



STORMWATER REPORT

234, Rangiuru Road, Otaki

DOCUMENT CONTROL RECORD

CLIENT	Classic Developments Rangiuru Road Limited
PROJECT	Rangiuru Road
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DOCUMENT TYPE	Stormwater Report, R003v2-1678-02
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ISSUE AND REVISION RECORD

DATE OF ISSUE	31 March 2026
STATUS	For Consent 
ORIGINATOR	Kyle Dirse – Director, Senior Civil Engineer 
REVIEWED	Andrew Jackson – Director, Civil
APPROVED FOR ISSUE	 Kyle Dirse – Director, Senior Civil Engineer



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1.0 INTRODUCTION

1.1 THE SITE

The development site is located at 234, Rangiu Road, Otaki. The existing lot is formally described as Lot 2 DP 42874 and is 2.39 hectares in size.

The site is currently a vacant lot with no existing buildings or permanent structures, aside from some temporarily parked farm machinery. The proposed development comprises a 43-lot subdivision, which will be accessed via a new road connecting to Rangiu Road at a single intersection.



Figure 1: Locality Plan

1.2 TOPOGRAPHY & ORIENTATION

The existing site is relatively flat and existing contours slopping away from Rangiu Road towards an existing stream north of the site. The levels across the site are uniform with the neighbouring properties.

1.3 EXISTING LAND USE

The site is predominantly grass covered with a small number of livestock kept on site.

1.4 PROPOSED DEVELOPMENT

The proposed development will create:

- 43 residential lots, each with one residential dwelling.
- 1 Road to vest
- 1 Drainage Reserve to vest, contains 2 ponds and a dispersion swale.

This report assesses feasibility of the stormwater design and modelling for the proposed development.



2.0 STORMWATER

2.1 GENERAL

The proposed stormwater management system is summarised as follows:

1. **Lot Runoff (10% AEP):** Stormwater from residential lots will be collected via roof downpipes and directed into individual rainwater reuse tanks. Overflow from these tanks will discharge into the underground piped network through lot-specific laterals.
2. **Road Runoff (10% AEP):** Road stormwater will drain to roadside raingardens, which provide the primary treatment function. Treated water will enter the network via subsoil drains, or overflow through the scupper manhole within each raingarden before being conveyed to the piped system.
3. **Major Flow (1% AEP):** During larger storm events, overland flow will be conveyed along road corridors and directed towards the two proposed attenuation ponds.
4. **Attenuation Ponds:** Two attenuation ponds are proposed to manage post-development peak flows and reduce them to pre-development discharge rates. Splitting attenuation across two ponds enables flows to be more evenly distributed and better reflect the natural catchment pattern.
5. **Discharge Swale:** A planted discharge swale is proposed along the northern boundary, equipped with a concrete level spreader to distribute flows evenly. As the ponds discharge into the swale via a bubble-up manhole, water will overtop the spreader bar uniformly, creating sheet flow which will convey across the 3m buffer zone to the boundary, then existing stream. This approach replicates pre-development sheet flow characteristics rather than concentrating flows at a single discharge point.

2.2 STORMWATER CATCHMENTS

The site comprises three primary pre-development catchments that currently discharge via overland sheet flow toward the stream to the north. The stormwater design methodology has been developed to replicate these pre-development flow patterns as closely as practicable. The existing catchment extents are shown in Figure 2.

