ASSESSING THE NET BENEFITS OF AUCKLAND COUNCIL STORMWATER PROJECTS USING THE MAURI MODEL

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ABSTRACT

The planning process for stormwater infrastructure includes an assessment of the net costs and benefits of different project options. The standard approaches, cost benefit and multicriteria analysis, respectively quantify the costs and benefits arising from a project, and capture some of the qualitative benefits that are difficult to capture in dollar terms. However, standard approaches can underestimate environmental and cultural benefits as these are hard to quantify. Further, multicriteria analysis does not typically consider the unique cultural context of Aotearoa. Therefore the true value of projects with significant environmental and cultural benefits may not be captured.

The Auckland Council Stormwater Department has trialed the Mauri Model Decision Making Framework, developed by Dr Kepa Morgan of the University of Auckland, to complement cost benefit and multicriteria analysis. The Mauri Model assesses project options in terms of their impacts on mauri, which is the binding force between spiritual and physical attributes, or the life force or capacity to sustain life in the air, soil and water. Mauri is a meaningful metric as it encompasses each of the economic, social, cultural and environmental wellbeing dimensions described in the Resource Management Act. It is also a concept that has resonance with mana whenua and Aotearoa's cultural environment.

This paper describes the development of a stormwater-specific Mauri Model assessment tool which was trialed on a number of stormwater infrastructure projects. The output from the tool and feedback from Stormwater Department project engineers and Auckland mana whenua are also discussed.

The Auckland Council Stormwater Department considers that while a cost benefit analysis provides a useful dollar value output, the Mauri Model in addition provides a more balanced analysis of net benefits than the traditional approach, and will support ongoing engagement with mana whenua throughout project planning and delivery.

KEYWORDS

Mauri Model, mauri, mana whenua, cost benefit analysis, multicriteria analysis, business case

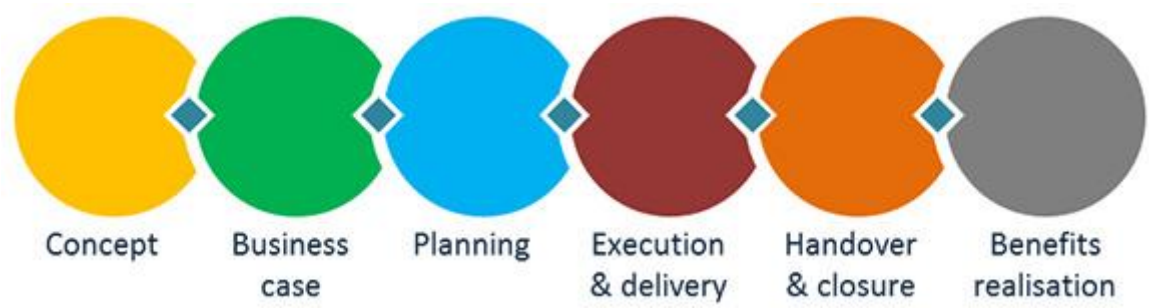
PRESENTER PROFILE

Claire Cunningham is a Senior Stormwater Specialist in the Auckland Council Stormwater Strategic Planning Team. She has experience in water quality analysis, environmental compliance, and development of monitoring programmes and continuous improvement tools and systems.

1 INTRODUCTION

The responsibilities of the Auckland Council Stormwater Department include building, replacing, operating and maintaining Auckland's public stormwater network. Of particular interest in this paper is the design and delivery of capital works projects, i.e. building new stormwater infrastructure, or replacing or enhancing existing infrastructure. The Stormwater Department capital works design and delivery process follows the Auckland Council project management framework, as shown in Figure 1 below.

Figure 1: The Auckland Council Project Management Framework



Using this framework, a stormwater issue or problem is developed into a concept. The concept is then expanded into a business case, where several options for solving the problem are explored and the preferred option is recommended for implementation. The chosen option is further developed in the planning phase, and then moved into the execution and delivery phase, where detailed design and construction are carried out. After construction the project moves into the handover and closure phase. The success of the project is measured in the benefits realisation phase.

A smooth transition from concept phase through to the benefits realisation phase of the project lifecycle relies on robust analysis and decision-making in each phase. Stormwater professionals have a wealth of knowledge and experience to draw from when making these judgements, and are guided by policy, legislation and requirements to meet agreed levels of service. However, the Stormwater Department recognises the opportunity to increase the use of standard tools and measures to support professionals to make more consistent, transparent decisions, and to ensure that decisions made reflect the organisational objectives that are sought.

Decision support systems and tools are of particular use at the business case phase of the project life cycle. The business case phase encompasses the biggest variations in potential budget or scope of a project. A stormwater professional developing and assessing potential options in the business case phase of a project therefore carries a large portion of the project's risk. The Stormwater Department currently utilises two tools to help manage this risk: cost benefit analysis and multicriteria analysis. Cost benefit analysis quantifies the costs and benefits arising from a project. However, cost benefit analysis can underestimate environmental and cultural benefits as these are hard to quantify. Multicriteria analysis captures some of the qualitative benefits that are difficult to capture in dollar terms, but does not interpret qualitative benefits specifically in terms of their relevance or significance to Maori. Therefore the true value of projects with significant environmental and cultural benefits may not be captured. These issues have prompted the Stormwater Department to explore other tools to ensure that all impacts on wellbeing, particularly cultural impacts, are considered in decision making.

This paper discusses the Stormwater Department's exploration of the Mauri Model Decision Making Framework (Mauri Model) as a tool that could be used to fill the gaps identified above, in order to improve decision making when developing capital works business cases.

2 MAURI MODEL DECISION MAKING FRAMEWORK

2.1 BACKGROUND

Dr Kepa Morgan of the University of Auckland's School of Engineering is assisting the Auckland Council Stormwater Department with the evaluation of the Mauri Model Decision Making Framework as a tool to assist with project short-listing, evaluation and approval, in order to better meet the Stormwater Department's legislative and strategic obligations.

The RMA requires balancing the impacts on environmental, social, economic and cultural wellbeing. Some priorities are not easily assessed using monetary equivalents, prompting the need to identify another measure that was relevant to the regulatory and cultural context. Dr Morgan developed the Mauri Model in response to the challenge of delivering engineering projects that give effect to the broader focus of the RMA, in particular the culturally rich geography of Aotearoa within which a solution is being sought.

