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

Office Use Only
Application Number:

Application for resource consent or fast-track resource consent

(Or Associated Consent Pursuant to the Resource Management Act 1991 (RMA)) (If applying for a Resource Consent pursuant to Section 87AAC or 88 of the RMA, this form can be used to satisfy the requirements of Schedule 4). Prior to, and during, completion of this application form, please refer to Resource Consent Guidance Notes and Schedule of Fees and Charges — both available on the Council's web page.

1. Pre-Lodgement Meeting

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

2. Type of Consent being applied for

(more than one circle can be ticked):

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

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

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

◯ **Yes** ✔ **No**

4. Consultation

Have you consulted with Iwi/Hapū? ✔ **Yes** ◯ **No**

If yes, which groups have you consulted with?	NgaPuhi and Te Uri O Hua
Who else have you consulted with?	Heritage NZ Pouhere Taonga

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

5. Applicant Details

Name/s: Prospect Estate Ltd c/- Peter Giesbers

Email: [redacted]

Phone number:

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

6. Address for Correspondence

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

Name/s: Northland Planning & Development 2020 Ltd

Email: [redacted]

Phone number:

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

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

7. Details of Property Owner/s and Occupier/s

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

Name/s: Prospect Estate Limited

Property Address/ Location: 93 Station Road, Kaikohe

Postcode 0474

8. Application Site Details

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

Name/s: Prospect Estate Limited

Site Address/ Location: 93 Station Road, Kaikohe

Postcode 0474

Legal Description: Part Kohewhata 69 Block **Val Number:** 00523-77500

Certificate of title: NA23A/821

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

Site visit requirements:

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

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

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

Please contact applicant to organise site 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.

Proposal to subdivide the site to create one additional allotment on a site split zoned Rural Production and Indsutrial. The proposal has been assessed as a Restricted Discretionary Activity.

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

10. Would you like to request Public Notification?

◯ **Yes** ✔ **No**

11. Other Consent required/being applied for under different legislation

(more than one circle can be ticked):

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

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

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

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

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

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

13. Assessment of Environmental Effects:

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

Your AEE is attached to this application ✔ **Yes**

13. Draft Conditions:

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

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

14. Billing Details:

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

Name/s: (please write in full) Prospect Estate Limited

Email: [redacted]

Phone number:

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

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

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

Name: (please write in full) Peter Giesbers

Signature: [redacted] Date 12-Jun-2025
(signature of bill payer MANDATORY

15. Important Information:

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

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

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

15. Important information continued...

Declaration

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

Name: (please write in full) Peter Giesbers

Signature: [redacted] Date 12-Jun-2025

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

Checklist (please tick if information is provided)

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

Subdivision Resource Consent Proposal

Prospect Estate Limited

93 Station Road, Kaikohe

Date: 13/06/2025

Attention: Liz Searle and Whitney Peat – Team Leaders Resource Consents

Please find attached:

- an application form for a Subdivision Resource Consent to create one additional allotment on a site split zoned ***Rural Production & Industrial*** under the Operative District Plan*;* and
- an Assessment of Environmental Effects indicating the potential and actual effects of the proposal on the environment.

The subdivision requires consent under the Operative District Plan as a **Restricted Discretionary Activity**. The subdivision is a **Permitted Activity** under the Proposed District Plan.

If you require further information, please do not hesitate to contact me.

Regards

Alex Billot

Resource Planner

Reviewed by:

Rochelle Jacobs

Director/Senior Planner

NORTHLAND PLANNING & DEVELOPMENT 2020 LIMITED

1. Table of Contents

Appendices

1. **Far North District Council Application Form**
2. **Certificate of Title** – *LINZ*
3. **Scheme Plan –** *Williams & King*
4. **Site Suitability Report –** *Geologix*
5. **Correspondence –** *Te Hono Support*
6. **Correspondence –** *Heritage NZ Pouhere Taonga*
7. **Correspondence –** *Iwi*

Assessment of Environment Effects Report

1.0 Description of the Proposed Activity

1.1 The proposal is to undertake a subdivision of Part Kohewhata 69 Block to create one additional allotment. The site is currently vacant land and is utilized for grazing of livestock

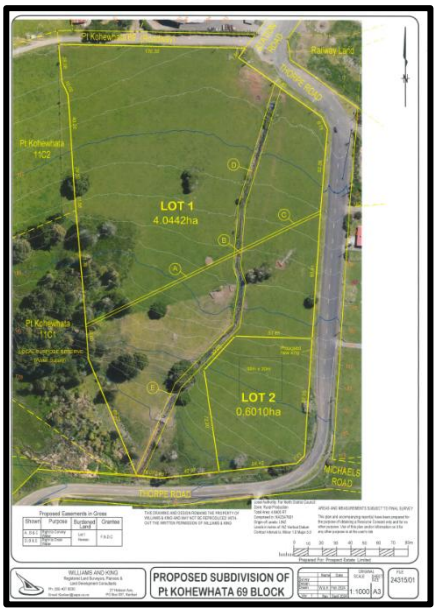


Figure 1: Proposed Scheme Plan

1.2 The proposed lot sizes are as follows:

- Proposed Lot 1 – 4.0442 hectares
- Proposed Lot 2 – 6010m^2

Areas and measurements are subject to final survey.

Site Suitability Report

1.3 A Site Suitability Report (SSR) has been completed by Geologix in support of the proposal. This is attached within **Appendix 4** of this application. The SSR also includes neighbouring developments, which will also be completed by the Applicant. The stage relevant to this proposal within the SSR are described as 'Stage 1'. It is therefore requested that only the relevant sections which refer to Stage 1 within the SSR are referred to as part of this proposal, however reference to the other stages can be reviewed to provide a full picture of the developments.

1.4 The SSR has been prepared generally in accordance with the FNDC 2023 Engineering Standards (stormwater, drainage and wastewater). However, to ensure that the application does not result in technical infringements to the ODP rules for property access, the 2009 Engineering Standards have been utilised. This ensures the proposal remains a Restricted Discretionary Activity rather than becoming a Discretionary Activity.

2.0 The site and surrounding environment

2.1 The subject site is located on the outskirts of the Kaikohe township. Lindvart Park, which is a recreational area is located to the north-east of the site, with Industrial zoned lots to the north. To the south are Rural Production zoned lots, as well as to the west. Many lots in the surrounding environment to the west and south of the site have been rezoned as Māori Purpose - Rural under the PDP.

2.2 The ODP has split zoned the site with the north-eastern portion of the site being zoned as Industrial and the remainder of the site being zoned as Rural Production. It is considered that this split zoning has occurred in error, with the zoning being corrected under the PDP, which follows the correct site boundaries. This is indicated in ***Figures 2 & 3*** below. As shown in ***Figure 4***, the site does not contain any industrial activities, with the nearest being to the north of the site, located on the opposite side of the Roadway to the north of the site.

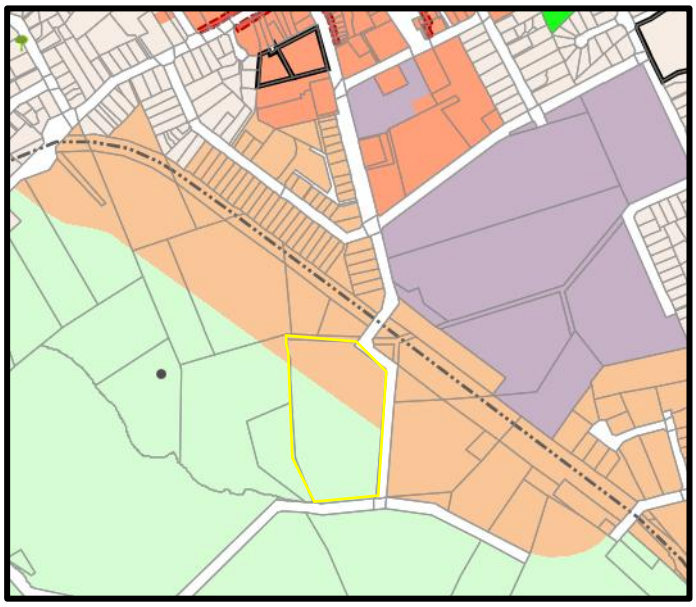


Figure 2: FNDC ODP Zoning Maps

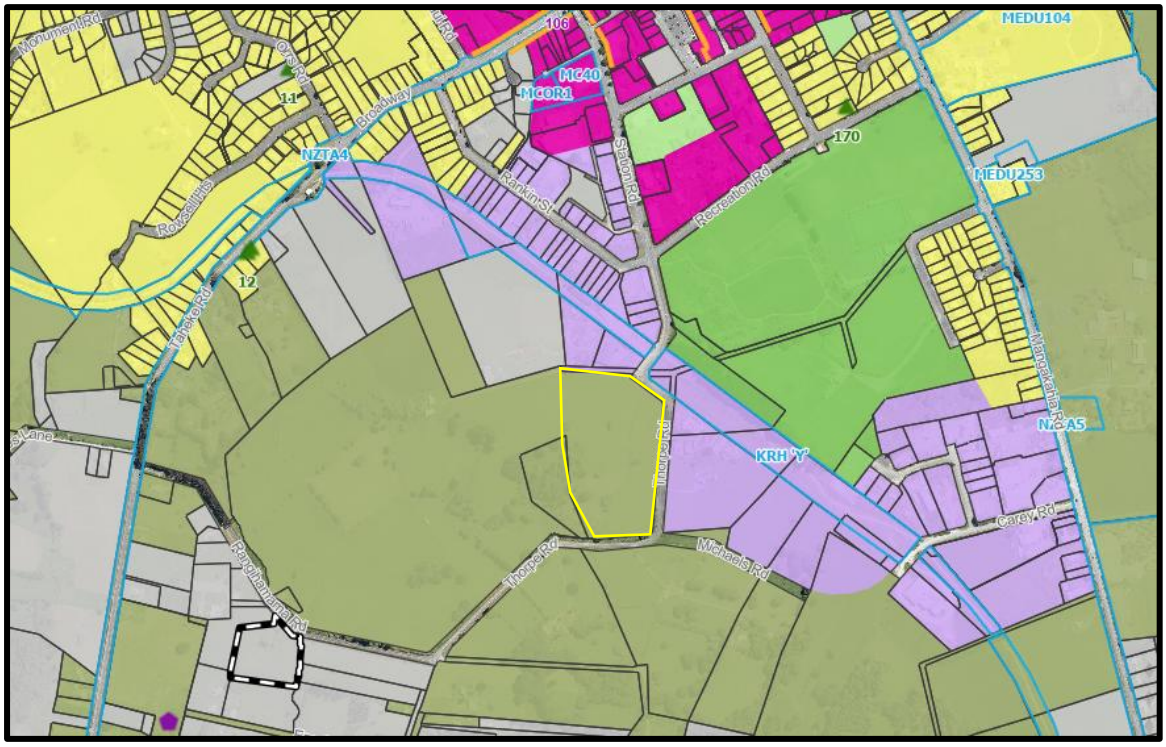


Figure 3: PDP Zoning Maps

Figure 4: Aerial view of the subject site as well as adjoining allotments in the same ownership.

2.3 As shown in ***Figure 4*** above, the site is currently vacant land and is utilized for grazing of livestock. The site is accessed via the Roadway along the northern boundary of the site. This Roadway provides access to other allotments as well. There is an overland flowpath /drain which dissects the site which is the location of a previous pipeline and drainage easement. These easements have been shown on the plan and are in favour of FNDC.

2.4 Thorpe Road wraps around the eastern and southern boundary of the site. Proposed Lot 2 is to be located in the south-eastern corner of the site and will be accessed via a new crossing place which is proposed to be located near the north-eastern corner of the new Proposed Lot 2. Proposed Lot 1 will continue to be accessed via the existing Roadway.

2.5 As discussed above, the surrounding environment consists of a range of lot sizes and land use activities. The proposed site is located in an area which is usually seen as a transition area between town and country. Although the site and surrounding lots to the south and west are zoned as Rural Production, the existing lot sizes in the area as well as land use activities are more rural lifestyle in nature. This is a common occurrence for lots which are located on the outskirts or buffer of townships, like Kaikohe.

Site Photos

2.6 A site visit was undertaken in March 2024, with a compilation of the photos below.

Figure 5: Proposed Lots 1 & 2 looking north from Thorpe road berm.

Figure 7: Image of Proposed Lot 1.

Figure 8: Image of Proposed Lot 2.

Figure 6: Image of the existing roadway, which provides access to Lot 1.

3. Background

Land Holdings in ownership of the Applicant

3.1. As illustrated in ***Figure 4*** above and reiterated in ***Figure 9*** below, the Applicant has ownership of an additional four adjoining allotments. Each of these allotments is proposed to be subject to future subdivision which will be provided in latter subdivision resource consent applications. The Site Suitability Report provided by Geologix and attached with this application, covers the multiple subdivisions across the sites, however it is imperative to note that only Part Kohewhata 69 is subject of this application and therefore no assessment of the future subdivision of the adjoining lots has been taken into consideration as part of this assessment.

3.2. Due to the nature and location of the future subdivisions on adjoining sites, assessment will be made of the overall effects at times as well as independently. However, in this case, the subdivision of Pt Kohewhata 69 will be assessed independently, such that no effects of the future subdivisions on adjoining lots will be taken into consideration.

3.3. It is intended that this subdivision will occur first, with the remaining subdivision activities to follow. Those future subdivisions will in some cases rely on this application.

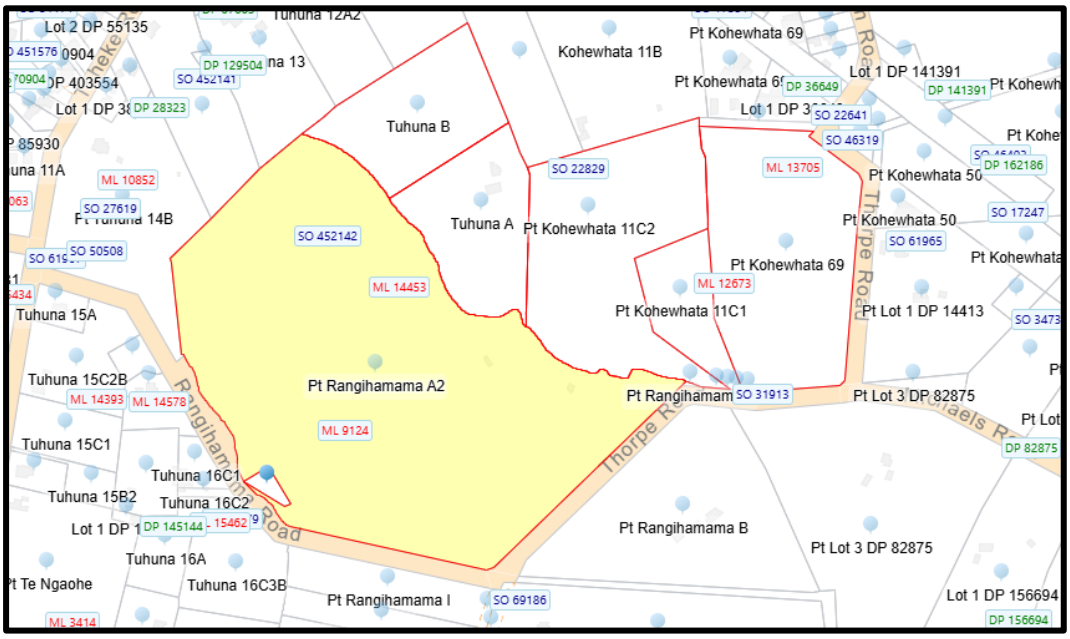


Figure 9: Image illustrating lots within ownership of the Applicant.

Title

3.4. The subject site is held within NA23A/821, which is dated 12th March 1973. The site is legally described as Part Kohewhata 69 Block with a land area of 4.6404 hectares. As mentioned earlier, there are existing drainage and water rights on the property. There are no consent notices registered on the title.

Site Features

3.5. The site is zoned both Rural Production and Industrial under the ODP. As mentioned earlier in this report, it is considered that the site has been incorrectly zoned Industrial, with the boundaries of the Industrial zone being corrected under the PDP, which follow the correct Industrial site boundaries. The site is zoned as Rural Production under the PDP.

3.6. The site does not have existing connections to reticulated water, wastewater or stormwater. These will be provided for on site at the time of built development within the lots.

3.7. The NRC Hazard Maps do not indicate that the site is susceptible to flooding.

3.8. NZAA has not mapped any archaeological sites within the property.

3.9. There are no known areas of significant indigenous vegetation or habitats of fauna within the subject site.

3.10. The subject site is not located within an area where kiwi are present.

3.11. The site is also not known to contain any areas of Outstanding Natural Landscapes or Features or areas of High Natural Character under the Regional Policy Statement for Northland (RPSN).

3.12. The subject site is shown to have soils which are classified as LUC 2. These are classified as highly versatile soils. As per the Land Implementation Guide for the National Policy Statement for Highly Productive Land (NPS-HPL), consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for.

3.13. The site is not known to be located within a Statutory Acknowledgement Area.

4. Activity Status of the Proposal

Weighting of Plans

4.1. The Council notified its' PDP on 27 July 2022. The period for public submissions closed on the 21 October 2022. A summary of submissions was notified on the 4 August 2023. The further submission period closed on the 5 September 2023. It is apparent from the summary of submissions relating to the applicable zone that a large number relate to the application of these provisions. Based on the volume and comprehensive nature of these submissions, the Council has confirmed that no other rules will have legal effect until such time as a decision is made on those provisions.

4.2. District Plan hearings on submissions are currently underway and are scheduled to conclude in October 2025. No decision on the PDP has been issued. For this reason, little weight is given to the PDP provisions.

Operative District Plan

4.3. As per Section 4.1.2(b) of the District Plan, *where a site is shown as having two or more zones applicable, each allotment shown on the subdivision plan shall comply with all of the zone standards applying to that allotment*. As mentioned above, the site is split zoned Rural Production and Industrial. It is considered that this is a mapping error, which has been corrected under the PDP mapping, which removes the Industrial zone from the site. As the Rural Production zone is the more restrictive zone, the site will be assessed against the criteria relevant to the Rural Production zone, including subdivision, zone and district wide rules.

ASSESSMENT OF THE APPLICABLE SUBDIVISION RULES FOR THE RURAL PRODUCTION ZONE:		
PERFORMANCE STANDARDS		
Plan Reference	**Rule**	**Performance of Proposal**
13.7.1	**BOUNDARY ADJUSTMENTS**	**Not applicable.**

13.7.2.1 (i)	**MINIMUM LOT SIZES**	**Restricted Discretionary Activity.** The title is dated 1973. The proposal will create one additional allotment (two lots in total) which have an area of 6010m^2 and 4.04 hectares. Therefore, the proposal is able to comply with Clause 3 of the Restricted Discretionary Activity Status.
13.7.2.2	**ALLOTMENT DIMENSIONS**	**Complies** The minimum dimension is 30m x 30m taking into account the 10m setback. The proposed lots are vacant and can accommodate the indicative building envelope.
13.7.2.4	**LOTS DIVIDED BY ZONE BOUDNARIES**	The subject site is split zoned Rural Production and Industrial. This is believed to be a mapping error, which has been corrected under the PDP. The subdivision has been assessed as a Restricted Discretionary Activity as per Rule 13.7.2.1(i) as the most restrictive standard.
13.7.2.3 & 13.7.2.5 - 9	Not Applicable for this application.	

4.4. The subdivision proposal is able to meet the **Restricted Discretionary** provisions for the Rural Production zone.

Rural Production zone

4.5. The proposed allotments do not currently contain any impermeable surfaces as the site is a piece of vacant land utilised for grazing of livestock. As part of the proposal, no additional impermeable surfaces, buildings or land use activities are proposed. Each lot will have independent access such that no private accessways are required and therefore there will not be an increase in impermeable surfaces on the sites. The sites will remain vacant as part of the proposal with any built development being at the discretion of future owners, once new titles are created.

4.6. As such, it is considered that the proposal is **Permitted** in terms of the rules under Section 8.6.5.1 of the Operative District Plan.

Industrial Zone

4.7. The part of the site zoned Industrial is vacant. It does not have any impermeable surfaces covering any part of the site such that it is compliant with the Stormwater rule. No further standards are applicable to this application.

District Wide Matters

Plan Reference	Rule	Performance of Proposal
15.1.6A	**TRAFFIC**	**Permitted Activity**

		The proposal will create one additional allotment, where access will be directly off Thorpe Road. Both lots will be vacant land as part of this proposal. The first residential unit on a site and farming activities are exempt from this rule.
15.1.6B	**PARKING**	**Permitted Activity** The proposed lots are considered of adequate area to provide for any future parking, if the lots are developed in the future.
15.1.6C.1.1	**PRIVATE ACCESSWAY IN ALL ZONES**	**Not applicable.** No private access ways are proposed.
15.1.6C.1.2	**PRIVATE ACCESSWAYS IN URBAN ZONES**	**Not applicable.**
15.1.6C.1.3	**PASSING BAYS ON PRIVATE ACCESSWAYS IN ALL ZONES**	**Not applicable.**
15.1.6C.1.4	**ACCESS OVER FOOTPATHS**	**Not applicable.** The footpath along Thorpe Road is located on the opposite side of the road.
15.1.6C.1.5	**VEHICLE CROSSING STANDARDS IN RURAL AND COASTAL ZONES**	**Permitted Activity.** (a) A new vehicle crossing will be required for Lot 2 and will be constructed in accordance with the Engineering Standards. This is anticipated to be a condition of consent on the decision document. Lot 1 will be accessed via the existing Māori Roadway. (b) Vehicle splays will be surfaced with permanent impermeable surfacing as required by this rule. (c) The vehicle crossing to Lot 2 will only service the site itself. Lot 1 will be accessed via the Māori Roadway.
15.1.6C.1.6	**VEHICLE CROSSING STANDARDS IN URBAN ZONES**	**Not applicable.**
15.1.6C.1.7	**GENERAL ACCESS STANDARDS**	**Permitted.** (a) Vehicle manoeuvring will be addressed at the time the sites are developed. There is adequate area within the sites to accommodate this. (b) Not applicable. (c) The sides of the driveway will remain in grass. (d) Stormwater will be managed on site.
15.1.6C.1.8	**FRONTAGE TO EXISTING ROADS**	(a) The site has access from Thorpe Road, which is considered to meet the legal road width standards. (b) Thorpe Road is considered to be constructed to the required standards. Where it adjoins the site it has been constructed to an urban standard with kerb and channelling. (c) Lot 1 has frontage to the existing Māori Roadway and also Thorpe Road. Access will continue to be via the Māori Roadway. It is considered the proposal meets the criteria within (c) and therefore complies with this rule.

		(d) There are no known encroachments of the carriageway into the proposed lots.
15.1.6C.1.9 – 15.1.6C..11 are not applicable to this application		

4.8. It is therefore determined that the proposal does not result in any land use infringements.

Overall status of the proposal under the Operative District Plan

4.9. The subdivision proposal is able to meet the **Restricted Discretionary** provisions for the Rural Production zone as per the requirements within 13.7.2.1(i).

Proposed District Plan

4.10. The proposal is also subject to the Proposed District Plan process. Within the Proposed District Plan, the entire site is zoned Rural Production. Assessment of the matters relating to the Proposed District Plan that have immediate legal effect, have been undertaken below:

Chapter	Rule Reference	Compliance of Proposal
Hazardous Substances	The following rules have immediate legal effect: Rule HS-R2 has immediate legal effect but only for a new significant hazardous facility. HS -R5 relates to a hazardous facility within a scheduled site and area of significance to Maori. HS-R6 relates to a hazardous facility within an SNA. HS-R9 relates to a hazardous facility within a scheduled heritage resource.	**Not applicable.** The site does not contain any hazardous substances to which these rules would apply.
Heritage Area Overlays	All rules have immediate legal effect (HA-R1 to HA-R14) All standards have immediate legal effect (HA-S1 to HA-S3)	**Not applicable.** The site is not located within a Heritage Area Overlay.
Historic Heritage	All rules have immediate legal effect (HH-R1 to HH-R10) Schedule 2 has immediate legal effect	**Not applicable.** The site does not contain any areas of historic heritage.
Notable Trees	All rules have immediate legal effect (NT-R1 to NT-R9) All standards have legal effect (NT-S1 to NT-S2) Schedule 1 has immediate legal effect	**Not applicable.** The site does not contain any notable trees.
Sites and Areas of Significance to Maori	All rules have immediate legal effect (SASM-R1 to SASM-R7) Schedule 3 has immediate legal effect.	**Not applicable.** The site does not contain any sites or areas of significance to Māori.

Ecosystems and Indigenous Biodiversity	All rules have immediate legal effect (IB-R1 to IB-R5)	**Not applicable.** The proposal does not include any indigenous vegetation pruning trimming, clearance or associated land disturbance. No plantation forestry activities are proposed. Therefore, the proposal is not in breach of rules IB-R1 to IB-R5.
Subdivision	The following rules have immediate legal effect: SUB-R6, SUB-R13, SUB-R14, SUB-R15, SUB-R17	**Not applicable.** The subdivision is not an Environmental Benefit Subdivision (SUB-R6), Subdivision of a site with heritage area overlay (SUB-R13), Subdivision of site that contains a scheduled heritage resource (SUB-R14), Subdivision of a site containing a scheduled site and area of significance to Māori (SUB-R15) or Subdivision of a site containing a scheduled SNA (SUB-R17).
Activities on the Surface of Water	All rules have immediate legal effect (ASW-R1 to ASW-R4)	**Not applicable.** The proposal does not involve activities on the surface of water.
Earthworks	The following rules have immediate legal effect: EW-R12, EW-R13 The following standards have immediate legal effect: EW-S3, EW-S5 As stated above the mapping system records the subject site as containing the Ratana Temple which is located on the adjoining site. Schedule 3 lists the legal description of MS07-18 as being P Ahipara A32A which is the adjoining site.	**Permitted.** Any earthworks will proceed under the guidance of an ADP and will be in accordance with the Erosion and Sediment Control Guidelines for Land Disturbing Activities in the Auckland Region 2016, in accordance with Rules EW-12, EW-R13, EW-S3 and EW-S5.
Signs	The following rules have immediate legal effect: SIGN-R9, SIGN-R10	**Not applicable.** No signs are proposed as part of this application.

	All standards have immediate legal effect but only for signs on or attached to a scheduled heritage resource or heritage area	
Orongo Bay Zone	Rule OBZ-R14 has partial immediate legal effect because RD-1(5) relates to water	**Not applicable.** The site is not located in the Orongo Bay Zone.

4.11. The assessment above indicates that the proposal is determined to be a **Permitted Activity** in regard to the Proposed District Plan. Therefore, no further assessment of these rules will be undertaken.

National Environmental Standards

National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health 2011

4.12. The subject site is considered to be a lifestyle block utilized for the grazing of livestock. A site visit, review of aerials and review of the property file for the site did not indicate that the site was HAIL. Although there are listed HAIL sites to the north of the sites, these are sites which contain a Waste Management Resource Recovery Centre and Transfer Station and a Car Yard. The activities undertaken within these sites are confined within their relevant site boundaries and do not impact the subject site. As such, the application has been considered **Permitted** in terms of this regulation.

National Environmental Standard for Freshwater 2020

4.13. The neighbouring allotment Pt Kohewhata 11C1 contains an area of wetland. No development is sought within 100m of this area such that the subdivision is compliant with this regulation.

4.14. No other National Environmental Standards are considered applicable to this development. The proposal is permitted in terms of these above-mentioned documents.

5. Statutory Assessment

Section 104C of the Act

5.1. Section 104C governs the determination of applications for Restricted Discretionary Activities. When considering an application for resource consent, a consent authority must consider only those matters over which a discretion is restricted in national environmental standards or other regulations, or it has restricted the exercise of its discretion in its plan or proposed plan. The consent authority can grant or refuse the application. If the application is granted, the consent authority may impose conditions under Section 108 only for those matters listed above.

Section 104(1) of the Act

5.2. Section 104(1) of the Act states that when considering an application for resource consent –

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

(a) Any actual and potential effects on the environment for 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

(b) Any relevant provisions of –
- *(i) A national environmental standard*
- *(ii) Other regulations*
- *(iii) A national policy statement.*
- *(iv) A New Zealand Coastal Policy Statement*
- *(v) A regional policy statement or proposed regional policy statement.*
- *(vi) A plan or proposed plan; and*

(c) Any other matter the consent authority considers relevant and reasonable necessary to determine the application.'

5.3. Actual and potential effects arising from a development as described in 104(1)(a) can be both positive and adverse (as described in section 3 of The Act). The proposal is considered to have actual and potential effects that are acceptable. In addition, the proposal is considered to have positive effects on the environment as the proposed allotments are capable of containing future residential development without impacting the surrounding allotments. The site is located on the periphery of the Kaikohe township, and will enhance the transition between town and country, providing lots which can provide for a residential dwelling and also small scale productive activities.

5.4. Section 104(1)(ab) requires that the consent authority consider 'any measure proposed or agreed to by the applicant for the purposes of ensuring positive effects on the environment to offset or compensate for any adverse effects on the environment that will or may result from allowing the activity'. It is considered the proposal is not of a scale or nature that would require specific offsetting or environmental compensation measures to ensure positive effects on the environment. It is considered that all effects can be managed within the proposed lot boundaries. As noted above, the proposed development itself will generate positive effects that are consistent with the intent of the Rural Production zone.

5.5. Section 104(1)(b) requires the consent authority to consider the relevant provisions of the above listed documents. An assessment of the relevant statutory documents that corresponds with the scale and significance of the effects that the activity may have on the environment has been provided in section 6.

5.6. Section 104(1)(c) states that consideration must be given to 'any other matters that the consent authority considers relevant and reasonable, necessary to determine the application'. There are no other matters relevant to this application.

6. Environmental Effects Assessment.

6.1. Having reviewed the relevant plan provisions and taking into account the matters that must be addressed by an assessment of environmental effects as outlined in Clause 7 of Schedule 4 of the Act, the following environmental effects warrant consideration as part of this application.

6.2. The proposal is considered to be a Restricted Discretionary activity as per rule 13.8.1. In considering whether to impose conditions on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters listed in 13.8.1 & 13.7.3. An assessment that corresponds with the scale and significance of the effects on the environment is provided below.

Subdivision within the Rural Production Zone

6.3. As per Section 13.8.1 of the District Plan, in considering whether or not to grant consent on applications for restricted discretionary subdivision activities, the Council will restrict the exercise of its discretion to the following matters:

- *effects on the natural character of the coastal environment for proposed lots which are in the coastal environment;*
- *effects of the subdivision under **(b)** and **(c)** above within 500m of land administered by the Department of Conservation upon the ability of the Department to manage and administer its land;*
- *effects on areas of significant indigenous flora and significant habitats of indigenous fauna;*
- *the mitigation of fire hazards for health and safety of residents.*

6.4. The subject site is not located within the coastal environment.

6.5. The subject site is not located within 500 metres of land administered by the Department of Conservation (DOC).

6.6. There are no areas of significant indigenous flora or fauna within the site and the proposal is not considered to have any such effects on these features. Especially given the fact that the new Proposed Lot 2 will be bounded by Thorpe Road on two boundaries and Proposed Lot 1 on the other two boundaries.

6.7. It is considered that the standard consent notice condition for both of the proposed lots will be applied to ensure that tanks are supplied for fire mitigation purposes at the building consent stage for any development within the lot.

Subdivision

6.8. In considering whether or not to impose conditions on applications for restricted discretionary subdivision activities the Council will restrict the exercise of its discretion to the following matters listed in 13.7.3.

PROPERTY ACCESS

6.8.1. Proposed Lot 2 is to be accessed via a new crossing place from Thorpe Road. An indicative location is shown on the scheme plan. Construction of this crossing place will be as per the required Engineering Standards.

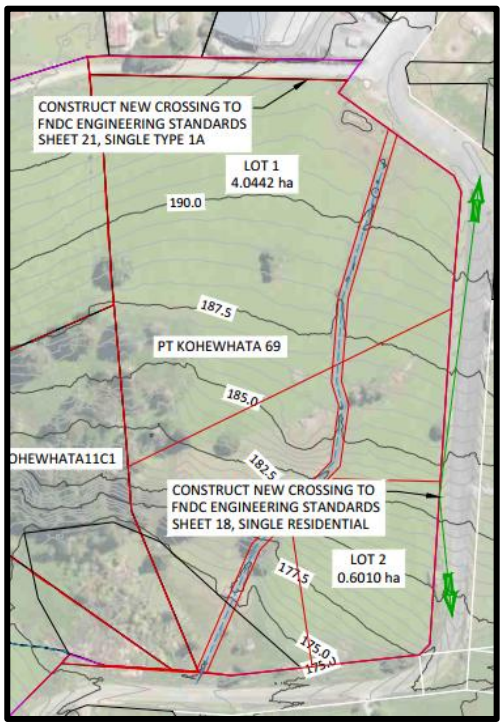


Figure 10: Snip taken from the SSR showing proposed location of crossing places to the new lots.

6.8.2. Proposed Lot 1 will be accessed via the existing Māori Roadway, which currently services the site. As the proposal will see only Lot 1 accessed from the Māori Roadway, there will be no increase in traffic movements along this roadway as part of this development, such that effects are considered to be less than minor.

6.8.3. At the beginning of the design process, the idea of including a right of way via Proposed Lot 1, parallel to the Māori Roadway was considered. This would allow Proposed Lot 1 independent access rather than access from the Māori Roadway. Northland Trasport Alliance (NTA) were contacted to get their thoughts on the proposal, which NTA was supportive of. Since then, there have been multiple reviews of the development process, and it was determined that the most appropriate way to access Lot 1 would be to continue the existing situation via the Māori Roadway.

6.8.4. An assessment of Chapter 15 was made in Section 4 of this report, which found that the proposal meets the permitted standards.

NATURAL AND OTHER HAZARDS

6.8.5. There are no matters listed under 13.7.3.2 which are applicable to the proposed subdivision, as determined within the Site Suitability Report from Geologix.

6.8.6. It is therefore considered that the proposal does not create any adverse effects in relation to natural and other hazards.

6.8.7. In terms of section 106 of the Act, the likelihood of natural hazards occurring is low. The subject site is not shown to be susceptible to natural hazards. No material damage is expected, and the proposal is not considered to accelerate or worsen natural hazards. It is therefore

considered that there are no matters under s106 of the Act which would cause the Council to refuse the subdivision consent.

WATER SUPPLY

6.8.8. The proposed lots do not contain any residential development, and it is considered the standard consent notice condition will apply for the lots to provide water supply for potable use and firefighting purposes at the time the site is developed with a residential dwelling.

STORMWATER DISPOSAL

6.8.9. Both sites when developed are more than sufficient in size to accommodate stormwater runoff. Each site is estimated to be developed with buildings covering 300m^2 and associated driveway areas of 200m^2 equating to 500m^2 in area. Councils standard consent notice conditions are offered requiring detention storage to be calculated at time of building consent in accordance with the findings Site Suitability Report (SSR) completed by Geologix.

6.8.10. It is therefore considered that the proposed allotments can manage stormwater runoff within the lot boundaries, without creating adverse effects on the surrounding environment or adjoining sites.

SANITARY SEWAGE DISPOSAL

6.8.11. Council's infrastructure is not available to this rural site.

6.8.12. Proposed Lot 1 will remain as the balance lot of over 4 hectares. There is ample area on site for any future wastewater disposal systems, which can be addressed at the time of built development on the site.

6.8.13. Lot 1 will be 6010m^2 in area. Geologix prepared a wastewater assessment as part of the SSR which concluded that a concept onsite wastewater system could be provided within the site. Geologix have recommended that *'each lot is subject to Building Consent specific review and design amendment according to final development plans by a suitably qualified professional.'*

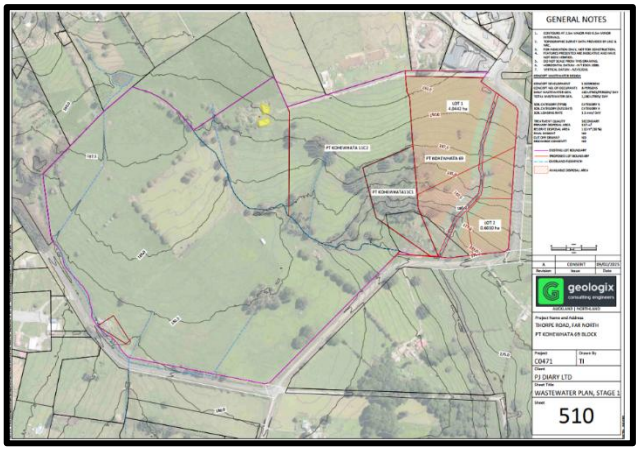


Figure 11: Snip of Wastewater Plan taken from the SSR prepared by Geologix.

6.8.14. It is therefore considered that the proposal will not create any adverse or cumulative effects in relation to wastewater disposal. It is anticipated that a consent notice condition will be imposed for the proposed lot which will require a site specific TP58 report to be submitted at the Building Consent Stage, for any building that requires effluent disposal, with reference back to the Geologix report.

ENERGY SUPPLY & TELECOMMUNICATIONS

6.8.15. The provision for power supply and telecommunications is not a requirement for the Rural Production zone.

6.8.16. The provision of energy supply and telecommunications is not anticipated to be a condition of consent for this proposal.

EASEMENTS FOR ANY PURPOSE

6.8.17. The original title for the subject site had a couple of easements over it which were created for the then Dairy Co. The Dairy Co owned the water supply site to the west (noted as Local Purpose Reserve Water Supply on the scheme plan) as well as land that is now Lindvart Park. Council now owns all of this land as well as the water supply.

6.8.18. The existing pipeline easement has been replicated, and the existing drainage easement has also been shown as a new easement to cover the correct position of the drain which dissects the subject site. These easements are in favour of the FNDC.

6.8.19. There is no need for any easements listed in (d) as these are not applicable to the proposal.

PRESERVATION AND ENHANCEMENT OF HERITAGE RESOURCES, VEGETATION, FAUNA AND LANDSCAPE, AND LAND SET ASIDE FOR CONSERVATION PURPOSES

6.8.20. The subject site does not contain any notable trees, historic site, building or objects. The site is not known to contain any sites of historical or cultural significance. The site is not shown as containing an Outstanding Natural Feature or Landscape Feature. There are no archaeological sites listed on the property.

6.8.21. The site is not shown to contain any areas of PNA or protected indigenous vegetation. There are some Totara trees scattered throughout Proposed Lot 1 (balance lot), however as the use of this site is considered to remain unchanged from what is currently in existence, it is considered that no adverse effects will be created. As stated within the report from Geologix, there are multiple building envelopes on site which are suitable for development.

6.8.22. The site is not located in an area which is shown to have kiwi present.

6.8.23. Heritage NZ Pouhere Taonga were contacted as part of the pre-application process, and we are yet to receive a response.

6.8.24. It is therefore considered that the proposed subdivision does not have any adverse effects on any indigenous vegetation or fauna habitats, heritage resources or landscapes.

ACCESS TO RESERVES AND WATERWAYS

6.8.25. The site does not have any access to public reserves, waterways or esplanade reserves. The site does adjoin a Local Purpose Reserve for Water Supply to the west, however access to this

site is via Thorpe Road, with access via the subject site not considered necessary, especially considering the purpose of the reserve.

6.8.26. It is therefore considered that the provision for public access is not applicable to this proposal. The provision for public works and utility services can be provided via access from Thorpe Road. Easements have been created to cover the existing pipe network through the site which are in favour of FNDC.

LAND USE COMPATIBILITY

6.8.27. The site is bounded by the Industrial zone to the north and west and as well as a Recreation site (Lindvart Park). To the East and south are sites zoned Rural Production, however the majority are zoned as Māori Purpose-Rural under the PDP. Further north are sites zoned Residential which reflects the township of Kaikohe.

6.8.28. The site is in a location where it is on the periphery of the Industrial zone of the Kaikohe township, which then directly adjoins the residential zone. Sites in the buffer zones of small townships are usually a transition zone between commercial/industrial/residential and larger productive lots.

6.8.29. The proposal will see one lot of 6010m^2 created and one lot of 4.0442 hectares. The intended land use activities for the balance lot will be the same as what is currently in existence, which will be rural-lifestyle use. The smaller lot will be for the purpose of rural-residential use, with the intention being for a residential dwelling and small-scale productive activities like a home garden etc. The proposed land use activities are not considered to create any incompatible land use activities, as it will not create any land use activities which are not already in existence in the surrounding environment.

6.8.30. It is noted that there are two industrial activities to the north of the site which are separated from the site by the Māori Roadway. The smaller rural residential allotment will be located over 200 metres from these industrial activities, such that there are no reverse sensitivity effects anticipated on the lot due to the large separation distance. The balance lot will be located on the opposite side of the Māori Roadway, nearest to the industrial activities. As mentioned, the use of this lot is anticipated to remain similar to what is currently in existence, with residential development being a possibility, such as it could be at present. Geologix have completed a Site Suitability Report which indicate that there are multiple suitable building sites on Proposed Lot 1. As the use of this lot will be remaining unchanged, it is considered that reverse sensitivity effects of the existing industrial activities on Proposed Lot 1 are considered to be less than minor. There is an existing mature hedge located along the boundary of the Waste Management Site which further mitigates effects to a less than minor degree by visually buffering any activities within the site as well as mitigating noise effects.

6.8.31. Overall, it is considered that the proposal does not result in any incompatible land use activities. The smaller rural-residential lot (Lot 2) will be located over 200 metres from the existing industrial activities, such that effects will be less than minor. Proposed Lot 1 will be of a size to enable the existing activities to continue, such that there will not be a change in land

use. Furthermore, a minimum 10 metre setback will be required from the site boundaries as a permitted activity, which further ensures that there is an adequate separation distance between the proposed lot and the existing industrial activities. The existing vegetation within the industrial site will further mitigate visual and sound effects.

6.8.32. It is therefore considered that the proposal is not objectionable with lots in the surrounding environment and does not set a precedence given it is an application enabled as a Restricted Discretionary activity within the plan.

6.8.33. The proposal is not considered to create incompatible land uses, as the existing use of the site can continue within Proposed Lot 1 and the proposed lot sizes are not objectionable to the surrounding environment.

PROXIMITY TO AIRPORTS

6.8.34. The subject site is not located in close proximity to any airport boundaries.

7. Policy Documents

7.1. In accordance with section 104(1)(b) of the Act the following documents are considered relevant to this application.

National Environmental Standards

National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health (NESCS)

7.2. In terms of the National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health (NES), it is considered that the proposal does not trigger the requirement for investigation under the NES as detailed within Section 4 of this report.

National Environmental Standard for Freshwater

7.3. The proposed subdivision and its associated physical works sit outside of the 100m setback from wetlands.

Other National Environmental Standards

7.4. No other National Environmental Standards are considered applicable to this development.

National Policy Statements

7.5. There are currently 8 National Policy Statements in place. These are as follows:

- National Policy Statement on Urban Development.
- National Policy Statement for Freshwater Management.
- National Policy Statement for Renewable Electricity Generation.
- National Policy Statement on Electricity Transmission.
- New Zealand Coastal Policy Statement.
- National Policy Statement for Highly Productive Land
- National Policy Statement for Indigenous Biodiversity.

- National Policy Statement for Greenhouse Gas Emissions from Industrial Process Heat 2023

7.6. The only applicable NPS documents specific to this proposal are the NPS-HPL and NPS-FM which will be assessed below.

National Policy Statement for Highly Productive Land 2022

7.7. As per the Land Guide to Implementation for the National Policy Statement for Highly Productive Land (NPS-HPL), consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for.

7.8. As has been discussed within this report, no reverse sensitivity or incompatible land uses are anticipated. The proposal will result in allotments which can accommodate a residential dwelling as well as productive activities within each lot. This is consistent with lots in the surrounding environment and the Rural Production zone in general. The lots are also capable of managing wastewater and stormwater within each of the lot boundaries such that no downstream effects are anticipated. The proposal is not considered to create any reverse sensitivity effects as detailed within this report.

7.9. As such, it is considered that the proposal will not create any reverse sensitivity effects or incompatible land uses and is consistent with the productive intent for the zone

National Policy Statement for Freshwater Management

7.10. The proposal involves activities that will be setback more than 100m from a wetland area. While future activities may be located within the 100m setback area, development on the site can be designed such that buildings and impermeable surfaces do not impact upon the wetland environment.

Regional Policy Statement

7.11. The role of the Regional Policy Statement is to promote sustainable management of Northland's natural and physical resources by providing an overview of the regions resource management issues and setting out policies and methods to achieve integrated management of Northland's natural and physical resources.

7.12. An assessment of this subdivision in terms of relevant objectives and policy documents has been undertaken below:

Objective 3.2 Region-wide water quality
Improve the overall quality of Northland's fresh and coastal water with a particular focus on:
(a) Reducing the overall Trophic Level Index status of the region's lakes;
(b) Increasing the overall Macroinvertebrate Community Index status of the region's rivers and streams;

(c) Reducing sedimentation rates in the region's estuaries and harbours;
(d) Improving microbiological water quality at popular contact recreation sites, recreational and cultural shellfish gathering sites, and commercial shellfish growing areas to minimise risk to human health; and
(e) Protecting the quality of registered drinking water supplies and the potable quality of other drinking water sources.

Policy 4.2.1 Improving overall water quality
Improve the overall quality of Northland's water resources by:
(a) Establishing freshwater objectives and setting region-wide water quality limits in regional plans that give effect to Objective 3.2 of this regional policy statement.
(b) Reducing loads of sediment, nutrients, and faecal matter to water from the use and development of land and from poorly treated and untreated discharges of wastewater; and
(c) Promoting and supporting the active management, enhancement and creation of vegetated riparian margins and wetlands.

7.12.1. The proposal is not considered to adversely affect any fresh and coastal waters as the subject site is not located near any rivers or coastal waters. The proposal is not considered to have any effects on freshwater areas as the proposal is of low density and will create one additional rural-residential allotment which does not contain nor is in close proximity to any freshwater areas. The balance lot can continue with the existing activities such that there will be no change in use as part of the proposal. Wastewater will be managed on site at the time of built development within the lots, as detailed in the Site Suitability Report from Geologix. The requirement for a site-specific wastewater report at the time of built development on each of the lots is anticipated to be a consent notice condition on the title. The site does not contain any riparian margins or wetlands.

3.5 Enabling Economic Wellbeing
Northland's natural and physical resources are sustainably managed in a way that is attractive for business and investment that will improve the economic wellbeing of Northland and its communities.

7.12.2. The natural and physical resources on the site will be sustainably managed and the allotments will provide for the economic wellbeing of Northland and its communities. Lot 1 will be kept to a minimum lot size, whilst complying with the RDA requirements for the zone, to ensure that the balance lot is kept to a sufficient size to enable rural productive activities, and essentially not changing the use of the site. The economic wellbeing will be enhanced by engaging professionals to carry out the work such as surveying to complete the subdivision.

