

# Application for resource consent or fast-track resource consent

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

## 1. Pre-Lodgement Meeting

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

☐ Yes ☒ No

## 2. Type of consent being applied for

(more than one circle can be ticked):

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

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

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

☒ Yes ☐ No

## 4. Consultation

Have you consulted with Iwi/Hapū? ☐ Yes ☒ No

If yes, which groups have you consulted with?

Who else have you consulted with?

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

## 5. Applicant details

Name/s:

Sue Teixeira

Email:

Phone number:

Work

Home

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

101 Shepherd Road

Kerikeri

Postcode 230

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

If yes, please provide details.

## 6. Address for correspondence

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

Name/s:

Bay of Islands Planning Limited

Email:

Phone number:

W

Home

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

Postcode 230

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

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

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

Name/s:

Sue Sheets Teixeira

Property address/  
location:

101 Shepherd Road

Kerikeri

Postcode 230

## 8. Application site details

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

Name/s:

Site address/  
location:

101 Shepherd Road

Kerikeri

Postcode 230

Legal description:

Lot 1 DP 160255

Val Number:

Certificate of title:

NA96B/480

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

### Site visit requirements:

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

Is there a dog on the property? ☐ Yes ☒ No

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

## 9. Description of the proposal

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

3 lot subdivision

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

## 10. Would you like to request public notification?

☐ Yes ☒ No

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

(more than one circle can be ticked):

☐ Building Consent

☐ Regional Council Consent (ref # if known)

☐ National Environmental Standard Consent

☐ Other (please specify)



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

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

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

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

☐ Subdividing land

☐ Disturbing, removing or sampling soil

☐ Changing the use of a piece of land

☐ Removing or replacing a fuel storage system

13. Assessment of environmental effects:

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

Your AEE is attached to this application ☒ Yes

14. Draft conditions:

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

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

15. Billing Details:

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

Name/s: (please write in full)

SUE SHEETS TEIXEIRA

Email:

[REDACTED]

Phone number:

Work

Home

[REDACTED]

Postal address:

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

100 SHEPHERD RD.

KERIKERI, 0230

Postcode 0230

Fees Information

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



### 15. Billing details continued...

#### Declaration concerning Payment of Fees

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

Name: (please write in full)

Signature:

(signature of bill payer)

SUE SAEETB TEIXEIRA  
[Redacted Signature]  
Date 12/11/25

MANDATORY

### 16. Important Information:

#### Note to applicant

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

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

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

#### Fast-track application

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

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

#### Privacy Information:

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

### 17. Declaration

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

Name (please write in full)

Andrew McPhee

Signature

[Redacted Signature]

Date

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

See overleaf for a checklist of your information...



## Checklist

*Please tick if information is provided*

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

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



## BAY OF ISLANDS PLANNING (2022) LIMITED

**Kerikeri House  
Suite 3, 88 Kerikeri Road  
Kerikeri**

Email – [office@bayplan.co.nz](mailto:office@bayplan.co.nz) Website - [www.bayplan.co.nz](http://www.bayplan.co.nz)

.....

18 November 2025

**Re: Proposed 3 lot Subdivision, 101 Shepherd Road, Kerikeri**

Our client, Sue Teixeira seeks a subdivision consent to subdivide a 11.5970-hectare rural property into three lots.

The application is a Restricted Discretionary Activity under the Operative Far North District Plan (**ODP**) that can meet the applicable subdivision performance standards specified in the Rural Production Zone. In terms of the Proposed Far North District Plan (**PDP**) the property is also zoned Rural Production. We attach the following information to support the application:

- **Planning Report and Assessment of Environmental Effects**
- **Appendix A – Record of Title**
- **Appendix B - Subdivision Plan, dated 10 November 2025**
- **Appendix C – Site Assessment Report (Geotechnical), dated 14 November 2025**
- **Appendix D – Site Suitability Report (three waters and access), dated 14 November 2025**

Please do not hesitate to contact me should you require any further information.



Andrew McPhee  
Consultant Planner

## 1.0 INTRODUCTION

The applicant seeks subdivision consent for a 3-lot subdivision of the 11.5970-hectare property at 101 Shepherd Road, Kerikeri and a concurrent boundary adjustment with the adjoining northern lot (Sec 4 SO 496053).

The site is legally described as Lot 1 DP 160255 and Sec 4 SO 496053. A copy of the Records of Title for these properties is attached at **Appendix A**.

The purpose of the boundary adjustment is to rectify a pre-existing shed/garage that straddles the common boundary. The new boundary, as shown on the Subdivision Plan (**Appendix B**), will place this building entirely within the boundary of Proposed Lot 3.

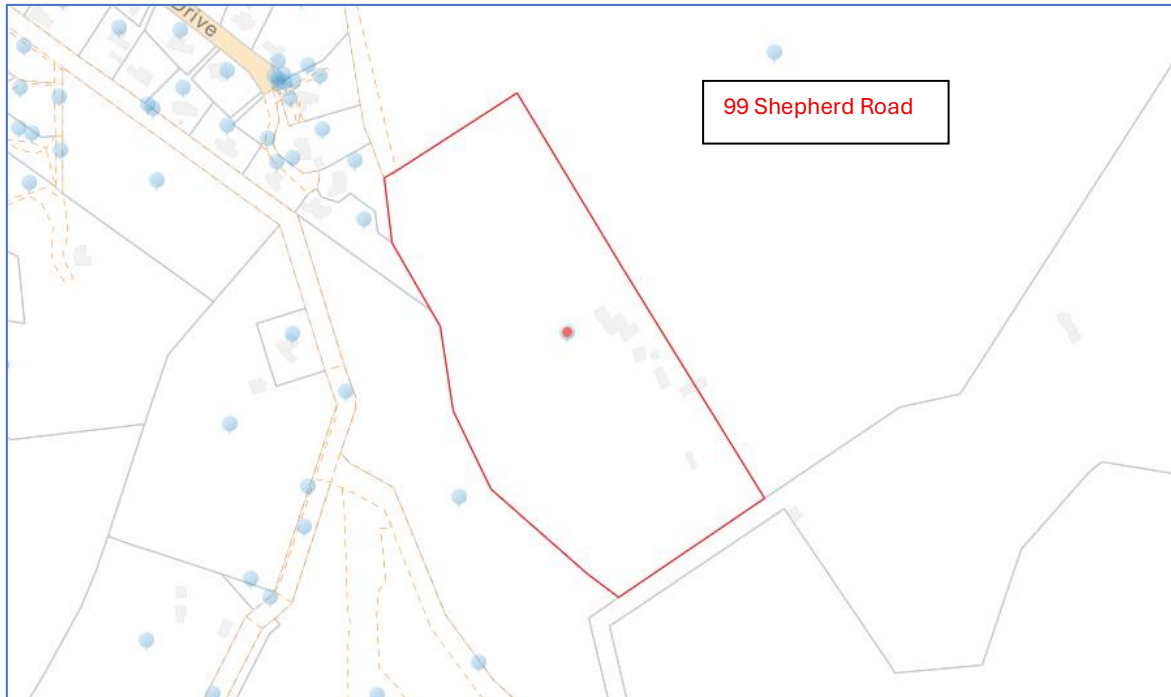
The application is a Restricted Discretionary Activity subdivision under the ODP, which complies with the minimum alternate subdivision standards for the Rural Production zone.

It is concluded that any potential adverse effects arising from the subdivision would be less than minor and that the proposal reflects an anticipated pattern of development that is enabled by the District Plan.



**Figure 1 – Site Aerial 101 Shepherd Rd (Source: Prover)**





**Figure 2 – Site 101 Shepherd Road (Source: Prover)**

## 2.0 SITE AND LOCALITY DESCRIPTION

The application site is accessed from Shepherd Road via a right of way over 99 Shepherd Road (Section 4 Survey Office Plan 496053), north of the site. The property is approximately 2km east of the urban area of Kerikeri Township and directly abuts the Rural Living zone in that direction.

The proposed allotments within the sites are predominantly covered in pasture.

The site has been used for grazing and is not identified as a contaminated site in the NRC land-use register therefore a HAIL report is not considered necessary.

The surrounds are similarly rural in nature and of a similar character to the application site.

## 3.0 DESCRIPTION OF THE PROPOSAL

### *Subdivision and Boundary Adjustment*

The proposal involves two components, as shown on the Subdivision Plan in **Appendix B:**

1. A 3-Lot Subdivision of Lot 1 DP 160255 to create two new rural-residential lots and a balance lot.
2. A Boundary Adjustment between the newly created balance lot (Proposed Lot 3) and the adjoining northern lot, Sec 4 SO 496053.

The proposed subdivision would create two rural residential lots, and a third balance lot established 19 September 1994 as follows:

- Lot 1 – 4,300m<sup>2</sup>
- Lot 2 – 4,200m<sup>2</sup>
- Lot 3 – 11.7ha
- Lot 4 – 45ha (balance of Sec 4 SO 496053).

See the proposed plan below. A detailed subdivision plan is attached at **Appendix B**.



**Figure 3 – Subdivision Plan (Source: BOI Survey)**

Lot 1 and 2 are the smaller rural residential lots, which are currently vacant. Proposed Lot 3 (balance lot) includes an existing dwelling and a number of garages and sheds.



All of the proposed Lots will be accessed via the right of way through 99 Shepherd Road. As detailed in the Civil Site Suitability Report (refer **Appendix D**), the existing shared accessway will be upgraded to service the new lots. This will include the construction of four new passing bays in the locations specified in the Accessway Plan (C400) to comply with Council standards.

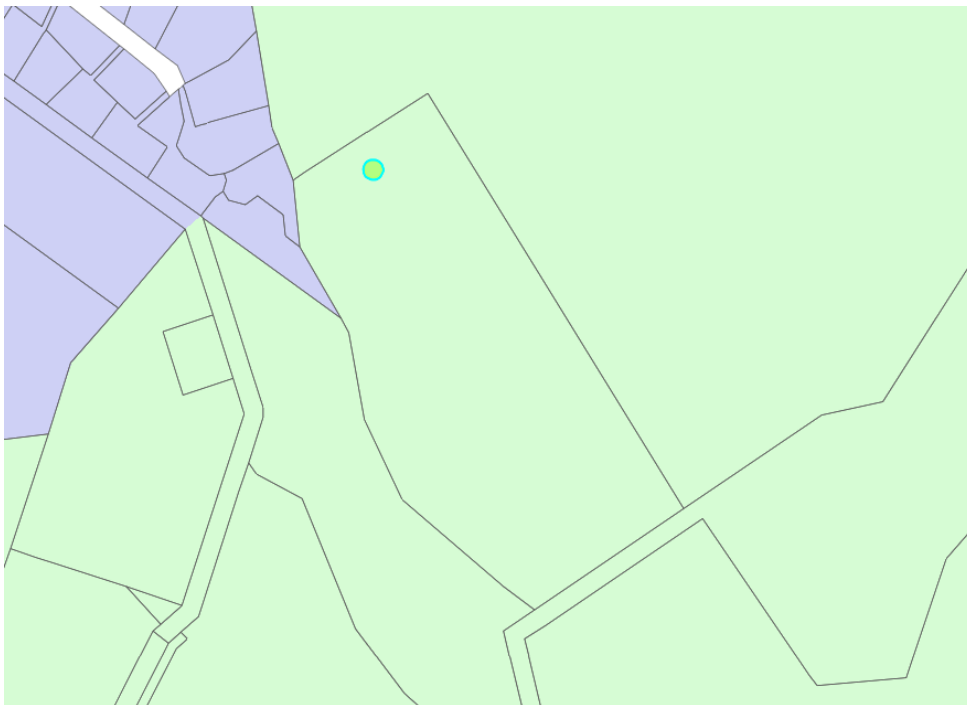
Proposed Lots 1 and 2 will share a right of way, electricity, telecommunications and water easement, shown as easement A on the Subdivision Plan (refer **Appendix B**).

From an engineering perspective, the proposal can be serviced on site subject to recommendations contained within the Engineering Reports found in **Appendix C and D**.

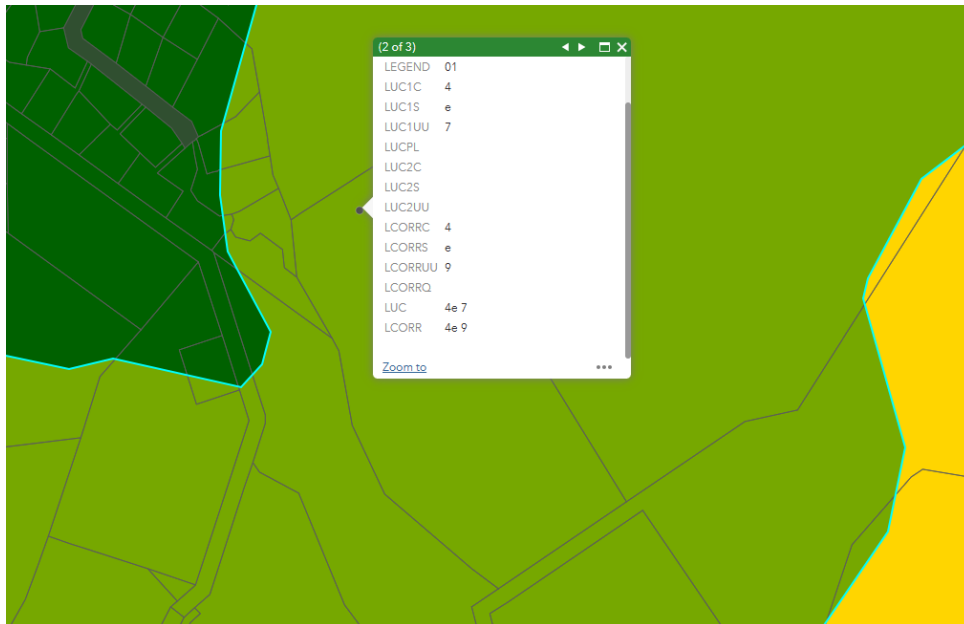
#### **4.0 REASONS FOR CONSENT**

##### **Operative Far North District Plan (ODP)**

Under the ODP, the site is zoned Rural Production. There are no resource features identified on the site. Soils are Class 4 and not considered to be highly productive.



**Figure 4 - FNDC Operative District Plan Map – Rural Production zone (Source Far North Maps)**



**Figure 5 - FNDC Land Cover and Land Use Map (Source Far North Maps)**

### **Proposed Far North District Plan (PDP)**

Under the PDP, the site is zoned Rural Production. There are no resource features identified on the site.



**Figure 6 - FNDC Proposed District Plan Map – Rural Production zone (Source Far North Maps)**

### **Subdivision**



Chapter 13 Subdivision Rules 13.7.2.1(i) Clause 3 ‘Allotment Sizes, Dimensions and Other Standards’ and Rule 13.8.1(b) ‘Restricted Discretionary Activities’ provide for alternate subdivision outcomes on sites existing as at or prior to 28 April 2000 as follows:

- A maximum of 3 lots in any subdivision, provided that the minimum site is 4,000m<sup>2</sup> and a balance lot of not less than 4 hectares.

A Boundary Adjustment is a ‘Controlled Activity’ under Rule 13.7.1 of the ODP where it meets the criteria (a) to (f).

The subdivision proposal is subject to other performance standards as set out in Table 1 below:

**Table 1: Subdivision Performance Standards**

| Performance Standard                 | Comment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rule 13.7.1 Boundary Adjustments     | <p>There is no change in the number and location of any access to the lots involved.</p> <p>There is no increase in the number of certificates of title.</p> <p>Proposed Lot 3 is already non-complying, however the site will increase in size. Lot 4 complies with the allowable minimum lot size.</p> <p>The area affected by the boundary adjustment is within or contiguous with the area of the original lots.</p> <p>All existing on-site drainage systems are wholly contained within the boundary adjusted sites.</p> <p><b>Controlled Activity</b></p> |
| Rule 13.7.2.1 – Minimum Lot Size     | <p>The proposal meets the RDA criteria as outlined above. Proposed lots 1 and 2 are larger than 4,000m<sup>2</sup> and the balance lot is greater than 4ha. The site existed prior to 28 April 2000.</p> <p><b>Restricted Discretionary Activity</b></p>                                                                                                                                                                                                                                                                                                         |
| Rule 13.7.2.2 – Allotment dimensions | <p>All proposed Lots can achieve the required 30m x 30m square building envelopes.</p> <p><b>Complies</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|                                                                                                                         |                |
|-------------------------------------------------------------------------------------------------------------------------|----------------|
| Rule 13.7.2.3 -Amalgamation of land in a rural zone with land in an urban or coastal zone                               | Not applicable |
| Rule 13.7.2.4 – Lots divided by zone boundaries                                                                         | Not applicable |
| Rule 13.7.2.5 - Sites divided by an outstanding landscape, outstanding landscape feature or outstanding natural feature | Not applicable |
| Rule 13.7.2.6 – Activities, Utilities, Roads and Reserves                                                               | Not applicable |
| Rule 13.7.2.7 – Savings as to previous approvals                                                                        | Not applicable |
| Rule 13.7.2.8 – Proximity to Top Energy transmission lines                                                              | Not applicable |
| Rule 13.7.2.9 – Proximity to National Grid                                                                              | Not applicable |

As a Restricted Discretionary Activity, the proposal must consider the matters set out in Table 2 below.

**Table 2: Subdivision Rule 13.7.3 Matters**

| Performance Standard                      | Comment                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Rule 13.7.3.1 – Property Access           | The existing accessway (right-of-way over 99 Shepherd Road) will be upgraded along its entire length to service the proposed sites. This includes the construction of new passing bays in the locations specified in the Civil Report Accessway Plan (C400), ensuring efficient and safe shared access.                  |
| Rule 13.7.3.2 - Natural and other Hazards | The Geotechnical Report ( <b>Appendix C</b> ) identifies the building platforms on Lots 1 and 2 as being on Class H (expansive soils). This is a known condition in the district and can be managed via a consent notice registered on the new titles, requiring specific engineering design for all future foundations. |
| Rule 13.7.3.3 - Water Supply              | The Civil Report ( <b>Appendix D</b> ) confirms that each new lot can be adequately serviced by on-site potable rainwater storage. It                                                                                                                                                                                    |

|                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                  | recommends 2 x 25,000l tanks per future dwelling for Lots 1 and 2 to meet domestic and firefighting needs.                                                                                                                                                                                                                                     |
| Rule 13.7.3.4 - Stormwater Disposal                                                                                              | The Civil Report ( <b>Appendix D</b> ) confirms stormwater can be managed on-site. The permitted impermeable area for Lots 1 & 2 is 630m <sup>2</sup> (15%). The report provides a concept design for attenuation using rainwater tanks, demonstrating that any breach of this (up to the 20% Controlled Activity threshold) can be mitigated. |
| Rule 13.7.3.5 - Sanitary Sewage Disposal                                                                                         | The Civil Report ( <b>Appendix D</b> ) confirms that Lots 1 and 2 are suitable for on-site wastewater disposal. It provides a concept design for a 4-bedroom dwelling using a secondary treatment system and a 360m <sup>2</sup> disposal field and a 108m <sup>2</sup> reserve area.                                                          |
| Rule 13.7.3.6 - Energy Supply                                                                                                    | Not a requirement for Rural Production subdivision, however an easement has been provided over proposed lot 3 to provide these services.                                                                                                                                                                                                       |
| Rule 13.7.3.7 - Telecommunications                                                                                               | Not a requirement for Rural Production subdivision, however an easement has been provided over proposed lot 3 to provide these services.                                                                                                                                                                                                       |
| Rule 13.7.3.8 - Easements for any purpose                                                                                        | The proposed easements are outlined within the Subdivision Plan (see <b>Appendix B</b> ).                                                                                                                                                                                                                                                      |
| Rule 13.7.3.9 - Preservation of heritage resources, vegetation, Fauna and Landscape and Land set aside for conservation purposes | Not applicable.                                                                                                                                                                                                                                                                                                                                |
| Rule 13.7.3.10 - Access to reserves and waterways                                                                                | There are no features of this nature on or adjacent to the site, therefore access is not required.                                                                                                                                                                                                                                             |
| Rule 13.7.3.11 - Land use compatibility                                                                                          | There are no Land Use incompatibility issues associated with the proposed subdivision as subdivision of this nature is expected.                                                                                                                                                                                                               |
| Rule 13.7.3.12 - Proximity to Airports                                                                                           | There are no airports within 500m of the proposed subdivision.                                                                                                                                                                                                                                                                                 |

For completeness, the existing development on Lot 3 has been checked against the land use rules of the Rural Production Zone. This is assessed in Table 3.



**Table 3: Rural Production Zone Performance Standards**

| <b>Chapter 8 – Rural Environment – Rural Production Zone</b> |                                                                                                                                                                                                                                                                                                                                                                                               |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Performance Standard</b>                                  | <b>Comment</b>                                                                                                                                                                                                                                                                                                                                                                                |
| <b>8.6.5.1.1 Residential Intensity</b>                       | <p>There is one existing residential dwelling on the property. This will be contained within proposed Lot 3. The remainder of the proposed sites are vacant in terms of residential units.</p> <p><b>Permitted Activity</b></p>                                                                                                                                                               |
| <b>8.6.5.1.2 Sunlight</b>                                    | <p>A pre-existing shed/garage straddles the boundary. This application includes a concurrent Controlled Activity boundary adjustment (under Rule 13.7.1) to relocate this boundary, placing the building entirely within proposed Lot 3. This rectifies the pre-existing non-compliance. The subdivision, once complete, will comply with this standard.</p> <p><b>Permitted Activity</b></p> |
| <b>8.6.5.1.3 Stormwater Management</b>                       | <p>The site is currently vacant in terms of impermeable surfaces with the exception of the existing residential dwelling on proposed Lot 3 which is less than 15% of the total area.</p> <p><b>Permitted Activity</b></p>                                                                                                                                                                     |
| <b>8.6.5.1.4 Setback from boundaries</b>                     | <p>A pre-existing shed/garage straddles the boundary. This application includes a concurrent Controlled Activity boundary adjustment (under Rule 13.7.1) to relocate this boundary, placing the building entirely within proposed Lot 3. This rectifies the pre-existing non-compliance. The subdivision, once complete, will comply with this standard.</p> <p><b>Permitted Activity</b></p> |
| <b>8.6.5.1.5 Transportation</b>                              | Refer Table 5 below                                                                                                                                                                                                                                                                                                                                                                           |
| <b>8.6.5.1.6 Keeping of Animals</b>                          | Not applicable.                                                                                                                                                                                                                                                                                                                                                                               |
| <b>8.6.5.1.7 Noise</b>                                       | <p>The proposed use of the site is for rural-residential and rural purposes and is subject to the District Plan noise standards. The existing dwelling on proposed Lot 3 is anticipated to comply as a residential activity.</p>                                                                                                                                                              |

|                                        |                                                                                                                                                                                                     |
|----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                        | <b>Permitted Activity</b>                                                                                                                                                                           |
| <b>8.6.5.1.8 Building Height</b>       | The existing buildings can comply with the height standards. Any new buildings would be subject to building height controls.<br><br><b>Permitted Activity</b>                                       |
| <b>8.6.5.1.8 Building Coverage</b>     | The existing building coverage on proposed Lot 3 is less than 12.5% of the total area. The other proposed lots are currently vacant in terms of built development.<br><br><b>Permitted Activity</b> |
| <b>8.6.5.1.11 Scale of Activities</b>  | Not applicable. Residential or rural activities proposed.<br><br><b>Permitted Activity</b>                                                                                                          |
| <b>8.6.5.1.12 Temporary Activities</b> | Not applicable<br><br><b>Permitted Activity</b>                                                                                                                                                     |

District wide rules are assessed below to ensure that subdivision does not result in additional land use consents. These are addressed in the tables below.

**Table 4: Natural and Physical Resources Performance Standards**

| <b>Chapter 12 – Natural and Physical Resources</b> |                                                                                                                                                                     |
|----------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>12.1 Landscapes and Natural Features</b>        | The proposed subdivision is not affected by landscapes and natural features.<br><br><b>Permitted Activity</b>                                                       |
| <b>12.2 Indigenous Flora and Fauna</b>             | The site is mapped as being within a Kiwi Present area.<br><br>Vegetation clearance is not required for this proposed subdivision.<br><br><b>Permitted Activity</b> |
| <b>12.3 Soils and Minerals</b>                     | There are no earthworks associated with the subdivision.<br><br><b>Permitted Activity</b>                                                                           |

|                                                       |                                                                                                                                                     |
|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>12.4 Natural Hazards</b>                           | There are no identified hazards on the NRC or FNDC natural hazard maps that affect the proposed 3-lot subdivision.<br><br><b>Permitted Activity</b> |
| <b>12.5 Heritage</b>                                  | There are no heritage or sites of cultural significance to Māori located on the property.<br><br><b>Permitted Activity</b>                          |
| <b>12.6 Air</b>                                       | Not applicable<br><br><b>Permitted Activity</b>                                                                                                     |
| <b>12.7 Lakes, Rivers, Wetlands and the Coastline</b> | Vacant lots can be developed an appropriate distance from these features.<br><br><b>Permitted Activity</b>                                          |
| <b>12.8 Hazardous Substances</b>                      | Not applicable<br><br><b>Permitted Activity</b>                                                                                                     |
| <b>12.9 Renewable Energy and Energy Efficiency</b>    | Not applicable<br><br><b>Permitted Activity</b>                                                                                                     |

Table 5: Transportation Performance Standards

| Chapter 15 - Transportation        |                                                                                                                                                       |
|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>15.1.6A.2 Traffic Intensity</b> | The proposed subdivision would enable land use activities that can comply with the permitted traffic intensity rule.<br><br><b>Permitted Activity</b> |
| <b>15.1.6B.1 Parking</b>           | On-site carparking can be provided for the range of permitted land use activities enabled by the subdivision.<br><br><b>Permitted Activity</b>        |
| <b>15.1.6C Access</b>              | The existing vehicle crossing is compliant. The existing accessway will be upgraded with new passing bays to meet the                                 |



|                                                              |                                                                                              |
|--------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>15.1.6C.1.5 Vehicle crossing standards in rural zones</b> | standard for 5 Household Equivalents, as detailed in the Civil Report ( <b>Appendix D</b> ). |
| <b>15.1.6C.1.8 Frontage to Existing Roads</b>                | <b>Permitted Activity</b>                                                                    |

### **FNDC Proposed District Plan (PDP)**

These matters below comprise relevant rules that have immediate effect under the Proposed District Plan.

**Table 6: PDP Rules**

| <b>Proposed District Plan</b>                                                                                                                                                                                             |                                                                                                                                                                                                                                           |                                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <b>Matter</b>                                                                                                                                                                                                             | <b>Rule/Std Ref</b>                                                                                                                                                                                                                       | <b>Evidence</b>                                   |
| Hazardous Substances<br>Majority of rules relates to development within a site that has heritage or cultural items scheduled and mapped however Rule HS-R6 applies to any development within an SNA – which is not mapped | Rule HS-R2 has immediate legal effect but only for a new significant hazardous facility located within a scheduled site and area of significance to Māori, significant natural area or a scheduled heritage resource. HS-R5, HS-R6, HS-R9 | Not indicated on Far North Proposed District Plan |
| Heritage Area Overlays (Property specific)<br>This chapter applies only to properties within identified heritage area overlays (e.g. in the operative plan they are called precincts for example)                         | All rules have immediate legal effect (HA-R1 to HA-R14)<br>All standards have immediate legal effect (HA-S1 to HA-S3)                                                                                                                     | Not indicated on Far North Proposed District Plan |
| Historic Heritage (Property specific and applies to adjoining sites (if the boundary is within 20m of an identified heritage item)).<br>Rule HH-R5 Earthworks within 20m of a scheduled heritage                          | All rules have immediate legal effect (HH-R1 to HH-R10)<br>Schedule 2 has immediate legal effect                                                                                                                                          | Not indicated on Far North Proposed District Plan |

|                                                                                                                                                                                                                                                                                                 |                                                                                                                                                             |                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| resource. Heritage resources are shown as a historic item on the maps)<br><br>This chapter applies to scheduled heritage resources – which are called heritage items in the map legend                                                                                                          |                                                                                                                                                             |                                                                                                                                                                          |
| Notable Trees<br>(Property specific)<br><br>Applied when a property is showing a scheduled notable tree in the map                                                                                                                                                                              | All rules have immediate legal effect (NT-R1 to NT-R9)<br><br>All standards have legal effect (NT-S1 to NT-S2)<br><br>Schedule 1 has immediate legal effect | Not indicated on Far North Proposed District Plan                                                                                                                        |
| Sites and Areas of Significance to Māori<br>(Property specific)<br><br>Applied when a property is showing a site / area of significance to Maori in the map or within the Te Oneroa-a Tohe Beach Management Area (in the operative plan they are called site of cultural significance to Maori) | All rules have immediate legal effect (SASM-R1 to SASM-R7)<br><br>Schedule 3 has immediate legal effect                                                     | Not indicated on Far North Proposed District Plan                                                                                                                        |
| Ecosystems and Indigenous Biodiversity<br><br>SNA are not mapped                                                                                                                                                                                                                                | All rules have immediate legal effect (IB-R1 to IB-R5)                                                                                                      | No vegetation clearance is proposed for the subdivision.                                                                                                                 |
| Activities on the Surface of Water                                                                                                                                                                                                                                                              | All rules have immediate legal effect (ASW-R1 to ASW-R4)                                                                                                    | Not indicated on Far North Proposed District Plan                                                                                                                        |
| Earthworks<br><br>all earthworks (refer to new definition) need to comply with this                                                                                                                                                                                                             | The following rules have immediate legal effect:<br>EW-R12, EW-R13<br><br>The following standards have immediate legal effect:<br>EW-S3, EW-S5              | Earthworks (if any) required to establish the proposed subdivision should it be approved will be in accordance with the relevant standards including GD-05 and will have |

|                                                                                                                                                                                                    |                                                                                                                                                                                                        |                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                                                                                                                                                                                    |                                                                                                                                                                                                        | an ADP applied.                                    |
| Signs<br>(Property specific) as rules only relate to situations where a sign is on a scheduled heritage resource (heritage item), or within the Kororareka Russell or Kerikeri Heritage Areas      | The following rules have immediate legal effect:<br>SIGN-R9, SIGN-R10<br>All standards have immediate legal effect but only for signs on or attached to a scheduled heritage resource or heritage area | Not indicated on Far North Proposed District Plan  |
| Orongo Bay Zone<br>(Property specific as rule relates to a zone only)                                                                                                                              | Rule OBZ-R14 has partial immediate legal effect because RD-1(5) relates to water                                                                                                                       | Not indicated on Far North Proposed District Plan. |
| Subdivision<br>Rules refer to environmental benefit subdivision. Subdivision of sites within a heritage overlay, containing a scheduled heritage resource, Māori site/area of significance or SNA. | The following rules have immediate legal effect SUB-R6, SUB-R13, SUB-R14, SUB-R15, SUB-R17.                                                                                                            | Not indicated on Far North Proposed District Plan. |
| <b>Comments:</b>                                                                                                                                                                                   |                                                                                                                                                                                                        |                                                    |
| Resource consent is not required under the PDP in relation to this subdivision.                                                                                                                    |                                                                                                                                                                                                        |                                                    |

## 5.0 SECTION 104 ASSESSMENT

Section 104C of the Resource Management Act (RMA) governs the determination of applications for restricted discretionary activities:

### 104C Determination of applications for restricted discretionary activities

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

With respect to restricted discretionary activities, the Council has discretion to grant or refuse an application but only in terms of the matters over which it has restricted its discretion.

When considering an application for resource consent, a consent authority must have regard to the matters under section 104 of the Resource Management Act 1991, including any matters relating to Part 2. References to Part 2 in applications are only required where Plans may be deficient in terms of giving effect to the purpose and principles of the Act.