2.2 MAURI AS A REPRESENTATION OF WELLBEING

Mauri can be defined as the binding force between the physical and spiritual realms. Mauri can also be defined as the life-force or life sustaining capacity in the air, soil and water, or life supporting capacity of an ecosystem, inclusive of the people who are an inseparable part of it (Mahi Maioro Professionals, 2014). Each of these definitions is representative of a holistic view of wellbeing and aligns with the RMA definition of wellbeing, for example the definition of sustainable management in Section 5 (2):

> "… the use, development, and protection of natural and physical resources in a way, or at a rate, which enables people and communities to provide for their social, economic, and cultural well-being and for their health and safety while…
>
> (b) safeguarding the *life-supporting capacity of air, water, soil, and ecosystems*…" (RMA, 1991)

Although mauri is a metaphysical concept that can't be quantified, conceptualising changes in the state of mauri is intuitive and straightforward for most practitioners who can correlate the concept of mauri to the RMA definition of wellbeing. Use of mauri as a metric provides additional advantages due to its resonance with the worldview of mana whenua. This enables an understanding of cultural wellbeing to be captured through engagement with mana whenua using the concept of mauri as a common term of reference.

2.3 MAURI INDICATORS AND SCORING

2.3.1 INDICATORS

To assess environmental, cultural, economic and social wellbeing dimensions using mauri as the measure of sustainability, it is necessary to identify physical representations of these dimensions for which the impact on mauri can be evaluated. Ideally, the representations of mauri will cover all wellbeing dimensions and will be specific to the project being evaluated.

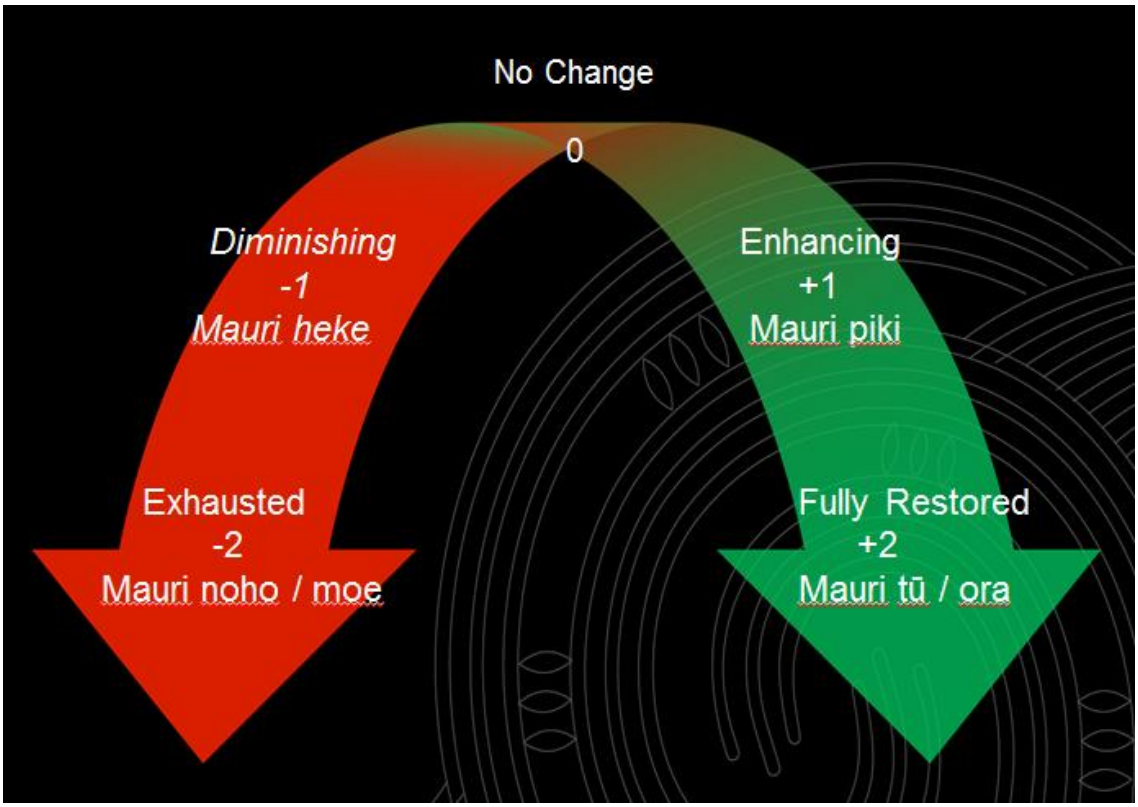
Therefore, the Mauri Model requires that indicators of mauri be developed that are tailored to the application of interest, and care should be taken to ensure that mauri indicators that represent each of environmental, economic, cultural and social wellbeing are developed.

Examples of mauri indicators for different applications can be found on the Mauri Model website, www.mauriometer.com. Specific indicators that were developed for stormwater projects are listed in Section 3.3.

2.3.2 SCORING

The Mauri Model employs a five point scoring system ranging from -2 to +2, -2 being a complete, irreversible destruction of mauri, and +2 being a complete restoration of mauri, equivalent to a pristine state. The range of scores is further explained in Figure 2 below.

Figure 2: Mauri Model Indicator Scoring Range (Morgan, 2015)

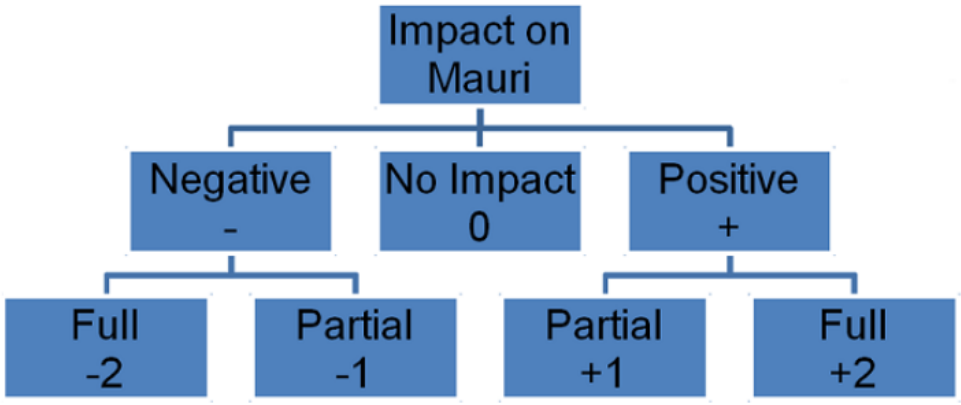


Each indicator requires clearly defined 0, +2, and -2 thresholds to remove bias in the evaluation process. +1 and -1 thresholds do not need to be defined as they naturally fall within the boundaries of the other thresholds. Ideally, +2 and -2 states for each indicator

should be defined in such a way that they are close to unachievable, in order to simplify the evaluation process.