3.6 Economic activities – reverse sensitivity and sterilisation
The viability of land and activities important for Northland's economy is protected from the negative impacts of new subdivision, use and development, with particular emphasis on either:
(a) Reverse sensitivity for existing:
(i) Primary production activities;
(ii) Industrial and commercial activities;
(iii) Mining*; *Includes aggregates and other minerals. or

(iv) Existing and planned regionally significant infrastructure; or
(b) Sterilisation of:
(i) Land with regionally significant mineral resources; or
(ii) Land which is likely to be used for regionally significant infrastructure

7.12.3. The proposal is not considered to create any reverse sensitivity effects on the industries listed. The proposal will see one rural residential allotment created in the south-eastern corner of the site, which is bounded by Thorpe Road on two sides and the balance lot of the proposed subdivision on the other two sides. The proposed lot sizes are not out of character within the area with many rural residential lots in close proximity due to the location of the site being on the peripheral of the Kaikohe township. The proposal will not inhibit the existing primary production activities in the area as the proposal is not objectionable to the surrounding environment. In regards to reverse sensitivity effects on Industrial and Commercial Activities, this is also anticipated to be less than minor. The site is split zoned industrial and rural production. This is however considered to be a mapping error, with the industrial zoning being removed from the site under the PDP. There are industrial activities to the north of the site, as discussed earlier in this report. The proposed smaller rural residential lot will be located over 200 metres from these activities, with the balance lot also being separated from these activities by an existing roadway. The balance lot has been kept to a maximum size to ensure that the existing activities on the site can remain. Therefore, as the use of the balance lot will remain as is, the proposal is not considered to create any reverse sensitivity effects on existing activities, as the use of the site will remain unchanged.

7.12.4. The site is not located in close proximity to mining activities nor any existing or planned regionally significant infrastructure.

7.12.5. The proposal does not result in the sterilisation of land with regionally significant mineral resources nor land which is likely to be used for regionally significant infrastructure.

3.15 Active Management
Maintain and / or improve;
(a) The natural character of the coastal environment and fresh water bodies and their margins;
(b) Outstanding natural features and outstanding natural landscapes;
(c) Historic heritage;
(d) Areas of significant indigenous vegetation and significant habitats of indigenous fauna (including those within estuaries and harbours);
(e) Public access to the coast; and
(f) Fresh and coastal water quality by supporting, enabling and positively recognising active management arising from the efforts of landowners, individuals, iwi, hapū and community groups.

7.12.6. The subject site is not located within the coastal environment nor any freshwater bodies. The site is not shown to contain any outstanding natural features or landscapes nor any areas of historic heritage. The site also does not contain any significant indigenous vegetation or habitats of indigenous fauna.

5.1.1 Planned and coordinated development
Subdivision, use and development should be located, designed and built in a planned and co-ordinated manner which:
(a) Is guided by the 'Regional Form and Development Guidelines' in Appendix 2;
(b) Is guided by the 'Regional Urban Design Guidelines' in Appendix 2 when it is urban in nature;
(c) Recognises and addresses potential cumulative effects of subdivision, use, and development, and is based on sufficient information to allow assessment of the potential long-term effects;
(d) Is integrated with the development, funding, implementation, and operation of transport, energy, water, waste, and other infrastructure;
(e) Should not result in incompatible land uses in close proximity and avoids the potential for reverse sensitivity;
(f) Ensures that plan changes and subdivision to / in a primary production zone, do not materially reduce the potential for soil-based primary production on land with highly versatile soils10, or if they do, the net public benefit exceeds the reduced potential for soil-based primary production activities; and
(g) Maintains or enhances the sense of place and character of the surrounding environment except where changes are anticipated by approved regional or district council growth strategies and / or district or regional plan provisions.
(h) Is or will be serviced by necessary infrastructure.

7.12.7. Throughout this application we have covered the issues listed within Part A Regional form and development guidelines. Part B Urban Design guidelines and Part C Māori Urban Design principles are not applicable to this rural subdivision. The cumulative effects of the proposal are considered to be less than minor. All effects can be managed within the site boundaries, with a Site Suitability Report prepared which is in support of the proposal. The subdivision complies with the RDA provisions for the zone and as such is considered to be anticipated by the plan. Infrastructure will be provided for on site. No incompatible land use activities or reverse sensitivity effects are anticipated as the proposal is compliant with the RDA provisions for the zone as well as being compatible with other land use activities in the area and lot sizes. The site does contain highly versatile soils however, as per the Land Guide to Implementation for the National Policy Statement for Highly Productive Land (NPS-HPL), consideration on the productive capacity of the land is not provided for within the discretion for activities with Controlled or Restricted Discretionary Activity statuses. However, consideration of the effect of the activity on existing land use activities must be provided for. Consideration of reverse sensitivity effects has been undertaken in detail within this report and it has been determined that the proposal does not result in reverse sensitivity effects.

7.12.8. The sense of place and character of the surrounding environment is considered to be maintained. The subject site is located on the periphery of the Kaikohe township, which is usually a transition area between town and country. The proposal will see one additional allotment created, which is considered to be of low density in terms of development and consistent with development on the outskirts of smaller townships. The proposal has ensured that the area of the balance lot is maximised, whilst ensuring the RDA requirements for the

zone are met. This ensures that the existing activities within the site can continue within the balance lot, mitigating any reverse sensitivity effects. As such, it is considered that the proposal will maintain the sense of place and character of the surrounding environment.

Summary

7.13. It can be concluded from the above that the proposal is generally compatible with the intent of the Regional Policy Statement. The proposal is not considered to create any reverse sensitivity effects.

Far North Operative District Plan

Relevant objectives and policies

7.14. As mentioned, the site is currently split zoned Rural Production and Industrial. It is considered that this is a mapping error, which has been corrected under the PDP mapping, which removes the Industrial zone from the site. As the Rural Production zone is the more restrictive zone, the site has been assessed against the criteria relevant to the Rural Production zone, including subdivision, zone and district wide rules. Therefore, the below assessment will cover the Rural Environment and Rural Production objectives and policies only, with no assessment of the Industrial Zone objectives and policies being made as this is considered irrelevant to the proposal.

7.15. The relevant objectives and policies of the Plan are those related to the Subdivision Chapter, the Rural Environment and the Rural Production Zone. The proposal is considered to create no more than minor adverse effects on the rural environment. The proposal is considered to be consistent with the rural character of the surrounding area and is considered to have negligible effects on the rural amenity value of the area, as the lot sizes in the locality already reflect the size of the lots proposed. The proposal is considered to be consistent with the objectives and policies of the Plan.

Assessment of the objectives and policies within the Subdivision Chapter

7.4 The following assessment is based upon the objectives and policies contained within section 13.3 and 13.4 of the District Plan.

Objectives

13.3.1 To provide for the subdivision of land in such a way as will be consistent with the purpose of the various zones in the Plan, and will promote the sustainable management of the natural and physical resources of the District, including airports and roads and the social, economic and cultural well being of people and communities.

13.3.2 To ensure that subdivision of land is appropriate and is carried out in a manner that does not compromise the life-supporting capacity of air, water, soil or ecosystems, and that any actual or potential adverse effects on the environment which result directly from subdivision, including reverse sensitivity effects and the creation or acceleration of natural hazards, are avoided, remedied or mitigated.

13.3.3 To ensure that the subdivision of land does not jeopardise the protection of outstanding landscapes or natural features in the coastal environment.

13.3.4 To ensure that subdivision does not adversely affect scheduled heritage resources through alienation of the resource from its immediate setting/context.

13.3.5 To ensure that all new subdivisions provide a reticulated water supply and/or on-site water storage and include storm water management sufficient to meet the needs of the activities that will establish all year round.

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

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

13.3.8 To ensure that all new subdivision provides an electricity supply sufficient to meet the needs of the activities that will establish on the new lots created.

13.3.9 To ensure, to the greatest extent possible, that all new subdivision supports energy efficient design through appropriate site layout and orientation in order to maximise the ability to provide light, heating, ventilation and cooling through passive design strategies for any buildings developed on the site(s).

13.3.10 To ensure that the design of all new subdivision promotes efficient provision of infrastructure, including access to alternative transport options, communications and local services.

13.3.11 To ensure that the operation, maintenance, development and upgrading of the existing National Grid is not compromised by incompatible subdivision and land use activities.

7.16. The subdivision will be consistent with the purpose of the Rural Production zone as the allotments can comply with the allotment sizes for Restricted Discretionary Activity. The proposed new allotments will enable *small scale farming and activities ancillary to rural production whilst maintaining and enhancing amenity values associated with the rural environment, and at minimising the likelihood and risk of incompatible land uses establishing in proximity to each other.* The subdivision is not considered to compromise the life supporting capacity of air, water, soil or ecosystems as the proposal will see only one additional allotment created where all effects can be managed within the site boundaries. No reverse sensitivity effects are anticipated as has been discussed in detail within this report. The site is not shown to be susceptible to natural hazards and the proposal is not considered to accelerate natural hazards. The site does not contain any outstanding landscapes or features and is not located within the coastal environment. The site is not shown to contain any heritage resources. On site water storage will be provided for at the time of built development on the lots. Stormwater will also be managed at the time of built development on the lots. The subject site is located on the peripheral of the Kaikohe township, and the proposal will only create one additional allotment which can comply with the RDA provisions for the zone. The proposal will maximise the area of the balance lot to ensure that the existing use of the site can remain, mitigating

reverse sensitivity effects to a less than minor degree. This is considered to result in a superior outcome compared to other forms of subdivision which could be undertaken on the site. The proposal is not considered to affect the relationship between Māori and their ancestral lands, water, sites, waahi tapu and other taonga. Electricity supply is not a requirement of the Rural Production zone. Energy efficient layout of any new building will be at the discretion of the new owners. Infrastructure will be provided for onsite. The National Grid will not be compromised.

Policies

13.4.1That the sizes, dimensions and distribution of allotments created through the subdivision process be determined with regard to the potential effects including cumulative effects, of the use of those allotments on:

- *natural character, particularly of the coastal environment;*
- *ecological values;*
- *landscape values;*
- *amenity values;*
- *cultural values;*
- *heritage values; and*
- *existing land uses.*

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

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

13.4.4 That in any subdivision where provision is made for connection to utility services, the potential adverse visual impacts of these services are avoided.

13.4.5 That access to, and servicing of, the new allotments be provided for in such a way as will avoid, remedy or mitigate any adverse effects on neighbouring property, public roads (including State Highways), and the natural and physical resources of the site caused by silt runoff, traffic, excavation and filling and removal of vegetation.

13.4.6 That any subdivision proposal provides for the protection, restoration and enhancement of heritage resources, areas of significant indigenous vegetation and significant habitats of indigenous fauna, threatened species, the natural character of the coastal environment and riparian margins, and outstanding landscapes and natural features where appropriate.

13.4.7 That the need for a financial contribution be considered only where the subdivision would:

(a) result in increased demands on car parking associated with non-residential activities; or

(b) result in increased demand for esplanade areas; or

(c) involve adverse effects on riparian areas; or

(d) depend on the assimilative capacity of the environment external to the site.

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

13.4.9 That bonus development donor and recipient areas be provided for so as to minimise the adverse effects of subdivision on Outstanding Landscapes and areas of significant indigenous flora and significant habitats of fauna.

13.4.10 The Council will recognise that subdivision within the Conservation Zone that results in a net conservation gain is generally appropriate.

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

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

13.4.13 Subdivision, use and development shall preserve and where possible enhance, restore and rehabilitate the character of the applicable zone in regards to s6 matters. In addition subdivision, use and development shall avoid adverse effects as far as practicable by using techniques including:

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

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

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

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

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

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

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

13.4.14 That the objectives and policies of the applicable environment and zone and relevant parts of Part 3 of the Plan will be taken into account when considering the intensity, design and layout of any subdivision.

13.4.15 That conditions be imposed upon the design of subdivision of land to require that the layout and orientation of all new lots and building platforms created include, as appropriate, provisions for achieving the following:

(a) development of energy efficient buildings and structures;

(b) reduced travel distances and private car usage;

(c) encouragement of pedestrian and cycle use;

(d) access to alternative transport facilities;

(e) domestic or community renewable electricity generation and renewable energy use.

13.4.16 When considering proposals for subdivision and development within an existing National Grid Corridor the following will be taken into account:

(a) the extent to which the proposal may restrict or inhibit the operation, access, maintenance, upgrading of transmission lines or support structures;

(b) any potential cumulative effects that may restrict the operation, access, maintenance, upgrade of transmission lines or support structures; and

(c) whether the proposal involves the establishment or intensification of a sensitive activity in the vicinity of an existing National Grid line.

7.17. The proposed subdivision will not have any adverse impacts on the character, ecological, landscape, amenity, cultural, heritage or existing land uses. Vehicular access has been assessed within this report which is considered the most suitable and practical for the proposed allotments. The site is not shown to be susceptible to natural hazards. Connection to utility services is not a requirement of the Rural Production zone. No adverse effects are anticipated on neighbouring properties, public roads and the natural and physical resources of the site. No vegetation removal is proposed as part of this application. The site is not known to contain any heritage resources or significant indigenous vegetation or habitats of fauna. The site is not located within the coastal environment, nor does it contain any riparian margins or areas of outstanding landscapes and features. Financial contribution is not considered necessary in this case. Water storage will be provided for onsite at the time of built development on the lots. Bonus development and recipient areas are not considered relevant. The site is not located within the conservation area. The proposal is not considered to affect the relationship of Māori and their culture and traditions. The proposal is not considered to be an intensive subdivision, and a management plan is not considered relevant.

7.18. In regards to Policy 13.4.13, the proposed rural-residential lot is to be located in the south-eastern corner of the site, furthest from the existing industrial activities on the lots to the north as well as being kept to a minimum lot size to maximise the size of the balance lot, whilst conforming to the RDA requirements for the zone. It is considered that this location for the rural residential allotment is the most suitable and will have the least effects on the surrounding environment. The site is not located near the coastal marine area. The proposal is not considered to have effects on the relationship of Māori and their culture, traditions or taonga. No planting of indigenous vegetation is proposed nor considered necessary as the site does not link existing habitats of indigenous vegetation or fauna. The site is not known to contain any areas of historic heritage. The site is not shown to be susceptible to natural hazards nor will it accelerate or worsen natural hazards.

7.19. The objectives and policies of the Rural Production Environment will be undertaken below. Due to the proposal meeting the RDA provisions for the zone, it is considered consistent with the intent of the zone. Built development on the site will be at the discretion of future owners. The proposal is not located within the National Grid.

Assessment of the objectives and policies within the Rural Environment.

7.20. The following assessment is based upon the objectives and policies contained within sections 8.3 and 8.4.

Objectives

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

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

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

8.3.4 To protect areas of significant indigenous vegetation and significant habitats of indigenous fauna

8.3.5 To protect outstanding natural features and landscapes.

8.3.6 To avoid actual and potential conflicts between land use activities in the rural environment.

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

8.3.8 To facilitate the sustainable management of natural and physical resources in an integrated way to achieve superior outcomes to more traditional forms of subdivision, use and development through management plans and integrated development.

8.3.9 To enable rural production activities to be undertaken in the rural environment.

8.3.10 To enable the activities compatible with the amenity values of rural areas and rural production activities to establish in the rural environment.

7.20.1. The proposal will promote the sustainable management of natural and physical resources by providing a balance lot which can continue the existing activities which are currently undertaken on the site. The proposal is of low density, seeing only one additional allotment being created which is not considered to impact the existing use of the site. The life supporting capacity of soils is not considered to be compromised as has been discussed within this report. No adverse or cumulative effects are anticipated. The site does not contain any areas of significant vegetation nor any areas of outstanding natural features or landscapes. Conflicts between land use activities are not anticipated as the surrounding environment already contains allotments which are utilised for rural-residential activities. The balance lot will surround the proposed rural-residential allotment such that it will act as a buffer between the proposed smaller lot and adjoining larger lots. As the balance lot is of a size where the existing activities can continue, this will further ensure that no conflicting land use activities are created. The proposed smaller rural residential lot is located a sufficient distance from any other activities such that no reverse sensitivity effects are anticipated. The maintenance and enhancement of the amenity values of the zone will be promoted as the proposal can comply with the RDA provisions for the zone and is therefore considered to be anticipated within the zone. The balance lot is of a size where the existing activities can continue. Management plans are not considered applicable to this low-density development. Rural production activities can continue within the site and surrounding environment. Amenity values will be maintained.

Policies

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

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

8.4.3 That any new infrastructure for development in rural areas be designed and operated in a way that safeguards the life supporting capacity of air, water, soil and ecosystems while protecting areas of significant indigenous vegetation and significant habitats of indigenous fauna, outstanding natural features, and landscapes.

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

8.4.5 That plan provisions encourage the avoidance of adverse effects from incompatible land uses, particularly new developments adversely affecting existing land-uses (including by constraining the existing land-uses on account of sensitivity by the new use to adverse affects from the existing use – i.e. reverse sensitivity).

8.4.6 That areas of significant indigenous vegetation and significant habitats of indigenous fauna habitat be protected as an integral part of managing the use, development and protection of the natural and physical resources of the rural environment.

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

8.4.8 That, when considering subdivision, use and development in the rural environment, the Council will have particular regard to ensuring that its intensity, scale and type is controlled to ensure that adverse effects on habitats (including freshwater habitats), outstanding natural features and landscapes on the amenity value of the rural environment, and where appropriate on natural character of the coastal environment, are avoided, remedied or mitigated. Consideration will further be given to the functional need for the activity to be within rural environment and the potential cumulative effects of non-farming activities.

7.20.2. The proposal promotes the sustainable management of natural and physical resources by utilizing the land in a more efficient way. Furthermore, the proposal will see the balance lot maintained so that the existing activities can occur on the site. The proposal is not considered to create any adverse effects. Infrastructure will be provided for on site at the time of built development within the lots as per the recommendations contained within the Site Suitability Report. The site does not contain any outstanding landscapes or features. Amenity values will be maintained. No incompatible land uses are anticipated nor any reverse sensitivity effects, as has been discussed in detail within this report. The site is not known to contain any areas of significant indigenous vegetation or fauna. The proposal will create one additional allotment which is considered to be easily absorbed into the existing roading network. No other demands on infrastructure will be created. The intensity, scale and type of the proposal is considered to be consistent with other lots in the area and no adverse effects are

anticipated. The proposal is considered to have a functional need to be located in the environment as the site is located on the periphery of the Kaikohe township so will enable a rural residential lot which is in close proximity to places of employment, schools and social activities. No cumulative effects are anticipated with the introduction of the proposed smaller rural-residential lot as the existing activities on the site can continue within the balance lot as well as the rural residential allotment being located a sufficient distance from other activities that no effects will be created on the operation of such activities.

Assessment of the objectives and policies within the Rural Production Zone

7.21. The following assessment is based upon the objectives and policies contained within sections 8.6.3 and 8.6.4

Objectives

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

8.6.3.2 To enable the efficient use and development of the Rural Production Zone in a way that enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety.

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

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

8.6.3.5 To protect and enhance the special amenity values of the frontage to Kerikeri Road between its intersection with SH10 and the urban edge of Kerikeri.

8.6.3.6 To avoid, remedy or mitigate the actual and potential conflicts between new land use activities and existing lawfully established activities (reverse sensitivity) within the Rural Production Zone and on land use activities in neighbouring zones.

8.6.3.7 To avoid remedy or mitigate the adverse effects of incompatible use or development on natural and physical resources.

8.6.3.8 To enable the efficient establishment and operation of activities and services that have a functional need to be located in rural environments.

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

7.21.1. The proposal will promote the sustainable management of natural and physical resources by creating a balance lot which can continue on with the existing productive activities within the site. This will also ensure that the amenity values of the zone and surrounding environment are maintained. Social, economic and cultural well-being will be provided for by providing one additional allotment which can be utilised for rural-residential living on the outskirts of the Kaikohe township. The introduction of one additional allotment is considered to be of low density and as such will be easily absorbed into the existing environment. Significant natural values of the zone will be protected as the balance lot is of a size that the existing productive activities can continue. The removal of a 6000m^2 area is not considered to impact the ability of the site to provide productive activities and due to the location of the site being on the buffer of the Kaikohe township, lots of the proposed size are not considered uncommon.

7.21.2. The site is not located along Kerikeri Road. Reverse sensitivity effects are not anticipated, due to the balance lot being of a size that can cater for the existing productive activities. The proposed rural-residential allotment is located over 200 metres from existing Industrial activities, which is considered adequate distance to absorb any noise or odours. The addition of one smaller allotment in the Rural Production zone is not considered out of the ordinary in the surrounding environment or within the zone. The subdivision can be provided for as a Restricted Discretionary Activity and is considered to therefore be anticipated by the plan. Incompatible uses are not anticipated. Lot 1 will be of a size where the existing productive activities can continue. Lot 2 is intended to be utilised for rural-residential use which is not uncommon in the surrounding environment, considering the close location to the Kaikohe township, nor is development of this size and density uncommon within the Rural Production zone itself. The proposal is considered to have a functional need within the rural environment as it will provide additional housing whilst being in close proximity to the Kaikohe township which allows less travel distance for schools, places of employment and social events/activities. The balance lot will provide a buffer around the rural-residential lot, whilst enabling the existing productive activities to continue. The proposal provides a transition zone between the adjoining dense industrial and residential zones and the larger rural productive lots. The proposal will not alter the ability of rural production activities to be undertaken in the zone, as the balance lot is of a sufficient size to enable the continuation of the existing activities on the site.

Policies

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

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

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

8.6.4.4 That the type, scale and intensity of development allowed shall have regard to the maintenance and enhancement of the amenity values of the Rural Production Zone to a level that is consistent with the productive intent of the zone.

8.6.4.5 That the efficient use and development of physical and natural resources be taken into account in the implementation of the Plan.

8.6.4.6 That the built form of development allowed on sites with frontage to Kerikeri Road between its intersection with SH10 and Cannon Drive be maintained as small in scale, set back from the road, relatively inconspicuous and in harmony with landscape plantings and shelter belts.

8.6.4.7 That although a wide range of activities that promote rural productivity are appropriate in the Rural Production Zone, an underlying goal is to avoid the actual and potential adverse effects of conflicting land use activities.

8.6.4.8 That activities whose adverse effects, including reverse sensitivity effects cannot be avoided remedied or mitigated are given separation from other activities
8.6.4.9 That activities be discouraged from locating where they are sensitive to the effects of or may compromise the continued operation of lawfully established existing activities in the Rural Production zone and in neighbouring zones.

7.21.3. The proposal is not considered to create any adverse effects on the environment nor any reverse sensitivity effects, as has been discussed throughout this report. There are no offsite effects anticipated. The proposed lot sizes are able to accommodate a buildable platform as well as area for onsite services as determined within the Site Suitability report from Geologix. No conflicting land uses are anticipated. Lot 1 is of a size that can cater for the existing productive activities on the site. Lot 2 will be just over 6000m^2 and is intended to be utilised for rural-residential use which is not uncommon in the surrounding environment nor the Rural Production zone in general. The proposal will create only one additional allotment which is considered to be of low density and will be easily absorbed into the surrounding environment. The proposal is not considered to have adverse effects on natural and physical resources.

7.21.4. The proposal will see one additional allotment created as a Restricted Discretionary Activity. It is considered that the proposed scale, type and intensity of the development is consistent with the surrounding environment and Rural Production zone in general.

7.21.5. The site does not have frontage to Kerikeri Road.

7.21.6. As discussed, no conflicting land uses are anticipated. As Lot 1 will be of a size to continue the existing productive activities on the site, no adverse or reverse sensitivity effects are anticipated as the use of the site will remain unchanged. Lot 2 will be for rural-residential use, however as it will be located over 200 metres from the existing industrial activities to the north and will be surrounded by Proposed Lot 1, the proposed separation distance is considered adequate to mitigate any reverse sensitivity effects to a less than minor degree. Proposed Lot 2 will be vacant, and any future buyers will be aware that the adjoining Lot 1 is of a size where productive activities can occur as with other lots in the wider environment. As such, it is considered that the separation distance between Lot 2 and the existing industrial activities within lots to the north, provides adequate mitigation to ensure reverse sensitivity effects are less than minor.

Proposed District Plan

7.22. Under the Proposed District Plan, the site is zoned Rural Production, and therefore an assessment of the objectives and policies within this chapter have been included below. The proposal is considered to create no more than minor adverse effects on the rural environment and is consistent with the rural intent of the surrounding environment and the zone. The proposal is considered to be consistent with the objectives and policies of the Proposed District Plan.

Rural Production Zone

7.23. An assessment on the relevant objectives and policies within the Rural Production Zone has been addressed below.

Objectives

RPROZ-O1 - The Rural Production zone is managed to ensure its availability for primary production activities and its long-term protection for current and future generations.

RPROZ-O2 - The Rural Production zone is used for primary production activities, ancillary activities that support primary production and other compatible activities that have a functional need to be in a rural environment.

RPROZ-O3 - Land use and subdivision in the Rural Production zone:

(a)protects highly productive land from sterilisation and enables it to be used for more productive forms of primary production;
(b)protects primary production activities from reverse sensitivity effects that may constrain their effective and efficient operation;
(c)does not compromise the use of land for farming activities, particularly on highly productive land;
(d)does not exacerbate any natural hazards; and
(e)is able to be serviced by on-site infrastructure.

RPROZ-O4 - The rural character and amenity associated with a rural working environment is maintained.

7.23.1. The proposal will create one additional allotment, with Proposed Lot 1 being of a size that can cater for primary production activities. The proposal therefore ensures the long term protection for current and future generations. The proposed lots are considered to have a functional need to be located in the rural environment as the proposal will ensure that the balance lot remains of a size where productive activities occur, whilst enabling an additional lot which can be utilised for rural-residential use. The site is quite unique where it is zoned as Rural Production however is located in a transition zone, on the buffer of the Kaikohe township, which usually is defined as rural lifestyle, to enable smaller allotments in closer proximity to small townships to enable ease of access and living for schools, places of employment and social events/activities. As mentioned, the proposal will still enable primary production activities to occur within Lot 1.

7.23.2. The proposal is considered to protect the land from sterilisation as it is of low density and will enable a larger balance lot to continue the existing productive activities. No reverse sensitivity effects are anticipated. Natural hazards will not be exacerbated. As per the Site Suitability Report, the allotments are capable of containing future onsite infrastructure.

7.23.3. As has been discussed throughout this report, the character and amenity of the rural environment is maintained.

Policies

RPROZ-P1 - Enable primary production activities, provided they internalise adverse effects onsite where practicable, while recognising that typical adverse effects associated with primary production should be anticipated and accepted within the Rural Production zone.

RPROZ-P2 - Ensure the Rural Production zone provides for activities that require a rural location by:

(a)enabling primary production activities as the predominant land use;

(b)enabling a range of compatible activities that support primary production activities, including ancillary activities, rural produce manufacturing, rural produce retail, visitor accommodation and home businesses.

RPROZ-P3 - Manage the establishment, design and location of new sensitive activities and other non-productive activities in the Rural Production Zone to avoid where possible, or otherwise mitigate, reverse sensitivity effects on primary production activities.

RPROZ-P4 - Land use and subdivision activities are undertaken in a manner that maintains or enhances the rural character and amenity of the Rural Production zone, which includes:

(a)a predominance of primary production activities;

(b)low density development with generally low site coverage of buildings or structures;

(c)typical adverse effects such as odour, noise and dust associated with a rural working environment; and

(d)a diverse range of rural environments, rural character and amenity values throughout the District.

RPROZ-P5 - Avoid land use that:

(a)is incompatible with the purpose, character and amenity of the Rural Production zone;

(b)does not have a functional need to locate in the Rural Production zone and is more appropriately located in another zone;

(c)would result in the loss of productive capacity of highly productive land;

(d)would exacerbate natural hazards; and

(e)cannot provide appropriate on-site infrastructure.

RPROZ-P6 - Avoid subdivision that:

(a)results in the loss of highly productive land for use by farming activities.

(b)fragments land into parcel sizes that are no longer able to support farming activities, taking into account:

1. *the type of farming proposed; and*
2. *whether smaller land parcels can support more productive forms of farming due to the presence of highly productive land.*

(c)provides for rural lifestyle living unless there is an environmental benefit.

RPROZ-P7 - Manage land use and subdivision to address the effects of the activity requiring resource consent, including (but not limited to) consideration of the following matters where relevant to the application:

(a)whether the proposal will increase production potential in the zone;
(b)whether the activity relies on the productive nature of the soil;
(c)consistency with the scale and character of the rural environment;
(d)location, scale and design of buildings or structures;
(e)for subdivision or non-primary production activities:
i. scale and compatibility with rural activities;
ii. potential reverse sensitivity effects on primary production activities and existing infrastructure;
iii. the potential for loss of highly productive land, land sterilisation or fragmentation
(f)at zone interfaces:
i. any setbacks, fencing, screening or landscaping required to address potential conflicts;
ii. the extent to which adverse effects on adjoining or surrounding sites are mitigated and internalised within the site as far as practicable;
(g)the capacity of the site to cater for on-site infrastructure associated with the proposed activity, including whether the site has access to a water source such as an irrigation network supply, dam or aquifer;
(h)the adequacy of roading infrastructure to service the proposed activity;
(i)Any adverse effects on historic heritage and cultural values, natural features and landscapes or indigenous biodiversity;
(j)Any historical, spiritual, or cultural association held by tangata whenua, with regard to the matters set out in Policy TW-P6.

7.23.4. The proposal is considered to enable productive activities within Lot 1. No adverse effects are anticipated. Proposed Lot 2 will be for rural-residential use, which is not uncommon in the surrounding environment. As mentioned, the site is located on the periphery of the Kaikohe township and is more of a transition zone between town and country. The rural character is considered to be maintained as the proposal is of low density. Proposed Lot 1 can continue with the existing productive activities which consist of grazing of livestock.

7.23.5. The proposal is considered to enable land use activities which are compatible with the existing environment. Productive capacity of the site is not considered applicable to this Restricted Discretionary subdivision as it is not a discretion provided for within the plan. Natural hazards will not be exacerbated, and each site can cater for onsite infrastructure.

7.23.6. As mentioned, the productive capacity of the lots is not a consideration of this Restricted Discretionary subdivision as it is not a discretion of the plan. Therefore, assessment of the loss of highly productive land within RPROZ-P6 is not considered applicable.

7.23.7. No adverse effects on historic heritage, cultural values, natural features, landscapes or indigenous biodiversity are anticipated.

Summary

7.24. The above assessment demonstrates that the proposal will be consistent with the relevant objectives and policies and assessment criteria of the relevant statutory documents.

8. Section 125 – Lapsing of consent

8.1. The Act prescribes a standard consent period of five years in which all works must be undertaken, but this may be amended as determined by the Council. It is requested that the standard five-year provision be applied in this case.

9. Notification Assessment – Sections 95A to 95G of The Act

Public Notification Assessment

9.1. Section 95A requires a council to follow specific steps to determine whether to publicly notify an application. The following is an assessment of the application against these steps:

Step 1 Mandatory public notification in certain circumstances
(2) Determine whether the application meets any of the criteria set out in subsection (3) and,—
(a)if the answer is yes, publicly notify the application; and
(b) if the answer is no, go to step 2.
(3)The criteria for step 1 are as follows:
(a)the applicant has requested that the application be publicly notified:
(b)public notification is required under section 95C:
(c)the application is made jointly with an application to exchange recreation reserve land under section 15AA of the Reserves Act 1977.

9.1.1. It is not requested the application be publicly notified and the application is not made jointly with an application to exchange reserve land. Therefore Step 1 does not apply and Step 2 must be considered.

Step 2: Public Notification precluded in certain circumstances.
(4) Determine whether the application meets either of the criteria set out in subsection (5) and,—
(a) if the answer is yes, go to step 4 (step 3 does not apply); and
(b)if the answer is no, go to step 3.
(5) The criteria for step 2 are as follows:
(a) the application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes public notification:
(b)the application is for a resource consent for 1 or more of the following, but no other, activities:
(i)a controlled activity:
(ii)[Repealed]
(iii) a restricted discretionary, discretionary, or non-complying activity, but only if the activity is a boundary activity.
(iv)[Repealed]
(6)[Repealed]

9.1.2. The application is for a Restricted Discretionary activity but not a boundary activity. No preclusions apply in this instance. Therefore, Step 3 must be assessed.

Step 3: If not precluded by Step 2, public notification required in certain circumstances
(7) Determine whether the application meets either of the criteria set out in subsection (8) and,—
(a)if the answer is yes, publicly notify the application; and
(b)if the answer is no, go to step 4.
(8)The criteria for step 3 are as follows:
(a)the application is for a resource consent for 1 or more activities, and any of those activities is subject to a rule or national environmental standard that requires public notification:
(b)the consent authority decides, in accordance with section 95D, that the activity will have or is likely to have adverse effects on the environment that are more than minor.

9.1.3. No applicable rules require public notification of the application. The proposal is not considered to have a more than minor effect on the environment as detailed in the sections above.

Step 4; Public notification in special circumstances
(9) Determine whether special circumstances exist in relation to the application that warrant the application being publicly notified and,—
(a) if the answer is yes, publicly notify the application; and
(b)if the answer is no, do not publicly notify the application, but determine whether to give limited notification of the application under section 95B.

9.1.4. There are no special circumstances that exist to justify public notification of the application because the proposal is for a subdivision within the rural environment where Proposed Lot 1 can retain productive activities which is considered as neither exceptional nor unusual. There are many allotments in the immediate vicinity which are of similar or smaller size to the proposed allotments and hence the proposal is not considered to be exceptional or unusual.

Public Notification Summary

9.1.5. From the assessment above it is considered that the application does not need to be publicly notified, but assessment of limited notification is required.

Limited Notification Assessment

9.2. If the application is not publicly notified, a consent authority must follow the steps of section 95B to determine whether to give limited notification of an application.

Step 1: Certain affected groups and affected persons must be notified.
(2) Determine whether there are any—
(a) affected protected customary rights groups; or
(b)affected customary marine title groups (in the case of an application for a resource consent for an accommodated activity).
(3) Determine—
(a)whether the proposed activity is on or adjacent to, or may affect, land that is the subject of a statutory acknowledgement made in accordance with an Act specified in Schedule 11; and
(b)whether the person to whom the statutory acknowledgement is made is an affected person under section 95E.

(4) Notify the application to each affected group identified under subsection (2) and each affected person identified under subsection (3).

9.2.1. There are no protected customary rights groups or customary marine title groups or statutory acknowledgement areas that are relevant to this application.

Step 2: Limited notification precluded in certain circumstances.
(5) Determine whether the application meets either of the criteria set out in subsection (6) and,—
(a)if the answer is yes, go to step 4 (step 3 does not apply); and
(b)if the answer is no, go to step 3.
(6) The criteria for step 2 are as follows:
(a)the application is for a resource consent for 1 or more activities, and each activity is subject to a rule or national environmental standard that precludes limited notification:
(b) the application is for a controlled activity (but no other activities) that requires a resource consent under a district plan (other than a subdivision of land).

9.2.2. There is no rule in the plan or national environmental standard that precludes notification. The application is not for a prescribed activity but is for a subdivision proposal. Therefore Step 2 does not apply and Step 3 must be considered.

Step 3: Certain other affected persons must be notified
(7) In the case of a boundary activity, determine in accordance with section 95E whether an owner of an allotment with an infringed boundary is an affected person.
(8) In the case of any other activity, determine whether a person is an affected person in accordance with section 95E.
(9) Notify each affected person identified under subsections (7) and (8) of the application.
The proposal is not for a boundary activity nor is it a prescribed activity.

9.2.3. The proposal is not for a boundary activity.

9.2.4. In deciding who is an affected person under section 95E, a council under section 95E(2):

(2) The consent authority, in assessing an activity's adverse effects on a person for the purpose of this section,—

(a) may disregard an adverse effect of the activity on the person if a rule or a national environmental standard permits an activity with that effect; and

(b) must, if the activity is a controlled activity or a restricted discretionary activity, disregard an adverse effect of the activity on the person if the effect does not relate to a matter for which a rule or a national environmental standard reserves control or restricts discretion; and

(c) must have regard to every relevant statutory acknowledgement made in accordance with an Act specified in Schedule 11.

9.2.5. A Council must not consider that a person is affected if they have given their written approval, or it is unreasonable in the circumstances to seek that person's approval.

9.2.6. With respect to section 95B(8) and section 95E, the permitted baseline was considered as part of the assessment of environmental effects undertaken in Section 6 of this report, which found that the potential adverse effects on the environment will be no more than minor. In

regard to effects on persons, the assessment in Sections 5, 6 & 7 are also relied on, and the following comments made:

- The size of the proposed allotments is consistent with the character of the allotments in the locality. Therefore, the proposed allotment sizes are not objectionable with the surrounding environment.
- Rural productive use of Lot 1 can be retained.
- The proposal is not considered to create any reverse sensitivity effects.
- The proposal will result in only one additional allotment which is considered to be a low-density development. The proposal has been assessed as a Restricted Discretionary Activity and is therefore considered to be anticipated by the plan.
- The development is not considered to be contrary to the objectives and policies under the Operative District Plan or Proposed District Plan.
- All other persons are sufficiently separated from the proposed development and works, such that there will be no effects on these people.

9.2.7. Therefore, no persons will be affected to a minor or more than minor degree.

9.2.8. Overall, the adverse effects on any persons are considered to be less than minor. Therefore Step 3 does not apply and Step 4 must be considered.

Step 4: Further notification in special circumstances

(10) whether special circumstances exist in relation to the application that warrant notification of the application to any other persons not already determined to be eligible for limited notification under this section (excluding persons assessed under section 95E as not being affected persons),

9.2.9. The proposal is to subdivide the site to create one additional allotment. No reverse sensitivity effects or incompatible land use activities are anticipated. It is considered that no special circumstances exist in relation to the application.

Limited Notification Assessment Summary

9.2.10. Overall, from the assessment undertaken Steps 1 to 4 do not apply and there are no affected persons.

Notification Assessment Conclusion

9.3. Pursuant to sections 95A to 95G it is recommended that the Council determine the application be non-notified for the above-mentioned reasons.

10. Part 2 Assessment

10.1. The application must be considered in relation to the purpose and principles of the Resource Management Act 1991 which are contained in Section 5 to 8 of the Act inclusive.

10.2. The proposal will meet Section 5 of the RMA as the proposal will sustain the potential of natural and physical resources whilst meeting the foreseeable needs of future generations as the

proposal is considered to retain the productive use of the land while still providing for their social, economic and cultural well-being. In addition, the proposal will avoid adverse effects on the environment and will maintain the rural character of the site and surrounding environment.

10.3. Section 6 of the Act sets out a number of matters of national importance. These matters of national importance are considered relevant to this application. The proposal is not located within the coastal environment nor are there any known lakes, or wetlands located within the site. The site does not contain any areas of Outstanding Natural Features and Landscapes. The proposal is not anticipated to affect any areas of indigenous vegetation. The site is not located along the coastal marine area or near lakes or rivers where public access would be required. The site is not known to contain any areas of cultural significance, and the proposal is not considered to affect the relationship of Māori and their culture and traditions. The site is not known to contain any sites of historical significance or be within an area subject to customary rights. The proposal does not increase the risk of natural hazards and will not accelerate, exacerbate or worsen the effects from natural hazards. It is therefore considered that the proposal is consistent with Section 6 of the Act.

10.4. Section 7 identifies a number of "other matters" to be given particular regard by a Council in the consideration of any assessment for resource consent, including the maintenance and enhancement of amenity values. The proposal maintains amenity values in the area as the proposal is in keeping with the existing character of the surrounding environment.

10.5. Section 8 requires Council to take into account the principals of the Treaty of Waitangi. It is considered that the proposal raises no Treaty issues. The subject site is not known to be located within an area of significance to Māori. The proposal has taken into account the principals of the Treaty of Waitangi and is not considered to be contrary to these principals.

10.6. Overall, the application is considered to be consistent with the relevant provisions of Part 2 of the Act, as expressed through the objectives, policies and rules reviewed in earlier sections of this application. Given that consistency, we conclude that the proposal achieves the purposes of sustainable management set out by Sections 5-8 of the Act.

11. Conclusion

11.1. The proposal is to undertake a subdivision to create one additional allotment. The proposal is considered to be of low density and will not create any reverse sensitivity effects on existing land use activities in the area.

11.2. Due to the existing pattern of development in the area it is not considered that there are any adverse cumulative effects, and that the proposal does not result in degradation of the character of the surrounding rural environment.

11.3. In terms of section 104(1)(b) of the Act, the actual and potential effects of the proposal will be less than minor.

11.4. It is also considered that the proposal will have less than minor adverse effects on the wider environment; no persons will be adversely affected by the proposal and there are no special circumstances.

11.5. As a Restricted Discretionary Activity, the proposal has been assessed against the specific matters and limitations imposed by the District Plan. In accordance with sections 104, 104C, 105 and 106 of the Act in relation to Restricted Discretionary activities, it is considered appropriate for consent to be granted on a non-notified basis.

12. Limitations

12.1. This report has been commissioned solely for the benefit of our client, in relation to the project as described above, and to the limits of our engagement, with the exception that the Far North District Council or Northland Regional Council may rely on it to the extent of its appropriateness, conditions and limitations, when issuing their subject consent.

12.2. Copyright of Intellectual Property remains with Northland Planning and Development 2020 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 information contained within this report.

12.3. 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.

12.4. 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.

