



Auckland Water Strategy Supplementary Document

Assessing the Mauri of Infrastructure and Water

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TEKTUS
CONSULTANTS



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Introduction

This report has been prepared by Tektus Consultants and Auckland Council, as a part of the development of the Auckland Water Strategy (the Water Strategy), as adopted by Auckland Council in March 2022. This report is one of three documents published to increase understanding about how infrastructure can respond to the vision of the Water Strategy (Te Mauri o te wai o Tāmaki Makaurau, the life-sustaining capacity of Auckland’s water, is protected and enhanced). These three documents help us to understand how and why we would build mauri-enhancing infrastructure. The three documents are:

1. Why Water Infrastructure Should be Mauri-enhancing
2. Mauri-enhancing Infrastructure Case Studies
3. **Assessing the Mauri of Infrastructure and Water (this document)**

Purpose

The purpose of this document is to provide guidance on assessing mauri in the context of water and water infrastructure. It is intended as an introduction to approaches that have been developed; care should be taken in assessing mauri and must be done by and with mana whenua. Appropriately assessing mauri is critical to the implementation of the Water Strategy and in setting the path for te mauri o te wai in Tāmaki Makaurau.

This report responds to Shift 4 of the Water Strategy: *“Regenerative Infrastructure: Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders.”*

Refer to Figure 1 for Shift 4’s context within the Water Strategy’s Strategic Framework. For further details on the Water Strategy and its implementation, refer to the full Auckland Water Strategy document and the Water Strategy Implementation Plan 2022.

It is important to recognise that only mana whenua can truly assess mauri, but through the implementation of the Water Strategy and working in partnership with mana whenua, we can develop and implement tools, capability, and institutional knowledge and memory to achieve te mauri o te wai.

This document relates to Action 4.3 within the Regenerative Infrastructure Shift: *“resource mana whenua to develop guidance and assessment methods for mauri-enhancing infrastructure.”*

It also relates to Action 4.4 within the Regenerative Infrastructure Shift: *“assess and map impacts of existing water infrastructure on te mauri o te wai, in partnership with mana whenua.”*

Context

Te mauri o te wai

Vision: Te mauri o te wai, the life-sustaining capacity of Auckland’s water, is protected and enhanced.

Te mauri o te wai was adopted as the guiding vision for the Auckland Water Strategy. The vision has been embedded in all of the shifts and is the foundation for all of the actions in the strategy. This can be clearly seen in the Water Strategy Strategic Framework (Figure 1). Achieving the vision of te mauri o te wai requires a change from thinking of water (or wai) as solely a resource to thinking of water as fundamental to the life-force of its environment and actively protecting and enhancing its life-sustaining capacity (mauri).

Water Strategy Strategic Framework																	
Our Vision	Te mauri o te wai, the life-sustaining capacity of Auckland’s water, is protected and enhanced’																
Our Treaty Context	The Council and mana whenua must take a partnership approach to the protection, management and enhancement of water																
Our Over-arching Challenges	<ol style="list-style-type: none"> 1. Protecting and enhancing the health of waterbodies and their ecosystems 2. Delivering 3-waters services at the right time, in the right place, at the right scale, as the city grows. 3. Having enough water for people now and in the future 4. Reducing exposure to water-related natural hazard risk over time. 5. Affordability for Aucklanders 6. Improving how the council works with its treaty partners 7. Improving how the council organises itself 																
Our Cross-cutting Themes	<p>Equity and Affordability: Equitable access to essential services and affordable investment</p> <p>Climate Change: Mitigating and adapting to the impacts of climate change</p>																
Our Strategic Shifts	<table border="1"> <tr> <td>1</td> <td>Te Tiriti Partnership The council and mana whenua working together in agreed ways on agreed things</td> <td>2</td> <td>Empowered Aucklanders Working with Aucklanders for better water outcomes</td> </tr> <tr> <td>3</td> <td>Sustainable Allocation and Equitable Access Prioritising mauri when using water, to sustain the environment and people in the long term</td> <td>4</td> <td>Regenerative Water Infrastructure Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders</td> </tr> <tr> <td>5</td> <td>Water Security Water abundance and security for growing population through efficient use and diverse sources</td> <td>6</td> <td>Integrated Land Use and Water Planning Integrating land use and water planning at a regional, catchment and site scale</td> </tr> <tr> <td>7</td> <td>Restoring and Enhancing Water Ecosystems Catchment-based approaches to the health of water ecosystems</td> <td>8</td> <td>Pooling Knowledge Shared understanding enabling better decisions for our water future</td> </tr> </table>	1	Te Tiriti Partnership The council and mana whenua working together in agreed ways on agreed things	2	Empowered Aucklanders Working with Aucklanders for better water outcomes	3	Sustainable Allocation and Equitable Access Prioritising mauri when using water, to sustain the environment and people in the long term	4	Regenerative Water Infrastructure Auckland’s water infrastructure is regenerative, resilient, low carbon, and increases the mauri of water. It’s able to be seen and understood by Aucklanders	5	Water Security Water abundance and security for growing population through efficient use and diverse sources	6	Integrated Land Use and Water Planning Integrating land use and water planning at a regional, catchment and site scale	7	Restoring and Enhancing Water Ecosystems Catchment-based approaches to the health of water ecosystems	8	Pooling Knowledge Shared understanding enabling better decisions for our water future
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Our Implementation	Co-ordination, Capacity and Capability across the Council Group 																

