

Restoring our environment

Our Cyclone Gabrielle recovery journey



**HAWKES BAY**
REGIONAL COUNCIL
TE KAUNIHERA Ā-ROHE O TE MATAU-A-MĀUI

Restoring our environment
our Cyclone Gabrielle recovery journey
Hawke's Bay | Te Matau a Maui
Hawke's Bay Regional Council
12 March 2024

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Date	12.03.2024		
Version	V1.0		
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Section 1: Foreword/ He mihi

The last year has seen a phenomenal effort by so many in our communities to work positively together with the same goal – to build back Hawke’s Bay safer, smarter and more resilient.

There is no doubt that the road to recovery following Cyclone Gabrielle has been and continues to be challenging, yet it’s heartening to see and be part of our community’s effort to pull together with kindness, courage and commitment.

A disaster, the scale of Cyclone Gabrielle, brought unprecedented volumes of rain and had a significant impact on the community. Recovery from such an event will be complex, and potentially take generations.

This report tells an important story about our mahi and progress to restore the environment over the last 12 months. As the main environmental agency for Hawke’s Bay responding to this disaster, we had to be agile, work extremely hard, and stand things up very quickly. We were responsible for restoration of vital flood mitigation infrastructure, land categorisation, removal of silt and woody debris, scientific environmental impact assessments, and research and rural recovery planning.

I’m very proud of the work of the Regional Council staff who worked long hours in the initial aftermath of the cyclone, and then stood up complex and critical recovery programmes in a short timeframe – and this report shows the depth of that work.

We worked alongside the four other councils and tangata whenua in Hawke’s Bay to bring funding to the region. Central Government committed a total of \$556 million to the region, including \$203.5 million for flood mitigation work. Our immediate focus for the short term is

building back flood infrastructure in some communities, and mitigating risk in others.

The work of the last 12 months, and engagement with our communities is informing our three-year Long Term Plan, and the delivery of an almost \$250 million Flood Resilience Programme, to construct new flood protection infrastructure for Category 2 areas.

The recommendations from the Hawke’s Bay Independent Flood Review, Flood Management Scheme Reviews (Heretaunga Plains and Upper Tukituki) and NIWA’s Flood Frequency Analysis will be taken on board for future planning and design of flood schemes.

We now have a more informed view of the significant environmental effects of Gabrielle, and this data will be critical for developing a long term recovery road map. What is also critical is climate change adaptation, water security, erosion control, support of rural communities with long-term recovery and improving our region’s biodiversity.

We will continue to work with our community and treaty partners for the long-term recovery of our region. Together, with collaboration and a united vision we will recover.



Hinewai Ormsby

Hawke’s Bay Regional Council Chair

Section 2: Hawke's Bay Regional Council's role

After an event, such as Cyclone Gabrielle, one of the core functions of Hawke's Bay Regional Council (HBRC) is to provide for flood control and offer input into catchment management. Regional Council has a unique role in relation to the recovery and resilience building of the region. As the only council that serves the entirety of the region, there is a breadth of connection with communities and tāngata whenua across the whole of Hawke's Bay. The Regional Council has unique obligations under s.30 of the Resource Management Act 1991 (RMA) which requires the management of natural and physical resources in the region in order to promote the sustainable management of the environment. The environment is at the heart of everything the Regional Council undertakes.

In addition to the RMA, Regional Council has other roles and responsibilities prescribed by other legislation such as the Local Government Act, the Soil Conservation and Rivers Control Act, and Land Drainage Act, among a number of other Acts. The Regional Council functions are significant in terms of the breadth and type of activities which it encompasses; we work and engage with a number of treaty partners (PSGE's and Taiwhenua) throughout the region, and there is a duty to undertake this work to serve them and the wider Hawke's Bay community, including stakeholders and industry. This work includes but is not limited to:

- *Managing the current flood control schemes within the region. As well as, developing and implementing flood management plans, providing flood warning systems, and managing river and drainage systems within HBRC managed schemes*
- *Providing advice and support to our communities around sound environmental practices which speak directly to 'working with te taiao' underpinned by regionally relevant science and research*
- *Providing advice and support to farmers and growers on a range of issues related to environmental management, including soil and water quality, nutrient management, and sustainable land use practices, eg. erosion control. This may involve working with individual farmers or growers or with groups such as catchment groups, farming associations and industry bodies*
- *Planning for climate change adaptation and mitigation. Adaptation involves adaptive measures such as managed retreat or seawalls, while mitigation aims to reduce emissions to slow climate change. Successful combination of these strategies can improve our interaction with nature and provide for a resilient environment that supports human well-being*
- *Engaging with the community and providing education and information on environmental issues and risks. It includes working with schools and other organisations to promote environmental awareness and sustainability.*
- *Transport planning and funding within the region. Regional Council works closely with Waka Kotahi - New Zealand Transport Agency (NZTA) and other stakeholders to develop and implement transport strategies and plans that reflect the needs and priorities of their region. They are also responsible for the provision of public transport*
- *Working with local businesses and communities to support sustainable economic development within their region. This may include providing funding, advice and support to businesses, investing in infrastructure and facilities, and promoting tourism and other economic activities*
- *Regulate and manage the sustainable use of resources across Hawke's Bay and respond to pollution incidents to minimise the impact on our environment.*

Section 3: Regional Recovery Framework

A locally led and regionally coordinated approach to recovery was taken by all five Hawke's Bay councils (Wairoa District Council, Hastings District Council, Napier City Council, Central Hawke's Bay District Council, and the Hawke's Bay Regional Council). A Regional Recovery Working Group was formed by councils and key partners and facilitated by the Regional Recovery Agency (RRA).

The RRA is a government-funded agency that was established by the Matariki Governance Group to coordinate Hawke's Bay's planning and recovery between councils, Iwi leaders and Government. The Recovery Working Group meets regularly to plan and align recovery activities, make collective decisions, determine new processes and policy, share key information, but most importantly deliver consistent information and messaging on recovery matters to the community.

HBRC established a small Recovery Team to interface between the Regional Recovery Working Group and internal teams to coordinate recovery activity. This team worked to keep internal teams informed and connected to region-wide recovery planning, and to provide oversight to the Cyclone Recovery Committee.

A Regional Recovery Framework for Hawke's Bay (see Appendix 1) was set by the RRA. This was made up of six pou (pillars or regional recovery workstreams); Environmental Resilience, Economic Growth, Whanau/Community Wellbeing, Primary Sector, Resilient Infrastructure and Resilient Transition. As the council responsible for environmental protection the Regional Council was appointed as the Environmental Resilience Pou lead and key stakeholder of the Resilient Infrastructure and Primary Sector Pou. This led to the development of the Environmental

Resilience Plan (April 2023). Other councils and partnering agencies were required to produce Locality Plans. The purpose of these plans was to outline immediate recovery needs and priorities, costs of recovery initiatives, and how this short-term recovery work would be delivered. These plans were developed at pace within the first month of the recovery phase. They were also used to signal to the Government the scale of Cyclone Gabrielle's impact on Hawke's Bay and what financial support was needed for the region's immediate recovery.

Hawke's Bay Regional Council's immediate recovery priorities included:

- Rapid rebuild and repair of the region's stopbank network and drainage schemes
- Supporting the removal and disposal of silt and debris
- Assessing the impact that the cyclone had on the region's natural environment and collecting vital scientific data
- Quantifying land damage caused by flood waters, landslips, erosion, and silt
- Ground truthing the impact on biodiversity ecosystems and biosecurity risks
- Repairing telemetric sites and equipment that was damaged to restore environmental monitoring
- Understanding the impact on rural communities and businesses
- Working with central government to obtain regulatory relief for impacted communities to allow them to undertake works quickly, to recover from the impacts of the cyclone, eg. Orders in Council
- Scaling up the organisation's Asset Management team to deliver large-scale/ high-value flood mitigation infrastructure projects
- Administering the Hawke's Bay Disaster Relief Trust, and commercial debris funding used to support impacted individuals and entities across Hawke's Bay.

Government’s role

In response to the North Island’s extreme weather events a Cyclone Recovery Unit (CRU) was established in March 2023 to support locally led recovery efforts in Auckland (Tāmaki Makaurau), Gisborne (Tairāwhiti), and Hawke’s Bay (Te Matau-a-Māui). The CRU leads, coordinates, and monitors recovery of these events across government. They are also responsible for leading engagement and consultation directly with Māori. The CRU reported to the Cyclone Recovery Taskforce, who have since been wound down. The Taskforce was responsible for overseeing each region’s recovery plans, connecting this to the work of government and private sector, and reporting into the Extreme Weather Recovery Cabinet Committee.

A general election was held on 14 October 2023, the outcome of which resulted in a change in Government. The impact of this change on the programme for recovery in Hawke’s Bay is not yet known. The new Emergency Management and Recovery Minister has visited the region to meet with mayors and leaders to understand what Government support is still needed. The RRA continue to lead regional recovery discussions with Government and will be submitting a new business case for Budget 2024.

Land categorisation framework and FOSAL programme

On 1 May 2023, the Government announced a risk categorisation framework (the Framework), as part of the Future Of Severely Affected Locations (FOSAL) programme. This framework was then used by HBRC to lead the Land Categorisation Process for Hawke’s Bay. The Framework outlines three categories (low risk, managed risk, high risk) under which properties in affected areas were to be assessed for future flood and landslide risks by local councils. This was used to guide policy

considerations, and to support consistent decision-making across local and central government. (See Appendix 2 for [FOSAL process](#) guide published by the Cyclone Recovery Unit in July 2023).

Risk categories and definitions used by Hawke’s Bay councils:

Category	Definition	Examples
1	Repair [dwelling] to previous state is all that is required to manage future severe weather event risk	Minor flood damage to repair but no need for significant redesign/retrofitting
2C*	The outcome of quality assurance of existing stopbank rebuilds may see the categorisation change to a 1 (category specific to Hawke’s Bay only)	As above
2C	Community level interventions are effective in managing future severe weather event risk	Local government repairs and enhances flood protection schemes to adequately manage the risk of future flooding events in the face of climate change effects
2P	Property level interventions are needed to manage future severe weather event risk, including in tandem with community level interventions	Property specific measures are necessary e.g., improved drainage, raising houses are necessary. Benefits accrue to property owners, but some may face affordability issues
2A	Potential to fall within 2C/2P/3 but significant further assessment required	Interventions may be required / possible but insufficient information to provide initial categorisation (these may subsequently move between "2" categories or to categories 1 / 3)
3	Future severe weather event risk cannot be sufficiently mitigated. In some cases, some current land uses may remain acceptable, while for others there is an intolerable risk of injury or death	In the face of enhanced climate risks, the property may face unacceptable risk of future flooding. Other property could be subject to unstable land that poses an ongoing risk

Hawke's Bay Civil Defence Emergency Management Group

Hawke's Bay Civil Defence Emergency Management (HBCDEM) Group is the regional Civil Defence Emergency Management system that is part of a three-tier Emergency Management framework in New Zealand – national, regional and local.

The Group works under the guidance of National Emergency Management Agency (NEMA), who leads or supports response and recovery phases from a national level following a natural emergency event. NEMA are also responsible for providing strategic leadership on risk reduction, readiness, response, and recovery activities, and for building capacity and capability in the use of national emergency management systems.

The HBCDEM Group works in partnership as a joint effort with all five Hawkes Bay councils, emergency services, and key organisations. Their role is to lead the coordination of these agencies in response to disasters. They do this by identifying and understanding risks and hazards, providing training to local councils and partners on emergency management responses, coordinating the response, and prepare Group plans that support risk and hazard management for the region.

All Hawke's Bay councils are responsible for planning and providing for civil defence within their district and ensuring it can operate independently during and after an emergency. They do this by actively supporting HBCDEM Group, deploying staff to assist the Group in an emergency, having an Incident Team that can be stood up to ensure their critical infrastructure is operational as soon as possible, developing

Business Continuity Plans, and delivering welfare support to their communities during and after an event.

Under the Civil Defence Emergency Management Act 2002 the local authorities within a region are required to form a Civil Defence Emergency Management Group as a joint standing committee. The Joint Standing Committee represents Hawke's Bay Regional Council, Napier City Council, Hastings District Council, Wairoa District Council and Central Hawke's Bay, as well as advisory members from Ngāti Kahungunu iwi and PSGE delegates.

The Standing Joint Committee meet regularly for national and scientific updates, and to make joint decisions on HBCDEM Group's work planning, risk and hazard management, regional recovery, district planning needs and preparedness for future events.

They are supported by the Coordinating Executives Group (Council CEOs, emergency service heads and other governmental agencies) who manage the implementation of agreed work programmes.

The Hawke's Bay Regional Council is the administrating authority for the Group and as such employs the staff in the CDEM Group office on behalf of the Group.

Section 4: Restoring our environment

The concept of building resilience into both our environment and communities is at the core of the recovery facing Hawke's Bay. Building back or restoring to how things were prior to the arrival of Cyclone Gabrielle would be foolhardy in the face of climate change and the significant increase in severe weather events that we have seen in the last few years.

A year on, we are now in a better position to recount the devastating affects Cyclone Gabrielle had on Hawke's Bay. This document follows on from the Environmental Resilience Plan that was created at the beginning of the recovery phase, but this document is a report not a plan. It is a report designed to summarise what we know of the event and provide a record of the short to medium-term work carried out by HBRC during the Recovery phase. This includes land categorisation, restoration of vital flood protection infrastructure, removal of silt and woody debris, scientific environmental impact assessments and research, rural recovery planning, Crown funding negotiations, and our Council's role in regional recovery.

This report aims to reconcile the recovery priorities outlined in the Environmental Resilience Plan to highlight what immediate recovery initiatives obtained funding. While the Environmental Resilience Plan outlined all the recovery work HBRC considered to be priorities just under 40% of these recovery initiatives received full or partial funding.

The Environmental Resilience Plan was developed in April 2023. This, along with District Council's Locality Plans and community-developed plans, were designed under the Regional Recovery Framework and used to inform the

first Regional Recovery Plan and accompanying Action Plan. This was brought together by the RRA, who used Council's initial plans to signal to Government the scale of the impact Cyclone Gabrielle had on Hawke's Bay and highlight the region's immediate recovery priorities and funding needs.

The original intent for this document was that it would be a 2nd edition of the Environmental Resilience Plan, and that engagement with mana whenua and communities would be sought. This was to understand what environmental resilience means to the people of Hawke's Bay. However, changes in requirements from the RRA meant this was no longer needed.

The intent of this document is to:

- Summarise what is known about the cyclone impact on the region's environment
- Document the work carried out during the early recovery phase
- Reconcile the workstreams and funding requirements identified in the Environmental Resilience Plan with actual funding received to date
- Inform future regional planning and Long-Term Plan priority setting
- Steer conversations on what Hawke's Bay needs, to build environmental resilience against the effects of climate change and natural hazards.

For a more detailed analysis of the impact of Cyclone Gabrielle please refer to the reports and scientific papers listed at the end of this document.

Under the Severe Weather Emergency Legislation Act 2023 (SWERL Act), HBRC was granted temporary changes in the statutory requirement to produce a 10-year Long Term Plan (LTP). Instead, a 3-year LTP was permitted. This will be used as a bridging plan to transition the organisation from recovery back to business as usual (BAU) that will then manage long-term recovery priorities.

How this document was prepared

This document includes high-level summaries of HBRC’s operational recovery work, and scientific ground truthing research during the first year of recovery. These accounts help build a picture of the recovery challenges facing the region, the scale of work that lies ahead, and the region’s long-term recovery and environmental resilience priorities. For further detail into key topics or studies please see links in the Resource section (p78).

This document was prepared by HBRC’s Recovery Team, who worked closely with internal teams to review and update the information presented in the Environmental Resilience Plan relevant to this report. It also provides insights into the Regional Council’s responsibilities for regional recovery.

Engagement for this document was not sought. This decision was made following the change in the requirement to submit a 2nd edition of the Environmental Resilience Plan to the RRA. The scope of this document was therefore changed to focus on documenting the impact of Cyclone Gabrielle from an HBRC perspective, key recovery work that was carried out, and what financial support was received.

Iwi and Māori entities continue to work directly with Central Government’s Cyclone Recovery Unit (CRU) on the Kaupapa Māori Pathway (see Appendix 3), due to the complexities of land categorisation on Māori land and their obligations to meet Te Tiriti o Waitangi and its principles. HBRC have been working closely with our iwi partners through our Māori Partnerships team and the Te Kupenga Forum, who are Māori relationship holders from across Hawke’s Bay.

Preliminary feedback on what environmental resilience means to the community was captured through a Social Pinpoint campaign run by HBRC based on the Environmental Resilience Plan. Social Pinpoint is a map-based

app that allows the public to drop a pin on their area and provide feedback on key environmental topics on how we can build resilience in these areas. Eighty responses were received during the campaign that ran from October until the end of November 2023. Figure 1 shows key words and topics that represent what environmental resilience means to community members who participated in the survey. Biodiversity, sustainable land use, water and flood protection received the highest percentage of comments, followed by community, transport, climate change and coastal hazards. (see survey chart in Appendix 4).



Figure 1: Word cloud of feedback on what environmental resilience means to the community

Further community feedback on the topic of environmental resilience was not pursued. This was to acknowledge the different stages of recovery impacted communities of Hawke's Bay were at. Communities will be able to have their say on medium to longer-term recovery planning when consultation and engagement begins for the next LTP, and subsequent plans.

Section 5: Summary of how Cyclone Gabrielle impacted Hawke's Bay

Cyclone Gabrielle was one of the worst weather events to ever hit Hawke's Bay. Rainfall figures reached 546mm during the storm with intensities of 56mm per hour; most of which was delivered within the first 12-24 hours. Data indicates this was the largest rainfall event ever recorded monitoring sites across the region; exceeding Cyclone Bola in 1988.

The region's river management network became overwhelmed with the deluge. This staggering volume of water was more than the system was designed and constructed to manage. This caused significant damage to the stopbank infrastructure, properties, lifelines, businesses, crops, and ecosystems. Tragically 11 people lost their lives in the floods.

Landslides from hill country erosion was extensive, with over 300,000 slips estimated along the East Coast of the North Island. On average, each landslide was found to contain 1,000 tonnes of soil (see summary map in Appendix 5). Hill country in Northern Hawke's Bay was found to be the worst-affected area compared to other landslide zones, with the highest record of landslide scars and debris tails.

In the Rapid Assessment of Land Damage (July 2023) report by Manaaki Whenua Landcare Research it was estimated that 300 million tonnes of sediment was deposited in the floodplains from landslips. In the Esk Valley alone, 5.7 million tonnes of silt from soil erosion was estimated.

Productive soils and woody vegetation were stripped from hillsides and plains. Healthy soil is an essential ingredient for resilient ecosystems and land restoration. Recovering from such large-scale loss will take generations. Remaining silt build-up on land poses new threats from

future flooding and dust; making this one of the region's biggest challenges in terms of long-term recovery.

The seabed along the coastline was blanketed with sediment and woody debris that was flushed out to sea; smothering marine ecosystems underneath. Woody debris choked the estuaries and banked up the beaches. Coastal marine life as well as local fisheries were badly affected.

Efforts to improve the region's freshwater and biodiversity outcomes have been set back with much existing protection work lost to cyclone damage. Considerable amounts of riparian margin plantings and fencing - used to control pollution, exclude stock from waterways, and keep pest animals out of protected areas - were destroyed. Thus, increasing the risk to already chronically or acutely threatened ecosystems.

The roading network was severely impacted, especially in rural parts. Many bridges and culverts were destroyed or damaged (See Appendix 6). Landslides buried roads and caused dropouts leading to many sections of the State Highway system to close temporarily. Many communities were isolated for months until temporary bailey bridges were installed.

Research and engagement revealed significant physical, financial, emotional losses by farmers, growers, and landowners in rural areas. Losses included production planting, pastoral fencing, water and irrigation systems, tracks, stock, feed and crops. Severe damage to access, land, and infrastructure was also widespread. Approximately \$1.7b worth of damage to crops and loss of ability to produce during 2023 was reported.

The overall cost of recovery for the region was reported as reaching \$4.918b, when combining all the regional recovery initiatives across councils and Mana Whenua groups. The effects of this event have been significant and widespread and will be felt across Hawke's Bay and its communities for many years to come.



Wairoa and Northern

Section 6: Recovery in our catchments

Wairoa and Northern

The Wairoa and Northern Catchments are the largest in the Hawke's Bay region and home to many natural features including rivers, beaches, estuaries, lakes, and coastal lagoons. Indigenous vegetation is also a dominant land cover in the catchments with large areas of native forest in Te Urewera and surrounding ranges.

Cyclone Gabrielle's Impacts

Major flooding occurred when the Wairoa River and numerous tributaries overtopped their banks after receiving over 500mm of rainfall within 12 hours. This caused residential areas to flood and resulted in rural communities becoming cut off.

The area of North Clyde in the Wairoa township and semi-rural areas of Waihirere and Ruataniwha were worst affected. Extensive flooding was also recorded in Awamate, Frasertown, Whakakī, Nuhaka, and Mahia, alongside significant damage to the landscape due to erosion and landslips.

Many forms of land-based industry were impacted by the cyclone, including horticulture, cropping, dairy, sheep and beef, and forestry. Rural landowners experienced limited access both to and within their properties due to rural roads and farm tracks being washed out or impacted by slips.

Over a 100 million tonnes of silt deposition was estimated in Wairoa. Initial assessments show that the Wairoa River alone lost over 100,000 cubic meters of riverbank. An estimated 12,000 tonnes of woody debris stockpiled on the beaches and reserves.

Infrastructure such as roading suffered major damage. At the peak of the event there were up to 30 roads closed isolating whanau, communities, and access to services. Wairoa was effectively cut off from the rest of Hawke's Bay to the south and Gisborne to the north. It was 3 months before the roads fully opened again. Power, communication, and other utilities experienced lifeline failures.

The main concerns for the community are with regards to the resilience of the roading network. State Highway 2 is repeatedly impacted by weather events, isolating the community both from the north and south.

The impact of plantation forestry in the area was investigated through a Ministerial Inquiry into Land Uses (May 2023) associated with the mobilisation of woody debris and sediment-related damage in Gisborne and Wairoa Districts in March and April 2023. The panel published many recommendations which can be found in the report (see Inquiry report in the Resources section below, p78).