The practitioner's evaluation of a project against each indicator follows a decision tree, as illustrated in Figure 3.

Figure 3: Mauri Model Indicator Scoring Decision Tree (www.mauriometer.com)

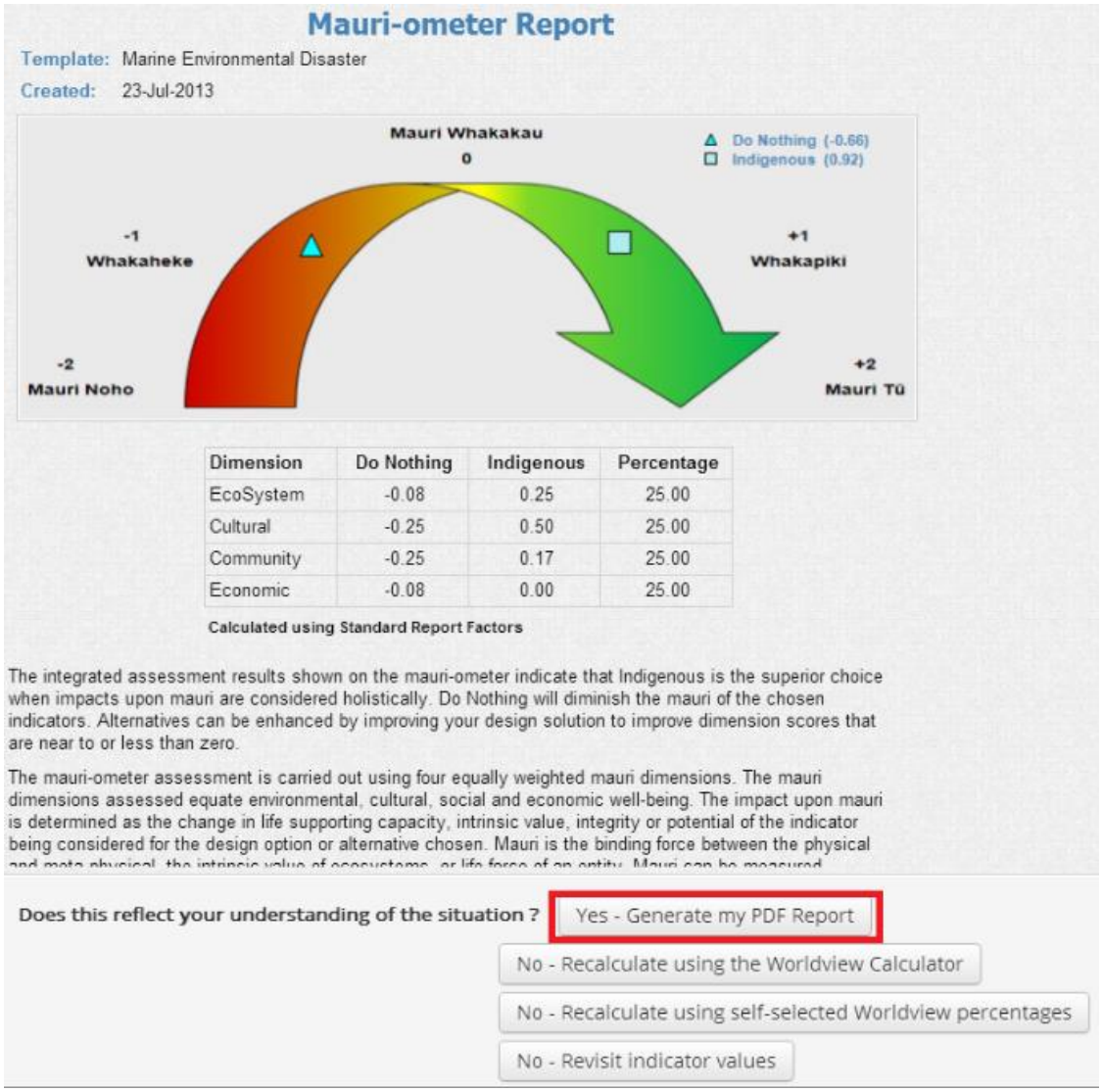


For each indicator, the practitioner needs to consider whether there is no impact on mauri, a positive impact, or a negative impact. If there is a positive or negative impact, the practitioner then needs to decide whether it meets the +2 or -2 criteria.

Results for each wellbeing dimension are calculated by averaging the scores achieved for each indicator within a wellbeing dimension. A total mauri impact score is achieved by averaging the wellbeing dimension results. Examples of the outputs from this process are shown in Sections 3.4.1 and 3.4.2.

Results can be carried out via a paper-based process, or through use of an excel spreadsheet or other software. The www.mauriometer.com website includes a generic tool that allows for the use of custom indicators and will calculate results. An example of output from the Mauri Model website is shown in Figure 4 below.

Figure 4: Example of Presentation of Results Using the Mauri Model Website Tool (www.mauriometer.com)



2.4 CONSIDERATION OF DIFFERENT WORLD VIEWS

Dr Morgan recognised that different worldviews can result in different prioritisations of each of the four wellbeing dimensions. Worldviews can therefore influence different parties' perceptions of the impacts on mauri of different project options. For example, a stormwater engineer may see social and economic wellbeing as having greater importance in their understanding of wellbeing, whereas a mana whenua representative may place greater importance on environmental and cultural wellbeing.

The Mauri Model allows for consideration of different world views side by side as part of the analysis of results. This is carried out by applying different weightings to wellbeing dimension results so that the overall result is skewed towards the dimensions that have a greater perceived importance. Worldview analysis increases the depth of understanding that may be gained by a practitioner, by allowing them to view options through the lens of differing stakeholders.

