

WHANGAEHU FLOOD RESILIENCE UPLIFT PROJECT

Final report

22 December 2017



Project initiated by the Rangitikei District Council, in collaboration with, among others, Horizons Regional Council, Whanganui District Council, Ngati Apa (Whangaehu and Nga Wairiki Ki Uta), Kauangaroa Marae Committee, Ministry of Social Development, and Te Puni Kokori.

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Project guided by Whangaehu Valley Community Advisory Board

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EXECUTIVE SUMMARY

The Whangaehu Valley was ravaged by four major floods between 2004 and 2015. In 2017, a massive flood was anticipated but did not take place. Future flooding is inevitable. Fortunately, to date, no lives have been lost – despite several near misses. There is a real prospect of tragic loss of life, especially for those living in Whangaehu Village. Proactive steps need to be taken to prevent this prospect from becoming a reality.

Much has been done to reduce flood risk in the valley since 2004. More can be done to improve public safety and resilience by building on existing provisions for flood risk reduction, readiness, response and recovery. Meaningful collaboration between valley residents and district, regional and central government agencies, iwi and hapu, and non-government stakeholders is essential to address concerns and develop and implement feasible and sustainable solutions. **The key recommendations of this report are to:**

- 1. Establish a representative Whangaehu Valley Community Advisory Group (WVCAG):** **Action:** Valley stakeholders to establish the WVCAG with the support and / or participation of the Manawatu-Wanganui Civil Defence Emergency Management (CDEM) Group (M-W CDEM Group), Rangitikei District Council (RDC), Whanganui District Council (WDC) and Horizons Regional Council (HRC), Ministry of Civil Defence and Emergency Management (MCDEM) and other stakeholders as appropriate. **Recommended Timeframe:** By the end of March, 2018.
- 2. Undertake two priority tasks under the auspices of the WVCAG:**
 - a. Review, revise and operationalize a valley-specific Community Response Plan:** **Action:** WVCAG, M-W CDEM Group, RDC, WDC, HRC, MCDEM, and other relevant government agencies and non-governmental stakeholders to circulate a first Community Response Draft Plan to valley residents and stakeholders. **Recommended Timeframe:** By the end 2018.
 - b. Prepare a valley-specific post-disaster Community Recovery Plan:** **Action:** WVCAG, M-W CDEM Group, RDC, WDC, HRC, MCDEM, and other government agencies and other parties involved in rural recovery, to circulate a first Draft Community Recovery Plan to valley residents and stakeholders. **Recommended Timeframe:** By the end 2018.
- 3. Review and if necessary revise District Plan provisions to prevent new development in high flood risk localities:** **Action:** RDC, WDC and HRC to submit a report(s) to relevant Councils. **Recommended Timeframe:** By the end 2018.
- 4. Review legislative, policy, funding and capability building provisions to enable local authorities to (a) prevent rebuilding of houses in high risk locations that have been subjected to repetitive extreme events and, where necessary, (b) facilitate planned relocation of at-risk communities:** **Action:** Government needs to determine how best to address these complex, precedent-setting matters, e.g., by a whole-of-government Technical Working Group or by a Government or Public Inquiry, such as a Royal Commission. **Recommended Timeframe:** In the course of 2018, the WVCAG should invite the Director of MCDEM, and other relevant government agencies and stakeholders, such as Local Government New Zealand and the Insurance Council, to report on progress made and likely implications for the Whangaehu Valley.

EXECUTIVE SUMMARY

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1. INTRODUCTION

Four destructive flood events have impacted people in the Whangaehu Valley since 2004. Another major flood was anticipated in April 2017 in the aftermath of Cyclone Debbie. Fortunately, this flood did not take place. If it had, flood levels some 15 meters above normal river levels could have caused devastating impacts. Future flooding, which is likely to be exacerbated by climate change, is inevitable. Much has already been done to reduce flood risk in this valley. More can be done and this project report outlines recommendations to build resilience (see Appendix 1).

The aim of the project is to develop a locally appropriate community-based flood resilience strategy for the Whangaehu River by putting communities at the centre of efforts to resolve this complex and sensitive issue.

A Community Advisory Board was established to provide oversight and guide this project, and to give voice to the concerns and aspirations of the people of the valley (see Appendix 2). A project support team included staff from local and regional councils involved in flood risk management. Open community hall meetings were held to provide an opportunity for people in the valley to share concerns and find out more about the project, and provide feedback (See Appendix 3). Prof. Bruce Glavovic, Massey University, provided independent expert advice and wrote this report. Many key informant interviews were conducted and several focus group discussions held to understand concerns and identify opportunities and challenges for reducing flood risk and building resilience. Bruce reviewed international 'best practice' about how to reduce risk in the face of repeat flood events and persistent severe risk to inform this analysis.

The project shows that there are vitally important actions that can be taken to improve efforts already in place to:

- a) Avoid putting people in harm's way by, among other things, synchronised Regional Council and District Plan rules and provisions that prohibit new development in areas exposed to extreme flood events;
- b) Improve community readiness for flood events, e.g., systems to better understand flood prospects, implement effective warning systems, and prepare and practice evacuation plans;
- c) Develop and continuously improve response measures, based on lessons learned from real-world experience; and
- d) Continuously improve recovery prospects by developing a valley-focused post-disaster recovery plan informed by past experience.

Significant progress has been made with regard to each of these considerations.

This report describes burning issues, opportunities and challenges, and makes recommendations to build upon and strengthen efforts to date. It starts by briefly describing the context of flood risk in the Whangaehu Valley (see Figure 1).



horizons
RIVER CHANNEL ONLY
River Channel only for
Whangaehu River (Coastal and past Kauangaroa)

Figure 1: The Whangaehu River, focusing on the southern portion of the river (Source: Horizons Regional Council)

2. THE SETTING: FLOOD RISK IN THE WHANGAEHU VALLEY

2.1 THE WHANGAEHU VALLEY

The Whangaehu River flows some 135 km from headwaters in the vicinity of the crater lake of Mt Ruapehu to dune hollows and wetlands at the coast (see Figure 1). People have lived in the Whangaehu Valley for many generations (Campion, 1988). There are three maraes and associated residential development in the valley: (a) Whangaehu, Marae Whangaehu Beach Road, Whangaehu Ngati Apa (Ngati Rangiwhakaturia, Ngati Tumataikura Ngati Tamaea, Ngati Kiriwheke); (b) Kauangaroa Marae, Kauangaroa Road, Kauangaroa Ngati Apa (Nga Wairiki, Ngati Huru); and (c) Te Kapua Marae, Kumuiti Road, Kauangaroa Ngati Apa (Nga Wairiki). The Whangaehu Village and school is at the junction of the river and State Highway 3, and there are settlements in Kauangaroa and Mangamahu. There is a variety of residential homes and lifestyle blocks in the valley, community assets like the Whangaehu Community Hall, and a mix of small- and large-scale commercial farms, including dairy farms that require daily access for tankers, sheep and beef farms, and forestry blocks. Critical infrastructure includes roads, rail infrastructure, power, and telecommunications infrastructure that provides incomplete cell phone coverage, and varying levels of internet access via copper wire, cable / fibre, and wireless connections. This project focused mainly on the southern reaches of the valley up to the vicinity of Okirae Road.

2.2 RECENT FLOOD EXPERIENCE (based mainly on information from Horizons Regional Council)

19th Century floods: Major floods occurred in 1830 and in 1891 with a flow rate of possibly 1129 cubic meters per second (cumecs). In 1897 another flood occurred, possibly about 1234 cumecs which is comparable to the 2004 flood.

February 2004 flood: The 2004 flood had a return period of about 200 years or 0.5% Annual Exceedance Probability (AEP), possibly higher. The flow rate was about 1887 cumecs, with a maximum flow rate up to 1935 cumecs. The velocity of floodwater was fast enough to strip tarmac off State Highway 3. It is likely that some floating trees and debris may have hit the Whangaehu Bridge. But it does not appear to have affected flooding in the Whangaehu Village. The Whangaehu Village was, however, inundated to a considerable depth with flood water entering directly from the river. The recorded flood level was 15.90m at Moturiki Datum, and in the Whangaehu Village it was about 1.6m at the house of the owner of Whangaehu Garage. It reached about 13.3m at Kauangaroa. Loss of life was narrowly averted in the Whangaehu Village and some resorted to evacuation by boat. The flood had devastating impacts on people in the valley (see Figures 2-4).

