Far North District Council
Te Kaunihera o Tai Tokerau ki te Raki

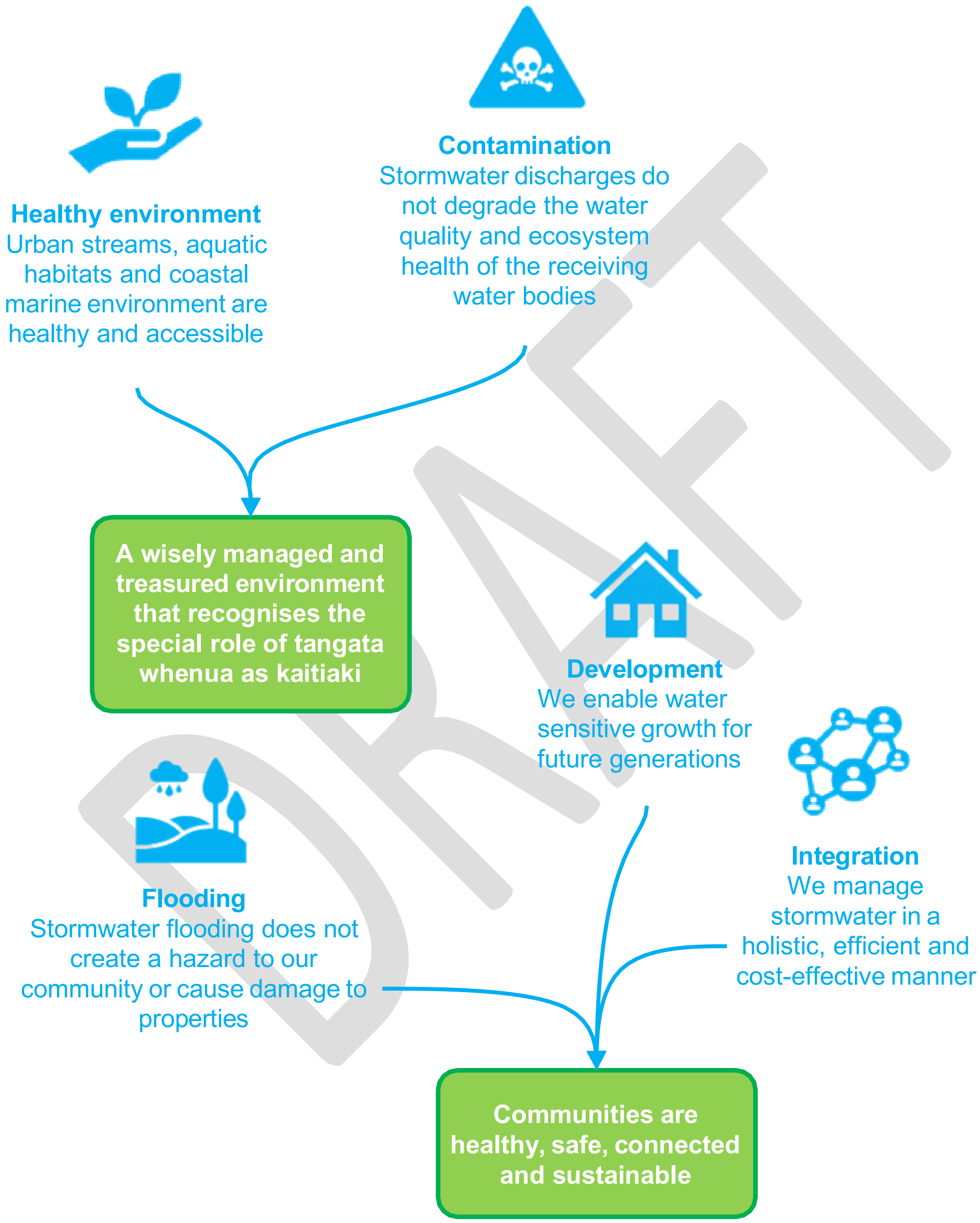
Draft Stormwater Strategy

A#####

EXECUTIVE SUMMARY

Why should we care about stormwater management?

Good stormwater management will directly contribute to two of the five Community Outcomes. Clear linkages between the two relevant community outcomes and the five focus areas identified in this strategy are shown below.



What are the key stormwater management issues we face?

Natural events and climate change

- Severe rainfall
- Sea level rise / storm surge
- Droughts

Development

- Adverse effects on existing stormwater infrastructure are not mitigated
- Lack of standards and policies has resulted in inconsistent planning advice and consent decisions across the Council leading to ineffective management of infrastructure and a significant strain on staff and financial resourcing to manage the consequences.
- Particular issue around design requirements for storage (flooding and stream bank protection), infiltration to ground and treatment.
- Lack of enforcement where developers and property owners are not following standards, policies and regulations e.g. impervious areas greater than allowance, filling in and/or impeding open channels and overland flowpaths.
- Protection and management of overland flowpaths

Operations and maintenance

- Community not satisfied with FNDC response and flood management
- Blocked networks during rainfall events leading to increased flooding occurrences
- Reactive approach to stormwater management

Statutory changes

- Central government – National Policy Statement for Freshwater Management 2020
- Regional government – NRC proposed Regional Pan
- Local government – FNDC Distract Plan

Affordability and effective use of resources and partnerships

- Funding sources
- Insufficient planning support resources

Structure planning

- Historic lack of masterplanning at a catchment-wide level

Integration of processes and linkages with other policies, plans and information systems

- Stormwater management not alignment with other policies and plans leading to inefficient management
- Lack of effective coordination between stormwater and roading work programmes and no integration between data held in RAMM and the stormwater asset register
- Relevant parts of catchment management plans need to be included in appropriate statutory documents such as the District Plan, Bylaws and Engineering Standards

Asset ownership and maintenance responsibility

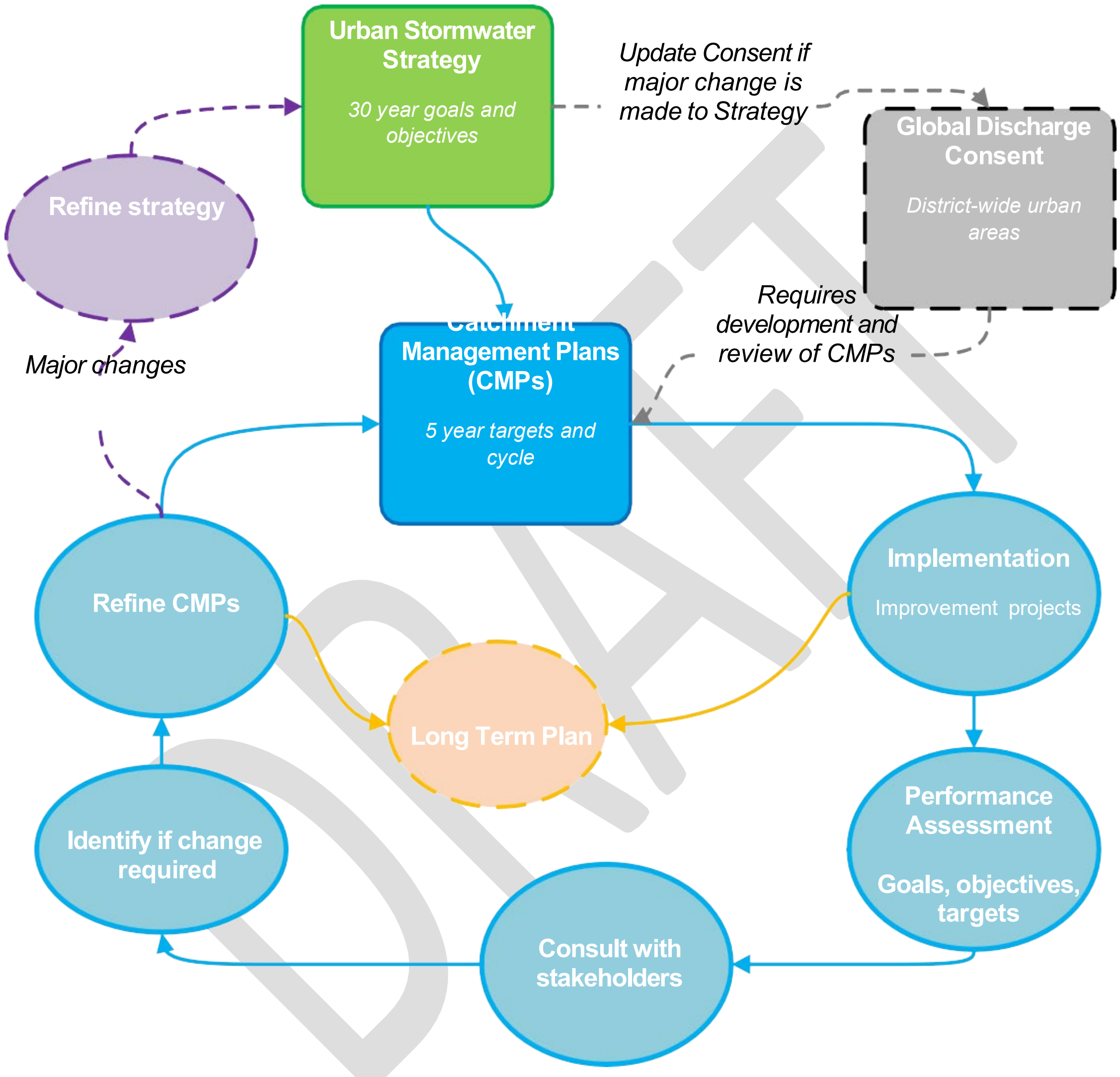
- Maintenance and ownership responsibilities between internal Council Departments or external organisations/individuals are not always clear

Water quality improvements

- Water quality issues associated with stormwater discharges throughout the district are not well understood

Why do we need a stormwater strategy?

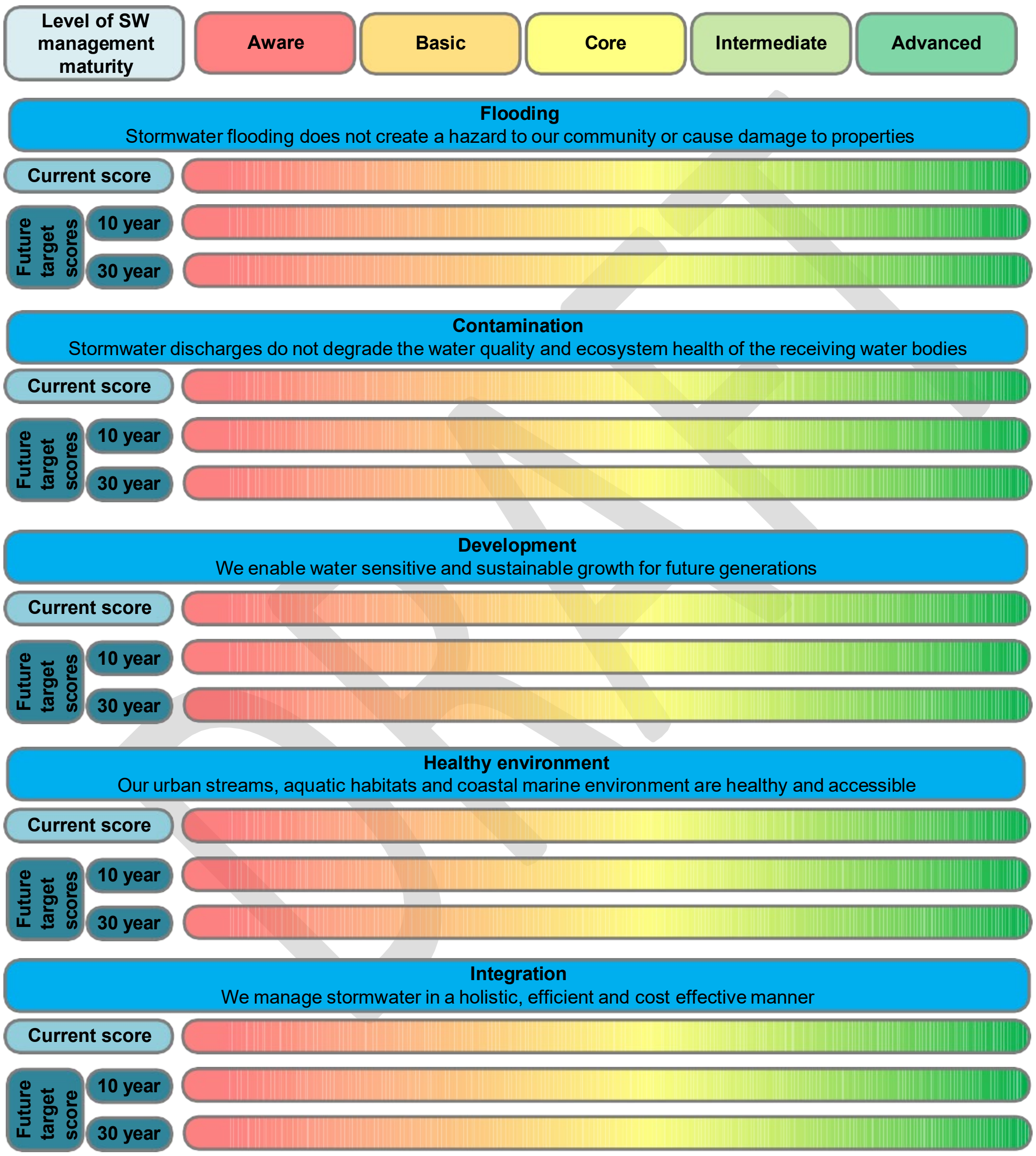
The strategy forms part of the stormwater catchment management framework shown below and articulates the Council's long-term vision. It also provides direction to the development of stormwater catchment management plans and supports development of and alignment with other strategy documents (LTP, Regional Plan, NPS-Freshwater Management etc). It can also provide the basis for a future global discharge consent if required.