Section 104 specifies that consent authorities have regard to the following matters when considering an application for a resource consent,

*“the consent authority must, subject to Part II, have regard to –*

- (a) any actual and potential effects on the environment of allowing the activity; and*
- (ab) any measure proposed or agreed to by the applicant for the purpose of ensuring positive effects on the environment that will or may result from allowing the activity; and*
- (c) any relevant provisions of –
  - i. a national environmental standard:*
  - ii. other regulations:*
  - iii. a national policy statement:*
  - iv. a New Zealand Coastal Policy Statement:*
  - v. a regional policy statement or proposed regional policy statement:*
  - vi. a plan or proposed plan; and**
- (d) any other matter the consent authority considers relevant and reasonably necessary to determine the application.”*

In the case of the subject application those considerations include the actual and potential effects of an activity on the environment, the relevant provisions of the regional policy statement or other relevant statutory document, a district plan and any other matter the consent authority considers relevant and reasonably necessary to determine the application. As the site is not within the Coastal Environment the NZCPS is not relevant.

The following assessment addresses all relevant considerations under s104 of the RMA.

#### **Section 104 (1)(a) Assessment of Effects on the Environment**



Section 104(1)(a) requires that consent authorities have regard to any actual or potential effects on the environment of allowing the activity. Section 2 of the RMA defines 'Environment' as follows:

**environment** includes—

- (a) ecosystems and their constituent parts, including people and communities; and
- (b) all natural and physical resources; and
- (c) amenity values; and
- (d) the social, economic, aesthetic, and cultural conditions which affect the matters stated in paragraphs (a) to (c) or which are affected by those matters

Section 3 defines the meaning of 'effect' to include:

### **3 Meaning of effect**

In this Act, unless the context otherwise requires, the term **effect** includes—

- (a) any positive or adverse effect; and
- (b) any temporary or permanent effect; and
- (c) any past, present, or future effect; and
- (d) any cumulative effect which arises over time or in combination with other effects—  
regardless of the scale, intensity, duration, or frequency of the effect, and also includes—
- (e) any potential effect of high probability; and
- (f) any potential effect of low probability which has a high potential impact.

Section 3: amended, on 7 July 1993, by section 3 of the **Resource** Management Amendment Act 1993 (1993 No 65).

Positive effects arising from the subdivision would include enablement of additional rural-residential sites in close proximity to the Kerikeri Township. This form and intensity of the subdivision proposed is anticipated in the Rural Production zone.

Potential adverse effects associated with this activity relate to the subdivision of the site. This will be addressed in the sections below.

#### *Effects arising from subdivision*

Potential adverse effects arising from subdivision occur because of changes to land use patterns and the activities that are enabled through subdivision. With respect to this application, the proposal seeks to establish a pattern of rural subdivision that is anticipated and provided for in the Rural Production Zone. This includes alternate lots sizes and configurations relative to the parent lot which must have been established prior to 28 April 2000.

The ODP provides for the specific form of subdivision requested as a Restricted Discretionary Activity through Rule 13.8.1(b). This rule was clearly intended to provide a limited opportunity for subdivision on historic lots that do not meet the standard 20ha minimum.

Proposed Lots one and two would establish a rural site that would enable rural lifestyle activities. Proposed lot three is currently occupied by a residential dwelling as well as a number of garages and sheds and will continue to be utilised in its current capacity as a rural lifestyle property. The proposed uses are considered consistent with any potential effects on the environment anticipated in the Rural Production Zone, particularly in this case where the property abuts the Rural Living zone.

In accordance with District Plan Rule 13.8.1 (i) and (ii) the Council has reserved its discretion over matters relating to:

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

None of the proposed lots are within the coastal environment.

- *Effects of the subdivision within 500 metres of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;*

The land to be subdivided is not within 500 metres of land administered by DOC.

- *Effects on areas of significant indigenous flora and significant habitats of indigenous fauna;*

The property is covered by pasture, with small areas of vegetation however this is not considered significant indigenous flora or fauna. No vegetation clearance is proposed as part of the subdivision. The site is not within or near a PNA.

- *The mitigation of fire hazards and safety of residents.*

Fire hazard mitigation on rural lots away from reticulated water supply is a matter that would be considered at the time of building consent and can be adequately provided for through the provision of dedicated water supply tanks. This can be conditioned on the titles for each allotment.

It is considered that any potential adverse effects arising from the proposed subdivision would be less than minor. Each site for proposed rural lifestyle activities can be adequately and safely serviced with on-site wastewater, water supply and stormwater management that would be subject to the requirements of Rule 13.7.3, which enable the Council to impose conditions of consent in accordance with Rule 13.8.1. Site specific stormwater and wastewater management requirements are addressed in the Site Suitability Report attached at **Appendix D**.

With respect to telecommunication and electricity services, connection is not required under the rules and can be investigated by future owners and users of the proposed lots. However, easements have been provided to proposed Lots 1 and 2 as per the subdivision plan in **Appendix B**.

No land use compatibility issues would arise from the proposed subdivision. The site is not within 500 metres of an airport.

The existing vehicle crossing and access arrangement over 99 Shepherd Road will continue. The appropriateness of this access has been addressed in the Site Suitability Report in **Appendix D**.

### **Relevant Plan Considerations**

Section 104 (1)(b) requires that regard be given to the relevant provisions of:

- A national environmental standard;
- Other regulations;
- A national policy statement;
- A New Zealand coastal policy statement;
- A regional policy statement or proposed regional policy statement;
- A plan or proposed plan

### **National Environmental Standards**

The National Environment Standards (**NES**) for Assessing and Managing Contaminants in Soil to Protect Human Health is not considered relevant to the site. The site has historically been used in a pastoral capacity, and no contamination is known according to NRC maps. The proposal is considered permitted in terms of this legislation.

The NES for Freshwater is not considered relevant to this site. There are no mapped wetlands according to NRC on the site or other known wetlands. The proposal is considered permitted in terms of this legislation. Given the permitted activity status, it is considered that the overarching aim to protect freshwater resources in particular wetlands will be achieved.

### **National Policy Statements**

There are no National Policy Statements directly relevant to this application except for the NPS for Highly Productive Land. The proposal is not anticipated to offend the contents of the NPS for Highly Productive Land as the soil associated with this site is not considered highly productive.

The proposal is not anticipated to offend the contents of the NPS for Indigenous Biodiversity as no vegetation clearance is proposed as part of this proposal.

#### *New Zealand Coastal Policy Statement*

The New Zealand Coastal Policy Statement 2010 (**NZCPS**) aims to provide policies to achieve the purpose of the RMA in respect of the Coastal Environment. This site falls outside the Coastal Environment as mapped within the Regional Policy Statement for Northland.

#### *Northland Regional Policy Statement or Proposed Regional Policy Statement*

The subject site is within the Northland region and is subject to the governing objectives and policies of the operative Northland Regional Policy Statement (operative May 2016). The jurisdiction for land use and subdivision activities is governed by the Far North District Council and the policy framework for subdivision activities and the management of potential adverse effects is set out in the Far North District Plan. Nonetheless, this Plan is subject to the governing regional policy framework set out in the Northland Regional Policy Statement. With respect to any identified features, the site is not within any area of 'High' or 'Outstanding' Natural Area, or within the Coastal Environment boundary.

Of statutory relevance to this proposal are regional objectives and policies relating to sustainable management, enabling economic wellbeing and planned/coordinated development. The proposed subdivision is considered to promote sustainable management as the additional lots will attract investment to the community and enable more housing to be provided within close proximity to the Kerikeri Township. The cumulative effects of this subdivision are assessed as being compatible within this environment. The development seeks to subdivide land within a rural area, where infrastructure can be provided on site. The existing character of the area is a mixture of rural and rural lifestyle along with undeveloped land, therefore the development will not be out of character. It is not proposed to clear vegetation to enable the subdivision, rather leave this to individual owners to consider their ideal building platforms and preferences regarding vegetation.

Overall, it is considered that the proposal would not be inconsistent with the Northland Regional Policy Statement objectives and policies.

#### *Operative Far North District Plan (ODP)*

The proposed subdivision relies on a specific pathway provided for in the ODP. Rule 13.8.1(b), in conjunction with Table 13.7.2.1(i), creates a specific Restricted Discretionary activity status for lots that existed prior to 28 April 2000. This provision explicitly anticipates and enables a limited, alternate



subdivision outcome for historic lots, such as the subject site, that differs from the standard 20-hectare minimum for the zone. This proposal therefore represents a form of development that was specifically contemplated and provided for by the ODP.

This subdivision application is subject to the provisions of the ODP. The site is zoned Rural Production and is to be assessed in terms of the objectives and policies for the zone and the district-wide subdivision and environment provisions. The subdivision would achieve the purpose of the Rural Production zone which is to ensure its ongoing rural productive purpose that encompasses a wide-range of compatible land use activities, including limited rural lifestyle and residential opportunities in a manner that avoids, remedies or mitigates adverse effects. It is anticipated that the size and form of subdivision proposed (which is in accordance with Council standards), and given the type of matters over which the Council has restricted its discretion, the proposal would:

- Promote the sustainable management of natural and physical resources in Objective 8.6.3.1;
- Enable efficient use and development in a way that enables people and communities to provide for their social, economic, and cultural wellbeing and for their health and safety (Objective 8.6.3.2);
- Promote maintenance of amenity values to a level that is consistent with the productive intent of the zone (Objective 8.6.3.3);
- Avoid, remedy or mitigate the actual or potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) (Objective 8.6.3.6);
- Avoid, remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources (Objective 8.6.3.8);
- Enable rural production activities to be undertaken in the zone. (Objective 8.6.3.9)

Supporting Rural Production Zone policies would also be achieved, in particular as a subdivision proposal that is in accordance with the size and scale of these lots would enable a range of compatible farming and rural production activities (including rural lifestyle activities) envisaged in the zone and avoid adverse effects on natural and physical environmental values as well as amenity values (Policies 8.4.6.1, 8.6.4.4, 8.6.4.7).

The proposed subdivision would also achieve the District Plan subdivision objectives and policies being a subdivision that is consistent with the purpose of the Rural Production Zone (Objective 13.3.1) and enabling of land use activities that avoids adverse effects on natural resources and would not exacerbate natural hazards or potential reverse sensitivity conflicts that are not envisaged by the District Plan (Objective 13.3.2).

The proposed subdivision would not impact on any identified outstanding landscape, natural feature or any scheduled heritage resource (Objective 13.3.3 and 13.3.4). The proposed lots can provide on-site services where required for further development (Objective 13.3.5 and 13.3.8). The subdivision proposal would not adversely impact on any identified Māori values (Objective 13.3.7).

Overall, it is considered that the proposal would not be contrary to any District Plan objective or policy.

#### Proposed Far North District Plan

While the application is processed under the ODP, regard must be had to the relevant objectives and policies of the PDP. The PDP framework, particularly policies RPROZ-P6 and SUB-P8, seeks to avoid rural-lifestyle subdivision to prevent the fragmentation of productive land and protect highly productive land.

The proposed subdivision is not contrary to these objectives for the following reasons:

- The PDP policies are primarily focused on protecting highly productive land. The AEE (refer Figure 5) confirms the site is LUC Class 4 under the National Policy Statement for Highly Productive Land. Therefore, the proposal does not result in the loss or sterilisation of the district's most valuable soil resources, which is a key concern of RPROZ-O3 and RPROZ-P5.
- The ODP establishes the benchmark for a viable, standard rural production lot at 20 hectares (the controlled activity minimum lot size). The 11.7 hectare parent lot is already undersized and is impractical for most traditional rural production activities.
- The proposal does not fragment a viable productive unit. It rationalises an existing undersized holding. The creation of a 11.7 hectare balance lot (Proposed Lot 3) retains the same scale and potential for limited/lifestyle farming activities, noting Lot 4, which is subject to the boundary adjustment, is still over 40ha. Therefore, there is no net loss of productive capacity or fragmentation that would offend PDP policies RPROZ-P6 or SUB-P8.
- The proposal creates two small rural-residential lots directly abutting the Rural Residential zone boundary. This is not an isolated intrusion into a highly productive landscape. It is a logical and efficient use of an undersized, non-highly productive land lot, creating a sensible transition from the Rural Residential zone. This is consistent with PDP Objective SUB-O1, which seeks subdivision that 'results in the efficient use of land' and 'contributes to the local character'.

#### **Proposed Far North District Plan Objectives & Policies & Weighting**

Section 88A(2) provides that “any plan or proposed plan which exists when the application is considered must be had regard to in accordance with section 104(1)(b).” This requires applications to be assessed under both the operative and proposed objective and policy frameworks from the date of notification of the proposed district plan.

In the event of differing directives between objective and policy frameworks, it is well established by case law that the weight to be given to a proposed district plan depends on what stage the relevant provisions have reached, the weight generally being greater as a proposed plan move through the notification and hearing process. In *Keystone Ridge Ltd v Auckland City Council*, the High Court held that the extent to which the provisions of a proposed plan are relevant should be considered on a case by case basis and might include:

- *The extent (if any) to which the proposed measure might have been exposed to testing and independent decision making;*
- *Circumstances of injustice; and*
- *The extent to which a new measure, or the absence of one, might implement a coherent pattern of objectives and policies in a plan.*

In my view the PDP has not gone through the sufficient process to allow a considered view of the objectives and policies for the Rural Production Zone and Subdivision however commentary demonstrating that the application is not contrary to these provisions has been provided.

## **6.0 NOTIFICATION ASSESSMENT (s95matters)**

The Council will need to determine the basis on which the application will be processed. These include public notification, limited notification, or non-notification.

### **Public Notification (S95a)**

Section 95A outlines the steps that must be followed to determine whether an application should be publicly notified.

**Step 1** – Details requirements for mandatory public notification. None of these apply to the proposal.

**Step 2** – Details situations where public notification is precluded (if not required under step 2). The application is for a Restricted Discretionary activity, therefore public notification is not precluded under this step.

**Step 3** – Details requirements for public notification in certain circumstances. This includes applications that are determined to be publicly notified under s95D. For this application, it is concluded that potential adverse effects would be less than minor.

**Step 4** – Details requirements in special circumstances. It is considered that there are no special circumstances that would warrant notification.

### **Limited Notification (S95b)**

The amended s95B also includes steps to be followed when deciding whether an application should be subject to limited notification.

**Step 1** – relates to the consideration of certain affected groups and affected persons including any protected customary rights groups or affected marine title groups. There are no such groups affected by this application.

**Step 2** – details requirements for limited notification where the application is for one or more activities that is precluded from limited notification by a rule or standard or is a controlled or prescribed activity. This step does not preclude this application from limited notification.

**Step 3** – relates to boundary adjustments, where an owner of an infringed boundary is to be notified or a prescribed activity. Also relates to any other activity where it is required to determine if a person is an affected person in accordance with s95E. For the purpose of limited notifying an application, a person is an affected person if a consent authority decides that the activity's adverse effects on the person are minor or more than minor (but are not less than minor). Given the proposed lot sizes can meet the restricted discretionary standard, neighbouring property owners are deemed to be affected in a less than minor way. Further, the boundary adjustment component involves the adjoining northern lot (Sec 4 SO 496053) and is owned by the applicant, Sue Teixeira. As the applicant is the owner of all land involved in the boundary adjustment, this party is not adversely affected, and written approval is not required.

**Step 4** – relates to requirements to notify where special circumstances exist.

There are no special circumstances that would warrant limited notification of this application.

## **7.0 PART II OF THE RMA**

### **Purpose**



The proposal can promote the sustainable management of natural and physical resources on site, as current and future owners and users of the land are able to provide for their social, cultural and economic wellbeing and their health and safety.

The proposed lots are vacant, with the exception of Lot 3, and will be available for future rural living development including housing within this rural area, while the balance lot can continue to be used in its current capacity. This provides opportunities for people looking to purchase land and build a home within the area. Those persons help contribute to the local economy and utilise local services and infrastructure. Housing is needed within the local area, in all shapes and sizes to accommodate various members of the community. In doing so, this achieves all four well beings as identified within Part 2. Air, water, soil, and ecosystems are not anticipated to be adversely affected by this subdivision within the Rural Production Zone. Any effects on the environment are not anticipated to be more than minor.

#### **Matters of National Importance**

The site is mapped as being within a Kiwi Present area. Māori are not considered to be adversely affected by this proposal, nor is any historic heritage likely to be impacted, however in the event anything is discovered the accidental discovery protocol will be adhered to.

#### **Other Matters**

The development will result in an efficient use of resources with the development occurring within the Rural Production zone providing for activities associated with this zone including future housing where other activities will not be adversely impacted. There will be no adverse impacts on local ecosystems or overall.

### **8.0 CONCLUSION**

This application seeks a Restricted Discretionary resource consent to undertake a 3-lot subdivision and a concurrent boundary adjustment within the Rural Production Zone. The assessment of effects on the environment concludes that for the reasons outlined in the application, the effects of undertaking this proposal will be no more than minor on the surrounding environment.

The proposal was considered to be consistent with the purpose of the National Environmental Standard for Assessing and Managing Contaminates in Soil to Protect Human Health and National Environmental Standard for Freshwater.

No National Policy Statements, including the New Zealand Coastal Policy Statement and National Policy Statement for Highly Productive Land, were considered to be undermined by this proposal.

The Regional Policy Statement for Northland was also reviewed as part of this application. The proposal was considered to be consistent with the aims of this document.

In terms of the ODP, the proposal was assessed against the objectives and policies for the Rural Environment in general, District Wide Matters and the Rural Production Zone, with the conclusion that it is generally compatible with the aims of the District Plan as expressed through those relevant objectives and policies.

Commentary against the PDP has also been undertaken concluding that the application is not contrary to the general aims as expressed through the relevant objectives and policies.

In terms of the potential adverse effects being minor or more than minor, it is considered that there are no directly affected parties to this proposal as all effects can be adequately mitigated.

An assessment of Part II of the RMA has also been completed with the proposal generally able to satisfy this higher order document also.

We look forward to receiving acknowledgment of the application and please advise if any additional information is required.

Yours sincerely,



Andrew McPhee  
Consultant Planner



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

**Guaranteed Search Copy issued under Section 60 of the Land  
Transfer Act 2017**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** **NA96B/480**  
**Land Registration District** **North Auckland**  
**Date Issued** 19 September 1994

**Prior References**  
NA78D/16

---

**Estate** Fee Simple  
**Area** 11.5970 hectares more or less  
**Legal Description** Lot 1 Deposited Plan 160255  
**Registered Owners**  
Sue Sheets Teixeira

---

**Interests**

Subject to Section 8 Mining Act 1971

Subject to Section 168A Coal Mines Act 1925

Appurtenant hereto is a right of way and power supply, telecommunications and water supply rights created by Transfer C708023.1 - 7.2.1995 at 9.22 am

The easements created by Transfer C708023.1 are subject to Section 243 (a) Resource Management Act 1991

8399448.3 Mortgage to ASB Bank Limited - 22.3.2010 at 1:00 pm





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

**Guaranteed Search Copy issued under Section 60 of the Land  
Transfer Act 2017**



  
R.W. Muir  
Registrar-General  
of Land

**Identifier** **753966**  
**Land Registration District** **North Auckland**  
**Date Issued** 23 August 2016

**Prior References**  
86956

---

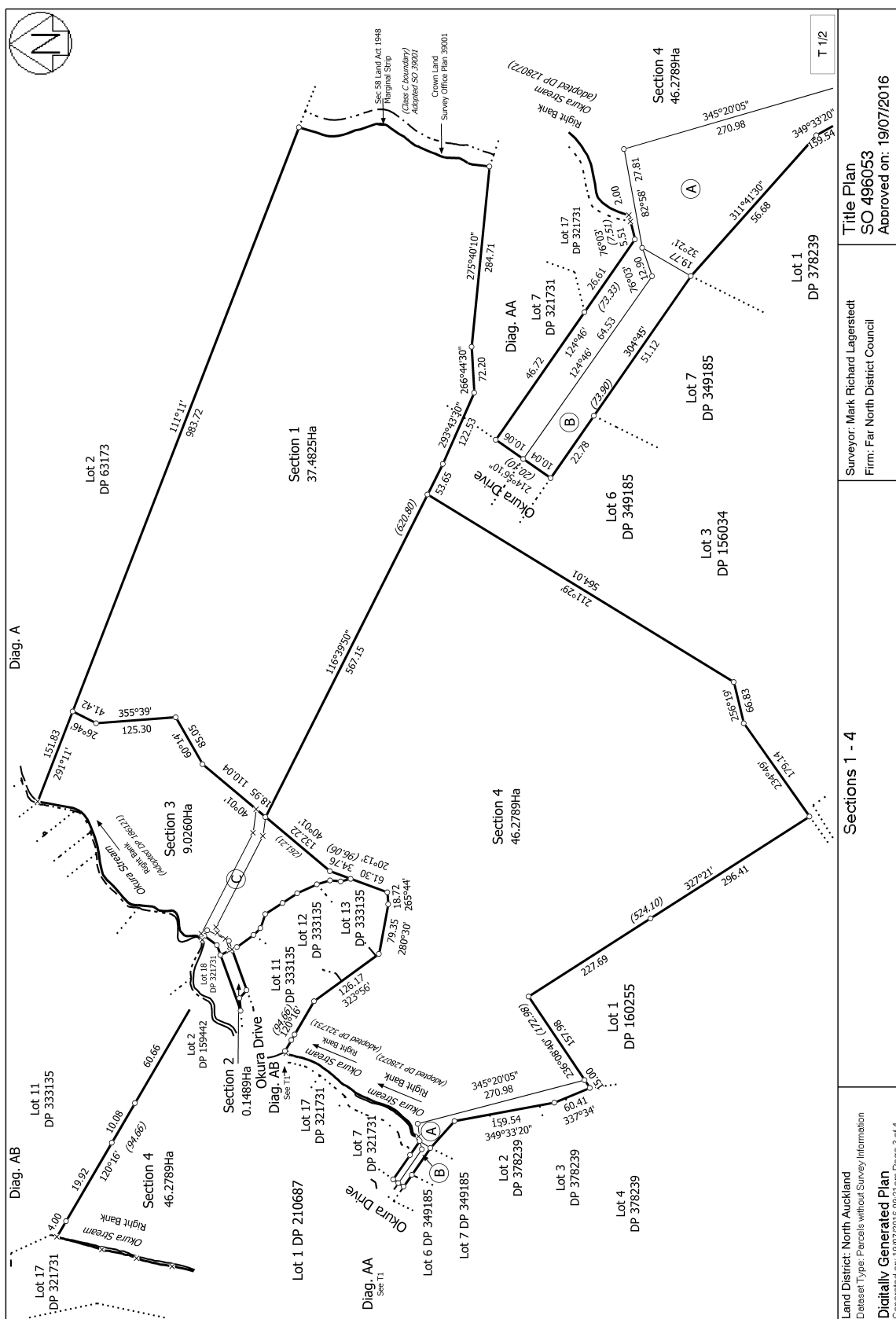
**Estate** Fee Simple  
**Area** 46.2789 hectares more or less  
**Legal Description** Section 4 Survey Office Plan 496053  
**Registered Owners**  
Gray Gilraine Holdings Limited

---

**Interests**

Subject to Section 8 Mining Act 1971  
Subject to Section 168A Coal Mines Act 1925  
Subject to a right of way and to power supply, telecommunications and water supply rights over parts marked A and B on SO 496053 created by Transfer C708023.1 - 7.2.1995 at 9.22 am  
The easements created by Transfer C708023.1 are subject to Section 243 (a) Resource Management Act 1991  
Subject to Section 241(2) Resource Management Act 1991 (affects DP 321731)  
Appurtenant to part formerly Lot 15 DP 321731 is a right of way, telecommunications, electricity and water supply easements created by Easement Instrument 7081959.4 - 24.10.2006 at 9:00 am  
The easements created by Easement Instrument 7081959.4 are subject to Section 243 (a) Resource Management Act 1991





**SITE** 101 Shepherd Road, Kerikeri

**LEGAL DESCRIPTION** Lot 1 DP 160255

**PROJECT** Proposed 3-Lot Subdivision

**CLIENT** Sue S. Teixeira

**REFERENCE NO.** 142948 – Revision B\*

**DOCUMENT** Site Assessment Report

**STATUS/REVISION NO.** FINAL – Resource Consent

**DATE OF ISSUE** 14 November 2025

| Report Prepared For | Attention                                       | Email                                                          |
|---------------------|-------------------------------------------------|----------------------------------------------------------------|
| Sue S. Teixeira     | Andrew McPhee (Bay of Islands Planning Limited) | <a href="mailto:andrew@bayplan.co.nz">andrew@bayplan.co.nz</a> |

|             |                                                         |                              |                                                      |                                                                                       |
|-------------|---------------------------------------------------------|------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------|
| Authored by | <b>A. Brooke</b><br>(NZDE - Civil)                      | Engineering Technician       | <a href="mailto:aidan@wjl.co.nz">aidan@wjl.co.nz</a> |  |
| Reviewed by | <b>S. Page</b>                                          | Engineering Technician       | <a href="mailto:shaun@wjl.co.nz">shaun@wjl.co.nz</a> |  |
| Approved by | <b>C. Hegedus</b><br>(BETech - Geotech, CPEng, CMEngNZ) | Senior Geotechnical Engineer | <a href="mailto:csaba@wjl.co.nz">csaba@wjl.co.nz</a> |  |

**\*Subdivision Scheme Plan updated (10<sup>th</sup> November 2025).**

## 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.

|                                                           |                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Development Type:</b>                                  | Proposed 3-Lot Subdivision (Lot 1 and 2 for Geotech assessment only).                                                                                                                                                                                                                                                                                          |
| <b>Development Proposals Supplied:</b>                    | Yes – Subdivision Scheme Plan.                                                                                                                                                                                                                                                                                                                                 |
| <b>NZS3604 Type Structure/s:</b>                          | Future structures are assumed to be.                                                                                                                                                                                                                                                                                                                           |
| <b>Proposed Earthworks:</b>                               | At the time of writing this report, no earthwork plans have been supplied. At this preliminary stage, all cuts and fills should be limited to heights of 1.5m and 0.60m respectively and be battered no steeper than 1V:4H (14°) and 1V:3H (18°) respectively. Any proposed cuts and fills outside these imposed limits should be referred to us for review.   |
| <b>Geology Encountered:</b>                               | Waipapa Group.                                                                                                                                                                                                                                                                                                                                                 |
| <b>Topsoil Encountered:</b>                               | A surficial layer of topsoil was encountered at a maximum depth of 0.4m below present ground level (bpgl).                                                                                                                                                                                                                                                     |
| <b>Overall Site Gradient in Proximity to Development:</b> | The ground surface across proposed Lots 1 and 2 is gently sloping from the eastern boundary down to the west, northwest, and north with slopes up to approximately 6°.                                                                                                                                                                                         |
| <b>Site Stability Risk:</b>                               | Low risk of instability at the site.                                                                                                                                                                                                                                                                                                                           |
| <b>Liquefaction Risk:</b>                                 | Negligible risk of liquefaction susceptibility.                                                                                                                                                                                                                                                                                                                |
| <b>Suitable Shallow Foundation Type(s):</b>               | Shallow foundations are suitable to support any future dwelling provided they are designed to accommodate vertical movement of soil associated with Soil Reactivity <b>Class H – Highly Reactive</b> .                                                                                                                                                         |
| <b>Shallow Soil Bearing Capacity:</b>                     | Yes – Natural Soils & Engineered Fill Only.<br>Geotechnical Ultimate Bearing Capacity = 300 kPa.                                                                                                                                                                                                                                                               |
| <b>NZBC B1 Expansive Soils Classification:</b>            | Class H – Highly Expansive ( $\gamma_s = 78\text{mm}$ ).                                                                                                                                                                                                                                                                                                       |
| <b>Conventional Footing Depths</b>                        | 0.9m below finished ground level. Bearing within Competent Natural Ground Only (OR Competent Engineered Fill).                                                                                                                                                                                                                                                 |
| <b>NZS1170.5:2004 Site Subsoil Classification:</b>        | Class C – Shallow Soil stratigraphy.                                                                                                                                                                                                                                                                                                                           |
| <b>Consent Application Report Suitable for:</b>           | Resource Consent.<br>Once future site-specific development proposals have been finalised, they should be referred to WJL for review prior to submission for a Building Consent application. Depending on the extent of the future development proposals, the review could range from a desktop assessment to further geotechnical investigation and reporting. |

## 2. INTRODUCTION / SCOPE OF WORK

Wilton Joubert Limited (WJL) was engaged by **Sue S. Teixeira** (the Client) to undertake a geotechnical assessment of ground conditions at the above site, where we understand, it is proposed to subdivide the existing property into three individual allotments. Proposed Lot 3 contains existing structures (dwelling, sheds, driveway etc.) and will be not further developed, while proposed Lots 1 and 2 will be assessed for residential construction suitability in this report.

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

## 3. SITE DESCRIPTION

The proposed development will be constructed within the following parent Lot (the site) which is located off the southeastern end of Shepherd Road, Kerikeri, legally described as Lot 1 DP 160255.

The site is shown on our appended Site Plan (Drawing No. 142948-G600) and in Figure 1 below.



**Figure 1: Aerial view with the subject property highlighted in blue. (From Far North District Council's online GIS database)**

The surface area of the subject site is approximately 11.6ha and can be accessed via a shared, gravel driveway at the northwestern boundary corner, from Shepherd Road. Built development on-site comprises an existing dwelling, minor dwelling and shed near the eastern boundary, boundary fences, gravel driveways and concrete parking areas. Vegetation comprises mainly pasture.

The ground surface across proposed Lots 1 and 2 is gently sloping from the eastern boundary down to the west, northwest, and north, with slopes up to approximately 6°.



4. DEVELOPMENT PROPOSALS

At the time of preparing this report, we were supplied with a Subdivision Scheme Plan, prepared by BOI Survey Limited, dated 10 November 2025 (Ref: 5045).

Based on our review of the supplied plan, we understand that it is proposed to subdivide the existing property into 3 individual allotments, as shown in Figure 2 below.

Proposed Lot 3 will contain the existing residential development and as such, is excluded from our assessments of this report..

Proposed Lot 1 and 2 will be situated at the northern corner of the parent Lot and encompass areas of 4,300m<sup>2</sup> (lot 1) & 4,200m<sup>2</sup> (lot 2). A 30m x 30m (900m<sup>2</sup>) Designated Building Platform (DBP) has been identified centrally on each lot for assessment, as depicted on our appended Site Plan (Drawing No. 142948-G600).

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

A Geotechnical Review of final Development and Foundation Plans will be required for Building Consent.