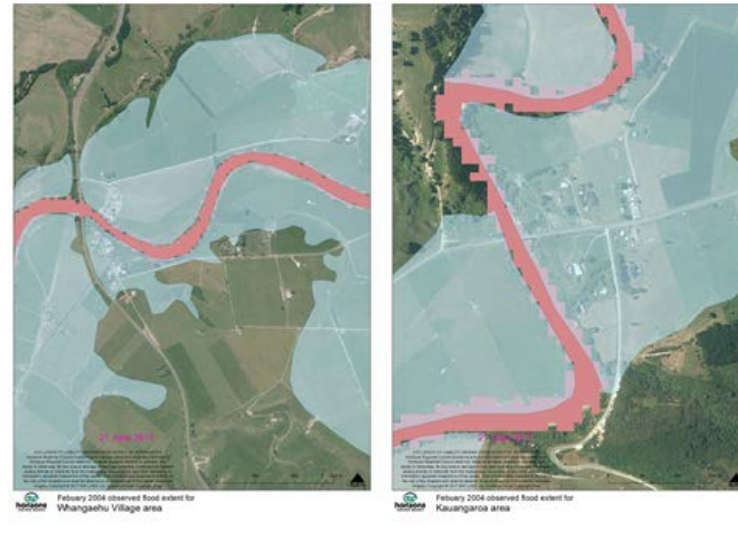


Figure 2: Observed 2004 flood levels for the Whangaehu Village and Kauangaroa areas (Source: Horizons Regional Council)



Figure 3: Aerial photograph of Whangaehu Village under floodwaters in 2004 (Source: Horizons)



Figure 4: Mike Cranstone rescues sheep on his flooded farm in 2004 (Source: <https://www.radionz.co.nz/news/national/328222/third-flood-lucky-whangaehu-farming-family-dodge-bullet>)

July 2006 flood: Peak flow was estimated to be about 873-1045 cumecs. The return period was just above 10% AEP. Upstream overflows occurred at a low spot on the left of the informal stopbank onto Ruatangata Road and flooded Whangaehu Village. The recorded flood level was 14.55m at Moturiki Datum; and about 0.2m at the house of the owner of Whangaehu Garage. It reached about 11.1m at Kauangaroa. The low spot on the Whangaehu Village stopbank was remedied by the RDC to a crest level of 15.22m (Moturiki Datum) which is about 0.62m higher than the estimated peak flow level in 2006. The stopbank capacity is estimated to be equivalent to a 15-year flood (6.67%AEP). In the Whanganui region, the Mangamahu settlement was isolated by the collapse of the Mangawhero River bridge, with damages estimated at \$10 million. More than 120 people were evacuated from Whangaehu and Turakina (see http://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=10954276; http://www.nzherald.co.nz/wanganui-chronicle/news/article.cfm?c_id=1503426&objectid=10942054).

October 2013 Flood: Peak flow was about 1061 cumecs.

June 2015 Flood: With a return period of about 120 years and a peak flow of about 1373 cumecs, this flood had major impacts on the valley, including Whangaehu Village and Kauangaroa. (See <http://www.stuff.co.nz/manawatu-standard/news/69649603/whangaehu-village-family-loses-everything-in-floods>) (see Figure 5).



Figure 5: Post-flood clean-up in the Whangaehu Village after the 2015 flood (Source: <http://www.stuff.co.nz/manawatu-standard/lifestyle/74829464/the-floods-that-came-with-force>)

April 2017 flood warning: The RDC declared a State of Emergency and activated the Whangaehu Response Plan in anticipation of major flooding that was expected to reach about 15m at Kauangaroa, which is higher than 2015 flood levels. Flooding of farmland was expected. Fortunately, this flooding did not take place.

In summary, the series of flood events experienced since 2004 is unprecedented in living memory. Floods in 2004 and 2015 caused significant damage; whereas floods in 2006 and 2013 were described by some as ‘nuisance floods’. The scale of anticipated 2017 flooding – with water levels possibly rising 15m above normal river levels – was hard for many people to comprehend because it would have been well-above recent flood levels. Nonetheless, there is robust understanding about the nature of flood risk (see Figure 6). Future flooding is inevitable. Climate change may exacerbate flooding in parts of the region (NIWA, 2016). Moreover, there is a real prospect of tragic loss of life given current exposure and vulnerability to flooding. It is therefore imperative to reduce flood risk and build resilience in the valley.

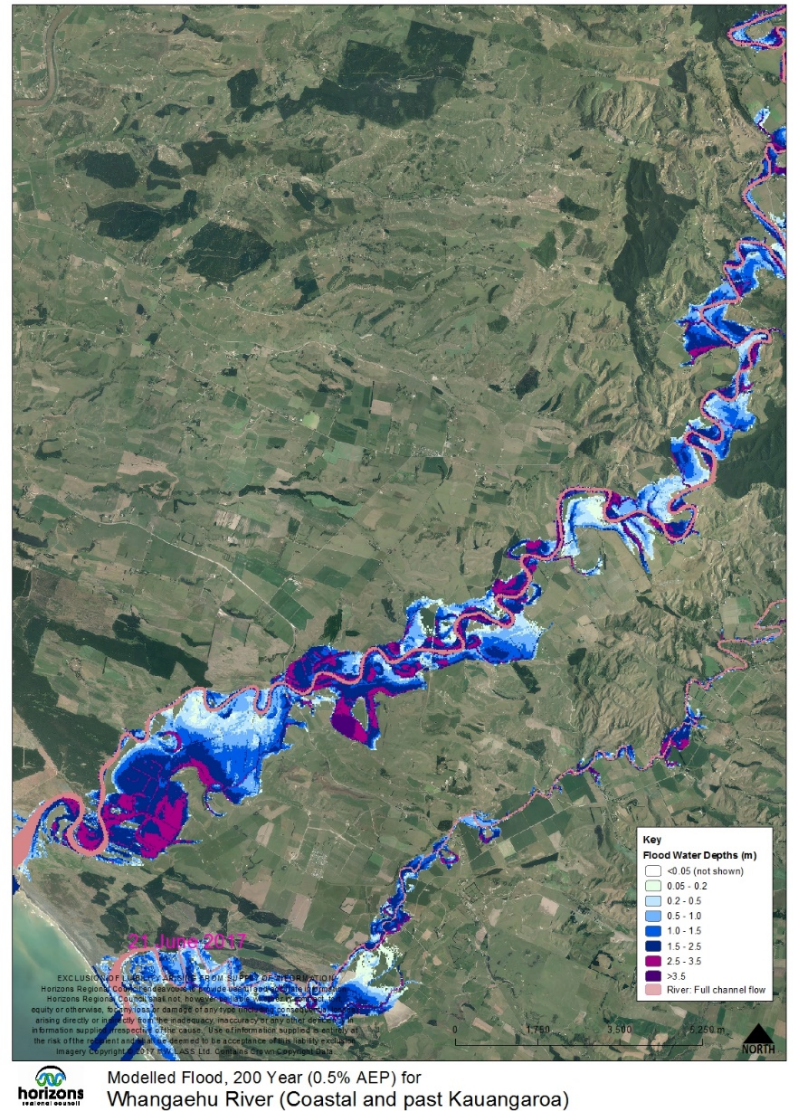


Figure 6: Flood water depths for a 200 year (0.5% Annual Exceedance Probability) flood (Source: Horizons)

3. BURNING ISSUES, OPPORTUNITIES AND CHALLENGES FOR REDUCING FLOOD RISK AND BUILDING RESILIENCE

Valley residents raised many issues that need to be addressed to reduce flood risk and build resilience. The range of issues, and opportunities and challenges to address them, reflects the diversity of people and activities in the valley, including tangata whenua, large- and small-scale farming enterprises, those living in homes and life-style blocks along the valley, and a range of infrastructure and service providers such as NZTA, KiwiRail, power and telecommunications providers, as well as a range of other service providers and government agencies active in the valley. Many significant interests are at risk of major impact and disruption in future flood events. There is no 'single solution' for reducing flood risk. Four main areas of activity, with associated opportunities and challenges, are examined in more detail, namely: (a) Risk reduction, i.e., avoid putting people in harm's way; (b) Readiness; (c) Response; and (d) Recovery.

Progress has been made with respect to each of these 4Rs. Since the 2004 floods, improvements have been made to, for example, the network of rain gauges in the region and modelling capacity to improve information about rainfall, river levels and flood prospects; and automated phone warnings and online information about river levels and flood risk. Hard-won experience means that many people understand flood risk and are 'good' at response and recovery. Actions have been taken to improve protection and accommodate flooding. For example, there have been stop bank enhancements; a 420m concrete flood protection wall was built around the Whangaehu Marae; some have raised plug points to minimise flood impacts on home wiring; and the floor level of a home has been raised. After the 2004 floods, Horizons investigated the feasibility to build protective works to safeguard the Whangaehu Village but found that the costs and residual risk (i.e., the risk that exists even after protective works are put in place) were unacceptable. Consideration was given to relocating people from the Whangaehu Village and a proposal was made to share the associated costs. However, agreement could not be reached and the idea was shelved in 2008-09. The feasibility of building protective works to safeguard the Kauangaroa marae was investigated and looked like a worthwhile undertaking until the 2017 flood prospect of 15m above normal river levels. The marae would have flooded even if the envisaged protective works had been in place. Consideration is now being given to relocating the marae. This section summarises 'burning issues' and opportunities and challenges to build resilience.