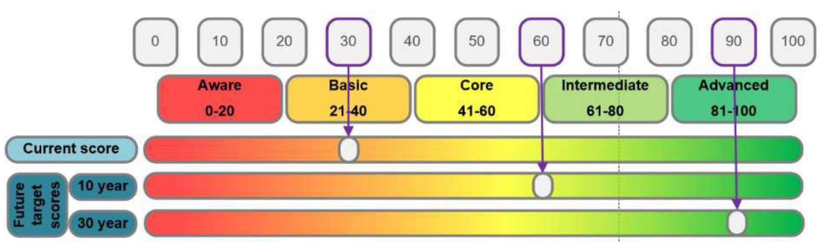


How will we measure our medium and long-term success?

A range of tangible district-wide outcomes have been set to support the delivery of the aspirational objectives linked to each of the 5 focus areas. Our current level of stormwater management maturity will be agreed and future 10-year (medium-term) and 30-year (long-term) targets will be set. These will be used as the basis for identifying and prioritising improvement projects in the individual catchment management plans.

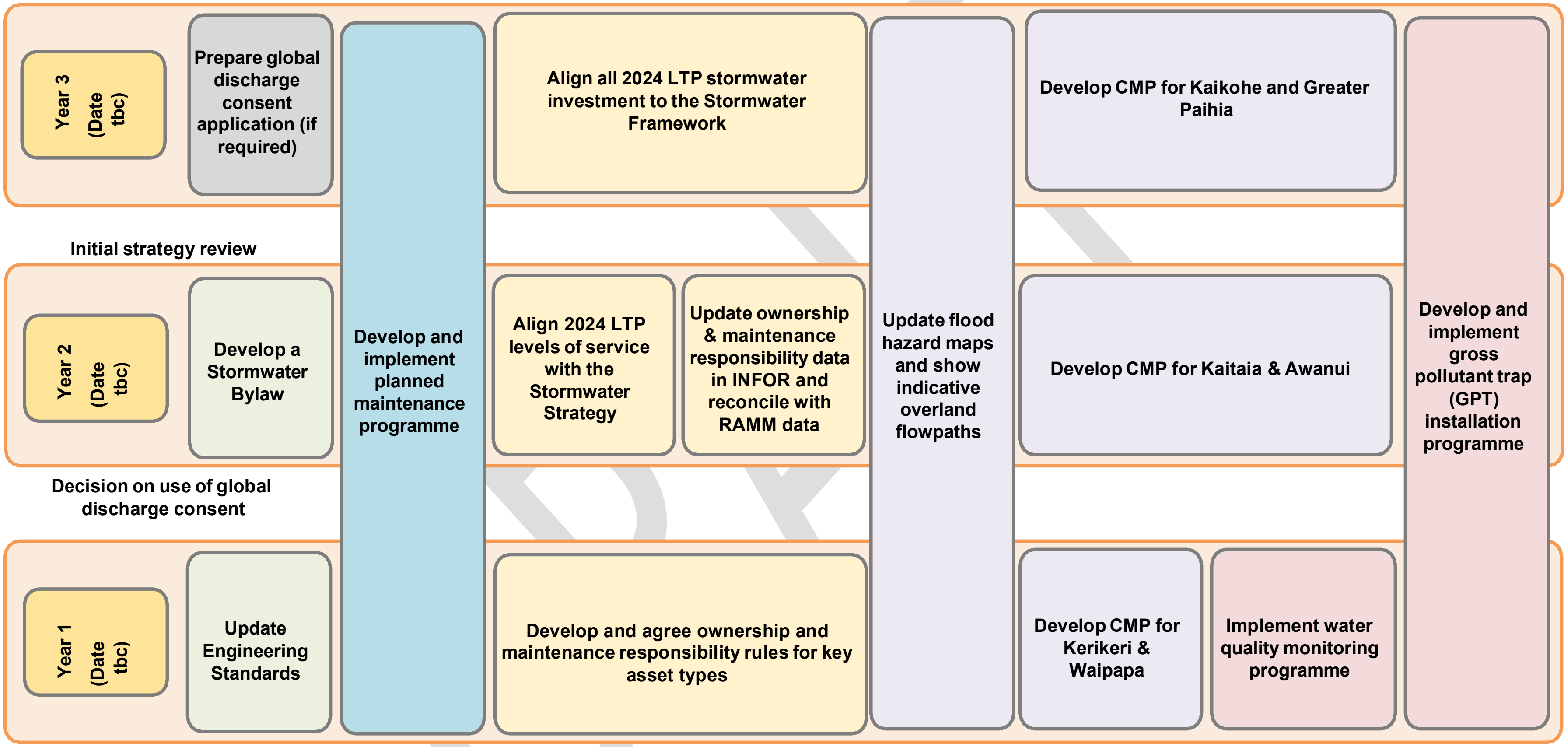
The outcomes for each of the 5 focus areas are shown below plus there's an example at the bottom of the page of how it may look when the scores are added.





What should we be working on now?

In addition to the development of medium and long-term targets, a 3-year plan has also been developed. This plan identifies the key projects that need to be completed in the next few years to build the foundations required to achieve our longer-term goals. The projects included in this plan are shown below.



CONTENTS

Revision history

Version numbering changes when a document is approved. Draft document numbering starts at 0.01. Released or approved numbering starts 1.01.

Revision no.	Status	Date	Author(s)	Reviewed by	Released by
1	Draft for internal stakeholder review	1 August 2021	Sophie Jones (FNDC)	n/a	n/a
1.1	Draft for Te Koukou workshop	5 July 2024	Losaline Finekifolau (FNDC)	n/a	n/a

Document acceptance and release notice

This is a managed document. For identification of amendments each page contains a release number and a page number. Changes will only be issued as a complete replacement document. Recipients should remove superseded versions from circulation.

Note: This is a CONTROLLED ELECTRONIC DOCUMENT that is regularly updated. Hard copies may not be the latest version and should be used with care

Acknowledgements

The contribution of the following organisations in developing this document is gratefully acknowledged:

- Tasman District Council for sharing their urban stormwater strategy and giving permission for it to be used for the development of this document.
- GHD for assisting in the identification of key issues and challenges.

1. Introduction

Our communities and the receiving environments are affected by stormwater discharges from our urban areas. Urbanisation and other changes in land use have led to increased stormwater runoff that contribute to flooding, loss of aquatic habitat, loss of places that are of significance to iwi, and water quality issues. It also impacts on the ability to use our waterways for recreation, amenity and māhinga kai (food gathering). The Council has a responsibility to manage stormwater in a way that supports the environmental, social, cultural and economic well-being of current and future generations.

1.1. Catchment management planning framework

Catchment management planning is an efficient and effective way of co-ordinating efforts to address multiple stormwater issues i.e. flood management, freshwater management, aquatic habitat management and amenity values within urban stormwater catchments.

The output from the catchment management planning process is a catchment management plan (CMP). There are a variety of reasons a CMP may need to be developed such as regulatory requirements and the need to address particular issues in the catchment such as manging the effects of land use change, reducing flood risk and improving water quality[1]. CMPs will assist the Council in identifying integrated solutions to existing issues and taking the necessary actions to avoid or minimise risks for the future. Once in place, the plans will also assist in cross Council alignment, collaboration and efficiency improvements.

The stormwater catchment planning framework will initially consist of the stormwater strategy and the CMPs. The CMPs will explain how Council manages any adverse effects of stormwater discharges from the public networks and could be used to support an application for a global discharge consent in the future. If this were to happen, the global discharge consent would become part of the framework.

The framework provides direction to other Council processes and legal documents such as the Long Term Plan (LTP) and Asset Management Plan (AMP) and it is important that all of these documents are reviewed when required to ensure alignment.

Figure 1 shows the different components of the framework and how they interact. Collaboration between Council and Iwi is required to develop each component of the framework and stakeholder consultation and public feedback will be sought separately when appropriate during development of the CMP’s.

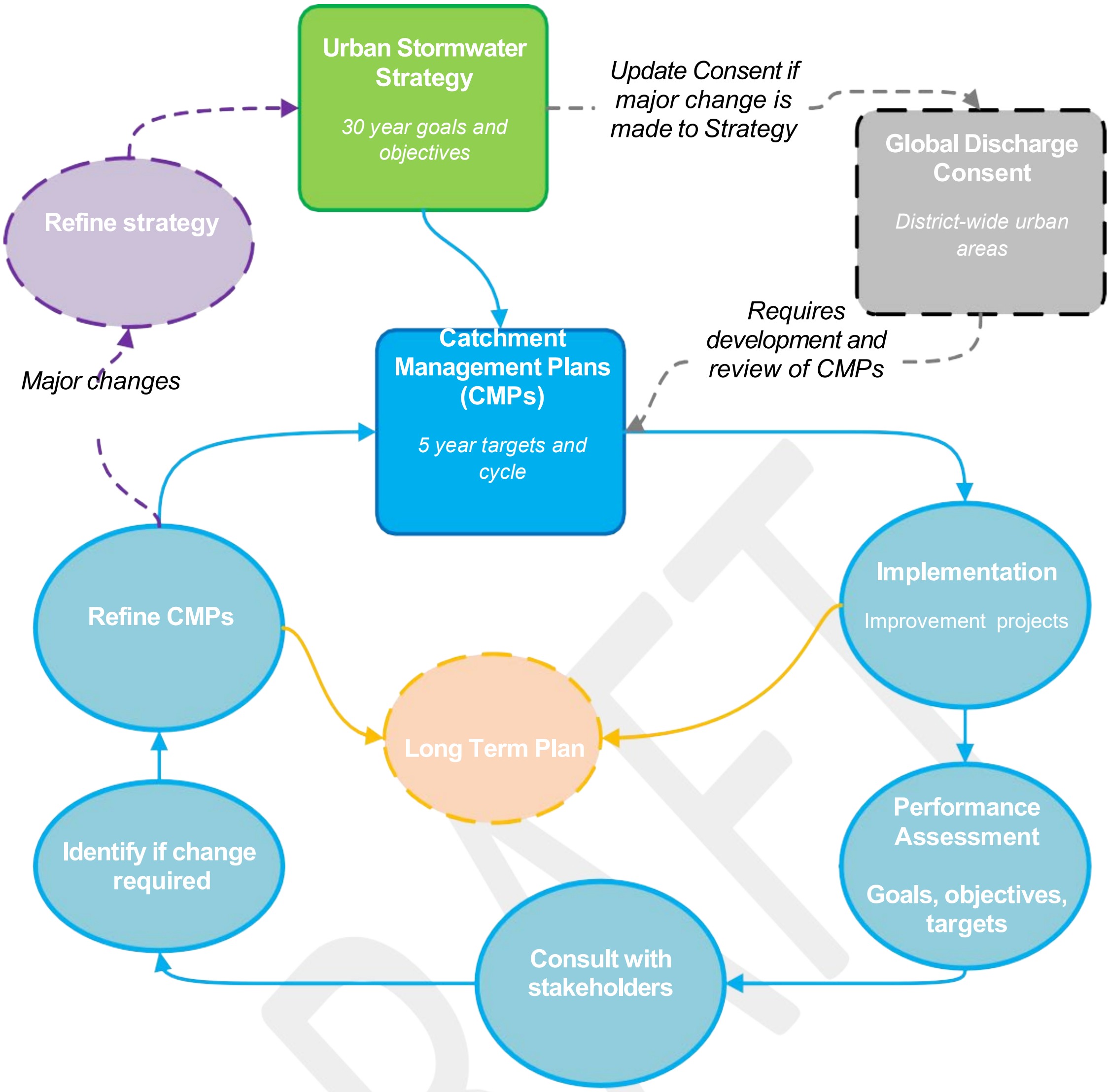


Figure 1: Framework outline

1.2. Strategy purpose

The purpose of this Strategy is to:

1. Articulate the long-term vision for stormwater in the District
2. Provide direction to the development of stormwater catchment management plans for each urban settlement (the District-wide performance targets in this strategy will be used to the CMPs.)
3. Support development of and alignment with other strategy documents (eg LTP, AMP, National Policy Statement – Freshwater Management etc)
4. Provide the basis for a future global discharge consent

1.3. Scope

The strategy is a non-statutory document and it’s primarily intended to provide an assessment framework for urban stormwater planning, but it will also consider upstream and downstream rural areas where appropriate.