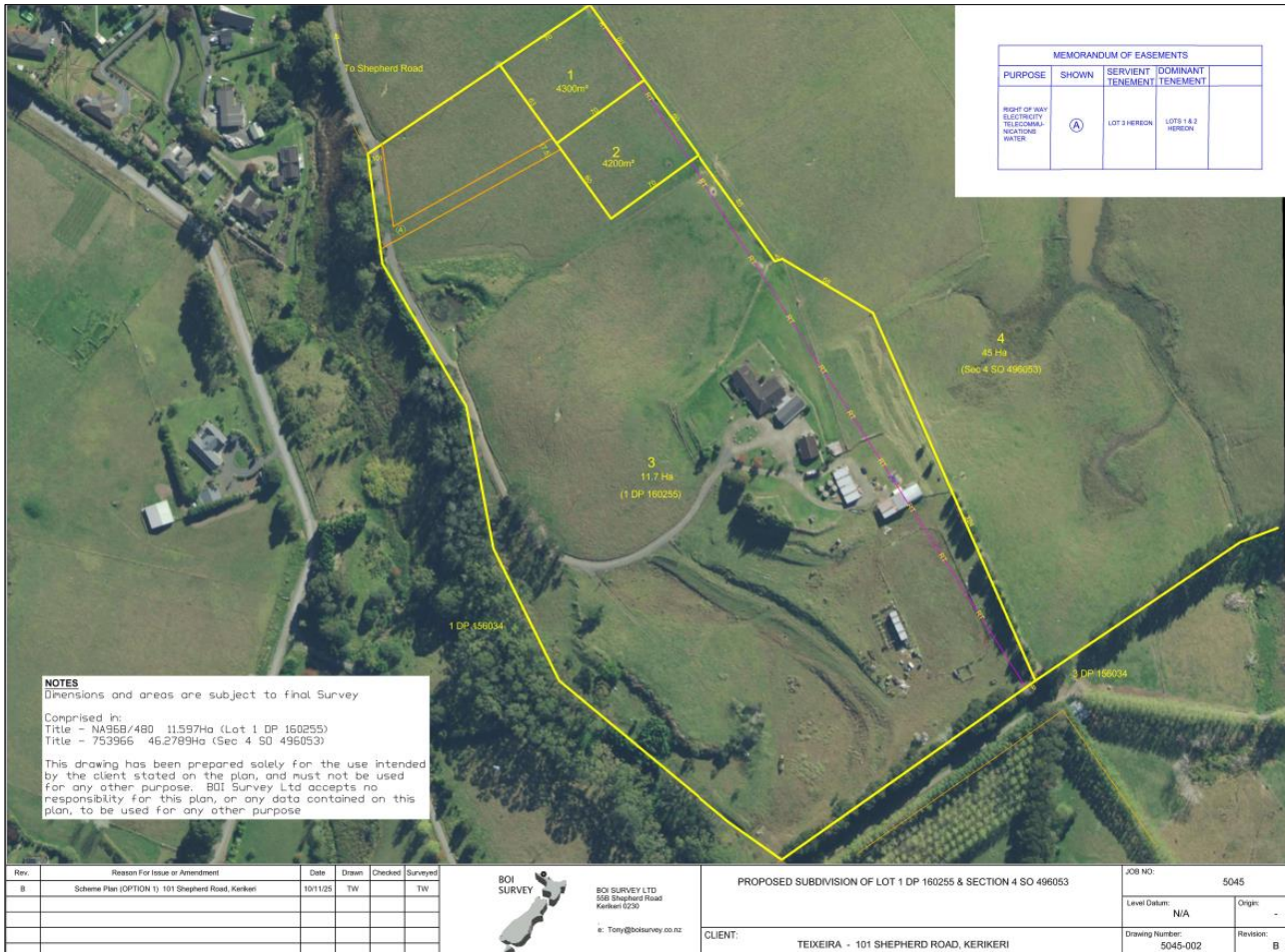


Figure 2: Subdivision Scheme Site Plan. (From BOI Survey Limited)

As a result, the principal objectives were to investigate and assess the suitability of the 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

Reference to the New Zealand Geology Web Map hosted by GNS Science indicates that the subject site and wider surrounding land is underlain by Waipapa Group sandstone and siltstone (Waipapa Composite Terrane).

Waipapa Group is described as; *“Massive to thin bedded, lithic volcaniclastic metasandstone and argillite, with tectonically enclosed basalt, chert and siliceous argillite.”*



Figure 3: Screenshot from New Zealand Geology Web Map hosted by GNS Science.

## 6. GEOTECHNICAL INVESTIGATION

### 6.1. FIELDWORK

Our fieldwork, as shown on our appended Site Plan, was undertaken on the 13<sup>th</sup> of October 2025 and involved drilling 4 (no.) 50mm diameter hand auger boreholes (HA01 to HA04 inclusive) to depths of up to 4.5m below present ground level (bpgl).

## 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.

The soil sample arisings from the HA's were logged in accordance with the *“Field Description of Soil and Rock”*, NZGS, December 2005.

### 7.1. TOPSOIL

Topsoil was encountered in all HAs to depths of up to 0.4m bpgl.

## 7.2. NATURAL GROUND

The underlying natural deposits encountered were consistent with our expectations of Waipapa Group soils, comprising stiff to hard, low to moderately plastic clayey SILTs and SILTs, with varying amounts of clay, sand and gravel content.

Measured in-situ, BS1377 adjusted peak Vane Shear Strengths ranged between 90kPa and greater than 197kPa, the latter being where soil strength was in excess of the shear vane capacity.

The ratio of peak to remoulded vane shear strength values ranged between 1.9 and 6.5, which indicates 'insensitive to sensitive' subgrade.

Sensitive soil sites require to protect the subgrade from rain, wind, etc, and to avoid (or minimise) construction traffic and vibrating plants.

## 7.3. GROUNDWATER

Groundwater was encountered in HA01 and HA03 at depths of 3.4m and 4.0m bpgl respectively on the day of our investigation.

## 7.4. SUMMARY TABLE

The following table summarises our inferred stratigraphic profiling.

**Table 1: Stratigraphic Summary Table**

| Investigation Hole ID | Termination Depth (m) | Depth to Base of Topsoil (m) | Vane Shear Strength Range within Natural Ground (kPa) | Groundwater Depth <sup>(1)</sup> (m) |
|-----------------------|-----------------------|------------------------------|-------------------------------------------------------|--------------------------------------|
| HA01                  | 4.0 <sup>(2)</sup>    | 0.2                          | 126 – 197+                                            | 3.4                                  |
| HA02                  | 3.0                   | 0.4                          | 110 – 197+                                            | NE                                   |
| HA03                  | 4.5 <sup>(2)</sup>    | 0.3                          | 90 – 197+                                             | 4.0                                  |
| HA04                  | 3.0                   | 0.2                          | 197+                                                  | NE                                   |

Table Note: (1) Measured on the day of drilling (2) Too hard to hand auger NE Not encountered

## 7.5. EXPANSIVE SOILS

Naturally occurring, seasonal moisture variations are a strong characteristic of most Upper North Island soils, which typically results in plastic soil masses swelling during winter months and then shrinking during summer months. Such volumetric changes in foundation soils (broadly termed 'Expansive Soils') vary according to clay mineralogy and geology and are a significant risk to buildings.

In this instance, without any laboratory testing, we have adopted the following conservative primary classification estimate of the soils underlying both sites:

- NZBC B1 Expansive Soil Class H
- Upper Limit of Characteristic surface movement ( $\gamma_s$ ) 78mm

Expansive soils will require mitigation by either deepened perimeter and bored footings, or a specifically designed stiffened raft slab. Foundation design recommendations are given in the appropriate Conclusion and Recommendation sections below.

## 8. GEOTECHNICAL ASSESSMENTS

As appropriate to the site conditions, we have carried out the following geotechnical analyses:

- Qualitative slope stability,
- Liquefaction susceptibility assessments.

### 8.1. QUALITATIVE SLOPE STABILITY

The ground surface across proposed Lots 1 and 2 is gently sloping from the eastern boundary down to the west, northwest, and north with slopes up to approximately 6°.

Our assessment also considered the followings:

- Stiff to hard soils of the Waipapa Group encountered during our investigation.
- Groundwater was encountered in HA01 and HA03 at depths of 3.4m and 4.0m bpgl respectively on the day of our investigation.
- The site is situated on an elevated location, with good water-shedding characteristics.
- There are no known active faults traversing through or close to the site.
- No visual signs of ground instability were observed at the time of our investigation.
- Our appended Cross-Section A-A' (142948-G610) indicates gently sloping ground across both proposed Lots.

### 8.2. SLOPE STABILITY ASSESSMENT CONCLUSION

Based on our qualitative assessment, land instability is not considered to be a constraint or risk to the proposed development.

### 8.3. LIQUEFACTION SUSCEPTIBILITY

Liquefaction is the loss of effective strength of a cohesionless soil (typically sand) due to pore-water pressures generated during a seismic event (earthquake). The partial or complete loss of effective strength of loose, saturated soils can result in vertical settlement and/or horizontal movement (lateral spreading) of the ground.

A commonly accepted definition is: "Areas susceptible to liquefaction generally correspond with geologically young deposits (less than 10,000 years) located in relatively flat areas close to active or abandoned waterways, in coastal or estuarine areas, and/or areas of uncompacted or poorly compacted fill". None of these characteristics apply to this site.

We have carried out liquefaction susceptibility assessments in order to identify the risk of ground damage during a seismic event.

- The FNDC Hazard Map categorises the site as an Unlikely Liquefaction Vulnerability area.
- Stiff to hard soils of the Waipapa Group encountered during our investigation.
- Groundwater was encountered in HA01 and HA03 at depths of 3.4m and 4.0m bpgl respectively on the day of our investigation.
- The site is situated on an elevated (hilltop) location, with good water-shedding characteristics.
- There are no known active faults traversing through or close to the site.
- Soils of the Waipapa Group underlie the site (Permian to Jurassic Age).

#### 8.4. LIQUEFACTION ASSESSMENT CONCLUSION

Based on our assessment, we conclude that the soils at the site have a negligible risk of liquefaction susceptibility, and liquefaction induced ground damage is consequently unlikely.

#### 9. CONCLUSIONS AND RECOMMENDATIONS

Based on our fieldwork investigation, subsoil testing results, walkover inspection and geotechnical assessments above, we consider on reasonable grounds that this report can be submitted to the Territorial Authority in support of a Resource Consent application for subdividing the subject site, substantiating that in terms of Section 106 of the Resource Management Act and its current amendments, either

- a) No land in respect of which the consent is sought, nor any structure on that land, is, nor is likely to be subject to material damage by erosion, falling debris, subsidence, or slippage from any source, or
- b) No subsequent use that is likely to be made of the land is likely to accelerate, worsen, or result in material damage to that land, other land, or structure, by erosion, falling debris, subsidence, or slippage from any source.

Therefore, we are satisfied that proposed Lots 1 and 2 should be generally suitable for future residential construction in terms of NZS3604:2011, subject to:

- **Future site-specific development designs being in accordance with our recommendations given in Section 9 below, and**
- **Once future site-specific development proposals have been finalised, they should be referred to WJL for review prior to submission of a Building Consent application. Depending on the extent of the future development proposals, the review could range from a desktop assessment to further geotechnical investigation and reporting.**

#### 9.1. PRELIMINARY FOUNDATION DESIGN

Shallow foundations are suitable to support any future dwelling provided they designed to accommodate vertical movement of soil associated with Soil Reactivity **Class H – Highly Reactive**.

##### 9.1.1. SHALLOW FOUNDATIONS BEARING CAPACITY

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

*Table 2: Bearing Capacity Values*

| Parameters                                     | Waipapa Group Soils |
|------------------------------------------------|---------------------|
| Geotechnical Ultimate Bearing Capacity         | 300 kPa             |
| ULS Dependable Bearing Capacity ( $\Phi=0.5$ ) | 150 kPa             |

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

- 0.5m below the invert of service trenches and/or
- the toe of adjacent retaining walls,

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

### 9.1.2. SHALLOW FOUNDATIONS ON EXPANSIVE SOILS

As described earlier in this report, we have estimated the following classification of the site soils:

- NZBC B1 Expansive Soil Class H
- Upper Limit of Characteristic surface movement ( $y_s$ ) 78mm

Given that the soils are not considered to lie within the definition of “good ground” as per NZS3604:2011, the design of shallow foundations is no longer covered by NZS3604:2011. 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 specific engineering design should be undertaken by a qualified engineer for the design of the proposed foundations.

### 9.2. NZS1170.5:2004 SITE SUBSOIL CLASSIFICATION

We consider both Designated Building Platforms (DBPs) to be underlain with a Class C – Shallow Soil stratigraphy.

### 9.3. SITE EARTHWORKS

At the time of writing this report, no earthwork plans have been supplied. Due to the gently sloping topography across both DBPs, we anticipate minimal earthworks will be undertaken associated with the foundation excavations for any future dwelling.

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” &
- The Far North District Council Engineering Standards (Version 0.6, dated May 2023).

### 9.4. SITE CLEARANCE & PREPARATION

The competency of the exposed subgrade underlying all future concrete slab foundations and invert of all perimeter and bored foundations should be confirmed by a Geo-Professional. In this regard, we recommend the stripping of all vegetation, topsoil and non-engineered fill deposits beneath any proposed concrete slab foundation, 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.

### 9.5. SUBGRADE PROTECTION

The subgrade beneath any proposed concrete slab foundation should not be exposed for any prolonged period but should be covered with a 100mm 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

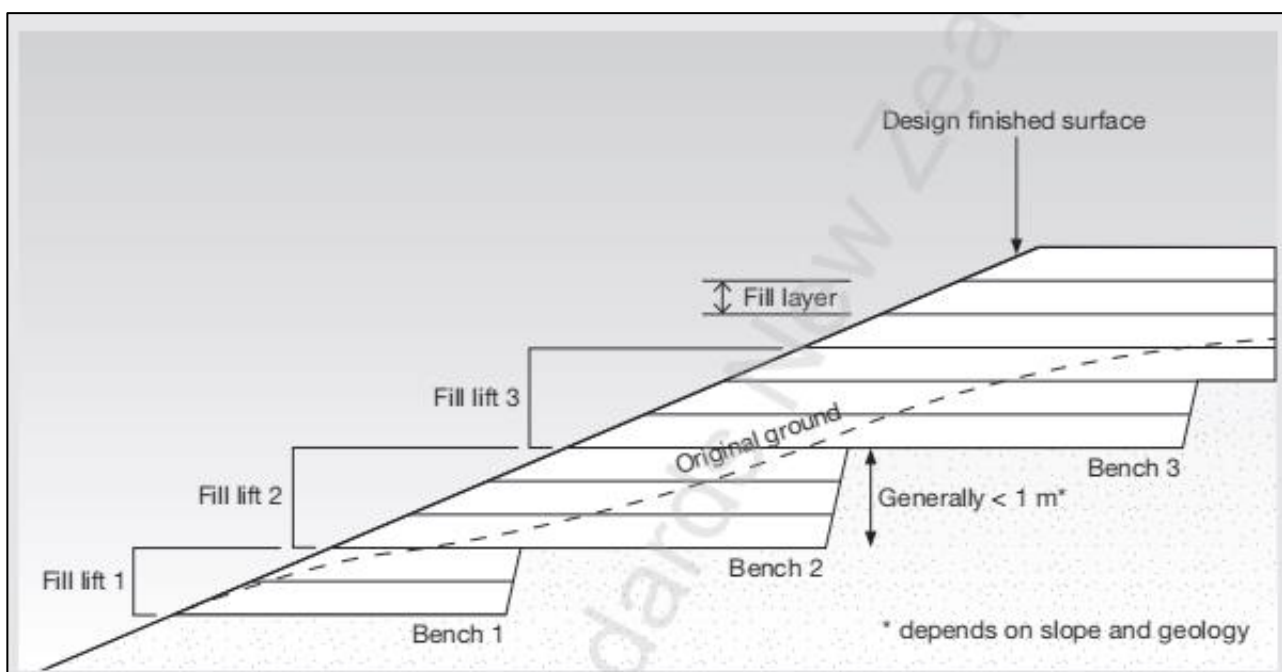
or

- 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.

## 9.6. CLAY FILL COMPACTION

The compaction of clay fill comes with the inherent risks of high-water content and inconsistency of soil, which can, more often than not, lead to poor quality compaction, especially if imported material is utilised.

Site benching should be carried out generally in accordance with Section 4 of NZS4431:2022 and Figure 4 below. Any water seepages must also be drained in accordance with NZS4431:2022.



**Figure 4: Typical benching detail (from NZS4431:2022: Figure 1 – Section C4.3.4).**

As a general guide, we recommend placing cohesive clay in loose lift thicknesses of around 0.15m to 0.20m, subject to being compacted using a suitably sized pad-foot roller. Attempted compaction with tracked machines and/or loaded trucks is not acceptable.

It is important that the moisture content of the material is at close to an optimum level, in order to achieve successful compaction. On the basis of our experience with similar materials, we anticipate the optimum moisture content for effective compaction to be between 30 to 40%. Although materials can still be compacted if wet or dry of this value, the results may not be acceptable and could require conditioning by drying or wetting as appropriate.

In order to provide the most flexibility for likely variations in soil types, it is recommended that earthworks compaction control use the maximum allowable air voids/minimum allowable shear strength criteria, as follows:

**Table 3: Air Voids and Shear Vane (for cohesive fill only)**

|                         | Air Voids Percentage<br>(as defined in NZS 4402:1986) |                           | Undrained Shear Strength<br>(Measured in-situ by IANZ calibrated vane) |                             |
|-------------------------|-------------------------------------------------------|---------------------------|------------------------------------------------------------------------|-----------------------------|
|                         | Maximum Average Value<br>%                            | Maximum Single Value<br>% | Minimum Average Value<br>kPa                                           | Minimum Single Value<br>kPa |
| <b>Residential Fill</b> | 10                                                    | 12                        | 140                                                                    | 110                         |

Note: The average value shall be determined over any ten consecutive tests

All clay fill that is proposed to be certified as engineered fill beneath any proposed concrete floor slab foundation should be supplemented with Nuclear Densometer Testing.

### 9.7. HARDFILL COMPACTION

The compaction of the 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 0.6m, 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.

**Table 4: Compaction Criteria (for granular fill only)**

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

### 9.8. TEMPORARY & LONG-TERM EARTHWORK BATTERS

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

During times of inclement weather, the earthworks site should be shaped to assist in stormwater run-off. 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.

At this preliminary stage, all cuts and fills should be limited to heights of 1.5m and 0.60m respectively and be battered no steeper than 1V:3H. Any proposed cuts and fills outside these imposed limits should be referred to WJL for review.

Finally, 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 Factor of Safety (FoS) against ground instability is available at all stages of the development.

### 9.9. CUT/FILL LIMITATIONS

Generally speaking, fills greater than 0.60m depth which have not been reviewed and approved herein, should be considered as being outside the constraints of NZS3604:2011, and hence should not be undertaken on this site unless reviewed and approved by a Geo-Professional familiar with the report contents herein. Filling in excess of this magnitude may, in certain circumstances, disturb existing stability conditions such as by overloading slopes and/or retaining walls, or inducing consolidation settlements of adjacent structures.

In a like fashion, cuts that could remove the support from slopes and/or adjacent structures (be they existing or future proposed), should also be restricted to a height of 1.5m unless specifically reviewed and approved.

For the reasons stated above, any future retaining walls supporting cut and/or fills in excess of these magnitudes will likely require specific assessment and, if considered appropriate, be subject to specific engineering design.

### 9.10. GENERAL SITE WORKS

We stress that any and all works should be undertaken in a careful and safe manner so that Health and Safety is not compromised, and that suitable Erosion and 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 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.

### 9.11. 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
- 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 the building site to an appropriate disposal point. All stormwater runoff from roofs and paved areas should be collected in sealed pipes and be discharged to a Council approved stormwater reticulated system.

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

#### **11. ON-SITE WASTEWATER DISPOSAL**

No reticulated sanitary sewer is available for the site; therefore, an on-site wastewater treatment and disposal system will be required to service future developments.

#### **12. DRAWING REVIEW**

Once final development foundation plans for future developments have been finalised, the drawings should be referred to us or a Chartered Professional Engineer who is familiar with the site and the findings of this report for review, to verify that the recommendations contained in this report have been incorporated into the design.

**Depending on the future development proposals, the review could range from desktop assessment to further geotechnical investigation and reporting.**

#### **13. FUTURE CONSTRUCTION MONITORING**

The foregoing statements are Professional Opinion, based on a limited collection of information, some of which is factual, and some of which is inferred. Because soils are not a homogeneous, manufactured building component, there always exists a level of risk that inferences about soil conditions across the greater site, which have been drawn from isolated "pinprick" 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 (BC) 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, WJL would then be in a position to issue the PS4 as required by Council.

At this time, the following Geotechnical Site Inspections and Testing should include, but are not limited to:

- Subgrade stripping (concrete slab foundations),
- Fill compaction testing (concrete slab foundations),
- Pre-pour strip and bored footing excavations (if required).

#### **14. LIMITATIONS**

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

This report has been commissioned solely for the benefit of our Client, **Sue S. Teixeira**, 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 Wilton Joubert Limited, 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.

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**



**Appendices:**

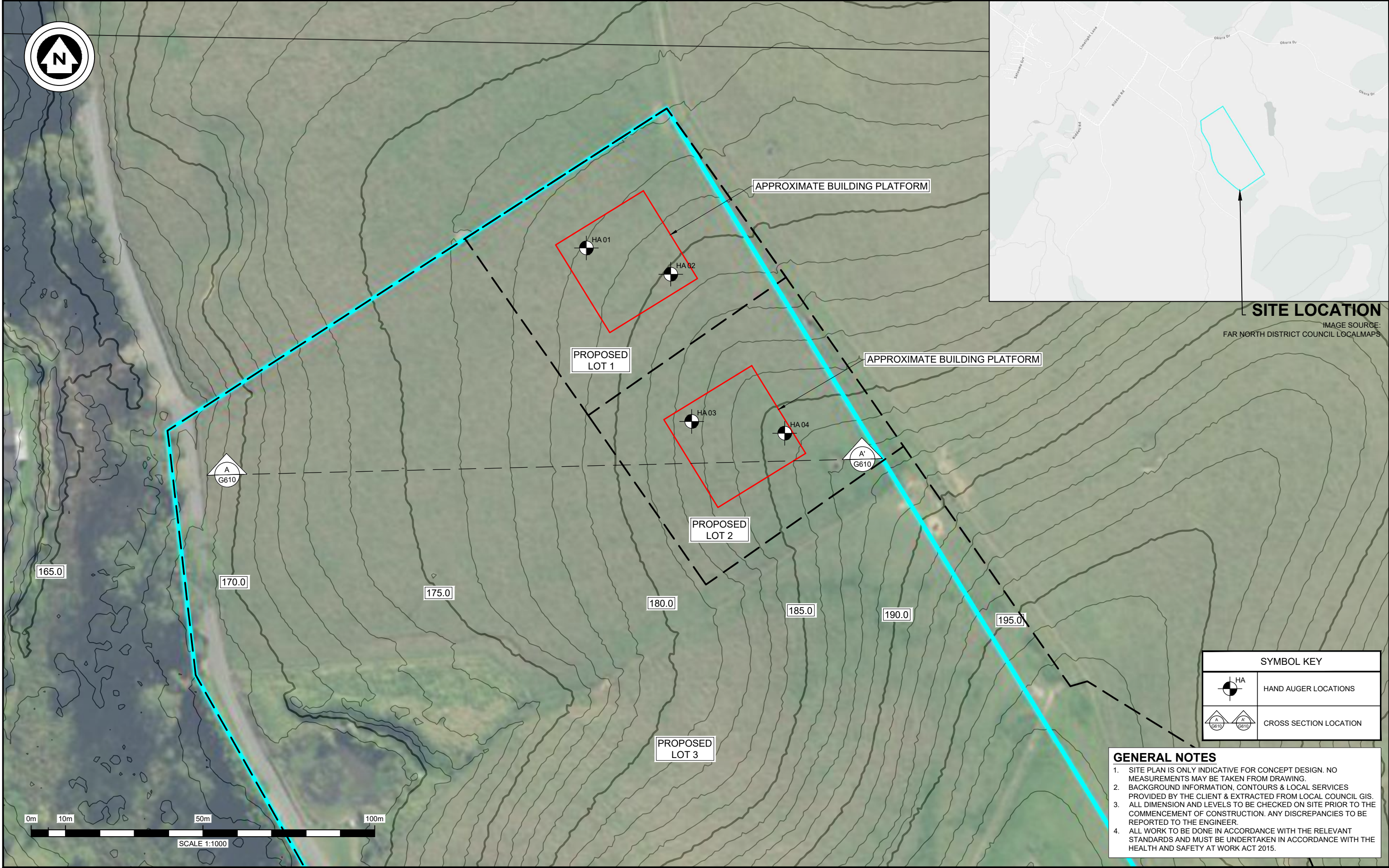
Site Plan and Cross-Section A-A' (2 sheets)

HA Records (4 sheets)

'Foundation Maintenance & Footing Performance', published by CSIRO (4 sheets)

WJL's Construction Monitoring Information (1 sheet)





**SITE LOCATION**

IMAGE SOURCE:  
FAR NORTH DISTRICT COUNCIL LOCALMAPS

| SYMBOL KEY                                                                            |                                           |
|---------------------------------------------------------------------------------------|-------------------------------------------|
|  | HA<br>HAND AUGER LOCATIONS                |
|  | A<br>A'<br>G610<br>CROSS SECTION LOCATION |

**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.



**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                | OCT 2025 | A.B | ISSUED WITH GEOTECHNICAL REPORT |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |

DESIGNED BY:

DRAWN BY:  
A.B

CHECKED BY:

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 ENGINEERS APPROVAL

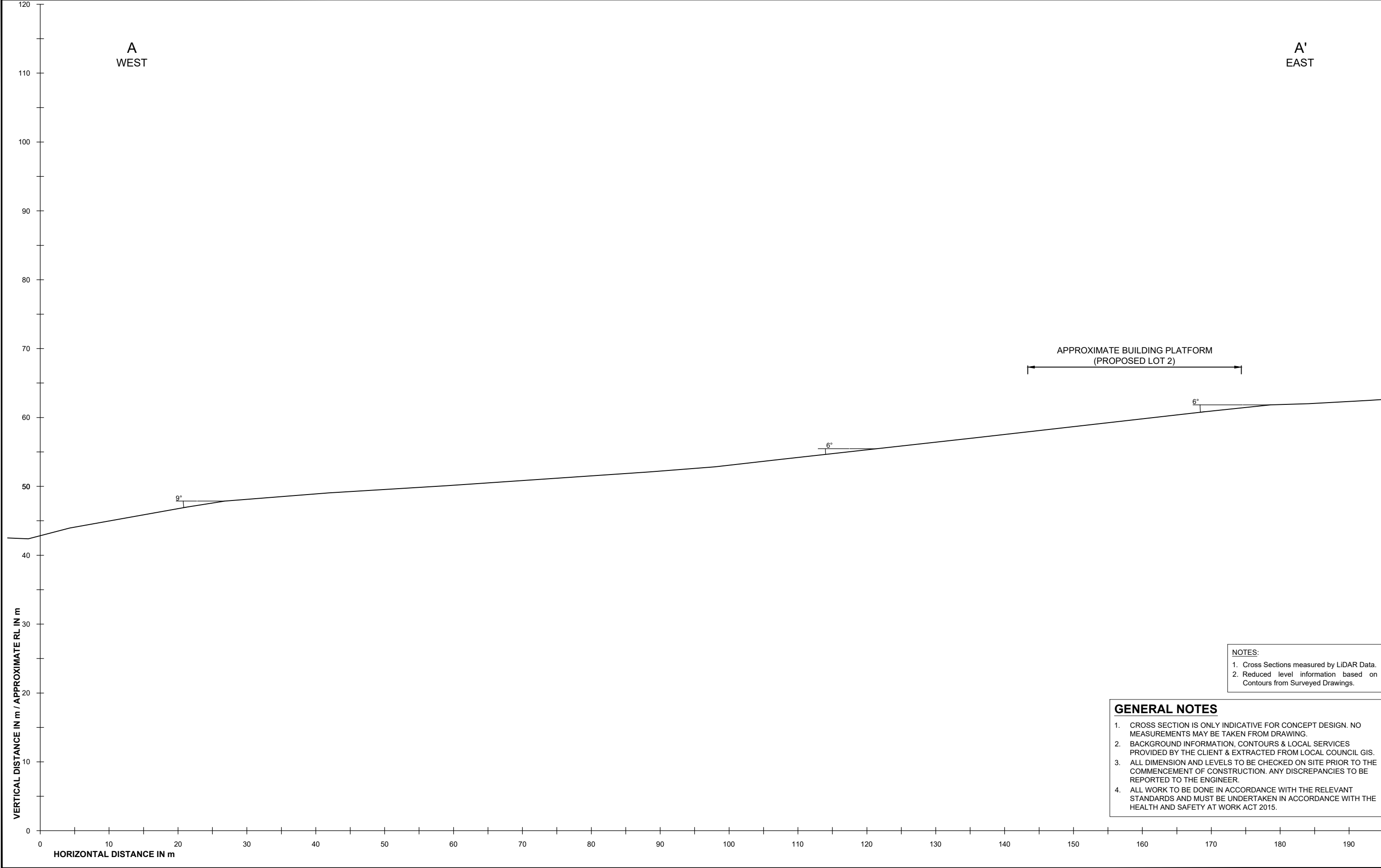
DRAWING TITLE:  
**SITE PLAN**

PROJECT DESCRIPTION:  
**PROPOSED SUBDIVISION**

PROJECT TITLE:  
**LOT 1 DP 160255  
101 SHEPHERD ROAD  
KERIKERI  
NORTHLAND**

|                                       |                                               |
|---------------------------------------|-----------------------------------------------|
| ORIGINAL DRAWING SIZE:<br><b>A3</b>   | OFFICE:<br><b>WHANGAREI</b>                   |
| DRAWING SCALE:<br><b>1:1000</b>       | CO-ORDINATE SYSTEM:<br><b>NOT COORDINATED</b> |
| DRAWING NUMBER:<br><b>142948-G600</b> | ISSUE:<br><b>A</b>                            |
| COPYRIGHT - WILTON JOUBERT LIMITED    |                                               |







**WILTON JOUBERT**  
Consulting Engineers

Northland: 09 945 4188  
Christchurch: 021 824 063

Auckland: 09 527 0196  
Wanaka: 03 443 6209

www.wiltonjoubert.co.nz

| ISSUE / REVISION |          |     |                                 |
|------------------|----------|-----|---------------------------------|
| No.              | DATE     | BY  | DESCRIPTION                     |
| A                | OCT 2025 | A.B | ISSUED WITH GEOTECHNICAL REPORT |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |
|                  |          |     |                                 |

DESIGNED BY:

DRAWN BY:  
A.B

CHECKED BY:

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 ENGINEERS APPROVAL

DRAWING TITLE:

CROSS SECTION

PROJECT DESCRIPTION:

PROPOSED SUBDIVISION

PROJECT TITLE:

LOT 1 DP 160255  
101 SHEPHERD ROAD  
KERIKERI  
NORTHLAND

|                                    |                                        |
|------------------------------------|----------------------------------------|
| ORIGINAL DRAWING SIZE:<br>A3       | OFFICE:<br>WHANGAREI                   |
| DRAWING SCALE:<br>1:500            | CO-ORDINATE SYSTEM:<br>NOT COORDINATED |
| DRAWING NUMBER:<br>142948-G610     | ISSUE:<br>A                            |
| COPYRIGHT - WILTON JOUBERT LIMITED |                                        |

## HAND AUGER : HA01

**JOB NO.: 142948**

**SHEET: 1 OF 1**

**START DATE:** 13/10/2025

**NORTHING:**

**GRID:**

**DIAMETER:** 50mm

EASTING:

SV DIAL: ET20828

**ELEVATION:** Ground

**FACTOR:** 1.405

**DATUM:**

**CLIENT:** Sue S. Teixeira

**PROJECT:** Proposed Subdivision

**SITE LOCATION:** 101 Shepherd Road, Kerikeri

| STRATIGRAPHY  | SOIL DESCRIPTION                                                                                                      | LEGEND                                                                                    | DEPTH (m) | WATER | SHEAR VANE          |                        |             | DCP - SCALA<br>(Blows / mm) | COMMENTS, SAMPLES, OTHER TESTS |
|---------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------|-------|---------------------|------------------------|-------------|-----------------------------|--------------------------------|
|               |                                                                                                                       |                                                                                           |           |       | PEAK STRENGTH (kPa) | REMOULD STRENGTH (kPa) | SENSITIVITY |                             |                                |
| Topsoil       | TOPSOIL.                                                                                                              |  TOPSOIL |           |       |                     |                        |             |                             |                                |
| Waipapa Group | Clayey SILT, light orangey brown, very stiff to hard, moist, moderate plasticity.                                     |  CLAY    | 0.2       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  SILT    | 0.4       |       | 197+                | -                      | -           |                             |                                |
|               | 0.6m: Light brownish white and light orangey brown.                                                                   |  SAND    | 0.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  GRAVEL  | 0.8       |       | 197+                | -                      | -           |                             |                                |
|               |                                                                                                                       |  PEAT    | 1.0       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  ROCK    | 1.2       |       | 197+                | -                      | -           |                             |                                |
|               | Clayey SILT/SILT, some clay, light brownish white/dark orange/light orangey brown, very stiff, moist, low plasticity. |  CLAY    | 1.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  SILT    | 1.6       |       | 169                 | 48                     | 3.5         |                             |                                |
|               |                                                                                                                       |  SAND    | 1.8       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  GRAVEL  | 2.0       |       | 126                 | 48                     | 2.6         |                             |                                |
|               |                                                                                                                       |  PEAT    | 2.2       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  ROCK    | 2.4       |       | 166                 | 70                     | 2.4         |                             |                                |
|               |                                                                                                                       |                                                                                           | 2.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 2.8       |       | 166                 | 48                     | 3.5         |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.0       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       | 3.2m: Wet.                                                                                | 3.2       |       | 169                 | 62                     | 2.7         |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.6       |       | 183                 | 28                     | 6.5         |                             |                                |
|               |                                                                                                                       | 3.8m: Hard.                                                                               | 3.8       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.0       |       |                     |                        |             |                             |                                |
|               | Too hard to auger.<br>EOH: 4.00m                                                                                      |                                                                                           | 4.2       |       | 197+                | -                      | -           |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.8       |       |                     |                        |             |                             |                                |

## REMARKS

REMARKS  
End of borehole @ 4.00m (Target Depth: 5.00m)

Standing groundwater @ 3.40m.

