# Information Session/Workshop - Te Pātaka o Rākaihautū Banks Peninsula Community Board NOTES ATTACHMENTS

**Date:** Monday 11 August 2025
**Time:** 12.15pm
**Venue:** Wairewa Little River Boardroom, 4238 Christchurch Akaroa Road, Wairewa Little River

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**SITE 3D VIEW PROPOSED**
Scale =1 : 250

TEAM
AUCKLAND
HAMILTON
NEW PLYMOUTH
NAPIER
PALMERSTON NORTH
WELLINGTON
GREYMOUTH
CHRISTCHURCH
WANAKA
DUNEDIN
ARCHITECTS

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| A | 07/08/25 | RESOURCE CONSENT |

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**LITTLE RIVER CORONATION LIBRARY**

4313 Christchurh Akaroa Road, 7591

TITLE
**PROPOSED SITE VIEW**

SIZE
**A3**

SCALE
**1 : 250**

PROJECT NUMBER
**246006**

ISSUE
**RESOURCE CONSENT**

SHEET NUMBER
**A2.11**

REV
**A**

# Little River

## Recent flood modelling & May 2025 flood event

1. Latest modelling by DHI (including summary of model results)
2. May 2025 flood event
3. Where to next with modelling?

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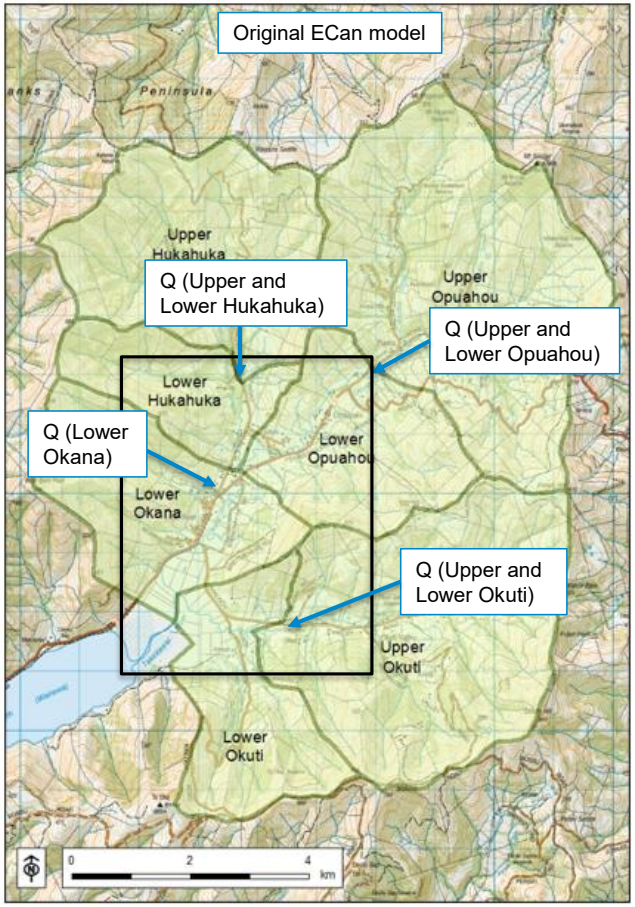
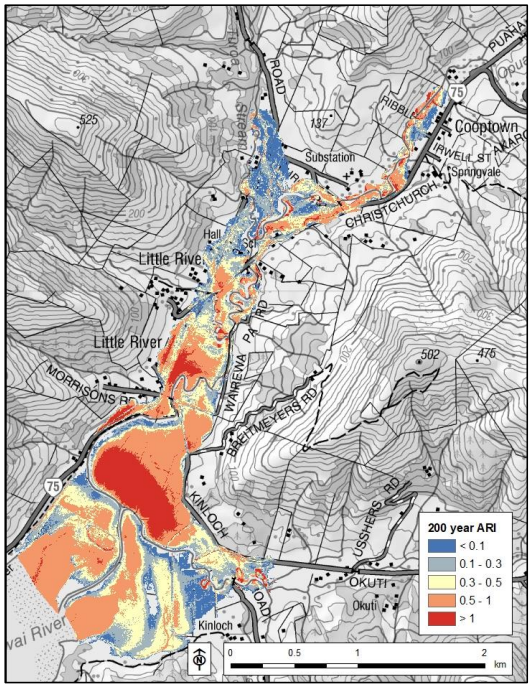
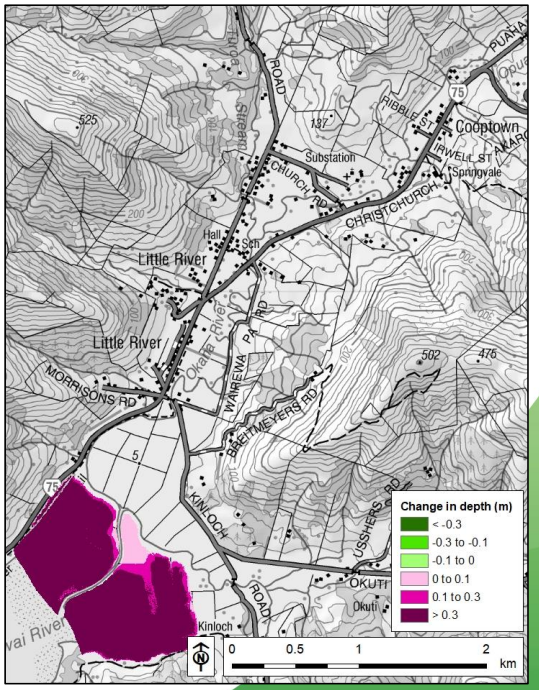
# Original ECan model




Water depth (m) – 200 year




Sensitivity run
Lake level increased by 1 metre
(above 2014 lake level)

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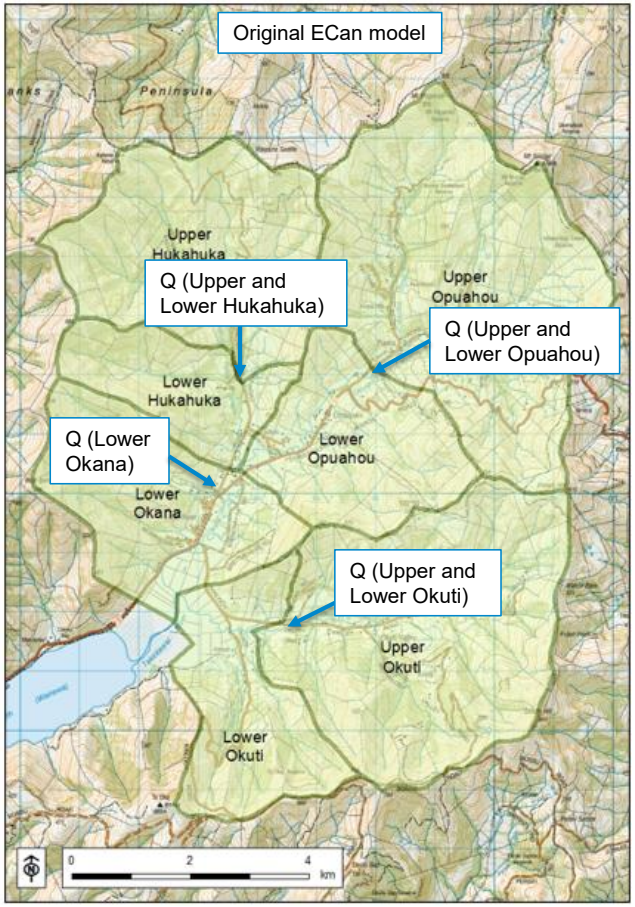
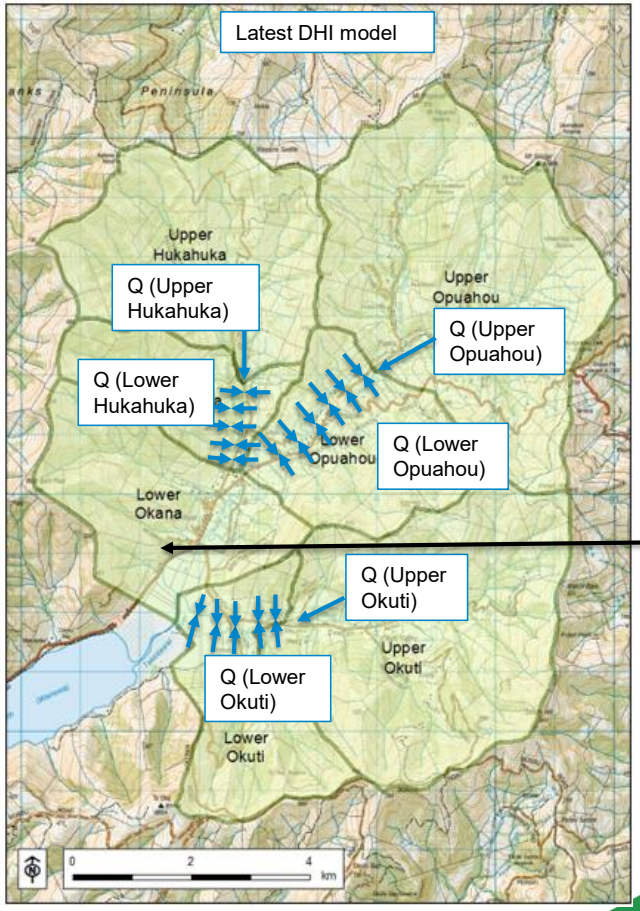
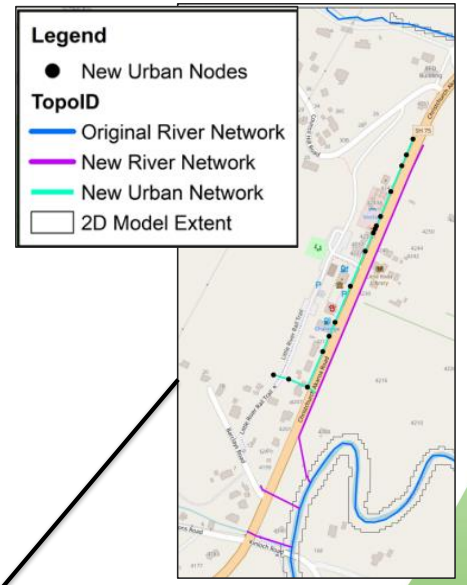
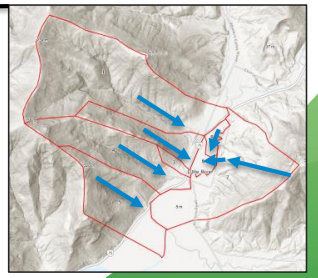
## Original ECan model → Latest DHI model

