

PDP HEARING 15D & 16 - October 2025

UPDATED WAIPAPA-KERIKERI FLOOD MODELLING AND MITIGATION

**STATEMENT BY CARBON NEUTRAL NZ TRUST ON BEHALF OF VISION KERIKERI,
CARBON NEUTRAL TRUST AND KAPIRO CONSERVATION TRUST**

With the agreement of the Hearings Panel, part of our presentation for Hearing 15D (flooding topic, Fred Terry FS177) was postponed in order to incorporate updated LiDAR information which was due to become available shortly after Hearing 15D

I will show a series of slides provided by NRC Kerikeri/Waipapa River Working Group¹:

- Updated NRC flood modelling maps, based on recent LiDAR² data, and
- Impact of the proposed 'K3A' flood detention dam about 2.5km upstream from Waipapa (to the west of SH10). Based on consultants reports and extensive modelling of the entire river catchment, in 2015 the NRC Kerikeri/Waipapa River Working Group identified the need for a flood detention dam in the upstream area.³

NRC is undertaking further work to ensure confidence in the recent flood model results before they are finalised. NRC is also drafting a business case for flood risk reduction options (K3A dam, spillway, others), aiming to inform the LTP by August 2026.

The NRC Rivers Group reported that "FNDC Council resolutions require that comprehensive flood mitigation for new developments be designed and funded by developers, with no cost to Council."⁴ Funding for flood infrastructure is expected from landowners and developers who benefit, as well as orchardists (irrigation water), tourist operators and others. Waka Kotahi should contribute funds to protect SH10, and the Ministry of Culture should contribute funds to protect historical buildings like the Stone Store (as they did for the Heritage Bypass in 2007).

Slide 1 shows the updated river catchment flood model for Waipapa (centre) and Kerikeri (right) – based on 100 year + CC flooding. The maximum depth varies from 0.1m (pale blue) up to about 9 or 10m (darker blue).

¹ NRC Kerikeri-Waipapa Rivers Working Group meeting, 9 Oct 2025, powerpoint slides on updated NRC flood modelling. For brevity, we refer to the group as 'NRC Rivers Group'.

² Light Detection and Ranging (or Laser Imaging, Detection and Ranging, LiDAR) is an optical remote sensing technology that uses laser light to measure distances and create 3D maps of the environment.

³ A concept design and costing for a proposed Kerikeri K3A Dam site was prepared in 2015 by Riley Consultants. Total cost in 2015 was \$13,766,000 inclusive of \$2,501,000 contingency sum. Further information: F. Terry FS177 (Flood Mitigation Report for Waipapa and Kerikeri Districts, Feb 2023, p.7).

⁴ NRC Kerikeri-Waipapa River Working Group meeting minutes, 9 October 2025, p.3.

Flooding around Waipapa commercial area

Slide 2 shows maximum flood depth (100 yr +CC) in and around Waipapa commercial area, SH10, and on both sides of Waipapa Road.

I would like to highlight two areas in slide 2:

1). Existing flooding in Waipapa commercial-industrial area:

- NRC Rivers Group has reported that site drainage in Waipapa is currently inadequate during **modest** rainfall events.⁵
- Consents granted for Waipapa commercial area have exacerbated flood hazards and created new flood paths, due to extensive impermeable surface (large buildings, large carpark areas), raised building platforms, and inadequate stormwater management. Appendix (below) provides examples and photos.