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

LOGGED BY: A.B

▼ Standing groundwater level

**CHECKED BY:**

▽ GW while drilling



45B Norfolk St, Kensington 0145, Whangarei  
Phone: 09 945 4188  
Email: [jobs@wjl.co.nz](mailto:jobs@wjl.co.nz)  
Website: [www.wiltonjoubert.co.nz](http://www.wiltonjoubert.co.nz)

Generated with CORE-GS by Geroo - WJL - Hand Auger v2 - 13/10/2025 3:42:57 PM

|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        |                   |                             |                           |                              |             |                             |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|-------------------|-----------------------------|---------------------------|------------------------------|-------------|-----------------------------|-----------------------------------|
| <h1>HAND AUGER : HA02</h1>                                                                                                            |                                                                                     | JOB NO.: 142948                                                                                                                                                                                                                                      |        | SHEET: 1 OF 1     |                             |                           |                              |             |                             |                                   |
| CLIENT: Sue S. Teixeira                                                                                                               |                                                                                     | START DATE: 13/10/2025                                                                                                                                                                                                                               |        | NORTHING: GRID:   |                             |                           |                              |             |                             |                                   |
| PROJECT: Proposed Subdivision                                                                                                         |                                                                                     | DIAMETER: 50mm                                                                                                                                                                                                                                       |        | EASTING:          |                             |                           |                              |             |                             |                                   |
| SITE LOCATION: 101 Shepherd Road, Kerikeri                                                                                            |                                                                                     | SV DIAL: 2432                                                                                                                                                                                                                                        |        | ELEVATION: Ground |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | FACTOR: 1.407                                                                                                                                                                                                                                        |        | DATUM:            |                             |                           |                              |             |                             |                                   |
| STRATIGRAPHY                                                                                                                          | SOIL DESCRIPTION                                                                    |                                                                                                                                                                                                                                                      | LEGEND | DEPTH (m)         | WATER                       | SHEAR VANE                |                              |             | DCP - SCALA<br>(Blows / mm) | COMMENTS, SAMPLES,<br>OTHER TESTS |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        |                   |                             | PEAK<br>STRENGTH<br>(kPa) | REMOULD<br>STRENGTH<br>(kPa) | SENSITIVITY |                             |                                   |
| Topsoil                                                                                                                               | TOPSOIL.                                                                            |                                                                                                                                                                                                                                                      | TS     | 0.0               | Groundwater Not Encountered |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 0.2               |                             |                           |                              |             |                             |                                   |
| Waipapa Group                                                                                                                         | Clayey SILT, light yellowish/orangey brown, very stiff, moist, moderate plasticity. |                                                                                                                                                                                                                                                      | X      | 0.4               | Groundwater Not Encountered | 110                       | 35                           | 3.1         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 0.6               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 0.8               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 1.0               |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 1.2               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 1.4               |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 1.6               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 1.8               |                             | 155                       | 72                           | 2.2         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 2.0               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 2.2               |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 2.4               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 2.6               |                             | 167                       | 84                           | 2.0         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 2.8               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 3.0               |                             | 163                       | 84                           | 1.9         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 3.2               |                             | 155                       | 73                           | 2.1         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                                                                                                                                                                                      |        | 3.4               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.6                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.8                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.0                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.2                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.4                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.6                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.8                                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
| EOH: 3.00m                                                                                                                            |                                                                                     |                                                                                                                                                                                                                                                      |        |                   |                             |                           |                              |             |                             |                                   |
| 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: A.B                                                                                                                        |                                                                                     | ▼ Standing groundwater level                                                                                                                                                                                                                         |        |                   |                             |                           |                              |             |                             |                                   |
| CHECKED BY:                                                                                                                           |                                                                                     | ▽ GW while drilling                                                                                                                                                                                                                                  |        |                   |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | <div><div><div>45B Norfolk St, Kensington 0145, Whangarei<br/>Phone: 09 945 4188<br/>Email: jobs@wj.co.nz<br/>Website: www.wiltonjoubert.co.nz</div></div></div> |        |                   |                             |                           |                              |             |                             |                                   |



Generated with CORE-GS by Gecoc - WJL - Hand Auger v2 - 13/10/2025 3:42:58 PM

| HAND AUGER : HA03                                                                                                                     |                                                                                                          |  |  |  | JOB NO.: 142948                                                                                                                                                  |           | SHEET: 1 OF 1     |                     |                        |             |                                |                          |  |
|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|--|--|--|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------------------|------------------------|-------------|--------------------------------|--------------------------|--|
| CLIENT: Sue S. Teixeira                                                                                                               |                                                                                                          |  |  |  | START DATE: 13/10/2025                                                                                                                                           |           | NORTHING: GRID:   |                     |                        |             |                                |                          |  |
| PROJECT: Proposed Subdivision                                                                                                         |                                                                                                          |  |  |  | DIAMETER: 50mm                                                                                                                                                   |           | EASTING:          |                     |                        |             |                                |                          |  |
| SITE LOCATION: 101 Shepherd Road, Kerikeri                                                                                            |                                                                                                          |  |  |  | SV DIAL: ET20828                                                                                                                                                 |           | ELEVATION: Ground |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  | FACTOR: 1.405                                                                                                                                                    |           | DATUM:            |                     |                        |             |                                |                          |  |
| STRATIGRAPHY                                                                                                                          | SOIL DESCRIPTION                                                                                         |  |  |  | LEGEND                                                                                                                                                           | DEPTH (m) | WATER             | SHEAR VANE          |                        |             | COMMENTS, SAMPLES, OTHER TESTS |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  |           |                   | PEAK STRENGTH (kPa) | REMOULD STRENGTH (kPa) | SENSITIVITY |                                | DCP - SCALA (Blows / mm) |  |
| Topsoil                                                                                                                               | TOPSOIL.                                                                                                 |  |  |  |                                                                                                                                                                  | 0.0       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 0.2       |                   |                     |                        |             |                                |                          |  |
| Waipapa Group                                                                                                                         | Clayey SILT, orangey brown, hard, moist, moderate plasticity.                                            |  |  |  |                                                                                                                                                                  | 0.4       |                   | 197+                | -                      | -           |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 0.6       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 0.8       |                   | 197+                | -                      | -           |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 1.0       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | Clayey SILT/SILT, some clay, dark orange/light brownish white.                                           |  |  |  |                                                                                                                                                                  | 1.2       |                   | 197+                | -                      | -           |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 1.4       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 1.6       |                   | 197+                | -                      | -           |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 1.8       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | 1.8m - 2.0m: Some fine to coarse sand.                                                                   |  |  |  |                                                                                                                                                                  | 2.0       |                   | 171                 | 67                     | 2.6         |                                |                          |  |
|                                                                                                                                       | 2.1m: Minor fine to medium sand.                                                                         |  |  |  |                                                                                                                                                                  | 2.2       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 2.4       |                   | 146                 | 59                     | 2.5         |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 2.6       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 2.8       |                   | 140                 | 39                     | 3.6         |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 3.0       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | 3.0m: Wet.                                                                                               |  |  |  |                                                                                                                                                                  | 3.2       |                   | 155                 | 70                     | 2.2         |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 3.4       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | 3.4m: Occasional black streaking.                                                                        |  |  |  |                                                                                                                                                                  | 3.6       |                   | 169                 | 90                     | 1.9         |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 3.8       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 4.0       |                   | 90                  | 34                     | 2.6         |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 4.2       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       |                                                                                                          |  |  |  |                                                                                                                                                                  | 4.4       |                   | 197+                | -                      | -           |                                |                          |  |
|                                                                                                                                       | Clayey SILT/SILT, some clay, minor fine to coarse sand, trace of fine gravel, hard, wet, low plasticity. |  |  |  |                                                                                                                                                                  | 4.6       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | Too hard to auger.                                                                                       |  |  |  |                                                                                                                                                                  | 4.8       |                   |                     |                        |             |                                |                          |  |
|                                                                                                                                       | EOH: 4.50m                                                                                               |  |  |  |                                                                                                                                                                  |           |                   |                     |                        |             |                                |                          |  |
| REMARKS                                                                                                                               |                                                                                                          |  |  |  | <div><div></div><div>45B Norfolk St, Kensington 0145, Whangarei<br/>Phone: 09 945 4188<br/>Email: jobs@wj.co.nz<br/>Website: www.wiltonjoubert.co.nz</div></div> |           |                   |                     |                        |             |                                |                          |  |
| End of borehole @ 4.50m (Target Depth: 5.00m)                                                                                         |                                                                                                          |  |  |  |                                                                                                                                                                  |           |                   |                     |                        |             |                                |                          |  |
| Standing groundwater @ 4.00m.                                                                                                         |                                                                                                          |  |  |  |                                                                                                                                                                  |           |                   |                     |                        |             |                                |                          |  |
| NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense |                                                                                                          |  |  |  |                                                                                                                                                                  |           |                   |                     |                        |             |                                |                          |  |
| LOGGED BY: A.B                                                                                                                        |                                                                                                          |  |  |  | ▼ Standing groundwater level                                                                                                                                     |           |                   |                     |                        |             |                                |                          |  |
| CHECKED BY:                                                                                                                           |                                                                                                          |  |  |  | ▽ GW while drilling                                                                                                                                              |           |                   |                     |                        |             |                                |                          |  |

## HAND AUGER : HA04

**JOB NO.: 142948**

**SHEET: 1 OF 1**

**START DATE:** 13/10/2025

**NORTHING:**

**GRID:**

**DIAMETER:** 50mm

**EASTING:**

SV DIAL: ET20828

**ELEVATION:** Ground

**FACTOR:** 1.405

**DATUM:**

**CLIENT:** Sue S. Teixeira

**PROJECT:** Proposed Subdivision

**SITE LOCATION:** 101 Shepherd Road, Kerikeri

| STRATIGRAPHY  | SOIL DESCRIPTION                                              | LEGEND                                                                                    | DEPTH (m)                            | WATER                       | SHEAR VANE                |                              |             | DCP - SCALA<br>(Blows / mm) | COMMENTS, SAMPLES,<br>OTHER TESTS |  |
|---------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------|--------------------------------------|-----------------------------|---------------------------|------------------------------|-------------|-----------------------------|-----------------------------------|--|
|               |                                                               |                                                                                           |                                      |                             | PEAK<br>STRENGTH<br>(kPa) | REMOULD<br>STRENGTH<br>(kPa) | SENSITIVITY |                             |                                   |  |
| Topsoil       | TOPSOIL.                                                      |  TOPSOIL |                                      |                             |                           |                              |             |                             |                                   |  |
| Waipapa Group | Clayey SILT, orangey brown, hard, moist, moderate plasticity. |  CLAY    | 0.1                                  | Groundwater Not Encountered |                           |                              |             |                             |                                   |  |
|               |                                                               |  SILT    | 0.2                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |  SAND    | 0.3                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |  PEAT    | 0.4                                  |                             | 197+                      | -                            | -           |                             |                                   |  |
|               |                                                               |  GRAVEL  | 0.5                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |  ROCK    | 0.6                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 0.7                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 0.8                                  |                             | 197+                      | -                            | -           |                             |                                   |  |
|               |                                                               |                                                                                           | 0.9                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.0                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.1                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.2                                  |                             | 197+                      | -                            | -           |                             |                                   |  |
|               |                                                               |                                                                                           | 1.3                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.4                                  |                             |                           |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.5m: Light red streaking.           |                             | 1.5                       |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           | 1.7m: Orangey brown/light red/white. |                             | 1.6                       | 197+                         | -           | -                           |                                   |  |
|               |                                                               |                                                                                           |                                      |                             | 1.7                       |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           |                                      |                             | 1.8                       |                              |             |                             |                                   |  |
|               |                                                               |                                                                                           |                                      |                             | 1.9                       |                              |             |                             |                                   |  |
|               |                                                               | Clayey SILT/SILT, some clay.                                                              | 2.0                                  |                             | 197+                      | -                            | -           |                             |                                   |  |
|               |                                                               | 2.1                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.2                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.3                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.4                                                                                       | 197+                                 | -                           | -                         |                              |             |                             |                                   |  |
|               |                                                               | 2.5                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.6                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.7                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 2.8                                                                                       | 197+                                 | -                           | -                         |                              |             |                             |                                   |  |
|               |                                                               | 2.9                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               | EOH: 3.00m                                                    | 3.0                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.1                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.2                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.3                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.4                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.5                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.6                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.7                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.8                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 3.9                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.0                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.1                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.2                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.3                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.4                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.5                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.6                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.7                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.8                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 4.9                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |
|               |                                                               | 5.0                                                                                       |                                      |                             |                           |                              |             |                             |                                   |  |

## REMARKS

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

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

LOGGED BY: A.B

▼ Standing groundwater level

**CHECKED BY:**

▽ GW while drilling



45B Norfolk St, Kensington 0145, Whangarei  
Phone: 09 945 4188  
Email: [jobs@wj1.co.nz](mailto:jobs@wj1.co.nz)  
Website: [www.wiltonioubert.co.nz](http://www.wiltonioubert.co.nz)

# Construction Monitoring Services

## Northland, Auckland-Waikato, Canterbury, Southern Lakes

### Need a PS4?

- Please read the conditions of your Building Consent to determine which section of the works Council wants an engineer to sign off on.
- Book an inspection with Wilton Joubert Ltd or with a suitable qualified engineer.
- Have the Consent documents on site at the time of the inspection
- Be sure to verify both the grounding conditions (soil parameters) as well as the structural elements of works in question
- If in doubt what to get inspected please clarify with Council.

Producer Statements 4 - Construction Review Documents (PS4's) relates to Building Consents (BC) only, not Resource Consents (RC), unless there is an element of the RC which requires a BC, e.g. a retaining wall needed to develop a subdivision.

In soils, RC's are usually verified with a "Statement of Professional Opinion as to Suitability for Building Development", or variations on that title.

## CONSTRUCTION MONITORING SERVICES

Construction monitoring refers to the physical inspection of selective components of the design or works as required by Council and as specified in the Consented documents. It is up to the Consent holder to read the special conditions set out by Council and arrange for the required inspections to be done. No PS4 can be issued without the physical inspection of works and sighting of Consented plans either by the design engineer, his representative, or another qualified engineer. (download PDF with more info via our website)

It is also important to note that, more often than not, there are two physical components that needs verification:

1. Geotechnical or grounding Conditions –referring to the strength or bearing capacity of the soil
2. Structural Components – verify that works are done as per design and in accordance with the consented plans.

To complicate matters there can be multiple engineers that might be engaged on the same site:

- Civil Engineer – To do storm water and wastewater designs
- Geotechnical Engineer – to do a Geotech report and specificity soil parameters as required
- Structural Engineer – to design structural components such as retaining walls, raft floors, beams and so on.

In cases where engineers from different companies are appointed it is important to make sure all the required boxes are ticked as not to complicate matters when it comes to the issuing of all the relevant PS4's.

Note: sites in the Auckland area might requires multiple PS4's for the same component (e.g. a raft floor requires a Geotechnical Engineer to verify the bearing capacity of the platform and a Structural engineer needs to verify the structural components are according to the design.

Not to mention a Council inspection is also required on the same floor to verify position, plumbing and so on.

### In Summary:

- Read the conditions as laid out in the Consent documents to which elements of the design requires a PS4's from the design engineer.
- Have Consented plans on site during inspection time
- Book inspections ahead of time (a minimum of 48 hours in advanced)
- Ensure both grounding conditions as well as structural components are inspected. In some cases, this might mean two separate inspections if different engineers are involved.
- If you have any further questions, feel free to contact us at any time during business hours.



## Construction Monitoring Enquiries

Email: [jobs@wjl.co.nz](mailto:jobs@wjl.co.nz)

or scan QR code to visit our website



# FOUNDATION MAINTENANCE AND FOOTING PERFORMANCE

## Preventing soil-related building movement

**This Building Technology Resource is designed as a homeowner's guide on the causes of soil-related building movement, and suggested methods to prevent resultant cracking.**

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 home owner 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. Generally soil classification is provided by a geotechnical report.

### 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.

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. Table 1 below is a reproduction of Table 2.1 from Australian Standard AS 2870-2011, Residential slabs and footings.

### 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 may be the province of the builder and should be taken into consideration as part of the preparation of the site for construction.

#### 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, from AS 2870). 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.

#### TREE ROOT GROWTH

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

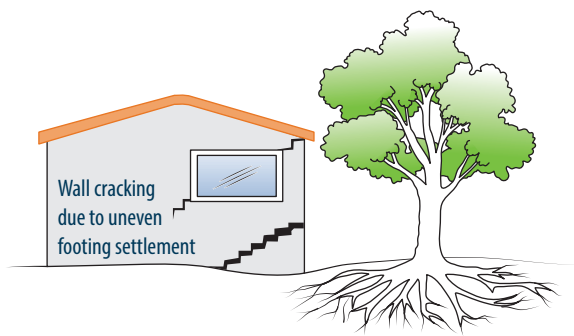
- ▶ Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.

**TABLE 1. 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                |

Source: Reproduced with the permission of Standards Australia Limited © 2011. Copyright in AS 2870-2011 Residential slabs and footings vests in Standards Australia Limited.





**FIGURE 1** Trees can cause shrinkage and damage.

- ▶ 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 through absorption. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Shrinkage usually begins on the side of the building 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 perpend).

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.

### 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. Table 2 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 AND 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 may 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 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.

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.

**TABLE 2. CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS.**

| Description of typical damage and required repair                                                                                                                                                                                        | Approximate crack width limit                             | Damage category |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|-----------------|
| Hairline cracks                                                                                                                                                                                                                          | <0.1 mm                                                   | 0 – Negligible  |
| Fine cracks which do not need repair                                                                                                                                                                                                     | <1 mm                                                     | 1 – Very Slight |
| Cracks noticeable but easily filled. Doors and windows stick slightly.                                                                                                                                                                   | <5 mm                                                     | 2 – Slight      |
| 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 – Moderate    |
| 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 – Severe      |

Source: Reproduced with the permission of Standards Australia Limited © 2011. Copyright in AS 2870-2011 Residential slabs and footings vests in Standards Australia Limited.

**Warning:** Although this Building Technology Resource 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, and mould.
- ▶ 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.

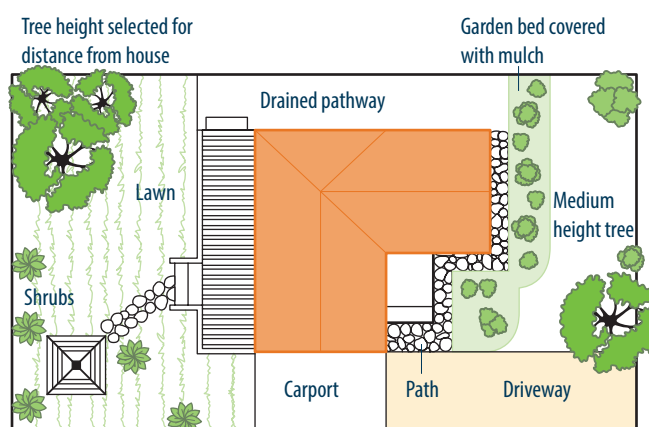
Overwatering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

## EXISTING TREES

Existing trees may cause problems with the upheaval of footings by their roots, or shrinkage from soil drying. 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. Soil drying is a more complex issue and professional advice may be required before considering the removal or relocation of the tree.

## 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.



**FIGURE 2** Gardens for a reactive site.

## 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 home owner 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.

**SITE** 101 Shepherd Road, Kerikeri

**LEGAL DESCRIPTION** Lot 1 DP 160255

**PROJECT** 3-lot Subdivision

**CLIENT** Sue S. Teixeira

**REFERENCE NO.** 142949

**DOCUMENT** Civil Site Suitability Report

**STATUS/REVISION NO.** 02

**DATE OF ISSUE** 14 November 2025

| Report Prepared For | Email           |
|---------------------|-----------------|
| Sue S. Teixeira     | suet@xtra.co.nz |

|                                   |                                                                    |                       |                   |                                                                                       |
|-----------------------------------|--------------------------------------------------------------------|-----------------------|-------------------|---------------------------------------------------------------------------------------|
| <b>Authored by</b>                | <b>P. McSweeney</b><br>(BE (Hons) Civil)                           | Civil Engineer        | patrick@wjl.co.nz |  |
| <b>Reviewed &amp; Approved by</b> | <b>B. Steenkamp</b><br>(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.

|                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                     |            |                                |         |                       |                   |                      |                         |
|-----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|------------|--------------------------------|---------|-----------------------|-------------------|----------------------|-------------------------|
| <b>Legal Description:</b>                           | Lot 1 DP 160255                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Lot Sizes:</b>                                   | Proposed Lot 1 – 4,300m <sup>2</sup><br>Proposed Lot 2 – 4,200m <sup>2</sup><br>Proposed Lot 3 – 11.7Ha                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Development Type:</b>                            | 3-Lot Subdivision                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Scope:</b>                                       | Civil Site Suitability Investigation: <ul style="list-style-type: none"> <li>- Wastewater Assessment</li> <li>- Stormwater Assessment</li> <li>- Potable Water</li> <li>- Access</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Development Proposals Supplied:</b>              | Subdivision Scheme Plan by Boi Survey Ltd (Job No. 5045 RevB, dated: 10.11.2025)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                     |            |                                |         |                       |                   |                      |                         |
| <b>District Plan Zone:</b>                          | Rural Production Zone                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Wastewater:</b>                                  | <p>The following is an indicative Pressure Compensated Drip Irrigation (PCDI) wastewater design for a 4-bedroom dwelling – given the subsoils encountered we recommend Secondary Level Treatment or higher:</p> <table> <tr> <td><b>Daily Wastewater Production:</b></td><td>1,080L/day</td></tr> <tr> <td><b>Daily Application Rate:</b></td><td>3mm/day</td></tr> <tr> <td><b>Disposal Area:</b></td><td>360m<sup>2</sup></td></tr> <tr> <td><b>Reserve Area:</b></td><td>108m<sup>2</sup> (30%)</td></tr> </table> <p>Recommendations for wastewater are provided in Section 5.</p>                                                                                                                                                                                                                                   | <b>Daily Wastewater Production:</b> | 1,080L/day | <b>Daily Application Rate:</b> | 3mm/day | <b>Disposal Area:</b> | 360m <sup>2</sup> | <b>Reserve Area:</b> | 108m <sup>2</sup> (30%) |
| <b>Daily Wastewater Production:</b>                 | 1,080L/day                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Daily Application Rate:</b>                      | 3mm/day                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Disposal Area:</b>                               | 360m <sup>2</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Reserve Area:</b>                                | 108m <sup>2</sup> (30%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Stormwater Management – District Plan Rules:</b> | <p>8.6.5.1.3 – <b>Permitted Activities – Stormwater Management</b> - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15%.</p> <p>8.6.5.2.1 – <b>Controlled Activities – Stormwater Management</b> - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 20%.</p>                                                                                                                                                                                                                                                                                                                                                                                                                   |                                     |            |                                |         |                       |                   |                      |                         |
| <b>Stormwater Management:</b>                       | <p>To comply with the parameters of the Permitted Activity Rule (8.6.5.1.3), future development on Lots 1 must not exceed a total impermeable area coverage of 645m<sup>2</sup>, Lot 2 must not exceed a total impermeable area coverage of 630m<sup>2</sup> and the existing developments on proposed Lot 3 must not exceed a total impermeable area coverage of 17,550m<sup>2</sup>.</p> <p>Proposed Lots 1 &amp; 2 are anticipated to fall within the Permitted – Controlled Activity range. Based on measurements of aerial imagery, the existing developments within proposed Lot 3 will fall under Permitted Activity Status post-subdivision.</p> <p>A stormwater attenuation report including a District Plan Assessment will be required for any future development on proposed Lots 1 or 2 that exceed the</p> |                                     |            |                                |         |                       |                   |                      |                         |

Permitted Activity coverage threshold at Building Consent stage. In such a case, attenuation for the 20% & 1% AEP storm events should be provided for runoff resulting from existing / future proposed impermeable areas exceeding the Permitted Activity threshold to mitigate adverse effects of runoff on the downstream receiving stormwater network.

A concept attenuation design is provided in Section 6 of this report to demonstrate the feasibility of on-site runoff attenuation.

---

Existing vehicle crossing sight distances are compliant.

We deem the existing crossing's geometry to be sufficient to serve the proposed and existing lots. The existing vehicle crossing dimensions are in general accordance with the standards and the crossing is in reasonable condition. Acceptance of any deviations from the standards is at council's discretion.

**Access:**

The existing access surfacing width will be sufficient to comply with the proposed district plan.

At least four (subject to survey/walkover of existing accessway) new passing bays will be required along the existing accessway to the proposed lots.

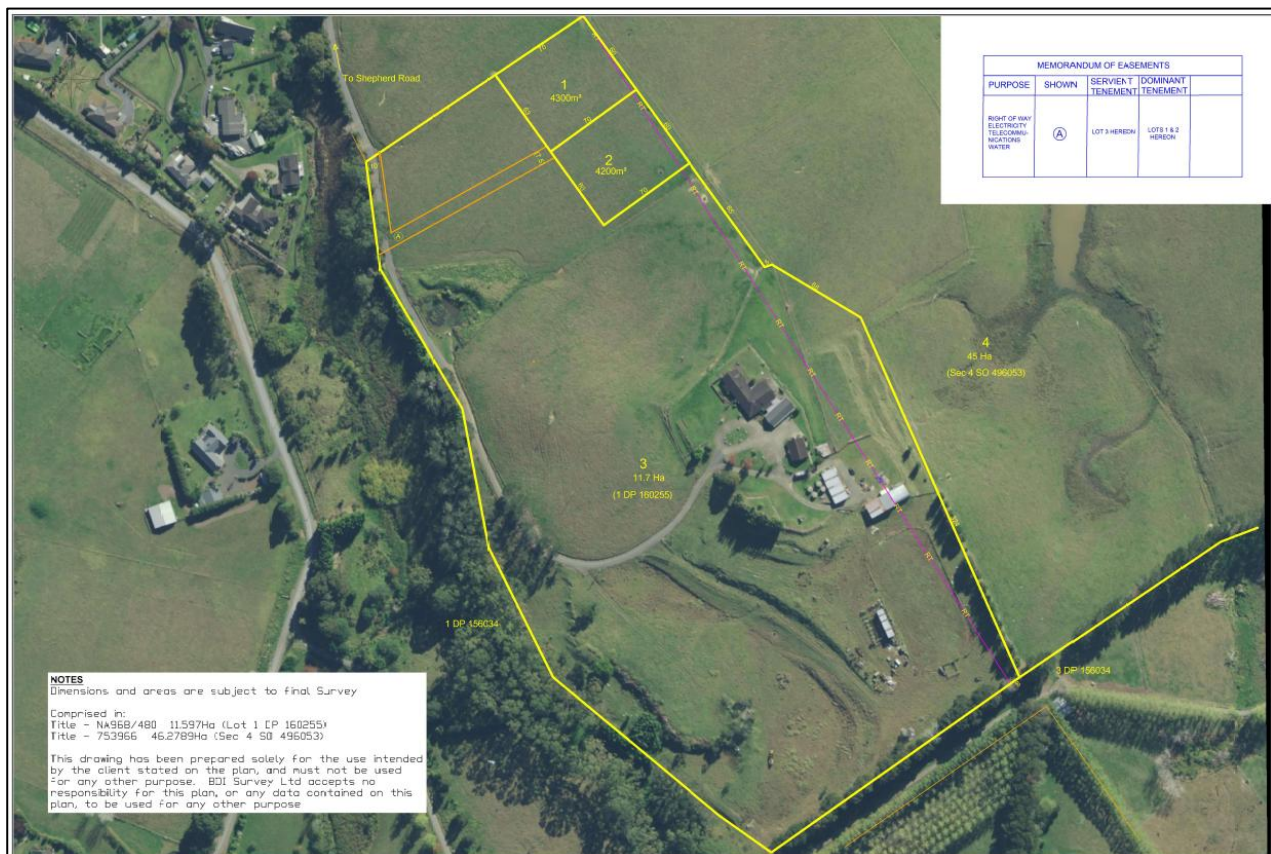
---



## 2 DEVELOPMENT PROPOSALS & SCOPE OF WORK

Wilton Joubert Ltd (WJL) was engaged by the client to undertake a civil site suitability assessment (wastewater, stormwater, potable water & access) to support a 1-into-3 lot subdivision of Lot 1 DP 160255, as depicted in the Subdivision Scheme Plan supplied by the client (Job No. 5045 RevB, dated: 10.11.2025).

Proposed Lot 1 and 2 will be situated at the northern corner of the parent Lot, encompassing areas of 4,300m<sup>2</sup> and 4,200m<sup>2</sup> respectively. A 30m x 30m (900m<sup>2</sup>) Designated Building Platform (DBP) has been identified centrally on each lot for assessment. Proposed Lot 3 contains existing structures (dwelling, sheds, driveway etc.).



