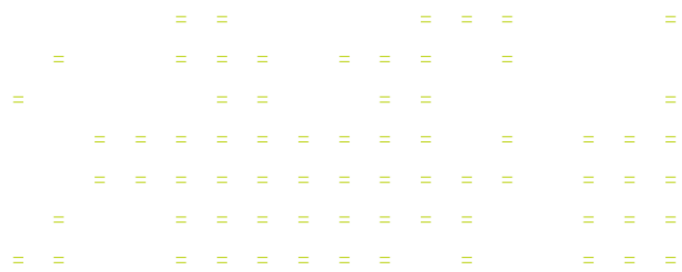
Earthworks are proposed to be undertaken during a relatively fine period of weather. Erosion and sediment control measures such as ensuring sediment laden water is directed to settlement areas during construction and the use of cut off drains to achieve this. Where necessary sediment fences may be used. There proposed building platform is located a minimum of 10 m from property boundaries and consequently the existing grass on the site will also aid in managing sediment runoff from the building platform. During construction it may be necessary to store topsoil, storage piles will be located on a relatively flat area, away from property boundaries and if stored for 12 months or more will be secured by way of grassing, or covering to ensure sediment does not become mobile.

Once works are complete any exposed soils will be regrassed to ensure they remain stable.

3.6 Other matters

There are no other matters relating to the proposal which would require resource consents.

It is anticipated that Council will impose and accidental discovery protocol consistent with wording approved by relevant iwi for use. The applicant accepts such a condition.



4 Planning framework

The Far North District Plan contains the relevant planning framework relating to the proposed dwelling development on the application site.

4.1 Zoning

The application site is in the Coastal Living Zone in the Operative Plan, as shown in Figure 2 below:

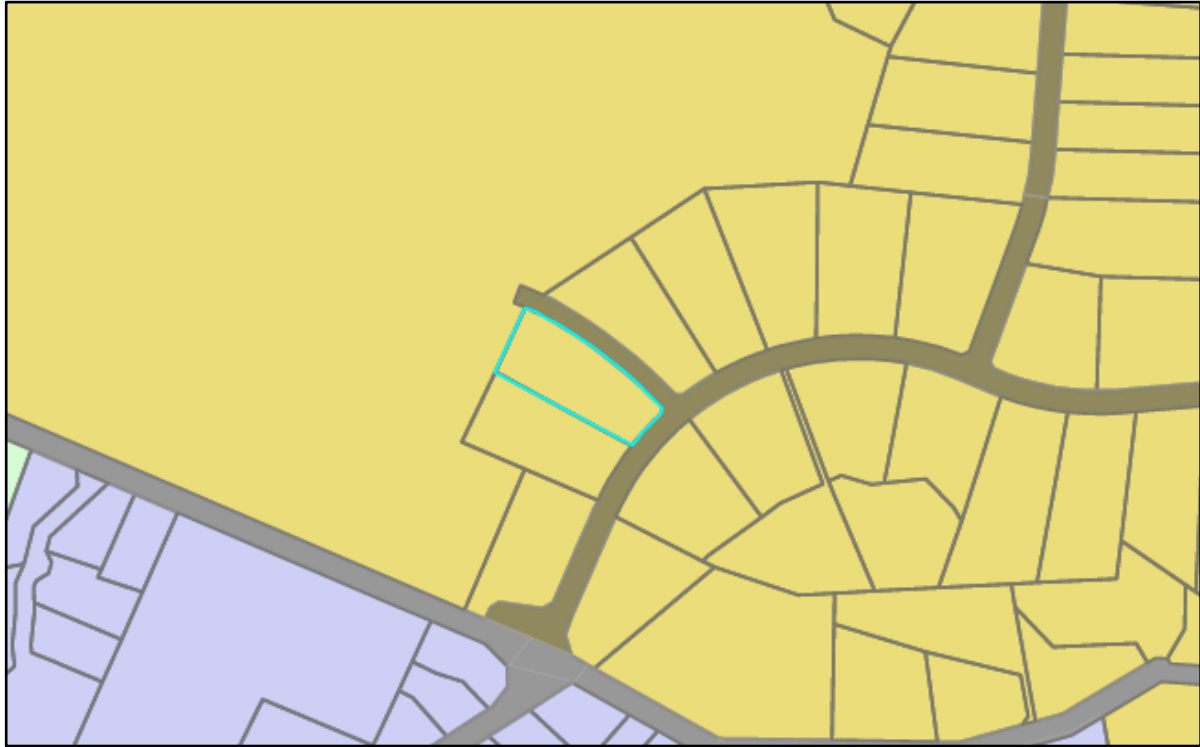
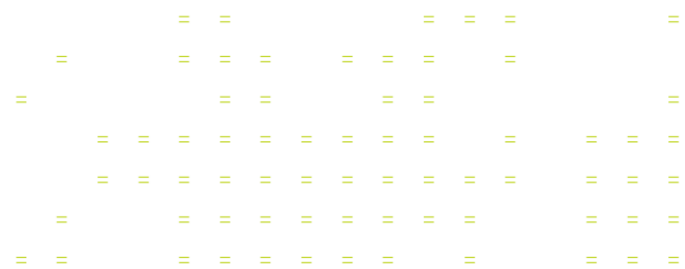


Figure 2: Excerpt from Planning Maps taken from Far North Operative District Plan Maps November 2024

4.2 Land use

The following is an assessment against the relevant Coastal Living Zone rules of the Operative Plan:

Rule	Proposal	Compliance
Chapter 10.7 Coastal Living Zone		
<p><i>10.7.5.1.1 VISUAL AMENITY</i> <i>The following are permitted activities in the Coastal Living Zone:</i></p> <p><i>(a) any new building(s), provided that the gross floor area of any new building(s) permitted under this rule does not exceed 50m²; or</i></p> <p><i>(b) any alteration/addition to an existing building which does not exceed 30% of the gross floor area of the building which is being altered or added to, provided that any alteration/addition does not exceed the height of the existing building and that any alteration/addition is to a building that existed at 28 April 2000.</i></p>	<p>The proposal seeks new buildings which exceed 50 m².</p>	<p>Does not comply</p>

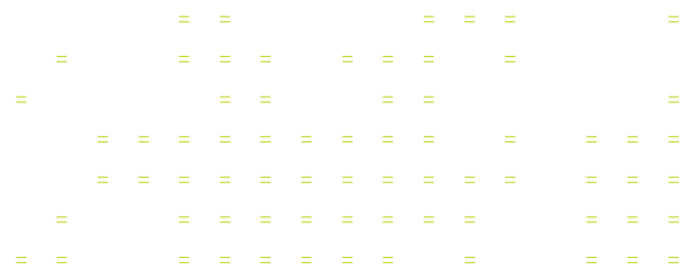


Rule	Proposal	Compliance
Chapter 10.7 Coastal Living Zone		
(c) replacement of any building so long as the replacement does not exceed the building envelope occupied by the previous building; or (d) renovation or maintenance of any building.		
10.7.5.1.4 BUILDING HEIGHT The maximum height of any building shall be 8m.	The proposal includes buildings which do not exceed 8 m in height.	Complies
10.7.5.1.5 SUNLIGHT No part of any building shall project beyond a 45 degree recession plane as measured inwards from any point 2m vertically above ground level on any site boundary (refer to definition of Recession Plane in Chapter 3 - Definitions), except where a site boundary adjoins a legally established entrance strip, private way, access lot, or access way serving a rear site, the measurement shall be taken from the farthest boundary of the entrance strip, private way, access lot, or access way.	The proposal includes sufficient setbacks from boundaries to comply with recession plane requirements.	Complies
10.7.5.1.6 STORMWATER MANAGEMENT The maximum proportion or amount of the gross site area which may be covered by buildings and other impermeable surfaces shall be 10% or 600 m ² whichever is the lesser.	The proposal seeks to cover more than 10 % of the site with buildings or other impermeable surfaces.	Does not comply
10.7.5.1.7 SETBACK FROM BOUNDARIES Buildings shall be set back a minimum 10m from any site boundary, except that on any site with an area less than 5,000m ² this set back shall be 3m from any site boundary.	The site is more than 5,000 m ² and all buildings are located more than 10 m from site boundaries.	Complies
10.7.5.2 CONTROLLED ACTIVITIES		
10.7.5.2.2 VISUAL AMENITY Any new building(s) or alteration/additions to an existing building that does not meet the permitted activity standards in Rule 10.7.5.1.1 are a controlled activity where the new building or building alteration/addition is located entirely within a building envelope that has been approved under a resource consent.	The proposal seeks a new building located fully within the building envelope approved under the subdivision resource consent as identified as part of the consent notice on the title.	Resource consent is required as a controlled activity
10.7.5.3 RESTRICTED DISCRETIONARY ACTIVITIES		
10.7.5.3.8 STORMWATER MANAGEMENT The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15% or 1,500m ² , whichever is the lesser.	The proposal includes buildings and site coverage which does not exceed 15 %.	Resource consent is required as a restricted discretionary activity

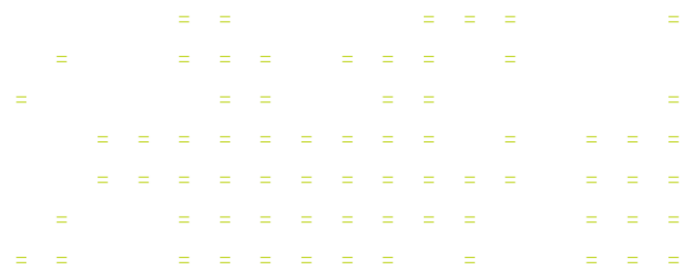
Given the above assessment the proposed activity is assessed as a restricted discretionary activity under Rule 10.7.5.3.8 of the Operative Plan.

4.3 Transport

The following is an assessment against the relevant transportation rules of the Operative Plan:



Rule	Proposal	Compliance
Chapter 15 Transportation		
<p>15.1.6A.2.1 TRAFFIC INTENSITY</p> <p>The Traffic Intensity threshold value for a site shall be determined for each zone by Table 15.1.6A.1 above. The Traffic Intensity Factor for a proposed activity (subject to the exemptions identified below) shall be determined by reference to Appendix 3A in Part 4.</p> <p>This rule only applies when establishing a new activity or changing an activity on a site. However, when considering a new activity or changing an activity, the Traffic Intensity Factor for the existing uses (apart from those exempted above) on site need to be taken into account in order to address cumulative effects.</p> <p>Exemptions: The first residential unit on a site, farming, forestry and construction traffic (associated with the establishment of an activity) are exempt from this rule.</p>	<p>The proposal seeks consent for the first residential unit on a site, and therefore is exempt from this rule</p>	<p>N/A</p>
<p>15.1.6B.1.1 ON-SITE CAR PARKING SPACES</p> <p>Where:</p> <p>(i) an activity establishes; or</p> <p>(ii) the nature of an activity changes; or</p> <p>(ii) buildings are altered to increase the number of persons provided for on the site;</p> <p>the minimum number of on-site car parking spaces to be provided for the users of an activity shall be determined by reference to Appendix 3C, unless an activity complies with the exemptions below.</p> <p>Appendix 3C requires 2 parking spaces for a standard residential unit.</p>	<p>The proposal includes more than 2 parking spaces.</p>	<p>Complies</p>
<p>15.1.6C.1.1 PRIVATE ACCESSWAY IN ALL ZONES</p> <p>(a) The construction of private accessway, in addition to the specifics also covered within this rule, is to be undertaken in accordance with Appendix 3B-1 in Part 4 of this Plan.</p> <p>Coastal living Zone, one household, carriageway 3 m, unsealed gradient 1:5, sealed gradient of 1:4 - with stormwater drainage.</p> <p>(b) Minimum access widths and maximum centreline gradients, are set out in the Appendix 3B-1 table except that the grade shall be:</p> <p>All urban zones; excluding the Commercial and Industrial Zones - No steeper than 1:8 adjacent to the road boundary for at least 5m.</p>	<p>The proposed driveway serving one household shall have a minimum width of 3 m and a gradient not exceeding 1:5 and shown on the attached plans.</p>	<p>Complies</p>
<p>15.1.6C.1.7 GENERAL ACCESS STANDARDS</p> <p>(a) Provision shall be made such that there is no need for vehicles to reverse off a site except where there are less than 4 parking spaces gaining access from a local road.</p> <p>(b) All bends and corners on the private accessway are to be constructed to allow for the passage of a Heavy Rigid Vehicle.</p> <p>(c) Any access where legal width exceeds formation requirements shall have surplus areas (where legal width is wider than the formation) grassed.</p> <p>(d) Runoff from impermeable surfaces shall, wherever</p>	<p>The proposed access will include turnaround areas. There are no bends in the access. Grass swales for stormwater management will be used where required.</p>	<p>Complies</p>



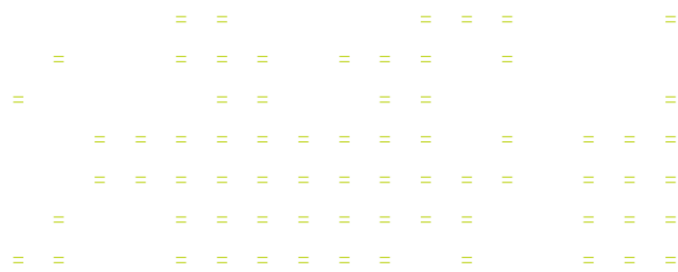
Rule	Proposal	Compliance
Chapter 15 Transportation		
<i>practicable, be directed to grass swales and/or shall be managed in such a way as will reduce the volume and rate of stormwater runoff and contaminant loads.</i>		

Given the above assessment the proposed activity is assessed as a permitted activity under Chapter 15 of the Operative Plan.

4.4 Earthworks

The following is an assessment against the relevant Natural and Physical Resources rules of the Operative Plan:

Rule	Proposal	Compliance
Chapter 12 Natural and Physical Resources		
<p>12.3.6.1.2 EXCAVATION AND/OR FILLING, INCLUDING OBTAINING ROADING MATERIAL BUT EXCLUDING MINING AND QUARRYING, IN THE RURAL LIVING, COASTAL LIVING, SOUTH KERIKERI INLET, GENERAL COASTAL, RECREATIONAL ACTIVITIES, CONSERVATION, WAIMATE NORTH AND POINT VERONICA ZONES</p> <p><i>Excavation and/or filling, excluding mining and quarrying, on any site in the Rural Living, Coastal Living, South Kerikeri Inlet Zone, General Coastal, Recreational Activities, Conservation, Waimate North and Point Veronica Zones is permitted, provided that:</i></p> <p><i>(a) it does not exceed 300m³ in any 12 month period per site; and</i></p> <p><i>(b) it does not involve a cut or filled face exceeding 1.5m in height i.e. the maximum permitted cut and fill height may be 3m.</i></p>	The proposal seeks to undertake earthworks exceeding 300 m ³ .	Does not comply
<p>12.3.6.1.4 NATURE OF FILLING MATERIAL IN ALL ZONES</p> <p><i>Filling in any zone shall meet the following standards:</i></p> <p><i>(a) the fill material shall not contain putrescible, pollutant, inflammable or hazardous components; and</i></p> <p><i>(b) the fill shall not consist of material other than soil, rock, stone, aggregate, gravel, sand, silt, or demolition material; and</i></p> <p><i>(c) the fill material shall not comprise more than 5% vegetation (by volume) of any load.</i></p>	Any fill shall not contain the materials as listed in this rule.	Complies
12.3.6.2 RESTRICTED DISCRETIONARY ACTIVITIES		
<p>12.3.6.2.1 EXCAVATION AND/OR FILLING, EXCLUDING MINING AND QUARRYING, IN THE RURAL LIVING, COASTAL LIVING, SOUTH KERIKERI INLET, GENERAL COASTAL, RECREATIONAL ACTIVITIES, CONSERVATION, WAIMATE NORTH AND POINT VERONICA ZONES</p> <p><i>Excavation and/or filling, excluding mining and quarrying, on any site in the Rural Living, Coastal Living, South Kerikeri Inlet Zone, General Coastal, Recreational Activities, Conservation, Waimate North and Point Veronica Zones is a restricted discretionary activity, provided that:</i></p> <p><i>(a) it does not exceed 2,000 m³ in any 12 month period per site; and</i></p> <p><i>(b) it does not involve a cut or filled face exceeding 1.5m in height i.e. the maximum permitted cut and fill height may be 3m.</i></p>	The proposed works are not likely to exceed 2,000 m ³ and cut and fill heights will not exceed 1.5 m.	Resource consent is required as a restricted discretionary activity



Given the above assessment the proposed activity is assessed as a **restricted discretionary** activity under Rule 12.3.6.2.1 of the Operative Plan.

4.5 Proposed Plan

The proposed plan has been notified, with submissions and further submissions received. The plan change is at the hearings stage, with decisions yet to have been made. Some of the provisions of the Proposed Plan are legally operative. Of the rules relevant to the proposal only the following rule is legally operative:

EW-R13 - Earthworks and erosion and sediment control

Activity status: Permitted

Where: PER-1 - The earthworks complies with standard EW-S5 Erosion and sediment control.

EW-S5 - Erosion and sediment control

Earthworks:

- 1. must for their duration be controlled in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016 (Auckland Council Guideline Document GD2016/005); and*
- 2. shall be implemented to prevent silt or sediment from entering water bodies, coastal marine area, any stormwater system, overland flow paths, or roads.*

In this case, the earthworks are able to be undertaken to ensure erosion and sediment control is managed in accordance with the standards. Given this assessment the proposal is considered to be a **permitted activity** under the legally operative provisions of the Proposed Plan.

4.6 Activity status

Overall, land use consent is sought for a **(restricted) discretionary activity** under the Operative Plan due to:

- Rule 10.7.5.1.1 (Controlled) Visual amenity
- Rule 10.7.5.3.8 (Restricted Discretionary) Stormwater
- Rule 12.3.6.2.1 (Restricted Discretionary) Earthworks volume

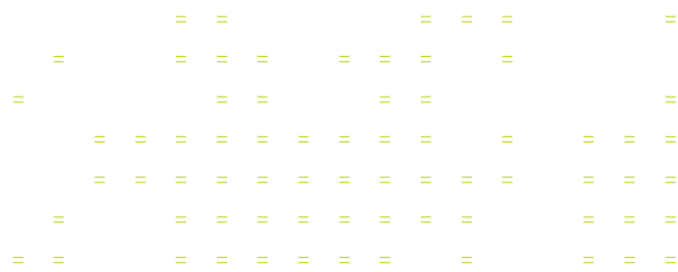
4.7 Assessment matters

The following assessment matters of the Operative Plan are considered to be relevant when considering the proposed activity:

10.7.5.2.2 VISUAL AMENITY

When considering an application under this provision the Council will restrict the exercise of its discretion to matters relating to:

- (i) the size, bulk, and height of the building or utility services in relation to ridgelines and natural features;*
- (ii) the colour and reflectivity of the building;*
- (iii) the extent to which planting can mitigate visual effects;*
- (iv) any earthworks and/or vegetation clearance associated with the building;*
- (v) the location and design of associated vehicle access, manoeuvring and parking areas;*
- (vi) the extent to which the building will be visually obtrusive;*
- (vii) the cumulative visual effects of all buildings on the site;*



- (viii) the degree to which the landscape will retain the qualities that give it its naturalness, visual and amenity values;*
- (x) the extent to which private open space can be provided for future uses;*
- (xi) the extent to which the siting, setback and design of building(s) avoid visual dominance on landscapes, adjacent sites and the surrounding environment;*
- (xii) the extent to which non-compliance affects the privacy, outlook and enjoyment of private open spaces on adjacent sites.*

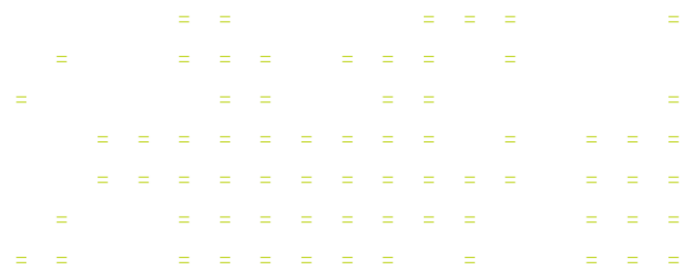
12.3.6.2.1 EXCAVATION AND/OR FILLING, EXCLUDING MINING AND QUARRYING, IN THE RURAL LIVING, COASTAL LIVING, SOUTH KERIKERI INLET, GENERAL COASTAL, RECREATIONAL ACTIVITIES, CONSERVATION, WAIMATE NORTH AND POINT VERONICA ZONES

The Council will restrict the exercise of its discretion to:

- (i) the effects of the area and volume of soils and other materials to be excavated; and*
- (ii) the effects of height and slope of the cut or filled faces; and*
- (iii) the time of the year when the earthworks will be carried out and the duration of the activity; and*
- (iv) the degree to which the activity may cause or exacerbate erosion and/or other natural hazards on the site or in the vicinity of the site, particularly lakes, rivers, wetlands and the coastline; and*
- (v) the extent to which the activity may adversely impact on visual and amenity values; and*
- (vi) the extent to which the activity may adversely affect cultural and spiritual values; and*
- (vii) the extent to which the activity may adversely affect areas of significant indigenous vegetation or significant habitats of indigenous fauna; and*
- (viii) the number, trip pattern and type of vehicles associated with the activity; and*
- (ix) the location, adequacy and safety of vehicular access and egress; and*

11.3 STORMWATER MANAGEMENT

- (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.*
- (b) The extent to which Low Impact Design principles have been used to reduce site impermeability.*
- (c) Any cumulative effects on 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.*
- (e) The physical qualities of the soil type.*
- (f) Any adverse effects on the life supporting capacity of soils.*
- (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.*
- (h) The extent to which paved, impermeable surfaces are necessary for the proposed activity.*
- (i) The extent to which landscaping may reduce adverse effects of run-off.*
- (j) Any recognised standards promulgated by industry groups.*
- (k) The means and effectiveness of mitigating stormwater run-off to that expected by the permitted activity threshold.*
- (l) The extent to which the proposal has considered and provided for climate change.*
- (m) The extent to which stormwater detention ponds and other engineering solutions are used to mitigate any adverse effects.*



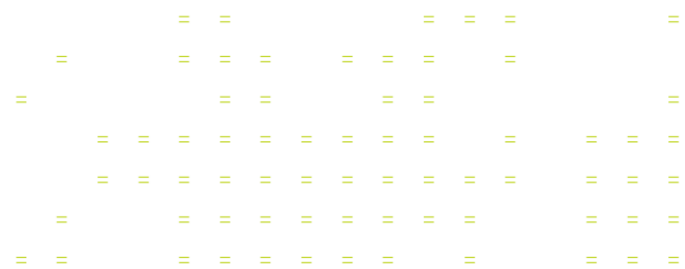
5 Assessment of relevant objectives and policies

Under Schedule 4 Clause 2(g) of the RMA, the following is an assessment of the activity against the relevant objectives and policies of the Operative Plan, the Proposed Plan and the Regional Policy Statement. Therefore, no other plans are considered relevant in this case.

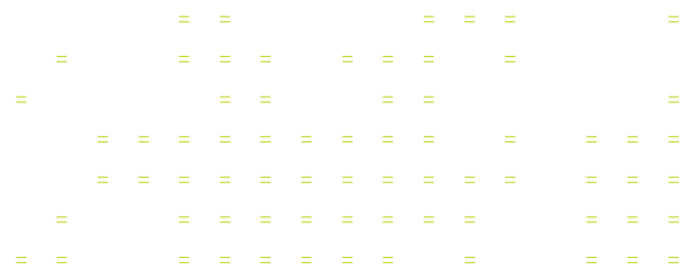
5.1 Operative Plan

The following is an assessment of the proposed development against the applicable Objectives and Policies in Chapters 10, 12 and 15 of the Operative Plan:

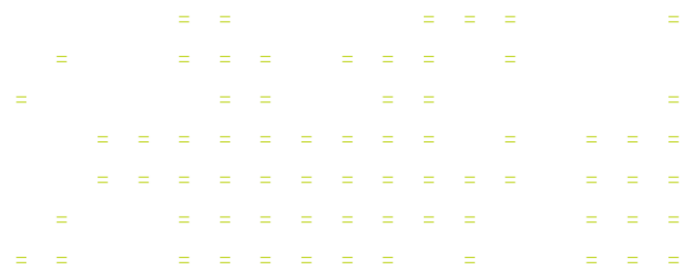
Objective or Policy	Proposal	Consistency
Chapter 10 Coastal Environment		
10.3 OBJECTIVES		
10.3.1 To manage coastal areas in a manner that avoids adverse effects from subdivision, use and development. Where it is not practicable to avoid adverse effects from subdivision use or development, but it is appropriate for the development to proceed, adverse effects of subdivision use or development should be remedied or mitigated.	The proposal seeks to place a dwelling within the approved building platform to ensure development meets the anticipated open space and amenity values of the coastal environment. The site is outside of any identified areas of significant indigenous vegetation or any areas of outstanding landscapes and natural features. The site is sufficiently far from the coastline to not affect the natural character.	Consistent
10.3.2 To preserve and, where appropriate in relation to other objectives, to restore, rehabilitate protect, or enhance: (a) the natural character of the coastline and coastal environment; (b) areas of significant indigenous vegetation and significant habitats of indigenous fauna; (c) outstanding landscapes and natural features; (d) the open space and amenity values of the coastal environment; (e) water quality and soil conservation (insofar as it is within the jurisdiction of the Council).	Earthworks will be undertaken in a manner which avoids the mobilisation of sediment into waterways.	Consistent
10.3.9 To facilitate the sustainable management of natural and physical resources in an integrated way to achieve superior outcomes to more traditional forms of subdivision, use and development through management plans and integrated development.		Consistent
10.4 POLICIES		
10.4.1 That the Council only allows appropriate subdivision, use and development in the coastal environment. Appropriate subdivision, use and development is that where the activity generally: (a) recognises and provides for those features and elements that contribute to the natural character of an area that may require preservation, restoration or enhancement; and (b) is in a location and of a scale and design that minimises adverse effects on the natural character	The proposal seeks to use the existing identified building platform which was approved to avoid adverse amenity or open space effects. The proposed dwelling can adequately be serviced for water supply, onsite wastewater discharge, and appropriate stormwater drainage to councils' system can be achieved, without creating adverse effects on this system. The vehicle crossing will be provided to Fantail Rise, and access to Blue Penguin Drive.	Consistent



Objective or Policy	Proposal	Consistency
<p>of the coastal environment; and</p> <p>(c) has adequate services provided in a manner that minimises adverse effects on the coastal environment and does not adversely affect the safety and efficiency of the roading network; and</p> <p>(d) avoids, as far as is practicable, adverse effects which are more than minor on heritage features, outstanding landscapes, cultural values, significant indigenous vegetation and significant habitats of indigenous fauna, amenity values of public land and waters and the natural functions and systems of the coastal environment; and</p> <p>(h) gives effect to the New Zealand Coastal Policy Statement and the Regional Policy Statement for Northland.</p>	<p>Any earthworks can be undertaken in accordance with an accidental discovery protocol to ensure any unknown items of cultural heritage value discovered during works are appropriately managed.</p>	
<p>10.4.11 To promote land use practices that minimise erosion and sediment run-off, and storm water and waste water from catchments that have the potential to enter the coastal marine area.</p>	<p>The proposal includes appropriate measures to manage the mobilisation of sediment avoiding the potential for sediment to enter the coastal marine area.</p>	Consistent
<p>10.4.12 That the adverse effects of development on the natural character and amenity values of the coastal environment will be minimised through:</p> <p>(a) the siting of buildings relative to the skyline, ridges, headlands and natural features;</p> <p>(b) the number of buildings and intensity of development;</p> <p>(c) the colour and reflectivity of buildings;</p> <p>(d) the landscaping (including planting) of the site;</p> <p>(e) the location and design of vehicle access, manoeuvring and parking areas.</p>	<p>The proposed dwelling is to be located within the approved building platform, and the dwelling will be of an appropriate colour scheme to avoid being intrusive in the landscape. Parking and access are located at the rear of the dwelling relative the public viewing points, and therefore will not impact on natural character or amenity values.</p>	Consistent
<p>10.7.3 OBJECTIVES</p> <p>These objectives supplement those set out in Section 10.3.</p> <p>10.7.3.1 To provide for the well being of people by enabling low density residential development to locate in coastal areas where any adverse effects on the environment of such development are able to be avoided, remedied or mitigated.</p> <p>10.7.3.2 To preserve the overall natural character of the coastal environment by providing for an appropriate level of subdivision and development in this zone.</p>	<p>The proposal seeks low density residential development on an approved building platform, on a site subdivided expressly for this purpose.</p>	Consistent
<p>10.7.4 POLICIES</p> <p>These policies supplement those set out in Section 10.4.</p> <p>10.7.4.1 That the adverse effects of subdivision, use, and development on the coastal environment are avoided, remedied or mitigated.</p> <p>10.7.4.2 That standards be set to ensure that subdivision, use or development provides adequate</p>	<p>The proposal has adequate servicing to support the development of the site. On-site mitigation of stormwater discharge rates will ensure the stormwater discharge does not overwhelm the reticulated service in this area.</p> <p>The site contains no indigenous biodiversity, and the proposed dwelling is to be located within the approved building platform as required by the consent notice to ensure open</p>	Consistent



Objective or Policy	Proposal	Consistency
<p>infrastructure and services and maintains and enhances amenity values and the quality of the environment.</p> <p>10.7.4.3 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the zone in regards to s6 matters, and shall avoid adverse effects as far as practicable by using techniques including:</p> <p>(a) clustering or grouping development within areas where there is the least impact on natural character and its elements such as indigenous vegetation, landforms, rivers, streams and wetlands, and coherent natural patterns;</p> <p>(b) minimising the visual impact of buildings, development, and associated vegetation clearance and earthworks, particularly as seen from public land and the coastal marine area;</p> <p>(d) through siting of buildings and development, design of subdivisions, and provision of access that recognise and provide for the relationship of Maori with their culture, traditions and taonga including concepts of mauri, tapu, mana, wehi and karakia and the important contribution Maori culture makes to the character of the District (refer Chapter 2, and in particular Section 2.5, and Council's "Tangata Whenua Values and Perspectives (2004)");</p>	<p>space and the character of the area is maintained.</p> <p>Any earthworks can be undertaken in accordance with an accidental discovery protocol to ensure any unknown items of cultural heritage value discovered during works are appropriately managed.</p>	
Chapter 12 Natural and Physical Resources		
12.3.3 OBJECTIVES		
12.3.3.1 To achieve an integrated approach to the responsibilities of the Northland Regional Council and Far North District Council in respect to the management of adverse effects arising from soil excavation and filling, and minerals extraction.	<p>Appropriate onsite management of soils during earthworks will ensure sediment is not mobilised into waterways as a result of works. Any excess spoil will be used within the site to provide for landscaping, and will be secured to ensure it remains stable, or will be removed off site to an appropriate location.</p>	Consistent
12.3.3.2 To maintain the life supporting capacity of the soils of the District.		Consistent
12.3.3.3 To avoid, remedy or mitigate adverse effects associated with soil excavation or filling.		Consistent
12.3.4 POLICIES		
12.3.4.1 That the adverse effects of soil erosion are avoided, remedied or mitigated.	<p>Appropriate onsite management of soils during earthworks will ensure sediment is not mobilised into waterways as a result of works. Any excess spoil will be used within the site to provide for landscaping, and will be secured to ensure it remains stable, or will be removed off site to an appropriate location.</p>	Consistent
12.3.4.2 That the development of buildings or impermeable surfaces in rural areas be managed so as to minimise adverse effects on the life supporting capacity of the soil.		Consistent
12.3.4.4 That soil excavation and filling, and mineral extraction activities be designed, constructed and operated to avoid, remedy or mitigate adverse effects on people and the environment.		Consistent
12.3.4.5 That soil conservation be promoted.		



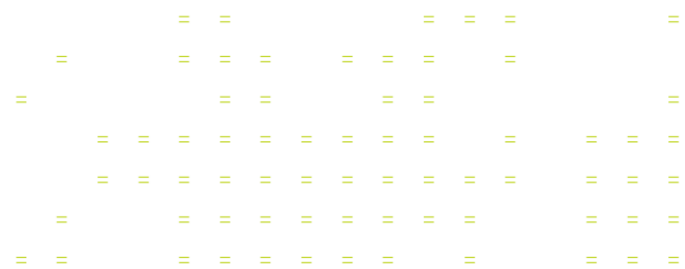
Objective or Policy	Proposal	Consistency
Chapter 15 Transportation		
<i>Objective 15.1.3.1 To minimise the adverse effects of traffic on the natural and physical environment.</i>	The site includes appropriate levels of parking, and appropriate vehicle access and crossing. A separate vehicle crossing application will be made.	Consistent
<i>Objective 15.1.3.3 To ensure that appropriate provision is made for on-site car parking for all activities, while considering safe cycling and pedestrian access and use of the site.</i>		Consistent
15.1.4 POLICIES		
<i>15.1.4.3 That parking spaces be provided at a location and scale which enables the efficient use of parking spaces and handling of traffic generation by the adjacent roading network.</i>	The site includes appropriate levels of parking, and appropriate vehicle access and crossing. A separate vehicle crossing application will be made.	Consistent
<i>15.1.4.6 That the number, size, gradient and placement of vehicle access points be regulated to assist traffic safety and control, taking into consideration the requirements of both the New Zealand Transport Agency and the Far North District Council.</i>		Consistent

Overall, it is considered the proposal is consistent with the objectives and policies of the Operative Plan.

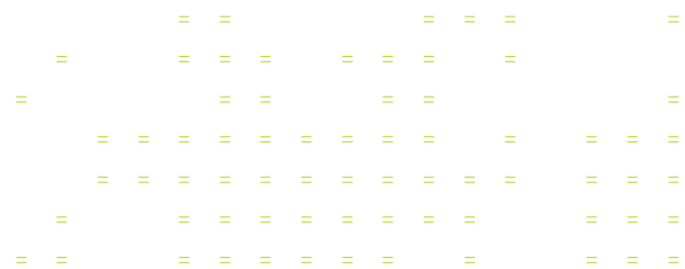
5.2 Proposed Plan

The following is an assessment of the proposed development against the applicable Objectives and Policies in the Proposed Plan:

Objective or Policy	Proposal	Consistency
Part 2 District Wide Matters – General District Wide Matters – Earthworks		
<i>EW-01 Earthworks are enabled where they are required to facilitate the efficient subdivision and development of land, while managing adverse effects on waterbodies, the coastal marine area, public safety, surrounding land and infrastructure.</i>	The proposal seeks to utilise site management practices during construction to ensure sediment is not mobilised into waterways or the coastal environment.	Consistent
<i>EW-02 Earthworks are appropriately designed, located and managed to protect historical and cultural values, natural environmental values, preserve amenity and safeguard the life-supporting capacity of soils.</i>		Consistent
<i>EW-03 Earthworks are undertaken in a manner which does not compromise the stability of land, infrastructure and public safety.</i>		Consistent
<i>EW-P4 Require earthworks to be of a type, scale and form that is appropriate for the location having regards to the effects of the activity, and:</i> <ul style="list-style-type: none"> <i>a. existing site constraints, opportunities and specific engineering requirements;</i> <i>b. the impact on existing natural landforms, features, historic heritage and indigenous biodiversity;</i> <i>c. compatibility with the visual amenity and character values of the area;</i> <i>d. changes in the natural landform that will lead to instability, erosion and scarring;</i> <i>e. impacts on natural drainage patterns and overland flow</i> 		Consistent



Objective or Policy	Proposal	Consistency
<p>paths;</p> <ul style="list-style-type: none"> f. using materials for retaining structures that are compatible with the visual amenity and the characteristics and qualities of the surrounding area; g. minimising adverse visual effects associated with any exposed cut faces or retaining structures, including with the use of screening, landscaping and/or planting; and h. loss of flood storage within flood hazard areas. 		
<p>EW-P5 Manage effects on historic heritage and cultural values that may be discovered when undertaking earthworks by:</p> <ul style="list-style-type: none"> a. requiring a protocol for the accidental discovery of archaeology, kōiwi and artefacts of Māori origin; and b. undertaking appropriate actions in accordance with mātauranga and tikanga Māori when managing effects on cultural values. 	<p>The applicant acknowledges that an accidental discovery protocol will be imposed as a condition of consent.</p>	<p>Consistent</p>
<p>EW-P6 Require that all earthworks are designed and undertaken in a manner that ensures the stability and safety of surrounding land, buildings or structures.</p>	<p>The proposal includes a geotechnical report setting out appropriate foundation design requirements to ensure this policy is achieved.</p>	<p>Consistent</p>
<p>EW-P8 Manage earthworks 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:</p> <ul style="list-style-type: none"> a. the location, scale and volume; b. depth and height of cut and fill; c. the nature of filling material and whether it is compacted; d. the extent of exposed surfaces or stockpiling of fill; e. erosion, dust and sediment controls; f. the risks of natural hazards, particularly flood events; g. stormwater controls; h. flood storage, overland flow paths and drainage patterns; i. impacts on natural coastal processes; j. the stability of land, buildings and infrastructure; k. visual amenity, natural character and landscape values, l. historic heritage values, and whether any assessment or advice from a suitably qualified and experienced heritage expert is required; m. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6; n. the life-supporting capacity of soils; o. the extent of indigenous biodiversity clearance and its effect on biodiversity values; p. outstanding natural character, outstanding natural landscapes and outstanding natural features; q. riparian margins; r. the location, operational and functional needs and use of infrastructure; s. temporary or permanent nature of any adverse effect; and t. traffic and noise effects. 	<p>The proposed works will exceed 300 m³ of works to enable the development of the dwelling, garage, pool areas. The works will be generally located centrally on the site within the approved building platform (except for parts of the driveway formation). Any cuts will be battered or retained as recommended in the geotechnical report.</p> <p>The site is not subject to known natural hazard events. Erosion sediment control measures consistent Council recommendations will be employed during construction, including the use of cut off drains and directing sediment laden water to appropriate settlement areas.</p> <p>The site is sufficiently far from the coastal marine area, and includes appropriate mitigation measures, to ensure sediment does not exit the site into waterways or the costal marine environment.</p> <p>The applicant acknowledges that an accidental discovery protocol will be imposed as a condition of consent.</p>	<p>Consistent</p>



Objective or Policy	Proposal	Consistency
Part 3 Area Specific Matters – Zones		
<p><i>RLZ-02 The predominant character and amenity of the Rural Lifestyle zone is characterised by:</i></p> <ul style="list-style-type: none"> <i>a. low density residential activities;</i> <i>b. small scale farming activities with limited buildings and structures;</i> <i>c. smaller lot sizes than anticipated in the Rural Production Zone;</i> <i>d. a general absence of urban infrastructure;</i> <i>e. rural roads with low traffic volumes;</i> <i>f. areas of vegetation, natural features and open space.</i> 	<p>The proposal seeks to enable low density residential activities with low traffic volumes within the site.</p>	<p>Consistent</p>
<p><i>RLZ-P4 – 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:</i></p> <ul style="list-style-type: none"> <i>a. consistency with the scale and character of the rural lifestyle environment;</i> <i>b. location, scale and design of buildings or structures;</i> <i>c. at zone interfaces:</i> <ul style="list-style-type: none"> <i>i. any setbacks, fencing, screening or landscaping required to address potential conflicts;</i> <i>ii. the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;</i> <i>d. the capacity of the site to cater for on-site infrastructure associated with the proposed activity;</i> <i>e. the adequacy of roading infrastructure to service the proposed activity;</i> <i>f. managing natural hazards;</i> <i>g. any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity; and</i> <i>h. any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.</i> 	<p>The site reflects the scale and character of the Rural Lifestyle environment.</p> <p>The proposed dwelling is to be located within an approved building platform on the site and will utilise recessive colours to ensure amenity values are maintained. The dwelling will be setback more than 10 m from site boundaries.</p> <p>The site is not subject to known natural hazard effects.</p>	<p>Consistent</p>

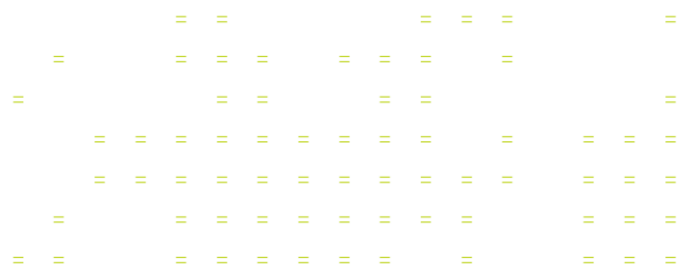
5.3 Regional Policy Statement

Under sections 73(4) and 75(3)(c) of the RMA, local authorities must ensure their district plans continue to give effect to the relevant regional policy statement. Therefore, it is considered if an activity is consistent with the objectives and policies of the relevant district plan or proposed plan, it is also consistent with the objectives and policies of the regional policy statement.