Ideally, worldview analysis would only be carried out after a workshop exercise with different stakeholders to quantify the different viewpoints, using a process developed by Dr Morgan (2009).

2.5 CONSIDERATION OF EFFECTS ON MAURI OVER TIME

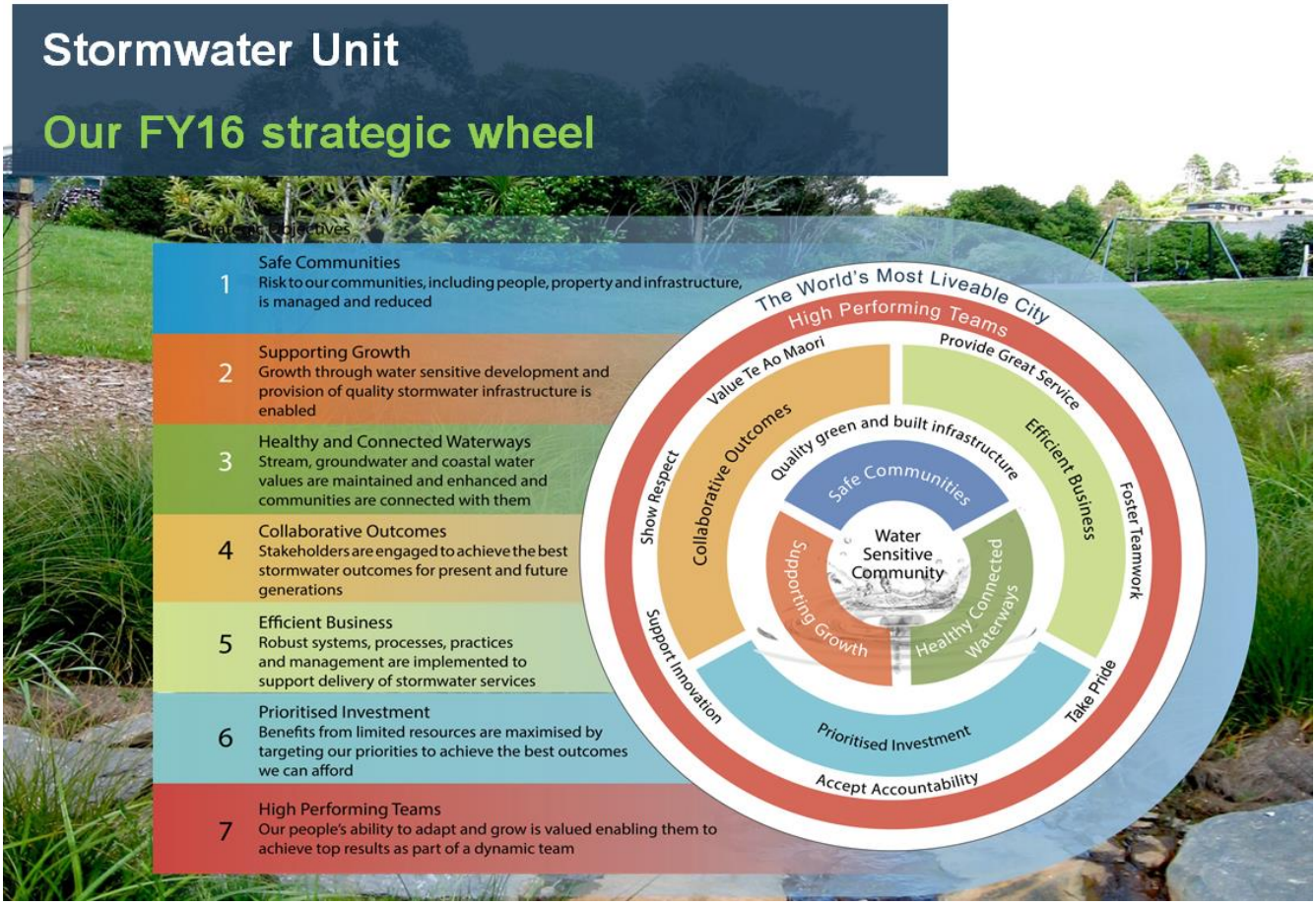
Any project can have varying impacts on mauri, depending on factors such as the phase of the project lifecycle in which the project resides, the construction phase, or the age of the asset. For example, a stream daylighting project may initially have negative impacts on mauri during construction due to noise and dust nuisance, sediment discharges or removal of trees. As the project reaches completion, mauri impacts become increasingly positive due to the reduced nuisance and discharge of sediments, and the improved amenity and water quality arising from the daylighted stream. As stream planting matures over time, mauri would be expected to further increase. The Mauri Model allows for considering effects of mauri over time so that a full life cycle analysis of mauri impacts can be carried out.

3 DEVELOPING A STORMWATER MAURI MODEL ASSESSMENT TOOL

3.1 AUCKLAND COUNCIL STORMWATER STRATEGIC CONTEXT

The Stormwater Department aims to contribute to delivering on the Auckland Plan's vision to be "The World's Most Liveable City" by meeting the seven strategic objectives defined in the Stormwater Asset Management Plan 2015-2045 (2015) (Figure 5).

Figure 5: The Stormwater Department Asset Management Plan Strategic Wheel



These objectives must be delivered within the budget constraints set by the Auckland Long Term Plan, and the legal framework, including the Resource Management Act 1991 (RMA), the Local Government Act 2002 (LGA) and other legislation.

Balancing the Stormwater strategic objectives with budgetary and legal constraints when considering project options can be difficult and the use of decision support and analysis tools aids in this process. Although cost benefit and multicriteria analysis tools are currently used for option analysis, the Mauri Model could supplement this tool set by providing a wider understanding of total wellbeing and capturing Maori values and world view more completely.

3.2 ANALYSIS OF MAURI MODEL "FIT" WITHIN STORMWATER DEPARTMENT PROJECT MANAGEMENT FRAMEWORK

Mauri was determined to be a useful measure for stormwater projects as it is holistic, has cultural relevance, and aligns with the intent of statutory expectations, as well as aligning with the objective of the Stormwater Department to "Value Te Ao Maori".