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# DHI model runs

**Baseline models:**

- 5, 20 and 50 year average recurrence interval (ARI)

**Modifications to the Kinloch Bridge area:**

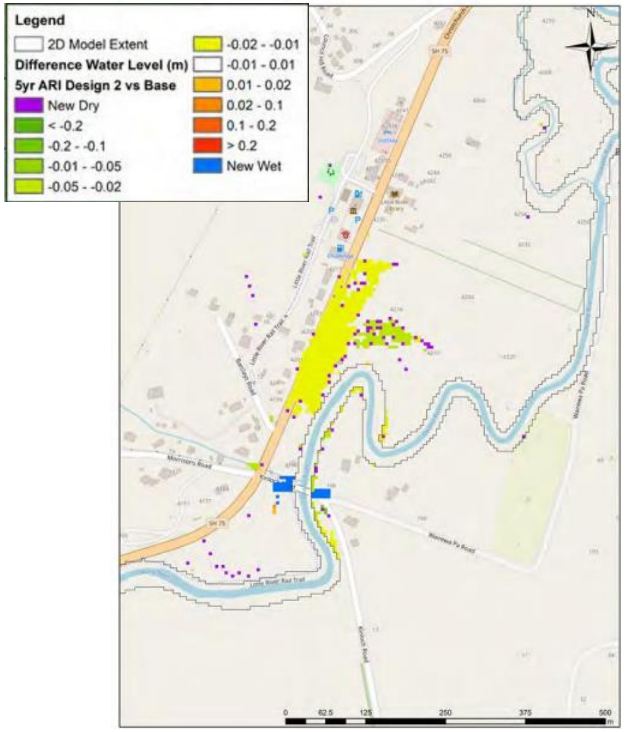
- A 5 year ARI flood event, with quite significant changes to the bridge.
- A 50 year ARI flood event, with extreme bridge and river channel alterations.

*Deliberately quite extreme to try and maximise the reduction in flood levels*

# Option 1: 5 year ARI flood event

An estimated 5 year return period flood was run with the following changes to the baseline model:

- Removed the bridge
- Removed the road embankment down to the floodplain (surrounding land) level for 1.5 x river channel width on either side of the main channel




10 – 20 mm water level reduction in the township area
20 – 50 mm reduction east of the main road

This confirms that if the bridge and associated road embankment are removed or lowered the reductions in maximum water level for a 5 year ARI event are minor

## Option 2: 50 year ARI flood event

An estimated 50 year return period flood was run with the following changes to the baseline model:

- Remove the bridge
- Remove the road embankment down to the floodplain (surrounding land) level for 1.5 x river channel width on either side of the main channel
- Main channel widened downstream of Kinloch Bridge for 140 m (down to the 90°bend) to the same width as upstream
- Levees (elevated banks) higher than the floodplain are removed
- Channel roughness between the bridge and the lake is reduced to represent the removal of willow growth
- Berm roughness upstream of the bridge is reduced to represent a smoother entry to the bridge

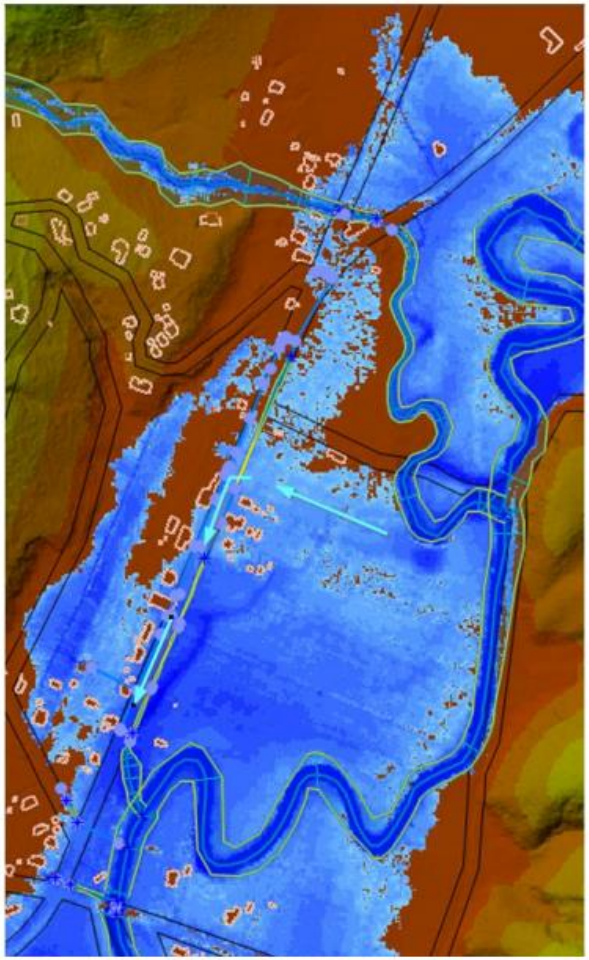


Figure 2: Flooded areas in a 1 in 50 year return period flood - Baseline Model

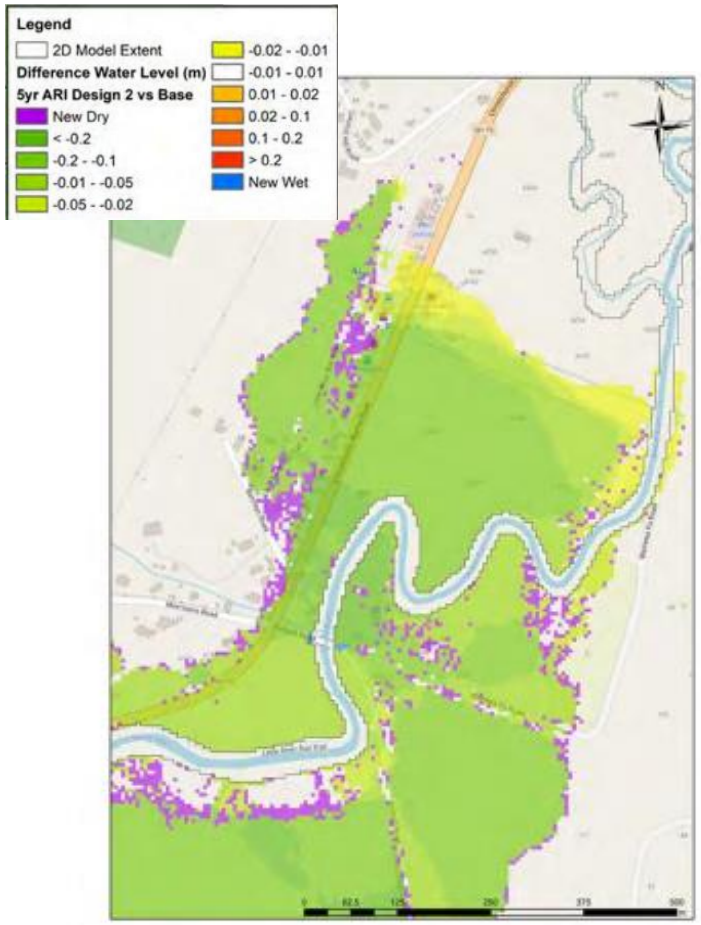



Figure 3: Flood Level Difference Map centred on township and Kinloch Bridge for a 50-year return period (2% AEP) rainfall event

Flood levels are reduced by ~100 to 200+ mm in the southern part of the settlement.

Reduces the risk to 5-6 houses between the Service Station and Barclays Road but does not show strong evidence of benefiting other buildings

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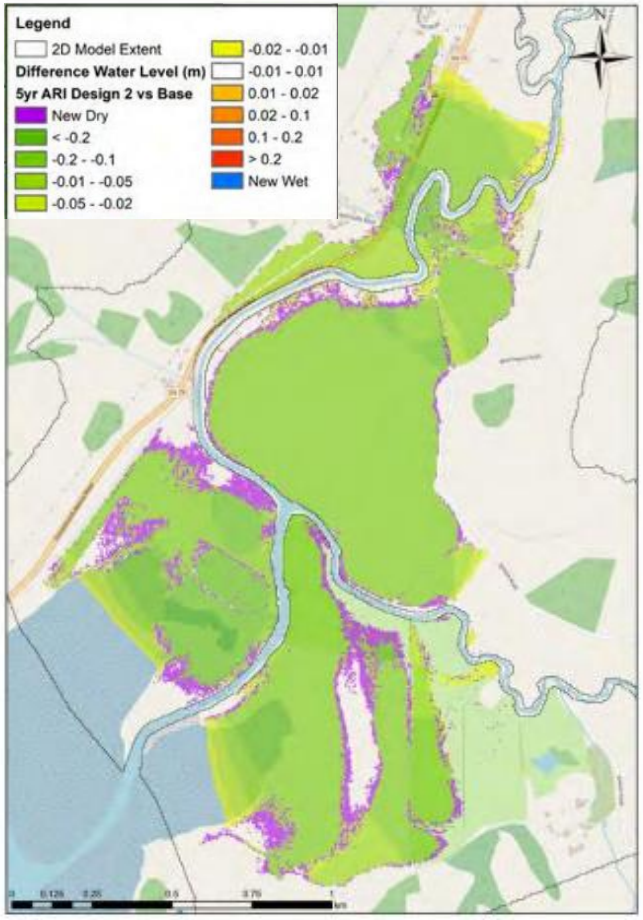