As determined earlier, the proposed activity is considered to be not contrary to any of the objectives and policies of the operative and proposed plan. Therefore, the proposed activity is considered to be consistent with the objectives and policies of the Northland Regional Policy Statement.

5.4 Summary

On balance, it is considered the proposed activity is consistent with the relevant objectives and policies of the Proposed District Plan and the Operative District Plan the Northland Regional Policy Statement.



6 Assessment of environmental effects

In accordance with section 88 of the RMA and the Fourth Schedule, the following is an assessment of the actual and potential effects on the environment arising from the proposed activity. This assessment includes consideration of the relevant matters set out in Clauses 6 and 7 of the Fourth Schedule.

As a restricted discretionary activity the matters listed in section 4.7 above are relevant.

The potential effects of the activity can be categorised into the following key areas:

- Neighbourhood and community effects
- Physical, landscape or visual effects
- Effects on ecosystems
- Effect on natural and physical resources
- Risk from natural hazards
- Positive effects

6.1 Neighbourhood and community effects

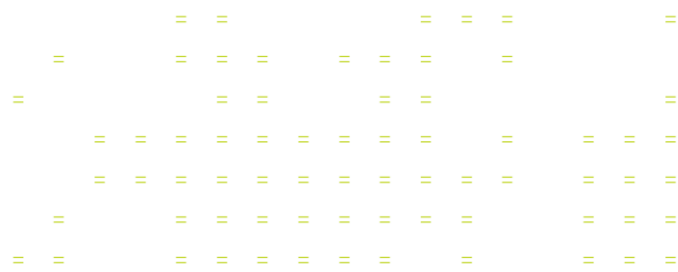
The proposal seeks to establish a dwelling on a site which has been subdivided within the intent of containing residential activities. The proposed dwelling is within the identified building platform, which has been approved under a previous consent. The proposed dwelling achieves height, building to boundary setback and recession plane requirements ensuring it does not appear overly dominant in the immediate area. The dwelling is located on the rear of the site when viewed from Blue Penguin Rise, ensuring it does not dominate this street environment. The application site is part of a series of rolling hills ensuring the proposed dwelling will not appear bulky along the ridgeline when viewed from public viewing places. Adjoining sites to the east and the west of this site have already been developed with residential dwelling. Given these features it is considered any effect on the neighbourhood and wider community have been adequately mitigated by way of the existing building platform and the overall design of the dwelling. Any actual effects will be less than minor.

6.2 Physical, landscape or visual effects

Visual effects

The proposal seeks to include a dwelling which exceeds the maximum building scale permitted in this area. The proposed dwelling is to be established on an approved building platform and is therefore considered as a controlled activity. In this case the proposed buildings are all to be single storied and utilising colours with low reflectance values to ensure they do not appear overly dominant in the landscape. The proposed buildings are clustered together. No vegetation clearance is required to support the dwelling, and any earthworks will be limited to pool excavation, installation of the onsite wastewater system, foundations for buildings and the formation of the driveway. The balance of the site will remain largely unchanged. Any exposed areas will be revegetated once works are complete to ensure the site remains with a similar appearance. The proposal seeks to keep parking and vehicle manoeuvring areas to the rear of the dwelling when viewed from Blue Penguin Rise and other road environments, ensuring the appearance of the site is consistent with surrounding activities. By utilising the approved building platform, the balance of the site will remain open, and appear appropriate in the surrounding landscape.

Given these features, it is considered any visual amenity effects arising from the proposed building are adequately mitigated and actual effects will be less than minor.



Physical Effects – Earthworks

The proposal includes earthworks exceeding 300 m³ in volume to provide for building foundations, the pool excavations, driveway construction and the installation of the onsite wastewater system. These works are to be managed on site during construction to minimise potential effects. Measures include undertaking works during a predicted period of fine weather, including site cut off drains and directing water to settlement areas, installing sediment fences where necessary to avoid sediment runoff onto adjoining properties, ensuring any exposed soils are regrassed so they remain stable.

The works are likely to occur in stages to support each of the different activities (foundations, pool, etc). For each activity the duration of exposed soils is likely to be relatively short (a few days through to a few weeks), however the full course of the works may be 6 – 9 months until completion.

With the above noted measures in place, any actual effects arising from the proposed earthworks will be less than minor.

Physical Effects – Stormwater

The proposal includes impervious surfaces which exceed the areas provided for in the Operative District Plan and have the potential to generate additional stormwater discharge that may overwhelm the infrastructure in the immediate area. The proposed impervious services will generate additional stormwater runoff from that originally anticipated by the development of the site, however the proposal includes onsite mitigation measures to ensure stormwater is sufficiently detained to avoid impacting the capabilities of the network. This is to be achieved through attenuation tanks, the use of suitable sumps and filters and erosion protection on the outlet, as described in the Stormwater Engineering Report attached in Appendix 3.

Although the system will increase the amount of impervious areas within the wider catchment, the proposal will avoid the potential for cumulative effects through the onsite detention system.

The system utilises a sealed system ensuring there is no opportunity for potential contaminants in the stormwater to enter soils in the surrounding area. Appropriate sumps in hardstand areas provide additional protection for any downstream environments.

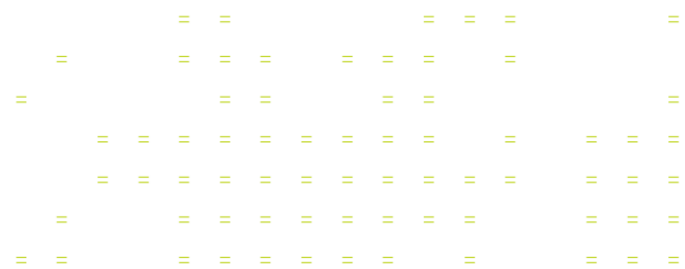
The design engineer has confirmed that the proposed mitigation measures will ensure the effect on the stormwater system will be no greater than the permitted situation. Given this it is considered any actual effect on the environment will be less than minor in this case.

6.3 Effects on ecosystems

The application site is vacant of any indigenous vegetation and is covered completely in pasture. Therefore, the proposed dwelling and associated buildings and earthworks will not impact or alter any ecosystems of significance.

6.4 Effect on natural and physical resources

The proposal will enable the use of land in the Coastal Living Zone to be used for a residential dwelling as intended at the time of subdivision. This is considered to be an appropriate use of the physical land resources. The proposal is able to meet the required vehicle crossing, parking and manoeuvring requirements, and therefore will have additional impact on the safety or functioning of the road environment. Given these features any actual effects on natural and physical resources will be less than minor.



6.5 Risks from natural hazards

The site is not identified as being at risk from natural hazards, and the development of the site is unlikely to create or exacerbate natural hazard effects. The geotechnical report outlines appropriate foundation design to ensure the buildings remain stable. Given these features it is considered any effects from risk of natural hazards is less than minor in this case.

6.6 Positive effects

The proposal will enable the applicant to fully utilise their property for its intended use, which will have a positive effect for the applicant. In addition, there are a range of consultants and trades people who contribute to the build of any dwelling, and will gain an economic benefit, which provides for the wider economy of the district. This is considered to be a positive effect.

6.7 Potentially affected parties

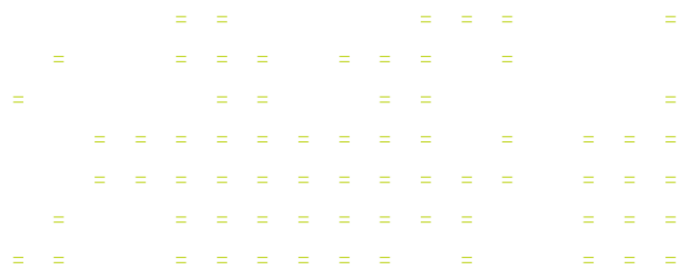
Under Schedule 4, clause 6(1)(f) of the RMA, an application for resource consent must identify the persons affected by the activity, any consultation undertaken and any response to the views of any person consulted.

In this case, the proposed dwelling is on a site specifically subdivided for this purpose and does not impact on any adjoining property. Given this, no parties are considered to be potentially affected, and none have been consulted.

6.8 Effects summary

The proposal seeks to establish a dwelling on the site within the building platform identified under the original subdivision consent for the site. The proposed dwelling will not adversely affect amenity values given its single storied nature and the use of recessive colours. The proposal includes earthworks which exceed 300 m³ and will be managed using appropriate onsite erosion control measures to avoid adverse effects. The proposal includes impervious surfaces beyond that permitted, however onsite stormwater detention will ensure any actual effects of the increased area will be no greater than the permitted activity.

Overall, it is considered the effects of this proposal on the environment are less than minor.



7 Statutory framework

7.1 Part 2 of the RMA

The Resource Management Act (“RMA” or “the Act”) is the principal legislation for the management of the natural and physical resources of New Zealand. All resource consent applications are subject to the provisions of Part 2 of the Act, which sets out the purpose and principles that guide this legislation.

Section 5 of the RMA states the purpose of the Act is “to promote the sustainable management of natural and physical resources.”

The term ‘sustainable management’ is defined in the RMA as meaning:

...managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while;

- (a) Sustaining the potential of natural and physical resources (excluding minerals) to meet the reasonably foreseeable needs of future generations; and*
- (b) Safeguarding the life-supporting capacity of air, water, soil, and ecosystems; and*
- (c) Avoiding, remedying, or mitigating any adverse effects of activities on the environment.*

The proposal is able to satisfy the purpose and principles of the Act, by adequately avoiding or mitigating any adverse effects on the environment arising from the new dwelling.

Section 6 of the Act requires certain matters to be recognised and provided for in relation to managing the use, development and protection of natural and physical resources. The proposal will not impact on the natural character of the coastal environment, given the setbacks from the coastline, and given the measures to mitigate potential sedimentation of the Coastal Marine Area.

Section 7 of the Act lists other matters for which particular regard shall be given to. Subsections (b), (c) and (f) are considered to be relevant to the assessment of the consent application:

- (b) the efficient use and development of natural and physical resources:*
- (c) the maintenance and enhancement of amenity values:*
- (f) maintenance and enhancement of the quality of the environment:*

The proposed activity will enable the use and development of a vacant allotment, created by subdivision for a suitable Coastal Living purpose. The development is proposed to be undertaken in a manner which provides for the above noted features.

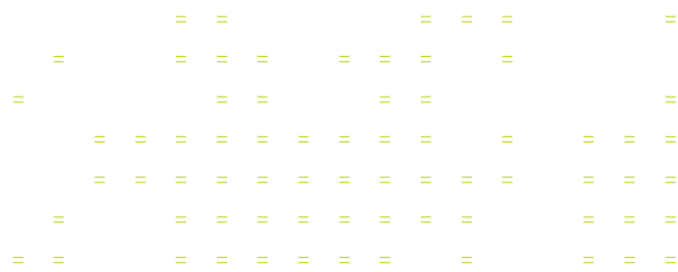
Section 8 requires the Council to take into account principles of the Treaty of Waitangi. It states:

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

It is considered the proposal will not be inconsistent with the principles of the Treaty of Waitangi.

7.2 Other relevant documents

Under Schedule 4, Clause 2(g) of the RMA, the following is an assessment of the activity against the relevant provisions of any other relevant statutory documents (other than district plans or proposed district plans).



National Environmental Standards – Soil Contamination

The National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health requires sites subject to a disturbance of soil to be assessed to determine if:

- (a) *an activity or industry described in the HAIL is being undertaken on it; and/or*
- (b) *an activity or industry described in the HAIL has been undertaken on it; and/or*
- (c) *it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it.*

The site has been investigated on Northland Regional Council's Selected Land-use Register (SLR). The investigation demonstrated there is no evidence of a HAIL activity having been carried out on the site. Furthermore, the owner of the application site has confirmed to the best of their knowledge, a HAIL activity is not being carried out on the site currently.

It is considered the obligations under clause 6 of the NES have been met and the site does not require further investigation to enable its disturbance of soil under clauses 8(3) of the standard.

New Zealand Coastal Policy Statement 2010

The New Zealand Coastal Policy Statement 2010 (NZCPS) sets out specific provisions in relation to the use of the Coastal Environment. In general, the NZCPS acknowledges that there is a place for urban activities within the coastal environment within appropriate forms and limits. There are specific provisions to manage environmental effects on natural character, indigenous biodiversity and natural features and landscapes. The proposal seeks to construct a dwelling on site without existing indigenous biodiversity values, and outside of identified natural features and landscapes overlays. Therefore, the proposal will not give rise to adverse effects in the context of the above noted matters.

Policy 22 of the NZCPS relates to sedimentation and seeks that activities do not generate or increase levels of sediment reaching the coastal marine environment. Works on the site will be managed to ensure sedimentation of waterways and thus the coastal marine environment does not occur.

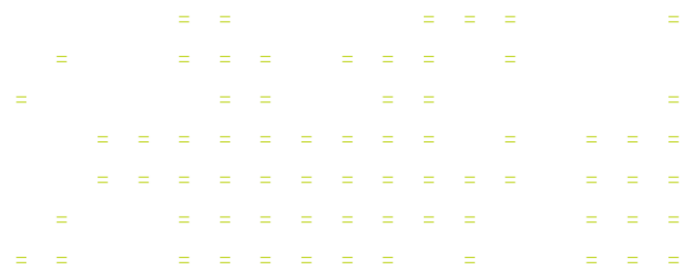
7.3 Consideration of applications (Section 104-104C)

Section 104 sets out those matters that must be considered when assessing an application for a resource consent. Subject to Part 2 of the Act, Section 104(1) requires a consent authority to have regard to the following matters:

- (a) *any actual and potential effects on the environment of allowing the activity; and*
- (ab) *any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity; and*
- (b) *any relevant standards of-*
 - (i) *a national environment standard;*
 - (ii) *other regulations;*
 - (iii) *a national policy statement;*
 - (iv) *a New Zealand coastal policy statement;*
 - (v) *regional policy statement or proposed regional policy statement;*
 - (iv) *a plan or proposed plan; and*
- (c) *any other matter the consent authority considers relevant and reasonably necessary to determine the application.*

Assessment against these matters has been provided within this application above.

Section 104C of the Act states in relation to the determination of applications for restricted discretionary activities:



- (1) *When considering an application for a resource consent for a restricted discretionary activity, a consent authority must consider only those matters over which—*
 - (a) *a discretion is restricted in national environmental standards or other regulations:*
 - (b) *it has restricted the exercise of its discretion in its plan or proposed plan.*
- (2) *The consent authority may grant or refuse the application.*
- (3) *However, if it grants the application, the consent authority may impose conditions under section 108 only for those matters over which—*
 - (a) *a discretion is restricted in national environmental standards or other regulations:*
 - (b) *it has restricted the exercise of its discretion in its plan or proposed plan.*

In this case, considering the matters consent is restricted to, consent can be granted subject to appropriate conditions.

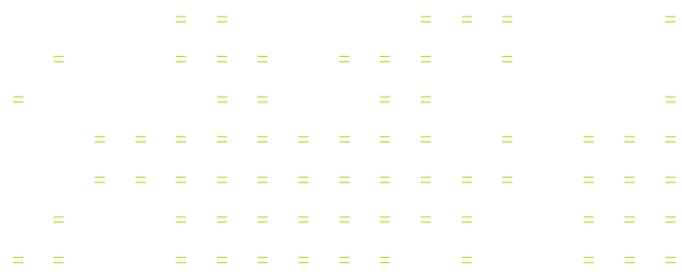
7.4 Notification

Public notification assessment

- None of the criteria listed in section 95A(3) that require public notification are relevant to this proposal.
- None of the criteria listed in section 95A(5) precluding public notification are relevant to this proposal.
- Pursuant to section 95A(8), the proposal is not subject to a rule or national environmental standard that requires public notification and, as assessed in this application, any potential or actual adverse effects are considered to be less than minor.
- Pursuant to section 95A(9)(b), there are considered to be no special circumstances relating to the application that warrant public notification.

Limited notification assessment

- None of the persons listed in section 95B(3) are considered to be affected persons in relation with this application.
- None of the criteria listed in section 95B(6) apply to this proposal.
- Under section 95B(7), and in accordance with section 95E, no persons are considered to be adversely affected by the proposal and therefore, no persons have been consulted.
- Pursuant to section 95B(10)(b), there are considered to be no special circumstances relating to the application that warrant limited notification.



8 Conclusion

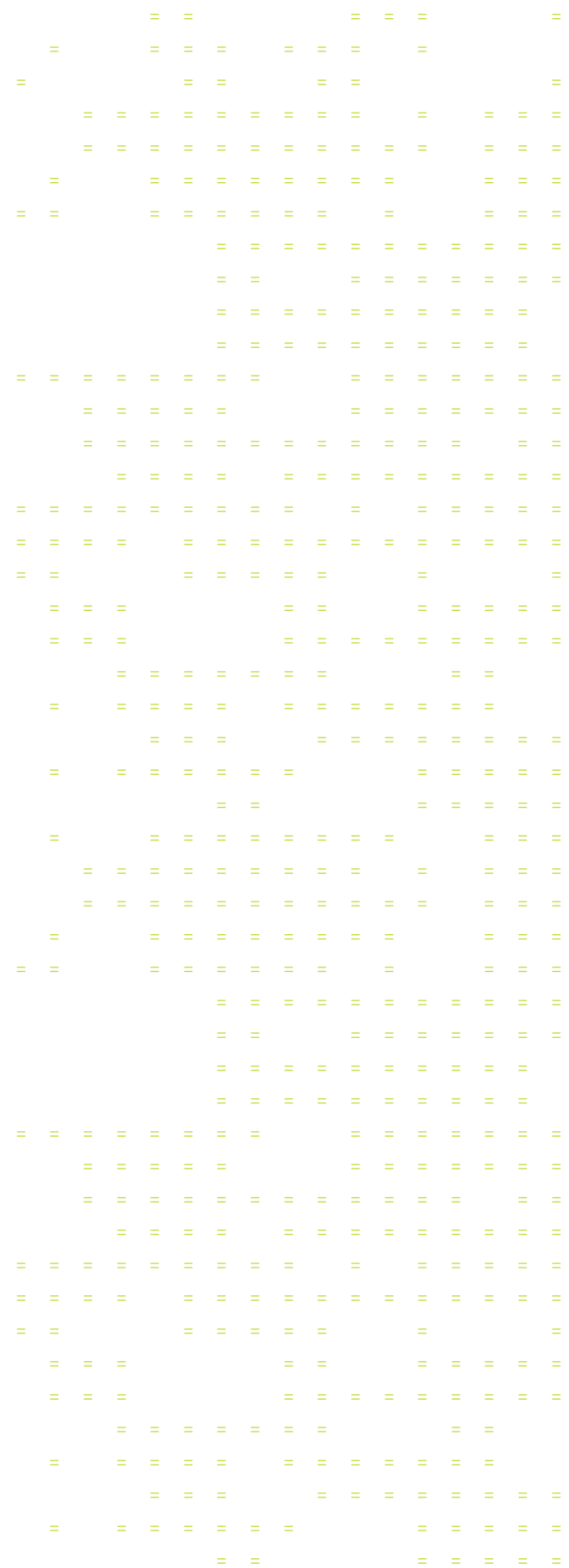
This application seeks land use consent to support a new dwelling with associated earthworks on the site.

The proposed activity is a **restricted discretionary activity** under the Operative District Plan for building area, earthworks and impervious surfaces non-compliances.

It has been demonstrated by the preceding assessment the effects on the environment as a result of this proposal will be less than minor.

Land use consent may be granted without the need for notification.

Appendix 1: Record of Title





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




R. W. Muir
Registrar-General
of Land

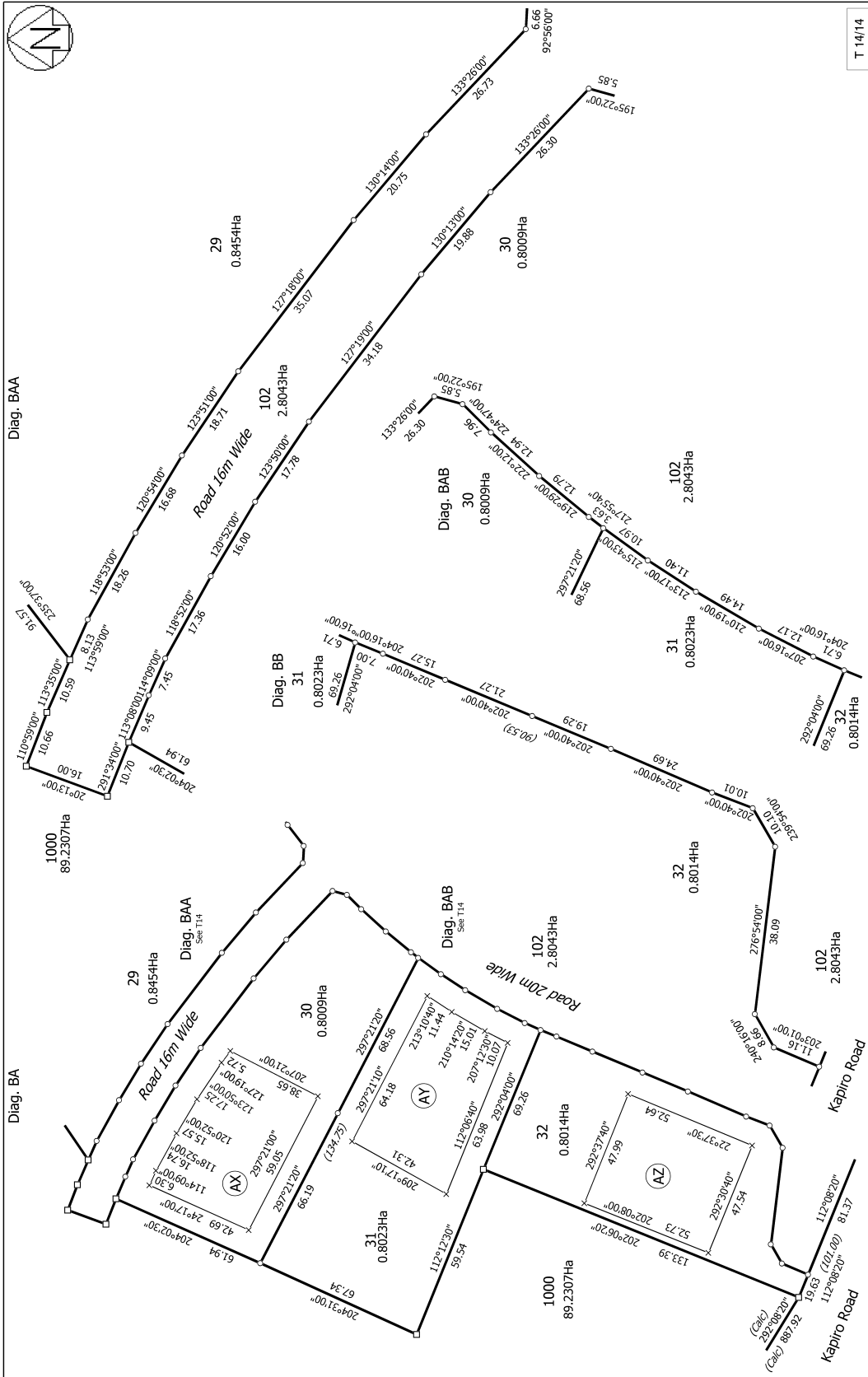
Identifier **723047**
Land Registration District **North Auckland**
Date Issued 10 August 2016

Prior References
NA97B/194

Estate Fee Simple
Area 8009 square metres more or less
Legal Description Lot 30 Deposited Plan 494309

Registered Owners
Mark John Coulson, Michaela Denise Coulson and New Zealand Family Trust Services Limited

Interests
10388614.2 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 10.8.2016 at 2:54 pm
Land Covenant in Transfer 10388614.8 - 10.8.2016 at 2:54 pm (Limited as to duration)
Land Covenant in Easement Instrument 10388614.9 - 10.8.2016 at 2:54 pm
Fencing Covenant in Transfer 10682064.1 - 3.2.2017 at 10:40 am



T 14/14

Land District: North Auckland
 Digitally Generated Plan
 Generated on: 11/08/2016 09:53:36am Page 21 of 21

Lot 1-32, Lot 75, Lots 100-102 and Lot 1000 being a subdivision of Sec 26 Blk VII Kerikeri SD, Pt Sec 3 Blk VII Kerikeri SD and Lot 1 DP 135938

Surveyor: Guy Martin McGregor
 Firm: Cook Costello Limited

Title Plan
 LT 494309
 Approved on: 1/08/2016

View Instrument Details



Instrument No 10388614.2
Status Registered
Date & Time Lodged 10 August 2016 14:54
Lodged By Wallace, Anne Michele
Instrument Type Consent Notice under s221(4)(a) Resource Management Act 1991



Affected Computer Registers	Land District
NA28A/800	North Auckland
NA80A/723	North Auckland
NA97B/194	North Auckland

Annexure Schedule: Contains 3 Pages.

Signature

Signed by Anthea Mary Coombes as Territorial Authority Representative on 24/08/2016 03:06 PM

*** End of Report ***



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THE RESOURCE MANAGEMENT ACT 1991

SECTION 221: CONSENT NOTICE

REGARDING RC 2160062
Being the Subdivision of Section 26 BLK VII Kerikeri SD,
Pt Sec 3 BLK VII Kerikeri SD (SO1130) and Lot 1 DP 135938
North Auckland Registry

PURSUANT to Section 221 and for the purpose of Section 224 (c) (ii) of the Resource Management Act 1991, this Consent Notice is issued by the **FAR NORTH DISTRICT COUNCIL** to the effect that conditions described in the schedule below are to be complied with on a continuing basis by the subdividing owner and the subsequent owners after the deposit of the survey plan, and these are to be registered on the titles of the allotments specified below.

SCHEDULE

Lots 1- 32 – DP 494309

- i) All buildings including water tanks and ancillary buildings shall be located within the approved building envelope as detailed within the survey plan.
- ii) In the event that the site remains undeveloped and that the landuse consent component of this decision lapses then the future development of the site (including any resource consent applications that may be required) shall be undertaken in general compliance with the design and development guidelines within the lapsed landuse decision (RC 2160062 issued by the Far North District Council dated 19th February 2016. This resource consent supercedes RC 2130171).
- iii) Pest and weed eradication measures established under the Building Development Landscape Plan and condition 11 of the landuse decision shall be implemented prior to and following the development of the site. The programme shall be maintained for the duration of the consent by the landowner.
- iv) In conjunction with the construction of any dwelling, and in addition to a potable water supply, 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.



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Website: www.fncc.govt.nz

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These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.

- v) When the vehicle crossing to the lot is finalized the lot owner/ developer shall apply to Council for a Vehicle Crossing Permit. The crossing is to be completed in accordance with the applicable Council Standards.
- vi) In conjunction with the construction of any building which includes a wastewater treatment and effluent disposal system the applicant shall submit for Council approval a site specific TP58 report prepared by a Chartered Professional Engineer or an approved TP58 report writer. The report shall be prepared generally in accordance with the onsite wastewater management section of the Engineers report prepared by Cook Costello Consulting Engineers (RC 2130171 and which is adopted into RC 2160062). The report shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a 100% reserve disposal area. The report shall confirm that all of the treatment and disposal system can be fully contained within the lot boundary and that it complies with the Regional Water and Soil Plan Permitted Activity Standards.
- vii) In conjunction with the construction of any building the applicant shall submit for Council approval as part of the Building Consent application a report prepared by a suitably qualified engineer for the design of the stormwater management system in accordance with the recommendations relevant to that particular lot contained in the approved Addendum to the Subdivision Suitability Report prepared by Cook Costello and dated 29 October 2014.

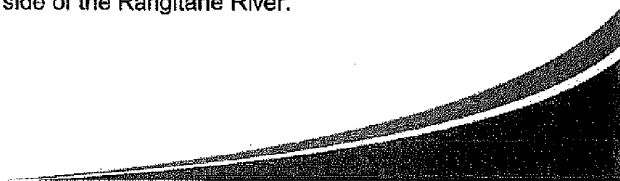
Lots 1-12, 17-20 & 22-32 – DP 494309

- viii) The lot is located within an area noted as having Kiwi present. Dogs within the lot shall remain under control at all times with cats kept inside in the evenings. It is also recommended that dogs within the lot should undertake Kiwi aversion training.

Lots 13-16, & 21 – DP 494309

- ix) No owners or occupiers of or visitors to any of the lots shall keep or introduce onto the land any carnivorous animal (such as cats, dogs, or mustelids) which have the potential to be Kiwi predators. This prohibition includes the bringing of any such animals onto the site by visitors and contractors.

Note: This requirement has been imposed as these allotments adjoin the Crown Grant Road and are immediately adjacent to high density kiwi populations located on the norther side of the Rangitane River.





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Lots 3, 4, 21, 25 & 26 – DP 494309

- x) For the purposes of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health these allotments are HAIL Sites. Prior to the commencement of any soil disturbance appropriate DSI Reports shall be completed and any required remediation and revalidation testing undertaken. An application to Council under the NES Regulations will be required where the Permitted thresholds of the NES Regulations are not met.

Lot 1000 only – DP 494309

- xi) Any site identified as a deposition area for material removed from Control Areas 1, 2 & 3 as required by condition 2(e) and which includes fill received from Control Areas 1, 2 & 3 is a HAIL site for the purposes of the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health and is therefore not suitable for residential development. The soil contaminants are to be tested and confirmed as being at or below levels considered suitable for recreational purposes.

SIGNED:


By the FAR NORTH DISTRICT COUNCIL
Under delegated authority:
PRINCIPAL PLANNER – RESOURCE MANAGEMENT

DATED at KERIKERI this 27th day of July 2016



Appendix 2: Site and Building Plans

BUILDING WORK THAT IS NOT SPECIFICALLY DETAILED ON THE CONSENTED PLANS WILL NOT BE THE RESPONSIBILITY OF DRAFTLINE OR THEIR NOMINATED LBP(DESIGN)

LAYOUT	REV	SHEET NAME
WORKING DRAWINGS		
A001	01	COVER PAGE
A002	01	PERSPECTIVES
A003	01	PERSPECTIVES
A004	01	PERSPECTIVES
A005	01	PERSPECTIVES
AI PLANS		
A101	01	KEYNOTES PAGE
A102	01	SITE PLAN
A103	01	SEDIMENT CONTROL PLAN
A104	01	EARTHWORKS GROUND HEIGHTS

LAYOUT	REV	SHEET NAME
A105	01	FOUNDATION PLAN - DWELLING & POOL HOUSE
A106	01	GROUND FLOOR PLAN - DWELLING & POOL HOUSE
A107	01	GIBFIX DETAILS
A108	01	PLUMBING PLAN - DWELLING & POOL HOUSE
A109	01	BRACING PLAN - DWELLING & POOL HOUSE
A110	01	BRACING CALCULATIONS - DWELLING & POOL HOUSE
A111	01	ROOF FRAMING PLAN - DWELLING & POOL HOUSE
A112	01	ROOF PLAN - DWELLING & POOL HOUSE

LAYOUT	REV	SHEET NAME
A113	01	OPENING SCHEDULE PLAN - DWELLING & POOL HOUSE
A114	01	EXTERIOR DOOR/WINDOW SCHEDULE - DWELLING
A115	01	INTERIOR DOOR SCHEDULE - DWELLING
A116	01	ELECTRICAL PLAN
B101	01	FOUNDATION / GROUND PLAN - GARAGE
B102	01	PLUMBING / ELECTRICAL PLAN - GARAGE
B103	01	BRACING PLAN - GARAGE
B104	01	ROOF / ROOF FRAMING PLAN - GARAGE

LAYOUT	REV	SHEET NAME
B105	01	OPENINGS SCHEDULE - GARAGE
A2 SECTIONS		
A201	01	SECTION AA
A202	01	SECTION BB
A203	01	SECTION CC
A204	01	SECTION DD
A205	01	SECTION EE
A206	01	SECTION FF
A207	01	SECTION GG
A208	01	POOL HOUSE SECTIONS
A209	01	GARAGE SECTIONS

LAYOUT	REV	SHEET NAME
A3 ELEVATIONS		
A301	01	HOUSE ELEVATIONS
A302	01	HOUSE ELEVATIONS
A303	01	POOL ELEVATIONS
B301	01	GARAGE ELEVATIONS
A4 DETAILS		
A401	01	FOUNDATION DETAILS
A402	01	CONSTRUCTION DETAILS
A403	01	CLADDING DETAILS - OBLIQUE
A404	01	CLADDING DETAILS - OBLIQUE
A405	01	CLADDING DETAILS - OBLIQUE

LAYOUT	REV	SHEET NAME
A406	01	CLADDING DETAILS - OBLIQUE
A407	01	CLADDING DETAILS - OBLIQUE
A408	01	CLADDING DETAILS - AB000
A409	01	CLADDING DETAILS - AB000
A410	01	CLADDING DETAILS - AB000
A411	01	CLADDING DETAILS - AB000
A412	01	ROOFING DETAILS
A413	01	ROOFING DETAILS
A414	01	INTERNAL WATERPROOFING DETAILS
A415	01	HWC DETAILS
A416	01	DRAINAGE DETAILS
A417	01	LUMBERLOK LINTEL DETAILS

LAYOUT	REV	SHEET NAME
A418	01	LUMBERLOK LINTEL / STUDLOK DETAILS
A419	01	LUMBERLOK DETAILS
A420	01	LUMBERLOK DETAILS
A421	01	LUMBERLOK DETAILS
A422	01	LUMBERLOK DETAILS
A423	01	LUMBERLOK PURLIN DETAILS
A424	01	ISOLATED BRACE DETAILS
A425	01	DURABILITY & FIXINGS
A426	01	DURABILITY & FIXINGS

REVNO	CHG	REVISION	DATE
01			28/10/2024



DRAFTLINE
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ALL CONSTRUCTION TO COMPLY WITH NZBC/NZS3604:2011, AND ALONGSIDE ALL OTHER CURRENT STANDARDS
PLANS MUST BE READ WITH THE ARCHITECTURAL SPECIFICATIONS AND MANUFACTURERS INFORMATION
ALL DIMENSIONS AND SITE LEVELS TO BE VERIFIED ON SITE

JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER CALEB BASTION
DRAFTSMAN JORDAN SMALL
CHECKED CALEB BASTION
PROJECT NUMBER 24020006
PRINT DATE 14/11/2024

CLIENT NAME COULSON FAMILY TRUST LAST
DRAWING TITLE COVER PAGE

SCALE @ A3 1:1, 1:2
DRAWING NUMBER A001
REVISION ID 01

DRAFTLINE PROJECT TEMPLATE VERSION 1.1: 4TH JULY 2022 - ANY MISSING INFORMATION - CONTACT THE DESIGNER. DO NOT SCALE OFF DRAWINGS. ONLY USE FIGURED DIMENSIONS. READ IN CONJUNCTION WITH THE MANUFACTURERS SPECIFICATION BEFORE INSTALLATION.