Areas of Wairoa township were provisionally categorised 2A in June 2023, affecting 627 properties. WSP was appointed as the engineering pod for the Wairoa category 2A area. The tripartite group, consisting of Wairoa District Council, Tātau Tātau, and HBRC, are working with the community to find a suitable flood mitigation solution that will provide protection to the impacted community. A total of \$70m for flood mitigation in Wairoa was obtained from the Government through the Crown funding negotiations.



Mohaka

Mohaka

The Mohaka catchment includes the Mohaka and Waihua River catchments. The Mohaka River rises in the Kaimanawa Ranges, is bound by the Kaweka and Maungaharuru Ranges to the south and east and flows into Hawke's Bay near the Mohaka settlement. The Waihua is a smaller catchment to the north.

Indigenous forest covers about half of the catchment, along with exotic plantation forestry, manuka/shrubland and exotic grasslands. There are some natural wetlands in forested areas.

There are no towns in the catchment – rather, small rural communities at Taharua, Puketitiri, Te Hāroto, Te Pōhue, Kotemaori, Raupunga and Mohaka. State Highways 2 and 5 bisect the area, connecting Hastings and Napier with Wairoa and Gisborne to the north, and Taupo and Waikato to the west. Pre-cyclone, a recently re-established coastal railway connected Wairoa to Napier and its port.

The main productive land uses are plantation forestry, and sheep and beef pastoral activities. There is a significant area of dairying in the Taharua catchment and orchards near the coast.

Cyclone Gabrielle's Impacts

Approximately 250mm of rain fell during the event at the eastern sites but lesser amounts in the west, with half the rainfall delivered in 12 hours.

This triggered widespread slips which devastated State Highways 2 and 5, as well as the local roading network. There were 32 damaged sites along State Highway 5, ranging from minor dropouts to significant underslips and washouts. State Highway 2 sustained significant damage at the Devil's Elbow south of Tūtira and at the Waikare Gorge, cutting off lower Mohaka communities from the south, while smaller slips isolated them from Wairoa in the north. Communities were not only physically isolated, but they also suffered prolonged power and communication outages.

Fortunately, the vast forest cover in the catchment limited Cyclone Gabrielle's impact on the natural environment. There was also limited damage to people's homes in the catchment, though there has been extensive pasture loss through slips, erosion and silt deposition. Many farms had limited access to and within their properties due to farm tracks being cut off or washed away. Fences and other farming infrastructure was also damaged, with some suffering livestock losses and loss of feed.

The lower parts of the Mohaka River historically experience poor river health due to high sediment and woody debris levels affecting the ecology, freshwater quality, clarity, and recreational qualities. These issues were exacerbated by the excessive levels of sediment and debris deposition from slips and erosion from Cyclone Gabrielle. Forestry slash from harvesting operations and other woody debris washed through the river accumulating near the river mouth and along the beach. There was also widespread loss of indigenous vegetation and riparian margin plantings protecting the river from livestock contamination.



Esk and Tangoio

Esk and Tangoio

The Esk and Tangoio catchments are the smallest of the six catchments in Hawke's Bay made up of two parts; the Esk Valley which is the northern gateway to the region and Lake Tūtira and surrounds including Tangoio. The major rivers in the catchment include the Waikare, Aropaoanui (Arapawanui), Te Ngarue and Esk running from the Maungaharuru ranges out to the coast.

Eskdale is situated north of Hastings and Napier, slightly inland from the coastal communities of Whirinaki and Bay View, with the critical route of State Highway 5 (Napier-Taupo Road) going through the Esk Valley.

The catchments are prone to flash flooding which has been evidenced by several significant events in the catchment including the 1938 floods and Cyclone Bola in 1988.

Cyclone Gabrielle's Impacts

The Esk catchment recorded the highest measure of all the region's rainfall sites. A recording of 546mm was captured at the Glengarry monitoring site in the early morning of 14 February. This equated to roughly half a year's worth of rain in less than 24 hours. Almost 400mm fell in 12 hours and the area was drilled by a maximum intensity of 56mm/hr.

The Esk River rose at an extraordinary pace during the cyclone with the volume of water causing the river to breach its banks. Esk Valley, Tangoio and Aropaoanui were particularly hard hit. Flood waters rose quickly and were described as a "tsunami of water" with many residents evacuated from their homes during the night as the floodwaters continued to rise.

The community was severely impacted, and many either completely lost or experienced significant damage to their homes and livelihoods. Communities experienced power and communications outages, and road connections to the north and west were cut off.

Once flood waters receded, silt deposits of up to 2 metres across the valley floor became visible. Amongst the silt was wooden debris and other debris picked up by the flood waters.

A number of key infrastructures were significantly affected including the two schools in the catchment (Eskdale School and Hukarere Girls College), wineries, the local campground, luxury accommodation and wedding venues, and the historic church. Tangoio Marae experienced significant devastation. The industrial area around the Pan Pac Forest Products site at Whirinaki was also severely affected, including facilities owned by Trust Power and Contact Energy.

Cyclone Gabrielle caused catastrophic damage to the local horticulture sector when millions of tonnes of silt were deposited throughout the valley. This resulted in a complete loss of field crops, orchards, and the potential for long-term production loss.

Damage extended to local farms, which lost livestock, fencing, forestry, riparian and erosion plantings, sheep and cattle yards, water supplies (including dams) and pasture from widespread landslips. Roads, culverts and bridges were also severely damaged.

Many Esk and Tangoio properties were confirmed as Category 3 during the Land Categorisation risk assessment process. Over 60 properties with dwellings in Category 3 were deemed no longer safe to live in, resulting in many residents needing to leave their homes to find safer places to live.



Heretaunga/ Hastings

Heretaunga/ Hastings

The Heretaunga plains are home to the Tūtaekurī, Ngaruroro and Karamū rivers, and the Karamū stream that flow from the Kaweka and upper Ruahine ranges through the Heretaunga Plains, merging just before they enter the sea near Clive. These waterways are intricately connected to the large Heretaunga Plains aquifer, which supplies water to both Hastings and Napier, and supports the local economy.

This catchment is the economic engine of Hawke's Bay, containing thousands of hectares of highly productive farms, orchards and vineyards, and home to 49% of the region's population. Land use is predominately dry stock (sheep and beef) farming in the upper catchment and a mixture of horticulture (apples, stonefruit, vegetables), with urban development in the lower catchment. The Heretaunga Plains is one of New Zealand's most productive horticultural areas due to the rich alluvial soils.

Urban land use in this catchment encompasses a range of industries, transport, flood protection and service infrastructure. Regional Council-owned flood defences (stopbanks) along the main rivers provide flood protection as well as recreational opportunities in the river corridors, including walking and cycle tracks.

Cyclone Gabrielle's Impacts

Being one of the larger catchments covering the Tūtaekurī, Ngaruroro and Karamū rivers the impacts from flooding to the Heretaunga plains were diverse and widespread. Stopbanks were overtopped and breached by floodwater, causing extensive flood damage to many communities.

Water levels recorded on the Irongate and Karamu streams rose to new highs caused by rainfall levels reaching up to 450mm in the western ranges of this catchment during the course of the event. The heaviest downpours brought peak intensities of 45mm/h at some monitoring sites.

Many properties, marae, businesses, orchards, farms, and key infrastructure were submerged. This left unprecedented amounts of silt deposits from landslips and erosion that had been washed down into the waterways; covering vast areas of the Heretaunga Plains and throughout the Tūtaekurī and Ngaruroro valleys. Damage to bridges caused significant impact to the roading and transport network, in particular for rural communities.

The rural farming community suffered significant damage to farmland. Many rural communities became isolated from damage to the roading network, cutting off their access to town centres, and loss of communications. Damage to land, loss of stock and fencing, combined with the extended duration of limited or no access for farmers to move stock caused immense stress and financial hardship.

Pakowhai, Twyford, Ōmāhu, Waiohiki, and Puketapu were some of the worst impacted communities in these catchments, with many residents needing to be rescued or evacuated. All of these communities were included in the FOSAL land categorisation process, with 57 property owners in Pakowhai and 1 in Ōmāhu placed into Category 3, and the others in Categories 2A or 2C. Many in 2C were later released to Category 1, while the others need to wait for a new flood protection infrastructure solution to be agreed before this can happen.



Ahuriri/ Napier

Ahuriri/ Napier

The Ahuriri catchment includes the Te Whanganui-a-Orotū (Ahuriri Estuary), which is a significant conservation area with an abundance of wildlife and high ecological value.

Napier is the region's second largest district with a population of approximately 66,880, making up 36.6% of the region's overall population. The city covers 10,270 hectares of which approximately a third is urban land use and the rest is rural. Sheep and cattle grazing is predominant in the rural pastoral hill country, whereas vineyards and crops are grown in the productive plains; many areas sharing boundaries with the Heretaunga catchment.

Napier geographically is an island, dependant on the airport, port, and roading and rail networks that run through the Hastings District - State Highway 2 running north to south, State Highway 5 running east to northwest, and the railway connecting the region to the south.

The road from Napier to Taupo suffered severe damage during the 1897 Easter Friday Floods and saw every bridge being swept away. There was significant loss of stock, and thousands of acres of pastoral land rendered unfit for use for many months afterwards. More recently, in 2020, Napier city experienced significant flooding, when the district had nine days of flooding, displacing 150 people from their homes.

Cyclone Gabrielle's Impacts

Gabrielle delivered approximately 320mm of rain within the first 24 hours to the western hills of the Ahuriri catchment near Puketapu, which is about one-third of the usual annual rainfall. Stopbanks were overtopped and then breached by floodwater, caused partly by the build-up of debris at structures such as bridges along both the Ngaruroro and Tūtaekurī Rivers.

Napier city became completely isolated after surrounding roads were cut-off and bridges were severely damaged, including the Redclyffe, Brookfields and Puketapu bridges that connects Napier to Hastings. The Waitangi Rail Bridge was completely destroyed. This cut off the rail links between Napier Port and Hastings and Palmerston North for several months. The Ngaruroro and Clive bridges connecting Napier to Clive were the only bridges to withstand the cyclone allowing restricted access after a number of safety checks and strengthening repairs were carried out.

Communities surrounding Napier experienced flood inundation. Many homes in Te Awa, Meeanee, Taradale, and Bay View were severely impacted. The industrial area of Awatoto was completely submerged. This included the Napier wastewater plant, Ravensdown fertilizer plant, animal rendering, and wool scourers that put neighbouring communities on high alert from contaminated floodwater.

Rural areas experienced substantial loss to crops, vineyards, orchards, animals, infrastructure and production, with much land being covered in silt and debris. Woody debris also covered the Napier coastline beaches.

Twenty three properties of Napier were severely affected leading 14 of them to be placed into Category 3 during the FOSAL land categorisation process. Many others were placed in Category 2C* and later released to Category 1 once stopbank and pump station repairs were complete.



Tūkituki

Tukituki

The Tukituki Catchment extends from the Ruahine and Wakarara Ranges, across the Ruataniwha Plains and then northwards between the 8 and Silver Ranges before finally reaching Haumoana. The Hawea Stream forms the boundary between Hastings District, to the north, and Central Hawke's Bay District, to the south. The Ruataniwha Aquifer lies beneath the plains, and the Papanui Aquifer near Ōtāne.

Pastoral farming is the dominant land use of this catchment, with more intensive farming and cropping occurring on the plains. The Tukituki River is an important source of water to farmers and orchardists across the catchment. The lower river and estuary have high wildlife values and is an outstanding water body.

The Upper Tukituki Flood Protection Scheme features a series of stopbanks, mainly along the Tukituki and Waipawa rivers, providing protection designed to a 1:100 - year standard to farmland and the townships of Waipukurau and Waipawa.

Cyclone Gabrielle's Impacts

Flood protection works along parts of the Waipawa River and a tributary, the Mangaonuku Stream were breached or weakened. Notably, part of the Waipawa township and parts of Waipukurau's industrial land were flooded, with some properties provisionally categorised as 2C in the FOSAL land categorisation assessment, but later released to Category 1.

The Waipawa River cut through at Walker Road to its old riverbed, joining with the Papanui Stream before discharging back into the Tukituki River by Middle Road. The Waipawa/Ōtāne and Waipukurau wastewater

treatment plants were both extensively damaged and damage to water treatment facilities resulted in severe shortages of potable water across all three towns. Waipawa was on a 'boil water' notice for over one month. Railway abutments at Waipawa were damaged when parts of the town flooded. There was also extensive gravel movement and deposition changing normal river channels.

Extensive flooding of farmland occurred around Ōtāne and there was localised flooding through river valleys including Tamumu, Elsthorpe, and Mangaorapa. Extensive hill country slipping took out fences, bridges, yards, sheds, feed and crops, destroying the functioning of hundreds of farming businesses. Tukituki cycle trails were also damaged.

The rural community was fragmented into many pockets with 110 sections of roads closed across all of Central Hawke's Bay District. Within three months post-cyclone most road access had been restored

The down-river catchment falls within the Southern Zone of Hastings District Council's Locality Plan. While less adversely impacted than other parts of that zone, this area still sustained damage. Notably, the failure of telecommunication systems on Kahuranaki resulted in widespread outages across the region, including of the water monitoring systems. The wastewater treatment plant at East Clive (between Te Awa o Mokotūāraro and the Tukituki River mouths) was affected by loss of power.

Community feedback obtained during community meetings held by Central Hawke's Bay District Council since the Cyclone has reiterated that the main issues of concern for this part of the region are ongoing river management, gravel extraction and management of Chilean needle grass.



Pōrangahau and Southern Coast

Pōrangahau and Southern Coast

From Cape Kidnappers on the Southern Coastline to the township of Pōrangahau in Central Hawkes Bay, this catchment covers 1,359 km² of land. It includes the Pōrangahau River and number of smaller streams including the Huatokitoki, Mangawhero, Mangaorapa and Mangamaire.

Pōrangahau is made up of both hill country and low-lying plains. The land is used extensively for pastoral sheep and beef farming, forestry and cropping. This part of the catchment is subject to drought and flooding which will increase with climate change, the fertile land is also prone to soil erosion.

The Southern Coast part of the catchment features Cape Kidnappers; an 8km peninsula that is home to a colony of gannets. It also includes some of Hawke's Bay's most-visited beaches; Ocean Beach and Waimarama Beach. This part of the catchment is subject to intense winds and rain from the exposure to the Pacific that causes coastal and hill country erosion. This subsequently affects water quality of the Pōrangahau River and estuary.

The Pōrangahau has the largest estuary in Hawke's Bay that spans almost 14kms. Rare fish species inhabit the estuary, including whitebait, muller, kahawai and flounder, which is why it is classified as an outstanding fishery.

Cyclone Gabrielle's Impacts

Flash flooding during the cyclone caused the Pōrangahau River to burst its banks causing widespread flooding to the township of Pōrangahau. This caused significant damage to properties and homes and led to many evacuations, as water levels rose. Both Pōrangahau and Mangaorapa rivers recorded record high levels.

Thirty-three homes were yellow stickered during Building Authority inspections. Community facilities, the Rongomaraeroa Marae and Waipuna Urupa (burial site) were also badly flooded. The Rongomaraeroa Marae still remains closed.

Landslips blocked roads and temporarily isolated the community. This was further compounded with loss of power and communications, and a failure in the drinking water system, putting the community on a boil notice.

Following the FOSAL Land Categorisation Process 138 properties in Pōrangahau were categorised as 2A. A new flood protection scheme to mitigate the risk from future flood events and protections from the Pōrangahau river is being investigated, and community engagement is underway.



Section 7: Regional Council-led recovery work

The below outlines the immediate recovery actions that were undertaken by HBRC in the first year post-cyclone. This is referred to as the **'restoration phase'** in the Regional Recovery Plan. The priorities were to reinstate key infrastructure, assess the impact of Cyclone Gabrielle to the environment and communities, as well as support Hawke's Bay's regional recovery efforts by taking on extra administrative and partnership roles.

Rapid rebuild of Hawke's Bay's stopbank network

Immediately after the cyclone HBRC formed a Rapid Rebuild team that involved local contractors and consultants to urgently repair stopbanks that had been breached or weakened. Approximately 6km of stopbanks across the 248km stopbank network were breached; a total of 30 breaches and 28km weakened. This extraordinary delivery of capital works that would typically take years to design, plan and execute saw repairs completed in the Heretaunga/Hastings within 4 months, and 99% of repairs to the network completed within 8 months (see recovery timeline on p39).

Before repairs took place, bunding (gravel banks) and waterproof plastic wrap was put in place around breaches to give temporary protection. Repairs then got underway to restore the stopbank back to pre-cyclone Levels of Service. Additional work to repair scours was also undertaken to add further resilience to the stopbanks. All stopbanks were returned to previous levels of service; Annual Exceedance Probability (AEP), which in most cases is a 1% (1:100) flood probability average, with the exception of Taradale stopbank which had been upgraded to a 0.2% (1:500-year) flood probability average in 2022.

Pump stations and drainage systems repairs

Quickly restoring flood affected pump stations across the network was a high priority. Drain and culvert cleaning was also carried out across the region, with many drains needing to be dug out multiple times due to the continuation of silt being washed back into them with the ongoing spells of heavy rain. Regional Council carried out flyovers to monitor the network and identify areas where silt near drain edges could be seeded, to stabilise them. Further to this, a review of the worst affected pump stations (Pakowhai, Mission and Brookfields) was undertaken to understand what repairs or upgrades were needed.

Restoring the telemetry network

Restoring the telemetry and communication networks damaged during the cyclone was critical to get sites that monitor rainfall and river levels back up and running quickly. The system was operational by 18 February 2023. The Environmental Monitoring team carried out site surveys, assessed access to compromised sites, and determined what new flood monitoring equipment and systems are needed to increase flood resilience. Two independent reviews were also carried out. Funding for network upgrades worth \$5m was agreed as part of the Crown cost-share agreement.

Environmental monitoring is a key function of the Regional Council. Its purpose is to measure and monitor the state of the environment to ensure it is healthy and safe. The data is analysed and used to monitor changes in the environment that may affect the region's biodiversity or threaten human or animal health. Environmental data is used for planning and mitigating risks, such as flooding. Rainfall, river levels and flows, low flows, groundwater, air quality, climate, and marine ecosystems are all monitored regularly.

Solid waste management (silt and mixed waste)

The Regional Council identified six separate types of waste streams that were generated as a consequence of the floods. They were silt, woody debris, posts and wire, animal (livestock) carcass, hazardous materials/contaminated silt, and chemical waste. All of which had to be retrieved and carefully disposed of to reduce risk to the community and environment.

By March 2023, HBRC together with Hastings District Council (HDC) set up a Silt Recovery Taskforce to manage sediment and debris collection. This was led by HBRC but was a cooperative effort across councils, who were all allocated funding for silt and debris removal. The Silt Taskforce developed a system with six zones across rural Hawke's Bay. Each zone had dedicated contractors to collect silt stockpiled from orchards, farms, roads and residential and commercial properties. Several sites for sediment and debris deposition and processing were operational (4 for silt cleaning, 2 for separating mixed waste, and 2 for woody debris).

Over the course of a year, the Silt Recovery Taskforce managed the collection of an estimated 3.26 million tonnes of silt from private and commercial properties, allowing many growers and farmers to get operations back up and running, and helping communities clean up their land and move forward in their recovery. As of December 2023, an estimated 1.2 million tonnes of uncollected silt waste still remaining on Hawke's Bay land.

At the cleaning sites silt was processed to separate mixed waste and tested for contamination. Clean silt could then be returned to the whenua for landowners to reintegrate into their land. Mixed waste, such as, horticulture fabric, rubber, metal, tanalised timber, concrete and wood was sorted and sent to various recycling plants across New Zealand to reduce the amount of waste going to landfills.

In June 2023 an Order in Council (OIC) was issued under the Severe Weather Emergency Legislation Act 2023 (SWERLA) to temporarily allow outdoor burning from 5 July until 1 November 2023 of items of waste usually prohibited by regional rules and National Environmental Standards for air quality, outside of the local airsheds. This consisted mainly of woody debris where landowners had made concerted efforts to remove contaminants such as plastics and mixed waste. However, this was not always possible due to the complex nature of the waste piles generated by the flood waters. Regional Council supported the OIC by providing landowners with fire management plans and a list of prohibited items excluded from the OIC. Soil testing was also required to manage any contamination to the land caused by burning of waste.

Woody debris

Work was undertaken by the Silt Recovery Taskforce to clear over 155,000 tonnes of woody debris from across the region. Landslips and erosion near rivers swept trees and vegetation into the waterways causing damage to infrastructure, habitats and communities. The Silt Taskforce and supporting teams worked to clear woody debris from rivers, riverbanks and mouths, beaches and from around bridges across the region to prevent further damage and to reduce risk of fire hazards. High-risk areas were identified through aerial surveys and prioritised. Where possible, an environmentally considered disposal option was used to recycle or repurpose woody debris, such as mulching or chipping. Where this wasn't possible Heli-burning was used to safely burn piles of woody debris in controlled areas near rivers and beaches. HBRC's Integrated Catchment Management team also lead a project targeting woody debris in the upper catchment areas where there was a risk of it remobilizing in a future flood event; risking damage to critical infrastructure.

Land Categorisation

Regional Council were responsible for the technical flood modelling and risk assessment of the Land Categorisation process. This work helped to develop hazard maps that were used to identify Hawke's Bay's provisional land categorisation zones. The technical assessment was prepared using the following data:

- Approximate flood extents derived from air photos taken immediately after the cyclone by Skycan Ltd
- Rapid building assessment data (stickered houses) for each District Council
- Contour information derived from LiDAR data collection November 2020
- Photographs of flood extents and flood damage and information supplied during public meetings and discussions with residents
- Information from insurance providers

On 1 June 2023, affected landowners in Hawke's Bay were notified of the initial land category for their property, supported by provisional hazard maps that were published on the landcathb.co.nz website (see final maps in Appendix 7)

The land categorisation process used to develop these maps were independently assured by two environmental and engineering consultants; Paddle Delamore Partners (PDP) and Tonkin and Taylor (T+T). These reviews were commissioned by both Regional Council (for the PDP report) and the Cyclone Recovery Taskforce (for the T+T report - see both reports in Resources below).

Throughout June until the end of September 2023 Hawke's Bay councils held joint engagements with affected communities to provide information

on land categorisation and seek feedback on the categorisation of individual properties. Requests for reassessment and additional supporting evidence from impacted community members were received over this period, and further technical and ground truthing assessments were carried out. During this time over 3,000 properties across all categories were assessed. This led to further refinements of the hazard maps until early October 2023 when PDP was able to complete its final assurance report. This work validated the land categorisation risk assessment process; enabling Category 3 areas to move from a provisional categorisation to a confirmed status. Landowners with dwellings on Category 3 land then qualified for the Voluntary Buyout Process, led by the Territorial Local Authorities (TLAs).