District-wide targets are set as a general guide for catchment management planning, but these may be adjusted for individual catchments if appropriate.

The main urban stormwater catchments within the District are shown in **Error! Reference source not found.**.

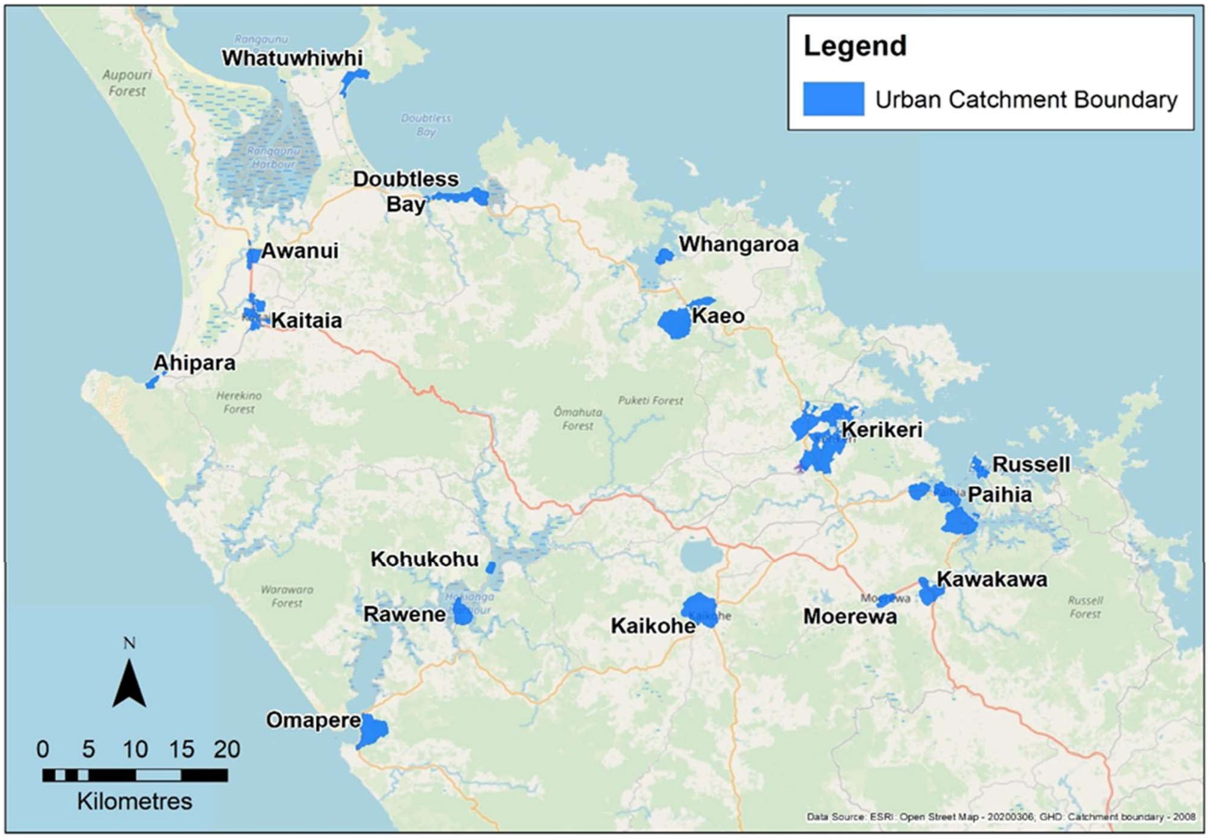


Figure 2: Main urban stormwater catchments

Because of the intangible nature of the targets, the assessments in the CMPs will consider the degree to which the outcomes in the strategy are met. Where possible, metrics and definitions from other documents and other industry best-practice will be used.

1.3.1. Implementation of National Policy Statement – Freshwater Management

The National Policy Statement - Freshwater Management (NPS-FM) came in to force on 3 September 2020 and provides local authorities with direction on how to manage freshwater under the Resource Management Act 1991. All local authorities must give effect to the National Policy Statement as soon as reasonably practicable. An overview of the purpose of the NPS-FM is included in Appendix A.

The NPS-FM requires regional councils to follow a specific process which includes defining Freshwater Management Units and identifying values, attributes, objectives, limits and methods and recognising the national significance of fresh water for all New Zealanders. It sets out objectives and policies that direct local government to manage water in an integrated and sustainable way, while providing for economic growth within set water quantity and quality limits.

Although there is clear overlap between the Stormwater Catchment Management Framework and the NPS-FM process, they work at different levels and require separate processes. The NPS-FM has a clear focus on water quality and ecosystem health, but it does not include water quantity aspects such as managing overland flow paths and flooding of properties. The catchment management plans will integrate both the water quality and quantity aspects of stormwater management.

The Council will be able to use the Catchment Management Planning Framework to implement the water quality objectives of the NPS-FM within its urban areas and values from the NPS-FM framework can be incorporated to align the Stormwater Strategy, CMPs and the Council's NPS-FM activities.

1.4. Context

1.4.1. Strategic documents

The Council has a number of strategic documents relating to stormwater and stream management, including but not limited to:

- 2018-2028 Long Term Plan
- 2018 Stormwater Asset Management Plan (a consolidated 3 waters, District Facilities and Solid Waste AMP is currently being developed)
- District Plan (2009)
- Engineering Standards (2009) (currently being updated)
- Land Drainage bylaw (2019)
- Control of Earthworks bylaw (2010)
- Control of on-site wastewater disposal systems bylaw (2010)
- Control of vehicle crossings bylaw (2010)
- Far North 2100 (2019)
- Integrated Transport Strategy (2020)
- Climate Change Roadmap (2020)
- Community Development Plans
- NZTA Township Plans (2019)

There are other regional and national documents that may be relevant, including:

- National Policy Statement for Freshwater Management (2020)
- MfE Environment Aotearoa Report (2019)
- NRC Proposed Regional Plan for Northland (Appeals Version - Aug 2020)
- NIWA NZ Fish Passage Guidelines (2018)
- MfE Urban Water Principles: Recommendations of Urban Water Working Group (2018)
- Kahui Wai Maori - Te Mana o te Wai: The health of our wai the health of our nation (2019)

This Strategy is informed by the objectives and policies from existing strategic documents and vice versa. Updating and aligning strategic documents is an ongoing process. The CMPs will provide information that is essential to this Strategy and as the CMPs are developed, this information will need to be incorporated in to the Strategy through subsequent review in order to achieve the desired outcomes.

The Council's budgets and programmes for specific projects are set through the Long Term Plan process, the Council's priorities will be informed and supported by the catchment management plans and individual business cases.

2. Key issues and challenges

Key issues and challenges relating to stormwater have been identified through discussions with teams across the Council and review of other key documents. They are as follows:

2.1. Natural events and climate change

2.1.1. Severe rainfall

Severe rainfall events will become more common leading to:

- Flooding of properties, roads and other infrastructure
- Overflows from sewers
- Erosion and sediment transport in waterways

2.1.2. Sea level rise / storm surge

Future sea level rise and storm surges will become more common leading to:

- Flooding of coastal properties and roads
- Loss of / damage to infrastructure located in coastal inundation and erosion zones

2.1.3. Droughts

More frequent and severe droughts will become more common leading to:

- Low flows have water quality and ecological effects on wetlands and waterways
- Reduction in the amount of water available to supply some communities

2.2. Development

2.2.1. New developments

The approach to stormwater management for new development is still largely focused on conveyance of stormwater through engineered solutions, which can result in negative effects such as degradation of natural waterways, increased water volumes and velocity and more contamination. This approach also often results in missed opportunities to reap the environmental and community benefits that can be offered by well-designed waterways and green spaces.

Some of the issues associated with new development are:

- Adverse effects on existing stormwater infrastructure are not mitigated
- Lack of standards and policies has resulted in inconsistent planning advice and consent decisions across the Council leading to ineffective management of infrastructure and a significant strain on staff and financial resourcing to manage the consequences.
- Particular issue around design requirements for storage (flooding and stream bank protection), infiltration to ground and treatment.
- Lack of enforcement where developers and property owners are not following standards, policies and regulations e.g. impervious areas greater than allowance, filling in and/or impeding open channels and overland flowpaths.

2.2.2. Management of overland flowpaths

Overland flowpaths have been filled in or built over, which increases the risk of flooding and damage to property and infrastructure.

2.3. Operations & maintenance

Inadequate management of flood information and flood response has resulted in:

- Community not satisfied with FNDC response and flood management
- Blocked networks during rainfall events leading to increased flooding occurrences

A more structured and proactive approach to stormwater maintenance is required including improved coordination between the Far North Waters Alliance and the Northland Transport Alliance.

2.4. Statutory changes (meeting national and regional legislative water quality requirements)

2.4.1. Central Government

NPS-FM aims to ensure that resources are managed in a way that prioritises the health and wellbeing of waterbodies and freshwater ecosystems above health needs of people and the ability of people and communities to provide for their wellbeing. Essentially, this means discharges to water must meet the fresh water objectives of the NPS-FM.

Costs associated with meeting these objectives, and the subsequent affordability to ratepayers is not a consideration under the NPS (i.e., poor quality discharges will not be able to be justified by FNDC not being able to afford to upgrade assets).

It is understood that NRC expects to implement changes to the Regional Plan by 2025 and this is likely to include more stringent water quality requirements for stormwater discharges.

2.4.2. Northland Regional Council

The Proposed Regional Plan for Northland (PRP) sets objectives, policies, and rules for discharges in Northland. The objectives and policies are not specifically focused on stormwater discharge quality, but rather maintaining and improving overall water quality. In general, resource consents will not be granted where the activity will, or is likely to, cause a water quality parameter to be exceeded.

There are 4 urban catchments identified as Urban Drainage Areas (UDA) in the PRP, which are:

- Kaitaia
- Kerikeri
- Paihia
- Kaikohe

2.4.3. FNDC District Plan

The Far North District Plan is currently under review, which presents an opportunity to improve the integration between land use and stormwater management. This is particularly relevant to impermeable areas and development within floodplains.

2.5. Affordability and effective use of resources and partnerships

Stormwater upgrades and flood management for new developments is only funded through rates and developer contributions are not generally received. There are also no targeted stormwater rates. Central government or other sources of funding (eg tourism, developer led projects) may be available now and in future for flood protection and water quality improvements, but it would be difficult to provide the evidence required to obtain this funding.

There are insufficient internal planning support resources available to cover the needs of the whole district and support the transition to a less reactive approach to stormwater management.

2.6. Structure planning (Masterplanning)

There has historically been a lack of masterplanning at a catchment-wide level. The predicted increase in future growth and associated development mean that this needs to be addressed to support a structured planning approach and support effective use of all available funding sources.

2.7. Integration of processes and linkages with other policies, plans and information systems

Stormwater management is not aligned to other policies and plans leading to ineffective management of infrastructure and inefficiencies (resources, budgets, decision-making). Lack of effective coordination between the Stormwater and Roading work programmes and integration of data held in RAMM and GIS are examples of this. Tools for sharing data within the 3 Waters Alliance could also be improved.

There is a lack of integration between the District Plan and catchment management planning, particularly coordination and sequencing of urban growth across 3 Waters. There should be alignment of the relevant catchment boundaries and constant communication along with sharing and interrogation of information between the disciplines involved in both processes.