3.1 BURNING ISSUES

Issues of particular concern – burning issues – are outlined in detail in Appendix 4 and summarized below:

The prospect of tragic loss of life: All else is secondary. The need to relocate people from localities exposed to repetitive flooding has been raised repeatedly and needs to be resolved.

Cultural resilience and deep-rooted ties to the river: For tangata whenua, identity and connection with the river are immensely important. Understanding this connection is essential. Many valley residents have deep-rooted ties to this place.

Resilient critical infrastructure: Access to power (and back-up options) and telecommunications is critical but uneven. Focused attention is needed to address this matter. Some roads are impassable in floods, cutting off people unless they have access to 4x4 vehicles. Many people raised concern about the impact of the State Highway and its embankment on river flow under flood conditions, possibly worsening flooding in Whangaehu village. Concerns were raised about the impact of the new culvert under State Highway 3; the safety of the State Highway bridge, and the railway bridge and line under flood conditions, and the extent to which this infrastructure exacerbates flooding.

Psycho-social resilience: Flooding has significant impacts on people in the valley. When homes are flooded and stranded, there is concern about looting and security. Each marae and community asset, like the Whangaehu Village community hall, plays a vital role especially in post-flood response and recovery. The potential of the hall as a community asset needs to be realised. More can be done to assist vulnerable people.

Economic and livelihood resilience: Impacts vary widely depending on where people are located, whether or not they are permanent residents, whether or not their homes are flooded, and the extent to which their business activities and livelihoods are severely disrupted. Government support, as well as insurance, are crucial to getting people back into homes and production as quickly as possible.

Environmental resilience: A range of flood-related environmental concerns were raised, including pollutants being carried in flood waters that could pose a public health risk; respiratory problems due to silt and dust after flooding; the relationship between flood risk and other natural hazard risks, e.g., lahar risk and the impact of climate change on flood risk; the impact of upstream activities on downstream residents and their exposure to flood risk; and the extent to which river management interventions could be used to manage flood risk.

Resilient governance systems: Governance refers to the way in which public decisions are made through interactions between government, civil society and the private sector. The river runs along the administrative boundary of two district councils and all flood risk- and resilience-related activities need to be coordinated. Resilient governance systems involve: (a) Building shared understanding about flood risk; (b) Streamlining and improving flood risk reduction efforts: What options are available for relocation of homes and groups of people exposed to extreme flood risk?; (c) Streamlining and improving emergency readiness and response efforts: Lessons learned from past efforts should be incorporated into a reinvigorated and updated Community Response Plan; (d) Streamline and improve recovery efforts: Community spirit is the key to long-term recovery and resilience. A plan based on valley recovery experience should be prepared to guide future recovery efforts.

3.2 OPPORTUNITIES AND CHALLENGES TO REDUCE FLOOD RISK AND BUILD RESILIENCE

Opportunities and challenges are outlined in three tables below: (a) Reduction, (b) Readiness and Response, and (c) Recovery.

Table 1: Reduction opportunities and challenges

OPPORTUNITIES AND CHALLENGES
REDUCTION
<p>Four sets of activities can be taken in a portfolio of actions to reduce risk and build resilience over time:</p> <ol style="list-style-type: none"> 1. Avoid: Use planning provisions and other regulatory and non-regulatory tools to prevent new development in localities prone to severe natural hazard risks such as flooding. 2. Protect: Structures like stopbanks can prevent harm when extreme events are within design standards. 3. Accommodate: Measures taken to reduce hazard impacts, e.g., by raising floor levels of a building. 4. Relocate: Where people and things they value, e.g., critical infrastructure, are already in harm's way, steps can be taken to move out them to a safer location.
1. Avoid
<p>Historically, planning provisions did not provide local authorities with adequate authority to deny new development based on natural hazard risk. However, this policy flaw has been remedied. Provisions in the HRC One Plan discourage locating residential development and critical infrastructure in areas subject to high natural hazard risk, notably areas prone to flooding. District Plans must give effect to One Plan provisions. Such provisions are in place. Consequently, people should not be able undertake new development in areas of the valley that are exposed and vulnerable to flooding or other natural hazard risks. It would be prudent to check to see that existing provisions and related compliance and enforcement are effective in achieving this outcome.</p>
2. Protect
<p>Construct / improve stopbanks: To protect Whangaehu Village and / or other valley assets and infrastructure</p> <p>HRC will continue to provide engineering advice and design support to provide protection consistent with the provisions applicable to the whole region. It is notable that there is an important shift in thinking and practice in NZ and around the world to move away from reliance on</p>

OPPORTUNITIES AND CHALLENGES

hard-engineered protective works as the primary measure to reduce natural hazard risk. Alternative approaches include 'soft-engineering' works that use the buffer capacity of natural systems (e.g., dunes to absorb coastal storm impacts).

An investigation by HRC after 2004 flood showed that to provide 100-year protection for Whangaehu Village:

- A stopbank of about 600m and 1.5-2.1m high was needed from Whangaehu Bridge to higher ground at the school on Ruatangata Road. In places, a flood wall might be needed up to about 100m long.
- The stopbank and floodwall cost was \$0.4m plus riverbank protection works of \$0.6m (2006/7 estimate).
- Residual risk from stopbank failures or over-design floods is unacceptably high given One Plan provisions and given that recent flooding has been in excess of the 100-year return period several times.
- This option is infeasible from a cost benefit perspective and unaffordable given cost sharing obligations.

Alternative measures need to be investigated to reduce the ongoing flood risk facing Whangaehu Village.

Kauangaroa Marae: The decision to investigate relocation of the Kauangaroa marae rather than build protective works around the marae is wise – especially in the light of the anticipated April 2017 flood.

Other protective works: No other proposals were made during this project concerning protective measures.

3. Accommodate

Flood-proof homes: Several people have taken practical steps to minimise the impact of having floodwaters through their houses. Examples include preparation of walls to minimise damage to gips; raising plug-points; etc. Such steps have been taken in other NZ flood-affected communities. Preparation and distribution of best-practice guidance would be very helpful.

Raise houses: Raising a house is costly but achievable. At least one home in the valley has been raised. There may be merit in exploring this option for some other homes or assets in the valley.

About 10 houses in Whangaehu village would need to be raised about 2m, but access / egress would remain dangerous during flooding. Moreover, the costs of this undertaking are likely to be unaffordable.

OPPORTUNITIES AND CHALLENGES

4. Relocate

A legal opinion provided by Cooper Rapley to the RDC (dated 26 February 2004), indicates that a landowner whose house has been severely damaged and even destroyed by flooding may rely on existing use rights to reconstruct the house in the same location provided the effects of the new dwelling are similar in character, intensity and scale to those of the original house. If a house is destroyed by flooding, existing use rights allow a land owner to construct a new dwelling on another part of their property that is less prone to flooding provided the effects of the new dwelling are similar in character, intensity and scale to those of the original house. In other words, even if a house has been flooded repeatedly and lives are at risk from inevitable future flooding, legislative and policy provisions cannot be used to compel relocation to a safer location. However, circumstances do arise when it is necessary to relocate houses and critical infrastructure out of harm's way. At least two issues arise. First, if there is a real prospect of loss of life and severe harm, local authorities or central government may need to be able to use coercive powers to prevent people from rebuilding in high risk locations or places that have experienced repetitive flooding. Second, there are occasions when it is necessary to initiate planned relocation of at-risk communities. Both issues have precedent-setting implications because many NZ communities and governing authorities face this predicament – especially in the face of climate change and escalating risk along rivers and the seashore. The underlying legislative and policy gap(s) needs to be closed to avert tragedy and avoid significant downstream costs.

Relocate houses in Whangaehu Village: A number of homes have been flooded repeatedly. In some cases, insurance payouts have been made and the houses have been repaired. Other residents are unable to obtain insurance and have had to repair their homes without support. Many interviewees indicated a willingness to relocate provided it was as close as possible to the existing village, and if it was affordable to move to a safer location, preferably as a community. Some interviewees are not interested in moving. Few have the resources necessary to relocate.

Very preliminary indications are that the cost of relocating houses in the Whangaehu village could begin with a cost between \$500K-\$1m based on land purchase, subdivision consent creating 11-12 new lots, wastewater package plant, roading, footpath, drainage, etc. It assumes water will be roof supply. This does NOT include relocation of buildings or construction of new dwellings. This assumes that suitable safe land is available in close proximity to the existing village. More detailed cost estimates would need to be investigated. But on this basis alone, planned village relocation seems unaffordable. Moreover, there is no clear policy direction from Government about how the costs of such a relocation might be shared between the Crown, local government, the insurance industry and affected residents / ratepayers.