BUILDING WORK THAT IS NOT SPECIFICALLY DETAILED ON THE CONSENTED PLANS WILL NOT BE THE RESPONSIBILITY OF DRAFTLINE OR THEIR NOMINATED LBP(DESIGN)

REVID	CHIO	REVISION	DATE
01			28/10/2024



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ALL DIMENSIONS AND SITE LEVELS TO BE VERIFIED ON SITE

JOB TITLE
**3 FANTAIL RISE KERIKERI
NEW DWELLING**

DESIGNER	CALEB BASTION
DRAFTSMAN	JORDAN SMALL
CHECKED	CALEB BASTION
PROJECT NUMBER	24020006
PRINT DATE	14/11/2024

CLIENT NAME
COULSON FAMILY TRUST LAST

DRAWING TITLE
PERSPECTIVES

SCALE @ A3		1:2
DRAWING NUMBER	REVISION ID	
A002 01		

REVO	CHG	REVISION	DATE
01			28/10/2024



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JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER	CALEB BASTION
DRAFTSMAN	JORDAN SMALL
CHECKED	CALEB BASTION
PROJECT NUMBER	24020006
PRINT DATE	14/11/2024

CLIENT NAME
COULSON FAMILY TRUST LAST

DRAWING TITLE
PERSPECTIVES

SCALE @ A3		1:2
DRAWING NUMBER	REVISION ID	
A003 01		

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REVID	CHIO	REVISION	DATE
01			28/10/2024



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JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER	CALEB BASTION
DRAFTSMAN	JORDAN SMALL
CHECKED	CALEB BASTION
PROJECT NUMBER	24020006
PRINT DATE	14/11/2024

CLIENT NAME
COULSON FAMILY TRUST LAST

DRAWING TITLE
PERSPECTIVES

SCALE @ A3
1:2

DRAWING NUMBER	REVISION ID
A004 01	

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JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER	CALEB BASTION
DRAFTSMAN	JORDAN SMALL
CHECKED	CALEB BASTION
PROJECT NUMBER	24020006
PRINT DATE	14/11/2024

CLIENT NAME
COULSON FAMILY TRUST LAST

DRAWING TITLE
PERSPECTIVES

SCALE @ A3		1:2
DRAWING NUMBER	REVISION ID	
A005 01		

REVNO	CHG	REVISION	DATE
01			28/10/2024



LEGAL DESCRIPTION
 3 FANTAIL RISE
 KERIKERI.
 LOT 30 DP 494309
 AREA: 8.005m²
 CLIMATE ZONE - I
 EARTHQUAKE ZONE - I
 EXPOSURE ZONE - C
 RAINFALL - 80-90mm BASED ON BRANZ
 WIND REGION - A
 WIND ZONE - VERY HIGH
 SNOW ZONE - NO
 TOTAL SITE AREA - 8.005m²
 BUILDING COVERAGE - 413.39m² (0.09%)
 PATHWAY COVERAGE - 345.22m²
 DRIVE COVERAGE - 385.48m²
 TOTAL HARSTAND SITE COVERAGE - 1144.09m² (14.29%)

EROSION & SEDIMENT CONTROL NOTES:
 SILT FENCE TO COMPLY WITH COUNCIL EROSION & SEDIMENT CONTROL CODE OF PRACTICE.
 ALL EROSION & SEDIMENT CONTROL MEASURES ARE TO BE CONSTRUCTED AND INSTALLED PRIOR TO BUILDING WORKS ON SITE COMMENCING.
 SILT FENCES ARE TO BE MONITORED FOR MAINTENANCE DURING CONSTRUCTION AT LEAST ONCE A WEEK AND AFTER ANY RAINFALL.

SITE SAFETY NOTES:
 SAFE GUARDS TO BE IMPLEMENTED TO PROTECT PEOPLE AND PROPERTY FROM CONSTRUCTION HAZARDS AS PER NZBC F5 IE. SITE TO BE PROTECTED AROUND ENTIRE PERIMETER UTILIZING 2m HIGH STEEL MESH FENCING SYSTEMS WHERE PERMANENT FENCING IS NOT ALREADY INSTALLED. SITE SHOULD BE FULLY SECURED TO PROTECT PUBLIC WHEN SITE IS UNATTENDED.

GOOD GROUND:
 BEFORE ANY EXCAVATION COMMENCES THE BUILDER MUST CONFIRM THE BUILDING SITE CONTAINS GOOD GROUND AS PER NZS3604 3.1.3

NOTE:
 ALL FINISHES/COLORS TO COMPLY TO ANNEXURE SCHEDULE OF THE RESOURCE CONSENT AND ALL OTHER RESOURCE CONSENT REQUIREMENTS.

KEY:
 ET EXISTING TREE

SITE PLAN

1:300

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JOB TITLE
 3 FANTAIL RISE KERIKERI
 NEW DWELLING

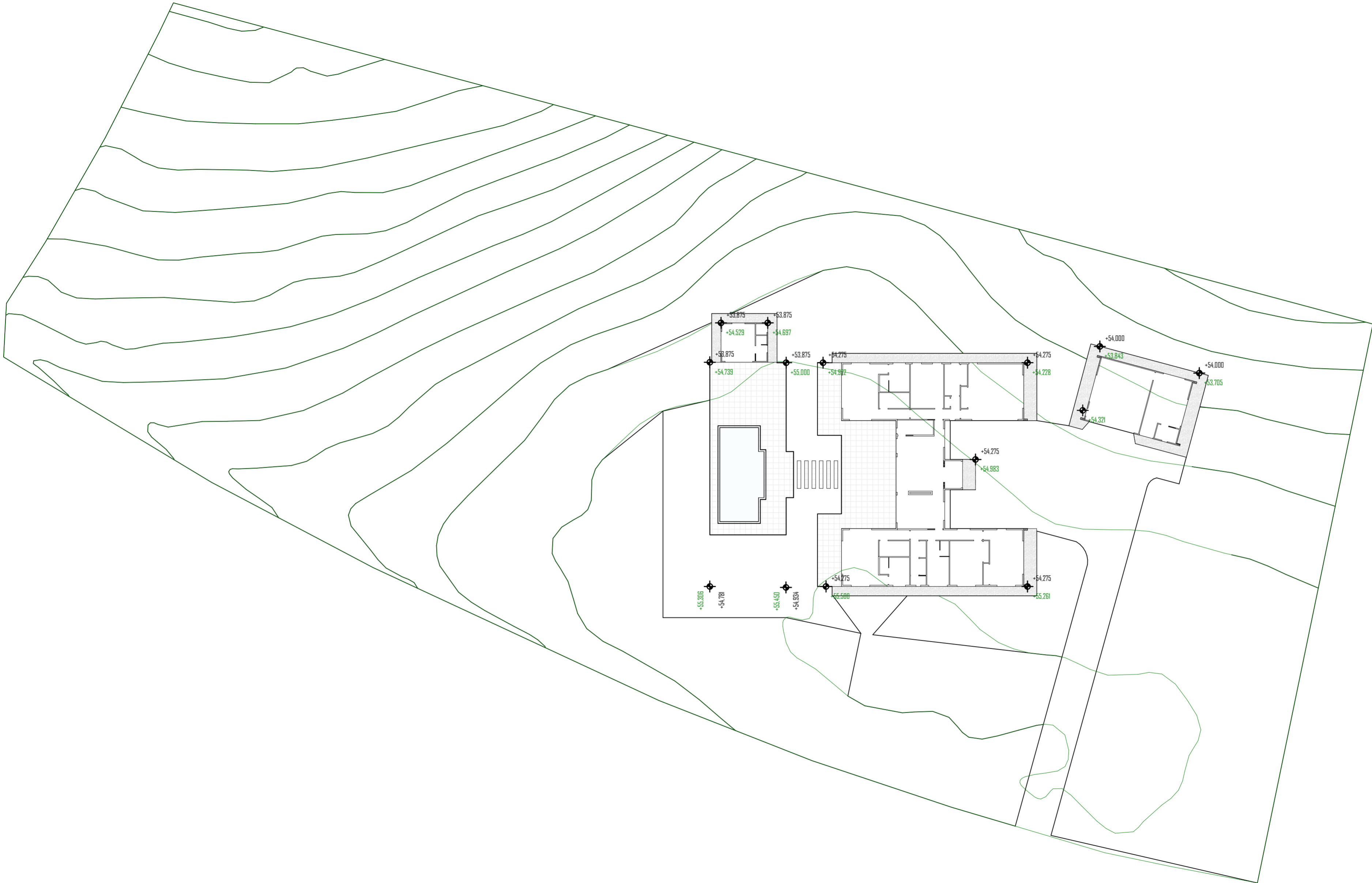
DESIGNER CALEB BASTION
DRAFTSMAN JORDAN SMALL
CHECKED CALEB BASTION
PROJECT NUMBER 24020006
PRINT DATE 14/11/2024

CLIENT NAME COULSON FAMILY TRUST LAST
DRAWING TITLE SITE PLAN

SCALE @ A3 1:300
DRAWING NUMBER A102 01
REVISION ID

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REV#	CHD	REVISION	DATE
01			28/10/2024



NOTE:
 EXISTING SITE HEIGHT IN GREEN AND PROPOSED IN BLACK.

SITE TO BE BATTERED TO FORM HEIGHTS - ENSURE SITE FALLS AWAY FROM DWELLING.

DWELLING F.F.L TO BE A MINIMUM OF +225 ABOVE PROPOSED HEIGHT.

GOOD GROUND: BEFORE ANY EXCAVATION COMMENCES THE BUILDER MUST CONFIRM THE BUILDING SITE CONTAINS GOOD GROUND AS PER NZS3601 31.3

EARTHWORKS
 TOTAL CUBIC CUT - 1679.07m³
 TOTAL SQUARE AREA AFFECTED IN CUT - 1360.81m²
 DEEPEST CUT - 1.3m BUT WELL OVER 3m FROM THE BOUNDARY

TOTAL SITE AREA - 8.005m²
 BUILDING COVERAGE - 413.39m² (10.07%)
 PATHWAY COVERAGE - 345.22m²
 DRIVE COVERAGE - 385.48m²
 TOTAL HARSTAND SITE COVERAGE - 1144.09m² (14.29%)

EARTHWORKS GROUND HEIGHTS

1:300

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JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER	CALEB BASTION
DRAFTSMAN	JORDAN SMALL
CHECKED	CALEB BASTION
PROJECT NUMBER	24020006
PRINT DATE	14/11/2024

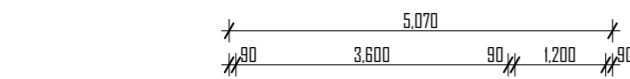
CLIENT NAME
COULSON FAMILY TRUST LAST

DRAWING TITLE
EARTHWORKS GROUND HEIGHTS

SCALE @ A3		1:300
DRAWING NUMBER	REVISION ID	
A104 01		

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BUILDING WORK THAT IS NOT SPECIFICALLY DETAILED ON THE CONSENTED PLANS WILL NOT BE THE RESPONSIBILITY OF DRAFTLINE OR THEIR NOMINATED LBP(DESIGN)



NOTE:
 - ALL FINISHES/COLOURS TO COMPLY TO ANNEXURE SCHEDULE OF THE RESOURCE CONSENT AND ALL OTHER RESOURCE CONSENT REQUIREMENTS.
 - HRV SYSTEM TO BE INSTALLED IN THE ROOF SPACE

REVNO	CHD	REVISION	DATE
01	01A 01B	RFI - Swimming Pool RFI - Electric Fire	28/10/2024

FLOOR AREA:

GROUND FLOOR HOUSE	275.78m ²
GARAGE	4125m ²
TOTAL AREA (COVER EXTERNAL WALLS)	317.03m²

NOTE:
 - SLIP RESISTANT SURFACE REQUIRED AT ENTRY AND WET AREAS IN ACCORDANCE WITH NZBC D1
 - WAZ WIS SILL SUPPORT BARS ARE REQUIRED TO ALL SILLS
 - FOR TIMBER FRAMING AT THE TIME OF INSTALLING LININGS, THE MAXIMUM ACCEPTABLE MOISTURE CONTENT SHALL BE 20% (18% FOR DIB LININGS) FOR INSULATED BUILDINGS
 - ARTIFICIAL LIGHTING PROVIDED WITHIN EXIT WAYS, ACCESS ROUTES AND COMMON AREAS TO ENABLE SAFE MOVEMENT IN ABSENCE OF NATURAL LIGHT
 - FINAL POSITION OF LIGHTS, SWITCHES ETC TO BE CONFIRMED AT WALK-THROUGH STAGE BETWEEN CLIENT AND ELECTRICIAN
 - ALL LIGHTS TO BE L.E.D AND IC-F RATED (COULX AT FLOOR LEVEL) IF DOWNLIGHTS INSULATE OVER TOP.

BOTTOM PLATE FIXING FOR TIMBER WALLS:
 CONCRETE FLOOR - ALL BOTTOM PLATES TO BE FIXED IN ACCORDANCE WITH NZS3604:2018 CLAUSE 7.5.12.2 - PROPRIETARY ANCHORS SHALL BE WITHIN 150mm OF EACH END OF THE PLATE AND 600mm MAXIMUM CENTRES.
 EXTERNAL WALLS & INTERNAL WALL BRACING ELEMENTS - 2/100mm X 3.75mm HAND DRIVEN NAILS OR 3/90mm X 3.15mm POWER DRIVEN NAILS @ 600mm MAXIMUM CENTRES.
 INTERNAL WALLS - 1/100mm X 3.15mm HAND DRIVEN NAIL OR 1/90mm X 3.15mm POWER DRIVEN NAIL @ 600mm MAXIMUM CENTRES.
 BRACING WALLS - ALL BRACING ELEMENT FIXINGS AS PER MANUFACTURERS SPECIFICATIONS.

SMOKE/SECURITY:
 ALARMS COMPLYING WITH AS 3786. BS 5446. PART 7/AS1 (WITHIN 3m OF BEDROOMS & ON EXIT PATHS MINIMUM INTERCONNECTED) WITH TEST & HUSH FACILITY. BACK UP BATTERY POWERED.

- SELECTED CARPET
- VINYL PLANKING (SEAL EDGES/JOINS)
- SELECTED NON-SLIP TILE
- INDICATES INSULATED WALL
- INDICATES UN-INSULATED WALL
- WET AREAS/GIB ADJACINE

- Notes**
- 4 **E2-ENCLOSURE**
 - 4.12.04 **GLASS BALUSTRADING**
EXTERNAL PROVISTA GLASS BALUSTRADING TO BE TOP FIXED AND INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS AND PSI PROVIDED. REFER TO DETAILS FOR FIXINGS AND ADDITIONAL LATERAL RESTRAINT REQUIREMENTS.
 - 4.13.02 **ELECTRIC FIREPLACE**
ELECTRIC FIRE PLACE TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS.

- 5 **INTERIOR**
- 5.01.09 **INTERNAL WATERPROOFING**
ARDEX WPM-001 LIQUID-APPLIED WATERPROOFING MEMBRANE TO BE INSTALLED IN WET AREAS IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS PROVIDED. REFER TO PLANS FOR EXTENT OF WATERPROOFING REQUIRED BELOW IMPERVIOUS FINISH I.E. TILES.
- 5.01.10 **INTERIOR TILE**
TILED FINISH TO BE INSTALLED TO COMPLY WITH E3/AS1 AND D1/AS1 TABLE 2 FOR SLIP RESISTANCE OF 0.40. REFER WET AREA DETAILS FOR SEALING DETAILS.
- 5.01.15 **ROOF ACCESS**
CEILING HATCH TO BE INSTALLED TO PROVIDE ACCESS TO ROOF SPACE. REFER MANUFACTURERS SPECIFICATIONS WHERE PULL DOWN LADDER TO BE INSTALLED.
- 5.01.16 **UNDERCUT**
UNDER CUT DOOR TO MAINTAIN COMPLIANCE WITH G4. ARE OF ROOM VENTED ADDED TO ADJACENT ROOM AREA WITH 5% OF COMBINED AREAS TO HAVE OPENINGS FOR VENTILATION.

- 6 **FINISH**
- 6.01.08 **PREPARATION SURFACE**
ALL FOOD PREP SURFACES TO HAVE AN IMPERVIOUS SURFACE FOR EASY CLEANING TO COMPLY WITH E3/AS1 AND G3/AS1. REFER DETAILS FOR SEALING REQUIREMENTS.

- 7 **SERVICES**
- 7.02.27 **HWC**
RHEEM MAINS PRESSURE ELECTRIC HOT WATER CYLINDER 31225015 - MAINS PRESSURE HWC TO BE INSTALLED WITH TEMPERING VALVE AND SAFE TRAY UNDER. SAFE TRAY WITH 40mm DIA OVERFLOW AND HWC WITH 20mm COPPER RELIEF VALVE BOTH TO DISCHARGE TO SAFE AND VISIBLE LOCATION OUTSIDE THE DWELLING WITH VERMIN PROOF CAP TO END.

- 11 **KITCHEN / BATHROOM DETAILS**
- 11.01.01 **SPLASH BACK**
SPLASH BACK TO BE TILED FINISH INSTALLED ON SPECIFIED WATERPROOFING MEMBRANE OR IMPERVIOUS GLASS FINISH. TO BE SEALED TO JUNCTION WITH BENCH TOP.

GROUND FLOOR PLAN (HOUSE & POOL HOUSE)

1:100

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JOB TITLE
3 FANTAIL RISE KERIKERI
NEW DWELLING

DESIGNER CALEB BASTION
DRAFTSMAN JORDAN SMALL
CHECKED CALEB BASTION
PROJECT NUMBER 24020006
PRINT DATE 14/11/2024

CLIENT NAME COULSON FAMILY TRUST LAST
GROUND FLOOR PLAN - DWELLING & POOL HOUSE

SCALE @ A3 1:100
DRAWING NUMBER A106 01
REVISION ID

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REVNO	CHG	REVISION	DATE
01			28/10/2024

FLOOR AREA:	
GROUND FLOOR HOUSE	377.03m ²
POOL HOUSE	21.65m ²
GARAGE	74.74m ²
TOTAL AREA (OVER EXTERNAL WALLS)	473.42m²

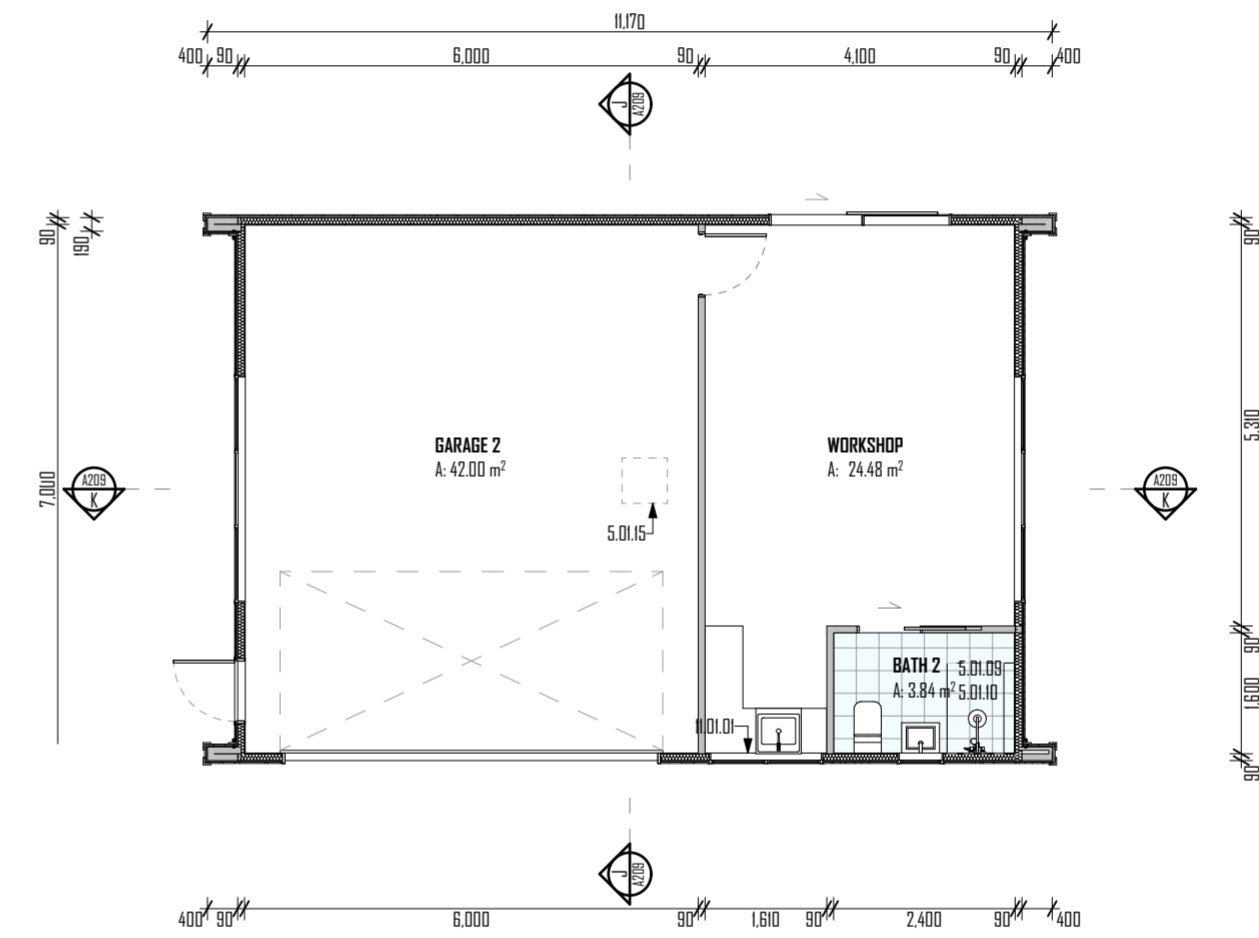
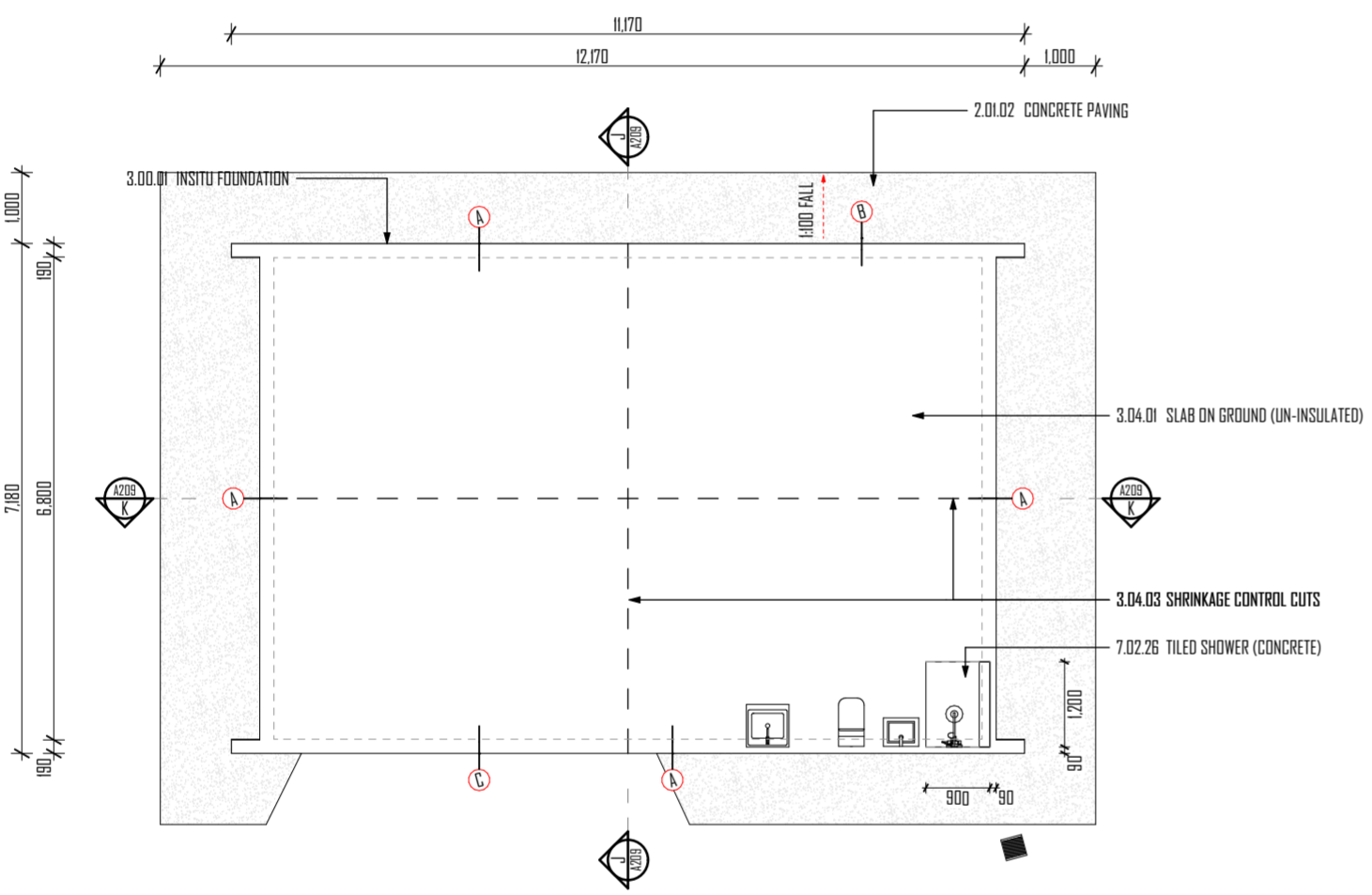
NOTE:
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 -WANG WIS SILL SUPPORT BARS ARE REQUIRED TO ALL SILLS
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 -ARTIFICIAL LIGHTING PROVIDED WITHIN EXIT WAYS, ACCESS ROUTES AND COMMON AREAS TO ENABLE SAFE MOVEMENT IN ABSENCE OF NATURAL LIGHT.
 -FINAL POSITION OF LIGHTS, SWITCHES ETC TO BE CONFIRMED AT WALK-THROUGH STAGE BETWEEN CLIENT AND ELECTRICIAN
 -ALL LIGHTS TO BE L.E.D AND IC-F RATED (COLUR AT FLOOR LEVEL) IF DOWNLIGHTS INSULATE OVER TOP.

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SMOKE/SECURITY:
 ALARMS COMPLYING WITH AS 3785: BS 5446: PART F7/AS1 (WITHIN 3m OF BEDROOMS & ON EXIT PATHS MINIMUM INTERCONNECTED) WITH TEST & HUSH FACILITY. BACK UP BATTERY POWERED.

-  SELECTED CARPET
-  VINYL PLANKING (SEAL EDGES/JOINS)
-  SELECTED NON-SLIP TILE
-  INDICATES INSULATED WALL
-  INDICATES UN-INSULATED WALL
-  WET AREAS/GIB AQUALINE

- Notes**
- 2 SITE
 - 2.01.02 CONCRETE PAVING
 100mm THICK 20mPa CONCRETE REINFORCED WITH SEB2 SEISMIC MESH ON 100mm MIN COMPACTED HARDFILL ALLOW FOR SAW CUTS AT 3m BOTH WAYS (TBC WITH CLIENT). ALLOW FOR NON-SLIP EXPOSED AGGREGATE FINISH TO COMPLY WITH WET SLIP RESISTANCE OF D1/AS1 TABLE 2 OF D.4U.
 - 3 BI-STRUCTURE
 - 3.00.01 INSITU FOUNDATION
 20mPa INSITU CONCRETE FOUNDATION AS PER NZS3604:2011 FIGURE 7.13 (B) OR 7.15(B).
 - 3.04.01 SLAB ON GROUND (UN-INSULATED)
 100mm THICK 20mPa CONCRETE SLAB REINFORCED WITH SEB2 500E MESH WITH 30mm MIN TOP COVER LAPPED IN ACCORDANCE WITH MANUFACTURERS REQUIREMENTS. ON 250 MICRON POLYTHENE DPM FULLY LAPPED AND SEALED AT ALL JOINTS. INSTALLED ON MAX 25mm SAND BLINDING PROTECTION WITH COMPACTED BASE COURSE IN 150mm MAX LAYERS.
 - 3.04.03 SHRINKAGE CONTROL CUTS
 25x5mm SHRINKAGE CONTROL CUTS INSTALLED AT MAX 6m FOR REINFORCED SLABS. TO BE INSTALLED TO COINCIDE WITH MAJOR CHANGES OF PLAN AND TO AVOID FORMING T JUNCTIONS IF POSSIBLE. NO SUPPLEMENTARY BARS TO BE PLACED OVER CUTS.
 - 5 INTERIOR
 - 5.01.09 INTERNAL WATERPROOFING
 ARDEX WPM-001 LIQUID-APPLIED WATERPROOFING MEMBRANE TO BE INSTALLED IN WET AREAS IN ACCORDANCE WITH MANUFACTURERS SPECIFICATIONS PROVIDED. REFER TO PLANS FOR EXTENT OF WATERPROOFING REQUIRED BELOW IMPERVIOUS FINISH I.E. TILES.
 - 5.01.10 INTERIOR TILE
 TILED FINISH TO BE INSTALLED TO COMPLY WITH E3/AS1 AND D1/AS1 TABLE 2 FOR SLIP RESISTANCE OF D.4U. REFER WET AREA DETAILS FOR SEALING DETAILS.
 - 5.01.15 ROOF ACCESS
 CEILING HATCH TO BE INSTALLED TO PROVIDE ACCESS TO ROOF SPACE. REFER MANUFACTURERS SPECIFICATIONS WHERE PULL DOWN LADDER TO BE INSTALLED.
 - 7 SERVICES
 - 7.02.26 TILED SHOWER (CONCRETE)
 TILED SHOWER FLOOR TO BE FORMED TO FALL 1:50 TOWARDS WASTE OUTLET. FLOOR SLAB SET DOWN 50mm WITH MESH LOWER OR SLAB TO BE 50mm THICKER WITH MESH SET DOWN LOWER TO ALLOW FOR SLAB TO BE GROUND DOWN AND TO MAINTAIN STEEL COVER. REFER DETAILS FOR INSTALLATION REQUIREMENTS. (INSTALL WATER STOPS AS PER E3/AS2)
 - 11 KITCHEN / BATHROOM DETAILS
 - 11.01.01 SPLASH BACK
 SPLASH BACK TO BE TILED FINISH INSTALLED ON SPECIFIED WATERPROOFING MEMBRANE OR IMPERVIOUS GLASS FINISH. TO BE SEALED TO JUNCTION WITH BENCH TOP.



FOUNDATION PLAN - GARAGE 1:100 GROUND FLOOR - GARAGE 1:100

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JOB TITLE
3 FANTAIL RISE KERIKERI
 NEW DWELLING

DESIGNER CALEB BASTION
DRAFTSMAN JORDAN SMALL
CHECKED CALEB BASTION
PROJECT NUMBER 24020006
PRINT DATE 14/11/2024

CLIENT NAME COULSON FAMILY TRUST LAST
DRAWING TITLE FOUNDATION / GROUND PLAN - GARAGE



SCALE @ A3 1:100
DRAWING NUMBER B101 01
REVISION ID

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Appendix 3: Stormwater Engineering Report

SITE 3 Fantail Rise, Kerikeri
 LEGAL DESCRIPTION Lot 30 DP 494309
 PROJECT Residential Dwelling
 CLIENT Shanaghan Construction
 REFERENCE NO. 134852
 DOCUMENT Stormwater Management Report
 STATUS/REVISION No. 02
 DATE OF ISSUE 29 August 2024

Report Prepared For	Email
Shanaghan Construction	shanaghan.construction@gmail.com

Authored by	P. McSweeney (BE(Hons) Civil)	Civil Engineer	Patrick@wjl.co.nz	
Reviewed & Approved by	B. Steenkamp (CPEng, BEng Civil, CMEngNZ, BSc (Geology))	Senior Civil Engineer	BenS@wjl.co.nz	

1. EXECUTIVE SUMMARY

The following table is intended to be a concise summary which must be read in conjunction with the relevant report sections as referenced herein.

Legal Description:	Lot 30 DP 494309	
Site Area:	8,005 m ²	
Development Proposals Supplied:	Preliminary Architectural Drawings (16 sheets), dated 3 May 2024, prepared by the Draftline (ref: 240200006)	
Associated Documents:	WJL Geotechnical Investigation & On-Site Wastewater Management Report Ref. 134850	
Development Type:	Proposed Residential Dwelling	
District Plan Zone:	Coastal Living	
Permitted Impermeable Coverage:	Consent Conditions: <u>800m²</u>	
Impermeable Coverage:	Proposed	
	Total Roof Area	588 m ²
	Total Hardstand Area	878 m ²
	Post-Development Total = 1466 m ² or 18.3% of the site area	
Activity Status:	<u>Discretionary – RC Required</u> District Plan Assessment provided in Section 8	
Attenuation:	Attenuation is to be provided in accordance with the requirements outlined in Section 5 for the impermeable area exceeding the permitted threshold specified in the consent conditions via flow attenuated outlets in a new detention tank.	
	Recommended Tank – 1 x 25,000 Rainwater Tank	
	Dimensions - 3600mmØ x 2600mm high (or greater)	
	50% AEP Control Orifice – 28mmØ orifice; located <u>>150mm above the tank base</u>	
	20% AEP Control Orifice – 28mmØ orifice; located <u>1030mm above the 50% AEP orifice</u>	
	1% AEP Control Orifice – 34mmØ orifice; located <u>1380mm above the 50% AEP Control Orifice</u>	
	Overflow – 150mmØ at top of tank	
Discharge Point:	<ul style="list-style-type: none"> To a new minimum 1800mmL x 450mmW x 300mmD riprap apron with 150mmØ aggregate at the northern/western Blue Penguin Drive roadside drain. Roof + Hardstand combined drainage line minimum 150mmØ @ >5% Or Multiple 150mmØ drainage lines @ >1% to discharge point 	

2. SCOPE OF WORK

Wilton Joubert Ltd. (WJL) was engaged by the client, Shanaghan Construction, to produce a stormwater management assessment at the above site.

At the time of report writing, the following documents were referred to for background data and details of the proposed development:

- Proposed Site Plan, Floor Plan and Elevations by Architects Ltd (Dated 01.12.2021)

Any revision of these drawings and/or development proposals with stormwater management implications should be referred back to us for review.

3. SITE DESCRIPTION

The 8,005m² subject site is Coastal Living zoned, covering the southern area of land off Fantail Rise and bound by Blue Penguin Rise along the eastern boundary. The completely fenced site is proposed to be accessed at the north-western boundary corner, approximately 300m north of the Blue Penguin Dr – Kapiro Road intersection.

Topographically speaking, the fenced property is set around a broad, flat to gently sloping crest that covers the approximate western two-thirds of the property. The eastern third is covered by a minor southeast facing slope, falling at grades ranging between 7° to 13°, down to Blue Penguin Rise and a neighbouring residential development within the allotment to the south. No built development is currently present on-site. The property is currently covered in pasture. Existing ground levels across the site range between approximately 55m (north) and 48.5m (south-eastern boundary corner) New Zealand Vertical Datum (NZVD).

At the time of preparing this report, we note that the FNDC 3 Waters Maps indicate that a:

- Stormwater swale drain borders the north-eastern boundary corner and eastern boundary, and
- A stormwater manhole is present adjacent to the north-eastern boundary corner.

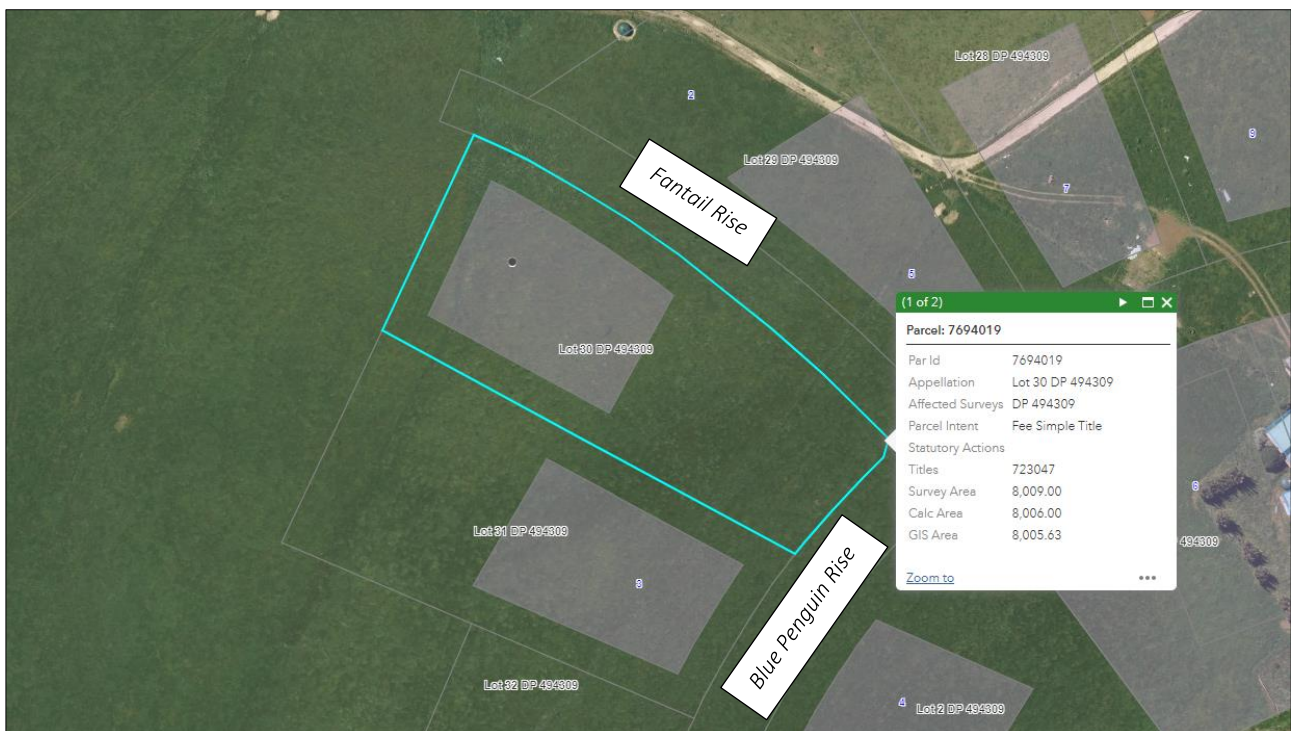


Figure 1: Screenshot aerial view of the subject site from the FNDC on-line GIS Property and Land Map. The property is highlighted in cyan. Hatched grey rectangle depicts Building Covenant area.