*Figure 4: Flood Level Difference Map downstream of Kinloch Bridge for a 50-year return period (2% AEP) rainfall event*

Even with extreme modifications to the Kinloch Bridge area, only small reductions in water level

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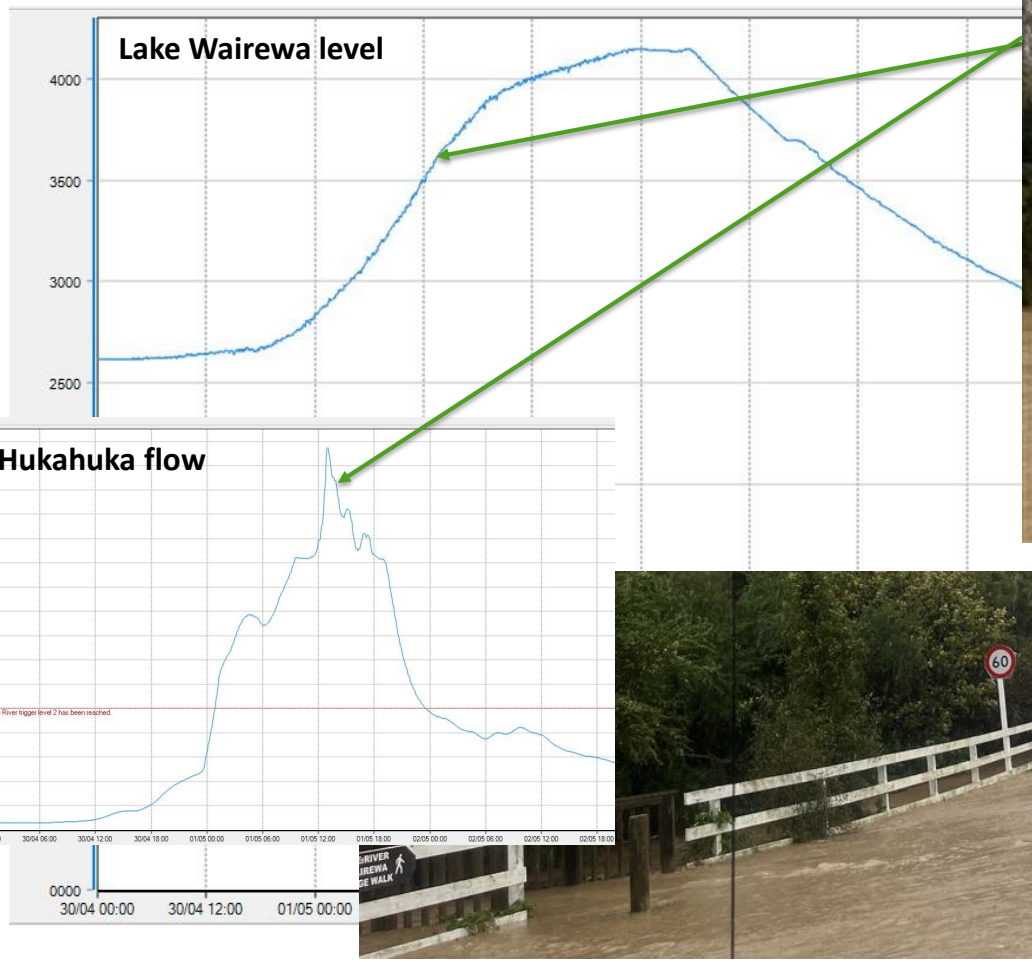
Attachment A Item 3

# Little River – 1 May 2025 at 2-3pm




# Little River – 1 May 2025 at 2-3pm

## Little River – 1 May 2025 at 2-3pm

Banks Peninsula hit hard by flooding – YouTube

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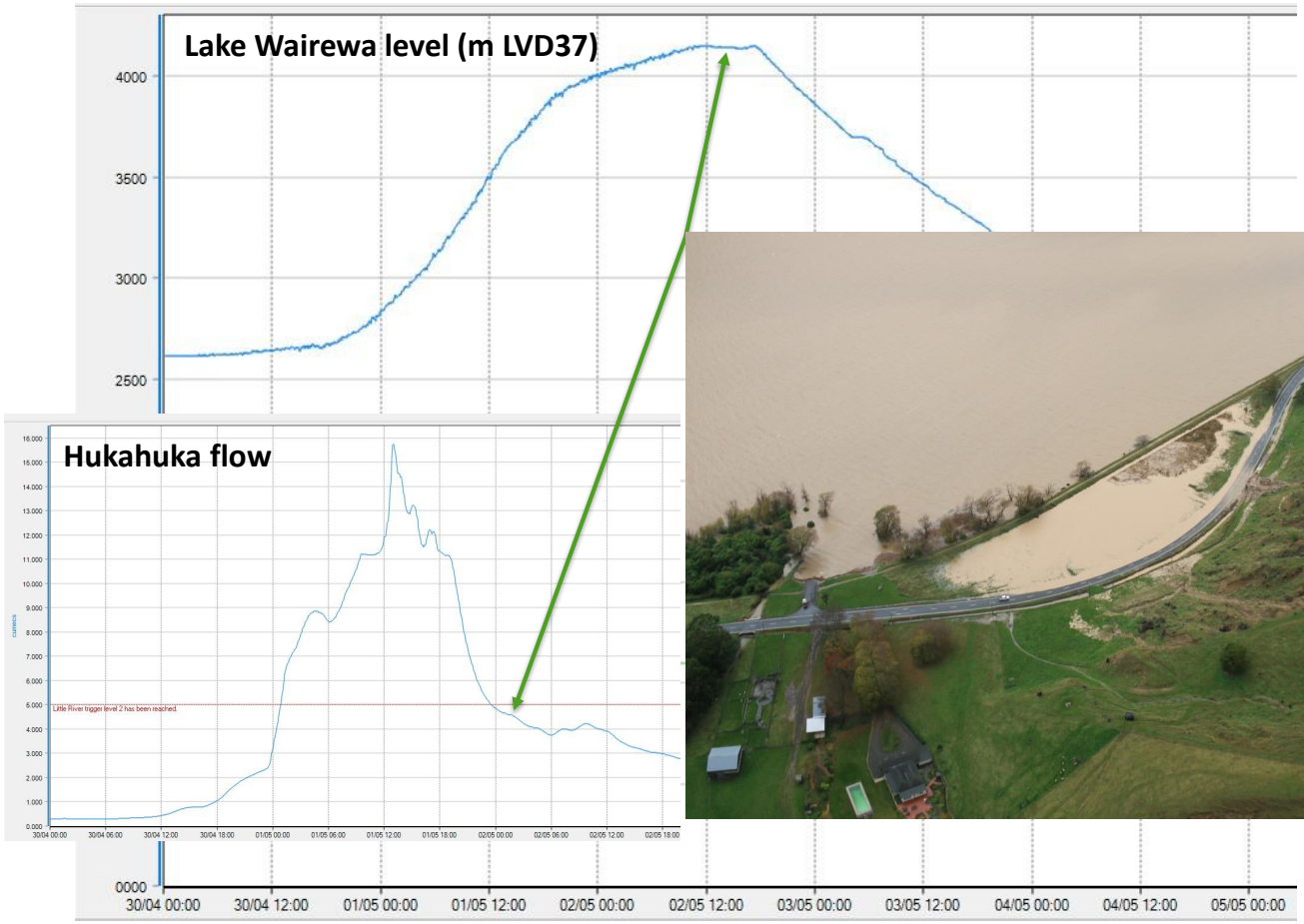
# Lake Forsyth (Lake Wairewa) – 2 May 2025 at 1:40pm



