Resilient Tangimoana:

Preliminary Adaptation Plan: 2026-2035

Community meeting, July 2025. Photo credit: Bruce Glavovic

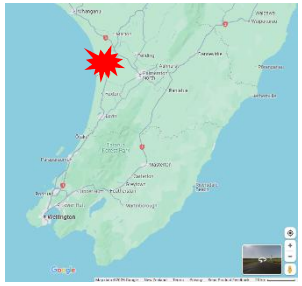
Community meeting, July 2025.
Photo credit: Bruce Glavovic

By Tangimoana Resilience Group

Prepared by Bruce Glavovic

24 November 2025

GLAVOVIC
Consulting
Services



2025 Google terrain maps of Tangimoana and surrounds

Resilient Tangimoana: Preliminary Adaptation Plan: 2026-2035
Client report: 2025 Tangimoana Rapid Risk Assessment and Adaptation Pathways Plan Development-CLIMAT001 Contract Extension
For: Horizons Regional Council
By: Bruce C. Glavovic

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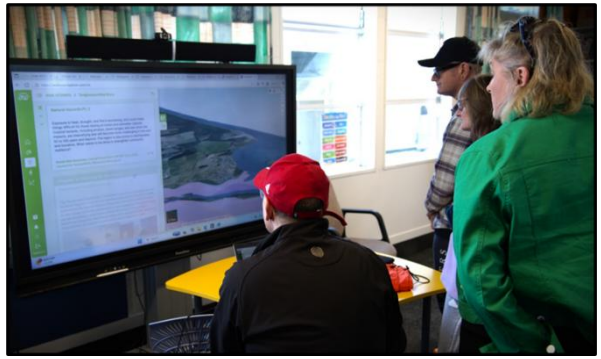
Acknowledgements

We sincerely appreciate the contributions by many individuals – who are too numerous to name, but are among the following who made this Plan possible, including:

- Residents of Tangimoana, especially Tangimoana Community Committee members,
- The Principal, staff and students of Tangimoana School,
- Tangata whenua,
- Elected members, leadership and staff of the Manawatū District Council,
- Elected members, leadership and staff of the Horizons Regional Council,
- Members of the Manawatū-Whanganui Climate Action Joint Committee.

Executive Summary

- The **Manawatū-Whanganui Climate Action Joint Committee** identified **Tangimoana** and **Pūtiki** as communities facing severe climate-compounded risk and **priority Deep South National Science Challenge (2022-2024) case studies** to understand how communities can reduce risk and adapt.
- A **Statement of Intent** was co-signed by Horizons Regional Council (HRC), Manawatū District Council (MDC) and the Tangimoana Community Committee (TCC) (November 2023) to work together. This **Preliminary Adaptation Plan (2026-2035)** results from this agreement, supported by **Deep South Reports** and additional reports on ***Resilient Tangimoana*** and a ***Risk Assessment Report***.
- Tangimoana residents have a **shared vision to build a thriving, resilient community**.
- **Tangimoana faces many natural hazards**. River flooding from inland is the greatest immediate peril. Extreme weather events are projected to become more severe with climate change, increasing riverine flooding and localised ponding. Tangimoana's **natural hazard risk profile** will change over time with projected sea-level rise and land subsidence likely to significantly **increase flood risk beyond ~2050**.
- Many **resilience building actions** can be taken to address risk in the short- (1-10 years) to medium-term (10-50 years). Sea-level rise will increase storm surge risk and possibly inundation flooding and is a key factor shaping longer term risk (50-100+ years). **Key adaptation strategies** include: (i) **Protect:** Measures that provide protection, like seawalls, stopbanks and nature-based solutions; (ii) **Accommodate:** Measures that reduce hazard impacts, like raising buildings; and (iii) **Retreat:** Measures to move out of harm's way, like planned relocation to higher ground.
- **This Plan lists how to:** (i) Build community resilience; (ii) Raise awareness, develop shared understanding, and work together better; (iii) Adopt tailor-made early warnings, and emergency



Community meeting at Tangimoana School (27 July 2025)
Photo credit: Bruce Glavovic

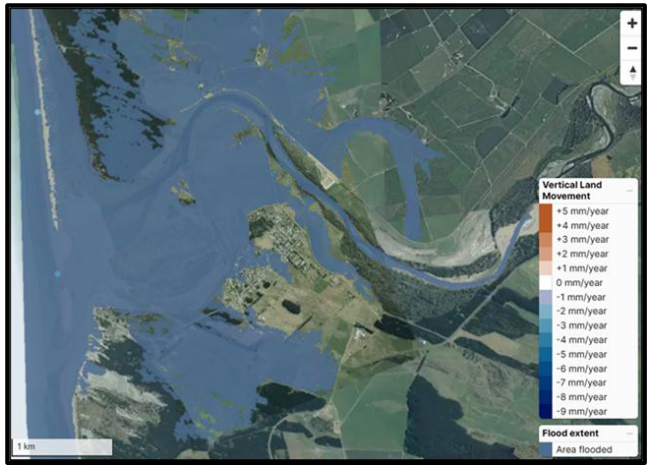


Figure 1: Scenario ~ 2100: 1% Annual Exceedance Probability; 0.9m sea-level rise + vertical land movement (2000 base)

response and post-disaster recovery plans; and (iv) Initiate priority adaptation actions (2026- 2035).

Priority actions include:

- MDC to work with the TCC to **review and update the existing Tangimoana and Surrounding Area Community Response and Recovery Plan**, ensuring it reflects emerging community needs, incorporates lived experience and local knowledge, and aligns council flood predictions and warnings with community understanding. **(MDC and TCC; Target: End 2026)**
- MDC to work with TCC to **prepare an updated Community Plan**, building on and extending the 2017 plan. **(MDC and TCC; Target: End 2026)**
- **Improve understanding about flood risk and ponding, and plausible options for integrated flood protection and managing stormwater:** New technical analysis is necessary to provide a robust estimate of likely costs and rates implications for options to improve protection works given projected sea-level rise and flood risk. Residents will only then be able to consider the feasibility and affordability of protection options. **HRC and MDC are requested to scope and fund an investigation to better understand projected localised flood risk accounting for interactions between flood protection options and ponding** after heavy downpours and stormwater drainage and sewage system implications in extreme events given projected sea-level rise and land subsidence. The scope should include identifying and costing solutions to inform future adaptation planning, as was done for Pūtiki – the other community prioritised by the Climate Action Joint Committee. Solutions could include assessment of viable property protection measures. **(HRC, MDC: Target completion: end 2026 to mid-2027)**
- Based on insights gained from above priority actions, **review and update this Preliminary Adaptation Plan**. **(TCC, HRC, MDC: Target completion: 2028)**

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1. Introduction

This plan builds on the **Deep South-Horizons project** which (i) established a long-term partnership between the village, the Manawatū District Council (MDC) and Horizons Regional Council (HRC); (ii) helped understand the risk Tangimoana faces; and (iii) identified urgent actions, together recorded in a co-signed **Statement of Intent** to work together (see Appendix 1).

I like Tangimoana

because it is peaceful

(Kid, Tangimoana School)

The plan has been prepared by the **Tangimoana Resilience Group** (TRG) which is made up of three representatives nominated by the **Tangimoana Community Committee** (TCC), and one representative each from the MDC and HRC. Bruce Glavovic, who co-led the Deep South-Horizons project, facilitated the TRG through 2025.

Residents want Tangimoana to be a **thriving, resilient community**. For the last year, the TRG has looked at how to achieve this through the actions of residents with support by the MDC and HRC. This plan focuses on short-term (next 1-10 years) priorities because more technical analysis is needed before medium- (10-50 years) to long-term (50-100+ years) resilience can be planned for and built.

... we can all work together

(Resident)

A **thriving, resilient Tangimoana** has a shared **vision** for the future, with clear **goals** for building community resilience. Tangimoana better understands the **risks** faced and agrees on **options** to address these risks over time through **pathways for action** that help realise community goals, with scheduled **monitoring, evaluation, plan revision, and learning** to track progress, and adapt over time.

I like Tangimoana because

it has a park

(Kid, Tangimoana School)

2. Vision & goals for a thriving, resilient Tangimoana

The **2017 Tangimoana Community Plan** records the community vision as: ***"Retain and improve the special natural character and environment that makes us an iconic Kiwiana village"***.

The 2017 Community Plan will be **updated in 2025-2026** and residents look forward to reconsidering their vision and resilience goals for the future.

Residents are inspired by the children at **Tangimoana School** who shared their artwork on what they love about the village at a community hui in July 2025.

3. Tangimoana risk profile

The **Tangimoana Resilience Group** summarised the risk profile in a series of 2025 reports. HRC contracted specialists to prepare a **Resilience Explorer tool** to show how risk might evolve over time.

The key finding of the Risk Assessment work is that, like many other communities, **Tangimoana faces many natural hazards** from flooding of the Rangitīkei River to severe ponding in heavy rainfall events due in part to a high water table, tsunami, wildfires and seismic events.