As catchment management plans are non-statutory, so relevant parts need to be included in appropriate statutory documents such as the District Plan, Bylaws and Engineering Standards.

2.8. Asset ownership and maintenance responsibility (FNDC SW, FNDC RD, NRC, NZTA, private etc)

Ownership and maintenance responsibility for stormwater assets can depend on number of factors such as:

- Asset type
- Rural vs urban
- Whether within a stormwater rateable area
- Whether within road reserve
- Position/alignment within road reserve
- Whether receiving discharges from a public network
- Agreements and MOUs etc

It is important to know which internal Council Department or external organisation/individual is the legal owner of the asset and which is responsible for its maintenance for a number of reasons including:

- Valuations
- Contract schedules
- Operational budget requirements
- Capital budget requirements
- Legal liability

Business rules need to be developed and agreed to clearly define ownership and maintenance responsibilities for all assets and this needs to be recorded in the Asset Management Information System.

2.9. Water quality improvement

There is limited data available to support good understanding of the quality of the stormwater discharges throughout the district. This is required to identify where improvements are required and ensure consent conditions are met.

Appropriate treatment requirements may not always be met with new developments, which cumulatively will lead to increased risk of discharge consent non-compliance.

3. Guiding principles and aspirations

3.1. Our vision

Our vision is aligned with the concept of Te Mana o te Wai that refers to the fundamental importance of water and recognises that protecting the health of freshwater protects the health and well-being of the wider environment. Te Mana o te Wai is about restoring and preserving the balance between the water, the wider environment and the community. An overview of Te Mana o te Wai is included in Appendix B.

3.2. Guiding principles for decision-making

The guiding principles of this Strategy are based on the National Urban Water Principles that were developed by the Ministry for the Environment in 2018 as part of a collaborative project.

These principles promote creation of water sensitive urban spaces that meet the needs of our communities using sustainable and resilient design practice and by drawing on mātauranga, the lessons of the past and international best practice. A summary of these principles is provided below and further details are provided in Appendix C.

- PAPATŪĀNUKU – "Our relationship with the land –papatūānuku – will pre-determine our relationship with water".
- NGĀ WAI TUKU KIRI – "Our waters are a gift of life provided to us by our tupuna".
- TĀNGATA – "Our environments are places of human occupation".
- TE HĀPORI ME TE WAI – "The community's love and care for water is enduring".
- TIAKINA MŌ APŌPŌ – "In building future resilience, our connectedness with the environment is our strength".

3.3. Our aspirations and objectives

A whole of catchment approach takes into account multiple values for stormwater management and this concept recognises the catchment as a whole entity rather than isolated features. This view of the environment acknowledges the relationship between all living things. To safeguard the integrity of wai / water, it is essential that all activities within the catchment are managed in an integrated way.

Five focus areas have been identified based on the key issues (refer to Appendix D for links between issues and focus areas) and challenges that we face and the clear linkages between the two most relevant community outcomes and the focus areas are shown in Figure 3. Further details of each focus area are included in the following sections.

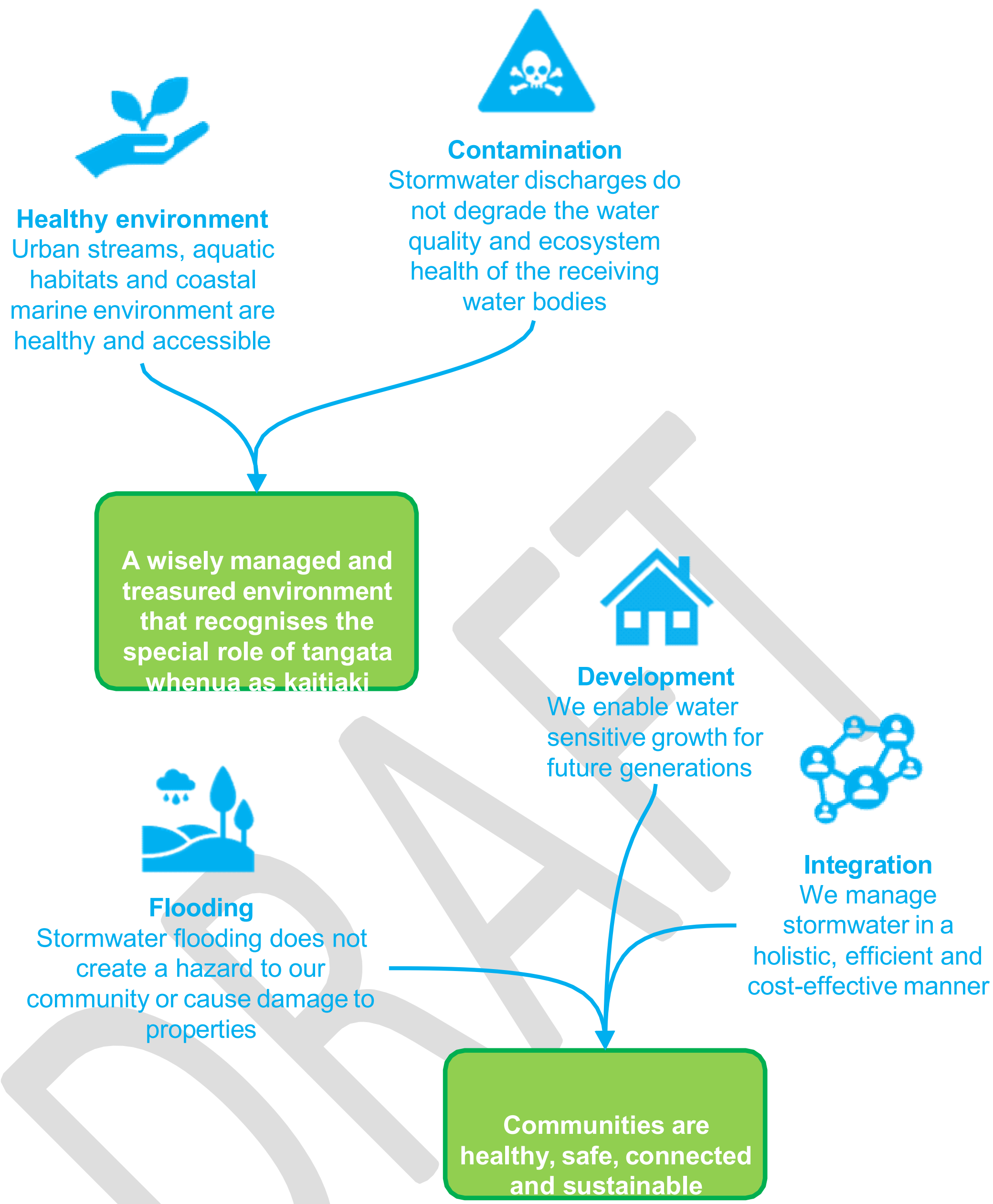


Figure 3: The five focus areas

3.3.1. Flooding

Aspiration: Stormwater flooding does not create a hazard to our community or cause damage to properties

Flooding typically occurs around stream corridors, overland flow paths and in low lying areas and associated with the stormwater drainage network, rivers or the sea. Flood risk is increased by:

- Increases in the flow rate, volume and velocity of stormwater runoff due to urbanisation and piped networks that are at capacity
- The piping of streams that reduces the natural flow capacity and storage capacity as well as reducing the ability of overland flows to re-enter the network
- Poorly managed overland flow (loss or obstruction due to development)

- Climate change causing more intense rainfall, sea level rise and higher ground water levels.

Piped networks have a limited capacity and are largely aimed to minimise nuisance flooding during small to medium storm events. Current design standards require primary systems to be designed to convey all flows up to a 10% annual exceedance probability[2] (AEP) and secondary systems (including overland flowpaths) to convey all flows up to a 1% AEP event.

The network modelling undertaken in 2010 estimated the amount of stress each pipe was under, referred to as the Pipe Stress Factor (PSF), for each storm event. The PSF is the Total flow / Pipe Capacity. When the PSF exceeds 1 then the capacity of the pipe is exceeded in that storm event. When considering the maximum possible development scenario and a 10% AEP, it was estimated that 17% of the all pipes had a PSF greater than 2. While this could result in a lower level of service than required by the Design Standard, the actual impacts of the reduced capacity need to be considered, for example, what secondary controls are available and how vulnerable are the areas that will be affected? There is no agreed trigger for system upgrades, but in addressing existing flooding issues the Council has set the priorities as shown in Figure 4 :

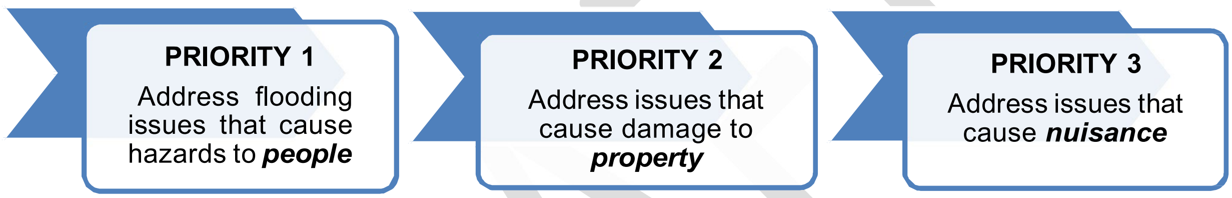


Figure 4: Flood priorities

Objectives:

1. New and existing properties are serviced by a primary network with capacity to convey flows of at least 10% AEP
2. No habitable floors are expected to flood as a result of a storm event of 1% AEP or less (as measured through stormwater modelling)
3. Flooding is addressed in a prioritised order (see Figure 4)
4. Overland flow paths are improved and protected to safely convey up to 1% AEP without any flooding of habitable floors
5. Climate change effects are accounted for in flood risk assessments
6. New developments are designed in accordance with the updated Engineering Standards
7. Residual flood risks (above 1% AEP) are understood and managed appropriately

3.3.2. Contamination

Aspiration: Stormwater discharges do not degrade the water quality and ecosystem health of the receiving water bodies

The management of contaminants in stormwater should be an integral part of the public or private activity that leads to the contamination through:

1. avoidance
2. treatment at source

[2] Annual exceedance probability (AEP) is the probability of an event occurring in any given year i.e. a 1% AEP means there is a 1% chance of the event occurring in any given year. A 1% AEP event is equal to a 100 year annual recurrence interval (ARI) or a '1 in 100-year event'.

3. tagging any water quality improvement options to other projects

There are many uncertainties such as future contaminant loads, the effectiveness of treatment, future costs and the effects on human and ecosystem health.

In the short term, contaminant management will be based on the current understanding of high-risk areas such as roads with high traffic volumes, large carparks and industrial areas. Water Sensitive Design is an important tool to avoid and reduce contaminant loads at source.

Objectives:

1. Avoid contamination of stormwater through source control
2. Treat stormwater runoff from (re)developments, where avoidance is not possible, in accordance with requirements of the updated Engineering Standards
3. Retrofit stormwater treatment to existing discharges, focusing on high risk areas such as busy roads, intersections and large carparks.
4. Implement a targeted approach to stormwater management and treatment of runoff from industrial, commercial and residential areas aimed at identified contamination risks related to specific activities.

3.3.3. Development

Aspiration: We enable water sensitive growth for future generations

Structure planning by the Council as well as by developers needs to use water sensitive design as a guiding design principle throughout the design process.

It is important that a relationship is established with the developers and contractors to create clarity and certainty about what is expected and required. Clear standards, rules and guidance through the District Plan, Engineering Standards and supporting practice notes is a key component in this process.

Where possible, input from the development community will ensure these rules and requirements can be implemented effectively.

Objectives:

1. Council will provide clear guidance through structure planning on catchment specific stormwater requirements in new growth areas
2. Utilise and support the implementation of Water Sensitive Design as the guiding design principle for all new developments and redevelopments.
3. Establish good working relationships with the development community to support the development of rules, requirements and supporting practice notes that are clear and implementable and reduce uncertainty.

3.3.4. Healthy environment

Aspiration: Our urban streams, aquatic habitats and coastal marine environment are healthy and accessible

Urban streams provide opportunities for ecological corridors, public access, amenity and connectivity for walking and cycling. Positive inclusion of streams in the urban landscape will render multiple benefits, not only in relation to stormwater management. Water Sensitive Design (WSD) includes components that look to protect and improve stream health through all phases of the design process.