The scoring system, whereby positive, negative and neutral impacts on mauri are assessed for a wide range of relevant indicators, potentially could be used at all stages of the project management framework. The ease of scoring will minimise the extra time required by practitioners to complete project analysis and decision making and will add value by:

- providing a quick assessment tool that can be used at any phase of the project life cycle where decision support tools aren't usually utilised; and
- providing a broad analysis of total wellbeing that will complement the cost benefit and multicriteria analyses that are currently used in the concept, business case and execution and delivery phases to varying degrees.

The Stormwater Department decided to proceed with further development of a generic Mauri Model assessment tool for scoring capital works project options.

3.3 DEVELOPMENT OF MAURI INDICATORS AND ASSESSMENT TOOL

Dr Morgan held workshops in 2014 to introduce the Mauri Model to the Stormwater Department and develop an initial set of indicators, which were then developed further within the Stormwater Department through discussions with stormwater planners, engineers and scientists, discussions with Dr Morgan, and reviews of strategic documents such as the Stormwater Asset Management Plan and iwi management plans.

During several workshops held in 2015, mana whenua representatives participated in development of appropriate mauri indicators, particularly for the cultural mauri indicators. Following these workshops, the indicators were revised again.

An excel based tool using the revised set of indicators was developed to enable engineers to quickly assess and record the scoring for project options. The tool was then trialed on project options detailed in Stormwater Department business cases, in order to confirm workability and relevance of the indicators, and to confirm the tool's suitability for scoring project options in the business case phase of the project life cycle. The tool was trialed again on the Stormwater Department 2015-2016 capital works programme, for further checks of workability and to assess the tool's suitability for scoring projects in the execution and delivery phase.

The indicator set that has been developed through this process is described in Table 1 below.

Table 1: Stormwater Department Mauri Indicator Set

Wellbeing Dimension	**Indicator**	**Description**
Cultural Mauri	Mana whenua involvement	Mana whenua involvement is required to validate the Stormwater Department's understanding of the other indicators in the Mauri Model.
	Water suitability for traditional practices	Improvements or declines in water quality and flow regimes can affect the use of water bodies for traditional practices.
	Availability of natural resources for cultural harvest	Inclusion of resources in a project that can be used for cultural or traditional purposes.
	Resource use	Resources used in a project are considered suitable from a mana whenua perspective. For example, plant ecosourcing.
	Enabling traditional practices	Projects designed in such a way that they allow the water body to be used for traditional practices.
	Protection of wahi tapu	The extent to which a project preserves wahi tapu.
Environmental Mauri	Providing, preserving and enhancing the values of open watercourses	Projects that have an influence on the environmental value that open water bodies such as streams and wetlands provide, e.g. stream daylighting or enhancement.
	Water quality	Projects that have an influence on water quality, e.g. wetland treatment.
	Vegetation	Effects on the quality and/or quantity of vegetation.
	Fish passage	Provision of fish passage.
	Management of flows	The extent to which the flow regime mimics a natural regime.
	Stream/watercourse erosion processes	The extent to which erosion processes follow a natural process, or mitigation of negative erosion impacts.
Social Mauri	Safety - protection from flooding	The number of properties where flood risk is minimised.
	Safety - maintains critical infrastructure	Whether the project being worked on has a significant impact on public safety.
	Amenity - provision of walkways	Projects that have added amenity value through the provision of walkways.
	Amenity – aesthetics	The extent to which a project improves the aesthetic value of the area.
	Food gathering	The extent to which a project improves the availability or quality of food sources, e.g. shellfish.
	Community involvement	The extent to which the community have been involved in planning, design or delivery of the project.
Economic Mauri	Provision of land for development	The extent to which the project makes land available for development, e.g. reducing the size of the flood plain.
	Cost to build	The extent to which the project offers value for money by being the most cost effective option to build.
	Value for money – achieving multiple benefits	Whether the project achieves multiple stormwater objectives, increasing the benefits gained for the money spent.
	Operation and maintenance costs	The extent to which the project offers value for money by being the most cost effective option to operate and maintain.
	Efficient water use	The extent to which the project offers value for money by repurposing water, e.g. irrigation.

The worldview analysis and mauri impacts over time components of the model were discussed but not explored in this trial.

3.4 CASE STUDIES

3.4.1 ARTILLERY TUNNEL

Artillery Tunnel is a tunnel boring project to install a 1.1 km length of 2.5 m diameter pipe through a developed area of Takanini, discharging into the Pahurehure inlet, as shown in Figure 6 below. The purpose of the project is to convey the increased flows which will arise from a large residential development upstream.

Figure 6: Artillery Tunnel

The Mauri Model assessment was carried out for the project option as it was designed. The scores for each of the indicators are presented in Table 2 below.

Table 2: Artillery Tunnel Mauri Score

Wellbeing Dimension	**Indicator**	**Mauri Score**
Cultural Mauri	Mana whenua involvement	1
	Water suitability for traditional practices	0
	Availability of natural resources for cultural harvest	0
	Resource use	0
	Enabling traditional practices	0
	Protection of wahi tapu	0
	Cultural Mauri Average Score	**0.17**
Environmental Mauri	Providing, preserving and enhancing the values of open watercourses	0
	Water quality	0
	Vegetation	1
	Fish passage	0
	Management of flows	-1
	Stream/watercourse erosion processes	0
	Environmental Mauri Average Score	**0**
Social Mauri	Safety - protection from flooding	2
	Safety - maintains critical infrastructure	2
	Amenity - provision of walkways	1
	Amenity – aesthetics	0
	Food gathering	0
	Community involvement	1
	Social Mauri Average Score	**1**
Economic Mauri	Provision of land for development	2
	Cost to build	-2
	Value for money – achieving multiple benefits	1
	Operation and maintenance costs	0
	Efficient water use	0
	Economic Mauri Average Score	**0.2**
	TOTAL MAURI SCORE	**0.34**

The project design was also compared to a do nothing scenario. The respective scores for the project and do nothing scenario are presented in Figures 7 and 8 below.