Manawatū Standard

Commonwealth Games
The medal hunt begins

TV shows to look forward to

Sodden Tangimoana community struggling

Brawling spills to sidelines

Riverine flooding from inland is the most immediate peril, as the 2004 floods demonstrated. Peak flow was estimated to be about 2% Annual Exceedance Probability (AEP) or a 50-year Return Period event. The stopbanks performed below the intended 2% AEP design standard in 2004, and the stopbank was breached. 41 homes were declared uninhabitable. **Through the HRC 2006-2016 Long Term Plan, protection was improved beyond the community's agreed 2% AEP design standard** to account for riverbed build up or aggradation over about 25 years. Further investigation is necessary to accurately determine current and projected levels of protection, but it is likely between 1-2% AEP at present.

How might the riverbed have changed in recent years? HRC investigations over at least the last 6 years have looked at how the Rangitīkei River channel and riverbed have changed, and how much gravel has been moved or deposited, with a focus on much gravel can sustainably be removed. HRC has not assessed the impacts of these changes on flood protection structures, and these investigations cannot be used to judge how well stopbanks or other flood assets would perform in a flood.

Tangimoana during February 2004 floods.
Photo credit: Horizons Regional Council & NZDF

Assessing how flood protection assets would perform in a flood requires far more than just understanding localised changes in the riverbed. Historical flooding of the Rangitīkei River has mainly occurred due to intense rainfall in the upper catchment; in the mountains and hill country. As flood water travels down the river, any changes in the riverbed will affect how much water reaches the lower river and when. To understand how much protection is provided by stopbanks and other flood protection structures requires assessing what will happen upstream along with other factors such as rainfall patterns. HRC have commissioned a **regional flood vulnerability assessment** that may provide some of this information for Tangimoana in the near future.

HRC work to date indicates that **the riverbed in lower reaches of the Rangitīkei River is not aggrading** (being raised). Studies have used laser mapping and other advanced mapping methods and compared findings with historic data and photographs.

Key points from recent investigations include:

- **Overall, the riverbed from Bulls to the river mouth is gradually lowering (degrading).** There are small local increases in the lower 5 km near the mouth, but these are temporary and should not be interpreted as long-term trends.
- Not enough sediment/gravel is coming from upstream to build up the river mouth. Gravel that does settle there is usually washed away in high flows.
- **Between 2004 and 2017, the lower 5.42 km shows a small increase in riverbed level, while upstream sections show a clear decline.**

- Downstream from about 15 km to the mouth, the active channel (where water flows at normal levels) has deepened because the river has formed a narrower single channel.
- **The river's shape makes it difficult to directly link gravel increases to long-term build-up in the active channel, so HRC recommendations about gravel extraction are cautious**.

Importantly, Tangimoana's **risk profile** will change over time with projected sea-level rise and land subsidence likely to **significantly increase coastal and riverine flood risk from ~2070-2080 onwards**.

Tangimoana stopbank.
Source: Deep South Living with Uncertainty Project

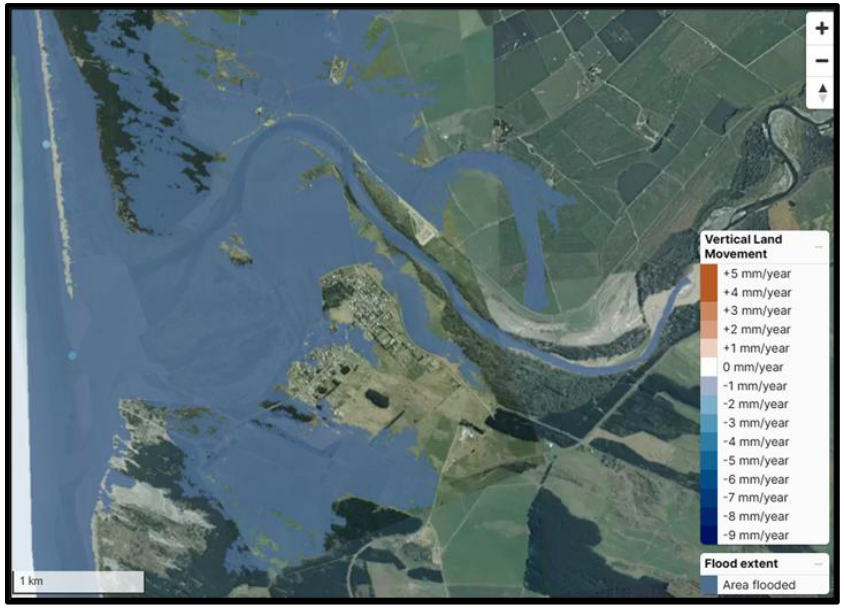
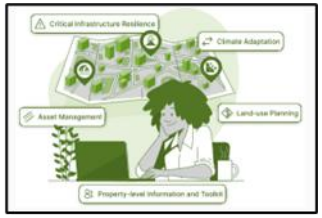


Figure 1: Scenario ~ 2100: 1% Annual Exceedance Probability; 0.9m sea-level rise + vertical land movement (2000 base)

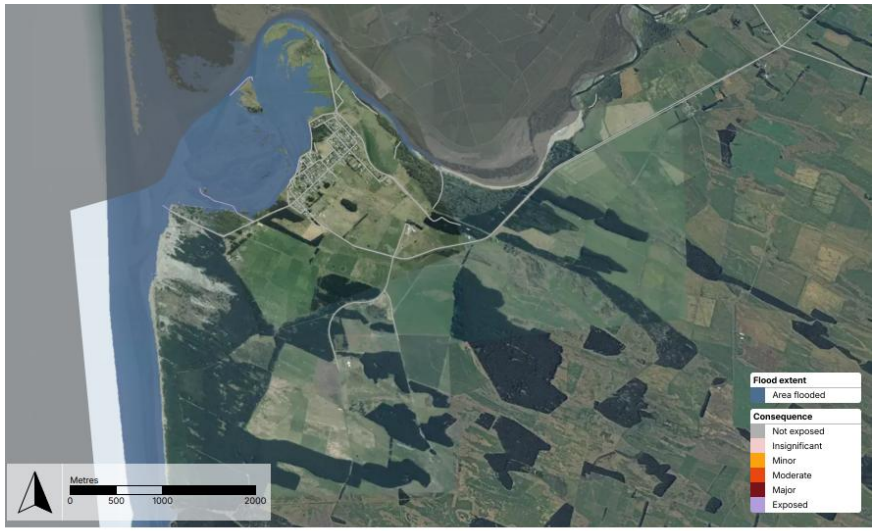
I don't think people realise the actual crisis that is literally knocking on our door (Tangata whenua)



4. Two scenarios: Coastal flood extent with no sea-level rise (present day) and with 1m sea-level rise (plausible ~2100) based on Resilience Explorer tool

The influence of projected sea-level rise is shown in the two scenarios below.

Scenario 1: Coastal flood (1% AEP, 0.0m sea-level rise)



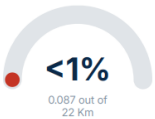
Map showing Bridges, Roads (Manawatū), Roads (New Zealand), Drainage Channels, Bank Protection Structures, and Flood Protection Structures at risk from:
- Coastal Flood Extent (1% AEP, 0.0 m SLR)

RISK SUMMARY - Roads (Manawatū)

Coastal Flood Extent (1% AEP, 0.0 m SLR)

For this scenario approximately **0.09** km of Roads (Manawatū) are threatened.

Percentage Exposed

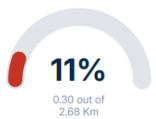


RISK SUMMARY - Bank Protection Structures

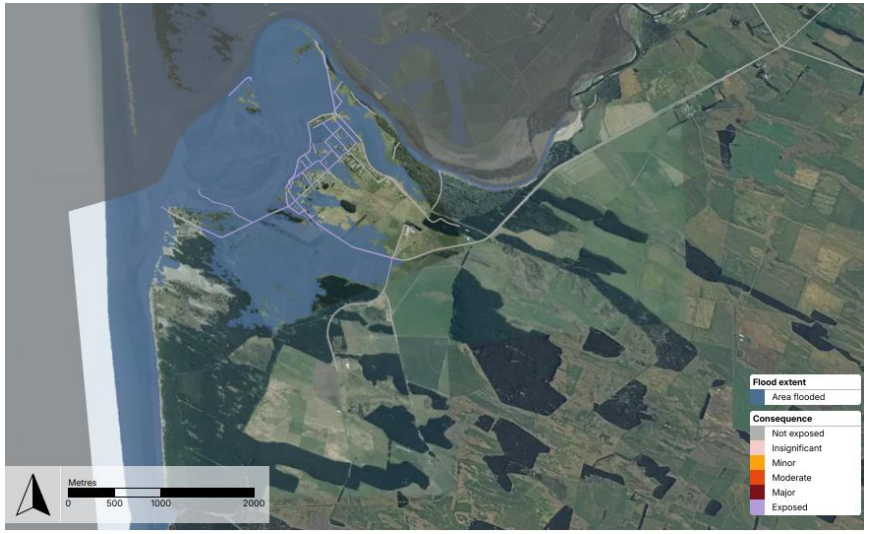
Coastal Flood Extent (1% AEP, 0.0 m SLR)

For this scenario approximately **0.3** km of Bank Protection Structures are threatened.