*Figure 2: Site photograph looking towards the western end of the proposed development area (northwest direction).
Orange cones approximately depict the development extent.*



*Figure 3: Site photograph looking towards the eastern end of the proposed development area (southeast direction).
Orange cones approximately depict the development extent.*

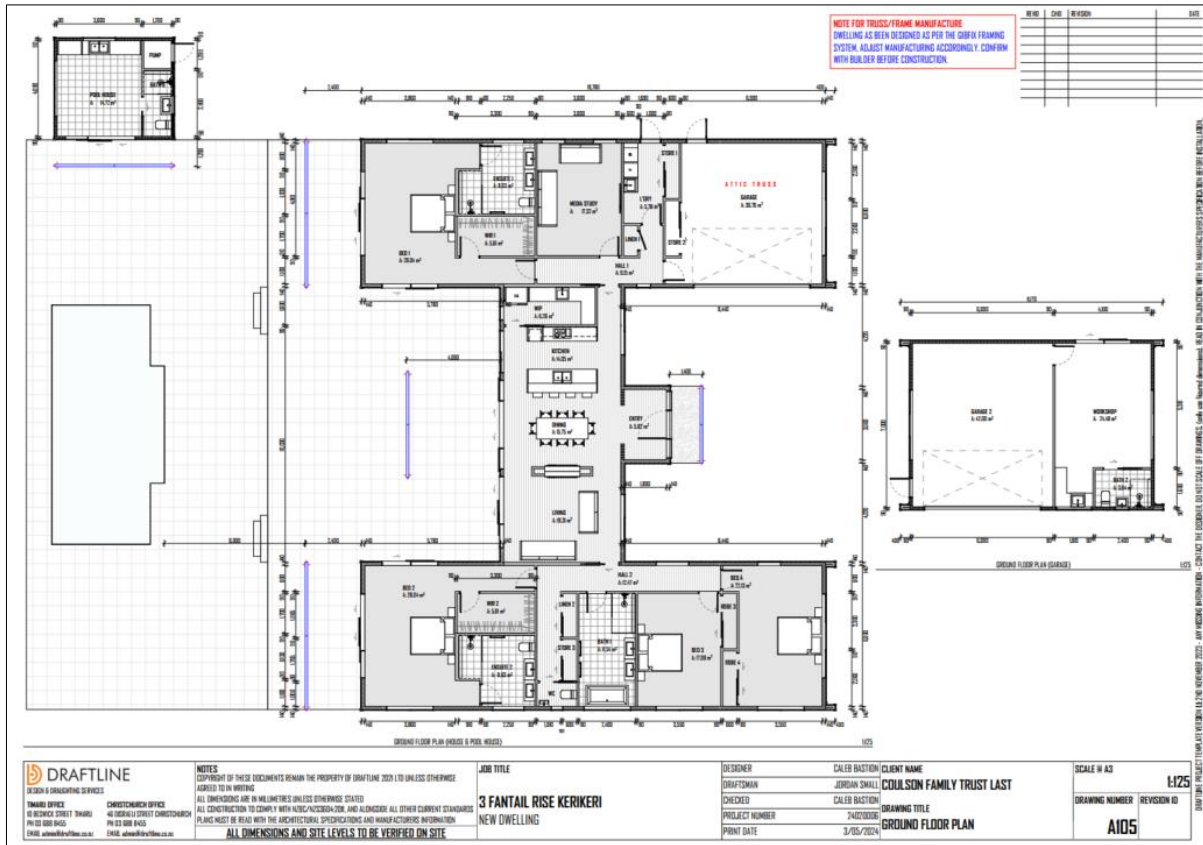


Figure 6: Screenshot of the Site Plan from the supplied architectural drawings (north is down the page).

The principal objective of this assessment is to provide an indicative stormwater disposal design which will manage runoff generated from the increased impermeable areas resulting from the proposed development.

5. ASSESSMENT CRITERIA

Impermeable Areas

The calculation for the stormwater system for the development is based on a gross site area of 8,005m² and the below areas extracted from the supplied plans:

	Post-Development Coverage
Roof Area	588 m²
Dwelling	452 m ²
Garage	96 m ²
Pool House	40 m ²
Hardstand (uncovered)	878 m²
Paved Driveway	550 m ²
Paved Patio Areas	282 m ²
Proposed Pool	46 m ²
Pervious	6,539 m²

The total amount of impermeable area on site, post-development will be 1466m² or 18.3% of the site area. Should any changes be made to the current proposal, the on-site stormwater mitigation design must be reviewed.

Consent Notices and District Plan Rules

The site is under the jurisdiction of the Far North District Council. This design has been completed in accordance with requirements contained within the FNDC Resource Consent Decision for RC2130171. The subject lot is designated as Lot 30 of 32 new residential lots formed in the subdivision.

The decision document grants an 800m² allowance for impermeable surfaces on the lot as stated below:

ADVICE NOTES

1. Resource consent has been granted for the construction of a dwelling and associated facilities with a maximum of 800m² impermeable surfaces (on Lots 1-32) and 600m³ of earthworks on Lots 1-2, 5-24, & 27-32 subject to the conditions detailed in the consent RC 2130171. These conditions include requirements for the owner to demonstrate compliance with specified matters and to present an amenity landscaping plan for the Building Envelope at the time of seeking building consent. Should the owner of one of those lots wish to undertake development which does not comply with the conditions of that land use consent, a discretionary resource consent application to vary the relevant condition(s) must be made to Council.

The development proposals exceed the impermeable coverage permitted by the consent conditions outlined above. Additionally, the development is subject to the following as per the FNDC District Plan:

10.7.5.3.8 – **Restricted Discretionary Activities – Stormwater Management** - *The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15% or 1,500m², whichever is the lesser.*

Therefore, the proposed development is classified as a Discretionary Activity and requires additional considerations for stormwater management as per the FNDC District Plan Cl 10.7.5.4. An Assessment of Environmental Effects has been included in Section 8 of this report to address this.

Design Requirements

Runoff resulting from the total impervious area exceeding the amount permitted by the consent notice (800m²) is to be attenuated to greenfields flow rates via stormwater management devices prior to discharge to the downstream environment. Therefore, the total input area for the attenuation design, based on the proposals supplied, will be 666m².

Stormwater Modelling Method

The hydrologic and hydraulic calculations have been computed using the HydroCAD modelling software. The model has been configured utilising a Type IA storm curve with a 24-hour duration in accordance with the FNDC Engineering Standards Table 4-1.

Pre-development 50%, 20% & 1% AEP 24-hr duration rainfall values of 103mm, 135mm and 244mm were adopted from NIWA HIRDS, with the post-development rainfall values being increased to 115mm, 153mm and 278mm per the RCP6.0 2081-2100 scenario to account for climate change effects.

The greenfields conditions of the site consist of pasture cover with underlying soils providing moderate to good drainage. Therefore, in accordance with Table 4-3 of the standards, a pre-development weighted runoff curve number of 74 has been adopted.

6. STORMWATER MITIGATION ASSESSMENT

Potable Water Supply

It is recommended that rainwater tanks are utilised to provide the proposed dwelling with a potable water supply. The tank type is at the discretion of the client.

A proprietary guttering system is required to collect roof runoff from the proposed dwelling, garage and pool house and direct this to the potable water tanks. Litter filters may be installed in-line between the gutters and the tank inlet. The tank inlet level should be at least 600mm below the gutter inlet and any in-line litter filters. The filters will require regular inspection and cleaning to ensure the effective operation of the system. The frequency of cleaning will depend on current and future plantings around the proposed dwelling. Provision should be made by the homeowner for top-up of the tanks via water tankers in periods of low rainfall. The tanks must be installed as per the manufacturer's specifications.

Due to inadequate water quality concerns, runoff from hardstand areas should not be allowed to drain to the potable water tanks.

The potable rainwater tanks must be linked at the top by a minimum 1 x 150mm \varnothing balancing pipe or 2 x 100mm \varnothing balancing pipes. The potable tanks are to direct overflows to a detention tank as specified below via minimum 1 x 150mm \varnothing pipe or 2 x 100mm \varnothing pipes at the top of the tanks.

Detention Tank

A detention tank is proposed to provide attenuation per the requirements outlined in Section 5. As per the attached design calculations, the design elements of the detention tank are as follows:

Proposed Tank	1 x 25,000 litre Rainwater Tank (or greater)
Tank dimensions	3600m \varnothing (or greater) x 2600mm high (or greater)
Outlet orifice (50% AEP control)	28mm diameter orifice ; located <u>150mm above the tank base</u> <ul style="list-style-type: none">- 1025mm water elevation- 10.4m³ Storage
Outlet orifice (20% AEP control)	28mm diameter orifice ; located <u>1030mm above the 50% AEP control orifice</u> <ul style="list-style-type: none">- 1373mm water elevation- 14.0m³ Storage
Outlet orifice (1% AEP control)	34mm diameter orifice ; located <u>1380mm above the 50% AEP control orifice</u> <ul style="list-style-type: none">- 2253mm water elevation- 22.9m³ Storage
Overflow Outlet	150mm diameter ; located at the top of the tank

Tank detail, 134852-C210, is appended to this report. Refer to the appended calculation set for clarification. A minimum 150mm sludge zone must be kept at the base of the tank. Discharge from the detention tank is to be directed to the discharge point via a minimum 150mm \varnothing drainage line at a minimum 1% grade.

Hardstand Drainage

Hardstand areas must be shaped to shed runoff to catchpits, which are required to drain directly to discharge point. Stormwater sumps and drainage piping should be in accordance with E1 Surface Water of the NZBC. We recommend the use of litter filters within hardstand catchpits as a pre-treatment device to aid in the longevity of the stormwater mitigation system.

Runoff collected via catchpits in the proposed driveway is to be directed to the discharge point via minimum 150mmØ sealed pipes at a minimum grade of 1%. Runoff collected via catchpits in the proposed pool patio area is to be directed to the discharge point via minimum 100mmØ sealed pipes at a minimum grade of 1%.

Contaminated overflows from the proposed pool may not be directed to the stormwater management system. Input is required from the pool designer for the management of pool overflows.

The outlet orifice fitted to the attenuation tank has been conservatively sized to allow for the unattenuated paved surface on-site. Stormwater neutrality is still achieved across the impermeable areas exceeding the permitted coverage.

Discharge Point

Discharge from the proposed detention tank and hardstand catchpits is to be directed to the roadside drain on the northern/western side of Blue Penguin Drive. Where the tank and hardstand drainage lines are joined, the downstream drainage line is to be a minimum 150mmØ pipe at a minimum grade of 5% to accommodate flows from the proposed impermeable areas.

A riprap apron is to be constructed at the discharge point to reduce flow velocity prior to discharge to the Blue Penguin Drive roadside drain. The minimum riprap dimensions are as follows: 1800mm long x 450mm wide x 300mm thick, with minimum aggregate diameter of 150mm. Refer to calculations in the appendices. An indicative outlet location is given in the attached site plan (134852-C200).



Figure 7: Typical Riprap Outlet

Firefighting Supply

As the proposed dwelling is not within a 90m distance of an open utilisable water body and the proposed dwelling is serviced by non-reticulated water supply, The New Zealand Fire Service Firefighting Water Supplies Code of Practice (SNZPAS 4509:2008) states that buildings require an on-site firefighting water supply.

The client confirmed on 29.08.2024 that a specific agreement was made with Fire Emergency New Zealand (FENZ) and separate fire water tanks are not required. Firewater storage will be provided in the potable water tanks and pool.

7. STORMWATER RUNOFF SUMMARY

Refer to the appended HydroCAD Calculation output.

Pre-Development Scenario – 50% AEP, 20% AEP and 1% AEP Storm Events

Surface	Area	Runoff CN	50% AEP Flow Rate	20% AEP Flow Rate	1% AEP Flow Rate
Area Exceeding Permitted Coverage – Greenfields Conditions	666 m ²	74	2.17ℓ/s	3.37ℓ/s	8.00ℓ/s

Post-Development Scenario – 50% AEP, 20% AEP and 1% AEP Storm Events + CCF

Surface	Area	Runoff CN	50% AEP Flow Rate	20% AEP Flow Rate	1% AEP Flow Rate
Proposed Roof Areas via Detention Tank	588 m ²	98	1.65ℓ/s	2.85ℓ/s	6.75ℓ/s
Hardstand Areas up to Exceedance Total	78 m ²	98	0.59ℓ/s	0.78ℓ/s	1.43ℓ/s
		Peak Flow	2.06ℓ/s	3.34ℓ/s	7.86ℓ/s

Given the design parameters, stormwater neutrality has been achieved for the 50% AEP, 20% AEP and 1% AEP storm events across the cumulative impermeable surfaces in excess of the Permitted threshold on-site.

8. DISTRICT PLAN ASSESSMENT

This report has been prepared to demonstrate the likely effects of increased stormwater run-off arising from the proposed development and the means of mitigating run-off to no more than the levels that would result from the permitted threshold under Stormwater Management Rule 10.7.5.1.6.

In assessing an application under this provision, the Council will exercise its discretion to review the following matters below, (a) through (m) of FNDCDP Section 11.3.

In respect of matters (a) through (m), we provide the following comments:

<i>(a) the extent to which building site coverage and Impermeable Surfaces contribute to total catchment impermeability and the provisions of any catchment or drainage plan for that catchment;</i>	1,466m ² of Impermeable surfaces will be present on-site post-development. Through newly proposed tank attenuation and low impact design principles the adverse effects of increased stormwater runoff can be remedied to that of the permitted activity threshold.
<i>(b) the extent to which Low Impact Design principles have been used to reduce site impermeability;</i>	Tank attenuation, suitable sumps/filters and erosion protection outlet proposed.
<i>(c) any cumulative effects on total catchment impermeability;</i>	Impervious coverage will increase by 1,466m ² or 18.3% of the site area.

<p><i>(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;</i></p>	<p>Runoff from the proposed roof areas is to be collected and directed to stormwater management devices via sealed pipes, with proposed hardstand areas being directed to the discharge point via sealed pipes, mitigating the potential for runoff to pass over / saturate the surrounding soils.</p> <p>Ponding is not anticipated to occur provided the recommendations within this report are adhered to, mitigating interference with natural water absorption.</p>
<p><i>(e) the physical qualities of the soil type;</i></p>	<p>Kerikeri Volcanic Group. Moderate to good drainage.</p>
<p><i>(f) any adverse effects on the life supporting capacity of the soils;</i></p>	<p>Runoff from the proposed roof and hardstand areas is to be collected and directed to stormwater management devices via sealed pipes, mitigating the potential for contamination of surrounding soils and harm to life.</p>
<p><i>(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;</i></p>	<p>Stormwater runoff from all impermeable surfaces will be captured by either a gutter system or stormwater sumps and conveyed via sealed pipes to the discharge point.</p> <p>The site is large enough for on-site stormwater and effluent disposal (i.e set backs between water sources and effluent disposal comply with Table 9 of the PRPN).</p>
<p><i>(h) the extent to which paved, Impermeable Surfaces are necessary for the proposed activity;</i></p>	<p>The proposed driveway is necessary for access to the dwelling. We do not deem the proposed paved areas to be excessive for the site.</p>
<p><i>(i) the extent to which land scaping and vegetation may reduce adverse effects of runoff;</i></p>	<p>Any introduced plantings will aid in runoff absorption and treatment processes. No specific planting/landscaping regime is proposed herein.</p>
<p><i>(j) any recognised standards promulgated by industry groups;</i></p>	<p>N/A.</p>
<p><i>(k) the means and effectiveness of mitigating stormwater runoff to that expected by permitted activity threshold.</i></p>	<p>666m² of impervious area on-site has been accounted for in this new design, via the tank attenuation (supplying outflow control for the 50%, 20% and 1% AEP storm events).</p> <p>Through the proposals of this report, adverse effects of stormwater runoff during storm events can be remedied to that of the permitted threshold specified in the consent conditions.</p>
<p><i>(l) the extent to which the proposal has considered and provided for climate change;</i></p>	<p>RCP 6.0 2081-2100 rainfall values from HIRDS have been utilised in the design of stormwater management devices, accounting for climate change.</p>

<i>(m) the extent to which stormwater detention ponds and other engineering solutions are used to mitigate any adverse effects.</i>	Tank attenuation is proposed. The proposed stormwater disposal method is via an erosion protection outlet discharging to the existing roadside drain.
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9. NOTES

If any of the design specifications mentioned in the previous sections are altered or found to be different than what is described in this report, Wilton Joubert Ltd will be required to review this report. Indicative system details have been provided in the appendices of this report (134852-C200, 134852-C210 & 134852-C211). Care should be taken when constructing the discharge point to avoid any siphon or backflow effect within the stormwater system.

Subsequent to construction, a programme of regular inspection / maintenance of the system should be initiated by the Owner to ensure the continuance of effective function, and if necessary, the instigation of any maintenance required.

Wilton Joubert Ltd recommends that all contractors keep a photographic record of their work.

10. LIMITATIONS

The recommendations and opinions contained in this report are based on information received and available from the client at the time of report writing.

This assignment only considers the primary stormwater system. The secondary stormwater system, Overland Flow Paths (OLFP), vehicular access and the consideration of road/street water flooding is all assumed to be undertaken by a third party.

All drainage design is up to the connection point for each building face of any new structures/slabs; no internal building plumbing or layouts have been undertaken.

During construction, an engineer competent to judge whether the conditions are compatible with the assumptions made in this report should examine the site. In all circumstances, if variations occur which differ from that described or that are assumed to exist, then the matter should be referred to a suitably qualified and experienced engineer.

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

This report has been prepared for the particular project described to us and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Wilton Joubert Ltd.



Patrick McSweeney
BE(Hons)

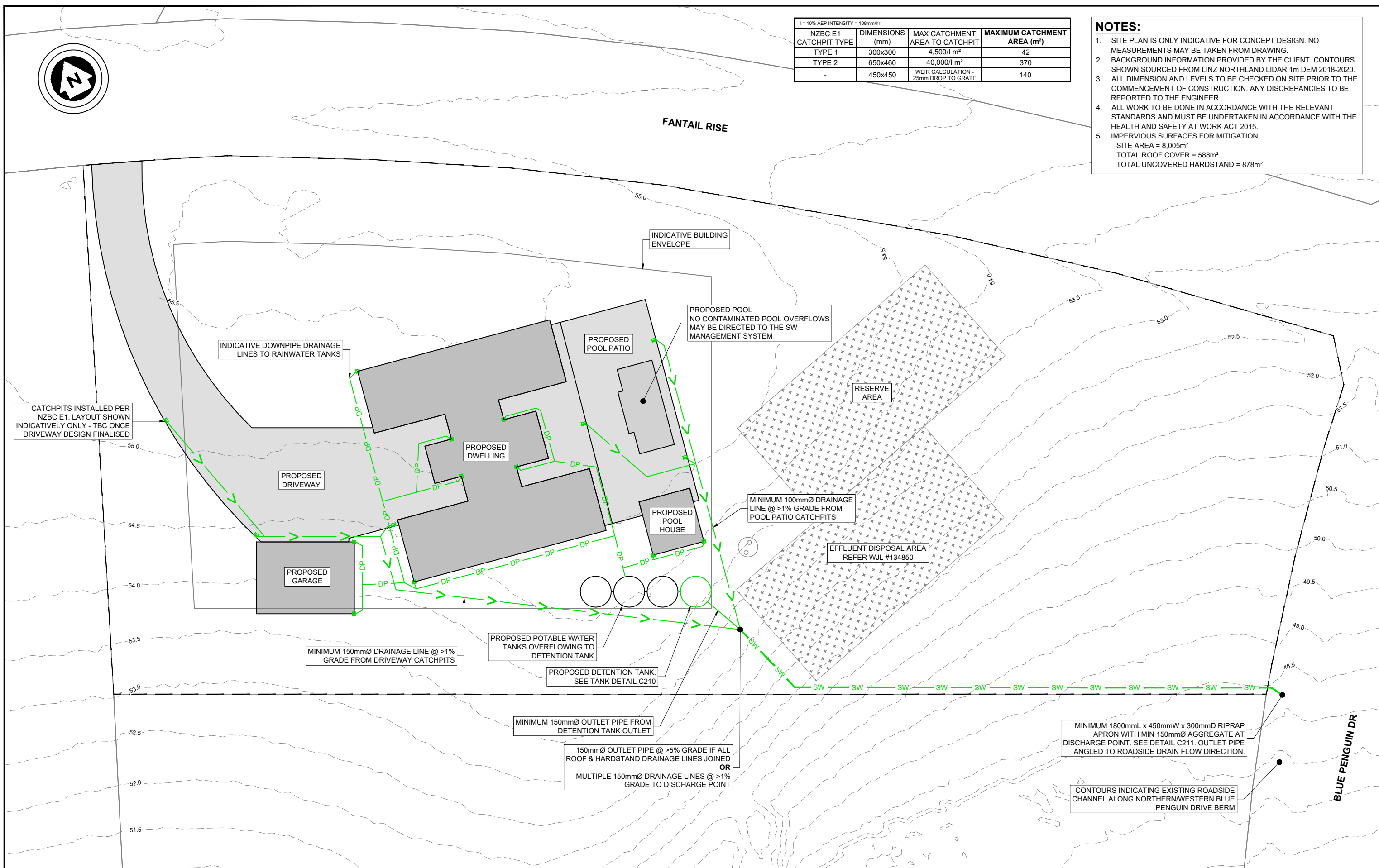
REPORT ATTACHMENTS

1. Site Plan - C200 (1 sheet)
2. Tank Detail - C210 (1 sheet)
3. Riprap Apron Detail - C211 (1 sheet)
4. Calculation Set



I = 10% AEP INTENSITY = 108mm/hr			
NZBC E1 CATCHPIT TYPE	DIMENSIONS (mm)	MAX CATCHMENT AREA TO CATCHPIT	MAXIMUM CATCHMENT AREA (m ²)
TYPE 1	300x300	4,500/l m ²	42
TYPE 2	650x460	40,000/l m ²	370
-	450x450	WEIR CALCULATION - 25mm DROP TO GRATE	140

- NOTES:**
- SITE PLAN IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
 - BACKGROUND INFORMATION PROVIDED BY THE CLIENT. CONTOURS SHOWN SOURCED FROM LINZ NORTHLAND LIDAR 1m DEM 2018-2020.
 - ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
 - ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
 - IMPERVIOUS SURFACES FOR MITIGATION:
 SITE AREA = 8,005m²
 TOTAL ROOF COVER = 588m²
 TOTAL UNCOVERED HARDSTAND = 878m²



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 Consulting Engineers
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 Christchurch: 021 824 063 Wanaka: 03 443 6209
 www.wiltonjoubert.co.nz

ISSUE / REVISION				
No.	DATE	BY	DESCRIPTION	
01	JUL '24	PM	STORMWATER REPORT REV01	
02	AUG '24	BGS	STORMWATER REPORT REV02	

DESIGNED BY: PM
 DRAWN BY: PM
 CHECKED BY: BGS
 SURVEYED BY: OTHER

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BUILDING CONSENT

DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

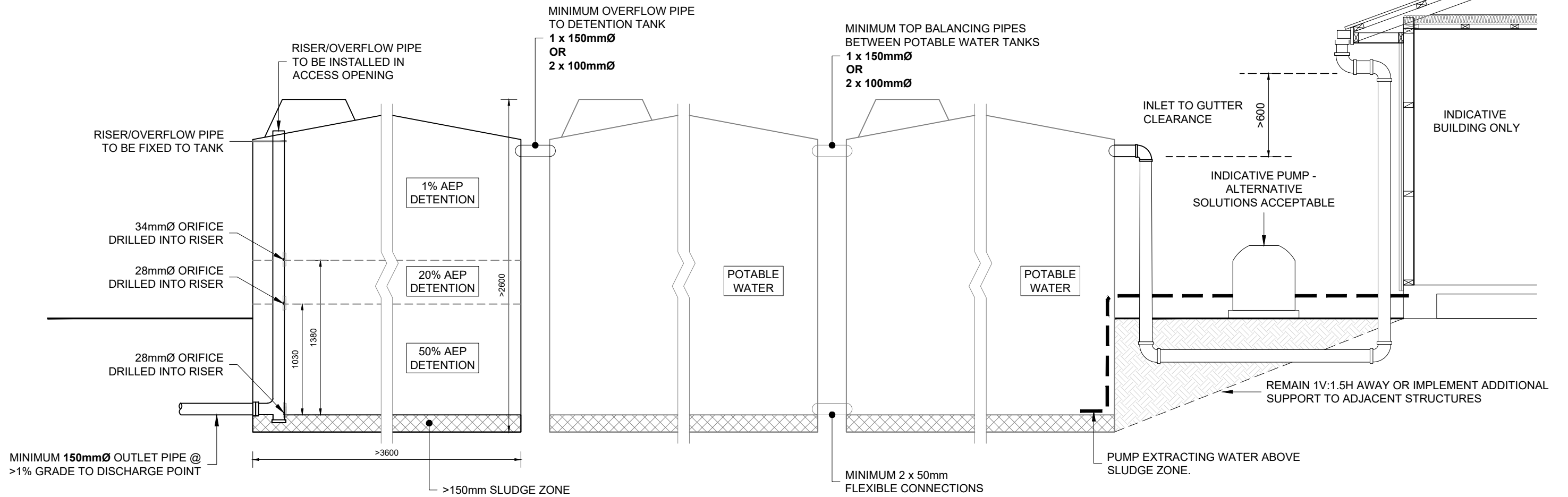
PROJECT TITLE: **LOT 30 DP 494309
 3 FANTAIL RISE
 KERIKERI**

ORIGINAL DRAWING SIZE: A3	OFFICE: OREWA
DRAWING SCALE: 1:400	CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: 134852-C200	ISSUE: 02
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3. TANKS TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS & RELEVANT COUNCIL STANDARDS.
4. REGULAR INSPECTION & CLEANING IS REQUIRED TO ENSURE THE EFFECTIVE OPERATION OF THE SYSTEM.
5. MINIMUM SLUDGE ZONE OF 150mm TO BE KEPT.
6. ASSUMED USE OF 4 x 25,000L TANKS.
7. ORIFICES TO BE FITTED WITH STAINLESS STEEL OR NYLON MESH COVERING.
8. EXTERNAL RISER PIPE SETUP ALSO ACCEPTABLE. ORIFICE TEES MUST BE FITTED WITH INSPECTION CAPS FOR MAINTENANCE.

TANK DETAIL TO BE PROVIDED TO TANK MANUFACTURER FOR REVIEW PRIOR TO INSTALLATION. FAILURE TO COMPLY WITH TANK MANUFACTURER'S SPECIFICATIONS MAY RESULT IN VOIDING OF TANK WARRANTY



01 TANK DETAIL
C200 N.T.S

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ISSUE / REVISION			
No.	DATE	BY	DESCRIPTION
01	JUL '24	PM	STORMWATER REPORT REV01
02	AUG '24	BGS	STORMWATER REPORT REV01

DESIGNED BY: PM
DRAWN BY: PM
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DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

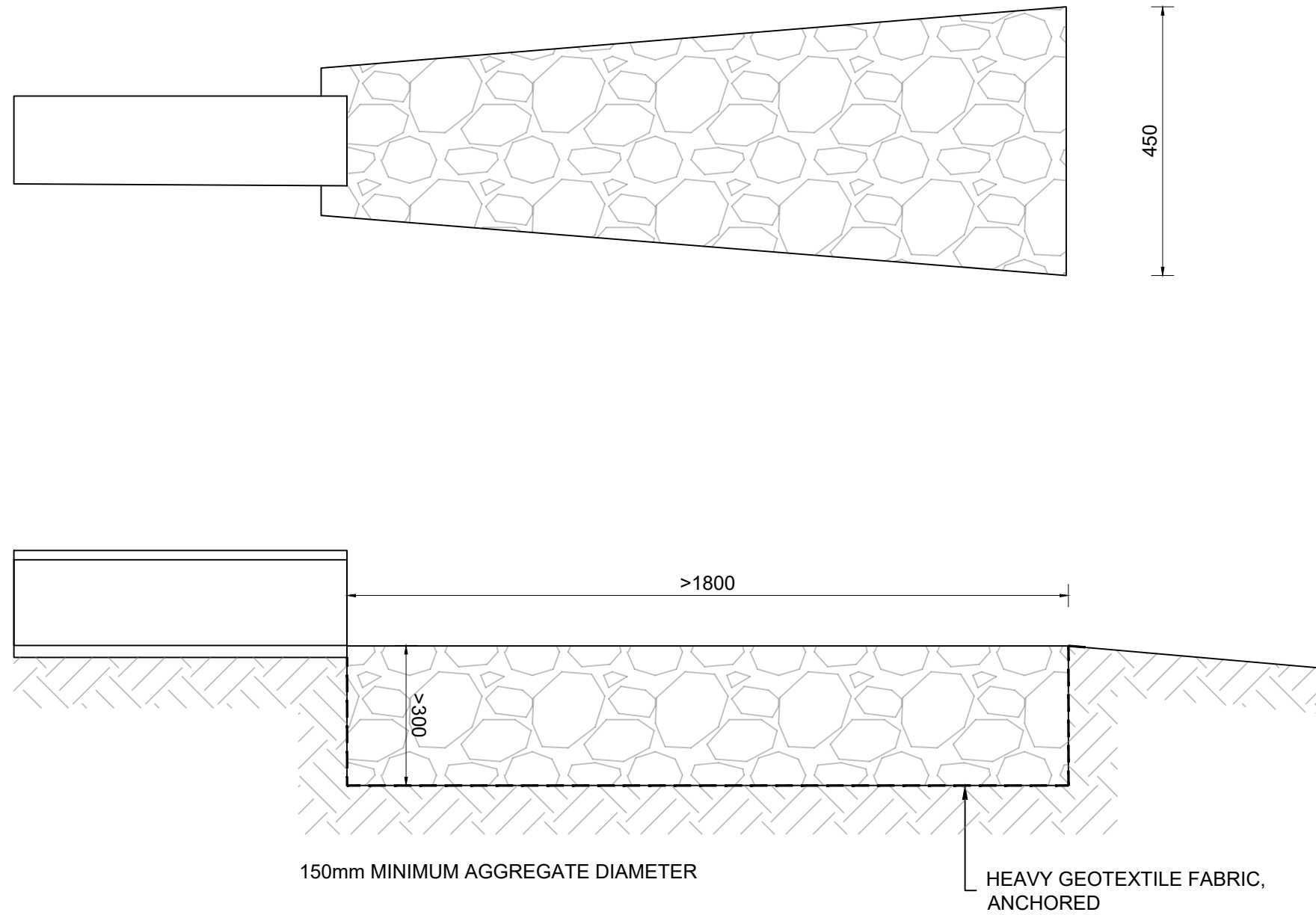
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PROJECT DESCRIPTION: STORMWATER MITIGATION REPORT

PROJECT TITLE: LOT 30 DP 494309
3 FANTAIL RISE
KERIKERI

ORIGINAL DRAWING SIZE: A3	OFFICE: OREWA
DRAWING SCALE: N.T.S	CO-ORDINATE SYSTEM: NOT COORDINATED
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3. REGULAR INSPECTION & CLEANING IS REQUIRED TO ENSURE THE EFFECTIVE OPERATION OF THE SYSTEM.



02 RIPRAP OUTLET DETAIL
C200 N.T.S

ISSUE / REVISION			
No.	DATE	BY	DESCRIPTION
01	JUL '24	PM	STORMWATER REPORT REV01
02	AUG '24	BGS	STORMWATER REPORT REV02

DESIGNED BY:	PM
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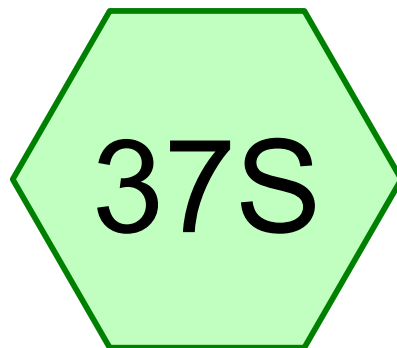
BUILDING CONSENT
DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

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PROJECT DESCRIPTION:	STORMWATER MITIGATION REPORT

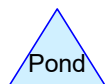
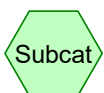
PROJECT TITLE:	LOT 30 DP 494309 3 FANTAIL RISE KERIKERI
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DRAWING SCALE:	N.T.S	CO-ORDINATE SYSTEM:	NOT COORDINATED
DRAWING NUMBER:	134852-C211	ISSUE:	02
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Pre-Development



Area Exceeding
Permitted Coverage -
Greenfields Conditions



Summary for Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions

Runoff = 8.00 l/s @ 7.99 hrs, Volume= 115.3 m³, Depth> 173 mm

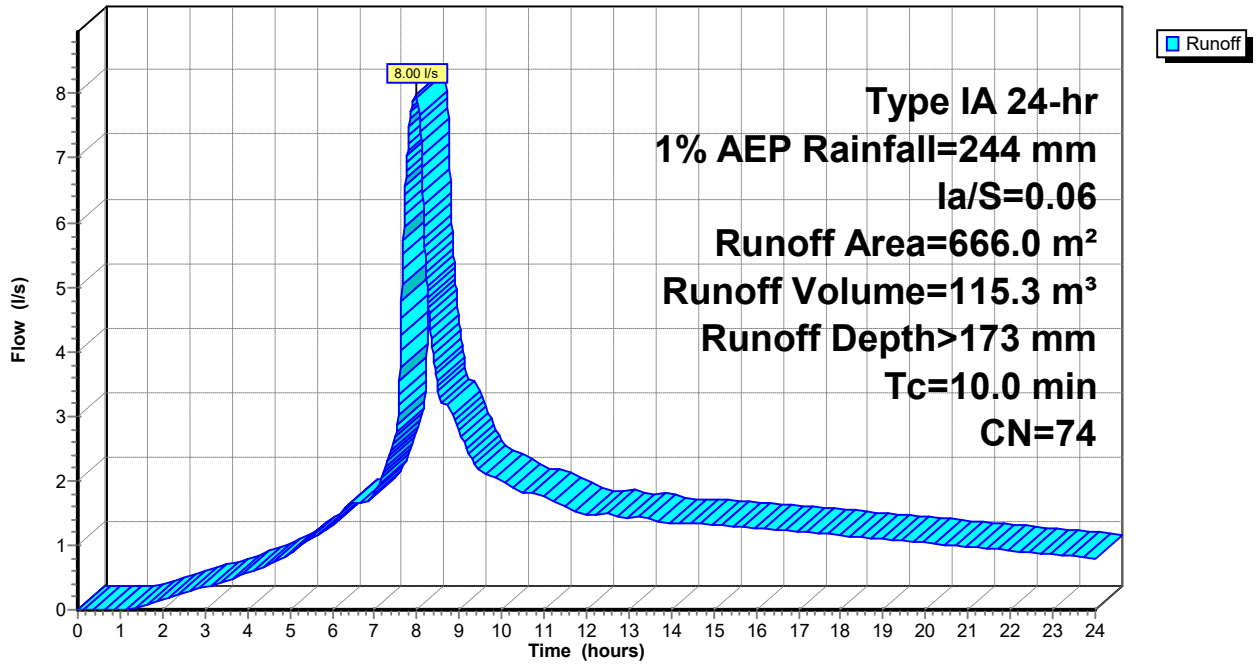
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1% AEP Rainfall=244 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 666.0	74	Permeable - Type C soil
666.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions

Hydrograph



Summary for Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions

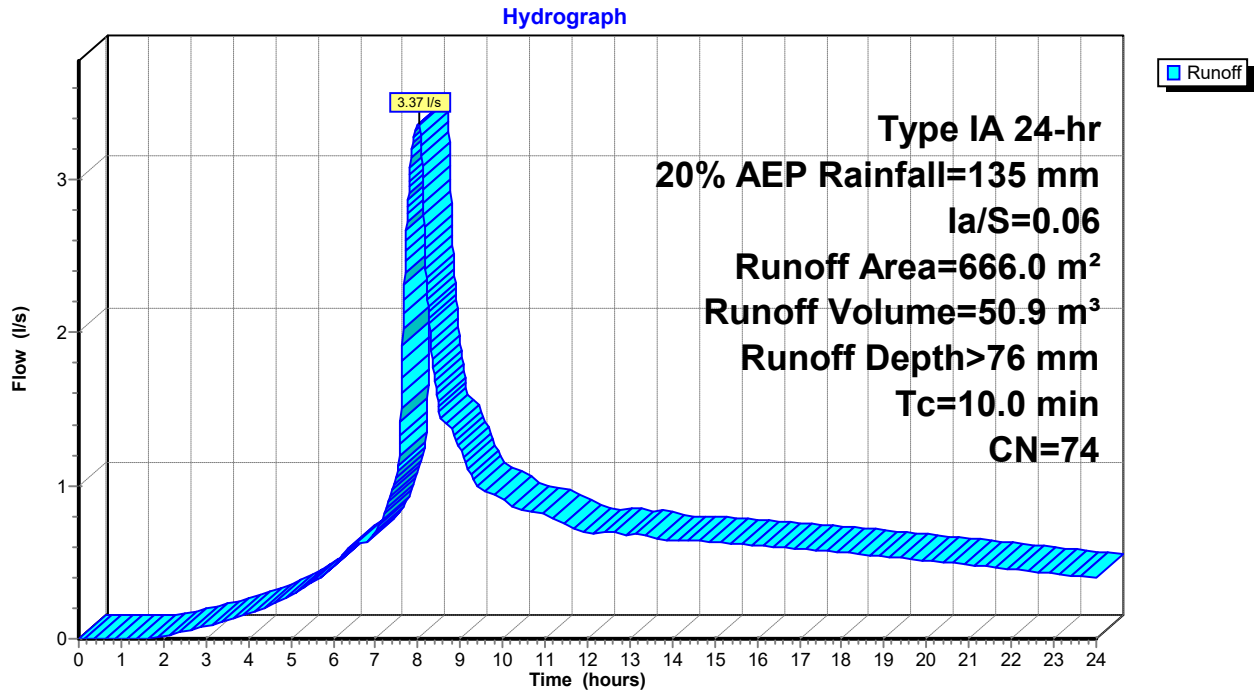
Runoff = 3.37 l/s @ 8.01 hrs, Volume= 50.9 m³, Depth> 76 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP Rainfall=135 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 666.0	74	Permeable - Type C soil
666.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions



Summary for Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions

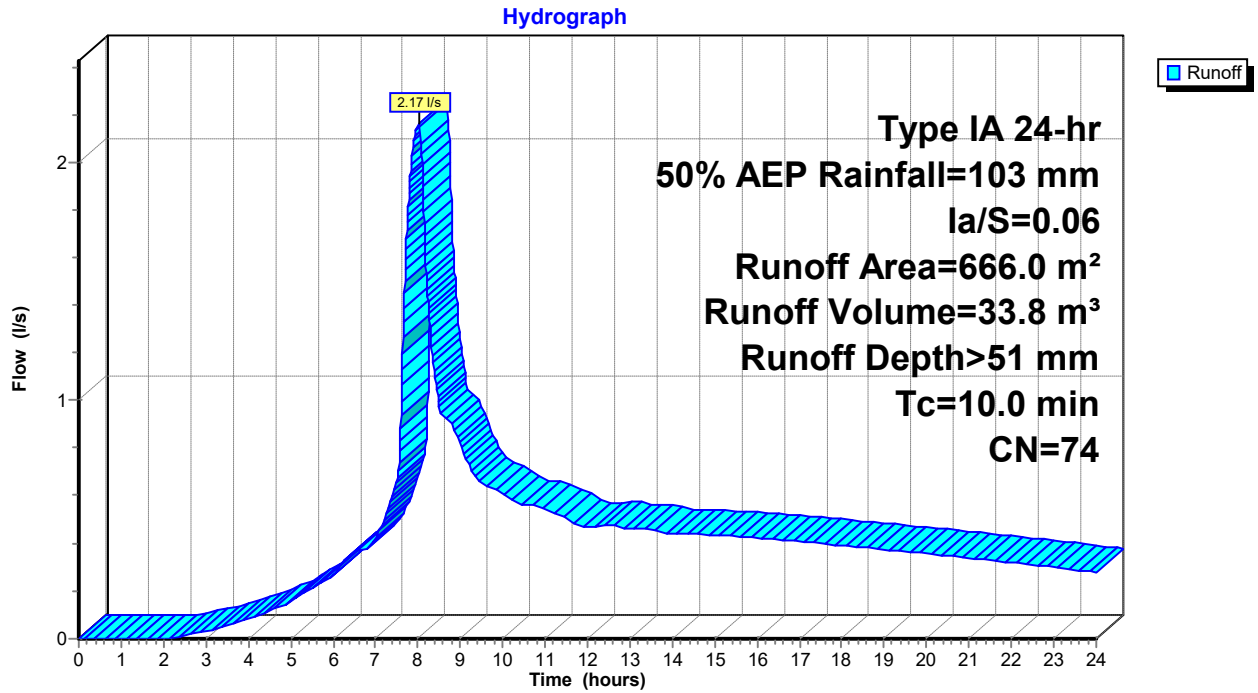
Runoff = 2.17 l/s @ 8.01 hrs, Volume= 33.8 m³, Depth> 51 mm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50% AEP Rainfall=103 mm, Ia/S=0.06