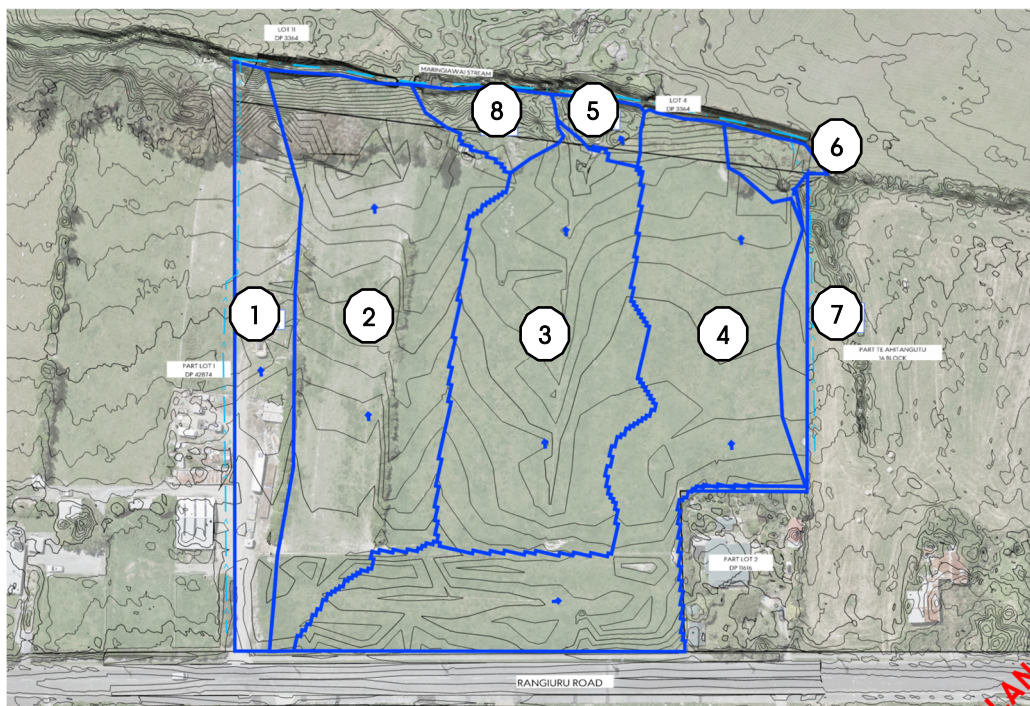


Figure 2: Catchment Plan



The tables below provide a summary of each catchment and its respective discharge characteristics, forming the basis for ensuring post-development flows align with pre-development conditions.

Table 1. Summary of Pre Development Catchment

Catchment ID	Area (ha)	Post Development Discharge Notes
01	0.27	Batters and back yards will discharge to the existing overland flow path on the western boundary
02	0.72	Discharge swale will match the pre-development sheet flow
03	0.60	Discharge swale will match the pre-development sheet flow
04	0.79	Discharge swale will match the pre-development sheet flow
05	0.04	Discharge swale will match the pre-development sheet flow
06	0.04	Batters from the earthworks will discharge here. The catchment is small and will generally remain unchanged. Discharge swale will match the pre-development sheet flow
07	0.05	Batters and back yards will discharge to the existing overland flow path on the eastern boundary
08	0.08	This is a highpoint along the northern boundary. The swale will not discharge here, and the post development catchment will generally remain unchanged.

2.3 PRIMARY NETWORK

Stormwater runoff from events up to the 10% AEP (including climate-change allowances) will be conveyed via kerb and channel to roadside raingardens, before discharging to the two attenuation ponds located within the development. Raingardens are positioned at local low points and along road corridors to intercept and treat runoff. Each raingarden is fitted with a scruffy dome to capture flows exceeding the water-quality event and to collect subsoil drainage, which will then be conveyed to the piped network. Each residential lot will also be provided with a lateral connection to the public stormwater system. The proposed network layout is shown on the 4000-series design drawings (Appendix 1).

2.4 SECONDARY NETWORK

The 1% AEP (with climate-change allowance) event will be conveyed as overland flow along the road corridors toward the two attenuation ponds. Minor ponding may occur within the roadway prior to overtopping the kerb and channel, however maximum depths are expected to remain shallow, generally up to 100mm.

2.5 STORMWATER TREATMENT

Stormwater treatment will be provided through three raingardens, which have been centralised where practicable to capture runoff from their contributing catchments. Each raingarden has been sized to treat the impervious road and parking areas that drain to it.

Additional treatment will be provided through low-flow channels within the ponds, as well as the planted swale, which will contribute to retention through evaporation and uptake by vegetation.

Each dwelling will also be required to install a rainwater re-use tank to support stormwater retention.



Table 2. Summary of raingardens

Raingarden ID	Road Area	Raingarden Area (m ²)	% Check
RG-01	410	8.5	2.1 %
RG-02	390	8.8	2.3 %
RG-03	874	17.5	2.0 %

2.6 HYDRAULIC NEUTRALITY & ATTENUATION

The stormwater ponds have been designed in accordance with the Kapiti Coast District Council *Subdivision and Development Principles and Requirements*, using HEC-HMS hydrological modelling. Key model outputs are summarised in the tables and figures below. The pond design parameters and resulting hydrographs have been directly incorporated into the flood model to inform the flood risk assessment, ensuring the system performs as intended during major flood events. No on-lot detention has been assumed in the design.

Each pond has a maximum water depth of 1.0 m, enabling full drainage and ensuring the base remains dry between storm events. The pond inverts are set at RL 4.10, with the discharge level spreader set at RL 4.05. A 300 mm freeboard is provided, and each pond includes capacity for the required 70 m³ of flood-storage offset, as outlined in the flood assessment.

Tables 5 and 6 present the peak water levels, discharges, and storage volumes for each pond for the 2-, 5-, 10- and 100-year events.

