

Greater Wellington Regional Council

10 YEAR PLAN 2015-25





SECTION 3

Infrastructure Strategy

Te Rautaki Hanganga

FLOOD PROTECTION



Our long term approach (over the 30 year life of the Infrastructure Strategy) for managing GWRC's flood protection assets is to maintain existing assets in perpetuity and to build new assets in accordance with GWRC's Floodplain Management Plans. In addition to managing our assets we also advise people and communities about flood risk.

Flood Management Plans are our key planning tool that set out how we manage flood risk on individual rivers and floodplains. The plans are comprehensive and involve extensive information gathering, consultation and discussion with the affected local communities, councils and mana whenua. The outcome of the floodplain management plan process is a document that guides how a floodplain and catchment should be managed to;

- Minimise risks to life, health and safety
- Reduce severity of flood damage
- Promote sustainable use of flood and erosion prone land
- Promote sustainable development of the wider catchment
- Use planning and community preparedness to ensure sustainable land use
- Identify options to manage the flood risk.

RENEWING OR REPLACING EXISTING ASSETS

GWRC's flood protection assets across the region have a replacement value of \$262.8 million.

Summary of asset types (total replacement value \$000)	
Flood protection infrastructure assets	262,820
Land, buildings, plant and machinery	23,689

They include stopbanks, outlet structures (culverts and pipes), berms, edge protection material and structures, debris arrestors, detention dams, barrage gates, flood walls and land within river corridors. Flood protection assets are located in the Hutt, Otaki, Waikanae, Wainuiomata, Porirua and Ruamahanga catchments.

All existing assets will continue to be maintained in perpetuity (including renewals or replacements when necessary) in order to provide the various levels of service set out in the Floodplain Management Plans (FMPs). We have FMPs in place for the Hutt River (2001), Otaki River (1998), and the Waikanae River (1996). In addition the Waitohu Stream Study also fulfils all the requirements of a FMP. For the Porirua Stream we do not have a formal FMP but all the elements have been completed separately.

FMPs are under development for the Te Kāuru (Upper Ruamahanga River), the Waiohine River, the Pinehaven Stream, and the Waiwhetu Stream. A FMP will also be developed within the next ten years for the Lower Ruamahanga River.

We also have infrastructural assets along the Wainuiomata River but there are currently no plans to progress a FMP.

In addition to maintaining existing assets there are a number of major projects underway or planned to renew or replace existing assets. Details can be found in the flood protection chapter (Section Five).

CHANGES IN DEMAND

New development in areas that are subject to flooding is not supported and there are no plans to provide new flood protection assets in such areas. Avoiding the flood hazard by not building in high hazards areas is the most effective way of managing flood risk in the long term.

The key drivers for changes in demand for flood protection services are likely to be:

- An increase in our knowledge and understanding of the potential for flood damage, including our knowledge of climate change impacts (such as changing rainfall patterns and sea level rise)
- Changes in community expectations. The demand for protection from flooding continues to increase in both the extent of the protection and the level of service provided along with improved environmental outcomes, in currently protected areas, and in other areas
- Where existing approved development is subject to an unacceptable degree of flood risk then construction of new infrastructure will be considered. In all other circumstances reliance will be placed on either avoidance or alternative non-structural measures
- The process for discussing and agreeing on our approach to managing flood hazards is primarily through the process of preparing and reviewing flood plain management plans. The context in which we undertake flood plain management planning is to firstly identify the nature and extent of the flood hazard, and secondly to avoid development in flood prone areas. We are considering investigations in six additional areas long term. These areas are Carterton, Paraparaumu, Featherston, Martinborough, Pukerua Bay, and Whareama. A further three areas may require investigation in advance of development pressure from large infrastructure projects. These are Judgeford, Te Horo and Mangaone.

CHANGES IN LEVELS OF SERVICE

GWRC is committed to providing and maintaining an agreed level of flood protection to existing communities.