Figure 7: Artillery Tunnel – Change in Mauri For Project and Do Nothing Scenario

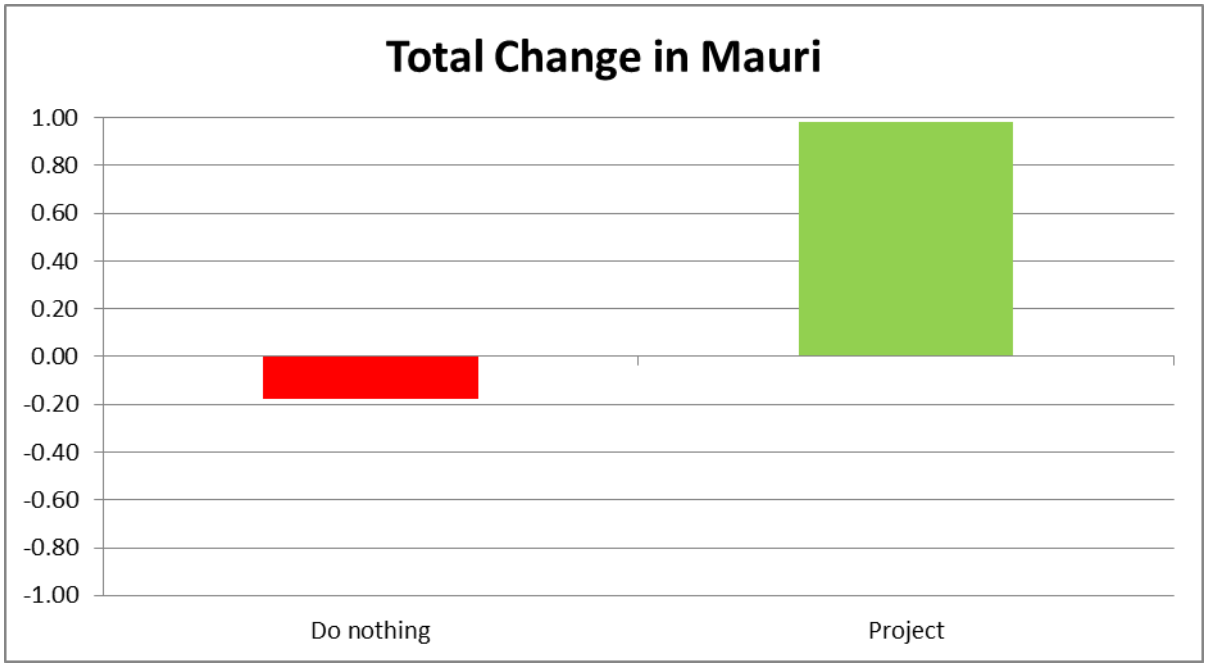
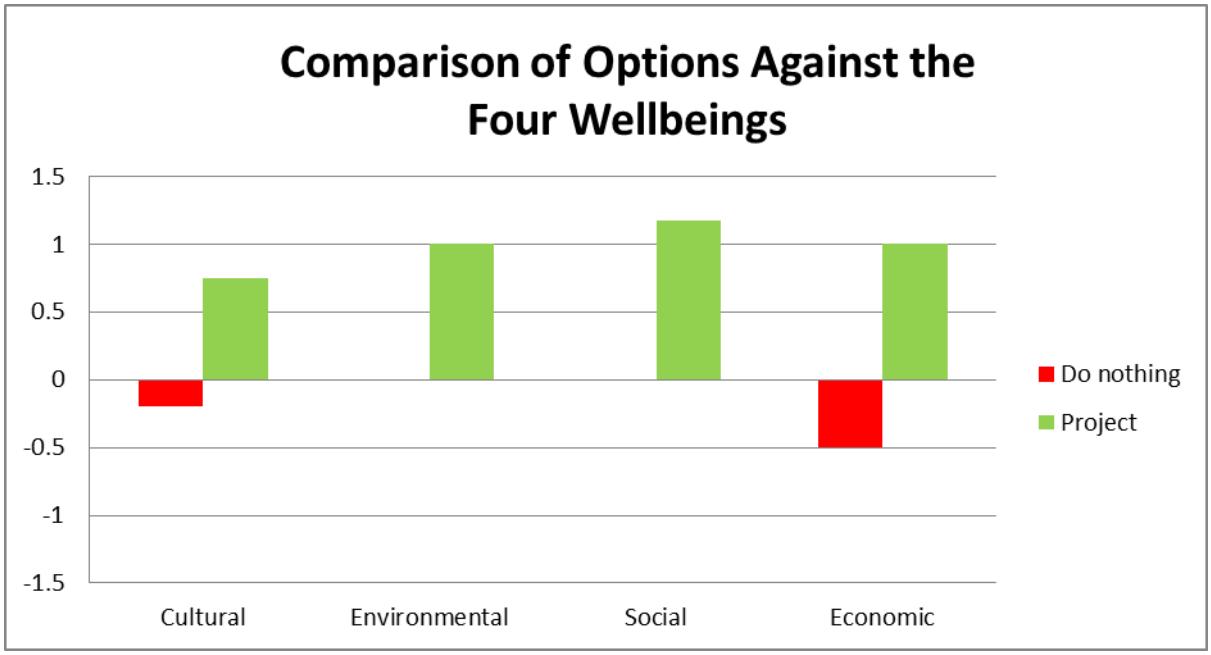


Figure 8: Artillery Tunnel – Change in Mauri in Each of the Wellbeing Dimensions



The tool outputs demonstrated the overall benefits to mauri that would be achieved by carrying out the project rather than doing nothing, and showed that the majority of benefits were being obtained in the social wellbeing dimension.

3.4.2 TE AUAUNGA AWA

Te Auaunga Awa is a Stormwater Department project focused on addressing habitable floor flooding through water-sensitive design which involves the rehabilitation and realignment of approximately 1.3km of the stream (Figure 9). The Project also incorporates a number of social, cultural and environmental benefits beyond just the physical works.

The Stormwater Department collaborated and engaged with mana whenua, local board representatives, technical specialists and interested parties to form a project team early in the design process. The Project Team regularly met to discuss the project and provide tracking updates. Feedback from partners and stakeholders received during the workshops helped to inform the detailed design of the project. For example, input from Mana Whenua regarding stormwater treatment resulted in the incorporation of additional stormwater treatment into the design.

Figure 9: Te Auaunga Awa

The Mauri Model assessment was carried out for the project option as it was designed. The scores for each of the indicators are presented in Table 3 below.