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	**NA23A/821**
Land Registration District	**North Auckland**
Date Issued	12 March 1973

Prior References
NA977/300

Estate	Fee Simple
Area	4.6404 hectares more or less
Legal Description	Part Kohewhata 69 Block
Registered Owners	

Prospect Estate Limited

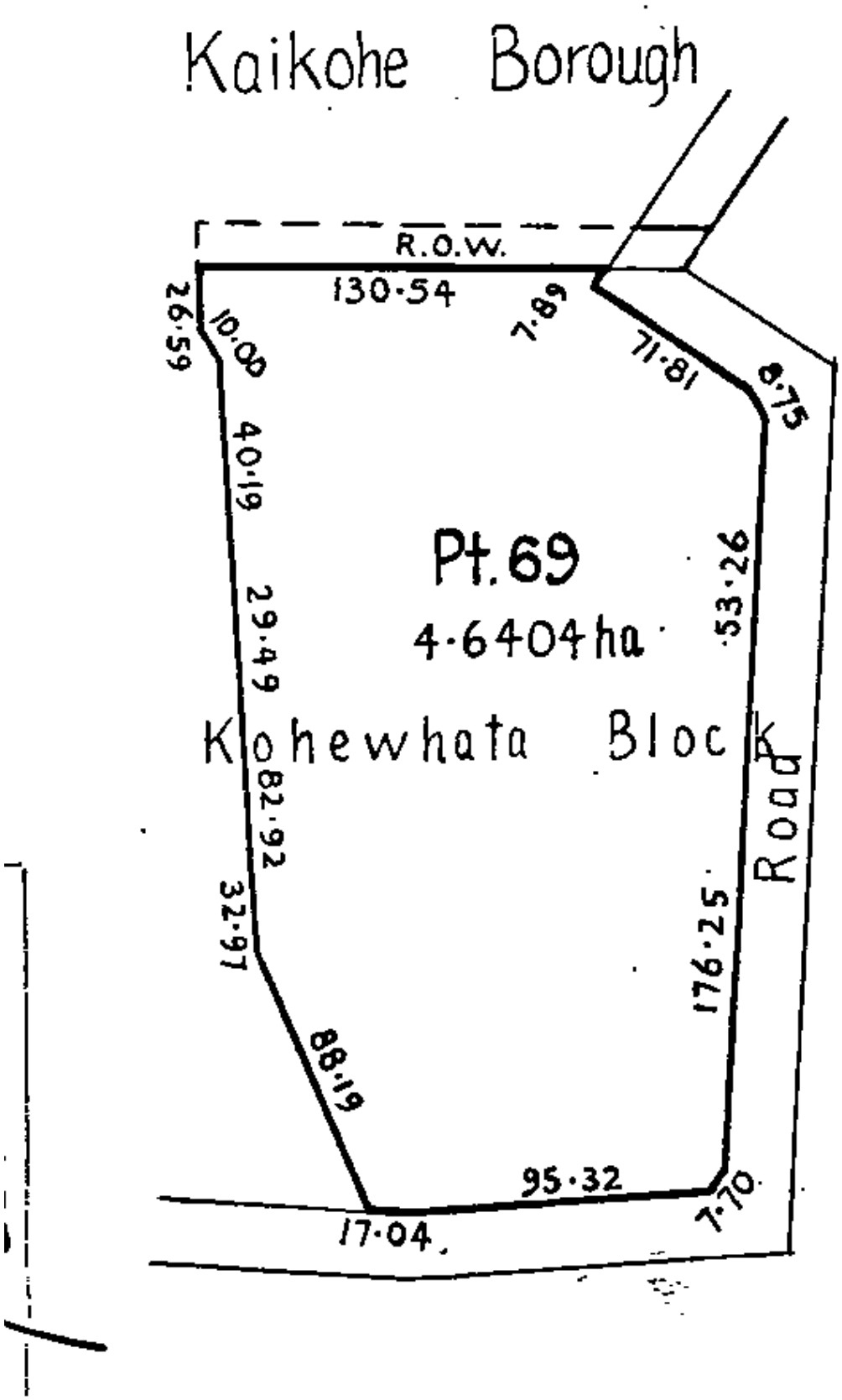
Interests

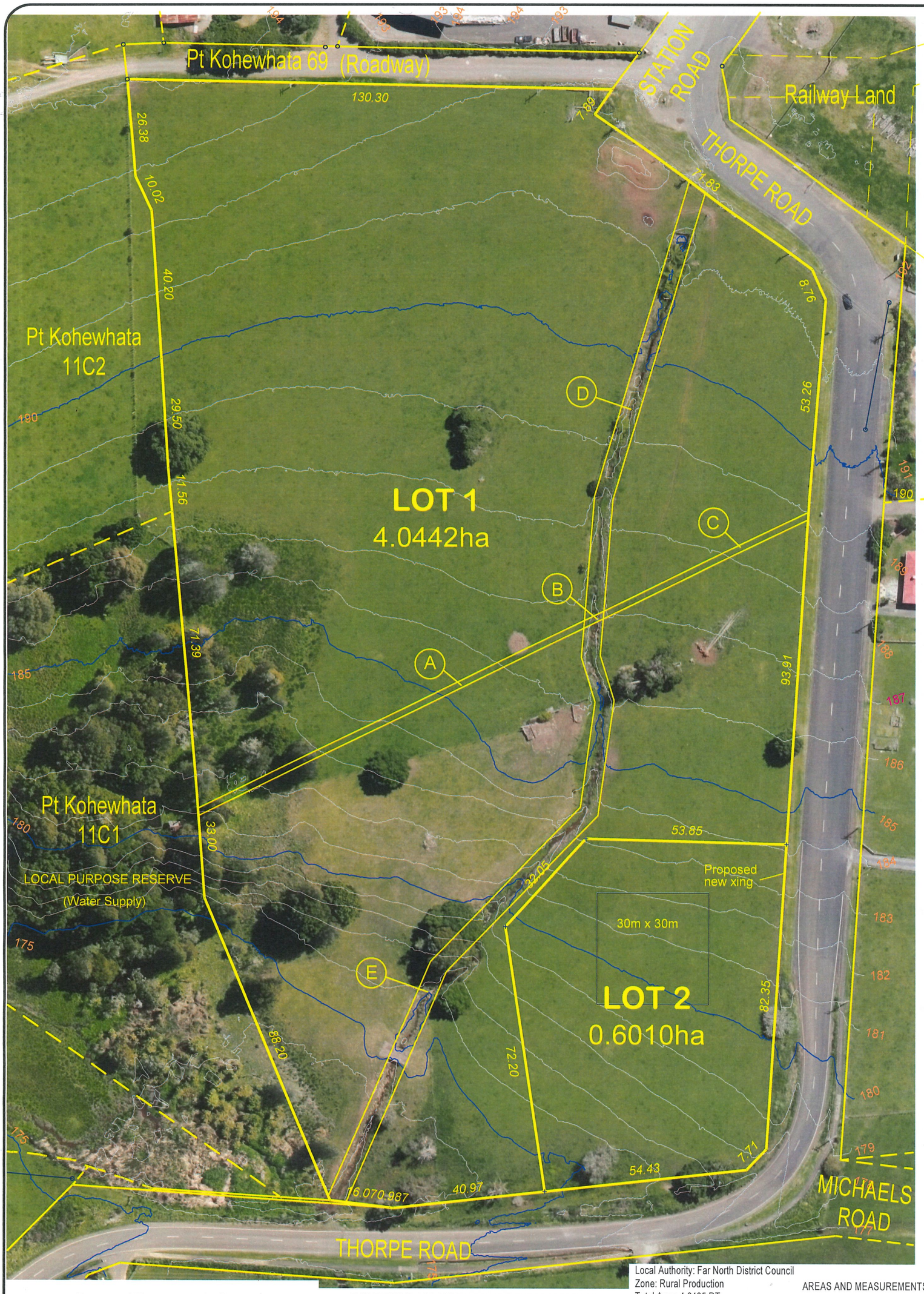
Subject to drainage and water rights over part created by Transfer 233995

Subject to drainage and water rights over part created by Transfer 240606

Appurtenant to part hereto is a right of way created by Provisional Register embodied in Register NAPR183/100

Order 12746 amending right of way created by Provisional Register NAPR183/100


Kaikohe Borough
R.O.W.
130·54
7·89
71·81
8·75
26·59
10·00
40·19
29·49
82·92
32·97
88·19
95·32
17·04
7·70
176·25
53·26
Pt. 69
4·6404 ha
Kohewhata Block
Road



Proposed Easements in Gross

Shown	Purpose	Burdened Land	Grantee
A , B & C	Right to Convey Water	Lot 1 Hereon	F.N.D.C
D, B & E	Right to Drain Water		

Local Authority: Far North District Council
Zone: Rural Production
Total Area: 4.6405 RT
Comprised in: NA23A?821
Origin of Levels: LINZ
Levels in terms of: NZ Vertical Datum
Contour interval is: Minor 1.0 Major 5.0

AREAS AND MEASUREMENTS SUBJECT TO FINAL SURVEY

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

0 10 20 30 40 50 60 70 80m

Prepared For: Prospect Estate Limited

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Ph: (09) 407 6030
Email: Kerikeri@saps.co.nz
27 Hobson Ave,
PO Box 937, Kerikeri

PROPOSED SUBDIVISION OF Pt KOHEWHATA 69 BLOCK

	Name	Date
Survey		
Design		
Drawn	W & K	Feb 2024
Ver 1	Rev	Sept 2024

ORIGINAL SCALE 1:1000 SHEET SIZE A3

FILE 24315/01

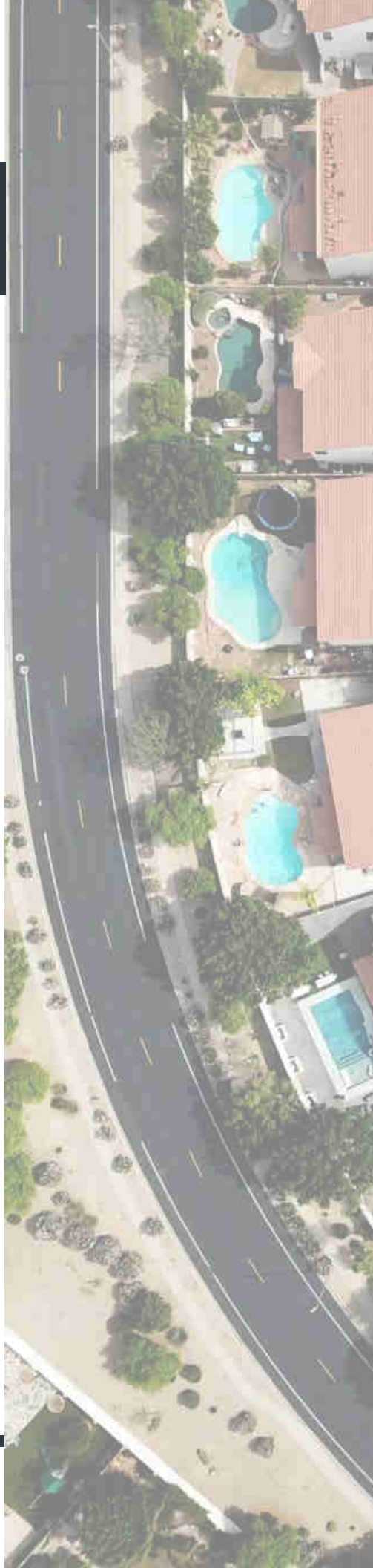
geologix
consulting engineers

SUBDIVISION SITE SUITABILITY ENGINEERING REPORT

THORPE ROAD, KAIKOHE
STAGES 1 TO 5

P J DAIRY LTD

C0471-S-02
MAY 2025
REVISION 2



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DOCUMENT MANAGEMENT

Document Title	Subdivision Site Suitability Engineering Report
Site Reference	Thorpe Road, Kaikohe. Stages 1 to 4
Client	P J Dairy Ltd
Geologix Reference	C0471-S-02
Issue Date	May 2025
Revision	02
Prepared	Edward Collings Managing Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
Reviewed	Sebastian Hicks Principal Civil Engineer, CPEng Reg. 1168062, CMEngNZ, IntPE(NZ) /APEC Engineer
Approved	Edward Collings Managing Director, CPEng, CMEngNZ, CEnvP, MPhys (Hons)
File Reference	*Z:\Geologix Files\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\06 - Reports\C0471-S-01-R02.docx*

REVISION HISTORY

Date	Issue	Prepared	Reviewed	Approved
February 2025May 2025	First Issue – For Consent	EC	SH	EC
May 2025	Second Issue – For Consent	EC	SH	EC

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TABLE OF CONTENTS

TABLES

1 INTRODUCTION

This Subdivision Site Suitability Engineering Report has been prepared by Geologix Consulting Engineers Ltd (Geologix) for P J Dairy Ltd as our Client in accordance with our standard short form agreement and general terms and conditions of engagement.

Our scope of works has been undertaken to assist with Resource Consent application in relation to the proposed subdivision of a rural property over multiple titles, off Thorpe Road, Kaikohe, the 'site'. Specifically, this assessment provides a civil engineering assessment for the management of wastewater, stormwater, potable water and firefighting, internal access and associated earthwork requirements.

The purpose of this report, if adopted in practice will enable new building sites with less than minor effects on the environment as a result of the proposed activities outlined below.

1.1 Proposal

Multiple proposed scheme plans were presented to Geologix at the time of writing, prepared by Williams and King Ltd[1] and are reproduced as Drawing Nos. 010 to 014, inclusive, within Appendix A.

It is understood the Client proposes to subdivide the legal title Pt Kohewhata 69 Block to create two rural residential lots, Pt Rangihamama A2 within Stage 2 to create four new rural residential lots and a balance lot. Stage 3 subdivides Tahuna A, Tahuna B Block and proposed lot 5 of stage 3 to create two new residential lots and a balance site by way of a boundary adjustment. Pt Kohewhata 11C2 Block within stage 4 is subdivided to create another two rural residential lots, before finally, within stage 5, lot 8 of stage 3 and lots 1 and 2 of stage 4 are subject to a boundary adjustment. The above assumptions are summarised in Table 1.

Amendments to the referenced scheme plan may require an update to the recommendations of this report which are based on conservative, typical rural residential development concepts. Where alterations of the referenced scheme plans are proposed Geologix should be consulted.

Table 1: Summary of Proposed Scheme

Proposed Lots	Size Range	Purpose
Stage 1 (Pt Kohewhata 69 Block)		
1	4.0442 ha	Balance/ rural residential
2	0.6010 ha	New rural residential
Stage 2 (Pt Rangihamama A2)		
1	2.0101 ha	New rural residential
2	2.1771 ha	New rural residential
3	2.0114 ha	New rural residential
4	2.0388 ha	New rural residential
5	7.6090 ha	Balance/ rural residential

[1] *Williams and King Ltd, Proposed Scheme Plans Ref. 24315-03 (Stage 3) and 24315-04 (Stage 4)*

Stage 3 (Tahuna A, Tahuna B, Stage 2 Proposed Lot 5)		
6	2.2834 ha	Proposed Lot 5 Stage 1
7	2.2779 ha	New rural residential
8	7.5622 ha	Existing rural residential (Boundary Adjustment)
Stage 4 (Pt Kohewhata 11C2 Blk)		
1	0.4647 ha	New rural residential
2	4.0498 ha	Balance/ rural residential
Stage 5 (Lot 8, Stage 3 and Lots 1 and 2, Stage 4		
9	7.1107 ha	Balance/ rural residential
10	0.4514 ha	Existing residential
11	4.4743 ha	Boundary adjustment

Access to the proposed new lots will be established from Thorpe Road and Station Road as summarised in Table 2. A specific traffic engineering assessment and/ or road safety assessment is outside the scope of this report.

Table 2: Summary of Proposed Access

Benefitted Lots	Location	Status
Stage 1, Lot 1	Station Road	New proposed RoW
Stage 1, Lot 2	Thorpe Road	New vehicle crossing
Stage 2, Lots 1 to 5	Thorpe Road	New proposed RoW A to C
Stage 3, Lots 6 to 8	Thorpe Road	RoW A to C formed in Stage 2
Stage 4, Lots 1 and 2	Thorpe Road	New Row D and E
Stage 5, Lots 9 to 11	Thorpe Road	Repurpose of RoW D and E

2 DESKTOP APPRAISAL

The site is located to the south of Kaikohe Township, with the stages formed over five existing parent titles legally described as Part Kohewhata 69 Block, Part Kohewhata 11C2, Part Rangihamama A2 Block, Tahuna A and B Blocks. The proposal will also provide easements over Part Kohewhata 11C2 Block.

The site covers a combined total site area of approximately 27.83 ha and is mostly utilised as rural pasture, generally interspersed with occasional mature tree cover and an existing residential development within Tahuna A Block (93 Station Road).

Topographically the site is generally formed over gentle terrain with broad slopes facilitating drainage to defined overland flow paths and a stream.

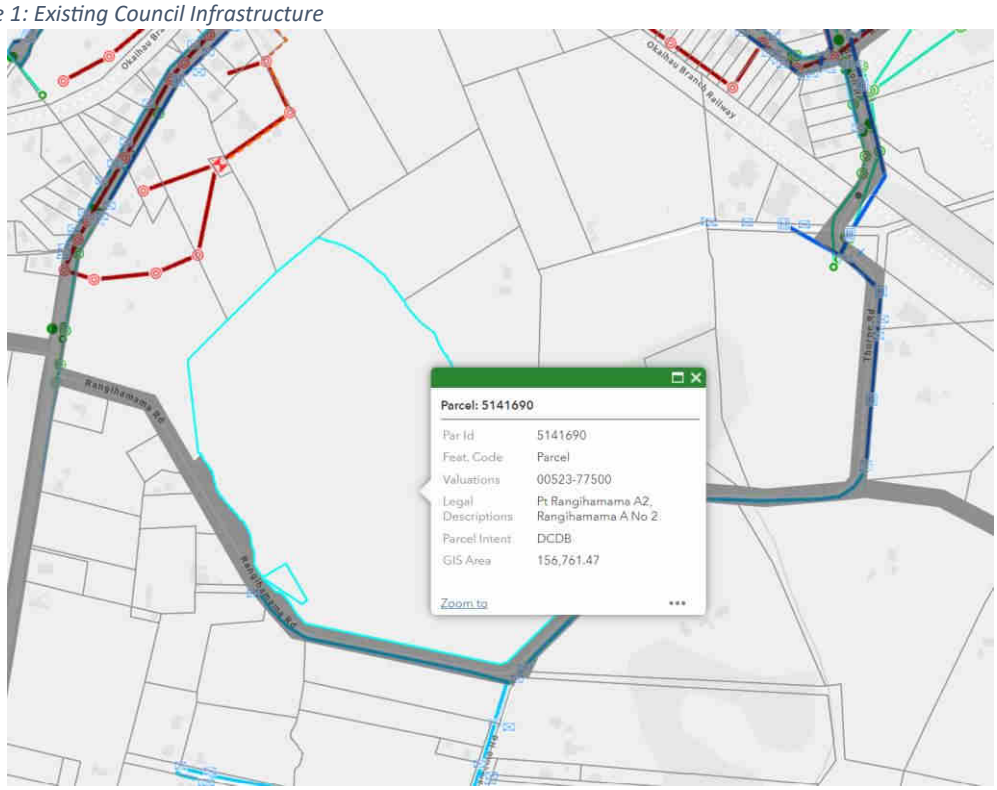
The site is generally consistent with the surrounding land uses. However, the site is bound to the north and northeast by semi-urban residential and industrial/ commercial uses, respectively

2.1 Existing Reticulated Networks

The site is generally not benefitted by reticulated networks. Potable water and stormwater networks are available at Thorpe Road. However, this report has been prepared with the basis of the proposal being self-sufficient for 3 water servicing.

The existing reticulated networks are shown schematically below as Figure 1.

Figure 1: Existing Council Infrastructure



2.2 Hydrological Setting

Desktop GIS information available from NIWA[2] has been reviewed to understand the sites hydrological setting. The developed understanding is summarised as Figure 2 and Table 3 below.

[2] *NIWA Hydrological Flow Path Explorer V2*

Figure 2: NIWA Hydrological Flow Path Explorer

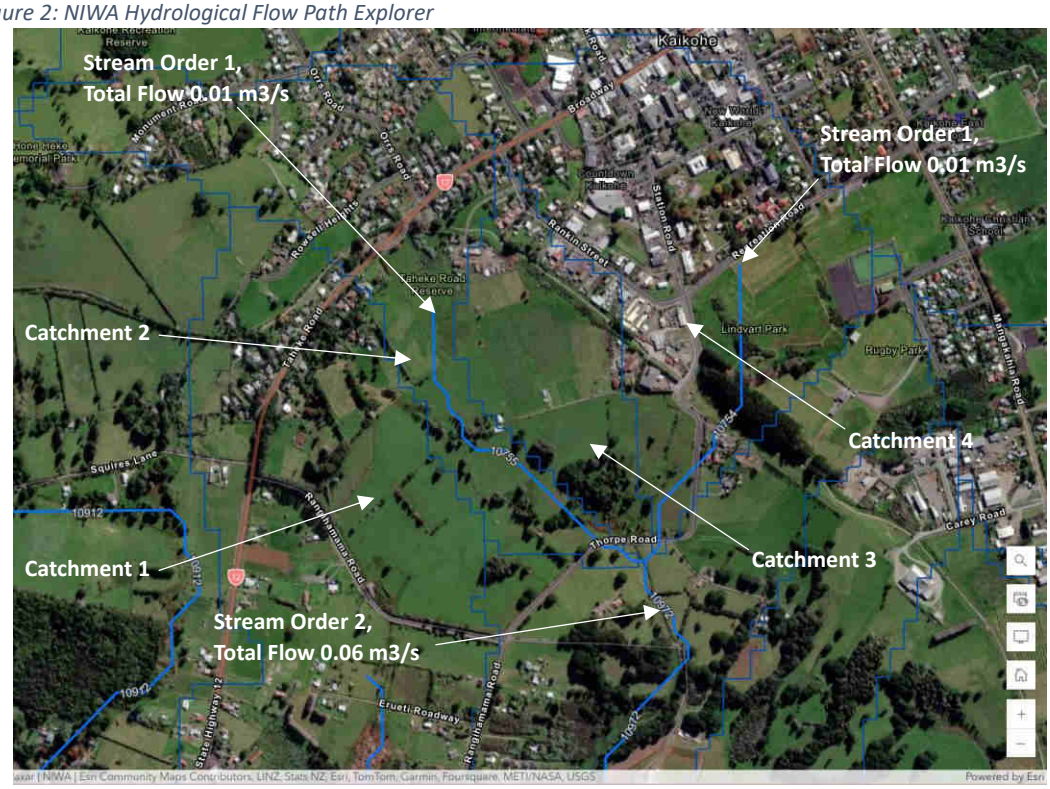


Table 3: Summary of Influencing Surface Water Features

Feature	Influencing	Location/ Comments
Overland Flow Paths	Yes	**Lot 7.** Existing farm drain trending north/ south. **Lot 8.** Shallow overland flow paths trend south to southeast, flowing offsite.
Streams/ Rivers	Yes	Two stream order 1 recorded within the site, forming ephemeral bodies.
Wetlands	Yes	Within a land covenant marked X within Pt Kohewhata 11C2 Blk. Refer to scheme plan.
Coastal Marine Area (CMA)	No	Not applicable

2.3 Mapped Flood Hazard

The site is covered by the Northland Regional Council (NRC) 2-dimensional flood hazard model. The mapped GIS data does not indicate flood potential to influence the site.

3 SITE WALKOVER SURVEY

A visual walkover survey of the property confirmed:

- Topography is in general accordance with that outlined in Section 2 and the available LiDAR dataset. The proposed building envelopes are proposed on generally gently sloping topography.

- The site is defined to the east and south by Thorpe Road, and is bound by similar pasture or rural properties in all directions. A waste processing industrial property is located immediately to the north of Stage 1.
- Surface water features are consistent with the information presented within Section 2 of this report.
- An existing residential development comprising a single storey timber framed dwelling with maintained private gardens was identified within Stage 5, lot 10.

4 WASTEWATER ASSESSMENT

The scope of this wastewater assessment comprises a ground investigation and establishment of minimum wastewater treatment and disposal to cater for probable future rural residential development. Relevant design guideline documents adopted include:

- Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.
- NZS1547:2012, On-site Domestic Wastewater Management.

4.1 Geological Setting

Available geological mapping[3] indicates the site to be directly underlain by Pliocene-aged Kerikeri Volcanics Group, described as basalt lava flows and volcanic plugs. This geology typically comprises a cohesive residual soil layer.

4.2 Ground Investigation

A site walkover survey and intrusive ground investigation was undertaken by Geologix on 12 March 2024. The ground investigation was scoped to ascertain a soil loading category. The ground investigation comprised:

- Six hand augered boreholes designated BH01 to BH06 inclusive, formed at suitable wastewater disposal field areas and scheduled for a target depth of 1.2 m below ground level (bgl). Refusals were accepted due to hard strata, potentially boulders between 0.6 and 1.0 m bgl.
- Monitoring of groundwater levels with a groundwater dip meter on the day of drilling.

Arisings recovered from the exploratory boreholes were logged by a suitably qualified geotechnical engineering professional in general accordance with New Zealand Geotechnical Society guidelines[4]. Engineering borehole logs are presented as Appendix B to this report and approximate borehole positions recorded on Drawing No. 500 within Appendix A.

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[3] Geological & Nuclear Science, 1:250,000 scale Geological Map, Sheet 1, Kaitaia, 1996.

[4] New Zealand Geotechnical Society, Field Description of Soil and Rock, 2005.

Strata identified during the ground investigation can be summarised as follows:

- **Topsoil to depths of 0.4 m bgl.** The overlying topsoil was described as a light brown silt with trace fine gravel, dry to moist and friable.
- **Kerikeri Volcanics Group residual soils to depths >0.6 to >1.0 m bgl.** The shallow residual soil was typically cohesive, described as silt with some clay or silty clay. The unit was similarly light brown and occasionally with a trace of sand and gravel. Generally the horizon was light brown, moist and of low plasticity. The exploratory holes refused upon gravel to cobble size fragments which are commonplace in the unit.
- **Groundwater.** No groundwater was encountered on the day of drilling.

A summary of ground investigation data is presented below as Table 4.

Table 4: Summary of Ground Investigation

Hole ID	Lot	Hole Depth	Topsoil Depth	Fill Depth	Groundwater[2]	Refusal	Wastewater Category[4]
BH01	1	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH02	2	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH03	3	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH04	4	1.0 m	0.4 m	NE	NE	1.0 m	5 – moderate to slow draining
BH05	5/6	0.6 m	0.2 m	NE	NE	0.6 m	5 – moderate to slow draining
BH06	7	0.7 m	0.4 m	NE	NE	0.4 m	5 – moderate to slow draining

1. All depths recorded in m bgl unless stated. 2. Groundwater measurements taken on day of drilling. 3. NE – Not Encountered. 4. Wastewater category in accordance with Auckland Council TP58[5].

4.3 Existing Wastewater Systems

A single wastewater treatment and disposal system is expected within proposed lot 10. The system comprises a conventional septic tank and trenches to the west of the existing dwelling which appeared to be functioning adequately at the time of inspection. The existing wastewater system and associated disposal fields were measured within the boundaries of proposed lot 10 with adequate offset.

4.4 Concept Future Development and Wastewater Generation Volume

The concept rural residential developments within this report assume that the proposed new lot may comprise up to a five-bedroom dwelling with a peak occupancy of eight people[6]. This considers the uncertainty of potential future Building Consent design. The number of usable bedrooms within a residential dwelling must consider that proposed offices, studies, gyms, or other similar spaces may be considered a potential bedroom by the Consent Authority.

[5] Auckland Council, Technical Publication 58, On-site Wastewater Systems: Design and Management Manual, 2004.

[6] TP58 Table 6.1.

The design water volume for roof water tank supply is estimated at 160 litres/ person/ day[7]. This assumes standard water saving fixtures[8] being installed within the proposed future developments. This should be reviewed for each proposed lot at the Building Consent stage within a development specific wastewater design by a suitably qualified professional.

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

4.5 Treatment Standard and System

Selection of a wastewater treatment system will be provided by future developers at Building Consent stage. This will be a function of a refined design peak occupancy according to final development plans. No specific treatment system design restrictions and manufacturers are currently in place. Future developers will be required to elect a treatment system and provide system specifications at Building Consent.

It is recommended that to meet suitable minimum treated effluent output quality, secondary treatment systems are accounted for within future developments. Secondary treatment has been elected to provide compliance as a permitted activity of the proposed Northland Regional Plan considering the site topography, surface water features and disposal characteristics.

In Building Consent design, considering final disposal field topography and proximity to controlling site features, a higher treated effluent output standard such as UV disinfection to tertiary quality may be required.

4.6 Soil Loading Rate

Based on the results of the ground investigation, conservatively the shallow soils are generally inferred to meet the drainage characteristics of TP58 Category 5, moderate to slow draining, described as sandy clay-loam, clay-loam, and silty clay-loam. This correlates to NZS1547 Category 4, imperfectly drained, described as clay loams. For a typical PCDI system, a soil loading rate of 3.5 mm/ day is recommended within NZS1547 Table 5.2.

To achieve the above SLR, technical guidance documents require the following compliance within the final design.

- 100 to 150 mm minimum depth of good quality topsoil (NZS1547 Table M1, note 1) to slow the soakage and assist with nutrient reduction.
- Minimum 30 % reserve disposal field area.

[7] *TP58 Table 6.2, AS/ NZS 1547:2012 Table H3.*

[8] *Low water consumption dishwashers and no garbage grinders.*

4.7 Concept Land Disposal System

To provide even distribution, evapotranspiration assistance and to minimise effluent runoff it is recommended that suitably treated effluent is conveyed to land disposal via Pressure Compensating Dripper Irrigation (PCDI) systems, a commonplace method of wastewater disposal.

The proposed PCDI systems may be surface laid, covered with minimum 150 mm mulch and planted with specific evapotranspiration species to provide a minimum of 80 % species canopy cover. Alternatively, lines could be subsurface laid to topsoil with minimum 200 mm thickness and planted with lawn grass. Clean, inert site-won topsoil sourced during development from building and/ or driveways footprints may be used in the land disposal system to increase minimum thicknesses.

Specific requirements of a concept land disposal system to be confirmed during Building Consent include the following.

Table 5: Disposal Field Design Criteria

Design Criteria	Site Conditions and Compliance
Topography at the disposal areas shall not exceed 25°. Exceedances will require a Discharge Consent.	Concept design complies, refer Drawing No. 500.
On shallower slopes >10 ° compliance with Northland Regional Plan (NRP) rule C.6.1.3(6) is required.	Concept design complies, proposed wastewater disposal fields are proposed on land <10 ° and do not require cutoff drains.
On all terrain irrigation lines should be laid along contours.	Concept design complies, refer Drawing No. 500.
Disposal system situated no closer than 600 mm (vertically) from the winter groundwater table for secondary treated effluent.	Concept design complies, groundwater not encountered within 0.6 to 1.0 m of the ground surface within our investigation.
Separation from surface water features such as stormwater flow paths (including road and kerb channels), rivers, lakes, ponds, dams, and natural wetlands according to Table 9, Appendix B of the NRP.	Concept design complies. Wastewater disposal fields can be designed to accommodate setbacks from on-site and adjacent surface water features.
Secondary treated effluent disposal is to be set at the 20-year ARI (5 % AEP) flood inundation height.	Concept design complies, no mapped flood hazard within the boundaries up to the 100-year ARI (1 % AEP) event.

4.7.1 Concept Disposal Field Sizing

The sizing of wastewater system disposal areas is a function of the design peak flow volumes, the SLR and topographic relief. For each proposed lot a concept primary and reserve disposal field is required as follows, to be refined at the Building Consent stage. The recommendations below are presented on Drawing No. 500.

- **Concept Primary Disposal Field.** A minimum PCDI primary disposal field of 366 m^2 laid parallel to the natural contours.
- **Concept Reserve Disposal Field.** A minimum reserve disposal field equivalent to 30 % of the primary disposal field is required under NRP rule C.6.1.3(9)(b) for secondary or

tertiary treatment systems. It is recommended each proposed lot provides a 110 m^2 reserve disposal area.

- **Available Disposal Field Area.** For concept design, the available disposal field area outside of applicable offsets has been indicated on Drawing No. 500. Available disposal field areas are summarised as Table 6.

Table 6: Summary of Required and Available Disposal Field Areas

Lot	Required Primary & Reserve Field Area	Available Area
	Stage 1	
1	476 m^2	28,870 m^2
2	476 m^2	5,120 m^2
	Stage 2	
1	476 m^2	14,072 m^2
2	476 m^2	15,200 m^2
3	476 m^2	18,507 m^2
4	476 m^2	19,032 m^2
5	476 m^2	39,938 m^2
	Stage 3	
6	476 m^2	18,058 m^2
7	476 m^2	11,765 m^2
8	NA – Existing system	NA
	Stage 4	
1	476 m^2	3,955 m^2
2	476 m^2	29,371 m^2
	Stage 5	
9	476 m^2	49,352 m^2
10	NA – Existing system	NA
11	476 m^2	34,055 m^2

4.8 Summary of Concept Wastewater Design

Based on the above concept design assumptions a summary of the concept wastewater design is presented as Table 7. It is recommended that each lot is subject to Building Consent specific review and design amendment according to final development plans by a suitably qualified professional.

The concept design has been prepared with no Discharge Consent requirement. These requirements should be reviewed at the Building Consent stage and may be subject to an alternative solution.

Table 7: Concept Wastewater Design Summary

Design Element	Specification
Concept development	Five-bedroom, peak occupancy of 8 (per lot)
Concept Design generation volume	160 litres/ person/ day – 1,280 litres/ day/ lot
Water saving measures	Standard. Combined use of 11 litre flush cisterns, automatic washing machine & dishwasher, no garbage grinder[1]
Water meter required?	No
Min. Treatment Quality	Secondary
Soil Drainage Category	TP58 Category 5, NZS1547 Category 4
Soil Loading Rate	3.5 mm/ day

Concept primary disposal field size	Surface/ subsurface laid PCDI. Min. 366 m^2
Concept reserve disposal field size	Surface/ subsurface laid PCDI. Min. 30 %, or 110 m^2
Concept Disposal Field Level	Sited above 5 % AEP event.
Dosing Method	Pump with high water level visual and audible alarm. Minimum 24-hour emergency storage volume.
Concept Stormwater Control	Divert surface/ stormwater drains away from disposal fields. Contour drains not required. Stormwater management discharges downslope of all disposal fields.

1. Unless further water saving measures are included.

4.9 Assessment of Environmental Effects

An Assessment of Environmental Effects (AEE) is required to address two aspects of wastewater disposal. These include the effect of treated wastewater disposal for an individual lot and the cumulative or combined effect of multiple lots discharging treated wastewater to land as a result of subdivision.

It is recommended that the AEE is reviewed at the time of Building Consent once specific development plans, final disposal field locations and treatment systems are established. The TP58 guideline document provides a detailed AEE for Building Consent application. Based on the proposed scheme plan, ground investigation, walkover inspection and Drawing No. 500, a site-specific AEE is presented as Appendix C to demonstrate the proposed wastewater disposal concept will have a less than minor effect on the environment.

5 STORMWATER ASSESSMENT

Increased storm water runoff occurs as pervious surfaces such as pasture are converted to impervious features such as future roof, driveway and/ or internal roading.

5.1 Impervious Surfaces and Activity Status

The proposed activity has been assessed as a **Permitted Activity**. A summary of this is provided as

Table 8 below which has been developed from our observations and AutoCAD drawings in lieu of specific survey. This has been taken as conceptual, maximum probable development of typical rural residential scenarios. Refer Section 0.

Table 8: Summary of Impervious Surfaces, Stage 1

Parameter	Area		
Lot		1	2
Lot Area	m^2	40442	6010
Existing			
Impervious	m^2	0	0
	%	0.00	0.00
Future (Concept)			
Roof	m^2	300	300
	%	0.74	4.99
Driveway	m^2	200	200
	%	0.49	3.33
RoW	m^2	0	0
	%	0.00	0.00
Total	m^2	1	8
	%	0.00	0.13
Activity Assessment			
Threshold	15 %	6066 m^2	902 m^2
Permitted		Yes	Yes

Table 9: Summary of Impervious Surfaces, Stage 2

Parameter	Area					
Lot		1	2	3	4	5
Lot Area	m^2	20101	21771	20388	20114	76090
Existing						
Impervious	m^2	0	0	0	0	0
	%	0.00	0.00	0.00	0.00	0.00
Future (Concept)						
Roof	m^2	300	300	300	300	300
	%	1.49	1.38	1.47	1.49	0.39
Driveway	m^2	200	200	200	200	200
	%	0.99	0.92	0.98	0.99	0.26
RoW	m^2	0	0	335	0	2080
	%	0.00	0.00	1.64	0.00	2.73
Total	m^2	500	500	835	500	2580
	%	2.49	2.30	4.10	2.49	3.39
Activity Assessment						
Threshold	15 %	3015 m^2	3266 m^2	3058 m^2	3017 m^2	11414 m^2
Permitted		Yes	Yes	Yes	Yes	Yes

Table 10: Summary of Impervious Surfaces, Stage 3

Parameter	Area			
Lot		6	7	8
Lot Area	m^2	22834	22779	75622
Existing				
Impervious	m^2	0	2080 (RoW Stage 2, easements A & B)	358
	%	0.00	9.14	0.47
Future (Concept)				
Roof	m^2	300	300	307
	%	1.31	1.32	0.41
Driveway	m^2	200	200	51
	%	0.88	0.88	0.07
RoW	m^2	0	727 (RoW Stage 3, easements C)	1829
	%	0.00	3.20	2.42
Total	m^2	500	3312	2187
	%	2.19	14.54	2.89
Activity Assessment				
Threshold	15 %	3425 m^2	3417 m^2	11343 m^2
Permitted		Yes	Yes	Yes

Table 11: Summary of Impervious Surfaces, Stage 4

Parameter	Area			
Lot			1	2
Lot Area	m^2		4647	40498
Existing				
Impervious	m^2		30	138
	%		0.65	0.34
Future (Concept)				
Roof	m^2		300	300
	%		6.46	0.74
Driveway	m^2		200	200
	%		4.30	0.49
RoW	m^2		30	138
	%		0.65	0.34
Total	m^2		530	638
	%		11.41	1.58
Activity Assessment				
Threshold	15 %		697 m^2	6075 m^2
Permitted			Yes	Yes

Table 12: Summary of Impervious Surfaces, Stage 5

Parameter	Area			
Lot		9	10	11
Lot Area	m^2	71107	4514	44743
Existing				
Impervious	m^2	0	358	168
	%	0.00	7.93	0.38
Future (Concept)				

Roof	m^2	300	307	300
	%	0.42	6.80	0.67
Driveway	m^2	200	51	200
	%	0.28	1.13	0.45
RoW	m^2	540	0	168
	%	0.76	0.00	0.38
Total	m^2	1040	358	668
	%	1.46	7.93	1.49
Activity Assessment				
Threshold	15 %	10666 m^2	677 m^2	6711 m^2
Permitted		Yes	Yes	Yes

5.2 Stormwater Management Concept

Based on the assessments within

Table 8 to Table 12, the proposed development meets the provisions of a Permitted Activity. The stormwater management concept considered in this report has been prepared to meet the requirements of the local and regional consent authorities considering the design storm event as follows:

- **Probable Future Development (New Rural Residential Lots).** The proposed application includes subdivision formation only and not lot specific residential development at this stage. As such a conservative model of probable future on-lot development has been developed for this assessment considering variation of scale in typical rural residential development. The probable future on-lot development concept includes up to 300 m^2 potential roof area and up to 200 m^2 potential driveway or parking areas.

  The concept has been prepared with attenuation provided within roof water tanks as combined retention/ detention systems.

- **Existing Development (Lot 8, Stage 3 becoming Lot 10, Stage 5).** The existing development meets the Permitted Activity standard based on the reduced size of the title once subdivision has occurred and no additional impervious surfaces are proposed for this lot. Therefore, no attenuation is proposed.

- **Subdivision Development.** Increased runoff from subdivision development is expected and additional attenuation is proposed to avoid an adverse environmental effect.

  The concept adopts two stormwater ponds, one within Stage 2 and one within Stage 3. The stormwater pond shall be subject to specific engineering design at the EDA stage and has conceptually been modelled adopting gravity flows.

5.3 Design Storm Event

It has been identified that development of the site does not pose an increase to flooding hazard on the downstream properties as flood hazard potential is not mapped. Therefore, in order to provide flow attenuation only in lieu of flood control in compliance with FNDC Engineering Standard Table 4-1, the concept design attenuates the post-development stormwater runoff peak discharge to 80 % of the pre-development condition for the 50 and 20 % AEP storm events.

Impermeable surfaces which contribute to the wetland catchment within Area X (Lots 9 to 11 and RoW E to G) have been modelled to the 1 % AEP storm event to mitigate any potential effect under the NES:FW.

To be compliant with the above rules, the attenuation modelling within this report has been undertaken for all of the above storm events. The calculation results are summarised this section and provided in full in Appendix D.

Correctly sized discharge devices have adopted the 1 % AEP event to reduce scour and erosion at discharge locations which may otherwise result in concentrated discharge. These are detailed further in Section 6.4.1 of this report.

Relevant design rainfall intensity and depths have been ascertained for the site location from the NIWA HIRDS meteorological model[9]. The NIWA HIRDS rainfall data is presented in full within Appendix D. Provision for climate change has been adopted by means of applying a factor of 20 % to rainfall intensities, in accordance with FNDC Engineering Standards 2023[10].

5.4 Concept Attenuation Model

Based on the design storm events indicated above and the corresponding modelling results (in Appendix D) an attenuation concept to suit the maximum storage requirement has been provided. This is achievable by installing specifically sized low-flow orifices into the attenuation devices.

5.4.1 Roof Runoff Tanks

Conceptual storage and outlet requirements within the tanks are included in Appendix D and a typical schematic retention/ detention tank arrangement detail is presented as Drawing No. 401 within Appendix A.

The rational method has been adopted by Geologix with run-off coefficients as published by FNDC Engineering Standards[10] to provide a suitable attenuation design to limit post-development peak flows to 80 % of pre-development conditions.

Table 13: Probable Future Development Attenuation Concept

Design Parameter	Flow Attenuation: 50 % AEP	Flow Attenuation: 20 % AEP	Flood Control: 10 % AEP	Flood Control: 1 % AEP
Regulatory Compliance	FNDC Engineering Standards Table 4-1	FNDC Engineering Standards Table 4-1	NRC Proposed Regional Plan	NES:FW & FNDC Engineering Standards Table 4-1
Criteria	80 % Pre-development	80 % Pre-development		
Applicable Lots	1 – 8	1 – 8	9 – 11	9 – 11
Pre-development peak flow (l/s)	5.16	6.68	7.79	11.55
80 % pre-development peak flow (l/s)	4.13	5.34	NA	9.24
Post-development peak flow (l/s)	9.41	12.17	14.20	21.06

[9] *NIWA High Intensity Rainfall Data System, https://hirds.niwa.co.nz.*
[10] *FNDC Engineering Standards 2021, Version 0.6, Issued May 2023.*

Total Storage Volume Required (m^3)	6.828	8.933	4.485	16.000
Concept Summary, Lots 1 – 8:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full). - Attenuation to 80 % of pre-development condition for 20 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 1 x 9,000 litre tank is sufficient for attenuation (8,933 l) - 20% AEP attenuation in isolation requires a 27 mm orifice 0.85 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			
Concept Summary, Lots 9 – 11:	- Attenuation storage calculation accounts for offset flow from driveway (not indicated explicitly in summary above. Refer Appendix D for calcs in full). - Attenuation to 80 % of pre-development condition for 1 % AEP storm represents maximum storage requirement and is adopted for the concept design tank storage. - 1 x 16,000 litre tank is sufficient for attenuation (16,000 l) - % AEP attenuation in isolation requires a 30 mm orifice 1.52 m below overflow. However regulatory requirements are to consider an additional orifice/s to control the 50% and 20 % AEP events specifically. We note this may vary the concept orifice indicated above. This should be provided with detailed design for building consent approval.			

5.4.2 On-Lot Discharge

The direct discharge of rainwater tank overflow in a concentrated manner can cause scour and erosion in addition to saturation of shallow soils. It is recommended that overflow from rainwater detention tanks is conveyed in sealed pipes to a designated discharge point with suitable dispersion devices downslope of proposed building footprints and wastewater disposal fields.

It is recommended that the conceptually sized dispersion devices are subject to specific assessment at the Building Consent stage to limit scour and erosion from tank overflows.

Typical rural residential developments construct either above or below ground discharge dispersion pipes. Feeding pipes can be either buried or pinned to the surface as desired. It is recommended that all pipes are designed to accommodate the design storm event peak flows from the attenuation tank and including minimum 100 mm dia. PVC piping. A concept dispersion pipe or trench length is presented in Table 14. Calculations to derive this are presented within Appendix D, based on the NIWA HIRDS Depth-Duration data and TR2013/018 document.

Table 14: Summary of Concept Dispersion Devices

Concept Impervious Area to Tank	Tank Outlet Velocity (at spreader orifices)	Tank outlet pipe diameter	Spreader pipe diameter	Dispersion Pipe/ Trench Length	Spreader orifice size	Concept
Proposed Lots 1 to 11						

500 m^2	0.75 m/s	0.1 m	0.15 m	17.67 m	20 mm @ 310 mm c/c	Above ground dispersion device or in-ground dispersion trench.

5.5 Internal Roading Stormwater Management

It is recommended that once Resource Consent has been granted that the proposed subdivision attenuation devices are revisited in a detailed design phase to specifically size and provide construction details.

It is proposed to construct two stormwater ponds that can be fed by gravity flows, refer Drawing No. 411. The stormwater ponds shall provide attenuation of proposed Right of Way surfaces to less than 80 % of the pre-development condition for the design storm event. The design storm event differs based on the pond design case as the bulk of RoW E to G (from CH75 onwards) discharges into a watercourse and ultimately a suspected natural inland wetland area (Catchment 2). Where possible, as defined by the catchments indicated on Drawing No. 410, gravity flows have been routed within Catchment 1 to the south of the site where no wetlands are known to exist.

A summary of increased runoff from the pre-development condition is presented below as Table 15.

Table 15: Summary of Increased Impermeable Surfaces

Item	Pre-development Impervious	Post development Impervious	Difference
Catchment 1			
RoW A & B	0 m^2	2080 m^2	+2080 m^2
RoW E, F, G (CH0–77m)	0 m^2	467 m^2	+467 m^2
		Catchment 1 Total Difference	+2547 m^2
Catchment 2			
RoW D, E (CH77 – 343m)	0 m^2	1697 m^2	+1697 m^2
		Catchment 2 Total Difference	+1697 m^2

1. *Refer to Drawing 410 for catchment definition.*
2. *Measured from 1 m NRC LiDAR model, subject to confirmation during detailed design phase.*
3. *Based on concept modelled roading surfaces including carriageway and shoulders.*

Based on the above catchment and proposed impermeable areas, Geologix have developed a detailed stormwater runoff modelling adopting proprietary software HEC-HMS by the U.S. Army Corps, Version 4.12 for each proposed pond. The model has been developed adopting the SCS curve number method to estimate the increased runoff from impermeable surfaces from the proposed subdivision development only. Parameters adopted in the model have

been derived from FNDC Engineering Standards[11] 2023. A summary of the adopted runoff parameters is presented below as Table 16.

Table 16: SCS Curve Number Runoff Parameters

Surface	Soil Type	SCS Curve Number
Pasture	Kerikeri Volcanics Group Type C	74
RoW Sealed		92
RoW Unsealed (Aggregate with swale drains)		89

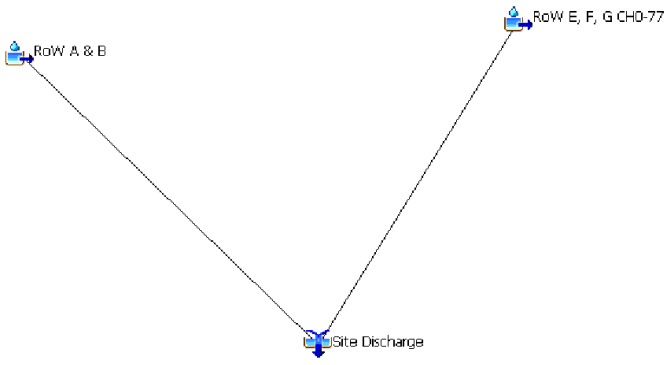
5.5.1 *Runoff Modelling*

Based on the above areas and parameters, the following increased runoff for the associated storm events has been calculated by our conceptual model. A schematic of the un-attenuated model to derive this is presented below as Figure 3 and the design criteria are presented as follows:

- **Pond 1** – Attenuation of catchment 1 elements, providing attenuation of peak flow to 80% of 50 and 20 % storm events with provision of climate change.
- **Pond 2** – Attenuation of catchment 2 elements, providing attenuation of peak flow to 80% of 1 % storm events with provision of climate change.

Figure 3: Pre Development Models

Pond 1



Pond 2

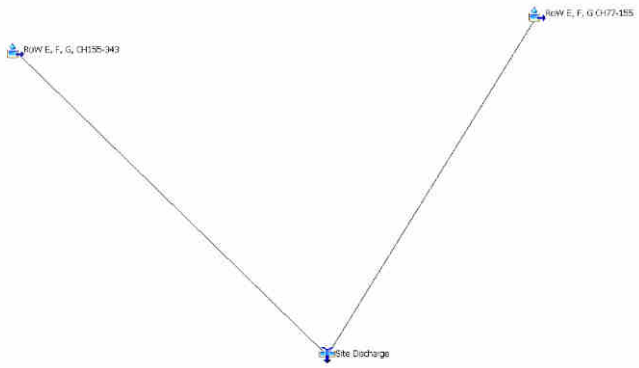


Table 17: Summary of Increased Runoff from to Ponds

Model	Storm Event	Condition	Peak Flow	Comments
Pond 1	50 % AEP	Pre-development	20 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	16 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	35 l/s	

[11] *Far North District Council Working Draft Engineering Standards 2021, Issue 0.3 – May 2021.*

		Post development Attenuated Concept	**13.5 l/s**	**Achieves and provides additional benefit to target**
Pond 1	20 % AEP	Pre-development	43 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	34.4 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	68 l/s	
		Post development Attenuated	**33 l/s**	**Achieves and provides additional benefit to target**
Pond 2	1 % AEP	Pre-development	37 l/s	Peak flow, no climate change adopted.
		80 % Pre-development Target	29.6 l/s	80 % reduction of pre-development peak flow.
		Post development Unattenuated	53 l/s	
		Post development Attenuated	**28 l/s**	**Achieves and provides additional benefit to target**

5.5.2 Stormwater Pond Concept

Based on the above calculation, dry ponds are required to provide attenuation of road surfaces to the above design criteria. A concept dry pond design has been undertaken by Geologix based on the above and available information according to Auckland Council GD01[12].

Preliminary design criteria presented within GD01 adopted for conceptual modelling are summarised as follows. It is important to note that the concept design does not present the level of rigour required for construction and the preliminary model shall be advanced by specific engineering design to prepare construction drawings backed by a Producer Statement.

- Pond to be formed with a grassed base.
- Inlet piping and rip-rap sized to accommodate the 1 % AEP peak flows from the RoW area subject to specific engineering design.
- Outlet from pond via scruffy dome manhole with orifice inlet and RCP pipeline to rip-rap outlet downstream of pond.
- No specific forebay but treatment achieved through gravity flow inlets (grassed swales) and grass/ vegetation in the base of the pond.

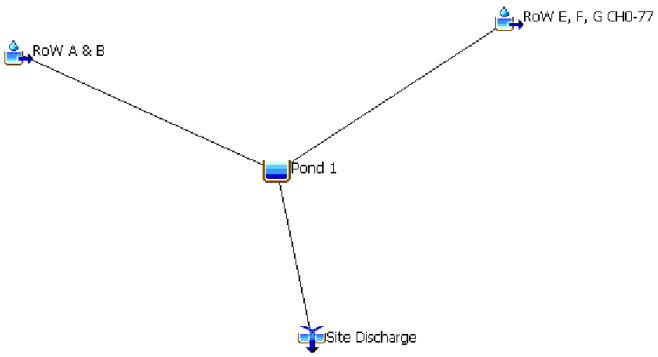
[12] *Auckland Council Guideline Document 2017/001, Stormwater Management Devices in the Auckland Region, December 2017, Incorporating Amendment 2.*

- Spillway constructed to provide controlled management above the design storm. According to GD01, spillway shall have an invert level of 100 mm above the design storm event storage height.
- Top of bank constructed with 300 mm freeboard above the design storm event (200 mm above the spillway invert). Pond banks are to be confirmed during detailed design. It is expected the pond will be partially or fully in-ground.
- Pond conceptually sized to achieve shallow pond depth to increase safety in design considering rural residential setting and positioning within proposed lot.

A schematic of the updated HEC-HMS model with allowance for the stormwater pond is presented below as Figure 4.

