Far North District Council

Office Use Only
Application Number:

Private Bag 752, Memorial Ave
Kaikohe 0440, New Zealand
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Phone: (09) 401 5200
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Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

APPLICATION FOR RESOURCE CONSENT OR FAST-TRACK RESOURCE CONSENT

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA))
(If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Form 9)

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

1. Pre-Lodgement Meeting

Have you met with a Council Resource Consent representative to discuss this application prior to lodgement? Yes / No

2. Type of Consent being applied for (more than one circle can be ticked):

- (X) Land Use
- O Fast Track Land Use*
- O Subdivision
- O Discharge
- O Extension of time (s.125)
- O Change of conditions (s.127)
- O Change of Consent Notice (s.221(3))
- O Consent under National Environmental Standard (e.g. Assessing and Managing Contaminants in Soil)
- O Other (please specify) _____

***The fast track for simple land use consents is restricted to consents with a controlled activity status and requires you provide an electronic address for service.**

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

~~Yes~~ / No

4. Applicant Details:

Name/s: Ashleigh & Sandra Hammond

Electronic Address for Service (E-mail): [redacted]

Phone Numbers:

Postal Address: (*or* alternative method of service under section 352 of the Act) [redacted]

Post Code: 0230

5. Address for Correspondence: *Name and address for service and correspondence (if using an Agent write their details here).*

Name/s: Williams & King, Attention: Natalie Watson

Electronic Address for Service (E-mail): [redacted]

Phone Numbers: _____ Home: _____

Postal Address: (*or* alternative method of service under section 352 of the Act)

Post Code: 0245

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

6. 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: Ashleigh James Hammond & Sandra June Hammond

Property Address/: Location

7. Application Site Details:

Location and/or Property Street Address of the proposed activity:

Site Address/ Location: 19 Tareha Place, Kerikeri

Legal Description: Lot 10 DP 540557 & 1/4 Share Lot 17 DP 540557 Val Number: 00215-83210

Certificate of Title: 906363

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.

8. Description of the Proposal:

Please enter a brief description of the proposal here. Attach a detailed description of the proposed activity and drawings (to a recognized scale, e.g. 1:100) to illustrate your proposal. Please refer to Chapter 4 of the District Plan, and Guidance Notes, for further details of information requirements.

Proposed residential development of vacant site in the Rural Living Zone, breaching permitted activity Stormwater Management, Building Coverage and Excavation and/or Filling Rules in the Operative District Plan.

If this is an application for an Extension of Time (s.125); Change of Consent Conditions (s.127) or 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) or extension being sought, with reasons for requesting them.

9. Would you like to request Public Notification

~~Yes~~/No

10. Other Consent required/being applied for under different legislation (more than one circle can be ticked):

Ⓧ Building Consent (BC ref # if known)

O Regional Council Consent (ref # if known)

O National Environmental Standard consent

O Other (please specify)

11. 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 (further information in regard to this NES is available on the Council's planning web pages):

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 O no O don't know

Is the proposed activity an activity covered by the NES? (If the activity is any of the activities listed below, then you need to tick the 'yes' circle).

Ⓧ yes O no O don't know

O Subdividing land

O Changing the use of a piece of land

Ⓧ Disturbing, removing or sampling soil

O Removing or replacing a fuel storage system

12. 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.

Please attach your AEE to this application.

13. 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 all names in full) Andrew Ritchie

Email: [redacted]

Postal Address: [redacted]

[redacted] Post Code: 0230

Phone Numbers: [redacted] Fax: _____

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: Andrew Ritchie (please print)

Signat[redacted] Ritchie (signature of bill payer – **mandatory**) Date: 5/7/24

14. 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.

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

Name: Natalie Watson (please print)

Signature: _____ (signature) Date: 5 July 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)
- ☒ 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.

Only one copy of an application is required, but please note for copying and scanning purposes, documentation should be:

UNBOUND **SINGLE SIDED** **NO LARGER THAN A3 in SIZE**

14. Important Information:

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

Name: Natalie Watson (please print)

Signatur[redacted] (signature) Date: 10 July 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)
- ☒ 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
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UNBOUND **SINGLE SIDED** **NO LARGER THAN A3 in SIZE**

Ashleigh & Sandra Hammond

Proposed Earthworks, Impermeable Surfaces & Building Coverage

19 Tareha Place, Kerikeri

Williams & King, Kerikeri[1]
10 July 2024

Cover Photograph: Application site.

[1] Williams & King - a Division of Survey & Planning Solutions (2010) Ltd
Surveyors, Planners, Resource Managers - Kerikeri and Kaitaia
PO Box 937 Kerikeri Phone (09) 407 6030 Email: nat@saps.co.nz

1.0 Overview

Ashleigh and Sandra Hammond are seeking land use consent for earthworks and impermeable surfaces required to form a building platform and to construct their proposed dwelling, internal vehicle access, parking and manoeuvring areas.

The subject site is a vacant rural residential property with a share in a jointly owned access lot, which provides vehicle access from Tareha Place. It is legally described as Lot 10 DP 540557 and is held in the Record of Title 906363.

The subject site is zoned Rural Living in the Operative Far North District Plan, and the proposed development requires resource consent as a discretionary activity overall for infringement of the 'Stormwater Management', 'Building Coverage' and 'Excavation and/or Filling…' zone and district wide rules. Under the Proposed Far North District Plan, the site is zoned Rural Residential. Relevant rules that have immediate legal effect can be met as permitted activities.

The application is accompanied by a Stormwater Mitigation Report, which provides the detail of proposed mitigation of stormwater runoff to comply with the requirements of a consent notice condition.

This assessment accompanies the Resource Consent application made by the Applicant and is provided in accordance with Schedule 4 of the Resource Management Act 1991. It is intended to provide the necessary information, in sufficient detail, to provide an understanding of the proposal and any actual or potential effects the proposed activity may have on the environment.

2.0 Description of Proposal

2.1 Proposed Residential Dwelling, Shed and Onsite Wastwater System

The purpose of the proposal is to develop the existing site for residential use. A four bedroom home with attached double garage is proposed to be built, with a floor area of with a roof area of approximately 262m² and a maximum height of approximately 5.337m above the finished ground level. The exterior of the dwelling will be clad in vertical 'Abodo Vulcan' and 'Linea Oblique' with profiled colorsteel roofing. Refer to the Architectural Plans in **Appendix 1**. A swimming pool, surrounded by a surfaced area and pool fence is proposed to be located to the west of the dwelling.

A 72m² shed is also proposed near the south east corner of the property. This will have a floor area of 8m by 9m and a mono pitch roof with a maximum height of 3.6m above the finished ground level. Access will be by two roller doors on the shed's northern face as well as a door on the western face. Refer to the set of plans in **Appendix 2**, and also drawing 01 in **Appendix 1**, which shows a proposed bathroom in the south western corner of the shed.

A new onsite wastewater treatment and disposal system will be installed, comprising a secondary aerated package treatment system and 308m² of surface laid pressure compensating drip irrigation lines, with a 30% reserve disposal area. The disposal area and reserve disposal area will be located parallel to the northern site boundary. Refer to the Wilton Joubert Limited Wastewater Design Report in **Appendix 3**.

The proposed development is shown on the Site Plan below.

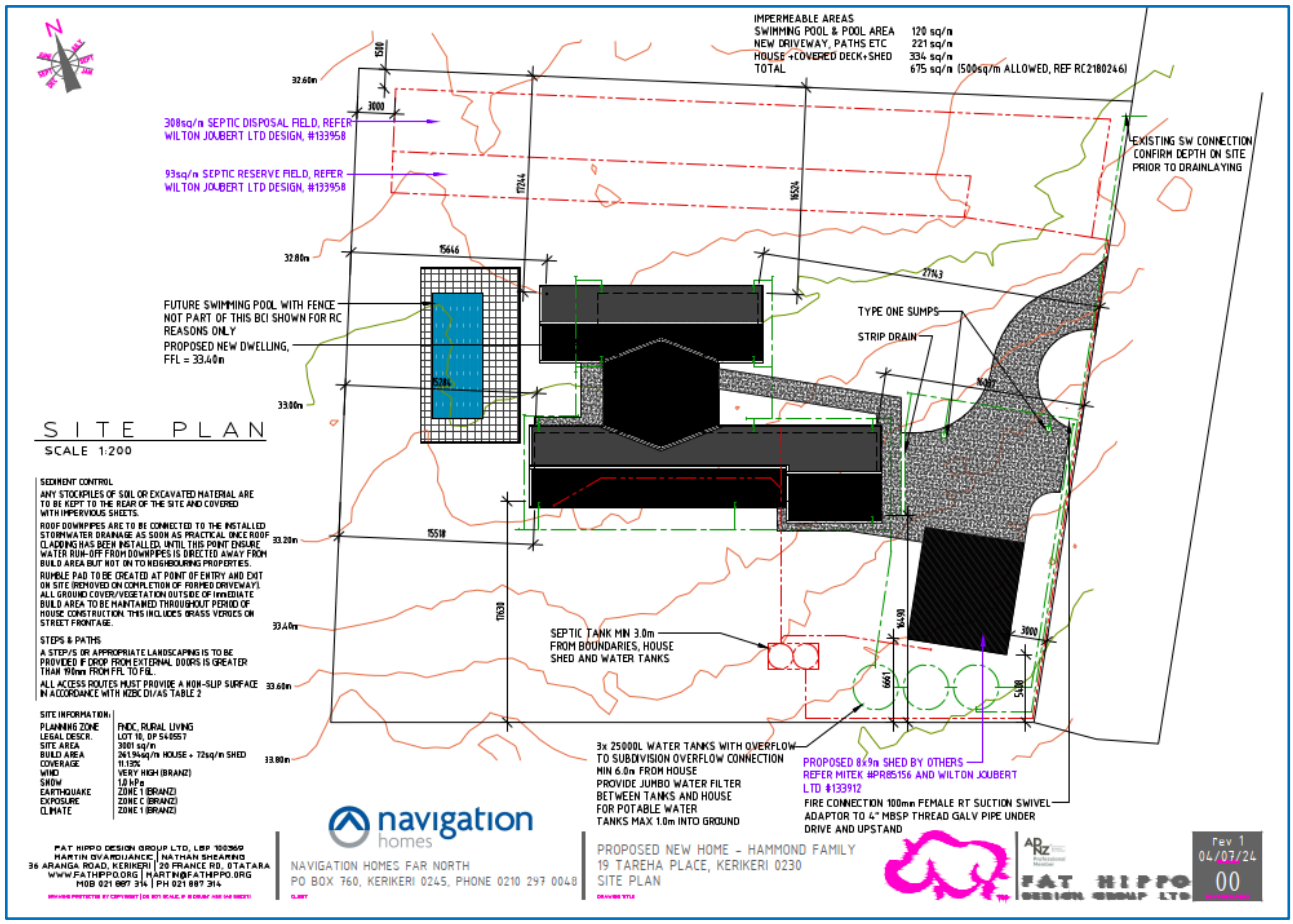


Figure 1: Site Plan

2.2 Earthworks

Earthworks are proposed for the formation of the building and shed platform. The proposed earthworks involve excavation of less than 150m³ of soil, to a maximum depth of 0.3m, and importation of approximately 40m³ of engineered fill to a maximum depth of 0.4m to prepare level building platforms. The excavated material will be redistributed on site as a mound for the onsite wastewater disposal area and landscaping, up to a maximum height of 0.4m.

The total earthworks volume proposed is therefore 340m³. Refer to the Site Plan in **Appendix 1** and copied in **Figure 2** below, and the Wilton Joubert Geotechnical Investigation Report (**Appendix 4**).

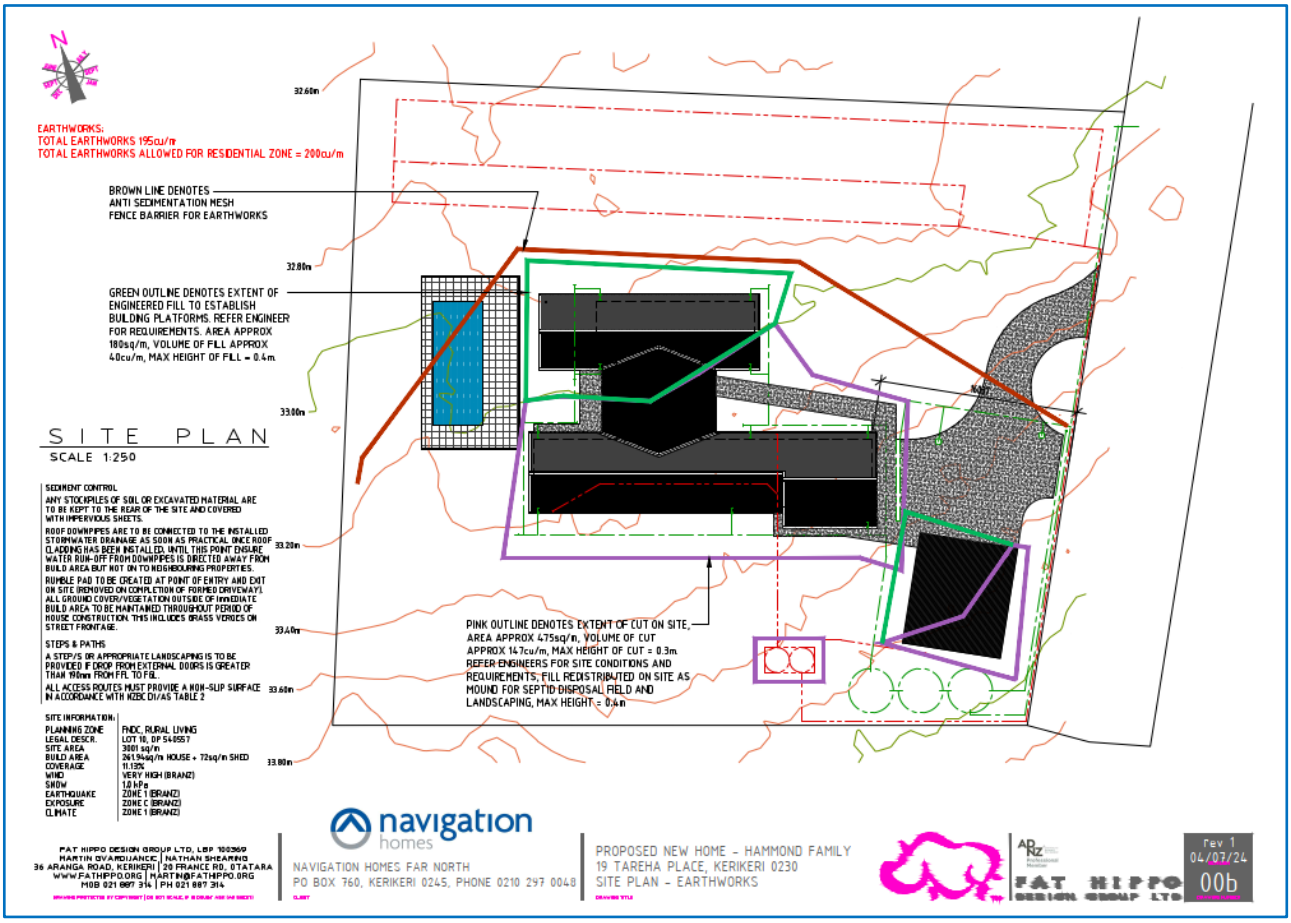


Figure 2: Site Plan showing proposed earthworks

Site specific erosion and sediment control measures will be implemented, including a downslope silt fence as shown on the Site Plan, which also notes that the proposed works will comply with the Auckland Council Guideline Document GD05 Erosion and Sediment Control. The Site Plan shows an anti-sedimentation mesh fence barrier downslope of the proposed earthworks and includes notes on the proposed sediment control measures. A construction management plan can be finalised by the Head Contractor responsible for overseeing the earthworks, taking into account the following principles.

- All earthworks will need to be completed in accordance with the Erosion and Sediment Control Guide for Land Disturbance Activities in the Auckland Region (June 2016, Guideline Document 2016/005 ("GD05") and the conditions of any resource consent issued to authorise the proposed works. Sediment laden stormwater runoff will be controlled by appropriate management techniques to ensure that sediment does not migrate beyond the site using the measures shown on Sheet 00b of the Site Plan. Any temporary stockpile of top soil must be within the silt fence perimeter. Immediately following the earthworks, exposed areas must be stabilised and/or topsoiled and re-vegetated. Once revegetation is satisfactorily established and stabilisation is complete, sediment control measures can be removed from the site.
- Erosion and sediment control measures shall be monitored by the Head Contractor, with regular inspection of silt fences with additional checks prior to and following heavy or persistent rainfall to ensure that the measures are repaired, replaced, reinforced or cleaned out if required. The Head Contractor will adjust erosion and sediment control as needed to suit site adjustments and weather conditions.

- All noise generating activities during the period of site works for this project will be managed on site as far as is reasonably practicable to meet New Zealand Standard NZS 6803:1999 Acoustics - Construction Noise. In addition, all persons undertaking day to day management of construction activities on the site will wherever possible adopt the best practical option at all times to ensure the emission of noise from the site does not exceed a reasonable level in accordance with Section 16 of the Resource Management Act 1991.
- Construction traffic to prevent sediment from being tracked onto public roads or shared private accessways. Construction traffic and parking to avoid any potential conflict with traffic and pedestrians in the vicinity of the site. The Site Plan in **Appendix 1** suggests a rumble pad be used.
- Dust mitigation measures will be utilised on-site to avoid dust being generated and carried beyond the site, including covering topsoil mounds if temporarily stockpiles remain beyond a short time period or are causing a dust nuisance.
- A copy of the Heritage New Zealand Pouhere Taonga Accidental Discovery Protocol (ADP) shall be made available to all contractors working on site.

2.3 Impermeable Surfaces and Stormwater Management

Condition (i) of Consent notice 11600632.5 on the subject Record of Title (906363), applied via RC 2180246, states that:

"In conjunction with the construction of any building requiring consent and associated impermeable surfaces on an allotment exceeding 500m² total impermeable surface coverage, the lot owner shall submit for approval of Council a stormwater management mitigation report. The system shall be designed as such that the total stormwater discharged from the site, after development, is no greater than 500m² allowance for impermeable surface flow from the site for rainfall events up to a 1% AEP plus allowance for climate change. The report shall be prepared by a suitably qualified and experienced practitioner and be submitted in conjunction with the Building Consent application."

In addition, RC 2180246 – Decision B – Landuse – Stormwater Management, grants consent for up to 500m² impermeable surface coverage on the application site. This approval has a ten year consent period, and therefore expires on 6 July 2028.

Proposed impermeable surfaces, comprising the driveway, roof area, and swimming pool complex are shown on the Site Plan as comprising 675m². This amounts to 22.5% of the gross site area of Lot 10 DP 54557. The definition for 'Impermeable Surface' in the Operative District Plan requires an equal share of the impermeable surface of a jointly owned access lot to be taken into account for the purpose of determining compliance with the relevant stormwater management rules.

Therefore, impermeable surfaces can be considered as:
Gross site area: 3001m² + ¼ (884m²) = 3222m²
Impermeable surfaces: 675m² + ¼(400) = 775m²
Percentage of gross site area: 24.1%

The proposal will add 675m² of impermeable surfaces to the site, comprising the additional roof area of the proposed dwelling and shed, the proposed driveway and hardstand area, and the swimming pool complex. The proposed extent of impermeable surface coverage exceeds the 500m² approved by Decision B of RC 2180246, however, condition (i) of Consent notice 11600632.5 applies nonetheless, requiring that the total stormwater discharged from the site be no greater than the 500m² allowance for rainfall events up to a 1% AEP plus allowance for climate change. A Stormwater Mitigation Report Prepared by Wilton Joubert Limited, dated 11th June 2024 is attached in **Appendix 5**, to satisfy this consent notice requirement in addition to reporting on the Operative District Plan assessment criteria and actual and potential stormwater effects arising from the proposal.

The recommendations of the Stormwater Mitigation Report are agreed to by the applicants, and are summarised as follows:

- Rainwater tanks are used to provide the proposed dwelling with a potable water supply. All potable tanks must be constructed level and fitted with balancing pipes at the top and near the base of each tank to connect all potable water tanks to each other.
- Runoff from hardstand areas should not be allowed to drain to the potable water tanks.
- The upper section of the potable water tanks is to act as a detention volume to achieve stormwater neutrality for the proposed impermeable surface areas exceeding the Permitted Activity coverage threshold. One of the tanks is to be fitted with a 100mm diameter overflow outlet with flow attenuation outlets as specified in the design elements listed on page 8 of the Stormwater Mitigation Report.
- Discharge and overflow from the potable water / detention tanks be directed via sealed pipes to the available stormwater connection.
- Adequate fall from the tank's outlet to the discharge point is required, if not achievable, review of the design will be required.
- The proposed driveway will be shaped to direct stormwater runoff to catchpits, which are required to drain directly to the available stormwater connection via sealed pipes. Stormwater catchpit(s) must have suitable pump to serve as a pre-treatment device prior to discharging to the discharge point.
- Stormwater runoff from smaller hardstand areas is to be shaped to shed to an equal or greater sized area of lower-lying lawn or planted areas for passive mitigation.
- No pool overflows may be directed to any part of the stormwater management system.

2.4 Vehicle Access and Parking

Access to the garage and shed will be via a new driveway formed from the jointly owned access lot. Parking will be provided within the garage, with other outdoor parking areas available on the new driveway.

3.0 Application Site Details and Description

3.1 Location

The subject site is located at 19 Tareha Place in Kerikeri. Refer to the maps in **Figures 3** and **4**.

Figure 3: Location Map

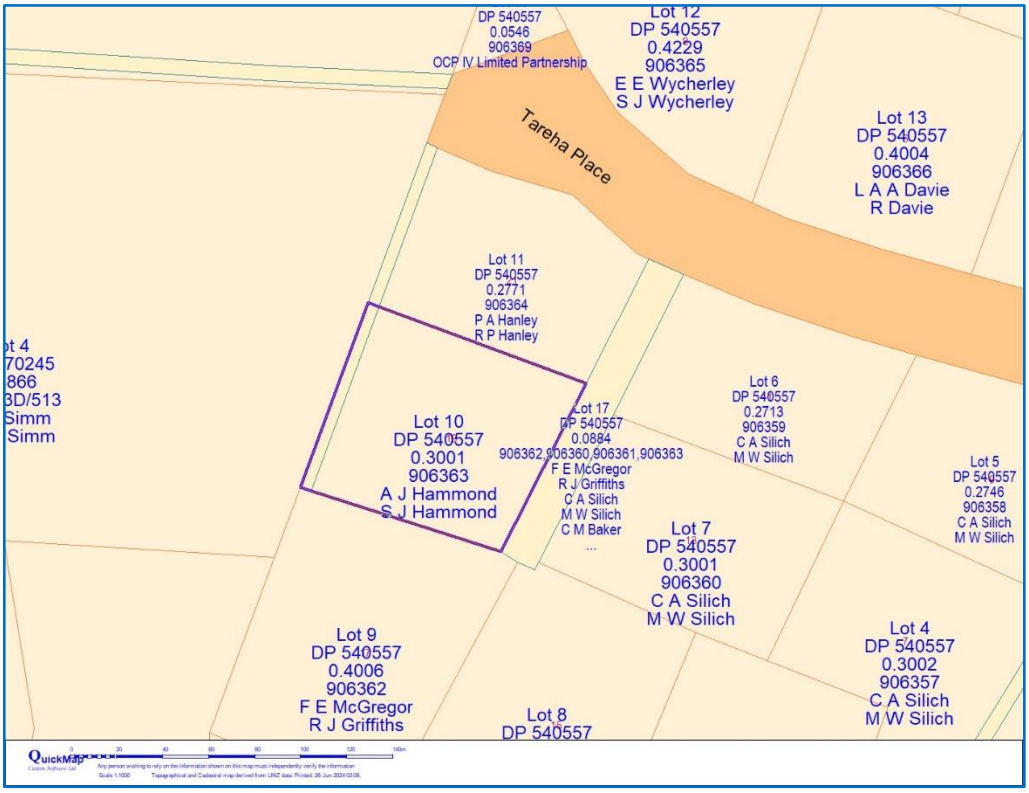


Figure 4: Cadastral Map

3.2 Legal Details

Legal details of the application site are listed below. The Record of Title is attached in **Appendix 6**.

RECORD OF TITLE	APPELLATION	TITLE AREA
906363	Lot 10 DP 540557 &	3001m² more or less
	¼ Share Lot 17 540557	884m² more or less

The Record of Title records the following relevant interests:

- Subject to Section 241(2) RMA 1991.
- 11600632.5 Consent Notice pursuant to Section 221 RMA 1991 (affects Lot 10 DP 540557)

Lots 1 to 15 DP 540557

(i) In conjunction with the construction of any building requiring consent and associated impermeable surfaces on an allotment exceeding 500m² total impermeable surface coverage, the lot owner shall submit for approval of Council a stormwater management mitigation report. The system shall be designed as such that the total stormwater discharged from the site, after development, is no greater than 500m² allowance for impermeable surface flow from the site for rainfall events up to a 1% AEP plus allowance for climate change. The report shall be prepared by a suitably qualified and experienced practitioner and be submitted in conjunction with the Building Consent application.

(ii) The road side drainage detention and attenuation in the vested road located in Lot 17, provides an allowance for likely impermeable surface coverage on the allotment to a maximum of 500m². Stormwater from roofs, other impermeable surfaces (driveways, paving, etc.) and tank overflows shall be directed to the road side drainage detention system up to the 500m² permitted allowance.

(iii) In conjunction with the construction of any building which includes a wastewater treatment & effluent disposal system the applicant shall submit for Council approval in conjunction with the Building Consent application. An onsite wastewater system Report prepared by a Chartered Professional Engineer or an council approved Report Writer. The report shall identify a suitable method of wastewater treatment for the proposed development along with an identified effluent disposal area plus a reserve disposal area and reference the on-site wastewater treatment and disposal assessment, produced by Ormiston Associates Ltd, dated June 2017, ref 3980 and submitted with Resource Consent 2180246 .

(iv) In conjunction with the construction of any dwelling, and in addition to a potable water supply and stormwater mitigation measures, a water collection system with sufficient supply for fire fighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.

- Subject to a right (in gross) to convey electricity over part Lot 17 DP 540557 marked C on DP 540557 in favour of Top Energy Limited created by Easement Instrument 11600632.8. Subject to Section 243(a) RMA 1991.
- Appurtenant to Lot 10 DP 540557 is a right of way, a right to convey water, electricity and telecommunications and a right to drain water created by Easement Instrument 11600632.10. Subject to Section 243(a) RMA 1991.

- Subject to a right of way, a right to convey water, electricity and telecommunications and a right to drain water over part Lot 17 DP 540557 marked C and a right to drain water over part Lot 10 DP 540557 marked F all on DP 540557 created by Easement Instrument 11600632.10. Subject to Section 243(a) RMA 1991.
- Land Covenant in Covenant Instrument 11600632.11.
- Subject to a right (in gross) to convey telecommunications over part Lot 17 DP 540557 marked C on DP 540557 in favour of Chorus New Zealand Limited created by Easement Instrument 11600632.7. Subject to Section 243(a) RMA 1991.

3.3 Site Conditions

The subject site is a regular shaped piece of land, which is generally level contour with a slight fall towards the northeast. The property is currently vacant, besides a temporary storage container located in the south western corner of the site, and in grass. The perimeter of the property is fenced and a grassed gated entry is located along the eastern boundary. Refer to **Photographs 1** and **2**.

Photograph 1: View over site facing east from jointly owned access lot (Lot 17 DP 540557). This photograph shows the temporary container and a mulch pile.

Photograph 2: View over north eastern corner of the subject site, also looking north along Lot 17 DP 540557 towards Tareha Place.

Drainage features and infrastructure are described in the Stormwater Mitigation Report.

3.4 Recorded Natural Features

The Northland Regional Council Regional Policy Statement maps do not record the site as having any areas of high or outstanding natural character, outstanding natural features or outstanding natural landscapes.

The site is not part of any ecological unit recorded in the Department of Conservation Protected Natural Area mapping. The site is not mapped as being located within a kiwi habitat.

4.0 District Plan Assessment

4.1 Operative Far North District Plan

The application site is zoned Rural Living and is not subject to any Resource Features. The proposal is assessed against the relevant rules of the District Plan as follows.

4.1.1 Rural Living Zone

Rule	Discussion	Compliance
Permitted Activities		
8.7.5.1.1 Residential Intensity	A single residential unit is proposed.	Complies
8.7.5.1.3 Building Height	The maximum building height is shown as 5.337m – refer to **Appendix 1**.	Complies
8.7.5.1.4 Sunlight	With the minimum setback shown, and taking into account the 2m vertical allowance and that the measurement can be taken from the eastern side of the jointly owned access lot, the proposed buildings comply with the permitted standard. Refer to **Appendix 1.**	Complies
8.7.5.1.5 Stormwater management	Proposed impermeable surfaces exceed 12.5% of gross site area.	Does not comply.
8.7.5.1.6 Setback from Boundaries	The proposed dwelling, shed and future swimming pool and fence achieve a 3m setback. Refer to **Appendix 1.**	Complies.
8.7.5.1.13 Building Coverage	More than 10% building coverage is proposed.	Does not comply
Controlled Activities		
8.7.5.2.2 Stormwater Management	Proposed impermeable surfaces exceed 20% of the gross site area.	Does not comply
Restricted Discretionary Activities		
8.7.5.3.4 Building Coverage	Building coverage will be less than 15%.	Complies
Discretionary Activities		
8.7.5 Discretionary Activities	Proposed impermeable surface coverage is a discretionary activity	Complies

4.1.2 District Wide Provisions

Natural & Physical Resources

Rule	Discussion	Compliance
12.3.6.1.1 PERMITTED ACTIVITIES		
12.3.6.1.2 Excavation and/or filling … in the Rural Living … Zones	The volume of cut to be redistributed as fill, plus engineered fill to prepare building platform will exceed the permitted standard. Maximum height of earthworks not exceeded.	Does not comply
12.3.6.2 RESTRICTED DISCRETIONARY ACTIVITIES		
12.3.6.2.1 Excavation and/or filling … in the Rural Living … Zones	Volume complies	Complies

Rule	Discussion	Compliance
12.4.6.1 PERMITTED ACTIVITIES		
12.4.6.1.2 Fire Risk to Residential Units	None of the listed vegetation areas within 20m of proposed dwelling.	Complies.

Financial Contributions

The proposal has no implications in terms of Chapter 14.

Transportation

Rule	Discussion	Compliance
Traffic – Permitted Activities		
15.1.6A.2.1 Traffic Intensity	The first residential unit on a site is exempt from this rule.	Complies.
Parking – Permitted Activities		
15.1.6B.1.1 On-Site Car Parking Spaces	Car parking is available within the proposed garage.	Complies.
15.1.6B.1.5 Car Parking Space Standards	Car parking dimensions and manoeuvring meets this standard.	Complies.
Access – Permitted Activities		
15.1.6C.1.1 Private Accessway in All Zones	Established at subdivision stage.	Complies.
15.1.6C.1.5 Vehicle Crossing Standards in Rural and Coastal Zones		
15.1.6C.1.7 General Access Standards		

4.1.3 Summary of Activity Status

Overall, the proposal has been assessed as a restricted discretionary activity, requiring consent under Rules 8.7.5.3.4, 8.7.5 and 12.3.6.2.1.

4.2 Proposed Far North District Plan

The subject site is zoned Rural Residential.

4.2.1 Rules with Immediate Legal Effect

Rules relating to earthworks and the discovery of suspected sensitive material, and earthworks and erosion and sediment control (EW-R12 and EW-R13) and associated standards EW-S3 and EW-S5 can be complied with through advice notes relating to the Heritage New Zealand Accidental Discovery Protocol and the requirement for erosion and sediment control to be implemented in accordance with the specified guideline document for the duration of earthworks. We are not aware of any other applicable rules with immediate legal effect under the Proposed District Plan. Other relevant rules without immediate legal effect are assessed below.

4.2.2 Area-Specific Matters - Rural Residential Zone

Rule	Discussion	Compliance
RRZ-R1 New buildings or structures …	PER-1 is met as a residential dwelling is proposed. PER-2 is met as outlined below.	Complies
RRZ-R2 Impermeable Surface Coverage	More than 12.5% impermeable surface coverage is proposed.	Does not comply – restricted discretionary activity.
RRZ-R3 Residential Activity	A single residential unit is intended.	Complies
RRZ-S1 Maximum Height	The buildings will not exceed 8m above ground level.	Complies
RRZ-S2 Height in Relation to Boundary	The buildings are contained within a building platform defined by the specified recession planes.	Complies
RRZ-S3 Setback	3m setback is achieved from all boundaries.	Complies
RRZ-S5 Building or Structure Coverage	Building and structure coverage is less than 12.5%.	Complies

4.2.3 District-Wide Matters – General District-Wide Matters – Transport

Rule	Discussion	Compliance
Permitted Activities		
TRAN-R1 Parking	Parking spaces are available within the garage or driveway.	Complies
TRAN-R2 Vehicle crossings and access, including private accessways	Vehicle access established at subdivision stage.	Complies
Tran-R5 Trip Generation	A single residential unit is proposed.	Complies.

4.2.4 District-Wide Matters – General District-Wide Matters – Earthworks

Rule	Discussion	Compliance
EW-R1 Earthworks for buildings or structures …	Earthworks volumes will exceed 300m³ (EW-S1). Maximum height is not exceeded. Site reinstatement is proposed within 6 months (EW-S4). EW-S6 is not met as the earthworks will not be set back 3m from a site boundary. EW-S7 is met as stability will be maintained as outlined in the Geotechnical Investigation Report. EW-S8 will be met (nature of filling material). EW-S9 is met, as the earthworks are not in a flood or coastal hazard area.	Does not comply – Restricted Discretionary Activity.
EW-R12 Earthworks and the discovery of suspected sensitive material.	The Heritage NZ Pouhere Taonga Accidental Discovery Protocol can be included as an Advice Note.	Complies.
EW-R13 Earthworks and erosion and sediment control.	EW-S5 is proposed to be met, as erosion and sediment control will be implemented for the duration in accordance with the listed standard.	Complies.

4.2.5 Summary of Activity Status under Proposed Far North District Plan

Overall, the proposal has been assessed as a restricted discretionary activity under the Proposed District Plan. Rules with immediate effect are EW-R12 and EW-R13, both of which can be satisfied as a permitted activity via consent conditions and an advice note.

5.0 Assessment of Environmental Effects

Section 104(1)(a) and (ab) of the Resource Management Act 1991 ("RMA") require the consent authority, subject to Part 2 of the Act, to have regard to any actual and potential effects on the environment of allowing the activity and 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.