While the land categorisation risk assessment was taking place Councils were undergoing negotiations for Crown funding towards Category 2 flood mitigations, which is essential infrastructure needed to build resilience against future climate change effects.

The Recovery Team worked closely with HBRC's Asset Management Engineering, Geographical Information Systems (GIS), Communication and Engagement, and Legal teams to coordinate the delivery of the FOSAL Land Categorisation process and its outputs.

Although this process was led by HBRC, TLAs supported the communication aspects of this process, helping to notify affected landowners within their districts (see process maps in Appendix 8). This partnership continued throughout, and joint community engagements were held to provide affected communities with information that was available to us at each key step of the process.

HBRC's Recovery Team linked in closely with the Regional Recovery Working Group as well as key agencies, such as the Cyclone Recovery Unit (CRU), Ministry for Social Development (MSD), Insurance Council of New

Zealand (ICNZ) and Building Authorities (from District Councils) in order to present correct and regionally aligned information at community meetings and workshops.

HBRC's Communications and Engagement team were an integral part of the Regional Recovery Working Group; ensuring key information, data and maps on land categorisation was shared appropriately, were accurate and regionally aligned. Their team facilitated Facebook live sessions that were held to communicate the FOSAL Land Categorisation Process to communities and answer any questions.

Crown negotiations

On 14 May 2023, the government announced a North Island Weather Events response and recovery package. Council officers collated information and developed scoping documents in anticipation of potential funding bids and negotiations.

Meetings with the Treasury NZ were undertaken between May and July 2023 until an agreement by all councils and the Crown was reached for the region in August 2023 (fully executed in October 2023). The regional support package was for the restoration of key infrastructure (roading and flood protection) and included support packages for outcomes of the FOSAL Land Categorisation process. This enabled decisions to be made on land categorisation and for communities to have certainty to move on with their lives.

HBRC's allocation was for the delivery of flood mitigations in Category 2 areas. The overall cost for flood mitigation measures were estimated at \$247.7m. The Treasury offered a contribution of 75% towards Category 2 future flood mitigations, except for Wairoa, where 100% Crown funding

was agreed. The cost-share deal amounted to \$203.5m, leaving HBRC with a commitment of \$44.15m left to fund.

Funding was also secured to support Category 3 Voluntary Buyouts. This was a 50/50 cost share between TLAs and the Treasury. Any changes to Category 2A where no viable solution could be found the monies allocated to Category 2 flood mitigations was transferred back to the Crown, who reallocated this to the Category 3 Voluntary Buyouts fund.

The regional recovery package also included support towards the rebuild and restoration of key transport infrastructure (roading and bridges) that was negotiated between the TLAs and the Treasury.

Capital Works Programme

The Local Government Act 2002 (LGA) requires local authorities to have an Infrastructure Strategy covering 10 years in detail and forecasts of significant issues out to 30 years for infrastructure assets including stormwater, flood protection and control works. The regional council manages drainage, flood protection and control schemes in the Hawke's Bay region.

Similarly, to the 3-year LTP, the Infrastructure Strategy 2024-2027 is being developed with this new SWERL Act scope which is to:

- develop a one off 3-year recovery focussed long-term plan, instead of the normal 10-year plan with forecasts to 30 years.
- outline any significant infrastructure issues and the principal options for managing those, and the implications of those options.
- outline a description of the major infrastructure capital projects that HBRC are proposing or implementing, including any to facilitate

recovery, the likely funding options for those, and the implications of those options for rates and debt.

Flood Resilience Programme

As part of the Capital Works Programme the Flood Resilience Programme will manage the large-scale flood mitigation and drainage infrastructure projects worth \$250m that was set out in the cost-share agreement with the Government.

A new Programme Management Office (PMO) is being established under HBRC's Asset Management Group to manage this large-scale infrastructure programme. The PMO will have a large team of project managers, engineers, and communications and engagement specialists dedicated to leading this work. Close engagement with communities and key stakeholders to keep them updated on progress and involved in the process will be led by the PMO.

Crown Infrastructure Partners (CIP) will oversee this programme. They are responsible for approving business cases and granting funding on behalf of the Government at each key stage for these projects.

In June 2023 an Engineering Pod project team was set up to lead the investigation and implementation of flood mitigation solutions in affected Category 2 areas.

Partnering with key consultants (WSP, T&T, PDP) to deliver these large-scale projects within the four-year funding timeframe, three pods were created to lead the work in northern, central, and southern parts of the region.

Each pod investigated solutions through an optioneering process. This assessed the critical criteria that would allow for a pathway from Category 2 to Category 1. Solution requirements included:

- Cultural values assessment
- Ecology assessment
- 3rd party infrastructure
- Industrial area resilience plans
- Financing
- Land access negotiations
- Building consents.

Only once a sound concept that has a consenting pathway, a legal interest in the relevant land in favour of HBRC (for access to the site), and available funding, can be gained through a Government approved business case, can the detailed design of these flood mitigations begin.

Long and short lists of options were presented to communities at joint meetings led by HBRC and supported by TLAs. Community feedback into the options are key considerations used to identify a preferred and viable solution.

When the preferred solution is agreed the concept can be developed further and detailed in the business case to CIP to release funding. The concept then undergoes the technical design phase and consenting applications before construction commences.

Also included in the Flood Resilience Programme is the update of pump stations. Further improvement work to existing flood protection infrastructure following the independent Schemes Review will be undertaken, as agreed in the Crown Cost-Share Agreement for Hawke's Bay.

Māori Partnerships

The Māori Partnerships Team played a key role in the HBRC's recovery efforts in the aftermath of the cyclone. The team acted as liaisons between Māori partners and HBRC to make connections with mana whenua for input on important projects such as the rapid rebuild of Hawke's Bay's stopbank network; ensuring their values and tikanga (cultural practices) were honoured throughout the swift repair process.

The team helped to facilitate community engagements, offering HBRC teams advice on approach, manner and content of information provided to Māori communities across Hawke's Bay. This ensures communications were effective, respectful, and received well by these communities.

They supported whanau living in severely flood-affected areas by helping with the clean-up of marae and homes, and accompanying residents when engineers came to carry out site visits for technical risk assessment of their properties during the land categorisation process. This helped facilitate discussions around reassessment of properties that were placed in provisional categories.

Relationship managers positioned in northern, central, and southern parts of the region have been working closely with communities to support their recovery. For example, Wairoa's relationship manager crossed over to work with Wairoa District Council to support its Recovery Manager with the development of their recovery plans, as well as using their established relationships to support community engagement and discussions with impacted landowners. Similarly in the South, hands-on help was offered to the Pōrangahau community, which was badly impacted by the floods.

The team's connections and relationships played a crucial role in advising the Department of the Prime Minister and Cabinet (DPMC) on engaging

with Māori entities in Hawke's Bay, ultimately leading to the development of bespoke policies that support Māori equitably in ongoing recovery efforts.

The role of Māori Partnerships at HBRC is to provide the organisation with insights into effective methods of engaging with Māori partners, maintain close relationships with iwi and mana whenua in order to strengthen partnerships between them and Regional Council. Thus, allowing for better and more meaningful engagement on ongoing environmental protection and enhancement work of the Council.

Rural Recovery

A Rural Recovery team was established to work closely with the Ministry for Primary Industries (MPI) and other key sector groups to support affected rural and semi-rural communities, who have been the worst affected in terms of the scale of damage and loss to homes, land, access, fencing, farming infrastructure, and production.

The team's role was to act a connector for landowners to access experts for advice on land recovery, funding, consenting, regulatory changes, future sustainable land management and resilience planning, as well as health and wellbeing support.

The team actively engaged with rural communities and businesses. In the first year of recovery, its members attended a wide range of events, workshops, and meetings; totalling 370 and interacted with over 4,200 participants. They regularly participate in community meetings, catchment groups, catchment collectives, and sector group meetings to offer leadership and input into the long-term recovery of rural areas across the region.

To understand the economic affects that Cyclone Gabrielle had across the sector, a number of surveys were carried out. HBRC's Rural Recovery team focused on assessing the impact on pastoral farming, in particular, scale and prevalence of damage to land, infrastructure, stock and crops, as well as access, water, feed, planting and animal health. In a survey carried out in April 2023, over 400 respondents from across Hawke's Bay provided feedback on the key issues they were facing (see Appendix 9). The majority of participants owned sheep, beef, or lifestyle block farms. Across all farm types and locations, the most common impacts felt related to fencing, tracks, water supply, and irrigation damage. The results showed a staggering 2,000kms of fencing and 500km of track damage of those surveyed.

A second survey was carried out in January to February 2024 to gain an updated picture of the context and degree of recovery remaining for landowners. This will be used to inform business continuity and long-term plan inputs for HBRC and associated agencies, and guide discussions on rural recovery and resilience with Central Government.

Erosion Control

The Erosion Control Scheme (ECS), Hill Country Erosion Fund (HCEF) and Soil Conservation Nursery are our key work programmes for managing erosion challenges across large areas of Hawke's Bay. This work includes the space-planting of soil conservation trees on pastoral hill country, the planting and/or retirement of land with a severe or extreme erosion risk, and, in some cases, earthworks or engineering solutions to address erosion and sediment issues.

Cyclone Gabrielle, on top of an unseasonably wet 2022 winter, spring, and summer, saw some landowners abandon or defer projects, reprioritising

their spending on recovery. Some landscapes have entirely changed due to the cyclone, and fencing labour and materials have been in short supply, compounding the challenges these work programmes face. Catchment teams had to work quickly to review existing ECS and HCEF project work to assess damage and cyclone impacts where possible. Work plans had to be reprioritised to support those impacted by the cyclone.

The soil conservation poplar and willow tree nursery, based in Pakowhai, experienced extensive flooding, causing widespread damage to the plant and infrastructure, with repair costs reaching \$650k. Remarkably, both mature and immature poplar and willow poles fared well, and the annual pole harvest went as planned.

Fencing works have come with challenges heading into summer due to the hardships being felt by the rural community. Large portions of capital investment and cash flow were used to re-fence areas of farmland that were damaged by Cyclone Gabrielle, which in turn has left little available money to put towards the protection of vulnerable eroding land. This is combined with the challenges of limited cash flow due to rising costs and decreased revenue on farms.

Unlike others, landowners live and work in the same place. Every day, they face the damage that the cyclone has done to their property. HBRC field staff are seeing the effects of the mental stress that adverse weather events have on landowners, with farmers being nervous and hesitant about re-fencing or completing new fencing projects due to the emotional and financial loss that will potentially happen with an ever-changing climate.

Environmental Science

HBRC's Science team is involved in leading and supporting a broad number of research studies and key recovery initiatives following Cyclone Gabrielle. It was important for critical data to be collected as quickly as possible, and for environmental monitoring to be increased to understand the cyclone impacts on Hawke's Bay's natural environment and its possible long-term effects.

Understanding land damage caused by landslips and silt deposition is vital to inform our recovery, and understand where efforts for support, erosion control and information need to be focused. Data was collected straight after the event by the National Institute of Water and Atmospheric Research (NIWA) and Canterbury University using light detection and ranging (LiDAR) technology that produces high-resolution 3D mapping of parts of the affected landscape, Manaaki Whenua Landcare Research (MWLR) undertook a rapid assessment of land damage on behalf of Ministry for the Environment (MfE) using satellite imagery, and GNS Science continue to work on an exhaustive map of each slip generated by Cyclone Gabrielle. These data sets will be used to map changes to the landscape and will inform further research, future planning for resilience against climate change (spatial planning), and economic development.

Council hydrologists and flood modellers worked with National Institute of Water and Atmospheric Research (NIWA), as part of the MBIE-funded Extreme Weather Response study. This was an extreme value analysis of the flood flows comparing flood level data with historical data to determine new flood statistics. This will characterise the scale and magnitude of Cyclone Gabrielle, and this data can help to inform the design of future or existing infrastructure to make them more resilient against future flood events. This study combined with recommendations made in the independent reviews of HBRCs existing flood protection

schemes will be used to decide if changes are required to the present levels of service.

HBRC Science team is also investigating the quality and quantity of surface and groundwater with support from MBIE and MfE. These projects include the impact of Cyclone Gabrielle on the region's lakes, rivers and estuaries, how these systems are responding and the likely trajectory for recovery. Increased monitoring and analyses have been crucial to provide enough sample resolution to understand the impacts of the cyclone. However, it is likely that these impacts will continue for some time.

Habitat assessments are also being carried out to understand the state of the environment and changes to marine and terrestrial ecosystems. Significant changes are expected based on the volume of water, sediment and debris that washed through water channels out to sea. HBRC Scientist have been looking at changes to the sediment composition of coastal sites, and NIWA is measuring changes to the ocean's seabed ecosystems and marine life health along the eastern coastline as part of a Fisheries New Zealand project.

HBRC terrestrial ecologists have been working with MWLR to understand the impacts of Cyclone Gabrielle on wetlands and forest systems, as part of a larger MBIE funded Integrated Ecological Assessment. They have also teamed up with the woody debris project team while they are working to clear debris from the rivers, streams, and coastlines to ensure bird habitats were not destroyed in the process, and to assess damage to habitats. A coastal bird survey was carried out along the Tūtaekurī, Ngaruroro and Tukituki River catchments over the summer months to assess the impact on their habitats and the birds' ability to nest.

Air quality monitoring was stepped up post-cyclone across the region in a MBIE funded project with NIWA. This project aimed to assess air quality associated with dust from exposed sediment, with more than 30 various

types of monitors in flood-affected areas. Escalated risk around windblown dust and contaminants from drying silt, especially through dry summer months, was raised as a public health concern. These levels are being monitored by Te Whatu Ora – Health New Zealand.

The feasibility for nature-based solutions for managing future hazard management and climate risks in natural systems are being investigated. Restoring wetlands is an example of this, due to their ability to retain water across a landscape, manage peak flows and peak droughts, and keep water in the catchments. They also sequester carbon and enhance biodiversity outcomes.

Biodiversity

While the HBRC Science team leads programmes to assess biodiversity, the Catchment Operations team leads two Regional Council biodiversity programmes where areas that had restoration assistance had been badly impacted due to the cyclone. The Priority Ecosystem and Environmental Protection and Enhancement programmes are major biodiversity projects designed to protect biodiversity in Hawke's Bay.

The Priority Ecosystem Programme protects and enhances the remaining 700 priority ecosystem sites across the region. This involves a partnership with internal and external stakeholders alongside land occupiers. The main actions are deer fencing, pest plant and animal control and enhancement planting.

Of the 19 sites currently managed under this programme, six (31%) of these were badly impacted by Cyclone Gabrielle. The cyclone caused slips, loss of trees, silt build-up, landscape changes, and high fencing loss. This threatens HBRC's investment in this programme and sets back the

protection measures for these highly endangered ecosystem sites. It also highlights the scale of potential damage and risk to the remaining 681 identified sites that are not yet under HBRC's management.

Prior to this event, Hawke's Bay had lost approximately 70% of its indigenous biodiversity area, with most ecosystem types remaining classified as acutely or chronically threatened. Impacts from this event increases the threat to the region's biodiversity; placing a higher value on what is intrinsic to the long-term health of the region's biodiversity, climate resilience, local economy, and New Zealander's quality of life.

The project team set out to accelerate the ground truthing of the other 681 sites to guide future work. The study will collect empirical data for each site: size, quality, ecosystem types, threat status and intactness. This will identify the highest quality and most at-risk priority ecosystem sites across the region and allow HBRC to prioritise and accelerate work to secure their protection.

The Protection and Enhancement Programme seeks to develop targeted environmental work plans to deliver high-value environmental outcomes on a catchment/sub-catchment scale for areas within Hawke's Bay that do not meet the criteria within our other funding programmes (eg. the Erosion Control Scheme or the Priority Ecosystem Programmes).

Following the environmental damage brought by the cyclone there is a need to design and implement a new delivery model for these programmes. This includes strategic advice on wetland management, riparian management/restoration, reestablishment of inanga habitat, resilient ecosystems, land retirement, indigenous reversion, and native planting, which are critical to post-cyclone recovery actions.

Biosecurity

Biosecurity risk has significantly increased following the cyclone due to the loss of fencing used to keep stock, pests and predators away from protected rivers, streams and biodiversity areas. Thousands of kilometres of fencing were destroyed. Working with landowners, HBRC along with MPI and industry partners have been working to assess the damage.

The spread of Chilean needle grass and other pest plants across the region has been difficult to confirm because of the extensive movement of water, silt, mud, and gravel during and post-event. This was further exacerbated by the movement of thousands of trucks, machines, and materials used to restore key infrastructure and clearing silt and waste across the region.

Chilean needle grass threatens productive land across Hawke's Bay. This pest plant displaces desirable pasture, causing a loss in productive pasture and crop yields. The needle-like seed can also penetrate the skin and muscle of stock, causing risk to animal health and welfare and diminishing the stock's economic value.

HBRC's Biosecurity and Catchment Management teams continued their existing work programme to prioritise supporting landowners to control the risk of Chilean needle grass spreading by offering subsidised contractor control and conducting some control operations in certain areas. In conjunction with Asset Management, the Biosecurity team implemented a Controlled Area Notice in the Tukituki catchment to allow regulated access to gravel contaminated with Chilean needle grass seed for cyclone recovery works at a local level.

Policy and legislative input by HBRC

To help with the recovery effort, the SWERL Act came into force on 13 April 2023 (Severe Weather Emergency Legislation Act 2023 No 4, Public Act Contents – New Zealand Legislation). The SWERL Act enables the Governor-General to make Orders in Council (OICs) to modify other statutes to provide those affected by the severe weather with relief from legislative requirements that are overly burdensome. Modifications are also permitted where necessary to enable prompt action for an efficient and timely recovery.

HBRC staff from the Policy and Regulation Group worked with Central Government ministry staff to identify areas where policy or regulatory legislation could be amended to allow for recovery activities to be accelerated or where impacted communities would be unfairly disadvantaged if they were required to meet legislative deadlines while focussing on recovering from the impact of the cyclone. The overview table lists the OICs that were made under the SWERL Act.

In summary, the main impacts for HBRC from these changes were:

- The ability to have an interim three-year Long Term Plan from 2024 to 2027, focussed on recovery, rather than the usual 10-year plan.
- Temporarily allow outdoor burning from 5 July until 1 November 2023 of items of waste usually prohibited by regional rules and National Environmental Standards for air quality, outside of the local airsheds. This consisted of mainly woody debris where landowners had made concerted efforts to remove contaminants such as plastics and mixed waste but where it was impossible to remove all the contaminants due to the nature of the waste piles generated by the flood waters.

- Provisions to allow NZTA and Kiwi Rail to make necessary repairs and improvements to impacted state highways and rail links in severely impacted regions, including amendments to expediate consenting requirements.
- Provide additional time for HBRC to publicly notify the required Freshwater Planning instrument under the NPS for Freshwater Management from 31 December 2024 to 31 December 2027 (this may be subject to further change from the recently appointed new government).
- Extend the deadline for all stock exclusion requirements to 1 July 2025.
- Extend the 'section 124' period for replacement water consents in the TANK catchments to give impacted water consent holders more time to apply if renewing their consent.

Overview of Severe Weather Recovery-related Orders in Council:

1. *Hastings District Rating Valuations*
2. *Local Government Act amendments*
3. *Climate Change – Forestry*
4. *Income Tax Accommodation Expenditure for North Island Flooding Events*
5. *Outdoor burning of cyclone waste on rural land that would otherwise be prohibited under rules or national regulations*
6. *Waste Minimisation Act*
7. *Waste management for landfills and temporary waste sorting facilities*
8. *Temporary accommodation under RMA*
9. *NZTA repair works under RMA*
10. *KiwiRail repair works under RMA*
11. *Extend statutory timeframe for Gisborne DC and HBRC to take enforcement/prosecution action (from 12 months to 24 months) under RMA*
12. *Extend timeframe for water permit replacement applications in the TANK catchment area*
13. *Provide additional time to comply with the following national direction timeframes:*
 - *NPS for Freshwater Management timeframe to notify freshwater planning instruments in Gisborne and Hawke's Bay*
 - *National Stock Exclusion Regulation timeframes to exclude stock from waterways in Gisborne and Hawke's Bay*
 - *National Planning Standards implementation timeframes for Hastings District Council*
14. *Faster RMA plan changes enabling permanent housing and papakāinga*
15. *Replace the 2024 Long Term Plan with a three-year plan under LGA and no requirement for LTP audit.*

Transport

Immediately following the Cyclone, the transport team were focused on assisting the organisational response and reinstating public transport services.

The Cyclone greatly impacted our transport system, along with other infrastructure, and has effectively required a full re-write of the Regional Land Transport Plan (RLTP). RLTP's are a 10 year transport system investment plans that are reviewed every 3 years. The RLTP covers all elements of the land transport system, including local roads and state highways, and is the primary means to secure co-investment from the National Land Transport Fund. The RLTP 2024 cycle was meant to be a simple 'review' round. However, the transport team, along with key stakeholders from NZTA and the TLA's have conducted a fulsome review, resulting in a full rewrite, including a new strategic direction and policies.

There is significant work to be carried out across the local road and state highway network over the next decade. The 10 year transport forecast sat at \$6.3b at the end of 2023. It is anticipated this will change in line with the new Governments' policy direction and investment desire. Irrespective, the cyclone showed that our transport system is at the limit of its durability and significant investment is now required to not only reinstate, but to build in system resilience to future events and risk.

Regional Recovery Agency Administration

HBRC took over the responsibility for managing the Regional Recovery Agency's back office functions, such as finance, HR, Health and Safety, and ICT. This is because the RRA is not a registered legal entity, therefore has no legal status as a stand-alone entity, does not have a bank account,

registration, financials or ability to execute agreements. This will continue until June 2025 when the agreement with Government is due to end.

The RRA received \$1.5m funding from the Department of Internal Affairs (DIA) to support the setup of the agency and their role of planning and coordinating regional recovery initiatives. A grant of a further \$7.3m was made to HBRC by the Department of the Prime Minister to cover the recovery agency's staffing costs, iwi liaison engagement, running costs of the recovery office and overheads for the next two fiscal years.

Lead Agency for Funding

To meet the government's desire and public calls for funding and given the absence of a legal status for the RRA, HBRC took a lead role with the support of all Hawke's Bay councils, to assist with coordination of immediate funding coming to our region.