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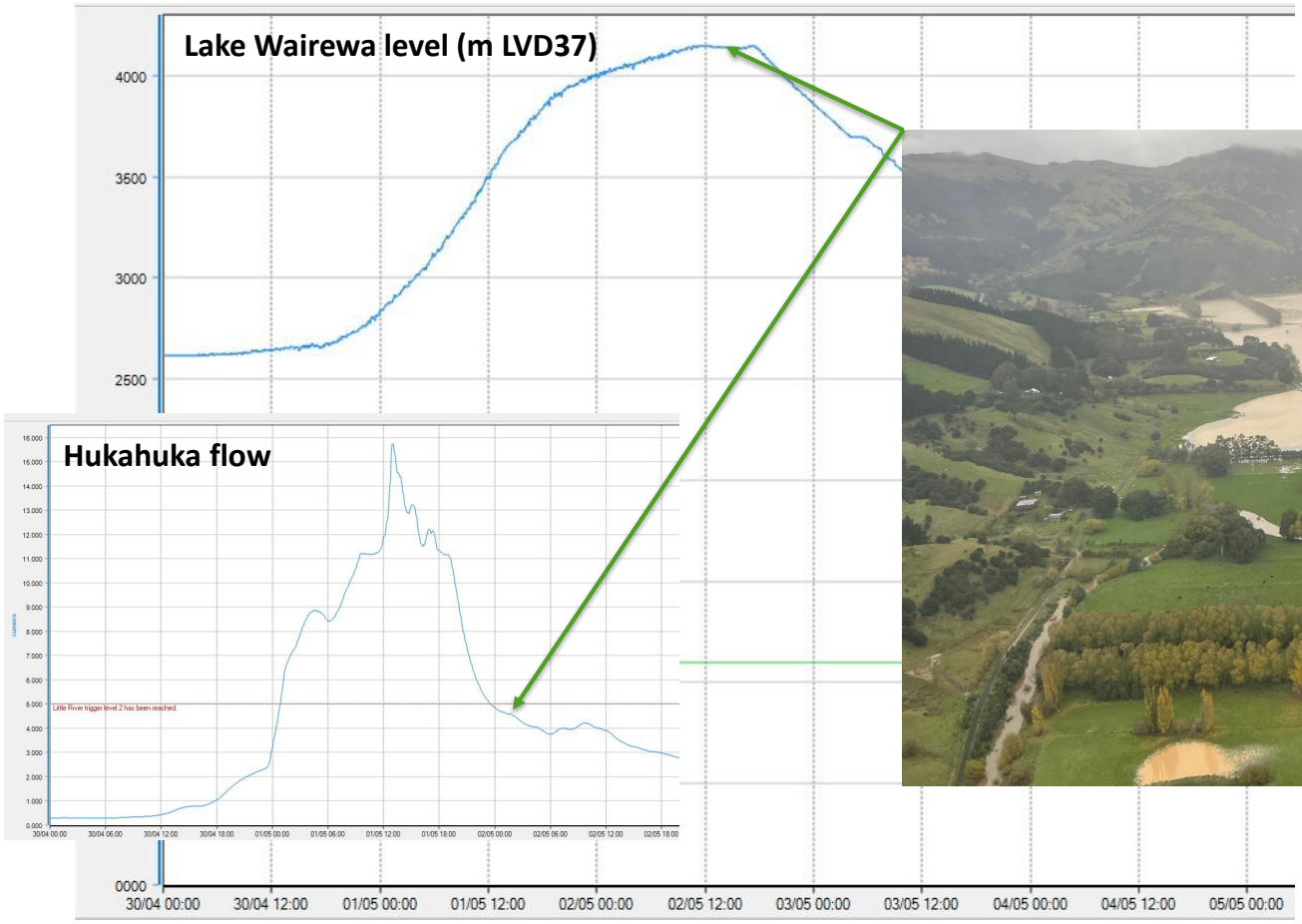
# Lake Forsyth (Lake Wairewa) – 2 May 2025 at 1:40pm

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## Lake Forsyth (Lake Wairewa) – 2 May 2025 at 1:40pm

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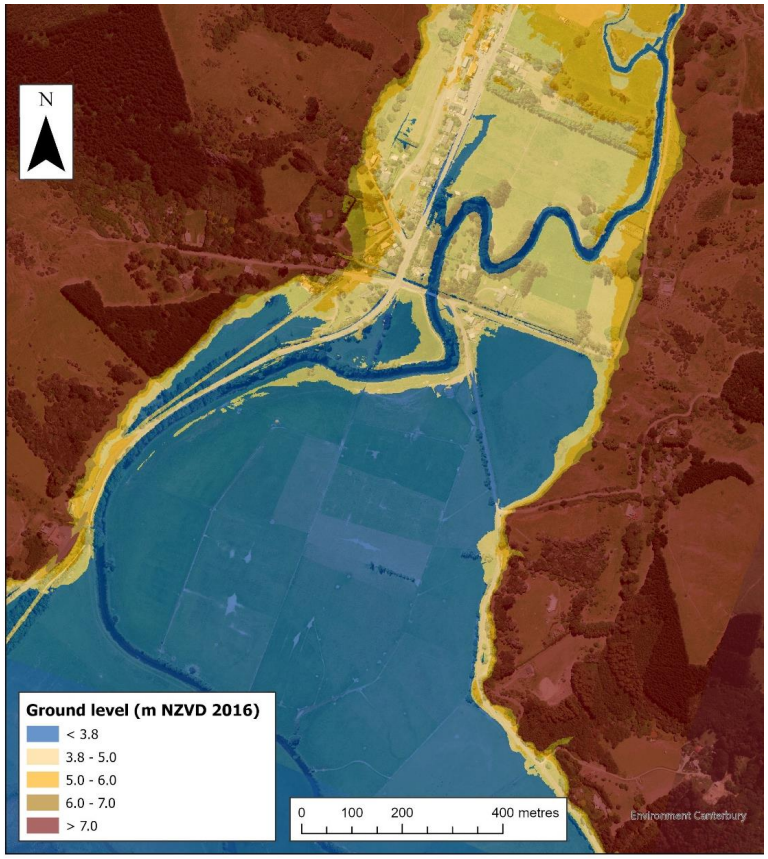
# Lake Forsyth (Lake Wairewa) – maximum lake level of 4.15 m LVD37

[= 3.8 m NZVD 2016, approx. 2 May 2025 at 1:40pm]

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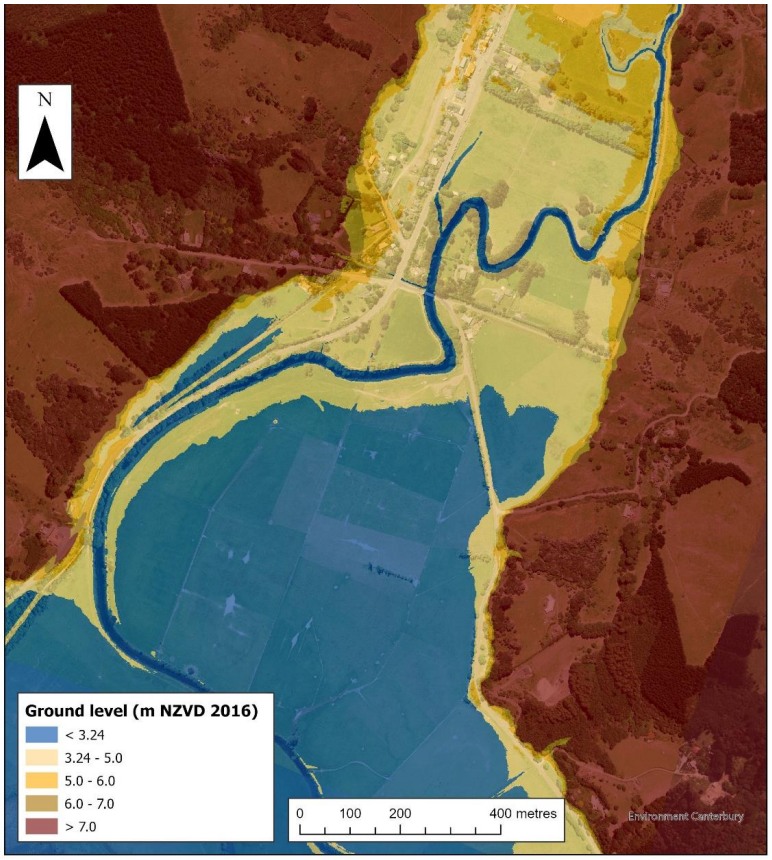
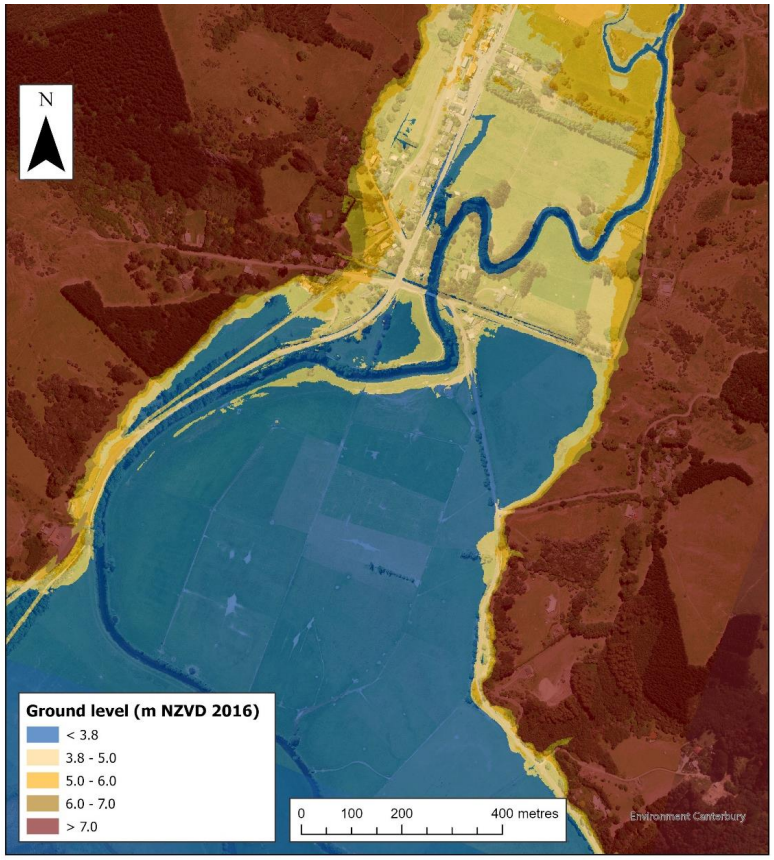
Attachment A Item 3

# Lake Forsyth (Lake Wairewa) – maximum lake level of 4.15 m LVD37 versus 3.6 m LVD37

3.24 m NZVD 2016 (1 May at 2-3pm) versus 3.8 m NZVD 2016 (2 May at 1:40pm)