The levels of service are set through the FMP process in consultation with the community. In general, within areas subject to flood risk, the following standards apply¹:

- Where required to protect existing residential development, stopbanks are constructed to achieve a minimum 1 in 100 year standard
- Where required in a rural context, stopbanks are constructed to a 1 in 20 year standard to protect land use from frequent flooding events.

There are no planned decreases to this level of service. However, as noted climate change may impact on the ability of GWRC to meet these levels of service long

¹ However this does not imply that infrastructure will be built without taking into account our drivers for change.

term. In some circumstances managed retreat may be the most appropriate response.

PUBLIC HEALTH

In maintaining existing flood protection assets and considering new assets, improving public health and safety is very important for GWRC. Through the provision of adequate flood protection, and information and advice about how to prepare and respond to floods we aim to minimise loss of life due to flood events, improve resilience and to promote safer communities. In order to do this GWRC seeks to improve resilience by firstly having a policy of avoiding new developments in areas subject to flooding¹, and secondly by prioritising the building of new or upgraded infrastructure for existing development.

ENVIRONMENTAL OUTCOMES

Providing, maintaining and operating flood protection assets can have adverse effects on the environment. Adverse effects might include:

- Sediment from river erosion and run-off entering streams and coastal waters during construction and maintenance.
- Changes in the natural river environment and consequent impacts on recreation, biodiversity and landscape values.

In order to address these issues GWRC takes measures to minimise the impacts of river control works on the natural form and function of rivers and streams through an adaptive management framework (we monitor our work, review our practices, and implement changes). A Code of Practice guides how all our flood protection works are carried out.

GWRC have also prepared environmental strategies for the major rivers in the west of the region (Hutt, Otaki and Waikanae). New environmental strategies will be prepared for those areas where FMPs are being developed.

RESILIENCE TO NATURAL HAZARDS

Building resilience into our flood protection infrastructure is very important to GWRC as it is these assets that help protect our communities from significant risks. The major natural hazards relating to our flood protection assets are damage from major earthquakes and damage from floods.

Major earthquakes could result in cracking and slumping of stopbanks, foundation settlement and cracking of concrete structures, cracking of river berms, and slumping of rock edge protections. Flood protection assets on land subject to liquefaction may also be damaged.

Assets located within fault zones would likely be completely destroyed by the rupture of those faults. For example, Hutt River assets located in the Wellington fault zone. It is also possible that a Wellington fault movement could cause major subsidence in the lower Hutt Valley reducing the capacity of the flood defences. We rely on self-insurance to pay for the repair or rebuild of assets following an earthquake event.

¹ Refer to policy 29 in the Regional Policy Statement.

Flood events themselves also have the potential to damage our flood protection assets and deposit large quantities of gravel in lower reaches of rivers. Flood events with a return period of up to five years may cause some damage to assets. We provide adequate funding in our annual maintenance budgets to accommodate such repairs. For flood events between 5-25 years, top up funding is available, if necessary, from the Flood Contingency Reserve.

Larger floods (between 25-40 year return period) may cause considerable damage to assets. To cover these situations GWRC has a Major Flood Protection Recovery Fund. Where damage exceeds the balance of either or both funds, borrowing may be necessary to carry out the repairs.

Floods with a return period in excess of 40 years may be eligible for some government funding otherwise damage would be funded by borrowing. GWRC also maintains insurance for some physical assets such as barrage gates and large concrete structures.

Section 5

FLOOD PROTECTION AND CONTROL WORKS

Te Tiaki me te Arahi Waipuke

GWRC is responsible for managing flood risk from the region's rivers and streams. We develop floodplain management plans, provide a free advice and consultation service, maintain and build flood protection infrastructure, work with the community to improve the environment and recreational opportunities and provide flood warnings.