Table 3. Pond 1 Summary

Pond 1	2 Year	5 Year	10 Year	100 Year
Peak Inflow	0.087	0.108	0.151	0.240
Peak Discharge	0.035	0.041	0.051	0.096
Pond Max. Depth (m)	0.234	0.296	0.43	0.71
Pond Volume (m ³)	77	98	144	236

Table 4. Pond 2 Summary

Pond 2	2 Year	5 Year	10 Year	100 Year
Peak Inflow	0.073	0.090	0.127	0.202
Peak Discharge	0.037	0.043	0.63	0.114
Pond Max. Depth (m)	0.249	0.318	0.47	0.70
Pond Volume (m ³)	49	63	93	140

Table 5 and Figures 2 and 3 illustrate the combined pre- and post-development flows for the site as a whole. These flows represent the total discharge from both ponds, conveyed to land via the level spreader.



Table 5. Pre/Post Development Discharge

Pre/Post	2 Year	5 Year	10 Year	100 Year
Pre-development Peak Flow (m ³ /s)	0.060	0.079	0.119	0.2108
Post-development Peak Flow (m ³ /s)	0.720	0.084	0.115	0.2107

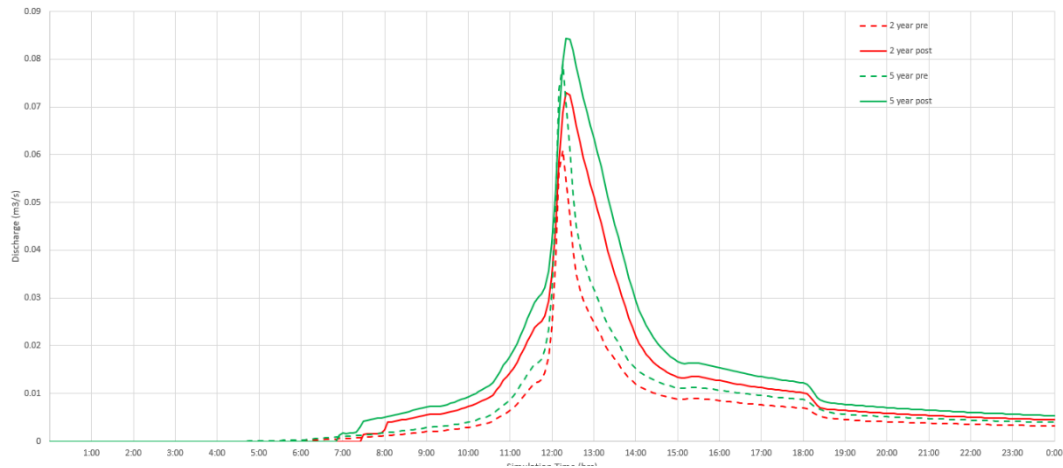


Figure 3: Pre and Post development peak flows. 2- and 5-year design event

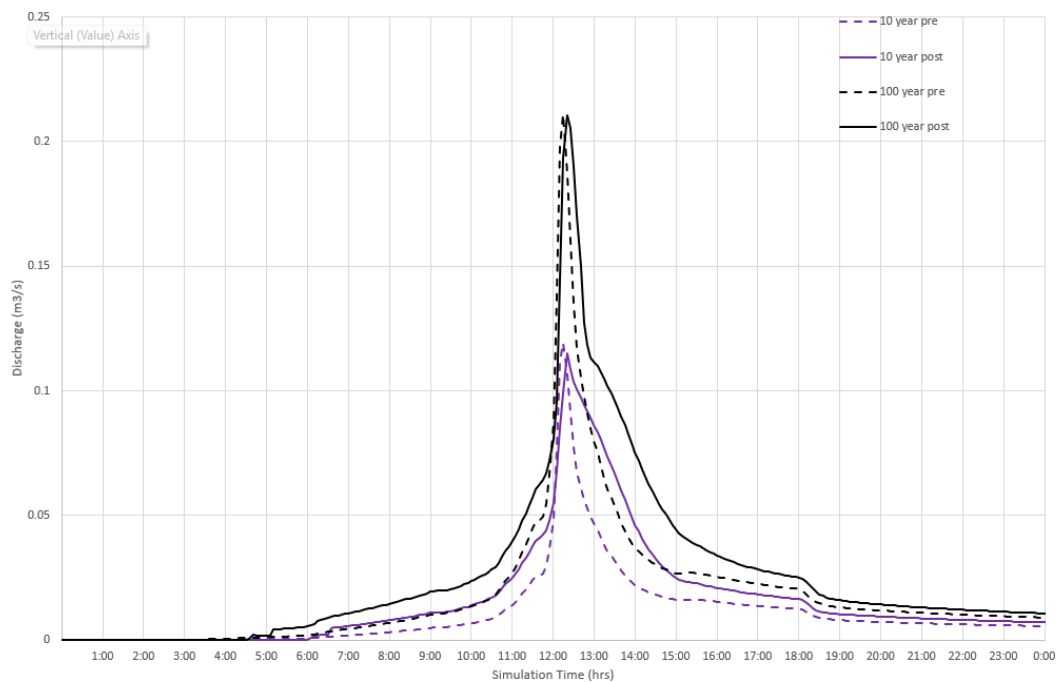


Figure 4: Pre and Post development peak flows. 10- and 100-year design event

These results show that the proposed pond (376m³ volume) is sufficient to attenuate stormwater from the site for storm events up to the 100-year event.

As stormwater from the development is disposed on site, the development meets the requirements for hydraulic neutrality in terms of peak flow and volume.



2.7 STORMWATER DISCHARGE

Stormwater will discharge via a dispersion swale and level spreader located 3 m south of the northern boundary. This design enables flows to be released as sheet flow, replicating pre-development conditions rather than concentrating runoff at a single outlet point. Three pre-development catchments naturally drain northwards, and the proposed system has been designed to maintain this distribution. Portions of the northern boundary are elevated and would not have received runoff under pre-development conditions; accordingly, the swale and spreader bar do not extend into these areas.

2.8 FLOOD RISK ASSESSMENT

An existing flood risk exists on the site. The flood risk can be alleviated by carrying out earthworks that will enable new dwellings to be constructed at proposed minimum recommended building levels (RBL's) that have been provided by KCDC GIS flood maps. Additionally, some lots have been raised along the east and west boundaries to account for updated flood modelling. 70m³ of on-site existing flood storage can be mitigated through the proposed stormwater attenuation pond. A further detailed assessment has been provided by Envelope.

2.9 RAINWATER RE-USE

4,000l rainwater tanks are proposed for rainwater re-use, supplying outdoor tap and toilet water for houses at the site. The Kapiti Coast District Plan requires a potable water reduction of 30% in order to meet the requirements of rule INF-MENU-R35 as a Restricted Discretionary activity.