HBRC signed a funding agreement with DIA for severe weather event recovery activities including the set up and the management of the Sediment and Debris Funding for the Hawke's Bay region. To date, HBRC has administered \$102.6m of Local Authority funding for Sediment and Debris clean up with a further \$40m expected soon to assist with the remaining clean up required on behalf of other councils. A further \$40m has been paid to Commercial Sediment and Debris Fund recipients.

The Hawke's Bay Disaster Relief Trust Fund was established; made up of donations from the public and larger organisations. HBRC helped to administer two rounds of payments on behalf of the fund's trustees to affected Hawke's Bay ratepayers and landowners, who were eligible for this hardship grant. A total number of 5,773 applications were approved; with a total of \$8,811,641.64 in grants being paid out.

Hawke's Bay Civil Defence Emergency Management

Following the transition from Response to Recovery the HBCDEM Group office worked to identify priority areas and opportunities to improve community preparedness and engagement and operational systems.

One of the key learnings of the HBCDEM Group following the response to Cyclone Gabrielle was that there were a broad range of key agencies and organisation all working in the community preparedness space, and there needed to be a more coordinated and aligned approach taken to prepare communities for emergencies.

A Community Resilience Working Group was formed in early July 2023. This was made up of council representatives, emergency services, iwi, hapū, Crown and community organisations. It was coordinated by the CDEM Group office to ensure best practice in supporting community-led emergency preparedness planning. It was agreed that the intention of the Group would be to support Councils, Māori and Pacifica with their locality plans.

The Working Group identified 54 priority communities that had been impacted during Cyclone Gabrielle that needed immediate support to build their resilience. Given the need to deliver emergency preparedness plans to these communities and with limited staff capacity, the Working Group needed to collaboratively develop a framework which would effectively address community needs and could also be delivered at pace.

CDEM Group office identified that the Wellington Regional Emergency Management Office (WREMO) hub model could be adapted to provide a framework to support the existing community hubs and further develop this across Hawke's Bay. WREMO's hub model had proved a success since its launch in 2017. With the support of WREMO, this model was adjusted

for the Hawke's Bay situation. This saved an extensive amount of time developing a regional framework from scratch.

The Hawke's Bay Community Resilience framework is based on two tools which help build community resilience through readiness:

1. The Community Emergency Hub Guide provides a guideline to setting up a hub and establishes a place of safety for the community. Existing hubs are able to adopt guidelines to enhance their current hub setup. Further to the setup of the hub the CDEM Group will provide regular workshops to connect communities and better prepare them for future events.
2. A Community Resilience Plan (CRP) template which enables a community to identify their resources and assets, hazards and risks collectively during a workshop. The CRP is agreed on by the community and collated by CDEM team for use as a source of reference during an emergency event. The plan provides an opportunity for communities to think of other preparedness initiatives such as phone trees or establishing a neighbourhood support network. This process is supported by CDEM staff and local councils.

In order to consolidate delivery of community resilience workshops, the Working Group members have agreed to combine staffing resources. CDEM teams, Council and emergency service representatives received hub workshop training in October 2023 followed by an immediate rollout of community training workshops.

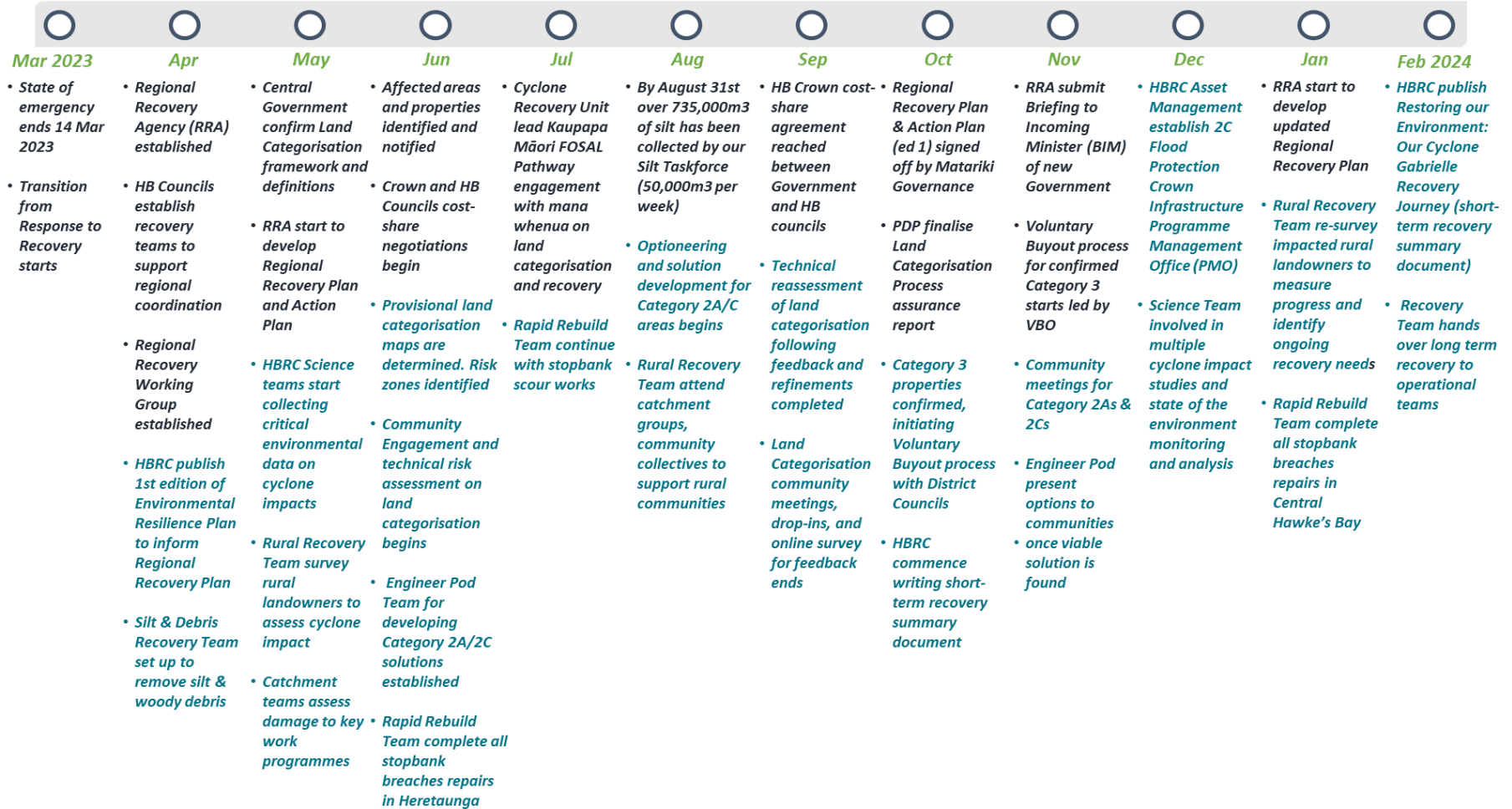
Communities have been highly supportive of the community resilience framework which acknowledges and seeks to improve on the success of community-led hubs during the Cyclone Gabrielle response.

Regional Recovery Timeline

The below timeline shows some of the key work and milestones carried out by HBRC and key partners in the first year of recovery:

CYCLONE GABRIELLE RECOVERY – YEAR 1: TIMELINE

- GOVERNMENT AND REGIONAL RECOVERY MILESTONES
- HBRC RECOVERY MILESTONES



Section 8: HBRC Recovery Initiatives

Funded Recovery Initiatives

In the Environmental Resilience Plan a list of short to medium-term recovery initiatives were presented. This along with a separate funding bid was submitted to the RRA to support regional recovery planning and conversations with Government on relief funding ahead of Budget 2023. Additionally, funding for key recovery projects were also sought through other avenues, such as science and research-based funds. The below table is a reconciliation of what projects and initiatives received funding, their timeline for delivery, cost and expected outcomes. The total of cost of these initiatives sits at approximately \$473m, although, some initiatives are only partially funded. Restoring existing and building new flood protection resilience against future flood events, understanding the impact and risks the impact of the cyclone has had on the natural environment, and the clean-up of silt and woody debris were prioritised for funding.

Flood Protection and Drainage

	Recovery Initiative	Description	Status	Timeline	Estimated Cost	Funding Status
1	Rapid Rebuild of Stopbanks	Repair damaged stopbanks to existing standards (Heretaunga Plains & Upper Tukituki). This is to restore the level of service to what we had pre-cyclone. Further cyclone repairs to Flood Control Schemes	In progress. Repair work 99% complete.	1 year Feb 2023-Mar 2024	\$35m	NEMA \$19m, Insurance \$13m, HBRC \$3m
2	Rapid Rebuild of other flood protection assets	Repair of damaged flood protection assets, such as drains, culverts, edge protection, etc.	In progress	2 years	\$40m	NEMA \$22m, Insurance \$14, HBRC \$4m
3	Provision for additional work to rapid repair sites following technical review	Further repair work following the technical review. This will include repairs to drains and culverts, Akmon groins, and tree plantings, as a result of Cyclone Gabrielle. This is to restore back to what we had pre-cyclone.	Not started	3 years (starting FY24/25)	\$30m	Funded under the Government cost-share agreement. (Crown 75%, HBRC 25%)

4	Specific Areas Land Category 2 Solutions (Excluding Wairoa)	To provide flood protection to a 1:100 year protection to Category 2C affected communities: Omaha, Pakowhai, Whirinaki, Pohutukawa Drive/ North Shore Road, Waiohiki, Porangahau.	In progress. Engineer consulting pods are working across the region to consult with communities on identified solutions. Confirmed options are in the design phase in some areas.	2-3 years (2023-2026)	\$104m (Beach Rd \$5.6m moved to Cat 3 – was \$109,650,000)	Funded under the Government cost-share agreement. (Crown 75%, HBRC 25%)
5	Wairoa Land Category 2 Solutions	To provide flood protection to a 1:100 year protection to residents of North Clyde, Wairoa	In progress. Tripartite are consulting with engineer pod and community on identified potential solutions.	4 years (2023-2027)	\$70m	Fully Crown funded
6	Flood Protection and Drainage Schemes Review	The review will help to reconfigure and build resilience against future floods. Schemes include Heretaunga, Upper Tukituki, Wairoa and Northern Schemes, Upper Makara, Heretaunga drainage, Ohuia, and Opoho.	In progress. Heretaunga and Upper Tukituki commencing in Jan 2024. Ohuia and Opoho commencing in Mar 2024.	3 year (2024-2027)	\$3m	Funded under the Government cost-share agreement. (Crown 75%, HBRC 25%)
7	Replace and Improve Drainage Pumpstations	Replace and improve pump stations. This includes undertaking review and consultation costs, consenting and seismic costs too.	In progress	3 years (2023-2026)	\$30m	Funded under the Government cost-share agreement. (Crown 75%, HBRC 25%)
Total Estimated Cost \$312m						

Environmental Science and Information

	Recovery Initiative	Description	Status	Timeline	Estimated Cost	Funding Status
8	Telemetry Network Repairs & Upgrades	Repair and upgrade of telemetry equipment used to capture environmental data that was damaged during the cyclone.	In progress. Telemetry is in planning and business case stage	2 years (2024-2026)	\$5m	Funded under the Government cost-share agreement. (Crown 75%, HBRC 25%)
9	LiDAR capture	LiDAR capture of the region to quantify land damage caused by landslips and flooding and understand changes to land	In progress	6 months (2023)	\$2.42m	MfE funded

		contours and impact on land use caused by sediment disposition.				
10	Assess impacts on air quality	Air quality monitoring and source apportionment to understand the impacts on air quality following the Cyclone.	Complete	6 months (2023)	\$150k	MBIE funded
11	Flood Frequency Analysis	Flood analysis and modelling is required in order to understand the magnitude of Cyclone Gabrielle, and to provide guidance on flood warning systems going forward. This will provide integral information on the recurrence interval of hydrological extremes in the Hawke's Bay region.	Complete	10 months (2023-2024)	\$550k	MBIE funded (NIWA-led)
12	Groundwater Quality	Monitoring groundwater quality and bores to understand impact on quality from floodwaters.	Complete	1 year (2023-2024)	\$120k	MBIE funded
13	Natural attenuation potential	Calculation of nature based solutions potential to dampen high flows and hold water during periods of drought. Assessment of flow statistics with natural attenuation systems. The aim is to reduce peak flows in the upper catchment	In progress	1 year (2024)	\$600k	MfE funded
14	Cyclone impact assessment on natural environment	Assess cyclone impact on freshwater, lakes, marine and coast, and terrestrial ecosystems. This is to understand what impacts the cyclone has had on our state of the environment - 4-7 year recovery period. To assist with tracking our protectory to recovery.	In progress	2 years (2023-2025)	\$2.36m	Partially funded - (\$342.5k NIWA, Envirolink, GNS and Otago University, Victoria University, and Canterbury University research funded, \$250k MfE funding.
15	Orthophotography	High resolution/high quality satellite acquisition to aid the quantification of the impact of Cyclone Gabrielle over the full region we recommend the tasking of a new high quality and resolution (0.5m or finer) satellite dataset.	In progress	2-4 months	\$640k	LINZ funded
Total Estimated Cost \$11.84m						

Silt and Woody Debris Management

	Recovery Initiative	Description	Status	Timeline	Estimated Cost	Funding Status
16	Silt (including mixed waste) management	Safe removal and disposal/ storage of silt to allow communities to rebuild. Separation of mixed waste from properties and orchards (posts & wires, PVC irrigation piping, netting, household waste). Mulching and repurposing where possible.	In progress	16 months (Mar 2023 -Dec 2024)	\$142.6m	Phase 1: \$70.6m Local Authorities Fund allocated from Government's \$133.2m funding package. Phase 2: \$12m was allocated from the Commercial Fund in Sept 2023. Phase 3: \$10m was allocated further from Government for Silt Taskforce in October 2023 and a further \$10m was allocated for the same in November 2023. Phase 4: \$40m was approved and allocated for Silt Taskforce with \$3m of the \$40m designated for Silt Taskforce operations in Wairoa. This was announced in February 2024.
17	Upper Catchment Woody Debris management	Removal of woody debris in the upper catchment areas where there is a risk of it remobilizing in a future flood event; risking damage to critical infrastructure.	In progress	16 months (Mar 2023 to July 2024)	\$4.07m	Te Uru Rakau (New Zealand Forest Service) and MPI funded (Joint funding partnership)
Total Estimated Cost \$146.67m						

Other

	Recovery Initiative	Description	Status	Timeline	Estimated Cost	Funding Status
18	Regional Climate Change vulnerabilities/risk assessment	Spatial based regional climate change risk assessment (updated under range of climate scenarios and completing data gaps).	Not yet started	2 years (2024/25)	\$500k	Funding has been requested in LTP by the Joint Committee for Climate Action
19	Cycleway repairs	Short term immediate repairs to open sections of the HB Trails network caused as a result of Cyclone Gabrielle, eg. grading of debris or replacement of scoured sections, signage repairs.	In progress	1 year – 18 months	\$2.2m	MBIE funded
Total Estimated Cost \$2.7m						

Unfunded Recovery Initiatives

Other recovery priorities highlighted in Environmental Resilience Plan were unsuccessful at acquiring external funding. Cyclone Gabrielle disrupted and set back much of the Regional Council’s work programmes and projects. For example, the destruction of many fences used to control pest animals and keep stock out of waterways, the loss of erosion control trees and shrubs plantings from hillsides and rivers, flood damage to HBRC’s pole nursery, and the need for unplanned science research and monitoring to understand the threat to endangered ecosystems. It was important that damage was assessed and any remediation work that could be carried out to prevent further impact on the progress of this work was done quickly. In many cases, budgets had to be reallocated to recovery efforts, while other work was put on hold. The below shows the status of some of these key recovery initiatives.

Catchment Management

	Recovery Initiative	Description	Status	Timeline	Estimated Cost
20	Erosion Control Scheme (post-cyclone project audit)	Where possible, review existing pole planting to assess the impact and identify the scale of remedial actions to understand immediate priorities around pole planting.	Complete	1 year (2023)	\$130k
21	Erosion Control Scheme Re-establishment	Re-establishing fencing and protection of previously planted schemes to re-instate to pre-cyclone standards. Complete gap analysis and develop tools and a resilient system to support the growth in the Erosion Control Scheme due to recovery.	In progress	Ongoing	\$470k

22	Increasing Soil Conservation Nursery Capacity	HBRC's Pakowhai Soil Conservation Nursery is the main source for the region's poplar and willow poles. Annual demand outweighs supply, and the cyclone has exacerbated this demand. We must increase our capacity to meet this additional demand and spread risk across the region by establishing more nurseries in various locations. Building nursery capacity enables farmer/landowner access to regional erosion protection poles.	In progress	3 years (2023-2026)	\$1.8m
23	Biosecurity post Cyclone Auditing	Full monitoring and audit of flood-affected properties for Chilean Needle Grass, Woolly Nightshade, Saffron Thistle, and Old Mans Beard. This will help develop an understanding of the potential impact of flood-affected properties that have pest plants.	In progress	1 year (2023-2024)	\$130k
Total Estimated Cost \$2.53m					

Rural Recovery

	Recovery Initiative	Description	Status	Timeline	Estimated Cost
24	HBRC Rural Recovery Team Establishment	The primary function of this team is to be connectors and facilitators to information, knowledge, resources, and technical expertise to assist in recovery actions.	In progress	2 years (2023-2024)	\$1.15m
25	Engaged Rural communities	Supporting rural communities by having HBRC specialist attending catchment groups and collectives, community workshops and meetings, and sector groups and forums.	In progress	1-2 years	\$495k
26	HBRC Rural Recovery Strategy Development	Carry out rural landowner impact assessment to understand the economic impact and recovery needs of rural communities, landowners, and businesses across Hawke's Bay. Develop a strategy and framework that enhances HBRC's Catchment Services delivery model.	On hold	1 year (2023-2024)	\$495k
Total Estimated Cost \$2.14m					

Biodiversity

	Recovery Initiative	Description	Status	Timeline	Estimated Cost
27	Biodiversity post-cyclone audit and modelling	Understand what impacts Cyclone Gabrielle has had on our priority ecosystems by auditing our project sites to understand the scale of degradation in terms of lost or damaged and then develop the design of a more robust recovery model.	In progress	2 years (2023-2024)	\$300k
28	Biodiversity Protection and Enhancement programme	Design and implement a recovery model for the Protection and Enhancement programme on a catchment scale. This would include	On hold	2 years	\$1.85m

	recovery design and implementation	wetland management, floodplain management, resilient ecosystems, retirement, reversion, and native planting.			
29	Priority Ecosystem sites ground-truthing	Completing ground truthing of the 700+ priority ecosystem sites across the region to collect important baseline information on each site, such as key threats, the ability to fence the site and the landowner's willingness. Establish a new recovery model, including the impact assessment results from both the Science and Primary Sector teams. This will drive a targeted and accelerated approach to the operational delivery of on-ground works through the Priority Ecosystem Programme.	On hold	3 years	\$2.15m
					Total Estimated Cost \$4.3m

Other

	Recovery Initiative	Description	Status	Timeline	Estimated Cost
30	Re-assessment of low flows	Re-assessment of low flows due to river morphological changes and environmental flow setting. Reset our baseline for the assessment of low flows.	In progress	1 year	\$200k
31	HBRC Recovery Team	New function that is the Conduit between RRA & HBRC. Oversees Recovery Work at HBRC. Supports regional recovery planning and community communications and engagement led by RRA. Oversees recovery initiatives. Supports the scoping and planning of recovery initiatives. Manages the development of Environmental Resilience Plan. Recovery reporting function. Supporting Central Govt & TLAs with Managed Retreat negotiations by providing key information to support the land categorisation process. Recovery comms & engagement to ensure ensuring consistency of messages, engagement plans and media is all managed succinctly and professionally for overall effectiveness and aligns with RRA & TLAs.	Complete	1 year	\$600k
					Total Estimated Cost \$800k

Section 9: Independent Reviews

Independent reviews aimed at gaining valuable lessons learned from Cyclone Gabrielle are being undertaken. These will influence future decision-making on investment to make Hawke's Bay more resilient against climate change and natural hazards, and how these events are managed.

Hawke's Bay Independent Flood Review

An independent review was commissioned by HBRC to investigate the circumstance and contributing factors that led to the Hawke's Bay floods during Cyclone Gabrielle. It is being led by Dr Phil Mitchell, along with an expert panel who specialise in resource management, engineering, and law.

The scope of the review will cover the performance of all Regional Council-owned and operated flood protection, control and drainage schemes during Cyclone Gabrielle, addressing: the origin and purpose of each scheme, including intended levels of service (LOS), the severity of the Cyclone Gabrielle event relative to scheme purpose and thirdly, the scheme maintenance and operation before, during and in the immediate aftermath of cyclone Gabrielle; and recommend improvements to scheme levels of service and maintenance or operational requirements for future events, having regard to climate change.

The final report of the review is expected to be presented the Council by the end of June 2024.

Flood Management Schemes Reviews

A further impartial and independent review of the Hawke's bay flood management schemes undertaken by T+T and PDP were also commissioned by HBRC.

The reviews will help to reconfigure and build resilience against future floods. Schemes include Heretaunga, Upper Tukituki, Heretaunga drainage, Upper Makara, Ohuia, and Opoho. Elements of the Karamu will be reviewed as part of the Heretaunga Plains Flood Control scheme review.

The reviews of the Heretaunga Plains and the Upper Tukituki schemes will be undertaken first as flood control will be prioritised. These reviews will look to assess how the schemes are meeting the levels of service (post Cyclone Gabrielle), make suggestions for capital improvements where the scheme cannot meet the level of service and will produce plans for how the scheme will manage events which exceed the level of service – which is most important for predicting outcomes of exceedance events.

Reviews of other key schemes will be undertaken in order of priority following the completion of the flood control scheme reviews.

The final report for the flood control scheme reviews is expected to be delivered in June 2024. The other reviews will be received over a 3 year period by the end of 2027.

Independent Review into the Hawke's Bay Civil Defence Emergency Management Response into Cyclone Gabrielle

This Independent Review has been commissioned by the Hawke's Bay Civil Defence Emergency Management Group Joint Standing Committee.

The purpose of this Independent Review is to assess the operational performance of the Hawke's Bay Civil Defence Emergency Management Group's immediate response to Cyclone Gabrielle, with a particular emphasis on the systems and processes, and roles and responsibilities of Group members and partners.

This Review will be focused on the lessons and opportunities that can be drawn from a really targeted period of time, including the days immediately leading into the event and the immediate emergency response stage, prior to the region's move toward recovery. The review will also look at how much the implementation of pre-existing arrangements contributed to an effective management of the response for mana whenua and Hawke's Bay communities.