Figure 4: Attenuated Post Development Model

Pond 1



Pond 2

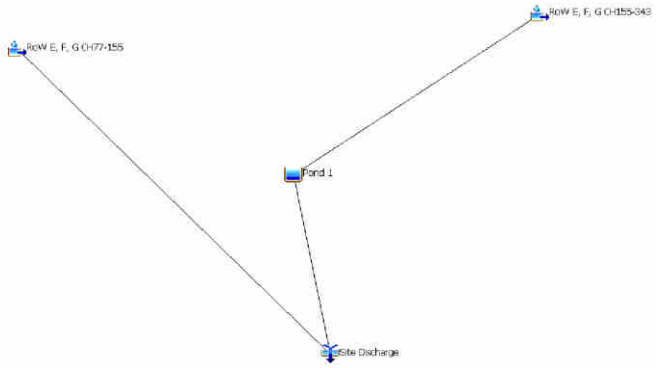


Table 18: Summary of Concept Stormwater Pond Design

Element	Design	Notes
Concept Pond base dimension	5 x 15 m	(Ratio of 1:3 W:L) with 1:3 side slopes
Pond 1		
50 % AEP +CC Attenuation		
Concept Orifice Diameter	100 mm	
Concept Orifice Invert Level	0.1 m	Above base of pond
Concept Storage Provided	70 m^3	
Concept Storage Height	570 mm	Above base of pond
20 % AEP +CC Attenuation		
Concept Orifice Diameter	140 mm	
Concept Orifice Invert Level	700 mm	Above base of pond
Concept Storage Provided	120 m^3	
Concept Storage Elevation	1890	Above base of pond
Pond 2		
1 % AEP +CC Attenuation		
Concept Orifice Diameter	90 mm	
Concept Orifice Invert Level	0.105 m	Above base of pond
Concept Storage Provided	33 m^3	
Concept Storage Height	330 mm	Above base of pond

The above measures are indicated, on the drawing set included within Appendix A. It is recommended that all stormwater infrastructure is subject to specific engineering design at the EPA stage.

5.6 Stormwater Quality

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

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

Stormwater treatment requirements are minor to maintain good quality stormwater discharge. Stormwater quality will be provided by:

- Leaf guards on roof guttering/ first flush devices on roof guttering and downpipes.
- Rainwater tank for potable use onsite only to be filled by roof runoff.
- Room for sedimentation (minimum 150 mm according to Auckland Council GD01) within the base of the stormwater attenuation pond and roof runoff tanks as dead storage volume.
- Stormwater discharges directed towards roading swale drains where possible.
- Grassed swale drains from rainwater inception (road surfaces) to discharge point.

The risk of other contaminants being discharged out of the site boundaries (hydrocarbons, metals etc.) as a result of the proposed activities once stormwater has been processed through the above measures that will affect the downstream water quality is considered low.

6 POTABLE WATER & FIRE FIGHTING

In the absence of potable water infrastructure within this development or within the site it is recommended that roof runoff water tanks are adopted for potable water supply with appropriate filtration and UV disinfection at point of use. The volume of potable water supply on each lot should consider the required stormwater detention volume identified within Table 13.

On-lot roof water supply tanks to be used for firefighting purposes. Specific analysis and calculation for firefighting is outside the scope of this report and may require specialist input. Supply for firefighting should be made in accordance with SNZ PAS4509:2008.

7 EARTHWORKS

As part of the subdivision application, earthworks are required as follows:

- **Construction of the RoW.** This is proposed by conventional cut and fill with imported GAP hard fill and/ or site-won earth fill subject to specific engineering design.

- **Construction of new or upgrade of existing vehicle crossings.** Due to the minor volume, this has been excluded from our earthwork estimates below.
- **Construction of stormwater pond.** Expected to be formed as a balance of cut/ fill to avoid excess site-won material. Total volume has therefore been taken as 50 % cut, 50 % fill.

7.1 Earthwork Volumes

Earthwork volumes have been conceptually sized as outlined in Table 19.

Table 19: Summary of Earthworks

Item	Area/ Volume	Height (maximum)
Stage 1		
Vehicle Crossings	<10 m^3	0.3 m
Stage 2		
Total Area of Earthworks	4,244.07 m^2	
RoW Cut Volume	722.9 m^3	0.8 m
RoW Fill Volume	53.92 m^3	0.5 m
Stormwater Pond 1 Volume (5 m W x 15 m L x 1.34 m D	237.11 m^3	1.34 m
Stormwater Pond 2 Volume	31.72 m^3	0.63 m
Total Volume (Net)	1,045.65 m^3 (937.81 m^3 cut)	
Stage 3		
Total Area of Earthworks	726.84 m^2	
RoW Cut Volume	132.1 m^3	0.8 m
RoW Fill Volume	4.51 m^3	0.5 m
Total Volume (Net)	136.61 m^3 (127.6 m^3 cut)	
Stage 4		
No earthworks proposed	NA	NA
Stage 5		
No earthworks proposed	NA	NA
Application Total		
Total Volume (Net)	1,182.26 m^3 (1,065.41 m^3 cut)	

7.2 General Earthworks Recommendations

Bulk fill with site-won earth can be moderately sensitive to disturbance when exposed to rain or runoff which may cause saturation or vehicle movements and trafficking during earthworks. Accordingly, care should be taken during construction, including probable future developments to minimise degradation of any earth fill due to construction traffic and to minimise machinery on site.

Any areas of proposed bulk fill which are required to meet specific subgrade requirements within should be subject to a specific earthwork specification prepared by a professional Engineer such as Geologix.

To reduce the risk of instability of excavations during construction of the subdivision, it is recommended that **temporary** unsupported excavations have a maximum vertical height of 1.0 m. Excavations >1.0 m are generally not expected but should be battered at 1V:1H or 45°.

Temporary batters should be covered with polythene sheets secured to the surface with pins or batons to prevent saturation. All works within close proximity to excavations should be undertaken in accordance with Occupational Safety and Health regulations.

All earthworks should be carried out in periods of fine weather within the typical October to April earthwork season. Consent conditions commonly prescribe working restrictions.

7.3 Erosion and Sediment Control

Specific erosion and sediment control measures are required to control sediment runoff from areas of proposed earthworks within the scope of this application. It is recommended that specific on-lot development is assessed at the time of Building Consent by the future developer. To form the subdivision the following erosion and sediment control measures are recommended:

- Silt fences along the downslope face of the RoW.
- Adoption of the proposed stormwater pond as a temporary sediment retention pond.
- Clean and/ or dirty water diversion bunds.

A site specific erosion and sediment control plan shall be provided to Council at the time of EDA.

8 INTERNAL ROADING AND VEHICLE CROSSINGS

It should be noted that we are not traffic engineers, and no specific Traffic Impact Assessment is included within the scope of these works.

8.1 Traffic Intensity Factor and Household Equivalents

According to Appendix 3A of the Operative District Plan, providing for one standard residential unit per lot, each accounting for up to 10 traffic movements per unit per day the following Traffic Intensity Factor (TIF) and Household Equivalents have been calculated.

Table 20: Summary of Existing Vs Proposed TIF

Stage	Location	Existing TIF	Proposed TIF
2	RoW A (Thorpe Road)	10	50
3	RoW A-B (Thorpe Road)	50	80
4	93 Station Road	50	No change
5	RoW A-E, Thorpe Road	80	No change
5	93 Station Road	50	No change

8.2 Right of Way

A new private access RoW will provide internal access to proposed lots 1 to 11 within the ultimate development and will be constructed to the standards specified in Appendix 3B-1 of the Operative District Plan and FNDC Engineering Standards Table 3-16, as summarised in Table 21.

The current FNDC Engineering Standards details a requirement for an enlarged 4 m wide access for 3 to 5 lot roads to allow for fire truck access in accordance with New Zealand Building Code Clause C1, Part 6 where a distance >75 m from the nearest hydrant is required. However, this Building Code Clause applies where a multi-unit development is proposed.

As the proposed subdivision does not trigger the Building Act and no multi-unit development is expected at this stage, the 'alt' option from FNDC Engineering Standards Table 3-16 has not been adopted for this assessment. However, to cover the possibility of a multi-unit development being proposed (such as a dwelling and a minor dwelling) a Consent notice would be required to upgrade the 3 m wide portion of the RoW to a 4 m carriageway width by the future developer.

Table 21: Summary of Proposed RoW Specification

Location	Standard	Min. Legal Width	Min. Carriageway Width	Surface Type
RoW A CH0 – 25	Category E	10 m	6.0 m with 5.5 m wide 'surfacing' and 2x 0.25 m wide shoulders	Seal
RoW A CH25 – 165	Category E	10 m	6.0 m with 5.5 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW A&B CH165 – 200	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW B CH200 – 268	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW E, F, G CH0 - 50	Category D	6 m	4.5 m with 4.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate
RoW E, F, G CH50 – 343	Category C	4 m	3.5 m with 3.0 m wide 'surfacing' and 2x 0.25 m wide shoulders	Aggregate

The proposed RoW shall be graded with a 3 % cross fall where sealed and a 4 % cross fall where in aggregate to direct stormwater runoff and to comply with FNDC Engineering Standards Sheet 9.

Concept RoW plans are presented within Appendix A, complying with Austroads Standards for vertical curvature and FNDC Engineering Standards Sheet 27. The enclosed plans are conceptual only and shall be subject to specific engineering design prior to construction.

8.3 Vehicle Crossings

Vehicle crossings will be formed at subdivision stage. A summary of proposed vehicle crossing standards is presented as Table 22.

Table 22: Summary of Proposed Vehicle Crossings

Location	Type	Detail	Formation
Thorpe Road/ RoW A	FNDC Type 1A, Light Vehicles	1x new crossing with 5.5 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and seal.	Subdivision
RoW A/ RoW E	FNDC Type 1A, Light Vehicles	1x new crossing with 4.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and seal.	Subdivision
All lots	FNDC Type 1A, Light Vehicles	New crossing with 3.0 m width at boundary. Curvature of radius = 5.0 m, a new 375 mm Dia RCP Class 4 culvert and concrete sealed or aggregate, as required to the boundary.	Subdivision
Station Road RoW	Not Required	No upgrade to vehicle crossing proposed as no change to traffic volume/ use of road.	Subdivision

RCP – Reinforced Concrete Pipe

8.4 Sight Distances

Proposed new vehicle crossings, including lot access within the new RoW will need to comply with FNDC Engineering Standards 2023, in particular Sheet 4. The National Speed Limit Register was reviewed for the site through the Waka Kotahi open data portal[13]. Public road speed limits can be summarised as follows:

- Thorpe Road – 50 km/h.

A 3d sight line assessment has been undertaken as part of our concept road modelling to determine the available sight distances at each vehicle crossing and to demonstrate compliance with FNDC Engineering Standards, as set out below in Table 23.

Table 23: Summary of Sight Distances

Vehicle Crossing	Speed Limit	Minimum Sight Distance	Available Distance	Complies
Thorpe Road RoW	50 km/h	70 m	>70 m both directions	Yes
Thorpe Road Lot 8	50 km/h	70 m	>70 m both directions	Yes
Station Road RoW	50 km/h	70 m	>70 m both directions	Yes

The above sight distances have been calculated at a height of 1.15 m above ground level, setback by 3.5 m from the primary road carriageway. Indication of modelled vehicle crossing locations are indicated on our drawings. Key findings in the above modelling are:

- Low risk with minimum line of sight achieved in both directions.

An existing vehicle crossing currently services the existing development at 93 Station Road. Following the proposal, no changes in traffic intensity will occur at this crossing point and the

[13] *https://opendata-nzta.opendata.arcgis.com/datasets/NZTA::national-speed-limit-register-nslr/explore*

vehicle crossing is not required to access any additional proposed household equivalent. As such the vehicle crossing while not meeting current Council standards does not require upgrading as part of this application.

9 NATURAL HAZARD ASSESSMENT

To satisfy the Resource Management Act, 1991 the proposed subdivision must plan for and manage the risk from natural hazards to reduce the potential adverse effects to less than minor. Regulatory assessment of natural hazards at the site location are managed under the jurisdiction of the FNDC District Plan[14], NRC Proposed Regional Plan for Northland[15] and Regional Water and Soil Plan for Northland. A summary of the proposed activities against defined natural hazards is presented as Table 24.

Table 24: Summary of Natural Hazards

Natural Hazard	Applicability	Mitigation & Effect on Environment
Erosion	NA	No mitigation required, less than minor.
Overland flow paths, flooding, inundation	NA	No mitigation required, less than minor.
Landslip	NA	No mitigation required, less than minor.
Rockfall	NA	No mitigation required, less than minor.
Alluvion	NA	No mitigation required, less than minor.
Avulsion	NA	No mitigation required, less than minor.
Unconsolidated fill	NA	No mitigation required, less than minor.
Soil contamination	NA	No mitigation required, less than minor.
Subsidence	NA	No mitigation required, less than minor.
Fire hazard	NA	No mitigation required, less than minor.
Sea level rise	NA	No mitigation required, less than minor.

NA – Not Applicable.

10 LIMITATIONS

This report has been prepared for P J Dairy Ltd as our Client. It may be relied upon by our Client and their appointed Consultants, Contractors and for the purpose of Consent as outlined by the specific objectives in this report. This report and associated recommendations, conclusions or intellectual property is not to be relied upon by any other party for any purpose unless agreed in writing by Geologix Consulting Engineers Ltd and our Client. In any case the reliance by any other party for any other purpose shall be at such parties' sole risk and no reliability is provided by Geologix Consulting Engineers Ltd.

The opinions and recommendations of this report are based on plans, specifications and reports provided to us at the time of writing, as referenced. Any changes, additions or amendments to the project scope and referenced documents may require an amendment to this report and Geologix Consulting Engineers should be consulted. Geologix Consulting Engineers Ltd reserve the right to review this report and accompanying plans.

[14] *Operative District Plan Rule 13.7.3.2.*

[15] *Proposed Regional Plan for Northland, Appeals Version, July 2021, Chapter D.6.*

The recommendations and opinions in this report are based on arisings extracted from exploratory boreholes at discrete locations and any available existing borehole records. The nature and continuity of subsurface conditions, interpretation of ground condition and models away from these specific ground investigation locations are inferred. It must be appreciated that the actual conditions may vary from the assumed ground model. Differences from the encountered ground conditions during subdivision construction may require an amendment to the recommendations of this report.

APPENDIX A

Drawings

GENERAL NOTES

1. CONTOURS AT 2.5m MAJOR AND 0.5m MINOR INTERVALS.
2. TOPOGRAPHIC SURVEY DATA PROVIDED BY LINZ & NRC.
3. FOR INDICATION ONLY, NOT FOR CONSTRUCTION.
4. FEATURES PRESENTED ARE INDICATIVE AND HAVE NOT BEEN VERIFIED.
5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.

25 0 Meters 25 50

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Revision	Issue	Date
A	CONSENT	09/02/2025

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AUCKLAND | NORTHLAND

Project Name and Address

THORPE ROAD, FAR NORTH

PT KOHEWHATA 69 BLOCK

Project	Drawn By
C0471	TI

Client

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Sheet Title

SCHEME PLAN, STAGE 1

Sheet

010

FILE PATH: C:\Users\GeologixConsulting\Synology Drive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwgC0471-Scheme plan.dwg

PLOTTED: 09/04/2022

TAHUNA B

TAHUNA A

LOT 5
7.6090 ha

LOT 3
2.0388 ha

LOT 2
2.1771 ha

LOT 4
2.0114 ha

LOT 1
2.0101 ha

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

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Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
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Sheet Title
SCHEME PLAN, STAGE 2

Sheet
011

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PLOTTED: 03/04/2022

TAHUNA B

LOT 8
7.5622 ha

TAHUNA A

LOT 7
2.2779 ha

PT RANGIHAMAMA A2 BLK

LOT 6
2.2834 ha

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

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Project Name and Address
THORPE ROAD, KAIKOHE
TAHUNA A & TAHUNA B BLKS &
STAGE 2 LOT 5

Project	Drawn By
C0471	TI

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Sheet Title
SCHEME PLAN, STAGE 3

Sheet
012

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7. VERTICAL DATUM - NZVD2016.

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Revision	Issue	Date

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Project Name and Address

THORPE ROAD, KAIKOHE

PT KOHEWHATA 11C2 BLK

Project	Drawn By
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Sheet Title

SCHEME PLAN, STAGE 4

Sheet

013

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TAHUNA B

LOT 9
7.1107 ha

LOT 10
0.4514 ha

LOT 11
4.4743 ha

TAHUNA A

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

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Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
BOUNDARY ADJUSTMENT OF
LOT 8, STAGE 3 & LOTS 1 & 2, STAGE 4

Project	Drawn By
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Sheet Title
SCHEME PLAN, STAGE 5

Sheet
014

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5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.
8. ALL AVAILABLE LOT BOUNDARIES SHOWN FROM ALL STAGES

NO INCREASE OF TRAFFIC VOLUMES TO EXISTING ROAD, NO PROPOSED UPGRADES AS PART OF THIS APPLICATION

NO PROPOSED UPGRADES TO EXISTING VEHICLE CRO DUE TO NO INCREASED TR

TAHUNA B

TAHUNA A

LOT 9
7.1107 ha

LOT 1
0.4647 ha

LOT 2
4.0498 ha

LOT 10
0.4514 ha

LOT 11
4.4743 ha

PT KOHEWHATA 11C2

CATCHMENT 1

CATCHMENT 2

CATCHMENT 3

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

Meters
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A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

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Sheet Title
CATCHMENT PLAN

Sheet
410

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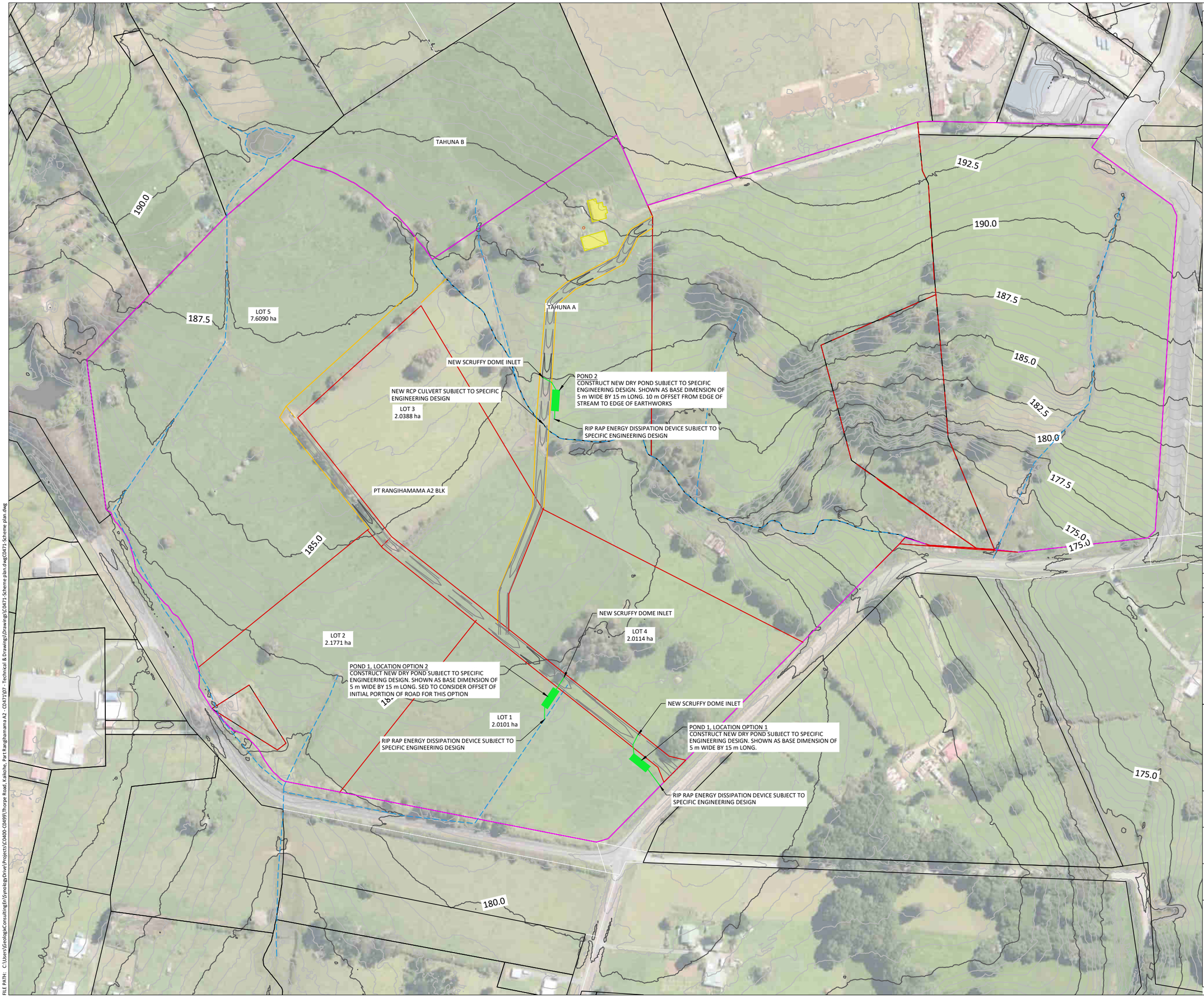

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5. DO NOT SCALE FROM THIS DRAWING.
6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.
8. PROPOSED ROADING SHOWN AS 0.1 m INTERVAL CONTOURS FOR CLARITY.

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25 0 25 50
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A	CONSENT	09/02/2025
Revision	Issue	Date

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Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
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Sheet Title
STORMWATER PLAN

Sheet
411

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CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, FAR NORTH
PT KOHEWHATA 69 BLOCK

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Sheet Title
WASTEWATER PLAN, STAGE 1

Sheet
510

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TAHUNA B

TAHUNA A

LOT 5
7.6090 ha

LOT 3
2.0388 ha

LOT 2
2.1771 ha

LOT 4
2.0114 ha

LOT 1
2.0101 ha

PT RANGIHAMAMA A2 BLK

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

GENERAL NOTES

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TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY

PROPOSED LOT BOUNDARY

OVERLAND FLOWPATH

AVAILABLE DISPOSAL AREA

Meters
25 0 25 50
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Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
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PT RANGIHAMAMA A2 BLK

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Sheet Title
WASTEWATER PLAN, STAGE 2

Sheet
511

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PLOTTED: 03/04/2022

TAHUNA B

LOT 8
7.5622 ha

EXISTING SYSTEM

TAHUNA A

LOT 7
2.2779 ha

PT RANGIHAMAMA A2 BLK

LOT 6
2.2834 ha

190.0

187.5

185.0

182.5

180.0

177.5

175.0

192.5

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CONCEPT WASTEWATER DESIGN

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CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY

PROPOSED LOT BOUNDARY

OVERLAND FLOWPATH

AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address

THORPE ROAD, KAIKOHE

TAHUNA A & TAHUNA B BLKS &

STAGE 2 LOT 5

Project	Drawn By
C0471	TI

Client

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Sheet Title

WASTEWATER PLAN, STAGE 3

Sheet

512

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PLOTTED: 03/04/2022

LOT 1
0.4647 ha

LOT 2
4.0498 ha

PT KOHEWHATA 11C2

192.5
190.0
187.5
185.0
182.5
180.0
177.5
175.0

GENERAL NOTES

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SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

25 0 Meters 25 50
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Revision	Issue	Date
A	CONSENT	09/02/2025

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Project Name and Address
THORPE ROAD, KAIKOHE
PT KOHEWHATA 11C2 BLK

Project	Drawn By
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Sheet Title
WASTEWATER PLAN, STAGE 4

Sheet
513

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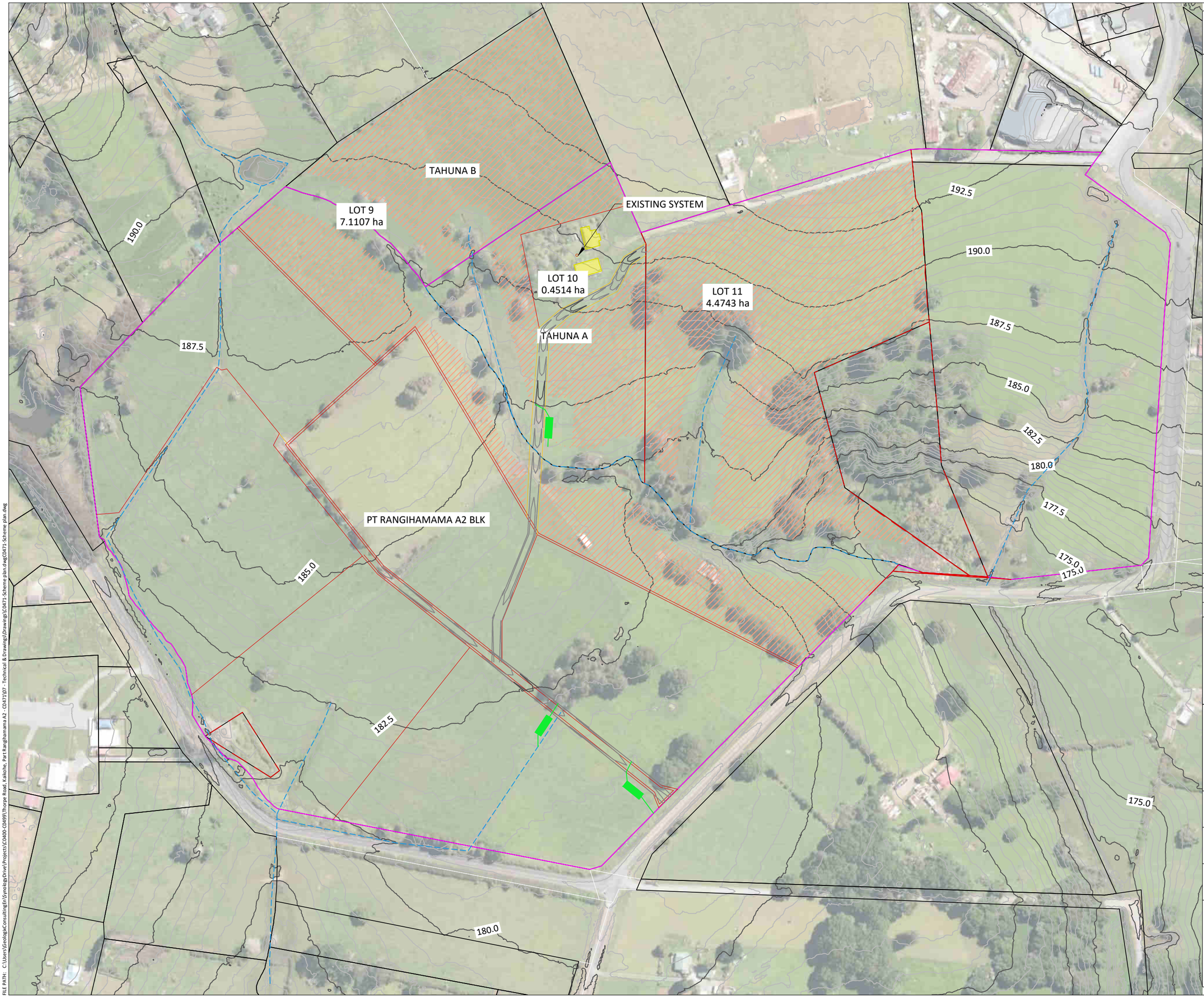
PLOTTED: 03/04/2022



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6. HORIZONTAL DATUM - MT EDEN 2000.
7. VERTICAL DATUM - NZVD2016.

CONCEPT WASTEWATER DESIGN

CONCEPT DEVELOPMENT	5 BEDROOM
CONCEPT NO. OF OCCUPANTS	8 PERSONS
DAILY WASTEWATER GEN.	160 LITRES/PERSON/ DAY
TOTAL WASTEWATER GEN.	1,280 LITRES/ DAY
SOIL CATEGORY (TP58)	CATEGORY 5
SOIL CATEGORY (NZS1547)	CATEGORY 4
SOIL LOADING RATE	3.5 mm/ DAY
TREATMENT QUALITY	SECONDARY
PRIMARY DISPOSAL AREA	367 m²
RESERVE DISPOSAL AREA	110 m² (30 %)
FINAL DESIGN?	NO
CUT OFF DRAINS?	NO
DISCHARGE CONSENT?	NO

EXISTING LOT BOUNDARY
PROPOSED LOT BOUNDARY
OVERLAND FLOWPATH
AVAILABLE DISPOSAL AREA

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
BOUNDARY ADJUSTMENT OF
LOT 8, STAGE 3 & LOTS 1 & 2, STAGE 4

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
WASTEWATER PLAN, STAGE 5

Sheet
514

FILE PATH: C:\Users\GeologixConsulting\Synology Drive\Projects\C0400-C0499\Thorpe Road, Kaikohe, Part Rangihamama A2 - C0471\07 - Technical & Drawings\Drawings\C0471-Scheme plan.dwg C0471-Scheme plan.dwg

PLOTTED: 03/04/2022

CONSTRUCT NEW CROSSING TO FNDC ENGINEERING STANDARDS SHEET 21, SINGLE TYPE 1A

LOT 1
4.0442 ha

PT KOHEWHATA 11C2

PT KOHEWHATA 69

PT KOHEWHATA11C1

CONSTRUCT NEW CROSSING TO FNDC ENGINEERING STANDARDS SHEET 18, SINGLE RESIDENTIAL

LOT 2
0.6010 ha

190.0
187.5
185.0
182.5
177.5
175.0
180.0

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

Meters
40 0 40 80
1:2500

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix
consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, FAR NORTH
PT KOHEWHATA 69 BLOCK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 1

Sheet
710

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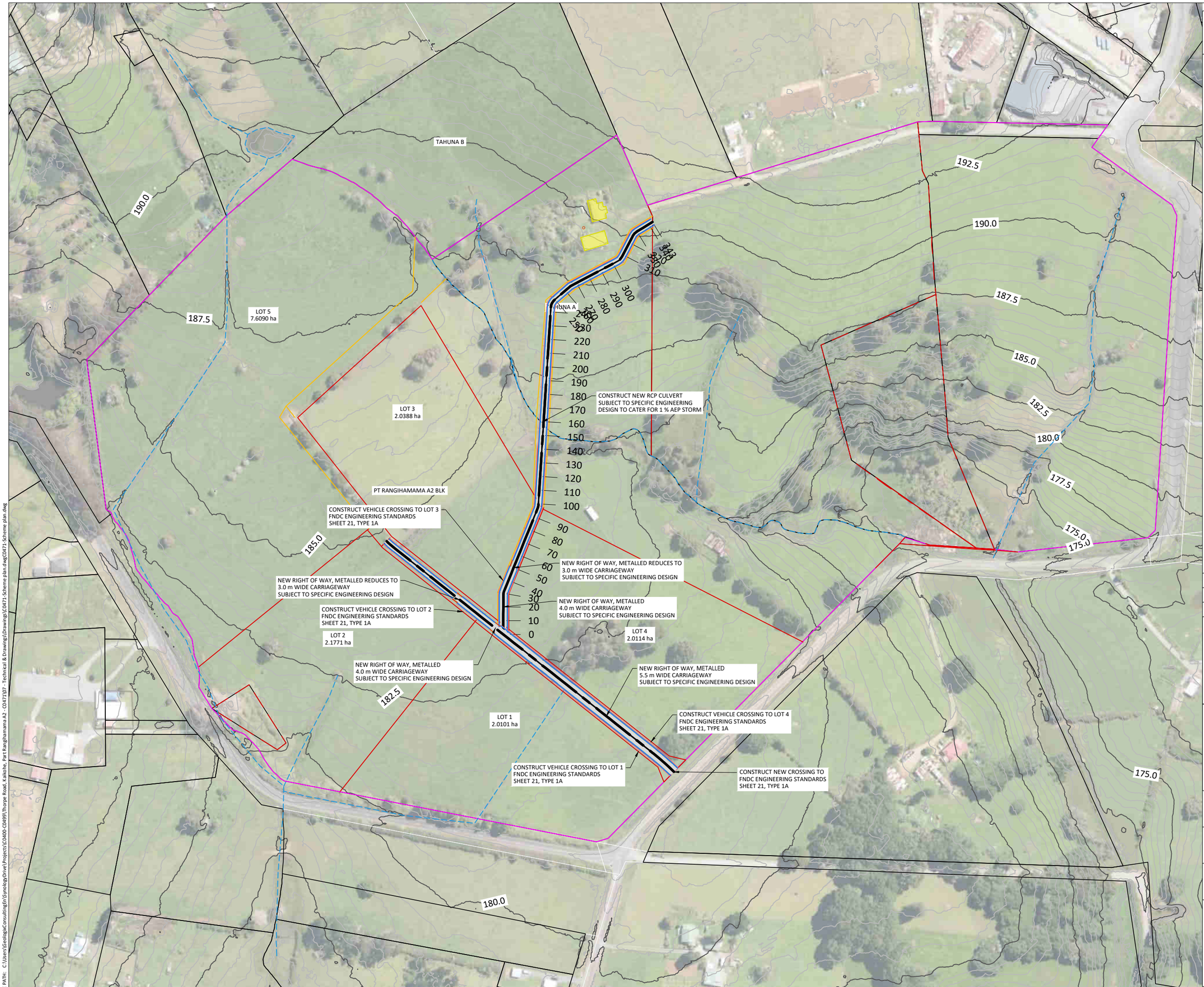
PLOTTED: 09/04/2022



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7. VERTICAL DATUM - NZVD2016.

Meters
25 0 25 50
1:2500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 2

Sheet
711

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PLOTTED: 09/04/2022

TAHUNA B

LOT 8
7.5622 ha

190.0

187.5

LOT 7
2.2779 ha

TAHUNA A

CONSTRUCT VEHICLE CROSSING TO LOT 6
FNDC ENGINEERING STANDARDS
SHEET 21, TYPE 1A

LOT 6
2.2834 ha

PT RANGIHAMAMA A2 BLK

EXTEND RIGHT OF WAY, STAGE 2
WITH 3.0 m WIDE METALLED
RIGHT OF WAY

185.0

GENERAL NOTES

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7. VERTICAL DATUM - NZVD2016.

Meters
15 0 15 30
1:1500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix
consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGE 3

Sheet
712

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PLOTTED: 03/04/2022

NO INCREASE OF TRAFFIC VOLUMES
TO EXISTING ROAD, NO PROPOSED UPGRADES
AS PART OF THIS APPLICATION

NO PROPOSED UPGRADES
TO EXISTING VEHICLE CROSSING
DUE TO NO INCREASED TRAFFIC VOLUME

LOT 10
0.4514 ha

LOT 11
4.4743 ha

TAHUNA A

192.5
190.0
187.5
185.0
182.5
180.0
177.5
175.0
175.0

GENERAL NOTES

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Meters
40 0 40

1:1500.0001

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix
consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
ROADING PLAN, STAGES 4&5

Sheet
713

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PLOTTED: 03/04/2022

ROW A&B

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.700	-0.500	45.9	2.6
2		-0.500	-0.300	252.4	30.0
3		-0.300	-0.100	774.4	129.1
4		-0.100	0.100	850.0	163.3
5		0.100	0.300	150.5	14.5
6		0.300	0.500	6.6	0.1

ROW E, F & G

Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.800	-0.600	19.6	1.0
2		-0.600	-0.400	253.4	23.2
3		-0.400	-0.200	628.6	109.8
4		-0.200	0.000	1100.8	295.6
5		0.000	0.200	160.3	7.6
6		0.200	0.400	1.6	0.1

HUNA A

LOT 3
2.0388 ha

PT RANGIHAMAMA A2 BLK

185.0

LOT 2
2.1771 ha

LOT 4
2.0114 ha

182.5

LOT 1
2.0101 ha

GENERAL NOTES

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15 0 15 30
1:1500

Revision	Issue	Date
A	CONSENT	09/02/2025

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
EARTHWORKS PLAN, STAGE 2

Sheet
810

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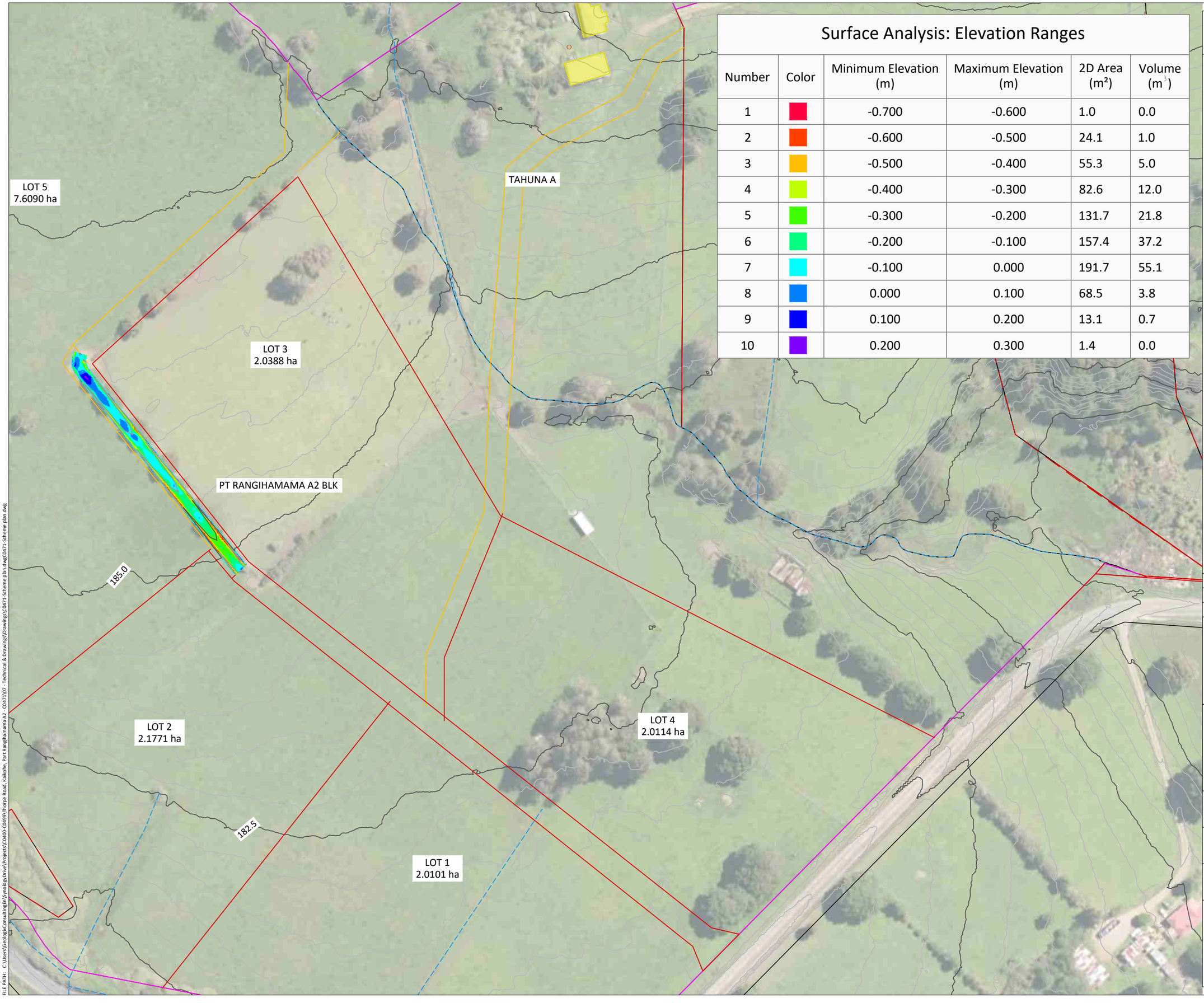
PLOTTED: 03/04/2022



Surface Analysis: Elevation Ranges

Number	Color	Minimum Elevation (m)	Maximum Elevation (m)	2D Area (m^2)	Volume (m^3)
1		-0.700	-0.600	1.0	0.0
2		-0.600	-0.500	24.1	1.0
3		-0.500	-0.400	55.3	5.0
4		-0.400	-0.300	82.6	12.0
5		-0.300	-0.200	131.7	21.8
6		-0.200	-0.100	157.4	37.2
7		-0.100	0.000	191.7	55.1
8		0.000	0.100	68.5	3.8
9		0.100	0.200	13.1	0.7
10		0.200	0.300	1.4	0.0

GENERAL NOTES

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Meters
15 0 15 30
1:1500

A	CONSENT	09/02/2025
Revision	Issue	Date

geologix consulting engineers
AUCKLAND | NORTHLAND

Project Name and Address
THORPE ROAD, KAIKOHE
PT RANGIHAMAMA A2 BLK

Project	Drawn By
C0471	TI

Client
PJ DIARY LTD

Sheet Title
EARTHWORKS PLAN, STAGE 3

Sheet
811

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PLOTTED: 03/04/2022

APPENDIX B

Engineering Borehole Records

INVESTIGATION LOG

HOLE NO.: BH01

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; brownish red. Moist; friable.		0.2				
		0.4				
End Of Hole: 0.60m		0.6				
		0.8				
		1.0				
		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.6m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: BH02

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; brownish red. Moist; friable.		0.2 0.4 0.6 0.8				
End Of Hole: 0.90m		1.0 1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.9m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- ▼ Standing Water Level
- ▷ Out flow
- ◁ In flow

INVESTIGATION TYPE

- ☑ Hand Auger
- ☐ Test Pit

INVESTIGATION LOG

HOLE NO.: BH03

CLIENT: P J Dairy Ltd
PROJECT: Thrope Road, Kaikohe
JOB NO.: C0471

SITE LOCATION:
CO-ORDINATES:
CONTRACTOR: Internal **RIG:** HAND AUGER
ELEVATION: Ground **DRILLER:** NT
START DATE: 01/08/2024 **END DATE:** 01/08/2024 **LOGGED BY:** NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0	TS			Groundwater Not Encountered
SILT; reddish brown.. Moist; friable.		0.2				
		0.4				
		0.6				
		0.8				
End Of Hole: 0.80m		1.0				
		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 0.8m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

INVESTIGATION LOG

HOLE NO.: BH04

CLIENT: P J Dairy Ltd

PROJECT: Thrope Road, Kaikohe

JOB NO.: C0471

SITE LOCATION:

START DATE: 01/08/2024

CO-ORDINATES:

ELEVATION: Ground

END DATE: 01/08/2024

CONTRACTOR: Internal

RIG: HAND AUGER

DRILLER: NT

LOGGED BY: NT

MATERIAL DESCRIPTION (See Classification & Symbology sheet for details)	SAMPLES	DEPTH (m)	LEGEND	SCALA PENETROMETER (Blows / 0mm) 2 4 6 8 10 12 14 16 18	VANE SHEAR STRENGTH (kPa) Vane: 50 100 150 200 Values	WATER
TOPSOIL comprising organic SILT; dark brown; moist; low plasticity.		0.0	TS			Groundwater Not Encountered
Clayey SILT; reddish brown. Moist; low plasticity.		0.2				
		0.4				
		0.6				
		0.8				
		1.0				
End Of Hole: 1.20m		1.2				

PHOTO(S)

REMARKS

1. Hand auger terminated at 1.2m bgl due to dense strata.
2. Groundwater not encountered at the time of drilling.

WATER

- Standing Water Level
- Out flow
- In flow

INVESTIGATION TYPE

- [x] Hand Auger
- [ ] Test Pit

APPENDIX C

Assessment of Environmental Effects and Assessment Criteria

Table 25: Wastewater Assessment of Environmental Effects

Item	NRC Separation Requirement[2]	FNDC Separation Requirement	Site Assessment[3]
Individual System Effects			
Flood plains	Above 5 % AEP	NR	Complies. Disposal field well above mapped flood hazard.
Stormwater flowpath[4]	5 m	NR	Complies, see annotations on Drawing No. 500.
Surface water feature[5]	15 m	15 – 30 m	Complies.
Coastal Marine Area	15 m	30 m	Complies.
Existing water supply bore.	20 m	NR	Complies.
Property boundary	1.5 m	1.5	Complies. Including proposed subdivision boundaries.
Winter groundwater table	0.6 m	0.6 m	Complies.
Topography			Complies, <10 °.
Cut off drain required?			No.
Discharge Consent Required?			No.
	TP58	**NZS1547**	
Cumulative Effects			
Biological Oxygen Demand	≤20 g/m^3		Complies – secondary treatment.
Total Suspended Solids	≤30 g/m^3		Complies – secondary treatment.
Total Nitrogen	10 – 30 g/m^3	15 – 75 g/m^3	Complies – secondary treatment.
Phosphorous	NR	4 – 10 g/m^3	Complies – secondary treatment.
Ammonia	NR	Negligible	Complies – secondary treatment.
Nitrites/ Nitrates	NR	15 – 45 g/m^3	Complies – secondary treatment.
Conclusion: Effects are less than minor on the environment.			

1. AEE based on proposed secondary treated effluent.
2. Northland Regional Plan Table 9.
3. Based on the recommendations of this report and Drawing No. 500.
4. Including any formed road with kerb and channel, and water-table drain that is down-slope of the disposal area.
5. River, lake, stream, pond, dam, or natural wetland.
AEP Annual Exceedance Probability.
NR No Requirement.