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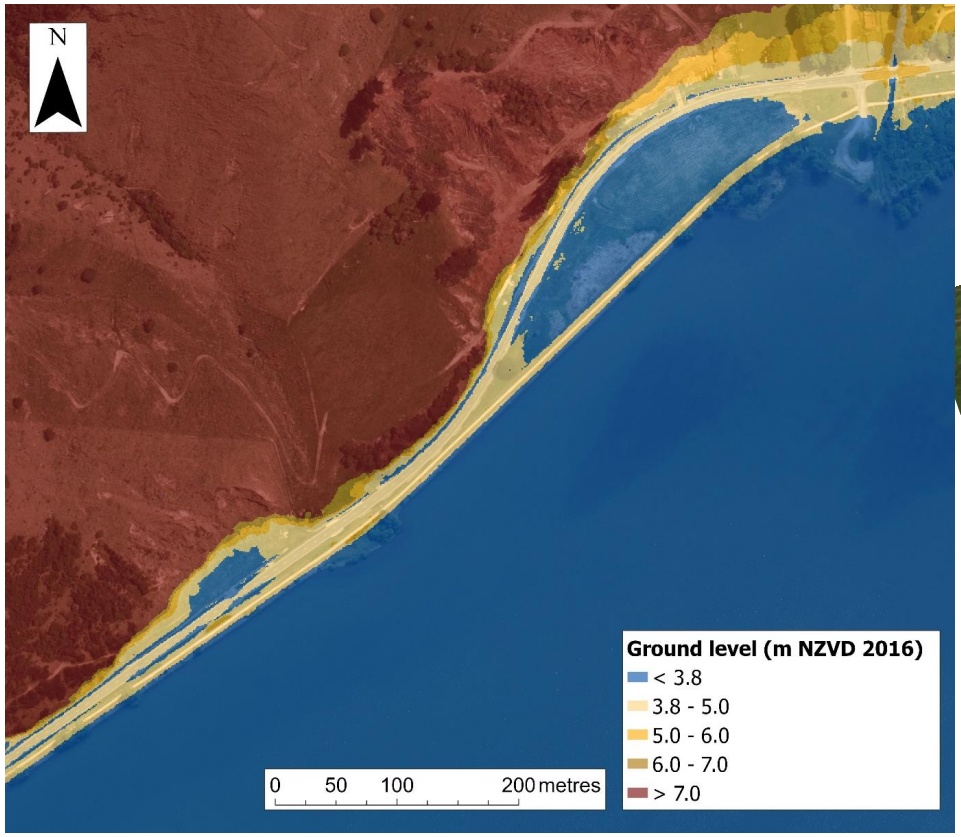
# Lake Forsyth (Lake Wairewa) – maximum lake level of 4.15 m LVD37

[= 3.8 m NZVD 2016, approx. 2 May 2025 at 1:40pm]

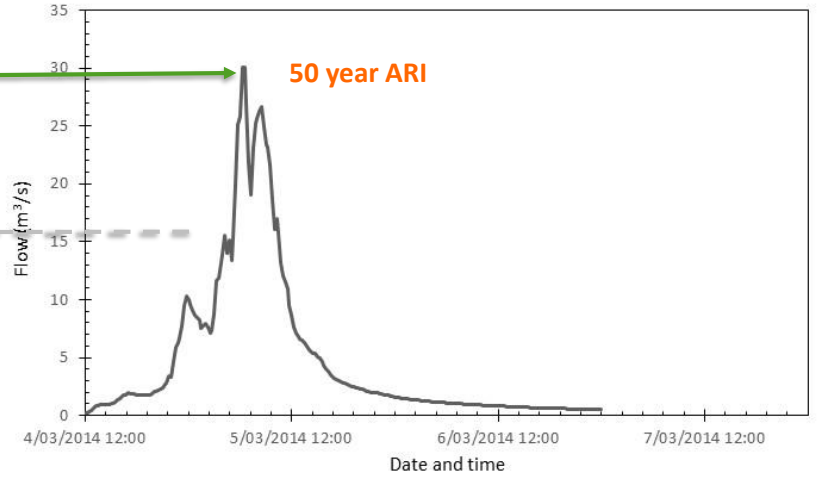


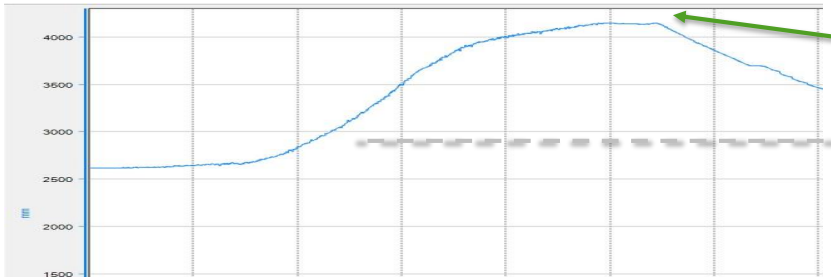

# How does May 2025 compare to March 2014?

**Hukahuka peak flow 16 m³/s versus 30 m³/s**

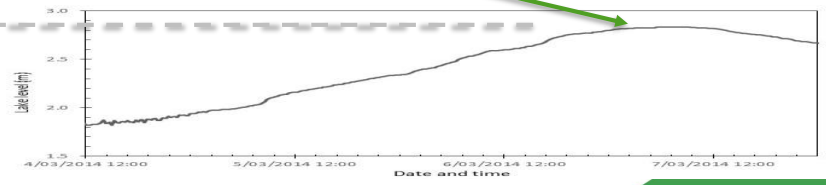
**May 2025**


**March 2014**




**Lake Wairewa peak level**
**4.2 m versus 2.8 m**




**Note: 1. Lag between peak flow and peak lake level**
**2. Previous highest recorded lake level was 3.07 m in June 2010**

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## What next?

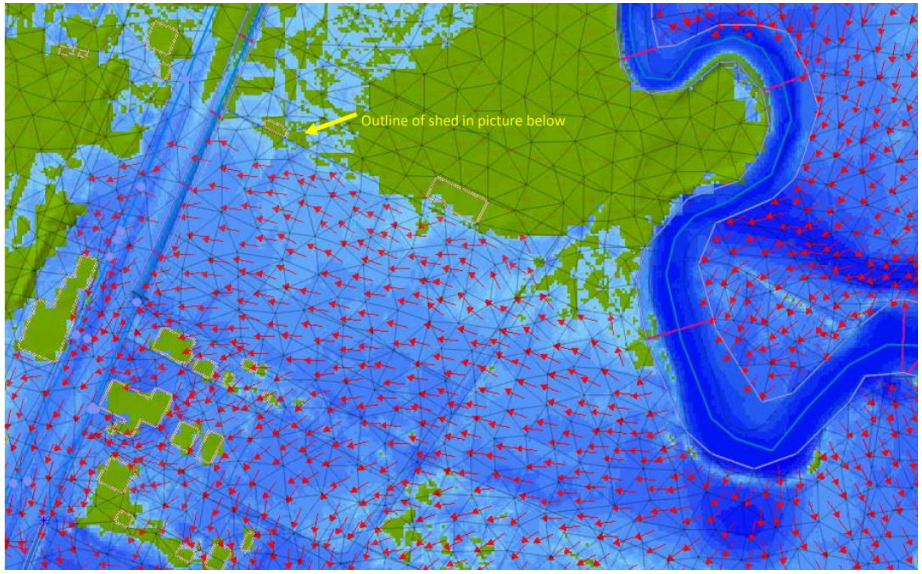
- Model animations
- Update LiDAR
- Convert model to rain on grid instead of point inflows
- Extend model to include lake and surrounding roads
- Run possible flood alleviation options
- Examine lake level further

# Potential model improvements:

- **Animations**

**Pros:**

- Can use latest model result files to produce some basic animations (e.g., arrows showing flow direction), which is not a lot of time and effort.
- Good for showing visually what is happening.



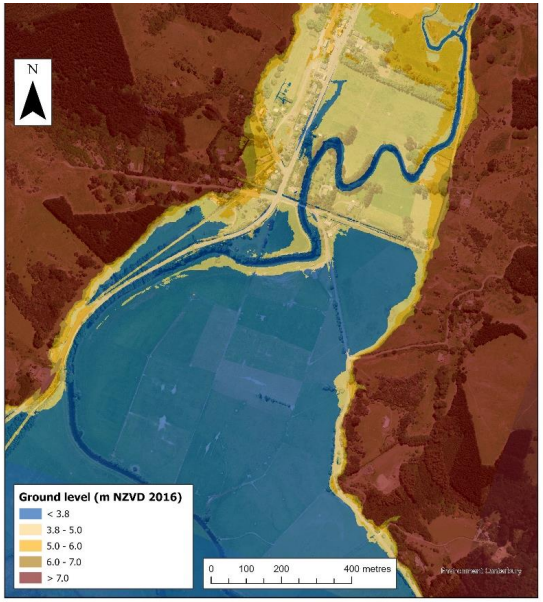

*Source: CCC*

# Potential model improvements:

- **<u>Update LiDAR</u>**

  **Cons:**

  - Higher resolution would be good for defining banks but a lot are hidden by dense vegetation (so not picked up by old or new LiDAR).
  - Would not expect many changes to ground levels between 2008, 2018 and 2023 – or that changes in LiDAR would drastically alter flood levels if looking at 'broad brush' feasibility of flood alleviation options.