Objectives:

1. Enhance habitat diversity and stream health, including riparian and wetland vegetation, diversity of bed/bank substrate (including woody debris), meander, diversity of width/depth, floodplain connectivity and diversity of bank shape suitable for aquatic and riparian fauna needs
2. Minimise stream modification and loss of natural streams (including springs and seeps).
3. Maintain and restore fish passage at man-made instream structures.
4. Provide for public access, amenity and connectivity along our urban stream network, creating green linkages connecting our hill country to the sea
5. Protect and restore specific areas of cultural and community significance within the stream corridors.

3.3.5. Integration

Aspiration: We manage stormwater in a holistic, efficient and cost-effective manner

There is a common organisational goal related to stormwater management, which recognises that;

- stormwater needs to be managed in a unified way
- stormwater management solutions often cover more than one theme

Objectives:

- Partner with tangata whenua and collaborate with internal and external stakeholders to achieve better stormwater outcomes
- Manage stormwater so that it addresses the needs of multiple values in a balanced and practical manner throughout the entire life of the asset (design, operation, decommissioning).

This Strategy should be informed and supported by the objectives and policies from existing strategic documents and vice versa. Updating and aligning strategic documents is an ongoing process. The CMPs will provide essential information into this Strategy and subsequent reviews and the resulting actions should support continued improvement and achievement of the desired outcomes.

The Council's budgets and programmes for specific projects are set through the Long Term Plan process, the Council's priorities will be informed and supported by the catchment management plans and individual business cases.

4. Stormwater management best practice

This section outlines best practices for stormwater management and guidance on how our aspirations and objectives should be achieved. These are used to inform the targets in Section 5.

4.1. The use of Water Sensitive Design (WSD) and Green Infrastructure

Best practice:

- WSD is the preferred stormwater management practice and should be used from the start of the design process for new urban areas as well as changes to existing developed areas.
- WSD requirements should be included in all areas of Council (e.g. roading, parks and properties) and in all regulatory documents including the TRMP.
- Integration of WSD (stormwater focus) with other green/ecological objectives such as the need for greenways is a good example of maximising community outcomes

Water Sensitive Design (WSD) is considered best practice internationally and is increasingly advocated, used and required inside and outside New Zealand. WSD is based on a design approach looking to mimic natural processes and often uses green infrastructure such as raingardens, swales and wetlands instead of pipes or other “hard” infrastructure. The key principles[1] of WSD are:

a. Use an inter-disciplinary planning and design process
b. Protect and enhance natural systems and their values
c. Address (and avoid) stormwater effects close to the source
d. Mimic natural processes for stormwater management

As urban areas become more intensely developed sufficient space for green and blue infrastructure comes under more pressure. At the same time, there is an increasing demand from the community for open (green) space which includes natural areas such as streams. Additionally, the demand on man-made and natural drainage systems also increases from a hydrological point of view.

For WSD to be successful, it is to be considered from the start of a design process including but not limited to the following steps:

- Retain waterways and protect riparian margins and other natural features (constraints).
- Minimise development within floodplains (generally around streams)
- Understand and manage overland flowpaths
- Minimise earthworks / compaction
- Minimise impervious area (public and private)
- Consider future land use and design of private and public spaces including roads
- Provide stormwater treatment at source (e.g. rain gardens, permeable paving, roof gardens, rain tanks etc.) before discharging into the natural environment.

Stream corridors are not only important to protect stream health but also to provide opportunities for ecological corridors (between the estuary and the hills), amenity values and connectivity for walking and cycling.

4.2. 1st Avoid, 2nd Remedy, 3rd Mitigate

Best practice

- Avoidance of issues is the most effective way to manage stormwater.
- If avoidance is not feasible, mitigation at source is the best approach and is more effective than end- of-pipe stormwater management. This applies to quantity (reducing changes in runoff) as well as quality management (water quality treatment).

The problems relating to flooding, contamination and the health of our natural waterways within an existing urban environment with limited space is complex and expensive. For this reason, the highest priority is given to avoidance of the problem in the first place. Only when effects cannot be avoided, should we look at remediation or mitigation.

There are many ways to prevent or avoid future issues such as minimising impervious areas, reducing compaction, not using building materials that can leach out heavy metals such as Zinc and Copper and not building in flood plains or significant overland flow paths.

If avoidance is not feasible or only partially addresses existing or new issues, the next most effective stormwater management approach is either remediation of the problem or mitigation at source (2nd and 3rd priority). The remediation of a stormwater issue takes the actual cause of the issue away, so the effect can no longer occur, for example by reinstating the natural situation. Within the context of urban development, remediation is often not feasible. The mitigation of a stormwater issue means that the effects are minimised, for example by providing stormwater treatment. Mitigation of stormwater is most effective when done as close to the source as possible.

Traditional stormwater management uses an end-of-pipe approach. Cumulative effects are often difficult to predict but are clearly evident now. Quality treatment is more effective at source than at the bottom of a catchment where contaminants are often diluted and more difficult and expensive to remove. Minimising increases in runoff at source will bring the hydraulic response from a rainfall event closer to pre-development levels and reduces flood risks.

4.3. Holistic and catchment wide approach

Best practice

- Key stormwater issues are often interrelated and should be addressed taking a holistic and catchment wide approach
- Cumulative effects related to stormwater management need to be assessed and addressed at a catchment wide scale

The different stormwater challenges that the Council and community is facing in the district are often interrelated. It is important to ensure that multiple issues are addressed holistically, rather than in isolation to ensure that proposed solutions do not impact negatively on each other. An integrated or holistic approach may also provide opportunity to address multiple issues through a single solution.

Most stormwater effects cannot be linked back to a single cause (e.g. discharge). Traditional effect assessments on a case-by-case basis have been unable to prevent increasing problems related to flooding, pollution and stream health.

Cumulative effects should be considered on a catchment level and translated into fit-for-purpose stormwater management responses which include regulatory and non-regulatory methods.

4.4. Masterplanning

Best practice:

- New developments require stormwater planning that considers the various opportunities and constraints, including specific engineering requirements from transportation, parks & reserves, utility services, etc
- Re-development (such as intensification) provide an opportunity to improve stormwater management practice including upgrades to existing infrastructure, improvements to natural assets and stormwater treatment

A site or area specific masterplan provides direction as to how a new area can be developed in an integrated way and for stormwater, this will consider natural stormwater features, including the location of stream corridors, floodplains and overland flow paths. Without the direction provided by a masterplan, there is a considerable risk that stormwater solutions (and services delivered through other activities) become sub-optimal and disjointed.

New infrastructure needs to meet the Council's design specification. Growth can also trigger the need to upgrade existing infrastructure, for example when connecting to existing infrastructure or when redevelopment in existing brown field areas is proposed.

4.5. Cross Council integration

Best practice:

- Land requirements for effective stormwater management and integrated urban design are identified and secured early in the planning and design process, including space for stream (corridors), flooding, overland flow and stormwater treatment.
- Stormwater management is integrated into all Council activities, including urban planning, reserve management and road corridor design.
- Integration with other Council projects provides a unique opportunity to achieve improved stormwater management outcomes.
- Catchment Management plans will be developed in partnership with Iwi

Many stormwater improvement works are very expensive and hard to justify in isolation. Any change in the urban environment provides a unique opportunity to achieve improved stormwater management outcomes. These principles apply to new developments as well as to any changes / works in existing urban areas. Examples are the inclusion of stormwater treatment as part of a road upgrade, stream enhancement as part of a reserve upgrade, or better flood management as part of a redevelopment initiative. The Council is always seeking efficiencies. The integration of improved stormwater management outcomes into Council and community initiatives is one way of achieving this.

4.6. Future proof design

Best practice:

- When considering the effects of possible changes in runoff or when scoping works to mitigate the effects of stormwater runoff a precautionary approach should be taken (within reason).
- Risk to lifelines and critical infrastructure should be given special consideration.

Many assessments of effects of future changes in runoff (quantity and quality) are based on a range of assumptions (e.g. climate change, future growth, expectations, legal requirements, treatment efficiencies, etc.). The cost related to future upgrades when the full range of necessary assumptions is not taken into account in the design phase are very high compared to the incremental costs to cover for uncertainty. Future proofing design solutions is seen as good practice in stormwater management. An options assessment should include a sensitivity analysis related to the assumptions made and the consequences related to scope and costs.

4.7. Value for money

Best practice:

- Stormwater management related solutions should consider (life cycle) cost and tangible and intangible benefits across Council and community.
- Operation and Maintenance requirements of man-made and natural assets are scheduled.
- Access to manmade and natural assets is legally and physically enabled and protected
- Public and Private responsibilities related to all aspects of stormwater management are clear and clearly communicated.

Stormwater needs to be managed in an effective and efficient manner. When considering options for new developments as well as in existing brown field areas, the principles outlined in the previous sections should be used. The whole-of-life-cycle costs and benefits need to account for both public and private stakeholder's interests. This includes intangible benefits such as ecosystem health and amenity.

It is not uncommon that access for efficient operation and maintenance of assets is difficult, specifically related to natural assets, but access needs to be provided. Access also needs to be legally possible and secured, specifically when it requires access though private land.

Although Operation and Maintenance of man-made assets is included in the AMPs it is less common to include the need to look after natural assets in a similar systematic manner. It is desirable to include costs related to the environmentally friendly maintenance of natural assets in the AMPs.

4.8. Cultural values

Best practice:

- Establish and facilitate a good working relationship and communication strategy between iwi and Council. This involves establishing a meaningful relationship whereby iwi have a management role, with input into decision-making beyond the RMA consenting processes.
- Catchment Management plans will be developed in partnership with Iwi to integrate Te Ao Māori values and kaitiakitanga aspirations.
- Indigenous vegetation is used where riparian margins are restored

The core Māori values and how they can underpin design principles are included in Appendix E.

5. Medium and long-term outcomes and targets

Our aspirations are long term goals for the future, and it is often not pragmatic, cost effective or realistic to try and achieve our aspirations within short timeframes. For this reason, medium (10 year) and long term (30 year) targets have been set and are shown against the current performance.

A range of tangible district-wide outcomes have been set to support the delivery of the aspirational objectives linked to each of the 5 focus areas. Our current level of stormwater management maturity was agreed through workshops with relevant stakeholders. The process involved scoring our performance against a number of objectives for each of the 5 focus areas. These Objectives are included in Appendix F.

A similar process was used to set the future 10-year (medium-term) and 30-year (long-term) targets. These target outcomes will be used as the basis for identifying and prioritising improvement projects in the individual catchment management plans.

The outcomes, current, and future target scores for each of the 5 focus areas are shown in the figures below.

5.1. Flooding

Flooding
Stormwater flooding does not create a hazard to our community or cause damage to properties

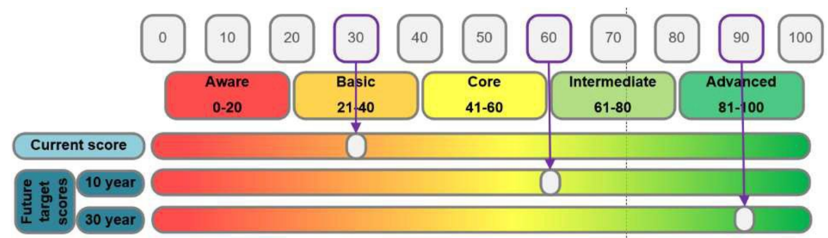
Level of SW management maturity	Aware	Basic	Core	Intermediate	Advanced

Outcomes

	Core	
Major storm events cause: • significant nuisance to our community • damage to properties • flooding of multiple habitable floors • health hazards and risks to life	**Major storm events cause:** • significant nuisance to our community • no damage to properties • no health hazards or risks to life	**Major storm events cause:** • flooding in designated areas only • no nuisance to our communities • no damage to properties • no health hazards or risks to life