Historic annual rainfall in Otaki is 1098mm/year with average monthly rainfall greater than 50mm/month and most months greater than 60mm/month. Based on the proposed roof areas and assuming 8% losses, the roof will supply approximately 6m³ of water per, with most months supplying significantly more than this.

Outdoor and toilet use has been estimated at approximately 30-40% of daily use. The daily water demand calculated in accordance with the KCDC SPDR is 600l/house, meaning that the outdoor and toilet water use is approximately 190-250l/house/day. The proposed rainwater tanks will supply 15-20 days of water, which would provide adequate supply of water for outdoor and toilet use.

The proposed 4,000l rainwater tanks are suitable to meet the restricted discretionary activity requirements of rule INF-MENU-R35. Dependent on the final development water usage, additional measures to achieve water reduction could be considered including the use of water reduction fixtures within houses.

The tanks will be detailed at the building consent stage.

3.0 CONCLUSIONS

Based on the above summary of our assessments, we conclude that there are no Infrastructure Servicing related issues which should affect the ability of the development proposal to be implemented.

Civil infrastructure will be designed in accordance with the Kapiti Coast District Council Subdivision and Development Principles and Requirements and NZS4404:2004

4.0 LIMITATIONS

4.1 GENERAL

This report is for the use of Classic Developments and Kapiti Coast District Council only and should not be used or relied upon by any other person or entity or for any other project.

This report has been prepared for the project described to us and its extent is limited to the scope of work agreed between the client and Envelope Engineering Limited. No responsibility is accepted by Envelope Engineering Limited or its directors, servants, agents, staff or employees for the accuracy



of information provided by third parties and/or the use of any part of this report in any other context or for any other purposes.



APPENDICES

APPENDIX 1

STORMWATER CALCULATIONS

Client	Classic Developments	
Project Site	Rangijuru Road	
Envelope Ref	1678-02	
Version	1	
Date	30/03/2026	
HEC - INPUTS		

Pre-Development								
Catchment	Area (m²)	Area (km²)	Impervious (%)	CN	la (mm)	tc (hrs)	lag time (hrs)	Storage Value
Input	23883	0.023883	0	69	5	0.1667	0.00	0.2501

Post-Development								
Catchment	Area (m²)	Area (km²)	Impervious (%)	CN	la (mm)	tc (mins)	lag time (hrs)	Storage Value
Lumped Pond 1	12968	0.01296776	51%	83.9	2.43	0.1667	0.001667	0.0714
Lumped Pond 2	10922	0.01092173	51%	83.8	2.45	0.1667	0.001667	0.0714