NRC Rivers Group has provided examples of current flood issues at Waipapa:

- “Site drainage has already proved inadequate in an even modest rainfall event. The drastically changed land form has created directional flood paths that increases the downstream flood velocity. There is a potential to endanger downstream properties and infrastructure, loss of access including the closure and damage to SH10 road, bridge structures and waterways.”⁶
- NRC Rivers Group has “highlighted ongoing issues with local drainage and stormwater systems, particularly in the Waipapa industrial area, and the need for significant upgrades to address both current and future flood risks.”⁷
- The Chair of NRC Kerikeri/Waipapa River Working Group has informed FNDC Councillors that 300mm rain in 12 hours would be “an absolute disaster”. He highlighted the fact that some people would not be able to leave the commercial area because all sealed roads are designed to be overland flow paths. He noted human safety risks of Waipapa Sawmill heat treatment kiln being flooded, causing a massive cloud of steam or potentially the kiln exploding.⁸

2). Flooding on SH10 - main access road to the north:

- SH10 is the major access route for communities further North. SH10 also provides an essential detour road when SH1 is closed due to slips or other problems.

⁵ NRC Kerikeri-Waipapa River Working Group submission, FS543, p.11, https://www.fndc.govt.nz/_data/assets/pdf_file/0024/17385/PDP-further-submission-543-nrc-kerikeri-waipapa-rivers-working-group.pdf

⁶ NRC River Working Group, FS543, p.11 (above).

⁷ NRC Kerikeri-Waipapa River Working Group meeting minutes, 9 October 2025, p.3.

⁸ Email from Councillor J. Carr to FNDC Councillors re: Waipapa industrial estate flooding of Kahikatea Lane, 18 April 2025.

- 250-300mm rain over 24 hours has the potential to close SH10 completely, closing the road access further North,⁹ with possible damage to the road, river channel and bridge.¹⁰

Figure 1: Flooding on SH10 next to Waipapa commercial area in 2007



Source: "Northland's Devastating Deluge-A pictorial record of the deluge that swamped Northland, NZ" by Westmount School, Northland Campus 2007

Slide 3 shows the impact of the K3A dam in the event of 100yr +CC flooding. Orange shading indicates a large area around Waipapa would become "dry" and free from flooding.

A dam such as this is essential for protecting Waipapa-Kerikeri in the event of extreme weather events (details in Box 1 below). The dam would also allow further commercial and residential development in Waipapa.

⁹ F. Terry (2023) Flood Mitigation Report for Waipapa and Kerikeri Districts, p.5, Hearing 15D statement, https://www.fndc.govt.nz/__data/assets/pdf_file/0022/42673/Fred-Terry,-FS177-Flood-Mitigation-Report.pdf

¹⁰ F. Terry, as above.

Box 1: Weather bomb events

Extreme rainfall is uncommon but climate change is expected to increase the frequency and intensity of extreme weather events. Mr Terry has estimated that an extreme weather event with 250-300mm rainfall per day (similar to the 1981 flood) would now be catastrophic due to extensive development in Kerikeri and Waipapa -

“There was a loss of life in the 1981 flood event when the peak flood volumes from the Kerikeri river, over-spilled into the Waipapa river catchment causing significant infrastructure and property damage.”

“The 1981 flood was the most devastating in volume with one life lost – all this caused by a 300mm high intensity ‘weather bomb’ in the upper catchment of the Kerikeri River!

“Should such a 250 – 300mm high intensity weather event occur again, in any of the Kerikeri river and district river systems, would now be catastrophic. The advanced development in the area over the last 43 years would reflect a huge increase of costs and with the further possibility of lives lost.”

Area between Waipapa and Turnstone property

Slide 4 shows the maximum flood depth on KiwiFresh KFO property, the south side of Waipapa Road, Amokura Drive, and Turnstone property (updated NRC model, 100 yr +CC).

I would like to highlight two locations:

1). Large existing flood-free area on KFO site:¹¹

Slide 4 indicates that **at least 50% of the KFO property is currently free from floods** (at 100 yr +CC max. flood depth) – visible as green pasture.

Large areas of the site are free from floods even at more extreme "double 100yr +CC" flood extent (Figure 2 below).

KFO's flood mitigation plan with a wide spillway intends to concentrate the volume and reduce the speed of the stormwater flow, creating additional benefits such as large green public spaces across the land, and essential new road connections between Kerikeri Village and SH10/Waipapa. Obviously, detailed plans will be thoroughly consulted, assessed and peer-reviewed in due time.