Figure 1: Auckland Water Strategy Strategic Framework

Historical Tāmaki Makaurau context

Ka mua, ka muri – ‘walking backwards into the future’ is a whakataukī (Māori proverb) that highlights the importance of using the past to inform our future. The mauri of water within Tāmaki Makaurau has been degraded over time due to historical approaches taken to infrastructure design and delivery. Historical reliance on subsurface pipe networks to manage our water infrastructure has contributed to Aucklanders’ lack of connection with our waterways as hidden and unknown ‘servicing’ has disconnected people from the environment. This approach to water infrastructure has cemented a perception of water as a resource and then a waste product for disposal, rather than a foundational element with life-supporting capacity, and a method of connection and value as tūpuna, taonga, and resource.

Auckland Council has management responsibilities for six ‘waters’: freshwater, coastal water, groundwater, wastewater, stormwater and drinking water. Waste, storm and drinking water are managed through provision and operation of infrastructure and referred to as the ‘three waters’. To fundamentally change ‘three waters’ management in Auckland to a ‘one water’ holistic approach and truly embed te mauri o te wai, it is critical to understand our current state and the reasons for that state and our journey to this point. The legacy of loss – land, language, tikanga, and mātauranga, compounded by inequity and development paradigms that have fundamentally altered the landscape without cognisance of the whakapapa connections between tangata, whenua, and taiao that must be acknowledged in how we respond to water in Tāmaki Makaurau moving forward.

What does this mean for Auckland’s infrastructure?

Placing te mauri o te wai central to infrastructure design and decision making will require us to consider each element of the natural world as part of a broader environmental and intergenerational context where the holistic wellbeing of each is entwined with the other.

When designing urban centres, it is important to not alter mauri to the extent that it is no longer recognisable. This includes the essential character of the site not changing as a result of human activity. A key outcome for Māori as kaitiaki, is the restoration of balance to the natural system as a whole and to maintain or enhance mauri.

To build trust-based partnerships, and respond to te mana o te wai¹, a stocktake of mauri-diminishing infrastructure is necessary. Action 4.4 in the Water Strategy is to “*assess and map impacts of existing infrastructure on te mauri o te wai, in partnership with mana whenua*”.² The stocktake should consider:

- where water assets occupy Māori land
- locations where construction and operation of water infrastructure assets continue to degrade te mauri o te wai
- where access is prevented or restricted to wāhi tapu, wāhi taonga, mahinga kai, mahinga rongoā, and other sites of significance in relation to water
- scenarios where council water infrastructure and connections were offered to hapū/marae in relation to public works, but not delivered

¹ ‘Te mana o te wai’ is the phrasing used in the National Policy Statement on Freshwater Management 2020 which sets out the objectives and policies for freshwater management under the Resource Management Act.

² For further details on the Water Strategy and its implementation, refer to the full Auckland Water Strategy document and the Water Strategy Implementation Plan 2022

- names of waterways within Tāmaki Makaurau, where appropriate, to reduce reference to “unnamed” tributaries
- assessing and identifying decision-making structures and enabling processes that have led or are leading to mauri degrading infrastructure

Assessing mauri

In order to carry out a stocktake of mauri-diminishing infrastructure, and measure whether new infrastructure is improving mauri, methods for assessing mauri must be developed and deployed. Appropriately assessing mauri is critical to the implementation of the Water Strategy and in setting the path for the protection and enhancement of te mauri o te wai in Tāmaki Makaurau.³

It is arguably overly reductionist to consider mauri assessments for our infrastructure solutions alone, with assessment more appropriately seeking to drive outcomes that enhance te mauri o te wai broadly within the catchment that proposed or renewed infrastructure will serve. Mauri itself inherently responds to the connections and interdependence between tangata, whenua, and taiao.