## Potential model improvements:

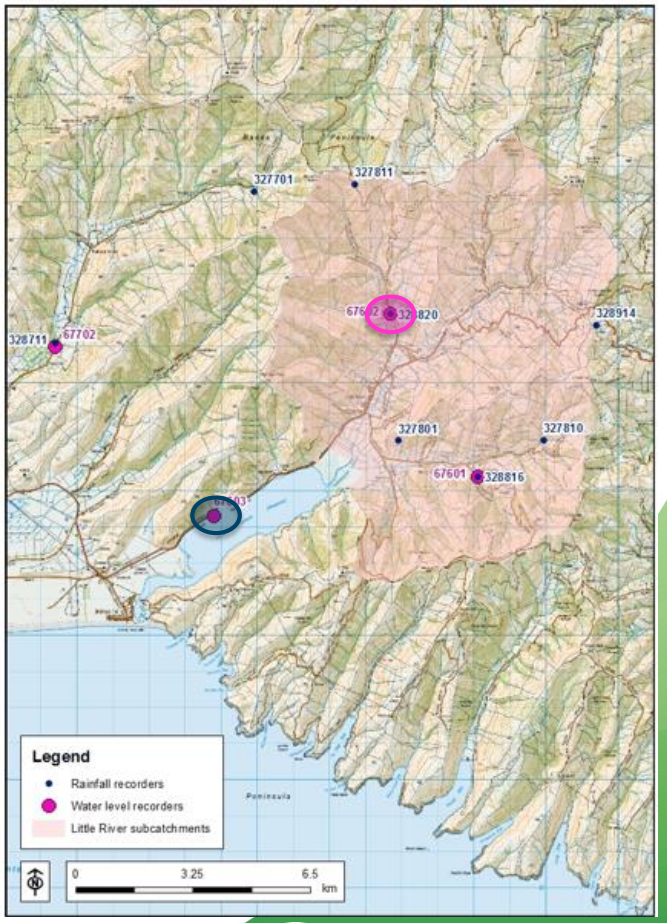
- **<u>Rain on grid (ROG) versus point source flows</u>**

**Cons:**

- Steep catchments not great for ROG modelling so ideally would create hydrological models to convert rainfall into flows for upper catchments & use ROG for floodplain.
- Only have one rain gauge currently operating with high resolution data in area
- Only one flow gauge to calibrate modelled flows
- Results are likely to not be too different if comparing 'broad brush' feasibility of various flood alleviation options
- Cost of upgrading model significant

**Pros:**

- Able to model areas away from the main water courses where water ponds in depressions.
- Would give more confidence if looking at more detailed benefits of flood alleviation options



## Potential model improvements:

- **<u>Extend model to include lake and surrounding roads that were flooded</u>**

  **Cons:**
  - LiDAR can already identify areas flooded by lake
  - Would require a new, larger model to be developed
  - Likely to show what we already have seen in field … that issue is likely due to large volumes of runoff from small catchments adjacent to road being greater than capacity of drainage system (i.e., culverts under road and rail embankment) unless lake level is impacting drainage – which can be identified from LiDAR (could any money be better spent on quick/cheap site specific assessments looking at providing better drainage to lake?)

  **Pros:**
  - Able to model areas away from the main water courses where water ponds in depressions.
  - Would produce a lake level responding to the amount of inflows rather than using a historic time series (still an estimate though as don't know spatial distribution of rainfall over catchment).

## Potential model improvements:

- **Run possible flood alleviation options**

  **Pros:**

  - Should be relatively quick and easy to run 'broad brush' flood alleviation options with current model *but* inhouse flood modelling resources at CCC and ECan are fairly limited. ECan also does not have the software to run the upgraded model with the urban pipe network included so it will be up to CCC or consultants to undertake any work.
  - Existing model should be able to give a good indication as to whether any flood alleviation option is worth looking into further (not looking at mm precision).

  Any options modelled should be 'realistic' (i.e., viable physically and financially) to avoid tying up resources required for other projects.

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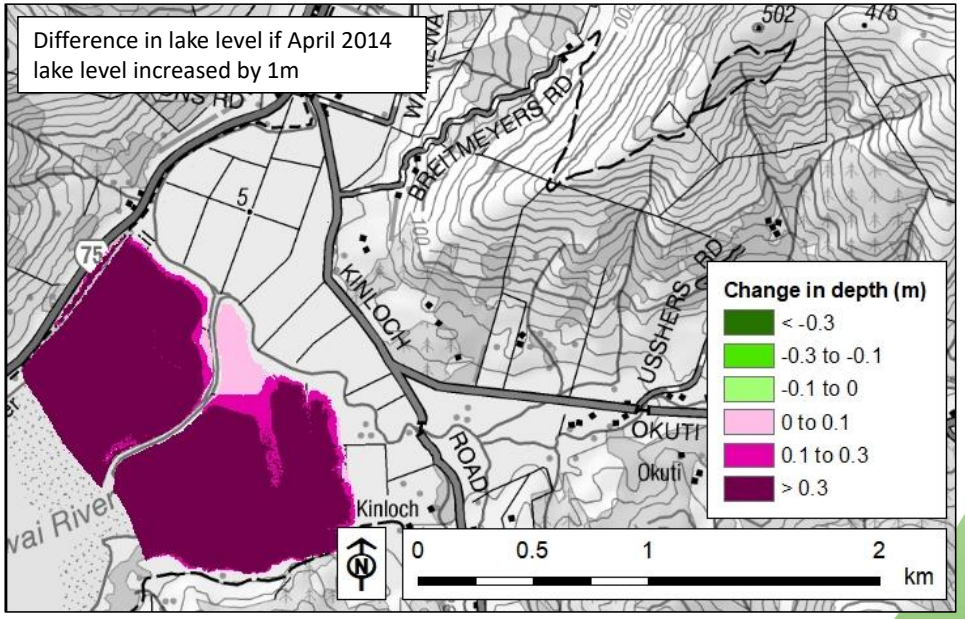
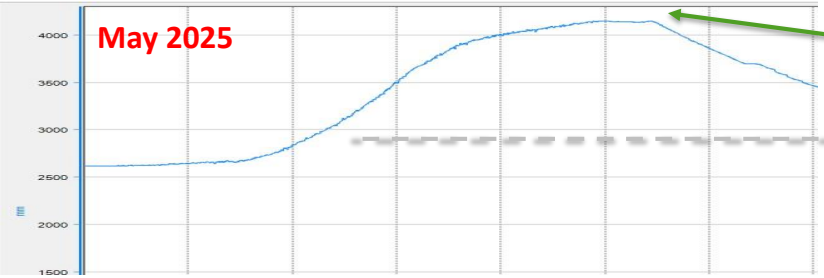
# Potential model improvements:

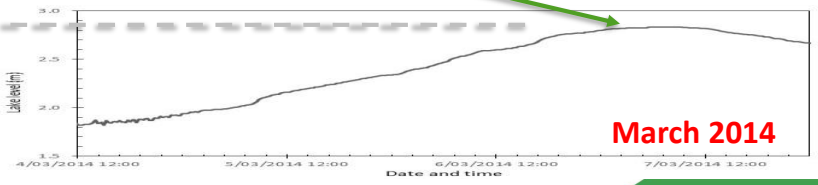
- **Examine lake level further**

  Further modelling? (Lake level was higher than previously modelled)




**Lake Wairewa peak level**
**4.2 m versus 2.8 m**

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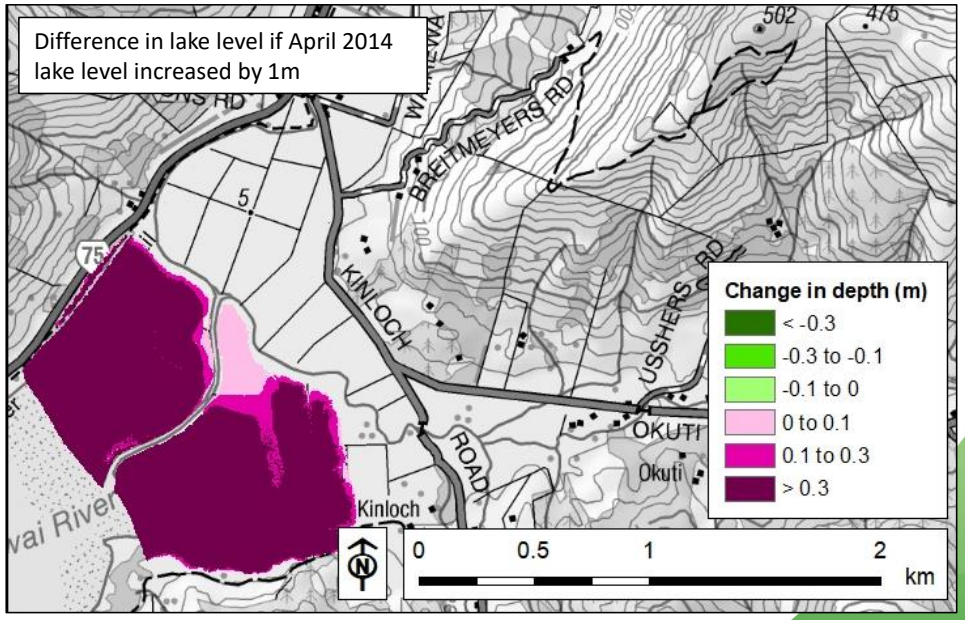
## Modelling summary:

- Can be expensive
- Should be able to replicate historic flooding
- Requires expert judgement as simplifying 'real world'
- Cannot properly simulate scour, erosion, and sediment accumulation
- Very good for simulating and comparing different scenarios (e.g. different lake levels, flood protection bunds, etc)
- Utilises the best available information and provides best estimates of flooding