Section 104(2) indicates that a consent authority may disregard an adverse effect of the activity on the environment if a national environmental standard of the plan permits an activity with that effect and Section 104(3)(a)(ii) requires a consent authority to not, when considering an application, have regard to any effect on a person who has given written approval to the application (unless that person has withdrawn the written approval before the date of a hearing or before the application is determined, as set out in 104(4)).

Clauses 6 and 7 of Schedule 4 of the RMA indicate the information requirements and matters that must be addressed in or by an assessment of environmental effects, both of which are subject to the provisions of any policy statement or plan.

5.1 Natural and Other Hazards

The subject site is not subject to natural hazards. The attenuation of stormwater to pre-development levels will ensure that the proposed impermeable surfaces do not contribute to downstream flooding.

5.2 Soil

The site contains highly versatile soil; however, the site is not within a primary production zone and has been zoned for rural residential use, in accordance with the existing settlement pattern of subdivision and land use present along Tareha Place and the wider Riverview area. Therefore, despite the site being mapped as comprising highly versatile soils, it is considered that the proposed earthworks and rural residential land use will have a negligible effect on soil resources and the availability of suitable land for primary production.

Stormwater will be collected, attenuated and discharged to the reticulated system in order to avoid soil erosion in the long term, and in the short term, this will be achieved through erosion control measures at the earthworks phase.

Overall, it is considered that the proposal has a negligible impact on the life supporting capacity of the soil.

5.3 Stormwater Management

The relevant Assessment Criteria listed in Section 11.3 of the Operative District Plan are addressed within the Stormwater Mitigation Report. This summarises that the effects of stormwater runoff from the proposed impermeable surfaces will be mitigated to flows lower the levels that would result from the permitted activity threshold. It states that "*provided that the recommendations within this report are adhered to, the effects of stormwater runoff resulting from the unattenuated proposed impermeable surfaces (500m² total) are considered to have less than minor effects on the receiving environment, equivalent to conditions that would result from development proposals falling within the Permitted Activity coverage threshold*."

With the stormwater management proposals adhered to, the effects of stormwater runoff will have a less than minor effect on the receiving environment.

5.4 Water Quality

Stormwater runoff is as described in the Stormwater Management Report, and the proposed mitigation measures will be implemented. Note that the permitted activity requirements of Regulation 8(3) of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 are intended to be met.

Onsite treatment and disposal of wastewater can be undertaken in accordance with the permitted activity standards of the Proposed Regional Plan, in order to avoid any adverse effects beyond the immediate disposal area.

Typical erosion and sediment control measures will be implemented to avoid the migration of sediment laden runoff beyond the earthworks area. All erosion and sediment control works will remain in place for the duration of the activity.

5.5 Visual Amenity and Rural / Natural Character

The proposal is for the development of the subject site in accordance with the intended purpose (being a rural residential land use), which is anticipated by the zoning of the site and the underlying subdivision consent. As such, no wider effects on the surrounding neighbourhood or wider community will arise.

The site does not have any high our outstanding landscape, natural character or visual values. The proposed development is an expected use of the site, and complies with permitted activity bulk and location standards in terms of setback, height in relation to boundary and building height so as not to be a dominant feature of the surrounding residential environment. The building is located centrally within the site, allowing ample areas for future landscaping and private outdoor space, and avoiding adverse effects on the outdoor areas of adjoining properties. There is an existing framework of recently planted vegetation on neighbouring properties, which over time, together with a similar nature of plantings on the subject lot, will ensure that privacy is achieved and amenity values enhanced. The extent of building and impermeable surface coverage is reasonable for the site. Overall, it is considered that the adverse effects on amenity values will be less than minor.

Short term visual amenity effects from the proposed earthworks and building phase of development will be temporary in duration, and unlikely to cause any significant adverse effects beyond the property boundary.

5.6 Flora and Fauna

As the subject site is devoid of any indigenous vegetation, the proposed activity will not have any direct or indirect adverse effects on ecosystems. No removal of indigenous vegetation is required.

5.7 Heritage Resources and Cultural Features

The site does not contain any known or mapped heritage resources or archaeological sites or sites of cultural significance. The standard Accidental Discovery Protocol advice note can be applied to the consent, outlining the procedures to be followed should any archaeological site be inadvertently uncovered, in order to avoid adverse effects on heritage resources.

5.8 Noise

The noise generated by the earthworks phase of the development is intended to be in accordance with the permitted activity standards of the Operative District Plan, as specified in Rule 8.6.5.1.7.

6.0 Statutory Assessment

Section 104(1)(b) of the Resource Management Act 1991 requires the consent authority, subject to Part 2 of the Act, to have regard to any relevant provisions of a national environmental standard, other regulations, a national policy statement, a New Zealand coastal policy statement, a regional policy statement, a plan or proposed plan, and any other matter the consent authority considers relevant and reasonably necessary to determine the application. Of relevance to the proposed activity are the following documents, which are commented on in the proceeding Sections 6.1 – 6.5 of this Report. This is followed by an assessment of Part 2 of the Act.

- *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011*
- *Resource Management (National Environmental Standards for Freshwater) Regulations 2020*
- *Regional Policy Statement for Northland*
- *Far North Operative District Plan*
- *Far North Proposed District Plan*
- *Proposed Regional Plan for Northland*

6.1 National Environmental Standards

6.1.1 National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health

The proposal has been considered in terms of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011. The subject site is not recorded on Northland Regional Council's Selected Landuse Register.[2]

Decision B of RC 2180246-RMACOM granted consent to undertake soil disturbance as part of the bulk earthworks for the underlying subdivision. Condition 5 of this consent required that "*upon completion of the works the consent holder shall submit to Council's Resource Consents Engineer or designate a Site Validation Report (SVR) prepared by a Suitably Qualified and Experienced Practitioner (SQEP). The SVR report prepared shall provide confirmation that on Lots 1 – 15 where soil has been deposited that the results for the 12 priority contaminants are in accordance with the Residential/Lifestyle Block 25% produce Soil Contaminant Scenario. Testing shall be undertaken in accordance with the guidelines set out within Contaminated Land Management Guideline No. 5*."

As the site has an approved rural residential use, the only new activity requiring consideration in terms of the regulations is the proposed soil disturbance. As a permitted activity, Regulation 8(3) allows the following:

Disturbing soil

(3) Disturbing the soil of the piece of land is a permitted activity while the following requirements are met:

(a)controls to minimise the exposure of humans to mobilised contaminants must—

(i)be in place when the activity begins:

(ii)be effective while the activity is done:

(iii)be effective until the soil is reinstated to an erosion-resistant state:

[2] Northland Regional Council. Retrieved 12 April 2023 from https://localmaps.nrc.govt.nz/localmapsviewer/?map=65b660a9454142d88f0c77b258a05f21

(b)the soil must be reinstated to an erosion-resistant state within 1 month after the serving of the purpose for which the activity was done:

(c)the volume of the disturbance of the soil of the piece of land must be no more than 25 m^3 per 500 m^2:

(d)soil must not be taken away in the course of the activity, except that,—

(i)for the purpose of laboratory analysis, any amount of soil may be taken away as samples:

(ii)for all other purposes combined, a maximum of 5 m^3 per 500 m^2 of soil may be taken away per year:

(e)soil taken away in the course of the activity must be disposed of at a facility authorised to receive soil of that kind:

(f)the duration of the activity must be no longer than 2 months:

(g)the integrity of a structure designed to contain contaminated soil or other contaminated materials must not be compromised.

The proposed volume of soil disturbance amounts to 147m³ over the total site area of 3,001m². Regulation 8(3)(c) allows 25m³ per 500m², which equates to 150m³ on the subject site. The volume of soil disturbance will be less than this permitted activity allowance, and therefore, provided that the remaining conditions specified in (a), (b), (d), (e), (f), and (g) are met, the application is considered to be a permitted activity.

6.1.2 National Environmental Standards for Freshwater & Amendments

Part 3, Clause 54 of the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 lists earthworks within, or within a 10m setback from, a natural inland wetland as being a non-complying activity; and taking, use, damming, diversion, or discharge of water into water within, or within a 100m setback from, a natural wetland, as being a non-complying activity, if there is a hydrological connection between the activity and the wetland, and will change or is likely to change, the water level range or hydrological function of the wetland, or if the discharge will enter the wetland.

The Northland Regional Council Biodiversity Wetlands mapping does not record any wetlands within 100m of the subject site and there are no wetlands in close proximity apparent on aerial photography or apparent following a site visit. Therefore, the proposal is not considered to have any implications in terms of the above regulations.

6.2 Regional Policy Statement for Northland ("RPS")

The RPS provides an overview of resource management issues and gives objectives, policies, and methods to achieve integrated management of natural and physical resources of the region.

The subject site is not in the coastal environment, does not include any outstanding natural landscapes or features and does not include any areas of high or outstanding natural character.

Relevant policies from the RPS are addressed beneath the applicable heading below.

Policy 4.2.1 – Improving overall water quality – can be supported in the short and long term, through implementation erosion and sediment control at the earthworks phase of the development.

Policy 5.1.1 – Planned and coordinated development, requires co-ordinated location, design and building or subdivision, use and development. The proposal supports the development of the site in accordance with its intended purpose, with suitable infrastructure, nearby footpath connections and social infrastructure in place, and avoidance of effects on landscape or natural character values, historic or cultural heritage values, significant ecological areas or species, or transport corridors achieved. The site contains highly versatile soils, however, is not within a primary production zone. The proposed use of the lot as a rural residential site is consistent with both the zoning of the land under the Operative and Proposed District Plan, as well as the predominant land use development pattern in the surrounding environment, so as to be compatible with other surrounding land use activities and avoid reverse sensitivity effects.

6.3 Far North Operative District Plan

The objectives and policies of the Rural Environment, Rural Living Zone and Earthworks Sections of the District Plan are relevant to this proposal. As discussed below, it is considered that the proposal will be consistent with the relevant objectives and policies.

RURAL ENVIRONMENT

8.3 OBJECTIVES

8.3.1 To promote the sustainable management of natural and physical resources of the rural environment.

8.3.2 To ensure that the life supporting capacity of soils is not compromised by inappropriate subdivision, use or development.

8.3.3 To avoid, remedy or mitigate the adverse and cumulative effects of activities on the rural environment.

8.3.7 To promote the maintenance and enhancement of amenity values of the rural environment to a level that is consistent with the productive intent of the zone.

8.4 POLICIES

8.4.1 That activities which will contribute to the sustainable management of the natural and physical resources of the rural environment are enabled to locate in that environment.

8.4.2 That activities be allowed to establish within the rural environment to the extent that any adverse effects of these activities are able to be avoided, remedied or mitigated and as a result the life supporting capacity of soils and ecosystems is safeguarded and rural productive activities are able to continue.

8.4.4 That development which will maintain or enhance the amenity value of the rural environment and outstanding natural features and outstanding landscapes be enabled to locate in the rural environment.

8.4.7 That Plan provisions encourage the efficient use and development of natural and physical resources, including consideration of demands upon infrastructure.

The proposal enables the use of the site for its intended purpose and is considered to represent sustainable management of this site and does not affect any land zoned for primary production. Adverse effects related to stormwater can be avoided and mitigated through the proposed stormwater management measures. The proposed building and impermeable surface coverage is considered to be reasonable for the site, with no significant loss to amenity values as a result.

RURAL LIVING ZONE

8.7.3 OBJECTIVES *These objectives supplement those set out in Section 8.3.*

8.7.3.1 To achieve a style of development on the urban periphery where the effects of the different types of development are compatible.

8.7.3.2 To provide for low density residential development on the urban periphery, where more intense development would result in adverse effects on the rural and natural environment.

8.7.4 POLICIES *These policies supplement those set out in Section 8.4.*

8.7.4.3 That residential activities have sufficient land associated with each household unit to provide for outdoor space, and where a reticulated sewerage system is not provided, sufficient land for onsite effluent disposal.

8.7.4.7 That provision be made for ensuring that sites, and the buildings and activities which may locate on those sites, have adequate access to sunlight and daylight.
8.7.4.10 That provision be made to ensure a reasonable level of privacy for inhabitants of buildings on adjoining sites.

The new dwelling is located centrally within the site to retain ample area for outdoor living, landscape planting and gardens and other measures to enhance privacy, and to retain space for onsite wastewater disposal and stormwater management. The buildings comply with permitted activity sunlight and setback standards in order to retain adequate access to sunlight and daylight for the proposed dwelling and adjoining sites.

SOILS & MINERALS
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.
12.3.3.2 To maintain the life supporting capacity of the soils of the District.
12.3.3.3 To avoid, remedy or mitigate adverse effects associated with soil excavation or filling.

12.3.4 POLICIES
12.3.4.1 That the adverse effects of soil erosion are avoided, remedied or mitigated.
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.
12.3.4.3 That where practicable, activities associated with soil and mineral extraction be located away from areas where that activity would pose a significant risk of adverse effects to the environment and/or to human health. Such areas may include those where:
(a) there are people living in close proximity to the site or land in the vicinity of the site is zoned Residential, Rural Living, Coastal Residential or Coastal Living;
(b) there are significant ecological, landscape, cultural, spiritual or heritage values;
(c) there is a potential for adverse effects on lakes, rivers, wetlands and the coastline;
(d) natural hazards may pose unacceptable risks.
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.
12.3.4.5 That soil conservation be promoted.

The proposed earthworks are small in scale and extent, and will occur for a short duration, solely for the purpose of preparing a residential building site. With the implementation of erosion and sediment control, management of dust, noise and traffic, it is considered that the adverse effects of earthworks on water quality, amenity values, can be avoided, remedied and mitigated. The earthworks location does not adversely affect any significant ecological, landscape, cultural, spiritual or heritage resources, and has an adequate setback from any water bodies. The site is not subject to any natural hazards.

Although the site contains highly versatile soils, it is an existing rural residential site within an existing neighbourhood of this nature. As such, the life supporting capacity of soils is maintained to a suitable extent.

Topsoil will be retained on the site and re-spread to support soil conservation, along with erosion control to prevent the loss of soil from the site.

In summary, it is considered that the proposal is in accordance with the relevant objective and policies of the Operative District Plan.

6.4 Far North Proposed District Plan

The proposed impermeable surface coverage would be a restricted-discretionary activity under the Proposed District Plan in terms of impermeable surface coverage and earthworks. The matters over which discretion is restricted to are adequately covered in the Stormwater Mitigation Report, and it is considered that the proposed activity is in accordance with the objectives and policies of the Rural Residential Zone within the Proposed District Plan.

The proposed earthworks component of the activity is also a restricted discretionary activity under the Proposed District Plan. As the matters that Council has restricted the exercise of its discretion to have been adequately addressed, it is considered that the proposal is in accordance with the relevant objectives and policies of the Proposed District Plan.

6.5 Regional Plans

6.5.1 Proposed Regional Plan – February 2024

Stormwater will be discharged in accordance with Rule C.6.4.2 including attenuation as required by the existing consent notice condition.

The discharge of sewage effluent on to land is controlled by the permitted activity rules C.6.1.3 of the Proposed Regional Plan. An effluent field and reserve area can be located on the site in compliance with the current rules.

It is noted that 5,000m² of exposed earth at any time is permitted in 'other areas' as per Table 15: Permitted activity earthworks thresholds for the Proposed Regional Plan. This threshold is not exceeded by the proposed earthworks activity.

No consents are considered necessary under the Proposed Regional Plan for this proposal.

6.6 Part 2 of the Resource Management Act 1991

An assessment of the proposal in relation to Part 2 of the Act is given below.

PART 2 PURPOSE AND PRINCIPLES

5 Purpose

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

(2) In this Act, sustainable management means managing the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural wellbeing 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.

7 Other matters

In achieving the purpose of this Act, all persons exercising functions and powers under it, in relation to managing the use, development and protection of natural and physical resources, shall have particular regard to-

(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;

8 Treaty of Waitangi

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

The proposal is considered to promote sustainable management as per the purpose of the Act (Section 5) by enabling the residential use of the subject site in accordance with its intended purpose as per the zoning under the Operative and Proposed District Plans. The development will be within an existing neighbourhood of similar sites, and is in a location that does not compromise any significant natural values. The proposal will not detract from the existing amenity, character or landscape values present in the surrounding environment.

The effects of stormwater runoff can be mitigated to no more than the levels that would result from the permitted activity threshold of impermeable surfaces. Temporary adverse effects associated with earthworks can be avoided using standard construction management techniques.

There are no relevant Section 6 Matters.

The proposal has regard to Section 7 Matters and represents an efficient and anticipated use of the land, which will retain existing amenity values and maintain the quality of the environment.

The proposed activity has no known implications in terms of the Treaty of Waitangi.

Overall, the proposal is considered to be consistent with the purpose and principles of the Resource Management Act 1991.

7.0 Consultation & Notification Assessment

7.1 Consultation

The applicant has not sought any written approvals for the proposed activity.

7.2 Public Notification Assessment

Step 1: Public notification is not requested. Section 95A(3)(b) and (c) do not apply.

Step 2: Public notification is not precluded.

Step 3: There are no rules that require public notification in terms of section 95A8(a). An assessment has been made in accordance with section 95D, and it is considered that the adverse effects of the activity are not more than minor. Refer to Section 5.0 of this report.

Step 4: No special circumstances exist to warrant public notification.

7.3 Limited Notification Assessment

Step 1: The site is not in the marine and coastal area or common marine and coastal area. There are no affected protected customary rights groups or affected customary marine title groups, the land is not subject to a statutory acknowledgement.

Step 2: Limited notification is not precluded.

Step 3: In terms of 95B(8), an assessment has been undertaken in accordance with section 95E. Section 95E(1) specifies that a person is an affected person if the consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor).

Section 95E(2) provides guidance as to how a consent authority should assess an activity's adverse effects on a person for the purposes of Section 95E, including clause (a), where they may disregard an adverse effect of the activity on a person if a rule or national environmental standard permits an activity with that effect and clause (b), where they must, if the activity is a controlled activity or a restricted discretionary activity, disregard an adverse effect of the activity on the person if the effect does not relate to a matter for which a rule or a national environmental standard reserves control or restricts discretion.

Section 95E(3) specifies that a person is not an affected person in relation to an application for a resource consent for an activity if (a) the person has given, and not withdrawn, approval for the proposed activity in a written notice received by the consent authority before the authority has decided whether there are any affected persons.

Taking into account the relevant matters of control, the anticipated adverse effects of the proposed development are expected to be less than minor, and will not result in adverse effects that are minor or greater on any person, for the following reasons:

- The proposal represents the development of the subject site in accordance with the intended purpose.
- The proposal does not include infringement of any boundary rules.
- The scale of development is consistent with other existing land use activities in the surrounding environment.
- The proposed activity does not generate any off-site effects.
- The recommended stormwater mitigation measures detailed in the Stormwater Mitigation Report are accepted by the applicant. This will ensure that the new impermeable surface areas will be attenuated using on-site water tanks to pre-development conditions, achieving stormwater neutrality, and ensuring that effects from stormwater runoff will be less than minor.
- The location, extent and design of the proposed earthworks together with control or erosion and sediment runoff and other construction management techniques, means that off-site effects can be avoided and mitigated so as to be less than minor.

Accordingly, it is considered that there are no persons affected by the application.

Step 4: There are no special circumstances to warrant notification to any person.

7.4 Summary of Notification Assessment

As outlined above we are of the opinion that the proposal satisfies the statutory requirements for non-notification, and we respectfully request that it be processed on that basis.

8.0 Conclusion

In terms of section 104 and 104B of the Resource Management Act 1991, we consider that:

- The actual and potential adverse effects of the proposal can be avoided and mitigated so as to be less than minor.
- The proposal is considered to be consistent with the relevant objectives and policies of the Operative District Plan, Proposed District Plan, and Regional Policy Statement.
- The proposal is in accordance with the Purpose and Principles of the Resource Management Act 1991.

We also note that:

- It has been assessed that the proposal meets the statutory criteria to be processed as non-notified.

For these reasons it is requested this application be considered to be a non-notified application, and that the Council grant consent to the proposal, under delegated authority, as detailed in the application and supporting information.

Signed ..... Date 10 July 2024
Natalie Watson, WILLIAMS & KING
Resource Planner Kerikeri

9.0 Appendices

Appendix 1: Architectural Plans

Appendix 3: Wilton Joubert Limited Wastewater Design Report
Appendix 4: Wilton Joubert Limited Geotechnical Report
Appendix 5: Wilton Joubert Limited Stormwater Mitigation Report
Appendix 6: Record of Title

RECORD OF TITLE
UNDER LAND TRANSFER ACT 2017
FREEHOLD
Search Copy

R.W. Muir
Registrar-General
of Land

Identifier **906363**
Land Registration District **North Auckland**
Date Issued 08 January 2020

Prior References
803342

Estate	Fee Simple
Area	3001 square metres more or less
Legal Description	Lot 10 Deposited Plan 540557

Registered Owners
Ashleigh James Hammond and Sandra June Hammond

Estate	Fee Simple - 1/4 share
Area	884 square metres more or less
Legal Description	Lot 17 Deposited Plan 540557

Registered Owners
Ashleigh James Hammond and Sandra June Hammond

Interests

Subject to Section 241(2) Resource Management Act 1991 (affects DP 540557)

11600632.5 Consent Notice pursuant to Section 221 Resource Management Act 1991 - 8.1.2020 at 2:59 pm (affects Lot 10 DP 540557)

Subject to a right (in gross) to convey telecommunications over part Lot 17 DP 540557 marked C on DP 540557 in favour of Chorus New Zealand Limited created by Easement Instrument 11600632.7 - 8.1.2020 at 2:59 pm

The easements created by Easement Instrument 11600632.7 are subject to Section 243 (a) Resource Management Act 1991

Subject to a right (in gross) to convey electricity over part Lot 17 DP 540557 marked C on DP 540557 in favour of Top Energy Limited created by Easement Instrument 11600632.8 - 8.1.2020 at 2:59 pm

The easements created by Easement Instrument 11600632.8 are subject to Section 243 (a) Resource Management Act 1991

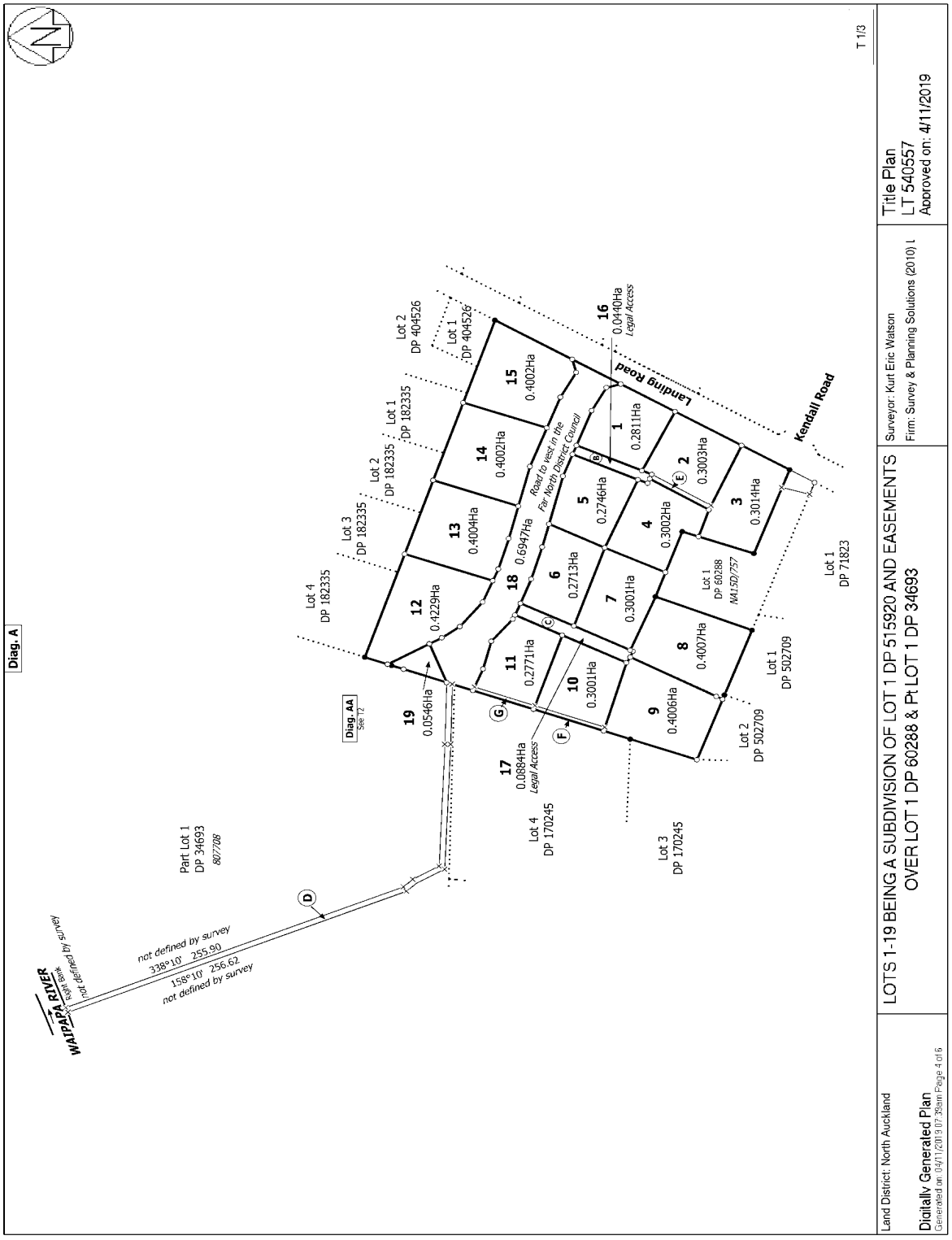
Subject to a right of way, a right to convey water, electricity and telecommunications and a right to drain water over part Lot 17 DP 540557 marked C and a right to drain water over part Lot 10 DP 540557 marked F all on DP 540557 created by Easement Instrument 11600632.10 - 8.1.2020 at 2:59 pm

Appurtenant to Lot 10 DP 540557 is a right of way, a right to convey water, electricity and telecommunications and a right to drain water created by Easement Instrument 11600632.10 - 8.1.2020 at 2:59 pm

The easements created by Easement Instrument 11600632.10 are subject to Section 243 (a) Resource Management Act 1991

Land Covenant in Covenant Instrument 11600632.11 - 8.1.2020 at 2:59 pm (affects Lot 10 DP 540557)

13017622.1 Mortgage to ASB Bank Limited - 24.5.2024 at 4:19 pm


Diag. A
T 1/3
WAIPAPA RIVER
not defined by survey
not defined by survey
338°10' 255.90
158°10' 256.62
not defined by survey
Part Lot 1 DP 34693
807708
Lot 4 DP 182335
Lot 3 DP 182335
Lot 2 DP 182335
Lot 1 DP 182335
Lot 2 DP 404526
Lot 1 DP 404526
Lot 4 DP 170245
Lot 3 DP 170245
Lot 2 DP 502709
Lot 1 DP 502709
Lot 1 DP 71823
Lot 1 DP 60288 NA150D/757
Diag. AA See 12
Road to vest in the Far North District Council
Landing Road
Kendall Road
1 0.2811Ha
2 0.3003Ha
3 0.3014Ha
4 0.3002Ha
5 0.2746Ha
6 0.2713Ha
7 0.3001Ha
8 0.4007Ha
9 0.4006Ha
10 0.3001Ha
11 0.2771Ha
12 0.4229Ha
13 0.4004Ha
14 0.4002Ha
15 0.4002Ha
16 0.0440Ha Legal Access
17 0.0884Ha Legal Access
18 0.6947Ha
19 0.0546Ha
Land District: North Auckland
LOTS 1-19 BEING A SUBDIVISION OF LOT 1 DP 515920 AND EASEMENTS OVER LOT 1 DP 60288 & Pt LOT 1 DP 34693
Surveyor: Kurt Eric Watson
Firm: Survey & Planning Solutions (2010) L
Title Plan
LT 540557
Approved on: 4/11/2019
Digitally Generated Plan
Generated on 04/11/2019 07:38am Page 4 of 6

View Instrument Details

Instrument No	11600632.5
Status	Registered
Date & Time Lodged	08 January 2020 14:59
Lodged By	Kenealy, Karyn Leanne
Instrument Type	Consent Notice under s221(4)(a) Resource Management Act 1991

Affected Records of Title	Land District
906354	North Auckland
906355	North Auckland
906356	North Auckland
906357	North Auckland
906358	North Auckland
906359	North Auckland
906360	North Auckland
906361	North Auckland
906362	North Auckland
906363	North Auckland
906364	North Auckland
906365	North Auckland
906366	North Auckland
906367	North Auckland
906368	North Auckland

Annexure Schedule Contains 3 Pages.

Signature

Signed by Karyn Leanne Kenealy as Territorial Authority Representative on 08/01/2020 12:43 PM

***** End of Report *****

Far North District Council

Private Bag 752, Memorial Ave
Kaikohe 0440, New Zealand
Freephone: 0800 920 029
Phone: (09) 401 5200
Fax: (09) 401 2137
Email: ask.us@fndc.govt.nz
Website: www.fndc.govt.nz

Te Kaunihera o Tai Tokerau Ki Te Raki

THE RESOURCE MANAGEMENT ACT 1991

SECTION 221: CONSENT NOTICE

REGARDING **RC 2180246**
Being the Subdivision of Lot 1 DP 488884
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.

Lots 1 to 15 DP 540557

(i) In conjunction with the construction of any building requiring consent and associated impermeable surfaces on an allotment exceeding 500m^2 total impermeable surface coverage, the lot owner shall submit for approval of Council a stormwater management mitigation report. The system shall be designed as such that the total stormwater discharged from the site, after development, is no greater than 500m^2 allowance for impermeable surface flow from the site for rainfall events up to a 1% AEP plus allowance for climate change. The report shall be prepared by a suitably qualified and experienced practitioner and be submitted in conjunction with the Building Consent application.

(ii) The road side drainage detention and attenuation in the vested road located in Lot 17, provides an allowance for likely impermeable surface coverage on the allotment to a maximum of 500m^2. Stormwater from roofs, other impermeable surfaces (driveways, paving, etc.) and tank overflows shall be directed to the road side drainage detention system up to the 500m^2 permitted allowance.

(iii) In conjunction with the construction of any building which includes a wastewater treatment & effluent disposal system the applicant shall submit for Council approval in conjunction with the Building Consent application. An onsite wastewater system Report prepared by a Chartered Professional Engineer or an council approved Report Writer. The report shall identify a suitable method of wastewater treatment for

Far North District Council

Te Kaunihera o Tai Tokerau Ki Te Raki

the proposed development along with an identified effluent disposal area plus a reserve disposal area and reference the on-site wastewater treatment and disposal assessment, produced by Ormiston Associates Ltd, dated June 2017, ref 3980 and submitted with Resource Consent 2180246 .

(iv) In conjunction with the construction of any dwelling, and in addition to a potable water supply and stormwater mitigation measures, a water collection system with sufficient supply for fire fighting purposes is to be provided by way of tank or other approved means and to be positioned so that it is safely accessible for this purpose. These provisions will be in accordance with the New Zealand Fire Fighting Water Supply Code of Practice SNZ PAS 4509.

Lots 1,2,3 & 15 DP540557

(v) The landscaping specified in condition 4(o) of RC2180246 is to be maintained in perpetuity. Plants requiring removal due to damage, disease or other cause shall be replaced with a similar specimen before the end of the next following planting season (1st May to 30th September).

Lots 1,2 & 15 DP540557

(vi) Vehicle crossings that gain access onto Landing Road are not permitted from lots 1, 2 and 15. Access to these lots is to be obtained via vested road as described in RC2180246. Vehicle Crossing's can only be permitted for lots 1,2 and 15 if written approval to construct is obtained from Councils Roading Engineer or their designate.

Lot 3 DP 540557

(vii) Lot 3 is only permitted to have one vehicle crossing from Landing road, this is via R.O.W A and the associated existing vehicle crossing. An additional crossing to lot 3 can only be permitted if written approval to construct is obtained from Councils Roading Engineer or their designate.

Far North District Council

Private Bag 752, Kaitaia
Kaitaia 0410, New Zealand
Telephone: 0800 920 029
Phone: (09) 401 5200
Fax: (09) 408 6863
Email: ask@fndc.govt.nz
Website: www.fndc.govt.nz

Te Kaunihera o Tai Tokerau Ki Te Raki

SIGNED: Mr Patrick John Killalea - Authorised Officer
By the FAR NORTH DISTRICT COUNCIL
Under delegated authority:
PRINCIPAL PLANNER – RESOURCE MANAGEMENT

DATED at **KERIKERI** this 19th day of December 2019

SITE PLAN

SCALE 1:200

IMPERMEABLE AREAS

SWIMMING POOL & POOL AREA	120 sq/m
NEW DRIVEWAY, PATHS ETC	221 sq/m
HOUSE +COVERED DECK+SHED	334 sq/m
TOTAL	**675 sq/m (500sq/m ALLOWED, REF RC2180246)**

308sq/m SEPTIC DISPOSAL FIELD, REFER WILTON JOUBERT LTD DESIGN, #133958

93sq/m SEPTIC RESERVE FIELD, REFER WILTON JOUBERT LTD DESIGN, #133958

EXISTING SW CONNECTION CONFIRM DEPTH ON SITE PRIOR TO DRAINLAYING

FUTURE SWIMMING POOL WITH FENCE NOT PART OF THIS BC! SHOWN FOR RC REASONS ONLY

PROPOSED NEW DWELLING, FFL = 33.40m

TYPE ONE SUMPS

STRIP DRAIN

SEPTIC TANK MIN 3.0m FROM BOUNDARIES, HOUSE SHED AND WATER TANKS

3x 25000L WATER TANKS WITH OVERFLOW TO SUBDIVISION OVERFLOW CONNECTION MIN 6.0m FROM HOUSE PROVIDE JUMBO WATER FILTER BETWEEN TANKS AND HOUSE FOR POTABLE WATER TANKS MAX 1.0m INTO GROUND

PROPOSED 8x9m SHED BY OTHERS REFER MITEK #PR85156 AND WILTON JOUBERT LTD #133912

FIRE CONNECTION 100mm FEMALE RT SUCTION SWIVEL ADAPTOR TO 4" MBSP THREAD GALV PIPE UNDER DRIVE AND UPSTAND

32.60m
32.80m
33.00m
33.20m
33.40m
33.60m
33.80m

1500
3000
17244
16524
15646
27143
15284
16037
15518
17630
16490
3000
6661
5408

SEDIMENT CONTROL

ANY STOCKPILES OF SOIL OR EXCAVATED MATERIAL ARE TO BE KEPT TO THE REAR OF THE SITE AND COVERED WITH IMPERVIOUS SHEETS.

ROOF DOWNPIPES ARE TO BE CONNECTED TO THE INSTALLED STORMWATER DRAINAGE AS SOON AS PRACTICAL ONCE ROOF CLADDING HAS BEEN INSTALLED. UNTIL THIS POINT ENSURE WATER RUN-OFF FROM DOWNPIPES IS DIRECTED AWAY FROM BUILD AREA BUT NOT ON TO NEIGHBOURING PROPERTIES.