It will be most appropriate to define mauri-enhancing infrastructure in partnership with mana whenua, however the following initial considerations are proposed:

- Mātauranga-a-iwi of mana whenua guides place-based decision making
- Infrastructure decisions should account for impacts beyond capital and operational economic cost, attributing the true whole-of-life socio-cultural and environmental costs and benefits to decision making
- waterways are connected, across te hurihanga wai (the water cycle): *mai i te rangi ki te nuku o te whenua*, from the sky to the land – rainfall, groundwater, surface water, estuarine, sea, evapotranspiration, access for tuna/inanga
- infrastructure avoids artificial mixing of waters: wai ora / wai tapu / wai māori / wai kino (pure or healthy water / sacred water / freshwater / polluted water) – The mauri of different waters should not be deliberately or unnaturally mixed where they are not compatible. When the mauri of water has diminished, for example through human use, it can only be restored through a return to Papatūānuku if the mauri of that water is not suitable for the subsequent use
- waters are safe and accessible to drink, swim, recreate, and harvest (rongoā and kai)
- systems are responsive and resilient to changing conditions – room is available for surface flows in excess of constrained constructed networks, water take is appropriate to the source, sources are protected
- waters are open to the senses – conspicuous, maintaining the personality of the waterway, i.e. sight, sound, smell, degree of modification or impact, cultural and environmental flows
- catchments nourish taonga and sentinel species – ngā rakau (trees), ngā otaota (riparian vegetation), ngā manu (birds), ngā ika (fish); with example indicators including presence or absence, diversity of species, prevalence of invasive and pest species, predators, abundance, and health
- solutions are locally sourced, prioritising low carbon and blue-green multifunctional solutions over single-function grey infrastructure/devices

³ Same as above

- distributed systems and hybrid systems, enhancing resilience and maintaining or managing at source
- carbon neutral or carbon positive solutions that respond to [Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan](#)
- resource recovery and circular economy systems, including construction methods which enable decommissioning for beneficial reuse and waste minimisation/avoidance
- forward planning for asset management actively empowers kaitiakitanga and the intergenerational transfer of knowledge in operations and maintenance of infrastructure solutions

Tools

A range of tools exists in Aotearoa New Zealand to guide the assessment of mauri. Many have evolved from the freshwater management space and so do not directly relate to infrastructure – but rather focus on the receiving environments and waterways our infrastructure solutions modify, whether through discharge, diversion, take, or other modification.

Table 1 provides a brief synopsis of a selection of available tools, and commentary in respect of regenerative, conspicuous, and mauri-enhancing infrastructure (the terms used in the Water Strategy). The tools selected are some that have been utilised in Auckland, currently or in the past, or those utilised widely in Aotearoa. Of varying complexity, these tools provide examples of the range of assessment criteria currently in use, with application requiring varied levels of training and all mana whena led, or in partnership with mana whenua.

Similarly, there is a range of tools that have been utilised in Tāmaki Makaurau which assess water sensitive and low carbon outcomes – for example the *More Than Water Tool* and the *Carbon Dashboard* – and so may be applied in partnership with mana whenua assessments of mauri to assess water sensitive outcomes that support regenerative and conspicuous infrastructure.