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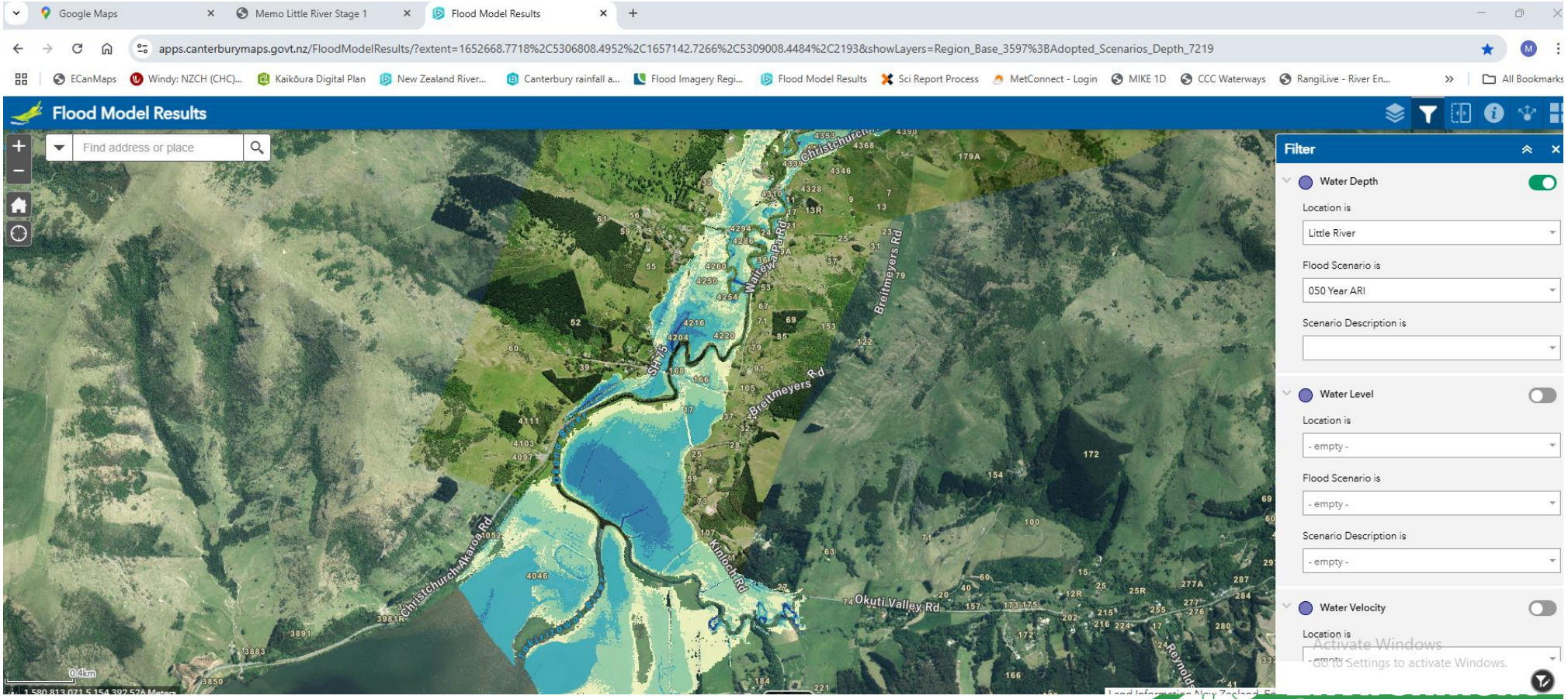
# Online flood model results (from original ECan study)




https://apps.canterburymaps.govt.nz/FloodModelResults/

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## Any questions …

# Coastal Hazards Adaptation Planning

Te Pātaka o Rākaihautū Banks Peninsula Community Board Information Session

11 August 2025

# Overview

# Current activity and focus over next 6-8 months

- 4 March 2025 Coastal Hazards Adaptation Plan for Whakaraupō Lyttelton Harbour and Koukourarata Port Levy approved

- Lessons Learnt and Where to Next

- Maintaining momentum:
  - Preparatory technical work – monitoring and gap filling, emphasis on producing accessible community-facing outputs
  - Pre-engagement: Building climate hazard awareness and literacy through district-wide community facing activity

- Acceleration: additional resources being recruited mid-year to develop a monitoring and reporting framework and bolster implementation aspects of the programme, increase our technical capacity, including through resourcing in asset units, and support better climate science communications

- Adaptation Futures conference 13-16 October

# Lessons Learnt: Whakaraupō Lyttelton Harbour and Koukourarata Port Levy

# Context

The first Adaptation Plan took approximately two years to complete

CHAP has additional funds for acceleration. Lessons learnt focus on identifying efficiencies that will maximise the use of available resources.

We do not intend to amend and re-consult on the Coastal Adaptation Framework (CAF) in advance of CG direction. Process changes must fit within current settings.

Lessons have been identified through surveys of the Coastal Panel, STAG, CHAP and the Independent Chair, as well as feedback and workshops with staff.

We are seeking your feedback and reflections today.

# What worked well

| | |
|---|---|
| Co-creation delivered an open and transparent process | 86% of the Panel agreed that it was an open process without pre-determined outcomes |
| Robust process ensured the options were well tested | All of the Panel agreed that there was value in going through the whole process for transparency |
| Adaptation practice knowledge was built across Council | 88% of the STAG would be willing to participate again. The majority agreed that the process added value to their BAU roles |
| Strong endorsement of the outcome | All of the Panel reported feeling comfortable with the preferred pathways: 33% were very comfortable, 67% were somewhat comfortable |
| CHAP efforts to reach all impacted private property owners | Significant efforts were made to engage all private property owners who may be affected by coastal hazards within 20-30 years. Letters were sent to property owners with specific information and maps about coastal hazard risks relevant to each property. |

# Key areas for improvement

## CHAP programme

**Adopting a flexible approach to asset planning:** Future planning could involve: 'by asset', 'by asset-class', 'by network', and/or 'by area' pathways

**Run a mock process:** This will test these different approaches and build staff capability

**Increased resources:** Could undertake adaptation planning concurrently in two Adaptation Areas, or a larger area

## Coastal Panel Operations

**Supporting young people on the Panel:** Additional support i.e. pre-meetings

**Clarify roles and responsibilities:** Clarify the role of the Panel in community engagement, address non-attendance, and clarify status of advice received in 'catch-up' meetings

**Terms of Reference:** Update the TOR accordingly

## Coastal Hazards Adaptation Plan

**Adaptation planning concepts:** Simplifying language, include more visual tools

**Clarifying the role and purpose of the Plan:** An Implementation Lead (IL) will support implementation into asset management

**Monitoring framework:** The IL will develop a monitoring framework to provide consistent signals, triggers and thresholds for action

# Next steps

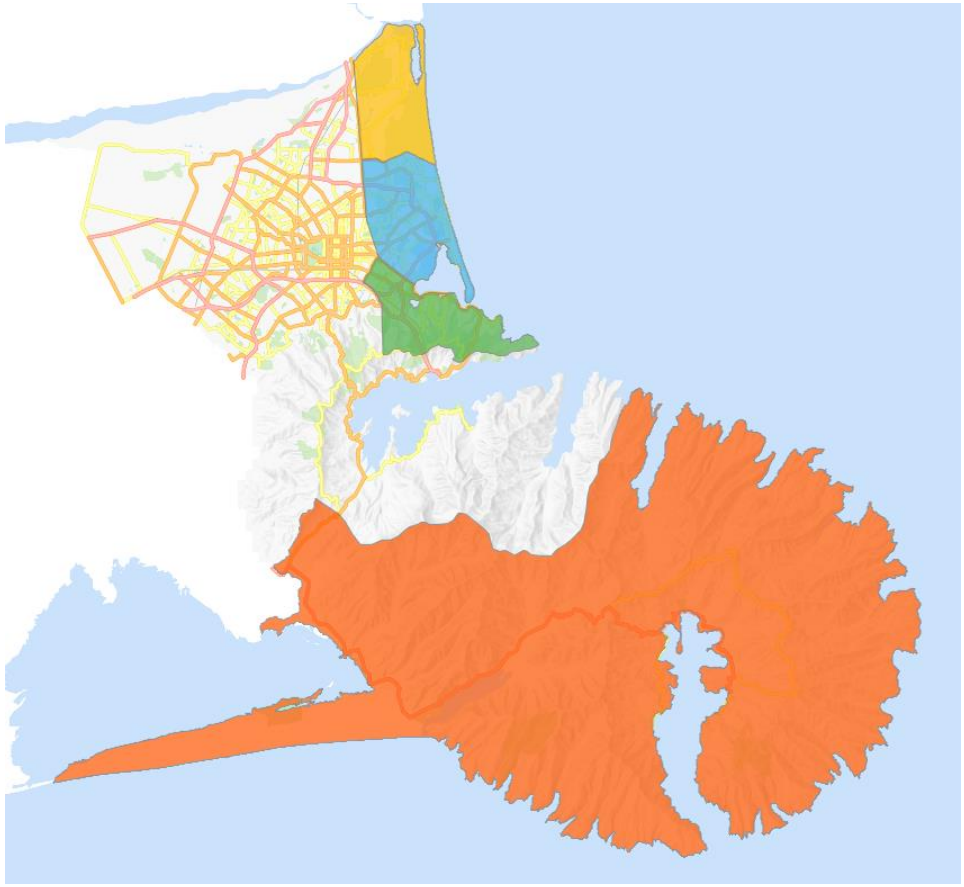
The CHAP team will integrate improvements into the process as appropriate, noting that selection of the next Adaptation Area will determine the relevance of some lessons learnt

Your feedback:

- Do you have any feedback on the CHAP process to date?