Further investigation is needed to establish whether or not there are opportunities to transfer flood-ravaged houses to a local authority after an insurance payout or repeated insurance payouts. Could the local authority be granted first right of refusal to purchase a flood-damaged property that is up for sale, regardless of insurance payout? This is not an ideal solution because it means waiting for the next flood – in which

OPPORTUNITIES AND CHALLENGES

lives could be lost. Therefore, it is important to proactively investigate options to acquire properties previously destroyed or damaged by flooding. It is also important to have in place the 'tools' necessary to prevent rebuilding of flood-impacted properties and avoid flood-damaged properties from being sold to a new owner.

There is no apparent scope for the Ministry for Social Development (MSD) to support/invest in local relocation, but MSD is committed to working towards community housing availability (probably in Whanganui) where Whangaehu residents qualify for such support.

Given the prevalence of this relocation problem around NZ, and the precedent setting nature of any initial agreement, it is not likely that resolution will be forthcoming in the short-term. Clear legislative / policy direction is urgently needed from Government. Insight can be drawn from extensive overseas experience in this regard, and some initial observations are outlined in the next section.

Relocate Whangaehu Garage and engineering works:

A proposal has been made to relocate the Whangaehu Garage. It is possible that a private arrangement could be made between local landowners and the owner of this business to undertake such relocation to higher ground. The RDC will make every effort to facilitate such relocation, including considering options to reduce, postpone or waive consent fees, provide rates relief, etc. More detailed investigation is required to determine the feasibility and practicalities of such a relocation.

Table 2: Readiness and response opportunities and challenges

OPPORTUNITIES AND CHALLENGES

READINESS AND RESPONSE

A wide range of readiness measures are already in place so that valley residents and stakeholders can prepare for the next flood; and response provisions are also in place so that necessary measures can be taken immediately before, during and after the next flood. Readiness measures include having insurance; functional communications; a back-up generator; having food, water and provisions for a reasonable period of time; etc. Response measures include functional warning systems, evacuation plans, rescue provisions, etc. Many detailed issues relevant to response and recovery were highlighted by key informants and are detailed in Appendix 4.

One of the most important outcomes of this project is recognition of the value of having an ongoing Whangaehu Valley Community Advisory Group, or some such body, to enable valley residents to work proactively with government and non-governmental stakeholders to streamline

OPPORTUNITIES AND CHALLENGES
READINESS AND RESPONSE
<p>and strengthen existing readiness and response measures, and where necessary initiate new activities. A community-based readiness and response plan (or simply a Community Response Plan) needs to be prepared for this purpose. The process of raising awareness about flood risk, and preparing, stress-testing, training, resourcing and implementing the plan will build shared understanding, strengthen relationships and help to build resilience. Key issues to be addressed in such a plan include measures to build:</p> <ul style="list-style-type: none"> • Cultural resilience • Resilient critical infrastructure • Psycho-social resilience • Economic and livelihood resilience • Environmental resilience • Resilient governance systems

Table 3: Recovery opportunities and challenges

OPPORTUNITIES AND CHALLENGES
RECOVERY
<p>Considerable recovery experience has been gained since the 204 floods, and many lessons learned. These insights need to be drawn upon to prepare for future flood events. Much would be gained by preparing a Community Recovery Plan that integrates these insights and actively engages valley residents and the range of government and non-government stakeholders involved in recovery efforts. Some insights about the scope of such a pre-event recovery plan are outlined in the next section.</p>

4. LESSONS LEARNED FROM NZ AND INTERNATIONAL EXPERIENCE

It is beyond the scope of this project to provide a comprehensive review of scholarship and past experience about how to reduce flood risk and build resilience. However, important lessons have been learned overseas and in NZ. This section spotlights some of these lessons. Some useful readings are listed in the References. The purpose of this section is to stimulate ideas for preparing a Community Response Plan and a Community Recovery Plan, and to inform future actions to prevent rebuilding in high-risk locations and facilitate planned relocation of at-risk communities.

4.1 BUILDING COMMUNITY RESILIENCE

A resilient community is able to prepare and plan for future stresses and shocks, some of which are unpredictable. A resilient community can absorb impacts, adapt to change over time, recover from adverse events, and, if necessary, transform so that it is less exposed and vulnerable to harm. A resilient community has cultural resilience, resilient critical infrastructure, psycho-social resilience, economic and livelihood resilience, environmental resilience and resilient governance systems. These dimensions of resilience are interconnected in complex ways. A resilient community understands the risks it faces, including the probabilities and likely consequences of extreme events, as well as ‘worst case scenarios’ in the face of societal and climate change. A resilient community focuses attention on reducing its exposure and vulnerability, and, in particular, practical ways to assist those most susceptible to harm. Importantly, all members of a resilient community are actively involved in risk reduction and resilience building efforts: there is local ownership and an effective working relationship between local community members and their elected leaders, iwi and hapu organisations, government agencies, non-governmental groups, and private sector organisations.

4.2 PLANNING FOR POST-DISASTER RECOVERY

Preparing a Community Recovery Plan helps to:

- Build a culture of disaster risk awareness and preparedness;
- Learn and apply lessons from past recovery experience;
- Focus attention on measures that can be taken to reduce disaster impacts;
- Identify post-disaster roles and responsibilities;
- Establish clear lines of communication;
- Identify potential funding sources and financial responsibilities for recovery;
- Enable the effective and integrated use of community assets and capabilities, and external resources;

- Assess overall disaster preparedness;
- Speed-up the recovery process;
- Proactively identify opportunities for post-disaster community betterment; and
- Institutionalise post-disaster lesson learning.

Much has been learned from recovery efforts overseas and in NZ in the aftermath of the 2004 Manawatu floods, 2005 Matata debris flow, 2010-2011 Greater Christchurch earthquakes, 2015 Whanganui flood, 2016 Kaikoura earthquake, and 2016 Edgecumbe flood. Much can also be learned from the series of floods that have ravaged the Whangaehu Valley. A Community Recovery Plan should summarise these lessons and build relevant insights into practical steps for future recovery efforts in the valley. This will help to strengthen cultural resilience, resilient critical infrastructure, psycho-social resilience, economic and livelihood resilience, environmental resilience and resilient governance systems.

4.3 PLANNED RELOCATION IN THE FACE OF DISASTER RISK

As outlined in the previous section, in NZ, existing use rights enable the owner of a home destroyed by flooding to rebuild the dwelling even after repeated flood events. When people live in places subject to repetitive flooding or are exposed to severe natural hazard risk, it may be necessary for governing authorities to use coercive powers to prevent rebuilding after a disaster and/ or to undertake planned relocation of an at-risk community or group of people. These are extremely sensitive and complex matters. Considerable international experience has been gained that needs to inform efforts to resolve the dilemma facing people and local governing authorities in places like Whangaehu Village.

There is a growing body of literature and guidance on best practices for planned relocation of people at risk of disaster due to natural hazards, like floods, and those on the frontline of climate and environmental change. This body of knowledge is related to and informed by studies on and experience with managed retreat, human migration and displacement. What do these terms mean?

Managed retreat is the strategic, coordinated relocation of people and assets away from natural hazard risk. This term usually refers to moving development out of the path of eroding coastlines and coastal hazards. Approaches include abandonment, relocation, setbacks (i.e., plan rules that set back development from a hazard), land acquisition, and various tools to avoid development in at-risk locations. Successful managed retreat addresses not only the *physical aspects* of managed retreat (including the technical, economic and ecological aspects) but also the *ethical, cultural, psychological, emotional and social aspects*.

Human migration refers mainly to voluntary movements of people from one place to another, temporarily or permanently, to improve living conditions.

Displacement refers mainly to the forced or involuntary movement of people from one place to another for a variety of reasons, including political or armed conflict, disaster impacts and climate change.

Planned relocation refers to the planned process of leaving a settlement and establishing or relocating to another permanent settlement.

Human migration, displacement and planned relocation or resettlement, raise complex and interconnected ethical, cultural, political, legal, administrative and practical considerations that have significant local, national and international implications.

There are important international agreements and initiatives in place or underway to address these matters, including the 2015 Sustainable Development Goals, 2015 Paris agreement on climate change, the 2015 Sendai Framework for Disaster Risk Reduction, and, among other things, the 2016 Task Force on Displacement under the Warsaw International Mechanism on Loss and Damage, and the proposed 2018 UN Global Compact for Safe and Orderly and Regular Migration.

There are NZ-specific legislative and policy provisions in place to address these matters. However, given existing use rights, and prevailing legislative and policy gaps, it is imperative to resolve legacy decisions to locate houses and critical infrastructure in areas prone to severe natural hazard risks, especially in the face of climate change. A robust investigation needs to be initiated and should take into account lessons learned and emerging best practice.