Percentage Exposed



Scenario 2: Coastal flood extent (1% AEP, 1.0m sea-level rise)



Map showing Bridges, Roads (Manawatū), Roads (New Zealand), Drainage Channels, Bank Protection Structures, and Flood Protection Structures at risk from:
- Coastal Flood Extent (1% AEP, 1.0 m SLR)

RISK SUMMARY - Roads (Manawatū)

Coastal Flood Extent (1% AEP, 1.0 m SLR)

For this scenario approximately **5.09** km of Roads (Manawatū) are threatened.

Percentage Exposed

RISK SUMMARY - Bank Protection Structures

Coastal Flood Extent (1% AEP, 1.0 m SLR)

For this scenario approximately **0.49** km of Bank Protection Structures are threatened.

Percentage Exposed

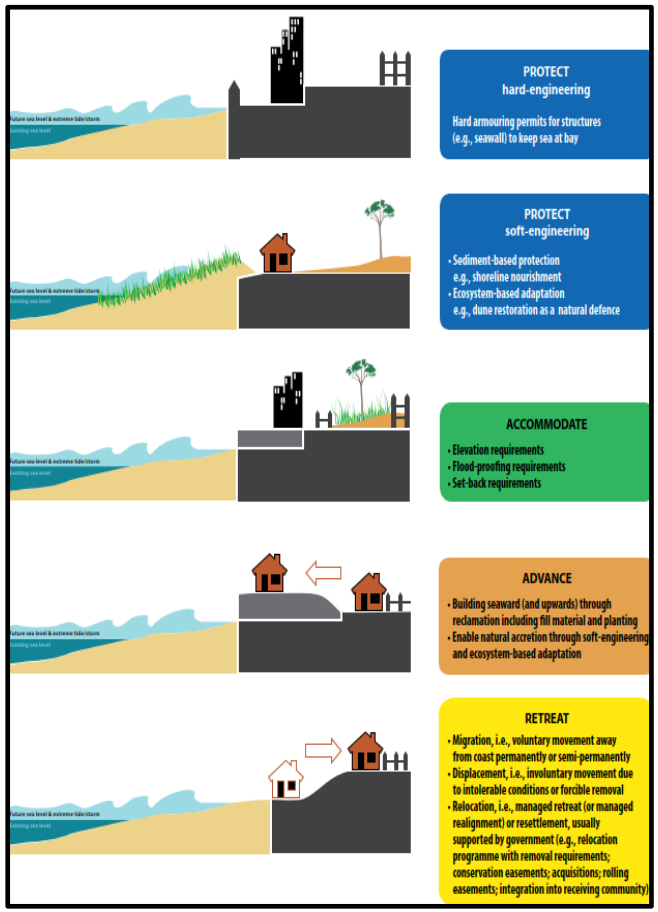
5. A thriving, resilient Tangimoana

The above scenarios highlight the need to build resilience in the face of escalating risk. Coastal communities like Tangimoana can use different measures to reduce risk and adapt over time, including individual and collective efforts involving a mix of behavioural, institutional, infrastructural, and nature-based responses. Examples include insurance innovations, new regulations to manage risk, ecosystem restoration to protect against coastal storms, etc. Many resilience building actions can be taken by individual households and communities to address risk in the short- (1-10 years) to medium-term (10-50 years). Sea-level rise is the key factor shaping long-term risk (50-100+ years), and key adaptation strategies to build enduring resilience include:

- **Protect:** Measures that provide protection, like seawalls, stopbanks and nature-based solutions;
- **Accommodate:** Measures that reduce hazard impacts, like raising buildings, back-up generators;
- **Advance:** Measures only possible in limited circumstances, like extending port infrastructure; and
- **Retreat:** Measures to move out of harm's way, like planned relocation to higher ground (Figure 2).

These strategies can be **very technical and costly** and are often **unaffordable**. But action can still be taken in the short- to medium-term. This **Plan** outlines ways to:

1. **Build community resilience**;
2. **Raise awareness, develop shared understanding, and work together better**;
3. **Adopt tailor-made early warnings, emergency response and post-disaster recovery plans**; and
4. **Initiate priority adaptation actions (2026- 2035)**.



IOC-UNESCO. 2021. *Community Guide for community members interested in risk reduction efforts. How to reduce coastal hazard risk in your community: A step-by-step approach*. IOC Manuals and Guides No. 85 Vol.2 (English). Paris, UNESCO.

Figure 2: Strategies to reduce the impact of sea-level rise

6. Build community resilience

Photo credit: Stuff Limited (David Unwin). Students from Tangimoana School are carrying out a scientific study on climate change adaptability in their village.

Photo credit: Bruce Glavovic

Key elements and examples of **resilience** previously identified are outlined in Appendix 4 Table 1. **Tangimoana residents** play crucial roles in **building the resilience of their households and community assets** like the beach, natural environment and Ellison Park; community hall; school; fire station; angling club; campgrounds; dairy; and village way of life. **With partner backing, residents can support Tangimoana resilience in many ways, for example:**

School resilience:

- **Help improve drainage** through creative landscaping, possibly using fill to create a mound over the drain field so that rainwater flows away and, not toward it
- **Redirect downspouts and other sources of runoff** away from the septic system
- **Help install a raised all-weather running/walking/cycling track on the field** to divert water away from neighbouring farmland to protect the school and neighbouring houses, including septic tanks
- **Involve school children in brainstorming new ideas to improve School resilience**

Environmental resilience

- Look into creative ways to **improve the resilience of the beach, dune and wetland systems**
- **Investigate and identify actions to protect and improve whitebait breeding habitat** in the estuary.
- **Plant native species** (like putaputāwētā); **establish 'rain gardens'** (specially designed planted areas that capture and absorb stormwater, and filter out pollutants before the water seeps away)

Contribute ideas for building Tangimoana resilience

- **Strengthen networks with residents and community groups to grow and share food**
- **Work with mana whenua** to build resilience.
- **Find out how HRC and MDC can support local resilience building**, e.g., could local government install temporary / portable flood barriers and environmental resilience building measures?

Household resilience

There is a range of actions homeowners can take to lessen flood damage, some options are:

- **Landscaping:** E.g., divert water by creating 'SandBag' gardens
- **Stockpile sandbags**: Have individual supply ready for a "Quick Dam"
- **Temporary defences / flood barriers:** Keep sandbags, plastic sheeting, and wooden planks on hand to create temporary barriers around openings before and during a flood; use removable gates or panels to seal doorways, windows, and other openings when a flood is expected
- **Waterproof walls:** E.g., liquid membranes, cement coatings, or water-resistant coatings to prevent water penetration of exterior and interior walls
- **Elevate utilities:** Move electrical sockets, air conditioning units, and service entry points above predicted flood level
- **Install backflow valves:** Fit non-return valves to drains, sewers / septic tanks, and toilet systems to prevent floodwater and sewage from entering your property

... our geographical situation ... bounded by ... rivers ... our sea ... if you're talking about ... weather impacts, we're kind of sitting ducks. ... we need to do this together... while we do stuff at local and regional levels and at national level, you also have a responsibility with you and your family to ... take care of yourself

(MDC Councillor)

the community can support itself. … we know when it floods, we protect each other

(Resident)

In addition to the above practical resilience building measures, there are many ways that residents can help one another, including for example:

- **Strengthen neighbourly relationships:** Based on informal day-to-day interactions that might include sharing meals and resources, or checking up on folk who are struggling, or supporting one another in an emergency. Such relationships can also help to build shared understanding about the risks faced and adaptation and resilience building options.
- **Establish self-help groups:** Such groups can form to share food, health support, or emergency aid after an extreme event.
- **Crowd funding:** Securing crowd-sourced funding and / or material support can meet local needs in the aftermath of an extreme event or to meet a particular community need in 'peacetime'.
- **Mutual lending:** Reducing vulnerability to displacement and strengthening resilience can be achieved by residents pooling funding and providing loans to each other. This operates outside the formal banking system and is founded on community participation and trust.
- **Mutual aid agreements:** These are more formal agreements between organisations, including councils, to support one another in emergency circumstances. This might involve sharing personnel, equipment, facilities and other resources.
- **Cooperative societies:** Such cooperatives can be formed by organisations that pool resources for shared goals such as housing and food provision. Profits can be distributed or re-invested to progress cooperative society goals.

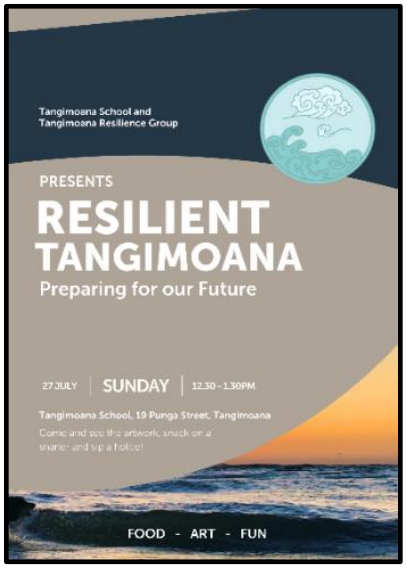
These and other forms of **mutual aid can support and enable community resilience building**, with different strategies being used in different circumstances and evolving over time.