Rainfall Data - Isohyet Maps 2090				
ARI	2 year	5 year	10 year	100 year
Depth	65	75	95	135
Duration	Normalized rainfall			
(mins)	2 year	5 year	10 year	100 year
5	5.2	6	7.6	10.8
15	9.1	10.5	13.3	18.9
60	16.9	19.5	24.7	35.1
120	24.7	28.5	36.1	51.3
180	29.9	34.5	43.7	62.1
360	39	45	57	81
720	52.65	60.75	76.95	109.35
1440	65	75	95	135

Lumped Pond 1			
Catchment	Area (m²)	CN	Adjusted
Roofs	5040.788	98	493997.224
Paved Surfaces	1260.197	98	123499.306
Lawn/garden	6300.985	69	434767.965
Ponds	365.79	98	35847.42
Total Catchment	12968		1088112
Weighted CN		83.9	
Impervious Area	6666.775	51%	
Pervious Area	6300.985	49%	

Lumped Pond 2			
Catchment	Area (m²)	CN	Adjusted
Roofs	4277.22	98	419167.2
Paved Surfaces	1069.30	98	104791.8
Lawn/garden	5346.52	69	368909.9
Ponds	228.69	98	22411.62
Total Catchment	10922		915280
Weighted CN		83.8	
Impervious Area	5575.21	51%	
Pervious Area	5346.52	49%	

STORMWATER PIPE SIZE CALCUATIONS - 1 IN 10 YEAR EVENT

ENVELOPE					Project Name: Rangioru								Project No: 1678-02				
Stormwater Design Chart - Mannings Formula					Location: OTAKI								Date: 28-11-2025				
DRAIN SECTION	SUB-CATCHMENT DETAILS	SUBCATCHMENT AREA (A)	COEFF OF RUNOFF (C)	EFFECTIVE AREA (CA)	TIME OF CONC (tc)	RAINFALL INTENSITY (i) (Including 16% Climate)	CUMMULATIVE EFFECTIVE AREAS (CA)	DESIGN DISCHARGE Q= 2.78CIA	TOTAL DISCHARGE	PIPE CROSS-SECTIONAL AREA	PIPE MATERIAL	'n' FACTOR	PIPE SIZE	ACTUAL SLOPE OF SECTION	VELOCITY	CAPACITY	SPARE CAPACITY
SW LINE 1		ha		ha	min	mm/hr	ha	l/s	l/s	m			mm	%		l/s	l/s
SWMH1-3 to SWMH1-2	CM 1-3 A	0.4000	0.63	0.2520	10	89.4	0.2520	62.63	62.63								
	CM 1-3 B	0.4000	0.63	0.2520	10	89.4	0.2520	62.63	125.26								
	CM 1-3 C	0.0300	0.63	0.0189	10	89.4	0.0189	4.70	129.96	0.110	RCRRJ	0.013	375	0.50	1.62	124.0	-6.0
SWMH1-2 to SWMH1-1	CM 1-2	0.1200	0.63	0.0756	10	89.4	0.0756	18.79	148.75								
	CM SUMP 6	0.0800	0.63	0.0504	10	89.4	0.0504	12.53	161.27	0.159	RCRRJ	0.013	450	0.50	1.83	201.6	40.3
SWMH1-1 to HM OUT 1	CM SUMP 6	0.1000	0.63	0.0630	10	89.4	0.0630	15.66	164.40								
	CM 1-1 B	0.0300	0.63	0.0189	10	89.4	0.0189	4.70	169.10	0.159	RCRRJ	0.013	450	0.50	1.83	201.6	32.5
SW LINE 3																	
SWMH3-1 to SWMH2-2	CM 2-2	0.2900	0.63	0.1827	10	89.4	0.1827	45.41	45.41	0.071	RCRRJ	0.013	300	0.50	1.40	68.4	23.0
SW LINE 2																	
SWMH2-3 to SWMH2-2	CM 2-3	0.1400	0.63	0.0882	10	89.4	0.0882	21.92	67.33	0.071	RCRRJ	0.013	300	0.50	1.40	68.4	1.1
SWMH2-2 to SWMH2-1	CM 2-2A	0.1000	0.63	0.0630	10	89.4	0.0630	15.66	82.98								
	CM 2-2B	0.0700	0.63	0.0441	10	89.4	0.0441	10.96	93.95	0.110	RCRRJ	0.013	375	0.50	1.62	124.0	30.0
SWMH2-1 to HM OUT 1-1	CM 2-1	0.1800	0.63	0.1134	10	89.4	0.1134	28.18	122.13	0.110	RCRRJ	0.013	375	0.50	1.62	124.0	1.8
	CM SWMH 61	0.1600	0.63	0.1008	10	89.4	0.1008	25.05	25.05	0.040	RCRRJ	0.013	225	0.50	1.16	31.8	6.7