Planned relocation should only be initiated with the free and informed consent of the individuals in affected communities. If consent is not granted, relocation should only take place if it meets the minimum standards provided by international and NZ law. Moreover, it should only take place in the face of serious and imminent threats to human life and health; if less intrusive approaches will not avert the threat; and after affected parties have been informed and consulted. In other words, there should be compelling reasons, robust evidence and a legal basis to undertake planned relocation. Planned relocation should improve, or at least restore, living conditions.

Table 4 summarises insights from some of this scholarship and experience. The lessons and best practices identified in Table 4 derive from the sources listed in the References and Further Reading section on human displacement, migration and planned relocation.

Table 4: Lessons learned and best practice for planned relocation of communities facing disaster risk

LESSONS LEARNED AND BEST PRACTICE
<p>Guiding principles of humanity, human dignity and human rights: These principles are enshrined in international law and NZ legislation and policy. Among other things, planned relocation needs to be implemented on the basis of consent, non-discrimination, participation and empowerment of affected communities. Particular consideration needs to be given to those who are marginalised or vulnerable, with due sensitivity to, among other things, gender, age, diversity and culture.</p>
<p>The duty of governments to protect citizens and address the special needs of the most vulnerable people: Planned relocation should be a 'last resort.' After investigating all reasonable alternatives, including establishing whether affected communities have identified planned relocation as their preferred option, pre-emptive or post-disaster relocation may be necessary to avoid harm and displacement. This strategy should be initiated if a locality is too dangerous for human habitation or if returning to a place is not possible. Appropriate vulnerability-, risk- and resilience-assessments should be undertaken. Appropriate mechanisms need to be established to ensure the accountability of decision-makers and to provide recourse for affected communities.</p>
<p>Enabling legislative and policy environment: An enabling legislative and policy environment, based on a whole-of government approach, needs to be created and institutionalised to facilitate the active involvement, support and coordination of relevant parties. This enabling environment needs to provide meaningful opportunities for active involvement of relevant stakeholders in civil society, the private sector and the scientific and research community. Roles and responsibilities need to be clearly spelled out.</p>
<p>Local leadership and authentic community involvement: Local communities need to be empowered to play a lead role in the process of planned relocation, with the support of their governing authorities and non-government organisations. Where appropriate, the authentic and sustained involvement of relocating and, if appropriate, host communities need to be ensured.</p>
<p>Ongoing communication, deliberation and conflict resolution: Sustained, two-way communication between governing authorities and affected communities needs to be ensured. Furthermore, practical steps need to be taken to enable ongoing communication and deliberation. Conflict is commonplace and proactive measures need to be put in place to enable independent mediation.</p>

LESSONS LEARNED AND BEST PRACTICE

Capability building for disaster risk reduction and resilience building:

Local capacity to undertake planned relocation is seldom well-developed. Support from central government is usually required to initiate, design, plan for, and successfully enable long-term planned relocation. The capability of local government as well as relocating and host communities needs to be addressed.

Proactive and sustained planning:

The sustainability of planned relocation needs to be established through proactive and enduring planning efforts that pay attention to matters such as place attachment, identity and culture, livelihoods, infrastructure needs, etc. Effective independent short- and long-term monitoring and evaluation systems need to be institutionalised so that relocation impacts can be assessed and addressed over time.

Compensation and incentives:

Adequate funding needs to be mobilised to enable planned relocation. Equitable compensation schemes need to be crafted according to the needs of affected communities. Cash-based compensation schemes alone are seldom sufficient. In-kind compensation may be necessary to compensate for lost assets and avert impoverishment. A combination of context-relevant compensation and incentives is likely to be required. Moreover, compensation schemes need to consider factors like gender, age, diversity and the special needs of vulnerable people. Transparency, equity and accountability are key.

Provision for permanent resettlement:

Suitable, culturally appropriate housing and associated infrastructure, including the (re)creation of communal and public spaces, need to be planned for in reasonable proximity to the original settlement. Relevant legal and land-title issues, and community safeguards, need to be addressed to enable permanent resettlement.

Livelihood, land and resource security:

Planned relocation needs to address employment and livelihood needs, as well concerns arising from the disruption of historic ties to land, resources and cultural sites. Consideration needs to be given to non-traditional skills and livelihood alternatives. Furthermore, planned relocation should take place in a manner that maintains and respects household, community and social cohesion as well as kinship ties.

5. RECOMMENDATIONS

Much has been done to reduce flood risk in the valley since 2004. More can be done to improve public safety and resilience by building on existing provisions for flood risk reduction, readiness, response and recovery. Meaningful collaboration between valley residents and district, regional and central government agencies, iwi and hapu, and non-government stakeholders is essential to address concerns and develop and implement feasible and sustainable solutions. Recommendations are made to foster such collaboration.

The most significant finding of this report: No lives have been lost to date. But loss of life is a real possibility, and may be inevitable, unless proactive measures are taken to move people out of harm's way. There are significant barriers to achieving this outcome and recommendations are made to address this concern.

The key recommendations of this report are to:

1. **Establish a representative Whangaehu Valley Community Advisory Group (WVCAG):** **Action:** Valley stakeholders to establish the WVCAG with the support and / or participation of the Manawatu-Wanganui Civil Defence Emergency Management (CDEM) Group (M-W CDEM Group), Rangitikei District Council (RDC), Whanganui District Council (WDC) and Horizons Regional Council (HRC), Ministry of Civil Defence and Emergency Management (MCDEM) and other stakeholders as appropriate. **Recommended Timeframe:** By the end of March, 2018.
2. **Undertake two priority tasks under the auspices of the WVCAG:**
 - a. **Review, revise and operationalize a valley-specific Community Response Plan:** This Plan should: enable valley stakeholders to work together to improve readiness, response and recovery prospects by raising awareness about flooding and other natural hazard risks; and put in place practical community planning, training and resourcing measures to build resilience. **Action:** WVCAG, M-W CDEM Group, RDC, WDC, HRC, MCDEM, and other relevant government agencies and non-governmental stakeholders to circulate a first Community Response Draft Plan to valley residents and stakeholders. **Recommended Timeframe:** By the end 2018.
 - b. **Prepare a valley-specific post-disaster Community Recovery Plan:** Building on lessons learned from past recovery experience, prepare a post-flood recovery plan that enables flood impacted people to rebuild safely and quickly restore livelihoods. **Action:** WVCAG, M-W CDEM Group, RDC, WDC, HRC, MCDEM, and other government agencies and other parties involved in rural recovery, to circulate a first Draft Community Recovery Plan to valley residents and stakeholders. **Recommended Timeframe:** By the end 2018.

- 3. Review and if necessary revise District Plan provisions to prevent new development in high flood risk localities:** Provisions in the HRC One Plan discourage locating residential development and critical infrastructure in areas subject to high natural hazard risk, notably areas prone to flooding. District Plans must give effect to One Plan provisions. As a proactive precautionary measure, the RDC and WDC should review and if necessary revise District Plan rules, and associated compliance and enforcement provisions, to prevent new development in high flood risk locations in the valley. **Action:** RDC, WDC and HRC to submit a report(s) to relevant Councils. **Recommended Timeframe:** By the end 2018.
- 4. Review legislative, policy, funding and capability building provisions to enable local authorities to (a) prevent rebuilding of houses in high risk locations that have been subjected to repetitive extreme events and, where necessary, (b) facilitate planned relocation of at-risk communities:** These matters involve complicated ethical, cultural, legal, administrative and practical considerations of national import. They transcend the responsibilities of any one government agency or sector, and have implications for, among other things, local, regional and central governmental roles and responsibilities in the face of severe natural hazard risk; funding mechanisms; insurance; existing use rights; and human rights. The current legislative and policy setting does not provide local authorities with the mandate, finances, capacity or 'tools' to prevent rebuilding of houses that have been repeatedly impacted by extreme events; nor to facilitate planned relocation of people exposed and vulnerable to severe risk, e.g., from flooding or rising sea levels. Unless this gap is filled, at-risk communities and their governing authorities will incur significant preventable harm and avoidable downstream costs. They will not be able to avert the all but inevitable tragedy facing residents living in Whangaehu Village and other high risk localities around the country. This predicament is getting worse in some localities because of the intersection of demographic and development trends and climate change compounded risks. This matter has ramifications that reach from the local community to the international level by virtue of NZ being a signatory to agreements on issues like disaster risk reduction, climate change and displaced persons. **Action:** Government should initiate a robust independent investigation to identify the legislative, policy, financial and operational implications, including capability building needs, and appropriate reforms, to resolve legacy decisions to locate houses and critical infrastructure in areas prone to severe natural hazard risks and, moreover, in the face of climate change. Consideration should be given to the most effective way to investigate these complex, precedent-setting matters, e.g., by a whole-of-government Technical Working Group or by a Government or Public Inquiry, such as a Royal Commission (see the Inquiries Act, 2013). **Recommended Timeframe:** In the course of 2018, the WVCAG should invite the Director of MCDEM, and other relevant government agencies and stakeholders, such as Local Government New Zealand and the Insurance Council, to report on progress made and likely implications for the Whangaehu Valley.
- 5. Follow up actions:** There are a series of follow-up actions to obtain additional information and insight that will help to address concerns raised, with more detailed information in Appendix 4. In no order of importance:

- a. **Investigate insurance concerns** in the light of valley and NZ experience. Consider establishing a Technical Working Group to investigate the concerns raised, involving the WVCAG, MCDEM, RDC, WDC, HRC, LGNZ, EQC, Insurance Council and other relevant stakeholders.
- b. The WVCAG should write to the **NZTA and KiwiRail** to request written explanations that address the concerns raised about infrastructure safety and flood implications.
- c. The RDC and the owner of the **Whangaehu Garage** and relevant landowners should investigate practical options for relocating the business to safer ground.
- d. Under the auspices of the WVCAG, initiate research that distils **lessons learned from the experience gained since 2004** to inform future efforts to prepare a Community Response Plan and a Community Recovery Plan.
- e. Under the auspices of the WVCAG, **prepare guidelines on how to build flood resilience in the valley**, based on local experience and best practices elsewhere.
- f. Government, in consultation with relevant stakeholders, should facilitate **research to determine the scope, distribution and future prospects of life-safety risk and asset exposure to flooding in the context of climate change**. Particular attention should be focused on the scope and prospects of and remedies for exposure to repetitive flooding in NZ. This knowledge will inform many of the other recommendations outlined in this report that have NZ-wide application.
- g. Lastly, **write-up lessons learned from this project about how to develop a community-based resilience strategy** because these insights have potential application in other NZ communities.

APPENDIX 1: BACKGROUND TO THE PROJECT

This project was initiated by the Rangitikei District Council to reduce flood risk and build resilience in the Whangaehu Valley. Collaborating organizations included: Horizons Regional Council (HRC), Whanganui District Council (WDC), Ngati Apa (Whangaehu and Nga Wairiki Ki Uta), Kauangaroa Marae Committee, Ministry of Social Development (MSD), Te Puni Kokori (TPK), and the Ministry of Civil Defence and Emergency Management (MCDEM) which provided funding from the Community Resilience Fund to cover some of the project costs.

The aim of the project is to develop a locally appropriate community-based flood resilience strategy for the Whangaehu River by putting communities at the centre of efforts to resolve this complex and sensitive issue.

A Community Advisory Board was established to provide oversight and guide this project, and to give voice to the concerns and aspirations of the people of the valley (see Appendix 2). Advisory Board meetings were open to residents of the valley and attended by representatives of local, regional and central government. A project support team included staff from local and regional councils involved in flood risk management. Open community hall meetings were held to provide an opportunity for people in the valley to share concerns and find out more about the project, provide feedback on the project. Information about the project is available on a Rangitikei District Council website: <https://www.rangitikei.govt.nz/district/projects/whangaehu-flood-resilience-uplift-project>

Prof. Bruce Glavovic, EQC Chair in Resilience and Natural Hazards Planning at Massey University, provided independent expert advice and wrote this report. He conducted about 50 key informant interviews and several focus group discussions to understand concerns and identify opportunities and challenges for reducing flood risk and building resilience (see Appendix 2). He and / or Ross McNiel also met with representatives of key government agencies, including MCDEM, MSD, NZ Transport Agency (NZTA), HRC, Local Government New Zealand (LGNZ), Insurance Council and EQC. Bruce reviewed international 'best practice' about how to reduce risk in the face of repeat flood events and persistent severe risk to inform this analysis.

The phases of the project are outlined below. The timeframe had to be extended because a series of extreme events delayed consultation with key national stakeholders involved in responding to the November 2016 Kaikoura earthquake and major flood events in early- to mid-2017.

<u>Phase</u>	<u>Description</u>	<u>Revised Timeframe</u>	<u>Comment</u>
1	Understand Whangaehu Valley context and scope of Flood Risk	Sep-Oct 2016	Work with key stakeholders and community representatives. Undertake community briefings
2	Assess Whangaehu Valley Flood Risk	Oct-Nov 2016	Work with key stakeholders and community representatives. Undertake community briefings
3	Develop Risk Reduction Action Plan (short, medium, long-term)	Nov-Jul 2017	Work with key stakeholders and community representatives. Community briefings & workshops
4	Finalise and Implement Risk Reduction Action Plan, and Monitor Progress	Sep-Dec 2017+	Some actions may require significant resources from councils and/or government agencies. Commitment of these resources may need to follow a formal approval process. For councils this may be an annual plan or long term plan process. End of project report to Ministry of Civil Defence Emergency Management

The project aimed to develop a community-based Flood Risk Reduction Action Plan that could be progressively implemented over time to reduce flood risk and build resilience in the valley. However, a critical legislative and policy gap needs to be filled before a robust flood risk reduction plan can be developed and effectively implemented in the Whangaehu Valley, and indeed, in NZ communities facing repetitive flood events. Recommendations are outlined to address this problem.





Whangaehu Flood Resilience Uplift Project

A Rangitikei District Council-led project is currently underway to look at the issues and impacts associated with flooding in the lower Whangaehu valley (Okirae south), and to identify options and actions for managing those impacts. This information sheet outlines why the project is being undertaken, what it hopes to achieve, who is involved and how residents and property owners can be involved.

Why Undertake this Project?

The Whangaehu valley has experienced four major flood events since 2004. On each occasion dwellings, community buildings, businesses and farms have been inundated, resulting in considerable damage, economic loss, social disruption and displacement of local people for many weeks. The villages of Whangaehu and Kauangaroa are particularly susceptible to flooding from the Whangaehu River, but no enduring solutions to avoid or mitigate the effects of flooding have been found. It is clear that these flood events will continue and, within a climate change context, we could expect large flood events on a more frequent basis.

The risk to human life and property – notably dwellings and community facilities – is significant, so removing or reducing these risks is a desired outcome. Further development in these high-risk zones is effectively controlled through the Rangitikei District Plan and the Building Code. However finding solutions for existing properties is not straightforward. There is a range of options (e.g. localised flood protection works, raising floor levels and relocation) to reduce risk and increase resilience, although conventional community-wide flood protection measures are not currently considered practicable or affordable.

Rangitikei District Council (RDC) has acknowledged the need to work with affected communities to find ways of improving individual and community resilience to flood events. RDC has secured funding through the Government's Civil Defence Emergency Management Resilience Fund to work with those affected by flooding in the Whangaehu valley.

The Whangaehu Flood Resilience Project

Increasing resilience to flooding centres on risk management and reduction, and requires a multi-agency approach and active community engagement that builds shared, evidence-based understanding of the problem, barriers and opportunities, and leads to potential solutions. International and local experience shows this is a complex challenge in practice.

This project will bring together local, regional and central government agencies, and draw on expertise from Massey University. The aim is to develop a locally appropriate community-based flood resilience strategy for the Whangaehu River by putting communities at the centre of efforts to resolve this complex and sensitive issue.

There are options to eliminate or reduce the risk of harm to people and major damage to property, and these will be identified and assessed (using an evidence-based approach) in conjunction with affected communities.

The approach will involve collaborative issue identification and problem-solving, and allow for the strengthening relationships between communities, local stakeholders, government agencies, local authorities, iwi leaders and researchers. This should create an environment where any difficult community decisions can be made, and appropriate action taken.

This project provides an opportunity to adapt approaches and tools used elsewhere in hazard management and mitigation, with the aim of identifying and evaluating options to reduce flood risk in the Whangaehu valley. The project will integrate international and local experience, including other research/studies, to build community-wide understanding about flood risk and develop resilience-building solutions.