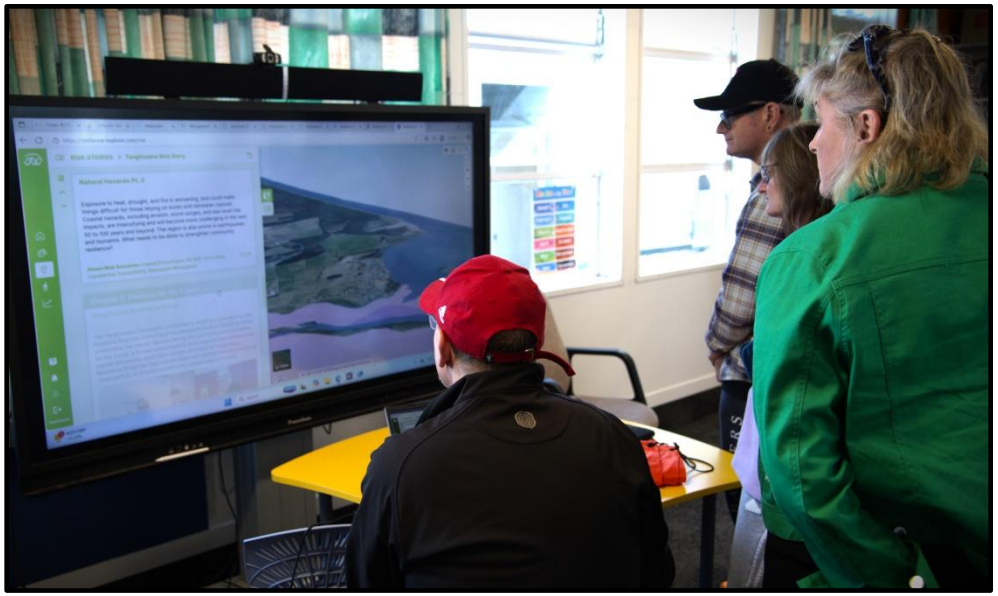
7. Raise awareness, develop shared understanding, and work together better

The TRG has worked hard to raise community awareness about the work underway to understand the risks faced and ways to build community resilience. It has been difficult to mobilise residents. A community meeting held at the Tangimoana School in July 2025 was well-supported and provided a good opportunity for residents to find out about the TRG work and hear firsthand from students about their hopes, dreams and creative ideas about how to make Tangimoana more resilient. Priority actions include:

- **Share Tangimoana resilience mahi with mana whenua.** **(HRC, MDC: TRG; ongoing)**
- **Update elected members of HRC and MDC**, and seek endorsement for key actions requiring council support noted in this Plan **(HRC, MDC; Target: before mid-2026)**
- **Raise resident awareness and understanding about insurance**, and how insurance access and premiums might be affected by climate-related risk **(see overview in Appendix 2; additional work to be determined, e.g., request ICNZ for list of priority actions that local communities can take to contain insurance premium increases and withdrawal)**
- **What other steps could be taken by residents?**

... knowledge is power ... putting your head in the sand is not going to work (Resident)



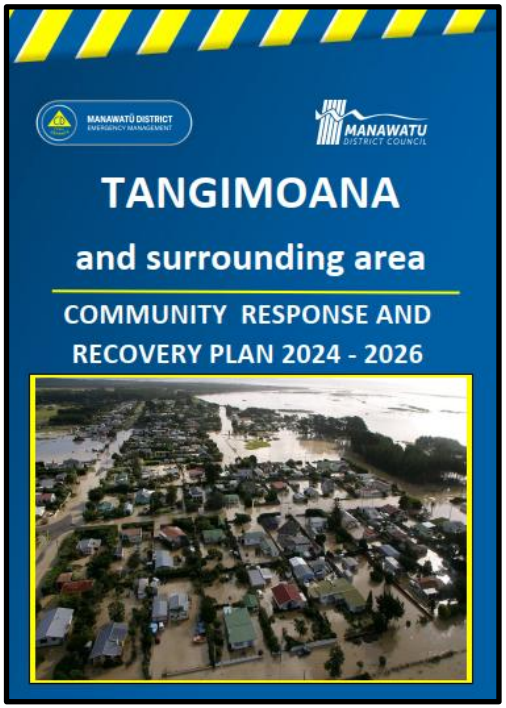


Community meeting at Tangimoana School (27 July 2025) Photo credit: Bruce Glavovic

8. Adopt tailor-made early warnings, and emergency response and post-disaster recovery plans

Tangimoana needs a tailor-made, dedicated early warning system as well as community-specific emergency response and post-disaster recovery plans. Priority actions include:

- MDC to work with the TCC to **review and update the existing Tangimoana and Surrounding Area Community Response and Recovery Plan**, ensuring it reflects emerging community needs, incorporates lived experience and local knowledge, and aligns council flood predictions and warnings with community understanding as part of the ongoing Tangimoana resilience planning and action **(MDC and TCC; Target: End 2026)**
- MDC to work closely with TCC to **prepare an updated Community Plan** for Tangimoana, to be approved by the TCC working with MDC, building on and extending the 2017 plan **(MDC and TCC; Target: End 2026)**
- MDC to work with PowerCo and relevant partners to **assess and progress alternative energy resilience options for Tangimoana** to facilitate suitable standby or renewable energy capability that supports critical community functions during emergencies **(MDC, TCC and PowerCo; Target: End 2026)**



Drive away so we do not get hurt, we will know it's coming because we have time. You can move your home on a trailer and go somewhere and then come back

(Kid, Tangimoana School)

9. Priority adaptation actions (2026-2035)

Further investigation is necessary to better understand medium- to long-term adaptation strategies (see Table 2) from both a technical and affordability standpoint, and consequently what mix of risk reduction and resilience building actions might be best to realise the vision for Tangimoana.

9.1 Protect

Have a big metal wall along the beach with a concrete pole. Leave a gate like on a big castle so we can still go to the beach

(Kid, Tangimoana School)

- **Improve understanding about flood risk and ponding, and plausible options for integrated flood protection and managing stormwater:** New technical analysis is necessary to provide a robust estimate of likely costs and rates implications for options to improve protection works given projected sea-level rise and flood risk. Residents will only then be able to consider the feasibility and affordability of protection options. **HRC and MDC are requested to scope and fund an investigation to better understand projected localised flood risk accounting for interactions between flood protection options and ponding** after heavy downpours and stormwater drainage and sewage system implications in extreme events given projected sea-level rise and land subsidence. The scope should include identifying and costing solutions to inform future adaptation planning, as was done for Pūtiki – the other community prioritised by the Climate Action Joint Committee. Solutions could include assessment of viable property protection measures. **(HRC, MDC: Target completion: end 2026 to mid-2027)**
- **Integrate local knowledge and experience** into joined up HRC-MDC flood risk modelling and overview of plausible responses and associated potential rates / cost-sharing implications. Account

for impact of land-use changes affecting drainage of farmland on boundaries of village. **(TCC, HRC, MDC: Work underway; Target completion: end 2026 to mid-2027)**

9.2 Accommodate

- **Improve understanding about the technical and financial implications of options to raise flood-prone houses in Tangimoana.** Various studies have been done on raising houses in flood-prone locations. Should investigation of stormwater/ flood indicate house raising is a viable option for some properties, and should sufficient homeowners request it, Councils could investigate Tangimoana-specific options and costs given locality-specific factors influencing feasibility and affordability. Such analysis should be scoped for a range of house types at Tangimoana where house raising is identified as a viable option but also indicate the likely range of costs given different housing types, liquefaction susceptibility, and implications for maintaining basic services (like potable water, sewage disposal, etc.), among other things. Past investigations in places like Anzac Parade on the Whanganui River indicate that raising houses is likely to be very expensive. At present, homeowners would likely bear all the costs, as there does not appear to be any available government or other support. Haphazard and inequitable outcomes would likely result if left to individual homeowner choice. **(TCC, MDC, HRC work underway; Target completion within 6 months of solutions from 'protect' investigations being completed).**

I have a bunker to go into if there is a tsunami or flood

(Kid, Tangimoana School)

I want to build a house with titanium stilts that won't rust and won't break down. ... We need to put all houses on stilts

(Kid, Tangimoana School)

Where the ocean line is, I am going to make a massive wall of bricks and titanium … Don't move Tangi … We should move the town only if in 20 years there are more flash floods

(Kid, Tangimoana School)

9.3 Planned relocation

- It is possible that sea-level rise compounded **risk could become intolerable in the next 4-7 decades**. For some residents, retreat might appeal. Improve understanding about managed retreat. Options include **migration**, i.e., voluntary movement away from exposed locations on a permanent or semi-permanent basis; **displacement**, i.e., involuntary movement or forcible displacement because of intolerable risk; and **planned relocation or managed retreat** to voluntarily move to higher ground with some government support. The availability of government support and / or possible insurance considerations is briefly outlined in Appendices. **Ad hoc retreat invariably results in unjust and inequitable outcomes born mostly by the most vulnerable people.** Tangimoana residents currently have no interest or appetite to relocate. This sentiment might change if there is another major flood event, like the 2004 flood, or if Government policy provisions on managed retreat change significantly. Investigating planned relocation options might be appropriate under such circumstances, or when this preliminary plan is reviewed. **(TCC, HRC, MDC, Target date: To be determined).**

9.4 Towards an adaptation pathways plan

Better understanding the technical, administrative and affordability implications of the above options will enable the TCC and Tangimoana residents to decide what combination of adaptation strategies and resilience building measures are best for the community, and how they might be sequenced over time.