Slide 5 indicates that the K3A dam would remove flooding from the majority of KFO land (at 100yr + CC flood depth). Thus KFO would be expected to contribute substantially to funding of the dam if the KFO land is zoned for development. However, KFO would not contribute much to the cost of the dam if the land remains as undeveloped low-value pasture.

¹¹ Our community groups support urban zoning and Precinct for the entire KFO site.

Purple areas in slide 5 indicate increased flood depth within the KFO wetlands - locations where additional mitigation would be feasible, if needed.

Figure 2: KFO land currently free from flooding (at double 1-in-100yr flood extent) NRC updated flood model. White areas (within red lines) on eastern side of KFO site are areas that are currently free from flooding, even at 'double 1-in-100 year' flooding

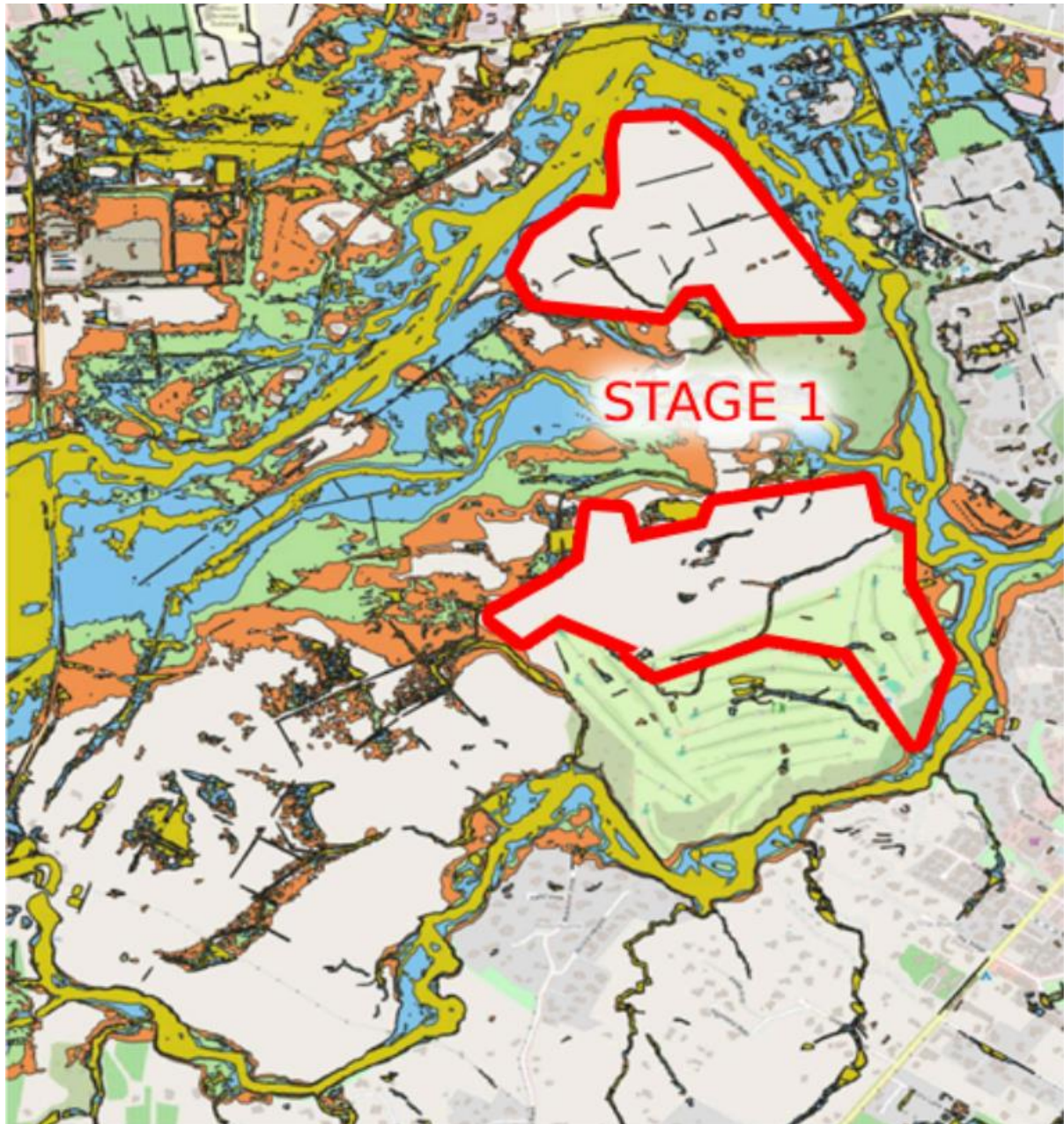


Figure E. New flood model extents for the KFO site. Orange = 2 x 1-in-100-yr; Green = 1-in-100-yr with climate change; Blue = 1-in-100-yr; Yellow = 1-in-10yr flood events. Source Water Technology 2025.

Source: Statement of evidence of Matthew de Boer for Northland Regional Council, Hearing 15D, Figure E, page 11

The KFO site is essential for Kerikeri's future growth and connectivity. It is the only area able to provide large amounts of **affordable** housing types that match market demand, due to its low-value pasture land, economies of scale, etc. Market realities mean that the large greenfield development at KFO is essential for providing sufficient **appropriate** development capacity under NPS-UD Policy 2. The proposed KFO urban zoning - combined with the notified PDP urban zoning in central Kerikeri - would align with key planning requirements for a well-functioning urban environment; this would prevent the destruction of Kerikeri's human-scale character and tourist economy. Under RMA s32 & 32A, the KFO development is the most appropriate, efficient and effective option (also taking account of alternatives and the risk of acting/not acting (s32(2)(c))).