Current score

Future target scores
10 year
30 year



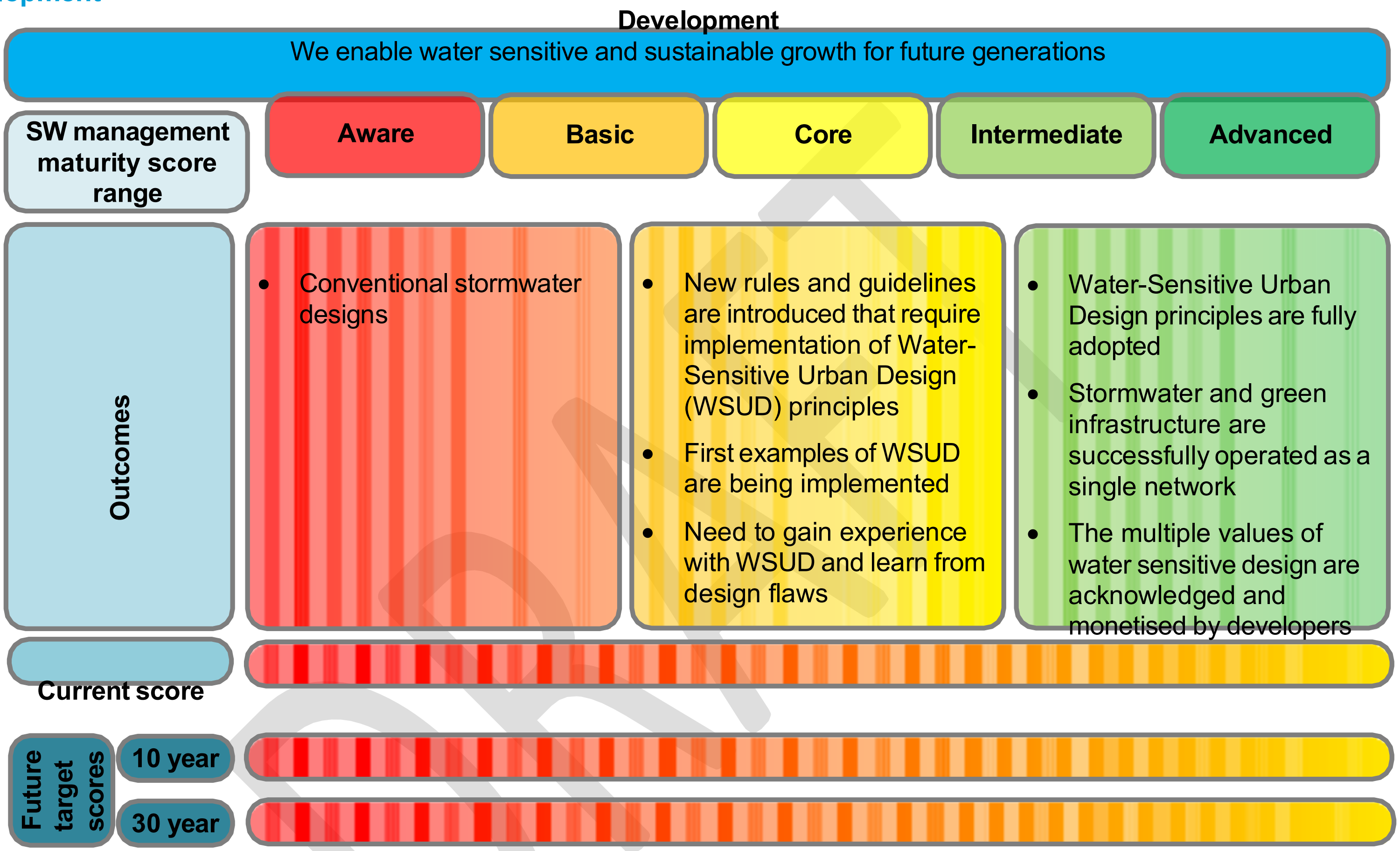
5.2. Contamination

Contamination

Stormwater discharges do not degrade the water quality and ecosystem health of the receiving water bodies

SW management maturity score range	**Aware**	**Basic**	**Core**	**Intermediate**	**Advanced**
Outcomes	• Stormwater from all surfaces is being discharged untreated • No source control • Regular uncontrolled contamination from private sites		• Stormwater treatment is being implemented within new developments • New rules and guidelines are introduced that require stormwater treatment from specific surfaces • Education programmes are creating awareness with the public • Water quality is monitored on a regular basis		• Source control avoids the risk of contamination • At source treatment of stormwater is implemented at new and existing sites • Water sensitive design is implemented • Treatment devices are designed, constructed and operated in accordance with industry accepted guidance documents • Private landowners are aware of the contamination risks and manage their sites appropriately
Current score					
Future target scores – **10 year**					
Future target scores – **30 year**					

5.3. Development



5.4. Healthy environment

Healthy environment
Our urban streams, aquatic habitats and coastal marine environment are healthy and accessible

SW management maturity score range	Aware	Basic	Core	Intermediate	Advanced

Outcomes

Aware / Basic

- Stream health is degraded with low habitat diversity
- Streams are heavily modified or piped
- Man-made structures create barriers to fish passage
- Lack of public access
- Cultural values and sites of cultural significance are not protected

Core

- Variable stream health and habitat diversity
- Modification or piping of natural streams is minimised
- Barriers to fish passage are being removed
- New rules and guidelines are introduced that require protection of streams
- Public access to streams within Council reserves

Intermediate / Advanced

- Excellent habitat diversity of the stream bed and banks
- No barriers to fish
- No further modification or piping of streams
- Modified streams are being restored or daylighted
- Streams form a network of green linkages between the hills and coast
- Good public access and amenity
- Cultural values are acknowledged and protected

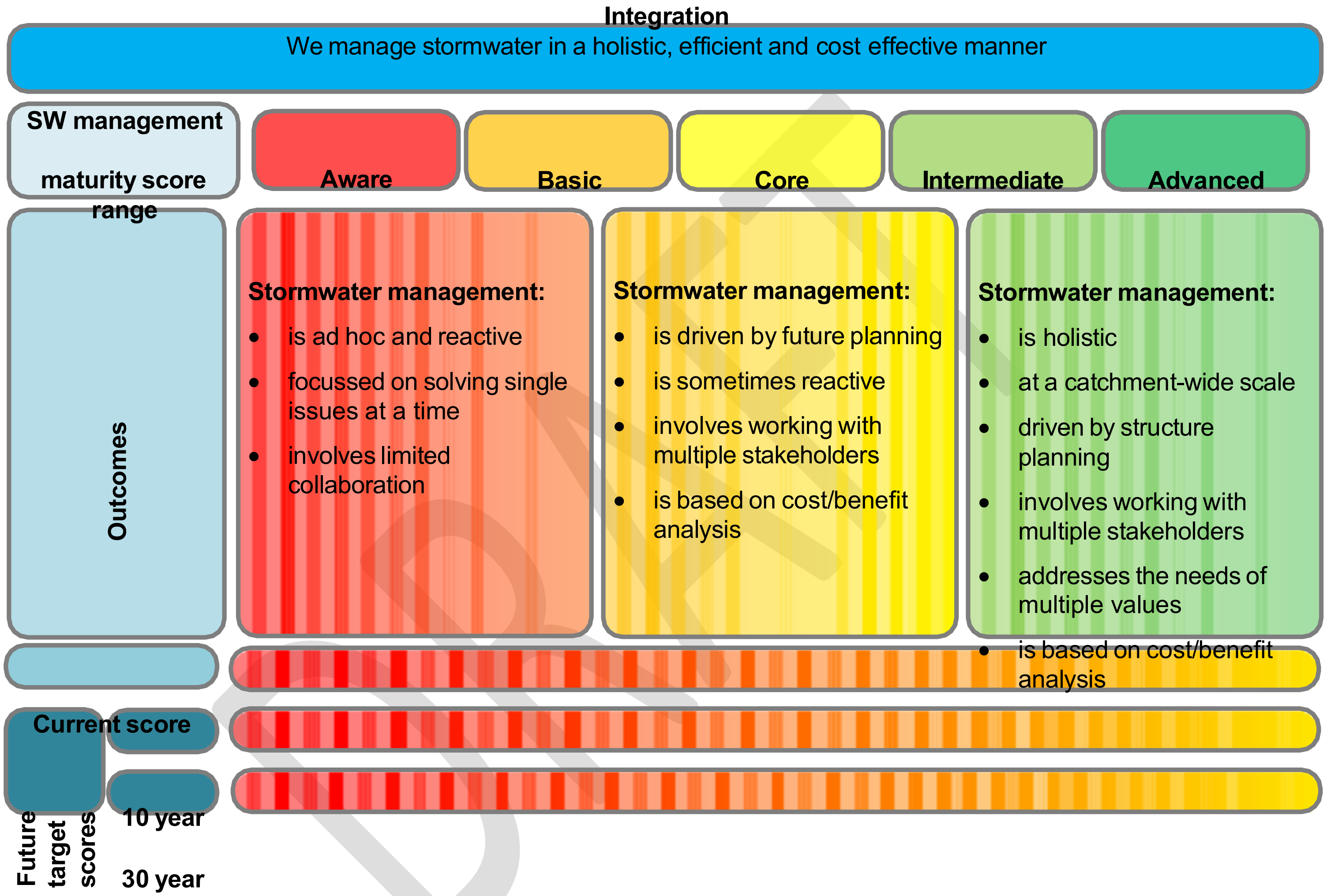
Current score

Future target

10 year

30 year

5.5. Integration



6. 3-year plan

The main purpose of this strategy is to set to the long-term direction for stormwater, but there are a number of key projects that need to be completed in the short-term (~ 3 years) if the long-term aspirational goals are to be achieved. A 3-year plan has been developed and details are provided in the following sections and Figure 5.

6.1. Update stormwater network models and flood hazard maps

To retain the values of the existing urban stormwater network models, they need to be updated. The updates will address issues such as:

- Advancements in modelling software
- Model input changes (eg rainfall, climate change assumptions, NRC river models etc)
- Installation of new infrastructure
- Availability of new LiDAR data

In addition to the model updates, systems need to be put in place to ensure the models are kept up to date in the future and can be used to model planning scenarios.

The network models are an important part of the CMPs but can be updated independently of them to ensure the latest flood mapping data is available. Central government (DIA) funding has been received to support update of the 3 waters network models including the stormwater models. A priority rank (refer to Table 1) was assigned to each urban stormwater catchment model based on the level of flood encroachment within building boundaries during a 100yr event, predicted growth and whether the catchment includes an urban drainage area (UDA) in the proposed Northland Regional Plan (pNRP).

Urban area	Priority
Kaitaia	1
Kerikeri	2
Greater Paihia	3
Kaikohe	4
Doubtless Bay	5
Awanui	5
Kawakawa & Moerewa	7
Greater Russell	8
Whatuwhiwhi	9
Ahipara	10
Houhora & Pukenui	11
Whangaroa	11
Rangiputa	11
Rawene & Kohukohu	11
Omapere & Opononi	15

Note: Proposed. Greater Paihia includes Paihia, Te Haumi, Opua and Haruru. Greater Russell includes Russell town, Tapeka and Okiato, Doubtless Bay includes Taipa, Mangonui, Coopers Beach and Cable Bay.

Table 1: Urban stormwater model update provisional prioritisation

6.2. Develop digital Stormwater Catchment Management Plans for priority areas

The catchment management plans developed in ~ 2010 will be used as the basis for development of fully updated digital, interactive plans that will form part of the Urban Stormwater Drainage Framework.

The catchment management plans will:

- Identify and address the specific features and issues of that stormwater network and the receiving environment it discharges to
- Be prepared to a specified timetable and with certain community engagement requirements
- Result in specific prioritised work programmes to address the identified stormwater management issues and how the network would be operated, maintained and upgraded to improve the quality of stormwater discharges.

The provisional urban stormwater models prioritisation shown in Table 1 could also be applied to the CMPs.

6.3. Update the Engineering Standards

The existing engineering standards have not been updated since 2009 and refer to NZS 4404:2004, which has now been superseded. Development of a new Engineering Standard that provides clear and consistent design and planning guidance to developers and FNDC staff is required.

As part of the process of updating the Engineering Standards, any other policies or guidelines that are identified as being required should be identified.

6.4. Implement a water quality monitoring programme

Water quality monitoring is required at specific locations to satisfy NRC stormwater discharge consent requirements, but can be used to build a picture of the general quality of discharges from the public stormwater network and the health of the receiving water bodies.

A programme of regular monitoring at key locations will be implemented and the results used to inform catchment planning.

6.5. Implement gross pollutant trap (GPT) installation programme

There are very few existing devices within the District to prevent gross pollutants from urban areas entering streams, rivers and oceans and those that are in place are often difficult to access and maintain safely. There are retrofit systems (such as debris nets) available that can treat large catchments and this type of solution should be used to target high risk catchments.

The use of more localised treatment, such as catchpit inserts, may also be appropriate in some situations particularly if there is a known litter 'hot-spot' or if very fine silt or specific types of contamination (eg hydrocarbons) need to be captured.