APPENDIX D

Stormwater Calculations

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**50 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A			
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 50% AEP, 10MIN DURATION

50 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	63.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
50 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	75.60	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

PRE AND POST-DEVELOPMENT RUNOFF, 50%AEP WITH CC, VARIOUS DURATIONS

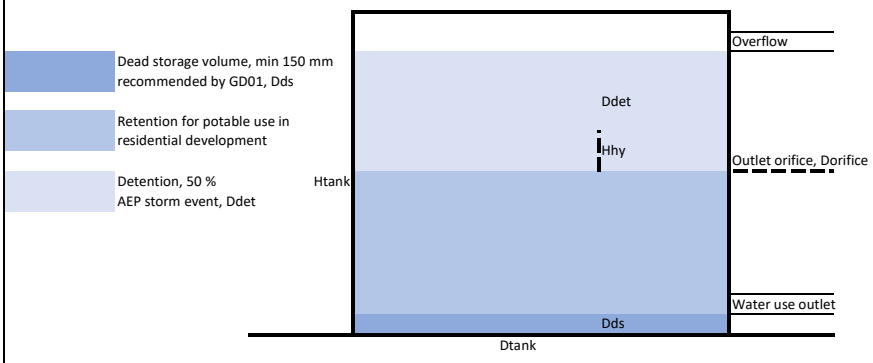
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	63.00	1.2	75.60	9.41	5.16	4.13	*Critical duration (time of concentration) for the catchments is 10min*
20	44.00	1.2	52.80	6.57	4.33	3.46	
30	35.80	1.2	42.96	5.35	3.52	2.82	
60	25.40	1.2	30.48	3.79	2.50	2.00	
120	17.90	1.2	21.48	2.67	1.76	1.41	*Pre-dev calculated on Intensity without CC factor*
360	10.00	1.2	12.00	1.49	0.98	0.79	
720	6.74	1.2	8.09	1.01	0.66	0.53	
1440	4.36	1.2	5.23	0.65	0.43	0.34	
2880	2.70	1.2	3.24	0.40	0.27	0.21	
4320	1.99	1.2	2.39	0.30	0.20	0.16	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	3.36	6.05	0.77	0.77	5.28	3167	*select largest required storage , regardless of duration, to avoid overflow*
20	2.35	4.22	1.11	0.77	3.45	4145	
30	1.91	3.44	0.91	0.77	2.67	4800	
60	1.35	2.44	0.64	0.77	1.67	6006	
120	0.95	1.72	0.45	0.77	0.95	6828	
360	0.53	0.96	0.25	0.77	0.19	4104	
720	0.36	0.65	0.17	0.77	No Att. Req.	0	
1440	0.23	0.42	0.11	0.77	No Att. Req.	0	
2880	0.14	0.26	0.07	0.77	No Att. Req.	0	
4320	0.11	0.19	0.05	0.77	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	6.828	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.65	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.80	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00077	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.32	m	
AREA OF ORIFICE, Aorifice	4.92E-04	m2	
ORIFICE DIAMETER, Dorifice	25	mm	
VELOCITY AT ORIFICE	3.57	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**20 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	PASTURE
EX. PERVIOUS	500	0.59	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 20% AEP, 10MIN DURATION

20 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	81.5	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
20 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	97.8	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

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

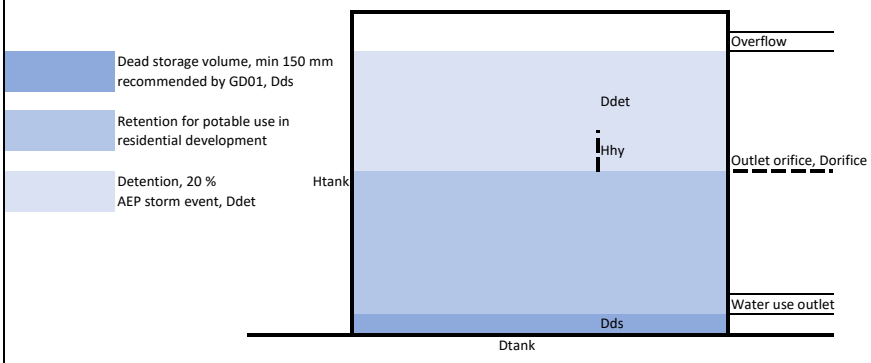
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	81.50	1.2	97.80	12.17	6.68	5.34	*Critical duration (time of concentration) for the catchments is 10min*
20	57.00	1.2	68.40	8.51	5.61	4.48	
30	46.50	1.2	55.80	6.94	4.57	3.66	
60	33.00	1.2	39.60	4.93	3.25	2.60	
120	23.30	1.2	27.96	3.48	2.29	1.83	*Pre-dev calculated on Intensity without CC factor*
360	13.10	1.2	15.72	1.96	1.29	1.03	
720	8.81	1.2	10.57	1.32	0.87	0.69	
1440	5.71	1.2	6.85	0.85	0.56	0.45	
2880	3.54	1.2	4.25	0.53	0.35	0.28	
4320	2.61	1.2	3.13	0.39	0.26	0.21	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	4.35	7.82	1.00	1.00	6.83	4097	*select largest required storage , regardless of duration, to avoid overflow*
20	3.04	5.47	2.57	1.00	4.48	5371	
30	2.48	4.46	2.09	1.00	3.47	6242	
60	1.76	3.17	1.49	1.00	2.17	7819	
120	1.24	2.24	1.05	1.00	1.24	8933	
360	0.70	1.26	0.59	1.00	0.26	5648	
720	0.47	0.85	0.40	1.00	No Att. Req.	0	
1440	0.30	0.55	0.26	1.00	No Att. Req.	0	
2880	0.19	0.34	0.16	1.00	No Att. Req.	0	
4320	0.14	0.25	0.12	1.00	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	8.933	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.85	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.00	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00100	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.42	m	
AREA OF ORIFICE, Aorifice	5.57E-04	m2	
ORIFICE DIAMETER, Dorifice	27	mm	
VELOCITY AT ORIFICE	4.08	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**10 % AEP STORM EVENT, TO PRE-DEVELOPMENT FLOW**	
Date:	14 July 2024	REV 1		

ATTENUATION DESIGN PROVIDED IN ACCORDANCE WITH NEW ZEALAND BUILDING CODE E1 FOR THE RATIONALE METHOD ACCOUNTING FOR THE EFFECTS OF CLIMATE CHANGE (20% FACTOR AS PER FNDC ENGINEERING STANDARDS).
THE 10% AEP SCENARIO IS PROVIDED TO SATISFY FNDC DISTRICT PLAN RULE 13.7.3.4. PRE-DEVELOPMENT RUNOFF REMAINS UNFACTORED IN THIS SCENARIO.
RUNOFF COEFFIENTS DETERMINED FROM FNDC ENGINEERING STANDARDS 2023 TABLE 4-3.

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
0	0	0	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 10% AEP, 10MIN DURATION

10 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	95.1	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
10 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	114.1	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

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

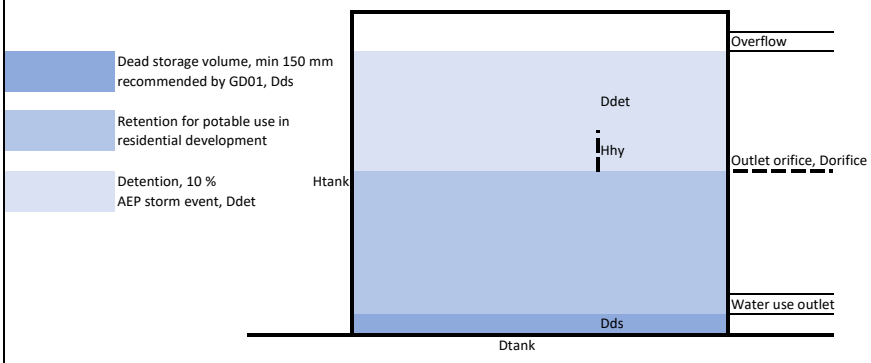
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s		COMMENTS
10	95.10	1.2	114.12	14.20	7.79		*Critical duration (time of concentration) for the catchments is 10min*
20	66.50	1.2	79.80	9.93	6.54		
30	54.30	1.2	65.16	8.11	5.34		
60	38.60	1.2	46.32	5.76	3.80		
120	27.30	1.2	32.76	4.08	2.68		*Pre-dev calculated on Intensity without CC factor*
360	15.40	1.2	18.48	2.30	1.51		
720	10.30	1.2	12.36	1.54	1.01		
1440	6.72	1.2	8.06	1.00	0.66		
2880	4.17	1.2	5.00	0.62	0.41		
4320	3.08	1.2	3.70	0.46	0.30		

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	5.07	9.13	2.72	2.72	6.41	3845	*select largest required storage , regardless of duration, to avoid overflow*
20	3.55	6.38	2.99	2.72	3.66	4396	
30	2.90	5.21	2.44	2.72	2.49	4485	
60	2.06	3.71	1.74	2.72	0.98	3545	
120	1.46	2.62	1.23	2.72	No Att. Req.	0	
360	0.82	1.48	0.69	2.72	No Att. Req.	0	
720	0.55	0.99	0.46	2.72	No Att. Req.	0	
1440	0.36	0.65	0.30	2.72	No Att. Req.	0	
2880	0.22	0.40	0.19	2.72	No Att. Req.	0	
4320	0.16	0.30	0.14	2.72	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	4.485	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	0.43	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	0.58	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00272	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.21	m	
AREA OF ORIFICE, Aorifice	2.15E-03	m2	
ORIFICE DIAMETER, Dorifice	52	mm	
VELOCITY AT ORIFICE	2.89	m/s	At max. head level

Project Ref:	C0471		**STORMWATER ATTENUATION TANK DESIGN**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE			
Design Case:	CONCEPT FUTURE DEVELOPMENT		**1 % AEP STORM EVENT, TO 80 % OF PRE DEVELOPMENT**	
Date:	14 July 2024	REV 1		

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

PRE DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
IMPERVIOUS A	0	0	
IMPERVIOUS B	0	0	
IMPERVIOUS C	0	0	
EX. PERVIOUS	500	0.59	PASTURE
0	0	0	
TOTAL	**500**	TYPE C	

POST DEVELOPMENT CATCHMENT PARAMETERS

ITEM	AREA, A, m2	COEFFICIENT, C	DESCRIPTION
TO TANK	300	0.96	ROOF
OFFSET	200	0.8	DRIVEWAY - METAL
PERVIOUS	0	0	
EX. CONSENTED	0	0	
0	0	0	
TOTAL	**500**	TYPE C	

RAINFALL INTENSITY, 1% AEP, 10MIN DURATION

1 % AEP RAINFALL INTENSITY, 10 MIN, I, mm/hr	141.0	mm/hr
CLIMATE CHANGE FACTOR, 2.1 DEG, 10 MIN*	20	%
1 % AEP RAINFALL INTENSITY, 10 MIN WITH CC	169.2	mm/hr

* CLIMATE CHANGE FACTOR OF 20% APPLIED IN ACCORDANCE WITH FNDC ENGINEERING STANDARDS 4.3.9.1. NIWA HISTORIC RAINFALL INTENSITY DATA, 10MIN, IS MULTIPLIED BY CLIMATE CHANGE FACTOR.

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

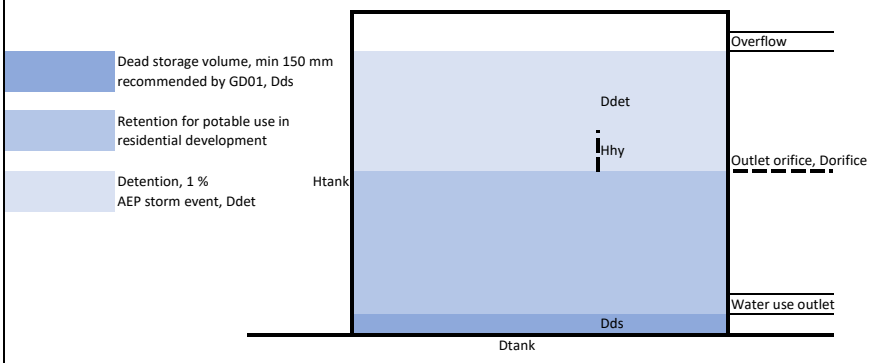
DURATION, min	INTENSITY, mm/hr	CC FACTOR	INTENSITY WITH CC, mm/hr	POST DEV RUNOFF, Qpost, l/s	PRE DEV RUNOFF, Qpre, l/s	80% of PRE DEV RUNOFF, Qpre(80%), l/s	COMMENTS
10	141.00	1.2	169.20	21.06	11.55	9.24	*Critical duration (time of concentration) for the catchments is 10min*
20	99.20	1.2	119.04	14.81	9.75	7.80	
30	81.20	1.2	97.44	12.13	7.98	6.39	
60	57.90	1.2	69.48	8.65	5.69	4.55	
120	41.10	1.2	49.32	6.14	4.04	3.23	*Pre-dev calculated on Intensity without CC factor*
360	23.30	1.2	27.96	3.48	2.29	1.83	
720	15.70	1.2	18.84	2.34	1.54	1.24	
1440	10.30	1.2	12.36	1.54	1.01	0.81	
2880	6.39	1.2	7.67	0.95	0.63	0.50	
4320	4.73	1.2	5.68	0.71	0.47	0.37	

ATTENUATION ANALYSIS, VARIOUS DURATIONS

DURATION, min	OFFSET FLOW, Qoff, l/s	TANK INFLOW , Qin, l/s	ALLOWABLE TANK OUTFLOW, Qpre(80%) - Qoff, l/s	SELECTED TANK OUTFLOW, Qout, l/s	DIFFERENCE (Qin - Qout), l/s	Required Storage, litres	
10	7.52	13.54	1.72	1.72	11.81	7088	*Selected Tank Outflow is selected for critical duration (time of concentration). In this case = 10min*
20	5.29	9.52	2.51	1.72	7.80	9360	
30	4.33	7.80	2.06	1.72	6.07	10929	
60	3.09	5.56	1.47	1.72	3.84	13806	
120	2.19	3.95	1.04	1.72	2.22	16000	*select largest required storage , regardless of duration, to avoid overflow for event of any duration*
360	1.24	2.24	0.59	1.72	0.51	11091	
720	0.84	1.51	0.40	1.72	No Att. Req.	0	
1440	0.55	0.99	0.26	1.72	No Att. Req.	0	
2880	0.34	0.61	0.16	1.72	No Att. Req.	0	
4320	0.25	0.45	0.12	1.72	No Att. Req.	0	

ATTENUATION TANK DESIGN OUTPUT

Concept sizing for 25,000 litre tank



SPECIFICATION

TOTAL STORAGE REQUIRED	16.000	m3	Select largest storage as per analysis
TANK HEIGHT, Htank	2.5	m	Concept sizing for 25,000 litre tank
TANK DIAMETER, Dtank	3.66	m	No. of Tanks 1
TANK AREA, Atank	10.52	m2	Area of ONE tank
TANK MAX STORAGE VOLUME, Vtank	26302	litres	
REQUIRED STORAGE HEIGHT, Ddet	1.52	m	Below overflow
DEAD STORAGE VOLUME, Dds	0.15	m	GD01 recommended minimum
TOTAL WATER DEPTH REQUIRED	1.67	m	
SELECTED TANK OUTFLOW, Qout, l/s	0.00172	m3/s	Selected tank outflow
AVERAGE HYDRAULIC HEAD, Hhy	0.76	m	
AREA OF ORIFICE, Aorifice	7.20E-04	m2	
ORIFICE DIAMETER, Dorifice	30	mm	
VELOCITY AT ORIFICE	5.46	m/s	At max. head level

Project Ref:	C0471	STORMWATER DISPERSION PIPE/ TRENCH	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	WEIGHTED RUNOFF	
Date:	14 July 2024 REV 1		

TP108 Worksheet 1 - Runoff curve number & Initial Abstraction

Soil Class	Cover description	Curve Number, CN	Area	Product of CN * Area
TYPE C	TO TANK	98	300	29400
TYPE C	PERVIOUS	89	0	0
TYPE C	EX. CONSENTED	80	0	0
TYPE C	#REF!	98	#REF!	#REF!
		Total	**#REF!**	**#REF!**
		Total Pervious	0	m2
		Total Impervious	#REF!	m2
		Weighted Runoff, CN	**#REF!**	
		Weighted Initial Abstraction, Ia	**#REF!**	mm

TP108, FIGURE 5.1

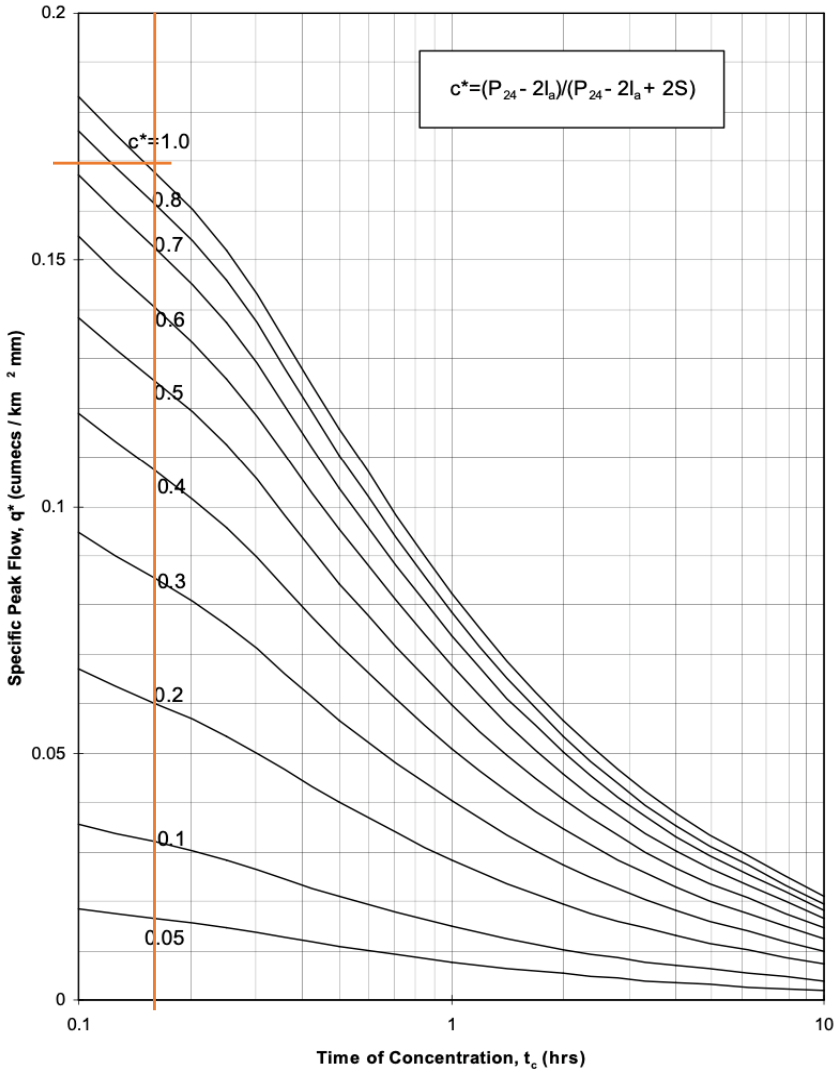


Figure 5.1 Specific Peak Flow Rate

Project Ref:	C0471	**STORMWATER DISPERSION PIPE/ TRENCH**	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	**DISCHARGE DEVICE - LEVEL SPREADER OR TRENCH**	
Date:	14 July 2024 REV 1		

DESIGN BASED ON REFERENCED DEVELOPMENT PLANS TO PROVIDE A MINIMUM LENGTH OF ABOVE OR BELOW GROUND STORMWATER TANK OVERFLOW DISCHARGE DISPERSION DEVICE. IN GENERAL ACCORDANCE WITH MODIFIED RATIONAL METHOD AND AUCKLAND COUNCIL TR2013/018.

DESIGN STORM EVENT **1%** AEP EVENT

SLOPE BETWEEN SOURCE & DISPERSION DEVICE

ELEVATION	h	CHAINAGE, x	Δ x	h bar	Δ A
m	m	m	m	m	m2
31.1	0	0	0	0	0
30	0.1	6	6	0.05	0.3
	TOTALS	6	6		0.3
	SLOPE, Sc	0.017	m/m		

MANNINGS PIPE FLOW - INCOMING PIPE

Dia, m	d/D	α, rad	P, m	A, m^2	R	1:S	n	V, m/s	Q, m^3/s	Q, l/s	
0.15	0.000	6.283	0.0000	0.0000	0.000	60	0.009	0.000	0.0000	0.000	**0 % full**
0.150	0.050	5.381	0.0677	0.0003	0.005	60	0.0090	0.413	0.0001	0.136	
0.150	0.100	4.996	0.0965	0.0009	0.010	60	0.0090	0.645	0.0006	0.593	
0.150	0.150	4.692	0.1193	0.0017	0.014	60	0.0090	0.831	0.0014	1.380	
0.150	0.200	4.429	0.1391	0.0025	0.018	60	0.0090	0.988	0.0025	2.487	
0.150	0.250	4.189	0.1571	0.0035	0.022	60	0.0090	1.126	0.0039	3.890	
0.150	0.300	3.965	0.1739	0.0045	0.026	60	0.0090	1.247	0.0056	5.561	
0.150	0.350	3.751	0.1899	0.0055	0.029	60	0.0090	1.355	0.0075	7.467	
0.150	0.400	3.544	0.2054	0.0066	0.032	60	0.0090	1.450	0.0096	9.570	
0.150	0.450	3.342	0.2206	0.0077	0.035	60	0.0090	1.534	0.0118	11.829	
0.150	0.500	3.142	0.2356	0.0088	0.038	60	0.0090	1.607	0.0142	14.200	**50 % full**
0.150	0.550	2.941	0.2506	0.0100	0.040	60	0.0090	1.670	0.0166	16.634	
0.150	0.600	2.739	0.2658	0.0111	0.042	60	0.0090	1.723	0.0191	19.080	
0.150	0.650	2.532	0.2813	0.0122	0.043	60	0.0090	1.767	0.0215	21.482	
0.150	0.700	2.319	0.2973	0.0132	0.044	60	0.0090	1.800	0.0238	23.777	
0.150	0.750	2.094	0.3142	0.0142	0.045	60	0.0090	1.822	0.0259	25.897	
0.100	0.800	1.855	0.2214	0.0067	0.030	60	0.0090	1.398	0.0094	9.415	
0.100	0.850	1.591	0.2346	0.0071	0.030	60	0.0090	1.395	0.0099	9.926	
0.100	0.900	1.287	0.2498	0.0074	0.030	60	0.0090	1.379	0.0103	10.266	
0.100	0.950	0.902	0.2691	0.0077	0.029	60	0.0090	1.343	0.0104	10.350	
0.100	1.000	0.000	0.3142	0.0079	0.025	60	0.0090	1.226	0.0096	9.632	**Flowing full**

DISPERSION SPECIFICATION

INCOMING PIPE PROPERTIES:

TANK OUTFLOW, 1 % AEP	13.54	l/s		
MAXIMUM PIPE FLOW	25.90	l/s		
SUFFICIENT CAPACITY IN PIPE	YES			
LONGITUDINAL SLOPE	0.017	m/m		
DESIGN VELOCITY, Dv	1.822	m/s		

LEVEL SPREADER SPECIFICATIONS:

PIPE DIAMETER, m	0.15	m		
MANNINGS PIPE ROUGHNESS	0.009			
NUMBER OF ORIFICES	58	No.		
DIA. OF ORIFICE, D	20	mm		
ORIFICE INTERVALS, C/C	310	mm		
DISPERSION PIPE LENGTH, L	**17.67**	**m**		

ORIFICE DESIGN FLOW CHECK:

AREA OF SINGLE ORIFICE, A	0.00031	m2		
FLOW OUT OF 1 ORIFICE	0.000236277	m3/s	0.24 l/s	
FLOW OUT OF ALL ORIFICES	0.01370407	m3/s	13.70 l/s	**DESIGN OK**
VELOCITY FROM SINGLE ORIFICE	0.75	m/s		

BROAD CRESTED WEIR DESIGN FLOW CHECK:

FLOW DEPTH, h	0.075	m		
BASE WIDTH = L	17.67	m		
FLOW AREA	1.33	m2		
WEIR FLOW	0.01390	m3/s	13.90 l/s	**DESIGN OK**
WEIR VELOCITY	0.010	m/s		

INCOMING PIPE & SPREADER SUMARY:

	LOT 1 - 11	
INCOMING PIPE DIAMETER, m	0.100	m
SPREADER PIPE DIAMETER, m	0.150	m
MANNINGS PIPE ROUGHNESS	0.009	
NUMBER OF ORIFICES	58	No.
DIA. OF ORIFICE, D	20	mm
ORIFICE INTERVALS, C/C	310	mm
DISPERSION PIPE LENGTH, L	**17.67**	**m**

Project Ref:	C0471	STORMWATER ATTENUATION TANK DESIGN	geologix consulting engineers
Project Address:	THORPE ROAD, KAIKOHE		
Design Case:	CONCEPT FUTURE DEVELOPMENT	CLIMATE CHANGE FACTORS	
Date:	14 July 2024 REV 1		

CLIMATE CHANGE PROJECTIONS

REPRODUCED FROM NIWA HIRDS, *https://niwa.co.nz/information-services/hirds/help*

Duration/ARI	2 yr	5 yr	10 yr	20 yr	30 yr	40 yr	50 yr	60 yr	80 yr	100 yr
1 hour	12.2	12.8	13.1	13.3	13.4	13.4	13.5	13.5	13.6	13.6
2 hours	11.7	12.3	12.6	12.8	12.9	12.9	13	13	13.1	13.1
6 hours	9.8	10.5	10.8	11.1	11.2	11.3	11.3	11.4	11.4	11.5
12 hours	8.5	9.2	9.5	9.7	9.8	9.9	9.9	10	10	10.1
24 hours	7.2	7.8	8.1	8.2	8.3	8.4	8.4	8.5	8.5	8.6
48 hours	6.1	6.7	7	7.2	7.3	7.3	7.4	7.4	7.5	7.5
72 hours	5.5	6.2	6.5	6.6	6.7	6.8	6.8	6.9	6.9	6.9
96 hours	5.1	5.7	6	6.2	6.3	6.3	6.4	6.4	6.4	6.5
120 hours	4.8	5.4	5.7	5.8	5.9	6	6	6	6.1	6.1

HIRDS V4 Intensity-Duration-Frequency Results
Sitename: Thorpe Road
Coordinate system: WGS84
Longitude: 173.7976
Latitude: -35.4176

DDF Mode Parameters:	c	d	e	f	g	h	i
Values:	0.00228788	0.50126823	-0.00280378	-0.00468173		0.25281537	-0.01167968	3.14262444
Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Rate (mm/hr)		
	24	100	3.17805383	4.600149227	10.26060378		

Rainfall intensities (mm/hr) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	57.6	40.2	32.7	23.2	16.3	9.14	6.13	3.97	2.45	1.81	1.44	1.19
2	0.5	63	44	35.8	25.4	17.9	10	6.74	4.36	2.7	1.99	1.58	1.31
5	0.2	81.5	57	46.5	33	23.3	13.1	8.81	5.71	3.54	2.61	2.08	1.73
10	0.1	95.1	66.5	54.3	38.6	27.3	15.4	10.3	6.72	4.17	3.08	2.45	2.04
20	0.05	109	76.2	62.3	44.3	31.4	17.7	11.9	7.76	4.82	3.56	2.83	2.36
30	0.033	117	82	67	47.7	33.8	19.1	12.9	8.38	5.21	3.85	3.06	2.55
40	0.025	123	86.1	70.4	50.1	35.6	20.1	13.6	8.82	5.49	4.05	3.23	2.69
50	0.02	127	89.3	73	52	36.9	20.9	14.1	9.17	5.71	4.22	3.36	2.8
60	0.017	131	91.9	75.2	53.6	38	21.5	14.5	9.46	5.89	4.35	3.47	2.89
80	0.013	137	96.1	78.6	56	39.8	22.5	15.2	9.91	6.17	4.56	3.64	3.03
100	0.01	141	99.2	81.2	57.9	41.1	23.3	15.7	10.3	6.39	4.73	3.77	3.14
250	0.004	159	112	91.8	65.5	46.6	26.5	17.9	11.7	7.29	5.4	4.31	3.59

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	5.3	3.4	2.6	1.7	1.2	0.73	0.53	0.22	0.18	0.12	0.1	0.1
2	0.5	5.7	3.7	2.7	1.9	1.3	0.8	0.58	0.24	0.2	0.13	0.11	0.12
5	0.2	8.1	5.6	4.2	2.7	1.9	1.1	0.83	0.35	0.28	0.2	0.15	0.16
10	0.1	11	7.8	5.9	3.7	2.6	1.5	1.1	0.48	0.35	0.25	0.2	0.2
20	0.05	14	11	8.3	4.9	3.5	2.1	1.5	0.65	0.45	0.33	0.25	0.25
30	0.033	16	13	9.9	5.8	4.2	2.5	1.7	0.78	0.52	0.38	0.29	0.28
40	0.025	18	14	11	6.5	4.7	2.8	1.9	0.87	0.57	0.42	0.32	0.31
50	0.02	20	16	12	7.1	5.1	3.1	2.1	0.95	0.62	0.46	0.35	0.33
60	0.017	21	17	13	7.7	5.5	3.4	2.3	1	0.66	0.49	0.38	0.35
80	0.013	24	19	15	8.6	6.2	3.8	2.6	1.1	0.72	0.54	0.42	0.39
100	0.01	26	21	16	9.3	6.7	4.2	2.9	1.2	0.78	0.59	0.45	0.42
250	0.004	36	29	23	13	9.5	6.1	4.1	1.7	1.1	0.8	0.62	0.55

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	61.7	43	35	24.8	17.4	9.65	6.42	4.13	2.54	1.86	1.48	1.22
2	0.5	67.6	47.1	38.4	27.2	19.2	10.6	7.07	4.55	2.8	2.05	1.63	1.35
5	0.2	87.7	61.3	50	35.5	25	13.9	9.29	5.98	3.68	2.71	2.15	1.78
10	0.1	102	71.7	58.5	41.5	29.3	16.3	10.9	7.04	4.34	3.2	2.54	2.11
20	0.05	117	82.2	67.2	47.8	33.8	18.9	12.6	8.13	5.02	3.7	2.94	2.44
30	0.033	126	88.5	72.3	51.4	36.4	20.3	13.6	8.79	5.43	4	3.18	2.64
40	0.025	133	92.9	76	54.1	38.3	21.4	14.3	9.26	5.72	4.22	3.35	2.78
50	0.02	137	96.4	78.9	56.1	39.8	22.2	14.9	9.63	5.96	4.39	3.49	2.9
60	0.017	141	99.3	81.2	57.8	41	22.9	15.4	9.93	6.14	4.53	3.6	2.99
80	0.013	148	104	84.9	60.5	42.9	24	16.1	10.4	6.44	4.75	3.77	3.14
100	0.01	153	107	87.7	62.5	44.3	24.9	16.7	10.8	6.67	4.92	3.91	3.25
250	0.004	172	121	99.1	70.8	50.2	28.2	19	12.3	7.61	5.62	4.47	3.71

Rainfall intensities (mm/hr) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	61.7	43	35	24.8	17.4	9.65	6.42	4.13	2.54	1.86	1.48	1.22
2	0.5	67.6	47.1	38.4	27.2	19.2	10.6	7.07	4.55	2.8	2.05	1.63	1.35
5	0.2	87.7	61.3	50	35.5	25	13.9	9.29	5.98	3.68	2.71	2.15	1.78
10	0.1	102	71.7	58.5	41.5	29.3	16.3	10.9	7.04	4.34	3.2	2.54	2.11
20	0.05	117	82.2	67.2	47.8	33.8	18.9	12.6	8.13	5.02	3.7	2.94	2.44
30	0.033	126	88.5	72.3	51.4	36.4	20.3	13.6	8.79	5.43	4	3.18	2.64
40	0.025	133	92.9	76	54.1	38.3	21.4	14.3	9.26	5.72	4.22	3.35	2.78
50	0.02	137	96.4	78.9	56.1	39.8	22.2	14.9	9.63	5.96	4.39	3.49	2.9
60	0.017	141	99.3	81.2	57.8	41	22.9	15.4	9.93	6.14	4.53	3.6	2.99
80	0.013	148	104	84.9	60.5	42.9	24	16.1	10.4	6.44	4.75	3.77	3.14
100	0.01	153	107	87.7	62.5	44.3	24.9	16.7	10.8	6.67	4.92	3.91	3.25
250	0.004	172	121	99.1	70.8	50.2	28.2	19	12.3	7.61	5.62	4.47	3.71

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	62.7	43.7	35.6	25.2	17.7	9.77	6.5	4.17	2.56	1.88	1.49	1.23
2	0.5	68.7	47.9	39.1	27.7	19.5	10.8	7.16	4.59	2.82	2.07	1.64	1.36
5	0.2	89.3	62.4	50.9	36.1	25.4	14.1	9.41	6.04	3.72	2.73	2.17	1.8
10	0.1	104	73	59.6	42.3	29.9	16.6	11.1	7.12	4.39	3.23	2.56	2.12
20	0.05	120	83.7	68.4	48.6	34.4	19.1	12.8	8.23	5.08	3.73	2.96	2.46
30	0.033	129	90.1	73.7	52.4	37.1	20.7	13.8	8.89	5.49	4.04	3.21	2.66
40	0.025	135	94.7	77.4	55.1	39	21.8	14.5	9.37	5.78	4.26	3.38	2.81
50	0.02	140	98.2	80.3	57.2	40.5	22.6	15.1	9.74	6.02	4.43	3.52	2.92
60	0.017	144	101	82.7	58.9	41.7	23.3	15.6	10.1	6.21	4.57	3.63	3.01
80	0.013	151	106	86.5	61.6	43.6	24.4	16.3	10.5	6.51	4.79	3.81	3.16
100	0.01	156	109	89.4	63.7	45.1	25.3	16.9	10.9	6.75	4.97	3.95	3.28
250	0.004	175	123	101	72.1	51.2	28.7	19.2	12.4	7.7	5.67	4.51	3.75

Rainfall intensities (mm/hr) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	65.9	45.9	37.4	26.5	18.6	10.2	6.73	4.31	2.63	1.92	1.52	1.26
2	0.5	72.3	50.5	41.1	29.1	20.5	11.2	7.43	4.74	2.9	2.12	1.68	1.39
5	0.2	94.2	65.8	53.7	38.1	26.8	14.8	9.79	6.25	3.83	2.81	2.22	1.84
10	0.1	110	77.1	62.9	44.7	31.5	17.4	11.5	7.38	4.52	3.32	2.63	2.18
20	0.05	126	88.5	72.3	51.4	36.3	20.1	13.3	8.53	5.24	3.84	3.05	2.52
30	0.033	136	95.3	77.9	55.4	39.1	21.7	14.4	9.22	5.67	4.16	3.3	2.73
40	0.025	143	100	81.8	58.2	41.1	22.8	15.2	9.72	5.97	4.39	3.48	2.88
50	0.02	148	104	85	60.5	42.7	23.7	15.8	10.1	6.22	4.56	3.62	3
60	0.017	152	107	87.5	62.3	44	24.5	16.3	10.4	6.41	4.71	3.74	3.1
80	0.013	159	112	91.5	65.2	46.1	25.6	17	10.9	6.73	4.94	3.92	3.25
100	0.01	165	116	94.6	67.4	47.7	26.5	17.7	11.3	6.97	5.12	4.06	3.37
250	0.004	186	131	107	76.3	54	30.1	20.1	12.9	7.95	5.85	4.64	3.85

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	62.3	43.4	35.4	25	17.6	9.72	6.47	4.16	2.55	1.87	1.48	1.23
2	0.5	68.3	47.6	38.8	27.5	19.3	10.7	7.12	4.57	2.81	2.06	1.64	1.36
5	0.2	88.6	61.9	50.5	35.8	25.3	14	9.36	6.02	3.7	2.72	2.16	1.79
10	0.1	104	72.4	59.1	42	29.7	16.5	11	7.09	4.37	3.21	2.55	2.12
20	0.05	119	83.1	67.9	48.3	34.1	19	12.7	8.19	5.05	3.72	2.95	2.45
30	0.033	128	89.5	73.1	52	36.8	20.5	13.7	8.85	5.47	4.02	3.2	2.65
40	0.025	134	94	76.8	54.7	38.7	21.6	14.5	9.33	5.76	4.24	3.37	2.8
50	0.02	139	97.5	79.7	56.8	40.2	22.5	15	9.69	5.99	4.41	3.51	2.91
60	0.017	143	100	82.1	58.5	41.4	23.2	15.5	10	6.18	4.55	3.62	3
80	0.013	150	105	85.9	61.2	43.3	24.2	16.2	10.5	6.48	4.78	3.79	3.15
100	0.01	154	108	88.7	63.2	44.8	25.1	16.8	10.9	6.72	4.95	3.93	3.27
250	0.004	174	122	100	71.6	50.8	28.5	19.1	12.4	7.66	5.65	4.5	3.73

Rainfall intensities (mm/hr) :: RCP6.0 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	68.8	47.9	39.1	27.6	19.3	10.5	6.93	4.42	2.69	1.96	1.55	1.28
2	0.5	75.6	52.7	43	30.4	21.3	11.6	7.67	4.87	2.97	2.17	1.71	1.42
5	0.2	98.5	68.9	56.2	39.8	28	15.3	10.1	6.44	3.93	2.88	2.27	1.88
10	0.1	115	80.7	65.9	46.8	32.9	18.1	11.9	7.61	4.65	3.4	2.69	2.23
20	0.05	132	92.8	75.8	53.9	37.9	20.9	13.8	8.79	5.38	3.94	3.12	2.58
30	0.033	143	99.9	81.7	58.1	40.9	22.6	14.9	9.51	5.83	4.27	3.38	2.79
40	0.025	150	105	85.8	61.1	43	23.8	15.7	10	6.14	4.5	3.56	2.95
50	0.02	155	109	89.1	63.4	44.7	24.7	16.4	10.4	6.39	4.68	3.71	3.07
60	0.017	160	112	91.7	65.3	46.1	25.5	16.9	10.8	6.6	4.84	3.83	3.17
80	0.013	167	117	96	68.4	48.3	26.7	17.7	11.3	6.92	5.07	4.02	3.33
100	0.01	173	121	99.2	70.7	49.9	27.6	18.3	11.7	7.17	5.26	4.17	3.45
250	0.004	195	137	112	80	56.6	31.4	20.9	13.3	8.18	6	4.76	3.94

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	63.4	44.2	36	25.5	17.9	9.87	6.55	4.2	2.58	1.89	1.49	1.24
2	0.5	69.6	48.5	39.6	28	19.7	10.9	7.22	4.63	2.84	2.08	1.65	1.37
5	0.2	90.4	63.2	51.5	36.6	25.8	14.3	9.5	6.09	3.74	2.75	2.18	1.81
10	0.1	106	73.9	60.4	42.9	30.2	16.8	11.2	7.18	4.42	3.25	2.57	2.14
20	0.05	121	84.8	69.3	49.3	34.8	19.4	12.9	8.3	5.11	3.76	2.98	2.47
30	0.033	130	91.3	74.7	53.1	37.5	20.9	13.9	8.97	5.53	4.07	3.23	2.68
40	0.025	137	95.9	78.4	55.8	39.5	22	14.7	9.45	5.83	4.29	3.4	2.83
50	0.02	142	99.6	81.4	58	41	22.9	15.3	9.83	6.06	4.46	3.54	2.94
60	0.017	146	102	83.8	59.7	42.2	23.6	15.8	10.1	6.26	4.61	3.66	3.03
80	0.013	153	107	87.7	62.5	44.2	24.7	16.5	10.6	6.56	4.83	3.83	3.18
100	0.01	158	111	90.6	64.6	45.7	25.6	17.1	11	6.8	5	3.98	3.3
250	0.004	178	125	102	73.1	51.8	29	19.4	12.5	7.76	5.71	4.54	3.77

Rainfall intensities (mm/hr) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	75.3	52.5	42.8	30.3	21.1	11.4	7.4	4.69	2.82	2.04	1.61	1.33
2	0.5	82.9	57.8	47.1	33.4	23.3	12.6	8.21	5.17	3.12	2.27	1.79	1.48
5	0.2	108	75.8	61.8	43.9	30.7	16.6	10.9	6.86	4.15	3.03	2.38	1.97
10	0.1	127	89	72.7	51.6	36.2	19.6	12.9	8.13	4.92	3.59	2.83	2.34
20	0.05	146	102	83.7	59.5	41.8	22.8	14.9	9.4	5.71	4.16	3.29	2.71
30	0.033	157	110	90.2	64.2	45.1	24.6	16.1	10.2	6.19	4.51	3.56	2.94
40	0.025	165	116	94.7	67.4	47.4	25.9	17	10.7	6.52	4.77	3.76	3.1
50	0.02	172	120	98.5	70.1	49.3	26.9	17.7	11.2	6.8	4.96	3.92	3.23
60	0.017	177	124	101	72.2	50.8	27.8	18.3	11.5	7.01	5.12	4.04	3.33
80	0.013	185	130	106	75.6	53.2	29.1	19.1	12.1	7.36	5.37	4.24	3.5
100	0.01	191	134	110	78.2	55.1	30.2	19.8	12.5	7.63	5.57	4.4	3.63
250	0.004	215	151	124	88.5	62.4	34.3	22.6	14.3	8.7	6.36	5.03	4.15

HIRDS V4 Depth-Duration-Frequency Results
Sitename: Thorpe Road
Coordinate system: WGS84
Longitude: 173.7976
Latitude: -35.4176
DDF Model

Parameters:	c	d	e	f	g	h	i
Values:	0.00228788	0.50126823	-0.00280378	-0.00468173		0.25281537	-0.01167968	3.142624

Example:	Duration (hrs)	ARI (yrs)	x	y	Rainfall Depth (mm)
	24	100	3.17805383	4.600149227	246.2544906

Rainfall depths (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	9.6	13.4	16.4	23.2	32.7	54.8	73.6	95.3	118	130	138	143
2	0.5	10.5	14.7	17.9	25.4	35.8	60.2	80.8	105	130	143	152	158
5	0.2	13.6	19	23.2	33	46.6	78.6	106	137	170	188	199	207
10	0.1	15.8	22.2	27.2	38.6	54.6	92.2	124	161	200	222	235	244
20	0.05	18.1	25.4	31.1	44.3	62.8	106	143	186	231	256	272	283
30	0.033	19.5	27.3	33.5	47.7	67.7	114	154	201	250	277	294	306
40	0.025	20.5	28.7	35.2	50.1	71.1	120	163	212	263	292	310	323
50	0.02	21.2	29.8	36.5	52	73.8	125	169	220	274	304	323	336
60	0.017	21.8	30.6	37.6	53.6	76.1	129	174	227	283	313	333	346
80	0.013	22.8	32	39.3	56	79.6	135	182	238	296	328	349	363
100	0.01	23.6	33.1	40.6	57.9	82.3	140	189	246	307	340	362	376
250	0.004	26.6	37.4	45.9	65.5	93.3	159	215	281	350	389	413	430

Depth standard error (mm) :: Historical Data

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	0.9	1.2	1.3	1.7	2.4	4.6	6.3	5.1	8.9	9.1	9.5	12
2	0.5	0.96	1.3	1.4	1.9	2.7	5.1	6.9	5.5	9.8	10	11	14
5	0.2	1.4	1.9	2.1	2.8	4	7.2	9.6	8.2	14	15	15	19
10	0.1	1.8	2.5	3	3.8	5.5	9.5	13	11	17	19	20	24
20	0.05	2.5	3.4	4.1	5.1	7.5	13	17	15	22	24	25	29
30	0.033	2.9	4.1	4.9	6	8.9	15	20	18	26	28	30	33
40	0.025	3.3	4.6	5.6	6.8	10	17	22	20	28	31	33	36
50	0.02	3.6	5	6.1	7.5	11	19	25	22	31	33	36	39
60	0.017	3.8	5.4	6.6	8.1	12	20	27	24	33	36	38	41
80	0.013	4.3	6	7.4	9.1	13	23	30	26	36	39	42	45
100	0.01	4.6	6.6	8.1	9.9	15	25	33	29	39	42	46	49
250	0.004	6.5	9.2	12	14	21	37	48	40	54	58	63	65

Rainfall depths (mm) :: RCP2.6 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.3	14.3	17.5	24.8	34.8	57.9	77.1	99.2	122	134	142	147
2	0.5	11.3	15.7	19.2	27.2	38.3	63.7	84.9	109	134	148	156	162
5	0.2	14.6	20.4	25	35.5	50	83.4	111	143	177	195	206	214
10	0.1	17.1	23.9	29.3	41.5	58.7	98.1	131	169	208	230	243	253
20	0.05	19.6	27.4	33.6	47.8	67.5	113	151	195	241	266	282	293
30	0.033	21	29.5	36.2	51.4	72.8	122	163	211	261	288	305	317
40	0.025	22.1	31	38	54.1	76.5	129	172	222	275	304	322	334
50	0.02	22.9	32.1	39.4	56.1	79.5	133	179	231	286	316	335	347
60	0.017	23.6	33.1	40.6	57.8	81.9	138	184	238	295	326	345	359
80	0.013	24.6	34.6	42.4	60.5	85.7	144	193	250	309	342	362	376
100	0.01	25.4	35.7	43.9	62.5	88.7	149	200	259	320	354	376	390
250	0.004	28.7	40.4	49.6	70.8	100	169	228	295	366	404	429	446

Rainfall depths (mm) :: RCP2.6 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.3	14.3	17.5	24.8	34.8	57.9	77.1	99.2	122	134	142	147
2	0.5	11.3	15.7	19.2	27.2	38.3	63.7	84.9	109	134	148	156	162
5	0.2	14.6	20.4	25	35.5	50	83.4	111	143	177	195	206	214
10	0.1	17.1	23.9	29.3	41.5	58.7	98.1	131	169	208	230	243	253
20	0.05	19.6	27.4	33.6	47.8	67.5	113	151	195	241	266	282	293
30	0.033	21	29.5	36.2	51.4	72.8	122	163	211	261	288	305	317
40	0.025	22.1	31	38	54.1	76.5	129	172	222	275	304	322	334
50	0.02	22.9	32.1	39.4	56.1	79.5	133	179	231	286	316	335	347
60	0.017	23.6	33.1	40.6	57.8	81.9	138	184	238	295	326	345	359
80	0.013	24.6	34.6	42.4	60.5	85.7	144	193	250	309	342	362	376
100	0.01	25.4	35.7	43.9	62.5	88.7	149	200	259	320	354	376	390
250	0.004	28.7	40.4	49.6	70.8	100	169	228	295	366	404	429	446

Rainfall depths (mm) :: RCP4.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.4	14.6	17.8	25.2	35.4	58.6	77.9	100	123	135	143	148
2	0.5	11.5	16	19.5	27.7	38.9	64.6	85.9	110	135	149	157	163
5	0.2	14.9	20.8	25.4	36.1	50.9	84.7	113	145	178	197	208	216
10	0.1	17.4	24.3	29.8	42.3	59.7	99.6	133	171	211	232	246	255
20	0.05	19.9	27.9	34.2	48.6	68.7	115	153	197	244	269	285	295
30	0.033	21.4	30	36.8	52.4	74.1	124	166	213	263	291	308	319
40	0.025	22.5	31.6	38.7	55.1	77.9	131	175	225	278	307	325	337
50	0.02	23.3	32.7	40.2	57.2	81	136	181	234	289	319	338	350
60	0.017	24	33.7	41.4	58.9	83.4	140	187	241	298	329	349	362
80	0.013	25.1	35.2	43.2	61.6	87.3	146	196	253	313	345	366	380
100	0.01	25.9	36.4	44.7	63.7	90.3	152	203	262	324	358	379	393
250	0.004	29.2	41.1	50.5	72.1	102	172	231	298	369	408	433	450

Rainfall depths (mm) :: RCP4.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11	15.3	18.7	26.5	37.1	61.1	80.7	103	126	138	146	151
2	0.5	12.1	16.8	20.6	29.1	40.9	67.3	89.1	114	139	153	161	167
5	0.2	15.7	21.9	26.8	38.1	53.6	88.5	117	150	184	202	213	221
10	0.1	18.4	25.7	31.5	44.7	63	104	138	177	217	239	252	261
20	0.05	21.1	29.5	36.2	51.4	72.5	120	160	205	251	277	292	303
30	0.033	22.7	31.8	38.9	55.4	78.2	130	173	221	272	299	317	328
40	0.025	23.8	33.4	40.9	58.2	82.2	137	182	233	287	316	334	346
50	0.02	24.7	34.6	42.5	60.5	85.5	142	189	242	298	329	348	360
60	0.017	25.4	35.7	43.7	62.3	88	147	195	250	308	339	359	371
80	0.013	26.6	37.3	45.8	65.2	92.2	154	205	262	323	356	376	390
100	0.01	27.4	38.5	47.3	67.4	95.3	159	212	272	335	369	390	404
250	0.004	30.9	43.5	53.4	76.3	108	181	241	310	382	421	446	462