# Where to next?

# Remaining Adaptation Areas

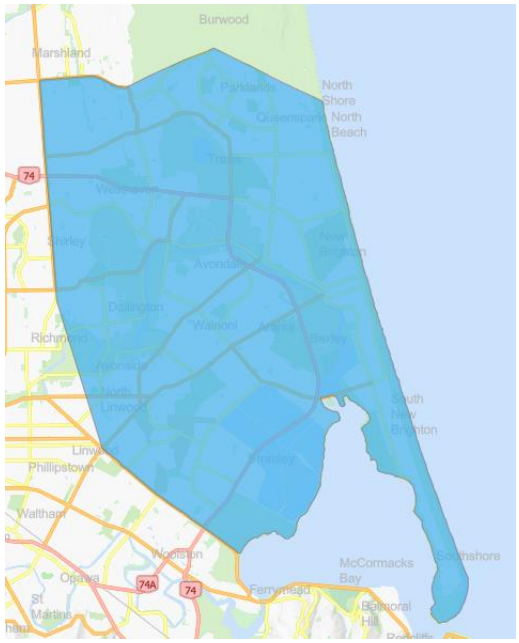


Based on:

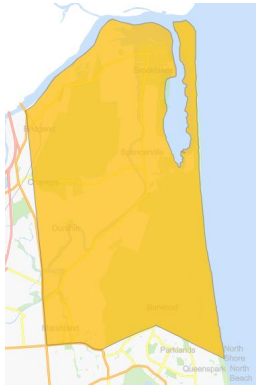
- Manageable scale
- Similar geographic archetypes and catchment boundaries
- Grouping community groups with existing connections to support collaborative working in a Coastal Panel and during community engagements
- Other Council programmes

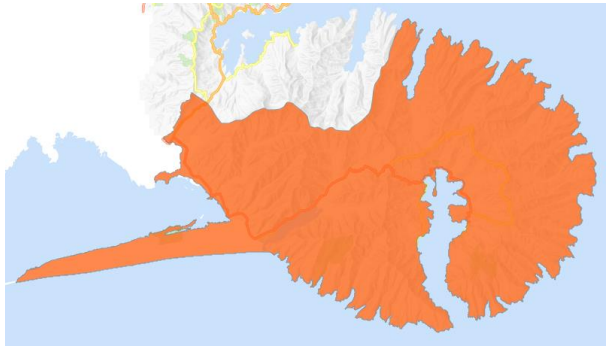
# Options

## Waimairi to Southshore & Lower Avon




## Lower Styx & Banks Peninsula





## Woolston to Taylors Mistake

# Risk by Adaptation Area

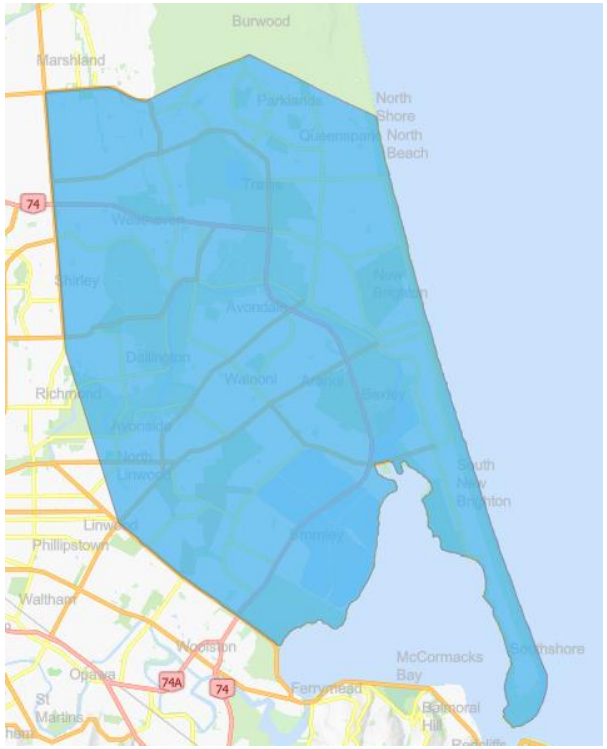
Roads, three water pipes, and residential, commercial and industrial buildings at risk of coastal hazards during a 1-in-100 year storm with 40cm of sea-level rise.

| | Roads | 3W Pipes | Residential buildings | Commercial & Industrial |
|---|---|---|---|---|
| **Option 1** (Waimairi – Southshore & Lower Avon) | **109** km (4%) | **149** km (2%) | **4,669** (3.8%) | **123** (2.8%) |
| **Option 2** (Lower Styx & Banks Peninsula) | **46** km (1.7%) | **33** km (0.4%) | **473** (0.4%) | **39** (0.8%) |
| **Option 3** (Woolson – Taylors Mistake) | **49** km (1.8%) | **91** km (1.2%) | **2,463** (2%) | **379** (7.7%) |

*Note: The data states the total distance/number of assets exposed and what this is as a percentage of that asset grouping across the district.*

# Option One

## Waimairi to Southshore & Lower Avon




### Opportunities:

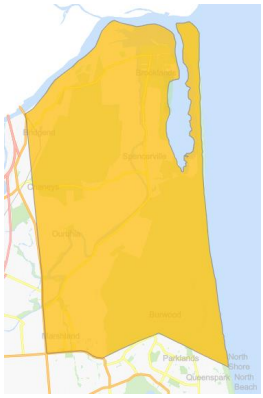
- Address the highest level of risk.
- Utilise high quality data and assessments.
- Three Waters OARC multi-hazards work ready for CHAP to pick up.
- Align conversations in areas where PC12 will impact most.
- Currently the dunes offer significant natural protection against coastal flooding and erosion – but if they are to form the basis of a long-term strategy, actions to make the dunes more resilient require significant lead-in time.

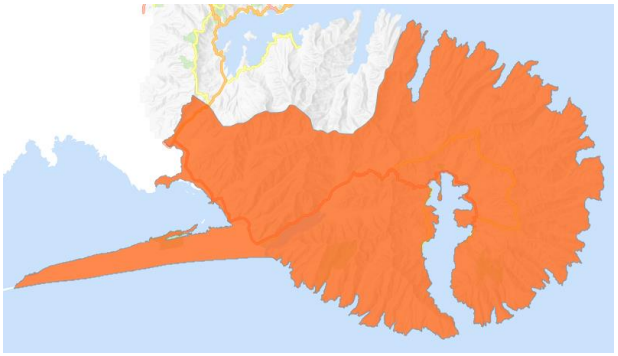
### Challenges:

- Large scale and complex – will require pre-planning and testing.
- Harder public/private split - challenging in the absence of Central Government adaptation and/or retreat legislation defining roles and responsibilities.
- Earthquake legacy issues not yet fully addressed.

# Option Two

## Lower Styx & Banks Peninsula





### Opportunities:

- Two areas with relatively lower risk profiles, so can work in two areas at once.
- Complete Banks Peninsula, with similar approach as Whakaraupō – Koukourarata.
- Support ongoing Ōnuku adaptation work.
- Existing relationship with Te Rūnanga o Koukourarata.
- Central government direction/legislation likely to have less impact so less likely to disrupt the process part way through.
- Banks Peninsula community readiness and willingness to engage.

### Challenges:

- Elements we haven't dealt with before (e.g. tourism impacts).
- Perception we are avoiding the most at-risk areas.
- High dependence on Waka Kotahi planning for SH75.
- Cross-over with ECan responsibility for the Waimakariri stopbanks.
- Existing challenging relationships, particularly in Brooklands.

# Option Three

## Woolston to Taylors Mistake

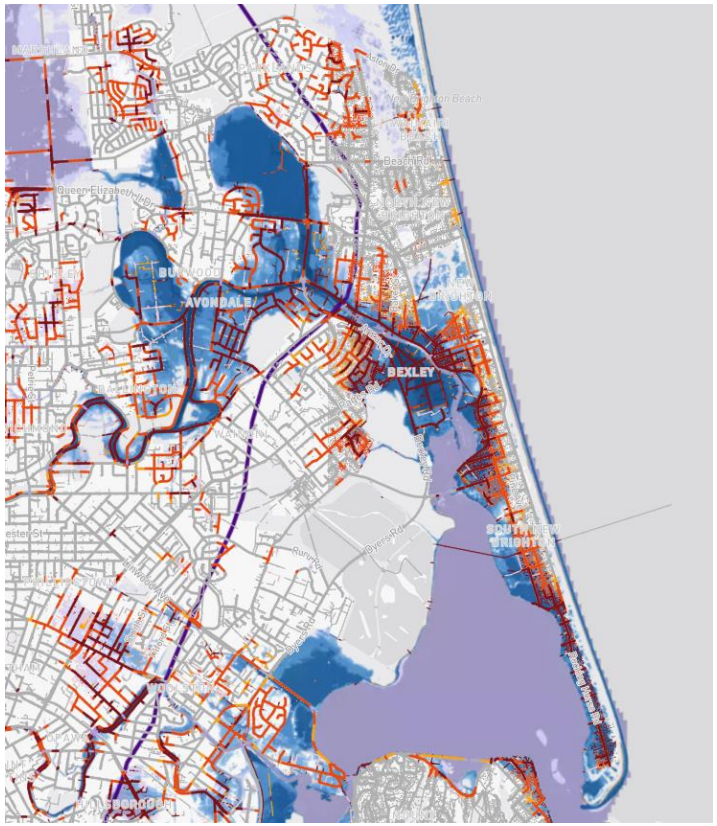

### Opportunities:

- Address the second highest level of risk.
- High level of community engagement and some have indicated a willingness to engage in adaptation planning conversations.

### Challenges:

- Large scale and complex – will require pre-planning and testing.
- Harder public/private split - challenging in the absence of CG adaptation and/or retreat legislation defining roles and responsibilities.
- Land Drainage Recovery Programme may provide additional multi-hazard modelling that would be useful for us. Aligning work programmes may be sensible.
- Existing built structures offer some level of protection against coastal flooding and erosion reducing the immediate urgency to develop a longer-term pathway.

# Adaptation planning may look slightly different




How we might address the challenge of scale and complexity:

- Dividing the area by geographic features
  - E.g. starting at with the dunes, then around the Lower Ōtākaro Avon River, then working out from those
- A mix of: asset-specific, network, and area-wide planning

# Next steps / decision timeline

- Your feedback:
  - Do you have any thoughts on the options?
  - Are you aware of any community groups in these areas actively focussing on or interested in adaptation planning?
- Continue socialising with wider Council teams, community boards, rūnanga and other stakeholders, looking for alignment where possible.
- May - August: Community Boards and Coastal Hazards Working Group
- August: ELT briefing
- Late 2025/early 2026: seek decision from Council