APPENDIX 2

ENGINEERING PLANS

APPENDIX 3

FLOOD RISK ASSESSMENT

FLOOD RISK ASSESSMENT

234 RANGIURU ROAD, OTAKI

TO	Classic Developments	DATE	05 December 2025
PROJECT NAME	234 Rangioru Road, Otaki	ENVELOPE REF	1678-02
ATTENTION	Will Dorset	FROM	Louis Freeland

1.0 INTRODUCTION

Envelope Engineering have been engaged to provide a Flood Risk Assessment for the proposed development at 234 Rangioru Road, Otaki. This memo provides an assessment of flood risk at the proposed development site, as well as assessing the effects of flooding pre and post development on the site and surrounding areas. This memo should be read in conjunction with the Envelope Engineering Infrastructure Report.

2.0 EXISTING FLOOD RISK

Kapiti Coast District Council (KCDC) GIS Maps show the site is subject to ponding and residual ponding with a stream corridor directly north of the site. There is a residual overflow path at the southwest corner of the site. Figure 1 shows the existing mapped KCDC Flood Hazards.

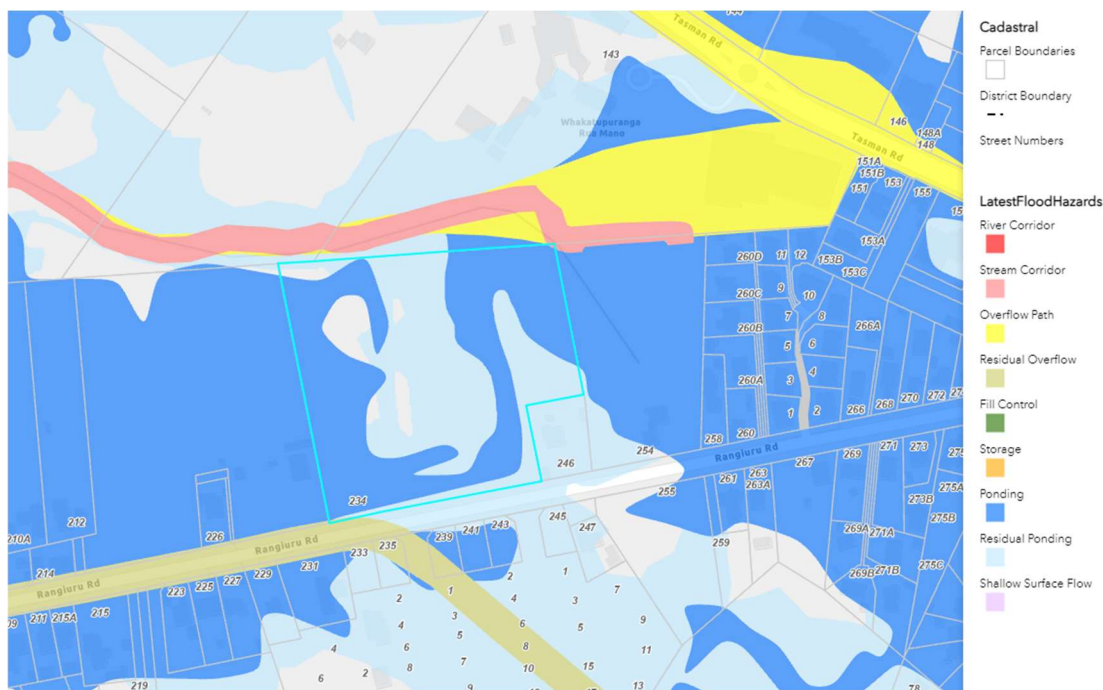


Figure 1. KCDC Flood Hazard Mapping.

KCDC are in the process of updating flood hazard mapping in the Otaki area, which encompasses the site. The new modelling (Appendix 1) takes into account a range of factors, including increased climate change and the effects of groundwater levels. The new KCDC model (Figure 2) results show that the risk of flooding to the site is significantly reduced from what the previous modelling predicted (Figure 1). The flooding is confined to isolated areas of the site and is of relatively shallow depth (typically <100 mm). There is approximately 70 m³ of storage volume on site. There are also



minor overland flow paths along the western boundary and in the northeast corner of the site that will need to be maintained.