This Review will be future focused, with outcomes used to identify learnings, improve resilience, and ensure the Hawke's Bay Civil Defence Emergency Management Group has robust emergency management capability and capacity to support better emergency management outcomes for Hawke's Bay communities.

Interim recommendations were submitted to the Minister for Emergency Management and Recovery on 7 Dec 2023. However, these will not be publicly released until deliberations are finished.

Government Inquiry into the Response to North Island Severe Weather Events

The Government has established this inquiry to identify lessons from the three severe North Island weather events in early 2023. The inquiry's recommendations will ensure New Zealand's emergency management system is appropriate to support preparedness for, and responses to, future natural emergencies.

The purpose of the inquiry is to ensure that the design of New Zealand's emergency management system is appropriate to support readiness for, and responses to, future emergency events (landslides, tsunami, earthquake, volcanic activity, floods, and storms) by identifying lessons from the 2023 North Island severe weather events. The final report for this inquiry is due on 26 March 2024.

Section 10: Looking forward

During 2023 an unprecedented amount of extreme weather events were reported across the world. Many countries are experiencing catastrophic effects from increased hazards under climate change. Climate change increases the probability and severity of flooding, landslips, heatwaves, wildfires, and drought. Coastal inundation and erosion are also risks due to sea level rise. These severe weather events have resulted in tragic loss of life, extinction of species, destruction of crops, threatened livelihoods, and economic uncertainty.

Climate change projections for the Hawke's Bay catchments include warming temperatures, fewer frost days, and a change in rainfall patterns with periods of higher rainfall and periods of low rainfall. Changes to the region's environmental risks will bring new challenges as climate change continues to accelerate.

The effects of Cyclone Gabrielle will take years to fully understand and recover from. Looking forward to the next stage of recovery, HBRC will focus on medium-term recovery issues. The key focus areas for the Council in the next LTP are:

- Resilient flood infrastructure: Living with rivers & flooding risk. This includes a substantial \$250 million programme for Category 2 flood mitigation (Flood Resilience Programme).
- A resilient community: Responding when needed. This includes \$880k for HBCDEM.

These priorities have been influenced by the funding received and the cost-share agreement HBRC has committed to with the Crown. The outcomes of

the Independent Reviews and key research will also guide decision making for these priority areas.

As these commitments get underway, collective thinking into resilience planning against climate change risks and long-term recovery needs of the region will begin for the next Long Term Plan (2027-2037).

Based on key issues identified in this report the below areas will be long-term recovery considerations.

- Climate change adaptation and mitigation
- Water storage and managing water resources
- Erosion control and regenerating of productive soils
- Supporting rural communities with long-term recovery
- Remediation to worst affected natural environment areas and improving biodiversity outcomes

Longer-term recovery for the region will look to develop greater resilience in the face of a changing climate. This will mean HBRC working with partners across risk and hazard identification and management. Long-term resilience for land use, particularly in hill country, will need to be a key focus to keep soils in place and reduce the amount of sediment entering our waterways. Building new, or modifying existing flood protection infrastructure, to provide an agreed level of community protection from future events will continue to be a significant workstream of the Regional Council, along with ongoing maintenance of existing schemes.

The council will continue to be a key disseminator of environmental information and maintaining monitoring systems to ensure vital information is gathered to assist with ongoing investigations into the state of our environment and risk during significant weather events. Together with all the councils involved in civil defence there will need to be a focus on clarity of roles, functions and service deliver

Section 11: Next Steps

As we move into the next phase of recovery and start to work on medium-term recovery priorities, the Regional Council will return to a BAU operational model that integrates medium to long-term recovery work into the work programmes set by the next LTP (2024-2027). The Recovery Team will transition out and handover ongoing recovery work to the responsible operational teams.

Public consultation for the LTP (2024-2027) will seek to understand how these key work programmes will be funded. Consultation will be held from 12 April-12 May 2024.

The Cyclone Recovery Committee that was temporarily established to provide governance to HBRC's recovery work has since reverted back to the Environmental Integrated Catchment Committee, under Clause 30 of Schedule 7 of the Local Government Act 2002. Recovery reporting will be incorporated into BAU work programme reporting to their appropriate committees.

The Flood Resilience Programme and set up of the Programme Management Office (PMO) is underway. Recruitment for this programme is ongoing. The PMO will oversee the construction of the new flood protection infrastructure for Category 2 areas, ongoing repair and upgrades to existing flood schemes, and the replacement and renewals of impacted pump stations and drainage systems.

Community communications and engagement on Category 2 infrastructure projects will be led by the PMO to keep impacted communities closely involved and updated on progress. Project dashboards will be available on HBRC's website for communities to access the latest information, and community meetings will continue, as needed.

Recommendations from the Hawke's Bay Independent Flood Review, Flood Management Schemes Review, and NIWA's Flood Frequency Analysis will all be taken on board in the future resilience planning and design of Hawke's Bay's new and existing flood and drainage schemes and their management.

HBRC's Regional Water Security programme is underway and will inform a more accurate understanding of the current regional pattern of water takes and use. It will look to future water demands in the context of a changing climate and identify future water management options.

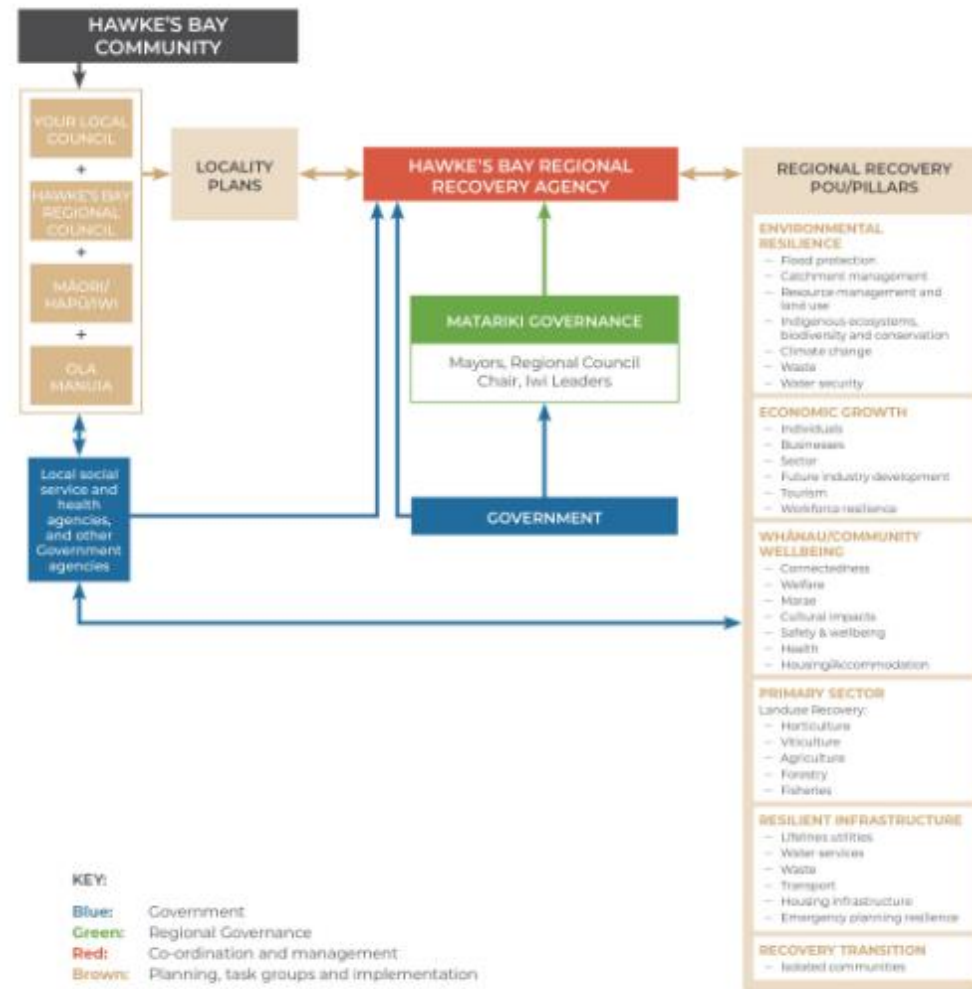
HBRC's Policy team have transitioned back into business as usual including the Kotahi related planning work (find link to the Kotahi Plan in Resources, p78). This work will progress an update to the Regional Policy Statement (RPS) as the team embark on addressing region-wide issues. Through this project issues in the catchments will be identified including any new issues brought about by Cyclone Gabrielle so they can be addressed through the relevant planning mechanisms.

HBRC will continue to partner with the RRA, councils and key agencies on the regionally led recovery efforts and joined up communications and community engagements. The Regional Council supports the work of the RRA in their efforts to work with the new Government to seek future relief funding for the region and are dedicated to deliver a united approach to regional recovery to achieve the best outcomes for our communities.

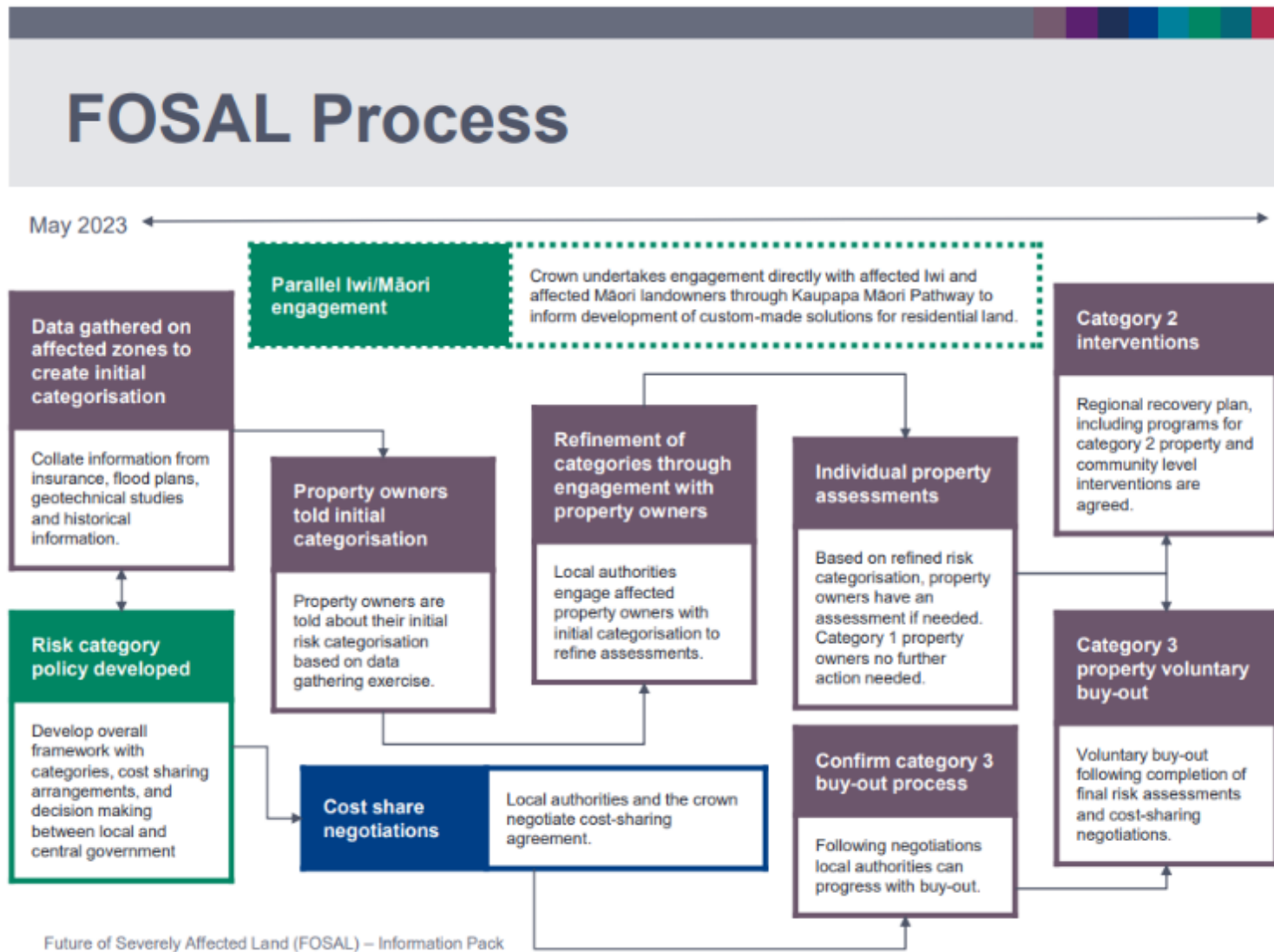


Appendix

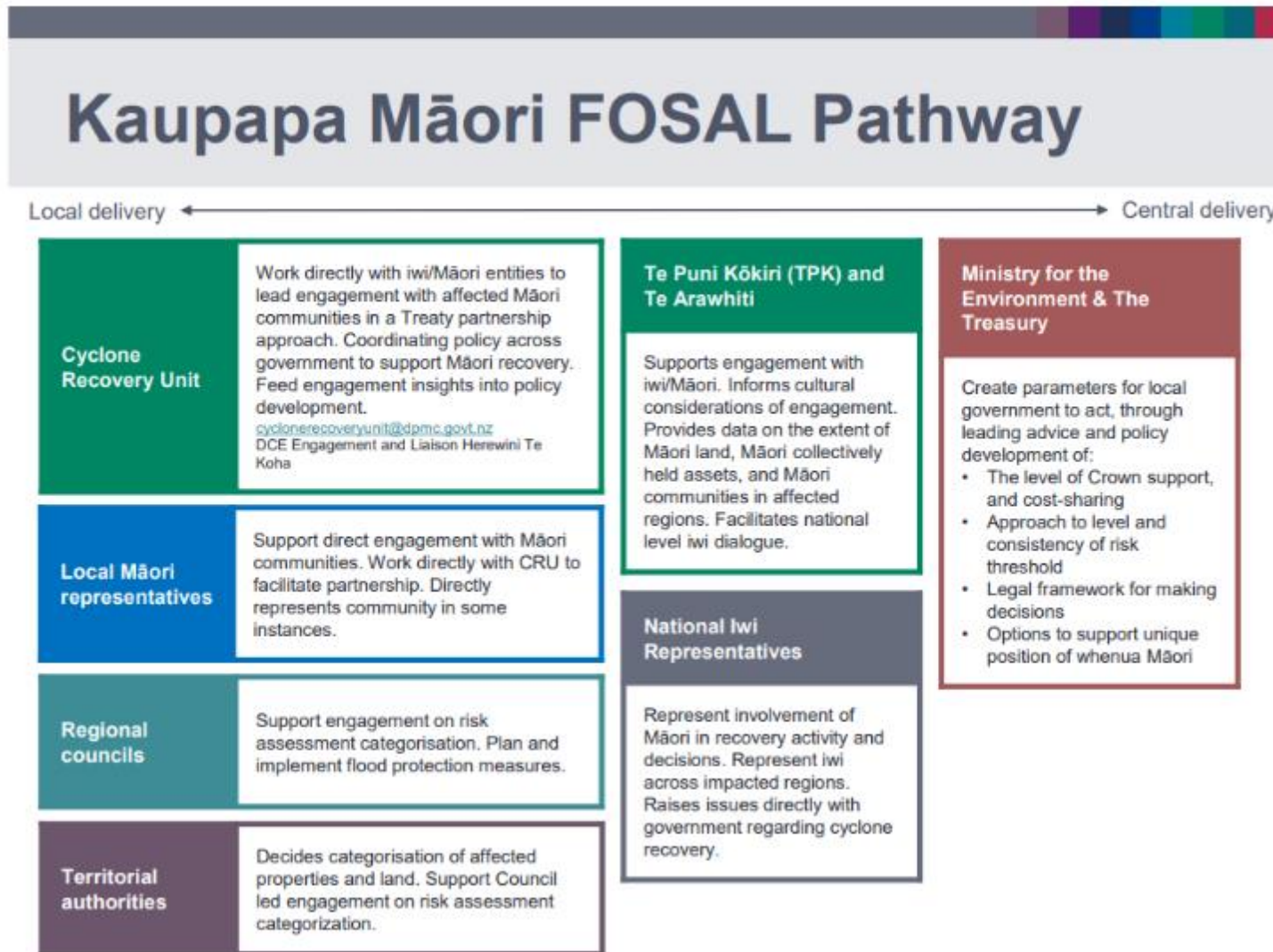
1. Hawke's Bay Recovery Framework by Hawke's Bay Regional Recovery Agency (taken from the RRA website, <https://www.hawkesbayrecovery.nz>)



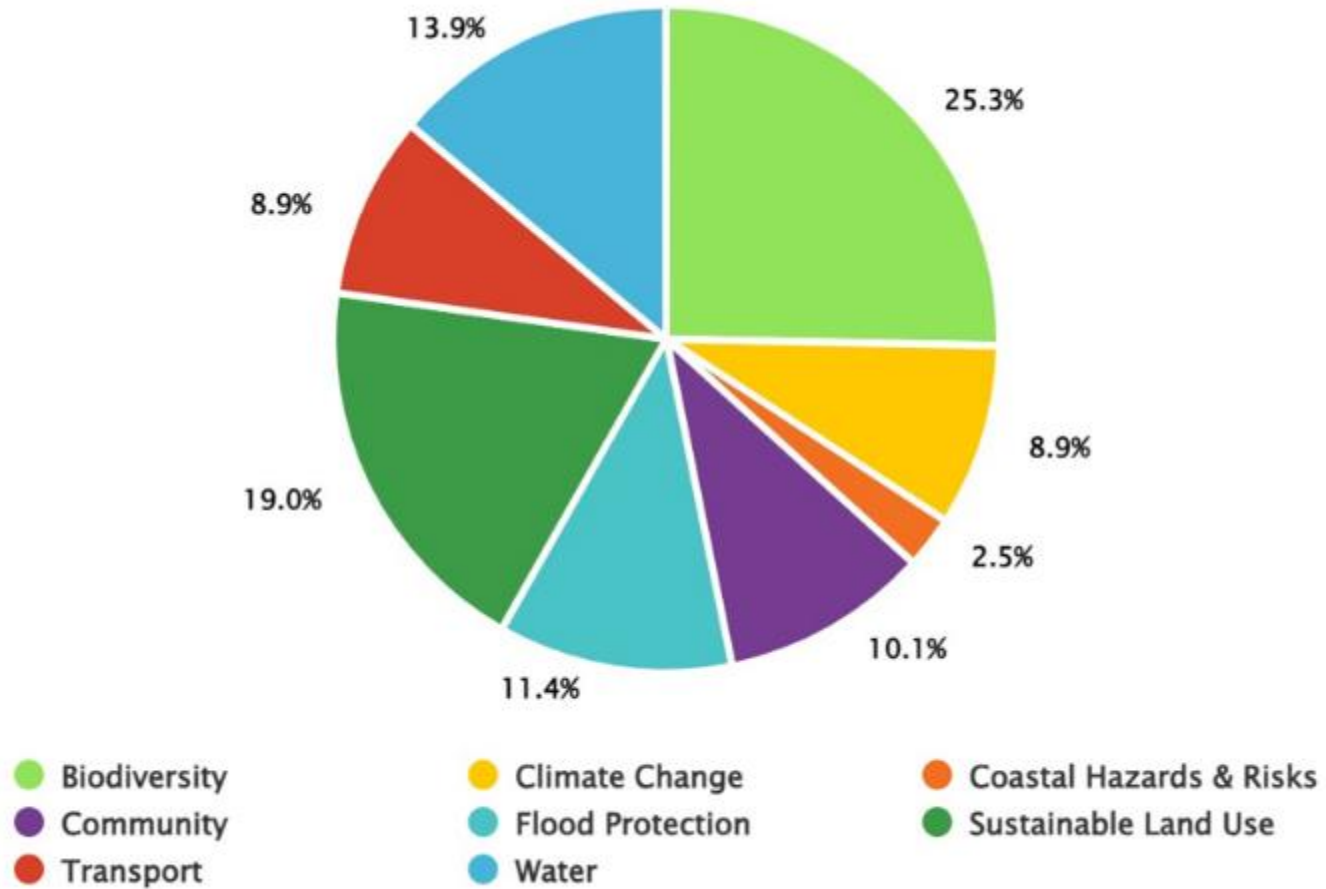
2. Future of Severely Affected Land (FOSAL) Process (taken from the DMPC website, www.dpmc.govt.nz)



3. Kaupapa Māori FOSAL Pathway (taken from the DMPC website, www.dpmc.govt.nz)



4. Community feedback: What does Environmental Resilience mean to you? The below chart shows the number of comments received for each environmental topic.