Major interventions may be necessary for enduring risk reduction and community resilience; but the cost of such interventions might be unaffordable without Crown contributions. Pending legislation on an adaptation framework for the country may shed some light on this prospect.

A key consideration is understanding when existing measures might reach their 'sell-by' date because residents believe that the measure(s) are no longer effective in achieving their intended risk reduction purpose. For example, the current level of stopbank protection is considered acceptable for now. But with rising sea level, the level of protection will be reduced in coming decades. At what point might residents believe the protection provided is no longer adequate? Residents will only be able to answer this question when more detailed, up-to-date information is available about the technical feasibility and affordability of the above protect, accommodate and planned relocation strategies, as well as the viability of resilience building measures.

The 16-17 February 2004 floods provide a useful reference point. Flooding resulted from direct outflows from the Rangitīkei River and, subsequently, from flood flows due to a stopbank breach. The flood was assessed by NIWA as having a 40-50 year return period (2-2.5% Annual Exceedance Probability [AEP]). After the severe 2004 floods that made 41 homes uninhabitable, HRC consulted the community about

2015 Horizons Regional Council chairman Bruce Gordon speaks at the unveiling of a Rangitīkei River stone monument to commemorate a significant Treaty of Waitangi signing site. The unveiling took place exactly 175 years after three Ngā Wairiki Ngāti Apa chiefs signed the Treaty at Tāwhirihoe - a riverside site near the village. The memorial was unveiled by two direct descendants of signatory Te Hākeke, and two local school students.
Source: Whanganui Chronicle, 27 May 2015.
Photo credit: photo supplied 26052015WCSUPBRUCE/

our people have actually been adapting to the movement of our awa for a long time (Tangata whenua)

We are quite a passionate small team, and we really care about our community and we really want to share whatever information and the best information we've got at that time to help people

(HRC Staff)

stopbank improvements. Tangimoana considered 1% AEP, or a 100 year return period, to be unaffordable. The community requested a design standard of 2% AEP, which was implemented through the HRC 2006-2016 Long Term Plan with stopbank improvements to the 2% AEP design standard plus provision for ~25 years aggradation and an additional 600 cm freeboard as a safety margin. It was expected that this level of protection would initially approximate 1% AEP. Recent HRC investigations indicate that the riverbed from Bulls to the river mouth is gradually lowering (degrading). But HRC has not assessed the impacts of river channel and riverbed changes on flood protection for Tangimoana. Further investigation is therefore necessary to accurately determine current and projected levels of protection.

The costs of stopbank improvements, and other protection works and / accommodation measures, have increased significantly over the last two decades. Hence the necessity to reassess these options to determine the adequacy of existing provisions and to determine at what point new measures might need to be taken, accounting for technical feasibility and affordability, and cost-sharing options.

10. Monitoring, evaluation, plan-revision and joint-learning

Adaptation and resilience building efforts need to be monitored, evaluated and actions taken to revise the plan and adjust actions through a process of joint learning from experience. To make continual improvements in adaptation planning and resilience building, ongoing collaboration and cooperation is needed by key partners, including residents, the TCC, MDC, HRC, tangata whenua and stakeholders.

The TRG proposes that this preliminary plan be reviewed and updated after the priority short-term actions identified above have been advanced, say in 2-3 years. Consideration should be given to a mid-term review based on a partnership-based process to enable continual improvements and action.

- Based on insights gained from the above priority actions, **review and update this Preliminary Adaptation Plan.** **(TCC, HRC, MDC: Target completion: 2028)**

Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

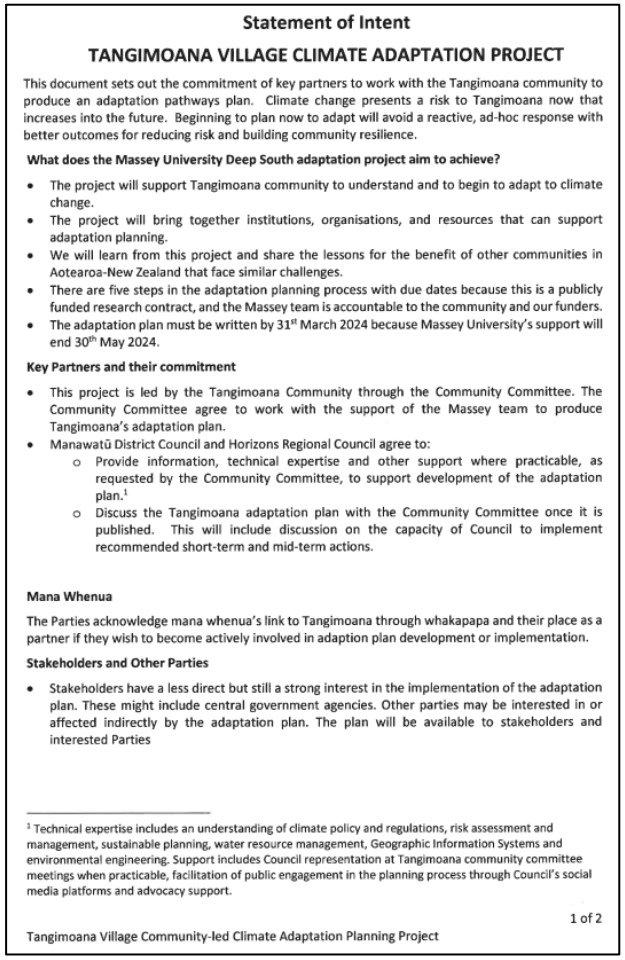
... yes there's work to do with communities and yes that's important but I think there's also work to do in that council space and then across the councils ... building that high trust environment

(MDC Staff)

Appendix 1: Statement of Intent

Signing the Statement of Intent (1 Nov 2023) (left to right): Michael McCartney (Horizons Regional Council), Shayne Harris (Manawatū District Council), Jennifer Moss (Tangimoana Community Committee), and Bruce Glavovic (Massey University).

Signing Priority Actions (25 June 2024) (left to right): Helen Worboys (Manawatū District Council), Michael McCartney (Horizons Regional Council), Jennifer Moss Joy (Tangimoana Community Committee), and Huhana Smith (Massey University).



Statement of Intent

TANGIMOANA VILLAGE CLIMATE ADAPTATION PROJECT

This document sets out the commitment of key partners to work with the Tangimoana community to produce an adaptation pathways plan. Climate change presents a risk to Tangimoana now that increases into the future. Beginning to plan now to adapt will avoid a reactive, ad-hoc response with better outcomes for reducing risk and building community resilience.

What does the Massey University Deep South adaptation project aim to achieve?

- The project will support Tangimoana community to understand and to begin to adapt to climate change.
- The project will bring together institutions, organisations, and resources that can support adaptation planning.
- We will learn from this project and share the lessons for the benefit of other communities in Aotearoa-New Zealand that face similar challenges.
- There are five steps in the adaptation planning process with due dates because this is a publicly funded research contract, and the Massey team is accountable to the community and our funders.
- The adaptation plan must be written by 31st March 2024 because Massey University's support will end 30th May 2024.

Key Partners and their commitment

- This project is led by the Tangimoana Community through the Community Committee. The Community Committee agree to work with the support of the Massey team to produce Tangimoana's adaptation plan.
- Manawatū District Council and Horizons Regional Council agree to:
  - Provide information, technical expertise and other support where practicable, as requested by the Community Committee, to support development of the adaptation plan.[1]
  - Discuss the Tangimoana adaptation plan with the Community Committee once it is published. This will include discussion on the capacity of Council to implement recommended short-term and mid-term actions.

Mana Whenua

The Parties acknowledge mana whenua's link to Tangimoana through whakapapa and their place as a partner if they wish to become actively involved in adaption plan development or implementation.