Figure 2. Updated pre-development flood model results from KCDC Model.

Greater Wellington Regional Council were contacted to ascertain if the site was impacted by flooding from the Otaki River. GWRC have advised that the site is not within the flood hazard zoning for breach scenarios (Appendix 2).

3.0 POST DEVELOPMENT FLOOD RISK

KCDC have advised that due to the minor nature of flooding at the site shown in the revised KCDC Flood Model, post-development flood modelling is not required. However, the effects of the development as they relate to flooding are required to be assessed.

The development consists of earthworks, which have the potential to displace flood waters. To mitigate the effects of this, offset volume is provided within the proposed wetland and attenuation pond area. These areas have been over-sized (from an attenuation perspective) and have sufficient volume to provide the required 70 m³ of flood offsetting. Overland flow paths have been provided and/or maintained to ensure that flood waters are conveyed to this area.



The existing flow paths along the western boundary and northeast corner of the site are being maintained.

KCDC have recommended a Recommended Building Level of 300 mm for this area. The areas of the site adjacent to the overland flow paths along the west boundary and east boundary of the site have been raised above the existing ground level to allow for this.

Provided that the recommendations in this report are followed, the effects of flooding at the site can be mitigated and the off-site effects are less than minor.

4.0 CONCLUSION

Envelope Engineering have been engaged to provide a Flood Risk Assessment for the proposed development at 234 Rangiuru Road, Otaki. KCDC are in the process of completing revised flood modelling for Otaki, which has resulted in a reduction in the flood hazard at the site. The effects of flooding on the site and on adjacent areas can be mitigated by way of maintaining overland flow paths, providing offset storage volume and adequate freeboard. Provided the recommendations of this memo are followed, the effects of flooding at the site can be mitigated and the on and off-site effects are less than minor.



Louis Freeland

Senior Civil Engineer







ENVELOPE

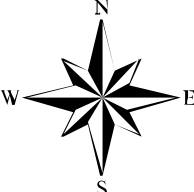
PROJECT: 234 RANGIURU ROAD		TITLE: PRE DEVELOPMENT FLOODING (100YR + CC)	
DESIGNED: LB	CHECK: KD	DRAWN: LB	DATE: 6/03/2024
STATUS: RESOURCE CONSENT		REVISION: R1	
PROJECT No: 1678-02		DRAWING No: 01	
NZGD 2000 New Zealand Transverse Mercator			

Legend

 Site Boundary

Depth (m)

-  <0.010
-  0.010 - 0.050
-  0.05 - 0.100
-  0.100 - 0.120
-  > 0.120



SCALE 1: 1,000



0 0.02 0.04 Km

From: Kyle Dirse
Sent: Friday, 1 December 2023 2:02 pm
To: Louis Freeland
Subject: FW: Request for GWRC Flood Model results
Attachments: [Ōtaki Hydraulic Modelling Report - Final \[1312795\].PDF](#)

KYLE DIRSE

DIRECTOR / SENIOR CIVIL ENGINEER

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 **ENVELOPE**



Happy Holidays

We're off on summer vacay from 1
22 December, returning on Monday 8

From: Kirsty Duff <Kirsty.Duff@gw.govt.nz>
Sent: Friday, December 1, 2023 12:16 PM
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Subject: FW: Request for GWRC Flood Model results

Kia ora Kyle

Please find attached the flood hazard modelling for the Ōtaki River. I have checked the 2D results for the breach scenarios and this location is not within the flood hazard for the breaches. The flooding in this area is likely from surface water/stormwater flooding and its interaction with Rangiuru Stream. I recommend contacting Kāpiti Coast District Council to understand the stormwater flood hazard in this location.

Ngā mihi
Kirsty



Kirsty Duff

Kaipūkaha | Senior Engineer – Water Knowledge

Greater Wellington Te Pane Matua Taiao

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From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>