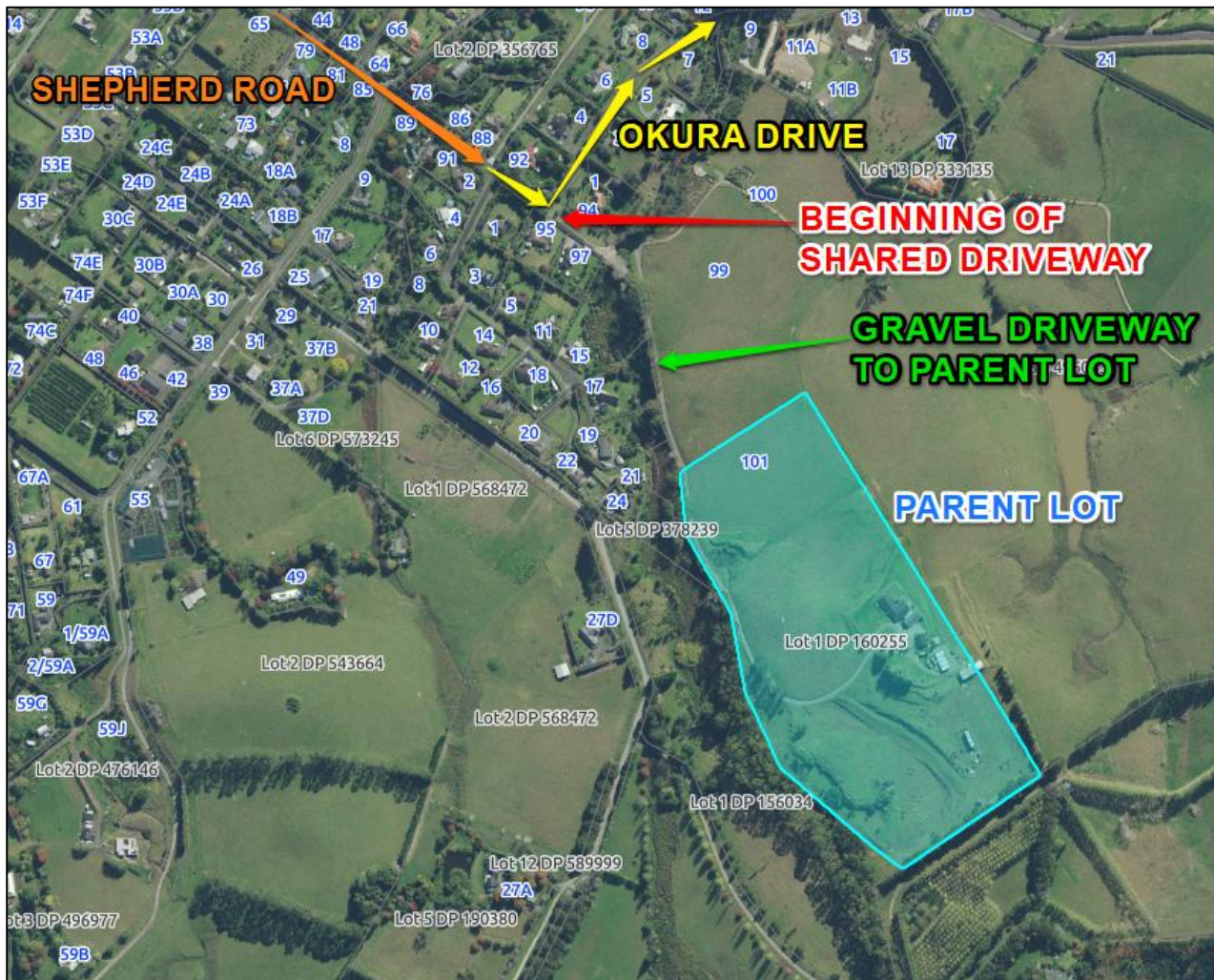
**Figure 1: Scheme Plan of proposed subdivision.**

A Geotechnical Site Suitability Report (WJL Ref. 142948) has been prepared by WJL for the proposed subdivision which should be read in conjunction with this report.

Any revision of the supplied drawings and/or development proposals with wastewater, stormwater, potable water and/or access implications should be referred back to us for review. This report is not intended to support Building Consent applications for the future proposed lots, and any revision of supplied drawings and/or development proposals including those for Building Consent, which might rely on wastewater stormwater, potable water and/or access assessments herein, should be referred to us for review.

### 3 SITE DESCRIPTION

The site of the proposed subdivision is legally described as Lot 1 DP 160255. The site is accessed via a shared gravel driveway off the southern side of Shepherd Road.



*Figure 2: Aerial view with the subject property highlighted in blue (From Far North District Council's online GIS database) and markings of site access.*

Built development on-site comprises an existing dwelling, minor dwelling and shed near the eastern boundary, boundary fences, gravel driveways and concrete parking areas. Vegetation comprises mainly pasture.

The ground surface across proposed Lots 1 and 2 is gently sloping from the eastern boundary down to the west, northwest, and north, with slopes up to approximately 6°. The downslope topography falls to a naturally flatter and intermittently damp/ponding fenced-off section of pasture on the northern side of the driveway. A stream borders the parent lot's western boundary.

No wastewater, stormwater or potable water reticulation is available to service the property.



#### 4 PUBLISHED GEOLOGY

Reference to the New Zealand Geology Web Map hosted by GNS Science indicates that the subject site and wider surrounding land is underlain by Waipapa Group sandstone and siltstone (Waipapa Composite Terrane).

Waipapa Group is described as; *“Massive to thin bedded, lithic volcanoclastic metasandstone and argillite, with tectonically enclosed basalt, chert and siliceous argillite.”*



*Figure 3: Screenshot from New Zealand Geology Web Map hosted by GNS Science.*

In addition to the above, geotechnical testing was conducted by WJL within the subject site.

In general terms, the subsoils encountered consisted of stiff to hard, low to moderately plastic clayey SILTs and SILTs, with varying amounts of clay, sand and gravel content.

Approximately 200-400mm of TOPSOIL was overlying the investigated area. Refer to the appended 'BH Logs'. Given the above, the site's soils have been classified as **Category 5** in accordance with the TP58 design manual.

## 5 WASTEWATER

### *Lots 1 & 2*

A new site-specific design in accordance with the ASNZS: 1547 / TP58 design manual will be required by FNDC for any future development within proposed Lots 1 & 2.

### *Lot 3*

We assume that an existing on-site wastewater treatment system currently services the lot's residential dwelling(s). If the existing on-site wastewater treatment system is functional, fit for the existing dwelling and located within Lot 3's proposed boundaries it may continue to operate.

Based on our observations, we expect that the system is well within the current and future lot boundary. If any part of the wastewater system, including any trenches or disposal fields is not located within proposed Lot 3, the system should be relocated to within the Lot 3 boundary with offsets complying Table 9 of the PRPN.

### 5.1 DESIGN PARAMETERS

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

As no development proposals are available at this stage for the eventual residential development within Lots 1 & 2, our recommendations have been based on a moderate size dwelling containing 4 bedrooms.

Given the subsoils encountered during WJL's fieldwork investigation, we recommend secondary treatment or higher for any new wastewater treatment system within the proposed lots.

Although dripper irrigation is recommended and shown below, an alternative trench or bed setup with secondary level treatment is also acceptable subject to specific design.

#### 5.1.1 Summary of Preliminary Design Parameters for a PCDI Secondary Treatment System

|                                              |                                                                                  |
|----------------------------------------------|----------------------------------------------------------------------------------|
| Development Type:                            | Residential Dwellings                                                            |
| Effluent Treatment Level:                    | Secondary (<BOD5 20 mg/L, TSS 30 mg/L)                                           |
| Fill Encountered in Disposal Areas:          | No                                                                               |
| Water Source:                                | Rainwater Collection Tanks                                                       |
| Site Soil Category (TP58):                   | Category 5 – Clayey SILT –Moderate Drainage                                      |
| Estimate House Occupancy:                    | 6 Persons                                                                        |
| Loading Rate:                                | PCDI System – 3mm/day                                                            |
| Estimated Total Daily Wastewater Production: | 1,080L/day                                                                       |
| Typical Wastewater Design Flow Per Person:   | 180L/pp/pd (Estimated –water conservation devices may enable lower design flows) |
| Application Method:                          | Surface Laid PCDI Lines                                                          |
| Loading Method:                              | Dosed                                                                            |
| Minimum Tank size:                           | >1,080L                                                                          |
| Emergency Storage:                           | 24 hours                                                                         |

|                                           |                                |
|-------------------------------------------|--------------------------------|
| Estimated Min. Disposal Area Requirement: | 360m <sup>2</sup>              |
| Required Min. Reserve Area:               | 30%                            |
| Buffer Zone:                              | Not anticipated to be required |
| Cut-off Drain:                            | Not anticipated to be required |

## 5.2 REQUIRED SETBACK DISTANCES

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 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 |



### 5.3 NORTHLAND REGIONAL PLAN ASSESSMENT

The existing wastewater disposal system servicing Lot 1 should meet the compliance points below, stipulated within Section C.6.1.1 of the Proposed Regional Plan for Northland:

| C.6.1.1 Existing on-site domestic type wastewater discharge – permitted activity                                                                                                                                                                                       |                                                                                                                                                                                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| The discharge of domestic type wastewater into or onto land from an on-site system that was a permitted activity at the notification date of this Plan, and the associated discharge of any odour into air from the onsite system, are permitted activities, provided: |                                                                                                                                                                                                              |
| #                                                                                                                                                                                                                                                                      | Rule                                                                                                                                                                                                         |
| 1                                                                                                                                                                                                                                                                      | the discharge volume does not exceed:                                                                                                                                                                        |
|                                                                                                                                                                                                                                                                        | a) three cubic metres per day, averaged over the month of greatest discharge, and                                                                                                                            |
|                                                                                                                                                                                                                                                                        | b) six cubic metres per day over any 24-hour period, and                                                                                                                                                     |
| 2                                                                                                                                                                                                                                                                      | the following reserve disposal areas are available at all times:                                                                                                                                             |
|                                                                                                                                                                                                                                                                        | a) one hundred percent of the existing effluent disposal area where the wastewater has received primary treatment or is only comprised of greywater, or                                                      |
|                                                                                                                                                                                                                                                                        | b) thirty percent of the existing effluent disposal area where the wastewater has received at least secondary treatment, and                                                                                 |
| 3                                                                                                                                                                                                                                                                      | 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                                        |
| 4                                                                                                                                                                                                                                                                      | wastewater irrigation lines are at all times either installed at least 50 millimetres beneath the surface of the disposal area or are covered by a minimum of 50 millimetres of topsoil, mulch, or bark, and |
| 5                                                                                                                                                                                                                                                                      | the discharge does not contaminate any groundwater supply or surface water, and                                                                                                                              |
| 6                                                                                                                                                                                                                                                                      | there is no surface runoff or ponding of wastewater, and                                                                                                                                                     |
| 7                                                                                                                                                                                                                                                                      | there is no offensive or objectionable odour beyond the property boundary.                                                                                                                                   |

Proposed Lot 3 is expected to meet the Permitted Activity Status requirements outlined above.

Any future wastewater disposal system should meet the compliance points below, stipulated within Section C.6.1.3 of the Proposed Regional Plan for Northland:

| 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                                                                                                                                                                  |
| 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 |
| 2                                                                                                                                                                                             | The volume of wastewater discharged does not exceed two cubic metres per day, and                                                                                     |
| 3                                                                                                                                                                                             | The discharge is not via a spray irrigation system or deep soakage system, and                                                                                        |

|    |                                                                                                                                                                                                                                                                                                                        |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4  | The slope of the disposal area is not greater than 25 degrees, and                                                                                                                                                                                                                                                     |
| 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: |
|    | a) dose loaded, and                                                                                                                                                                                                                                                                                                    |
|    | b) covered by a minimum of 50 millimetres of topsoil, mulch, or bark, and                                                                                                                                                                                                                                              |
|    | For the discharge of wastewater onto the surface of slopes greater than 10 degrees:                                                                                                                                                                                                                                    |
|    | a) the wastewater, excluding greywater, has received at least secondary treatment, and                                                                                                                                                                                                                                 |
|    | b) the irrigation lines are firmly attached to the disposal area, and                                                                                                                                                                                                                                                  |
| 6  | 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                                                                                                   |
|    | d) a minimum 10 metre buffer area down-slope of the lowest irrigation line is included as part of the disposal area, and                                                                                                                                                                                               |
|    | e) the disposal area is located within existing established vegetation that has at least 80 percent canopy cover, or                                                                                                                                                                                                   |
|    | f) the irrigation lines are covered by a minimum of 100 millimetres of topsoil, mulch, or bark, and                                                                                                                                                                                                                    |
| 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                                                                                                              |
| 8  | for septic tank treatment systems, a filter that retains solids greater than 3.5 millimetres in size is fitted on the outlet, and                                                                                                                                                                                      |
|    | the following reserve disposal areas are available at all times:                                                                                                                                                                                                                                                       |
| 9  | a) 100 percent of the existing effluent disposal area where the wastewater has received primary treatment or is only comprised of greywater, or                                                                                                                                                                        |
|    | b) 30 percent of the existing effluent disposal area where the wastewater has received secondary treatment or tertiary treatment, and                                                                                                                                                                                  |
| 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                                                                                                                                                  |
| 11 | the discharge does not contaminate any groundwater water supply or surface water, and                                                                                                                                                                                                                                  |
| 12 | there is no surface runoff or ponding of wastewater, and                                                                                                                                                                                                                                                               |
| 13 | there is no offensive or objectionable odour beyond the property boundary.                                                                                                                                                                                                                                             |

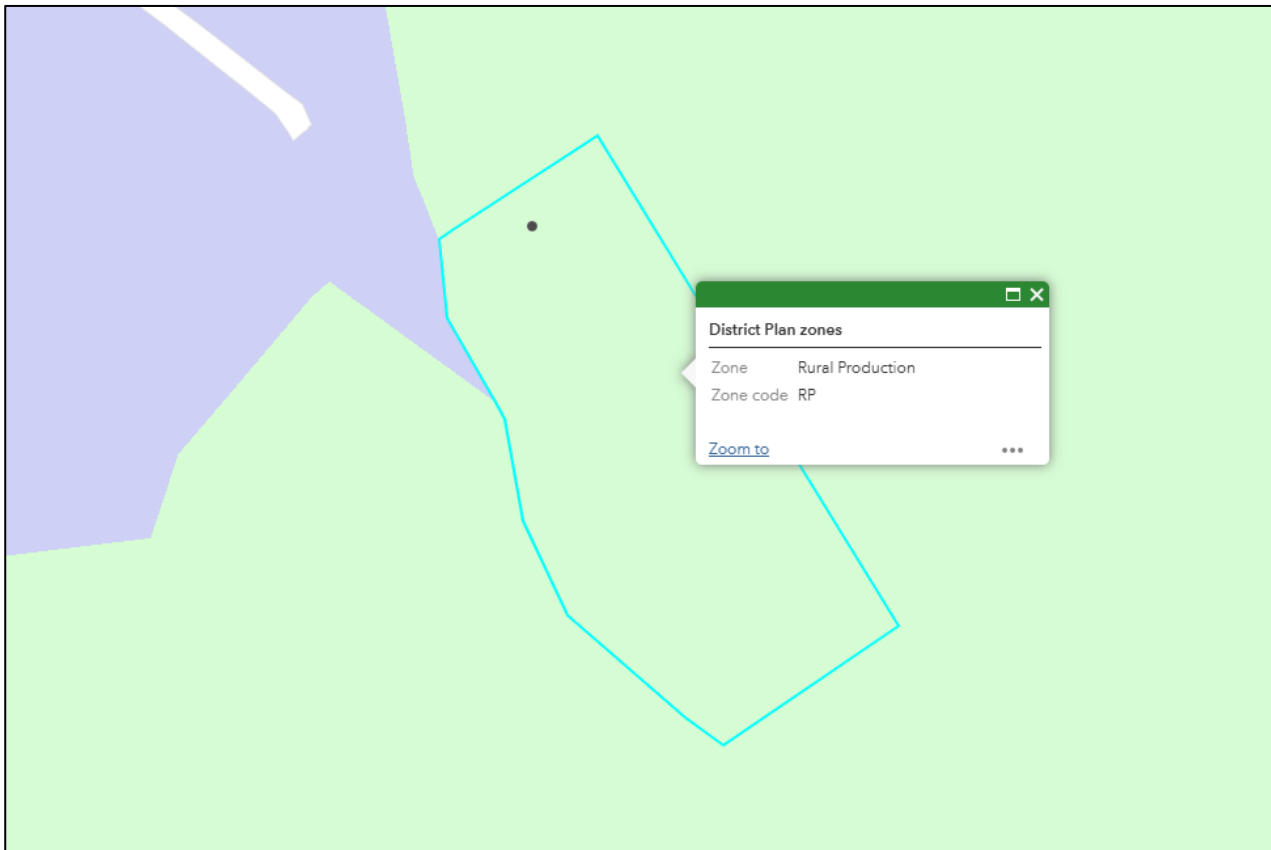
Proposed Lots 1 and 2 are expected to meet the Permitted Activity Status requirements outlined above.

## 6 STORMWATER MANAGEMENT

### 6.1 ASSESSMENT CRITERIA

The site lies within the Far North District. The stormwater assessment has been completed in accordance with the recommendations and requirements contained within the Far North District Engineering Standards and the Far North District Council District Plan.

As below, the site resides in a Rural Production Zone.



*Figure 4: Snip of FNDC Maps showing site in Rural Production Zone.*

The following Stormwater Management Rules Apply:

**8.6.5.1.3 – Permitted Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 15%.

**8.6.5.2.1 – Controlled Activities – Stormwater Management** - The maximum proportion or amount of the gross site area covered by buildings and other impermeable surfaces shall be 20%.

To comply with the parameters of the Permitted Activity Rule (8.6.5.1.3), future development on Lots 1 must not exceed a total impermeable area coverage of 645m<sup>2</sup>, Lot 2 must not exceed a total impermeable area coverage of 630m<sup>2</sup> and the existing developments on proposed Lot 3 must not exceed a total impermeable area coverage of 17,550m<sup>2</sup>.

The existing impermeable coverage on proposed Lot 3 (including gravel accessway) was measured from GIS imagery as approximately ~4,700m<sup>2</sup>. The anticipated coverage of future developments on proposed Lots 1 & 2 is unknown at the time of report-writing – based on the distance from the proposed lots' southern boundaries to the DBPs indicated in the appended site plan, it is expected that the driveway coverage on each lot will need to be at least 150m<sup>2</sup> to provide access to the dwellings.

Given the above, the existing development within Lot 3 is considered to be a Permitted Activity and future development of Lots 1 & 2 are expected to fall within the Permitted Activity / Controlled Activity range, with the final Activity Status dependent on the future developments' roof areas and driveway layouts. If the developments fall under Controlled Activity status then a stormwater attenuation report including a District Plan Assessment will be required at Building Consent stage.

In such cases, attenuation for the 20% & 1% AEP storm events should be provided for runoff resulting from proposed impermeable areas exceeding the Permitted Activity threshold to mitigate adverse effects of runoff on the downstream receiving stormwater network.

Indicative tank attenuation design parameters are given below to demonstrate the feasibility of implementing attenuation on-site. The Type IA storm profile was utilised in attenuation calculations in accordance with TR-55. HydroCAD® software has been utilised in calculations for a 20% & 1% AEP climate-change-adjusted rainfall values of 185mm and 332mm respectively with a 24-hour duration. Rainfall data was obtained from HIRDS and increased by 20% to account for climate change.

To appropriately mitigate stormwater runoff from the existing and future proposed impermeable areas, we recommend utilising Low Impact Design Methods as a means of stormwater management. Design guidance should be taken from 'The Countryside Living Toolbox' design document, and where necessary, 'Technical Publication 10, Stormwater Management Devices – Design Guidelines Manual' Auckland Regional Council (2003).

Stormwater management recommendations are provided below.

## **6.2 PRIMARY STORMWATER**

### **6.2.1 Stormwater Runoff from Roof Areas**

Stormwater runoff from the roof of any future buildings must be captured by a gutter system and conveyed to rainwater tanks on the corresponding lot.

Discharge and overflow from the rainwater tanks should be directed to a discharge point as specified below via sealed pipes.

### **6.2.2 Stormwater Runoff from Hardstand Areas**

Where driveways are formed perpendicular to the slope of the topography, the driveway may shed runoff to lower-lying grassed areas via even sheet flow, well clear of any structures. Runoff passed through grassed areas will be naturally filtered of entrained pollutants and will act to mitigate runoff by way of ground recharge and evapotranspiration.

Where even sheet flow is not practicable, concentrated flows must be managed with swales to prevent erosion/scouring. These should be sized to manage and provide capacity for secondary flows and mitigate flow velocity where appropriate. Swales are to direct runoff to silt traps with suitably sized grate / scruffy dome inlets, from which runoff may be piped to the discharge point.

Alternatively, if sealed, driveways may be formed to shed runoff to catchpits installed per E1 of the NZ Building Code. Runoff collected via catchpits is to be directed to an outlet as specified below via sealed pipes.

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

### **6.2.3 Attenuation Feasibility**

Design parameters for on-site runoff attenuation are provided below, based on a scenario of 20% site area (840m<sup>2</sup>) impermeable coverage with estimated roof and driveway areas of 250m<sup>2</sup> and 590m<sup>2</sup> respectively. We consider this to be a conservative scenario given the size of the proposed lots.

It is recommended that a detention volume, if required, be provided in the upper section of the potable water tanks (2 x 25,000L tanks with 3.6m diameter assumed). For the given coverage scenario, the potable water tanks should be fitted with a 60mmØ orifice (20% AEP control) located >220mm below the overflow outlet at the top of the tank and a 60mmØ orifice (1% AEP control) located 80mm below the overflow outlet. The total resulting detention volume amounts to 4.4m<sup>3</sup> in the top 220mm of the tanks. Refer to the appended Tank Detail C210 and calculation set for clarification.

The above coverage scenario is only intended to demonstrate the feasibility of on-site attenuation via rainwater tanks and is not intended to be a specification for future development coverage.

#### 6.2.4 Stormwater Runoff Discharge Point

##### Proposed Lots 1 & 2

It is recommended that stormwater runoff from the new potable supply tanks and hardstand drainage be directed via sealed pipes to a dispersal bar outlet or similar outlet with appropriate erosion protection. The outlet should be located downslope of any effluent disposal fields and promote even sheet flow through the downslope pasture to ensure the prevention of erosion and the treatment of runoff via filtration and evapotranspiration. See the appended Dispersal Bar Detail C211 for clarification. Alternatively, a specifically designed dispersal trench may also be used.

##### Proposed Lot 3

The existing stormwater discharge point serving the existing developments should be located and confirmed to be within the boundary of Lot 3 as well as being suitable to continue to service the existing developments without causing adverse effects to the future developments on proposed Lots 1 & 2 or any neighbouring properties.

#### 6.3 SECONDARY STORMWATER

Where required, overland flows and similar runoff from higher ground should be intercepted by means of shallow surface drains or small bunds near structures to protect these from both saturation and erosion.

#### 6.4 DISTRICT PLAN ASSESSMENT

This section has been prepared to demonstrate the likely effects of the activity on stormwater runoff and the means of mitigating runoff.

In assessing an application under this provision, the Council will exercise discretion to review the following matters below, (a) through (r). In respect of matters (a) through (r), we provide the following comments:

##### 13.10.4 – Stormwater Disposal

|                                                                                                                                                                                                                                                                                        |                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>(a) Whether the application complies with any regional rules relating to any water or discharge permits required under the Act, and with any resource consent issued to the District Council in relation to any urban drainage area stormwater management plan or similar plan.</i> | No discharge permits are required. No resource consent issued documents stipulating specific requirements are known for the subject site or are anticipated to exist. |
| <i>(b) Whether the application complies with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009 (to be used in conjunction with NZS 4404:2004).</i>                                                                                    | The application is deemed compliant with the provisions of the Council's "Engineering Standards and Guidelines" (2004) - Revised March 2009                           |
| <i>(c) Whether the application complies with the Far North District Council Strategic Plan - Drainage.</i>                                                                                                                                                                             | The application is deemed compliant with the Far North District Council Strategic Plan - Drainage                                                                     |



|                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <i>(d) The degree to which Low Impact Design principles have been used to reduce site impermeability and to retain natural permeable areas.</i>                                                                                                                                                                                                                   | Stormwater management should be provided for the subject lot by utilising Low Impact Design Methods. Guidance for design should be taken from 'The Countryside Living Toolbox' design document, and where necessary, "Technical Publication 10, Stormwater Management Devices – Design Guidelines Manual" Auckland Regional Council (2003). All roof runoff will be collected by rainwater tanks for conveyance to a safe outlet point. Hardstand areas should either be shaped to shed to lower-lying lawn areas as passive mitigation, or to swales for runoff conveyance to a safe outlet location. |
| <i>(e) The adequacy of the proposed means of disposing of collected stormwater from the roof of all potential or existing buildings and from all impervious surfaces.</i>                                                                                                                                                                                         | As above. Runoff from new roof areas will be collected, directed to rainwater tanks and discharged in a controlled manner to a designated outlet, reducing scour and erosion. Hardstand areas should either be shaped to shed to lower-lying lawn areas as passive mitigation, or to swales for runoff conveyance to a safe outlet location.                                                                                                                                                                                                                                                           |
| <i>(f) The adequacy of any proposed means for screening out litter, the capture of chemical spillages, the containment of contamination from roads and paved areas, and of siltation.</i>                                                                                                                                                                         | Runoff from roof areas is free of litter, chemical spillages, or contaminants from roads. Future proposed hardstand areas are best shaped to shed to large pasture areas via sheet flow to ensure that runoff does not concentrate. Large downslope pasture areas act as bio-filter strips to filter out entrained pollutants.                                                                                                                                                                                                                                                                         |
| <i>(g) The practicality of retaining open natural waterway systems for stormwater disposal in preference to piped or canal systems and adverse effects on existing waterways.</i>                                                                                                                                                                                 | No alteration to waterways is proposed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <i>(h) Whether there is sufficient capacity available in the Council's outfall stormwater system to cater for increased run-off from the proposed allotments.</i>                                                                                                                                                                                                 | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>(i) Where an existing outfall is not capable of accepting increased run-off, the adequacy of proposals and solutions for disposing of run-off.</i>                                                                                                                                                                                                             | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>(j) The necessity to provide on-site retention basins to contain surface run-off where the capacity of the outfall is incapable of accepting flows, and where the outfall has limited capacity, any need to restrict the rate of discharge from the subdivision to the same rate of discharge that existed on the land before the subdivision takes place.</i> | Not applicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <i>(k) Any adverse effects of the proposed subdivision on drainage to, or from, adjoining properties and mitigation measures proposed to control any adverse effects.</i>                                                                                                                                                                                         | Outlet locations are to be determined during detailed design and are to be located such that                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

|                                                                                                                                                                                                                                                                                                                                                      |                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|
|                                                                                                                                                                                                                                                                                                                                                      | there are no adverse effects on adjacent properties. |
| <i>(l) In accordance with sustainable management practices, the importance of disposing of stormwater by way of gravity pipe lines. However, where topography dictates that this is not possible, the adequacy of proposed pumping stations put forward as a satisfactory alternative.</i>                                                           | Not applicable.                                      |
| <i>(m) The extent to which it is proposed to fill contrary to the natural fall of the country to obtain gravity outfall; the practicality of obtaining easements through adjoining owners' land to other outfall systems; and whether filling or pumping may constitute a satisfactory alternative.</i>                                              | Not applicable.                                      |
| <i>(n) For stormwater pipes and open waterway systems, the provision of appropriate easements in favour of either the registered user or in the case of the Council, easements in gross, to be shown on the survey plan for the subdivision, including private connections passing over other land protected by easements in favour of the user.</i> | Not applicable.                                      |
| <i>(o) Where an easement is defined as a line, being the centre line of a pipe already laid, the effect of any alteration of its size and the need to create a new easement.</i>                                                                                                                                                                     | Not applicable.                                      |
| <i>(p) For any stormwater outfall pipeline through a reserve, the prior consent of the Council, and the need for an appropriate easement.</i>                                                                                                                                                                                                        | Not applicable.                                      |
| <i>(q) The need for and extent of any financial contributions to achieve the above matters.</i>                                                                                                                                                                                                                                                      | Not applicable.                                      |
| <i>(r) The need for a local purpose reserve to be set aside and vested in the Council as a site for any public utility required to be provided.</i>                                                                                                                                                                                                  | Not applicable.                                      |

## 7 POTABLE WATER SUPPLY

Proposed Lots 1 & 2 potable water is to be supplied via rainwater tanks in accordance with the Countryside Living Toolbox requirements. It is recommended to provide at least 2 x 25,000L tanks for potable water usage. The type of tank and volume is for the client to confirm.

8 ACCESS AND VEHICLE CROSSING

8.1 GENERAL

A basic access and vehicle crossing assessment for the proposed Lots has been completed with recommendations provided herein.

It is our understanding that the proposed lots will continue to utilise the existing access off Shepherd Road. As per the supplied Scheme Plan, access to proposed Lots 1 & 2 is to be constructed off the existing gravel driveway within the bounds of proposed Lot 3 with a Right of Way (ROW) easement on proposed Lot 3 (Easement A depicted in Subdivision Scheme Plan by Boi Survey Ltd (Job No. 5045 RevB, dated: 10.11.2025)).

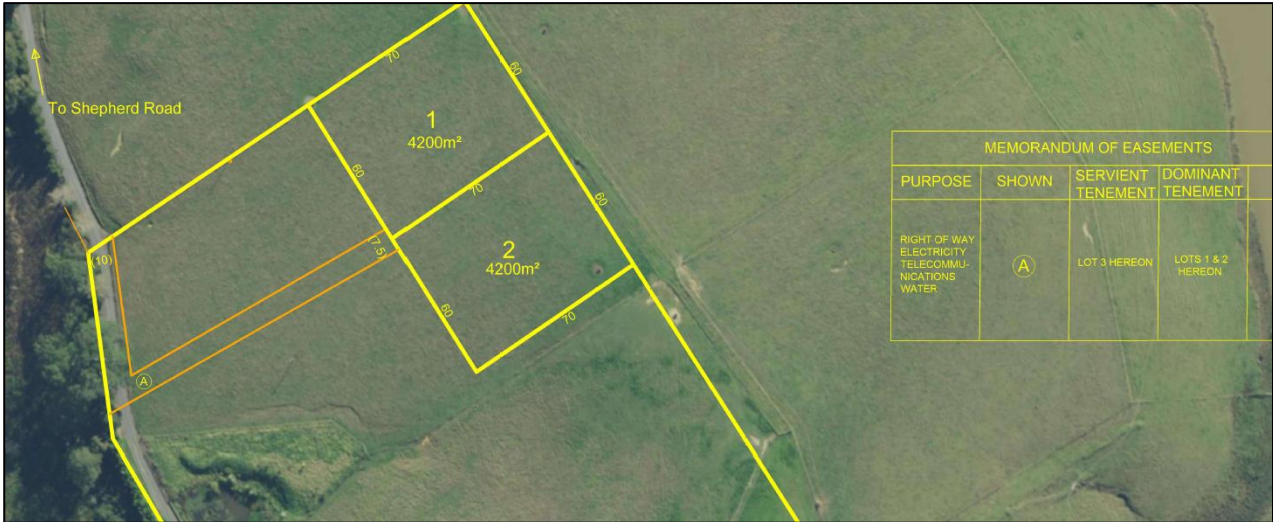


Figure 5: Snip of Scheme Plan showing proposed access layout.

8.2 VEHICLE CROSSING

The existing vehicle crossing from the southern side of Shepherd Road is sealed, consistent with the adjoining carriageway surface, and transitions smoothly from the road channel into the driveway alignment. The surface appears in reasonable condition with no significant disrepair evident. The grade of the crossing is virtually flat.

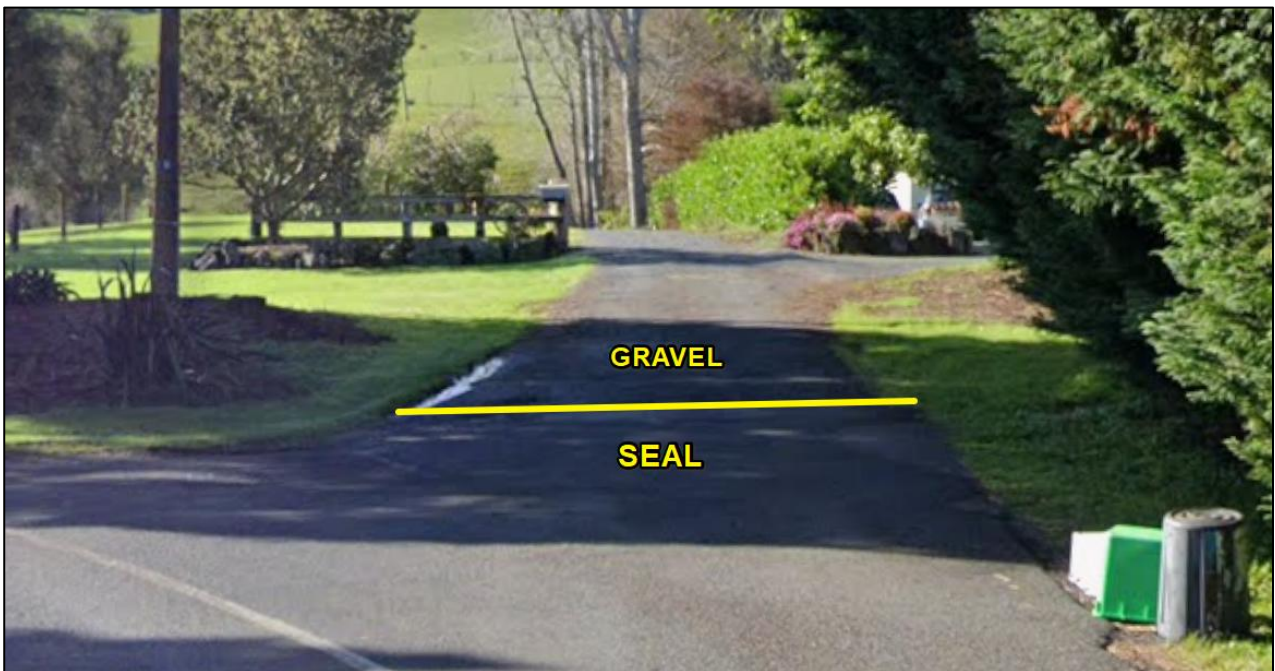
The crossing geometry appears to be generally in accordance with the Far North District Council Engineering Standards (2023) Sheet 21 Type 1A – Light Vehicles. The usage of the crossing is relatively low, serving 5 Household Equivalents post-subdivision.