5. Ministry for the Environment summary map of landslides

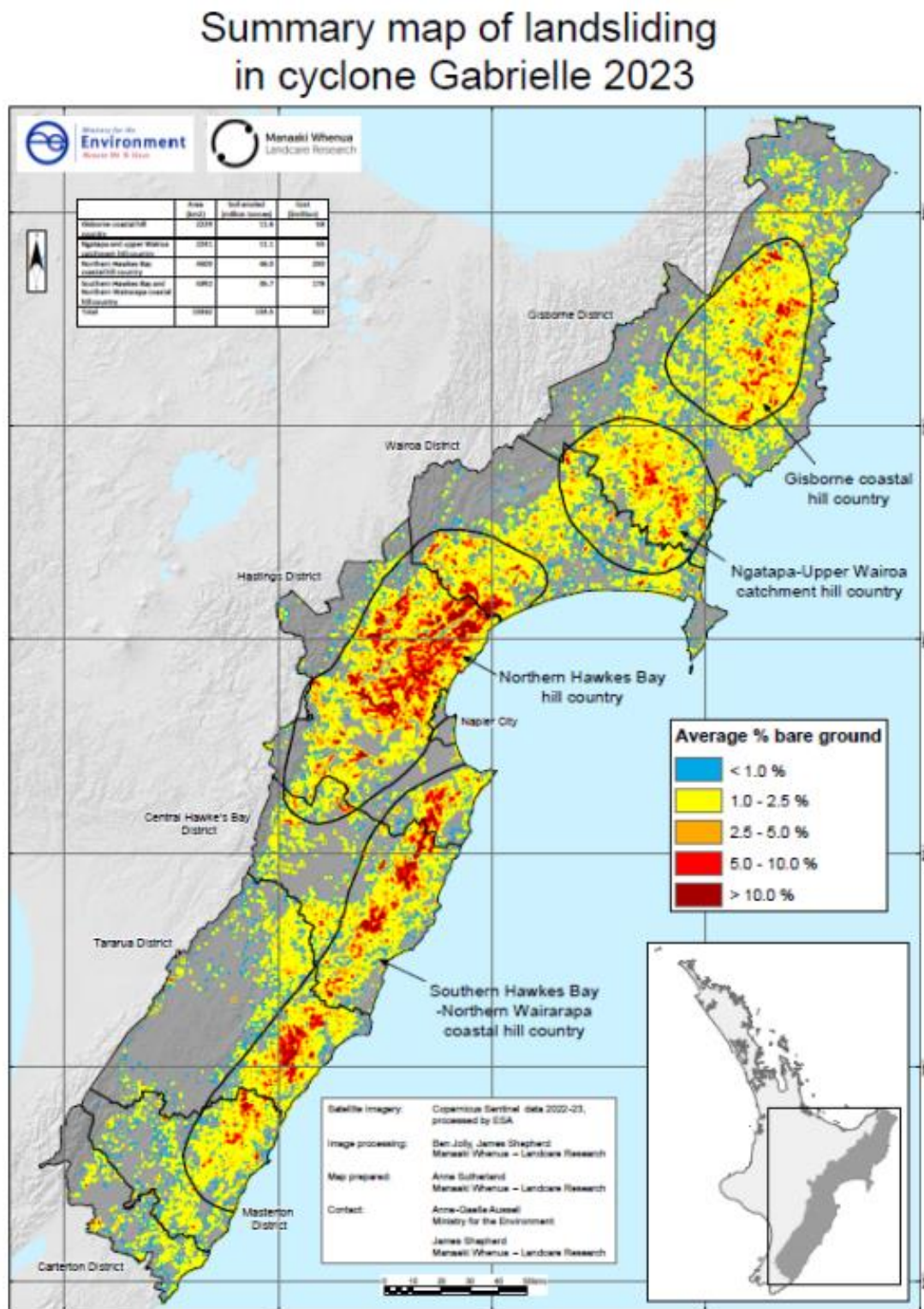
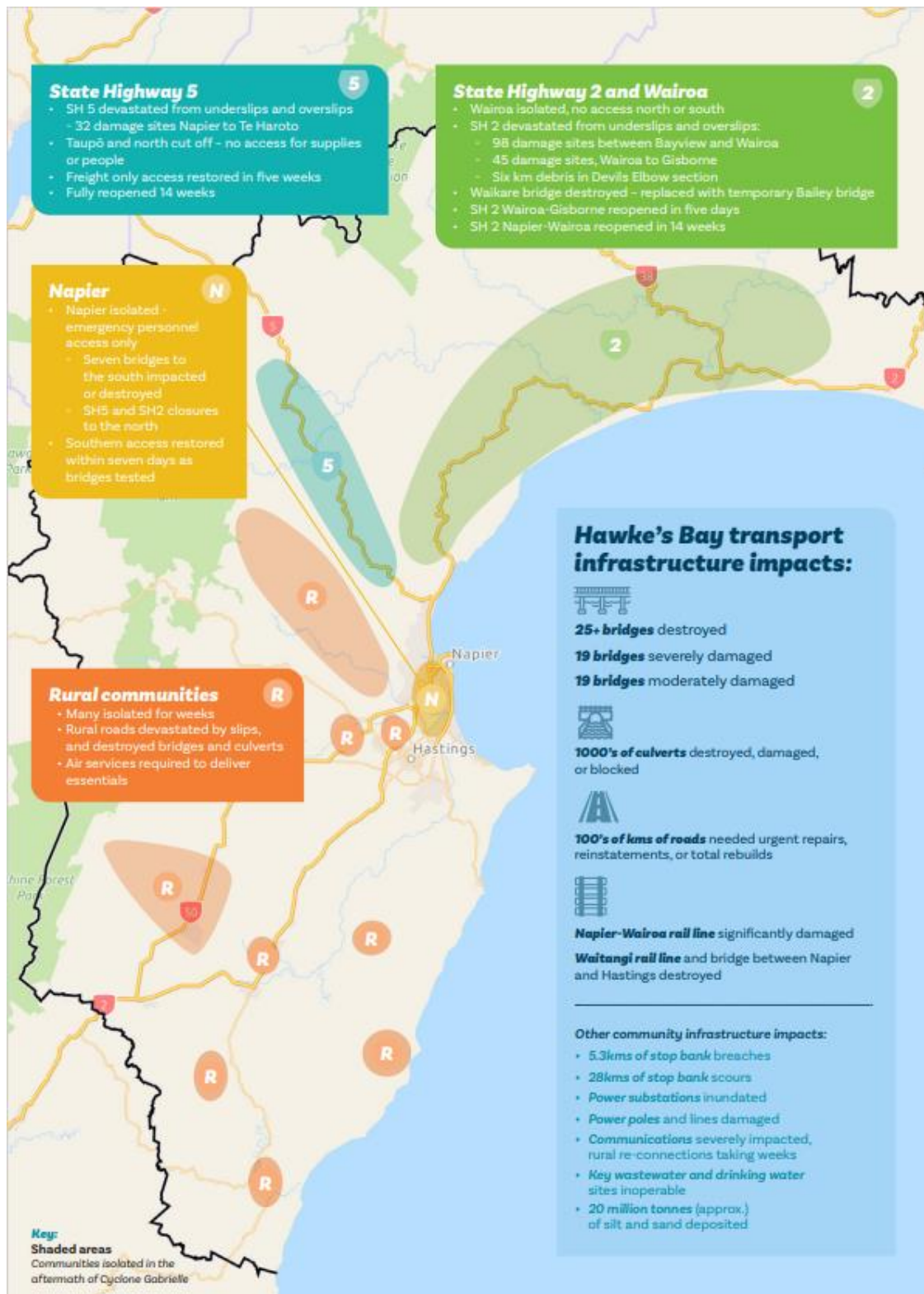
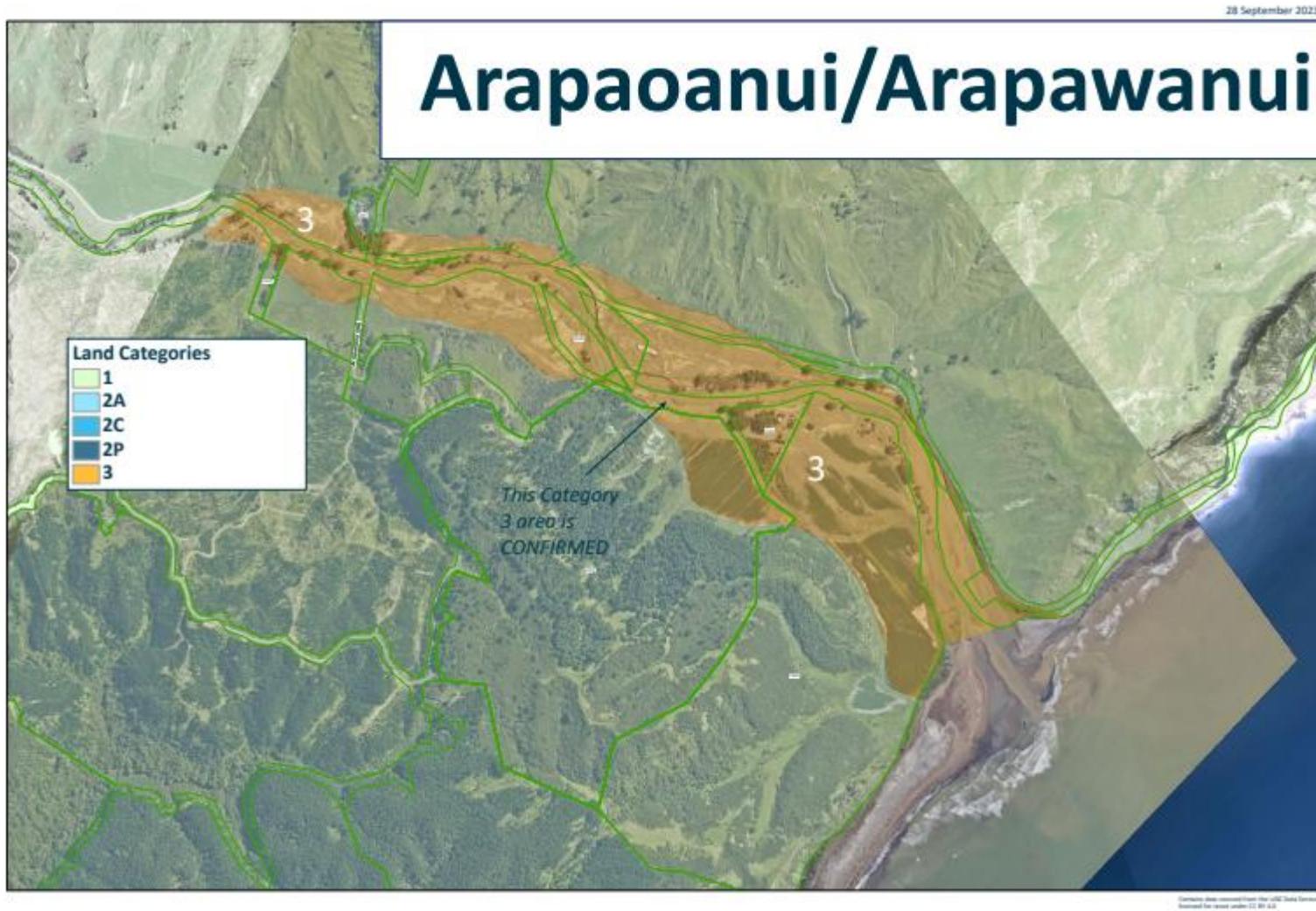


Figure 2. Summary map of landsliding. Colours show the proportion of land in each square kilometre mapped as bare (either landslide scar or debris tail).

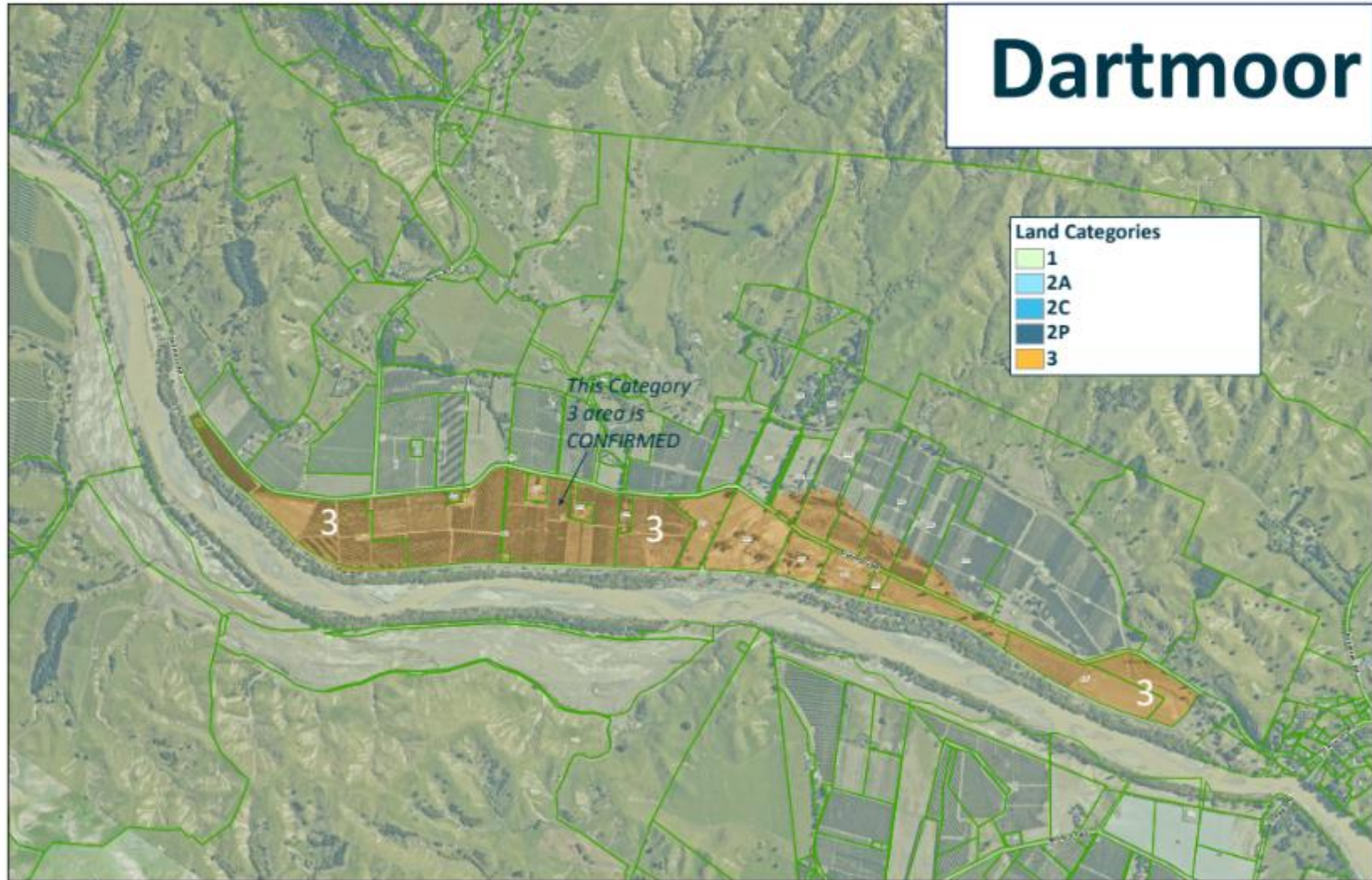
6. Hawke's Bay DRAFT Transport Infrastructure Impacts summary



7. Final Hazard Maps published on hlandcat.co.nz website.

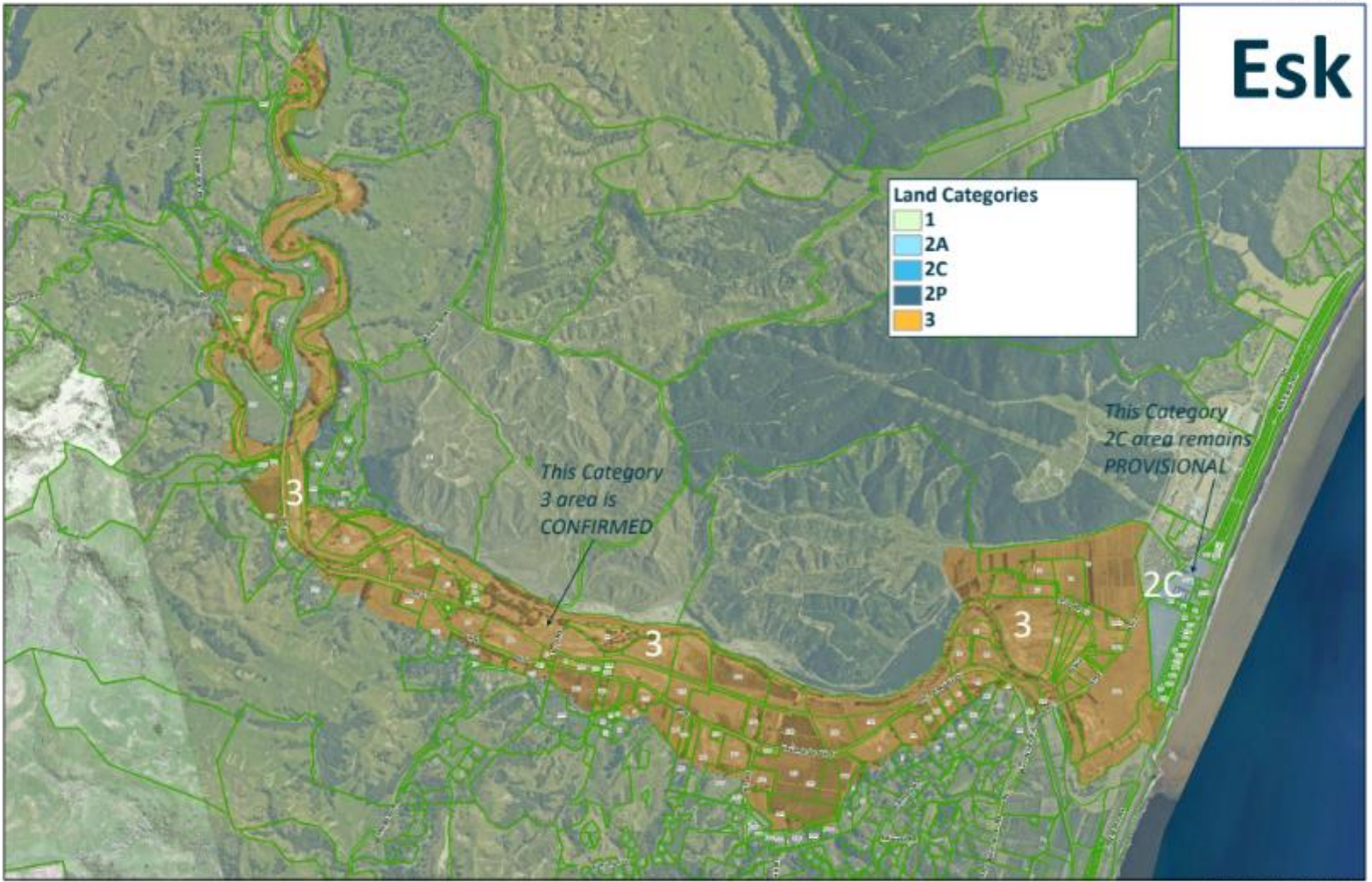


Dartmoor



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Esk



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Havelock North



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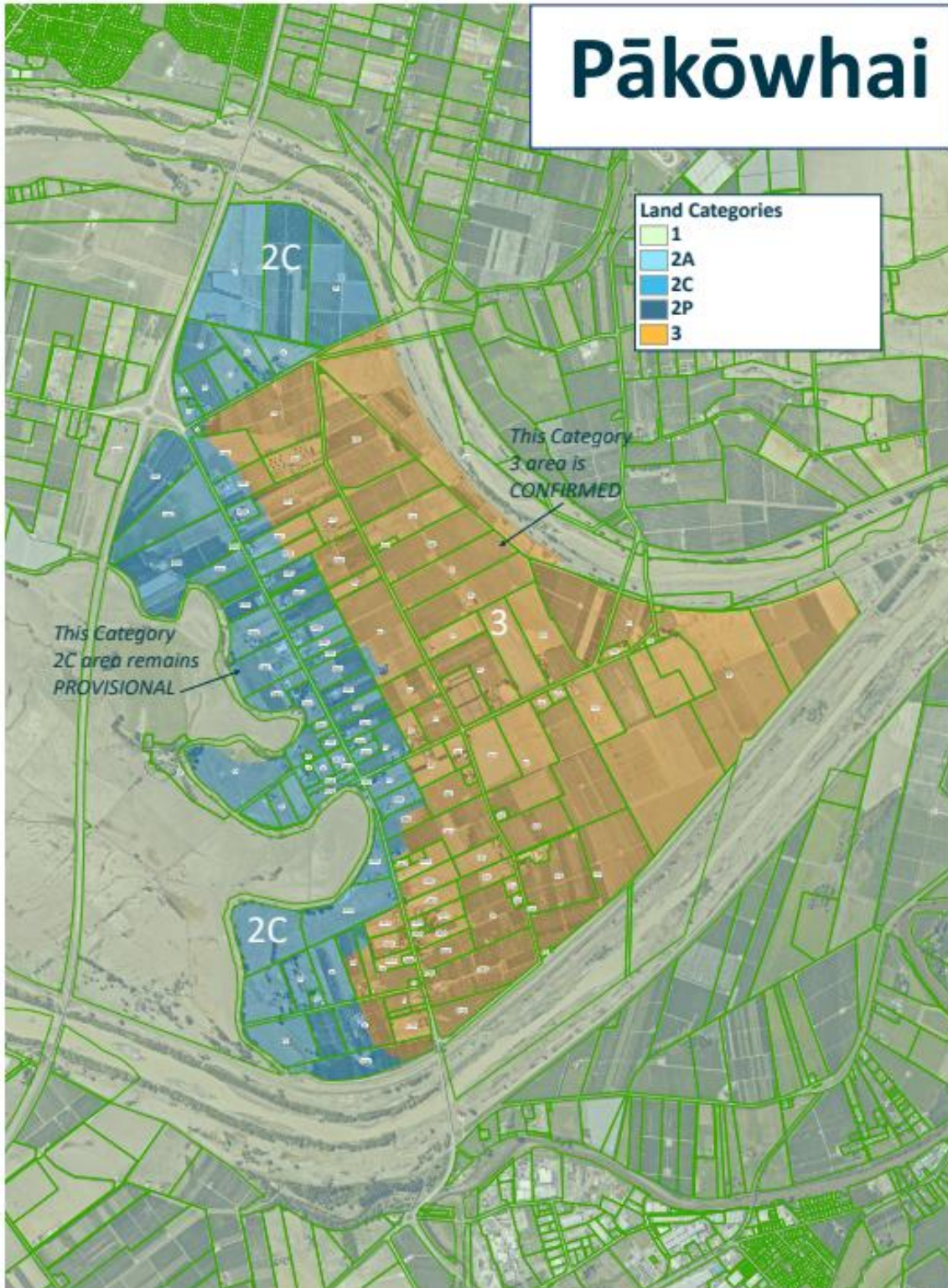