6.6. Define ownership and maintenance responsibilities and update in asset management system(s)

Management of stormwater is complex and required cooperation between various internal and external stakeholder. A lack of clearly defined rules around ownership and maintenance responsibility for assets (based on location, function and physical characteristics etc) increases the risk that assets will not be appropriately managed. There are particular issues with understanding the ownership/maintenance responsibilities between:

- FNDC Stormwater and FNDC Transport/Roading assets
- FNDC and NZTA assets
- FNDC and NRC assets
- FNDC and private assets

The first stage of this piece of work is to agree and document rules for assigning ownership and maintenance responsibility and the second stage will be applying the new rules to all assets held in all systems. This is likely to have some effect on future valuations and maintenance contracts.

Reconciliation of data held in INFOR, RAMM and the financial Fixed Asset Register will be required on a regular basis.

It is necessary to clearly identify all assets that will be vested to Council at the planning stage of new developments so that any issues with design or future maintenance can be addressed.

6.7. Align levels of service and stormwater investment with the Stormwater Strategy

There is currently only one level of service statement, which does not reflect the Stormwater Management Framework objectives and the only performance measured currently in place are the DIA mandatory non-financial measures. New levels of services statements (likely to strongly align with the 5 high-level aspirations and objectives identified in this document) are required that are supported by SMART (Specific, Measurable, Achievable, Relevant, Timebound) performance measures.

Future investment should be aligned to the Stormwater Strategy by measuring and prioritising all projects and activities against the objectives and targets that are set through the Catchment Management Planning Framework.

6.8. Develop a Stormwater Bylaw

The need for a Stormwater Bylaw has been identified as it will assist with:

- Managing development and maintenance of the stormwater network
- Protecting the existing stormwater network from damage, misuse or loss
- Managing use of the existing stormwater network including conditions on which connection may be made or maintained
- Ensuring discharges into the existing stormwater network do not damage the network or compromise the Council's ability to comply with any applicable network discharge consents
- Preventing interference with the public stormwater network
- Ensuring the public network is managed in a way that protects the public from nuisance and promotes / maintains public health and safety
- Manage the ground soakage systems that form part of the network
- Ensure the maintenance and operation of private stormwater systems and the removal or decommissioning of redundant stormwater systems on private land to prevent damage to the stormwater network, protect the public from nuisance and maintain public health and safety

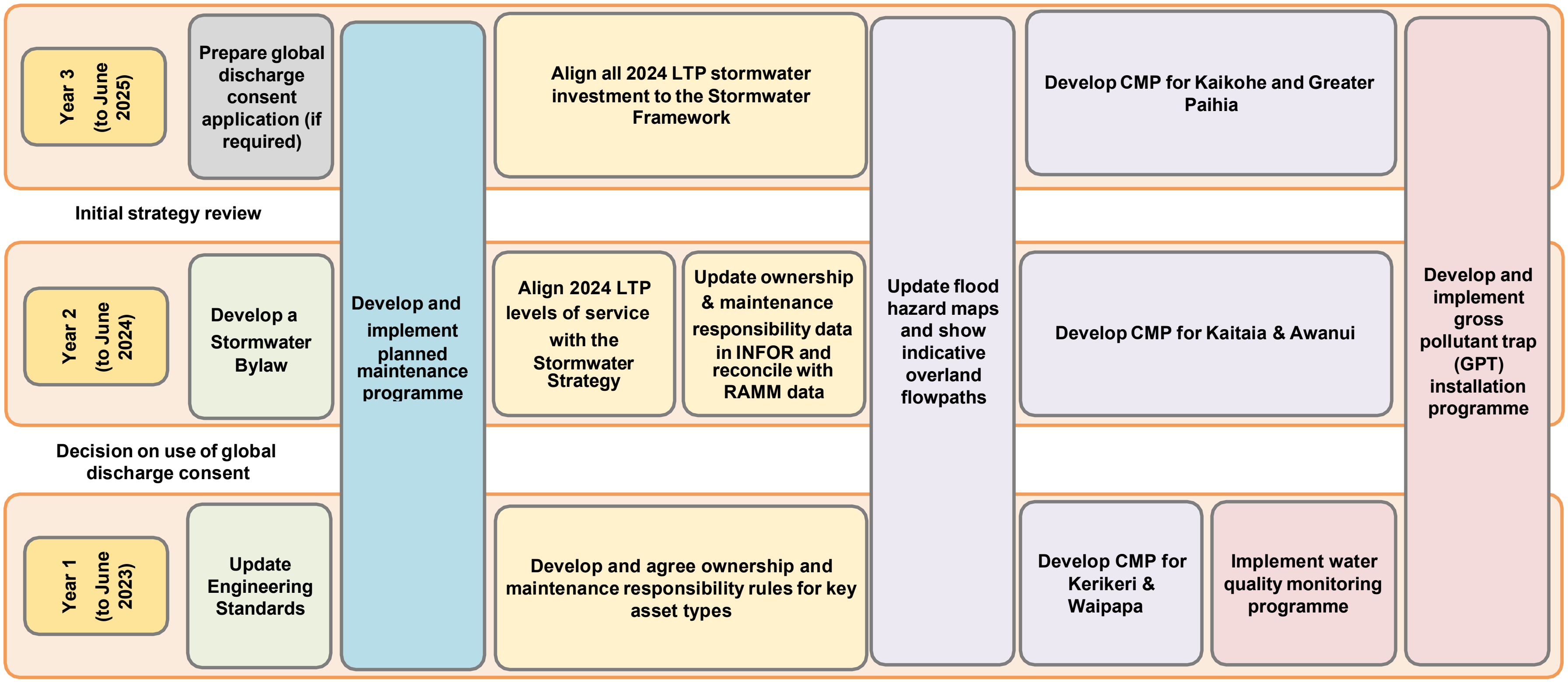


Figure 5: 3-year plan

Table of tables

Table of figures

Appendix A: NPS-FM overview

The main focus of the NPS-FM is:

- setting freshwater objectives (goals that describe the desired state of freshwater now or in the future)
- setting limits (the maximum amount of the resource available for use)
- implementing methods to achieve the freshwater objectives and limits.

Some of the key requirements of the NPS-FM are to:

- consider and recognise Te Mana o te Wai in freshwater management
- safeguard fresh water's life-supporting capacity, ecosystem processes, and indigenous species
- safeguard the health of people who come into contact with the water
- maintain or improve the overall quality of fresh water within a freshwater management unit
- improve water quality so that it is suitable for primary contact more often
- protect the significant values of wetlands and outstanding freshwater bodies
- follow a specific process (the national objectives framework) for identifying the values that tāngata whenua and communities have for water, and using a specified set of water quality measures (called attributes) to set objectives
- set limits on resource use (eg, how much water can be taken or how much of a contaminant can be discharged) to meet limits over time and ensure they continue to be met
- determine the appropriate set of methods to meet the objectives and limits
- take an integrated approach to managing land use, fresh water and coastal water
- involve iwi and hapū in decision-making and management of fresh water.

Appendix B :Overview of Te Mana o te Wai

source: Te Mana o te Wai report

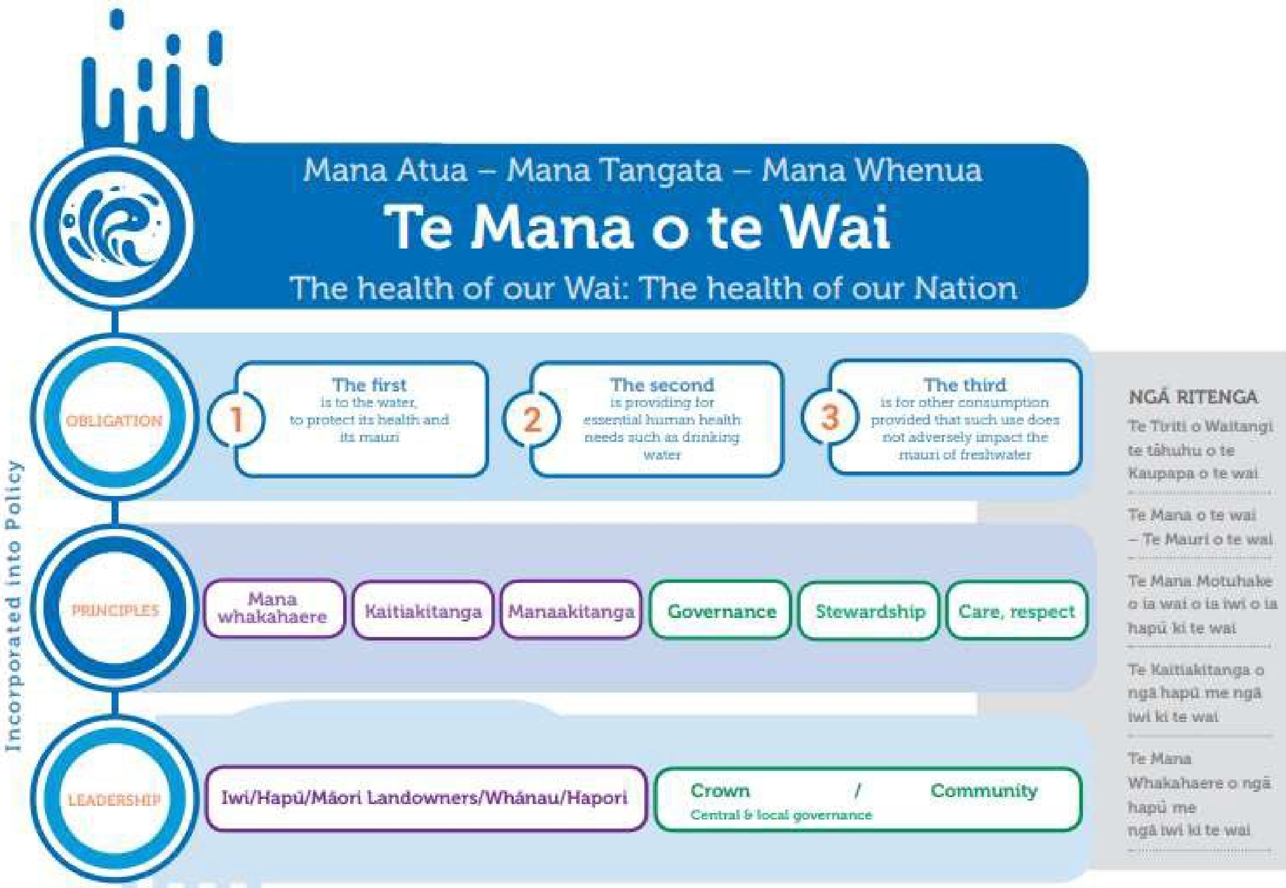


Figure 1

Appendix C: National Urban Water Principles

PAPATŪĀNUKU – “Our relationship with the land –papatūānuku – will pre-determine our relationship with water”.

1. Protect and enhance ecosystem health of all receiving environments. Use integrated planning to ensure that decisions made upstream protect downstream receiving environments, such as streams, lakes, wetlands and terrestrial ecosystems, groundwater, estuaries, and the ocean.
2. Co-design with nature an integrated and regenerative approach to urban development. Use nature-based or green infrastructure engineering solutions where possible to mimic or work with processes found in the natural environment. Retain, restore and enhance existing elements of the natural drainage system, and integrate these elements into the urban landscape.
3. Address pressures on waterbodies close to source. Urban water ecosystems are under increased pressure from a wide range of pollutants, modified flow characteristics and altered channel form. These pressures can be either acute (such as a spill or pollution incident) or chronic, created by the cumulative effects of these pressures over time. Mitigating these pressures at or close to their source prevents degradation downstream.

NGĀ WAI TUKU KIRI – “Our waters are a gift of life provided to us by our tupuna”.

4. Recognise and respect mana motuhake – the whakapapa and relationship that mana whenua have with water ecosystems in their rohe. Mana motuhake means the authority (mana) gained through self-determination and control over one's own destiny. Mana whenua communities have this authority in their customary ‘rohe’ or territory and have special cultural relationships with ecosystems in these areas. It is important to proactively engage mana whenua in designing urban environments within their rohe so that they can have a meaningful role in shaping the outcome.

TĀNGATA – “Our environments are places of human occupation”.

5. Identify and consider the community values for urban water and reflect them in decision-making. Communities often have strong aspirations and values for their urban spaces, including values for environmental sustainability, sense of place, and general amenity and liveability. Urban planning and design processes should create opportunities for communities to express their values and for decision-makers to reflect these goals in their decisions.
6. Optimise environmental, social and cultural benefits when investing in buildings and infrastructure. When considering options for investment, prioritise options that provide multiple benefits. Investment decisions should take lifecycle costs of buildings and infrastructure into account and generate an enduring well-being gain.