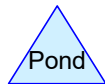
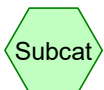
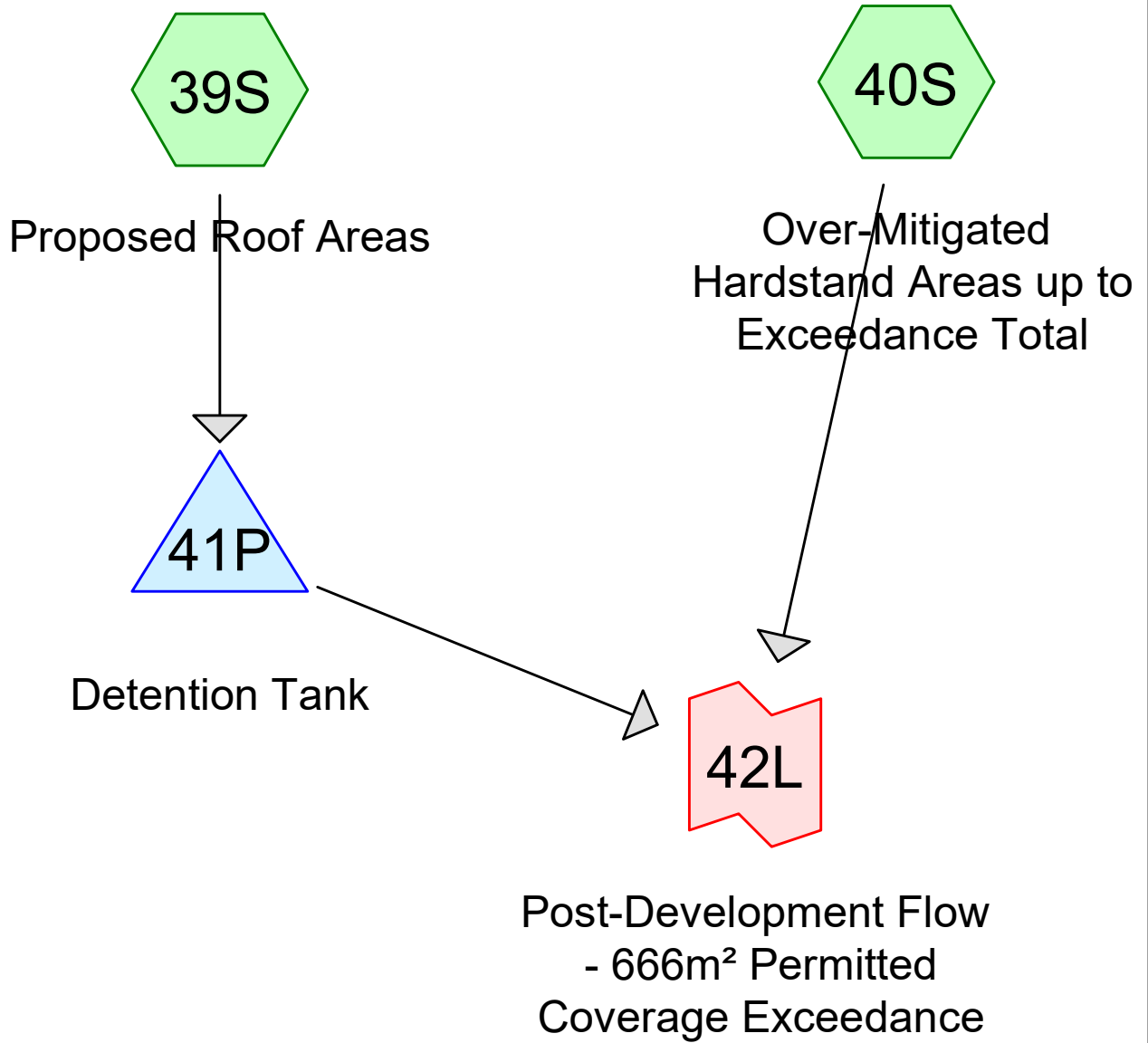
Area (m ²)	CN	Description
* 666.0	74	Permeable - Type C soil
666.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 37S: Area Exceeding Permitted Coverage - Greenfields Conditions



Post-Development



Summary for Subcatchment 39S: Proposed Roof Areas

Runoff = 10.78 l/s @ 7.94 hrs, Volume= 159.8 m³, Depth> 272 mm

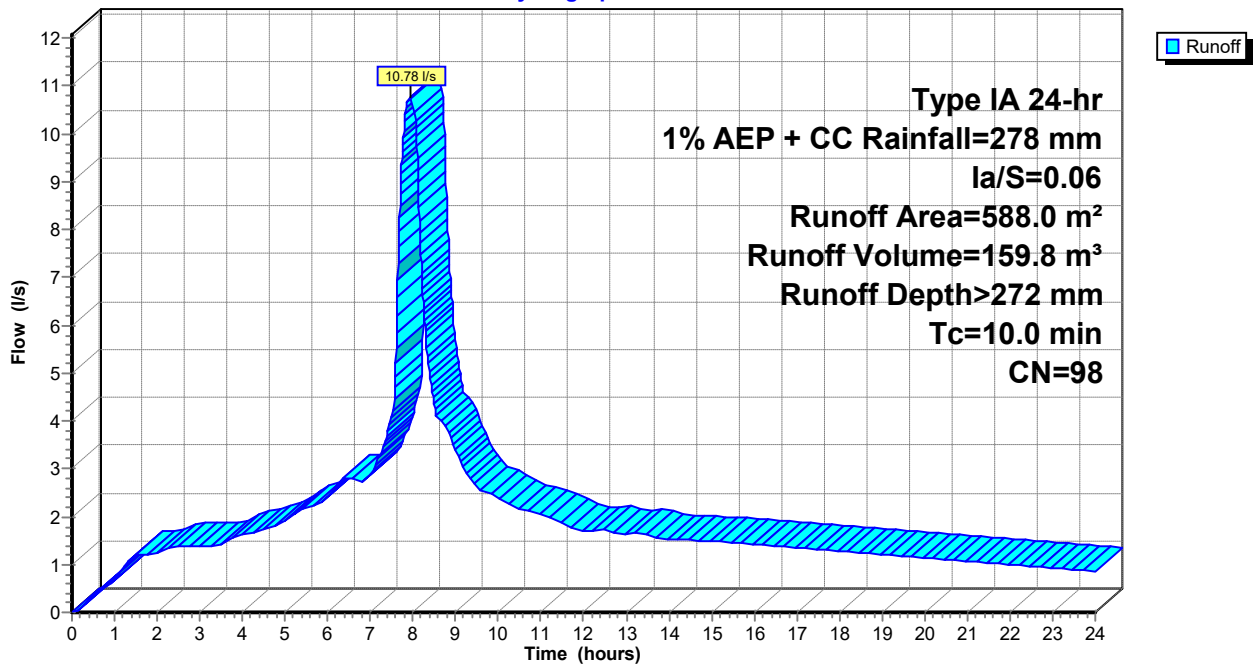
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1% AEP + CC Rainfall=278 mm, Ia/S=0.06

	Area (m ²)	CN	Description
*	452.0	98	Dwelling Impermeable Roof Area
*	96.0	98	Garage Impermeable Roof Area
*	40.0	98	Pool House Impermeable Roof Area
	588.0	98	Weighted Average
	588.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 39S: Proposed Roof Areas

Hydrograph



Summary for Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Runoff = 1.43 l/s @ 7.94 hrs, Volume= 21.2 m³, Depth> 272 mm

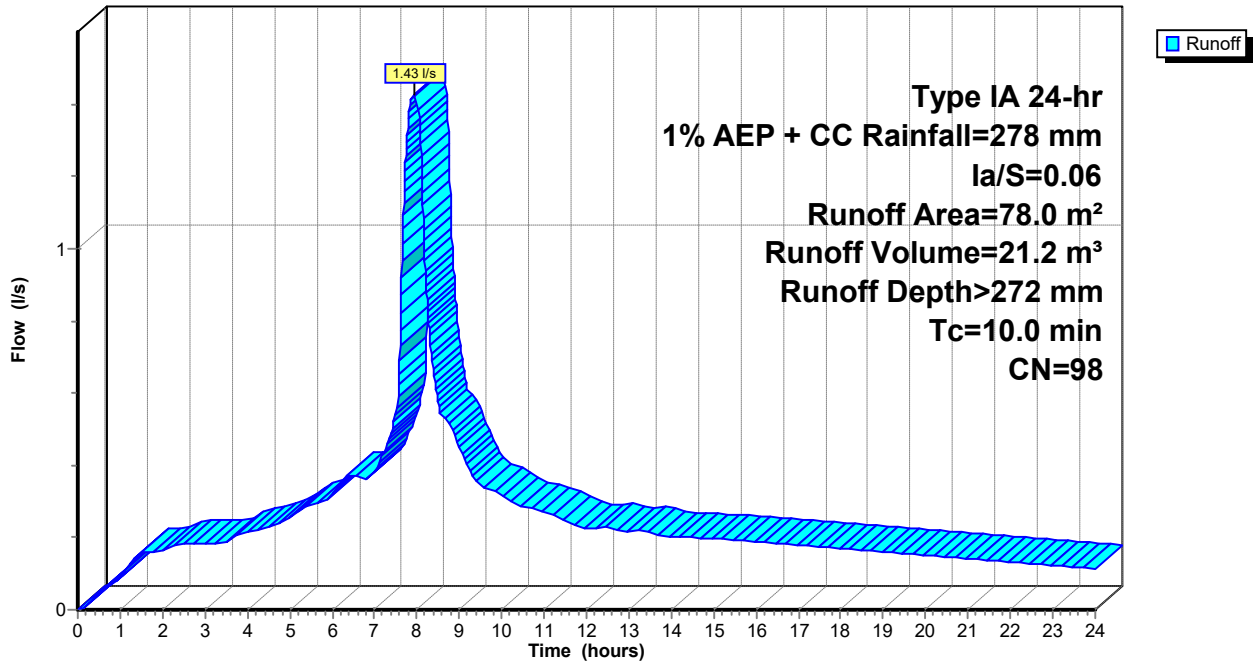
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 1% AEP + CC Rainfall=278 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 78.0	98	Impermeable Hardstand Area
78.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Hydrograph



Summary for Pond 41P: Detention Tank

Inflow Area = 588.0 m², 100.00% Impervious, Inflow Depth > 272 mm for 1% AEP + CC event
 Inflow = 10.78 l/s @ 7.94 hrs, Volume= 159.8 m³
 Outflow = 6.75 l/s @ 8.22 hrs, Volume= 155.6 m³, Atten= 37%, Lag= 16.9 min
 Primary = 6.75 l/s @ 8.22 hrs, Volume= 155.6 m³

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 2.253 m @ 8.22 hrs Surf.Area= 10.2 m² Storage= 22.9 m³

Plug-Flow detention time= 78.9 min calculated for 155.6 m³ (97% of inflow)
 Center-of-Mass det. time= 58.4 min (701.5 - 643.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	26.5 m ³	3.60 mD x 2.60 mH Vertical Cone/Cylinder

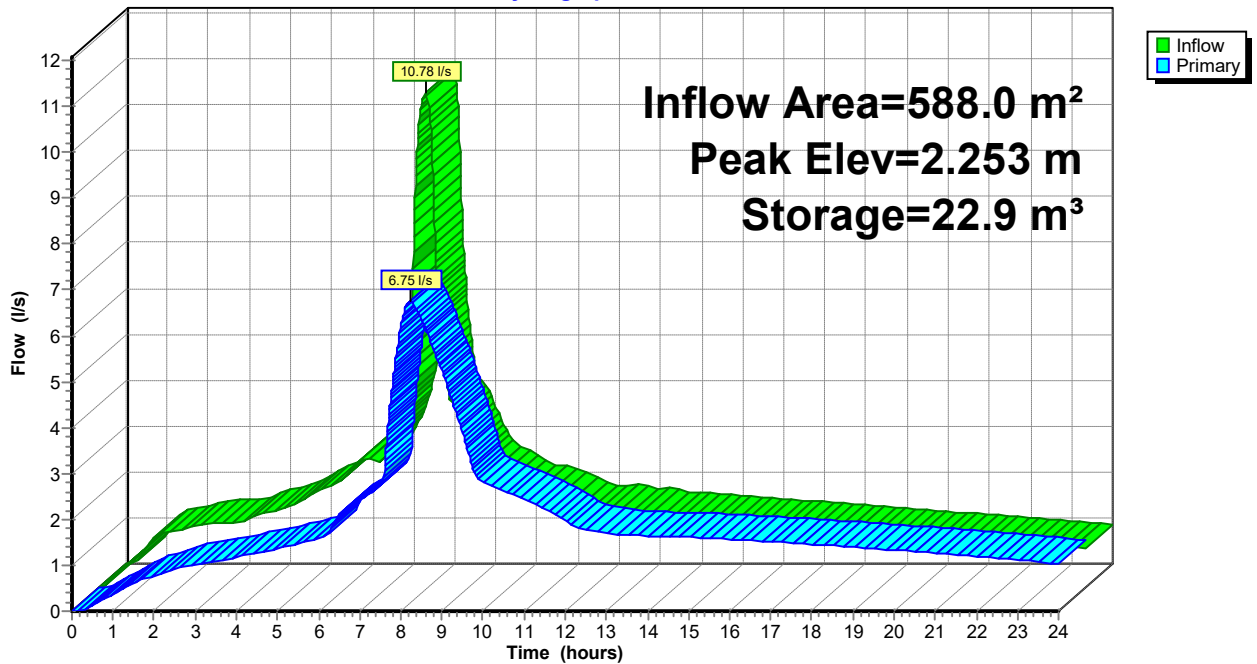
Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	28 mm Vert. 50% AEP Detention Orifice C= 0.600
#2	Primary	1.030 m	28 mm Vert. 20% AEP Detention Orifice C= 0.600
#3	Primary	1.380 m	36 mm Vert. 1% AEP Detention Orifice C= 0.600

Primary OutFlow Max=6.75 l/s @ 8.22 hrs HW=2.253 m (Free Discharge)

- 1=50% AEP Detention Orifice (Orifice Controls 2.45 l/s @ 3.98 m/s)
- 2=20% AEP Detention Orifice (Orifice Controls 1.80 l/s @ 2.92 m/s)
- 3=1% AEP Detention Orifice (Orifice Controls 2.50 l/s @ 2.46 m/s)

Pond 41P: Detention Tank

Hydrograph

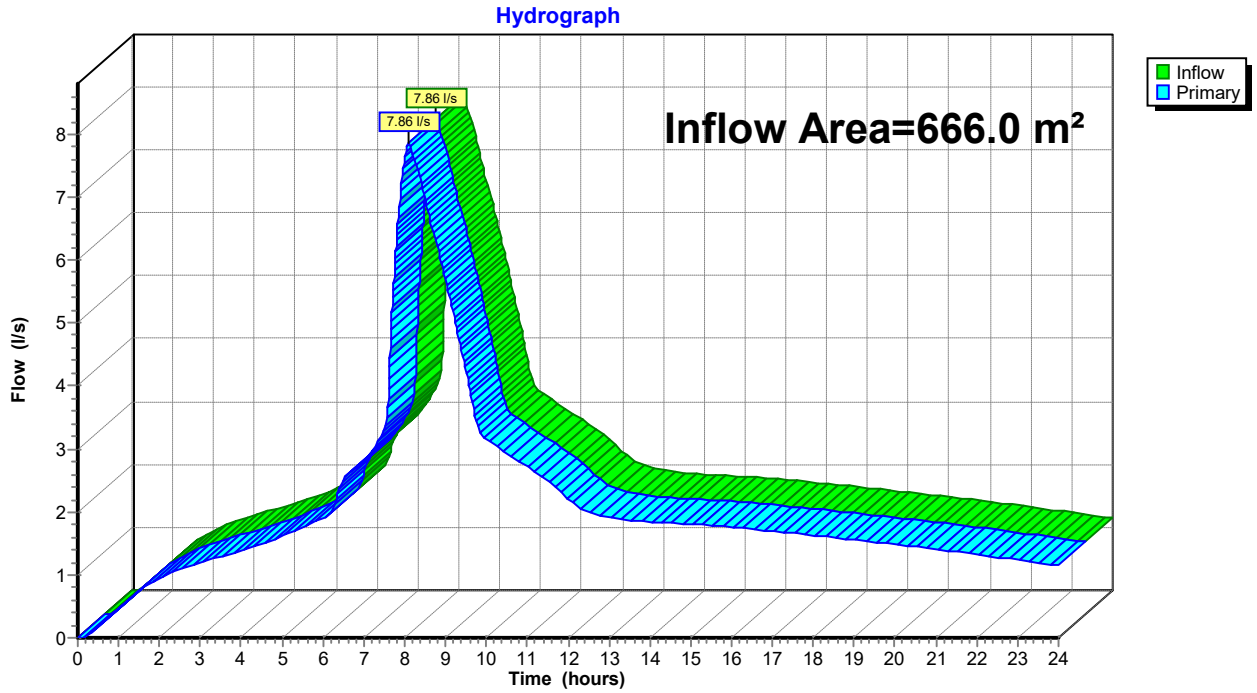


Summary for Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance

Inflow Area = 666.0 m², 100.00% Impervious, Inflow Depth > 265 mm for 1% AEP + CC event
Inflow = 7.86 l/s @ 8.10 hrs, Volume= 176.8 m³
Primary = 7.86 l/s @ 8.10 hrs, Volume= 176.8 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance



Summary for Subcatchment 39S: Proposed Roof Areas

Runoff = 5.91 l/s @ 7.94 hrs, Volume= 86.6 m³, Depth> 147 mm

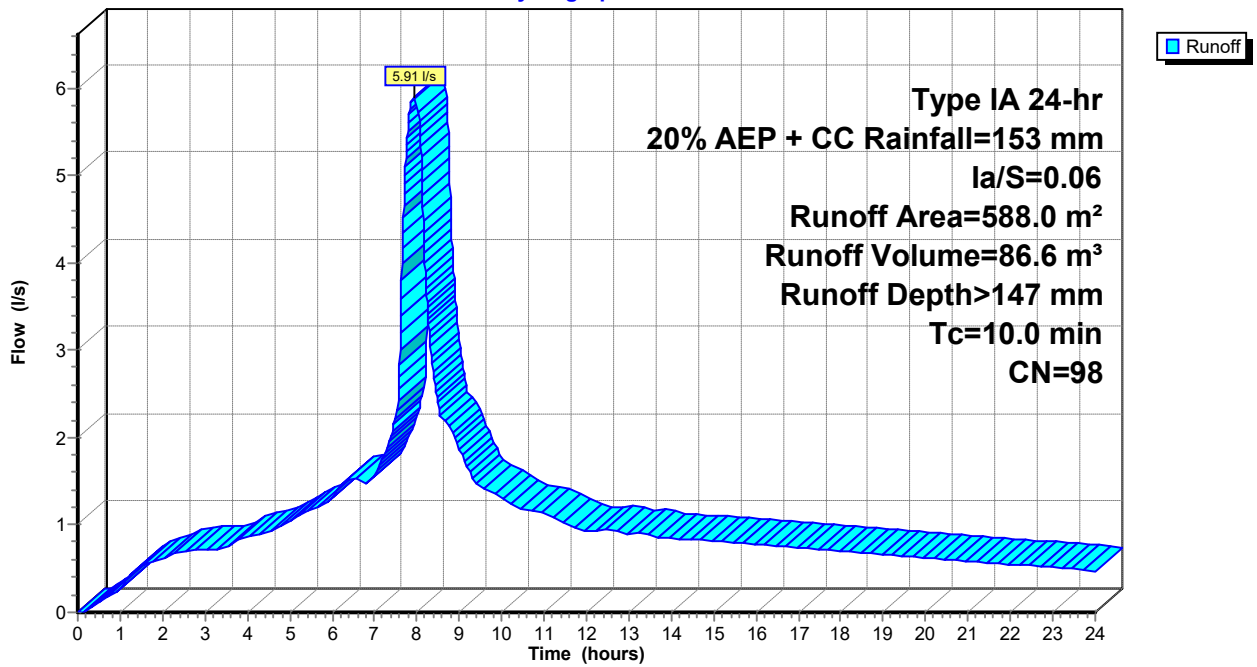
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type IA 24-hr 20% AEP + CC Rainfall=153 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 452.0	98	Dwelling Impermeable Roof Area
* 96.0	98	Garage Impermeable Roof Area
* 40.0	98	Pool House Impermeable Roof Area
588.0	98	Weighted Average
588.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 39S: Proposed Roof Areas

Hydrograph



Summary for Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Runoff = 0.78 l/s @ 7.94 hrs, Volume= 11.5 m³, Depth> 147 mm

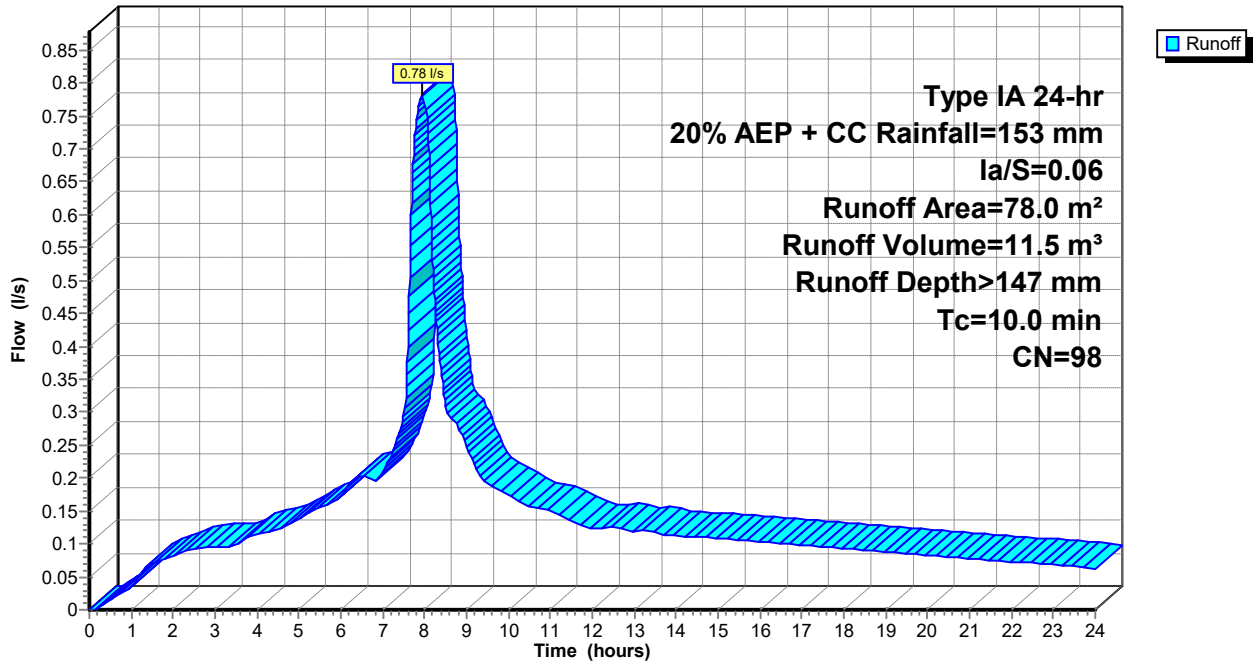
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 20% AEP + CC Rainfall=153 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 78.0	98	Impermeable Hardstand Area
78.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Hydrograph



Summary for Pond 41P: Detention Tank

Inflow Area = 588.0 m², 100.00% Impervious, Inflow Depth > 147 mm for 20% AEP + CC event
 Inflow = 5.91 l/s @ 7.94 hrs, Volume= 86.6 m³
 Outflow = 2.85 l/s @ 8.36 hrs, Volume= 85.4 m³, Atten= 52%, Lag= 25.5 min
 Primary = 2.85 l/s @ 8.36 hrs, Volume= 85.4 m³

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1.373 m @ 8.36 hrs Surf.Area= 10.2 m² Storage= 14.0 m³

Plug-Flow detention time= 70.5 min calculated for 85.4 m³ (99% of inflow)
 Center-of-Mass det. time= 59.9 min (710.0 - 650.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	26.5 m ³	3.60 mD x 2.60 mH Vertical Cone/Cylinder

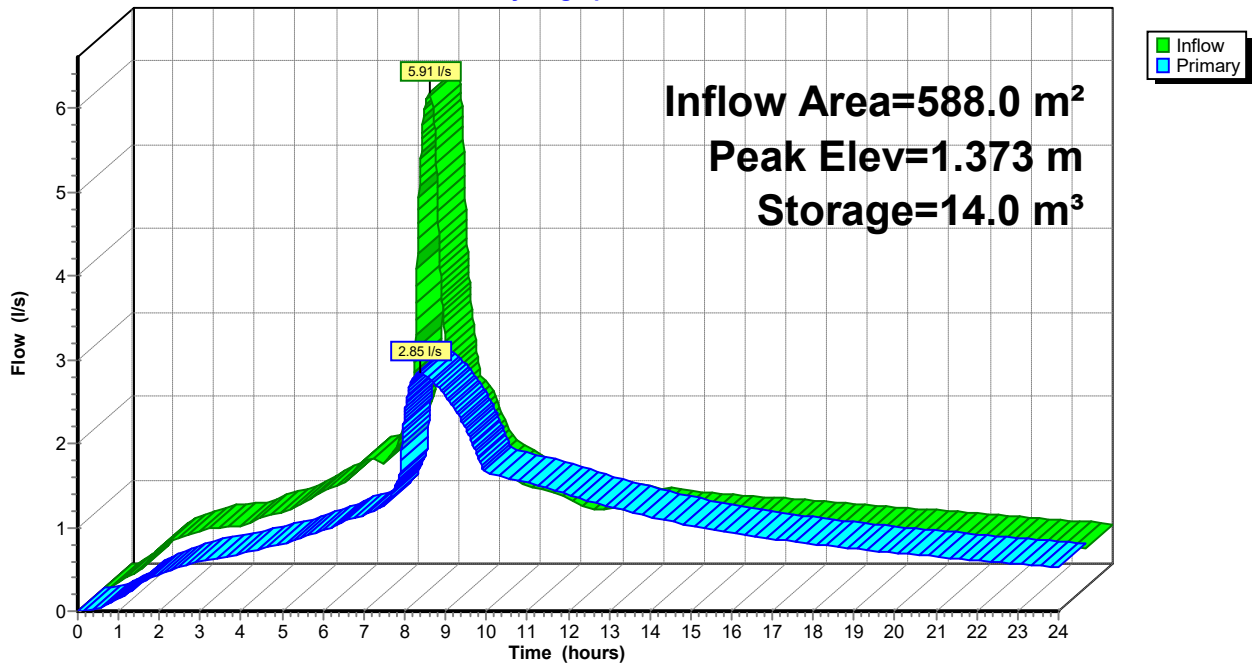
Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	28 mm Vert. 50% AEP Detention Orifice C= 0.600
#2	Primary	1.030 m	28 mm Vert. 20% AEP Detention Orifice C= 0.600
#3	Primary	1.380 m	36 mm Vert. 1% AEP Detention Orifice C= 0.600

Primary OutFlow Max=2.85 l/s @ 8.36 hrs HW=1.373 m (Free Discharge)

- 1=50% AEP Detention Orifice (Orifice Controls 1.91 l/s @ 3.10 m/s)
- 2=20% AEP Detention Orifice (Orifice Controls 0.94 l/s @ 1.53 m/s)
- 3=1% AEP Detention Orifice (Controls 0.00 l/s)

Pond 41P: Detention Tank

Hydrograph

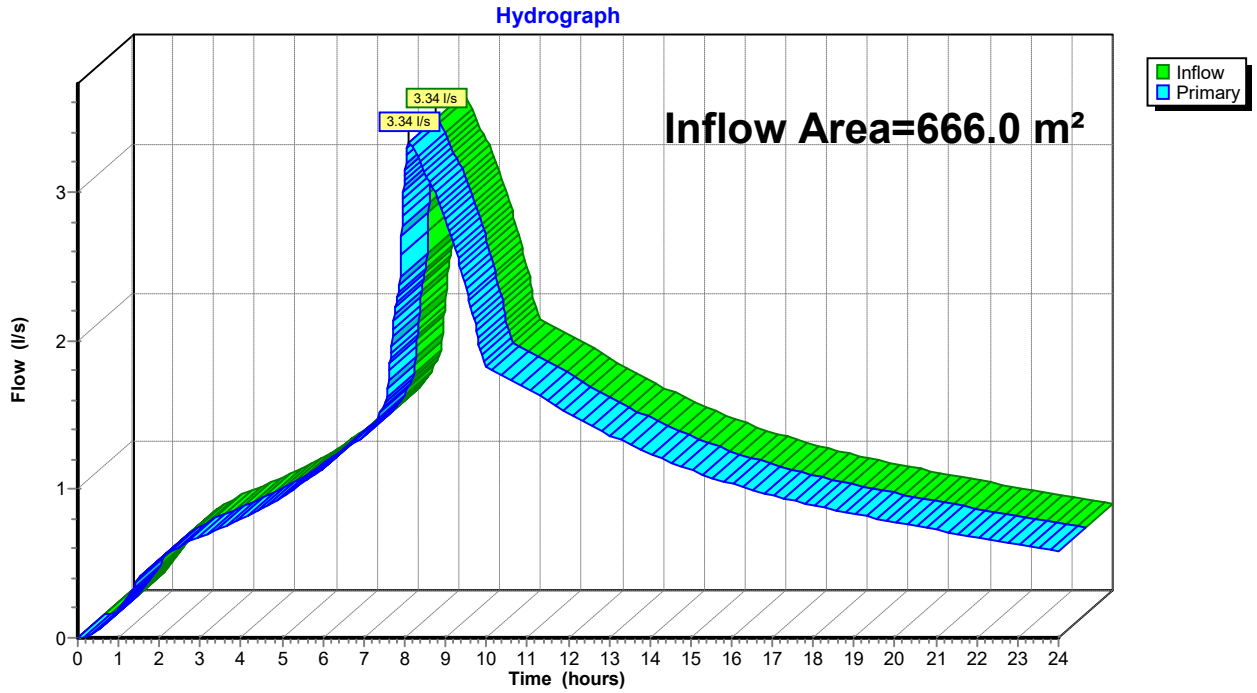


Summary for Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance

Inflow Area = 666.0 m², 100.00% Impervious, Inflow Depth > 145 mm for 20% AEP + CC event
Inflow = 3.34 l/s @ 8.12 hrs, Volume= 96.9 m³
Primary = 3.34 l/s @ 8.12 hrs, Volume= 96.9 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance



Summary for Subcatchment 39S: Proposed Roof Areas

Runoff = 4.42 l/s @ 7.94 hrs, Volume= 64.3 m³, Depth> 109 mm

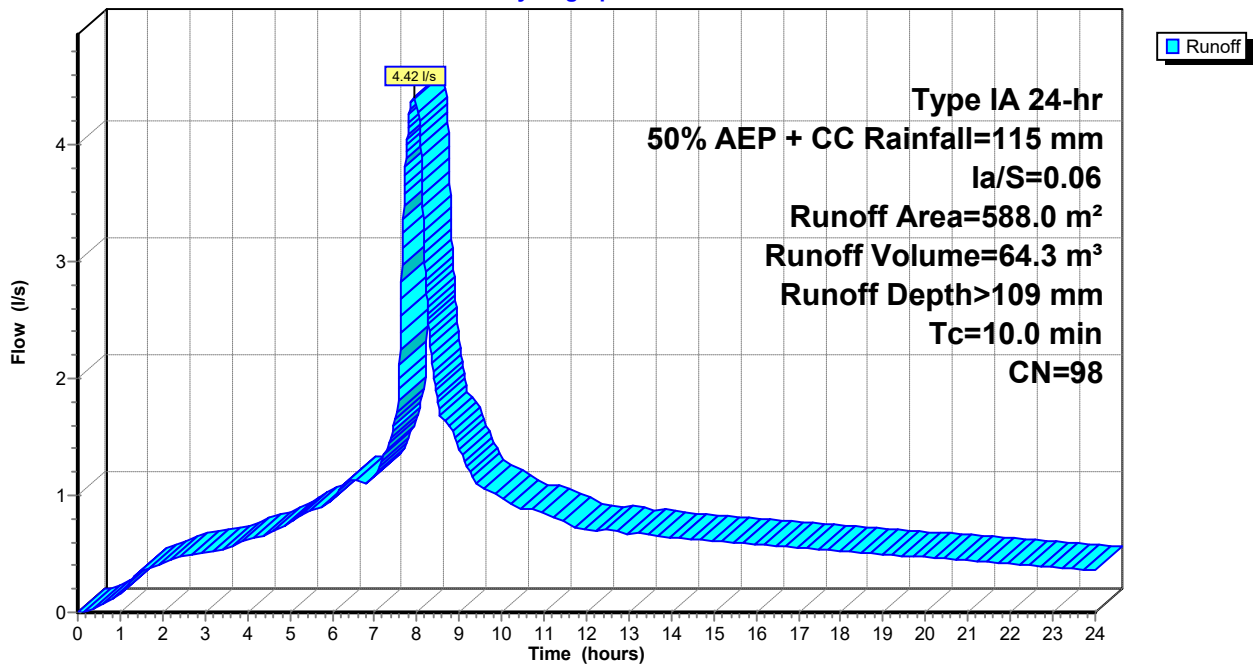
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50% AEP + CC Rainfall=115 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 452.0	98	Dwelling Impermeable Roof Area
* 96.0	98	Garage Impermeable Roof Area
* 40.0	98	Pool House Impermeable Roof Area
588.0	98	Weighted Average
588.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 39S: Proposed Roof Areas

Hydrograph



Summary for Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Runoff = 0.59 l/s @ 7.94 hrs, Volume= 8.5 m³, Depth> 109 mm

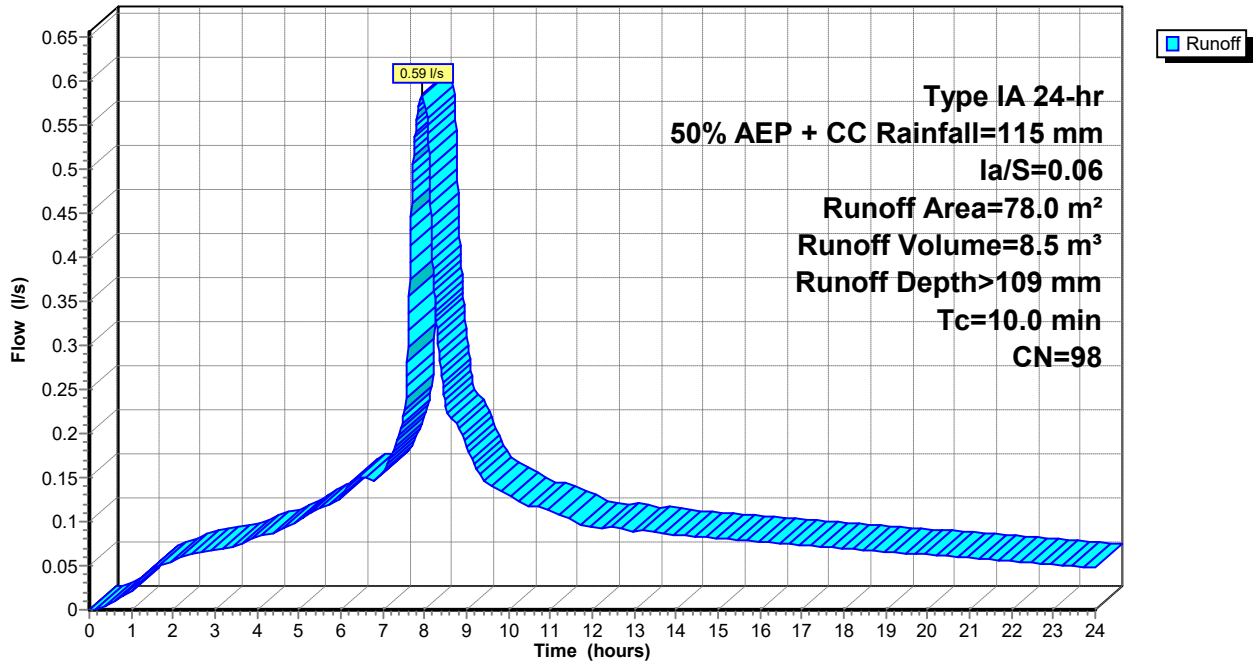
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
Type IA 24-hr 50% AEP + CC Rainfall=115 mm, Ia/S=0.06

Area (m ²)	CN	Description
* 78.0	98	Impermeable Hardstand Area
78.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m ³ /s)	Description
10.0					Direct Entry,

Subcatchment 40S: Over-Mitigated Hardstand Areas up to Exceedance Total

Hydrograph



Summary for Pond 41P: Detention Tank

Inflow Area = 588.0 m², 100.00% Impervious, Inflow Depth > 109 mm for 50% AEP + CC event
 Inflow = 4.42 l/s @ 7.94 hrs, Volume= 64.3 m³
 Outflow = 1.65 l/s @ 8.57 hrs, Volume= 63.6 m³, Atten= 63%, Lag= 38.0 min
 Primary = 1.65 l/s @ 8.57 hrs, Volume= 63.6 m³

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 1.025 m @ 8.57 hrs Surf.Area= 10.2 m² Storage= 10.4 m³

Plug-Flow detention time= 63.9 min calculated for 63.6 m³ (99% of inflow)
 Center-of-Mass det. time= 55.4 min (710.1 - 654.8)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	26.5 m ³	3.60 mD x 2.60 mH Vertical Cone/Cylinder