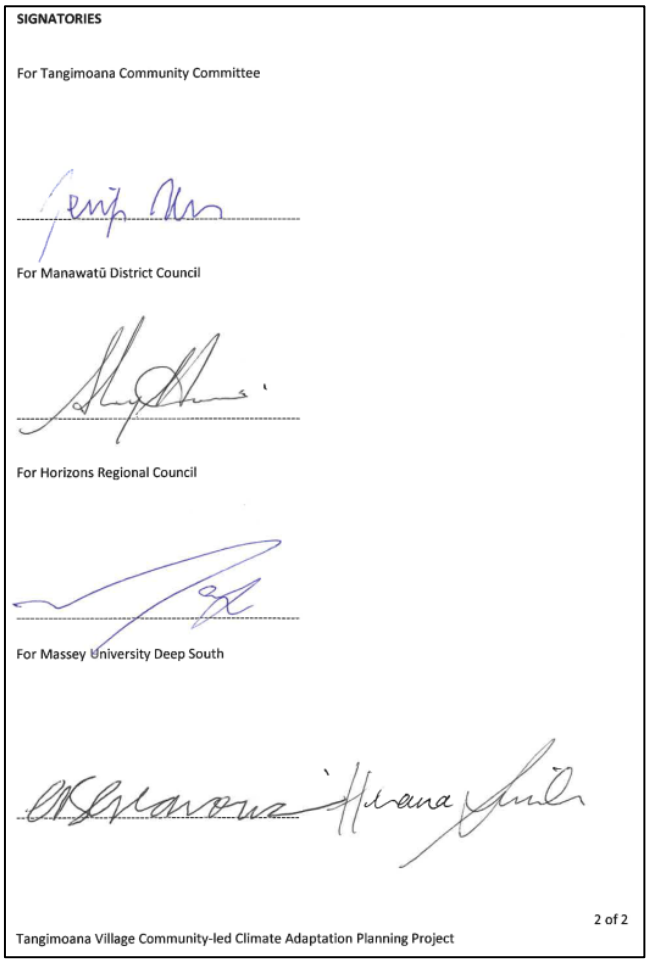
Stakeholders and Other Parties

- Stakeholders have a less direct but still a strong interest in the implementation of the adaptation plan. These might include central government agencies. Other parties may be interested in or affected indirectly by the adaptation plan. The plan will be available to stakeholders and interested Parties

[1] Technical expertise includes an understanding of climate policy and regulations, risk assessment and management, sustainable planning, water resource management, Geographic Information Systems and environmental engineering. Support includes Council representation at Tangimoana community committee meetings when practicable, facilitation of public engagement in the planning process through Council's social media platforms and advocacy support.

1 of 2

Tangimoana Village Community-led Climate Adaptation Planning Project



SIGNATORIES

For Tangimoana Community Committee

For Manawatū District Council

For Horizons Regional Council

For Massey University Deep South

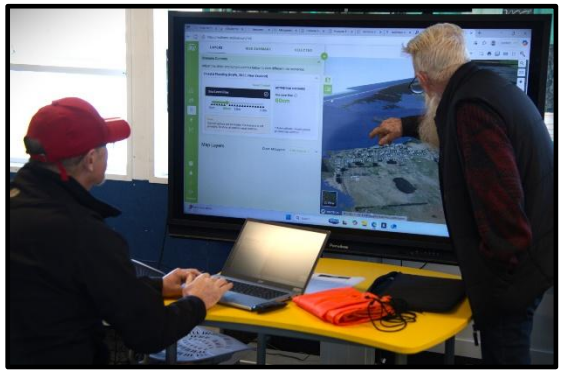
2 of 2

Tangimoana Village Community-led Climate Adaptation Planning Project

Appendix 2: TRG priority short-term actions in 2025

Priority short-term actions were identified through the Deep South-Horizons project with additional priorities identified by the **Tangimoana Resilience Group** in early 2025. This Appendix summarises TRG actions undertaken in 2025:

- **Community leadership to get better outcomes for Tangimoana:** The Tangimoana Community Committee (TCC) established the Tangimoana Resilience Group which completed a Rapid Risk Appraisal and this Preliminary Adaptation Plan, with HRC and MDC staff involvement. Findings shared with residents via mail drops and community hui. ***ACTIONED & FINDINGS SHARED AT JULY 2025 COMMUNITY HUI; TRG reported back to the TCC; ONGOING***
- **Develop stronger community relationships with HRC and MDC and work better together for Tangimoana**: Working on: (i) joined-up HRC-MDC understanding and options for managing flood, storm, drinking and waste waters; (ii) lobbying government; (iii) accessing credible property-level data for risk management. ***ACTIONED & FINDINGS SHARED AT JULY 2025 COMMUNITY HUI; ONGOING***
- **Develop better shared understanding about how climate change could affect households and the community, including local knowledge about risk:** The Resilience Explorer tool and adaptation and resilience planning carried out in 2025 improves understanding and identifies priority actions to address identified risks. MDC and HRC are working closely with the TRG. Concerted effort to share information with residents, especially new residents. ***ACTIONED & FINDINGS SHARED AT JULY 2025 COMMUNITY HUI; ONGOING***



Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

- **Better shared understanding about coastal and riverine flood risk, and ponding:** Building on above, need to better understand interactions between flood protection and ponding after heavy downpours and limits of stormwater drainage and impacts on sewage system in extreme events. Build local knowledge and experience into joined up HRC-MDC flood risk modelling and management. Include impact of land-use changes and works affecting drainage of farmland on boundaries of village. Could the low point in park be used for stormwater storage to mitigate surface flooding? How could floodwater be pumped back over stop bank if the village floods? ***ACTIONED & FINDINGS SHARED AT JULY 2025 COMMUNITY HUI; AND HRC & MDC EXPERTS DEVELOPING SCOPE OF WORK TO BETTER UNDERSTAND INTEGRATED SOLUTIONS FOR FLOOD PROTECTION & STORMWATER MANAGEMENT; ONGOING***
- **Customise Tangimoana response and recovery planning so warnings, evacuation and emergency responses reflect Tangimoana's unique ability to react and response to emergency events and its risk profile. Ensure the community is adequately resourced for emergency response:** MDC is revising the *Tangimoana and Surrounding Area Community Response and Recovery Plan* and will tailor the plan through more focused resident input. Work underway to assess and progress alternative energy resilience options for Tangimoana that enable suitable standby or renewable energy capability that can support critical community functions during emergencies. Better align Council flood predictions and warnings with local knowledge and lived experience. ***ACTIONED & WORK UNDERWAY***
- **Raise awareness and understanding about insurance**, and how insurance access and premiums could be affected by climate-related risk. ***INITIAL FINDINGS OUTLINED IN THIS REPORT***

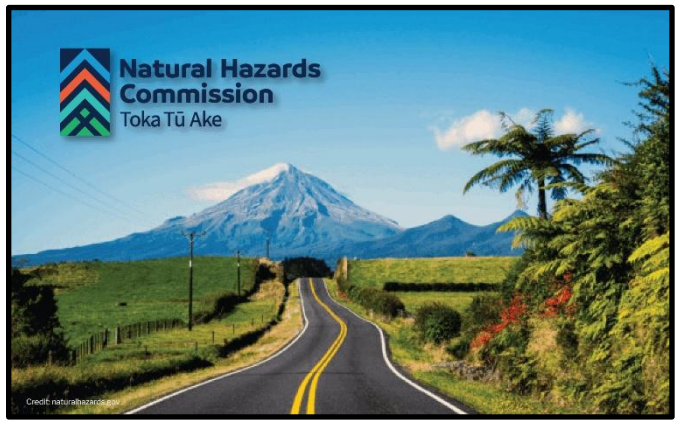
- **Build networks with community groups that are growing and sharing food.** ***ONGOING: CONTACTS HAVE BEEN PROVIDED FOR THE MANAWATŪ FOOD ACTION NEXTWORK WHO WOULD WELCOME ANY TANGIMOANA KAI RESILIENCE GROUPS INTO THAT COLLECTIVE.***
- **Identify and assess environmental projects that can protect and improve biodiversity and potentially water quality with a focus on the Rangitīkei estuary. Whitebait spawning habitat is an area of particular interest for the community and is priority.** ***TO BE ACTIONED*****.**

Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

Appendix 3: Some insurance implications

Climate-compounded **extreme events (e.g., river flooding) and disruptive change (e.g., sea-level rise) are increasing in intensity and frequency**. **Insured losses have already increased sharply** in recent years. Insurance **premiums have increased significantly**. In some high-risk locations, '**insurance retreat**' has occurred, making it difficult if not impossible to get a new private insurance cover and secure a bank mortgage. This situation could become much worse in coming decades.



If a natural hazard impacts your home, your **private insurer** and the Natural Hazards Commission (NHC) provide cover. **After an earthquake, landslide, volcanic or hydrothermal activity, or tsunami, the NHC covers the first $300,000 of damage to your home** (including structures used for daily living, like a shed or garage, and some essential services, like electricity). Your **private insurance company covers the rest** according to your insurance policy. The NHC also **contributes to repairs for damage to your land**: under and up to 8m around your home related to buildings and structures; and under or supporting the main access way up to 60m from your home.