Table 3: Te Auaunga Awa Mauri Score

Wellbeing Dimension	**Indicator**	**Mauri Score**
Cultural Mauri	Mana whenua involvement	1
	Water suitability for traditional practices	0
	Availability of natural resources for cultural harvest	1
	Resource use	1
	Enabling traditional practices	1
	Protection of wahi tapu	1
	Cultural Mauri Average Score	**0.75**
Environmental Mauri	Providing, preserving and enhancing the values of open watercourses	1
	Water quality	1
	Vegetation	1
	Fish passage	1
	Management of flows	1
	Stream/watercourse erosion processes	1
	Environmental Mauri Average Score	**1**
Social Mauri	Safety - protection from flooding	2
	Safety - maintains critical infrastructure	1
	Amenity - provision of walkways	1
	Amenity – aesthetics	1
	Food gathering	1
	Community involvement	1
	Social Mauri Average Score	**1.17**
Economic Mauri	Provision of land for development	1
	Cost to build	1
	Value for money – achieving multiple benefits	2
	Operation and maintenance costs	0
	Efficient water use	1
	Economic Mauri Average Score	**1**
	TOTAL MAURI SCORE	**0.98**

The project design was also compared to a do nothing scenario. The respective scores for the project and do nothing scenario are presented in Figures 10 and 11 below.

Figure 10: Te Auaunga Awa – Change in Mauri For Project and Do Nothing Scenario

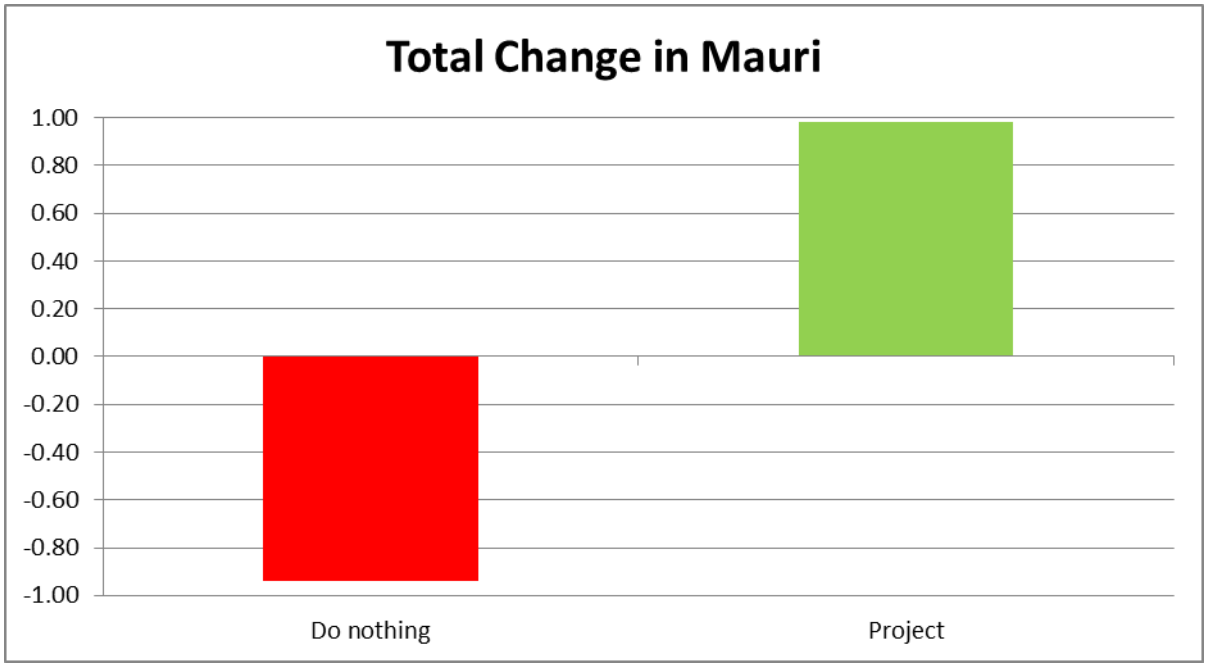
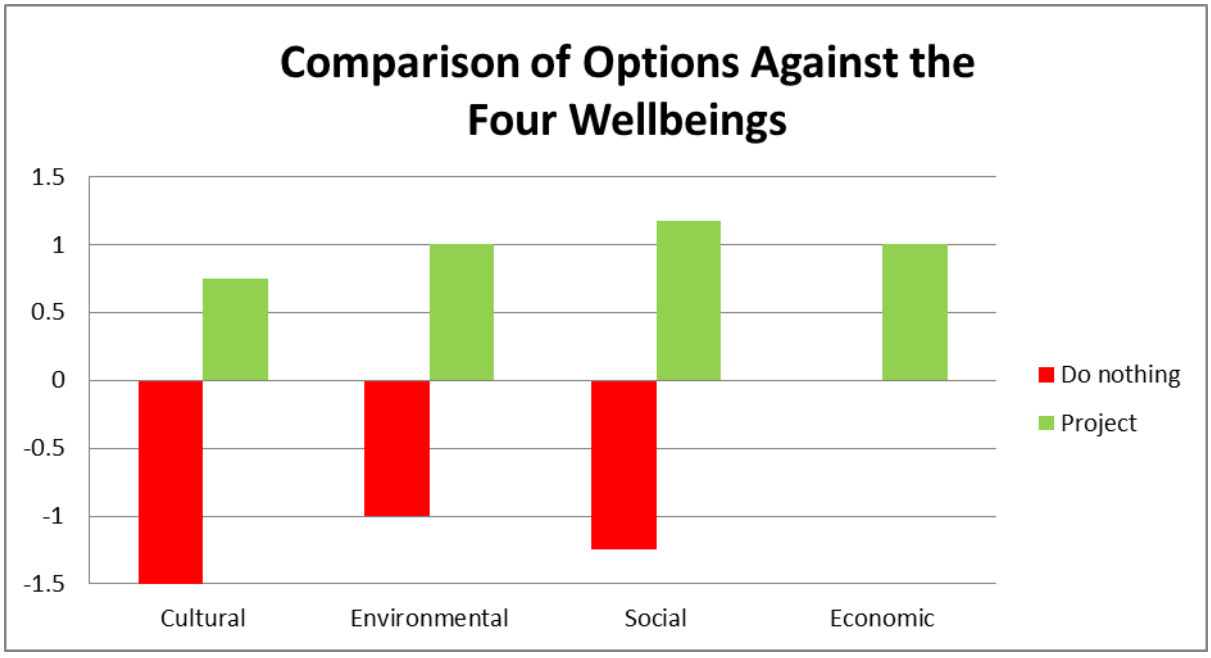


Figure 11: Te Auaunga Awa – Change in Mauri in Each of the Wellbeing Dimensions



The tool outputs demonstrated the overall benefits to mauri that would be achieved by carrying out the project rather than doing nothing, and showed that benefits were being obtained relatively evenly across all wellbeing dimensions.

