

# SUSTAINABLE DEVELOPMENT – HOW DO WE MEASURE IT?

*Rebecca Upton-Birdsall and Toby Martin (Harrison Grierson)*

---

## ABSTRACT

Sustainable development in New Zealand is currently difficult to monitor as we have no established metrics by which to measure success. It is not typically a major design factor when designing or operating a water supply or wastewater treatment system. For sustainability initiatives to be standardised with design and implementation, there needs to be a scale to measure and monitor results.

Sustainable development as per the Resource Management Act (RMA) and Local Government Act (LGA) consists of four main aspects; environmental, economical, social and cultural. The cultural aspect is more difficult to assess as currently evaluation measures are only qualitative. In order to successfully monitor the cultural aspect of sustainability, a metric scale needs to be developed to rank the cultural features and impacts of the project or operation.

In the United Kingdom (UK) sustainability appraisals are established prior to a project to assess how the works will contribute to sustainable development. The UK sustainability appraisals covers the environmental, economical and social impacts of a project. It is developed in the project planning stage and refined as the project progresses. The UK also has established a policy and vision over the water industry as a whole, to move towards sustainable development in the water sector.

This paper will compare the progress of the UK's sustainable initiatives with where New Zealand is heading, and also discuss the feasibility of implementing an established sustainability metric for the New Zealand water industry.

## KEYWORDS

**Sustainable development, water supply, carbon footprint, UK, appraisal**

## 1 INTRODUCTION

Sustainable development is defined as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (WCED, 1987). This definition has been established for 32 years and our progress over that period has been poor.

With water as the most valuable resource, it is extremely important that the development and operation of the water industry is approached in a sustainable manner.

This paper investigates the sustainability metrics available, the development of implementing sustainable procedures in the UK and how New Zealand's position on the sustainability ladder compares.

## 2 AVAILABLE METRICS

There are a number of established metrics available in the infrastructure industry to holistically evaluate sustainability. The two perhaps most reputable tools at this stage are detailed in the following subsections; Civil Engineering Environmental Quality Assessment & Awards Scheme (CEEQUAL) and Infrastructure Sustainability Council of Australia (ISCA) Rating Tool.

## 2.1 CIVIL ENGINEERING ENVIRONMENTAL QUALITY ASSESSMENT & AWARDS SCHEME (CEEQUAL)

CEEQUAL is an international scheme ensuring sustainability is a major design and operating consideration in civil engineering, infrastructure, landscaping and public realm works. The system involves an evidence-based self-assessment, which is then verified by an external CEEQUAL-appointed verifier and formalised by the CEEQUAL Scheme Management Team. A certificate is then awarded based on the result achieved. The CEEQUAL rating result is presented as a percentage and there are four levels of achievement (Venables, 2008):

- Exceed by 25%            Pass
- Exceed by 40%            Good
- Exceed by 60%            Very Good
- Exceed by 75%            Excellent

CEEQUAL was developed by an Institution of Civil Engineers managed team, supported by its Research and Development Enabling Fund and the UK Government. It was developed between 1999 and 2003 and now operates and continues to be developed by CEEQUAL Limited.

CEEQUAL can be used in either of the following forms:

- CEEQUAL for Projects (for example water treatment works, bridges and roadworks);
- CEEQUAL for Term Contracts (for example highway, rail and sewer maintenance).

The assessment is categorised into nine sections, as follows:

- Section 1:        Project or Contract Strategy
- Section 2:        Project or Contract Management
- Section 3:        People and Communities
- Section 4:        Landuse and Landscape
- Section 5:        The Historic Environment
- Section 6:        Ecology and Biodiversity
- Section 7:        Water Environment (Fresh and Marine)
- Section 8:        Physical Resources Use and Management
- Section 9:        Transport

CEEQUAL has been developed to version 5, which incorporates the fundamental aspects of sustainable development. The schematic below illustrates how the latest version of CEEQUAL considers the triple bottom line – economical, environmental and social aspects (CEEQUAL, 2015).