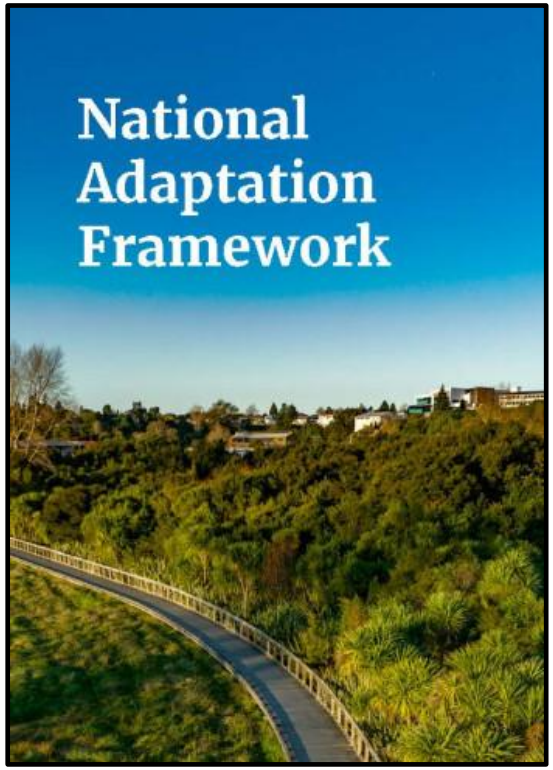
Your private insurance company covers storm and flood damage according to your policy. The **NHC can contribute to the cost of cleaning up the insured parts of your land** (it does not cover work you do yourself), including removing silt 15mm or deeper; debris removal; and repairing the surface of land that has been washed away.

The **NHC** also covers some costs for damaged **retaining walls, bridges and culverts**. **Private insurers might provide additional cover** for some parts of your property, like retaining walls, that will be detailed in your insurance policy.

The **insurance industry understands the risks facing Tangimoana**, the region, and Aotearoa New Zealand. Private insurance companies have property-specific contracts with insured property/homeowners that is proprietary information that is not shared publicly.

The **Insurance Council of New Zealand (ICNZ)** represents the insurance industry but is not allowed to share proprietary information. The ICNZ can provide guidance on how local government, tangata whenua and at-risk residents can prepare for future disruptions, including steps that homeowners and residents can take to safeguard their home and property, and contain premiums increases and insurance retreat. Examples include:

- Know your risk
- Build partnerships in your community, with tangata whenua, and your district and regional councils, and other relevant stakeholders
- Take proactive steps to reduce household and community risk, including options to pool risk through a collective / cooperative insurance scheme for Tangimoana
- Have a community-based plan to adapt and build resilience over time
- Invite the ICNZ to brief HRC and the MDC, with information provided to Tangimoana residents
- Other?



Appendix 4: Possible regulatory (policy) implications

The Government provides guidance on ways that Local Government can support local adaptation. But there is **no nationally consistent regulation (policy or law) about how local communities should adapt, and how to allocate costs** between home- and business-owners, tangata whenua, local government and the Crown. **Government contributions to adaptation and post-disaster recovery efforts have varied widely** and **those impacted have experienced wide ranging costs and benefits**.

The Government released its **National Adaptation Framework** on 16 October 2025, based on four pillars: First, prioritise better climate risk information. Second, clarify adaptation roles and responsibilities. Third, invest in risk reduction. Finally, resolve cost-sharing and Crown contributions. The Government promised a **Climate Adaptation Bill in 2026**.

The Government has signalled that Crown assistance for adaptation and post-disaster property buy-outs could be phased out in two decades. **The costs of post-disaster buy-outs and adaptation strategies like planned relocation will fall on communities, tangata whenua, and local government**. This approach sharply contrasts with the policy approach explored towards the end of the last Labour-led government, which indicated openness to Crown contributions to such costs to enable more just and equitable outcomes. **Cross-party agreement needs to be reached on Crown contributions** to adaptation and post-disaster buy-outs, especially for low-lying communities along rivers and the coast.

Appendix 5: Building community resilience

The Deep South-Horizons project identified the following resilience elements and examples.

Table 1: Elements and examples of community resilience in Tangimoana

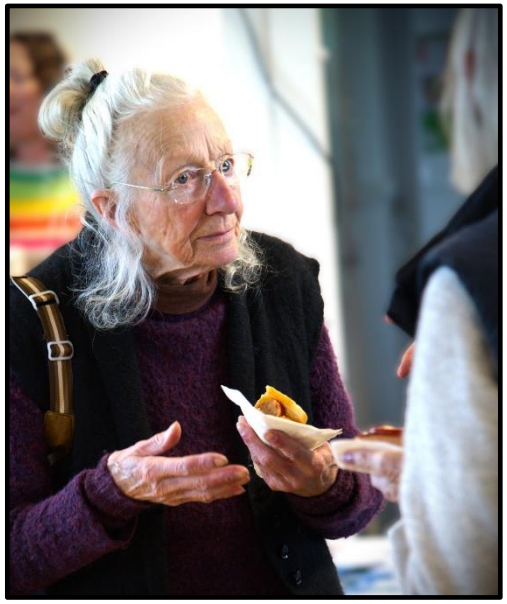
Elements of community resilience	Examples of community resilience in Tangimoana
Human: Individual capacity to cope and thrive in adversity	Physically capable, rural folk who are tough and care for each other. Access to 4x4, quad bikes, boats, etc. Self-reliant with local knowledge. Starlink.
Social: Strong interpersonal networks, trust, and belonging	Village isolation creates "sense of community". Independent but connected. Worked together through tough times. Long-term residents.
Cultural: Maintain distinct identity, values, knowledge and practices in face of disruption	Culture and heritage are valued and preserved. Tāngata whenua maintain knowledge and care of important sites. Treaty signing commemoration memorial. Colonial history documented.
Economic: Capacity of economy to withstand and bounce back from shocks and stresses	Rural and outdoor lifestyle celebrated. Barter system provides access to meat, kaimoana, firewood, rainwater / bore / springwater. Incomes from work in neighbouring towns helps village improvements. Local store.
Built: Capacity of buildings, roads and infrastructure to function after extreme events	Stormwater upgrades by MDC. Stopbank improvements to 1:50 year protection. Warning system provides evacuation notice of 8-11 hours. Pumping system. Single road access backup through forestry and farmland away from river.
Natural / environmental: Ecosystem ability to absorb impacts and recover structure, function and adaptability	Mild climate and ability to grow food locally. Estuary and wetland = buffer against storm surge. Ellison Reserve = sump in floods. Coastcare projects improve ecosystem function. Crown-owned land could be location for planned relocation some time in future.
Governance / institutional: Effectiveness of laws and policies and capacity to support communities in face of adversity	National MfE adaptation guidance useful but need national policy and legislation. Need to complement iwi and hapū adaptation efforts. Regional Climate Action Joint Committee is showing national leadership in adaptation planning and action. Commitment to work together is promising.

Photo credit: 2017 Tangimoana Community Plan.

Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

Appendix 6: Participation in resilience building & adaptation planning & action



Community meeting, 27 July 2025.

Photo credit: Bruce Glavovic

Residents cannot become resilient on their own given the 'forever' nature of climate-compounded risk. At-risk residents, tangata whenua, local government, government and other stakeholders need to work together. Nonetheless, residents can work to improve household resilience, as well as the resilience of their community, with partner support.

HRC and MDC provide enabling support for community-based resilience planning and action. Local government provides critical support as well as **essential services** that include building and health and safety regulations; roads; infrastructure for drinking water, stormwater and sewage; rubbish collection; flood protection; and environmental and emergency management. **Rates cover the costs of providing these essential services.**

Tangata whenua are custodians of many aspects of the **cultural legacy** of Tangimoana and surrounds and play **crucial kaitiakitanga (guardian) roles in environmental stewardship** across the region. Tangata whenua are often vital **first responders** after a disaster and **help community recovery**.

Appendix 7: Creating a flood resilient home – Auckland

External solutions – or dry proofing

Key: The colour of the circle indicates the type of approach the solution uses.