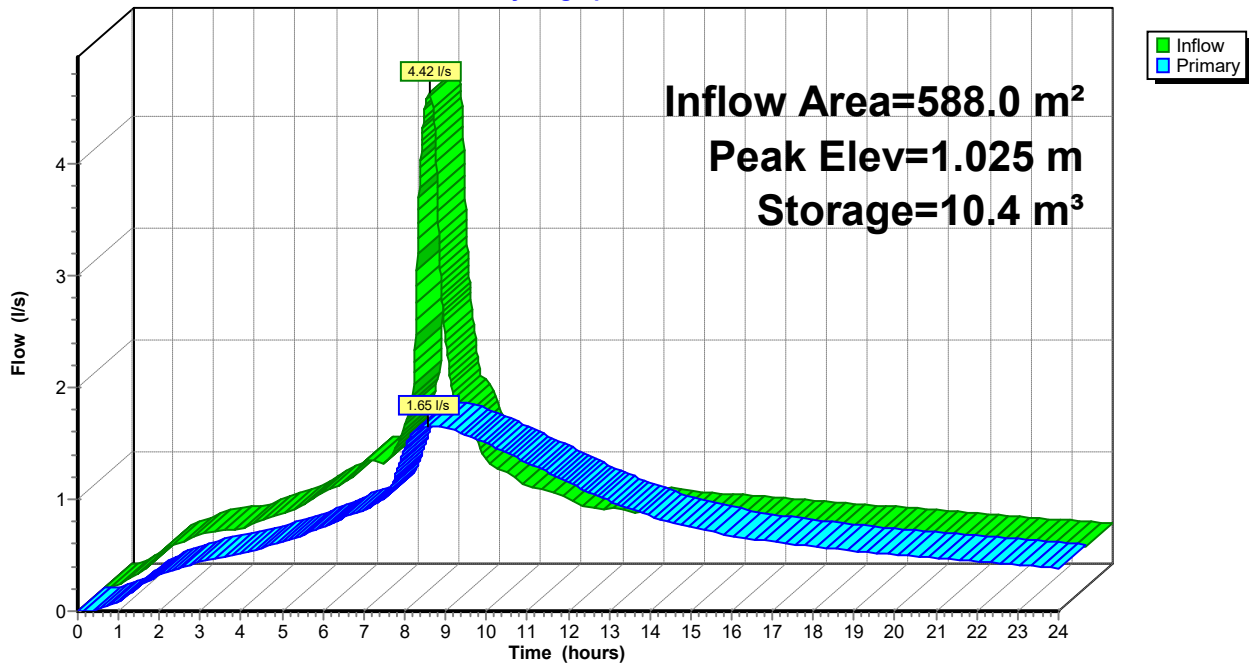
Device	Routing	Invert	Outlet Devices
#1	Primary	0.000 m	28 mm Vert. 50% AEP Detention Orifice C= 0.600
#2	Primary	1.030 m	28 mm Vert. 20% AEP Detention Orifice C= 0.600
#3	Primary	1.380 m	36 mm Vert. 1% AEP Detention Orifice C= 0.600

Primary OutFlow Max=1.65 l/s @ 8.57 hrs HW=1.025 m (Free Discharge)

- 1=50% AEP Detention Orifice (Orifice Controls 1.65 l/s @ 2.67 m/s)
- 2=20% AEP Detention Orifice (Controls 0.00 l/s)
- 3=1% AEP Detention Orifice (Controls 0.00 l/s)

Pond 41P: Detention Tank

Hydrograph

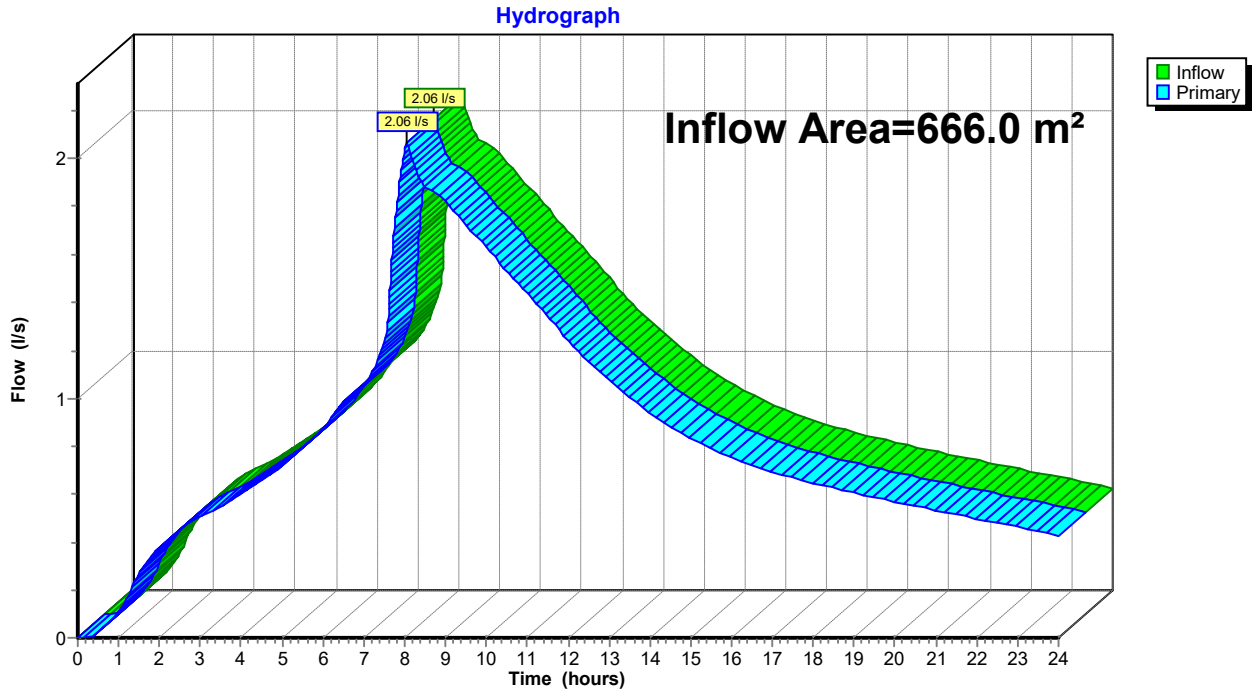


Summary for Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance

Inflow Area = 666.0 m², 100.00% Impervious, Inflow Depth > 108 mm for 50% AEP + CC event
Inflow = 2.06 l/s @ 8.07 hrs, Volume= 72.2 m³
Primary = 2.06 l/s @ 8.07 hrs, Volume= 72.2 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 42L: Post-Development Flow - 666m² Permitted Coverage Exceedance





**WILTON
JOUBERT**

Consulting Engineers

JOB #:

134852

Address:

3 Fantail Rise

Kerikeri

Catchpit Calculator

By:

PM

Checked:

BGS

Date:

03.07.2024

AS E1/AS1 - Sect 3.6.2

i 108.0 mm/hr [10% AEP + CC RCP6.0 10-min duration]

Catchpit Capacity: Sect 3.2.2

Catchpit Type Type 1 Dimensions = 300x300 mm
Area Served = 4500 // m²
= 42 m²

Catchpit Type Type 2 Dimensions = 650x460 mm
Area Served = 40,000 // m²
= 370 m²



ADDRESS	3 Fantail Rise Kerikeri
REFERENCE	Outlet protection design as per TP10 *In accordance with section 13.4

JOB NO.:	134852
DATE:	03.07.2024
DESIGNER:	PM
CHECKER:	BGS

EROSION PROTECTED OUTLET SPECIFICATIONS FOR VARYING OUTLET GRADIENTS

Discharge velocity

	11.1 l/s	calculated flow rate from SW catchments	(peak flow for 20% AEP + CCF)
	0.15 m	size of outlet (D _o)	
	0.0177 m ²	outlet area = $\pi r^2 \times (x/2)^2$	
	5 %	maximum grade on pipe	
	0.011	pipe material mannings (n)	
Dv	1.349 m/s	discharge velocity from pipe outlet	

Equivalent Aggregate Diameter (d_s)

Where: $d_s = 0.25 \times D_o \times F_o$

	0.15 m	Outlet diameter (m)
	1.62 m	Froude number = $V / (g \times d_p)^{0.5}$
	0.071 m	depth of flow in pipe
	1.349 m/s	velocity of flow in pipe
Ds1	0.061 m	calculated aggregate diameter to avoid scour
Ds2	0.150	minimum aggregate diameter to avoid scour
Ds	0.150	required aggregate diameter to avoid scour

Thickness of Aggregate Layer

Where: $D_a = 2d_s$

Da1	0.300	calculated depth of aggregate at base of rip-rap
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Width of Mouth of Rip-Rap (W_a)

Where: $W_a = 3D_o$

W _a	0.450 m
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Rip-Rap Outfall Length (L_a)



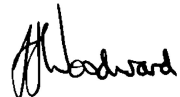

Where: $D_o (8 + 17 \times \log F_o)$

L _a	1.733 m
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Appendix 4: Geotechnical and Onsite Wastewater Discharge Engineering Report

SITE	3 Fantail Rise, Kerikeri
LEGAL DESCRIPTION	Lot 30 DP 494309
PROJECT	New Dwelling, Separate Garage, Pool House & In-Ground Swimming Pool
CLIENT	Shanaghan Construction
REFERENCE NO.	134850
DOCUMENT	Site-Specific Geotechnical & On-site Wastewater Management Report
STATUS/REVISION NO.	FINAL – Development Review of Earthworks & Foundation Plans Required for Building Consent
DATE OF ISSUE	4 July 2024

Report Prepared For	Email
Shanaghan Construction	shanaghan.construction@gmail.com

Authored by	S. Page <i>Part Dip. (Civil)</i>	Engineering Technician	shaun@wjl.co.nz	
Reviewed by	N. Ngaropo <i>BSc (Geology)</i>	Engineering Geologist	nikora@wjl.co.nz	
Geotechnical Component Approved by	S. J. Woodward <i>ME (Civil) CMEngNZ, CPEng</i>	Principal Geotechnical Engineer	simonwoodward@wjl.co.nz	
Civil (Wastewater) Component Approved by	B. Steenkamp <i>(BEng Civil, BSc Geol, CPEng, CMEngNZ)</i>	Principal Civil Engineer	bens@wjl.co.nz	

1. EXECUTIVE SUMMARY

The following table is intended to be a concise summary which must be read in conjunction with the relevant report sections as referenced herein.

Development Type:	New dwelling, separate garage, pool house & in-ground swimming pool.
Development Proposals Supplied:	Yes – Preliminary architectural drawings only (16 sheets).
NZS3604 Type Structure/s:	Yes.
Geology Encountered:	Kerikeri Volcanic Group.
Surficial Topsoil Encountered:	Yes – 0.25m to 0.30m thick surficial layers.
Overall Site Gradient in Proximity to Development:	Broad, flat to gently sloping.
Site Stability Risk:	Overall Low Risk of deep-seated global instability.
Liquefaction Risk:	Negligible risk of liquefaction susceptibility.
Suitable Shallow Foundation Type(s):	Reinforced, stiffened raft slab, or Conventional slab-on-grade with deepened perimeter strip footings.
Shallow Soil Bearing Capacity:	Yes – Natural Soils & Engineered Hardfill Only. Geotechnical Ultimate Bearing Capacity = 300 kPa.
NZBC B1 Expansive Soils Classification:	Class M – Moderately Expansive ($y_s = 44\text{mm}$). Refer report text for design guidance.
Minimum Footing Depths :	Deepened Strip Footings: 0.60m below finished ground levels and 0.30m into competent natural ground, whichever is deeper. Isolated Foundations: 0.90m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.
NZS1170.5:2004 Site Subsoil Classification:	Class C – Shallow Soil stratigraphy.
Earthworks:	The finished ground and floor levels for all four proposed structures are currently unknown. A crossfall of approximately 1.5m is envisaged across the entire development area. If the client wishes, there is a possibility of the entire development area being founded completely on cut ground with localised fills essentially confined to minor levelling across proposed concrete slab foundation areas. Alternatively, minor filling can be undertaken downslope to create suitable level building sites for slab construction. The client has indicated that an excavation of approximately 1.5m will be made to form the in-ground swimming pool building site. Refer Section 9.2 for design guidance.
Wastewater:	Refer Section 12 for design guidance.
Consent Application Report Suitable for:	Once architectural drawings, most notably earthworks and foundation plans, have been finalised, they should be referred to us for development review and a supplementary memorandum will be provided in supporting the Building Consent application.

2. INTRODUCTION

2.1. SCOPE OF WORK

Wilton Joubert Limited (WJL) was engaged by the client; **Shanaghan Construction**, to undertake a geotechnical assessment of ground conditions at the above site, where we understand, it is proposed to construct a new residential development within the Building Covenant area that covers much of the western half of the property.

The proposed development comprises of a residential dwelling, separate garage, pool house, and in-ground swimming pool. For the purposes of this report, we have assumed the development will comprise of lightweight, timber framed structures, designed and constructed generally in keeping with the requirements of NZS3604:2011.

Our report also includes the assessment of an on-site wastewater management system that will service the dwelling, separate garage, and pool house.

2.2. SUPPLIED INFORMATION

At the time of preparing this report, we have been supplied with the following documentation pertaining to the proposed development:

- Far North District Council (FNDC) Operative District Plan Decision on Resource Consent Application (Combined Subdivision and Land use) and Decision Under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, dated 21 November 2013,
- Certificate of Title, dated 10 August 2016, and
- Preliminary Architectural Drawings (16 sheets), dated 3 May 2024, prepared by the Draftline (ref: 240200006). The drawing set includes Site, Floor, and Elevation Plans of the proposed dwelling, garage, and pool house. No drawings of the proposed in-ground swimming pool have been supplied.

Once architectural drawings, most notably earthworks, pool and foundation plans, have been finalised, they should be referred to us for development review and a supplementary memorandum will be provided in supporting the Building Consent application.

3. SITE DESCRIPTION

The subject 8,009m² Coastal Living zoned, almost rectangular shaped property covers the southern area of land off Fantail Rise and is bound by Blue Penguin Rise along the eastern boundary.

The completely fenced site is proposed to be accessed at the north-western corner, approximately 5.8km northeast of the Kerikeri Central Business District. At its closet point, the Kerikeri Inlet tidal environment is offset approximately 630m to the south and 780m to the east.

Existing ground levels across the site range between approximately 55m (north) and 48.5m (south-eastern boundary corner) New Zealand Vertical Datum (NZVD).

The property is shown on our appended Site Plan (ref: 134850-G600) and in Figure 1 below.



Figure 1: Screenshot aerial view of the subject site from the FNDC on-line GIS Property and Land Map.
The property is highlighted in cyan. Hatched grey rectangle depicts Building Covenant area.

Topographically speaking, the fenced property is set around a broad, flat to gently sloping crest that covers the approximate western two-thirds of the property. The eastern third is covered by a minor southeast facing slope, falling at grades ranging between 7° to 13°, down to Blue Penguin Rise and a neighbouring residential development within the allotment to the south. The property is currently covered in pasture with no built development yet in place.



Figure 2: Site photograph looking towards the western end of the proposed development area (northwest direction).
Orange cones approximately depict the development extent.



Figure 3: Site photograph looking towards the northern end of the proposed development area (north direction). Orange cones approximately depict the development extent.



Figure 4: Site photograph looking towards the eastern end of the proposed development area (southeast direction). Orange cones approximately depict the development extent.

At the time of preparing this report, we note that the FNDC Water Services Map indicates that a:

- Stormwater swale drain borders the north-eastern boundary corner and eastern boundary, and
- A stormwater manhole is present adjacent to the north-eastern boundary corner.

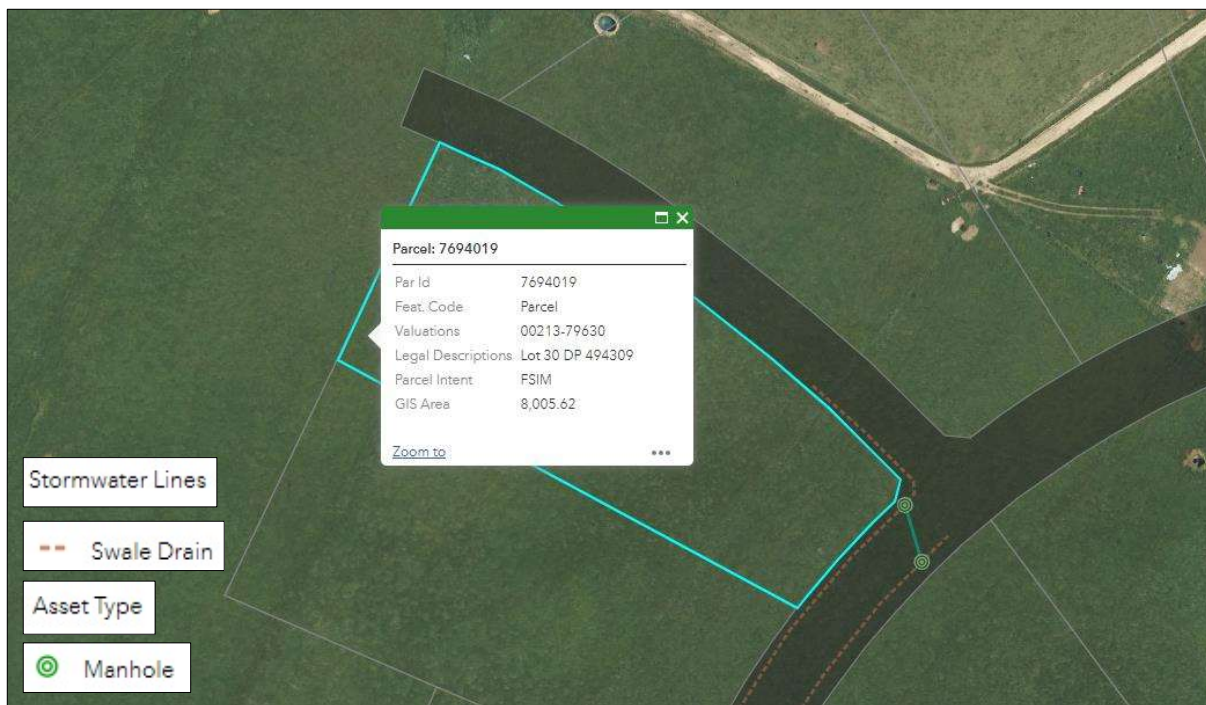


Figure 5: Screenshot aerial view of the subject site from the FNDC on-line GIS Water Services Map.

4. DEVELOPMENT PROPOSALS

Based on our review of the supplied preliminary architectural drawings, it is our understanding that the client proposes to construct a new single-level residential dwelling, separate garage, pool house, and in-ground swimming pool within the Building Covenant area that covers much of the western half of the property.

At this preliminary stage, we are unsure of the proposed foundations for each structure, but it is anticipated that concrete slabs are likely to be implemented for the dwelling, separate garage, and pool house, and that the pool will be 'in-ground' proprietary-type design. Our report will provide recommendations for both reinforced, stiffened raft slab foundation systems and for conventional slab-on-grade systems with deepened perimeter strip footings.

The finished ground and floor levels (FGL and FFL, respectively) for all four proposed structures are currently unknown. Sourced LiDAR contour data from the Northland Regional Council (NRC) on-line GIS Hazard Map indicates that a crossfall of approximately 1.5m is currently present across the entire development area.

If the client wishes, there is a possibility for the entire development area to be founded completely on cut ground with localised fills essentially confined to minor levelling across proposed concrete slab foundation areas. Alternatively, minor filling can be undertaken downslope to create suitable level building sites for slab construction.

The client has indicated that an excavation of approximately 1.5m will be made to form the in-ground swimming pool building site.

As a result, the principal objectives were to investigate and assess the suitability of potential foundation options for the site subsoils, not only primarily in terms of bearing capacity, but also for differential foundation movement.

5. DESKTOP STUDY

5.1. GEOLOGY

Local geology across this and wider surrounding property is noted on the GNS Science New Zealand Geology Web Map, Scale 1:250,000, as; **Kerikeri Volcanic Group Miocene Basalt of Kaikohe – Bay of Islands Volcanic Field**. These deposits are approximately 1.8 to 9.7 million years in age and described as; “*Basalt lava, volcanic plugs, and minor tuff*” (ref: GNS Science Website).

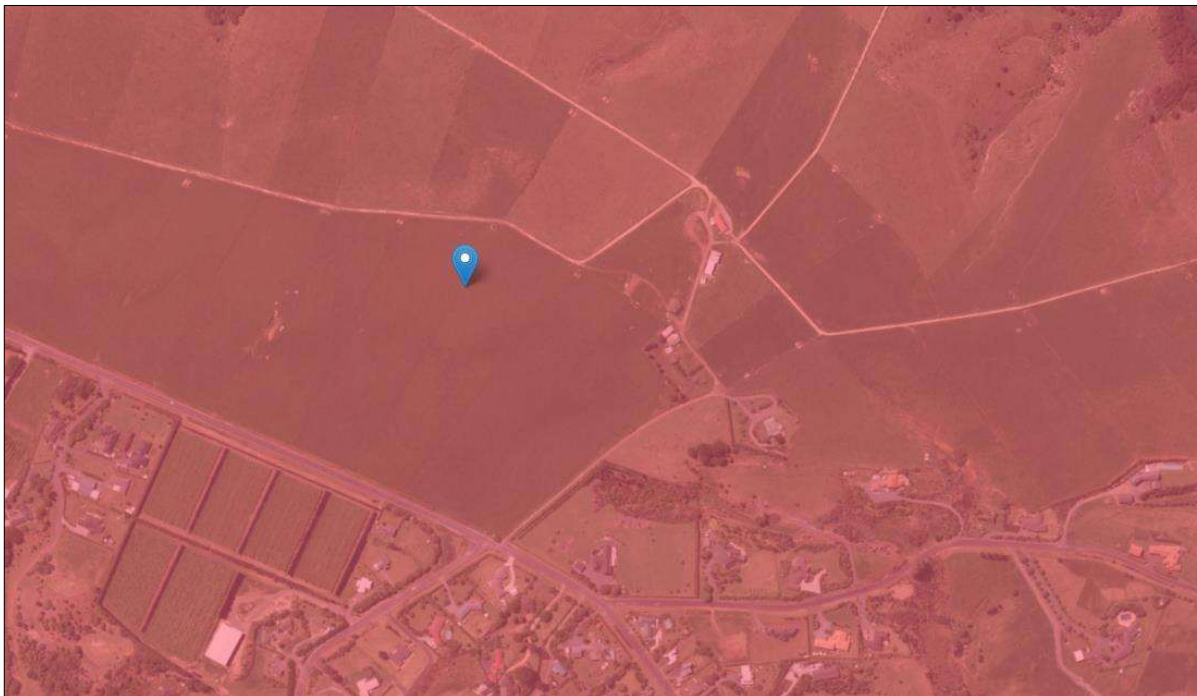


Figure 8: Screenshot aerial view of the subject site and wider surrounding land from the New Zealand Geology Web Map. Blue marker approximately depicts property location.

5.2. HISTORICAL GEOTECHNICAL REPORTS

We have reviewed the following Geotechnical Report pertaining to the subdivision of the parent Lot that the subject allotment was created from:

- Subdivision Suitability Report (SSR), dated 21 May 2012, prepared by Cook Costello (ref: 11067-001).

In reviewing the SSR, we note the following relevant Geotechnical recommendations were made by Cook Costello:

- “*Geotechnical investigations indicate that the proposed subdivision site is stable, and the subsoil properties have adequate strength parameters necessary for the proposed development,*
- *Future building foundations will require engineering design in accordance with AS2870 Class M soils or specific design for moderately expansive and plastic soils. This will require the design to meet engineering standards confirmed by a Chartered Professional Engineer with suitable Geotechnical experience,*
- *A recommended foundation option for concrete slab floors is that they are of stiffened raft or rib raft (waffle raft) design in accordance with AS2870, and*
- *Controlled fill and any replacement fill at the site is to be suitably compacted and tested to NZS4431.”*

6. GEOTECHNICAL INVESTIGATION

Our fieldwork was undertaken on 27 June 2024, and involved:

- Drilling 6 (no.) 50mm diameter hand auger boreholes (HA01 to HA06 inclusive), to depths ranging between 2.6m to 3.0m below present ground level (bpgl),
- Drilling 2 (no.) 50mm diameter wastewater hand auger boreholes (WW01 to WW06 inclusive) both to a depth of 1.2m bpgl, and
- The on-site measurement of an electronic Zip Level and tape cross-section (A-A').

The approximate locations of the boreholes and cross-section are depicted on our appended Site Plan (ref: 134597-G600). The cross-section (ref: 134850-G610) and boreholes are appended to this report.

The soil sample arisings from the boreholes were logged in accordance with the "Field Description of Soil and Rock", NZGS, December 2005.

In-situ undrained Vane Shear Strengths were measured within HA01 to HA06 at intervals of depth and then adjusted in accordance with the New Zealand Geotechnical Society (NZGS); Guidelines for Handheld Shear Vane Testing, August 2001, with strengths classified in accordance with the NZGS Field Classification Guidelines; Table 2.10, December 2005. The materials identified are described in detail on the appended records, together with the results of the various tests undertaken, plus the groundwater conditions as determined during time on site.

7. GEOTECHNICAL FINDINGS

The following is a summary of the ground conditions encountered in our investigation. Please refer to the appended logs for greater detail.

7.1. TOPSOIL

Surficial TOPSOIL layers of 0.25m to 0.30m thickness were overlying all six HA's.

7.2. NATURAL GROUND

The underlying natural deposits encountered on-site were consistent with our expectations of Kerikeri Volcanic Group deposits, comprising of non to low plasticity, very stiff Slightly Clayey SILT, Slightly Gravelly, and SILT deposits, until termination of all six HA's.

Measured in-situ, BS1377 adjusted peak shear strengths ranged between 169kPa and greater than 197kPa to 224kPa, where soil strength was in excess of the shear vane capacity, or the vane was 'Unable to Penetrate' (UTP) into the soil.

Where measurable, ratios of peak to remoulded Vane Shear Strength values ranged between 2.8 to 3.8, indicating that the underlying subsoil are 'Moderately Sensitive.'



Figure 9: Site photograph of the typical HA soil arisings (HA01: 0.0m to 3.0m).

7.3. GROUNDWATER

Groundwater was not encountered within any of the six HA's. Considering the elevation, topography, and underlying geological profile which contains good percolation, it is generally envisaged that groundwater levels will not be significantly elevated across the proposed development area for any prolonged period of time.

7.4. SUMMARY TABLE

The following table summarises our inferred stratigraphic profiling:

Investigation Hole ID	Termination Depth (m)	Depth to Base of Surficial Topsoil or Non-Engineered Fill (m)	Vane Shear Strength Range (kPa) within Natural Ground	Standing Groundwater Depth (m)
HA01	3.0	0.25	217+ / UTP	NE
HA02	2.6	0.25	224+	NE
HA03	2.8	0.30	217+ / UTP	NE
HA04	3.0	0.30	217+ / UTP	NE
HA05	3.0	0.30	202 - 217+ / UTP	NE
HA06	3.0	0.25	169 - 197+ / UTP	NE

Note: UTP = Unable to Penetrate, NE = Not Encountered

8. GEOTECHNICAL ASSESSMENTS

8.1. SITE STABILITY

On the basis of:

- No obvious evidence of deep-seated instability within the immediate vicinity of the property and surrounding influential land,
- Broad, flat to gently sloping nature of the development area, which takes account of a minimum 24m stability margin of gently sloping land, averaging less than 7°, present downslope of the development area,
- The very stiff, in-situ measured Vane Shear Strengths recorded during our investigation,
- The lack of groundwater evidence within our HA's, and
- The property being encompassed within previous Geotechnical investigations and reporting which do not identify the site as being at unsatisfactory stability risk,

we consider that the risk of deep-seated global slope instability impacting the proposed developments to be significantly low.

In the long-term, provided that all of the recommendations within this report, or subsequent revisions, are adhered to, then we do not anticipate any significant risk of instability either within, or immediately beyond, the proposed building site.

8.2. LIQUEFACTION ASSESSMENT

Liquefaction is a natural phenomenon where a loss of strength of sand-like soils is experienced following cyclic induced stress, which is typically a result of prolonged seismic shaking and the resultant increase in pore water pressure of saturated soils. Recent examples of this were experienced in Christchurch and the greater Canterbury Region during the Canterbury Earthquake Sequence between 2010-2011.

Cyclic loading during prolonged seismic shaking induces an increase in pore water pressure, which in turn decreases the effective stress of a sand-like deposit of soil. Excess pore water pressure (EPWP) can build to such an extent that the effective stress of the underlying soils is reduced to near zero, whereby the soils no longer carry shear strength and behave as a semi solid/fluid. In such a scenario, excess pore water pressures will follow the path of least resistance to eventual dissipation, which can lead to the migration of liquefied soils towards the surface, or laterally towards a free-face (edge of slope, riverbank, etc.) or layers that have not yet undergone liquefaction.

At the time of preparing this report, we note that the FNDC on-line GIS Liquefaction Vulnerability Map indicates that the property and wider surrounding land lies within an '*Unlikely*' zone.

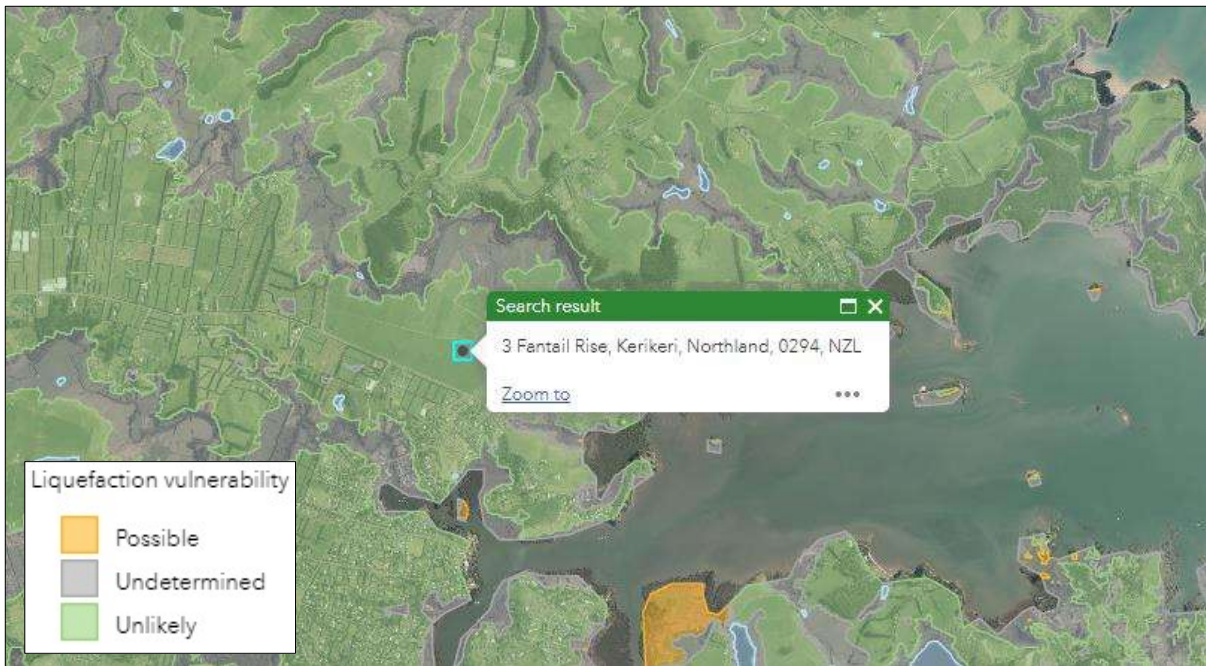


Figure 10: Screenshot aerial view of the subject site and surrounding land from the FNDC on-line GIS Liquefaction Vulnerability Map. Cyan square approximately depicts property location.

A screening procedure based on geological criteria was adopted to examine whether the proposed development might be susceptible to liquefaction, with observations as follows:

- There are no known active faults traversing through the property or wider surrounding land,
- There is no historical evidence of liquefaction at the property,
- The site is situated on an elevated location with good water-shedding characteristics,
- Very stiff in-situ measured Vane Shear Strength recorded during our investigation,
- The underlying natural soil deposits comprise of very stiff, cohesive soils that are not generally considered susceptible to liquefaction, and
- The subsoils beneath the development areas are underlain by Kerikeri Volcanic Group deposits which are approximately 1.8 to 9.7 million years of age, allowing for adequate consolidation in comparison to Holocene age material (10,000 years).

Based on the above, we conclude that the subsoils across the property have a negligible risk of liquefaction susceptibility and liquefaction damage is therefore considered to be unlikely.

9. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the above analyses, we consider that the risk of moderate to deep-seated slope instability impacting on the proposed development within the property to be satisfactorily low, provided all recommendations contained within our report are implemented in design and construction.

With regard to the Building Act 2004; Sections 71-72, we believe on reasonable grounds that:

- i. The current proposed site development and associated building work within the relayed building platforms should not accelerate, worsen, or result in slippage or subsidence on the land on which the building work is to be carried out or any other property, and
- ii. The land beneath the building footprints and surrounding immediate amenity areas of the relayed building platforms are neither subject nor likely to be subject to slippage or subsidence, provided the development is undertaken in accordance with the recommendations and guidance of this report.

9.1. FOUNDATIONS

At this preliminary stage, we are unsure of the proposed foundations for each structure. It is generally assumed that concrete slabs are to be implemented for the dwelling, separate garage, and pool house. Our report will provide recommendations for both reinforced, stiffened raft slab foundation systems and conventional slab-on-grades with deepened perimeter strip footings. It is our understanding that the swimming pool is to be of an in-ground proprietary-type design.

9.1.1. SHALLOW FOUNDATION BEARING CAPACITY

The following bearing capacity values are considered to be appropriate for the design of shallow foundations, subject to founding directly within or on competent natural ground and/or engineered hardfill, for which careful Geo-Professional inspections of the subgrade should be undertaken to check that underlying ground conditions are in keeping with our expectations:

Geotechnical Ultimate Bearing Capacity	300 kPa
ULS Dependable Bearing Capacity ($\Phi=0.5$)	150 kPa

When finalising development proposals, it should be checked that all foundations lie outside 45° envelopes rising up from:

- 0.50m below the invert of service trenches, and/or
- the toe of adjacent retaining walls,

unless such foundation details are found by specific engineering design (SEDO to be satisfactory. Deeper foundation embedment with piles may be required for any surcharging foundations.

During inspections, it is important to exercise caution to verify that the natural ground meets the recommended bearing capacity mentioned in this report. This is crucial for preserving stability and structural integrity.

9.1.2. SHALLOW FOUNDATIONS ON EXPANSIVE SOILS

As noted in Section 5.2 above, the SSR recommends a primary classification of Class M (Moderately) expansive soils in accordance with AS2870.

Based on the above, our subsoil findings of low plasticity, silt dominated volcanic deposits, and our extensive previous experience, we have adopted a primary classification of Class M (Moderately) expansive soils, as defined in clause 7.5.13.1.2 and introduced to NZS3604 by Amendment 19 of NZBC Structure B1/AS1.

- **NZBC B1 Expansive Soil Class M**
- **Upper Limit of Characteristic surface movement (ys) 44mm**

Soil expansiveness can be mitigated as indicated in the appended modulation calculations, and summarized as follows:

- **For Raft Slab Foundation Systems:**
 - Reinforced, stiffened raft slab specifically designed for a Y_s value of 44mm and founded on a minimum of 0.10m of engineered hardfill that extends a minimum of 1.0m beyond the building footprint.
- **For Conventional Slabs-on-Grade with Deepened Perimeter Strip Footings:**
 - Minimum embedment of 0.45m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.
- **For Isolated Foundations:**
 - Minimum embedment of 0.45m below finished ground levels and 0.30m into competent natural ground, whichever is deeper.

9.1.3. NZS1170.5:2004 SITE SUBSOIL CLASSIFICATION

We consider the proposed buildings to be underlain with a Class C – Shallow Soil stratigraphy.

9.2. SITE EARTHWORKS

The FGL and FFL's for all four proposed structures are currently unknown. A crossfall of approximately 1.5m is envisaged across the entire development area.

If the client wishes, there is a possibility for the entire development area to be founded completely on cut ground with localised fills essentially confined to minor levelling across proposed concrete slab foundation areas. Alternatively, minor filling can be undertaken downslope in creating suitable level building sites for slab construction.

The client has indicated that an excavation of approximately 1.5m will be made to form the in-ground swimming pool building site. If required, retaining wall design parameters are provided in Section 9.7 below.

All earthworks should be undertaken in accordance with the following standards:

- NZS4431:2022 “Code of Practice for Earth Fill Residential Development”,
- Section 2 “Earthworks & Geotechnical Requirements” of NZS4404:2010 “Land Development and Subdivision Infrastructure”, and
- Chapter 2 “Site Development Suitability (Geotechnical and Natural Hazards)” of the Far North District Council Engineering Standards, (Version 0.6 issued May 2023).

9.3. SITE PREPARATION

The competency of the exposed subgrade underlying all proposed foundations should be confirmed by a Geo-Professional. In this regard, we recommend that the stripping of all vegetation, topsoil, and any non-engineered fill deposits encountered, be completed prior to requesting Geo-Professional inspection(s) of the stripped ground to confirm that the underlying natural subgrade conditions are in keeping with the expectations of this report. Without such inspections being undertaken, a Chartered Professional Geotechnical Engineer is unable to issue a Producer Statement - PS4 – Design Review which could result in the failure to meet Building Consent requirements as set by Council as conditions of consent.

9.4. SUBGRADE PROTECTION

The subgrade beneath the building platform should not be exposed for any prolonged period and should be covered with a 0.10m thick layer of granular fill such as GAP40 basecourse, as soon as possible.

Likewise, pile/post inverts should be poured as soon as possible once inspected by a Geo-Professional or covered with a protective layer of site concrete.

If subgrade degradation occurs by:

- Excessive drying out resulting in desiccation shrinkage cracking, it will be necessary to either re-hydrate the subgrade or undercut the degraded material and replace with compacted hardfill, or
- Excessive subgrade softening after a period of wet weather resulting in weakened soils, it will be necessary to undercut the degraded material and replacement with compacted hardfill.

9.5. HARDFILL COMPACTION

The compaction of hardfill should be undertaken using either a heavy plate compactor or a steel wheeled roller with low frequency dynamic compaction. Hardfill layers should not exceed 0.15m at a time, and where the total depths exceed 0.60m, there is likely to be a Building Consent condition for observation/testing of the hardfill by a Geo-Professional. We recommend achieving the following compacted target values, with equivalence testing using either a Clegg Impact Hammer or Dynamic Cone – Scala Penetrometer Test.