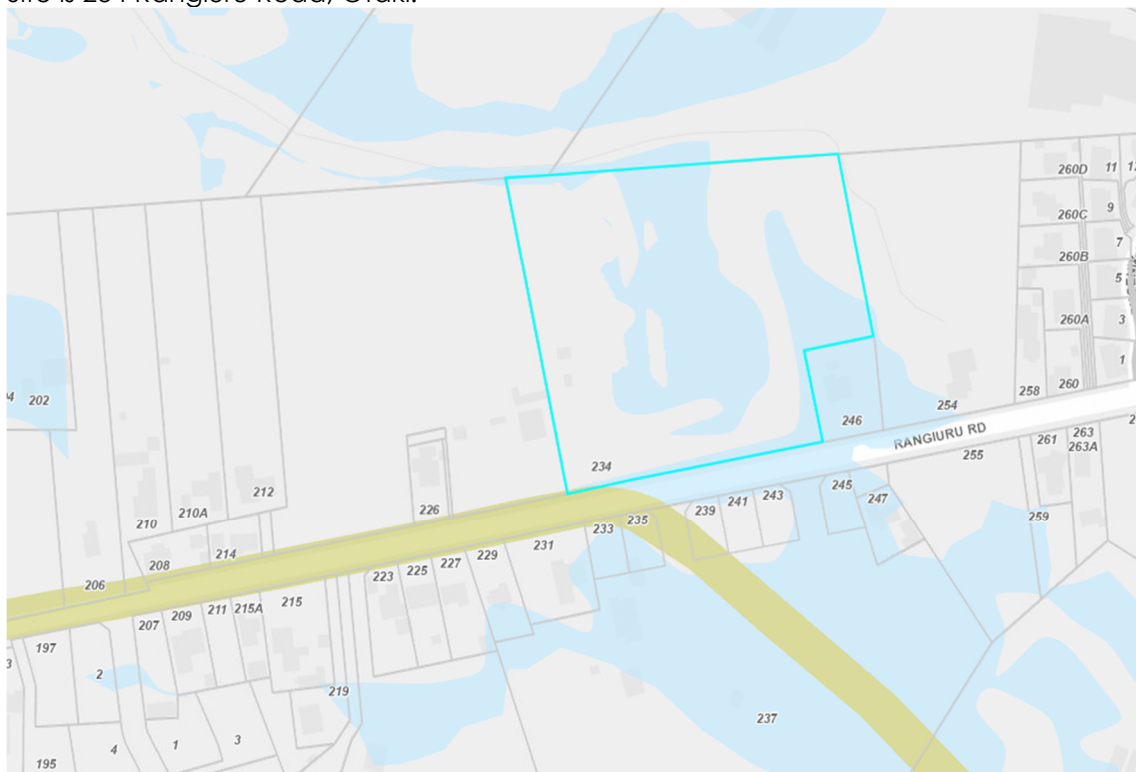
Sent: Tuesday, November 28, 2023 12:19 PM

To: Kirsty Duff <Kirsty.Duff@gw.govt.nz>

Subject: RE: Request for GWRC Flood Model results

Hi Kristy,

Just need the report which details those scenarios as well as the updated flood hazard mapping post-construction of the stop bank.\nSite is 234 Rangioru Road, Otaki.



I don't think we need the model at this stage.

KYLE DIRSE**DIRECTOR / SENIOR CIVIL ENGINEER****M** +64 27 228 1287**A** 26A Tawa St

Mount Maunganui 3116



From: Kirsty Duff <Kirsty.Duff@gw.govt.nz>
Sent: Tuesday, November 28, 2023 10:12 AM
To: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>
Subject: RE: Request for GWRC Flood Model results

Kia ora Kyle

Your request has been passed on to me.

Would you be able to provide a bit more context to your request. What format you are looking for these breach runs? Is there a specific location you are looking for? Or do you want the MIKE modelling files?

Ngā mihi
Kirsty

**Kirsty Duff**

Kaipūkaha | Senior Engineer – Water Knowledge

Greater Wellington Te Pane Matua Taiao**021 58 4684**

100 Cuba St, Te Aro, Wellington 6011

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From: Christina Schierlitz <Christina.Schierlitz@gw.govt.nz>
Sent: Friday, November 24, 2023 3:00:58 PM
To: James Flanagan <James.Flanagan@gw.govt.nz>
Subject: FW: Request for GWRC Flood Model results

Kia ora James

Would you be able to help with the query below or else point Kyle in the right direction?

Ngā mihi
Christina



Christina Schierlitz

Kaitohutohu Matua | Senior Resource Advisor, Consents and Compliance

Greater Wellington Te Pane Matua Taiao

021 280 3202

100 Cuba St, Te Aro, Wellington 6011

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Please note that on Tuesdays and Thursdays I only work from 9am to 1pm

From: Kyle Dirse <kyle.dirse@envelope-eng.co.nz>

Sent: Friday, November 24, 2023 2:59 PM

To: Christina Schierlitz <Christina.Schierlitz@gw.govt.nz>

Subject: FW: GWRC Flood Model

Hi Cristina,

Can you please provide the Greater Wellington Regional Council's (GWRC's) 2012 Ōtaki River Model results for the Chrystall's Bend and T-breach scenarios.

Regards,

KYLE DIRSE

DIRECTOR / SENIOR CIVIL ENGINEER

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 **ENVELOPE**



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