RUMBLE PAD TO BE CREATED AT POINT OF ENTRY AND EXIT ON SITE (REMOVED ON COMPLETION OF FORMED DRIVEWAY). ALL GROUND COVER/VEGETATION OUTSIDE OF ImmEDIATE BUILD AREA TO BE MAINTAINED THROUGHOUT PERIOD OF HOUSE CONSTRUCTION. THIS INCLUDES GRASS VERGES ON STREET FRONTAGE.

STEPS & PATHS

A STEP/S OR APPROPRIATE LANDSCAPING IS TO BE PROVIDED IF DROP FROM EXTERNAL DOORS IS GREATER THAN 190mm FROM FFL TO FGL.

ALL ACCESS ROUTES MUST PROVIDE A NON-SLIP SURFACE IN ACCORDANCE WITH NZBC D1/AS TABLE 2

SITE INFORMATION:

PLANNING ZONE	FNDC, RURAL LIVING
LEGAL DESCR.	LOT 10, DP 540557
SITE AREA	3001 sq/m
BUILD AREA	261.94sq/m HOUSE + 72sq/m SHED
COVERAGE	11.13%
WIND	VERY HIGH (BRANZ)
SNOW	1.0 kPa
EARTHQUAKE	ZONE 1 (BRANZ)
EXPOSURE	ZONE C (BRANZ)
CLIMATE	ZONE 1 (BRANZ)

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MOB 021 887 314 | PH 021 887 314

navigation homes

NAVIGATION HOMES FAR NORTH
PO BOX 760, KERIKERI 0245, PHONE 0210 297 0048
CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
SITE PLAN
DRAWING TITLE

ADNZ Professional Member

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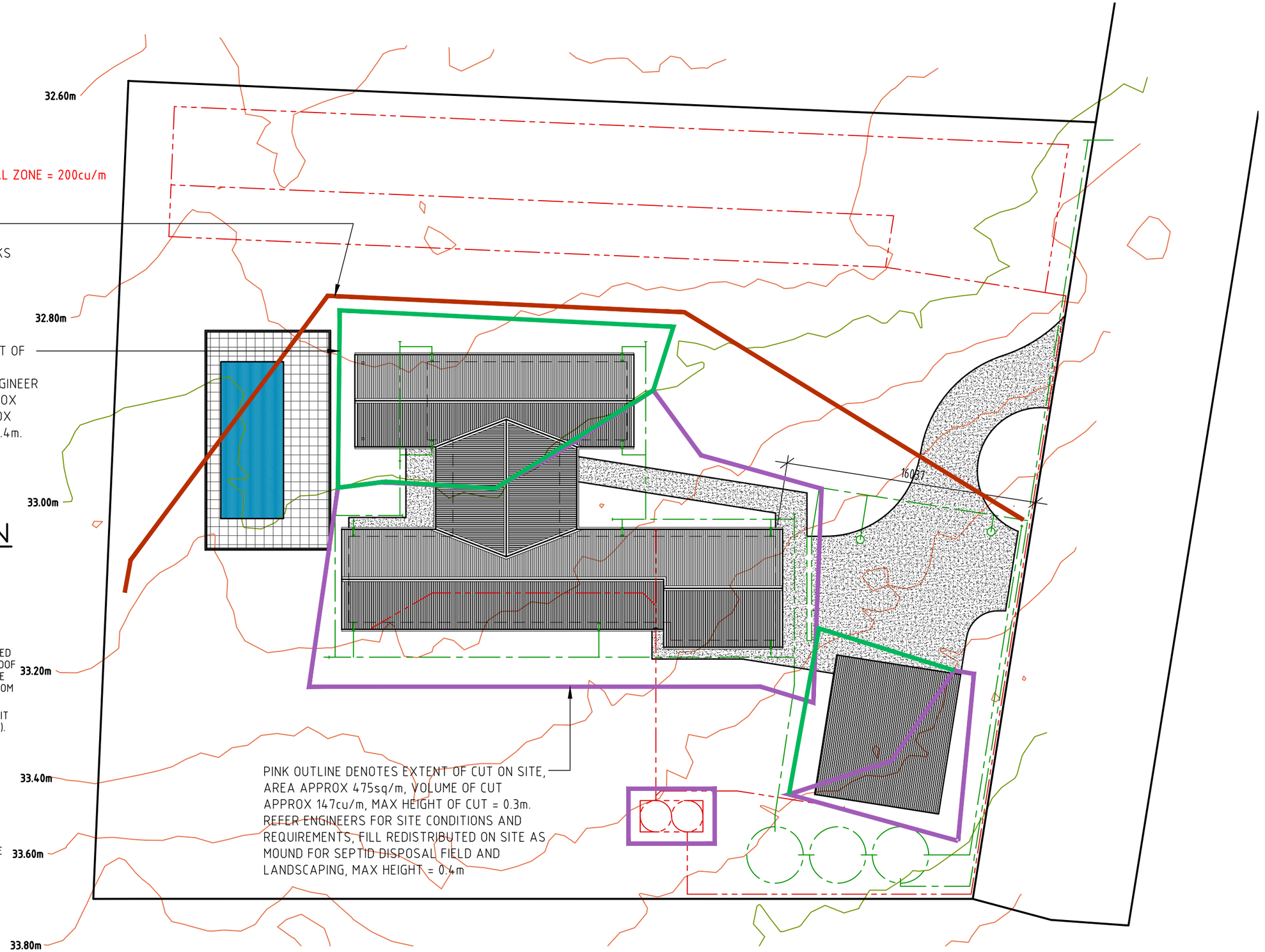
EARTHWORKS:
TOTAL EARTHWORKS 195cu/m
TOTAL EARTHWORKS ALLOWED FOR RESIDENTIAL ZONE = 200cu/m

BROWN LINE DENOTES
ANTI SEDIMENTATION MESH
FENCE BARRIER FOR EARTHWORKS

GREEN OUTLINE DENOTES EXTENT OF ENGINEERED FILL TO ESTABLISH BUILDING PLATFORMS. REFER ENGINEER FOR REQUIREMENTS. AREA APPROX 180sq/m, VOLUME OF FILL APPROX 40cu/m, MAX HEIGHT OF FILL = 0.4m.

SITE PLAN

SCALE 1:250



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EXPOSURE	ZONE C (BRANZ)
CLIMATE	ZONE 1 (BRANZ)

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NAVIGATION HOMES FAR NORTH
PO BOX 760, KERIKERI 0245, PHONE 0210 297 0048
CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
SITE PLAN - EARTHWORKS
DRAWING TITLE

ADNZ Professional Member
FAT HIPPO DESIGN GROUP LTD

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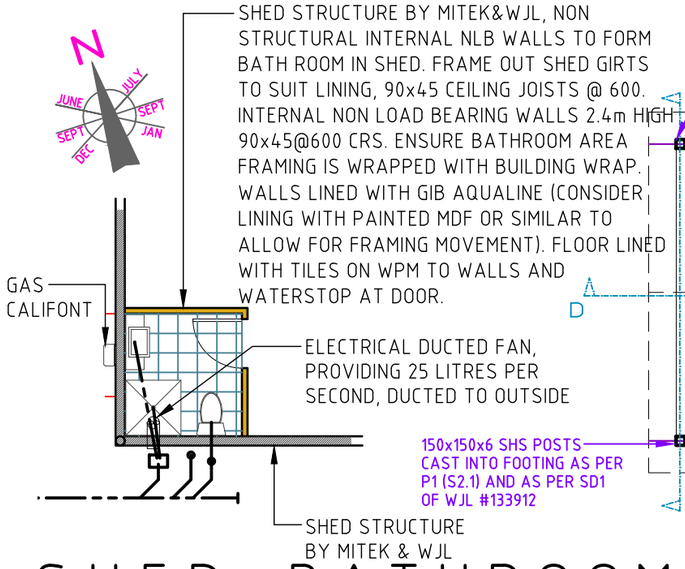
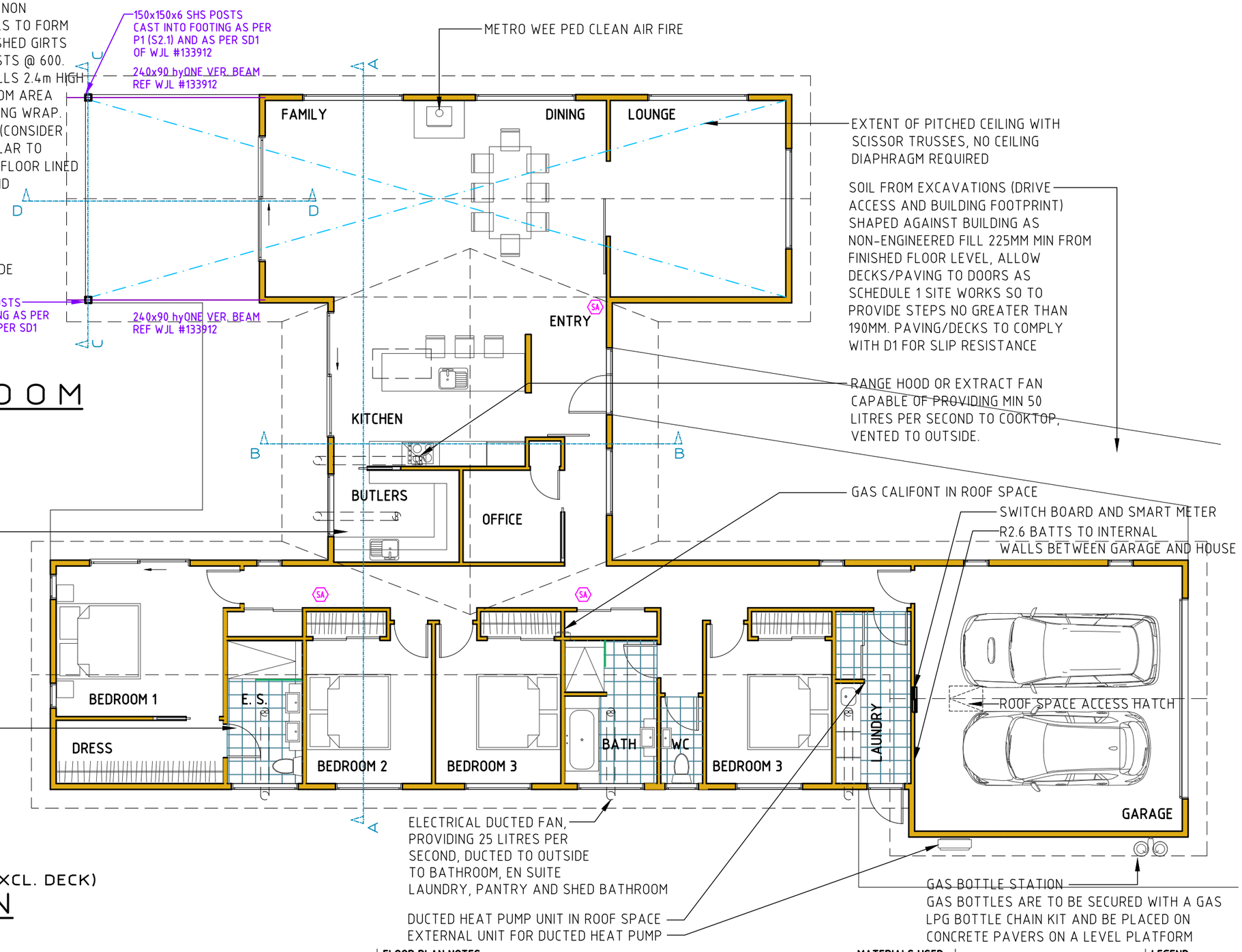


SHED BATHROOM

SCALE 1:100



AREA = 261.94sq/m (OVER FOUNDS, EXCL. DECK)

LAYOUT PLAN

SCALE 1:100

E2/AS1 RISK MATRIX

WIND ZONE	V.HIGH	2
No OF STOREYS	LOW	0
ROOF/WALL INTERSECTION	LOW	0
EAVES WIDTH	MEDIUM	1
ENVELOPE COMPLEXITY	MEDIUM	1
DECK DESIGN	LOW	0
	TOTAL	**4**

FLOOR PLAN NOTES

MECHANICAL EXTRACTION IS REQUIRED TO TERMINATE TO EXTERNAL AIR SPACE THROUGH SOFFIT

ALL SMOKE ALARMS TO COMPLY WITH EITHER UL217, ULCS531, AS3786 OR BS5446 Pt1

HOT WATER PIPES TO BE SIZED ACCORDING TO NZBC G12 & NZS 4305:1996. MAINS PRESSURE: ø15mm ALLOWS 12m MAX PIPE LENGTH. PIPE LENGTH BEYOND THIS MUST BE LAGGED.

ARTIFICIAL ELECTRICAL LIGHTING SHALL BE PROVIDED TO ALL AREAS PROVIDING A MINIMUM OF 20 LUX IN ACCORDANCE WITH G8 OF THE NZBC

MATERIALS USED

FLOOR	RIBRAFT CONC. SLAB
FRAMING	SG8 H1.2 RADIATA
ROOFING	PROFILED COLORSTEEL ROOFING
CLADDING	VERTICAL LINEA OBLIQUE & ABODO VULCAN
WALL INSULATION	R3.2 BATTS
ROOF INSULATION	2x R3.6 BATTS
FLOOR INSULATION	RIBRAFT+HOTEDGE

LEGEND

EXTERNAL WATER TAP

SA SMOKE ALARM WITH HUSH

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NAVIGATION HOMES FAR NORTH
PO BOX 760, KERIKERI 0245, PHONE 0210 297 0048
CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
LAYOUT PLAN
DRAWING TITLE

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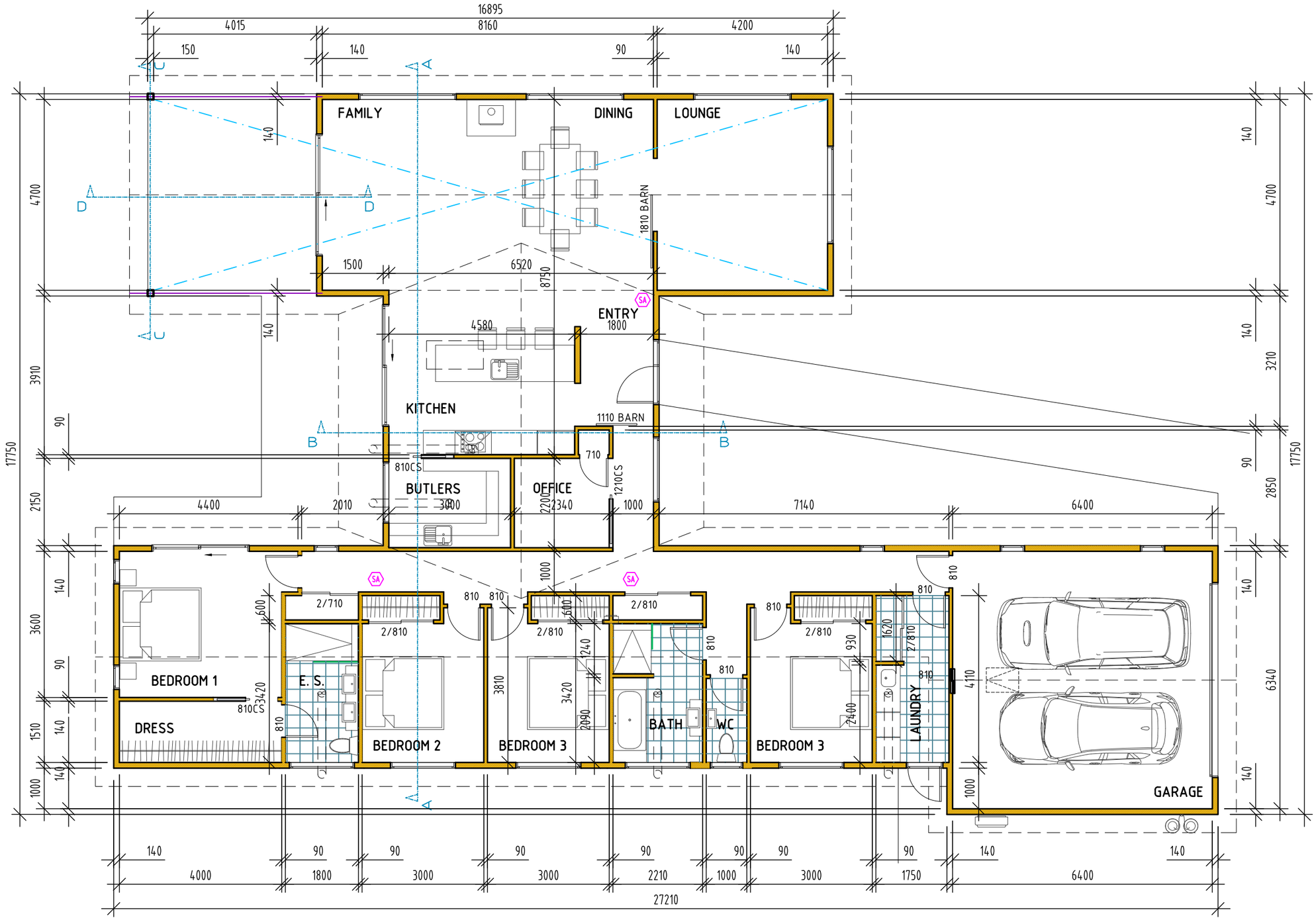

AREA = 261.94sq/m (OVER FOUNDS, EXCL. DECK)

FLOOR PLAN

SCALE 1:100

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CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
FLOOR PLAN
DRAWING TITLE

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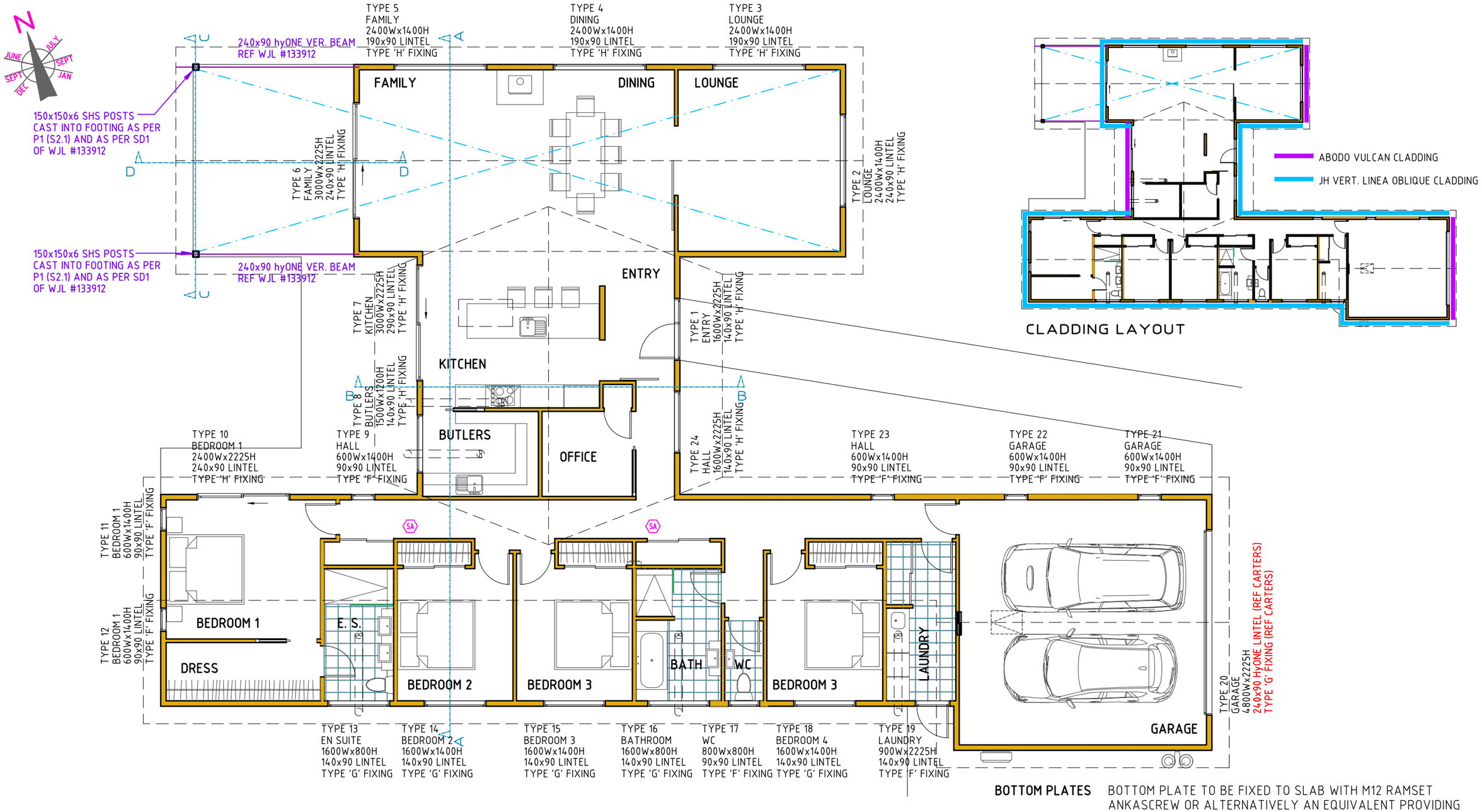

CLADDING LAYOUT

LINTELS TYPE F,G,H – REFER LUMBERLOK LINTEL FIXINGS
SED UPLIFT FIXINGS ARE SPECIFICALLY NOTED WHERE REQUIRED

ROOF PURLINS 70x45 @ 900 CRS (600 CRS TO END SPANS) FIXED WITH 1/10g SELF DRILLING SCREW, 80mm LONG

TOP PLATES TOP PLATE FIXINGS TO BE AS PER TRUSS MANUFACTURERS' DESIGN

BOTTOM PLATES BOTTOM PLATE TO BE FIXED TO SLAB WITH M12 RAMSET ANKASCREW OR ALTERNATIVELY AN EQUIVALENT PROVIDING 15kN TO ALL LOAD BEARING BRACING WALLS AND MIN 7kN TO ALL OTHER LOAD BEARING (NON BRACING) WALLS AND SET NOT LESS THAN 75mm INTO CONCRETE AND PROJECTING SUFFICIENTLY TO ALLOW FOR A WASHER ABOVE THE TIMBER AS SHOWN IN FIG 7.21 OF NZS 3604:2011. FIXINGS SHALL BE LOCATED NOT MORE THAN 150mm FROM THE END OF THE TIMBER AT CORNERS OF FOUNDATIONS AND NOT MORE THAN 900mm CRS ALONG WALL AS PER PARAGRAPH 7.5.12.2 OF NZS3604:2011

BOTTOM PLATE TO BE FIXED TO FLOOR FRAMING WITH 90x3.16 POWER DRIVEN NAILS, 3 @ 600 CRS TO EXTERNAL WALLS AND INTERNAL BRACING WALLS, AND 1 @ 600 CRS AT INTERNAL WALLS

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CLIENT

PROPOSED NEW HOME – HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
FIXING DETAILS AND CLADDING LAYOUT
DRAWING TITLE

ADNZ Professional Member
FAT HIPPO DESIGN GROUP LTD

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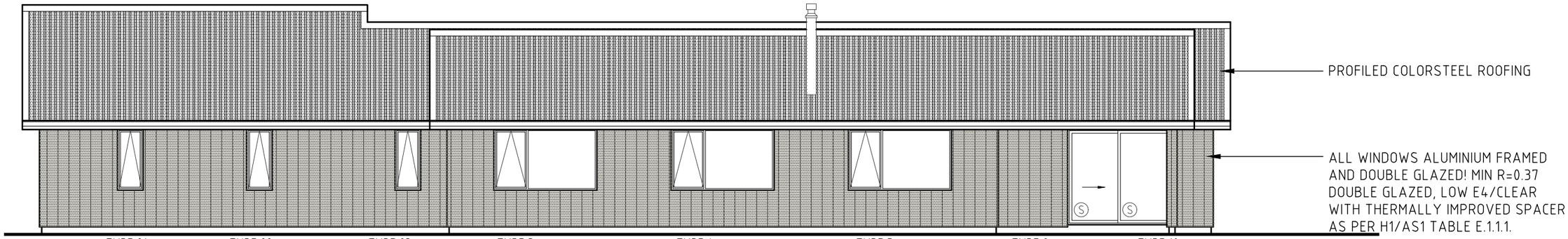
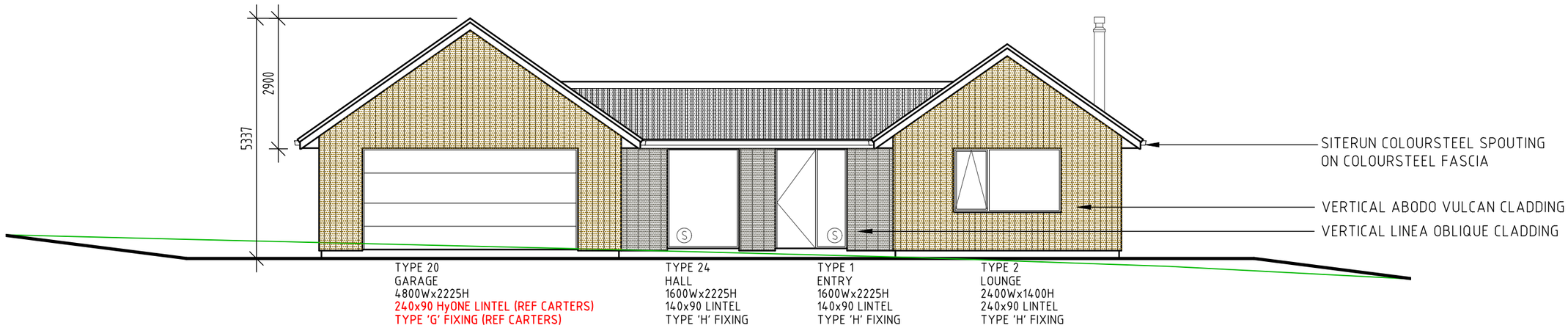


NORTH ELEVATION

SCALE 1:100



EAST ELEVATION

SCALE 1:100

H1 CALCULATIONS - COMPLIES WITH SCHEDULE METHOD

ORIENTATION	WALLS	WINS	RATIO
NORTH	78.06	17.10	21.91%
SOUTH	78.06	11.92	15.27%
WEST	49.00	16.83	34.35%
EAST	49.00	10.48	21.39%
TOTAL	**254.12**	**56.33**	**22.17%**

REQUIRED R VALUES

CLIMATE ZONE	1
FLOOR	2.50
WALLS	2.00
WINDOWS	0.46
SKYLIGHTS	0.46
ROOF	6.60

ELEVATION NOTES

ALL WINDOWS TO BE DOUBLE GLAZED, R VALUE TO BE R0.46 UNLESS OTHERWISE NOTED
ALL WINDOW DIMENSIONS ARE OUTSIDE REVEL WITH BUILDER TO ALLOW FITTING TOLERANCE

ALL LINTELS ARE TO BE SG8 GRADE AND ARE DETERMINED BY THE ALLOWANCES OF NZS 3604:2011 AS ALLOWED, BUT WHERE IMPOSED TRUSS LOADING OR SPAN EXCEEDS THIS, TRUSS MANUFACTURERS' LINTELS SUPERSEDE THE INFORMATION GIVEN

Ⓢ DENOTES SAFETY GLAZING IN ACCORDANCE WITH NZS 4223

Ⓡ DENOTES RESTRICTOR STAY RESTRICTING OPENING TO 100mm MAX

ELEVATION NOTES

ALL FIXINGS & FASTENINGS ARE TO BE IN ACCORDANCE WITH DURABILITY REQUIREMENTS OF NZS3604:2011

EXPOSURE ZONE 1 HOT DIPPED GALV. AND ADDITIONAL PROTECTION FIXINGS ARE REQUIRED IN EXPOSED AND RAIN WET LOCATIONS

ALL CLADDINGS MUST BE FIXED IN ACCORDANCE WITH MANUFACTURERS' SPECIFICATIONS

'A GRADE' SAFETY GLASS TO ALL EXTERIOR WINDOWS AND DOORS WITH GLAZING 1200mm IN HEIGHT OR GREATER

WANZ SUPPORT BAR TO ALL SLIDING DOOR UNITS AND WINDOWS

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navigation homes

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CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
ELEVATIONS SHEET 1 OF 2
DRAWING TITLE

ARNZ Professional Member

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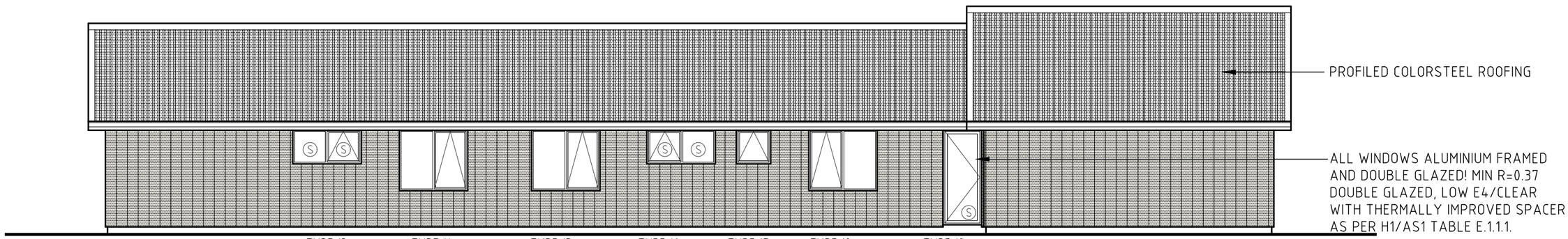
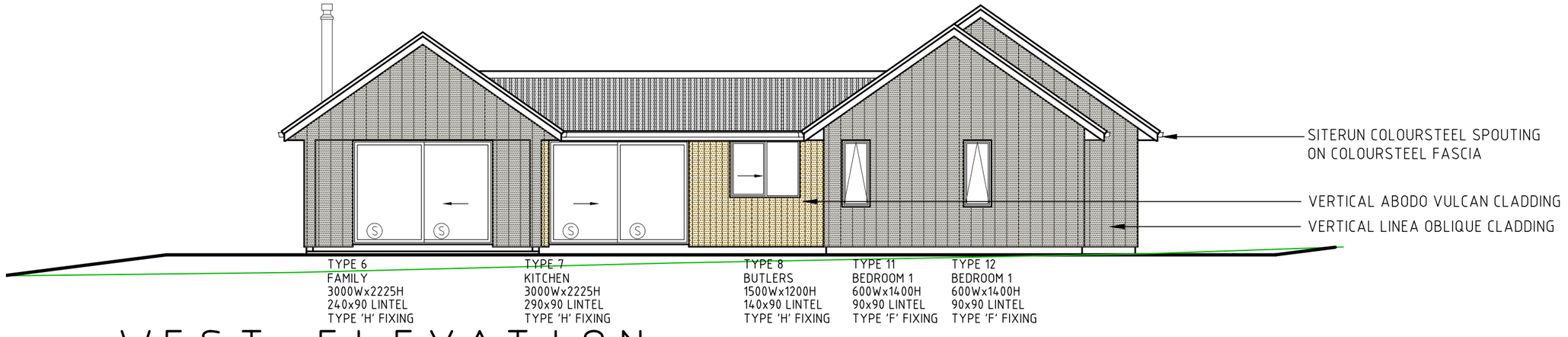


SOUTH ELEVATION

SCALE 1:100



WEST ELEVATION

SCALE 1:100

H1 CALCULATIONS - COMPLIES WITH SCHEDULE METHOD

ORIENTATION	WALLS	WINS	RATIO
NORTH	78.06	17.10	21.91%
SOUTH	78.06	11.92	15.27%
WEST	49.00	16.83	34.35%
EAST	49.00	10.48	21.39%
TOTAL	**254.12**	**56.33**	**22.17%**

REQUIRED R VALUES

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FLOOR	2.50
WALLS	2.00
WINDOWS	0.46
SKYLIGHTS	0.46
ROOF	6.60

ELEVATION NOTES

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PO BOX 760, KERIKERI 0245, PHONE 0210 297 0048
CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
ELEVATIONS SHEET 2 OF 2
DRAWING TITLE

ADNZ Professional Member
FAT HIPPO DESIGN GROUP LTD

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REVISION
05
DRAWING NUMBER

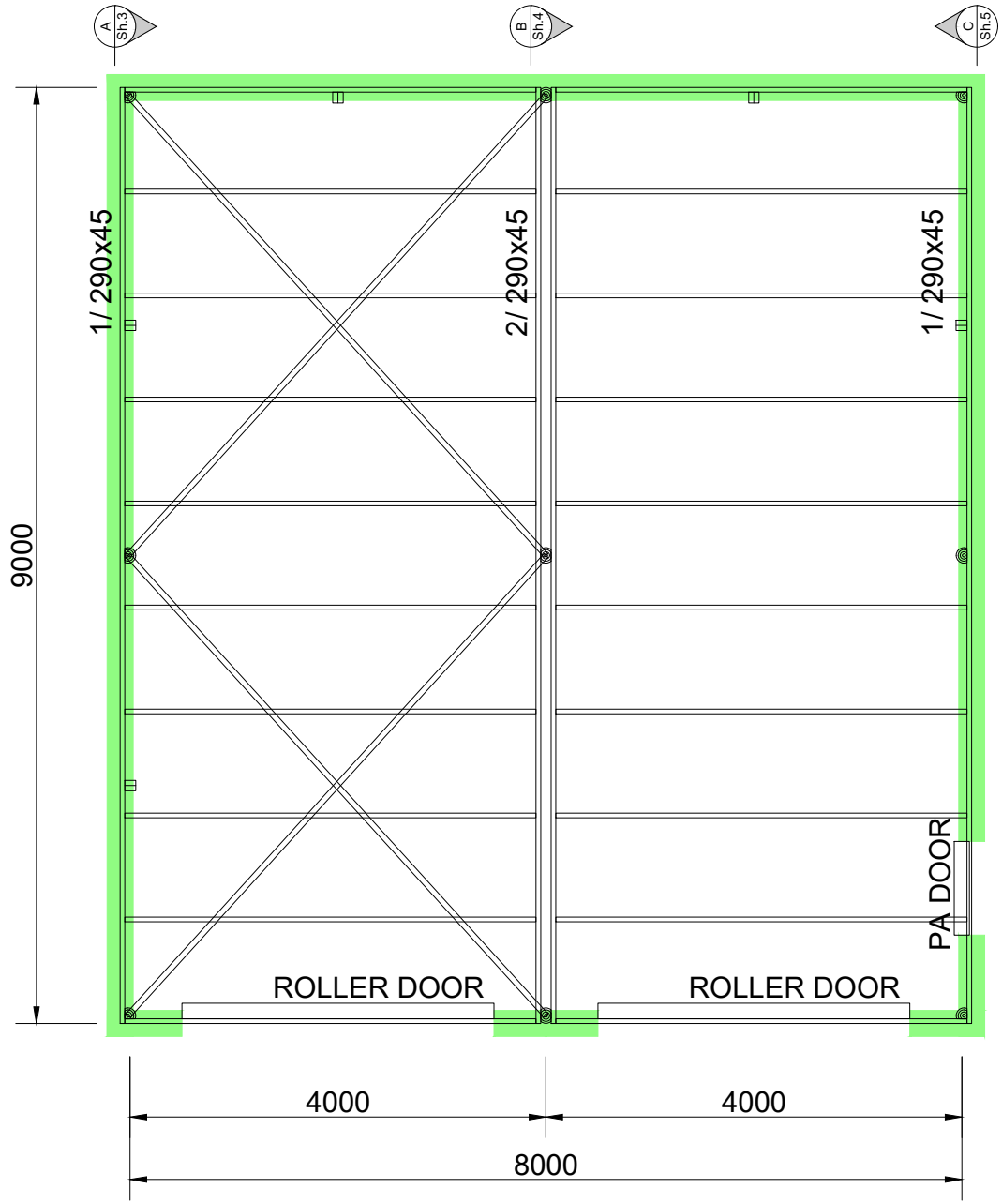
Building Information:

Roof Pitch: 3.8 deg.
Wind Load: Very High
Snow Load: Sg = 0 kPa
Earthquake Zone: 1
Timber Grade: SG8
Bay Spacing: 4000mm
Purlin Size: 190x45
Purlin Centres: 1000mm
Girt Size: 140x45, 140x45 (Rear)
Girt Centres: 1100mm
Wind Column Size: 2/ 150x50
Pole Size: 150 SED
Pole Embedment: 1000mm
Rafter Size: 290x45, 290x45 (Internal)
Rafter Span: 4500mm
Props Required: NA
Max Pole Height: 3600mm
Low Pole Height: 3000mm
Floor Type: Concrete
Front Overhang: None
Rear Overhang: None

Key:

= Clad Walls
= Column
= Pole
= Single Row of Tensioned Multibrace

Notes: Order #: ritchie construction hammond



MiTek®

Job Name: hammond
Job Site: 19 Tareha Place, Kerikeri

Plan

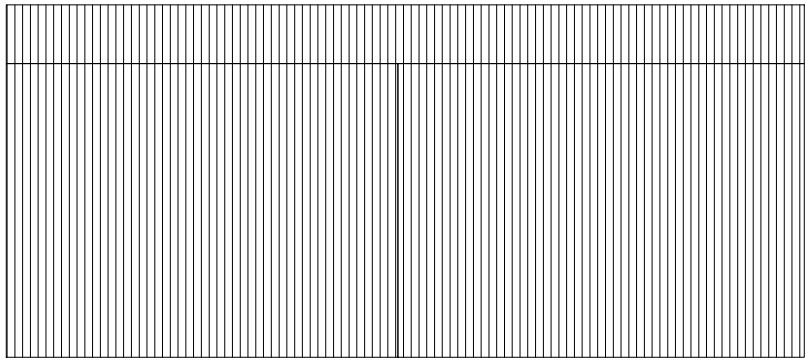
Drawing Number: PR85156

Client Name: Mike Frear
Drawn by: Chris Richards
Date: 10 / 04 / 24
Scale: drawings to scale
Sheet Number: 1

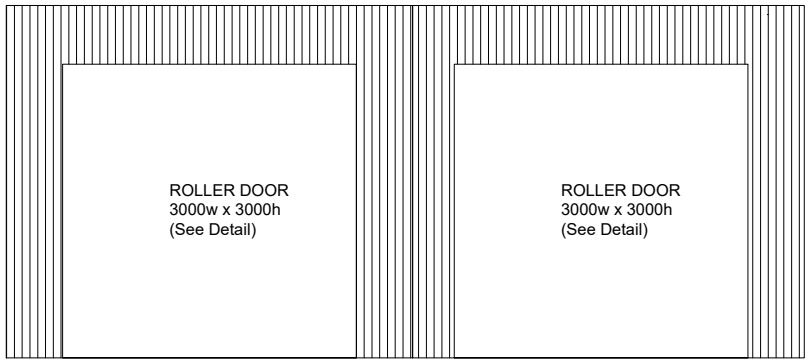
Notes:

N.B. This design does not include any design or detail for flashing and/or drainage requirements.