As such, we deem the existing crossing’s geometry to be sufficient to serve the proposed and existing lots. The crossing dimensions have only been estimated at the time of report-writing, and are to be confirmed on-site via walkover or survey. The acceptance of any deviations from the standards is at council’s discretion.





*Figure 6: Screenshot from Google Street View of existing crossing to shared driveway from Shepherd Road, facing southeast.*



*Figure 7: Screenshot from Google Street View of existing crossing to shared driveway from Shepherd Road, facing southeast. Edge of seal marked in yellow.*

### 8.3 SIGHT DISTANCES

Shepherd Road has a speed limit of 40km/hr (NZTA National Speed Limits Register). The Far North District Council Engineering Standards (2023) – Sheet 4 notes that the minimum required sight distance is 45m for access roads.

In compliance with the Far North District Council's sight distance requirements, the existing vehicle crossing provides >45m of sight distance to the northwest along Okura Drive / Shepherd Road and to the east along Okura Drive.



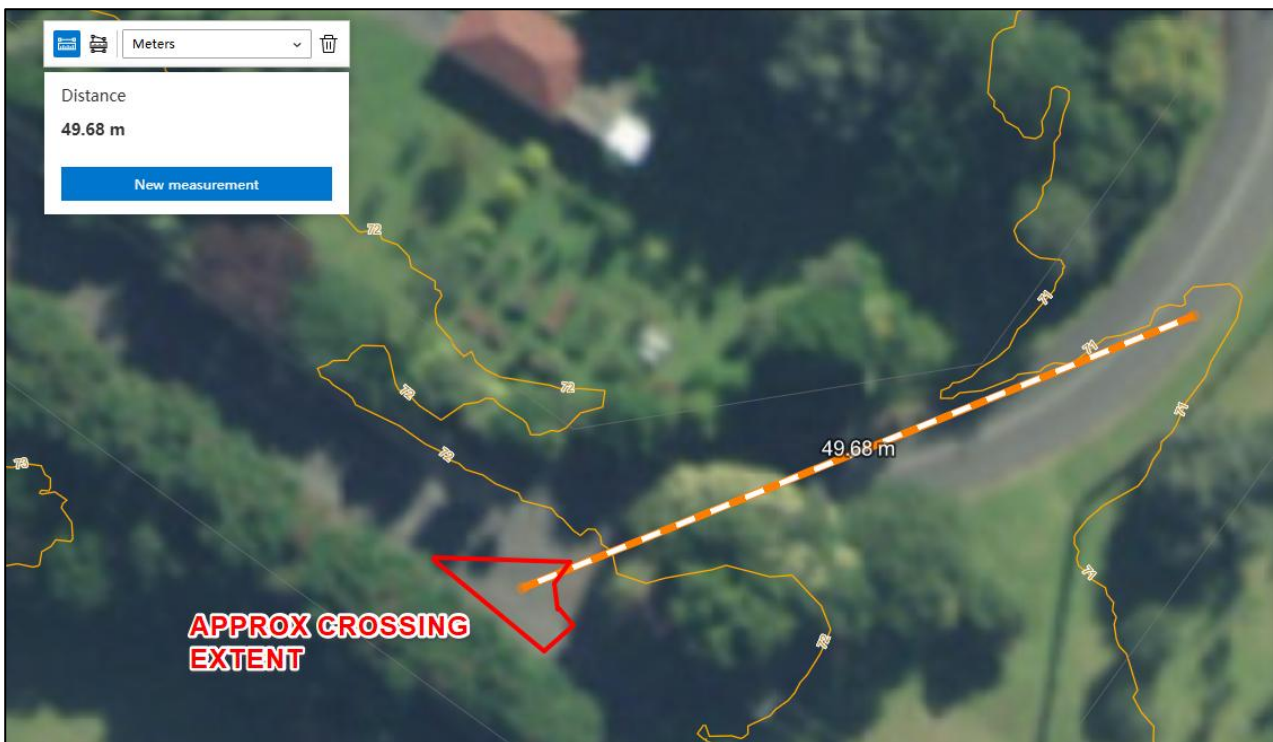


Figure 8: Aerial view (FNDC GIS) of existing crossing sight distance to northeast along Okura Drive.

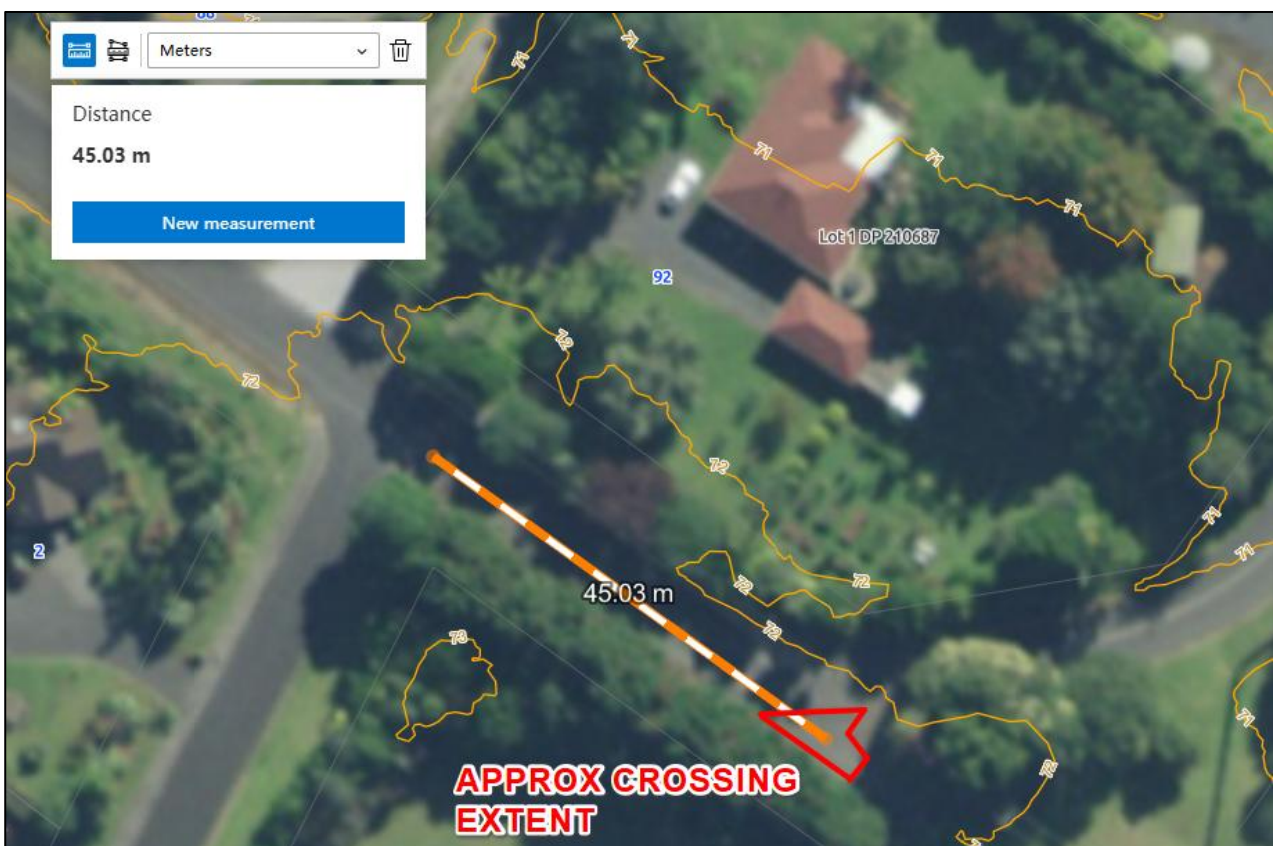


Figure 9: Aerial view (FNDC GIS) of existing crossing sight distance to northwest along Okura Drive / Shepherd Road.



## 8.4 VEHICLE ACCESS

### 8.4.1 Legal & Surfacing Widths

As a result of the subdivision, the usage of the existing shared driveway from Shepherd Road will increase from 3 Household Equivalents (H.E) to 5 H.E. The existing shared driveway from the point of access onwards to the proposed lots will serve 3 H.E.

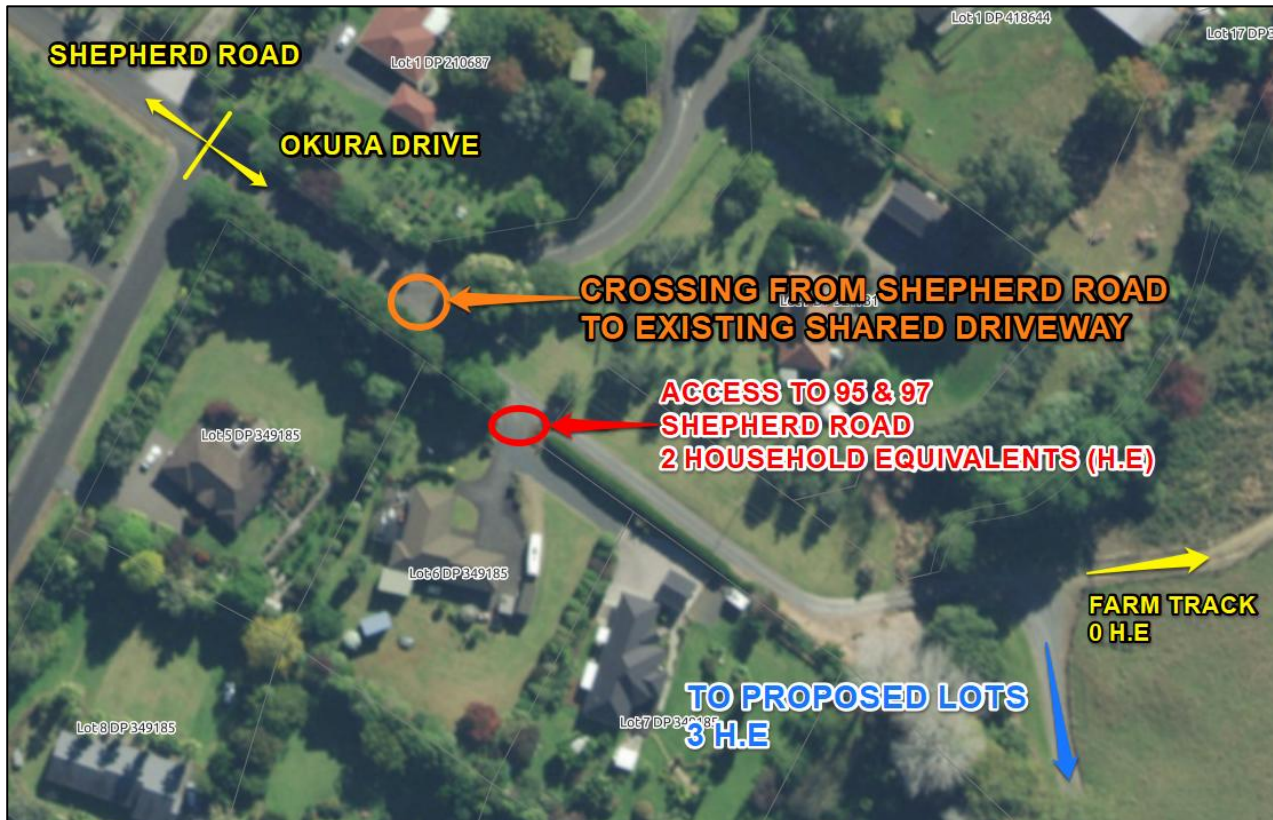


Figure 10: Aerial view (FNDC GIS) of existing crossing and shared driveway from Okura Drive. Markups indicating driveway usage.

Per the **operative** district plan requirements shown in Figure 11 below, the minimum ROW legal and surfacing widths are:

- 7.5m and 3.0m with passing bays respectively for 3 H.E
- 7.5m and 5.0m respectively for 5 H.E

Per the **proposed** district plan (at the time of report-writing) shown in Figure 12 below, the minimum ROW legal and surfacing widths are 6m and 3.0m respectively for 3-5 H.E

The surfacing of the existing shared driveway is estimated to be between 3.0 - 4.0m in width. We anticipate the existing shared driveway width will be sufficient to comply with the proposed district plan requirements for the proposed subdivision.

### APPENDIX 3B-1: STANDARDS FOR PRIVATE ACCESS

(Reference: *Part 3 District Wide Provisions, Section 15.1 Traffic, Parking and Access and Zone Maps*)

| Zone                       | No. of H.E.s | Legal Width | Carriageway Width     | Maximum Gradient |        | Kerb | Foot-path | Storm-water Drain <sup>1</sup> |
|----------------------------|--------------|-------------|-----------------------|------------------|--------|------|-----------|--------------------------------|
|                            |              |             |                       | Unsealed         | Sealed |      |           |                                |
| Residential                | 1            | -           | 3.0                   | 1:6              | 1:4    | -    | -         | Yes                            |
| Coastal Residential        | 2            | 5.0         | 3.0                   | -                | 1:4    | -    | -         | Yes                            |
| Russell Township           | 3 - 4        | 7.5         | 3.0 with passing bays | -                | 1:4    | -    | -         | Yes                            |
| Point Veronica             | 5 - 8        | 7.5         | 5.0                   | -                | 1:4    | Yes  | -         | Yes                            |
| Commercial                 | 1            | -           | 3.0                   | 1:8              | 1:5    | -    | -         | Yes                            |
| Industrial                 | 2 - 4        | 8.0         | 6.0                   | -                | 1:5    | -    | -         | Yes                            |
| Orongo Bay Special Purpose | >5           | 8.0         | 6.0                   | -                | 1:5    | -    | -         | Yes                            |
| Rural Production           | 1            | -           | 3.0                   | 1:5              | 1:4    | -    | -         | Yes                            |
| Rural Living               |              |             |                       |                  |        |      |           |                                |
| Waimate North              |              |             |                       |                  |        |      |           |                                |
| Horticultural Processing   | 2            | 5           | 3.0                   | 1:5              | 1:4    | -    | -         | Yes                            |
| Carrington Estate          |              |             |                       |                  |        |      |           |                                |
| General Coastal            | 3 - 4        | 7.5         | 3.0 with passing bays | 1:5              | 1:4    | -    | -         | Yes                            |
| Coastal Living             |              |             |                       |                  |        |      |           |                                |
| South Kerikeri Inlet       |              |             |                       |                  |        |      |           |                                |
| Recreational Activities    | 5 - 8        | 7.5         | 5.0                   | 1:5              | 1:4    | -    | -         | Yes                            |

<sup>1</sup> All private access must have stormwater drainage measures such that adverse effects are not created on adjoining properties or the public road, in accordance with Council's "Engineering Standards and Guidelines" (June 2004 – Revised 2009)

**Note 1:** H.E. = Household Equivalent represented by 10 vehicle movements

**Note 2:** Refer to *Rules 15.1.6B.1.1(c) and (d)*.

**Note 3:** Access for more than 8 Household Equivalents shall be by public road and constructed to a standard identified in *Appendix 3B-2*.

**Note 4:** Access carriageways in urban zones that serve two or more users shall be sealed or concreted, refer *Rule 15.1.6B.1.2(c)*.

Figure 11: FNDC Operative DP Table 3B-1: Standards for Private Accessways

| TRAN-Table 9 - Requirements for private accessways |                    |                         |                               |                 |       |                    |                                                                                           |                                    |
|----------------------------------------------------|--------------------|-------------------------|-------------------------------|-----------------|-------|--------------------|-------------------------------------------------------------------------------------------|------------------------------------|
| Number of <a href="#">residential units</a>        | Maximum length (m) | Minimum legal width (m) | Minimum carriageway width (m) |                 |       | Footpath width (m) | Maximum gradient                                                                          | Crossfall                          |
|                                                    |                    |                         | Unsealed shoulder             | Surfacing width | Total |                    |                                                                                           |                                    |
| <a href="#">Urban</a>                              |                    |                         |                               |                 |       |                    |                                                                                           |                                    |
| 2-4                                                | 50                 | 4.0                     | -                             | 1 x 3.0         | 3.0   | -                  | 12.5% from the first 5m from the <a href="#">road boundary</a> and 22% for the remainder  | 3%                                 |
| 5-8                                                | 100                | 6.0                     |                               | 1 x 4.5         | 4.5   | 1 x 0.95           | restricted to straight sections                                                           |                                    |
| <a href="#">Rural</a>                              |                    |                         |                               |                 |       |                    |                                                                                           |                                    |
| 2                                                  | -                  | 4.0                     | 2 x 0.25                      | 1 x 3.0         | 3.5   | -                  | 12.5% for the first 5m from the <a href="#">road boundary</a> and 22.2% for the remainder | 3% where sealed; 6% where unsealed |
| 3 - 5                                              |                    | 6.0                     | 2 x 0.25                      | 1 x 3.0         | 4.5   |                    |                                                                                           |                                    |
| 6 - 8                                              |                    | 10.0                    | 2 x 0.25                      | 1 x 3.0         | 6.0   |                    |                                                                                           |                                    |

Figure 12: Snip of FNDC proposed District Plan TRAN-Table 9.

#### 8.4.2 Passing Bays

To our knowledge, no passing bays exist along the alignment of the shared driveway. The total distance along the shared driveway from the farm track to the interface between proposed Easement A and the proposed Lot 3 driveway is approximately 338m.

Section 3.2.28.3 of the FNDC Engineering Standards 2023 states: *“On accessways more than 200 m long and less than 4.5 m carriageway width, passing bays shall be provided at points of intervisibility (at approximate 100 m intervals). For such passing bays the carriageway width should be increased to 5.5 m over a 15 m length including 5 m tapers at each end.”*

A total of at least four new passing bays will be required along the shared driveway from the farm track to the interface between proposed Easement A and the proposed Lot 3 driveway to comply with the standards. See the appended Accessway Plan C400 for an indicative layout.

## 9 LIMITATIONS

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

This report has been commissioned solely for the benefit of our client, 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 back to us for further evaluation. Copyright of Intellectual Property remains with Wilton Joubert Limited, 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 civil 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.

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.

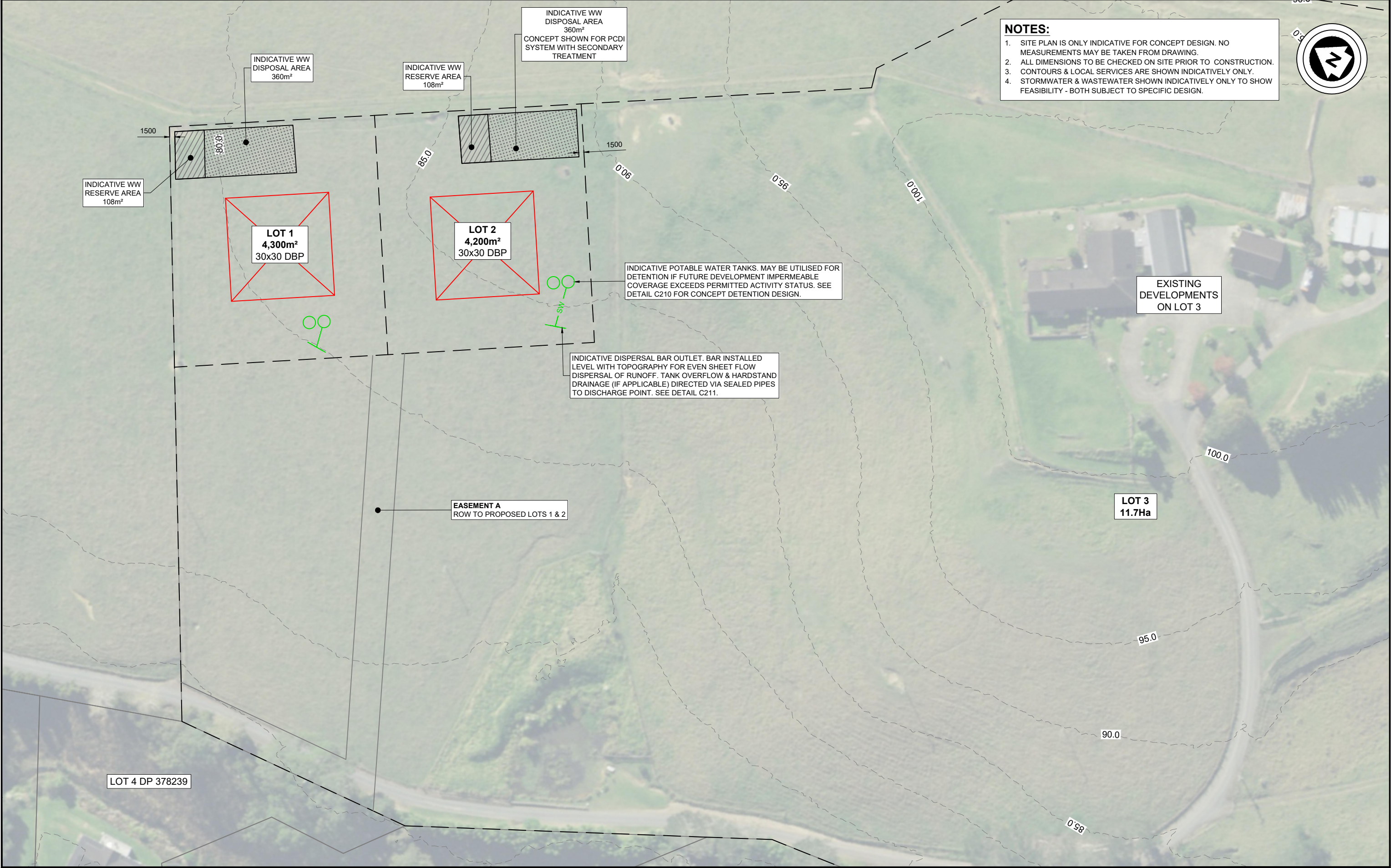
Yours faithfully,

**WILTON JOUBERT LIMITED**

### **Enclosures:**

- Site Plan – C001 (1 sheet)
- Tank Detail – C210 (1 sheet)
- Dispersal Bar Detail – C211 (1 sheet)
- Accessway Plan – C400 (1 sheet)
- Hand Auger Borehole Records (4 sheets)
- Calculation Set (13 sheets)





- 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.
  - 4. STORMWATER & WASTEWATER SHOWN INDICATIVELY ONLY TO SHOW FEASIBILITY - BOTH SUBJECT TO SPECIFIC DESIGN.



**WILTON  
JOUBERT**

Consulting Engineers

Northland: 09 945 4188  
Christchurch: 021 824 063

Auckland: 09 527 0196  
Wanaka: 03 443 6209

www.wiltonjoubert.co.nz

| ISSUE / REVISION |         |    |                               |
|------------------|---------|----|-------------------------------|
| No.              | DATE    | BY | DESCRIPTION                   |
| 01               | OCT '25 | PM | CIVIL SITE SUITABILITY REPORT |
| 02               | NOV '25 | PM | SCHEME PLAN B                 |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |

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

**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.

**FOR INFORMATION**

DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

DRAWING TITLE:

**SITE PLAN**

PROJECT DESCRIPTION:

**CIVIL SITE SUITABILITY REPORT**

PROJECT TITLE:

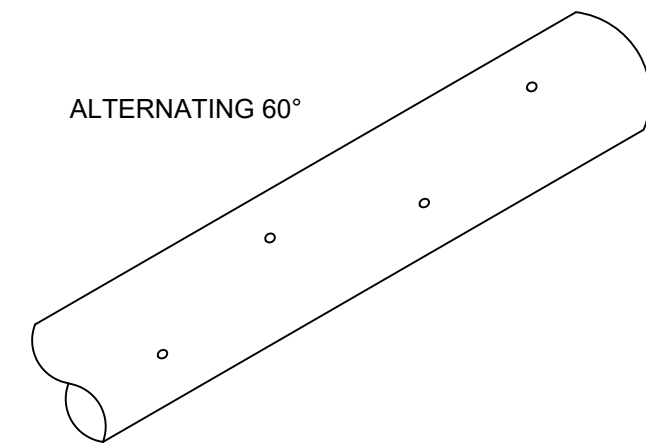
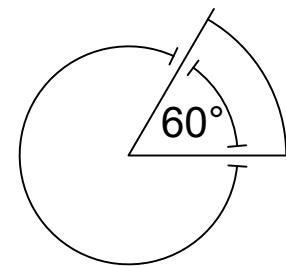
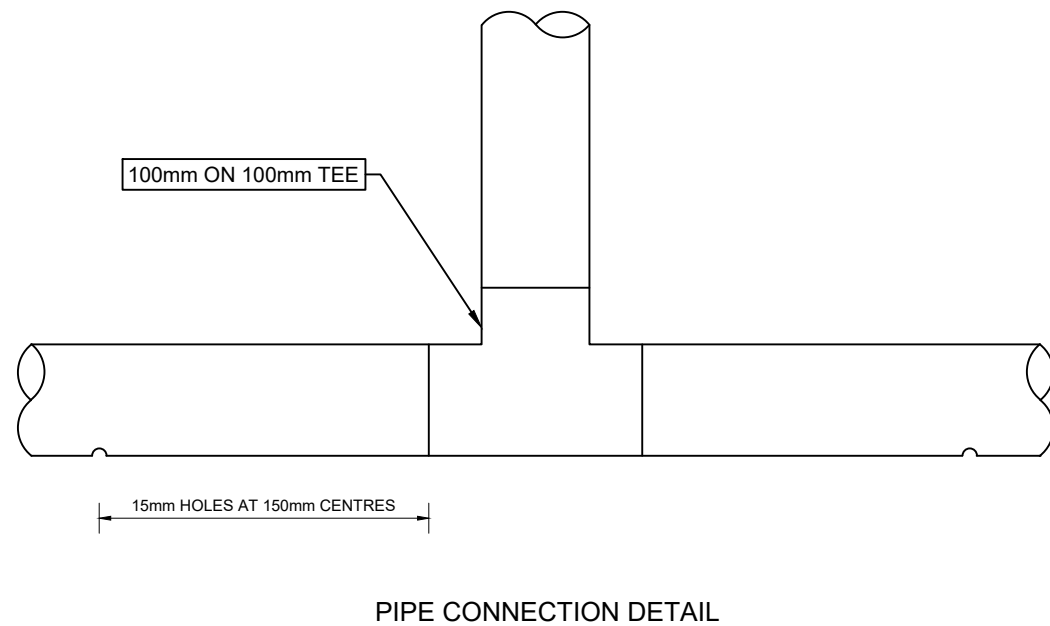
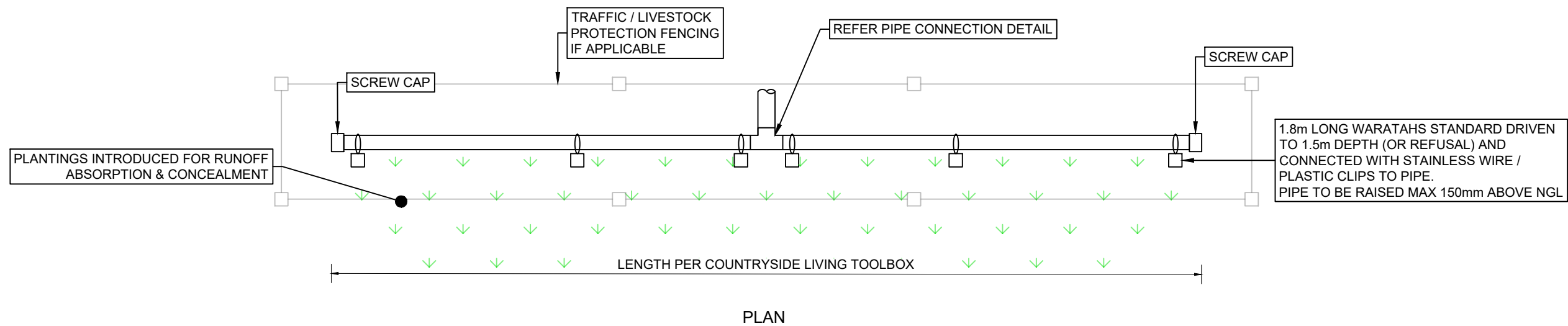
**SUBDIVISION OF  
LOT 1 DP 160255  
101 SHEPHERD ROAD  
KERIKERI**

|                                    |                     |
|------------------------------------|---------------------|
| ORIGINAL DRAWING SIZE:             | OFFICE:             |
| A3                                 | <b>OREWA</b>        |
| DRAWING SCALE:                     | CO-ORDINATE SYSTEM: |
| <b>1:1000</b>                      | NOT COORDINATED     |
| DRAWING NUMBER:                    | ISSUE:              |
| <b>142949-C001</b>                 | <b>02</b>           |
| COPYRIGHT - WILTON JOUBERT LIMITED |                     |



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. TANKS TO BE INSTALLED AS PER MANUFACTURERS SPECIFICATIONS & RELEVANT COUNCIL STANDARDS.
4. REGULAR INSPECTION & CLEANING IS REQUIRED TO ENSURE THE EFFECTIVE OPERATION OF THE SYSTEM.
5. MINIMUM SLUDGE ZONE OF 200mm TO BE KEPT.
6. ASSUMED USE OF 2 x 25,000L RAINWATER TANKS OR SIMILARLY APPROVED.
7. ORIFICE(S) TO BE COVERED WITH STAINLESS STEEL OR NYLON MESH.
8. TANK DETAIL CONCEPTUAL ONLY, SHOWN FOR 20% IMPERMEABLE SITE COVERAGE SCENARIO ON PROPOSED LOTS 1 AND/OR 2. IMPERMEABLE COVERAGE NOT FALLING UNDER PERMITTED ACTIVITY STATUS WILL REQUIRE SPECIFIC STORMWATER DESIGN AT BUILDING CONSENT STAGE.





PIPE OUTLET HOLE ARRANGEMENT DETAIL

02  
C200

**DISPERSAL BAR DETAIL**  
N.T.S

| ISSUE / REVISION |         |    |                               |
|------------------|---------|----|-------------------------------|
| No.              | DATE    | BY | DESCRIPTION                   |
| 01               | OCT '25 | PM | CIVIL SITE SUITABILITY REPORT |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |

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

**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.

**FOR INFORMATION**  
DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

|                      |                                      |
|----------------------|--------------------------------------|
| DRAWING TITLE:       | <b>DISPERSAL BAR DETAIL</b>          |
| PROJECT DESCRIPTION: | <b>CIVIL SITE SUITABILITY REPORT</b> |

|                |                                                                          |
|----------------|--------------------------------------------------------------------------|
| PROJECT TITLE: | <b>SUBDIVISION OF LOT 1 DP 160255<br/>101 SHEPHERD ROAD<br/>KERIKERI</b> |
|----------------|--------------------------------------------------------------------------|

|                                    |                    |                     |                 |
|------------------------------------|--------------------|---------------------|-----------------|
| ORIGINAL DRAWING SIZE:             | A3                 | OFFICE:             | <b>OREWA</b>    |
| DRAWING SCALE:                     | <b>N.T.S</b>       | CO-ORDINATE SYSTEM: | NOT COORDINATED |
| DRAWING NUMBER:                    | <b>142949-C211</b> | ISSUE:              | <b>01</b>       |
| COPYRIGHT - WILTON JOUBERT LIMITED |                    |                     |                 |





**NOTES:**

1. PASSING BAY SPACING NO MORE THAN 100m PER FNDC ENGINEERING STANDARDS.
2. LAYOUT SHOWN INDICATIVELY. ALTERNATIVE LAYOUT COMPLYING WITH STANDARDS ALSO ACCEPTABLE.
3. SURVEY/WALKOVER OF EXISTING ACCESSWAY NOT COMPLETED AT TIME OF REPORT-WRITING. IF SECTIONS ALONG ACCESSWAY NOT INDICATED IN THIS PLAN ARE CONFIRMED TO BE COMPLIANT WITH PASSING BAY DIMENSIONS THE LAYOUT MAY BE ADJUSTED ACCORDINGLY.