We consider it necessary to provide KFO with the re-zoned basis to plan and develop the huge property to help address Kerikeri's multiple problems and shortcomings we have described in other Hearings. It is appropriate to approve the rezoning request.

2). Current flood risk at wastewater pump station in Kerikeri:

Slide 4 also shows the flood zone in the lower part of Amokura Drive in Kerikeri (near Golf View Road) - where a wastewater pump station serving the area west of Kerikeri Road is at risk of flooding. NRC has noted past incidents of overflow during heavy rainfall, indicating the need for protection works for the pump station. They highlighted "the need for Council action to protect this critical infrastructure."¹²

Mr Terry noted that, at present, the low lying residential properties and wastewater infrastructure at Amokura Drive and Tuatahi Place (where two rivers merge) are at risk. He also suspects that stormwater enters the reticulation system, causing overflow.

Area between Heritage Bypass and the Stone Store

Slide 6 shows the maximum flood depth between the Heritage Bypass and the Stone Store heritage area (updated NRC model, 100 yr +CC). Flooding in this area would be significantly worse if it coincides with a high tide.

Slide 7 shows the impact of K3A dam would be much less in this area – Peacock Garden Drive and the Stone Store area would still be at risk, but to a lesser degree.

Other urban Kerikeri flooding

- "Urban Kerikeri township experiences limited flooding from spilling from stormwater manholes during a 10 year ARI event, but [this] increases to wide spread flooding of properties from stormwater manholes in a 100 ARI + event" like the 1981 flood."¹³
- The PDP district plan review report noted that 'Development in the district is typically small scale – 2 to 3 lot subdivision. This results in a piecemeal approach to stormwater with a lot of private drainage infrastructure as developers don't want to

¹² NRC Kerikeri-Waipapa River Working Group meeting minutes, 9 October 2025, p.3.