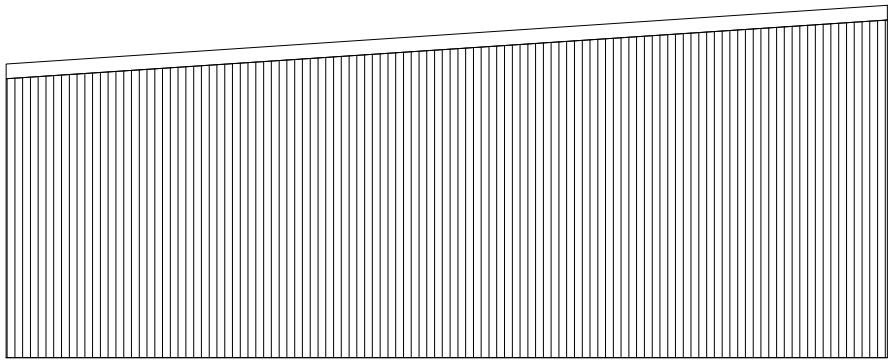
Any Concrete Floor shown is indicative only and not required as part of the structural integrity of the Building.



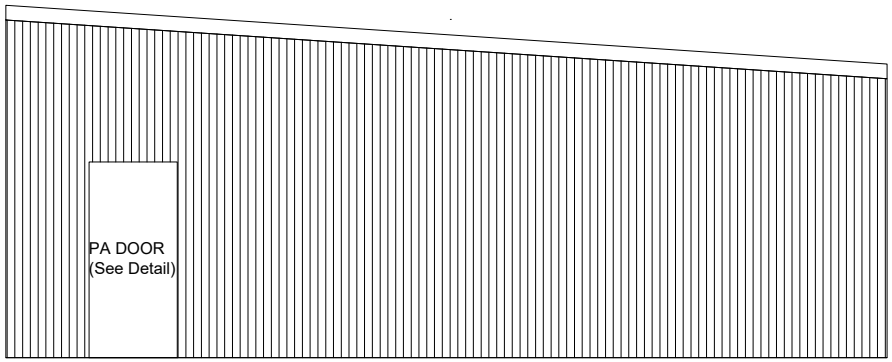
REAR ELEVATION



FRONT ELEVATION



LEFT END ELEVATION



RIGHT END ELEVATION

MiTek®

Job Name: hammond

Job Site: 19 Tareha Place, Kerikeri

Client Name: Mike Frear

Drawn by: Chris Richards

Elevations

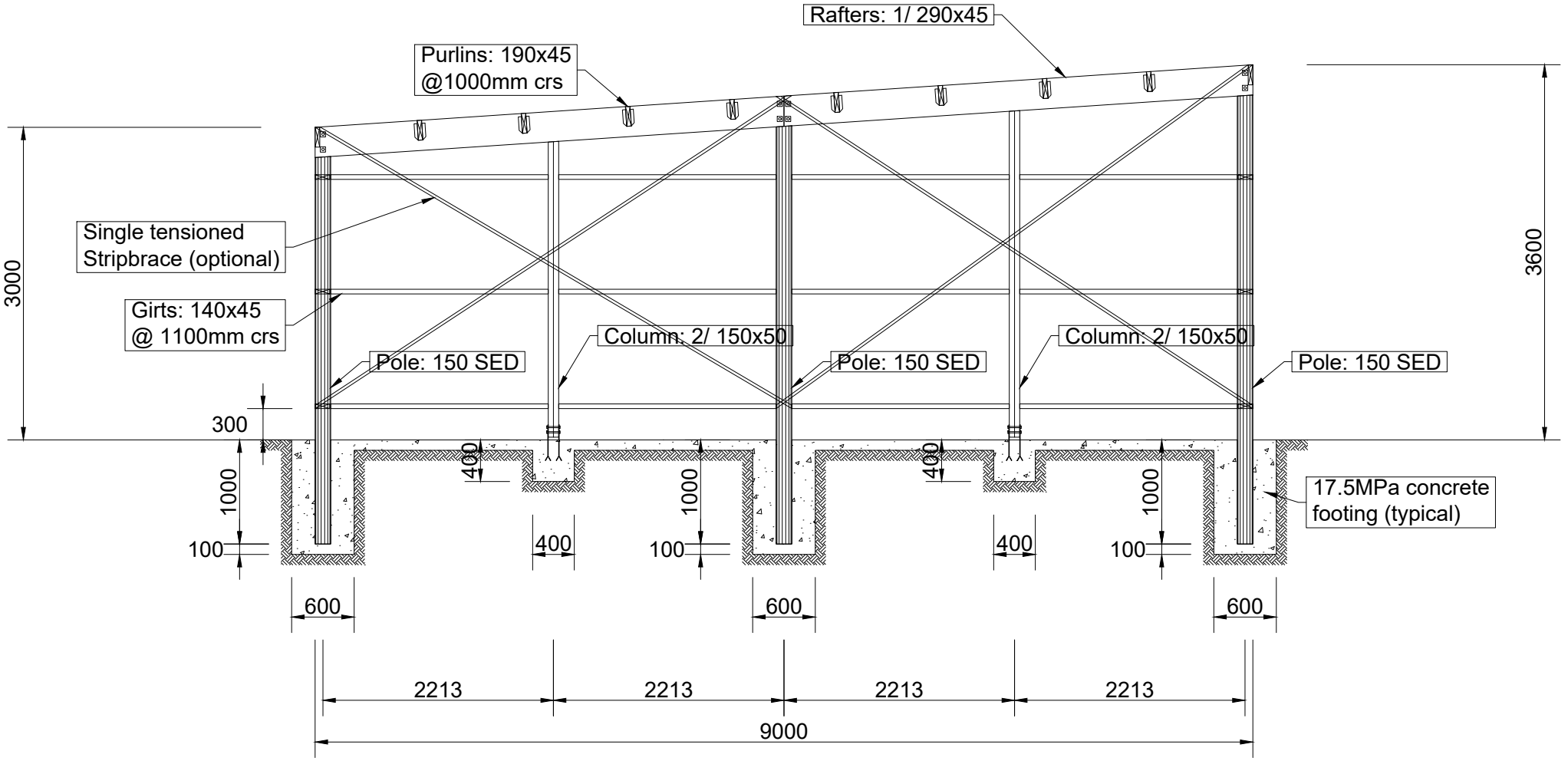
Drawing Number: PR85156

Date: 10 / 04 / 24

Scale: drawings to scale

Sheet Number: 2

Note: Girt pattern may vary, as long as spacings do not exceed 1100mm.



Pitch: 3.8 deg.

MiTek®	Job Name: hammond Job Site: 19 Tareha Place, Kerikeri	Section A		Drawing Number: PR85156
	Client Name: Mike Frear	Drawn by: Chris Richards	Date: 10 / 04 / 24	Scale: drawings to scale Sheet Number: 3

Wilton Joubert Limited
09 527 0196
PO BOX 11-381
Ellerslie
Auckland 1524

SITE	19 Tareha Place, Kerikeri
LEGAL DESCRIPTION	Lot 10 DP 540557
PROJECT	Proposed Residential Dwelling
CLIENT	Navigation Homes (Far North) Ltd.
REFERENCE NO.	133959
DOCUMENT	Wastewater Design Report
STATUS/REVISION No.	B
DATE OF ISSUE	11th June 2024

Report Prepared For	Attention	Email
Navigation Homes (Far North) Ltd.	Andrew Ritchie	andrew@navigationhomes.co.nz

Authored by	**G.Brant** *(BE(Hons) Civil)*	Civil Design Engineer	Gustavo@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 10 DP 540557
Site Area:	3,001m²
Development Type:	Proposed Residential Dwelling, Shed and Pool
Development Proposals Supplied:	Plan Set prepared by Fat Hippo Design Group Ltd. (dated: 08.06.2024)
Associated Documents:	WJL Geotechnical Report Ref. 131319 WJL Stormwater Report Ref. 133958
Overall Site Gradient within Disposal Area:	Disposal slope 5-9°
Geology Encountered:	Kerikeri Volcanic Group
Site Soil Category (TP58):	Category 5
Daily Application Rate:	3.5mm/day
Number of Bedrooms:	4
Max Dwelling Occupancy:	6
Water Source:	Rainwater Collection Tanks (180l/pp/pd)
Daily Wastewater Production:	1,080L/day
Disposal Area:	308m²
Reserve Area:	93m² (30%)
Application Method:	Surface Laid Pressure Compensating Drip Irrigation Lines
Effluent Treatment Level:	Secondary Aerated Package Treatment Plant (<BOD5 20 mg/L, TSS 30 mg/L)

2. INTRODUCTION

2.1 SCOPE OF WORK

Wilton Joubert Ltd was engaged by the clients, **Navigation Homes (Far North) Ltd.**, to undertake an effluent disposal assessment at the above site, where we understand, it is proposed to construct a residential dwelling, shed and pool.

At the time of report writing, we have been supplied the following documents:

- Plan Set prepared by Fat Hippo Design Group Ltd. including site plan, floor plan and elevations (dated: 08.06.2024)
- ROW & Stormwater As-built plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019)

Any revision of drawings and/or development proposals with implications on the wastewater design should be referred back to WJL for review.

3. SITE DESCRIPTION

The proposed development will be constructed within the following property, which is located on the western side of a minor right-of-way (ROW) that extends off the southern side of Tareha Place:

- 19 Tareha Place, legally described as Lot 10 DP 540557.

The subject site encompasses an area of 3,001m² and will be accessed along the eastern ROW boundary. No built development is currently present on-site.

Topographically speaking, the site is flat natured, falling towards the northeast at grades averaging less than 3°. The greater surrounding area displays a similar topographical profile.

The site is currently covered in lawn with bush and mature trees covering the western boundary. It is our understanding that an easement boundary is present along the western perimeter of the property.

Figure 1: Aerial Snip from FNDC Maps Showing Site Boundaries (cyan) & 1m Contours (yellow)

Figure 2: Site Photo – Facing Southeast from North-Western Boundary Corner

The ROW & Stormwater As-built plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019) indicates that the site is serviced by a stormwater connection near the lot's eastern corner. The property is not serviced by public wastewater or potable water reticulation.

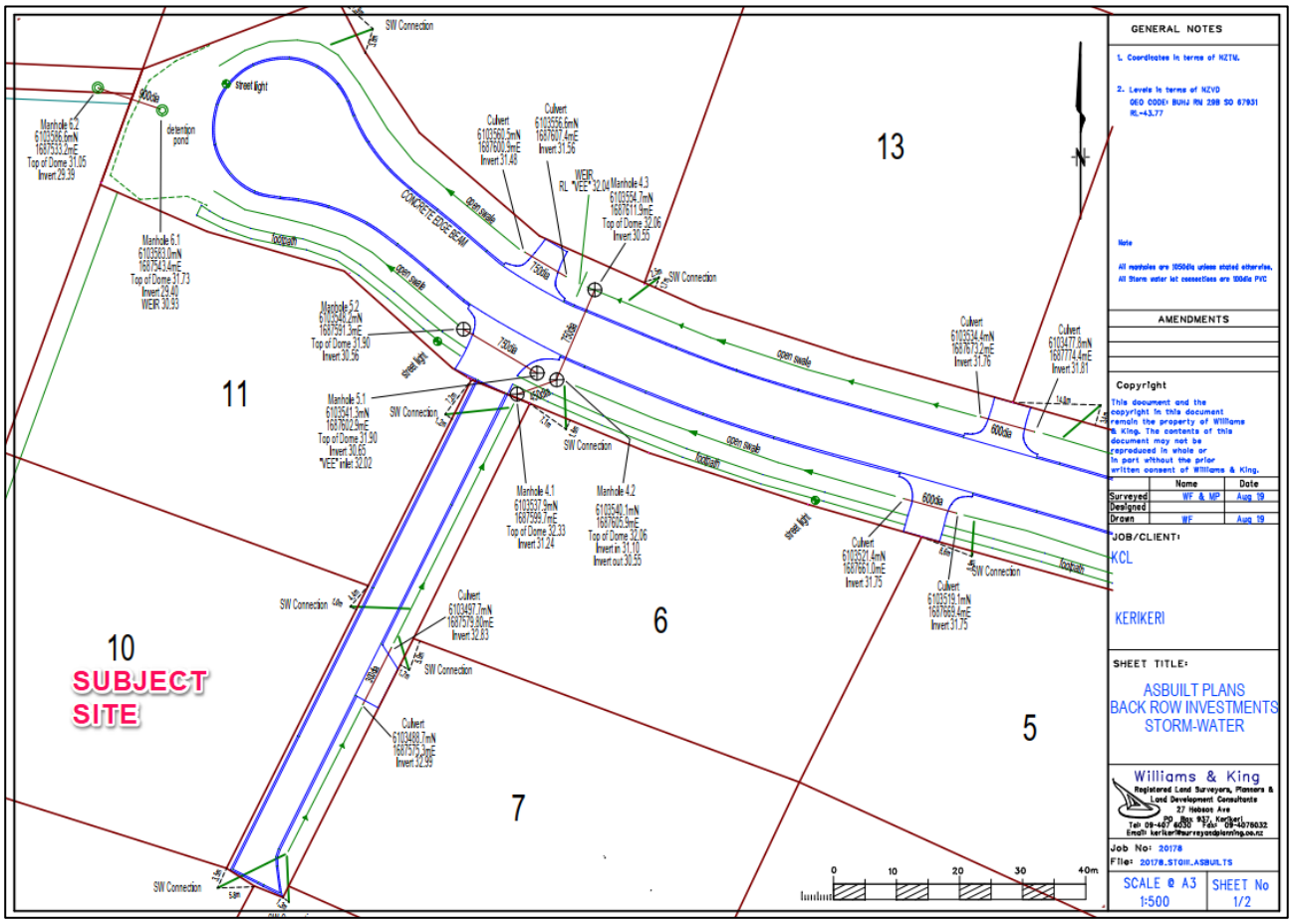


Figure 3: Snip of ROW & Stormwater As-built Plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019)

4. DEVELOPMENT PROPOSALS

The development proposal, obtained from the client, is to construct a 4-bedroom residential dwelling on-site as depicted in the plan set provided by Fat Hippo Design Group Ltd. (dated: 08.06.2024).

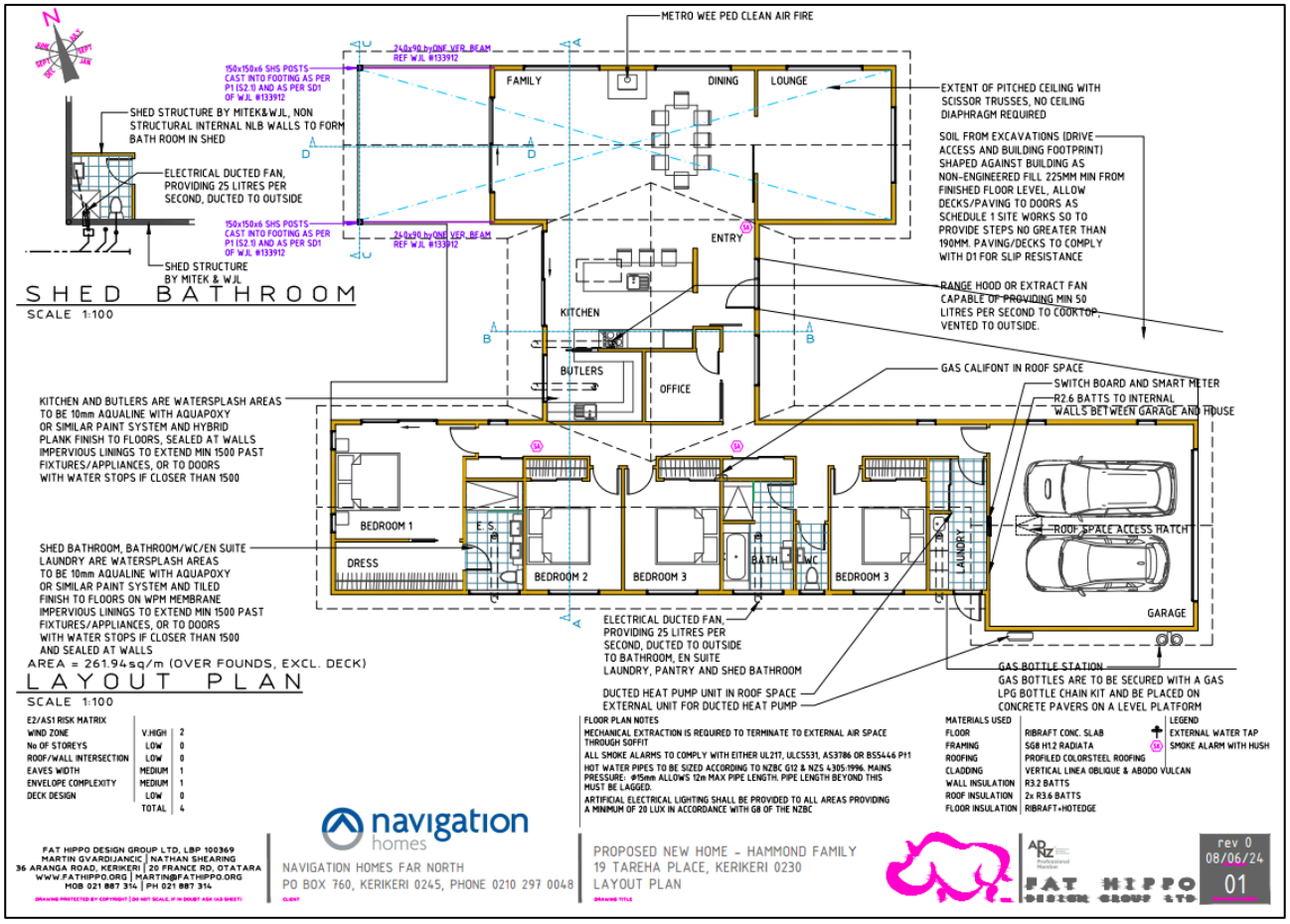


Figure 4: Snip of Proposed Floor Plan Provided by Fat Hippo Design Group Ltd. (dated: 08.06.2024)

The principal objectives of our investigation were to investigate the soil profile, variability, relative density, and strength of soils together with any observed groundwater levels, other water sources and potential short-circuiting pathways within the proposed effluent disposal area.

5. MAPPED GEOLOGY & SOIL ASSESSMENT

Local geology across the property and greater surrounding area 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"* (refer: GNS Science Website).

Figure 5: Screenshot aerial view of the subject site from the New Zealand Geology Web Map hosted by GNS Science. Blue marker represents the property.

Figure 6: Arising from HA01

Figure 7: Arising from HA02

Figure 8: Arising from HA03

Figure 9: Arising from HA04

Geotechnical hand auger testing was conducted at the site by WJL in December 2023 as shown in figures above.

In general terms, the subsoils encountered on-site consisted predominantly of Gravelly SILT and Clayey SILT. Approximately 100mm of TOPSOIL was overlying the investigated area, with approximately 500mm-700mm of FILL observed below the TOPSOIL layer. Refer to the appended 'BH Logs'.

Due to the observed FILL within the subject site, it is proposed to place the disposal field atop a minimum 500mm thick topsoil bed.

Given the above information, the site's soils have been classified as Category 5 in accordance with TP58. Based on our investigation, and provided that all report recommendations are followed, WJL consider that there should be no wastewater disposal stability problems associated with the site.

6. ASSESSMENT CRITERIA

Table 1: Compliance with Section C.6.1.3 of the PRPN

C.6.1.3 Other on-site treated domestic wastewater discharge– permitted activity			
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:			
#	Rule	✓/x	Explanation
1	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	✓	Design has been carried out in accordance with TP58 and cross referenced with AS/NZS 1547:2012
2	The volume of wastewater discharged does not exceed two cubic metres per day, and	✓	Total proposed discharge = 1,080L
3	The discharge is not via a spray irrigation system or deep soakage system, and	✓	Pressure compensated drip irrigation lines proposed
4	The slope of the disposal area is not greater than 25 degrees, and	✓	Disposal area slope <10°
5	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:	✓	Secondary Treatment and Pressure compensated drip irrigation lines proposed
	a) dose loaded, and	✓	Dose loading proposed
	b) covered by a minimum of 50 millimetres of topsoil, mulch, or bark, and	✓	Drip lines to be surface laid on a minimum 500mm thick topsoil bed and recovered in 100mm of bark or mulch.
6	For the discharge of wastewater onto the surface of slopes greater than 10 degrees:		n.a - Disposal area slope <10°
	a) the wastewater, excluding greywater, has received at least secondary treatment, and	n.a	"
	b) the irrigation lines are firmly attached to the disposal area, and	n.a	"
	c) where there is an up-slope catchment that generates stormwater runoff, a diversion system is installed and maintained to divert surface water runoff from the up-slope catchment away from the disposal area, and	n.a	"
	d) a minimum 10 metre buffer area down-slope of the lowest irrigation line is included as part of the disposal area, and	n.a	"
	e) the disposal area is located within existing established vegetation that has at least 80 percent canopy cover, or	n.a	"
	f) the irrigation lines are covered by a minimum of 100 millimetres of topsoil, mulch, or bark, and	n.a	"

7	the disposal area and reserve disposal area are situated outside the relevant exclusion areas and setbacks in Table 9: Exclusion areas and setback distances for on-site domestic wastewater systems, and	✓	From on-site investigation the Field positions comply with table 9
8	for septic tank treatment systems, a filter that retains solids greater than 3.5 millimetres in size is fitted on the outlet, and	n.a	
9	the following reserve disposal areas are available at all times:		
	a) 100 percent of the existing effluent disposal area where the wastewater has received primary treatment or is only comprised of greywater, or	n.a	
	b) 30 percent of the existing effluent disposal area where the wastewater has received secondary treatment or tertiary treatment, and	✓	30% reserve area provided
10	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	✓	Maintenance as outlined within section 12 of this report
11	the discharge does not contaminate any groundwater water supply or surface water, and	✓	Groundwater not encountered at hand auger testing locations to a maximum depth of 3.0m below ground level. Appropriate offsets, and conservative loading rates applied to avoid adverse effects on water sources.
12	there is no surface runoff or ponding of wastewater, and	✓	Appropriate application rates applied for subsoil permeation capabilities/site conditions
13	there is no offensive or objectionable odour beyond the property boundary.	✓	WJL anticipated compliance as long as all recommendations within this report are adhered to

7. 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:

Table 2: "Table 9" of the PRPN (Proposed Regional Plan for Northland).

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 meters	5 meters	5 meters
River, lake, stream, pond, dam or wetland	20 meters	15 meters	15 meters
Coastal marine area	20 meters	15 meters	15 meters
Existing water supply bore	20 meters	20 meters	20 meters
Property boundary	1.5 meters	1.5 meters	1.5 meters
Vertical setback distances			
Winter groundwater table	1.2 meters	0.6 meters	0.6 meters

In compliance with above:

- There are no known or mapped flood zones in proximity to the disposal area,
- The site is not in proximity to a coastal marine area,
- Groundwater not encountered at hand auger testing locations to a maximum depth of 3.0m below ground level. Appropriate offsets, and conservative loading rates applied to avoid adverse effects on water sources,
- Ground water 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 north, northeast and northwest of the proposed building platform with appropriate offsets to the property's boundary (>1.5m), the proposed dwelling (>3.0m).

8. 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 Table 3 below.

Table 3: Design flows for proposed dwelling

Development	4 bedrooms
Combined Occupancy Allowance	6-person peak occupancy
Water Reduction	*no*
Daily Flow Allowances	180L / person / day
Design Flow Rate	1,080L / day
Water Meter	None required.
Other Notes	No garbage grinder

Notes: 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.

Therefore, for the purpose of this application and design report, the total peak design occupancy was calculated as 6 persons.

9. WASTEWATER TREATMENT

Wilton Joubert Ltd. recommends the installation of an approved Secondary Level Treatment Plant to service the proposed dwelling. 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 Table 4 below.

Table 4: Secondary Treatment Requirements

Emergency Storage Capacity	Minimum 1,080L (24-hour)
Telemetry Alarm System	Visual and Audible alarm located at plant.
Location	Please refer to Site Plan. More than 3.0m clear of habitable buildings; 1.5m clear of boundaries
Discharge Quality	Secondary Level BOD^5 <= 20g/m^3, TSS <= 30g/m^3

10. DESIGN VOLUMES

Maximum Daily Wastewater Discharge = Maximum Occupancy x Flow Allowance (litres/ person/ day). This calculation results in a total wastewater flow rate of 1,080 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 (3,001m²) / 1,080 Max Daily Flow (litres/day). This calculation provides an A:V Ratio of approximately 2.8 m²/litre/day.

11. LAND DISPOSAL METHOD

Surface Laid Lines on a Raised Topsoil Bed

The drip lines are recommended to be surface laid on a minimum 500mm thick topsoil bed to ensure sufficient separation to the FILL layer, with a daily application rate of 3.5mm/day. A required disposal field area of 308m² amounts.

The drip lines must be securely pinned to the grounds surface and installed in a regular 'grid' pattern as far as practicable, with row spacings of no more than 1.0m. The grid should consist of 308 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.

Table 5: Land Disposal System

LAND DISPOSAL SYSTEM	PCDI drip irrigation (Ref: Soil Assessment)
Type	Surface laid, pressure compensating dripper irrigation lines
Soil Category (TP58)	Category 5
Buffer Zone	Not required
Cut-off Drain	Not required
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 - >1,080L
Primary Disposal Area	308m^2 at 1.0m centres – surface laid
Reserve Disposal Area	93m^2 (30% reserve area)

12. 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 TP58 and cross referenced with AS/NZS 1547:2012. It further complies with the setbacks stipulated in the *P*RPN.

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 atop a minimum 500mm thick topsoil bed, recovered in mulch or bark or topsoil, with introduced grass plantings facilitating evapotranspiration and nutrient removal.

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 30% 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 vehicles, persons or animals we recommend that the disposal area be fenced off or clearly marked. Vehicular traffic over the disposal area is not allowed.

- 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. LIMITATIONS

The recommendations and opinions contained in this report are based on our visual reconnaissance of the site, information from geological maps and upon data from the field investigation as well as the results of in-situ testing of soil carried out by Wilton Joubert Ltd. Inferences are made about the nature and continuity of sub soils away from and beyond the exploratory holes but cannot be guaranteed. The descriptions detailed on the exploratory borehole logs are based on the field descriptions of the soils encountered.

This assignment only considers the design of a secondary on-site effluent treatment system and all drainage designs are up to the connection point for each building face of any new structures/slabs; no internal building plumbing or layouts have been done.

During construction, a person competent to judge whether the conditions are compatible with the assumption made in this report should examine the site. In all circumstances, should variations in the subsoil occur which differ from that described or assumed to exist, the matter should be referred back to Wilton Joubert Ltd.

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.

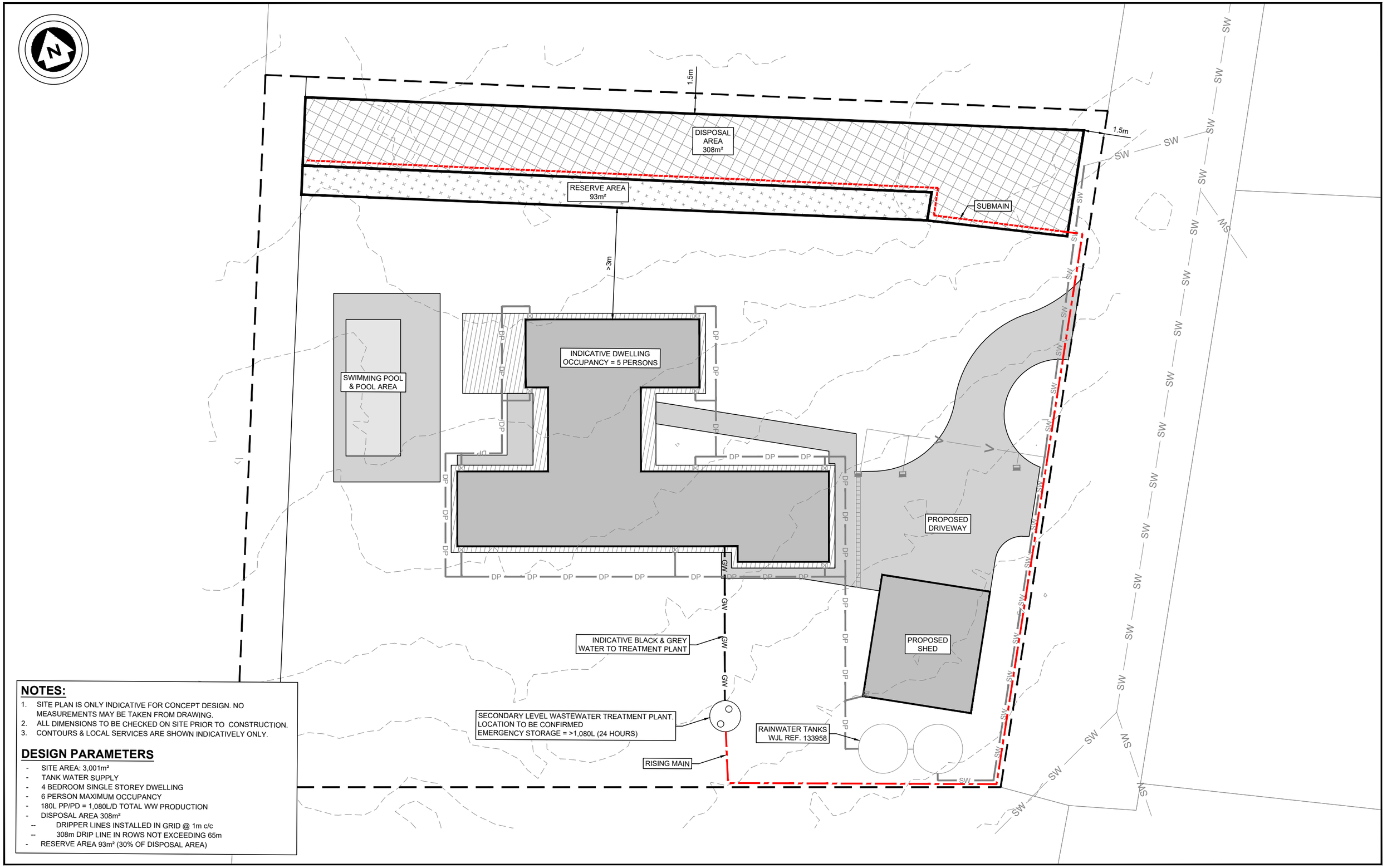
Yours faithfully,

Wilton Joubert Ltd.