APPENDIX 2: COMMUNITY ADVISORY GROUP MEMBERS AND PROJECT SUPPORT

Community Advisory Group members

Katarina Hina	Nga Wairiki Ki Uta (Kauangaroa)
James Allen	Chair, Kauangaroa Marae Committee
Alan Turia	Ngati Apa (Whangaehu)
Tim Matthews	Federated Farmers/Rural Support Trust (Whanganui/Rangitikei)
Rachel Cvitanovich	Whangaehu community
John Wilkie	Whangaehu Farmer

Local, Regional and Central Government Representatives

Andy Watson	Mayor, Rangitikei DC
Dean McManaway	Deputy Mayor, Rangitikei DC
Soraya Peke-Mason	Councillor, Rangitikei DC
Bruce Gordon	Chair, Horizons Regional Council
Gloria Campbell	Ministry of Social Development

Project Support

Ross McNeil	Chief Executive, RDC
Bruce Glavovic	Massey University
Ramon Strong	GM River Management, Horizons

Ian Lowe	Manager, Emergency Management Office, Horizons
Johan Cullis	Team Leader, Regulatory Services, RDC
Tim Crowe	Emergency Management Officer, Whanganui DC
Paul Chaffe	Emergency Management Officer, RDC
Ian Wilson	Regional Emergency Management Advisor, MCDEM

APPENDIX 3: COMMUNITY ADVISORY GROUP MEETINGS

Advisory Group Meeting Dates:

Wednesday 6 December 2017

Thursday 22 June 2017

Tuesday 29 November 2016 – Public meeting

Tuesday 24 November 2016

Thursday 15 September 2016

Names of members/attendees/invitees:

Rachel Cvitanovich	Ramon Strong
Tim Matthews	Ged Shirley
Katarina Hina	Ian Wilson
James Allen	Gloria Campbell
Theresa Allen	Te Aroha McDonnell
Alan Turia	Mike McDonnell
Dean McManaway	John Wilkie
Bruce Gordon	Soraya Peke Mason
Ian Lowe	Grant Huwyler
Timothy Crowe	Toko Kapea
Paul Chaffe	Pauline Tahau
Andy Watson	
Johan Cullis	

APPENDIX 4: KEY INFORMANT OBSERVATIONS AND BURNING ISSUES

FLOOD-RELATED OBSERVATIONS MADE BY KEY INFORMANT INTERVIEWEES:

Connection and association with Valley:

- For tangata whenua: Long standing connection – whakapapa – “I am the river, the river is me.” The valley and the river are an integral part of individual, whanau, hapu and community identity. Risk reduction solutions need to understand this fundamental reality.
- More recent residents have made this valley home. A very special place.
- Sense of community varies and changes over time and in different parts of valley but is very strong for many e.g., Whangaehu Village.
- Flood impacts have impacted people’s sense of safety and future prospects.

Past flood experience:

- Floods have had devastating impact on many people – but range of experiences from nuisance to threat to life and things dear to people.
- For some, such as some large-scale farmers, flooding is normal part of business risk, notwithstanding the dangers and disruptions.
- For others, floods have disrupted family, health, prospects for building homes, etc.

Expectation of future flooding:

- Repeat events in 2006, 2013 and especially 2015 have made prospect of future flood a frightening reality – can’t ignore it!.
- Climate change is likely to compound future flood risk.
- Despite warnings about that the April 2017 could exceed flood levels in 2015, it was hard for many people to comprehend the likely consequences of such an anticipated flood.
- Need to make decisions now in the face of an uncertain future – in particular to avoid potential loss of life in a future flood.

Who is involved in dealing with flood risk?

- A wide range of stakeholders must be involved in all aspects of risk reduction and resilience building: Residents of villages (Whangaehu; Kauangaroa); farmers; government (RDC, WDC, HMW; Ministries); service providers (rural post; insurance; banks; Fed Farmers, Red Cross, etc.)

BURNING ISSUES ARISING FROM PAST FLOOD EXPERIENCES:

The prospect of tragic loss of life: All else is secondary, notwithstanding devastation of 2004 and 2015 floods. Loss of life has been narrowly averted on more than one occasion in recent floods. A number of valley residents, and local government officials, including the current Rangitikei District Mayor, have expressed very serious concern about this prospect. Dangerous flood waters have swept through the Whangaehu and Kauangaroa Villages on several occasions. Significant flooding in Whangaehu Village is expected in a 20-year flood, with flood water entering the village directly. In a 30-year flood, water will flow over Ruatangata Road stopbank into village. If people fail to evacuate timeously, it is likely that someone will drown. Concern has also been expressed about the flood risk facing some people living in the northern reaches of the valley near Mangamahu and along Okirae Rd. The controversial and sensitive issue of needing to relocate people from localities exposed to repetitive flooding has been raised repeatedly and needs to be proactively addressed.

Cultural resilience and deep-rooted ties to the river: This connection is reflected in the statement voiced by a person living close to the river: “I am the river; the river is me.” For tangata whenua, identity, meaning and connection to the river are immensely important. Understanding this connection is essential. Views vary, however, and at the end of the day, most people interviewed, including tangata whenua, put the safety of their loved ones above all else.

Resilient critical infrastructure: Widespread loss of power and communications in major floods, often for 2-3 days or more, is a major challenge. PowerCo does a good job of restoring power but loss of power stops everything if you don't have backup generators. Access to power is critical and valley residents have creative ideas about how to improve the resilience of the power network as well as valley-wide back-up generator options. Access to telecommunications is essential in disaster situations. But cell phone coverage in the valley is incomplete and focused attention on this matter is needed. “We need better cellphone coverage at our end of the valley. In the 2004 floods, the phones went down and we lacked power so our internet service was compromised. I had a cellphone but had to go by motorbike to the highest hill in the area in order to contact people with our need of a generator to run our cowshed.” Some roads are impassable in floods, cutting off people unless they have access to 4x4 vehicles. Concerns were raised about the alignment and placement of some road and rail infrastructure that might impede river flow and in some localities worsen flood impacts. Many people raised concern about the impact of the State Highway and its embankment on the flow of the river under flood conditions, possibly impeding river flow and worsening the flooding of Whangaehu village. Moreover, when the State Highway is flooded, there are few options to access more remote parts of the valley and elsewhere in the region. The new culvert under State Highway 3 was put in place without consultation and concern has been raised about the impact it might have on flooding in Whangaehu Village. Concern has also been raised about the safety of the State Highway bridge under flood conditions. Concerns were also expressed about

the safety of the railway bridge and line under flood conditions, and the extent to which this infrastructure exacerbates flooding. Questions were also raised about the feasibility of new protective works to reduce flood risk.

In an effort to address the concerns raised about State Highway 3, the following initial information was obtained. Information reported by the HRC shows that (i) A 100-year flood (1% AEP) occurs at 15.6m (Moturiki Datum) about 250m upstream from the Whangaehu Bridge, leaving a likely freeboard to the bridge soffit of about 0.9-1m in a 100-year flood. This does not meet the NZ Transit Authority (NZTA) design standard of 1.2m freeboard in a 100-year flood where there is substantial debris carried by the river. (ii) The State Highway embankment appears to have relatively minor impact in small flood conditions – trapping water release. (iii) State Highway 3 does not appear to present a material obstruction to major flood flows (e.g., 2004 and 2015) because the highway centreline is as low as 13.79m (Moturiki Datum) for up to 275m long, which is around 2m lower than the 2004 flood levels in the Whangaehu Village. In seeking clarity on this situation, a meeting with an NZTA representative indicated that bridge safety is addressed through a robust, regular 2-year inspection and an in-depth inspection every 6 years to ensure the bridge meets stringent standards of a State Highway. Additional information will be needed to allay about concerns that road acts as a ‘dam’ and worsens flooding of Whangaehu Village, as well as more detailed information about culvert specifications, functional role and capacity.

Psycho-social resilience: Flooding has significant impacts on individuals, families, whanau and people in the valley. One person said: “It feels like the floods have washed my daughter away”. Some school kids may have been traumatised by flooding. There is a deep sense of loss felt by those who have had to move away from the valley. Flooding isolates people from their families, friends and social networks. Flooding disrupts people’s sense of belonging and the loss of one’s home is especially devastating. When homes are flooded and stranded, there is concern about looting and security. “I think it might be helpful to install security cameras at the entrance to both Ruatangata road and Beach road. Being dead end roads, this would provide residents some peace of mind following a flood when homes are empty, and have ongoing value as a means of security.” Each marae and community asset, like the Whangaehu Village community hall, plays a vital role in building psycho-social resilience – especially in the post-flood response and recovery process. Maraes are sanctuaries of safety, refuge and community for people in the valley – “our first home” and especially after flooding in practical as well as cultural, spiritual and other ways. Protecting maraes against flood impacts is seen to be a wise investment. Relocation of an at risk marae is an extremely complex and delicate matter. However, in the face of repetitive flooding and extreme risk, relocation is considered appropriate and necessary – as is being explored by the Kauangaroa Marae Committee. Many people stressed the vital role played by the Whangaehu Village Community Hall and the need to use it for community benefit and not for only for a select few. Support by the RDC to assist the Community Hall committee in making improvements to the hall is much appreciated. Much remains to be done to realise the potential of the hall as a community asset, including the option for using it as a post-flood Emergency Operation Centre and a place for community activities. It was pointed out that more can be done to assist people who are vulnerable, starting with identifying and

taking practical steps to help people who are susceptible to harm, e.g., those on life-support or without access to cell phone coverage or the internet, and those with inadequate means.