¹³ F. Terry (2023) Flood Mitigation Report for Waipapa and Kerikeri Districts, p.5.

pay for the larger scale required to vest in council. The flip side is that council doesn't necessarily want or have funding to manage new facilities.'¹⁴

The s32 report also noted: "There is a general assumption that stormwater is being managed on a holistic basis, but that is not necessarily the case. It is being managed on roads.'¹⁵

PROPOSED CHANGES – ESSENTIAL FLOOD MITIGATION

Flood protection infrastructure: Major flood protection infrastructure such as the **K3A is urgently required upstream** from SH10 (on west side of SH10) to address the underlying flood problems affecting the Waipapa commercial area and downstream areas in Kerikeri.¹⁶ This type of infrastructure would support good urban form and may also incentivise a supermarket in Waipapa, helping to reduce traffic volumes into Kerikeri in future.

Detention dam infrastructure could potentially serve several beneficial purposes: mitigating flood risk and creating a new supply of town and irrigation water which will be essential for future growth. Multiple purposes for the dam will also help to justify the cost. PK Engineering's Lake Waipapa proposal, for example, would provide additional benefits – it could generate electricity (hydro and solar), provide a recreational boating area and other recreational areas (including a botanic garden) that would benefit tourism and the community.

Localised upgrades in stormwater management infrastructure: As noted above, the NRC Rivers Group "highlighted ongoing issues with local drainage and stormwater systems, particularly in the Waipapa industrial area, and the need for significant upgrades to address both current and future flood risks."¹⁷ For example, the under-capacity of culverts in Waipapa and under SH10 needs to be addressed urgently.

A moratorium on further FNDC resource consents and building consents for buildings and impermeable surfaces in flood hazard areas in Waipapa and Kerikeri should stay in place **until:**

- Practical improvements are implemented in stormwater management infrastructure in Waipapa and Kerikeri, and
- The implementation of major upstream flood prevention infrastructure such as the K3A dam.

Further consenting, particularly in and around the commercial area of Waipapa, would increase flood risks and increase FNDC's liability for damage/costs. A FNDC report

¹⁴ FNDC district plan review, Natural Hazards Options Assessment, June 2019, appendix 3, p..4.

¹⁵ FNDC district plan review, Natural Hazards Options Assessment, June 2019, appendix 3, p..4.

¹⁶ Following Cyclone Gabrielle, the NRC has adopted a new standard for modelling extreme events – scenarios with double the 100-year plus climate change flow (2 x 100-yr +CC). NRC says this aligns with national recommendations for assessing flood risk under future climate conditions. Source: NRC Kerikeri-Waipapa River Working Group meeting minutes, 9 October 2025, p.2.

¹⁷ NRC Kerikeri-Waipapa River Working Group meeting minutes, 9 October 2025, p.3.

noted that Council has been sued for damage to property sustained during flood events e.g. the 2007 flood in Waipapa.¹⁸

Improved requirements for stormwater management in the PDP: Given the existing stormwater management deficiencies even during moderate rainfall, as well as the flood risk from extreme weather events (increasing due to climate change), we consider that the PDP needs to specify improved requirements for stormwater management.

Requirement for engineering assessments in the PDP: The FNDC district plan review noted that it is inappropriate to focus on flood hazard alone. “Potentially every site in the district would have some natural hazard – [this] would **support a clear direction in the plan that every application needs an engineering assessment** – except rural production subdivision where land will continue to be used for rural purposes.”¹⁹ Hazards may include unstable land, soil contaminants, coastal inundation, tsunami, wildfire, etc.

¹⁸ FNDC district plan review, Natural Hazards Options Assessment, June 2019, appendix 3, p.4.

¹⁹ FNDC district plan review, Natural Hazards Options Assessment, June 2019, appendix 3, p.6.