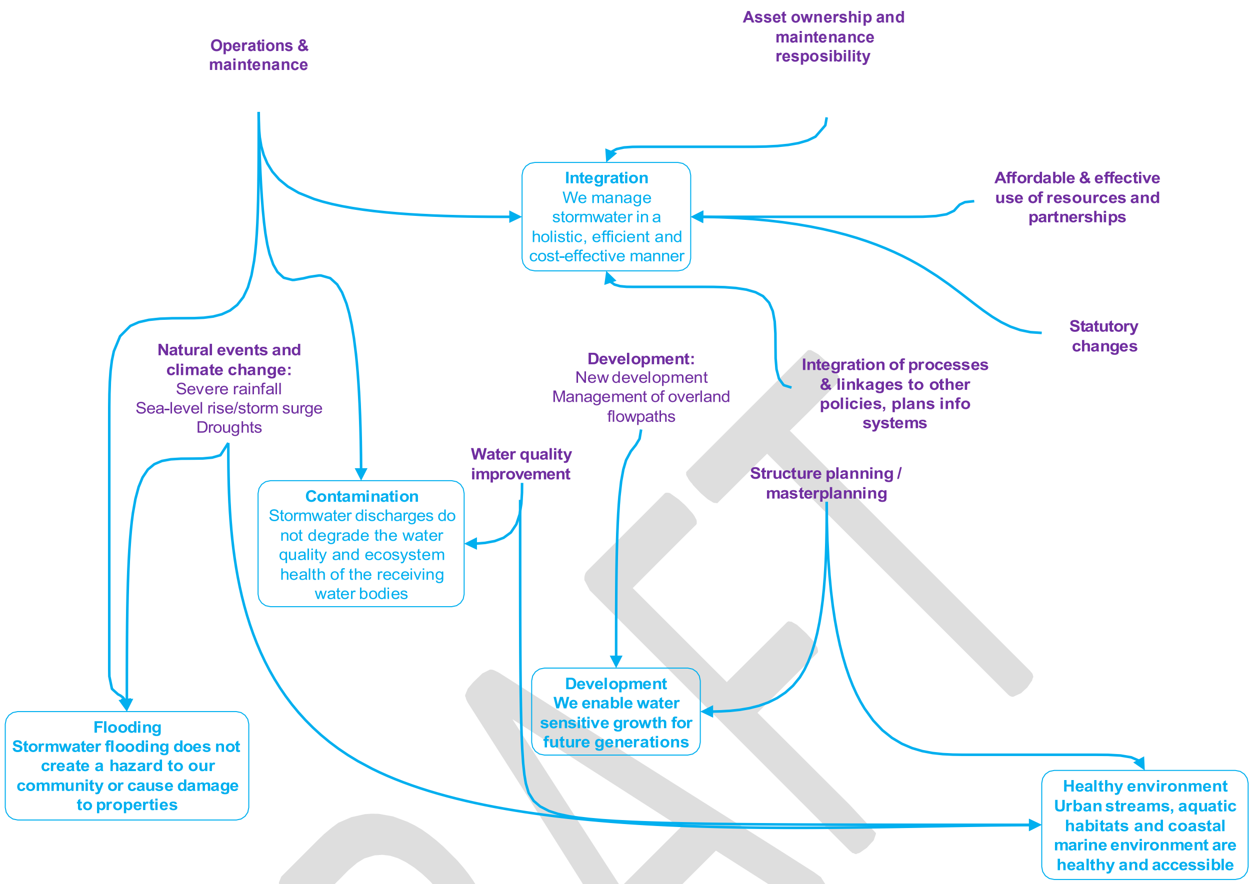
TE HĀPORI ME TE WAI – “The community’s love and care for water is enduring”.

7. Uphold and foster kaitiakitanga and custodianship of urban water ecosystems. Everyone has a responsibility to care for the health of our urban water bodies. Because of this, it is important that all community members can connect with these water bodies and are encouraged and empowered to take direct action to maintain and restore ecosystem health.
8. Collect and share information to promote common understanding of urban water issues, solutions and values. Meaningful and transparent data and information is necessary to improve both the design and use of our urban environments. Improving access to quality information can support integrated catchment planning and water sensitive design, while information for urban residents and businesses on current and emerging issues and solutions can foster positive behaviour change and the acceptance of new policy and technology.

TIAKINA MŌ APŌPŌ – “In building future resilience, our connectedness with the environment is our strength”.

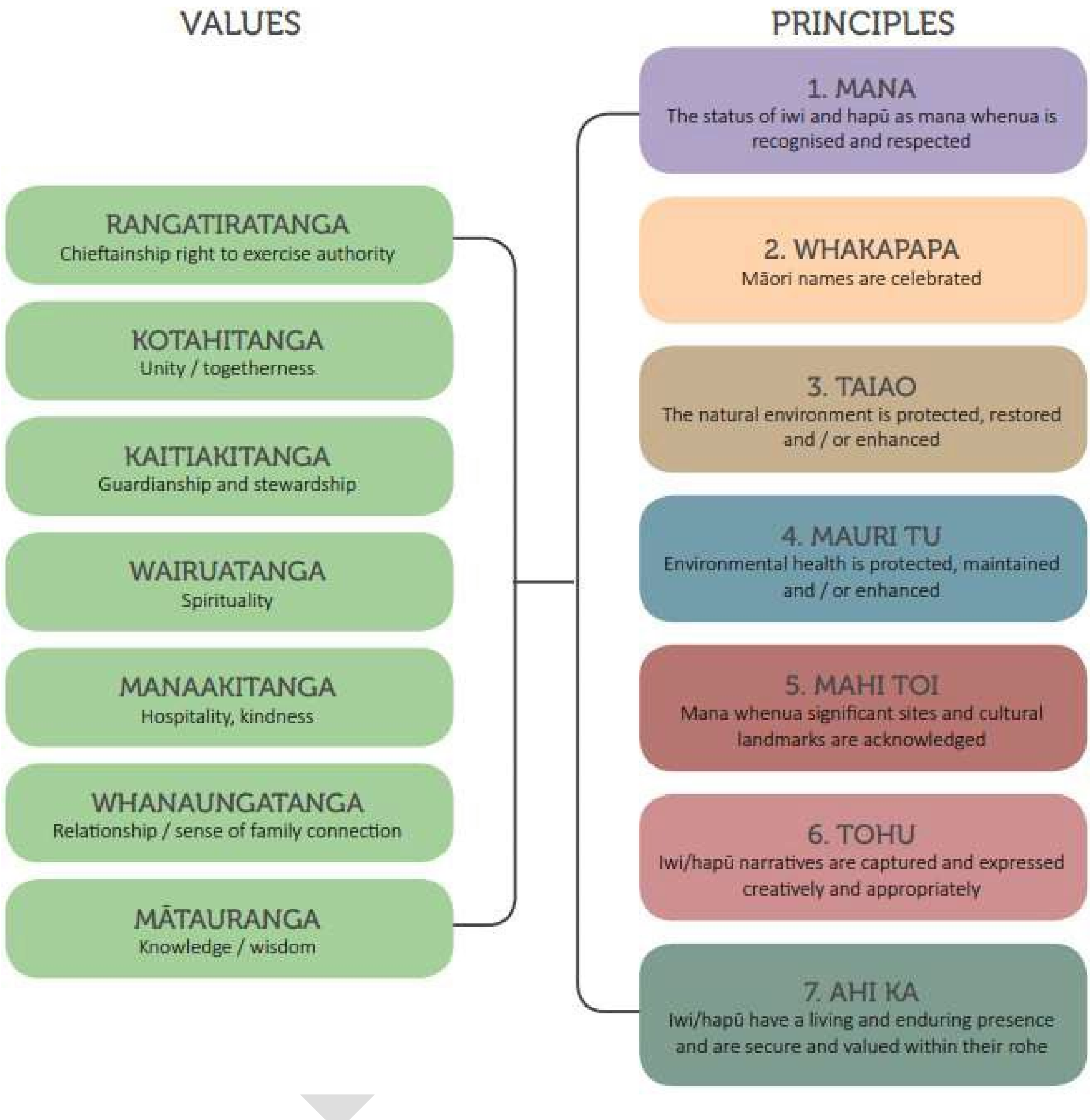
9. Increase resilience to natural hazards and climate change. To improve the resilience of urban communities, we need to design water sensitive systems and landscapes which reflect the environmental characteristics of the area and are resilient to natural disasters and change.
10. Conserve and reuse water resources. Drinking water, wastewater and stormwater are each valuable resources and we should reduce their consumption and/or production and maximise their reuse. This includes increasing water-use efficiency by reducing potable water demand and maximising the use of greywater and stormwater

Appendix D: Links between key issues and the 5 focus areas



Appendix E: Core Māori values and design principles

(source: Tāmaki Regeneration Company (2016). Tāmaki Reference Plan (Version 0.17)



Appendix F: Agreed current and target scores against objectives

1. FLOODING

Aspiration: Stormwater flooding does not create a hazard to our community or cause damage to properties

		Score (0 to 100)		
ID	**Objectives**	**Current**	**10yr**	**30yr**
1.1	New and existing properties are serviced by a primary network with capacity to convey flows of at least 10% AEP or more			
1.2	No habitable floors are expected to flood as a result of a storm event of 1% AEP or less (as measured through stormwater modelling)			
1.3	Flood risks are prioritised in the order of: ■ 1st - Hazards (minimise safety effects) ■ 2nd - Damage (minimise economic effects) ■ 3rd - Nuisance (minimise social effects)			
1.4	Overland flow paths are improved and protected to safely convey up to 1% AEP without any flooding of habitable floors			
1.5	Climate change effects are accounted for in flood risk assessments			
1.6	New developments are designed in accordance with the relevant requirements of the Engineering Standards (primary network design capacity: 10% AEP and secondary network design capacity: 1%AEP)			
1.7	Understand and manage residual flood risks (above 1% AEP) appropriately			

2. CONTAMINATION

Aspiration: Stormwater discharges do not degrade the water quality and ecosystem health of receiving water bodies

		Score (0 to 100)		
ID	**Objectives**	**Current**	**10yr**	**30yr**
2.1	Avoid contamination of stormwater through source control			
2.2	Treat stormwater runoff from (re)developments, where avoidance is not possible, in accordance with requirements of the Engineering Standards.			
2.3	Retrofit stormwater treatment to existing discharges, focusing on high risk areas such as busy roads, intersections and large carparks.			
2.4	Implement a targeted approach to stormwater management and treatment of runoff from industrial and commercial areas aimed at identified contamination risks related to specific activities.			

3. DEVELOPMENT

Aspiration: We enable water sensitive and sustainable growth for future generations

ID	Objectives	Score (0 to 100) Current	10yr	30yr
3.1	Utilise and support the implementation of Water Sensitive Design as the guiding design principle for all new developments and redevelopments			
3.2	Council will provide clear guidance on catchment specific stormwater requirements in new growth areas			
3.3	Establish good working relationships with the development community to support the development of rules, requirements and supporting practice notes that are clear and implementable and reduce uncertainty.			

4. HEALTHY ENVIRONMENT

Aspiration: Our urban streams, aquatic habitats and coastal marine environment are healthy and accessible

ID	Objectives	Score (0 to 100) Current	10yr	30yr
4.1	Enhance habitat diversity and stream health, including riparian and wetland vegetation, diversity of bed/bank substrate (including woody debris), meander, diversity of width/depth, floodplain connectivity and diversity of bank shape suitable for aquatic and riparian fauna needs			
4.2	Minimise stream modification and loss of natural streams, including springs and seeps			
4.3	Maintain and restore fish passage at man-made instream structures.			
4.4	Provide for public access, amenity and connectivity along our urban stream network, creating green linkages connecting our hill country to the sea.			
4.5	Protect and restore specific areas of cultural and community significance within the stream corridors.			

5. INTEGRATION

Aspiration 1: We manage stormwater in a holistic, efficient and cost effective manner

ID	Objectives	Score (0 to 100) Current	10yr	30yr
5.1	Engage and collaborate with tangata whenua and other internal and external stakeholders to achieve best stormwater outcomes			
5.2	Manage stormwater so that it addresses the needs of multiple values in a balanced and practical manner throughout the entire life of the asset (design, operation, decommissioning)			