FLOOD PROTECTION AND CONTROL WORKS



FLOOD PROTECTION
TOTAL OF GWRC
EXPENDITURE
6%

WHAT WE DELIVER

The flood protection and control works group of activities includes:

Understanding
flood risk

Maintaining flood
protection and
control works

Improving flood
security

CONTRIBUTION TO COMMUNITY OUTCOMES

Flood protection and control works activities primarily contribute towards achieving a **resilient community** by:

- Reducing the risk of flooding in the region now and in the future by promoting the avoidance of inappropriate development in our most flood-prone areas
- Informing communities about the risk and consequences of flood events in their area
- Maintaining existing flood protection works and building planned flood protection works

Our flood protection and control works also contribute towards achieving:

- A **strong economy** by minimising the impact of flooding on activities that contribute to the regional economy
- A **healthy environment** by enhancing the environment along river corridors
- An **engaged community** by enabling people to enjoy recreational use of river corridors



CHALLENGES WE FACE

The region contains a number of major rivers and streams that have the potential for flooding, making flooding the region's greatest hazard, both in terms of frequency and continuing losses.

We are committed to providing and maintaining our existing infrastructure assets and as new infrastructure assets are built, maintaining existing levels of service. Flood protection infrastructure is expensive to build and maintain. As new infrastructure assets are built, the costs of maintenance will continue to increase.

Over time climate change and sea level rise will challenge our ability to maintain the existing levels of service being provided and we need to investigate and plan for this.

While pressure to develop in areas that are subject to flooding continues, avoiding inappropriate development in high risk areas is a key part of our work, and we do this by providing advice and information about flood hazards. Mitigating flooding by building infrastructural assets may not always be the most appropriate or cost effective solution. Increasing community resilience by raising awareness of flood risk and the need to be prepared is particularly important in existing communities that are subject to flooding.

Community expectations and the potential effects of our work on the environment are changing the way we work. The community has expectations that GWRC will deliver more than just well-maintained assets in the river and stream corridors that we are responsible for.

STRATEGY FOR FLOOD PROTECTION AND CONTROL WORKS

GWRC's long-term approach to flood protection is to promote a safe and prosperous community through appropriate flood protection measures while maintaining a natural river environment. We achieve this by providing a range of services that include: providing advice and information, developing flood management plans (FMPs), managing river schemes and building and maintaining infrastructure. This approach minimises loss of life, supports economic development, informs and empowers communities, enhances ecological quality and provides for recreational opportunities. Development that is compatible with flood risk is an essential part of this approach. We advocate against inappropriate development in flood risk areas, and manage the risk to existing developments.

GWRC's flood protection assets across the region have a replacement value of \$262.8 million. They include stopbanks, outlet structures (culverts and pipes), berms, edge protection material and structures, debris arrestors, detention dams, barrage gates, flood walls and land within river corridors. Flood protection assets are located in the Hutt, Otaki, Waikanae, Wainuiomata, Porirua and Ruamahanga catchments.

All existing assets will continue to be maintained (including renewals or replacements when necessary) in order to provide the levels of service set out in the FMPs. We have FMPs in place for the Hutt River (2001), Otaki River (1998), and the Waikanae River (1996). In addition the Waitohu Stream Study (2006) also fulfils all the requirements of a FMP. For the Porirua Stream we do not have a formal FMP but all the elements have been completed separately (1994).

FMPs are under development for the Te Kāuru (Upper Ruamahanga River), the Waiohine River, the Pinehaven Stream, and the Waiwhetu Stream. A FMP will be developed within the next ten years for the Lower Ruamahanga River. We also have infrastructural assets and flood hazard information on the Wainuiomata River but there are currently no plans to progress a FMP.

In addition to maintaining existing assets there are a number of major projects underway or planned to renew or replace existing assets. The new FMP's currently under development or proposed in the future are likely to result in a requirement for further investment to provide the desired level of service.

POLICY FRAMEWORK

The policies and plans that relate to the flood protection group of activities are:

- Floodplain management plans – outline a holistic approach to reducing the effects of flooding, including physical protection, non-structural measures, and environmental opportunities
- Regional Policy Statement 2013 – includes objectives and policies relating to flood hazards

POTENTIAL NEGATIVE EFFECTS

There is the potential for flood protection projects and ongoing operations and maintenance activities to have a negative effect on the environment. GWRC seeks to minimise the impact of flood protection projects, maintenance and operations on the environment.