Rainfall depths (mm) :: RCP6.0 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.4	14.5	17.7	25	35.2	58.3	77.6	99.8	122	135	142	148
2	0.5	11.4	15.9	19.4	27.5	38.7	64.2	85.5	110	135	148	157	163
5	0.2	14.8	20.6	25.3	35.8	50.5	84.2	112	144	178	196	207	215
10	0.1	17.3	24.1	29.6	42	59.3	99	132	170	210	231	245	254
20	0.05	19.8	27.7	34	48.3	68.3	114	153	197	243	268	283	294
30	0.033	21.3	29.8	36.6	52	73.6	123	165	212	262	290	307	318
40	0.025	22.3	31.3	38.4	54.7	77.4	130	174	224	276	305	323	336
50	0.02	23.2	32.5	39.9	56.8	80.4	135	180	233	288	318	337	349
60	0.017	23.8	33.5	41	58.5	82.8	139	186	240	297	328	347	360
80	0.013	24.9	35	42.9	61.2	86.7	145	195	252	311	344	364	378
100	0.01	25.7	36.1	44.4	63.2	89.6	151	202	261	322	356	378	392
250	0.004	29	40.8	50.1	71.6	102	171	230	297	368	407	432	448

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

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	11.5	16	19.5	27.6	38.6	63.2	83.2	106	129	141	148	154
2	0.5	12.6	17.6	21.5	30.4	42.7	69.8	92	117	142	156	164	170
5	0.2	16.4	23	28.1	39.8	56	92	122	155	189	207	218	225
10	0.1	19.2	26.9	33	46.8	65.8	108	143	183	223	245	258	267
20	0.05	22.1	30.9	37.9	53.9	75.9	125	166	211	258	284	300	310
30	0.033	23.8	33.3	40.8	58.1	81.9	135	179	228	280	307	324	335
40	0.025	24.9	35	42.9	61.1	86.1	143	189	241	295	324	342	354
50	0.02	25.9	36.3	44.6	63.4	89.5	148	196	250	307	337	356	368
60	0.017	26.6	37.4	45.9	65.3	92.2	153	203	258	317	348	368	380
80	0.013	27.9	39.1	48	68.4	96.6	160	212	271	332	365	385	399
100	0.01	28.8	40.4	49.6	70.7	99.9	166	220	281	344	379	400	414
250	0.004	32.4	45.6	56.1	80	113	188	250	320	393	432	457	473

Rainfall depths (mm) :: RCP8.5 for the period 2031-2050

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	10.6	14.7	18	25.5	35.8	59.2	78.6	101	124	136	143	149
2	0.5	11.6	16.2	19.8	28	39.4	65.2	86.7	111	136	150	158	164
5	0.2	15.1	21.1	25.8	36.6	51.5	85.6	114	146	180	198	209	217
10	0.1	17.6	24.6	30.2	42.9	60.5	101	134	172	212	234	247	256
20	0.05	20.2	28.3	34.7	49.3	69.6	116	155	199	245	271	286	297
30	0.033	21.7	30.4	37.3	53.1	75.1	125	167	215	265	293	310	321
40	0.025	22.8	32	39.2	55.8	78.9	132	176	227	280	309	327	339
50	0.02	23.7	33.2	40.7	58	82	137	183	236	291	321	340	353
60	0.017	24.3	34.2	41.9	59.7	84.5	141	189	243	300	332	351	364
80	0.013	25.4	35.7	43.8	62.5	88.4	148	198	255	315	348	368	382
100	0.01	26.3	36.9	45.3	64.6	91.5	153	205	264	326	360	382	396
250	0.004	29.6	41.7	51.2	73.1	104	174	233	301	372	411	436	453

Rainfall depths (mm) :: RCP8.5 for the period 2081-2100

ARI	AEP	10m	20m	30m	1h	2h	6h	12h	24h	48h	72h	96h	120h
1.58	0.633	12.5	17.5	21.4	30.3	42.1	68.1	88.8	112	135	147	155	160
2	0.5	13.8	19.3	23.6	33.4	46.6	75.4	98.5	124	150	163	172	177
5	0.2	18.1	25.3	30.9	43.9	61.4	99.8	131	165	199	218	229	236
10	0.1	21.2	29.7	36.3	51.6	72.4	118	155	195	236	259	272	280
20	0.05	24.4	34.1	41.8	59.5	83.5	137	179	226	274	300	316	325
30	0.033	26.2	36.8	45.1	64.2	90.2	148	194	244	297	325	342	352
40	0.025	27.5	38.6	47.4	67.4	94.8	156	204	258	313	343	361	372
50	0.02	28.6	40.1	49.2	70.1	98.6	162	212	268	326	357	376	388
60	0.017	29.4	41.3	50.7	72.2	102	167	219	277	336	369	388	400
80	0.013	30.8	43.3	53.1	75.6	106	175	230	290	353	387	407	420
100	0.01	31.8	44.7	54.9	78.2	110	181	238	301	366	401	422	436
250	0.004	35.9	50.5	62	88.5	125	206	271	343	418	458	483	498

Project: Pond1
Simulation Run: Pre Dev 50 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 00:30

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Site Discharge
RoW E, F, G CHo - 77	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	74	5
RoW E, F, G CHo - 77	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.02	01Jan2000, 12:20	52.47
RoW E, F, G CHo - 77	0	0	01Jan2000, 12:20	52.47
Site Discharge	0	0.02	01Jan2000, 12:20	52.47

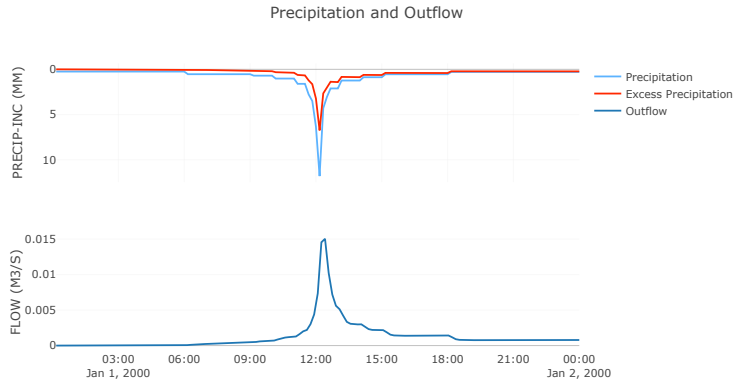
Subbasin: RoW A & B

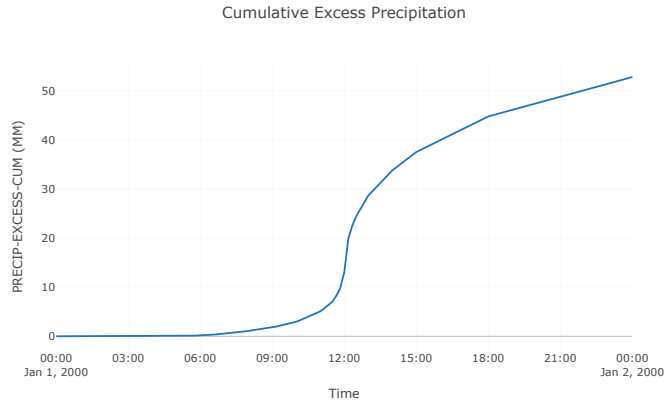
Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

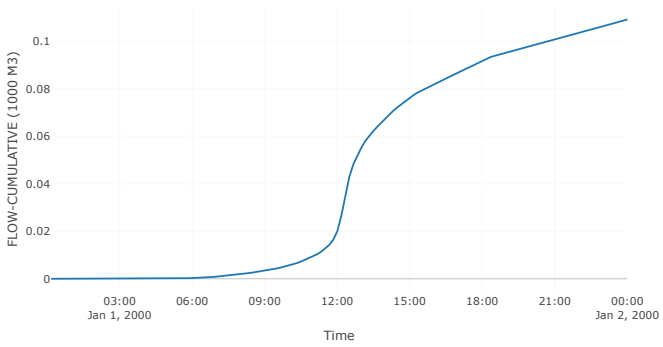
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW A & B	
Peak Discharge (M3/S)	0.02
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47
Precipitation Volume (M3)	218.28
Loss Volume (M3)	108.46
Excess Volume (M3)	109.82
Direct Runoff Volume (M3)	109.15
Baseflow Volume (M3)	0

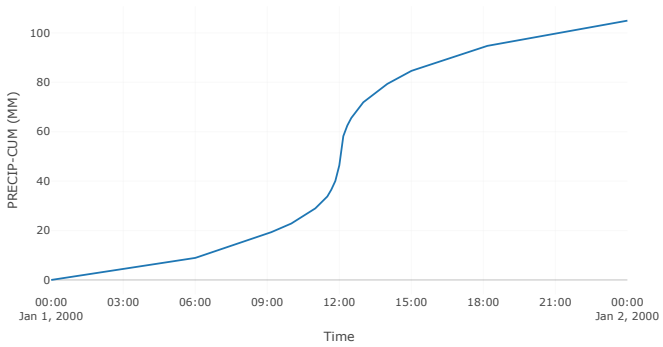


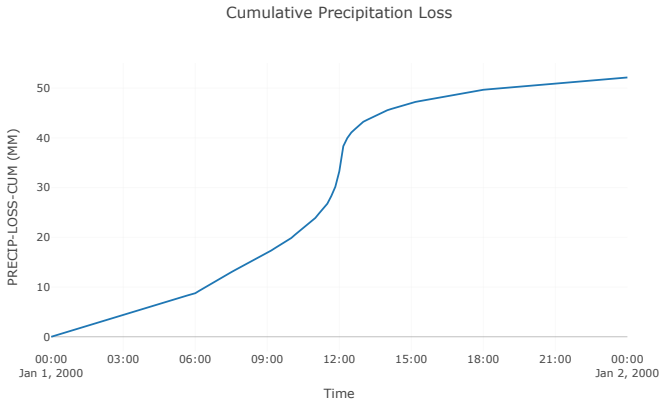


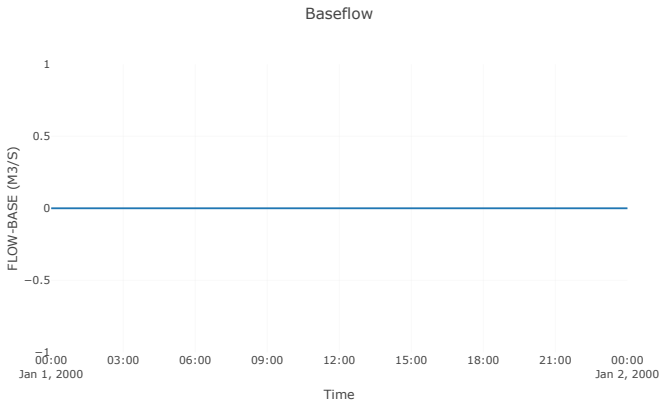
Cumulative Outflow

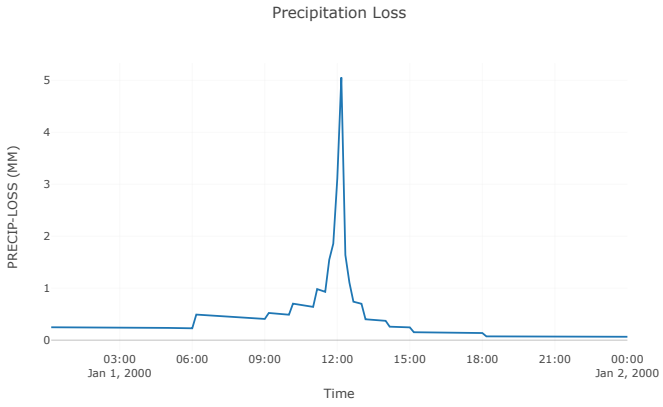


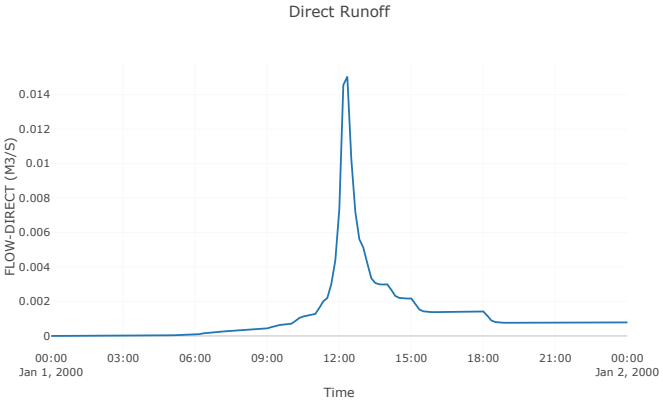
Cumulative Precipitation




Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
5
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
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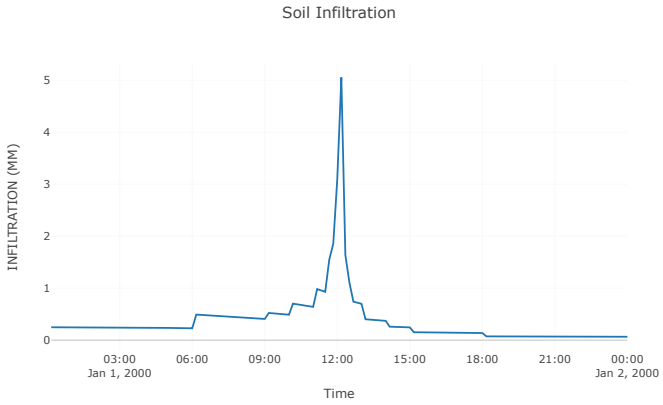
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

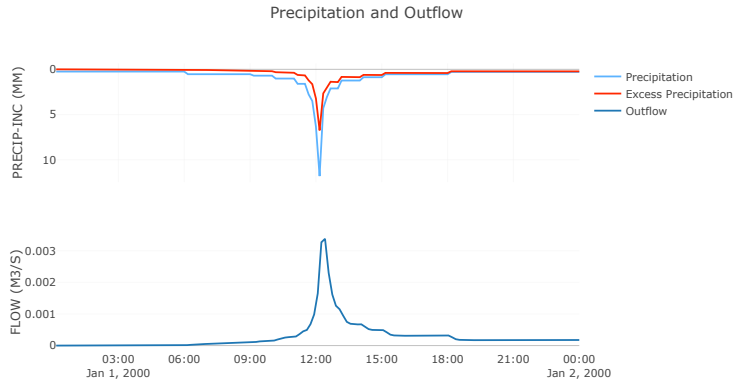
Subbasin: RoW E, F, G CHo-77

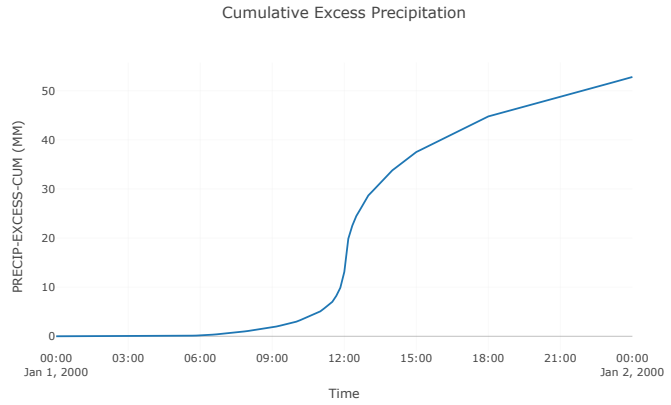
Area (KM2) : 0
Downstream : Site Discharge

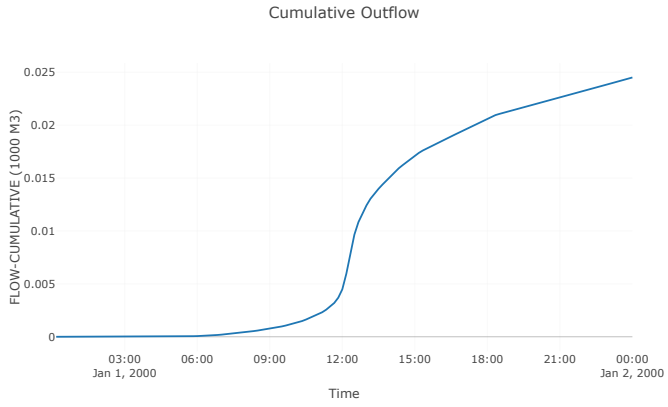
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

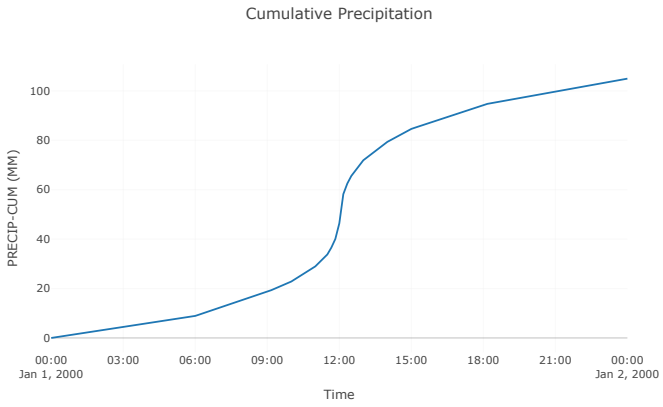
Transform: Scs	
Lag	10
Unitgraph Type	Standard

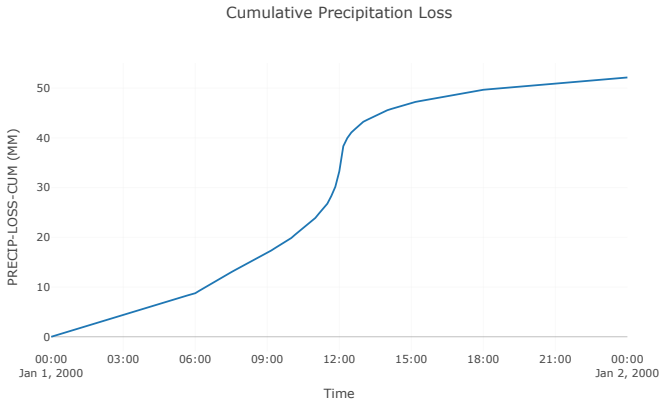
Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47
Precipitation Volume (M3)	49.01
Loss Volume (M3)	24.35
Excess Volume (M3)	24.66
Direct Runoff Volume (M3)	24.51
Baseflow Volume (M3)	0

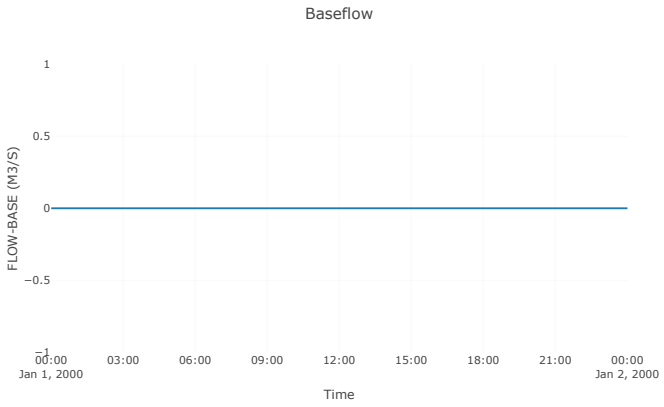


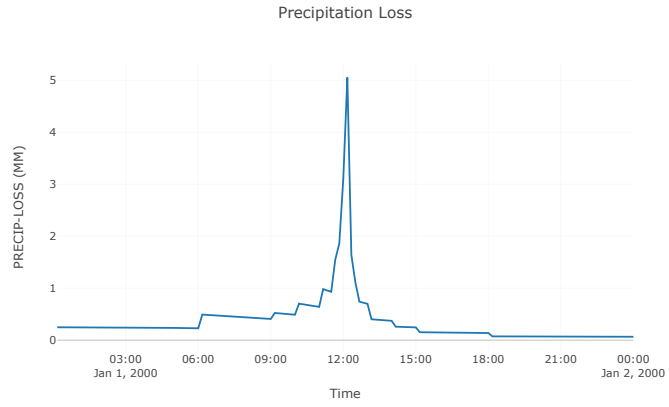


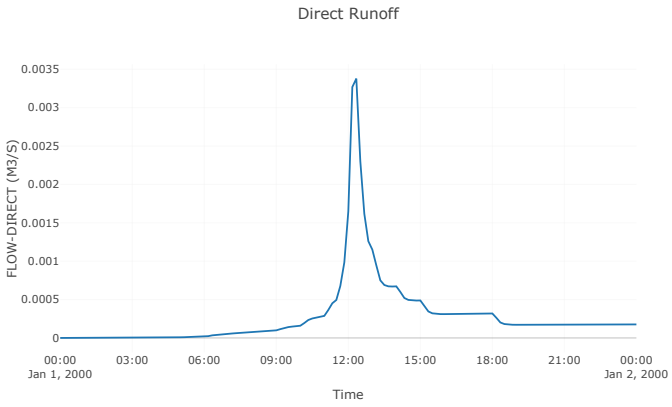

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.025
0.02
0.015
0.01
0.005
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

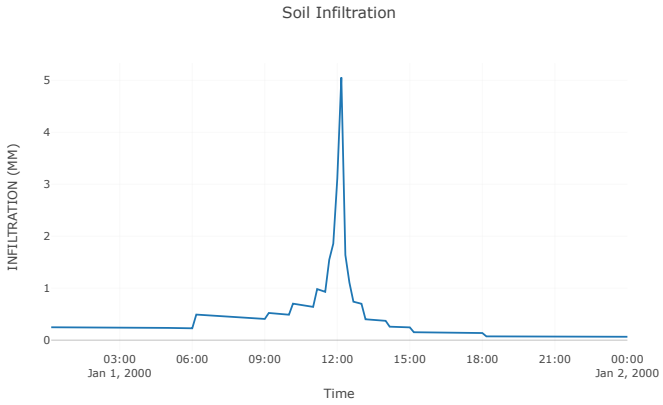

Cumulative Precipitation
PRECIP-CUM (MM)
100
80
60
40
20
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

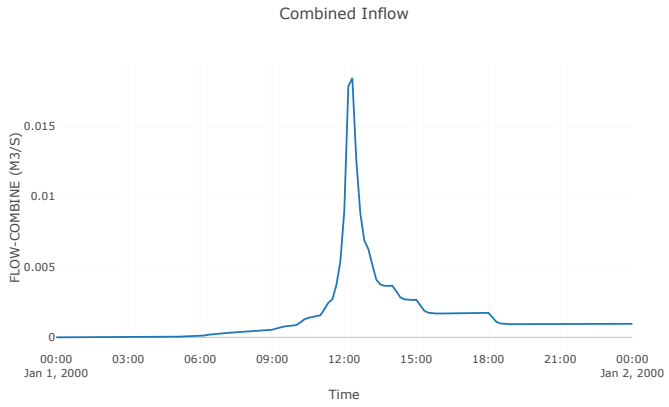

Precipitation Loss
PRECIP-LOSS (MM)
5
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

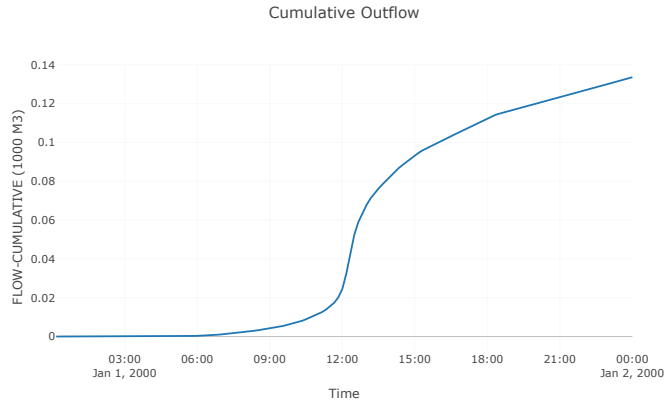

Direct Runoff
FLOW-DIRECT (M3/S)
0.0035
0.003
0.0025
0.002
0.0015
0.001
0.0005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

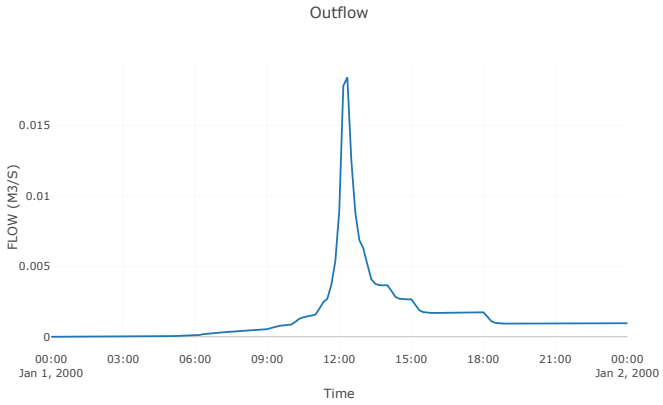

Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.02
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	52.47






Outflow
FLOW (M3/S)
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Post Dev Att 50 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Pond 1
RoW E, F, G CHo - 77	Pond 1

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	92	0
RoW E, F, G CHo - 77	0	89	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.03	01Jan2000, 12:10	101.65
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:10	95.42
Pond 1	0	0.01	01Jan2000, 12:50	100.3
Site Discharge	0	0.01	01Jan2000, 12:50	100.3

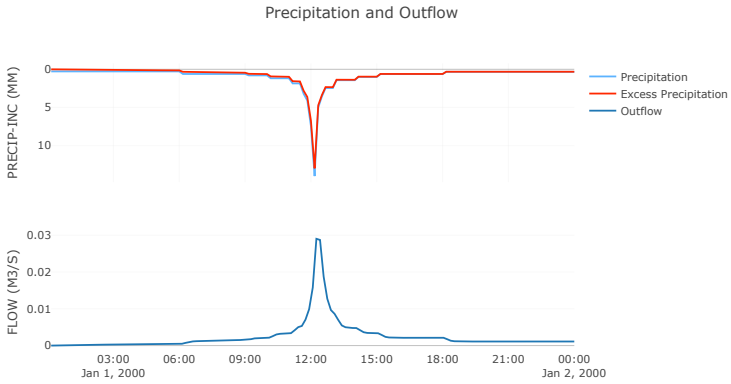
Subbasin: RoW A & B

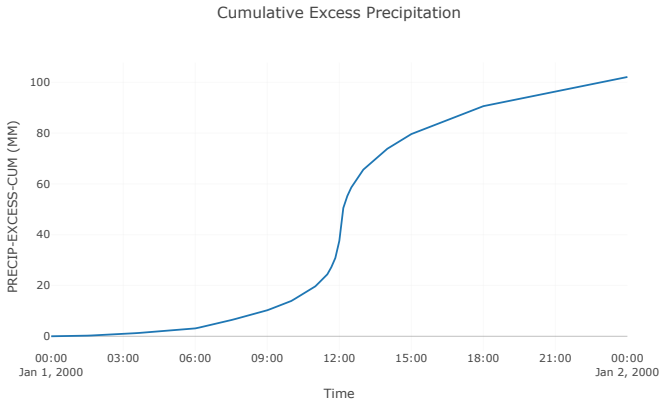
Area (KM2) : 0
Downstream : Pond 1

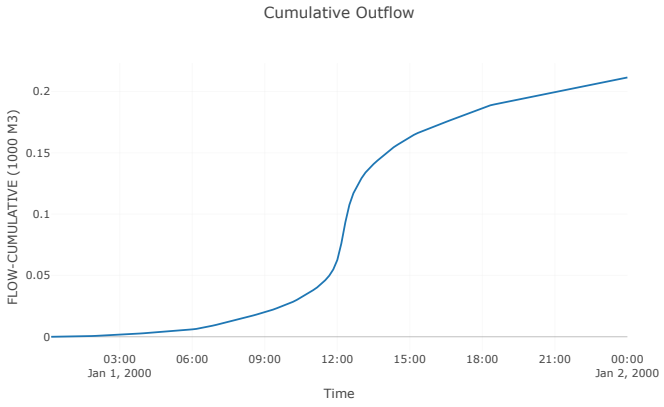
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

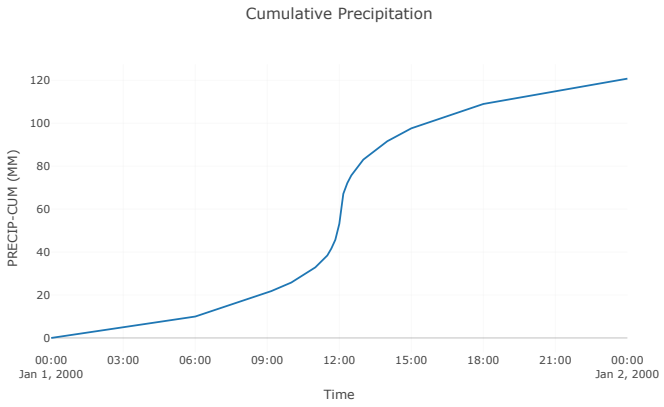
Transform: Scs	
Lag	10
Unitgraph Type	Standard

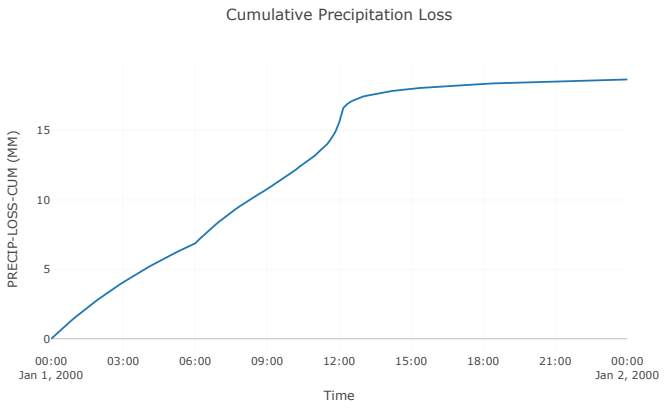
Results: RoW A & B	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	101.65
Precipitation Volume (M3)	251.23
Loss Volume (M3)	38.84
Excess Volume (M3)	212.39
Direct Runoff Volume (M3)	211.44
Baseflow Volume (M3)	0

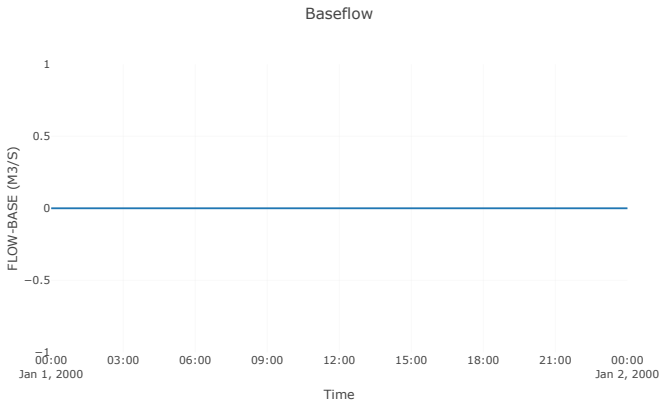


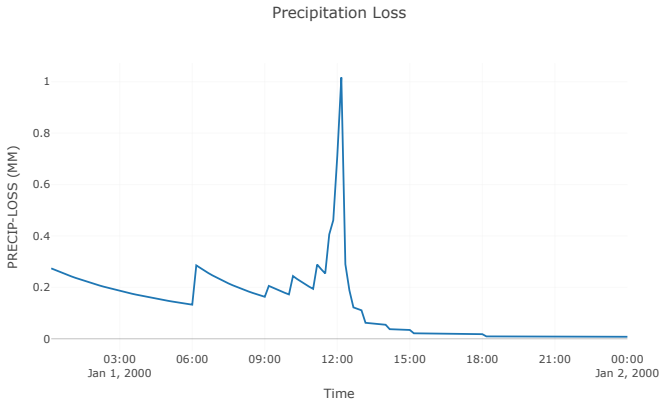


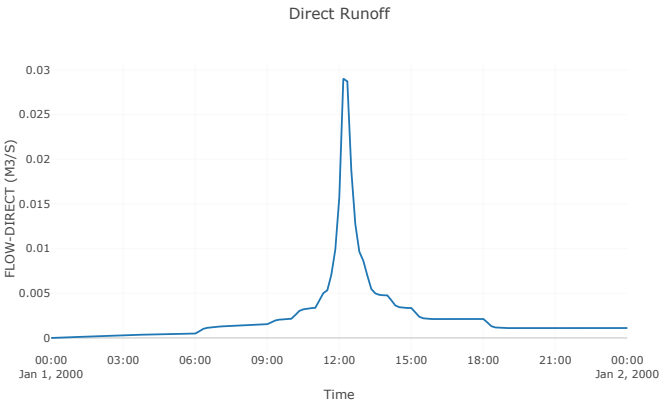

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

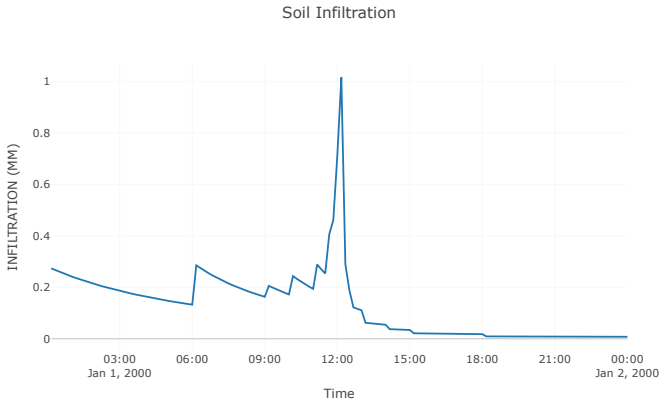

Cumulative Precipitation
PRECIP-CUM (MM)
120
100
80
60
40
20
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

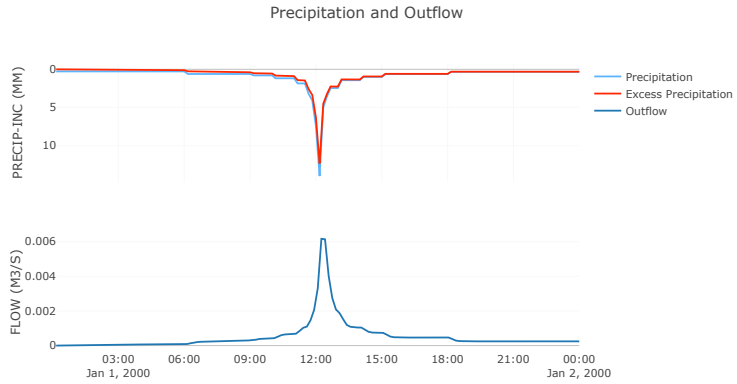
Subbasin: RoW E, F, G CHo-77

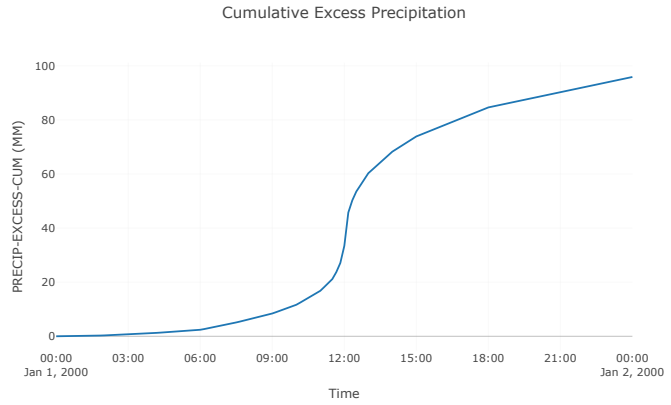
Area (KM2) : 0
Downstream : Pond 1

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

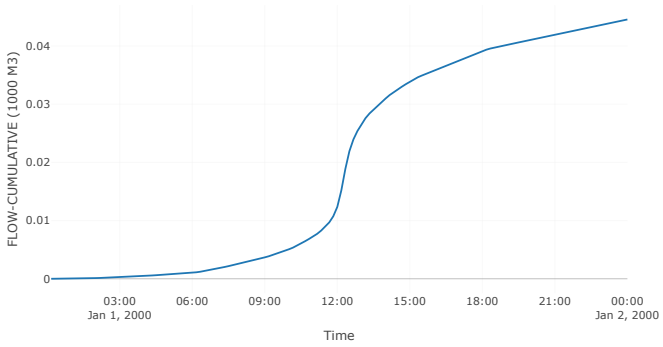
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	95.42
Precipitation Volume (M3)	56.41
Loss Volume (M3)	11.64
Excess Volume (M3)	44.77
Direct Runoff Volume (M3)	44.56
Baseflow Volume (M3)	0

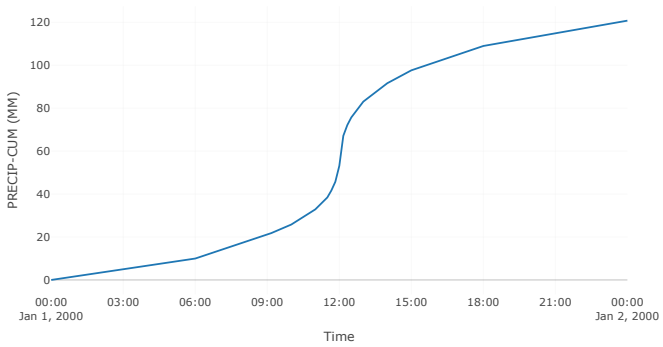


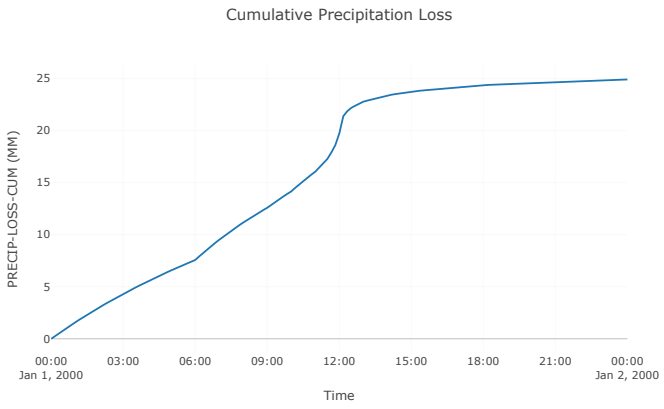


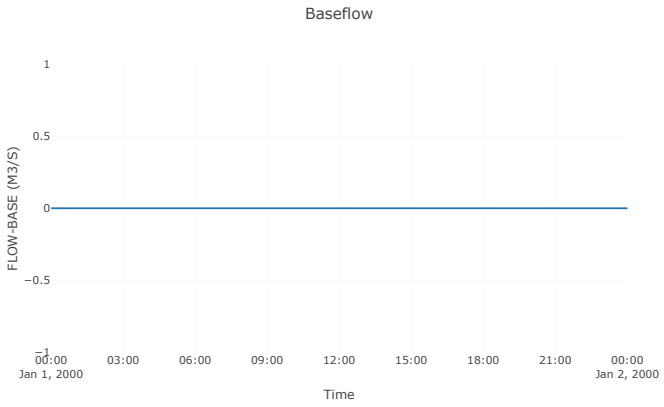
Cumulative Outflow

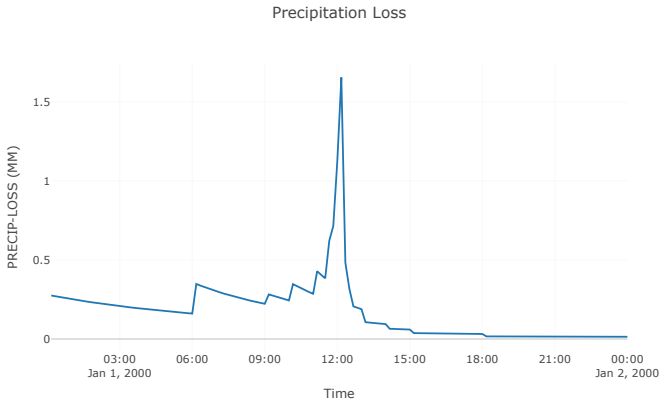


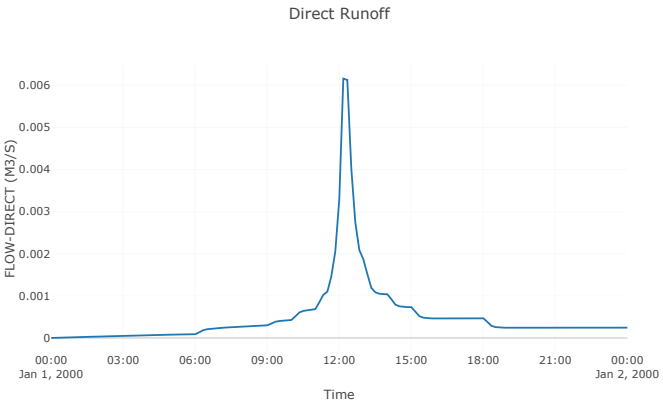
Cumulative Precipitation

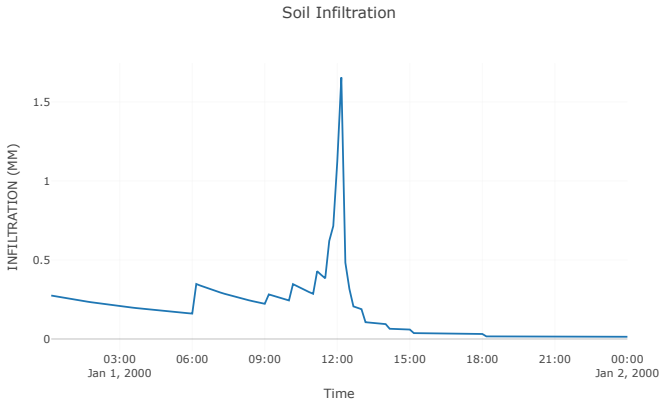



Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1.5
1
0.5
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

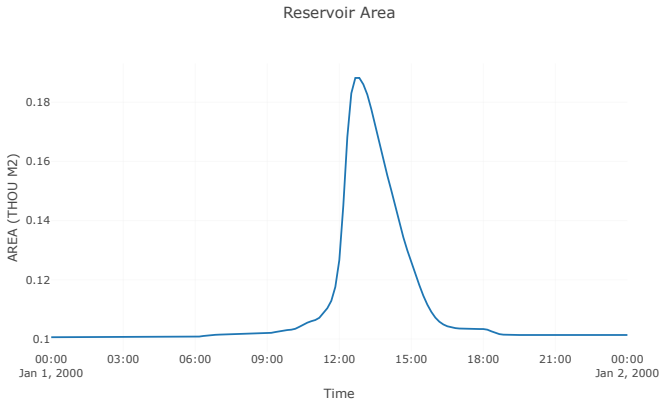

Direct Runoff
FLOW-DIRECT (M3/S)
0.006
0.005
0.004
0.003
0.002
0.001
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

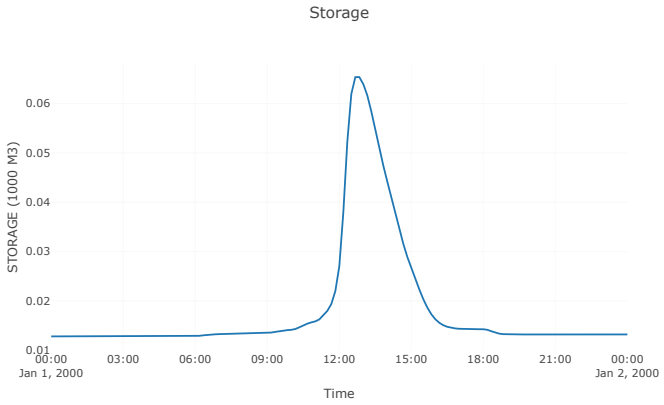

Soil Infiltration
INFILTRATION (MM)
1.5
1
0.5
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

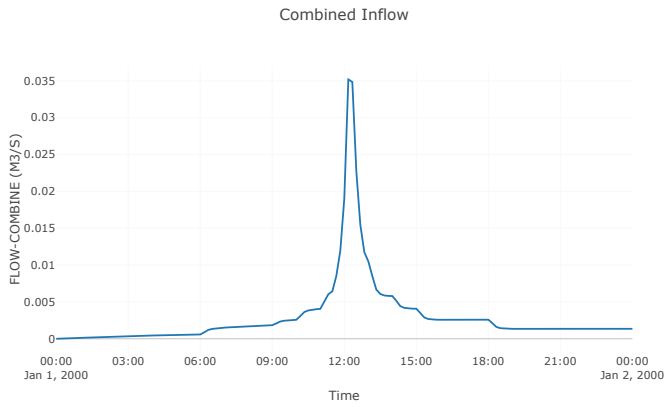
Reservoir: Pond 1

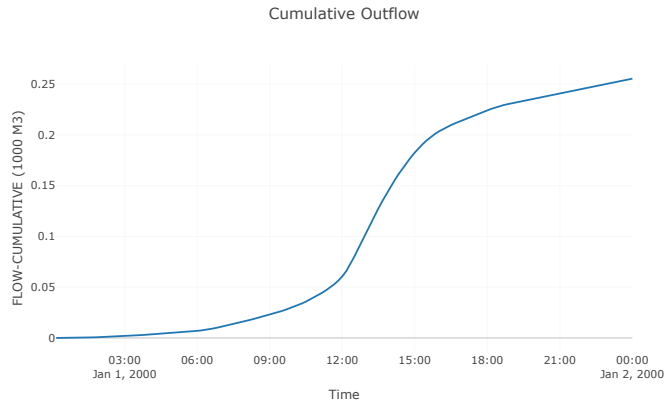
Downstream : Site Discharge

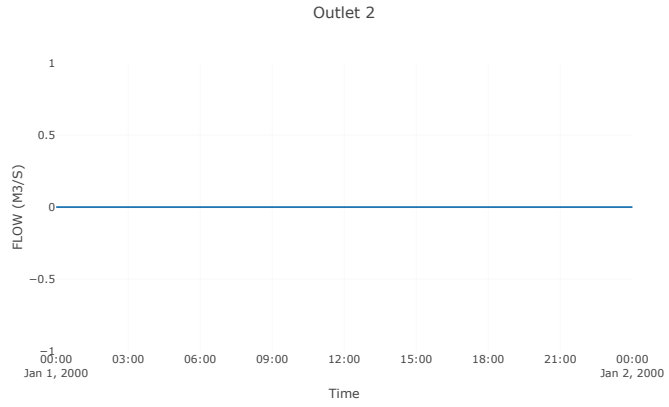
Results: Pond 1	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:50
Volume (MM)	100.3
Peak Inflow (M3/S)	0.04
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	256
Maximum Storage (M3)	65.36
Peak Elevation (M)	0.57
Discharge Volume (M3)	255.46