**WILTON  
JOUBERT**

Consulting Engineers

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

| ISSUE / REVISION |         |    |                               |
|------------------|---------|----|-------------------------------|
| No.              | DATE    | BY | DESCRIPTION                   |
| 01               | OCT '25 | PM | CIVIL SITE SUITABILITY REPORT |
| 02               | NOV '25 | PM | SCHEME PLAN B                 |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |
|                  |         |    |                               |

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

**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.

**FOR INFORMATION**

DESIGN / DRAWING SUBJECT TO ENGINEERS APPROVAL

DRAWING TITLE:

**ACCESSWAY PLAN**

PROJECT DESCRIPTION:

**CIVIL SITE SUITABILITY REPORT**

PROJECT TITLE:

**SUBDIVISION OF  
LOT 1 DP 160255  
101 SHEPHERD ROAD  
KERIKERI**

ORIGINAL DRAWING SIZE: **A3**

DRAWING SCALE: **1:1500**

DRAWING NUMBER: **142949-C400**

OFFICE: **OREWA**

CO-ORDINATE SYSTEM: **NOT COORDINATED**

ISSUE: **02**

COPYRIGHT - WILTON JOUBERT LIMITED



## HAND AUGER : HA01

**JOB NO.: 142948**

**SHEET: 1 OF 1**

**START DATE:** 13/10/2025

**NORTHING:**

**GRID:**

**DIAMETER:** 50mm

EASTING:

SV DIAL: ET20828

**ELEVATION:** Ground

**FACTOR:** 1.405

**DATUM:**

**CLIENT:** Sue S. Teixeira

**PROJECT:** Proposed Subdivision

**SITE LOCATION:** 101 Shepherd Road, Kerikeri

| STRATIGRAPHY  | SOIL DESCRIPTION                                                                                                      | LEGEND                                                                                    | DEPTH (m) | WATER | SHEAR VANE          |                        |             | DCP - SCALA<br>(Blows / mm) | COMMENTS, SAMPLES, OTHER TESTS |
|---------------|-----------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|-----------|-------|---------------------|------------------------|-------------|-----------------------------|--------------------------------|
|               |                                                                                                                       |                                                                                           |           |       | PEAK STRENGTH (kPa) | REMOULD STRENGTH (kPa) | SENSITIVITY |                             |                                |
| Topsoil       | TOPSOIL.                                                                                                              |  TOPSOIL |           |       |                     |                        |             |                             |                                |
| Waipapa Group | Clayey SILT, light orangey brown, very stiff to hard, moist, moderate plasticity.                                     |  CLAY    | 0.2       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  SILT    | 0.4       |       | 197+                | -                      | -           |                             |                                |
|               | 0.6m: Light brownish white and light orangey brown.                                                                   |  SAND    | 0.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  GRAVEL  | 0.8       |       | 197+                | -                      | -           |                             |                                |
|               |                                                                                                                       |  PEAT    | 1.0       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  ROCK    | 1.2       |       | 197+                | -                      | -           |                             |                                |
|               | Clayey SILT/SILT, some clay, light brownish white/dark orange/light orangey brown, very stiff, moist, low plasticity. |  CLAY    | 1.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  SILT    | 1.6       |       | 169                 | 48                     | 3.5         |                             |                                |
|               |                                                                                                                       |  SAND    | 1.8       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  GRAVEL  | 2.0       |       | 126                 | 48                     | 2.6         |                             |                                |
|               |                                                                                                                       |  PEAT    | 2.2       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |  ROCK    | 2.4       |       | 166                 | 70                     | 2.4         |                             |                                |
|               |                                                                                                                       |                                                                                           | 2.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 2.8       |       | 166                 | 48                     | 3.5         |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.0       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       | 3.2m: Wet.                                                                                | 3.2       |       | 169                 | 62                     | 2.7         |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 3.6       |       | 183                 | 28                     | 6.5         |                             |                                |
|               |                                                                                                                       | 3.8m: Hard.                                                                               | 3.8       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.0       |       |                     |                        |             |                             |                                |
|               | Too hard to auger.<br>EOH: 4.00m                                                                                      |                                                                                           | 4.2       |       | 197+                | -                      | -           |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.4       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.6       |       |                     |                        |             |                             |                                |
|               |                                                                                                                       |                                                                                           | 4.8       |       |                     |                        |             |                             |                                |

## REMARKS

REMARKS  
End of borehole @ 4.00m (Target Depth: 5.00m)

Standing groundwater @ 3.40m.

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

LOGGED BY: A.B

▼ Standing groundwater level

**CHECKED BY:**

▽ GW while drilling



45B Norfolk St, Kensington 0145, Whangarei  
Phone: 09 945 4188  
Email: [jobs@wjl.co.nz](mailto:jobs@wjl.co.nz)  
Website: [www.wiltonjoubert.co.nz](http://www.wiltonjoubert.co.nz)



Generated with CORE-GS by Geroo - WJL - Hand Auger v2 - 13/10/2025 3:42:57 PM

|                                                                                                                                       |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|--------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------------|------------------------------|-------------|-----------------------------|-----------------------------------|
| <h1>HAND AUGER : HA02</h1>                                                                                                            |                                                                                     | JOB NO.: 142948                                                                      |        | SHEET: 1 OF 1                                                                                                                 |                             |                           |                              |             |                             |                                   |
| CLIENT: Sue S. Teixeira                                                                                                               |                                                                                     | START DATE: 13/10/2025                                                               |        | NORTHING: GRID:                                                                                                               |                             |                           |                              |             |                             |                                   |
| PROJECT: Proposed Subdivision                                                                                                         |                                                                                     | DIAMETER: 50mm                                                                       |        | EASTING:                                                                                                                      |                             |                           |                              |             |                             |                                   |
| SITE LOCATION: 101 Shepherd Road, Kerikeri                                                                                            |                                                                                     | SV DIAL: 2432                                                                        |        | ELEVATION: Ground                                                                                                             |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | FACTOR: 1.407                                                                        |        | DATUM:                                                                                                                        |                             |                           |                              |             |                             |                                   |
| STRATIGRAPHY                                                                                                                          | SOIL DESCRIPTION                                                                    |                                                                                      | LEGEND | DEPTH (m)                                                                                                                     | WATER                       | SHEAR VANE                |                              |             | DCP - SCALA<br>(Blows / mm) | COMMENTS, SAMPLES,<br>OTHER TESTS |
|                                                                                                                                       |                                                                                     |                                                                                      |        |                                                                                                                               |                             | PEAK<br>STRENGTH<br>(kPa) | REMOULD<br>STRENGTH<br>(kPa) | SENSITIVITY |                             |                                   |
| Topsoil                                                                                                                               | TOPSOIL.                                                                            |                                                                                      | TS     | 0.2                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 0.4                                                                                                                           |                             | 110                       | 35                           | 3.1         |                             |                                   |
| Waipapa Group                                                                                                                         | Clayey SILT, light yellowish/orangey brown, very stiff, moist, moderate plasticity. |                                                                                      | X      | 0.6                                                                                                                           | Groundwater Not Encountered |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 0.8                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 1.0                                                                                                                           |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 1.2                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 1.4                                                                                                                           |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 1.6                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 1.8                                                                                                                           |                             | 155                       | 72                           | 2.2         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 2.0                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 2.2                                                                                                                           |                             | 197+                      | -                            | -           |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 2.4                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 2.6                                                                                                                           |                             | 167                       | 84                           | 2.0         |                             |                                   |
|                                                                                                                                       |                                                                                     |                                                                                      |        | 2.8                                                                                                                           |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.0                                                                                  | 163    | 84                                                                                                                            | 1.9                         |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.2                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.4                                                                                  | 155    | 73                                                                                                                            | 2.1                         |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.6                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 3.8                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.0                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.2                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.4                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.6                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     | 4.8                                                                                  |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| EOH: 3.00m                                                                                                                            |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| <b>REMARKS</b>                                                                                                                        |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| 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: A.B                                                                                                                        |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| CHECKED BY:                                                                                                                           |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| Standing groundwater level                                                                                                            |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
| GW while drilling                                                                                                                     |                                                                                     |                                                                                      |        |                                                                                                                               |                             |                           |                              |             |                             |                                   |
|                                                                                                                                       |                                                                                     |  |        | 45B Norfolk St, Kensington 0145, Whangarei<br>Phone: 09 945 4188<br>Email: jobs@wjl.co.nz<br>Website: www.wiltonjoubert.co.nz |                             |                           |                              |             |                             |                                   |

Generated with CORE-GS by Gecoc - WJL - Hand Auger v2 - 13/10/2025 3:42:58 PM

| HAND AUGER : HA03                                                                                                                     |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | JOB NO.: 142948                                                                                                                                                                                                                                      |           | SHEET: 1 OF 1     |                     |                        |             |                                |
|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|-------------------|---------------------|------------------------|-------------|--------------------------------|
| CLIENT: Sue S. Teixeira                                                                                                               |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | START DATE: 13/10/2025                                                                                                                                                                                                                               |           | NORTHING: GRID:   |                     |                        |             |                                |
| PROJECT: Proposed Subdivision                                                                                                         |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | DIAMETER: 50mm                                                                                                                                                                                                                                       |           | EASTING:          |                     |                        |             |                                |
| SITE LOCATION: 101 Shepherd Road, Kerikeri                                                                                            |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | SV DIAL: ET20828                                                                                                                                                                                                                                     |           | ELEVATION: Ground |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | FACTOR: 1.405                                                                                                                                                                                                                                        |           | DATUM:            |                     |                        |             |                                |
| STRATIGRAPHY                                                                                                                          | SOIL DESCRIPTION                                                                                         |                                                                                        |                                                                                        |                                                                                        | LEGEND                                                                                                                                                                                                                                               | DEPTH (m) | WATER             | SHEAR VANE          |                        |             | COMMENTS, SAMPLES, OTHER TESTS |
|                                                                                                                                       |  TOPSOIL                |  CLAY |  SAND |  PEAT |                                                                                                                                                                                                                                                      |           |                   | PEAK STRENGTH (kPa) | REMOULD STRENGTH (kPa) | SENSITIVITY |                                |
| Topsoil                                                                                                                               | TOPSOIL.                                                                                                 |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 0.0       |                   |                     |                        |             |                                |
| Waipapa Group                                                                                                                         | Clayey SILT, orangey brown, hard, moist, moderate plasticity.                                            |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 0.2       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 0.4       |                   | 197+                | -                      | -           |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 0.6       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 0.8       |                   | 197+                | -                      | -           |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 1.0       |                   |                     |                        |             |                                |
|                                                                                                                                       | Clayey SILT/SILT, some clay, dark orange/light brownish white.                                           |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 1.2       |                   | 197+                | -                      | -           |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 1.4       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 1.6       |                   | 197+                | -                      | -           |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 1.8       |                   |                     |                        |             |                                |
|                                                                                                                                       | 1.8m - 2.0m: Some fine to coarse sand.                                                                   |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 2.0       |                   | 171                 | 67                     | 2.6         |                                |
|                                                                                                                                       | 2.1m: Minor fine to medium sand.                                                                         |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 2.2       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 2.4       |                   | 146                 | 59                     | 2.5         |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 2.6       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 2.8       |                   | 140                 | 39                     | 3.6         |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 3.0       |                   |                     |                        |             |                                |
|                                                                                                                                       | 3.0m: Wet.                                                                                               |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 3.2       |                   | 155                 | 70                     | 2.2         |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 3.4       |                   |                     |                        |             |                                |
|                                                                                                                                       | 3.4m: Occasional black streaking.                                                                        |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                     | 3.6       |                   | 169                 | 90                     | 1.9         |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                    | 3.8       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                   | 4.0       | ▼                 | 90                  | 34                     | 2.6         |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                   | 4.2       |                   |                     |                        |             |                                |
|                                                                                                                                       |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                   | 4.4       |                   | 197+                | -                      | -           |                                |
|                                                                                                                                       | Clayey SILT/SILT, some clay, minor fine to coarse sand, trace of fine gravel, hard, wet, low plasticity. |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                   | 4.6       |                   |                     |                        |             |                                |
|                                                                                                                                       | Too hard to auger.                                                                                       |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                   | 4.8       |                   |                     |                        |             |                                |
| EOH: 4.50m                                                                                                                            |                                                                                                          |                                                                                        |                                                                                        |     |                                                                                                                                                                                                                                                      |           |                   |                     |                        |             |                                |
| REMARKS                                                                                                                               |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | <div><div></div><div>45B Norfolk St, Kensington 0145, Whangarei<br/>Phone: 09 945 4188<br/>Email: jobs@wj.co.nz<br/>Website: www.wiltonjoubert.co.nz</div></div> |           |                   |                     |                        |             |                                |
| End of borehole @ 4.50m (Target Depth: 5.00m)                                                                                         |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                                                                                                      |           |                   |                     |                        |             |                                |
| Standing groundwater @ 4.00m.                                                                                                         |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                                                                                                      |           |                   |                     |                        |             |                                |
| NZGS Definition of Relative Density for Coarse Grain soils: VL - Very Loose; L - Loose; MD - Medium Dense; D - Dense; VD - Very Dense |                                                                                                          |                                                                                        |                                                                                        |                                                                                        |                                                                                                                                                                                                                                                      |           |                   |                     |                        |             |                                |
| LOGGED BY: A.B                                                                                                                        |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | ▼ Standing groundwater level                                                                                                                                                                                                                         |           |                   |                     |                        |             |                                |
| CHECKED BY:                                                                                                                           |                                                                                                          |                                                                                        |                                                                                        |                                                                                        | ▽ GW while drilling                                                                                                                                                                                                                                  |           |                   |                     |                        |             |                                |

## HAND AUGER : HA04

**JOB NO.: 142948**

**SHEET: 1 OF 1**

**START DATE:** 13/10/2025

**NORTHING:**

**GRID:**

**DIAMETER:** 50mm

**EASTING:**

SV DIAL: ET20828

**ELEVATION:** Ground

**FACTOR:** 1.405

**DATUM:**

**CLIENT:** Sue S. Teixeira

**PROJECT:** Proposed Subdivision

**SITE LOCATION:** 101 Shepherd Road, Kerikeri

[illegible]

## 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: A.B

▼ Standing groundwater level

**CHECKED BY:**

▽ GW while drilling



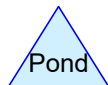
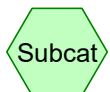
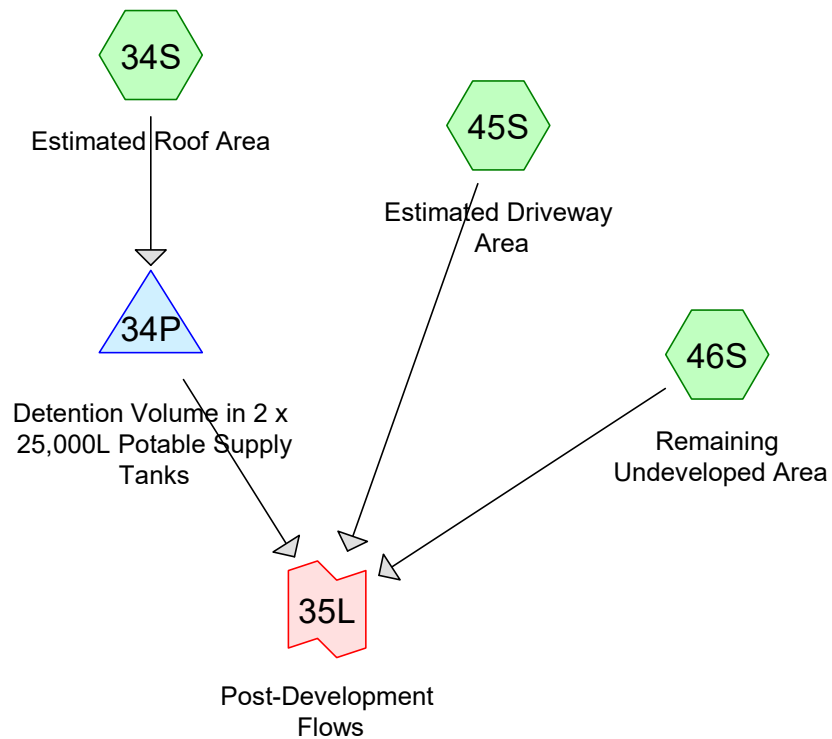
45B Norfolk St, Kensington 0145, Whangarei  
Phone: 09 945 4188  
Email: [jobs@wjf.co.nz](mailto:jobs@wjf.co.nz)  
Website: [www.wiltonioubert.co.nz](http://www.wiltonioubert.co.nz)

## Permitted Peak Flows



Maximum Permitted  
Coverage

## 20% Site Coverage Scenario



### Routing Diagram for 142949

Prepared by {enter your company name here}, Printed 20/10/2025  
HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC



142949

Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 2

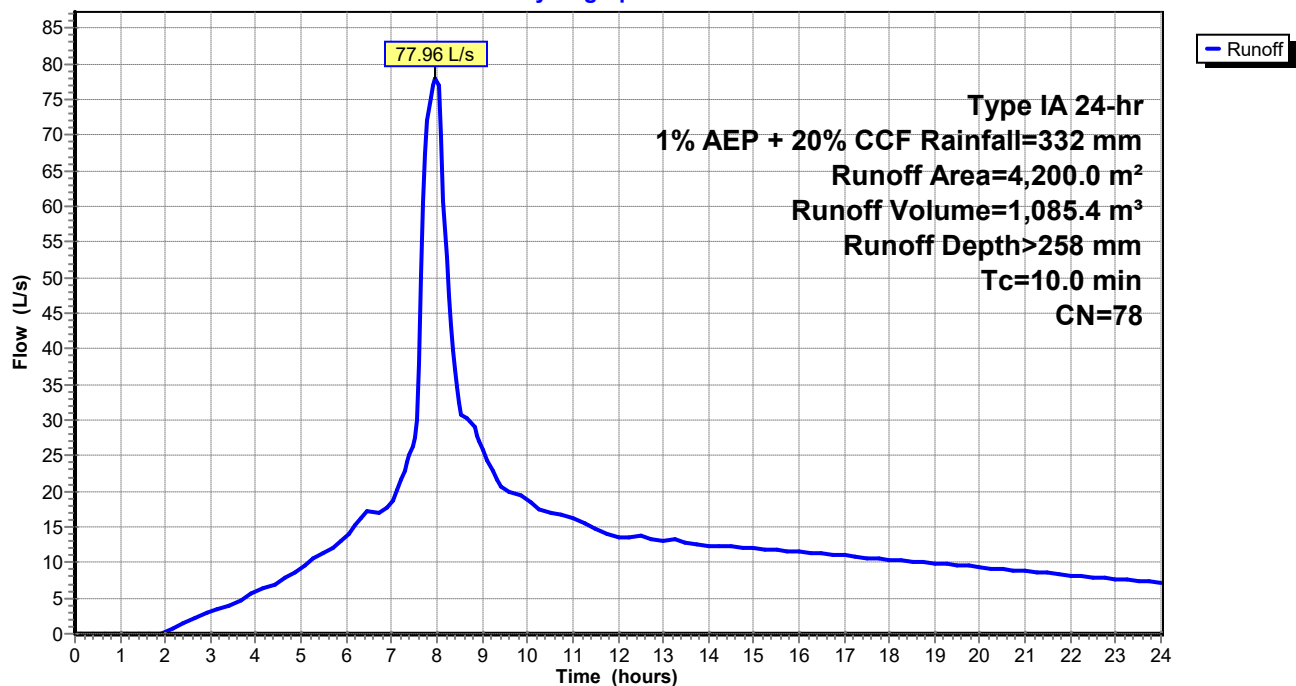
**Summary for Subcatchment 24S: Maximum Permitted Coverage**Runoff = 77.96 L/s @ 7.97 hrs, Volume= 1,085.4 m<sup>3</sup>, Depth> 258 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

|   | Area (m <sup>2</sup> ) | CN | Description            |
|---|------------------------|----|------------------------|
| * | 630.0                  | 98 | Impermeable            |
| * | 3,570.0                | 74 | Permeable              |
|   | 4,200.0                | 78 | Weighted Average       |
|   | 3,570.0                |    | 85.00% Pervious Area   |
|   | 630.0                  |    | 15.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 24S: Maximum Permitted Coverage**

Hydrograph



142949

Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 3

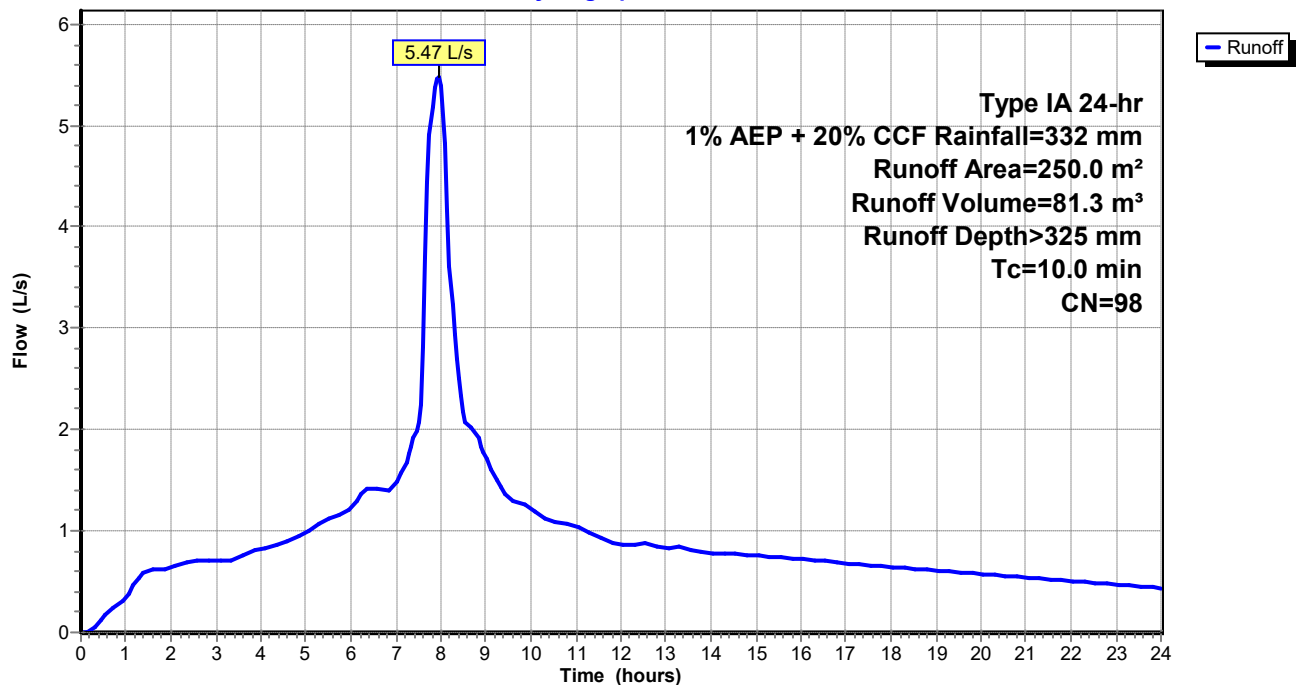
**Summary for Subcatchment 34S: Estimated Roof Area**Runoff = 5.47 L/s @ 7.94 hrs, Volume= 81.3 m<sup>3</sup>, Depth> 325 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

| Area (m <sup>2</sup> ) | CN | Description             |
|------------------------|----|-------------------------|
| 250.0                  | 98 |                         |
| 250.0                  |    | 100.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 34S: Estimated Roof Area**

Hydrograph



142949

Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 4

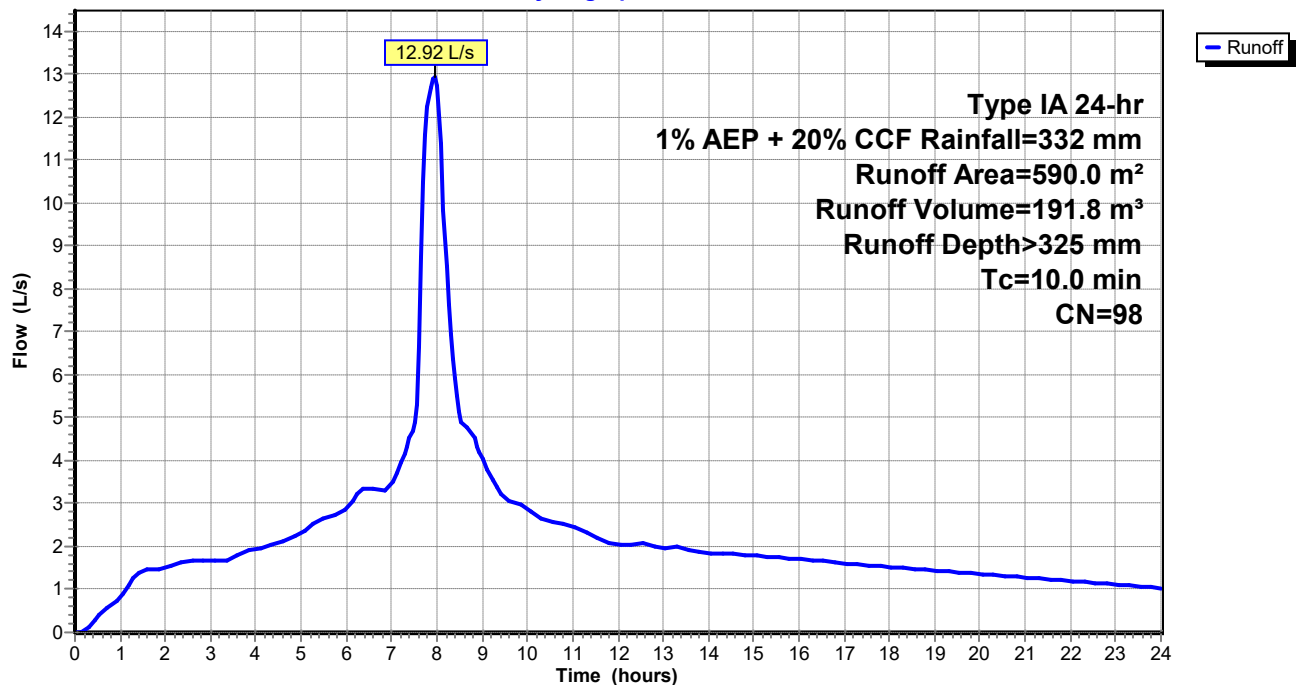
**Summary for Subcatchment 45S: Estimated Driveway Area**Runoff = 12.92 L/s @ 7.94 hrs, Volume= 191.8 m<sup>3</sup>, Depth> 325 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

|   | Area (m <sup>2</sup> ) | CN | Description             |
|---|------------------------|----|-------------------------|
| * | 590.0                  | 98 |                         |
|   | 590.0                  |    | 100.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 45S: Estimated Driveway Area**

Hydrograph



142949

Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 5

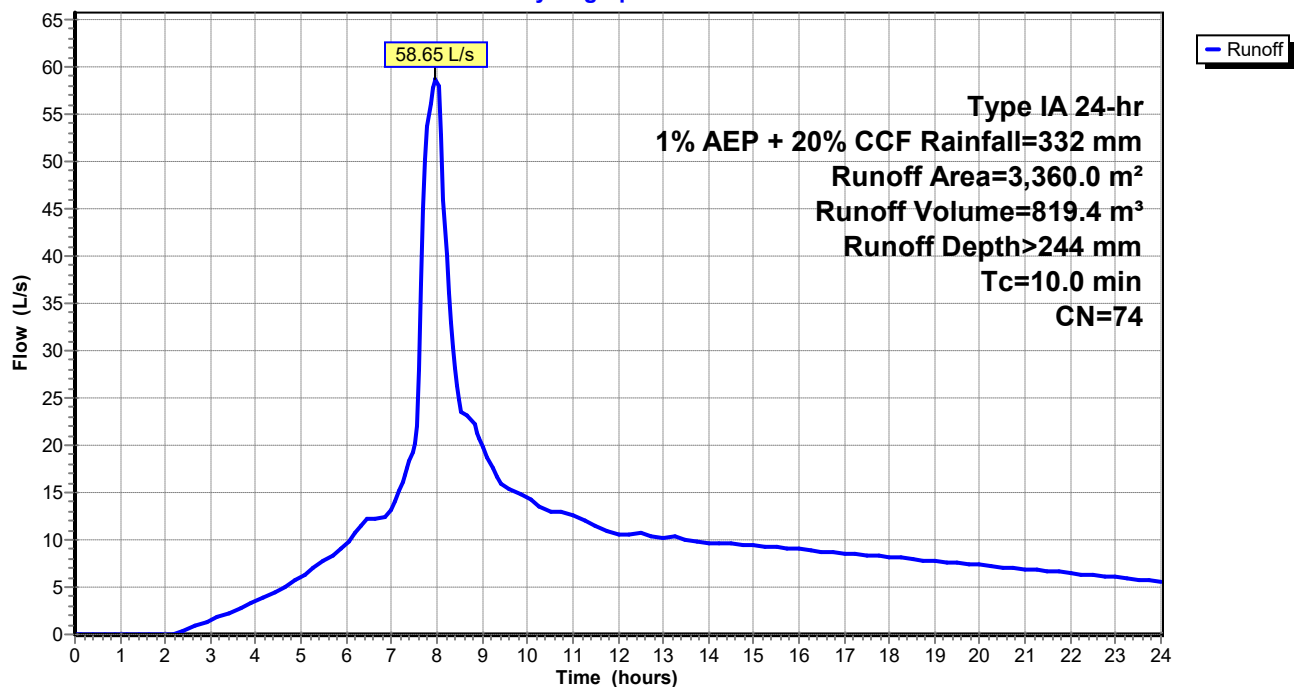
**Summary for Subcatchment 46S: Remaining Undeveloped Area**Runoff = 58.65 L/s @ 7.98 hrs, Volume= 819.4 m<sup>3</sup>, Depth> 244 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

| Area (m <sup>2</sup> ) | CN | Description           |
|------------------------|----|-----------------------|
| 3,360.0                | 74 |                       |
| 3,360.0                |    | 100.00% Pervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 46S: Remaining Undeveloped Area**

Hydrograph





142949

Type IA 24-hr 1% AEP + 20% CCF Rainfall=332 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 6

**Summary for Pond 34P: Detention Volume in 2 x 25,000L Potable Supply Tanks**

Inflow Area = 250.0 m<sup>2</sup>, 100.00% Impervious, Inflow Depth > 325 mm for 1% AEP + 20% CCF event  
 Inflow = 5.47 L/s @ 7.94 hrs, Volume= 81.3 m<sup>3</sup>  
 Outflow = 4.87 L/s @ 8.09 hrs, Volume= 80.7 m<sup>3</sup>, Atten= 11%, Lag= 9.3 min  
 Primary = 4.87 L/s @ 8.09 hrs, Volume= 80.7 m<sup>3</sup>

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
 Peak Elev= 0.217 m @ 8.09 hrs Surf.Area= 20.4 m<sup>2</sup> Storage= 4.4 m<sup>3</sup>

Plug-Flow detention time= 17.4 min calculated for 80.7 m<sup>3</sup> (99% of inflow)  
 Center-of-Mass det. time= 11.7 min ( 654.9 - 643.2 )