APPENDIX: EXISTING FLOOD ISSUES IN WAIPAPA COMMERCIAL AREA

Examples of existing flood issues in Waipapa commercial area

Flood problems in Waipapa have been summarised by Mr Terry (infrastructure consultant for NRC Kerikeri/Waipapa Rivers Working Group) as follows:

“The intensive Waipapa industrial/commercial development since 1981 has created a high level of changed land-forms, impervious surfaces, stormwater drainage systems and directional flood paths. This will contribute the potential to enhance the devastation of the previous flooding events.”²⁰

Examples:

- The immediate storm water drainage for most of Kahikatearoa Lane and part of Klinac Lane passes under SH10 (at the intersection with Kahikatearoa Lane) via an under-capacity 600-750mm culvert pipe. In a flood event the stormwater flow path would overflow to join with the Waipapa river catchment and the Kerikeri river.²¹
- The buildings, yards and parking facilities in the new ITM and Bunnings developments on Waipapa Road have created very large impervious surfaces, which will drain into the small Whiriwhiritoa Stream catchment, before discharging downstream to the Waipapa Stream catchment.²²
- If Waipapa Sawmill heat treatment kiln becomes flooded, the kiln might potentially explode or make a massive cloud of hot steam. Either event would present a significant safety hazard to workers and loss of property.²³
- Sealed roads in Waipapa industrial/commercial area are designed to be overland flow paths.²⁴ In the event of significant rainfall (e.g. 300mm in 12 hours) there is potential for some people to be trapped and unable to leave the industrial/commercial area.
- Downstream, the Kerikeri River passes existing low lying properties in Waitotara Drive, currently protected by a continuous bunding that could over-top when the predicted peak flow volumes occur. Peak flood flows will also endanger developments in the Rainbow Falls Road area and low lying residential properties and wastewater infrastructure at Amokura Drive and Tuatahi Place, for example, where two rivers join.²⁵

²⁰ NRC Kerikeri-Waipapa River Working Group submission, FS543, p.12, https://www.fndc.govt.nz/_data/assets/pdf_file/0024/17385/PDP-further-submission-543-nrc-kerikeri-waipapa-rivers-working-group.pdf

²¹ NRC Kerikeri-Waipapa River Working Group, FS543, p.5.

²² NRC Kerikeri-Waipapa River Working Group, FS543, p.7.

²³ Email from Councillor J. Carr to FNDC Councillors re: Waipapa industrial estate flooding of Kahikatearoa Lane, 18 April 2025.

²⁴ Councillor J Carr, as above.

²⁵ F Terry, as above.

Examples of undersize culverts near Waipapa commercial area

Undersized culvert under SH10 intersection with Kahikatearoa Lane – the main access road to Waipapa Estate (near new FNDC Sports Hub)



Undersized culvert with vegetation growth in Whiriwhiroa Stream channel under SH10. This culvert is under capacity for receiving spill-overflow from Kerikeri River



Photos: F Terry (2023) Flood Mitigation Report for Waipapa and Kerikeri Districts, p.3 and 6.

Raised building platforms constructed in Waipapa commercial-industrial area exacerbate flooding elsewhere



Photo: F Terry. Building under construction in Klinac Lane, 2023.

Large areas of impermeable surface are common in Waipapa commercial area



Photo: F Terry (2023) Flood Mitigation Report for Waipapa and Kerikeri Districts.

Recent construction of ITM and Bunnings has created another large new impermeable surface area on the corner of Waipapa Road and SH10



Photo: Google maps

Example of inadequate stormwater management in recent 2025 construction in Waipapa commercial area

Photos below were taken on 19 April 2025 on the new extension of the entry road past Carters, Waipapa. It shows poor drainage and ponding on the road adjacent to and beyond the new warehouse under construction on the left of the road. The road in this area seems to fall in the wrong direction.

Photo at bottom right: On the other side of the road from the new warehouse, the photo shows a new building platform about 1 metre higher than the road level. It illustrates that water flow in a flood will be obstructed by these two buildings and directed along the road. The road is probably intended to be the flood pathway, however its level does not seem to direct the water away, looking at the ponding shown in the photos.



Photos: Rod Brown, Vision Kerikeri, on 19 April 2025 (at about 1.30pm).