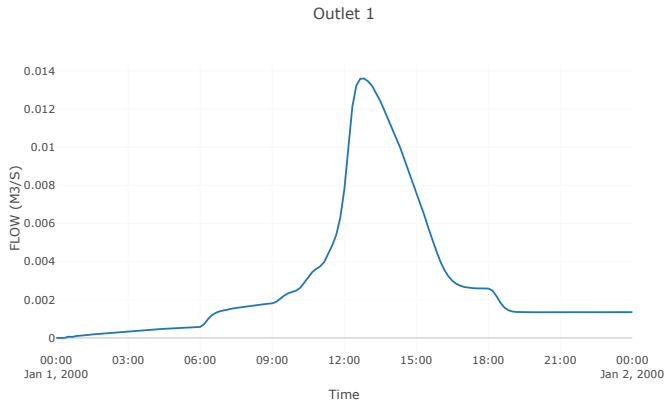


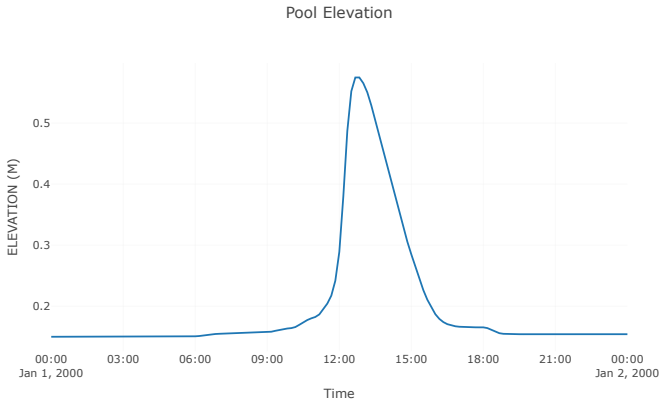


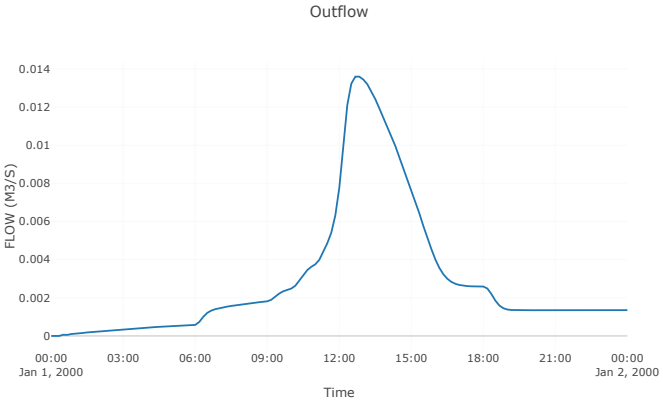

Combined Inflow
FLOW-COMBINE (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Outlet 2
1
0.5
0
−0.5
−1
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

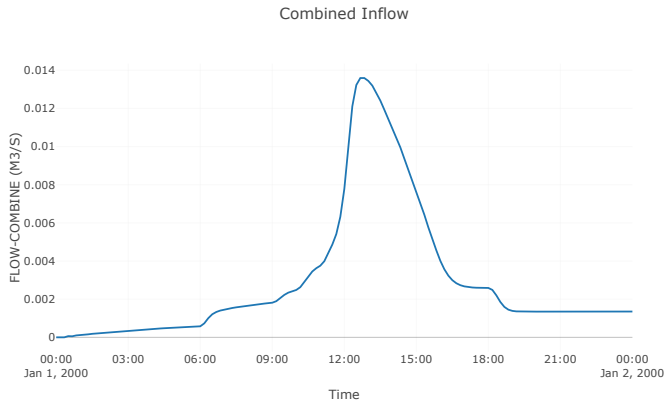

Outlet 1
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

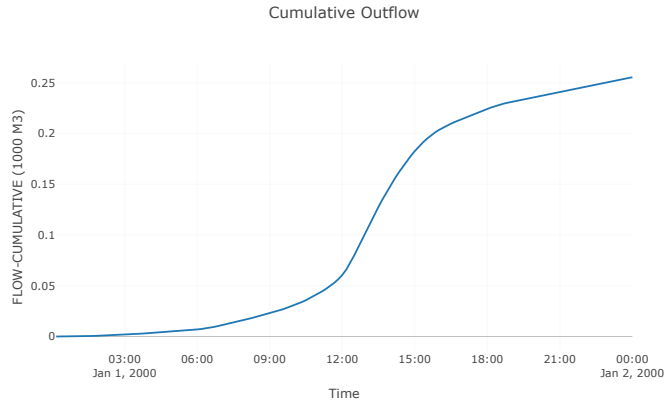

Pool Elevation
ELEVATION (M)
0.5
0.4
0.3
0.2
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

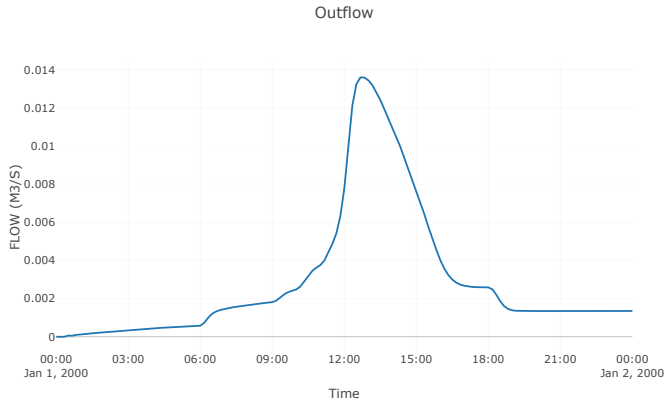

Outflow
FLOW (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:50
Volume (MM)	100.3






Outflow
FLOW (M3/S)
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Pre Dev, 20 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Site Discharge
RoW E, F, G CHo - 77	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	74	5
RoW E, F, G CHo - 77	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.03	01Jan2000, 12:20	120.48
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:20	120.48
Site Discharge	0	0.04	01Jan2000, 12:20	120.48

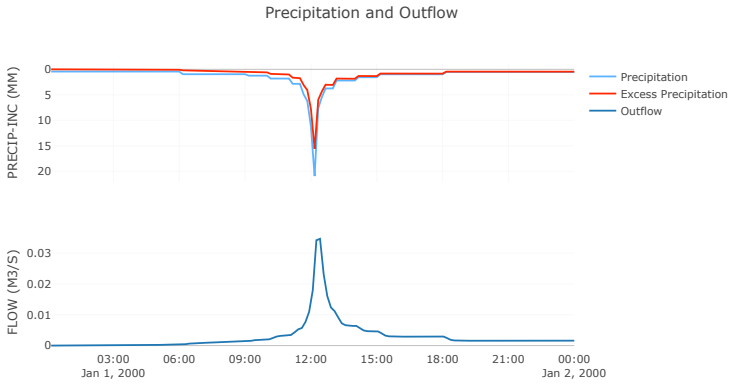
Subbasin: RoW A & B

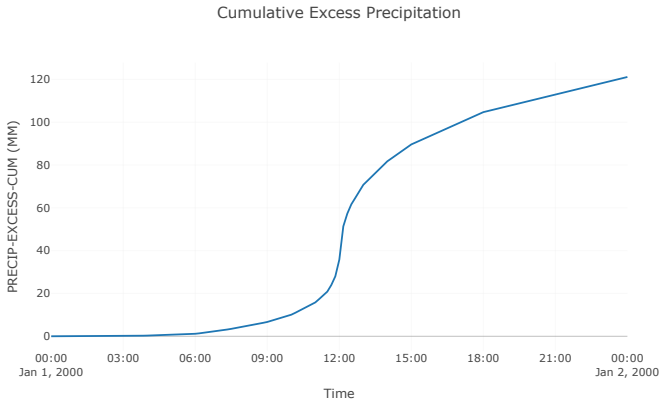
Area (KM2) : 0
Downstream : Site Discharge

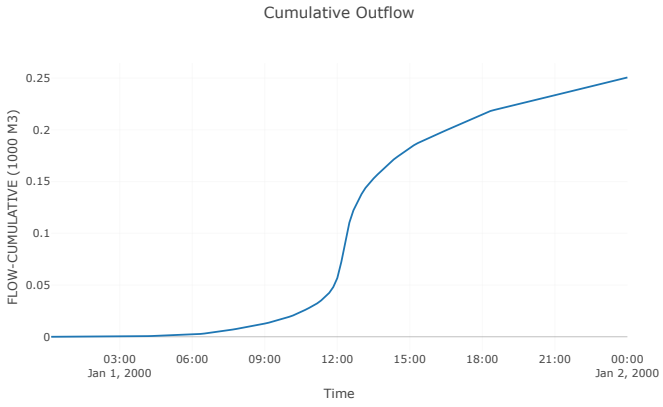
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

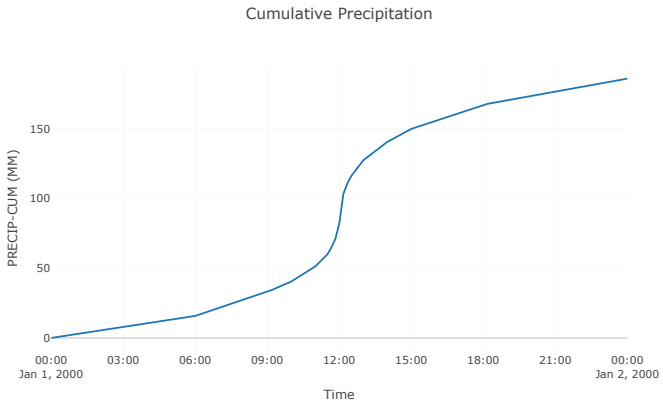
Transform: Scs	
Lag	10
Unitgraph Type	Standard

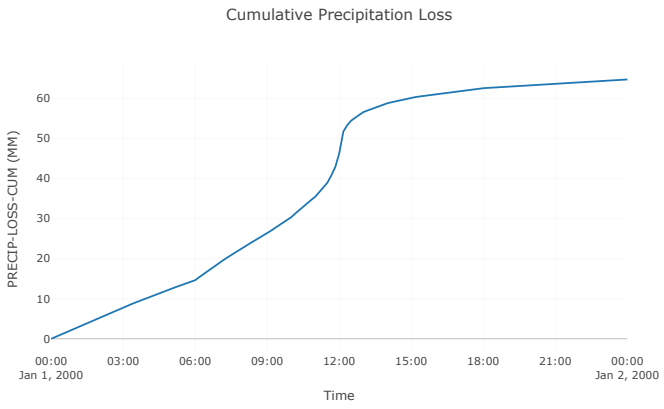
Results: RoW A & B	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48
Precipitation Volume (M3)	386.67
Loss Volume (M3)	134.7
Excess Volume (M3)	251.97
Direct Runoff Volume (M3)	250.6
Baseflow Volume (M3)	0

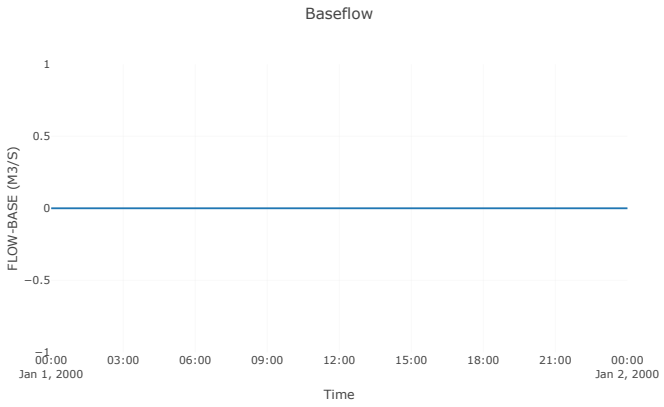


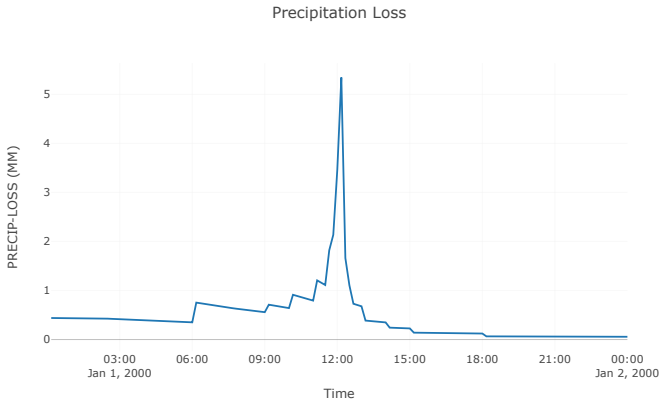


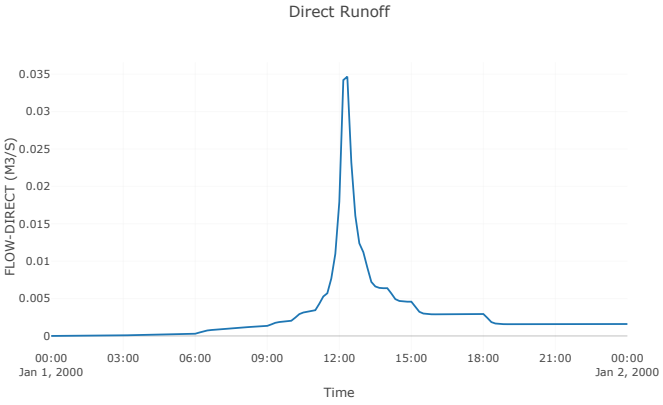

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

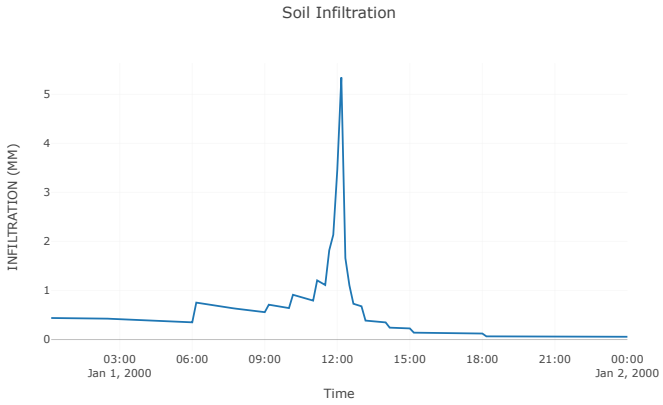

Cumulative Precipitation
PRECIP-CUM (MM)
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
60
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
5
4
3
2
1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

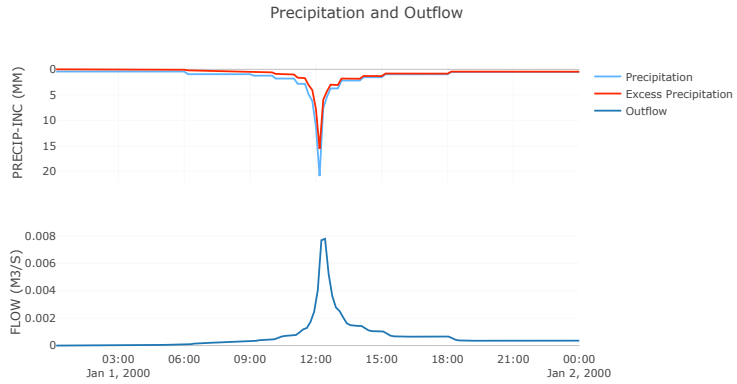
Subbasin: RoW E, F, G CHo-77

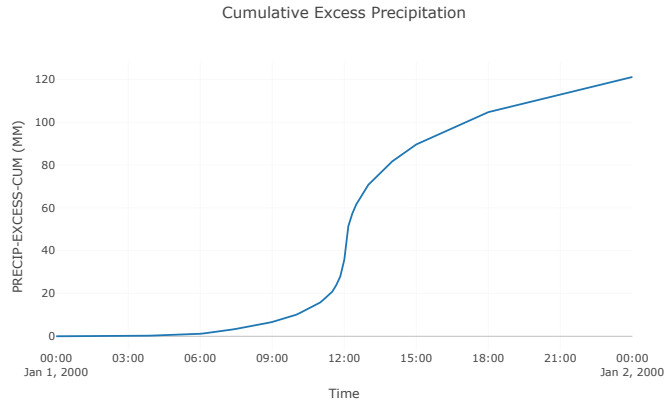
Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

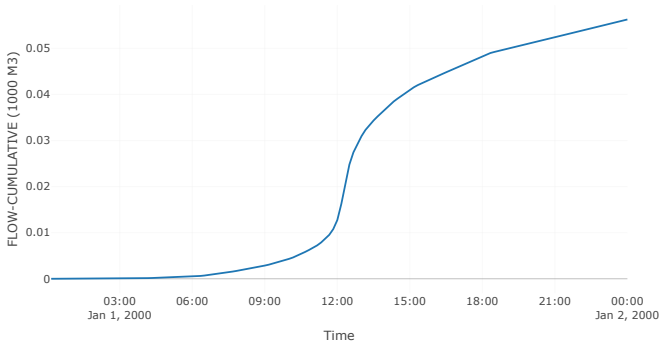
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48
Precipitation Volume (M3)	86.81
Loss Volume (M3)	30.24
Excess Volume (M3)	56.57
Direct Runoff Volume (M3)	56.26
Baseflow Volume (M3)	0

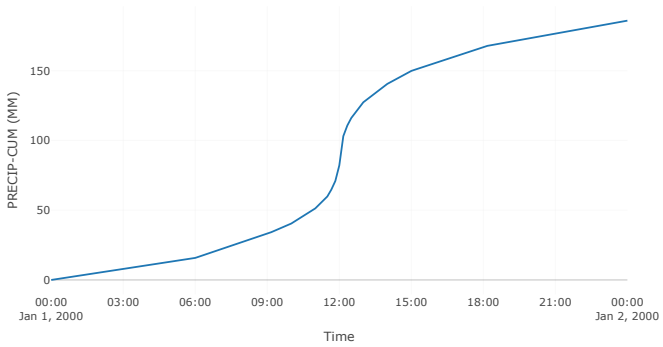


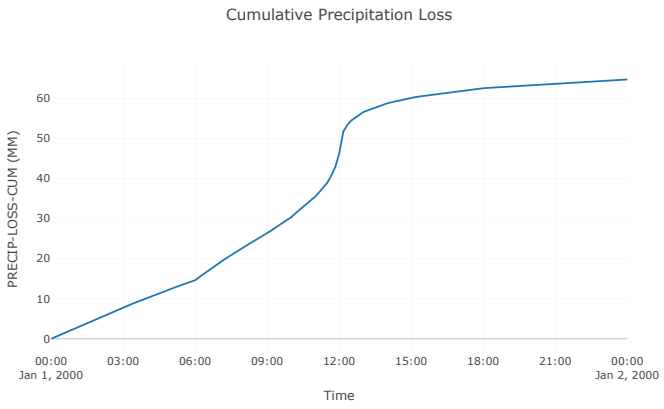


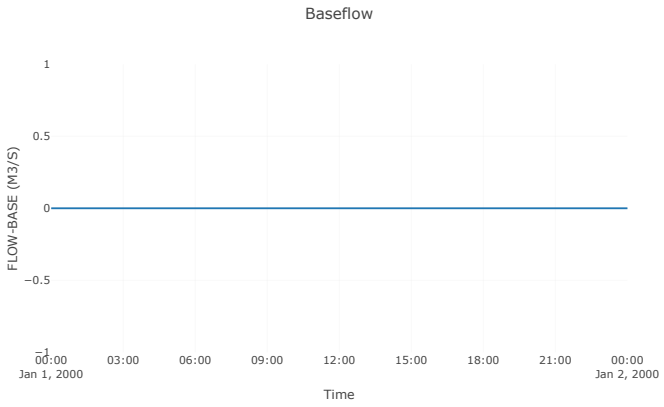
Cumulative Outflow

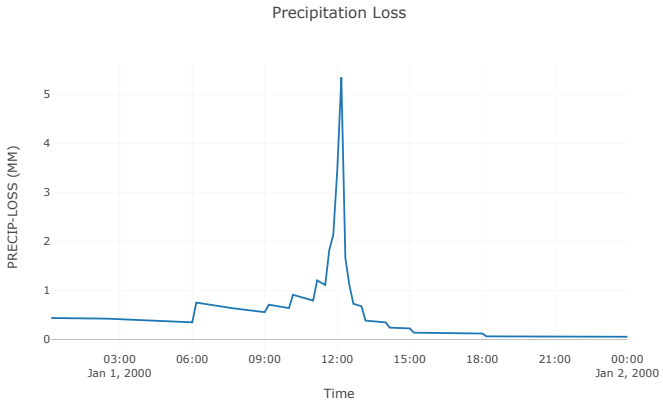


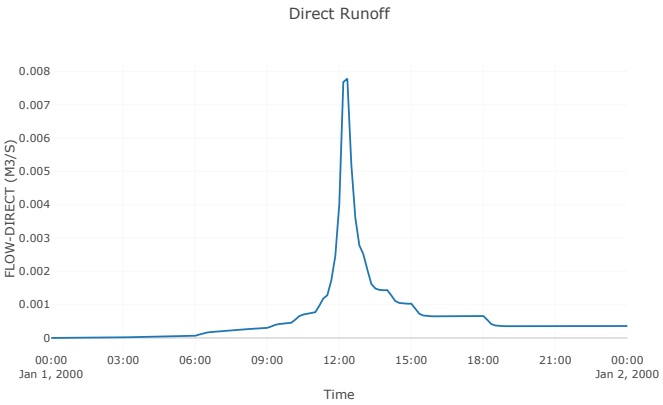
Cumulative Precipitation

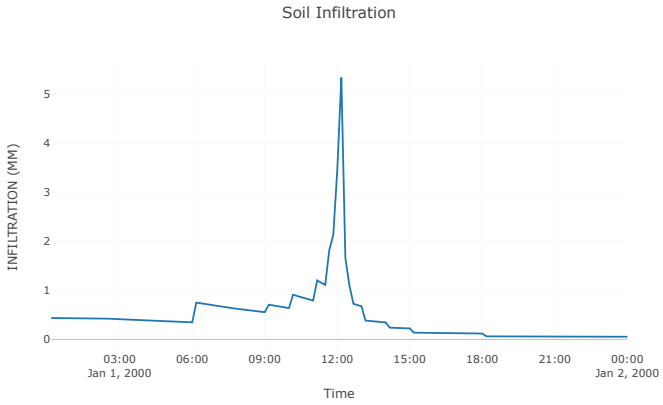



Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
60
50
40
30
20
10
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

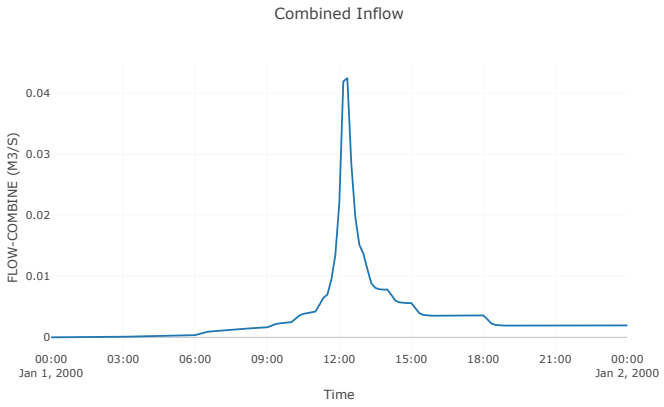

Precipitation Loss
PRECIP-LOSS (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

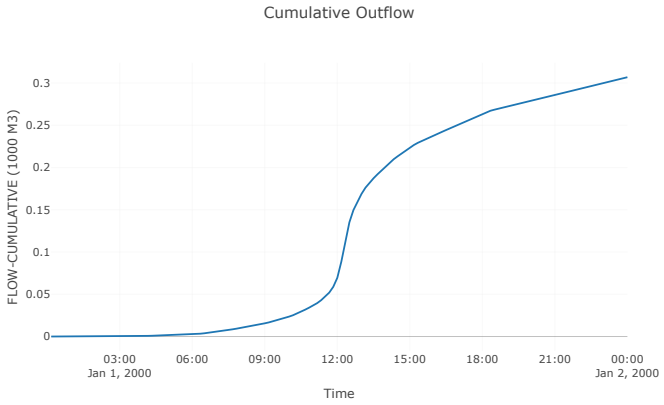

Direct Runoff
FLOW-DIRECT (M3/S)
0
0.001
0.002
0.003
0.004
0.005
0.006
0.007
0.008
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

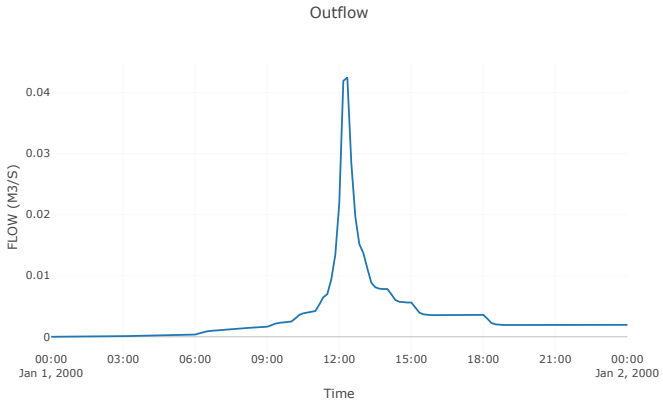

Soil Infiltration
INFILTRATION (MM)
0
1
2
3
4
5
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	120.48






Outflow
FLOW (M3/S)
0.04
0.03
0.02
0.01
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Pond1
Simulation Run: Post Dev Att 20 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 08 May 2025, 01:06

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW A & B	0
RoW E, F, G CHo - 77	0

Downstream

Element Name	Downstream
RoW A & B	Pond 1
RoW E, F, G CHo - 77	Pond 1

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW A & B	0	92	0
RoW E, F, G CHo - 77	0	89	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW A & B	10	Standard
RoW E, F, G CHo - 77	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW A & B	0	0.06	01Jan2000, 12:10	196.72
RoW E, F, G CHo - 77	0	0.01	01Jan2000, 12:10	189.34
Pond 1	0	0.03	01Jan2000, 12:40	195.26
Site Discharge	0	0.03	01Jan2000, 12:40	195.26

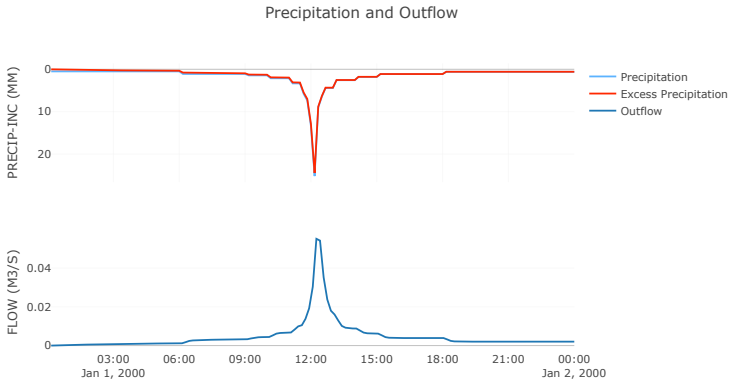
Subbasin: RoW A & B

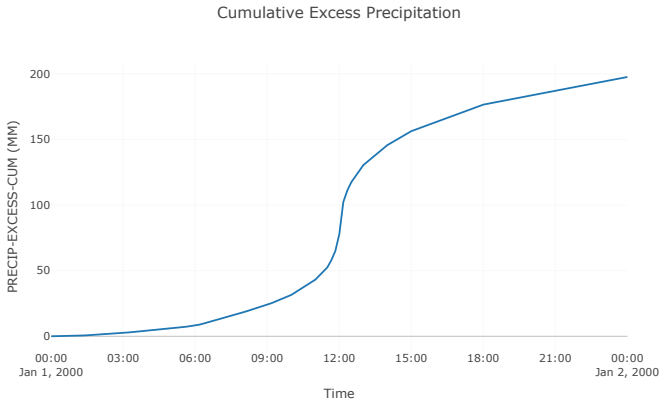
Area (KM2) : 0
Downstream : Pond 1

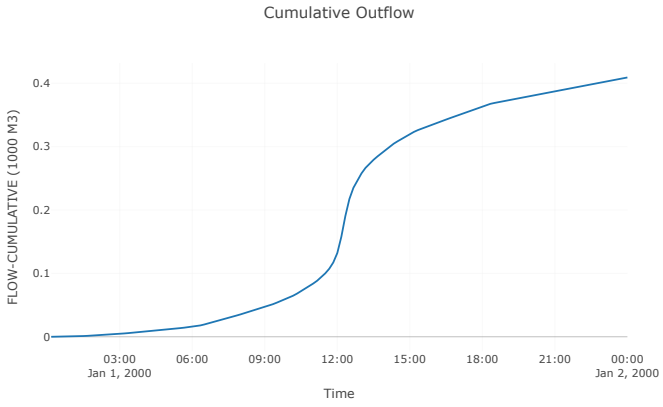
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

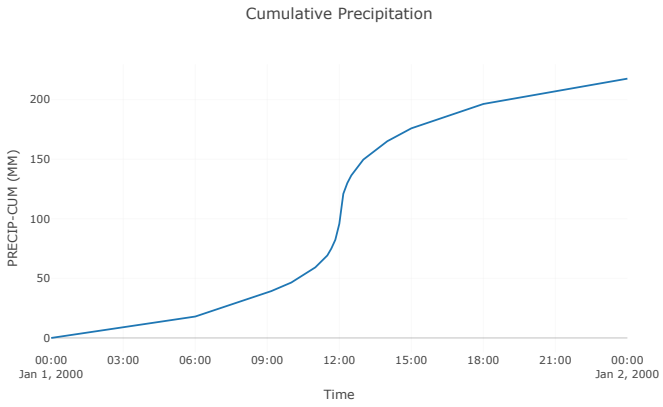
Transform: Scs	
Lag	10
Unitgraph Type	Standard

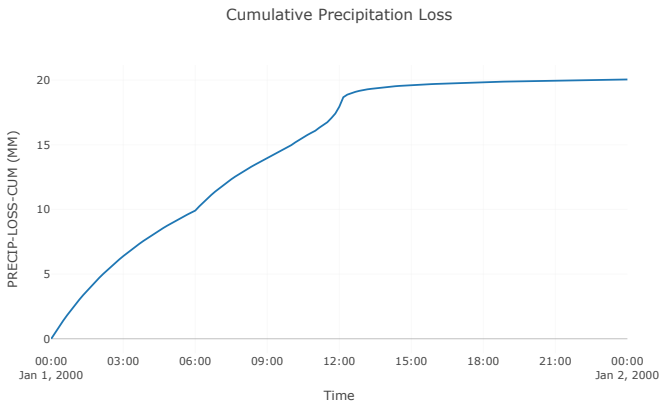
Results: RoW A & B	
Peak Discharge (M3/S)	0.06
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	196.72
Precipitation Volume (M3)	452.62
Loss Volume (M3)	41.71
Excess Volume (M3)	410.91
Direct Runoff Volume (M3)	409.17
Baseflow Volume (M3)	0

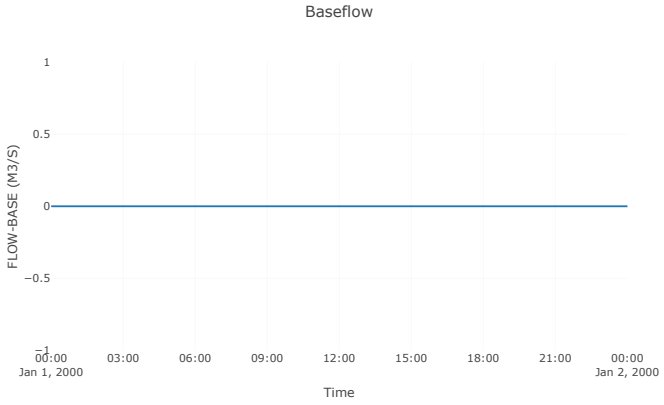




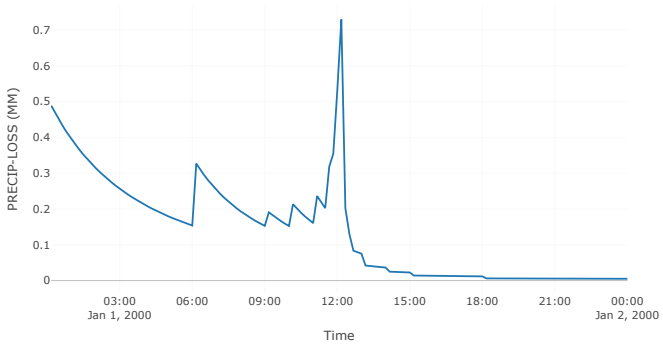

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation
PRECIP-CUM (MM)
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

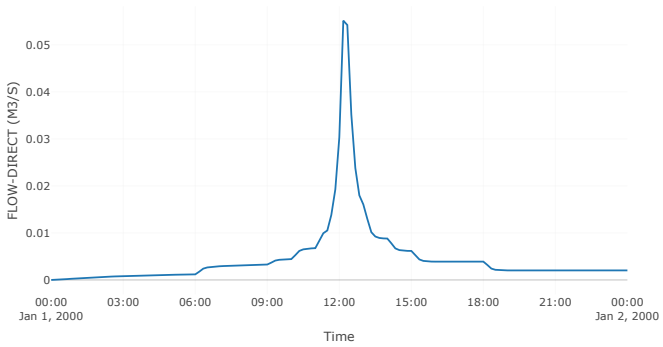

Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

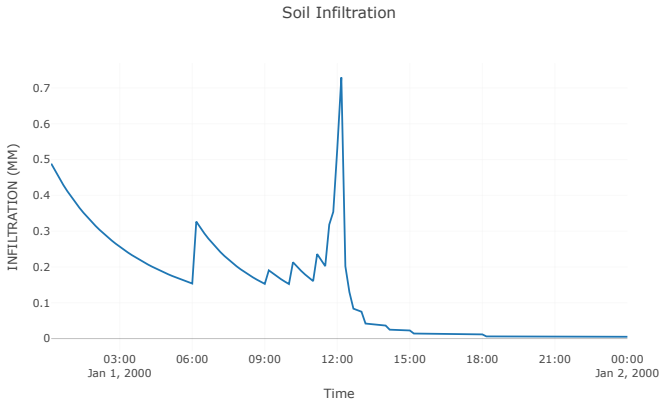

Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Precipitation Loss



Direct Runoff




Soil Infiltration
INFILTRATION (MM)
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

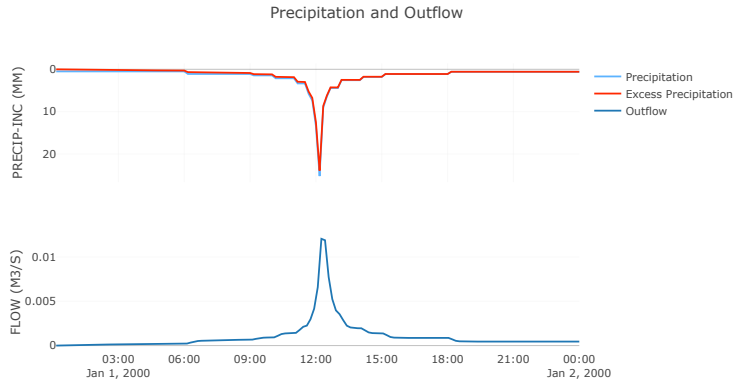
Subbasin: RoW E, F, G CHo-77

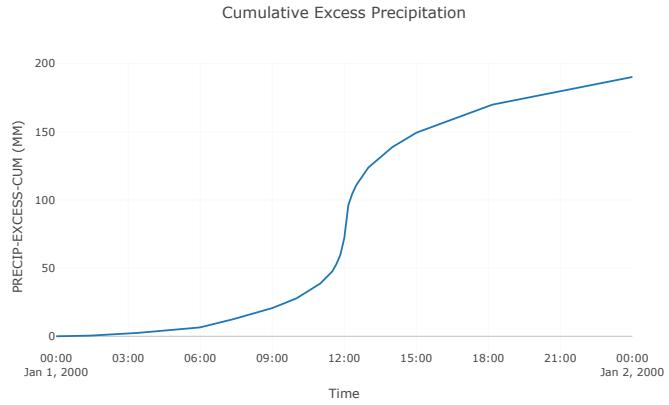
Area (KM2) : 0
Downstream : Pond 1

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

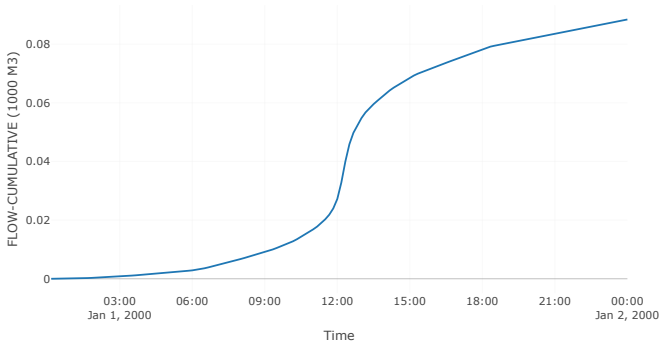
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CHo-77	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	189.34
Precipitation Volume (M3)	101.62
Loss Volume (M3)	12.81
Excess Volume (M3)	88.81
Direct Runoff Volume (M3)	88.42
Baseflow Volume (M3)	0

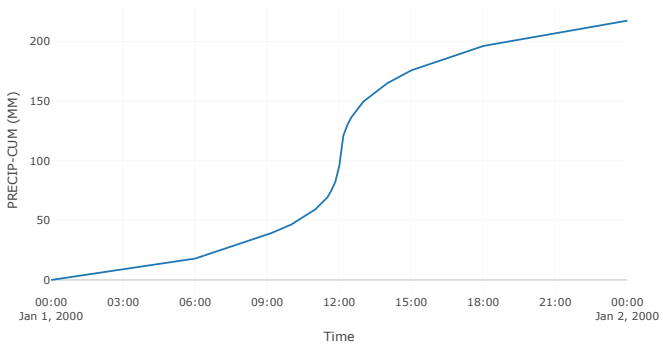


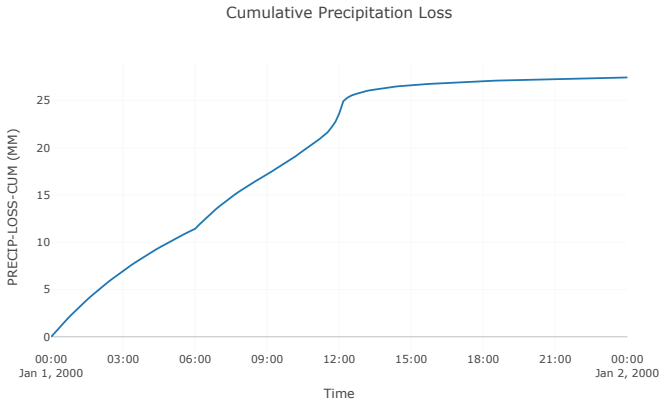


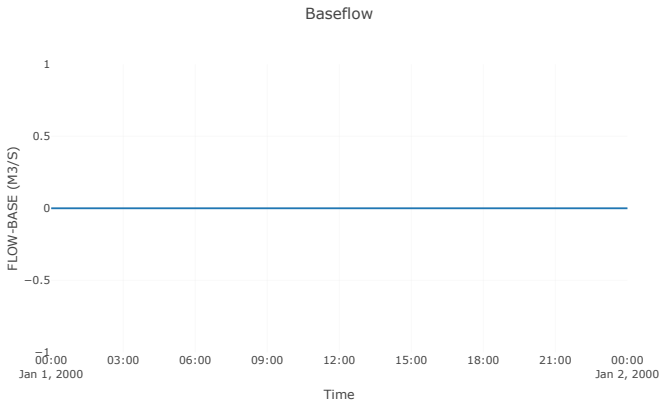
Cumulative Outflow



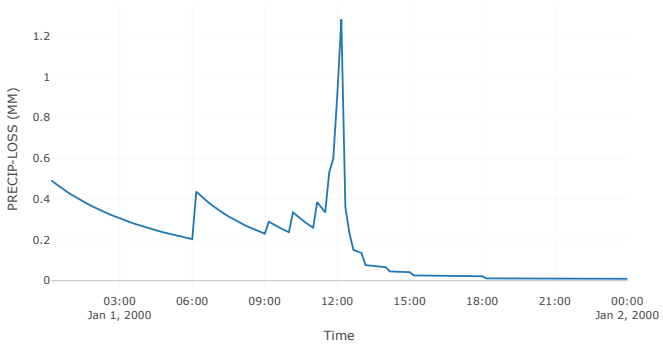
Cumulative Precipitation



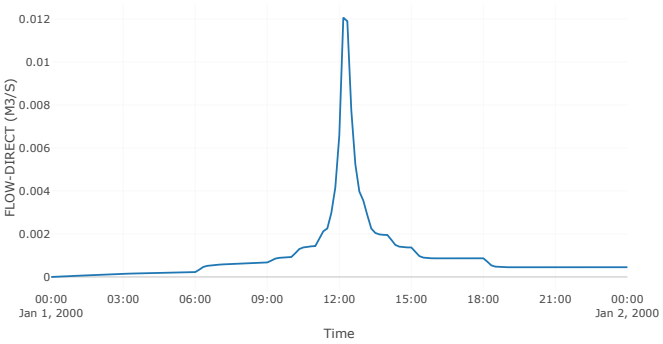

Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

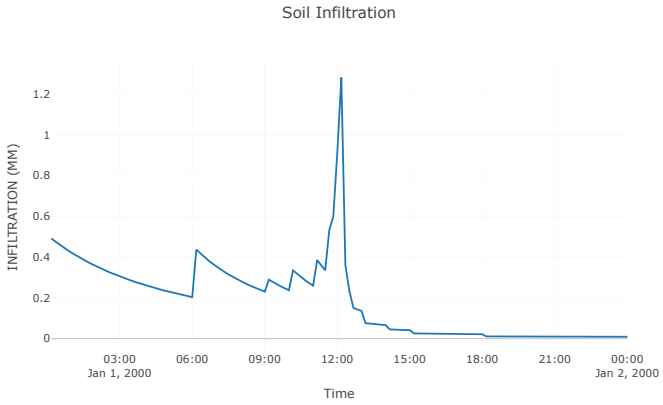

Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Precipitation Loss



Direct Runoff

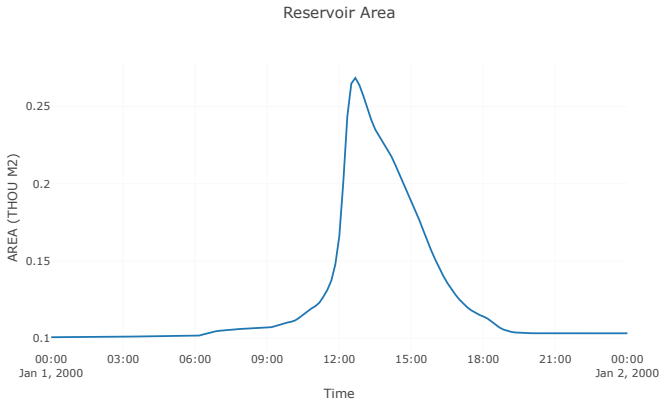


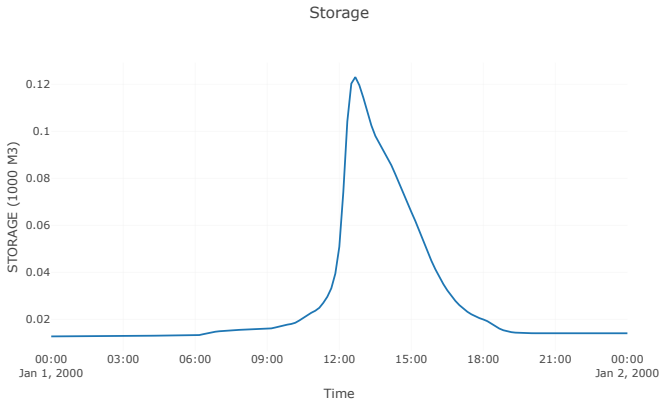

Soil Infiltration
INFILTRATION (MM)
1.2
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

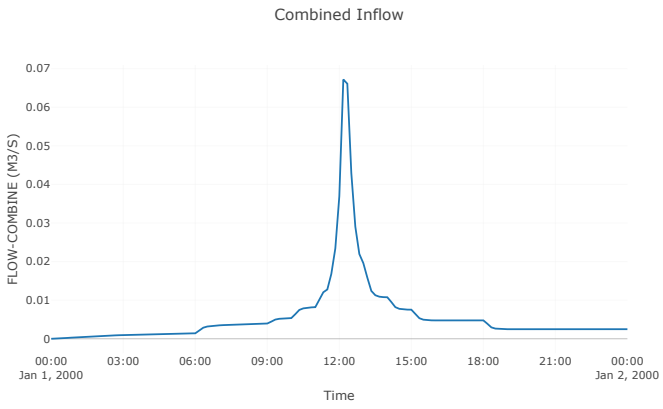
Reservoir: Pond 1

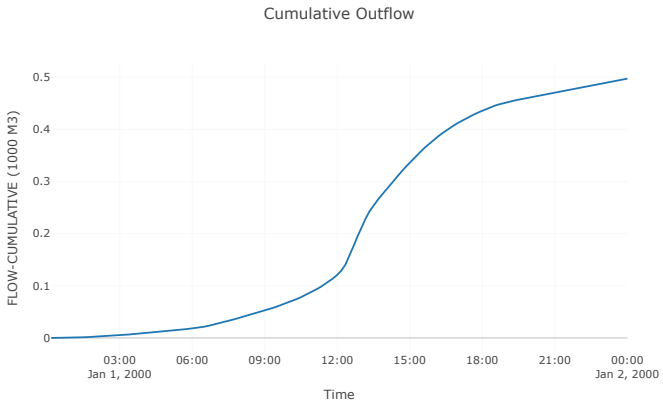
Downstream : Site Discharge

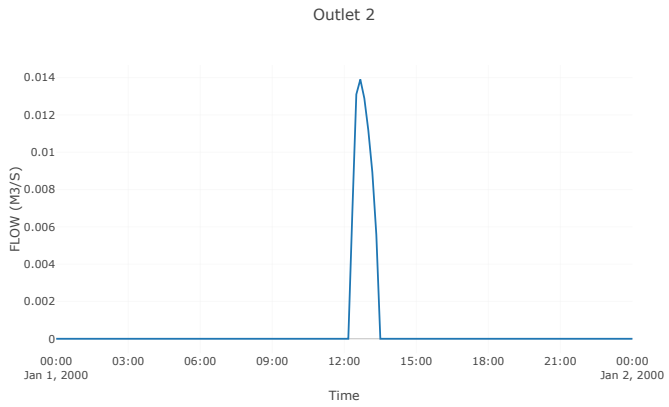
Results: Pond 1	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:40
Volume (MM)	195.26
Peak Inflow (M3/S)	0.07
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	497.59
Maximum Storage (M3)	123.1
Peak Elevation (M)	0.89
Discharge Volume (M3)	497.33