Foundation Support Type	CBR	Equivalent Clegg Impact Value (CIV)	Equivalent DCP-Scala Penetrometer Blows
Foundation Footings & Beams (Over a depth of no less than twice the foundation width)	≥ 10%	Minimum 20 Average 25	≥5 blows/100mm (NZS3604)
Floor Slabs	≥ 7%	Minimum 18 Average 20	≥3.5 blows/100mm (NZS3604)

9.6. TEMPORARY & LONG-TERM EARTHWORK BATTERS

We recommend that earthworks only be undertaken during periods of fine weather.

During times of inclement weather, the earthworks site should be shaped to assist in stormwater run-off. The toe of batter excavations should be shaped to avoid ponding water, as saturating site soils could result in a reduction of bearing capacities.

All cuts up to a height of 2.0m should be battered no steeper than 1V:3H (18°) or if this cannot be achieved due to site constraints, advice from a Geo-Professional should be sought.

All fills up to a height of 0.60m should be battered no steeper than 1V:4H (14°). All proposed fills that are outside the imposed limits noted above should be referred to a Geo-Professional.

The structural designer and building contractor should ensure that a satisfactory Factor of Safety (FoS) against ground instability is available at all stages of the development.

9.7. RETAINING WALLS

For the design of cantilever and/or flexible diaphragm retaining walls that can deform sufficiently to mobilize active pressures (i.e., timber pole retaining walls not supporting critical structures and/or long-term traffic loads), we recommend calculating coefficients of active lateral earth pressure (K_a).

However, for stiff, inflexible retaining walls, which are unable to deflect sufficiently to generate active earth pressures (i.e., concrete and/or masonry block retaining walls supporting building loads and/or driveways/car-parking areas), we recommend calculating coefficients of at-rest lateral earth pressure (K_o).

We recommend assuming the following soils parameters for retaining wall design:

Material Type	Angle of Internal Friction ϕ'	Bulk Density, Gamma	Undrained Shear Strength (S_u) for Pole/Pile Embedment*
Natural Kerikeri Volcanic Soils	30°	18 kN/m ³	80 kPa

*For the calculation of pole embedment depths, the Broms method as specified in B1/VM4 may be used provided that depths are not less than 4 pile diameters, for which the above stated undrained shear strength value may be assumed, provided an appropriate strength reduction factor is applied and is subject to confirmation by Engineering inspection during construction.

To the above figures please apply an appropriate strength reduction factor for satisfying Ultimate Limit State conditions.

Furthermore, the above figures make no allowances for any surcharges, be they ground slopes and/or applied loads, and hence, all retaining wall designs should also accommodate all anticipated upslope surcharges. Furthermore, reduced toe support by existing or proposed excavations and/or slopes must be taken into consideration.

To avoid build-up of hydrostatic pressures, retaining walls must be constructed with appropriate behind-wall drainage comprising:

- A perforated drain coil wrapped in Filtersok, located at the base of the walls, connected into an approved stormwater disposal system,
- Followed by backfilling behind all retaining walls lightly tamped, free draining granular backfill, such as scoria or 40/20 blue chip, extending up to within 0.30m of their full height with material.

9.8. GENERAL SITE WORKS

We stress that any and all works should be undertaken in a careful and safe manner so that Health & Safety is not compromised, and that suitable Erosion & Sediment control measures should be put in place. Any stockpiles placed should be done so in an appropriate manner so that land stability and/or adjacent structures are not compromised.

Furthermore:

- All works must be undertaken in accordance with the Health and Safety at Work Act 2015,
- Any open excavations should be fenced off or covered, and/or access restricted as appropriate,
- The location of all services should be verified at the site prior to the commencement of construction,
- The Contractor is responsible at all times for ensuring that all necessary precautions are taken to protect all aspects of the works, as well as adjacent properties, buildings and services, and
- Should the contractor require any site-specific assistance with safe construction methodologies, please contact WJL for further assistance.

9.9. LONG-TERM FOUNDATION CARE & MAINTENANCE

The recommendations given above to mitigate the risk of expansive soils, do not necessarily remove the risk of external influences affecting the moisture in the subgrade supporting the foundations.

All owners should also be aware of the detrimental effects that significant trees can have on building foundation soils, viz:

- Their presence can induce differential consolidation settlements beneath foundations through localised soil water deprivation, or conversely, and
- Foundation construction too soon after their removal can result in soil swelling and raising foundations as the soil rehydrates.

To this end, care should be taken to avoid:

- Having significant trees positioned where their roots could migrate beneath the house foundations, and
- Constructing foundations on soils that have been differentially excessively desiccated by nearby trees, whether still existing, or recently removed.

We recommend that homeowners make themselves familiar with the appended Homeowners' Guide published by CSIRO, with particular emphasis on maintenance of drains, water pipes, gutters, and downpipes.

10. UNDERGROUND SERVICES

At the time of preparing this report, we note that the FNDC on-line GIS Water Services Map indicates that reticulated services are not available within the property. However, other underground services, public or private, mapped, or unmapped, of any type may be present, hence we recommend staying on the side of caution during the commencement of any work within the proposed development area.

11. STORMWATER CONTROL

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

Overland flows and similar runoff such as from any higher ground should be intercepted by means of shallow surface drains and be directed away from the development area to protect building platforms from both saturation and erosion. Water collected in interceptor drains should be diverted away from building sites to a stable disposal point that is well clear of the development area. All stormwater runoff from roofs and paved areas should be collected in sealed pipes and be discharged in accordance with the above.

Under no circumstances should concentrated overflows from any source discharge into or onto the ground in an uncontrolled fashion.

12. ON-SITE WASTEWATER DISPOSAL

No reticulated wastewater connection is available for the site therefore, an on-site wastewater treatment and disposal system will be required to service the proposed development.

12.1. WASTEWATER ASSESSMENT CRITERIA:

The effluent system has been designed in compliance with Table 1: Compliance with Section C.6.1.3 of the NRC Proposed Regional Plan (PRPN) and the following Resource Consent Decision Notice Conditions, dated 21 November 2013:

vi) In conjunction with the construction of any building which includes a wastewater treatment and effluent disposal system the applicant shall submit for Council approval a site specific TP58 report prepared by a Chartered Professional Engineer or an approved TP58 report writer. The report shall be prepared generally in accordance with the onsite wastewater management section of the Engineers report prepared by Cook Costello Consulting Engineers and submitted with the application. The report shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a 100% reserve disposal area. The report shall confirm that all of the treatment and disposal system can be fully contained within the lot boundary and that it complies with the Regional Water and Soil Plan Permitted Activity Standards.

Figure 11: Excerpt from the FNDC Operative District Plan Decision on Resource Consent Application (Combined Subdivision and Landuse) and Decision Under the National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health, dated 21 November 2013.

<i>C.6.1.3 Other on-site treated domestic wastewater discharge– permitted activity</i>			
<i>The discharge of domestic type wastewater into or onto land from an on-site system and the associated discharge of odour into air from the on-site system are permitted activities, provided:</i>			
#	Rule	✓/x	Explanation
1	<i>The on-site system is designed and constructed in accordance with the Australian/New Zealand Standard. On-site Domestic Wastewater Management (AS/NZS 1547:2012), and</i>	✓	Design has been carried out in accordance with AS/NZS 1547:2012 and cross-referenced with TP58
2	<i>The volume of wastewater discharged does not exceed two cubic metres per day, and</i>	✓	Total proposed discharge = 1,440L
3	<i>The discharge is not via a spray irrigation system or deep soakage system, and</i>	✓	Pressure compensated drip irrigation lines proposed
4	<i>The slope of the disposal area is not greater than 25 degrees, and</i>	?	Less than 10°
5	<i>The wastewater has received secondary or tertiary treatment and is discharged via a trench or bed in soil categories 3 to 5 that is designed in accordance with Appendix L of Australian/New Zealand Standard. On-site Domestic Wastewater Management (AS/NZS 1547:2012); or is via an irrigation line system that is:</i>	?	Secondary Treatment and Pressure compensated drip irrigation lines proposed
	<i>a) dose loaded, and</i>	?	Dose loading proposed
	<i>b) covered by a minimum of 50 millimetres of topsoil, mulch, or bark, and</i>	?	Drip lines to be surface pinned and recovered in a minimum of 150mm to 200mm of bark or mulch
7	<i>the disposal area and reserve disposal area are situated outside the relevant exclusion areas and setback distances for on-site domestic wastewater systems, and</i>	?	From on-site investigation the Field positions comply with table 9
8	<i>for septic tank treatment systems, a filter that retains solids greater than 3.5 millimeters in size is fitted on the outlet, and</i>	n.a	
9	<i>the following reserve disposal areas are available at all times:</i>		
	<i>a) 100 percent of the existing effluent disposal area where the wastewater has received primary treatment or is only comprised of greywater, or</i>	n.a	
	<i>b) 30 percent of the existing effluent disposal area where the wastewater has received secondary treatment or tertiary treatment, and</i>	?	100% reserve area provided for secondary treated effluent as per the consent conditions.
10	<i>the on-site system is maintained so that it operates effectively at all times and maintenance is undertaken in accordance with the manufacturer's specifications, and</i>	?	Maintenance as outlined within section 12 of this report

11	<i>the discharge does not contaminate any groundwater water supply or surface water, and</i>	?	Groundwater was not encountered at the proposed effluent field in testing up to 1.2m depth. HA testing at the building platform did not encounter groundwater up to a depth of 3.0m of testing. Appropriate offsets and conservative loading rates applied to avoid adverse effects on water sources.
12	<i>there is no surface runoff or ponding of wastewater, and</i>	?	Appropriate application rates applied for subsoil permeation capabilities/site conditions
13	<i>there is no offensive or objectionable odour beyond the property boundary.</i>	?	WJL anticipated compliance as long as all recommendations within this report are adhered to

12.2. REQUIRED SETBACK DISTANCES

As per Point 7 above, the disposal and reserve areas must be situated outside the relevant exclusion areas and setbacks described within Table 9 of the PRPN: Exclusion areas and setback distances for on-site domestic wastewater systems (see below):

Feature	Primary treated domestic wastewater	Secondary treated domestic wastewater	Greywater
Exclusion areas			
Floodplain	5% AEP	5% AEP	5% AEP
Horizontal setback distances			
Identified stormwater flow paths (downslope of disposal area)	5 metres	5 metres	5 metres
River, lake, stream, pond, dam or 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
Property boundary	1.5 metres	1.5 metres	1.5 metres
Vertical setback distances			
Winter groundwater table	1.2 metres	0.60 metres	0.60 metres

In compliance with above:

- There are no known or mapped flood zones in proximity to the disposal area,
- >5m separation distance from stormwater flow paths is provided & >15m separation distance from the ponds is provided,
- The site is not in proximity to a coastal marine area,
- Groundwater was not encountered in the excavated boreholes conducted by WJL, which were taken to a maximum depth of 1.2m below ground level (see appended logs). Appropriate offsets, and conservative loading rates applied to avoid adverse effects on water sources, and
- Groundwater bore sources were not identified within the property or anticipated to exist within proximity to the property's boundaries given a review of NRC bore location maps.

The disposal and reserve fields are proposed to be situated southeast of the proposed development area with appropriate offsets to the property's boundary (>1.5m) and proposed structures (>3.0m).

12.3. DISCHARGE DETAILS

Water supply for the proposed dwelling will be sourced from on-site domestic tank supply. A per capita flow allowance of 180 litres/person/day was used in the calculations as outlined in the Table below:

Development	4-Bedrooms + Media/Study + Workshop
Combined Occupancy Allowance	8-person peak occupancy
Water Reduction	<i>no</i>
Daily Flow Allowances	180L / person / day
Design Flow Rate	1,440L / day
Water Meter	None required.
Other Notes	No garbage grinder

Note: Additional Occupancy Allowance takes account of additional rooms above and beyond any marked as 'dining', 'lounge' or 'bedrooms'. The calculation is made on the basis of one extra person times the ratio of the total floor area of the additional rooms to that of the smallest designated bedroom & rounded up to the next whole number.

12.4. WASTEWATER TREATMENT

WJL recommends the installation of an approved Secondary Level Treatment Plant to service the proposed development. We recommend a Duracrete Clean Stream TXR or similar. Discharge from this system is required to be directed to a new disposal field consisting of pressure compensated drip irrigation lines. The basic system requirements are summarised in the Table below:

Emergency Storage Capacity	Minimum 1,440L
Telemetry Alarm System	Visual and Audible alarm located at plant.
Location	Please refer to Site Plan. More than 3.0m clear of structures; 1.5m clear of boundaries
Discharge Quality	Secondary Level BOD ⁵ <= 20g/m ³ , TSS <= 30g/m ³

12.4. DESIGN VOLUMES

Maximum Daily Wastewater Discharge = Maximum Occupancy x Flow Allowance (litres/ person/ day). This calculation results in a total wastewater flow rate of 1,440 litres per day. Since the daily flow does not exceed 2,000 litres, the output complies with the PRPN as a Permitted Activity and a Resource Consent is not required.

The ratio of lot area to design flow = Gross Lot Area (8,009m²) / 1,440 Max Daily Flow (litres/day). This calculation provides an A:V Ratio of approximately 5.6 m²/litre/day.

12.5. LAND DISPOSAL METHOD

Surface Laid Lines

The drip lines are recommended to be surface pinned with a daily application rate of 3.5mm/day. A required disposal field area of 412m² amounts. Topsoil should be at least 200mm thick. Additional topsoil should be imported where this is not achieved. Stripped topsoil from building platforms can be spread out over the recommended field location however, compaction should be limited.

The drip lines must be installed in a regular 'grid' pattern as far as practicable, with row spacings of no more than 1.0m. The grid should consist of a minimum of 412 linear metres of drip line split into individual rows not exceeding 65m, with a manual flushing valve at the end of each row. The manual flushing valves must be located within flush boxes for inspection and maintenance purposes. End-feeding the drip lines will lower the cost of installation, with each drip line only requiring one manual flushing valve. 65m long drip lines should be easily flushed by the pump supplied with the system.

The disposal field area requires re-covering with 100mm of bark or mulch and planted out at a density of 1 plant per m², to assist in evapotranspiration and nutrient removal. See a summary of the system below.

Alternatively, the system can be installed sub-surface and re-grassed. In this scenario 200mm of topsoil should be beneath the dripper lines and 100mm of topsoil must be placed over the lines before grassing. The 412m² effluent field should have dripper lines spaced at 0.6m x 0.6m, resulting in a minimum of 686 lineal metres of drip lines. Please see table below for land disposal method:

LAND DISPOSAL SYSTEM	PCDI drip irrigation (Ref: Soil Assessment)
Type	Surface laid, pressure compensating dripper irrigation lines
Soil Category	Category 4 (AS/NZS:1547 Table 5.2) Category 5 (TP58)
Cut-off Drain	Provided – Refer to appended Site Plan (134850-C600)
Loading Rate	3.5mm/day
Loading Method	Pump
Pump	High water level alarm is installed in pump chamber – audible/visual alarm Design head is subject to supplier specs. Pump Chamber Volume is integral to the treatment system Required Emergency Storage volume - >1,440L
Primary Disposal Area	412m ² at 1.0m centres - surface laid
Reserve Disposal Area	412m ² (100% reserve area)

12.6. ASSESSMENT OF ENVIRONMENTAL EFFECTS

This report serves as a full AEE. Each section displays compliance with the relevant council standards while providing explanations on how the proposed design of on-site effluent treatment system will prevent adverse effects on the surrounding environment.

In conclusion:

- The system has been designed in accordance with AS/NZS 1547:2012 and cross-referenced with TP58. It further complies with the setbacks stipulated in the PRPN,
- It is anticipated that the proposed secondary treatment system and PCDI disposal system for the site will have a less than minor effect on the environment. The irrigation field area will be surface laid, recovered in mulch or bark, with introduced grass plantings facilitating evapotranspiration and nutrient removal, and
- Separation distances shall be maintained from the property's boundary and existing vegetation will assist with the retention, breakdown and uptake of effluent at the site and prevent effluent from being washed off-site. Given the appropriate separation distances to water sources, a reserve area of 100% and the discharge of secondary level of effluent treatment, the proposed wastewater disposal is considered to be suitable to protect the environment and the effects are deemed less than minor.

Additionally:

- To protect against any possible failure of the disposal area, the reserve area should remain undeveloped and should be maintained with a grassed/vegetated surface ready for the possible installation of additional drip lines into it,
- To protect the integrity of the disposal area from unwanted damage from persons or animals we recommend that adequate protection measures be put in place, and
- To protect the physical treatment plant from misuse or neglect the manufacturer of the plant will supply a detailed maintenance schedule that must be adhered to. It is imperative that the operator of the system both schedule and undertake regular maintenance of the system to ensure its effectiveness.

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

Since the discharge volume does not exceed: three cubic metres per day, averaged over the month of greatest discharge, and six cubic metres per day over any 24-hour period, the application falls under a Permitted Activity and Northland Regional Council Resource Consent is not required.

13. FUTURE CONSTRUCTION MONITORING

The foregoing statements are Professional Opinion, based on a limited collection of information, some of which is factual, and some of which is inferred. Because soils are not a homogeneous, manufactured building component, there always exists a level of risk that inferences about soil conditions across the greater site, which have been drawn from isolated “pin-prick” locations, may be subject to localized variations. Generally, any investigation is deemed less complete until the applicability of its inferences and the Professional Opinions arising out of those are checked and confirmed during the construction phase, to an appropriate level.

It is increasingly common for the Building Consent Authorities to require a Producer Statement – Construction (PS4) which is an important document. The purpose of the PS4 is to confirm the Engineers’ Professional Opinion to the BCA that specific elements of construction, such as the verification of design assumptions and soil parameters (NZBC clause B1/VM4 2.0.8), are in accordance with the approved Building Consent and its related documents, which should include the subject Geotechnical Report. Where site works will involve the placement of fill, the PS4 should reference NZBC clause B1/VM1 10.1.

For WJL to issue a PS4 to meet the above clauses of the NZBC, we will need to carry out the site inspections as per the Building Consent and Council requirements.

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

Site inspections should be undertaken by a Chartered Professional Geotechnical Engineer or their Agent, who is familiar with both this site and the contents of this Geotechnical Report.

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

The primary purpose of the site inspections is to check that the conditions encountered are consistent with those expected from the investigations and adopted for the design as discussed herein. If anomalies or uncertainties are identified, then further Professional advice should be sought from the Geo-Professional, which will allow the timely provision of solutions and recommendations should any engineering problems arise.

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

At this time, the following Geotechnical site inspections and testing should include, but are not limited to:

- Site cut, and
- Hardfill compaction.

14. LIMITATIONS

We anticipate that this report is to be submitted to Council in support of a Building Consent application.

This report has been commissioned solely for the benefit of our client, **Shanaghan Construction**, in relation to the project as described herein, and to the limits of our engagement, with the exception that the local Territorial Authority may rely on it to the extent of its appropriateness, conditions and limitations, when issuing the subject consent. Any variations from the development proposals as described herein as forming the basis of our appraisal should be referred to us for further evaluation. Copyright of Intellectual Property remains with WJL, and this report may NOT be used by any other entity, or for any other proposals, without our written consent. Therefore, no liability is accepted by this firm or any of its directors, servants, or agents, in respect of any other geotechnical aspects of this site, nor for its use by any other person or entity, and any other person or entity who relies upon any information contained herein does so entirely at their own risk. Where other parties may wish to rely on it, whether for the same or different proposals, this permission may be extended, subject to our satisfactory review of their interpretation of the report.

The recommendations provided in this geotechnical report are in accordance with the findings from our shallow investigation. However, it is important to acknowledge that additional refinement of the investigation and analysis may be necessary to meet the specific requirements set by the local council.

Although this report may be submitted to a local authority in connection with an application for a consent, permission, approval, or pursuant to any other requirement of law, this disclaimer shall still apply and require all other parties to use due diligence where necessary and does not remove the necessity for the normal inspection of site conditions and the design of foundations as would be made under all normal circumstances.

Thank you for the opportunity to provide our service on this project, and if we can be of further assistance, please do not hesitate to contact us.

Yours faithfully,

WILTON JOUBERT LIMITED

Enclosures:

Site Plan (1 sheet)

Cross-section A-A' (1 sheet)

Hand Auger Borehole Records (8 sheets)

Soils Modulation (1 sheet)

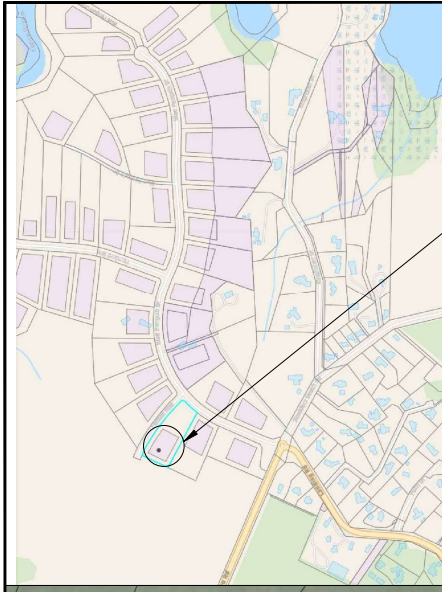
'Foundation Maintenance & Footing Performance' sheet BTF18: A Homeowner's Guide, published by CSIRO (4 sheets)

Construction Monitoring (1 sheet)

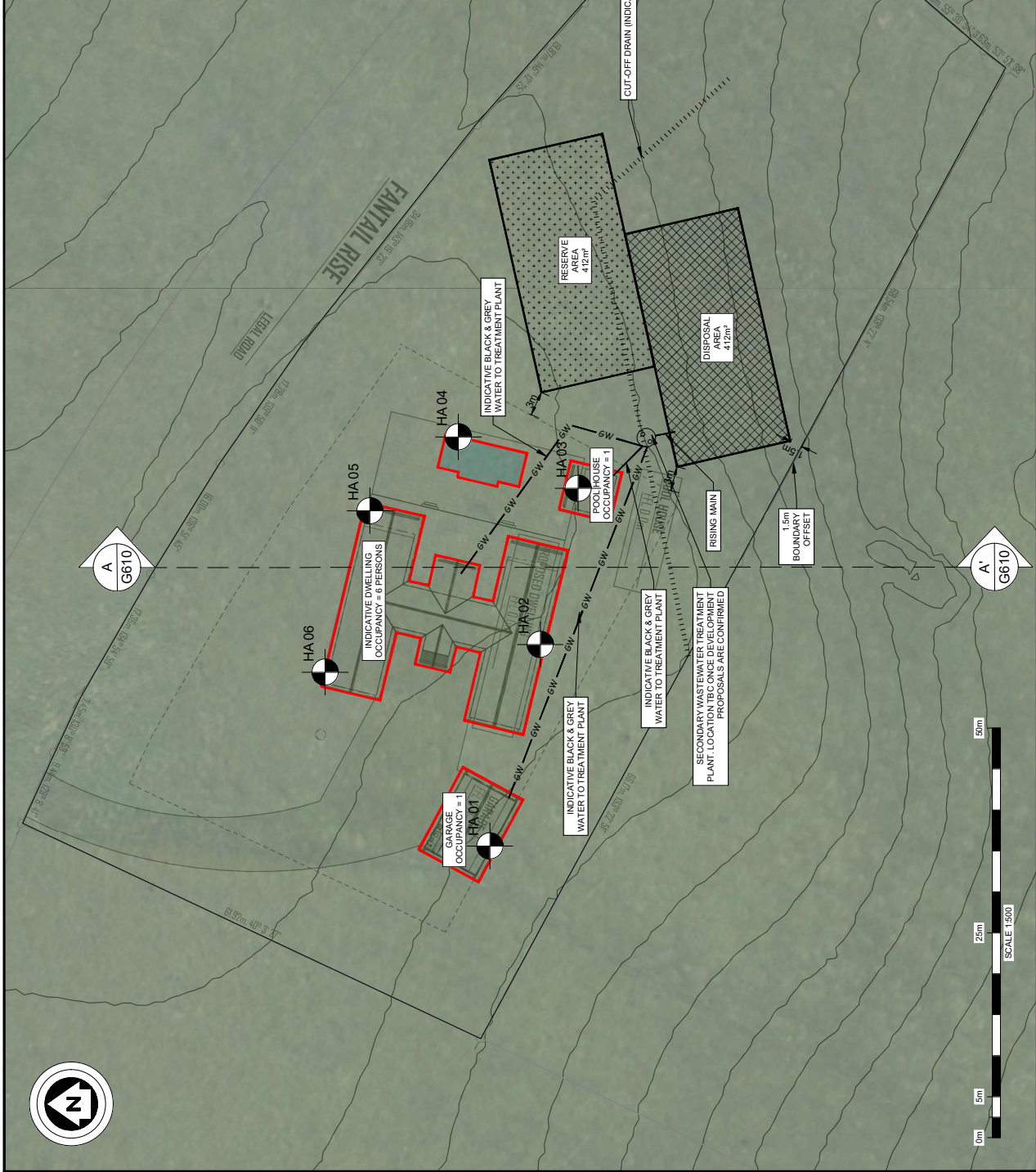
Technical Information of Chosen System (3 sheets)

OSET Treatment Certificate (1 sheet)

Effluent Disposal Producer Statement (1 sheet)



SITE LOCATION
IMAGE SOURCE:
FAR NORTH DISTRICT COUNCIL LOCALITIES



SYMBOL KEY

	H/A	HAND AUGER LOCATIONS
		PROPOSED DEVELOPMENT LOCATIONS
		CROSS SECTION LOCATION

DESIGN PARAMETERS

- SITE AREA: 8000m²
- 4 BEDROOM SINGLE STOREY DWELLING
- 8 PERSON MAXIMUM OCCUPANCY
- 180L P/PPD = 1440L/D TOTAL WW PRODUCTION
- DISPOSAL AREA 4.22m²
- 4.22m DRIP LINE IN ROWS NOT EXCEEDING 60m
- RESERVE AREA 4.22m (100% OF DISPOSAL AREA)

GENERAL NOTES

1. THIS PLAN IS A PRELIMINARY CONCEPT DESIGN. NO MEASUREMENTS HAVE BEEN TAKEN FROM DRAWINGS.
2. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM LOCAL COUNCIL GIS.
3. ALL DIMENSION AND LEVELS TO BE CHECKED ON SITE PRIOR TO THE COMMENCEMENT OF CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER.
4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.

ORIGINAL DRAWING SIZE OFFICE

A3 **KERIKERI**

DRAWING SCALE COORDINATE SYSTEM

1:500 **NOT COORDINATED**

DRAWING NUMBER ISSUE

134850-G600 **A**

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PROJECT TITLE

LOT 30 DP 494309

3 FANTAIL RISE

KERIKERI

NORTHLAND

DRAWING TITLE

SITE PLAN

PROJECT DESCRIPTION

NEW DWELLING, GARAGE, POOL HOUSE & IN-GROUND SWIMMING POOL

SERVICES NOTE

WHERE EXISTING SERVICES CROSS THE SITE ARE INDICATED ONLY AND NOT TO BE TAKEN AS A GUARANTEE OF LOCATION OR DEPTH. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN AND VERIFY ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN AND VERIFY ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORK.

BUILDING CONSENT

SEE PLAN FOR BUILDING CONSENT REQUIREMENTS

DESIGNED BY

DRAWN BY **MPN**

CHECKED BY

SUPPLIED BY

ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
1A	JUNE 2024	MPN	ISSUED WITH GEOTECHNICAL REPORT

WILTON JOUBERT

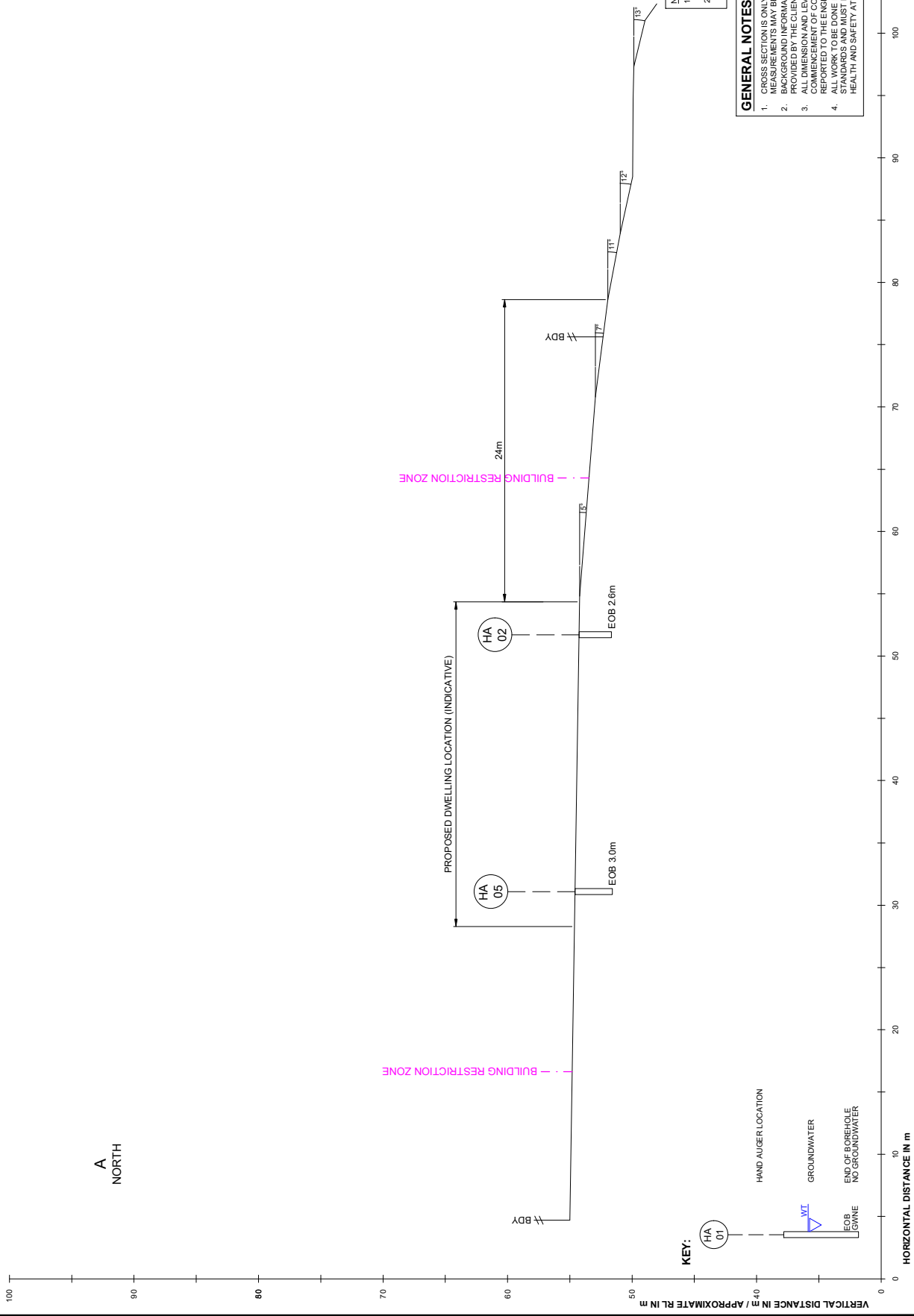
Consulting Engineers

Northland: 09 945 4198
Auckland: 09 527 0196
Christchurch: 03 453 6079
www.wiltonjoubert.co.nz



A
NORTH

A'
SOUTH



NOTES:
 1. Cross Sections measured by hand-held tape
 2. Reduced level information based on Contours from Surveyed Drawings.

GENERAL NOTES
 1. CROSS SECTION IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
 2. BACKGROUND INFORMATION, CONTOURS & LOCAL SERVICES PROVIDED BY THE CLIENT & EXTRACTED FROM LOCAL COUNCIL GIS.
 3. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.
 4. ALL WORK TO BE DONE IN ACCORDANCE WITH THE RELEVANT STANDARDS AND MUST BE UNDERTAKEN IN ACCORDANCE WITH THE HEALTH AND SAFETY AT WORK ACT 2015.

ORIGINAL DRAWING SIZE	OFFICE
A3	KERIKERI
DRAWING SCALE	COORDINATE SYSTEM
1:300	NOT COORDINATED
DRAWING NUMBER	ISSUE
134850-G610	A
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PROJECT TITLE
 LOT 30 DP 494309
 3 FANTAIL RISE
 KERIKERI
 NORTHLAND

DRAWING TITLE
 CROSS SECTION A-A'

PROJECT DESCRIPTION
 NEW DWELLING, GARAGE, POOL HOUSE & IN-GROUND SWIMMING POOL

SERVICES NOTE
 WHERE EXISTING SERVICES ARE SHOWN THEY ARE INDICATIVE ONLY AND NOT TO BE TAKEN AS A GUARANTEE. ALL SERVICES ARE SHOWN AT THE DISCRETION OF THE ENGINEER. THE ENGINEER IS NOT RESPONSIBLE FOR THE ACCURACY OF EXISTING SERVICES. CONSULT WITH THE RELEVANT AUTHORITIES FOR CONFIRMATION OF SERVICES.

BUILDING CONSENT
 BUILDING CONSENT

DESIGNED BY	INPN
DRAWN BY	INPN
CHECKED BY	
SUPERVISED BY	

No.	DATE	BY	DESCRIPTION
1A	JUNE 2024	INPN	ISSUED WITH GEOTECHNICAL REPORT

WILTON JOUBERT
 Consulting Engineers
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 Auckland, 09 527 0196
 Christchurch, 09 442 8009
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HAND AUGER : HA01

JOB NO.: 134850 SHEET: 1 OF 6

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL: DR4802

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR: 1.55

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)	
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic		0.0 - 0.2	Groundwater Not Encountered					
	Slightly Gravelly SILT, gravel as fine to coarse weakly to strongly fused clasts, brown, red, very stiff, moist, low plasticity (NATURAL)		0.2 - 0.8		UTP	-	-		
Kerikeri Volcanic Group	Slightly Clayey SILT, reddish brown, very stiff, moist, low plasticity	0.8 - 1.5	217+		-	-			
	1.5m: becoming moist to wet	1.5 - 1.6	217+		-	-			
	2.0m: becoming wet, reddish purple	2.0 - 2.2	217+		-	-			
	2.2m: becoming silty, trace clay, non to low plasticity	2.2 - 2.4	217+		-	-			
		2.4 - 2.6	217+		-	-			
		2.6 - 2.8	217+		-	-			
		2.8 - 3.0	217+		-	-			
		3.0 - 3.0							
	EOH: 3.00m - (Target Depth)								

REMARKS

End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: JEM

▼ Standing groundwater level

CHECKED BY: NPN

▽ GW while drilling



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HAND AUGER : HA02

JOB NO.: 134850 SHEET: 2 OF 6

CLIENT: Shanaghan Construction
 PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool
 SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

START DATE: 27/06/2024 NORTHING: GRID:
 DIAMETER: 50mm EASTING:
 SV DIAL: 772 ELEVATION: Ground
 FACTOR: 1.6 DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)	
Topsoil	TOPSOIL - trace rootlets, brown, dark brown, moist, non plastic		0.0 - 0.2	Groundwater Not Encountered					
	Slightly Clayey SILT, brown, very stiff, dry to moist, non to low plasticity (NATURAL)		0.2 - 0.4		√224+	-	-		
Kerikeri Volcanic Group	Slightly Clayey, Gravelly SILT, brown with mottled red, very stiff, dry to moist, non to low plasticity	0.4 - 0.8	√224+		-	-			
	0.8m: reddish brown with occasional white specks as strongly fused clast inclusions	0.8 - 1.2	√224+		-	-			
		1.2 - 1.4	√224+		-	-			
		1.4 - 1.6	√224+		-	-			
		1.6 - 1.8	√224+		-	-			
		1.8 - 2.0	√224+		-	-			
	SILT, minor clay, reddish brown with occasional pink, yellow and white streaks, very stiff to hard, dry to moist, non plastic - becoming friable	2.0 - 2.4	√224+		-	-			
	2.4m: becoming gravelly as strongly fused clasts <20mmØ	2.4 - 2.6	√224+		-	-			
		2.6 - 2.8	√224+		-	-			
		2.8 - 3.0	√224+		-	-			
		3.0 - 3.2	√224+		-	-			
		3.2 - 3.4	√224+		-	-			
		3.4 - 3.6	√224+		-	-			
		3.6 - 3.8	√224+		-	-			
	3.8 - 4.0	√224+	-		-				
	4.0 - 4.2	√224+	-		-				
	4.2 - 4.4	√224+	-		-				
	4.4 - 4.6	√224+	-		-				
	4.6 - 4.8	√224+	-	-					
	4.8 - 5.0	√224+	-	-					
	5.0 - 5.2	√224+	-	-					
	5.2 - 5.4	√224+	-	-					
	5.4 - 5.6	√224+	-	-					
	5.6 - 5.8	√224+	-	-					
	5.8 - 6.0	√224+	-	-					
	6.0 - 6.2	√224+	-	-					
	6.2 - 6.4	√224+	-	-					
	6.4 - 6.6	√224+	-	-					
	6.6 - 6.8	√224+	-	-					
	6.8 - 7.0	√224+	-	-					
	7.0 - 7.2	√224+	-	-					
	7.2 - 7.4	√224+	-	-					
	7.4 - 7.6	√224+	-	-					
	7.6 - 7.8	√224+	-	-					
	7.8 - 8.0	√224+	-	-					
	8.0 - 8.2	√224+	-	-					
	8.2 - 8.4	√224+	-	-					
	8.4 - 8.6	√224+	-	-					
	8.6 - 8.8	√224+	-	-					
	8.8 - 9.0	√224+	-	-					
	9.0 - 9.2	√224+	-	-					
	9.2 - 9.4	√224+	-	-					
	9.4 - 9.6	√224+	-	-					
	9.6 - 9.8	√224+	-	-					
	9.8 - 10.0	√224+	-	-					
	EOH: 2.60m - (Too Hard To Auger)								

REMARKS
 End of borehole @ 2.60m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: SJP
 CHECKED BY: NPN

Standing groundwater level
 GW while drilling



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Generated with CORE_GSS by Cerroc - WJL - Hand Auger v2 - 30/06/2024 9:39:44 PM

HAND AUGER : HA03

JOB NO.: 134850 SHEET: 3 OF 6

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL: DR4802

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR: 1.55

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)	
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic		0.0 - 0.2	Groundwater Not Encountered					
	Slightly Clayey SILT, orange brown, very stiff, dry to moist, non to low plasticity (NATURAL)		0.2 - 0.4		√217+	-	-		
Kerikeri Volcanic Group	Slightly Gravely SILT, fine to medium, brownish orange, very stiff to hard, moist, low plasticity	0.4 - 0.6	√217+		-	-			
		0.6 - 0.8	√217+		-	-			
		0.8 - 1.0	√217+		-	-			
		1.0 - 1.2	√217+		-	-			
		1.2 - 1.4	√217+		-	-			
		1.4 - 1.6	√217+		-	-			
		1.6 - 1.8	√217+		-	-			
		1.8 - 2.0	√UTP		-	-			
	SILT, trace fine sand, minor fine to medium angular gravel as strongly fused volcanic clasts, hard, moist, non plastic - friable	2.0 - 2.2	√UTP	-	-				
		2.2 - 2.4	√UTP	-	-				
	2.4 - 2.6	2.6m: some fine to coarse angular gravel as weakly to strongly fused clasts	√UTP	-	-				
	2.6 - 2.8	EOH: 2.80m - (Too Hard To Auger)	√UTP	-	-				
	2.8 - 3.0								