3.5 FEEDBACK RECEIVED

3.5.1 STORMWATER DEPARTMENT FEEDBACK

Further to the case studies discussed above, the Mauri Model assessment tool has been trialled on all projects scheduled for construction in the 2015/2016 capital works programme. Each project was discussed individually and scored with the project manager and at least one moderator. Feedback received from project managers is discussed below.

Use of the tool

Many project managers were enthusiastic about using the tool, however it was noted by several project managers assessing projects in the construction phase that it would be more useful to use the tool at the business case to ensure that the best option was chosen and developed before it came to the construction phase.

Attitudes towards how to use the tool differed widely, dependent on the experience and personality of the project manager trialing the tool. Some project managers were concerned about using the tool correctly, others expressed concerns about how a poor score might be perceived by managers or external stakeholders. Some project managers wished to take a lenient approach to scoring to enable their projects to score well.

Indicators

Most project managers supported the indicators that were proposed. It was noted that the value of renewal projects was not well captured within the existing indicator set.

3.5.2 MANA WHENUA FEEDBACK

Representatives of 15 of the 19 Auckland iwi have attended at least one Stormwater Mauri Model workshop between March and December 2015 to give feedback on the use of the tool within the Stormwater Department, and on the specific mauri indicators to be used. Special attention was paid to development of cultural indicators with mana whenua representatives. However, representatives were given the opportunity to give feedback on the environmental, social and economic indicators.

Feedback from mana whenua is discussed below.

Feedback relating to the Stormwater Department's use of the tool

Those mana whenua representatives who have attended workshops have endorsed the tool. Examples of positive feedback:

- "Not only looks right but feels right and aligns to our kaupapa." Te Aroha Morehu, Ngati Whatua Orakei
- "Impressive paradigm shift for Stormwater." Jamie Forsman, Ngati Paoa

Feedback relating to the stage of the project life cycle at which the tool would be used

Most mana whenua representatives were enthusiastic about the tool being used in the business case phase.

Concerns were raised about the tool being used only to assess projects that were already in the execution phase, limiting the opportunity for the tool to influence the decision making process.

Some representatives expressed a desire for the tool to be used earlier, at the concept phase, where the tool could influence thinking before a solution to a problem had been developed. It was thought that this would avoid a predetermined set of options being presented in business cases.

Feedback on specific indicators

Representatives gave extensive verbal feedback on cultural indicators, which was used to develop the final set proposed by the Stormwater Department.

Mana whenua representatives were broadly in agreement on the nature of cultural indicators that were proposed by the Stormwater Department.

Some verbal contributions to development of the environmental indicators were made by mana whenua in the workshops, however most representatives were broadly in agreement with the indicators proposed by the Stormwater Department.

Representatives agreed with the social and economic indicators proposed by the Stormwater Department.

General feedback relating to engagement

Many mana whenua representatives expressed a desire to be engaged earlier in the project lifecycle, ideally at the concept phase. Representatives saw the Mauri Model assessment tool as a means to support the engagement process.

4 CONCLUSIONS

The Mauri Model Decision Making Framework is a useful supplement to the cost benefit and multicriteria analysis techniques that are currently utilised for assessing stormwater capital works project options.

The scoring system was simple, user friendly, fast, and reduced the degree of bias that might occur, compared to a system where weightings were used.

The Mauri Model assessment tool could be used at all stages of the project life cycle. Some refinement of the indicators for each stage of the project life cycle may need to be made to reflect the different decisions to be made at the project phase. The Stormwater Department intends to entrench the tool as part of the business case development phase of the project life cycle as it is considered that more robust analysis of options at this phase will provide the greatest benefits to the final project outcomes.

The process of developing indicators in partnership with Stormwater Department professionals and mana whenua increased buy-in to use the tool, supported an open and positive relationship with mana whenua, and resulted in robust indicators which represented the views of the majority, while remaining practicable and relevant to a stormwater engineering application.

The Mauri Model assessment tool's main scoring system was considered useful by most parties who gave feedback. The option to analyse mauri effects over time was not explored, due to the desire to present a simple analysis process to assist with uptake of the tool within the Stormwater Department. However, as greater facility with the tool is developed, it is expected that this functionality will be used to explore mauri effects over the project lifecycle, adding further value to the analysis of options. The worldview analysis function was only briefly explored as part of this trial. It is acknowledged that this functionality could be a useful addition to the analysis, particularly where a comprehensive analysis of mana whenua perspective is required.

Most previous applications of the tool have involved developing a set of indicators for an individual project. The Stormwater Department's trial has demonstrated that a Mauri Model assessment tool with generic indicators can also be successfully used to assess a large number of broadly similar projects, provided the developers and users of the tool are aware of the tool's limitations for this kind of application. It is difficult to define the mauri indicators to an extent that avoids all subjectivity and differences between users in their understanding of the indicator and scoring. This is less problematic when used in the business case phase to score different project options, as the same user will be scoring each option based on their understanding of the indicators. It is more problematic if the tool is being used to score different projects, as each project manager will bring a different bias to the scoring, and thus could skew results.

A Mauri Model assessment tool could potentially be used for project benchmarking and KPI reporting, however this functionality needs further exploration.

The Mauri Model is a useful adjunct to engagement with mana whenua. The tool could be used to reach common understandings of project options, and explore these options using specialist knowledge from both stormwater engineers and mana whenua.

The tool could be used as a "living tool" whereby the indicators are further refined as understanding and knowledge changes. This will be beneficial to decision making, however it should be noted that this will reduce the ability to use the tool for scoring purposes, e.g. to benchmark different years.

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