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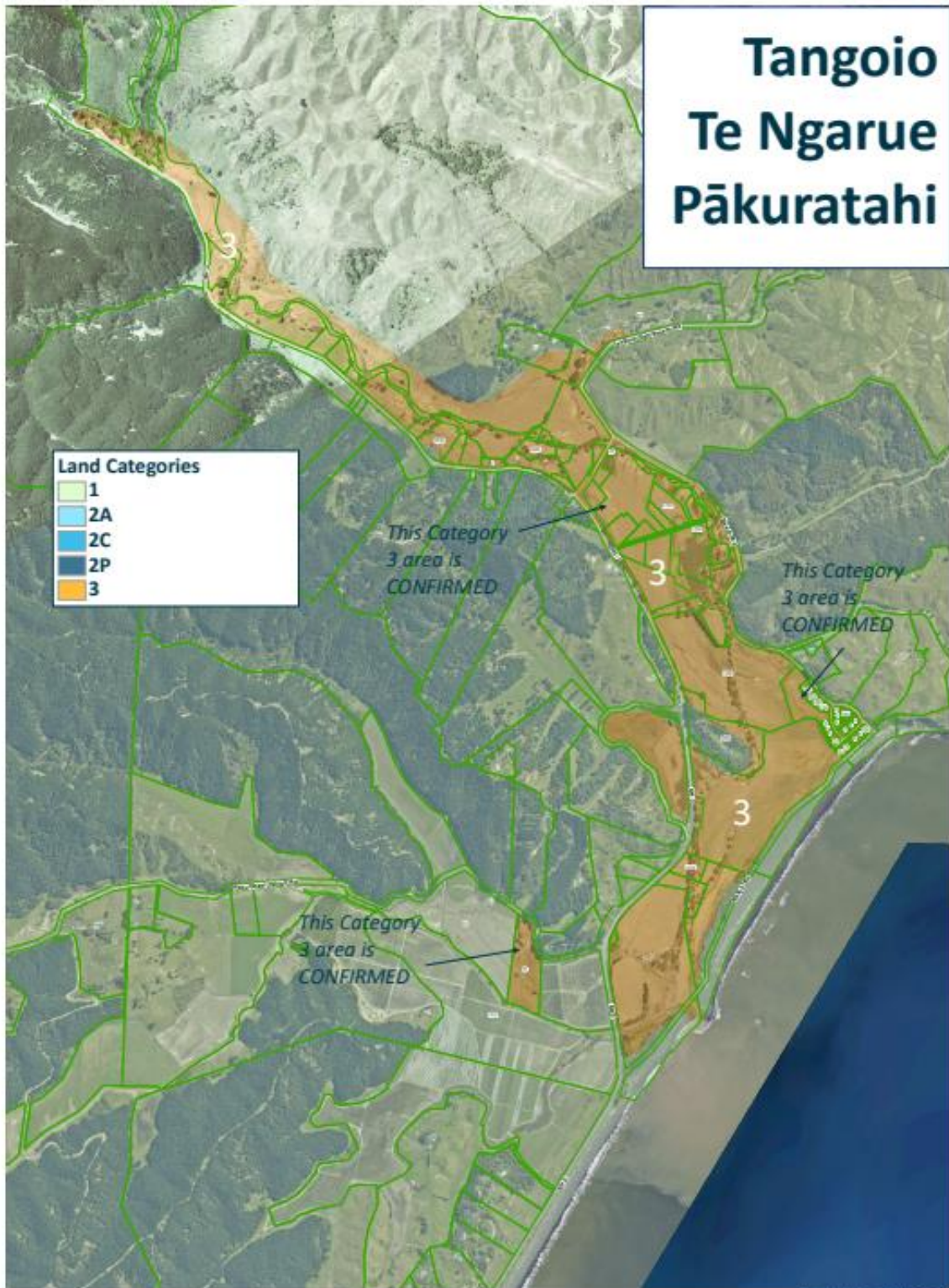
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Pākōwhai

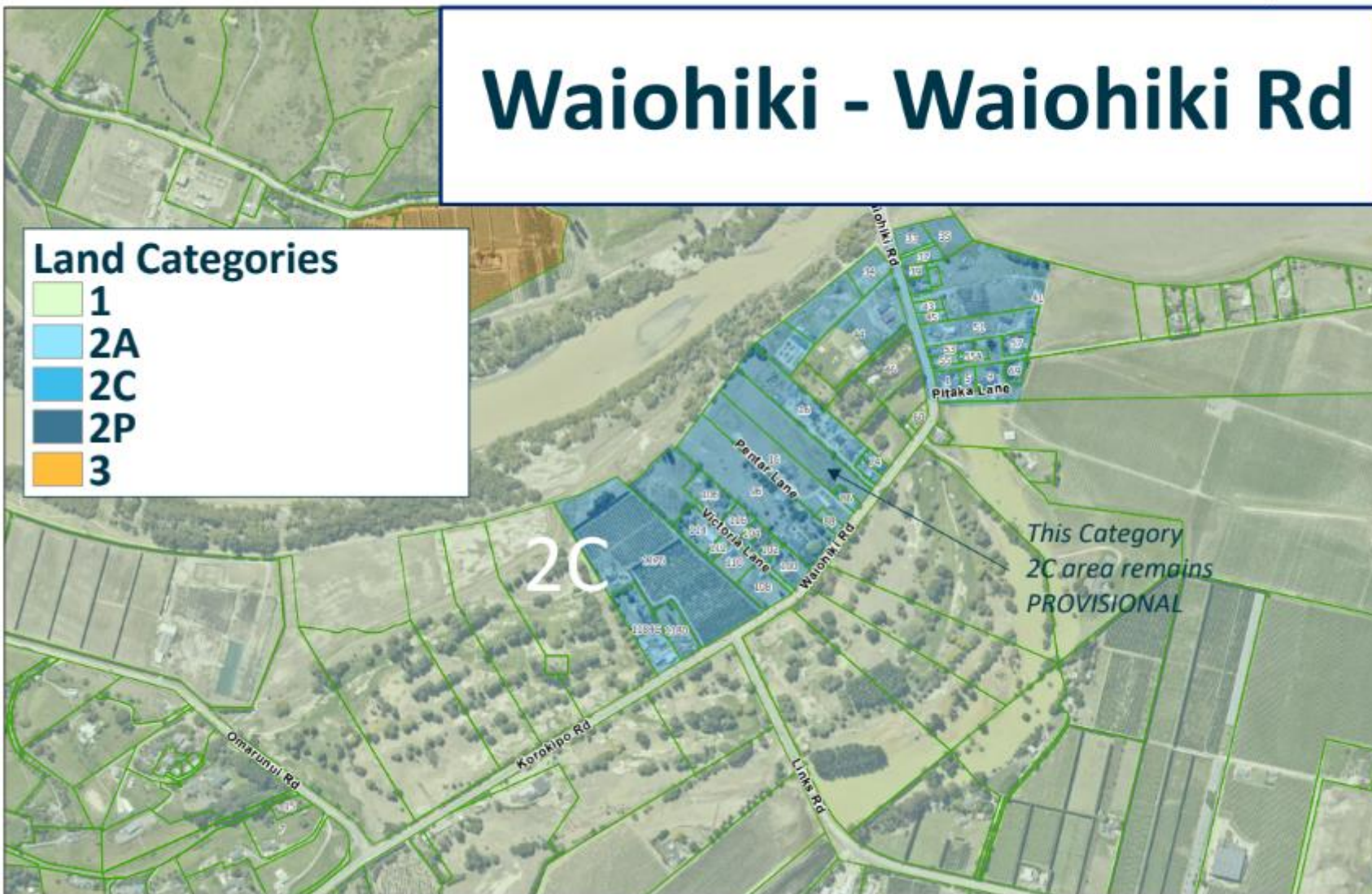


Cartographic data sourced from the LINZ Data Service. Revised for Water under CC-BY 4.0

Tangoio Te Ngarue Pākuratahi

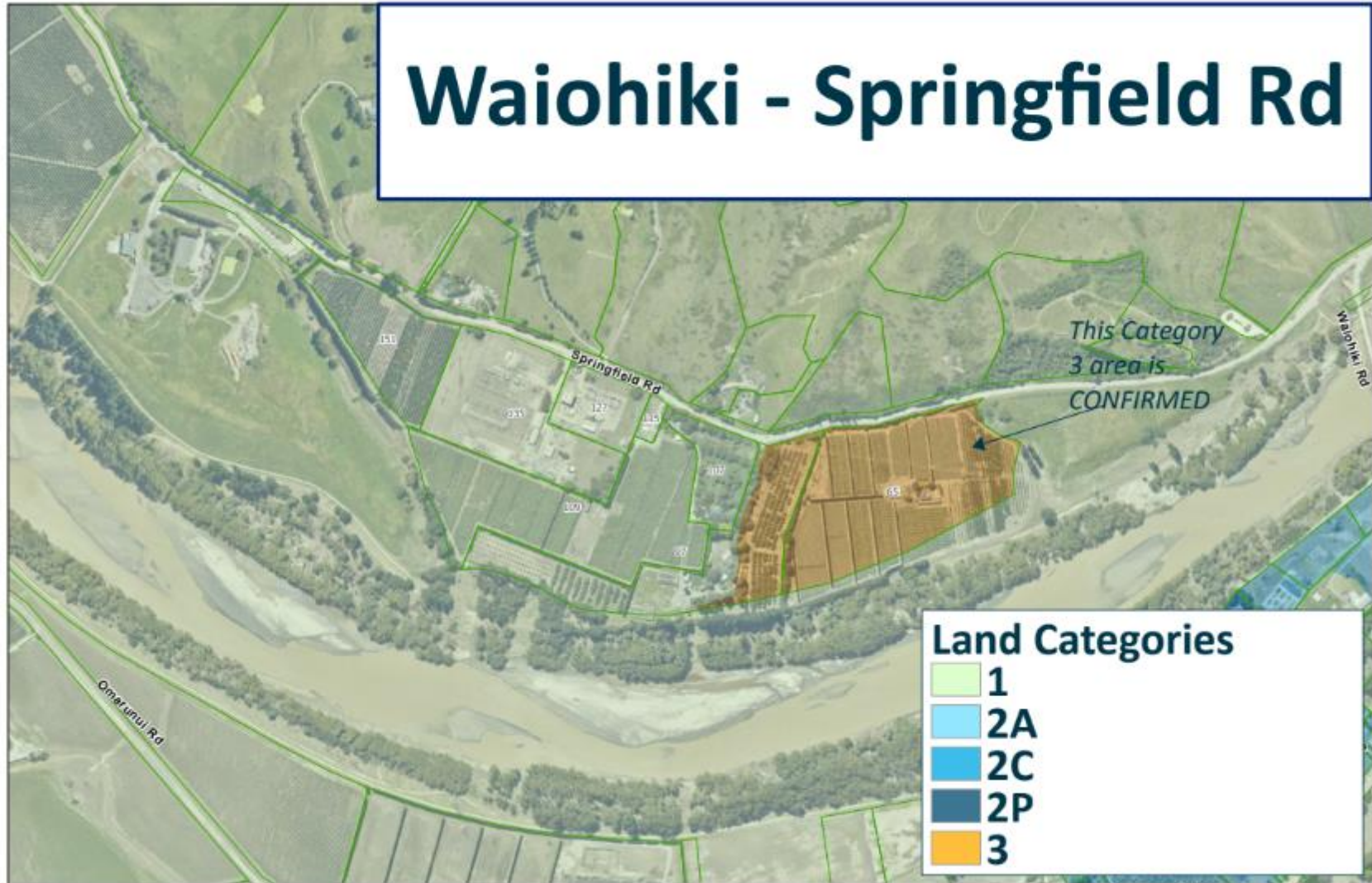


Waiohiki - Waiohiki Rd



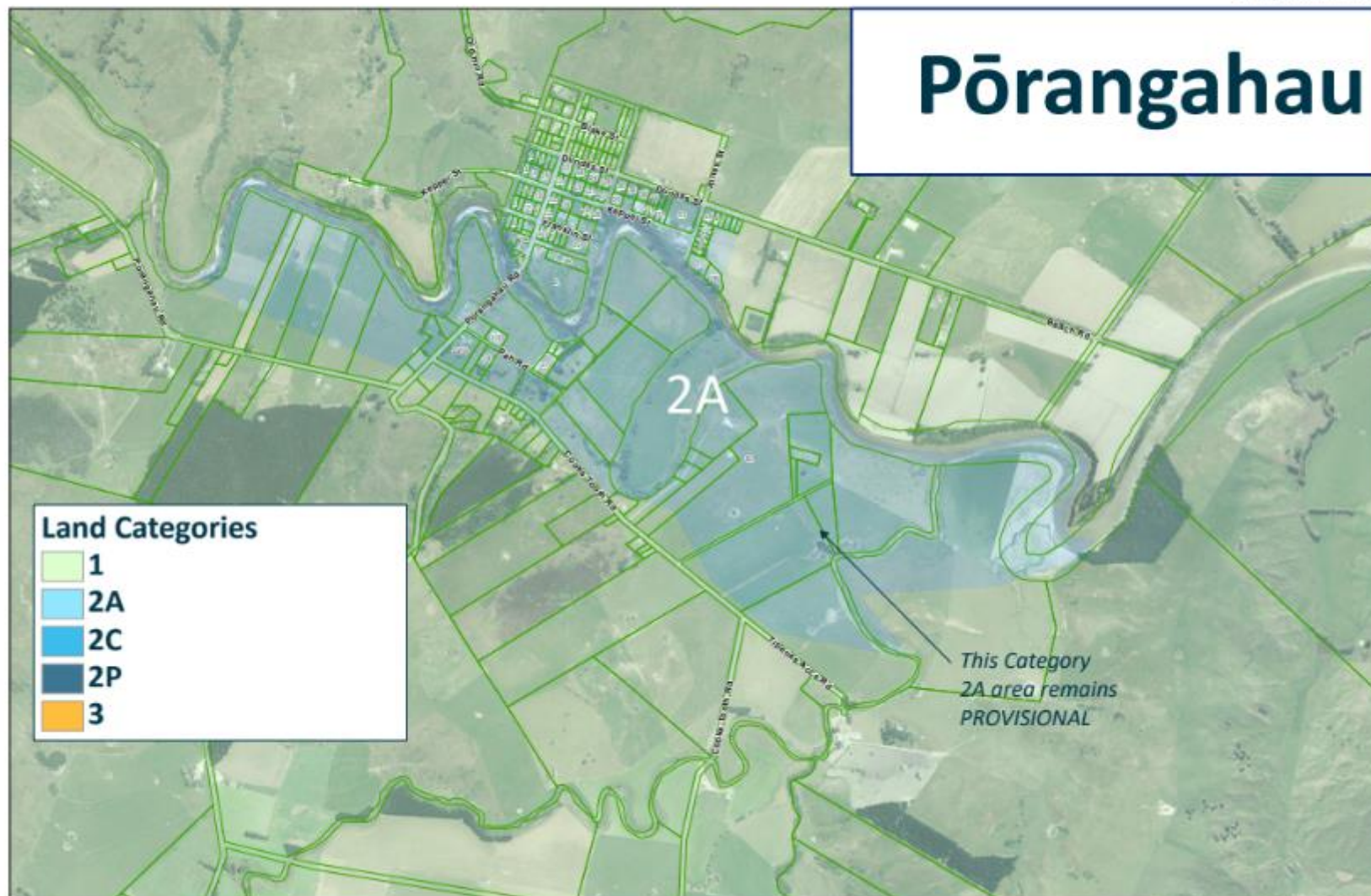
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Waiohiki - Springfield Rd

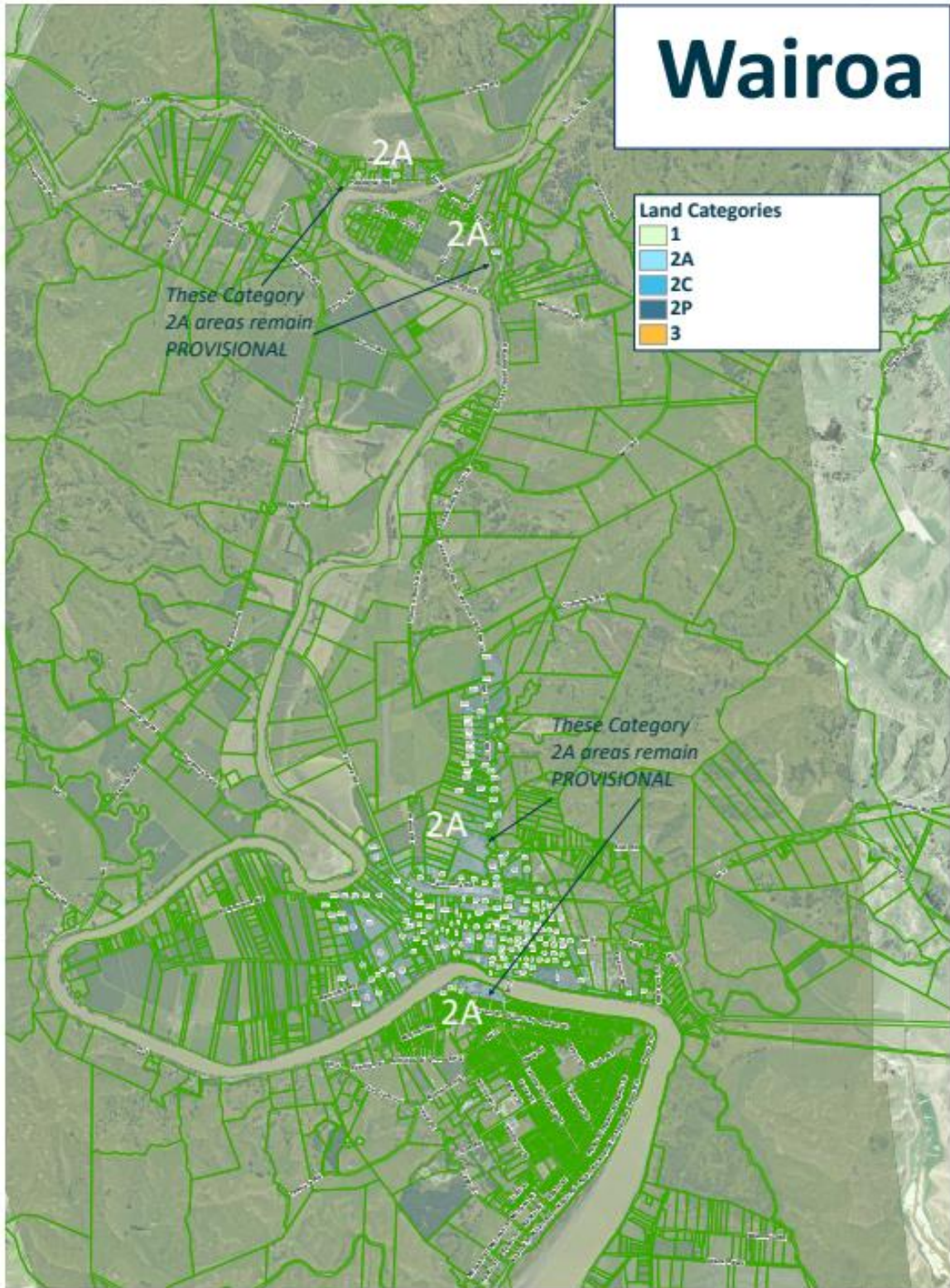


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Pōrangahau



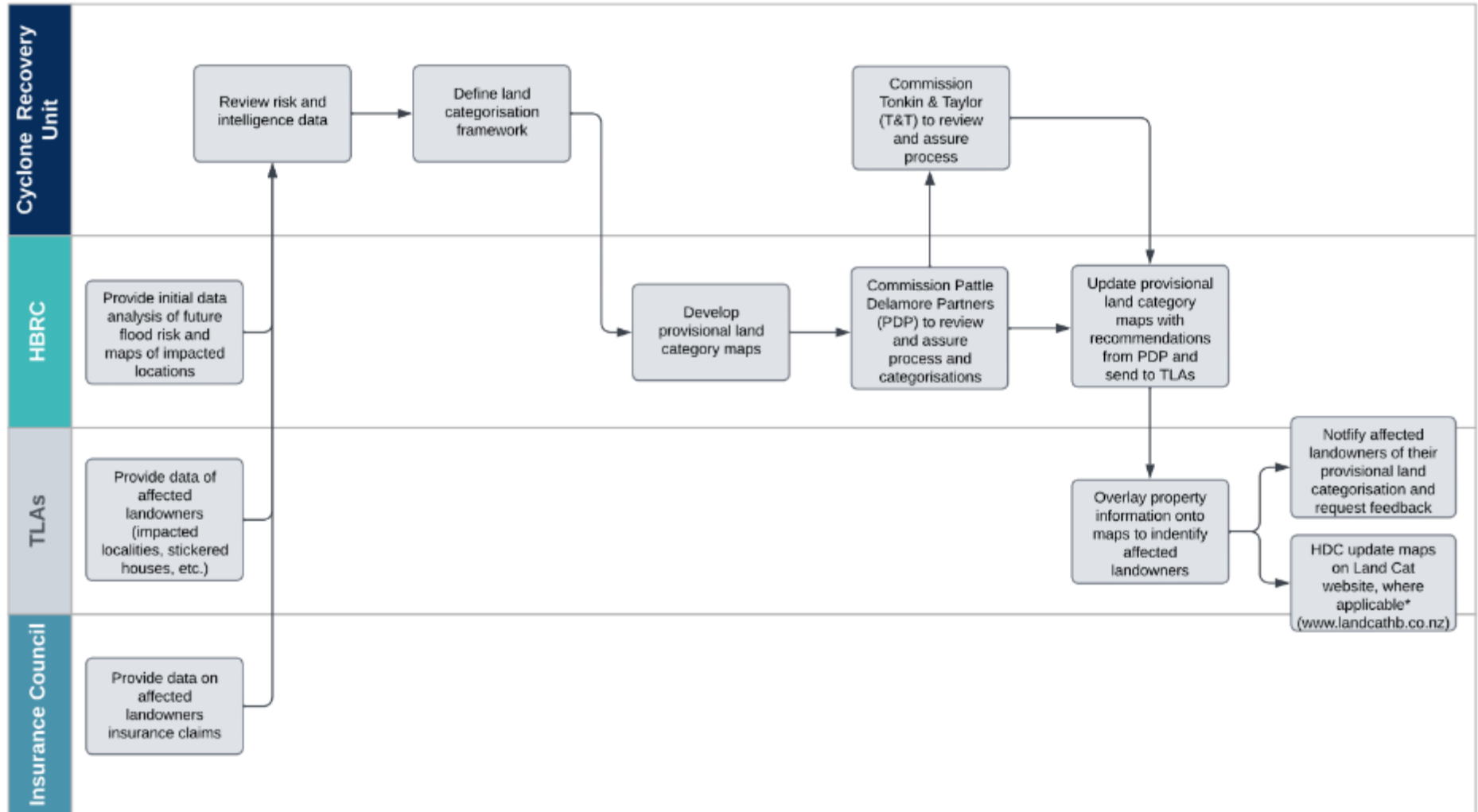
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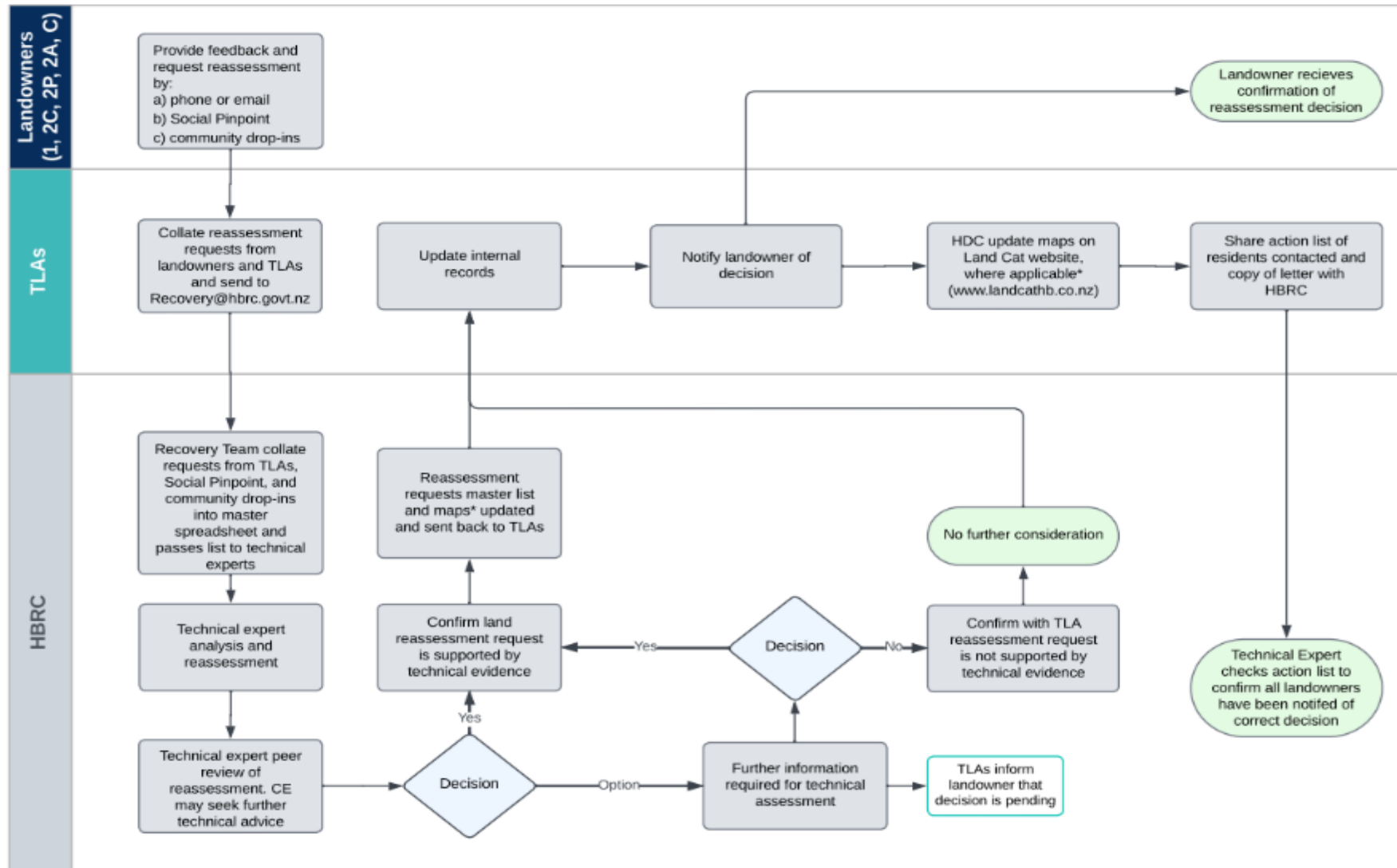
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8. Land Categorisation Process Mapping (internal use only).