Economic and livelihood resilience: Impacts vary widely depending on where people are located, whether or not they are permanent residents, whether or not their homes are flooded, and the extent to which their business activities and livelihoods are severely disrupted. In general, 2004 and 2015 floods were extremely impactful whereas floods in 2006 and 2013 were more like 'nuisance' floods. Repeat floods have worn people out and left some places in a state of disrepair. What can be done to support people who bought land in the valley pre-2004 with the intention of building a home that is no longer allowed? Farmers experience a range of impacts from damage and destruction of fences and farm installations and equipment to loss of livestock, disruption of milk production, and deposition of silt and debris on farmland. The longer the water stays on the land, the worse the damage. Clearing the silt and debris after major floods is a huge burden. Fine dust from silt gets into all machinery causing damage. Government support in the response phase, as well as insurance, are crucial to getting back into production as quickly as possible. Maintaining the productive base of the valley is vital, whilst reducing cost and trauma of future events. Insurance helps people recover much more quickly than would otherwise be the case. However, insurability varies from those who are uninsured to those whose premiums have increased significantly and in some cases has become unaffordable. People do not feel that there is equitable access to insurance. This matter needs to be addressed more holistically than on an individual home / business owner basis. What role can local government or parties like the Insurance Council or EQC play? The equity issue is sensitive because there is a perception that insurance can be a windfall for some people and the opposite for those who lack insurance. Other insurance issues raised include the appropriateness of multiple insurance payouts after repetitive flood events; and the lost opportunity with insurance provisions limited to replacing like with like instead of intentionally designing resilience into rebuilding efforts.

Exploring the insurance issue a little further is important because of the key role it plays in building resilience. The insurance landscape is changing with increasing exposure of people living in localities exposed to hazards like flooding. In some countries, different perils are being separated into different policies (one for flood, one for fire, etc.) and insurance is withdrawn or premiums are unaffordable for high risk situations. What would happen if insurance on homes and assets in this valley becomes unaffordable / unavailable? In NZ, there is extensive insurance coverage and there is no evidence of any intention by insurance companies to withdraw or dramatically escalate premiums in the near future. There are, however, uninsured properties in the Whangaehu Village and this presents extreme hardship for those whose homes have been repeatedly flooded. Paradoxically, for those who are insured, and who are paid out after repeat flood events, there is a perverse incentive to continue to own and occupy homes given the benefit of repeat pay-outs. To compound matters further, different companies have different policies and provisions, with potential for inequitable outcomes. There are a range of insurance issues that have country-wide implications for people in high risk locations prone to repeat extreme events. The question arises of whether or not the insurance industry in NZ, including the EQC, Insurance

Council of New Zealand and insurance companies, should establish consistency in such provisions. Furthermore, a case could be made to have a policy of, for example, 'three strikes and you are out' coupled with a provision that gives the local authority first option to purchase the at-risk property to prevent transfer of the property to another purchaser.

Environmental resilience: A range of flood-related environmental concerns were raised. Flooding, albeit a natural process, can have negative impacts on already compromised ecosystems, e.g., landslides, wetland degradation, etc. Some concerns were expressed about pollutants being carried in flood waters that could pose a public health risk. Concerns were raised about respiratory problems due to silt and dust after flooding. The relationship between flood risk and other natural hazard risks was raised, e.g., lahar risk and the impact of climate change on flood risk. A number of people raised concern about the impact of upstream activities on downstream residents and their exposure to flood risk. Questions were also raised about the extent to which river management interventions could be used to manage flood risk, e.g., does clearing banks of willow trees lead to reduced flood risk? Would river works / management at the mouth assist in reducing flood risk? "We need to have the river management scheme explained to us."

Resilient governance systems: Governance refers to the way in which public decisions are made through interactions between government, civil society and the private sector. The need to have resilient governance systems and processes to address flood risk and resilience was raised directly and indirectly by many people. The starting point was to recognize that the river runs along the administrative boundary of two district councils – the RDC and WDC – and consequently it is imperative for all flood risk- and resilience-related activities to be coordinated. Otherwise, there is likely to be disjointed decision-making that could negatively impact resilience building. Resilient governance systems involve:

(a) Building shared understanding about flood risk: Credible information is key and needs to be shared by valley residents and stakeholders on an ongoing basis, with a particular focus on those new to the valley. More attention needs to be focused on integrating local knowledge into all phases of risk reduction, readiness, response and recovery. Those with local knowledge need to be consulted by local government planners, scientists, engineers, etc. because local people have vast knowledge about the flood risk. "We can't stop flooding. But we can reduce the damage caused and speed up recovery." People stressed the value of credible information about support and assistance options and what to do to help / be helped. It is essential to make this information readily accessible to all. New information that has become available since 2004, such as that provided by HRC on advanced warnings and flood modelling, is very helpful and much appreciated.

(b) Streamlining and improving flood risk reduction efforts: The main issues related to flood risk reduction were firstly, to prevent new development from taking place in areas exposed to significant flood risk. It is understood that the planning provisions do not allow people to initiate new development in exposed locations. The problem is what happens when historic development was located in places prone to flooding

– especially given that some homes have been repeatedly flooded and it is well-known that they will flood again? Concern was expressed about the inevitability of tragic loss of life resulting from people living in flood-prone localities. What options are available for relocation of such homes and even groups of people, such as the Whangaehu Village or Kauangaroa marae? Some people want to relocate. What are practical options to get assistance to relocate? Others understand the flood risk and want to stay. “Why move the church and leave the congregation at risk? Shouldn’t the congregation be moved first?” What if government were to buy out flood ravaged homes and not allow reoccupation of at-risk homes? What cost sharing arrangement might be offered? Larry Collard’s Whangaehu Garage and engineering works could and possibly should be relocated. How can the RDC and relevant authorities facilitate relocation to higher ground so that the long-standing service provided to valley residents can be continued? Can the ‘red tape’ be cut and consent fees and rates relief be provided? Is it possible to use the Regional Council’s Environmental Grant system for some actions as part of a cost sharing arrangement? What role can central government play in assisting with planned relocation? The complexity of such an undertaking is recognized. But this is not an excuse for inaction.

(c) Streamlining and improving emergency readiness and response efforts: The WDC and RDC flood-related readiness and response efforts need to be aligned and coordinated, e.g., coordinate early warnings; alerts based on information about river levels and rainfall predictions; coordinating the declaration of emergencies, where appropriate; timing of evacuations, etc. The RDC and WDC practice of declaring emergencies in anticipation of major event enables proactive and timely interventions that can be vital when region-wide impacts are being experienced and vulnerable people are at risk in remote areas. Particular attention needs to be focused on better understanding who is most vulnerable to flooding and ensure that effective evacuation plans are in place to help these people, e.g., elderly residents in exposed localities. Having ‘phone trees’ in place can help but they have to be kept up to date. Ad hoc assistance has worked up to now but can be improved upon. After 2004 floods, the response was amazing and everyone was out to help. But after the 2015 floods, many felt that they were left on their own. Guidelines about how to respond to flood events would be helpful, including information about avenues for assistance and support. Many groups were really helpful but not everyone had equal access to such support. Groups like Task Force Green played a crucial supporting role. Some ‘false promises’ were made by a local mayor after the 2004 floods that left some people in the lurch after losing everything. There is also a common perception that there is a ‘lolly scramble’ after a flood – with some people exploiting available support whilst others lose out. Information about possible support from government needs to be widely shared so those most in need are supported. Lessons learned from response efforts should be incorporated into a reinvented and updated Community Response Plans.

(d) Streamline and improve recovery efforts: The concern about sharing information about available support spills over from response into recovery. More work needs to be done on ensuring that all those impacted by flooding understand post-disaster assistance options and opportunities. Practical arrangements to support initial recovery include investigating options to secure extended credit to help farmers get back on their feet. Providing skip bins could assist with removal of flood damaged goods. What can be done to facilitate drainage of flooded fields?

Such questions do not have simple one-off answers. Capacity to cope varies significantly between different groups / people. Priority needs to be given to supporting those who need help most. Need to have support in place so that people can get back into their homes as soon as possible. 'Rural posties' play a vital role in distributing information and other vital necessities e.g., medical supplies but they can be hindered by accessibility. Experience suggests that support by RDC and WDC varies in post-disaster situations. There is a need for better communication, coordination and consistency in response and recovery. Priority needs to be given to incorporating lessons from past recovery experience into a new up-to-date post-flood recovery plan. For example, how can recovery be done in a way to build resilience for the future? What are the options for minimising future flood exposure and impacts – from raising the height of plug points to replacing gib-board with more robust panelling and even raising buildings. What can be done to support the school kids and what role can the school play in community response and recovery? People expect to be flooded again in the future – although no one wants to experience a major flood again. Living with this risk is stressful. "I worry about flooding whenever it rains for a few days." Community spirit is the key to long-term recovery and resilience. Despite the devastating impacts of flooding, there is underlying resilience which depends to a large extent on the ability of the valley community(s) to come together and support each other through difficult circumstances. Government can assist communities in building their resilience, but it is the people themselves who must recover and build resilience. A plan based on valley recovery experience should be prepared to guide future recovery efforts.

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