Gustavo Medina Brant
BE(Hons)

REPORT ATTACHMENTS

- Site Plan (1 sheet)
- Floor Plan (1 sheet)
- Borelogs (4 sheet)
- Duracrete Clean Stream TXR Specifications (3 sheets)
- FNDC TP58 PS1 (1 sheet)



NOTES:

1. SITE PLAN IS ONLY INDICATIVE FOR CONCEPT DESIGN. NO MEASUREMENTS MAY BE TAKEN FROM DRAWING.
2. ALL DIMENSIONS TO BE CHECKED ON SITE PRIOR TO CONSTRUCTION.
3. CONTOURS & LOCAL SERVICES ARE SHOWN INDICATIVELY ONLY.

DESIGN PARAMETERS

- SITE AREA: 3,001m²
- TANK WATER SUPPLY
- 4 BEDROOM SINGLE STOREY DWELLING
- 6 PERSON MAXIMUM OCCUPANCY
- 180L PP/PD = 1,080L/D TOTAL WW PRODUCTION
- DISPOSAL AREA 308m²
  - -- DRIPPER LINES INSTALLED IN GRID @ 1m c/c
  - -- 308m DRIP LINE IN ROWS NOT EXCEEDING 65m
- RESERVE AREA 93m² (30% OF DISPOSAL AREA)

WILTON JOUBERT
Consulting Engineers
Northland: 09 945 4188 Auckland: 09 527 0196
Christchurch: 021 824 063 Wanaka: 03 443 6209
www.wiltonjoubert.co.nz

ISSUE / REVISION			
No.	DATE	BY	DESCRIPTION
A	MAY '24	GMB	WASTEWATER REPORT
B	JUN '24	GMB	WASTEWATER REPORT REV B

DESIGNED BY: GMB
DRAWN BY: GMB
CHECKED BY: BGS
SURVEYED BY: N/A

SERVICES NOTE

WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

BUILDING CONSENT

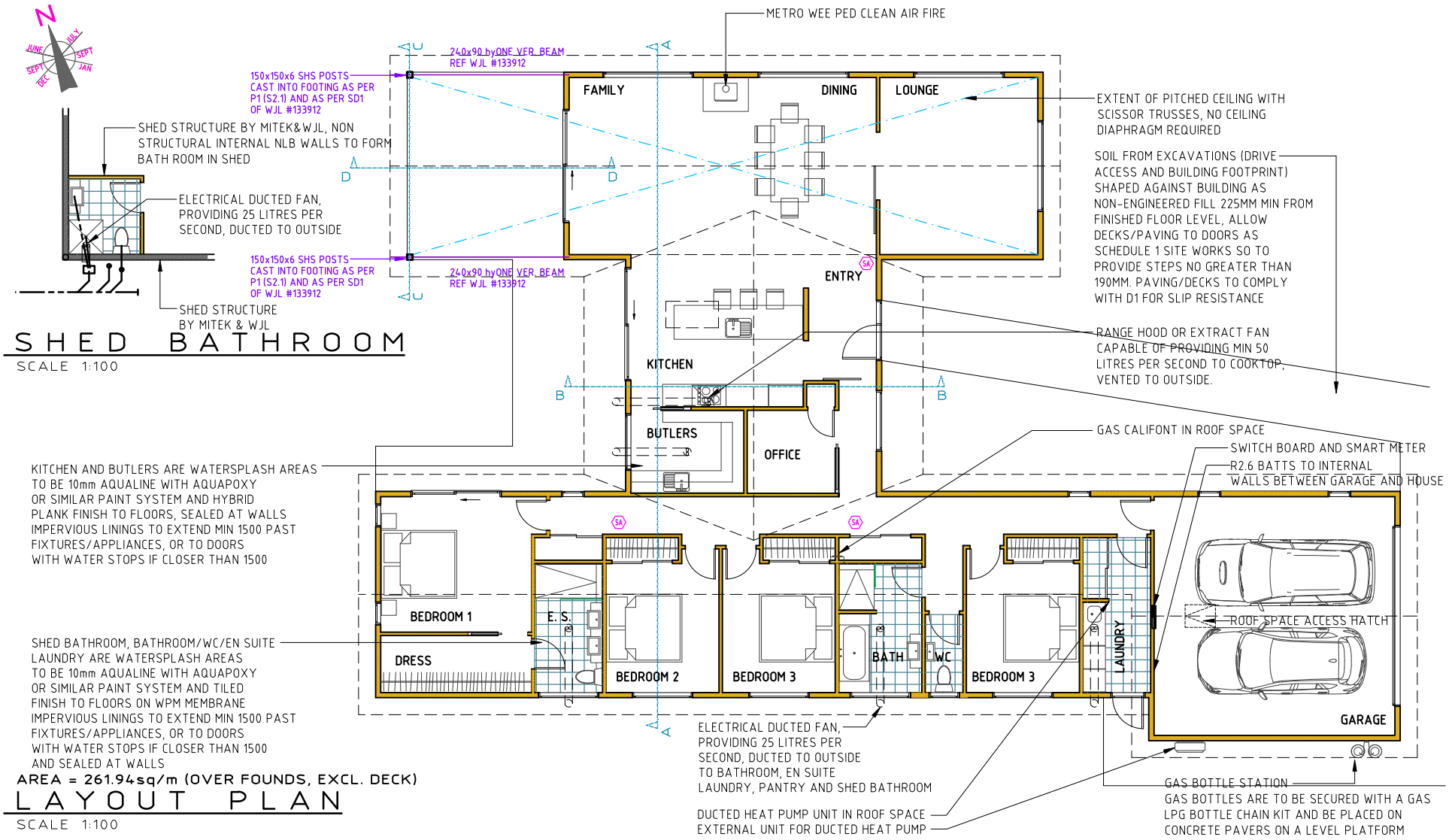
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **WASTEWATER REPORT**

PROJECT TITLE: **LOT 10 DP 540557 19 TAREHA PLACE KERIKERI NORTHLAND**

ORIGINAL DRAWING SIZE: A3
OFFICE: OREWA
DRAWING SCALE: 1:250
CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: 133959-C300
ISSUE: B



SHED BATHROOM

SCALE 1:100

LAYOUT PLAN

SCALE 1:100

AREA = 261.94sq/m (OVER FOUNDS, EXCL. DECK)

E2/AS1 RISK MATRIX

WIND ZONE	V.HIGH	2
No OF STOREYS	LOW	0
ROOF/WALL INTERSECTION	LOW	0
EAVES WIDTH	MEDIUM	1
ENVELOPE COMPLEXITY	MEDIUM	1
DECK DESIGN	LOW	0
	TOTAL	**4**

FLOOR PLAN NOTES

MECHANICAL EXTRACTION IS REQUIRED TO TERMINATE TO EXTERNAL AIR SPACE THROUGH SOFFIT

ALL SMOKE ALARMS TO COMPLY WITH EITHER UL217, ULCS531, AS3786 OR BS5446 Pt1

HOT WATER PIPES TO BE SIZED ACCORDING TO NZBC G12 & NZS 4305:1996. MAINS PRESSURE: Ø15mm ALLOWS 12m MAX PIPE LENGTH. PIPE LENGTH BEYOND THIS MUST BE LAGGED.

ARTIFICIAL ELECTRICAL LIGHTING SHALL BE PROVIDED TO ALL AREAS PROVIDING A MINIMUM OF 20 LUX IN ACCORDANCE WITH G8 OF THE NZBC

MATERIALS USED

FLOOR	RIBRAFT CONC. SLAB
FRAMING	SG8 H1.2 RADIATA
ROOFING	PROFILED COLORSTEEL ROOFING
CLADDING	VERTICAL LINEA OBLIQUE & ABODO VULCAN
WALL INSULATION	R3.2 BATTS
ROOF INSULATION	2x R3.6 BATTS
FLOOR INSULATION	RIBRAFT+HOTEDGE

LEGEND

- EXTERNAL WATER TAP
- SA SMOKE ALARM WITH HUSH

FAT HIPPO DESIGN GROUP LTD, LBP 100369
MARTIN GVARDIJANCIC | NATHAN SHEARING
36 ARANGA ROAD, KERIKERI | 20 FRANCE RD, OTATARA
WWW.FATHIPPO.ORG | MARTIN@FATHIPPO.ORG
MOB 021 887 314 | PH 021 887 314

navigation homes

NAVIGATION HOMES FAR NORTH
PO BOX 760, KERIKERI 0245, PHONE 0210 297 0048
CLIENT

PROPOSED NEW HOME - HAMMOND FAMILY
19 TAREHA PLACE, KERIKERI 0230
LAYOUT PLAN
DRAWING TITLE

FAT HIPPO DESIGN GROUP LTD

rev 0
08/06/24
01
DRAWING NUMBER

HAND AUGER : HA01

JOB NO.: 131319 **SHEET:** 1 OF 1

START DATE: 20/12/2023 **NORTHING:** **GRID:**

CLIENT: Ash & Sandie Hammond **DIAMETER:** 50mm **EASTING:**

PROJECT: Geotechnical Investigation for New Dwelling & Shed **SV DIAL:** 1994 **ELEVATION:** Ground

SITE LOCATION: 19 Tareha Place, Kerikeri **FACTOR:** 1.41 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS							
FILL	FILL: Clayey SILT, very stiff, moist, low plasticity, frequent fine to coarse gravel & clast inclusions		0.2						
			0.4		197+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Gravelly SILT, brown streaked orange, very stiff, moist, no plasticity, frequent subangular to subrounded gravel inclusions		0.8		197+	-	-		
	Slightly Clayey SILT, brown, very stiff, moist, low plasticity		1.0						
	1.3m: Becoming Clayey SILT, brown & orange, low to moderate plasticity		1.2	Groundwater Not Encountered	197+	-	-		
			1.4						
			1.6		192	107	1.8		
	Silty CLAY, grey & orange, very stiff, moist, moderate plasticity, occasional white weakly fused clast inclusions		1.8						
			2.0		178	102	1.7		
			2.2						
			2.4		158	87	1.8		
			2.6						
	Slightly Clayey SILT, orange, very stiff, moist, low plasticity		2.8		UTP	-	-		
	EOH: 3.00m - Target Depth		3.0						
			3.2						
			3.4						

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

CHECKED BY: DXS

▼ Standing groundwater level

▽ GW while drilling

WILTON JOUBERT Consulting Engineers

185 Waipapa Road, Kerikeri 0295
Phone: 09-945 4188
Email: jobs@wjl.co.nz
Website: www.wiltonjoubert.co.nz

HAND AUGER : HA02

JOB NO.: 131319 **SHEET:** 1 OF 1

START DATE: 20/12/2023 **NORTHING:** **GRID:**

CLIENT: Ash & Sandie Hammond **DIAMETER:** 50mm **EASTING:**

PROJECT: Geotechnical Investigation for New Dwelling & Shed **SV DIAL:** DR4802 **ELEVATION:** Ground

SITE LOCATION: 19 Tareha Place, Kerikeri **FACTOR:** 1.55 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOSPOIL, dark brown, moist	TS							
FILL	FILL: Clayey Fine to Coarse Gravelly SILT, very stiff, dry to moist, no to low plasticity		0.2						
			0.4		217+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Clayey SILT, orangey brown, very stiff, moist, low to moderate plasticity		0.8						
	SIlty CLAY, orangey brown, very stiff, moist, moderate to high plasticity		1.0		UTP	-	-		
	1.2m: Becoming brownish grey streaked orange		1.2	Groundwater Not Encountered	217+	-	-		
	1.4m: Becoming orange streaked red & pink		1.4						
			1.6		217+	-	-		
	1.8m: Thin lense (50mm) of dark orange strongly fused clasts		1.8						
			2.0		180	108	1.7		
			2.2						
			2.4						
			2.6		158	71	2.2		
	2.7m: Becoming grey, occasional weakly fused clast inclusions		2.8						
	EOH: 3.00m - Target Depth		3.0		127	78	1.6		
			3.2						
			3.4						

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

CHECKED BY: DXS

▼ Standing groundwater level

▽ GW while drilling

WILTON JOUBERT Consulting Engineers

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HAND AUGER : HA03

CLIENT: Ash & Sandie Hammond
PROJECT: Geotechnical Investigation for New Dwelling & Shed
SITE LOCATION: 19 Tareha Place, Kerikeri

JOB NO.: 131319 **SHEET:** 1 OF 1
START DATE: 20/12/2023 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: DR4802 **ELEVATION:** Ground
FACTOR: 1.55 **DATUM:**

SOIL DESCRIPTION: TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS		Groundwater Not Encountered					
FILL	FILL: Fine to Coarse Gravelly Clayey SILT, very stiff, dry to moist, no to low plasticity		0.2						
			0.4		217+	-	-		
			0.6						
			0.8		217+	-	-		
Kerikeri Volcanic Group	NATURAL: Gravelly Clayey SILT, orangey brown & grey, very stiff, moist, low plasticity		1.0						
	Silty CLAY, orangey brown & grey, very stiff, moist, moderate to high plasticity								
	1.2m: Becoming brownish grey streaked orange		1.2		UTP	-	-		
	1.4m: Becoming dark orangey brown streaked red & pink		1.4						
			1.6		UTP	-	-		
	1.7m: Dense Gravel (<10 recovery)		1.8		UTP	-	-		
	EOH: 1.80m - Too Dense To Auger		2.0						
			2.2						
			2.4						
			2.6						
			2.8						
			3.0						
			3.2						
			3.4						

REMARKS
End of borehole @ 1.80m (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
CHECKED BY: DXS

▼ Standing groundwater level
▽ GW while drilling

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185 Waipapa Road, Kerikeri 0295
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HAND AUGER : HA04

CLIENT: Ash & Sandie Hammond
PROJECT: Geotechnical Investigation for New Dwelling & Shed
SITE LOCATION: 19 Tareha Place, Kerikeri

JOB NO.: 131319 **SHEET:** 1 OF 1
START DATE: 20/12/2023 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: 772 **ELEVATION:** Ground
FACTOR: 1.6 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS							
FILL	FILL: Slightly Fine to Coarse Gravelly Clayey SILT, dark brown with occasional red & orange, very stiff, moist, low plasticity		0.2						
			0.4		224+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Fine to Coarse Gravelly SILT, brown mottled orange/red/yellow/black, very stiff, moist, no to low plasticity		0.8		UTP	-	-		
			1.0						
	Clayey SILT, brown streaked red, very stiff, moist, low plasticity		1.2		224+	-	-		
	Silty CLAY, brown streaked red, very stiff, moist, moderate plasticity		1.4						
	1.5m: Becoming brown/bluish grey/red		1.6		224+	-	-		
	1.8m: Frequent fine to coarse gravel & weak/strongly fused clast inclusions		1.8						
			2.0		224+	-	-		
	Clayey SILT, orangey brown & red mottled bluish grey & black, very stiff, moist, low plasticity, occasional fine to coarse gravel & weakly/strongly fused clast inclusions		2.2						
			2.4		112	48	2.3		
	Slightly Fine to Coarse Gravelly Silty CLAY, bluish grey mottled red & yellow, very stiff, moist, moderate plasticity		2.6						
	Clayey SILT, bluish grey mottled red & yellow, very stiff, moist, low plasticity		2.8		141	64	2.2		
	EOH: 3.00m - Target Depth		3.0						
			3.2						
			3.4						

Groundwater Not Encountered

SOIL DESCRIPTION
TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

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: SJP
CHECKED BY: DXS

▼ Standing groundwater level
▽ GW while drilling

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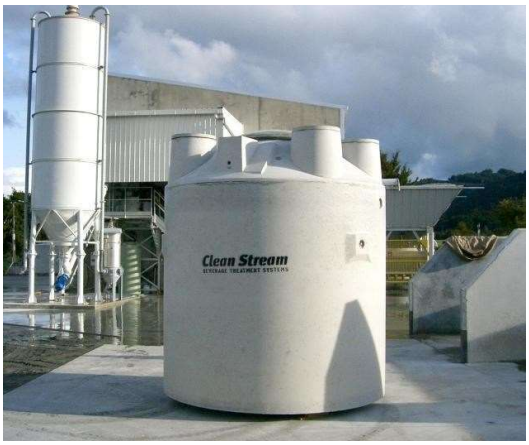
TECHNICAL INFORMATION – CLEANSTREAM TXR-1

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



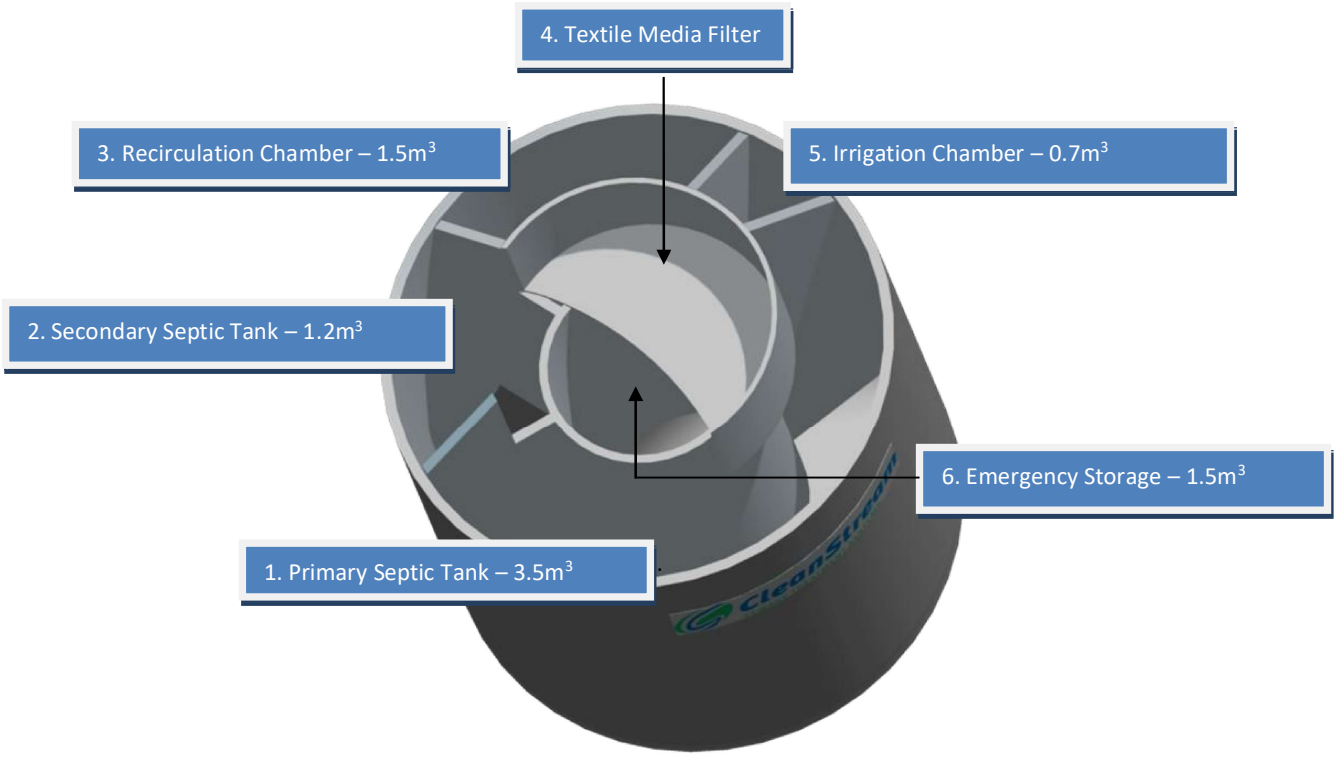
- The TXR-1 tank, roof and walls are constructed from galvanised, steel reinforced concrete (70MPA at 28 days) and come with a manufacturer's warranty of 10 years from the day they leave the factory. The mechanical components of the system (pumps) also come with a 2 year warranty from the date of commission. 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 (BOD_5) 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 (BOD_5), total suspended solids (TSS), total nitrogen (TN), ammonia nitrogen (NH_4-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 BOD_5 of $\leq$ 20 g/m^3 and TSS of $\leq$ 30 g/m^3 with no one result for BOD_5 being >30 g/m^3 and no one result for TSS being >45 g/m^3. The **CleanStream TXR-1 system achieved** a performance level of **100%** for BOD_5 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

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: Navigation Homes (Far North) Ltd. (owner)

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

PROPERTY LOCATION: 19 Tareha Place, Kerikeri

LOT…10……DP……540557…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 11.06.2024

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.

Wilton Joubert Limited
09 945 4188
185 Waipapa Road,
Kerikeri

SITE	**19 Tareha Place, Kerikeri**
LEGAL DESCRIPTION	**Lot 10 DP 540557**
PROJECT	**Proposed Residential Dwelling & Shed**
CLIENT	**Ash & Sandie Hammond**
REFERENCE NO.	**131319**
DOCUMENT	**Site-Specific Geotechnical Report**
STATUS/REVISION NO.	**FINAL – Pending Geotechnical Review of Development and Foundation Plans for Building Consent**
DATE OF ISSUE	**21 December 2023**

Report Prepared For	Email
Ash & Sandie Hammond	ashjhammond@gmail.com

Authored by	**S. Page**	Engineering Technician	shaun@wjl.co.nz	
Reviewed by	**N. Anson** *BE(Civil), MEngNZ*	Geotechnical Engineer	nick@wjl.co.nz	
Approved by	**D. Soric** *(BE, CMEngNZ, CPEng)*	Senior Geotechnical Engineer	damir@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:	Proposed residential dwelling and shed
Development Proposals Supplied:	No
NZS3604 Type Structure(s):	Yes
Geology Encountered:	Kerikeri Volcanic Group
Topsoil Encountered:	Yes – Surficial layers of 0.10m thickness
Fill Encountered:	Yes – Below surficial topsoil, encountered to depths of 0.60m to 0.80m bpgl. Material has been placed under engineering supervision by Cook Costello Ltd & Geocivil (refer Section 7.2 & appendices) and is assessed as suitable to remain at the building site, subject to a detailed site cut inspection prior to foundation construction. Any softer deposits/soft spots encountered may require further assessment, as well as removal and replacement with engineered hardfill.
Overall Site Gradient in Proximity to Development:	Flat natured (average gradients of less than 3°)
Site Stability Risk:	Overall Low Risk of deep-seated global instability.
Liquefaction Risk:	Negligible risk of liquefaction susceptibility
Suitable Shallow Foundation Type(s):	SED stiffened raft slab Bored, concrete encased, tanalised timber pile/pole foundations Slab-on-grade with deepened perimeter strip/pad footings
Shallow Soil Bearing Capacity:	Yes – Natural Soils, Existing Fill & Engineered Hardfill Geotechnical Ultimate Bearing Capacity = 300 kPa
NZBC B1 Expansive Soil Classification:	Class M – Moderately Expansive (y_s = 44mm) Refer report text for design guidance
Conventional Footing Depth :	Minimum of 0.60m below finished ground level
NZS1170.5:2004 Site Subsoil Classification:	Class C – Shallow Soil stratigraphy
Earthworks:	Minimal (crossfall of less than 0.60m across both building sites) Refer report text for design guidance
Consent Application Report Suitable for:	Geotechnical Review of Development and Foundation Plans for Building Consent

2. INTRODUCTION

2.1. SCOPE OF WORK

Wilton Joubert Limited (WJL) was engaged by **Ash & Sandie Hammond** (the Clients) to undertake a geotechnical assessment of ground conditions at the above site, where we understand, it is proposed to construct a residential dwelling and shed.

For the purposes of this report, we have assumed both structures will comprise lightweight buildings designed and constructed generally in keeping with the requirements of NZS3604:2011.

2.2. SUPPLIED INFORMATION

Our assessment is based on correspondence with the client only. The client has indicated that both proposed structures are to be positioned approximately centrally on-site.

Please note, the primary purpose of this report is to support the geotechnical suitability of the proposed development in principle, subject to specific engineering design (SED) of foundations. This report alone should not be used to support any future Building Consent application(s) unless submitted to Council in conjunction with a Geotechnical Review Memorandum supporting such future SED.

3. SITE DESCRIPTION

The proposed development will be constructed within the following property, which is located on the western side of a minor right-of-way (ROW) that extends off the southern side of Tareha Place:

- 19 Tareha Place, legally described as Lot 10 DP 540557.

The site is shown on the appended Site Plan (Drawing No 131319-G600) and in Figures 1 and 2 below.

Figure 1: Screenshot aerial view of the subject site from the Far North District Council (FNDC) on-line GIS Property and Land Map. Subject property is highlighted in cyan. 1.0m LiDAR contours are overlaid.

Figure 2: Screenshot aerial view of the subject site from Google Maps. Subject property is approximately highlighted in red.

The subject site encompasses an area of 3,000m² and will be accessed along the eastern ROW boundary. No built development is currently present on-site.

Topographically speaking, the site is flat natured, falling towards the northeast at grades averaging less than 3°. The greater surrounding area displays a similar topographical profile.

The site is currently covered in lawn with bush and mature trees covering the western boundary. It is our understanding that an easement boundary is present along the western perimeter of the property.

During our site investigation, no signs of noticeably hummocky ground and/or soil cracking was apparent at the property.

The FNDC on-line GIS Water Services Map indicates that reticulated potable water, wastewater, and stormwater service line connections are not available to the property.

Figure 3: Site photograph of the proposed development area from the north-western boundary corner (southeast direction). Orange cones indicate the approximate development extent.

4. DEVELOPMENT PROPOSALS

The client has indicated that they intend to construct a new 240m² single-level residential dwelling and 70m² shed across the approximate central area of the property. For the purposes of this report, we have assumed both structures will comprise lightweight buildings designed and constructed generally in keeping with the requirements of NZS3604:2011.

The client has advised that the dwelling is to be founded on a reinforced concrete raft slab supporting lightweight cladding and roofing. We are unsure of the proposed shed foundations however, we will provide design and construction recommendations for both concrete slab and timber pole construction.

We are unsure of the proposed finished floor levels (FFL) for both structures. To create level building sites, engineered cut/fill earthwork operations will be required. It is generally envisaged that a crossfall of less than approximately 0.60m is present across both proposed building platform areas.

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. PUBLISHED GEOLOGY

Local geology across the property and greater surrounding area 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*" (refer: GNS Science Website).

Figure 4: Screenshot aerial view of the subject site from the New Zealand Geology Web Map hosted by GNS Science. Blue marker represents the property.

5.2. HISTORICAL GEOTECHNICAL REPORTS

We have endeavoured to research the development history behind the creation of the subject title, but all we could anecdotally establish was:

1. The suitability of the underlying property for subdivision was reported on by Ormiston Associates Ltd, ref 3980, dated June 2017, to support an application for Resource Consent 2180246,
2. During subdivisional development, Cook Costello Ltd carried out fill testing and issued a Schedule 1C Certificate as per NZS4404:2010 for the infrastructure, as well as the attached Cut/Fill site plan prepared by Williams & King, Registered Land Surveyors. That plan indicates fill depths of up to around 0.60m, and
3. Apparently, there was no Resource Consent condition requiring a Geotechnical Completion Report (GCR).

As a result of the lack of any specified Statement of Professional Opinion as to Suitability of Land for Building Development as is usually attached to a GCR, we approached our investigation as if for a "*greenfields*" site, but with the above information in mind.

6. GEOTECHNICAL INVESTIGATION

6.1. FIELDWORK

Our fieldwork, as shown on the appended Site Plan (Drawing No 131319-G600), was undertaken on 20 December 2023, and involved drilling 4 (no.) 50mm diameter hand auger boreholes (HA01 to HA04 inclusive) to depths ranging between 1.8m to 3.0m below present ground level (bpgl).

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 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 0.10m thickness were overlying all four borehole testing locations.

7.2. FILL

Below surficial topsoil, fill was encountered at all four borehole testing locations to depths ranging between 0.60m to 0.80m bpgl. The material comprised of very stiff Clayey SILT with frequent gravel inclusions. Measured in-situ, BS1377 adjusted peak shear strengths within the fill all exceeded 197kPa, where soil strength was in excess of the shear vane capacity.

The material has been placed under engineering supervision and testing by Cook Costello Ltd and Geocivil. This includes nuclear densometer testing of the material and a supporting Schedule 1C Certificate which are both appended to this report.

Based on all the above, we conclude that the existing fill deposits can remain at the building site, subject to a detailed site cut inspection during earthworks. Any softer deposits/soft spots encountered may require further assessment, as well as removal and replacement with hardfill.

7.3. NATURAL GROUND

The underlying natural deposits encountered on-site were consistent with our expectations of Kerikeri Volcanic Group deposits, generally comprising of very stiff clayey silt and silty clay deposits that contained varying amounts of fine to coarse gravel and weakly/strongly fused clasts.

Measured in-situ, BS1377 adjusted peak shear strengths in the natural soils ranged from 112kPa (48kPa remoulded) and greater than 224kPa, where soil strength was in excess of the shear vane capacity, or the vane was not able to penetrate into the soil (UTP).

The ratio of peak to remoulded vane shear strength values measured within the natural soils ranged between 1.6 and 2.3 which generally indicates an 'Insensitive, Normal to Moderately Sensitive' underlying subgrade.

Figure 5: Site photograph of the HA01 soil arisings.

Figure 6: Site photograph of the HA02 soil arisings.

Figure 7: Site photograph of the HA03 soil arisings.

Figure 8: Site photograph of the HA04 soil arisings.

7.4. GROUNDWATER

Groundwater was not encountered within any of our four boreholes. Considering the elevation, topography, and underlying geological profile encountered across the property, it is generally envisaged that groundwater levels will not be significantly elevated.

7.5. SUMMARY TABLE

The following table summarises our inferred stratigraphic profiling:

Investigation Hole ID	Termination Depth (m)	Depth to Base of Surficial Topsoil (m)	Vane Shear Strength Range (kPa)	Standing Groundwater Depth (m)
HA01	3.0	0.10	158 – 197+/UTP	NE
HA02	3.0	0.10	127 - 217+/UTP	NE
HA03	1.8	0.10	217+/UTP	NE
HA04	3.0	0.10	112 – 224+/UTP	NE

UTP = Unable to Penetrate, NE = Not Encountered

8. GEOTECHNICAL ASSESSMENTS

8.1. SHALLOW SOIL EXPANSIVITY

In this instance, without any laboratory testing, considering the high silt and gravelly content of the underlying subsoils at foundation levels, we have adopted a conservative 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**

Foundation design recommendations are given in the appropriate Conclusions and Recommendations section in following Section 9 below.

Given that the soils are not considered to lie within the definition of "*good ground*" as per NZS3604, the design of shallow foundations are no longer covered by that standard, and care must be taken to mitigate against the potential seasonal shrinkage and swelling effects of expansive foundation soils on both superstructures and floors. We therefore recommend SED should be undertaken by a qualified engineer for the design of the proposed foundations.

8.2. SITE STABILITY

On the basis of:

- No obvious evidence of deep-seated instability within the immediate vicinity of influence of proposed development areas,
- The flat topography of the property that averages gradients less than 3°,
- The very stiff in-situ measured Vane Shear Strengths encountered within the investigated boreholes, and
- Lack of significantly elevated groundwater evidence at our borehole testing locations,

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 (see Section 9 below), 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.

8.3. 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 manifestation 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.

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 site,
- There is no historical evidence of liquefaction at this location,
- The site is situated on an elevated location with good water-shedding characteristics,
- The lack of groundwater at shallow depth (>3.0m),
- Very stiff in-situ measured Vane Shear Strength readings recorded during our investigation,
- The underlying natural soil deposits generally comprise very stiff cohesive oils which are not generally considered susceptible to liquefaction, and
- The subsoils at both building platforms are underlain by Waipapa Group deposits, being approximately 154 to 270 million years of age, allowing for adequate consolidation in comparison to Holocene age material (10,000 years). This also corroborates with the high Vane Shear Strengths recorded during our investigation.

Furthermore, the FNDC GIS maps designates an "*Unlikely*" Liquefaction Vulnerability classification for this site.

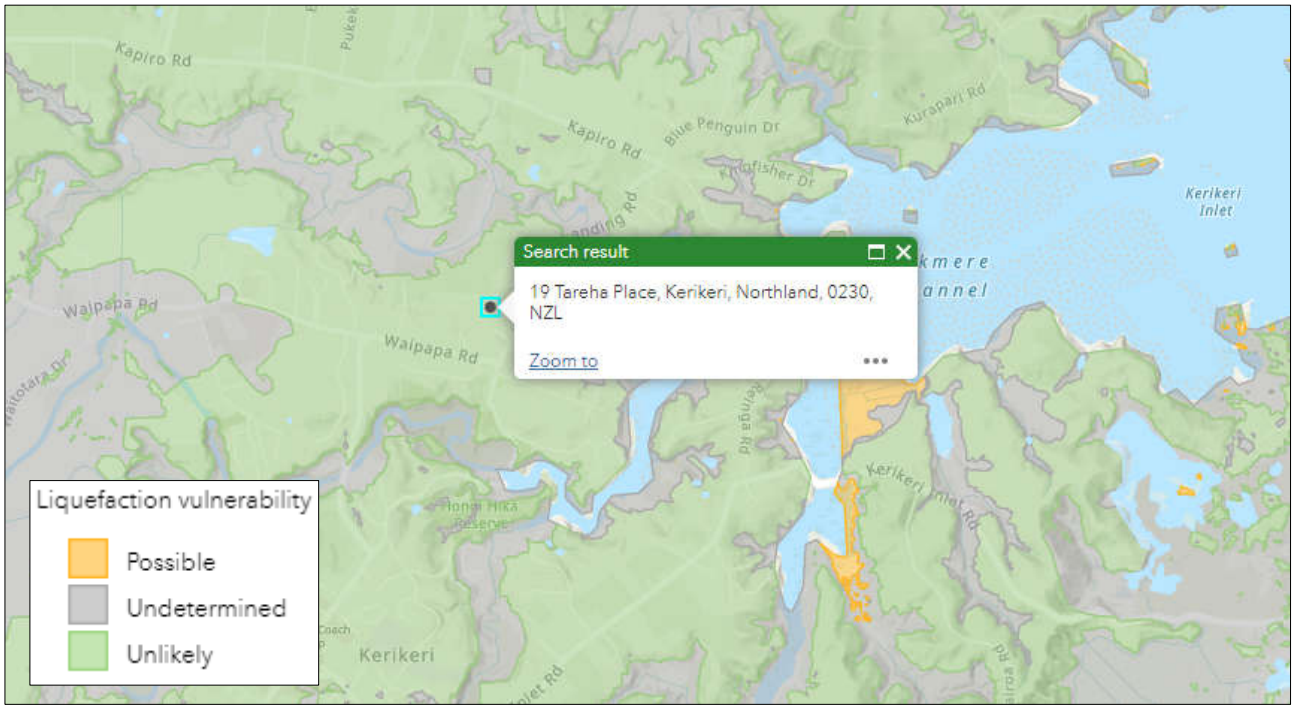


Figure 9: Screenshot of the FNDC on-line GIS Liquefaction Vulnerability Map.