REMARKS

End of borehole @ 2.80m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: NPN

▼ Standing groundwater level

CHECKED BY: SJP

▽ GW while drilling



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HAND AUGER : HA04

JOB NO.: 134850 SHEET: 4 OF 6

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL: DR4802

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR: 1.55

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)	
Topsoil	TOPSOIL - some rootlets <2mmØ, brown, dark brown, moist, non plastic		0.0 - 0.2						
	Slightly Clayey SILT, minor fine to coarse angular gravel as strongly fused volcanic clasts, very stiff to hard, dry to moist, low plasticity (NATURAL)		0.2 - 0.4		UTP	-	-		
Kerikeri Volcanic Group			0.4 - 0.6	Groundwater Not Encountered					
			0.6 - 0.8		217+	-	-		
			0.8 - 1.0						
			1.0 - 1.2						
			1.2 - 1.4		UTP	-	-		
			1.4 - 1.6						
			1.6 - 1.8		217+	-	-		
			1.8 - 2.0						
			2.0 - 2.2		217+	-	-		
			2.2 - 2.4						
	SILT, trace clay, trace fine sand, frequent weakly to strongly fused volcanic clasts <10mmØ, brownish purple, greyish orange, hard, moist, non plastic - becoming friable		2.4 - 2.6	UTP	-	-			
			2.6 - 2.8						
			2.8 - 3.0	UTP	-	-			
	EOH: 3.00m - (Target Depth)		3.0						

REMARKS

End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: NPN

▼ Standing groundwater level

CHECKED BY: SJP

▽ GW while drilling



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HAND AUGER : HA05

JOB NO.: 134850 SHEET: 5 OF 6

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL: DR4802

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR: 1.55

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE			DCP - SCALA (Blows /mm)	COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY		
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic	TS	0.0 - 0.2						
Kerikeri Volcanic Group	Slightly Clayey SILT, minor fine to coarse angular gravel as strongly fused volcanic clasts, orange brown, hard, dry to moist, non to low plasticity (NATURAL)	X	0.2 - 0.4	Groundwater Not Encountered	UTP	-	-		
			0.4 - 0.6						
			0.6 - 0.8						
			0.8 - 1.0						
			1.0 - 1.2						
			1.2 - 1.4						
			1.4 - 1.6						
			1.6 - 1.8						
			1.8 - 2.0						
			2.0 - 2.2						
2.2 - 2.4	202	71	2.8						
2.4 - 2.6	UTP	-	-						
2.6 - 2.8	SILT, minor clay, pinkish orange, occasional brown streaks, very stiff to hard, moist, non to low plasticity	X	2.8 - 3.0	UTP	-	-			
3.0 - 3.0									
	EOH: 3.00m - (Target Depth)								

REMARKS

End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: NPN

▼ Standing groundwater level

CHECKED BY: SJP

▽ GW while drilling



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HAND AUGER : HA06

JOB NO.: 134850 SHEET: 6 OF 6

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL: 1994

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR: 1.41

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE			DCP - SCALA (Blows /mm)	COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY		
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic	TS	0.0 - 0.2						
	Slightly Clayey SILT, frequent fine to coarse gravel as weakly to strongly fused volcanic clasts, very stiff to hard, moist, non to low plasticity (NATURAL)	TS	0.2 - 3.0	Groundwater Not Encountered					
Kerikeri Volcanic Group			0.2						
			0.4		UTP	-	-		
			0.6						
			0.8		197+	-	-		
			1.0						
			1.2		197+	-	-		
			1.4						
			1.6		197+	-	-		
			1.8						
			2.0		197+	-	-		
		2.2							
		2.4		169	45	3.8			
		2.6							
		2.8		197+	-	-			
		3.0							
	EOH: 3.00m - (Target Depth)								

REMARKS

End of borehole @ 3.00m (Target Depth: 3.00m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: JEM

▼ Standing groundwater level

CHECKED BY: NPN

▽ GW while drilling



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HAND AUGER : WW01

JOB NO.: 134850 SHEET: 1 OF 2
 START DATE: 27/06/2024 NORTHING: GRID:
 DIAMETER: 50mm EASTING:
 SV DIAL: ELEVATION: Ground
 FACTOR: DATUM:

CLIENT: Shanaghan Construction
 PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool
 SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS	
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)		
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic	TS	0.0 - 0.2	Groundwater Not Encountered						
	Kerikeri Volcanic Group	Slightly Clayey SILT, light brownish orange, very stiff, moist, low plasticity (NATURAL)	X		0.2 - 0.6					
0.6m: some fine to coarse gravel as strongly fused volcanic clasts		X	0.6 - 1.2							
EOH: 1.20m - (Target Depth)					1.2 - 1.4					
					1.4 - 1.6					
					1.6 - 1.8					
					1.8 - 2.0					
					2.0 - 2.2					
					2.2 - 2.4					
					2.4 - 2.6					
					2.6 - 2.8					

REMARKS
 End of borehole @ 1.20m (Target Depth: 0.60m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: NPN ▼ Standing groundwater level
 CHECKED BY: SJP ▽ GW while drilling



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HAND AUGER : WW02

JOB NO.: 134850 SHEET: 2 OF 2

START DATE: 27/06/2024

NORTHING:

GRID:

CLIENT: Shanaghan Construction

DIAMETER: 50mm

EASTING:

PROJECT: New Dwelling, Garage, Pool House and In-Ground Pool

SV DIAL:

ELEVATION: Ground

SITE LOCATION: Lot 30 DP 494309 - 3 Fantail Rise, Kerikeri

FACTOR:

DATUM:

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE				COMMENTS, SAMPLES, OTHER TESTS
					PEAK STRENGTH (kPa)	REMOULD STRENGTH (kPa)	SENSITIVITY	DCP - SCALA (Blows /mm)	
Topsoil	TOPSOIL - brown, dark brown, moist, non plastic		0.0 - 0.2	Groundwater Not Encountered					
	Kerikeri Volcanic Group		Slightly Clayey SILT, reddish brown, orange, very stiff, moist, low plasticity (NATURAL) 0.5m: minor fine to medium angular gravel as weakly to strongly fused volcanic clasts		0.2 - 0.4				
0.4 - 0.6									
0.6 - 0.8									
0.8 - 1.0									
1.0 - 1.2									
1.2 - 1.4									
1.4 - 1.6									
1.6 - 1.8									
1.8 - 2.0									
2.0 - 2.2									
EOH: 1.20m - (Target Depth)									

REMARKS

End of borehole @ 1.20m (Target Depth: 0.60m)

NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense

LOGGED BY: NPN

▼ Standing groundwater level

CHECKED BY: SJP

▽ GW while drilling



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MODULATION OF CHARACTERISTIC SURFACE MOVEMENT

CLIENT : Shamaghan Construction
 SITE : 3 Fantail Rise
 Kerikeri

JOB NO : 134850
 DATE : 25-Aug-22
 PAGE NO. : 1 of 1

DESCRIPTION:
 This classifier uses multiple soil layers to test the required depth of a hardfill raft layer over soils of a specific y_s value, to reduce to y_s for a selected range of values.

3.7

Formula:

$$y_s = \frac{1}{100} \int \frac{H_s}{I_{pr} \Delta H} dh$$

where y_s = characteristic surface movement
 H_s = depth of design suction change (m)
 I_{pr} = instability index
 ΔH = adjusted I_{ps} (soil shrinkage index) = $(\alpha \times I_{ps})$
 where $\alpha = 1$ in cracked zone
 & $\alpha = 2/5$ in uncracked zone
 ΔH = soil suction change at depth z from the surface, pf
 Δh = increment of contributing depth considered

Model Assumptions
 If soil is to be considered as a fill younger than 5 years, how many years?
 Assume at surface: $H_s = 0m$, change in soil suction stress $U_o =$
 Crack depth per NZBC: $H_{cr} =$
 Assume depth of no change, $H_s =$
 \Rightarrow profile gradient $m = 1.25$

Suction Profile \Rightarrow
 $z = m \cdot du - H_s$
 ie over depth range 0.75 m to 1.5 m, for which,
 $\alpha = 2/5 - 2/5$.
 $U_{Hcr} = 0$

B1 Structure Amendment 19 Classifications

Surface Movement	Site Classifier	Class Code	Iss Range
$0mm < y_s \leq 22mm$	Slightly	S	0-1.9%
$23mm < y_s \leq 44mm$	Moderately	M	2.0-3.7%
$45mm < y_s \leq 76mm$	Highly	H	3.8-6.5%
$y_s > 76mm$	Extremely	E	6.6-7.5%

Model Validation Calculations for I_{ps}

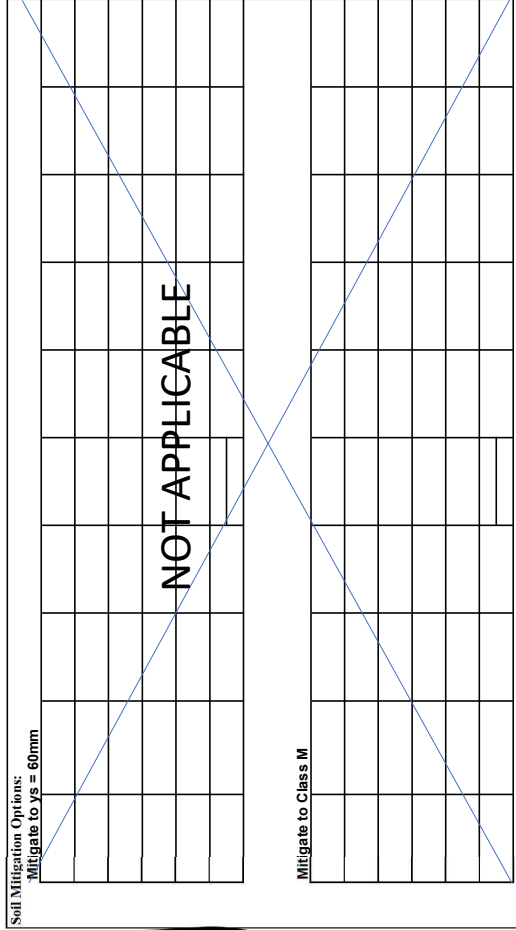
Layer No.	Ztop Zbase	Soil type	I_{ps}	$\alpha =$	I_{pt}	∂z	∂u	Average ∂u	δy_s
1	0	Zero Hardfill Raft	0	1.00	0.00	0	1.20	1.2000	0.00
2	0	Soil Class M	3.7	1.00	3.70	0.75	0.60	0.9000	24.98
3	-0.75	Soil Class M	3.7	1.85	6.75	0.25	0.60	0.5000	8.44
4	-1	Soil Class M	3.7	1.80	6.57	0.25	0.40	0.3000	4.93
5	-1.25	Soil Class M	3.7	1.75	6.38	0.25	0.20	0.1000	1.60
	-1.5			1.70			0.00		

Total Surface Movement: $\Rightarrow \Sigma \delta y_s = 39.94$
 Amendment 19 crack depth: 0.75m depth demarcation recognises

Convert from AS2870 1 in 300 yr drought to NZBC 1 in 500 yr by adding 11% $\Rightarrow y_s = 44mm$



Northland, Auckland-Waikato, Canterbury, Southern Lakes



Mitigate to NZS3604 "Good Ground", equiv to $y_s = 25mm$

Layer No.	Ztop Zbase	Soil type	I_{ps}	$\alpha =$	I_{pt}	∂z	∂u	Average ∂u	δy_s
1	0	Hardfill Raft	0	1.00	0.00	0.37	1.20	1.0520	0.00
2	-0.37	Soil Class M	3.7	1.00	3.70	0.38	0.90	0.7520	10.57
3	-0.75	Soil Class M	3.7	1.85	6.79	0.15	0.60	0.5400	5.50
4	-0.90	Soil Class M	3.7	1.82	6.64	0.25	0.48	0.3800	6.31
5	-1.15	Soil Class M	3.7	1.77	6.46	0.25	0.28	0.1800	2.91
	-1.40			1.72			0.08		

ie, hardfill depth = 0.37 m $\Rightarrow \Sigma \delta y_s = 25.29$
 round to $y_s = 25mm$

Mitigate to Class S

Layer No.	Ztop Zbase	Soil type	I_{ps}	$\alpha =$	I_{pt}	∂z	∂u	Average ∂u	δy_s
1	0	Hardfill Raft	0	1.00	0.00	0.45	1.20	1.0200	0.00
2	-0.45	Soil Class M	3.7	1.00	3.70	0.3	0.84	0.7200	7.99
3	-0.75	Soil Class M	3.7	1.85	6.79	0.15	0.60	0.5400	5.50
4	-0.90	Soil Class M	3.7	1.82	6.66	0.2	0.48	0.4000	5.33
5	-1.10	Soil Class M	3.7	1.78	6.49	0.25	0.32	0.2200	3.57
	-1.35			1.73			0.12		

ie, hardfill depth = 0.45 m $\Rightarrow \Sigma \delta y_s = 22.39$
 round to $y_s = 22mm$
 cf Class S $y_s = 0 - 22mm$

Foundation Maintenance and Footing Performance: A Homeowner's Guide



PUBLISHING
BTF 18-2011
replaces
Information
Sheet 10/91

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type in order to ascertain the measures that should be put in place in order to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870-2011, the Residential Slab and Footing Code.

Causes of Movement

Settlement due to construction

There are two types of settlement that occur as a result of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, as a result of compaction of the soil under the weight of the structure. The cohesive quality of clay soil mitigates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compressive or shear stresses. This will usually take place during the first few months after construction, but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation

This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all of its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume, particularly imported sand fill for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil

All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence that takes away the support needed by the footing to retain equilibrium.

Shear failure

This phenomenon occurs when the foundation soil does not have sufficient strength to support the weight of the footing. There are two major post-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion or excavation.

In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.

GENERAL DEFINITIONS OF SITE CLASSES

Class	Foundation
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites, which may experience only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which may experience moderate ground movement from moisture changes
H1	Highly reactive clay sites, which may experience high ground movement from moisture changes
H2	Highly reactive clay sites, which may experience very high ground movement from moisture changes
E	Extremely reactive sites, which may experience extreme ground movement from moisture changes

Notes

1. Where controlled fill has been used, the site may be classified A to E according to the type of fill used.
2. Filled sites. Class P is used for sites which include soft fills, such as clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soil subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.
3. Where deep-seated moisture changes exist on sites at depths of 3 m or greater, further classification is needed for Classes M to E (M-D, H1-D, H2-D and E-D).

Tree root growth

Trees and shrubs that are allowed to grow in the vicinity of footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots in the vicinity of footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement

The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where subfloor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures

Erosion and saturation

Erosion removes the support from under footings, tending to create subsidence of the part of the structure under which it occurs. Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the wall or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpendes).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay

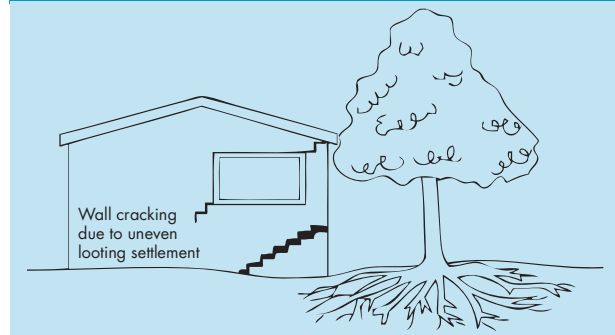
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher than the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is more likely that swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring.

As the weather pattern changes and the soil begins to dry out, the external footings will be first affected, beginning with the locations where the sun's effect is strongest. This has the effect of lowering the

Trees can cause shrinkage and damage



external footings. The doming is accentuated and cracking reduces or disappears where it occurred because of dishing, but other cracks open up. The roof lines may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm, wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry and winters are cold and wet, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots

In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself

Most forces that the soil causes to be exerted on structures are vertical – i.e. either up or down. However, because these forces are seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures

Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore usual to see cracking at weak points, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralised the affected portion of footing and the structure has stabilised on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is also usual that brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilise, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should always be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the main focus of attention, however there are a few examples of dwellings whose external leaf of masonry plays some supporting role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must be capable of supporting themselves.

Effects on framed structures

Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation causes a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all of the above symptoms for a considerable period. The same warning period should apply in the case of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the subfloor masonry walls can be expected to behave as full brickwork walls.

Effects on brick veneer structures

Because the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry will behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage

Where a water service pipe, a sewer or stormwater drainage pipe is in the vicinity of a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can have the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into subfloor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.

- Corroded guttering or downpipes can spill water to ground.
- Downpipes not positively connected to a proper stormwater collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking

In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870-2011.

AS 2870-2011 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

Prevention/Cure

Plumbing

Where building movement is caused by water service, roof plumbing, sewer or stormwater failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible, and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes sufficient spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the subfloor area.

Ground drainage

In all soils there is the capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a graded drain system connected to the stormwater collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish watertable height and subsoil water flows. This subject is referred to in BTF 19 and may properly be regarded as an area for an expert consultant.

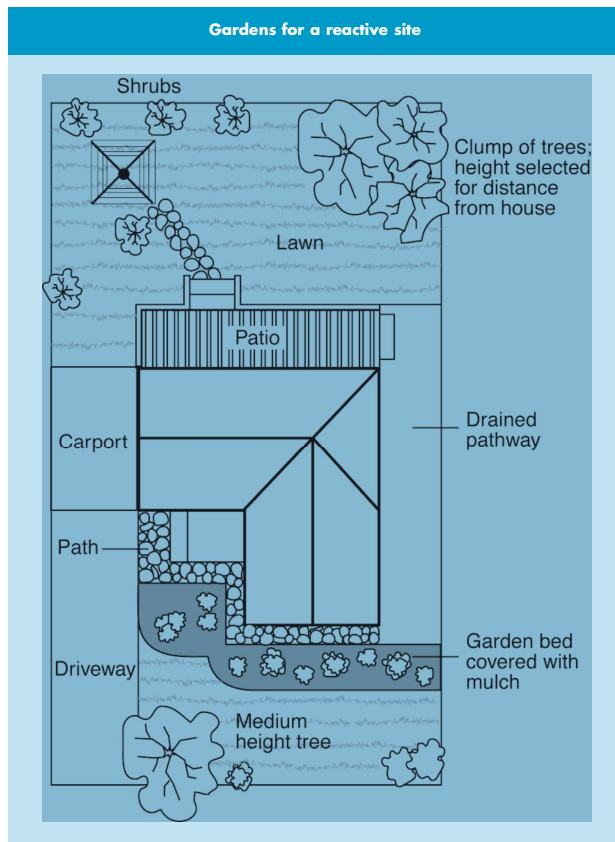
Protection of the building perimeter

It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist or are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS

Description of typical damage and required repair	Approximate crack width limit (see Note 3)	Damage category
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows stick slightly.	<5 mm	2
Cracks can be repaired and possibly a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weathertightness often impaired.	5–15 mm (or a number of cracks 3 mm or more in one group)	3
Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeably, some loss of bearing in beams. Service pipes disrupted.	15–25 mm but also depends on number of cracks	4



extend outwards a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earthenware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19).

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation

In buildings with a subfloor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the subfloor and significantly slows the process of drying out. Installation of an adequate subfloor ventilation system, either natural or mechanical, is desirable.

Warning: Although this Building Technology File deals with cracking in buildings, it should be said that subfloor moisture can result in the development of other problems, notably:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High subfloor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden

The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing trees

Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to remove the relevant roots without damage to the tree, an application to remove the tree should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs

State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens are also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation

Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at an angle that allows the soil under the footing to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation

Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same density. Where footings have been undermined, augmentation or other specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.

Where isolated footings rise and fall because of swell/shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, Construction Diagnosis.

The information in this and other issues in the series was derived from various sources and was believed to be correct when published.

The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.

Further professional advice needs to be obtained before taking any action based on the information provided.

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CONSTRUCTION MONITORING SERVICES

Construction monitoring is a service, which provides the client with independent verification (to the extent of the consultant's engagement) that the works have been completed in accordance with specified requirements. Most construction projects are unique, and construction works are often complex in detail and skilled professional involvement is necessary for the successful execution of such projects.

The decision as to which level is appropriate will be project dependent, but factors influencing the level of construction monitoring for a project are the size and importance of the project, the complexity of the construction works, and the experience and demonstrated skill in quality management of the constructor. The primary responsibility for completing the contract works in accordance with the requirements of the plans and specifications is the constructor's.

The involvement of the consultants is important during the construction phase to ensure that the design is being correctly interpreted, the construction techniques are appropriate and do not reduce the effectiveness of the design and the work is completed generally in accordance with the plans and specifications. The risk of non-compliance can be reduced by increasing the involvement of the consultant.

Table 1 sets out the five levels of construction monitoring, describes the types of review and indicates where a particular level of monitoring is appropriate. Tables 2 and 3 provide rating values for various aspects of a project to enable an assessment of an appropriate monitoring level to be made.

Table 1

LEVEL	REVIEW	COMMENT
CM1	Monitor the outputs from another party's quality assurance programme against the requirements of the plans and specifications. Visit the works at a frequency agreed with the client to review important materials of construction critical work procedures and/or completed plant or components. Be available to advise the constructor on the technical interpretation of the plans and specifications.	This level is only a secondary service. It may be appropriate where:- For the design consultant when another party is engaged to provide a higher level of construction monitoring or review during the period of construction or:- When the project works are the subject of a performance based specification and performance testing is undertaken and monitored by others.
CM2	Review, preferable at the earliest opportunity, a sample of each important work procedure, material of construction and component for compliance with the requirements of the plans and specifications and review a representative sample of each important completed work prior to enclosure or completion s appropriate. Be available to provide the constructor with technical interpretation of the plans and specification.	This level of service is appropriate for smaller projects of a routine nature being undertaken by an experienced and competent constructor and where a higher than normal risk of non-compliance is acceptable. It provides for the review of a representative sample of work procedures and materials of construction. The assurance of compliance of the finished work is dependent upon the constructor completing the work to at least the same standard as the representative sample reviewed.
CM3	Review, to an extent agreed with the client, random samples of important work procedures, for compliance with the requirements of the plans and specifications and review important completed work prior to enclosure or on completion as appropriate. Be available to provide the constructor with technical interpretation of the plans and specifications.	This level of service is appropriate for medium sized projects of a routine nature being undertaken by an experienced constructor when a normal risk of non-compliance is acceptable.
CM4	Review, at a frequency agreed with the client, regular samples of work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review the majority of completed work prior to the enclosure or on completion as appropriate.	This level of service is appropriate for projects where a lower than normal risk of non-compliance is required.
CM5	Maintain personnel on site to constantly review work procedures, materials of construction and components for compliance with the requirements of the plans and specifications and review completed work prior to enclosure or on completion as appropriate.	This level of service is appropriate for Major projects -Projects where the consequences of failure are critical -Projects involving innovative or complex construction procedures. The level of service provides the client with the greatest assurance that the completed work complies with the requirements of the plans and specifications.

Source www.ipenz.org.nz/ipenz/practicesupport/endorsedinfo/codes

Table 2

CRITERIA	K	ASSESSMENT				SELECTED VALUE
Project Status		Small	Medium	Large	Major	
	KA	1	2	3	4	
Complexity of work procedures		Routine	Difficult	Complex		
	KB	2	4	6		
Constructor's relevant experience		Inexperienced	Experienced	Certified ISO 9000		
	KC	6	2	1		
Consequences of non-compliance		Minor	Moderate	Serious	Critical	
	KD	1	4	6	12	
KTOTAL = KA + KB + KC + KD ->						

Table 3

KTOTAL	LEVEL OF CONSTRUCTION MONITORING				
	CM1	CM2	CM3	CM4	
5-6	-	Sampling only	-	-	-
7-8	-	N/A	Weekly	-	-
9-10	A	N/A	Twice Weekly	-	-
11-12	Secondary	N/A	N/A	Twice Weekly	-
13-14	Service	N/A	N/A	Every second day	-
15-16	-	N/A	N/A	Daily	-
17-	-	N/A	N/A	N/A	Constant

N/A = Not Appropriate

- Secondary Service - This level of service is only appropriate when another party is responsible for undertaking the primary review of construction standards.

- Table 3 indicates the frequency of review considered to be appropriate for the project concerned. Not indicated is the time input requirement at each review. The time on each occasion will increase with the increased size and complexity of the construction works and should be agreed with the consultant at the time of engagement.

- Frequency of inspection is intended to be indicative of involvement with actual frequency dependent on the rate of progress of the works.

TECHNICAL INFORMATION – CLEANSTREAM TXR-1

The Cleanstream TXR-1 is a complete, one tank textile media treatment system. Its multi-chambered design consists of 2 septic stages, a textile filter stage and irrigation and recirculation stages.

- 8400 litre total capacity
- Emergency storage (without cross contamination - 3500 litres)
- Alarm system (to notify the homeowner of any faults)
- Comprehensive maintenance by Duracrete



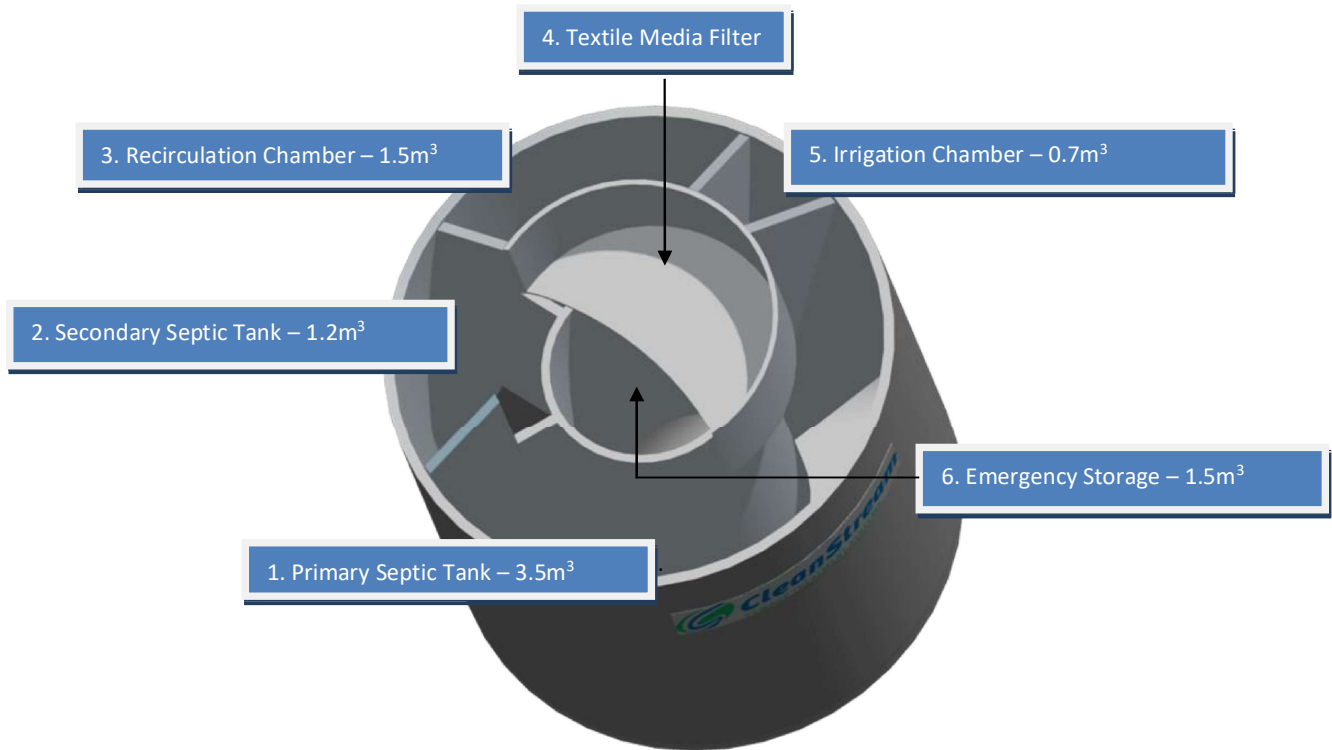
- The TXR-1 tank, roof and walls are constructed from galvanised, steel reinforced concrete (70MPA at 28 days) and come with a manufacturer's warranty of 10 years from the day they leave the factory. The mechanical components of the system (pumps) also come with a 2 year warranty from the date of commission. Electrical components come with a 1 year manufacturers warranty.
- The textile filter and recirculation stages are designed so that effluent is filtered multiple times through the textile media leading to much higher effluent quality than conventional aerobic systems.
- Separate septic stages mean there is always a working septic tank even after periods of non use, this allows the system to stay in a relatively active state.
- The system comes fully constructed, making installation a plug and play operation which provides for a faster turnaround while minimizing installation problems.
- Large emergency storage reduces problems during pump or power failure. The system has approximately 2.5 days of emergency capacity without cross contamination (based on typical flow through 1200L/day)

TREATMENT PERFORMANCE

12 monthly servicing is required to maintain efficient and effective treatment of household waste. This service must be performed by suitably trained personnel.

Expected treatment for medium size homes with daily flows up to 1500L is BOD5 10 mg/L, TSS 10 mg/L. However the system can treat up to 2000L per day whilst still complying with ARC TP58 effluent quality of BOD <15mg and TSS <15 mg/L for Advanced Secondary Treatment Systems – Packed Bed Reactors. Provision for 6 monthly service is required to achieve these larger daily flows.

TREATMENT OVERVIEW



1. The primary septic tank receives the wastewater. It acts like a conventional septic tank and reduces BOD and suspended solids. Effluent then passes through a particulates filter designed to stop large objects from inhibiting the treatment process further on.
2. The secondary septic provides an anoxic environment which aids in nitrate removal converting ammonia into nitrate, while reducing BOD and suspended solids. At the completion of this stage effluent passes through an attached growth filter, which provides an environment for denitrifying bacteria to flourish.
3. The Recirculation Chamber contains a large amount of emergency capacity and is a storage place for effluent before it passes through the textile filter.
4. From the Recirculation chamber treated wastewater is pumped onto the textile filter, this effectively aerates the effluent. Organic Nitrogen is converted to Ammonia by nitrifying bacteria. This process increases effluent quality as it passes through the textile media in the textile filter. The effluent then flows back into the secondary septic tank, unless there is sufficient forward flow to warrant irrigation in which case it drains into the irrigation chamber. Recirculation generally happens multiple times before irrigation is needed.
5. From the irrigation chamber the effluent is passed through a 130 micron Arkal Filter and then dispersed through self compensating drip irrigation.
6. In the event of pump failure emergency storage is provided in the central and recirculation chambers.

On-site Effluent Treatment National Testing Programme (OSET NTP)

PERFORMANCE CERTIFICATE CleanStream TXR-1 On-site Domestic Wastewater Treatment System, OSET NTP Trial 9, 2013/2014

System Tested

The **CleanStream TXR-1 system** is a packed bed recirculating textile filter wastewater treatment unit. The manufacturer's rated design capacity is 1,200 litres/day. Total liquid volume is 7,400 litres (primary treatment 2 tanks each with an effluent filter 3,700 and 1,200 litres; secondary treatment with packed bed 900 litres; recirculation tank 1,100 litres; pump chamber 700 litres). Emergency storage is 1,500 litres. No tertiary treatment (such as UV disinfection) is incorporated. The manufacturer's stated service frequency is annual.

Test Flow Rate

The **CleanStream TXR-1 system** was tested at 1,000 litres/day (equivalent to servicing a 3-bedroom 5 to 6 person household) over an 8 month (35 week) period November 2013 to July 2014 followed by a 1 month (4 week) high load effects test involving 5 days at 2,000 litres per day then 1,000 litres/day over the following 3 weeks.

Testing and Evaluation Procedures

A total of 37 treated effluent samples of organic matter (BOD₅) and suspended solids (TSS) at generally six day intervals during weeks 9 to 35 were tested and evaluated against the secondary effluent quality requirements of the joint Australia/NZ standard AS/NZS 1547:2012.

A total of 16 treated effluent samples of organic matter (BOD₅), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH₄-N), total phosphorus (TP) and faecal coliforms (FC) at generally six day intervals during weeks 23 through 35 were tested and the results benchmarked and rated on their median values. In addition, the energy used by the treatment system was assessed on the mean of consumption levels over the benchmark period.

AS/NZS 1547:2012 Secondary Effluent Quality Requirements

These requirements are that 90% of all test samples must achieve a BOD₅ of ≤ 20 g/m³ and TSS of ≤ 30 g/m³ with no one result for BOD₅ being >30 g/m³ and no one result for TSS being >45 g/m³. The **CleanStream TXR-1 system achieved** a performance level of **100%** for BOD₅ and **100%** for TSS based on the full set of 37 test results in weeks 9 to 35, with no results exceeding the maximums. The **CleanStream TXR-1 system thus meets** the secondary effluent quality requirements of AS/NZS 1547:2012.

Benchmark Ratings

The **CleanStream TXR-1 system achieved** the following effluent quality ratings for the sixteen benchmarking results in weeks 20 to 35.

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				A+	A	B	C	D
BOD (mg/L)	2	1	A+	<5	<10	<20	<30	≥30
TSS (mg/L)	3	1	A+	<5	<10	<20	<30	≥30
Total Nitrogen (mg/L)	37.1	5	D	<5	<15	<25	<30	≥30
NH ₄ - Nitrogen (mg/L)	1.9	4	A	<1	<5	<10	<20	≥20
Total phosphorus (mg/L)	4.4	0.5	B	<1	<2	<5	<7	≥7
Faecal Coliforms (cfu/100mL)	65,000	100,000	C	<10	<200	<10,000	<100,000	≥100,000
Energy (kWh/d) (mean)	0.98	0.12	A	0	<1	<2	<5	≥5

This Performance Certificate is specific to the **CleanStream TXR-1** model as specified above when operated at a flow rate of 1,000 litres/day. The initial Performance Certificate was issued on 20 February 2015 with a 5 year validity to 20 February 2020. For the full OSET NTP report on the performance of the **CleanStream TXR-1 system** contact **Duracrete Products Ltd**, Kamo, Whangarei, Ph: 0800 387 227 Email:ric@duracrete.co.nz.

On 21 November 2019 Duracrete Products Ltd applied to retest their **CleanStream TXR-1** plant in the 2021 OSET-NTP Trial 16 and applied for an extension to the above certificate through to the end of Trial 16. They provided a signed and legally witnessed statement confirming that there has been no change made whatsoever to the plant as tested in 2014. Hence OSET-NTP confirm that the validity of the Performance Certificate of 20 February 2015 as detailed above can be extended to 5 March 2022.

Authorised By:



Ray Hedgland, Technical Manager, OSET NTP
28 February 2020

On-site Effluent Treatment National Testing Programme, c/- Technical Manager, 10 Tide Close, Mt Wellington, AUCKLAND 1060 Mob: 021 626 772 E-mail: ray@hedgland.co.nz

DESIGN

GUIDELINES

Site Area:	0.8009 ha	
Water Supply:	Roof water	
Development:	4	Table 6.1 (notes) - Equivalent Bedrooms
Extra person/floor area ratio:	2	Follow the notes in table 6.1 to calculate extras
Combined occupancy:	8 Persons	Table 6.1
Water reduction re-use:	Standard fixtures	(Table 6.2-Water conservation fixtures)
Daily flow allowances:	180 L/Person/day	
Design flow rate:	1440 L/Day	
Water meter required:	No	(4.4.6: Where signs of failure occur - Council will insist on a meter)
Emergency Storage:	1.44 m ³	(4.4.2: 24-hour emergency storage in all pump chambers required = min 1000 L)
Topsoil Depth:	200 mm	
Soil Category TP58:	5	Table 5.1 - Ensure 250 - 300 mm topsoil to Soil Cat 5,6,7 for buried PCDI systems
Areal loading:	3.5	(4.4.2: - a conservative areal loading of 3mm/day or less for moderate to slowly draining soils)
Disposal Area:	411 m ²	Minimum disposal field area
Drip Line Spacings:	1.0 m	(This can be increased to 1.0m if surface mount)
Minimum length of drip line:	411.4 m	Minimum length of irrigation line
Reserve area % required:	100	In accordance with Chp 5 : Table5.3 - 30% for Northland Councils where permitted
Reserve area required:	411.4 m ²	
Area Check:	AREA OK	Ensure enough space within the constraints of the site to fit disposal & reserve fields
Pipes Buried?:	PERMITTED	There should be enough topsoil depth to enable the establishment of a "biomass".

PRODUCER STATEMENT

DESIGN: ON-SITE EFFLUENT DISPOSAL SYSTEMS (T.P.58)

ISSUED BY: Ben Steenkamp on behalf of Wilton Joubert Ltd(approved qualified design professional)

TO: Shanaghan Construction(owner)

TO BE SUPPLIED TO:Far North District Council.....

PROPERTY LOCATION: 3 Fantail Rise, Kerikeri
.....

LOT ...30.....DP494309... VALUATION NUMBER.....


TO PROVIDE : Design an on-site effluent disposal system in accordance with Technical paper 58 and provide a schedule to the owner for the systems maintenance.

THE DESIGN: Has been in accordance with G13 (Foul Water) G14 (Industrial Liquid Waste) B2 (durability 15 years) of the Building Regulations 1992.

As an independent approved design professional covered by a current policy of Professional Indemnity Insurance (Design) to a minimum value of \$200,000.00, I BELIEVE ON REASONABLE GROUNDS that subject to:

- (1) The site verification of the soil types.
- (2) All proprietary products met the performance requirements.

The proposed design will met the relevant provisions of the Building Code and 5.3.11 of The Far North District Council Engineering Standards.

(Signature of approved design professional)

CPEng, BEng (Civil), BSc (Geology), CMEngNZ.....(Professional qualifications)

2001008(Licence Number or professional Registration number)

Address 196 Centreway Road, Orewa, Auckland

Phone Number 09 527 0196 Fax Number Cell Phone 0272792392

Date 01.07.2024

Note: This form is to accompany every application for a Building Consent incorporating a T.P.58. Approval as a design professional is at Councils discretion.

On-site Wastewater Disposal Site Evaluation Investigation Checklist