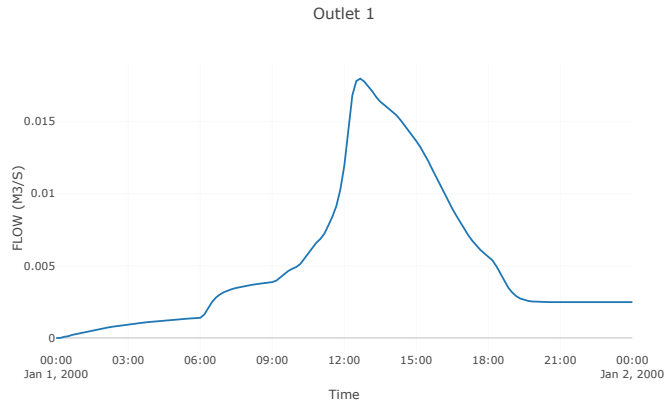


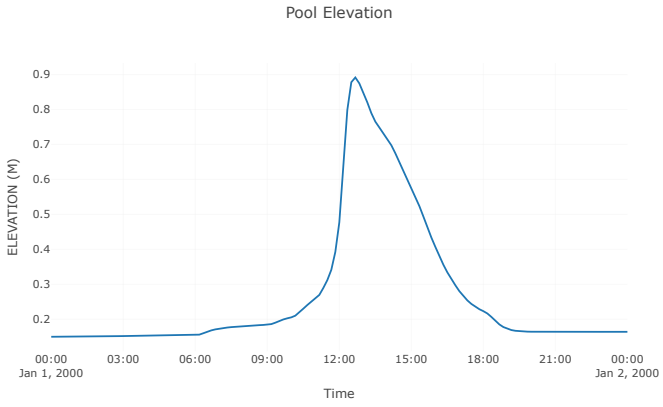


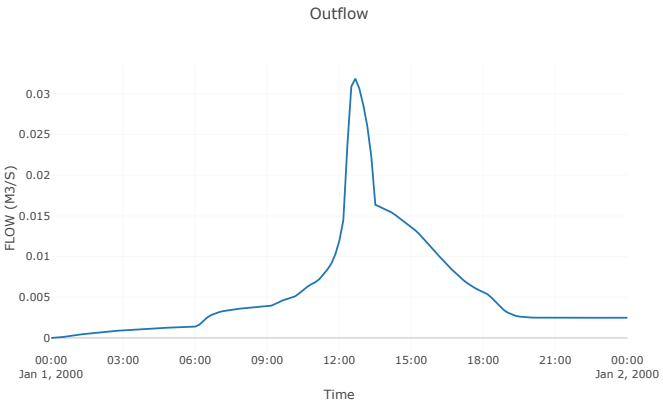

Combined Inflow
FLOW-COMBINE (M3/S)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Outlet 2
0.014
0.012
0.01
0.008
0.006
0.004
0.002
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

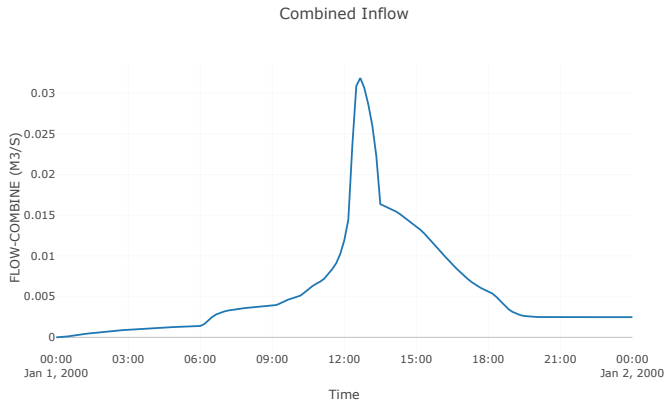

Outlet 1
0.015
0.01
0.005
0
FLOW (M3/S)
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

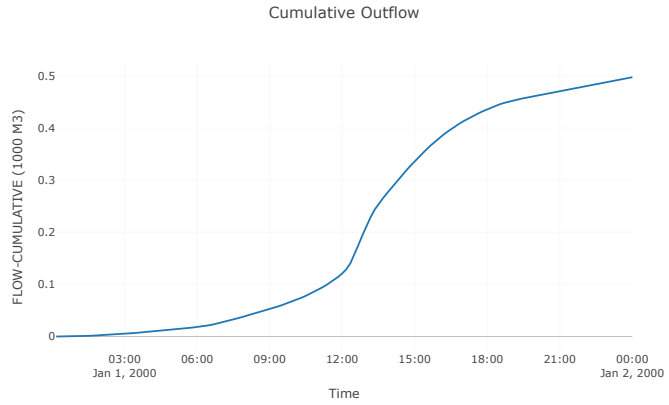

Pool Elevation
ELEVATION (M)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

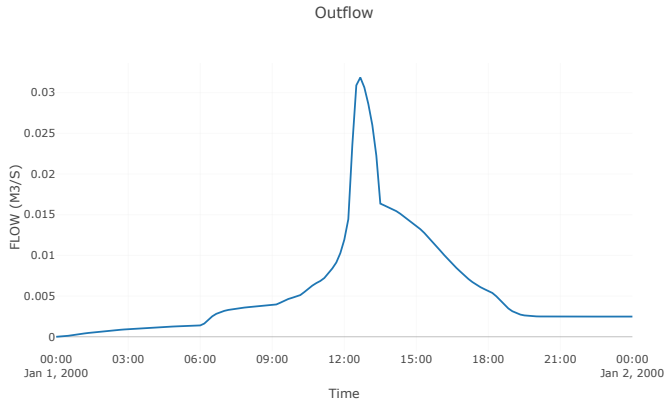

Outflow
FLOW (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:40
Volume (MM)	195.26






Outflow
FLOW (M3/S)
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Project: Project_1
Simulation Run: Pre Dev, 1 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 18 February 2025, 10:20

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW E, F, G CH155 - 343	0
RoW E, F, G CH77 - 155	0

Downstream

Element Name	Downstream
RoW E, F, G CH155 - 343	Site Discharge
RoW E, F, G CH77 - 155	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW E, F, G CH155 - 343	0	74	5
RoW E, F, G CH77 - 155	0	74	5

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW E, F, G CH155 - 343	10	Standard
RoW E, F, G CH77 - 155	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW E, F, G CH155 - 343	0	0.03	01Jan2000, 12:20	174.84
RoW E, F, G CH77 - 155	0	0.01	01Jan2000, 12:20	174.84
Site Discharge	0	0.04	01Jan2000, 12:20	174.84

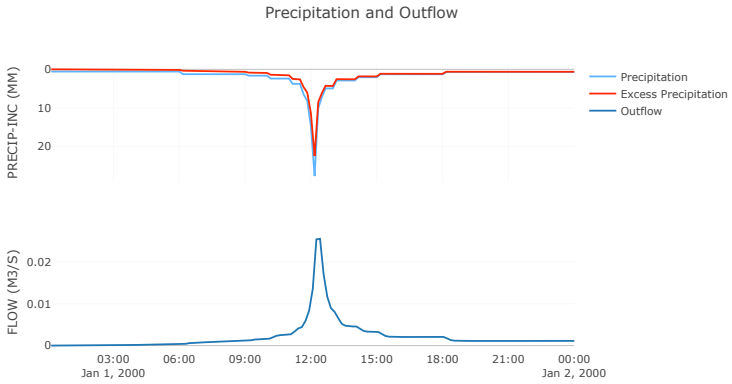
Subbasin: RoW E, F, G CH155-343

Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CH155-343	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84
Precipitation Volume (M3)	260.61
Loss Volume (M3)	74.32
Excess Volume (M3)	186.29
Direct Runoff Volume (M3)	185.33
Baseflow Volume (M3)	0



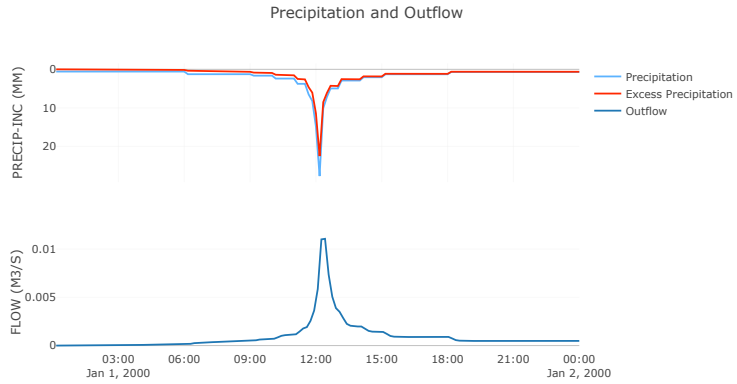
Subbasin: RoW E, F, G CH77-155

Area (KM2) : 0
Downstream : Site Discharge

Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	74
Initial Abstraction	5

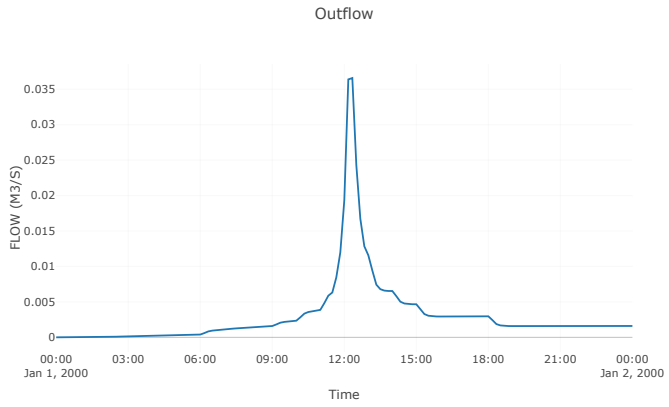
Transform: Scs	
Lag	10
Unitgraph Type	Standard

Results: RoW E, F, G CH77-155	
Peak Discharge (M3/S)	0.01
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84
Precipitation Volume (M3)	113.1
Loss Volume (M3)	32.25
Excess Volume (M3)	80.84
Direct Runoff Volume (M3)	80.43
Baseflow Volume (M3)	0



Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	174.84



Project: Project_1
Simulation Run: Post Dev Att 1 % AEP
Simulation Start: 31 December 1999, 24:00
Simulation End: 1 January 2000, 24:00

HMS Version: 4.12
Executed: 18 February 2025, 11:05

Global Parameter Summary - Subbasin

Area (KM2)

Element Name	Area (KM2)
RoW E, F, G CH155 - 343	0
RoW E, F, G CH77 - 155	0

Downstream

Element Name	Downstream
RoW E, F, G CH155 - 343	Pond 1
RoW E, F, G CH77 - 155	Site Discharge

Loss Rate: Scs

Element Name	Percent Impervious Area	Curve Number	Initial Abstraction
RoW E, F, G CH155 - 343	0	89	0
RoW E, F, G CH77 - 155	0	92	0

Transform: Scs

Element Name	Lag	Unitgraph Type
RoW E, F, G CH155 - 343	10	Standard
RoW E, F, G CH77 - 155	10	Standard

Global Results Summary

Hydrologic Element	Drainage Area (KM2)	Peak Discharge (M3/S)	Time of Peak	Volume (MM)
RoW E, F, G CH155 - 343	0	0.04	01Jan2000, 12:10	260.04
RoW E, F, G CH77 - 155	0	0.16	01Jan2000, 12:10	267.84
Pond 1	0	0.03	01Jan2000, 12:30	260.07
Site Discharge	0.01	0.19	01Jan2000, 12:20	266.38

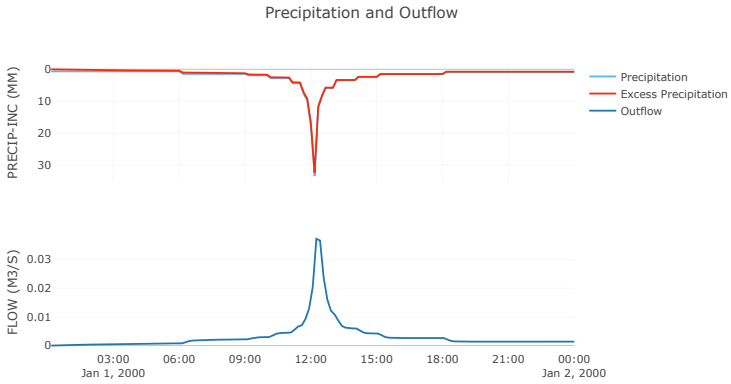
Subbasin: RoW E, F, G CH155-343

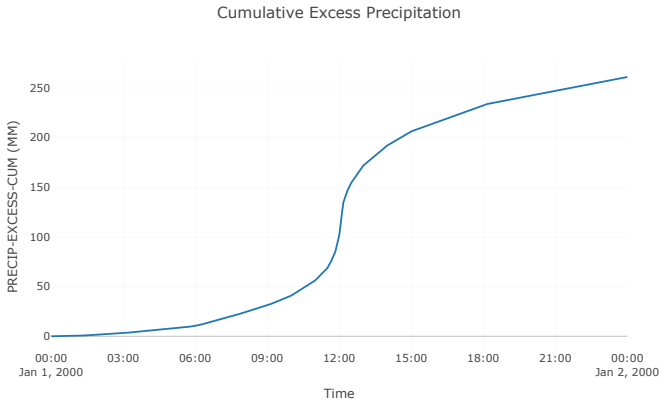
Area (KM2) : 0
Downstream : Pond 1

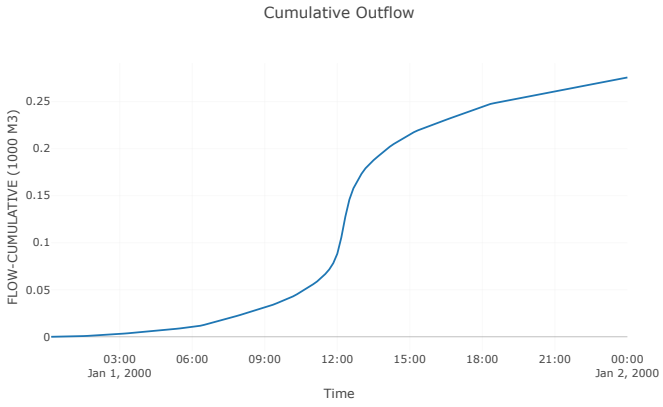
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	89
Initial Abstraction	0

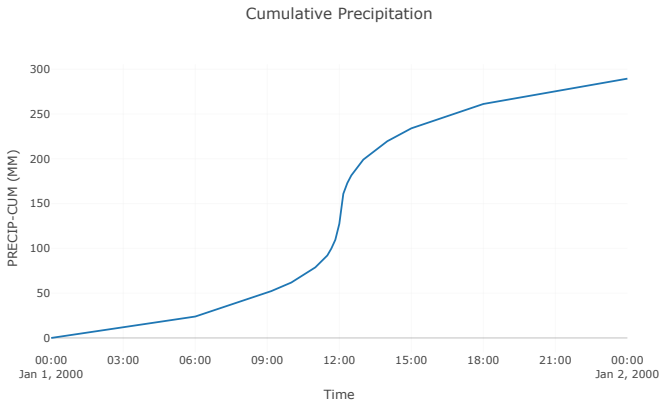
Transform: Scs	
Lag	10
Unitgraph Type	Standard

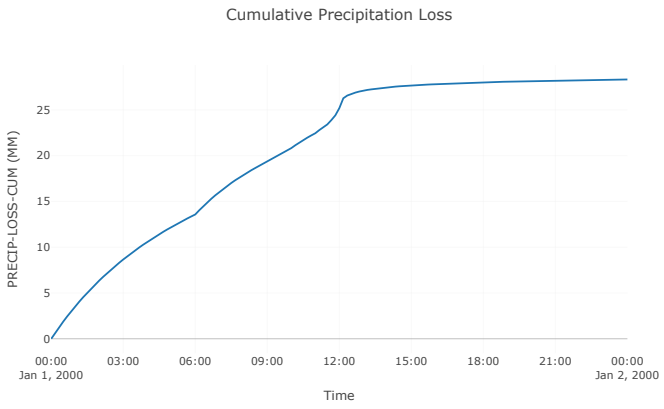
Results: RoW E, F, G CH155-343	
Peak Discharge (M3/S)	0.04
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	260.04
Precipitation Volume (M3)	306.84
Loss Volume (M3)	30.02
Excess Volume (M3)	276.82
Direct Runoff Volume (M3)	275.64
Baseflow Volume (M3)	0

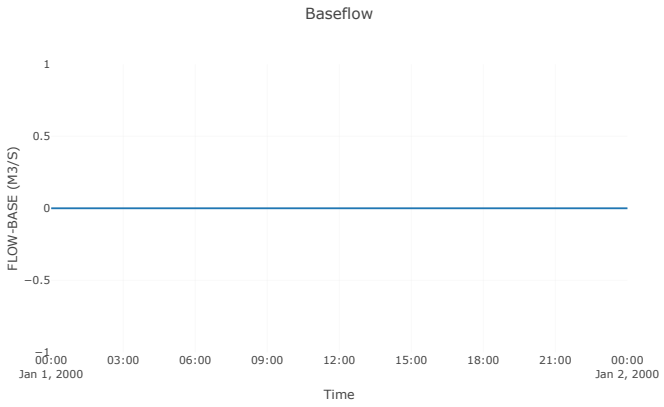


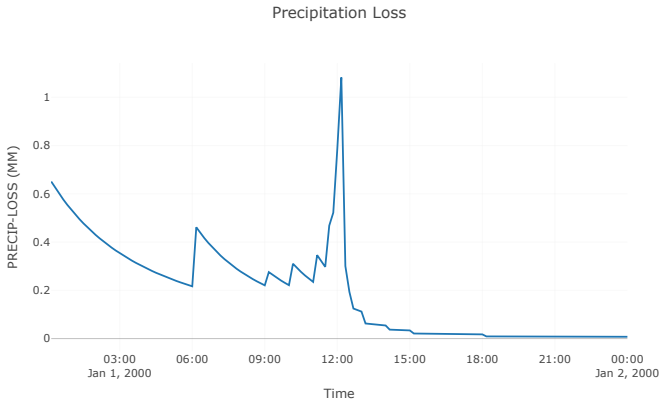


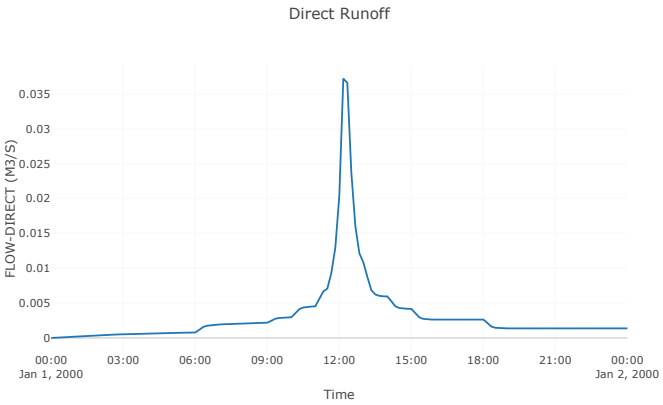

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

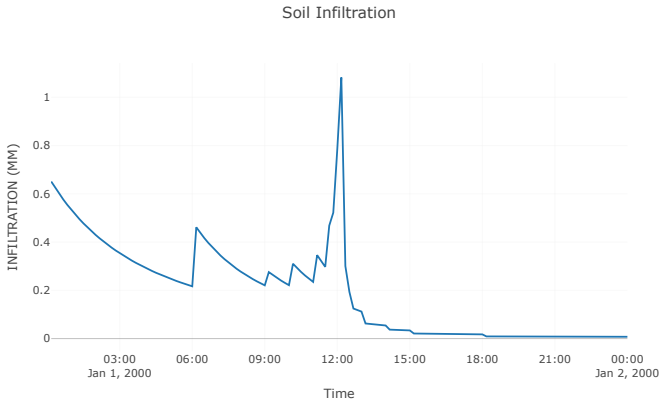

Cumulative Precipitation
PRECIP-CUM (MM)
300
250
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
25
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Direct Runoff
FLOW-DIRECT (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Soil Infiltration
INFILTRATION (MM)
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

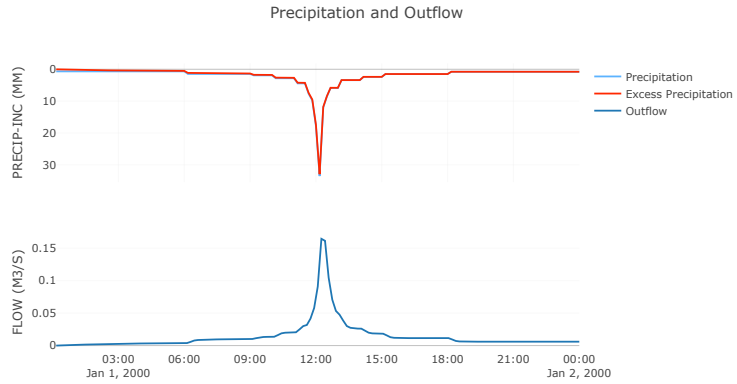
Subbasin: RoW E, F, G CH77-155

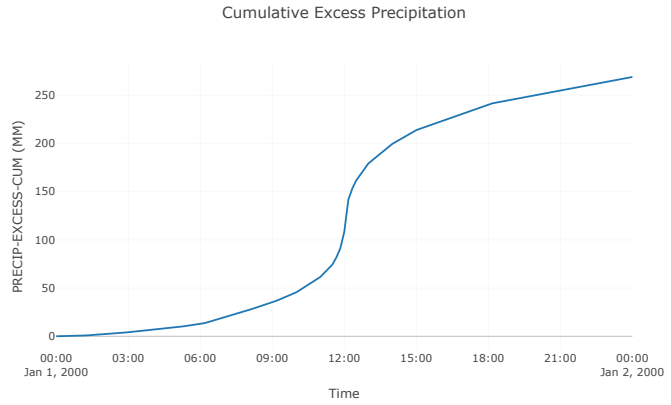
Area (KM2) : 0
Downstream : Site Discharge

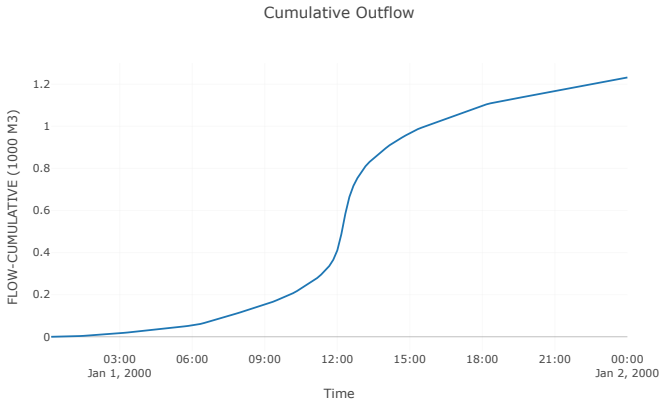
Loss Rate: Scs	
Percent Impervious Area	0
Curve Number	92
Initial Abstraction	0

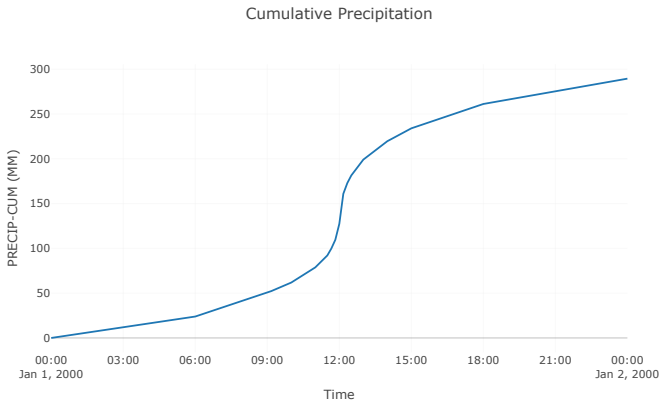
Transform: Scs	
Lag	10
Unitgraph Type	Standard

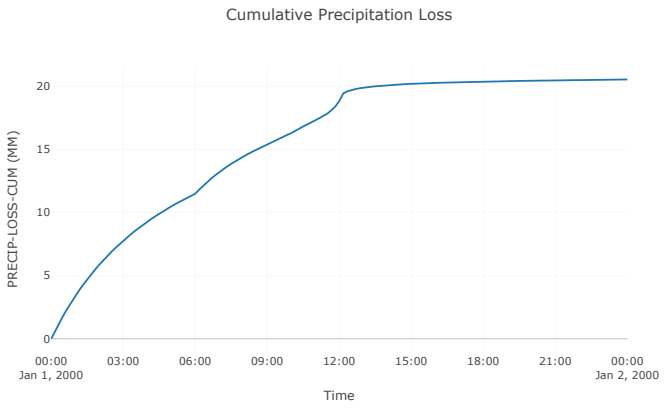
Results: RoW E, F, G CH77-155	
Peak Discharge (M3/S)	0.16
Time of Peak Discharge	01Jan2000, 12:10
Volume (MM)	267.84
Precipitation Volume (M3)	1331.59
Loss Volume (M3)	94.4
Excess Volume (M3)	1237.19
Direct Runoff Volume (M3)	1232.05
Baseflow Volume (M3)	0

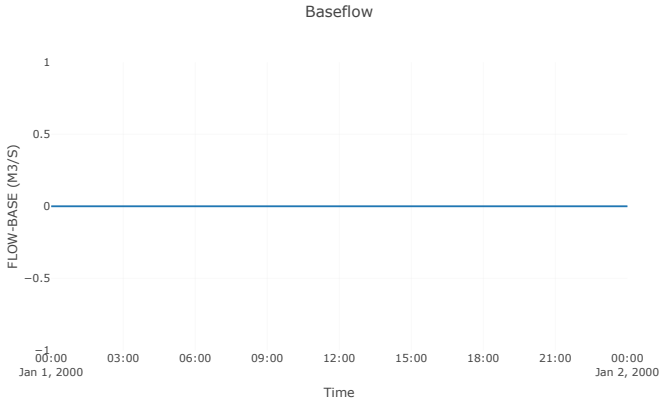


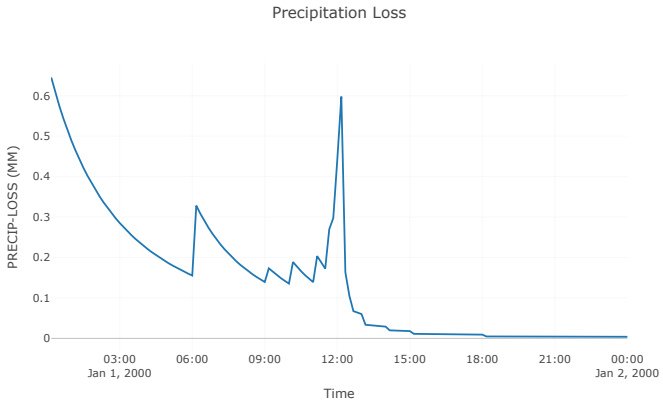


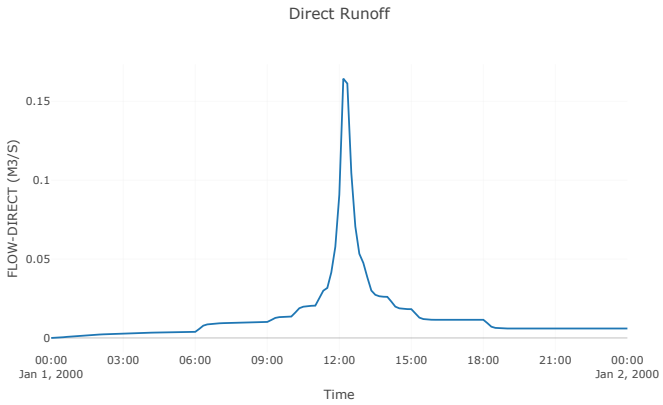

Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
1.2
1
0.8
0.6
0.4
0.2
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

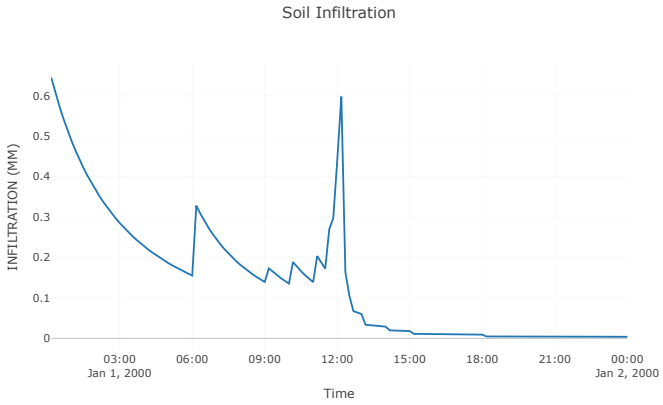

Cumulative Precipitation
PRECIP-CUM (MM)
300
250
200
150
100
50
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Precipitation Loss
PRECIP-LOSS-CUM (MM)
20
15
10
5
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Baseflow
FLOW-BASE (M3/S)
1
0.5
0
−0.5
−1
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Precipitation Loss
PRECIP-LOSS (MM)
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

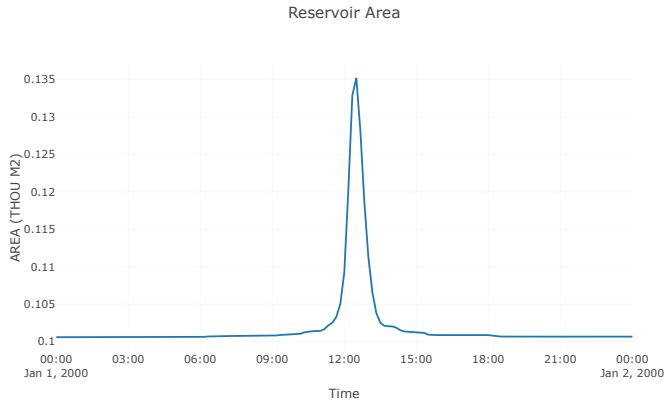

Direct Runoff
FLOW-DIRECT (M3/S)
0.15
0.1
0.05
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

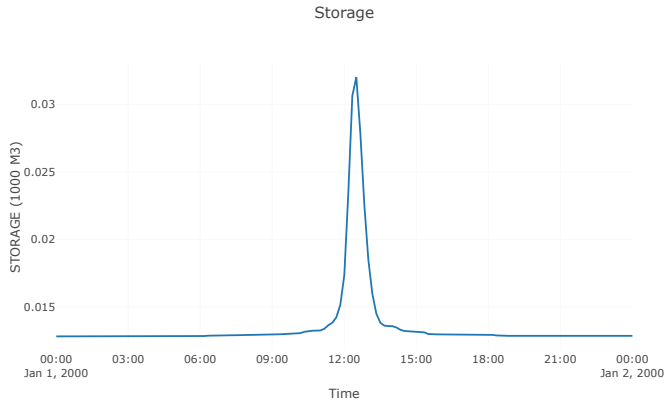

Soil Infiltration
INFILTRATION (MM)
0.6
0.5
0.4
0.3
0.2
0.1
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

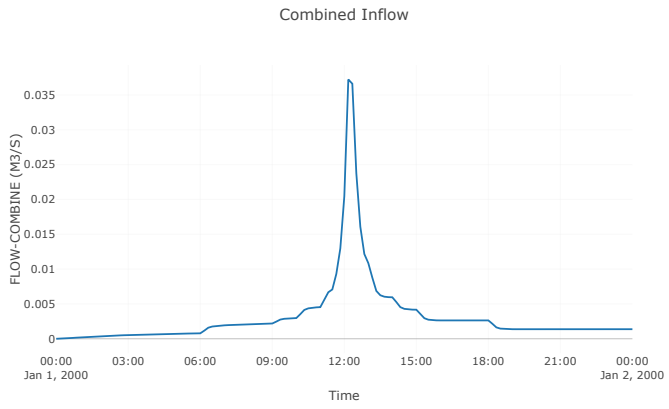
Reservoir: Pond 1

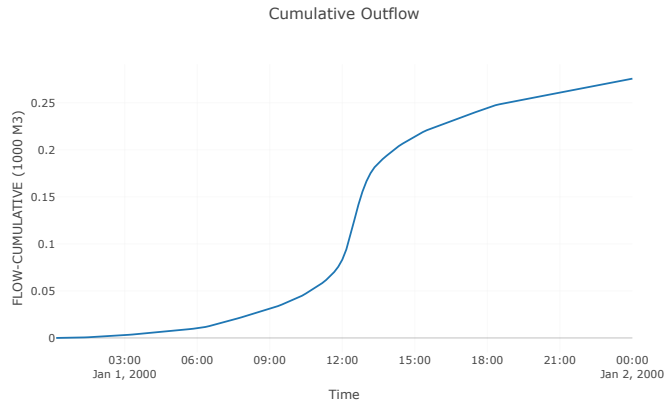
Downstream : Site Discharge

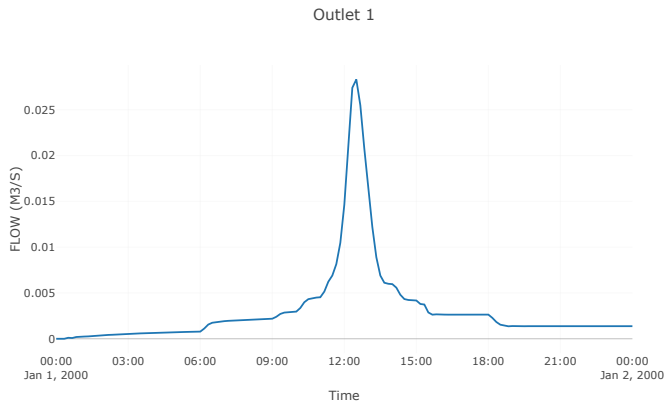
Results: Pond 1	
Peak Discharge (M3/S)	0.03
Time of Peak Discharge	01Jan2000, 12:30
Volume (MM)	260.07
Peak Inflow (M3/S)	0.04
Time of Peak Inflow	01Jan2000, 12:10
Inflow Volume (M3)	275.64
Maximum Storage (M3)	32.04
Peak Elevation (M)	0.33
Discharge Volume (M3)	275.67

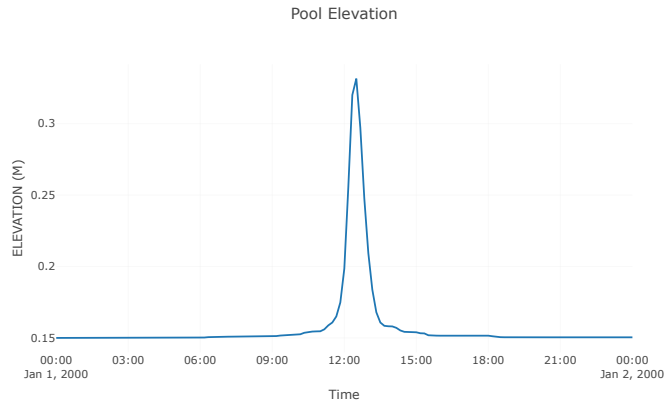


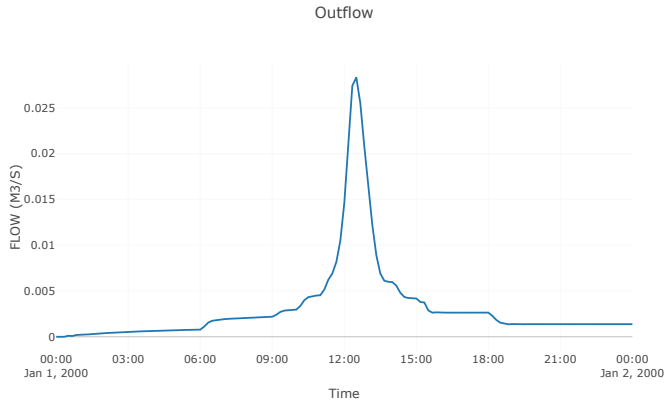



Combined Inflow
FLOW-COMBINE (M3/S)
0.035
0.03
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time


Cumulative Outflow
FLOW-CUMULATIVE (1000 M3)
0.25
0.2
0.15
0.1
0.05
0
03:00
Jan 1, 2000
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

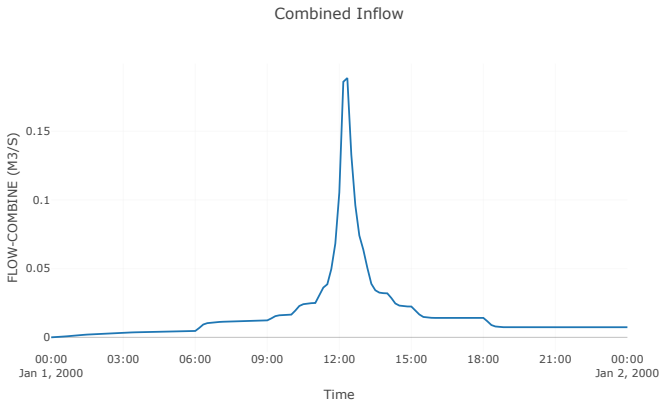

Outlet 1
FLOW (M3/S)
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

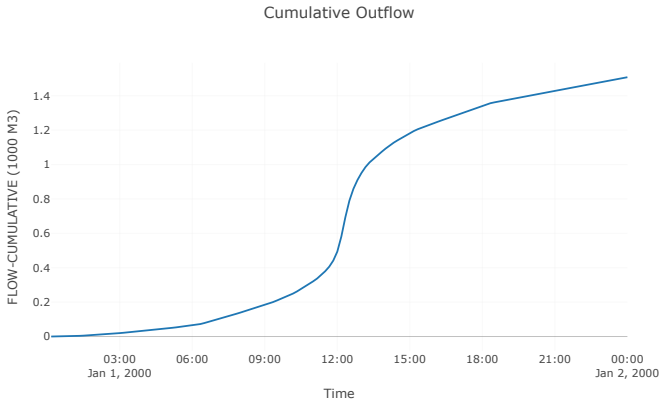

Pool Elevation
ELEVATION (M)
0.3
0.25
0.2
0.15
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

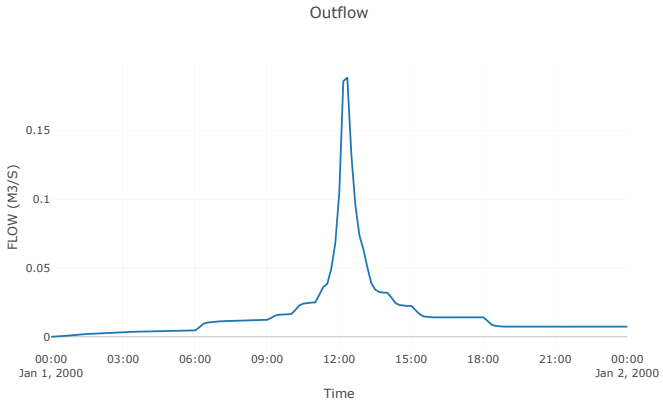

Outflow
FLOW (M3/S)
0.025
0.02
0.015
0.01
0.005
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Junction: Site Discharge

Results: Site Discharge	
Peak Discharge (M3/S)	0.19
Time of Peak Discharge	01Jan2000, 12:20
Volume (MM)	266.38






Outflow
FLOW (M3/S)
0.15
0.1
0.05
0
00:00
Jan 1, 2000
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
Jan 2, 2000
Time

Alex Billot

From: Te Hono Support <tehonosupport@fndc.govt.nz>
Sent: Tuesday, 1 April 2025 2:13 pm
To: Alex Billot
Subject: RE: Proposed subdivisions - Kaikohe

Kia Ora Alex.

The contact iwi would be Ngapuhi, communications@ngapuhi.org tel 094015530, hapu to consider will be Te Uri O Hua- Floyd Wihongi floydwihongi@outlook.com, Woody Wihongi woodywihongi@hotmail.com

Appreciate getting in contact.

From: Alex Billot <Alex@northplanner.co.nz>
Sent: Tuesday, April 1, 2025 1:26 PM
To: Te Hono Support <tehonosupport@fndc.govt.nz>
Subject: RE: Proposed subdivisions - Kaikohe

Kia ora,

Just following up on my below email, if you could please provide the Iwi contacts for the Kaikohe area (Station Road/Thorpe Road area), that would be much appreciated.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 14 March 2025 10:56 am
To: Te Hono Support <tehonosupport@fndc.govt.nz>
Subject: Proposed subdivisions - Kaikohe

Kia ora,

We are in the process of preparing subdivision applications for some properties in Kaikohe (Station Road/Thorpe Road).
Can you please assist with advising who the Iwi contacts are for this rohe so we can consult with them prior to lodgement of the applications?

Thanks in advance.

Kind regards,

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

Alex Billot

From: Alex Billot
Sent: Thursday, 19 June 2025 10:10 am
To: 'Bill Edwards'
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Morena Bill,

Just following up on the below request for the proposed subdivisions in Kaikohe.
We are finalising our report ready for lodgement to Council and are hoping to lodge the applications in the next week.

If you require any further information, please do not hesitate to get in touch.

Thanks.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 2 May 2025 9:26 am
To: Bill Edwards <BEdwards@heritage.org.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Morena Bill,

Just following up on the below request for the proposed subdivisions in Kaikohe.
We are just waiting on some minor changes to the engineering report so are hoping to lodge the applications in the next week or two.

Thanks.

Kind regards,

Alex Billot

NORTHLAND
PLANNING & DEVELOPMENT

Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Bill Edwards <BEdwards@heritage.org.nz>
Sent: Tuesday, 1 April 2025 1:44 pm
To: Alex Billot <Alex@northplanner.co.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Kia ora Alex,

Thank you we have a planning meeting on a Tuesday so we will provide comments after that.

Nga mihi

Bill

From: Alex Billot <Alex@northplanner.co.nz>
Sent: Tuesday, 1 April 2025 1:24 pm
To: Bill Edwards <BEdwards@heritage.org.nz>; James Robinson <jrobinson@heritage.org.nz>
Subject: RE: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

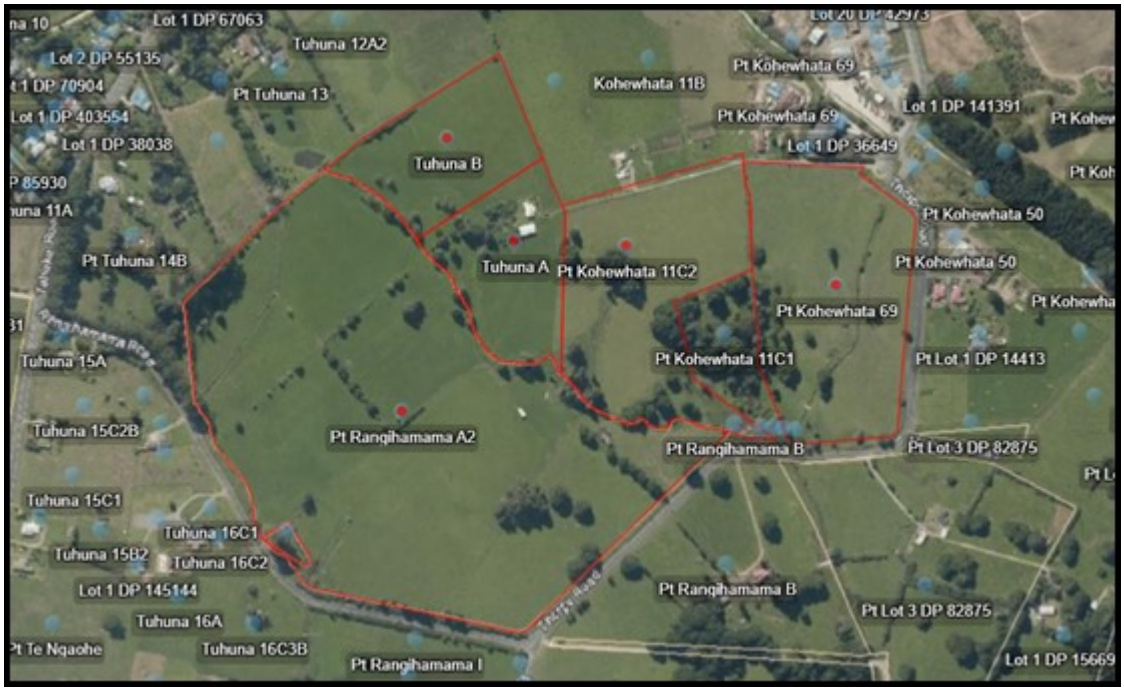
Kia ora Bill & James,

In addition to my below email, we are completing two additional staged subdivisions on adjoining lots of Pt Kohewhata 69 Block, which was described in my below email.

The second subdivision will involve a two staged subdivision. The first stage will be the subdivision of Pt Rangihamama A2 Block, where four additional two hectare lots will be created. Stage 2 will involve a boundary adjustment between Lot 5 of Stage 1 and Tuhuna A & B. The two scheme plans are attached to this email referenced Title 2 – Stage 1 & 2.

The third subdivision will also be a two staged subdivision. The first stage will involve the subdivision of Pt Kohewhata 11C2 block, where one additional allotment will be created. The second stage will involve a boundary adjustment between Lot 8 of Title 2 Stage 2 and Lots 1 & 2 of Title 3 Stage 1. The scheme plans have been attached to this email referenced Title 3 – Stages 1 & 2.

The below image shows the location of all lots involved over all subdivisions.



If you could please provide comments on behalf of Heritage Pouhere Taonga NZ to include with our application, that would be greatly appreciated.
We have also contacted Te Hono Support for Iwi contacts in the area but are yet to receive a response.

Thanks in advance.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

From: Alex Billot
Sent: Friday, 14 March 2025 11:01 am
To: Bill Edwards <BEdwards@heritage.org.nz>; James Robinson <jrobinson@heritage.org.nz>
Subject: Proposed subdivision - Station Road/Thorpe Road, Kaikohe

Kia ora Bill & James,

We are in the process of preparing a subdivision application at Pt Kohewhata 69 Block (address is 93 Station Road, Kaikohe). The proposal includes subdividing the site to create one additional allotment as can be seen in the attached scheme plan.

Can you please provide comments on behalf of Heritage NZ Pouhere Taonga to include with our application?

Thanks in advance.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.

Alex Billot

From: Alex Billot
Sent: Tuesday, 1 April 2025 2:22 pm
To: communications@ngapuhi.org; floydwihongi@outlook.com; woodywihongi@hotmail.com
Cc: Rochelle
Subject: Proposed subdivisions - Kaikohe (Thorpe Road/Station Road)
Attachments: Appendix 3 - Title 1 - Scheme Plan.pdf; Title 2 - Stage 1.pdf; Title 2 - Stage 2.pdf; Title 3 -Stage 1.pdf; Title 3 - Stage 2.pdf

Tēnā koutou,

We are in the process of preparing three separate subdivision applications across adjoining allotments along Thorpe Road, Kaikohe.
Below is an image showing the allotments involved with the three subdivisions.

The first subdivision involves the subdivision of Pt Kohewhata 69 to create one additional allotment. The scheme plan is attached to this email and referenced Title 1 – Scheme Plan.

The second subdivision will involve a two staged subdivision. The first stage will be the subdivision of Pt Rangihamama A2 Block, where four additional two hectare lots will be created. Stage 2 will involve a boundary adjustment between Lot 5 of Stage 1 and Tuhuna A & B (no additional titles will be created as part of Stage 2). The two scheme plans are attached to this email referenced Title 2 – Stage 1 & 2.

The third subdivision will also be a two staged subdivision. The first stage will involve the subdivision of Pt Kohewhata 11C2 block, where one additional allotment will be created. The second stage will involve a boundary adjustment between Lot 8 of Title 2 Stage 2 and Lots 1 & 2 of Title 3 Stage 1 (no additional titles will be created as part of Stage 2). The scheme plans have been attached to this email referenced Title 3 – Stages 1 & 2.

We would appreciate if you could review the proposed subdivisions and advise if there are any comments you would like to make prior to lodgement of the applications to Far North District Council.

If you require any further information, please do not hesitate to contact our office.

Thank you for your time and consideration.

Kind regards,

NORTHLAND
PLANNING & DEVELOPMENT

Alex Billot
Resource Planner

Offices in Kaitaia & Kerikeri
09 408 1866
Northland Planning & Development 2020 Limited

My office hours are Monday, Thursday & Friday 9am – 2pm.