Based on the above, we conclude that the subsoils across proposed development areas 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 a future development within the site 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 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

9.1.1. SHALLOW FOUNDATION BEARING CAPACITY

The following bearing capacity values are considered to be appropriate for the design of shallow foundations for the proposed dwelling and shed, subject to founding directly on or within competent natural ground, existing fill, or engineered fill, for which a careful Geo-Professional inspection(s) 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 (Φ=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 SED 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 described earlier in this report, we have estimated the classification of the soils:

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

For shallow foundations, possessing sufficient lateral stability is crucial. Adequate lateral stability is essential to protect foundation integrity and prevent any potential damage to the structure and adjacent elements. It is also essential to ensure that the load from a foundation does not impose any additional stress or load on the surrounding features.

Soil expansiveness can be mitigated for foundations as follows:

- **For Raft Slab Foundations:**
  - Specifically designed reinforced concrete stiffened raft designed for a Ys value of 44mm founded on 0.10m of engineered hardfill.

- **For Timber Pile/Pole Foundations:**
  - Bored, concrete-encased, tanalised timber pile/pole foundations embedded a minimum of 0.60m below finished ground levels.

- **For Concrete Slab Foundations:**
  - Slab-on-grade designed for Class M expansivity with perimeter strip/pad footings embedded a minimum of 0.60m below finished ground levels.

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

We are unsure of the proposed FFL's for both structures. To create level building sites, engineered cut/fill earthwork operations will be required. It is generally envisaged that a crossfall of less than approximately 0.60m is present across both proposed building platform areas.

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 CLEARANCE & PREPARATION

The competency of the exposed subgrade underlying all proposed concrete slab foundations and structures should be confirmed by a Geo-Professional. In this regard, we recommend the stripping of all vegetation, topsoil, and all non-engineered fill deposits 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 proposed concrete slab building platforms 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/pier 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 replace 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 DCP-Scala Penetrometer.

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 15 Average 18	≥5 blows/100mm (NZS3604)
Floor Slabs	≥ 7%	Minimum 12 Average 15	≥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, earthwork sites should be shaped to assist in stormwater run-off. Any batter excavations should be protected with a geotextile fabric with the toe of the excavations shaped so as to avoid ponded water, as saturating site soils could result in a reduction of bearing capacities.

Temporary stormwater diversion must be constructed around the upslope perimeter of bulk excavations to direct overland flows away. This could take the form of a soil bund or other measures as deemed appropriate by the supervising Geo-Professional.

All cuts 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 should be battered no steeper than 1V:4H (14°) or if this cannot be achieved due to site constraints, advice from a Geo-Professional should be sought.

All exposed batters should be covered with topsoil or geotextile before being re-grassed and/or planted as soon as practicable to aid in stabilising the slopes.

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

9.7. 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.
- Should the contractor require any site-specific assistance with safe construction methodologies, please contact WJL for further assistance.

9.8. 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 soils rehydrate.

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. STORMWATER & SURFACE WATER 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/or small bunds and be directed away from building footprints to protect the building platforms from both saturation and erosion. Water collected in interceptor drains should be diverted away from building sites to an appropriate disposal point. All stormwater runoff from roofs and paved areas, should be collected in sealed pipes and be discharged to a stable disposal point.

11. UNDERGROUND SERVICES

The FNDC on-line GIS Water Services Maps indicates that reticulated service line connections are not available to the property. It should be assumed that 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 areas.

12. 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 (BCA) 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 BC 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, Wilton Joubert Limited 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:

- Subgrade stripping,
- Hardfill compaction testing, and,
- Pre-pour dwelling and shed foundations.

13. 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 clients, **Ash and Sandie Hammond,** 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 FNDC.

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 sheets)
Hand Auger Borehole Records (4 sheets)
Cook Costello Ltd Schedule 1C Certificate (1 sheet)
Geocivil Cut/Fill Area Site Plan & Nuclear Densometer Testing Data (3 sheets)
'Foundation Maintenance & Footing Performance' sheet BTF18: A Homeowner's Guide, published by CSIRO (4 sheets)
Construction Monitoring (1 sheet)

GENERAL NOTES

1. SITE PLAN 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 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.

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ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	DEC 2023	NPN	ISSUED WITH GEOTECHNICAL REPORT

DESIGNED BY:
DRAWN BY: NPN
CHECKED BY: SJP
SURVEYED BY:

SERVICES NOTE

WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

GEOTECHNICAL

DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **PROPOSED DWELLING AND SHED**

PROJECT TITLE: **LOT 10 DP 540557
19 TAREHA PLACE
KERIKERI
NORTHLAND**

ORIGINAL DRAWING SIZE:	OFFICE:
A3	KERIKERI
DRAWING SCALE:	CO-ORDINATE SYSTEM:
1:300	NOT COORDINATED
DRAWING NUMBER:	ISSUE:
TAREHA-G600	A

HAND AUGER : HA01

JOB NO.: 131319 **SHEET:** 1 OF 1

START DATE: 20/12/2023 **NORTHING:** **GRID:**

CLIENT: Ash & Sandie Hammond **DIAMETER:** 50mm **EASTING:**

PROJECT: Geotechnical Investigation for New Dwelling & Shed **SV DIAL:** 1994 **ELEVATION:** Ground

SITE LOCATION: 19 Tareha Place, Kerikeri **FACTOR:** 1.41 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS							
FILL	FILL: Clayey SILT, very stiff, moist, low plasticity, frequent fine to coarse gravel & clast inclusions		0.2						
			0.4		197+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Gravelly SILT, brown streaked orange, very stiff, moist, no plasticity, frequent subangular to subrounded gravel inclusions		0.8		197+	-	-		
	Slightly Clayey SILT, brown, very stiff, moist, low plasticity		1.0						
	1.3m: Becoming Clayey SILT, brown & orange, low to moderate plasticity		1.2	Groundwater Not Encountered	197+	-	-		
			1.4						
			1.6		192	107	1.8		
	Silty CLAY, grey & orange, very stiff, moist, moderate plasticity, occasional white weakly fused clast inclusions		1.8						
			2.0		178	102	1.7		
			2.2						
			2.4		158	87	1.8		
			2.6						
	Slightly Clayey SILT, orange, very stiff, moist, low plasticity		2.8		UTP	-	-		
	EOH: 3.00m - Target Depth		3.0						
			3.2						
			3.4						

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

CHECKED BY: DXS

▼ Standing groundwater level

▽ GW while drilling

WILTON JOUBERT Consulting Engineers

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HAND AUGER : HA02

JOB NO.: 131319 **SHEET:** 1 OF 1

START DATE: 20/12/2023 **NORTHING:** **GRID:**

CLIENT: Ash & Sandie Hammond **DIAMETER:** 50mm **EASTING:**

PROJECT: Geotechnical Investigation for New Dwelling & Shed **SV DIAL:** DR4802 **ELEVATION:** Ground

SITE LOCATION: 19 Tareha Place, Kerikeri **FACTOR:** 1.55 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOSPOIL, dark brown, moist	TS							
FILL	FILL: Clayey Fine to Coarse Gravelly SILT, very stiff, dry to moist, no to low plasticity		0.2						
			0.4		217+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Clayey SILT, orangey brown, very stiff, moist, low to moderate plasticity		0.8						
	SIlty CLAY, orangey brown, very stiff, moist, moderate to high plasticity		1.0		UTP	-	-		
	1.2m: Becoming brownish grey streaked orange		1.2	Groundwater Not Encountered	217+	-	-		
	1.4m: Becoming orange streaked red & pink		1.4						
			1.6		217+	-	-		
	1.8m: Thin lense (50mm) of dark orange strongly fused clasts		1.8						
			2.0		180	108	1.7		
			2.2						
			2.4						
			2.6		158	71	2.2		
	2.7m: Becoming grey, occasional weakly fused clast inclusions		2.8						
	EOH: 3.00m - Target Depth		3.0		127	78	1.6		
			3.2						
			3.4						

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

CHECKED BY: DXS

▼ Standing groundwater level

▽ GW while drilling

WILTON JOUBERT Consulting Engineers

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Website: www.wiltonjoubert.co.nz

HAND AUGER : HA03

CLIENT: Ash & Sandie Hammond
PROJECT: Geotechnical Investigation for New Dwelling & Shed
SITE LOCATION: 19 Tareha Place, Kerikeri

JOB NO.: 131319 **SHEET:** 1 OF 1
START DATE: 20/12/2023 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: DR4802 **ELEVATION:** Ground
FACTOR: 1.55 **DATUM:**

SOIL DESCRIPTION: TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS		Groundwater Not Encountered					
FILL	FILL: Fine to Coarse Gravelly Clayey SILT, very stiff, dry to moist, no to low plasticity		0.2						
			0.4		217+	-	-		
			0.6						
			0.8		217+	-	-		
Kerikeri Volcanic Group	NATURAL: Gravelly Clayey SILT, orangey brown & grey, very stiff, moist, low plasticity		1.0						
	Silty CLAY, orangey brown & grey, very stiff, moist, moderate to high plasticity								
	1.2m: Becoming brownish grey streaked orange		1.2		UTP	-	-		
	1.4m: Becoming dark orangey brown streaked red & pink		1.4						
			1.6		UTP	-	-		
	1.7m: Dense Gravel (<10 recovery)		1.8		UTP	-	-		
	EOH: 1.80m - Too Dense To Auger		2.0						
			2.2						
			2.4						
			2.6						
			2.8						
			3.0						
			3.2						
			3.4						

REMARKS
End of borehole @ 1.80m (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
CHECKED BY: DXS

▼ Standing groundwater level
▽ GW while drilling

WILTON JOUBERT Consulting Engineers
185 Waipapa Road, Kerikeri 0295
Phone: 09-945 4188
Email: jobs@wjl.co.nz
Website: www.wiltonjoubert.co.nz

HAND AUGER : HA04

CLIENT: Ash & Sandie Hammond
PROJECT: Geotechnical Investigation for New Dwelling & Shed
SITE LOCATION: 19 Tareha Place, Kerikeri

JOB NO.: 131319 **SHEET:** 1 OF 1
START DATE: 20/12/2023 **NORTHING:** **GRID:**
DIAMETER: 50mm **EASTING:**
SV DIAL: 772 **ELEVATION:** Ground
FACTOR: 1.6 **DATUM:**

STRATIGRAPHY	SOIL DESCRIPTION	LEGEND	DEPTH (m)	WATER	SHEAR VANE PEAK STRENGTH (kPa)	SHEAR VANE REMOULD STRENGTH (kPa)	SHEAR VANE SENSITIVITY	DCP - SCALA (Blows / mm)	COMMENTS, SAMPLES, OTHER TESTS
Topsoil	TOPSOIL, dark brown, moist	TS							
FILL	FILL: Slightly Fine to Coarse Gravelly Clayey SILT, dark brown with occasional red & orange, very stiff, moist, low plasticity		0.2						
			0.4		224+	-	-		
			0.6						
Kerikeri Volcanic Group	NATURAL: Fine to Coarse Gravelly SILT, brown mottled orange/red/yellow/black, very stiff, moist, no to low plasticity		0.8		UTP	-	-		
			1.0						
	Clayey SILT, brown streaked red, very stiff, moist, low plasticity		1.2		224+	-	-		
	Silty CLAY, brown streaked red, very stiff, moist, moderate plasticity		1.4						
	1.5m: Becoming brown/bluish grey/red		1.6		224+	-	-		
	1.8m: Frequent fine to coarse gravel & weak/strongly fused clast inclusions		1.8						
			2.0		224+	-	-		
	Clayey SILT, orangey brown & red mottled bluish grey & black, very stiff, moist, low plasticity, occasional fine to coarse gravel & weakly/strongly fused clast inclusions		2.2						
			2.4		112	48	2.3		
	Slightly Fine to Coarse Gravelly Silty CLAY, bluish grey mottled red & yellow, very stiff, moist, moderate plasticity		2.6						
	Clayey SILT, bluish grey mottled red & yellow, very stiff, moist, low plasticity		2.8		141	64	2.2		
	EOH: 3.00m - Target Depth		3.0						
			3.2						
			3.4						

Groundwater Not Encountered

SOIL DESCRIPTION
TOPSOIL, CLAY, SAND, PEAT, FILL, SILT, GRAVEL, ROCK

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: SJP
CHECKED BY: DXS

▼ Standing groundwater level
▽ GW while drilling

WILTON JOUBERT Consulting Engineers
185 Waipapa Road, Kerikeri 0295
Phone: 09-945 4188
Email: jobs@wjl.co.nz
Website: www.wiltonjoubert.co.nz

SCHEDULE 1C

CERTIFICATION UPON COMPLETION OF LAND DEVELOPMENT/SUBDIVISION

ISSUED BY: CCL 2015 Ltd.
(Approved certifier firm)

TO: Back Row Investments Ltd.
(Developer/owner)

TO BE SUPPLIED TO: FNDC
(Territorial authority)

FOR: 2180246 - RMACOM
(Description of land development/subdivision)

AT: 86 Landing Road, Kerikeri
(Address)

Philip Cook has been engaged by Jared Milne
(Consultant/designer) *(Developer/owner)*

to provide construction observation review and certification services for the above subdivision which is described in the specification and shown on the drawings numbered 14153-001 DD01 - DD43 approved by FNDC
(Territorial authority)

I have sighted the FNDC consent and conditions of subdivision
(Territorial authority)

and the approved specification and drawings.

On the basis of periodic reviews of the construction and information supplied by the contractor in the course of the construction, I believe on reasonable grounds that the infrastructure other than those outstanding works listed below, is complete and has been constructed in accordance with:

(a) The approved engineering drawings and specifications and any approved amendments;
(b) The Council's Engineering Standards; and
(c) The manufacturer's instructions

..... Date 6/11/2019
(Signature of approved certifier on behalf of the approved certifier firm)

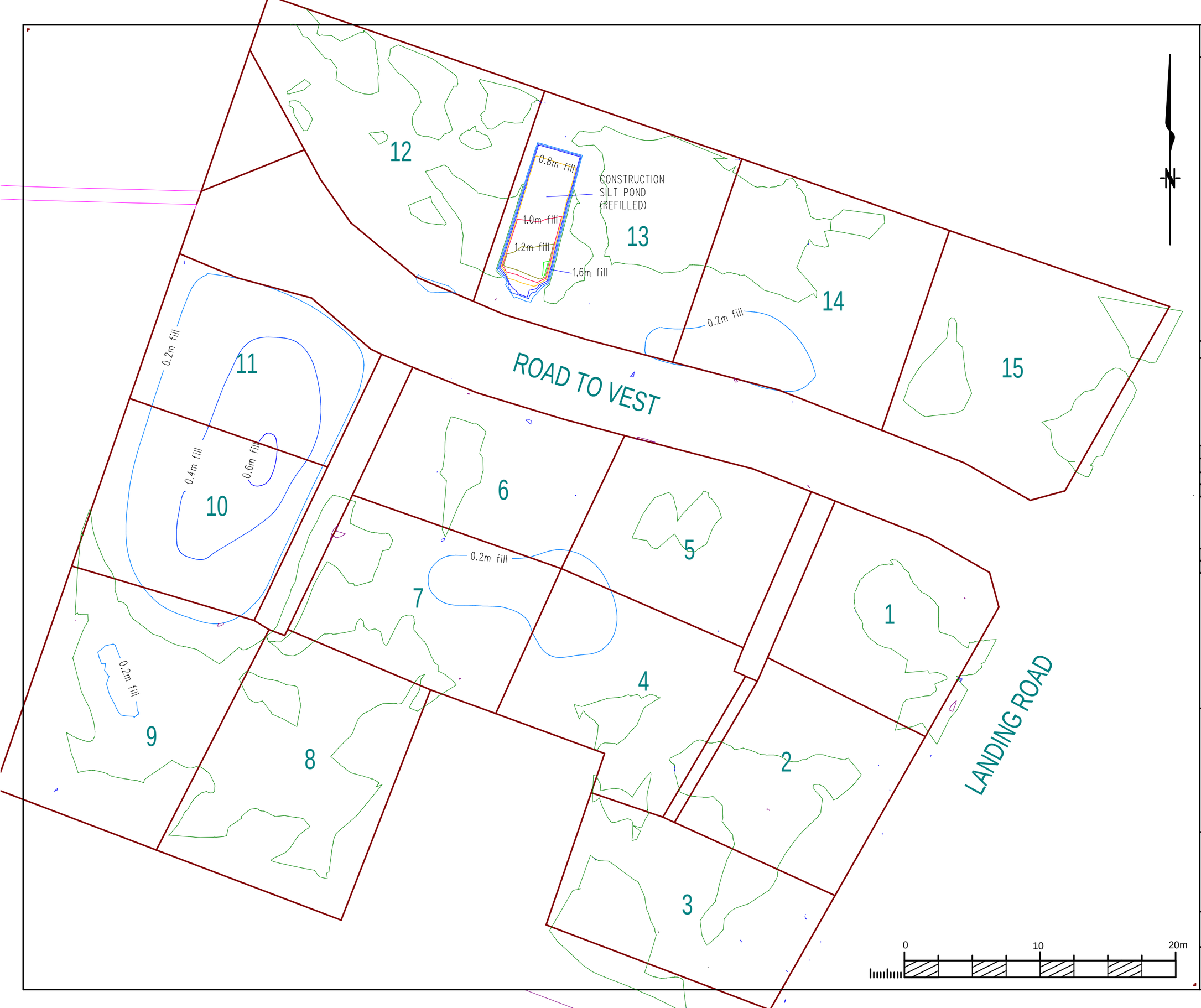
Philip Cook, Chartered Professional Engineer, BE, CPEng
(Name, title, and professional qualifications)

NOTE – This statement shall only be relied upon by the territorial authority named above. Liability under this statement accrues to the approved certifier firm only. The total maximum amount of damages payable arising from this statement and all other statements provided to the territorial authority in relation to this land development/ subdivision, whether in contract, tort, or otherwise (including negligence), is limited to the sum of $ $500,000 (insert).

Outstanding works

The kerbs/ edge beams are not covered by this producer statement. Broadspectrum have given FNDC a warranty for the kerbs/ edge beams. Evidence of this is shown on pages 2-4 of this document.

Sealing of the new road, ROW 1 and ROW 2 including preparation work for sealing has not yet been completed and therefor is not covered by this producer statement. The road sealing work is covered by a bond which is shown on pages 5-7. The bond value is base on a KCL quote shown on pages 8-9.



GENERAL NOTES

KEY

FILL LEVEL

- 0.0m
- 0.2m
- 0.4m
- 0.6m
- 0.8m
- 1.0m
- 1.2m
- 1.4m

	Name	Date
Surveyed	MP	Oct 19
Designed		
Drawn	WF	Oct 19

Title Area

JOB/CLIENT:

BACKROW INVESTMENTS LTD

KERIKERI

SHEET TITLE:

CUT/FILL AREAS

Williams & King
Registered Land Surveyors, Planners & Land Development Consultants
27 Hobson Ave
PO Box 937, Kerikeri
Tel: 09-407 6030 Fax: 09-4076032
Email: kerikeri@surveyandplanning.co.nz

Job No: 22386

File: BULK CUT FILL.lcd

SCALE @ A3 1:1000

SHEET No 1/1

Whangarei Laboratory
166 Bank Street
Whangarei
M: 027 656 5226
E: info@geocivil.co.nz

TEST REPORT

Lab Job No: 8020-1702

Your ref.: -

Date of Issue: 5/04/2019

Date of Re-Issue: -

Page: 1 of 2

Test Report No. W19-226

PROJECT: **86 Landing Road**

CLIENT: Cook Costello
2 Norfolk St
Whangarei

ATTENTION: Deva Howat

TEST METHODS: Determination of the field dry density & water content using a nuclear densometer – Direct Transmission
NZS 4407:2015 Test 4.2

SAMPLING METHOD: N/A

TEST RESULTS: As per attached sheets

G. Breckon
Laboratory Technician

S. Kokich
Approved Signatory

IANZ ACCREDITED LABORATORY
All tests reported herein have been performed in accordance with the laboratory's scope of accreditation

Whangarei Laboratory
166 Bank Street
Whangarei
P: 09 438 4417
E: info@geocivil.co.nz

NUCLEAR DENSOMETER READINGS

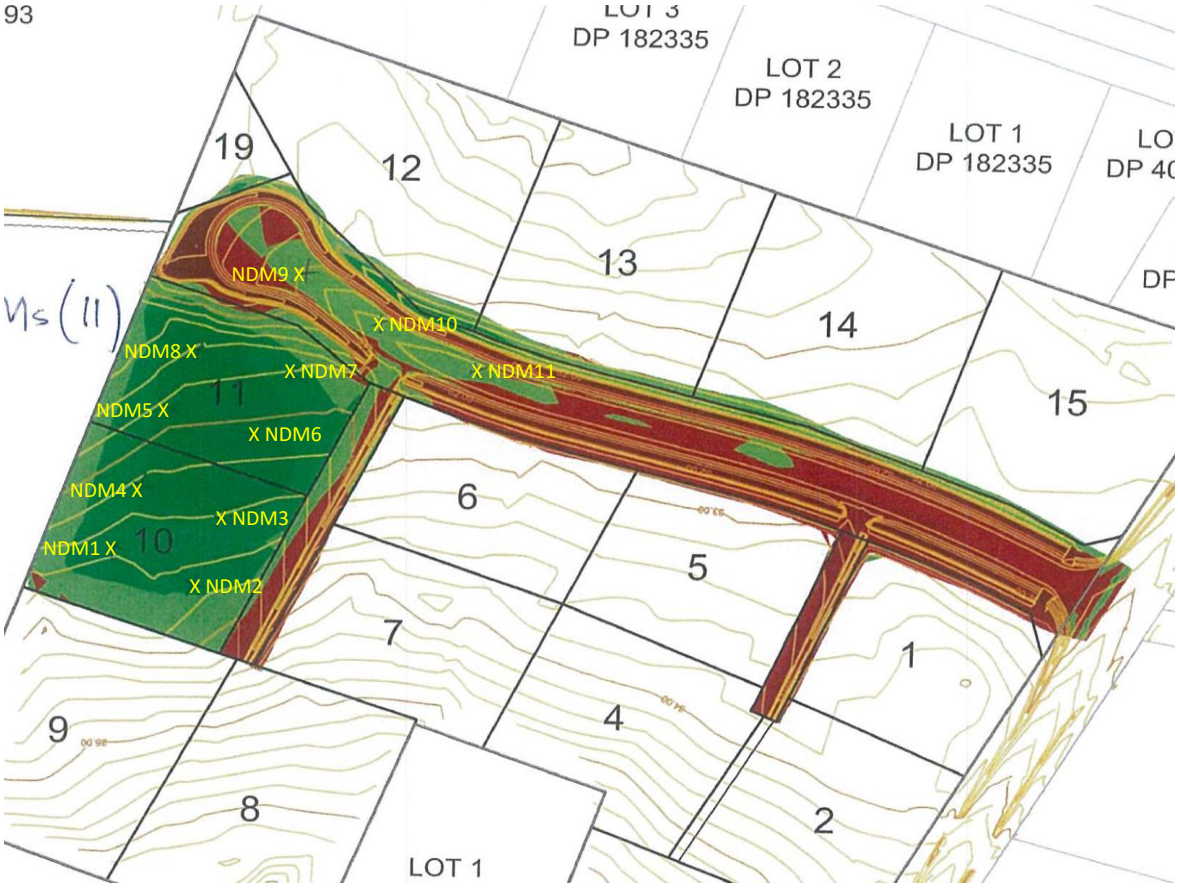
NZS 4407:2015 Test 4.2, 4.3

Lab Job No:	8020-1702	**Tested By:**	D.O
Client:	Cook Costello	**Date:**	26/03/2019
Job:	86 Landing Road	**Checked By:**	
Location:	Kerikeri	**Date:**	
REF:	14153-001	**Page:**	2 of 2
Report No:	W19-226		

Material: Silty CLAY, minor weak to very weak gravels up to 15mm, traces of fine to medium sand, brown with reddish brown patches, moist

Solid Density (assumed): 2.72 t/m^3 **Max dry density (assumed):** 1.30 t/m^3

Date	Site No	Test No	Bulk Density t/m^3	Dry Density t/m^3	Moisture Content % **	% Air Voids	% Compaction	Probe Depth (mm)	Vane Shear Strength (corrected) kPa	Comments
26/03/2019	1	1	1.72	1.27	35.5	8	98	250	-	Finished Level
26/03/2019	2	2	1.72	1.24	37.3	8	96	250	-	Finished Level
26/03/2019	3	3	1.71	1.26	36.0	8	97	250	-	Finished Level
26/03/2019	4	4	1.73	1.28	35.4	8	98	250	-	Finished Level
26/03/2019	5	5	1.75	1.30	34.8	7	100	250	-	Finished Level
26/03/2019	6	6	1.76	1.29	36.6	6	99	250	-	Finished Level
26/03/2019	7	7	1.76	1.29	36.8	5	99	250	-	Finished Level
26/03/2019	8	8	1.74	1.25	38.5	6	96	250	-	Finished Level
26/03/2019	9	9	1.73	1.31	31.8	10	101	250	-	Finished Level
26/03/2019	10	10	1.73	1.28	34.6	9	99	250	-	Finished Level
26/03/2019	11	11	1.72	1.27	35.4	8	98	250	-	Finished Level



X Approximate Test locations only

S. Kokich
Approved Signatory

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 perpends).

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.

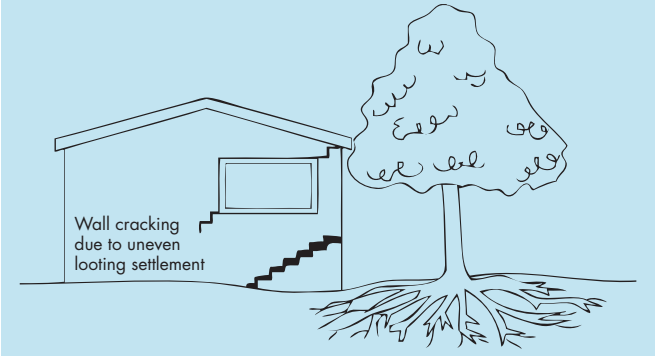
The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally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

Trees can cause shrinkage and damage



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 grated 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.

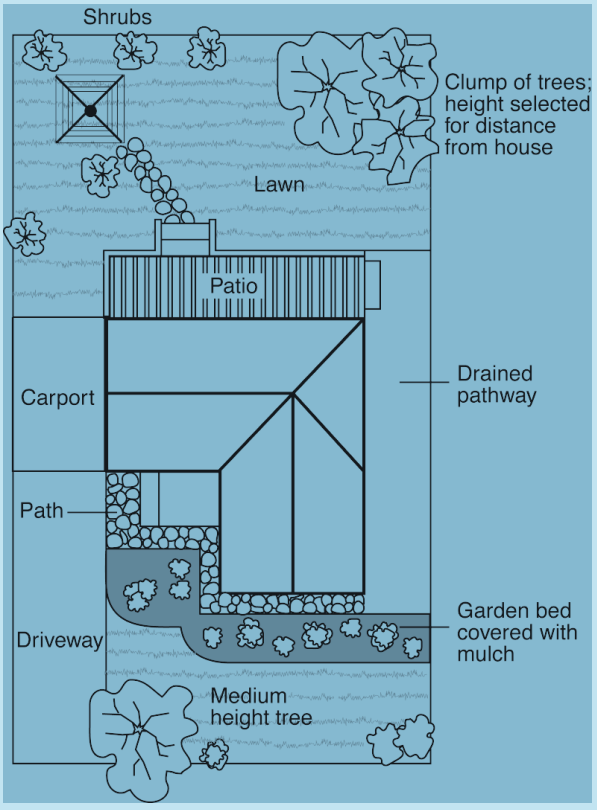
Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

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

Gardens for a reactive site



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.

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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

	LEVEL OF CONSTRUCTION MONITORING				
KTOTAL	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.

Wilton Joubert Limited
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SITE	19 Tareha Place, Kerikeri
LEGAL DESCRIPTION	Lot 10 DP 540557
PROJECT	Proposed Residential Dwelling
CLIENT	Navigation Homes (Far North) Ltd.
REFERENCE NO.	133958
DOCUMENT	Stormwater Mitigation Report
STATUS/REVISION No.	B
DATE OF ISSUE	11th June 2024

Report Prepared For	Attention	Email
Navigation Homes (Far North) Ltd.	Andrew Ritchie	andrew@navigationhomes.co.nz

Authored by	**G.Brant** *(BE(Hons) Civil)*	Civil Engineer	Gustavo@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 10 DP 540557
Site Area:	3,001m²
Development Type:	Proposed Residential Dwelling
Development Proposals Supplied:	Plan Set prepared by Fat Hippo Design Group Ltd. (dated: 08.06.2024)
Associated Documents:	WJL Geotechnical Report WJL Ref. 131319 WJL Wastewater Report WJL Ref. 133959
District Plan Zone:	Rural Living
Permitted Activity Coverage:	12.5% or 3,000m²
Impermeable Coverage:	**Post-Development Impermeable Areas** Total Roof Area 414m² Total Uncovered Hardstand 341m² Total impermeable area = 755m² or 25.2% of the site area
Activity Status:	Discretionary Activity
Roof Attenuation:	Attenuation is to be provided in accordance with the requirements outlined in Section 5 via flow attenuated outlets in the proposed dwelling's rainwater tanks. **Recommended Tank** – 2 x 25,000 litre Rainwater Tanks **Dimensions** – 3600mm Ø x 2600mm high **10% AEP Control Orifice** – 38mmØ orifice; located >630mm below the Overflow Outlet **1% AEP Control Orifice** – 22mmØ orifice; located 400mm above the 10% AEP Control Orifice **Overflow** – 100mmØ at the top of the tank
Driveway Attenuation:	It is recommended to shape the proposed driveway to direct runoff to catchpits, which are required to drain directly to the available stormwater connection via sealed pipes.
Point of Discharge:	To available stormwater connection, the connections needs to be confirmed to be minimum 100mmØ @ 2%.

2. SCOPE OF WORK

Wilton Joubert Ltd. (WJL) was engaged by the client, **Navigation Homes (Far North) Ltd.**, to produce an on-site stormwater mitigation assessment at the above site.

At the time of report writing, we have been supplied the following documents:

- Plan Set prepared by Fat Hippo Design Group Ltd. including site plan, floor plan and elevations (dated: 08.06.2024)
- ROW & Stormwater As-built plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019)

Should any changes be made to the provided plans with stormwater management implications, WJL must be contacted for review.

3. SITE DESCRIPTION

The proposed development will be constructed within the following property, which is located on the western side of a minor right-of-way (ROW) that extends off the southern side of Tareha Place:

- 19 Tareha Place, legally described as Lot 10 DP 540557.

The subject site encompasses an area of 3,001m² and will be accessed along the eastern ROW boundary. No built development is currently present on-site.

Topographically speaking, the site is flat natured, falling towards the northeast at grades averaging less than 3°. The greater surrounding area displays a similar topographical profile.

The site is currently covered in lawn with bush and mature trees covering the western boundary. It is our understanding that an easement boundary is present along the western perimeter of the property.

Figure 1: Aerial Snip from FNDC Maps Showing Site Boundaries (cyan) & 1m Contours (yellow)

Figure 2: Site Photo – Facing Southeast from North-Western Boundary Corner

The ROW & Stormwater As-built plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019) indicates that the site is serviced by a stormwater connection near the lot's eastern corner. The property is not serviced by public wastewater or potable water reticulation.

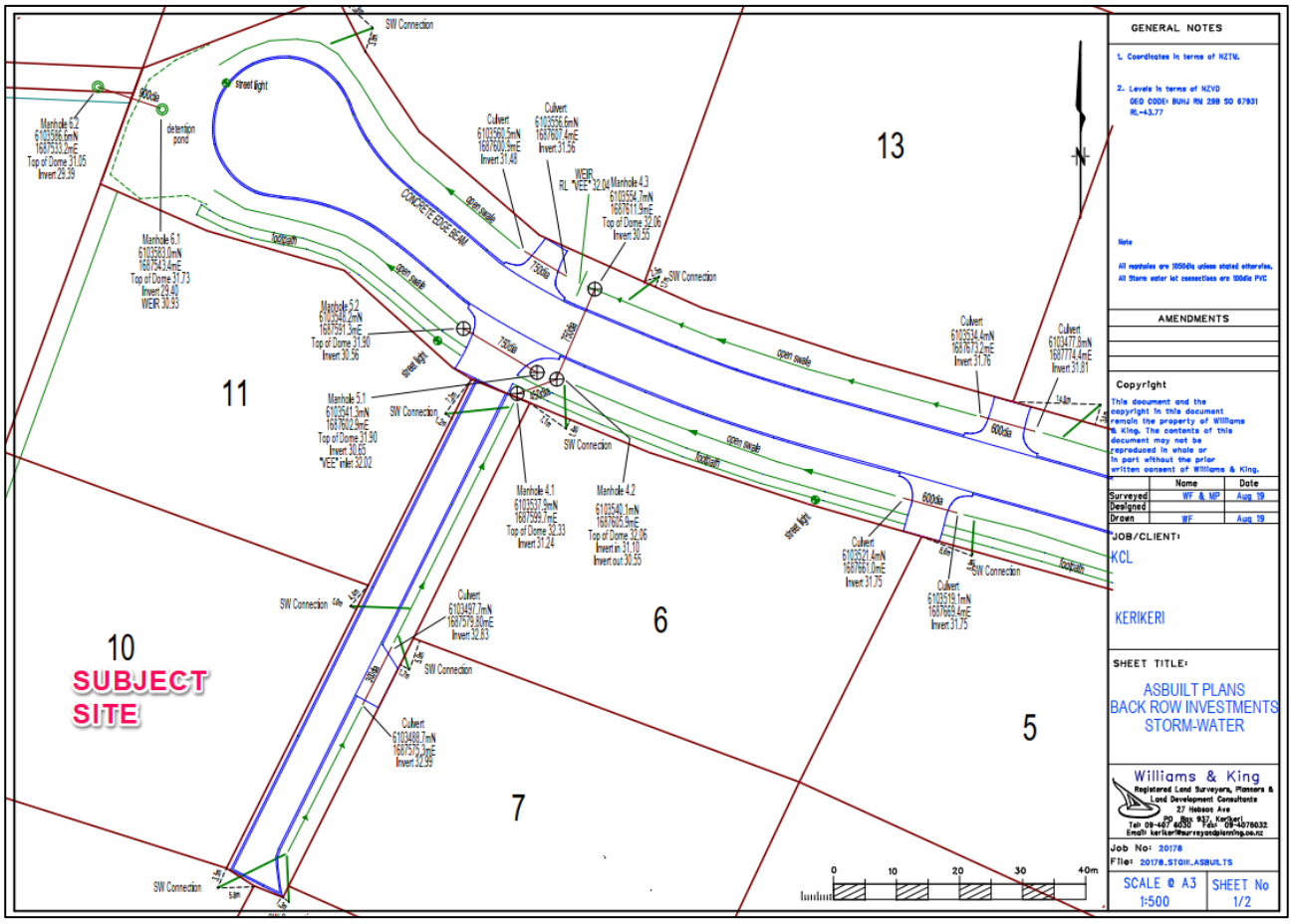


Figure 3: Snip of ROW & Stormwater As-built Plan by Williams & King Ltd. (Ref No: 20178, dated: August 2019)

4. DEVELOPMENT PROPOSALS

The development proposal, obtained from the client, is to construct a residential dwelling, shed and associated hardstand areas on-site as depicted in the plan set provided by Fat Hippo Design Group Ltd. (dated: 08.06.2024).