Land Categorisation Process
Process 1: Identification of Impacted Properties

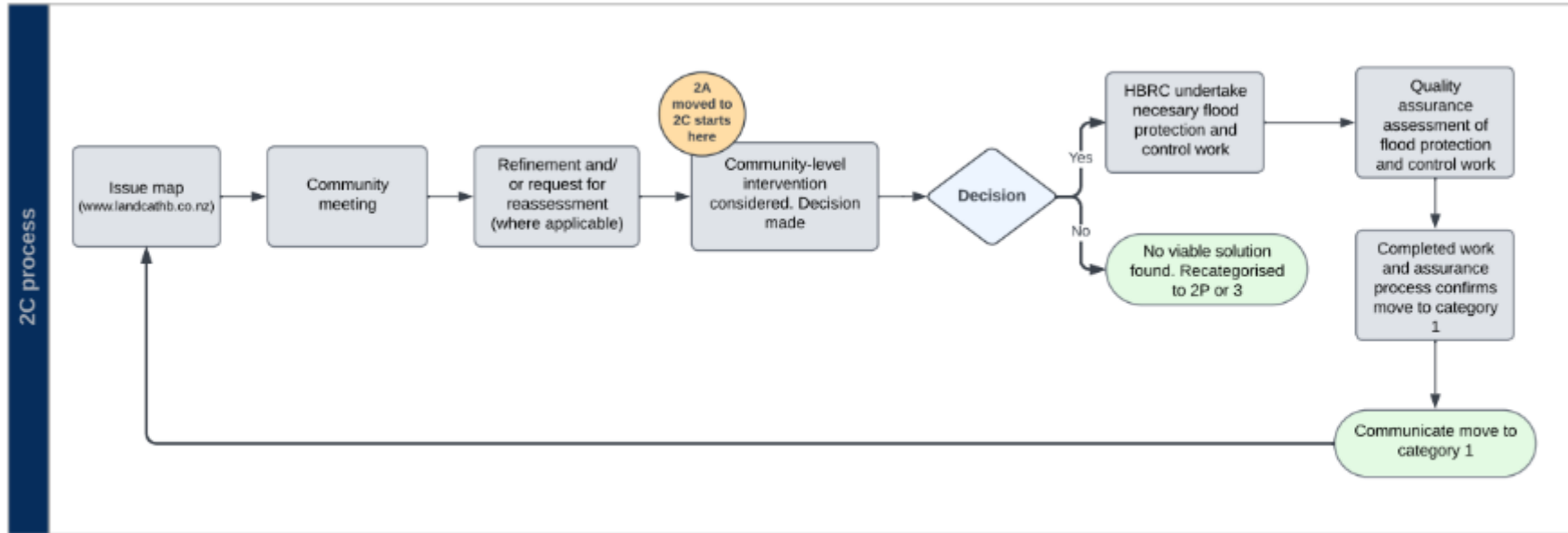


Land Categorisation Process
 Process 2: Reassessment Process



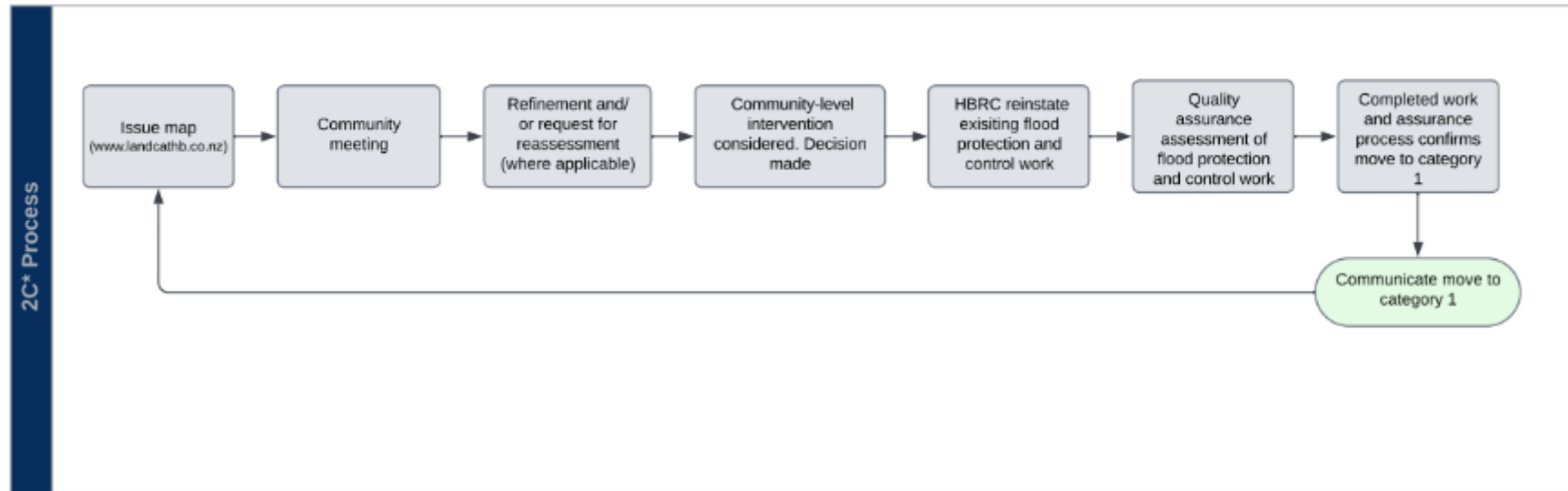
*Maps will only be updated when new clusters are identified or map fringe lines adjustment.

Land Categorisation Process
Process 3a: Recategorisation of category 2C



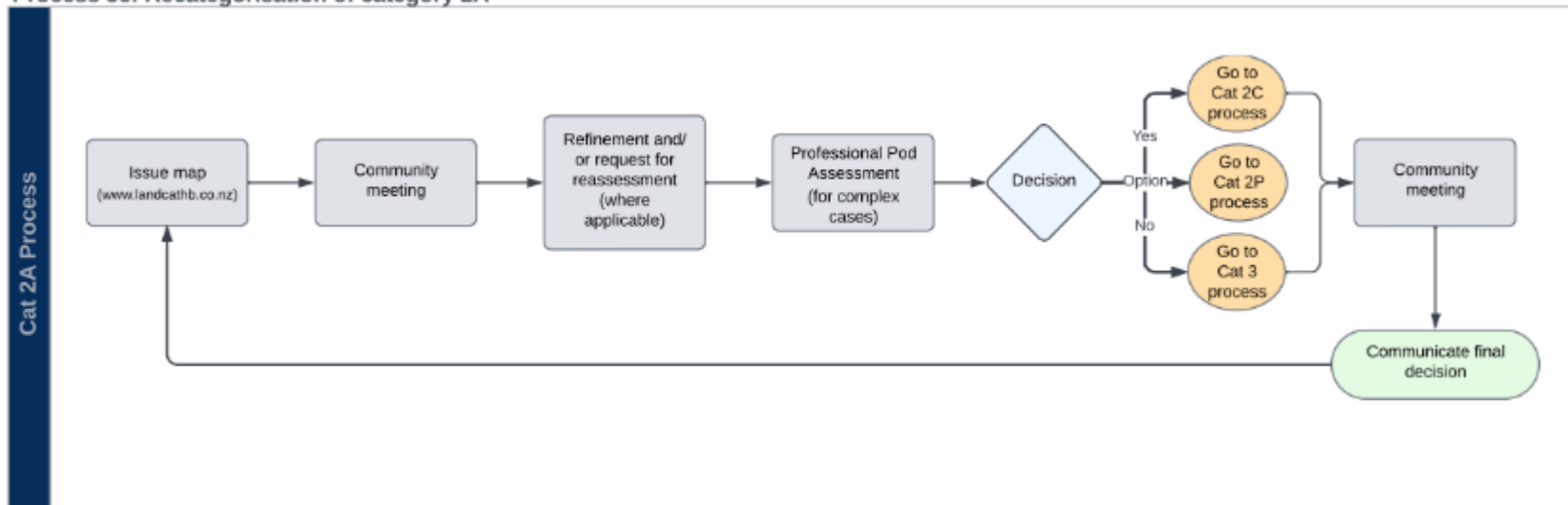
Land Categorisation Process

Process 3b: Recategorisation of category 2C*



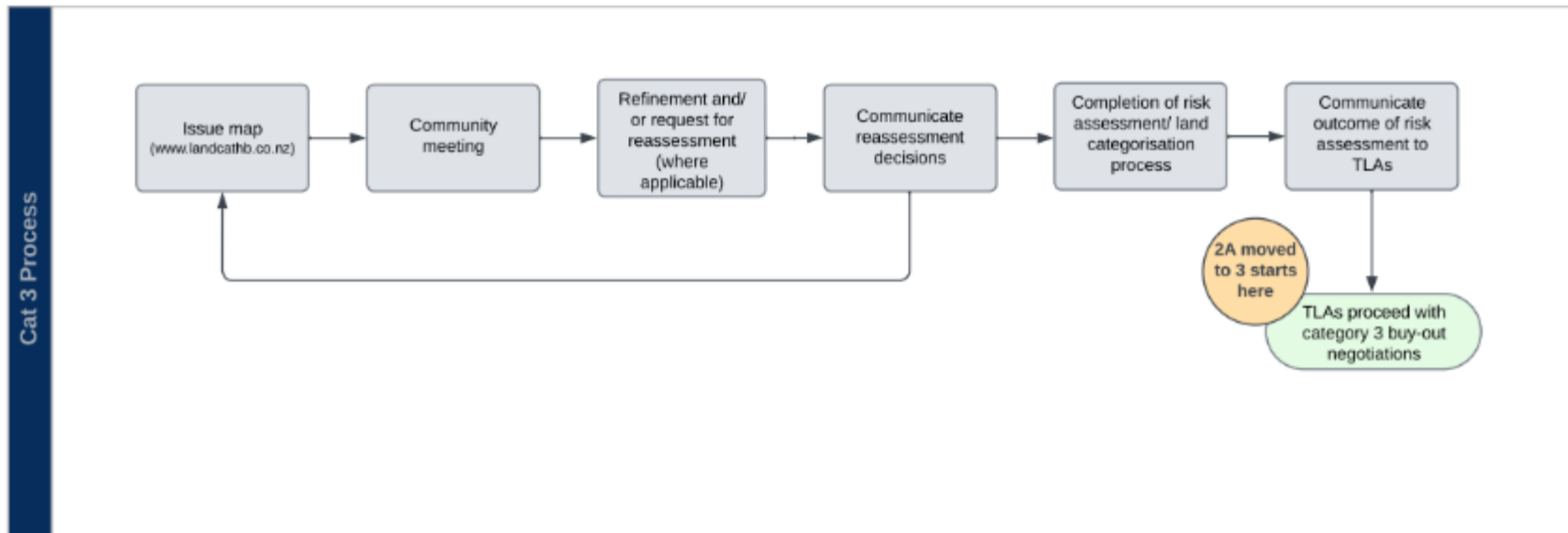
Land Categorisation Process

Process 3c: Recategorisation of category 2A



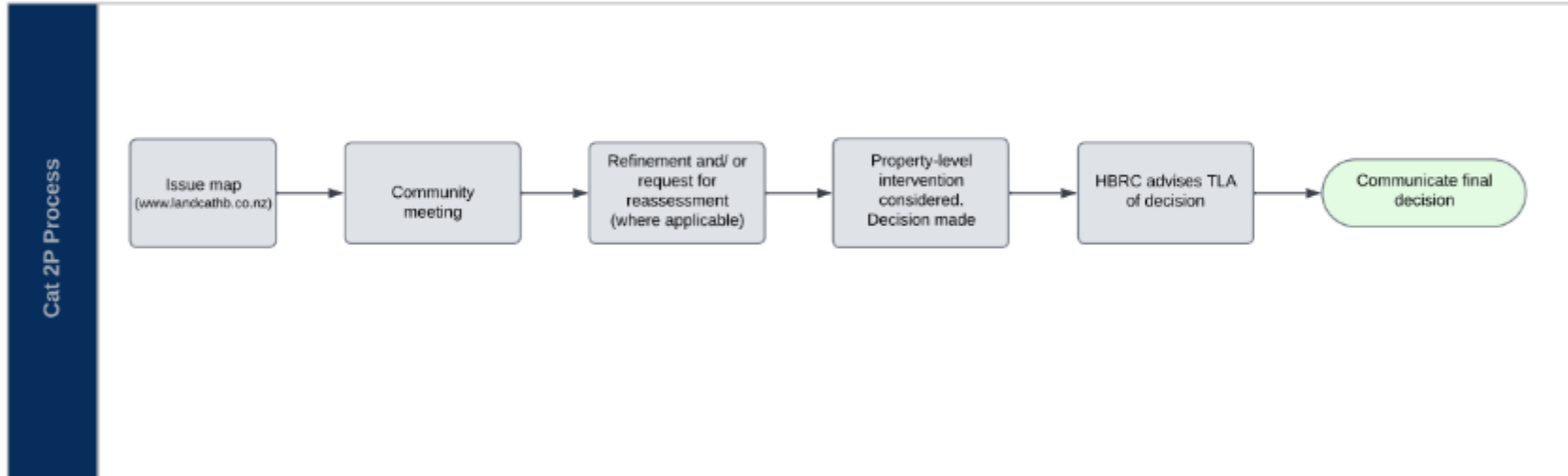
Land Categorisation Process

Process 3d: Land categorisation for category 3

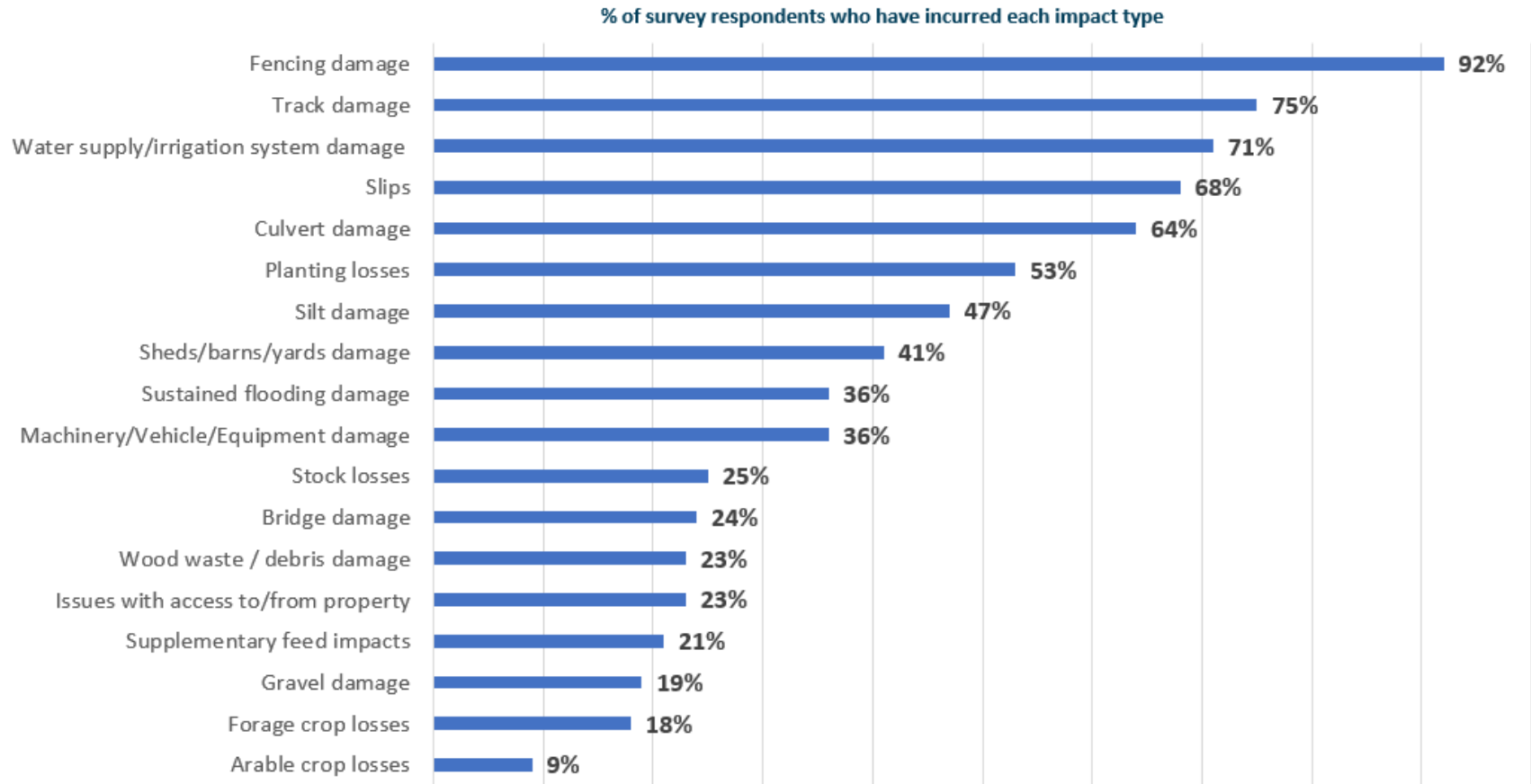


Land Categorisation Process

DRAFT Process 3e: Recategorisations for Category 2P



9. Rural Recovery Cyclone Impact Assessment feedback analysis on impact types.



Resources

1. Regional Recovery Plan by Regional Recovery Agency

<https://www.hawkesbayrecovery.nz/assets/Uploads/FINAL-Hawkes-Bay-Regional-Recovery-Plan.pdf>

2. The Cyclone Recovery Unit

<https://www.dPMC.govt.nz/our-business-units/cyclone-recovery-unit>

3. DPMC's Future of Severely Impacted Areas (FOSAL) Information Pack

<https://www.dPMC.govt.nz/sites/default/files/2023-07/Future-of-Severely-Affected-Land-FOSAL-Information-Pack.pdf>

4. Outrage to Optimism: Report of the Ministerial Inquiry into land uses

<https://environment.govt.nz/assets/Outrage-to-Optimism-CORRECTED-17.05.pdf>

5. Rapid assessment of land damage – Cyclone Gabrielle by Manaaki Whenua Landcare Research

<https://environment.govt.nz/assets/Rapid-assessment-of-land-damage-Cyclone-Gabrielle-Manaaki-Whenua-Landcare-Research-report.pdf>

6. GNS landslide mapping

<https://www.gns.cri.nz/news/cyclone-gabrielle-induced-landslide-mapping-project/>

7. Land Categorisation Process methodology and framework

<https://www.hastingsdc.govt.nz/assets/Document-Library/Cyclone-Land-Categorisation-Documents/HBRC/1.-FINAL-HBRC-Land-Categorisation-Methodology-and-Framework.pdf>

8. PDP and Tonkin & Taylor Land Categorisation Technical Process Assurance reports

<https://www.hastingsdc.govt.nz/land-categorisation-hb/land-category-info/>

9. Hawke's Bay Independent Flood Review by Dr Phil Mitchell

<https://www.hbifr.nz/>

10. Kotahi Plan

<https://www.hbrc.govt.nz/services/policy-and-planning/kotahi/>