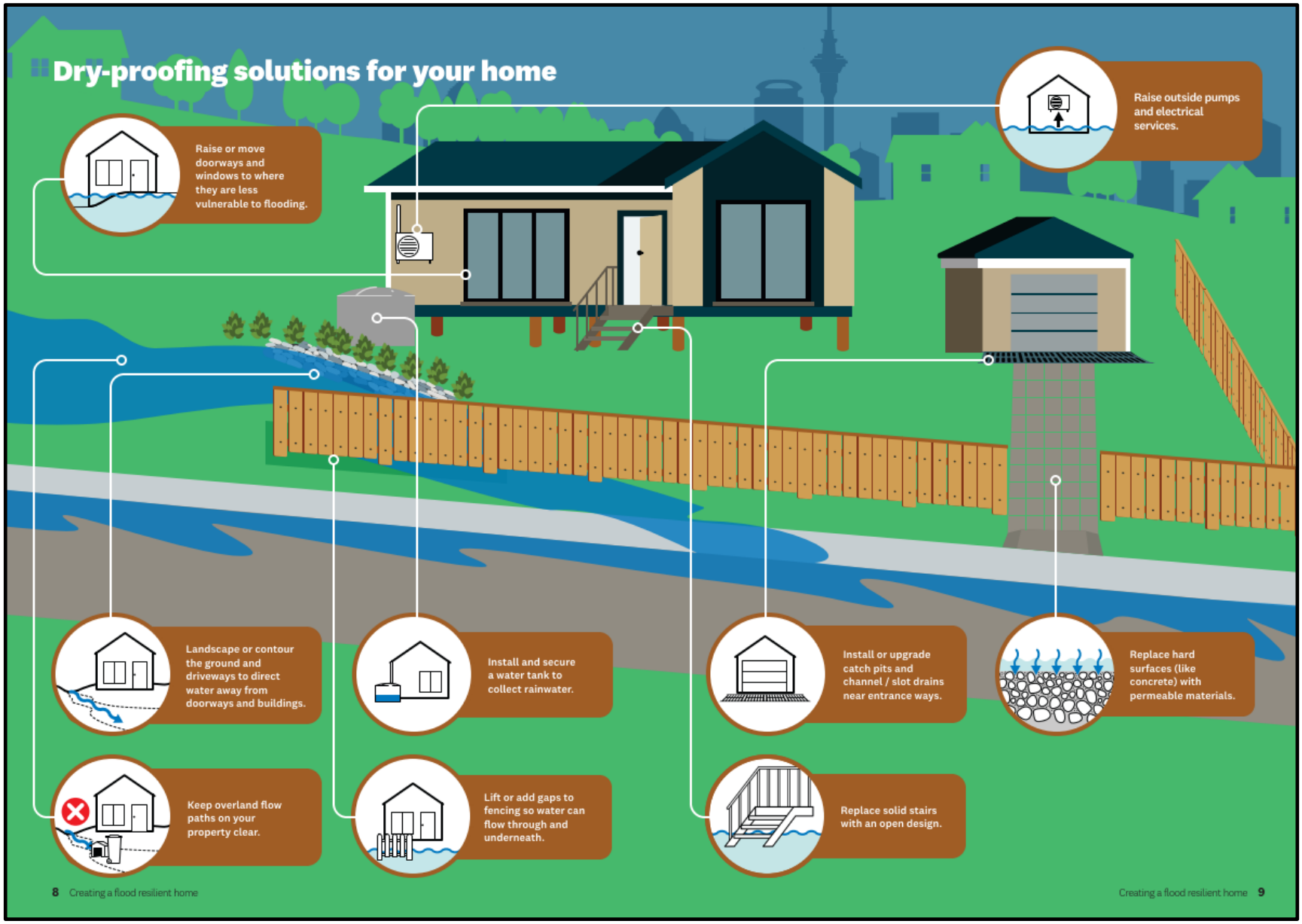
◯ Dry proofing ◯ Wet proofing

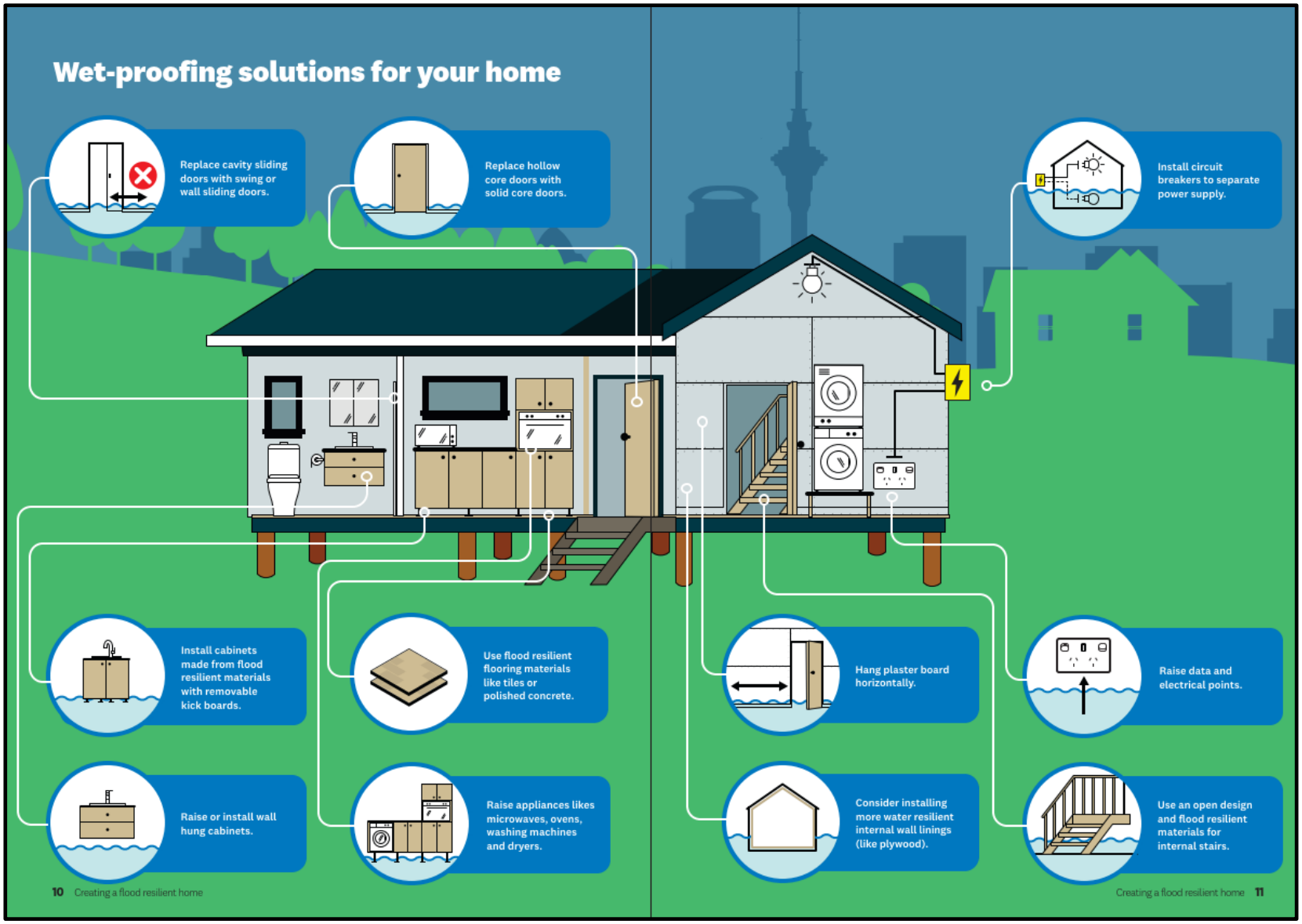
- Replace solid fences or carport screens with permeable fencing or screening and /or raise them to allow water to flow through and under. Solid fences and screens can cause ponding and divert water into your house. A solid fence can collapse under the weight of water and cause damage to neighbouring properties downstream.
- Install more water resilient stairs with an open design that allows water to flow through. Solid stairs restrict water flow.
- Replace hard surfaces (like concrete) with permeable materials such as permeable paving, gravel or grass to help slow, filter and absorb water.
- Install a water tank to collect rainwater and ensure it is secured to the ground. Building and planning regulations apply.
- Landscape or contour the ground and driveways to direct water away from doorways and buildings. Any works must not alter the flow, location or characteristics of the water as it passes a property boundary.
- Install or upgrade catch pits and channel / slot drains near entrance ways to reduce low level flows into your home. Check with your design professional or Auckland Council's building helpdesk to confirm whether building consent may be required.
- Keep overland flow paths on your property clear of items, structures and rubbish to maintain water flow.
- Raise or move doorways, windows and other openings to parts of the building that are less susceptible to flooding.
- Raise outdoor electrical features like heat pump and air conditioning compressors, water tank pumps, switchboards and hot water units to reduce the chance of water damage and outages.

Internal solutions – or wet proofing

- Consider installing more water resilient internal wall linings (like plywood).
- Replace hollow core doors with solid core doors, which are more resilient to damage and the force of flood water.
- Raise cabinetry. Higher, wall hung cabinets and storage shelves will reduce the risk of water damage.
- Replace cabinets with units made from flood resilient materials and make kick boards removable so cleaning and drying is easier after a flood.
- Use an open design and flood resilient materials for internal stairs.
- Replace cavity sliding doors with swing or wall sliding doors to help minimise water getting into the wall cavity.
- Hang plaster board horizontally so the lower panel can be removed and replaced easily if damaged by water.
- Use flood resilient flooring options like tiles, stone or brushed concrete
- Install circuit breakers for lower floor electrical circuits to maintain electricity on upper floors if the ground floor floods.
- Install laundry appliances such as washing machines and dryers onto benches or wall brackets and raise kitchen appliances like ovens and microwaves to reduce the risk of flood damage.
- Raise data and electrical points (including multi-boxes and extension leads) to reduce the risk of power outages during a flood.

Appendix 8: Auckland City Guide




Wet-proofing solutions for your home
Replace cavity sliding doors with swing or wall sliding doors.
Replace hollow core doors with solid core doors.
Install circuit breakers to separate power supply.
Install cabinets made from flood resilient materials with removable kick boards.
Use flood resilient flooring materials like tiles or polished concrete.
Hang plaster board horizontally.
Raise data and electrical points.
Raise or install wall hung cabinets.
Raise appliances likes microwaves, ovens, washing machines and dryers.
Consider installing more water resilient internal wall linings (like plywood).
Use an open design and flood resilient materials for internal stairs.
10 Creating a flood resilient home
Creating a flood resilient home 11

Find out more

Tangimoana Village: https://www.facebook.com/groups/272951064631084/

Email: tangiresilience@gmail.com