Table 1: Mauri Assessment Tools

Tool	Comment	Assessment Criteria
Auckland Council's Wai Ora Wai Māori Programme	<p>Evolution of the Wai Ora Wai Māori framework, with proposed mana whenua values, attributes, and measures for Auckland Council's Wai Ora Wai Māori programme.</p> <p>Developed as a Māori Freshwater Values Framework for input into the National Policy Statement for Freshwater Management (NPSFM).</p>	<p>Includes a basic set of quantitative/ biophysical attributes, alongside a more comprehensive set of qualitative indicators determined by iwi/hapū. 16 economic, physical, biophysical, and metaphysical values that can be applied to the Tāmaki Makaurau context. The nested framework outlines 126 individual indicators – some of which could be further sub-divided into other indicators.</p> <p>Examples include assessment of artificial mixing of mauri, access to wai (in multiple states), presence of tīpua/kaitiaki, mauri assessment, safe to swim/recreate, mahinga kai, he ara haere (navigational routes), and he au pūtea (economic growth).</p> <p>Iwi to determine what indicators are included or excluded from the framework.</p> <p>Scoring a combination of binary (Āe/Kao), Likert scales (Pai Rawa Atu / Mauri Ora to Auē / Mauri Noho), and numerical measures.</p> <p>Cumulative scores given by individual observers are then averaged to give an overall site score, aligned with NPS-FM attribute bands (A to D)</p>
Wai Ora Cultural Health Framework	<p>Developed within Auckland Council's Healthy Waters department, with implementation of a pilot study with Te Ahiwaru.</p> <p>It is understood further development of this model is in progress within Healthy Waters.</p>	<p>Nine tohu / attributes - vegetation, water, soil, air, animals, sacred places, metaphysical attributes, special places, and urban impact. Each encompasses scientific measures and cultural measures, with characteristics of a tohu dependent on geographic region, history of the awa, and capacity of mana whenua / living knowledge.</p> <p>Likert scoring: 1-5, qualitative assessment through wānanga, engaging traditional Tuakana-Teina approaches with Kaumātua, Kuia, and Rangatahi.</p>
Mauri Model (Mauri-o-meter)	<p>Originally designed as a tool to assist with decisions around potential engineering projects and their benefit to or impact on mauri, this tool has been applied widely.</p> <p>It is a tool focused on selecting between options for future projects to improve the quality of decision-making, not to collect mātauranga Māori about the current state of a waterbody or ecosystem.</p> <p>Applied within Auckland Council previously, with application by engineers/scientists deemed inappropriate without the guidance of mana whenua holding mātauranga and ability to determine mauri.</p>	<p>Radar diagram for comparison over time.</p> <p>Four nested domains: Ecosystem, Hapū (cultural), Community (social), Whanau (economic).</p> <p>Likert scale from -2 (diminishing mauri) to +2 (enhancing mauri), with ability to weight the four aspects of mauri to address their relative importance to users and decision-makers.</p> <p>Measured indicators vary from site to site, as each is a bespoke assessment related to the project/location and hapū/whānau undertaking the assessment.</p>

Tool	Comment	Assessment Criteria
Take Mauri Take Hono	<p>Take Mauri–Take Hono is a body of work developed as a Cultural Health Indicator Framework Tool by iwi mana whenua of Tāmaki Makaurau in conjunction with Kaiwhakaora Whenua Specialist Richelle Kahui-McConnell of Mealofa Ltd.</p> <p>Used for Awataha Greenway Project, the framework acknowledgement recognises use of the Framework Tool across other projects is at the sole discretion and direction of mana whenua.</p> <p>Iwi mana whenua who actively engaged in the development of the Take Mauri-Take Hono Framework Tool were Ngāi Tai ki Tāmaki, Te Patukirikiri, Ngā Maunga Whakahī o Kaipara, Te Ākitai Waiohua, Ngaati Whanaunga, Ngāti Maru, and Ngāti Whātua Runanga.</p>	<p>Three waiora tohu: environment (Aho Taiao – living with nature), culture and community (Aho tangata – E tipu e rea: Growing with nature) and social-economic (Aho Toi – Weaving the strands) whenu or strands.</p> <p>10 indicators within – including authentic ngahere, para kore (zero waste), authentic awa ecosystem, clean water, connected healthy waterways that function naturally, living classroom to enable kaitiakitanga, seeing our faces in our places, mahi toi (cultural expression), expression through the wider landscape, and Māori outcomes framework.</p> <p>Likert scale assessment from -2 (Degraded, Mauri Titaha) to +2 (Vibrant, Mauri Tū/Ora)</p>
Mauri Compass	<p>Mauri is embedded as a compulsory freshwater value in the Tairāwhiti Resource Management Plan. In response, the Mauri Compass was developed as a pragmatic tool founded on tikanga Māori, scientific research, and resource management planning.</p> <p>The Mauri Compass offers a statistically robust means of assessing changes to a range of parameters important to iwi and hapū. It can be employed to demonstrate current state and changes in the state of a waterbody across time, and a framework for planning the restoration of those waters.</p>	<p>A digital tool covering 12 aspects in three kete: Tangata Whenua (Tangata Whenua, Tikanga, Wairua, and Mahinga Kai), Tāne (Habitat, Biodiversity, Biohazards and Chemical Hazards), and Tangaroa (Fish species, Abundance, Fish Health and Growth Rates).</p> <p>It combines mātauranga Māori with Western indicators including both qualitative and quantitative assessment.</p> <p>Results are presented in an accessible, visual compass - using radar diagrams - giving understanding of current state across a range of factors.</p>
Stream Cultural Health Index (CHI)	<p>Cultural Health Index for Streams and Waterways, is intended as a tool for nationwide use, to respond to change over time. It is one of the most widely used and adapted tools.</p> <p>Best for local scale and sites (small wetlands and estuaries, food gathering locations, short stream reaches).</p>	<p>14 indicators across three domains: Site status (i.e. traditional site), Mahinga Kai (i.e. presence, access), cultural stream health (i.e. water quality, habitat, land use, riparian margins).</p> <p>Combination of binary (1/0) and Likert scale (1-5).</p>

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