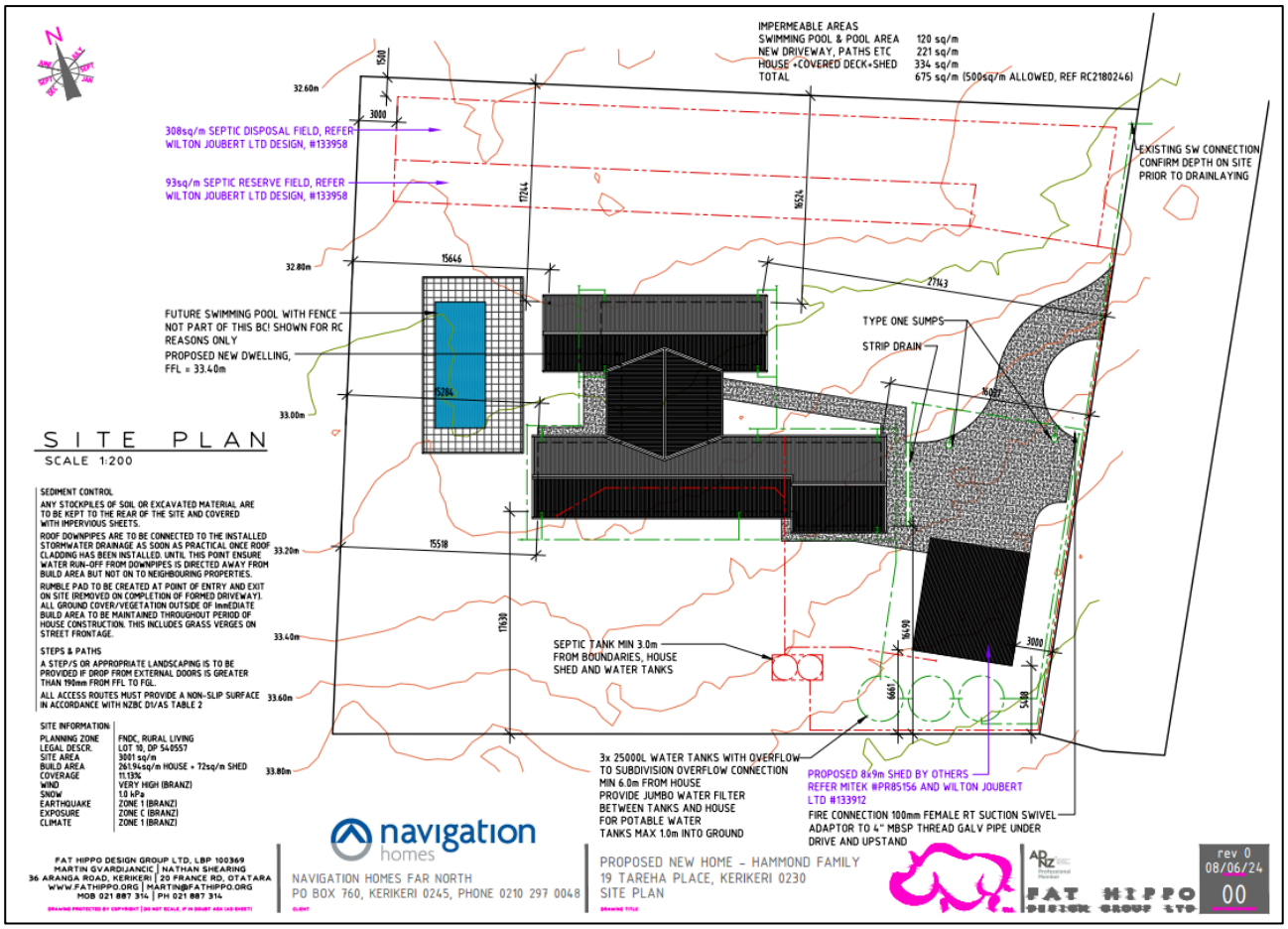


Figure 4: Snip of Proposed Site Plan Provided by Fat Hippo Design Group Ltd. (dated: 08.06.2024)

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

5. ASSESSMENT CRITERIA

Impermeable Areas

The calculations for the development's stormwater system are based on a gross site area of 3,001m² and the below areas *extracted from the supplied plans*:

	Pre-Development	Post-Development	Total Change
Total Roof Area	**0 m²**	**414 m²**	414 m²
Proposed Dwelling	0 m²	342 m²	
Proposed Shed	0 m²	72 m²	
Total Uncovered Hardstand	**0 m²**	**341 m²**	341 m²
Proposed Concrete Driveway	0 m²	211 m²	
Proposed Concrete Path	0 m²	10 m²	
Proposed Pool & Pool Area	0 m²	120 m²	
Pervious	3,001 m²	2,246 m²	-755 m²

The total amount of impermeable area on site, post-development, equates to 755m² or 25.2% of the site area. Should any changes be made to the current proposal, the on-site stormwater mitigation design must be reviewed.

District Plan Rules

The site is zoned Rural Living. The following rules apply under the FNDC District Plan:

8.7.5.1.5 – **Permitted Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 12.5% or 3,000m², whichever is the lesser.

8.7.5.2.2 – **Controlled Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other Impermeable Surfaces shall be 20% or 3,300m², whichever is the lesser.

The total proposed impermeable area for the development exceeds 20% of the site area and does not comply with Permitted Activity Rule (8.7.5.1.5) nor Controlled Activity Rule (8.7.5.2.2). Therefore, the proposals are considered to be a Discretionary Activity. Additional considerations for stormwater management as outlined in the FNDC District Plan Section 11.3 are required. A District Plan Assessment has been included in Section 8 of this report.

Design Requirements

The site is under the jurisdiction of the Far North District Council. The design has been completed in accordance with the recommendations and requirements contained within the Far North District Council Engineering Standards, the Far North District Council District Plan, Clause E1 of the New Zealand Building Code and the following consent notice item pertaining to RC 2180246:

> Lots 1 to 15 DP 540557
>
> (i) In conjunction with the construction of any building requiring consent and associated impermeable surfaces on an allotment exceeding 500m^2 total impermeable surface coverage, the lot owner shall submit for approval of Council a stormwater management mitigation report. The system shall be designed as such that the total stormwater discharged from the site, after development, is no greater than 500m^2 allowance for impermeable surface flow from the site for rainfall events up to a 1% AEP plus allowance for climate change. The report shall be prepared by a suitably qualified and experienced practitioner and be submitted in conjunction with the Building Consent application.

The total proposed impermeable area exceeding the 500m^2 allowance as specified in the item above is **255m^2**. Stormwater attenuation for the 10% AEP and 1% AEP storm events with an adjustment for climate change will therefore be provided for this excess impermeable area.

Provided that the recommendations within this report are adhered to, the effects of stormwater runoff resulting from the unattenuated proposed impermeable surfaces (500m^2 total) are considered to have less than minor effects on the receiving environment, equivalent to conditions that would result from development proposals falling within the Permitted Activity coverage threshold.

Stormwater Modelling Method

The attenuation calculations have been computed using HydroCAD modelling software. The model has been configured utilising the Rational Method (NZ Building Code E1). The rainfall intensity values for the 10% and 1% AEP storm events adjusted for climate change are as follows:

	Rainfall Intensity Values (RCP6.0 2081-2100)							
Time	10m	20m	30m	1h	2h	6h	12h	24h
10% AEP	121	87.1	72.0	51.5	36.1	19.3	12.5	7.71
1% AEP	181	131	109	78.0	54.9	29.6	19.2	11.9

The NIWA RCP6.0 rainfall data scenario for 2081-2100 has been used to account for climate change.

6. STORMWATER MITIGATION ASSESSMENT

To meet the requirements outlined in Section 5, the following must be provided:

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 roof area. A first flush diverter and/or leaf 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 filters. Any 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 roof areas. Provision should be made by the homeowner for top-up of the tanks via water tankers in periods of low rainfall.

All potable tanks must be constructed level and fitted with balancing pipes at the top and near the base of each tank to connect all potable water tanks to each other. Due to inadequate water quality concerns, runoff from hardstand areas should not be allowed to drain to the potable water tanks.

The upper section of the potable water tanks is to act as a detention volume to achieve stormwater neutrality for the proposed impermeable areas exceeding the Permitted Activity threshold. One of the tanks is to be fitted with a 100mmØ overflow outlet with flow attenuation outlets as specified below.

Potable Tanks Detention Volume

As per the attached design calculations, the design elements of the detention volume are as follows:

Proposed Tank	2 x 25,000 litre Rainwater Tanks
Tank dimensions	3600mmØ (or greater) x 2600mm high (or greater)
Outlet orifice (10% AEP control)	**38mm diameter orifice**; located >630mm below the overflow outlet - 392mm water elevation - 8.0m³ Storage
Outlet orifice (1% AEP control)	**22mm diameter orifice**; located 400mm above the 10% AEP control orifice - 627mm water elevation - 12.8m³ Storage
Overflow Outlet	**100mm diameter**; located at the top of the tank

Discharge from the potable water / detention tanks must be transported via sealed pipes to the available stormwater connection. Refer to the appended Site Plan (133958-C200), Tank Detail (133958-C201) and calculation set for clarification.

The tank must be installed in accordance with the tank suppliers' details and specifications. Levels are to be confirmed by the contractor on-site prior to construction. Adequate fall (minimum 2% grade) from the tank's outlet to the discharge point is required. If this is not achievable, WJL must be contacted for review of the design.

Stormwater Mitigation – Hardstand

It is recommended to shape the proposed driveway to direct runoff to catchpits, which are required to drain directly to the available stormwater connection via sealed pipes.

Stormwater catchpit(s) and draining piping should be in accordance with E1 Surface Water of the NZBC. The catchpit(s) must have a suitable sump to serve as a pre-treatment device prior to discharging to the discharge point.

Runoff resulting from smaller hardstand areas is to be shaped to shed to an equal or greater sized area of lower-lying lawn / planted areas for passive mitigation. Runoff passed through lawn / planted areas will be naturally filtered of entrained pollutants via filtration and evapotranspiration.

Pool Overflows

To prevent contamination of runoff, no pool overflows may be directed to any part of the stormwater management system. Pool overflows are to be managed by a separate system designed by a suitably qualified professional.

7. STORMWATER RUNOFF SUMMARY

Refer to the appended HydroCAD Calculation output.

Pre-Development Scenario – 10% AEP & 1% AEP Storm Events + CCF

Surface	*Area*	*Runoff C*	*10% AEP Peak Flow Rate*	*1% AEP Flow Peak Rate*
Greenfields Impermeable Areas Exceeding Consent Condition Threshold (500m²)	255 m²	0.59	1.86ℓ/s	2.82ℓ/s

Post-Development Scenario – 10% AEP & 1% AEP Storm Events + CCF

Surface	*Area*	*Runoff C*	*10% AEP Peak Flow Rate*	*1% AEP Flow Peak Rate*
Post-Development Proposed Dwelling Roof Area Exceeding Consent Condition Threshold (500m²) via Detention Tanks	255 m²	0.96	1.84ℓ/s	2.82ℓ/s

Given the design parameters, stormwater neutrality has been achieved for the 10% AEP and 1% AEP storm events across the proposed impermeable surfaces over the permitted consent condition threshold.

8. DISTRICT PLAN ASSESSMENT

As the proposed development is not compliant with Permitted Activity Rule 8.7.5.1.5, nor Controlled Activity Rule 8.7.5.2.2, it is therefore regarded as a Discretionary Activity.

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:

(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;	Impermeable surfaces resulting from the development increase site impermeability. The proposed impermeable areas in exceedance of the consent condition threshold (500m²) have been attenuated back to pre-development flow rates for the 10% AEP and 1% AEP storm events, adjusted for climate change.
(b) the extent to which Low Impact Design principles have been used to reduce site impermeability;	The proposed impermeable areas in exceedance of the consent condition threshold (500m²) have been attenuated back to pre-development flow rates for the 10% AEP and 1% AEP storm events, adjusted for climate change.
(c) any cumulative effects on total catchment impermeability;	Impervious coverage will increase by 755m².
(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;	Runoff from the proposed impermeable areas is to be collected and directed to the available stormwater connection via sealed pipes. Ponding is not anticipated to occur provided the recommendations within this report are adhered to, mitigating interference with natural water absorption.
(e) the physical qualities of the soil type;	Kerikeri Volcanic Group – Moderate Drainage
(f) any adverse effects on the life supporting capacity of soils;	Stormwater runoff from the proposed impermeable roof areas 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 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;	Runoff resulting from the proposed roof areas and hardstand area is to be collected and directed to the available stormwater connection via sealed pipes, mitigating the potential for runoff to pass over / saturate surrounding soils. The site is large enough for on-site stormwater and effluent disposal (i.e. setbacks between water sources and effluent disposal comply with Table 9 of the PRPN).
(h) the extent to which paved, Impermeable Surfaces are necessary for the proposed activity;	The proposed driveway is necessary to provide the dwelling with access and is not considered excessive.
(i) the extent to which land scaping and vegetation may reduce adverse effects of run-off;	Existing vegetation and any plantings introduced by the homeowner during occupancy will aid in reducing surface water velocity and providing treatment. No

	specific landscaping scheme is proposed as part of the stormwater management system described herein.
(j) any recognised standards promulgated by industry groups;	Not applicable.
k) the means and effectiveness of mitigating stormwater runoff to that expected by permitted activity threshold;	The proposed impermeable areas in exceedance of the consent condition threshold (500m²) have been attenuated back to pre-development flow rates for the 10% AEP and 1% AEP storm events, adjusted for climate change. As such, stormwater runoff has been attenuated to flows lower than the permitted activity threshold flows.
(l) the extent to which the proposal has considered and provided for climate change;	NIWA RCP6.0 rainfall data scenario for 2081-2100 has been used for the post-development flow scenario.
(m) the extent to which stormwater detention ponds and other engineering solutions are used to mitigate any adverse effects.	The proposed impermeable areas in exceedance of the consent condition threshold (500m²) have been attenuated back to pre-development flow rates for the 10% AEP and 1% AEP storm events, adjusted for climate change.

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 (133958-C200 & 133958-C201).

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.

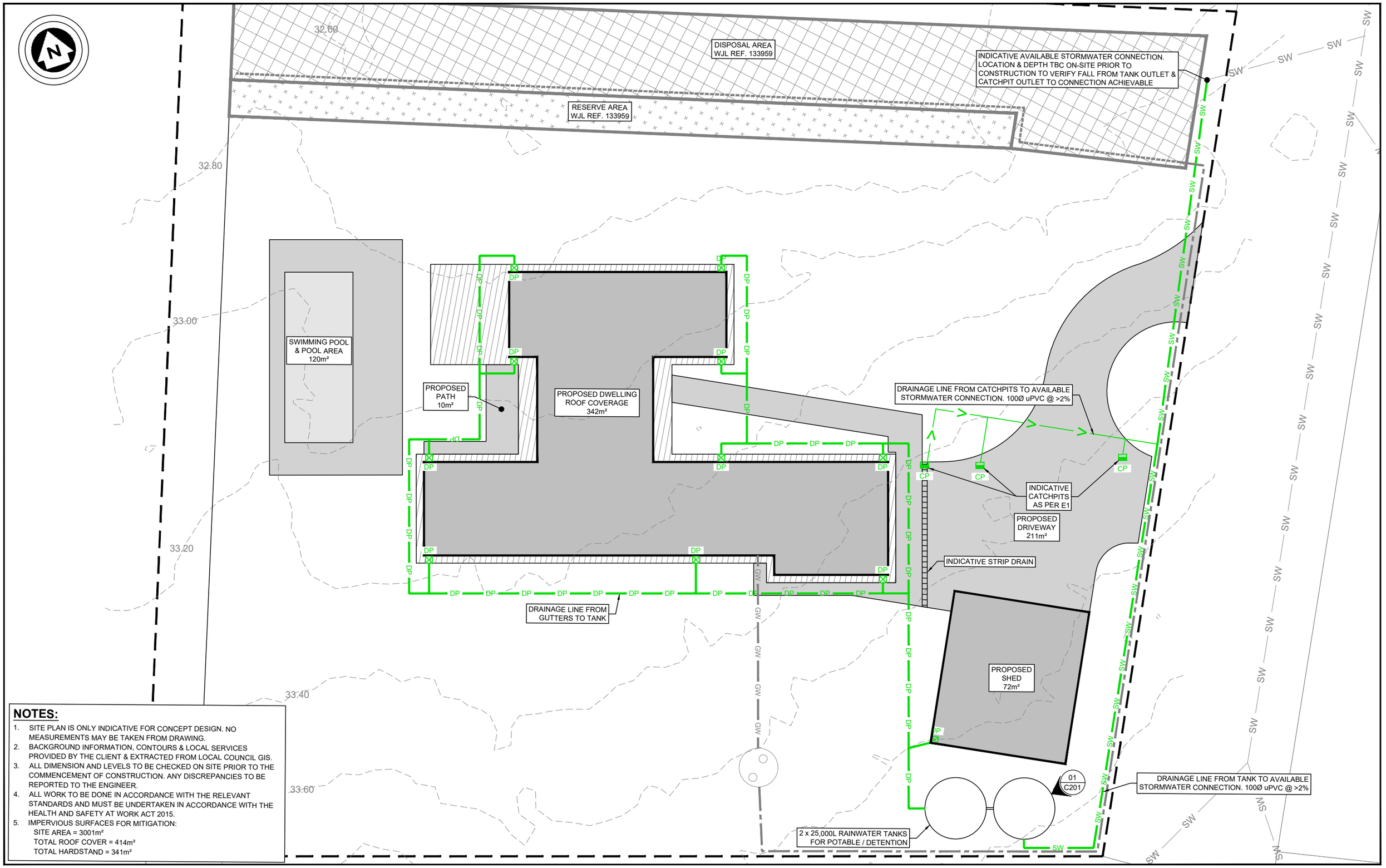
This report has been prepared for the particular project described to us and no responsibility is accepted for the use of any part of this report in any other context or for any other purpose.

Wilton Joubert Ltd.

Gustavo Brant
Civil Engineer
BE(Hons)

REPORT ATTACHMENTS

- Site Plan - C200 (1 sheet)
- Tank Detail - C201 (1 sheet)
- Calculation Set



NOTES:

1. SITE PLAN 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 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.
5. IMPERVIOUS SURFACES FOR MITIGATION:
   SITE AREA = 3001m²
   TOTAL ROOF COVER = 414m²
   TOTAL HARDSTAND = 341m²

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ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	MAY '24	GMB	STORMWATER MITIGATION REPORT
B	JUN '24	GMB	STORMWATER MITIGATION REPORT REV B

DESIGNED BY: GMB
DRAWN BY: GMB
CHECKED BY: BGS
SURVEYED BY: N/A

SERVICES NOTE
WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

BUILDING CONSENT
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

PROJECT TITLE:
LOT 10 DP 540557
19 TAREHA PLACE
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE:	OFFICE:
A3	OREWA
DRAWING SCALE:	CO-ORDINATE SYSTEM:
1:200	NOT COORDINATED

DRAWING NUMBER: **133958-C200**
ISSUE: **B**

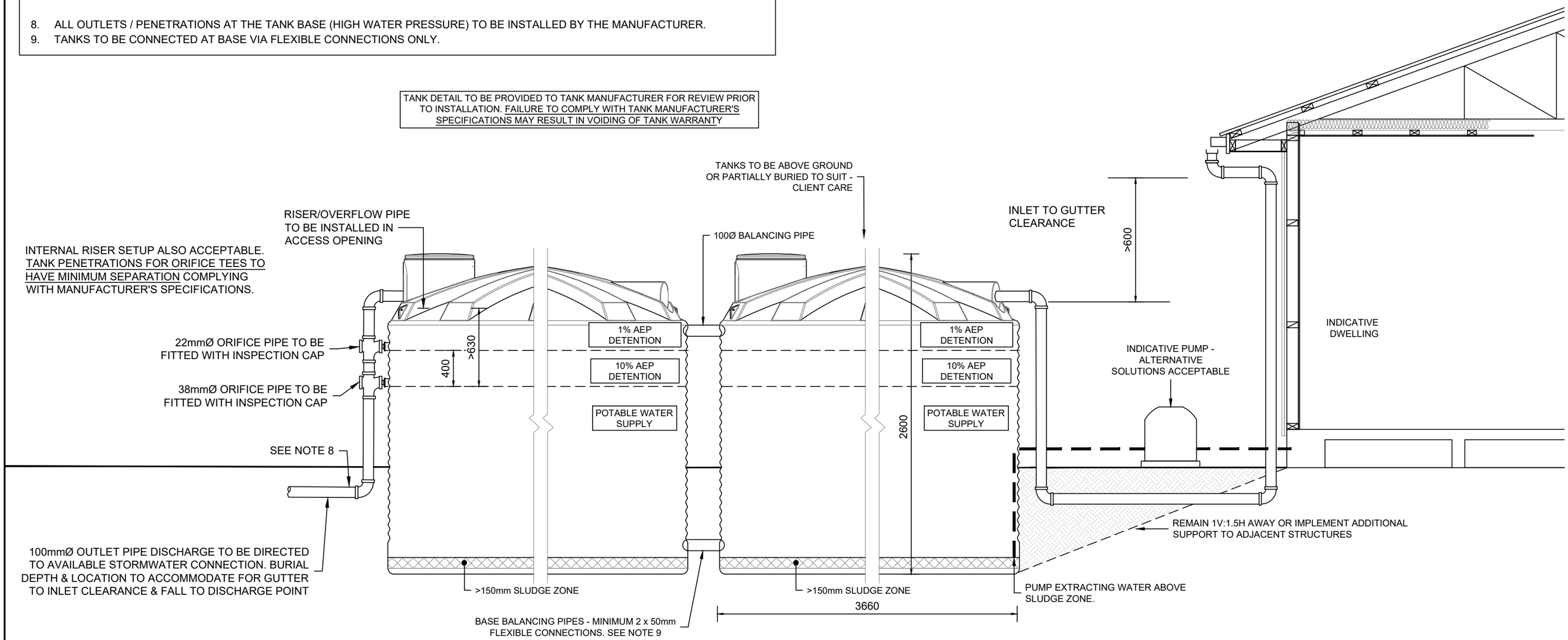
NOTES:

1. NOT TO SCALE. DRAWN INDICATIVELY ONLY.
2. ALL LEVELS & DIMENSIONS TO BE CONFIRMED ON SITE & ANY DISCREPANCIES TO BE REPORTED TO THE ENGINEER PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
3. TANK 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. ALL ORIFICE OUTLETS TO BE COVERED WITH STAINLESS STEEL OR NYLON MESH.
7. ASSUMED USE OF A 2 x 25,000 LITRE PLASTIC PROMAX WATER TANKS OR SIMILARLY APPROVED.

PLASTIC TANKS NOTES:

8. ALL OUTLETS / PENETRATIONS AT THE TANK BASE (HIGH WATER PRESSURE) TO BE INSTALLED BY THE MANUFACTURER.
9. TANKS TO BE CONNECTED AT BASE VIA FLEXIBLE CONNECTIONS ONLY.

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 / C200 **TANK DETAIL**
N.T.S

WILTON JOUBERT
Consulting Engineers
Northland: 09 945 4188 Auckland: 09 527 0196
Christchurch: 021 824 063 Wanaka: 03 443 6209
www.wiltonjoubert.co.nz

ISSUE / REVISION

No.	DATE	BY	DESCRIPTION
A	MAY '24	GMB	STORMWATER MITIGATION REPORT
B	JUN '24	GMB	STORMWATER MITIGATION REPORT REV B

DESIGNED BY: GMB
DRAWN BY: GMB
CHECKED BY: BGS
SURVEYED BY: N/A

SERVICES NOTE
WHERE EXISTING SERVICES ARE SHOWN, THEY ARE INDICATIVE ONLY AND MAY NOT INCLUDE ALL SITE SERVICES. WILTON JOUBERT LTD DOES NOT WARRANT THAT ALL, OR INDEED ANY SERVICES ARE SHOWN. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE AND PROTECT ALL EXISTING SERVICES PRIOR TO AND FOR THE DURATION OF THE CONTRACT WORKS.

BUILDING CONSENT
DESIGN / DRAWING SUBJECT TO ENGINEER'S APPROVAL

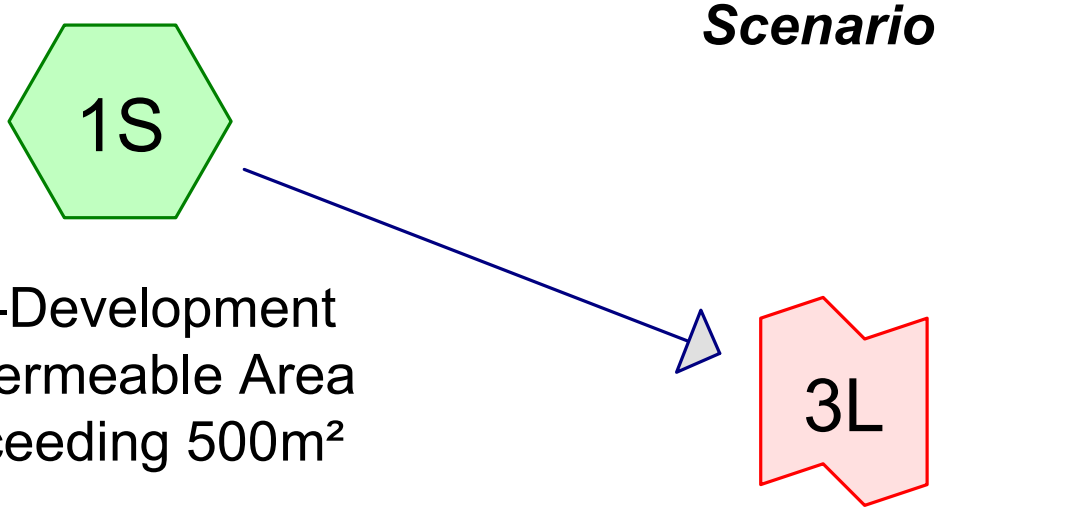
DRAWING TITLE: **SITE PLAN**

PROJECT DESCRIPTION: **STORMWATER MITIGATION REPORT**

PROJECT TITLE:
LOT 10 DP 540557
19 TAREHA PLACE
KERIKERI
NORTHLAND

ORIGINAL DRAWING SIZE: A3
OFFICE: **OREWA**
DRAWING SCALE: **N.T.S**
CO-ORDINATE SYSTEM: NOT COORDINATED
DRAWING NUMBER: **133958-C201**
ISSUE: **B**

Pre-Development Scenario



Subcat Reach Pond Link

Routing Diagram for 133958-B
Prepared by Wilton Joubert Limited, Printed 11/06/2024

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre-Development Runoff Area=255.0 m² 0.00% Impervious Runoff Depth=35 mm
Tc=10.0 min C=0.59 Runoff=1.86 L/s 8.9 m³

Link 3L: Pre-Development Inflow=1.86 L/s 8.9 m³
Primary=1.86 L/s 8.9 m³

Summary for Subcatchment 1S: Pre-Development Impermeable Area Exceeding 500m²

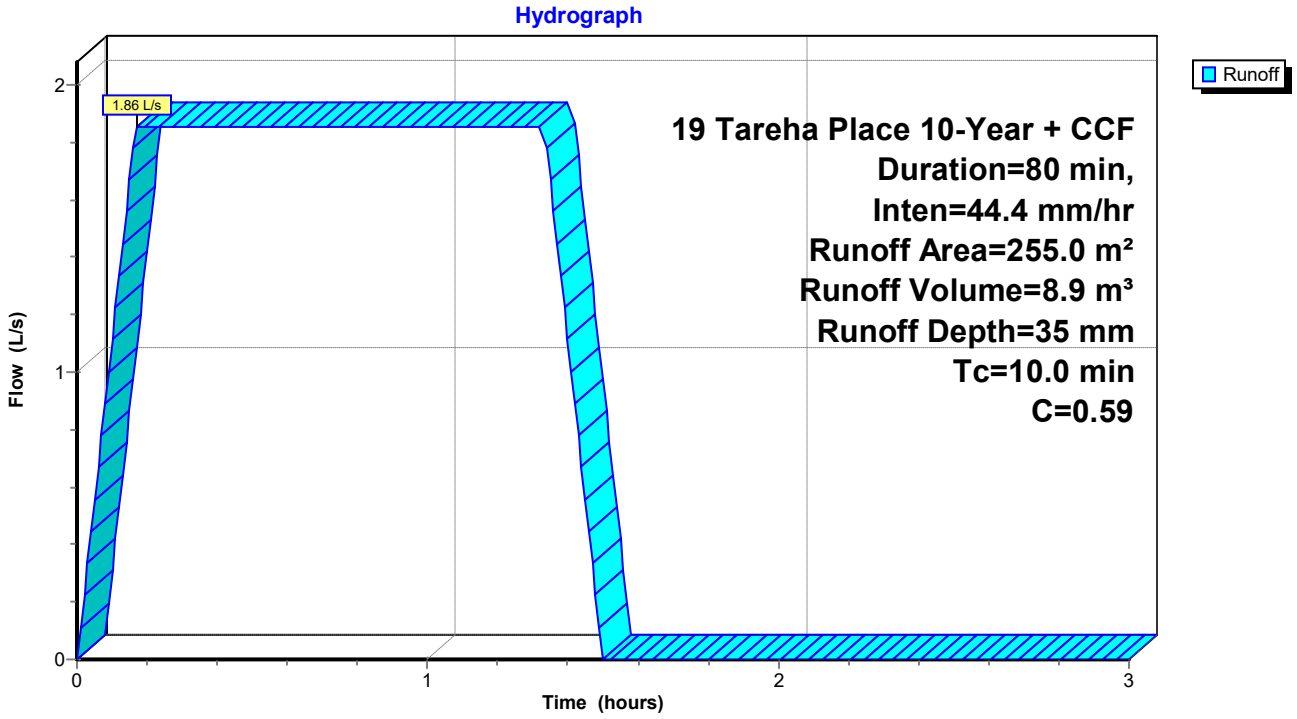
Runoff = 1.86 L/s @ 0.17 hrs, Volume= 8.9 m³, Depth= 35 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
19 Tareha Place 10-Year + CCF Duration=80 min, Inten=44.4 mm/hr

Area (m²)	C	Description
255.0	0.59	Grass, short
255.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Pre-Development Impermeable Area Exceeding 500m²

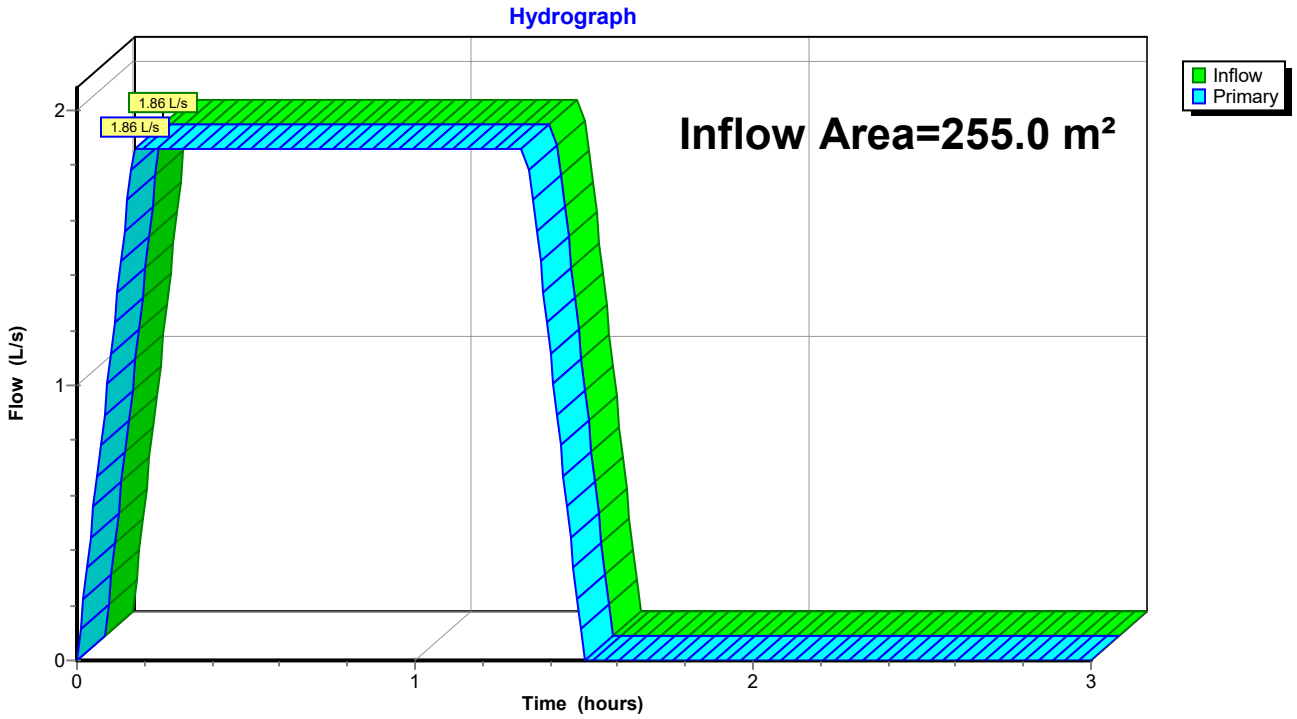


Summary for Link 3L: Pre-Development

Inflow Area = 255.0 m², 0.00% Impervious, Inflow Depth = 35 mm for 10-Year + CCF event
Inflow = 1.86 L/s @ 0.17 hrs, Volume= 8.9 m³
Primary = 1.86 L/s @ 0.17 hrs, Volume= 8.9 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Development



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1S: Pre-Development Runoff Area=255.0 m² 0.00% Impervious Runoff Depth=53 mm
Tc=10.0 min C=0.59 Runoff=2.82 L/s 13.5 m³