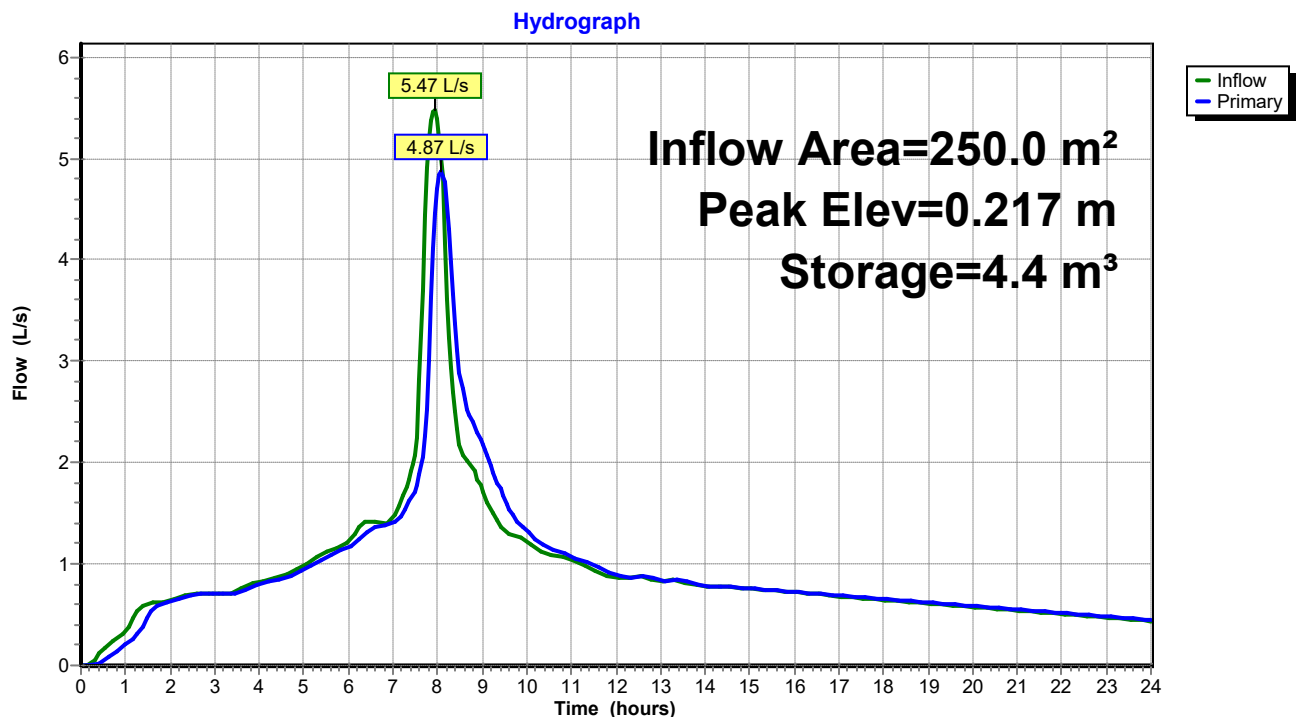
| Volume | Invert  | Avail.Storage       | Storage Description                                 |
|--------|---------|---------------------|-----------------------------------------------------|
| #1     | 0.000 m | 52.9 m <sup>3</sup> | <b>3.60 mD x 2.60 mH Vertical Cone/Cylinder x 2</b> |

| Device | Routing | Invert  | Outlet Devices                            |
|--------|---------|---------|-------------------------------------------|
| #1     | Primary | 0.000 m | <b>60 mm Vert. Orifice/Grate</b> C= 0.600 |
| #2     | Primary | 0.140 m | <b>60 mm Vert. Orifice/Grate</b> C= 0.600 |

**Primary OutFlow** Max=4.88 L/s @ 8.09 hrs HW=0.217 m (Free Discharge)

1=Orifice/Grate (Orifice Controls 3.25 L/s @ 1.15 m/s)

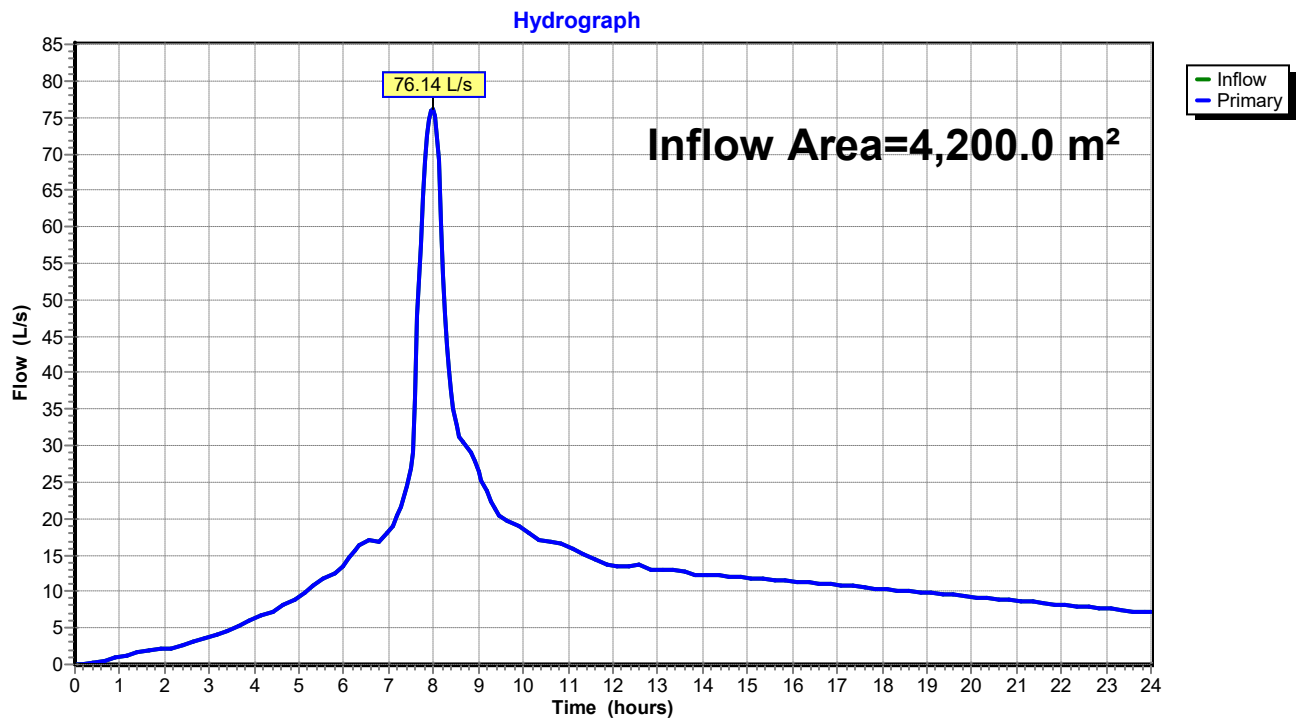
2=Orifice/Grate (Orifice Controls 1.63 L/s @ 0.58 m/s)

**Pond 34P: Detention Volume in 2 x 25,000L Potable Supply Tanks**

**Summary for Link 35L: Post-Development Flows**

Inflow Area = 4,200.0 m<sup>2</sup>, 20.00% Impervious, Inflow Depth > 260 mm for 1% AEP + 20% CCF event  
Inflow = 76.14 L/s @ 7.98 hrs, Volume= 1,091.9 m<sup>3</sup>  
Primary = 76.14 L/s @ 7.98 hrs, Volume= 1,091.9 m<sup>3</sup>, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

**Link 35L: Post-Development Flows**

### Summary for Subcatchment 24S: Maximum Permitted Coverage

Runoff = 35.23 L/s @ 7.99 hrs, Volume= 503.2 m<sup>3</sup>, Depth> 120 mm

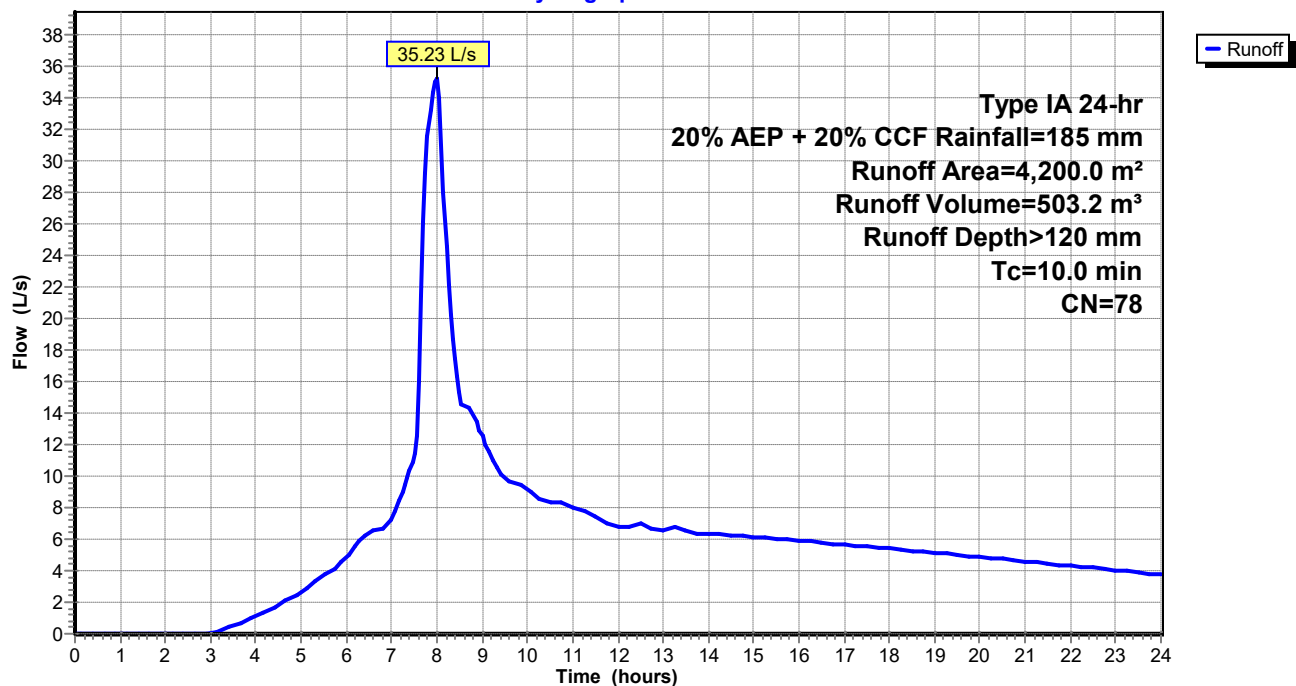
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

|   | Area (m <sup>2</sup> ) | CN | Description            |
|---|------------------------|----|------------------------|
| * | 630.0                  | 98 | Impermeable            |
| * | 3,570.0                | 74 | Permeable              |
|   | 4,200.0                | 78 | Weighted Average       |
|   | 3,570.0                |    | 85.00% Pervious Area   |
|   | 630.0                  |    | 15.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

### Subcatchment 24S: Maximum Permitted Coverage

Hydrograph



142949

Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 9

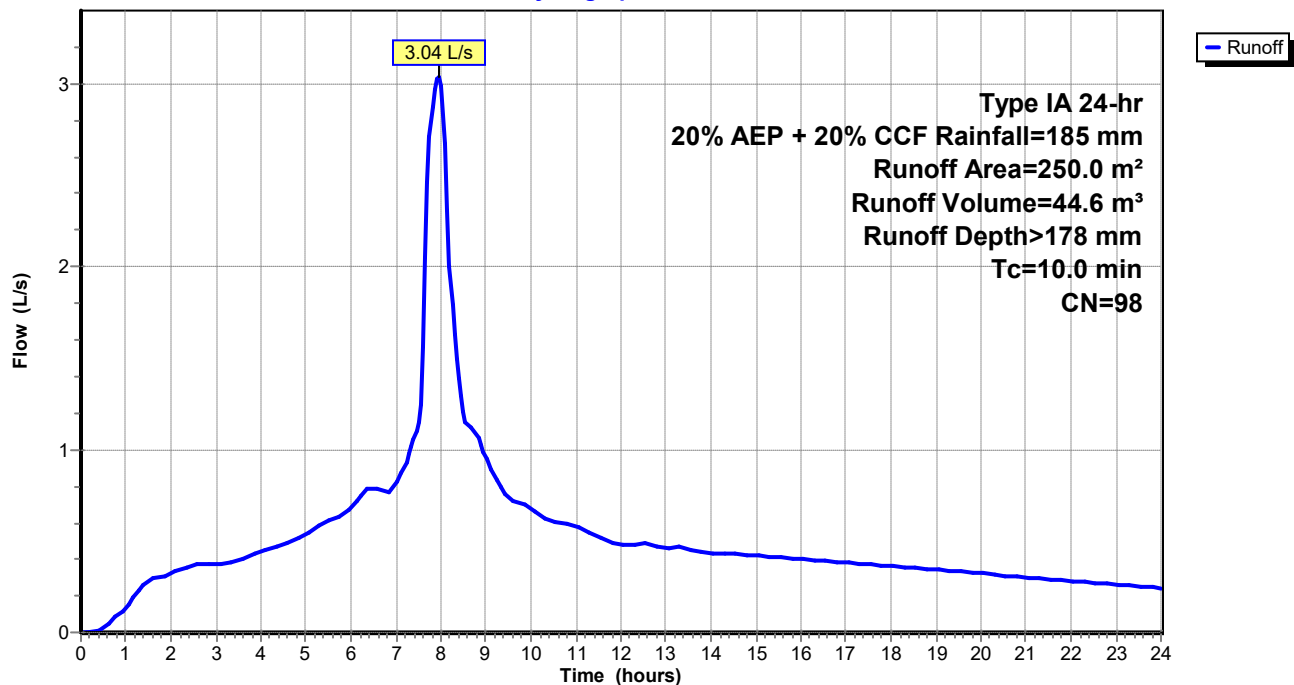
**Summary for Subcatchment 34S: Estimated Roof Area**Runoff = 3.04 L/s @ 7.94 hrs, Volume= 44.6 m<sup>3</sup>, Depth> 178 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

| Area (m <sup>2</sup> ) | CN | Description             |
|------------------------|----|-------------------------|
| 250.0                  | 98 |                         |
| 250.0                  |    | 100.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 34S: Estimated Roof Area**

Hydrograph





142949

Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 10

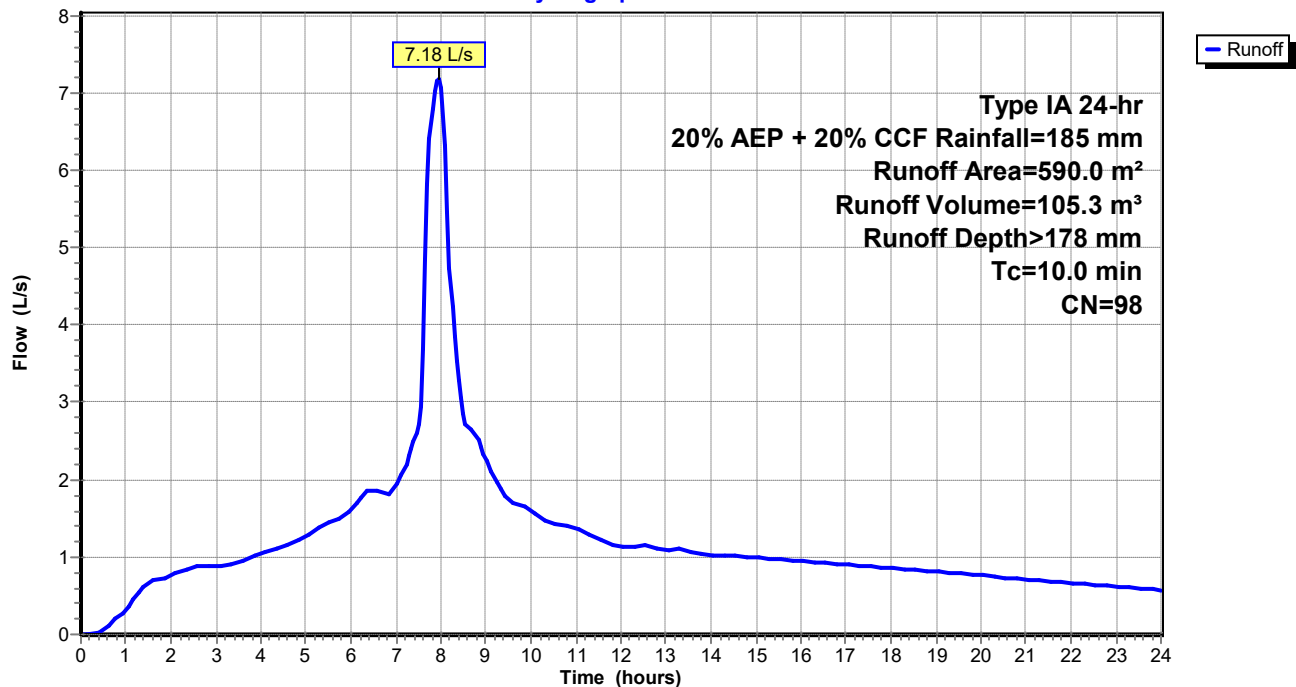
**Summary for Subcatchment 45S: Estimated Driveway Area**Runoff = 7.18 L/s @ 7.94 hrs, Volume= 105.3 m<sup>3</sup>, Depth> 178 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

| Area (m <sup>2</sup> ) | CN | Description             |
|------------------------|----|-------------------------|
| * 590.0                | 98 |                         |
| 590.0                  |    | 100.00% Impervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 45S: Estimated Driveway Area**

Hydrograph



142949

Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 11

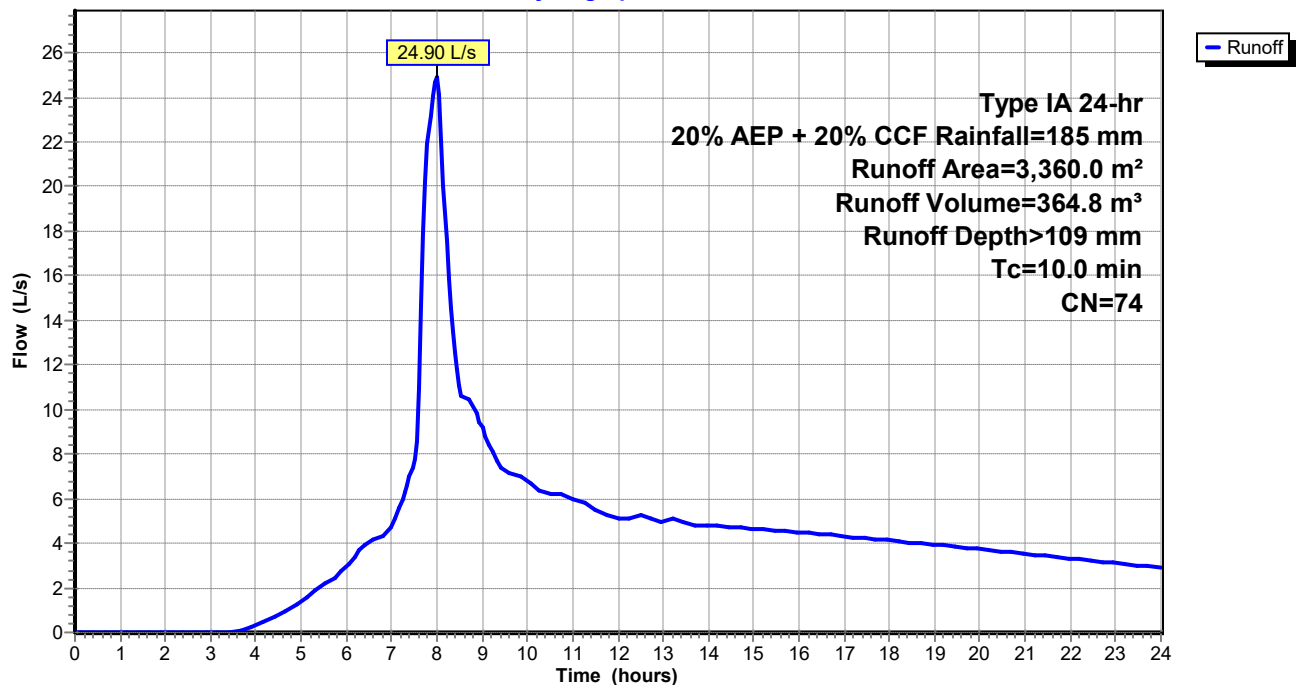
**Summary for Subcatchment 46S: Remaining Undeveloped Area**Runoff = 24.90 L/s @ 8.00 hrs, Volume= 364.8 m<sup>3</sup>, Depth> 109 mmRunoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs  
Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

| Area (m <sup>2</sup> ) | CN | Description           |
|------------------------|----|-----------------------|
| 3,360.0                | 74 |                       |
| 3,360.0                |    | 100.00% Pervious Area |

| Tc<br>(min) | Length<br>(meters) | Slope<br>(m/m) | Velocity<br>(m/sec) | Capacity<br>(m <sup>3</sup> /s) | Description   |
|-------------|--------------------|----------------|---------------------|---------------------------------|---------------|
| 10.0        |                    |                |                     |                                 | Direct Entry, |

**Subcatchment 46S: Remaining Undeveloped Area**

Hydrograph



142949

Type IA 24-hr 20% AEP + 20% CCF Rainfall=185 mm

Prepared by {enter your company name here}

Printed 20/10/2025

HydroCAD® 10.00-26 s/n 10413 © 2020 HydroCAD Software Solutions LLC

Page 12

**Summary for Pond 34P: Detention Volume in 2 x 25,000L Potable Supply Tanks**

Inflow Area = 250.0 m<sup>2</sup>, 100.00% Impervious, Inflow Depth > 178 mm for 20% AEP + 20% CCF event  
 Inflow = 3.04 L/s @ 7.94 hrs, Volume= 44.6 m<sup>3</sup>  
 Outflow = 2.39 L/s @ 8.14 hrs, Volume= 44.2 m<sup>3</sup>, Atten= 21%, Lag= 12.2 min  
 Primary = 2.39 L/s @ 8.14 hrs, Volume= 44.2 m<sup>3</sup>

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Peak Elev= 0.131 m @ 8.14 hrs Surf.Area= 20.4 m<sup>2</sup> Storage= 2.7 m<sup>3</sup>Plug-Flow detention time= 20.4 min calculated for 44.2 m<sup>3</sup> (99% of inflow)

Center-of-Mass det. time= 13.8 min ( 664.0 - 650.2 )

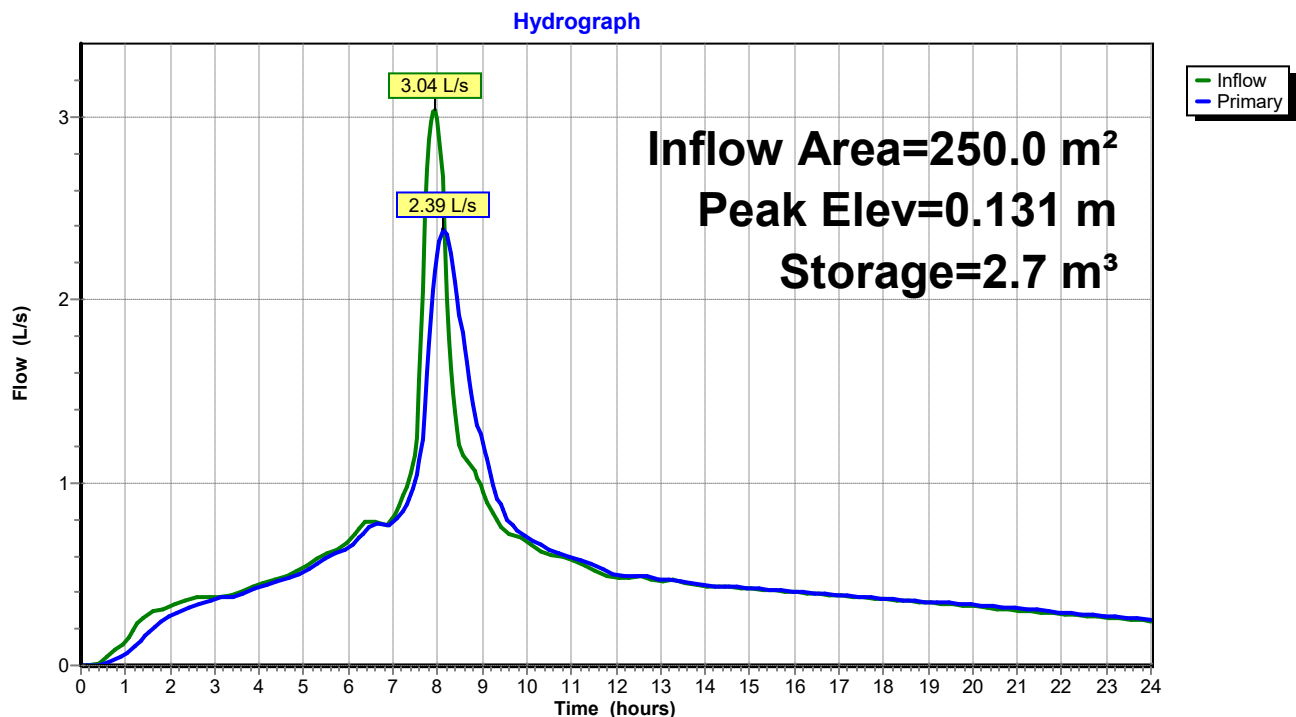
| Volume | Invert  | Avail.Storage       | Storage Description                                 |
|--------|---------|---------------------|-----------------------------------------------------|
| #1     | 0.000 m | 52.9 m <sup>3</sup> | <b>3.60 mD x 2.60 mH Vertical Cone/Cylinder x 2</b> |

| Device | Routing | Invert  | Outlet Devices                            |
|--------|---------|---------|-------------------------------------------|
| #1     | Primary | 0.000 m | <b>60 mm Vert. Orifice/Grate</b> C= 0.600 |
| #2     | Primary | 0.140 m | <b>60 mm Vert. Orifice/Grate</b> C= 0.600 |

**Primary OutFlow** Max=2.39 L/s @ 8.14 hrs HW=0.131 m (Free Discharge)

1=Orifice/Grate (Orifice Controls 2.39 L/s @ 0.84 m/s)

2=Orifice/Grate ( Controls 0.00 L/s)

**Pond 34P: Detention Volume in 2 x 25,000L Potable Supply Tanks**

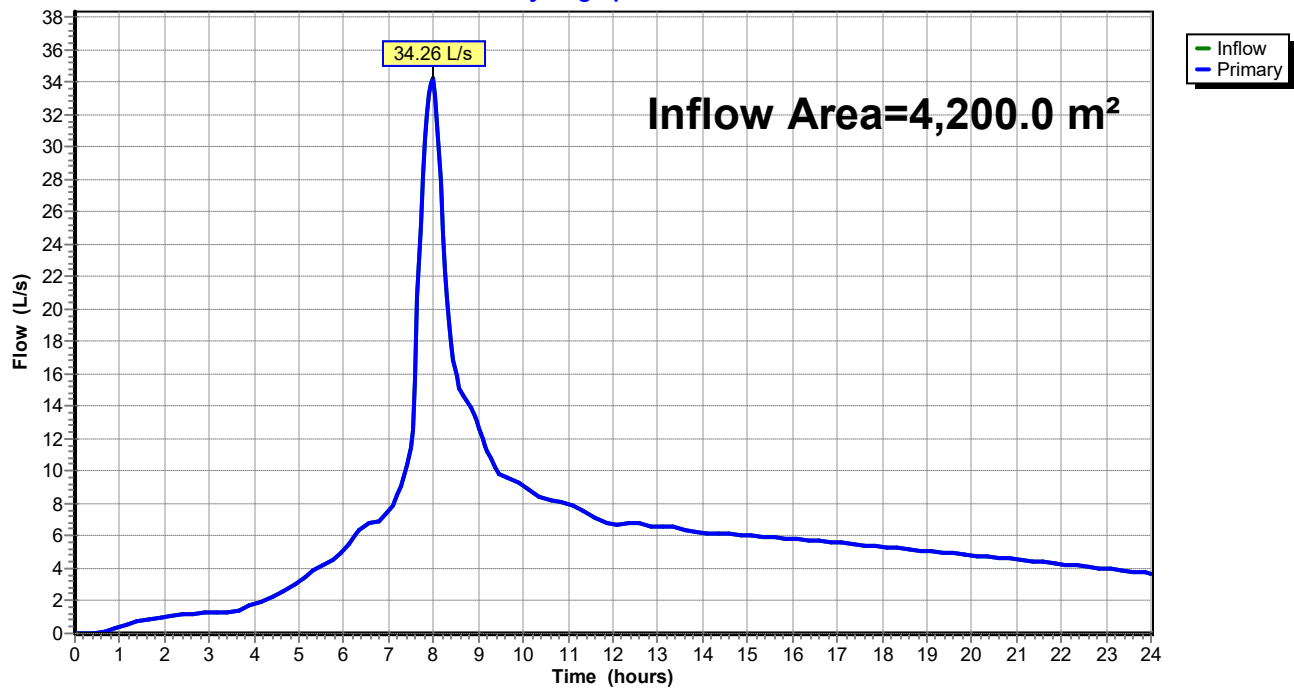
**Summary for Link 35L: Post-Development Flows**

Inflow Area = 4,200.0 m<sup>2</sup>, 20.00% Impervious, Inflow Depth > 122 mm for 20% AEP + 20% CCF event  
Inflow = 34.26 L/s @ 7.99 hrs, Volume= 514.3 m<sup>3</sup>  
Primary = 34.26 L/s @ 7.99 hrs, Volume= 514.3 m<sup>3</sup>, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

**Link 35L: Post-Development Flows**

Hydrograph







| MEMORANDUM OF EASEMENTS                                    |       |                   |                      |  |
|------------------------------------------------------------|-------|-------------------|----------------------|--|
| PURPOSE                                                    | SHOWN | SERVIENT TENEMENT | DOMINANT TENEMENT    |  |
| RIGHT OF WAY<br>ELECTRICITY<br>TELECOMMUNICATIONS<br>WATER | (A)   | LOT 3 HEREON      | LOTS 1 & 2<br>HEREON |  |

NOTES

Dimensions and areas are subject to final Survey

Comprised in:  
Title - NA96B/480 11.597Ha (Lot 1 DP 160255)  
Title - 753966 46.2789Ha (Sec 4 SO 496053)

This drawing has been prepared solely for the use intended by the client stated on the plan, and must not be used for any other purpose. BOI Survey Ltd accepts no responsibility for this plan, or any data contained on this plan, to be used for any other purpose

| Rev. | Reason For Issue or Amendment                      | Date     | Drawn | Checked | Surveyed |
|------|----------------------------------------------------|----------|-------|---------|----------|
| B    | Scheme Plan (OPTION 1) 101 Shepherd Road, Kerikeri | 10/11/25 | TW    |         | TW       |
|      |                                                    |          |       |         |          |
|      |                                                    |          |       |         |          |
|      |                                                    |          |       |         |          |
|      |                                                    |          |       |         |          |



BOI SURVEY LTD  
55B Shepherd Road  
Kerikeri 0230  
e: Tony@boisurvey.co.nz

|                                                               |  |                          |             |                          |
|---------------------------------------------------------------|--|--------------------------|-------------|--------------------------|
| PROPOSED SUBDIVISION OF LOT 1 DP 160255 & SECTION 4 SO 496053 |  | JOB NO: 5045             |             | Scale: NTS               |
|                                                               |  | Level Datum: N/A         | Origin: -   | Co-ord System: NZGD 2000 |
|                                                               |  | Drawing Number: 5045-002 | Revision: B | Sheet: 1 of 1            |
| CLIENT: TEIXEIRA - 101 SHEPHERD ROAD, KERIKERI                |  |                          |             |                          |