Link 3L: Pre-Development Inflow=2.82 L/s 13.5 m³
Primary=2.82 L/s 13.5 m³

Summary for Subcatchment 1S: Pre-Development Impermeable Area Exceeding 500m²

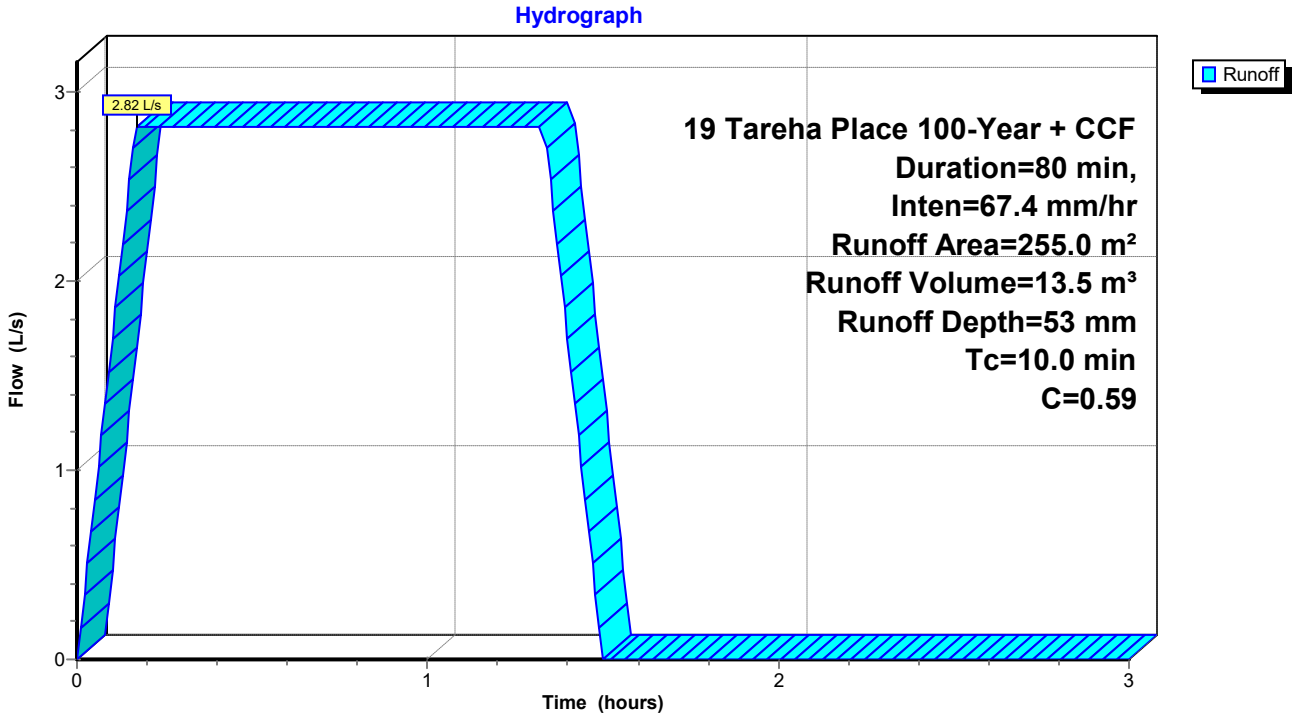
Runoff = 2.82 L/s @ 0.17 hrs, Volume= 13.5 m³, Depth= 53 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
19 Tareha Place 100-Year + CCF Duration=80 min, Inten=67.4 mm/hr

Area (m²)	C	Description
255.0	0.59	Grass, short
255.0		100.00% Pervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 1S: Pre-Development Impermeable Area Exceeding 500m²

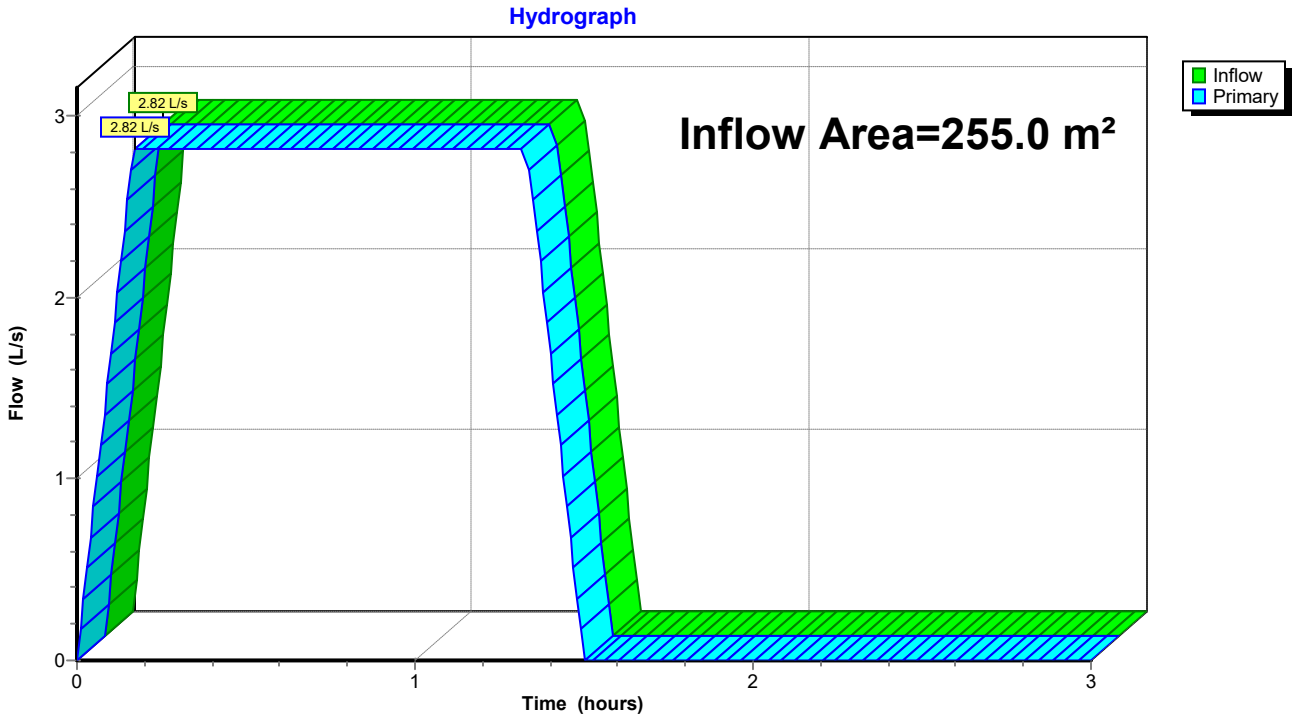


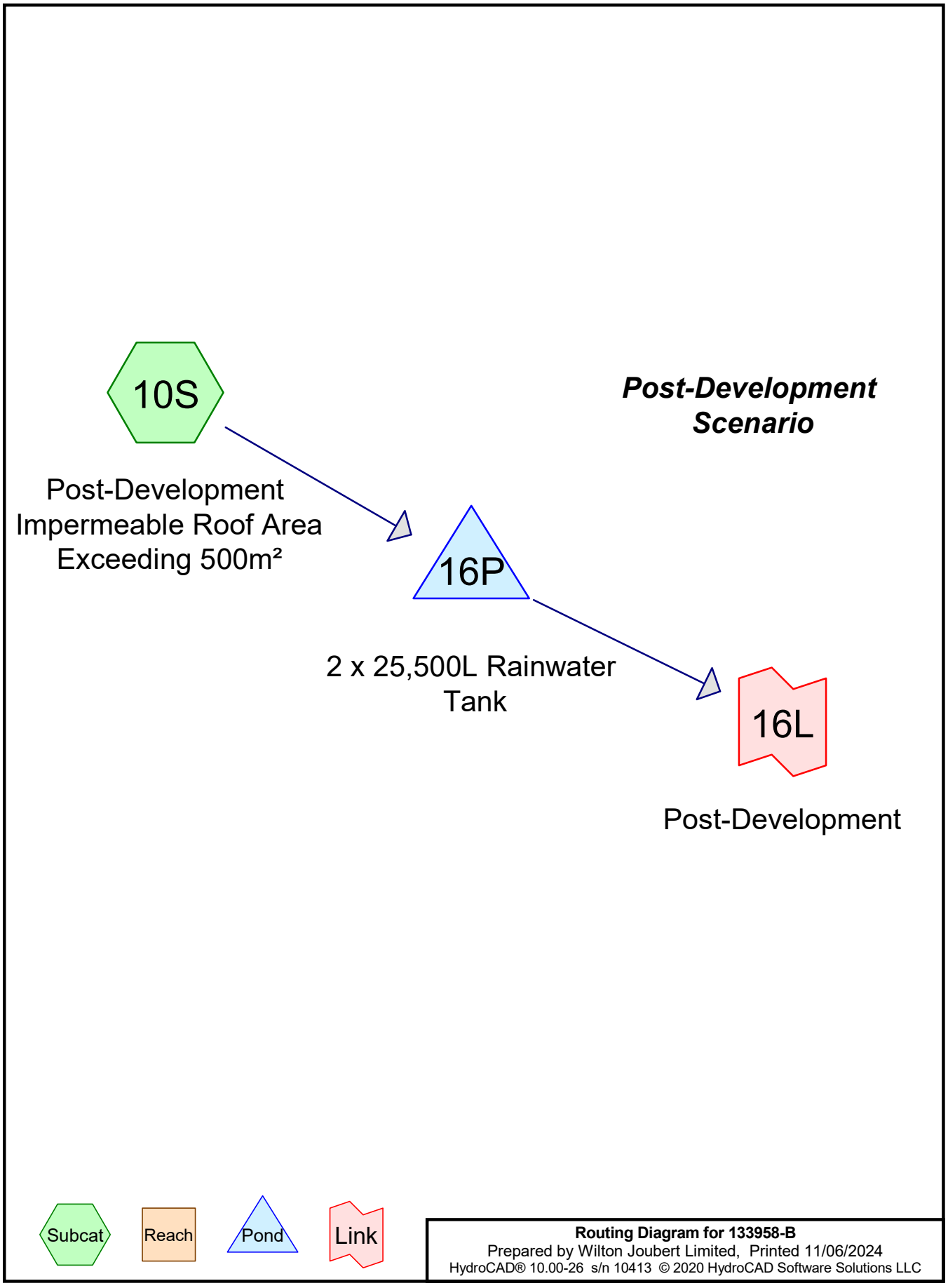
Summary for Link 3L: Pre-Development

Inflow Area = 255.0 m², 0.00% Impervious, Inflow Depth = 53 mm for 100-Year + CCF event
Inflow = 2.82 L/s @ 0.17 hrs, Volume= 13.5 m³
Primary = 2.82 L/s @ 0.17 hrs, Volume= 13.5 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 3L: Pre-Development





Routing Diagram for 133958-B
Prepared by Wilton Joubert Limited, Printed 11/06/2024

Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Post-Development Runoff Area=255.0 m² 100.00% Impervious Runoff Depth=57 mm
Tc=10.0 min C=0.96 Runoff=3.02 L/s 14.5 m³

Pond 16P: 2 x 25,500L Rainwater Tank Peak Elev=0.392 m Storage=8.0 m³ Inflow=3.02 L/s 14.5 m³
Outflow=1.84 L/s 13.3 m³

Link 16L: Post-Development Inflow=1.84 L/s 13.3 m³
Primary=1.84 L/s 13.3 m³

Summary for Subcatchment 10S: Post-Development Impermeable Roof Area Exceeding 500m²

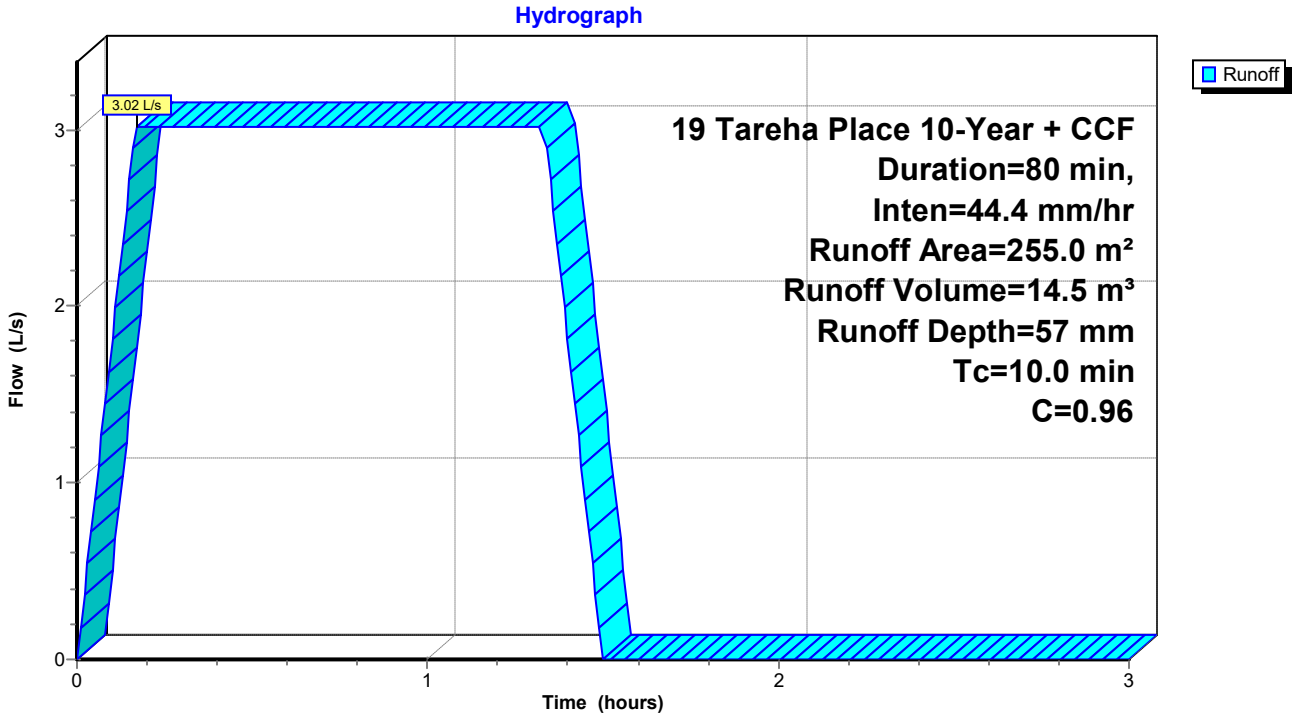
Runoff = 3.02 L/s @ 0.17 hrs, Volume= 14.5 m³, Depth= 57 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
19 Tareha Place 10-Year + CCF Duration=80 min, Inten=44.4 mm/hr

Area (m²)	C	Description
255.0	0.96	Roof
255.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 10S: Post-Development Impermeable Roof Area Exceeding 500m²



Summary for Pond 16P: 2 x 25,500L Rainwater Tank

Inflow Area = 255.0 m², 100.00% Impervious, Inflow Depth = 57 mm for 10-Year + CCF event
Inflow = 3.02 L/s @ 0.17 hrs, Volume= 14.5 m³
Outflow = 1.84 L/s @ 1.40 hrs, Volume= 13.3 m³, Atten= 39%, Lag= 73.7 min
Primary = 1.84 L/s @ 1.40 hrs, Volume= 13.3 m³

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 0.392 m @ 1.40 hrs Surf.Area= 20.4 m² Storage= 8.0 m³

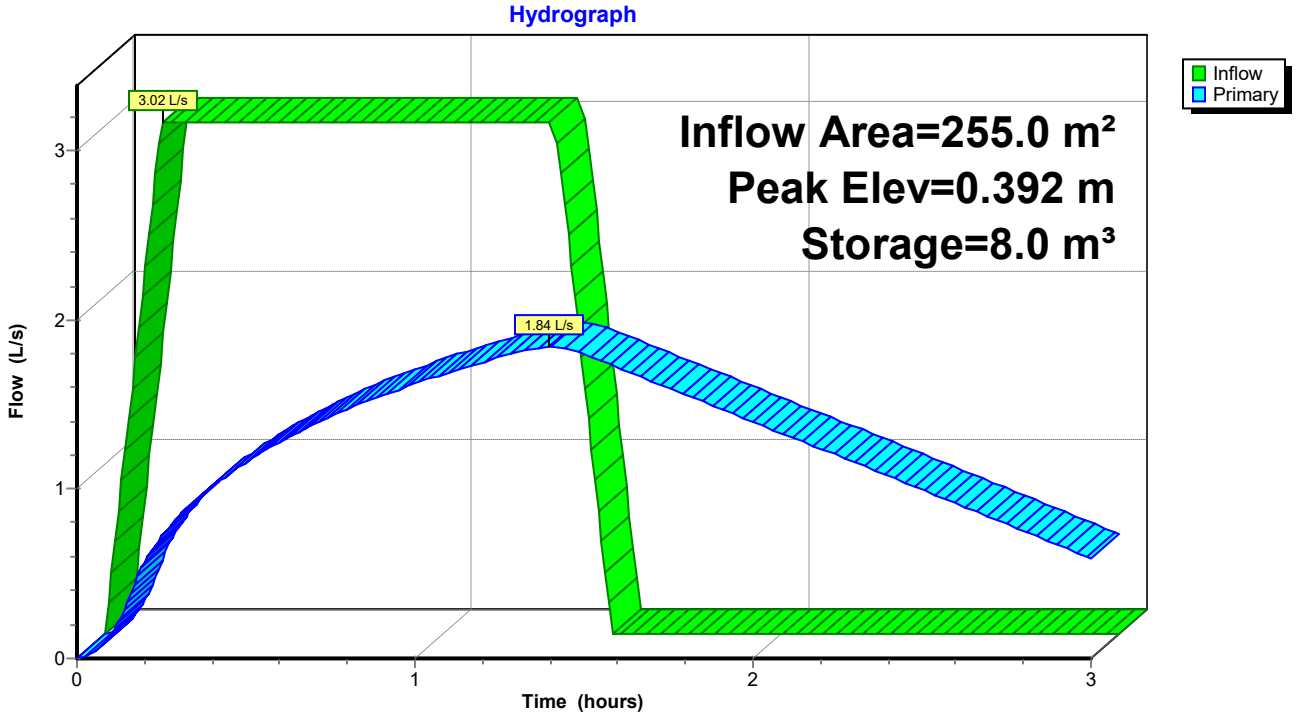
Plug-Flow detention time= 48.7 min calculated for 13.3 m³ (92% of inflow)
Center-of-Mass det. time= 45.4 min (90.4 - 45.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	52.9 m³	**3.60 mD x 2.60 mH Vertical Cone/Cylinder** x 2

Device	Routing	Invert	Outlet Devices	
#1	Primary	0.000 m	**38 mm Vert. Orifice/Grate**	C= 0.600
#2	Primary	0.400 m	**22 mm Vert. Orifice/Grate**	C= 0.600

Primary OutFlow Max=1.84 L/s @ 1.40 hrs HW=0.392 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 1.84 L/s @ 1.62 m/s)
└**2=Orifice/Grate** (Controls 0.00 L/s)

Pond 16P: 2 x 25,500L Rainwater Tank

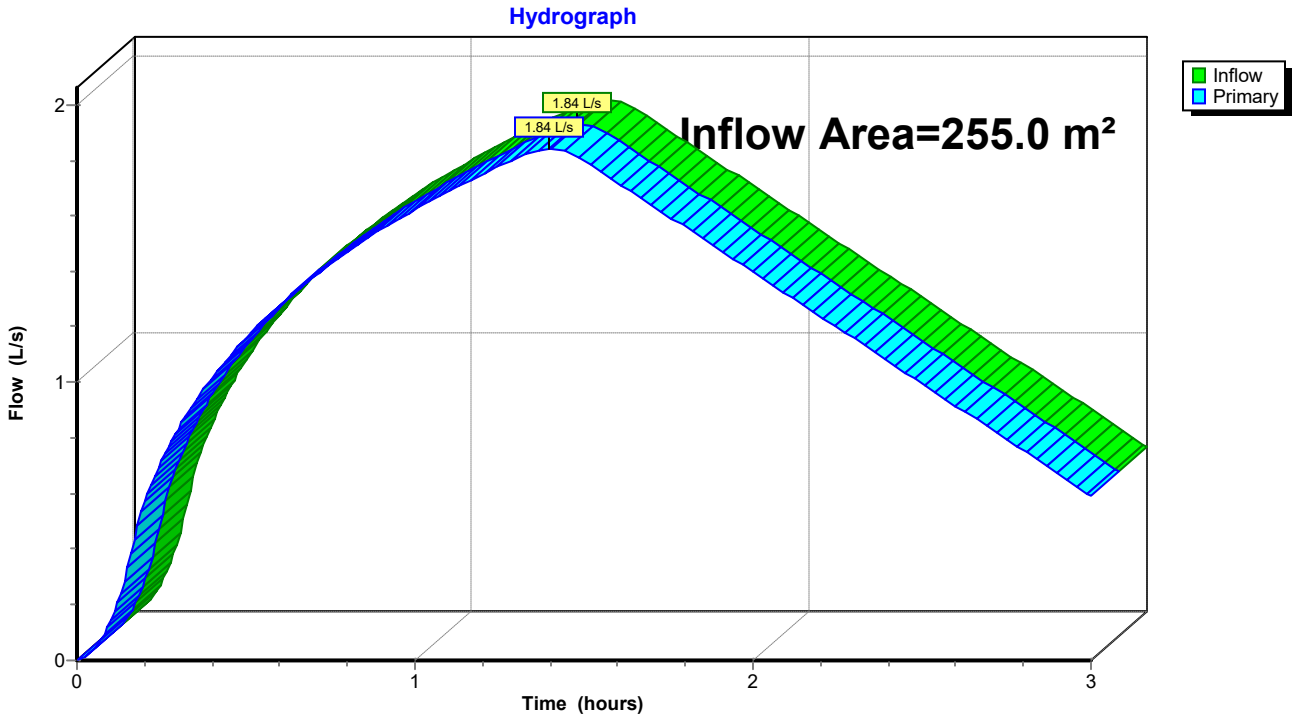


Summary for Link 16L: Post-Development

Inflow Area = 255.0 m²,100.00% Impervious, Inflow Depth > 52 mm for 10-Year + CCF event
Inflow = 1.84 L/s @ 1.40 hrs, Volume= 13.3 m³
Primary = 1.84 L/s @ 1.40 hrs, Volume= 13.3 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 16L: Post-Development



Time span=0.00-3.00 hrs, dt=0.01 hrs, 301 points
Runoff by Rational method, Rise/Fall=1.0/1.0 xTc
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 10S: Post-Development Runoff Area=255.0 m² 100.00% Impervious Runoff Depth=86 mm
Tc=10.0 min C=0.96 Runoff=4.58 L/s 22.0 m³

Pond 16P: 2 x 25,500L Rainwater Tank Peak Elev=0.627 m Storage=12.8 m³ Inflow=4.58 L/s 22.0 m³
Outflow=2.82 L/s 19.2 m³

Link 16L: Post-Development Inflow=2.82 L/s 19.2 m³
Primary=2.82 L/s 19.2 m³

Summary for Subcatchment 10S: Post-Development Impermeable Roof Area Exceeding 500m²

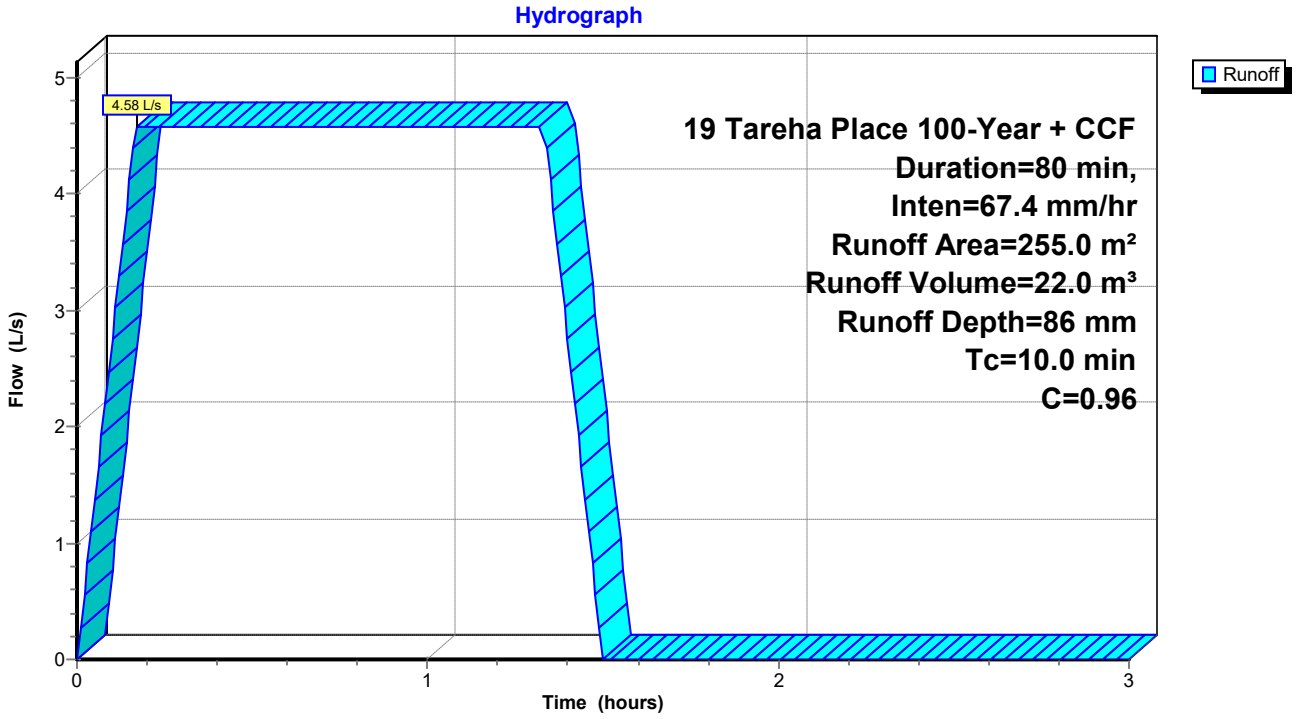
Runoff = 4.58 L/s @ 0.17 hrs, Volume= 22.0 m³, Depth= 86 mm

Runoff by Rational method, Rise/Fall=1.0/1.0 xTc, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
19 Tareha Place 100-Year + CCF Duration=80 min, Inten=67.4 mm/hr

Area (m²)	C	Description
255.0	0.96	Roof
255.0		100.00% Impervious Area

Tc (min)	Length (meters)	Slope (m/m)	Velocity (m/sec)	Capacity (m³/s)	Description
10.0					**Direct Entry,**

Subcatchment 10S: Post-Development Impermeable Roof Area Exceeding 500m²



Summary for Pond 16P: 2 x 25,500L Rainwater Tank

Inflow Area = 255.0 m², 100.00% Impervious, Inflow Depth = 86 mm for 100-Year + CCF event
Inflow = 4.58 L/s @ 0.17 hrs, Volume= 22.0 m³
Outflow = 2.82 L/s @ 1.40 hrs, Volume= 19.2 m³, Atten= 38%, Lag= 73.6 min
Primary = 2.82 L/s @ 1.40 hrs, Volume= 19.2 m³

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs
Peak Elev= 0.627 m @ 1.40 hrs Surf.Area= 20.4 m² Storage= 12.8 m³

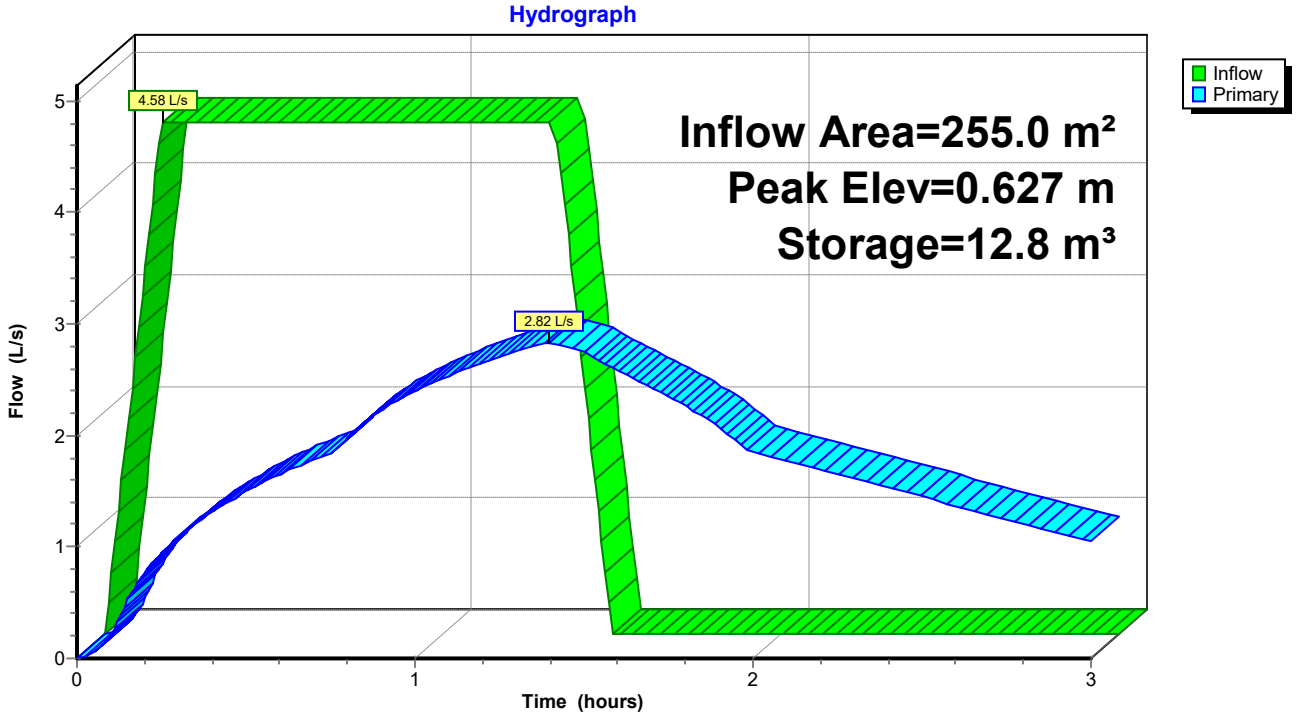
Plug-Flow detention time= 52.0 min calculated for 19.2 m³ (87% of inflow)
Center-of-Mass det. time= 46.8 min (91.8 - 45.0)

Volume	Invert	Avail.Storage	Storage Description
#1	0.000 m	52.9 m³	**3.60 mD x 2.60 mH Vertical Cone/Cylinder** x 2

Device	Routing	Invert	Outlet Devices	
#1	Primary	0.000 m	**38 mm Vert. Orifice/Grate**	C= 0.600
#2	Primary	0.400 m	**22 mm Vert. Orifice/Grate**	C= 0.600

Primary OutFlow Max=2.82 L/s @ 1.40 hrs HW=0.627 m (Free Discharge)
└**1=Orifice/Grate** (Orifice Controls 2.35 L/s @ 2.07 m/s)
└**2=Orifice/Grate** (Orifice Controls 0.47 L/s @ 1.24 m/s)

Pond 16P: 2 x 25,500L Rainwater Tank

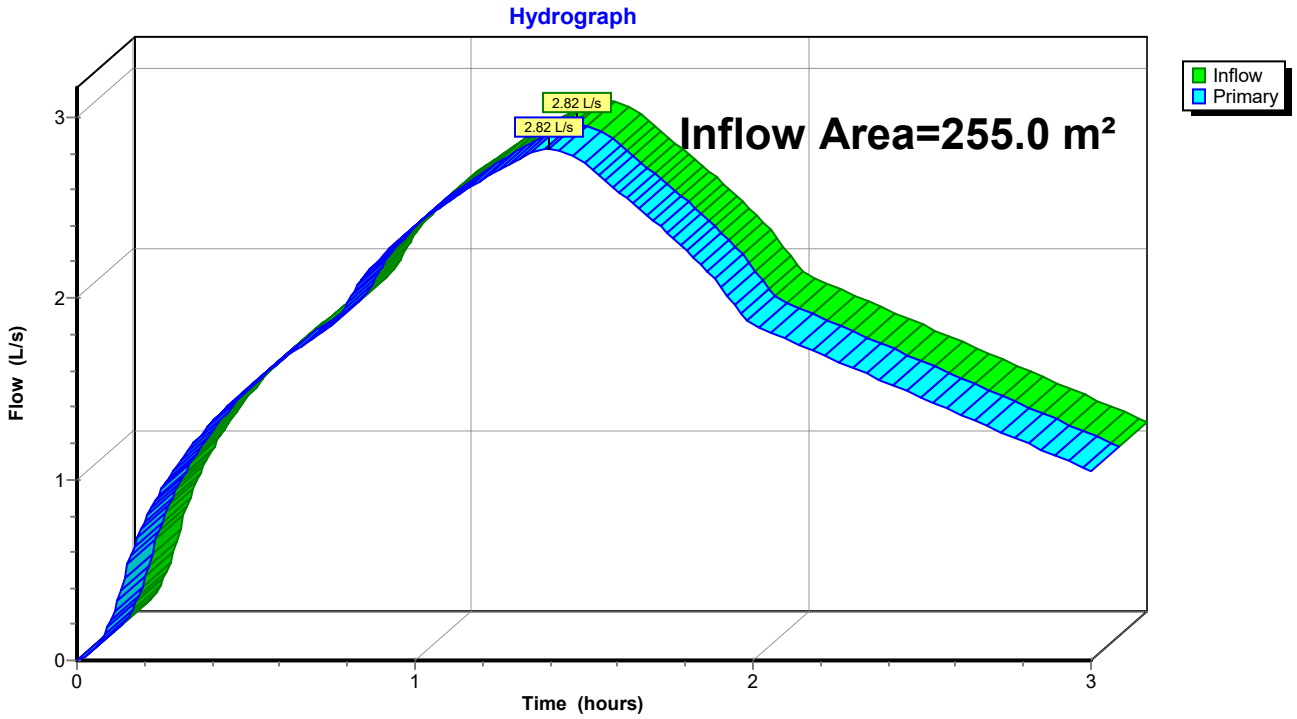


Summary for Link 16L: Post-Development

Inflow Area = 255.0 m²,100.00% Impervious, Inflow Depth > 75 mm for 100-Year + CCF event
Inflow = 2.82 L/s @ 1.40 hrs, Volume= 19.2 m³
Primary = 2.82 L/s @ 1.40 hrs, Volume= 19.2 m³, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs

Link 16L: Post-Development



From

RITCHIE CONSTRUCTION 2017 LTD
Business Acc
06-0350-0837302-00

Details on **your** statement	**19 Tareha Pl** Particulars	**RC** Code	**Hammond** Reference

To	Amount	Date	Things to know
Far North District C 12-3244-0022509-00	**$2,558.00**	**10/07/2024**	Your payment has been set up and we've withdrawn the funds.

Details on **their** statement	**19 Tareha Pl** Particulars	**RC** Code	**Hammond** Reference