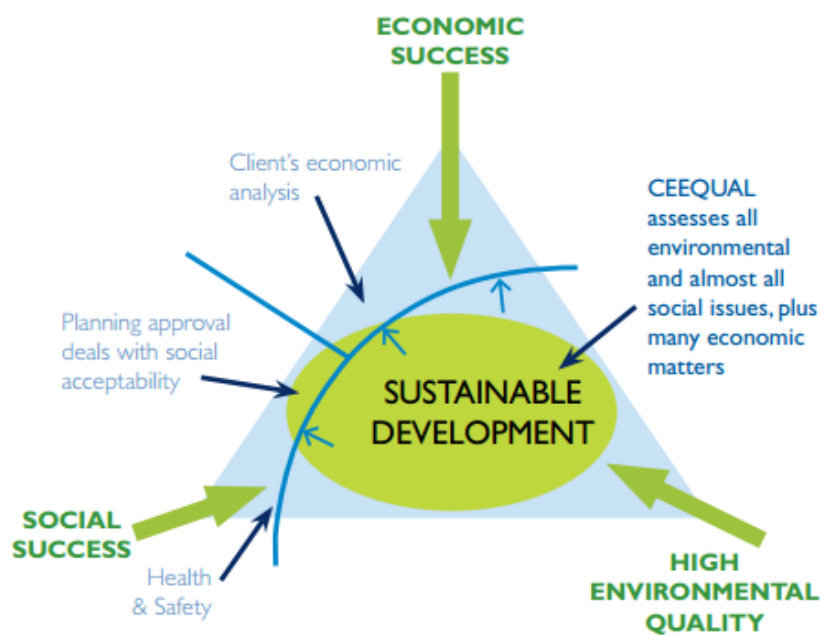


Figure 1: CEEQUAL Version 5 Coverage (CEEQUAL, 2015).

## 2.2 INFRASTRUCTURE SUSTAINABILITY COUNCIL OF AUSTRALIA (ISCA) TOOL

ISCA is an Australian not-for-profit, member based council aiming to improve the productivity and livability of industry and communities through sustainable infrastructure development (ISCA, 2014).

In 2010 ISCA started development of the Infrastructure Sustainability (IS) rating scheme and the product was launched in 2012.

The IS rating tool assesses the environmental, social, economic and governance aspects of infrastructure projects. The tool is able to be applied to a variety of infrastructure sectors (transport, water, energy and communications as is illustrated in the figure below), and consists of an IS scorecard, IS materials calculator and IS materials guideline.





Transport	Water	Energy	Communication
			
Airports, Ports and Harbours Cycleways and Footpaths Railways, Roads and Bridges	Sewerage and Drainage Storage and Supply	Electricity Transmission and Distribution Gas Pipelines	Communication Networks

Figure 2: Rateable infrastructure sectors with the IS tool (ISCA, 2014).

The IS rating scheme is separated into six sustainability themes, with fifteen associated categories. These are displayed in the table below.

Table 1: IS Rating Themes and Categories (ISCA, 2014)

Themes	Categories
Management and Governance	Management Systems
	Procurement and Purchasing
	Climate Change Adaptation
Using Resources	Energy & Carbon
	Water
	Materials
Emissions, Pollution and Waste	Discharges to Air, Land & Water
	Land
	Waste
Ecology	Ecology
People and Place	Community Health, Well-being and Safety
	Heritage
	Stakeholder Participation
	Urban & Landscape Design
Innovation	Innovation

The IS rating tool can be used officially to gain certified rating or unofficially to assist with decision making and sustainability benchmarking. The IS rating guidelines should be used in the planning stages to assist with determining the project feasibility, project development and procurement. The IS rating tool can then be applied to the design, construction and operation stages of the project to determine the certified rating. The application of the IS rating tool throughout the project life cycle is illustrated on the schematic below.

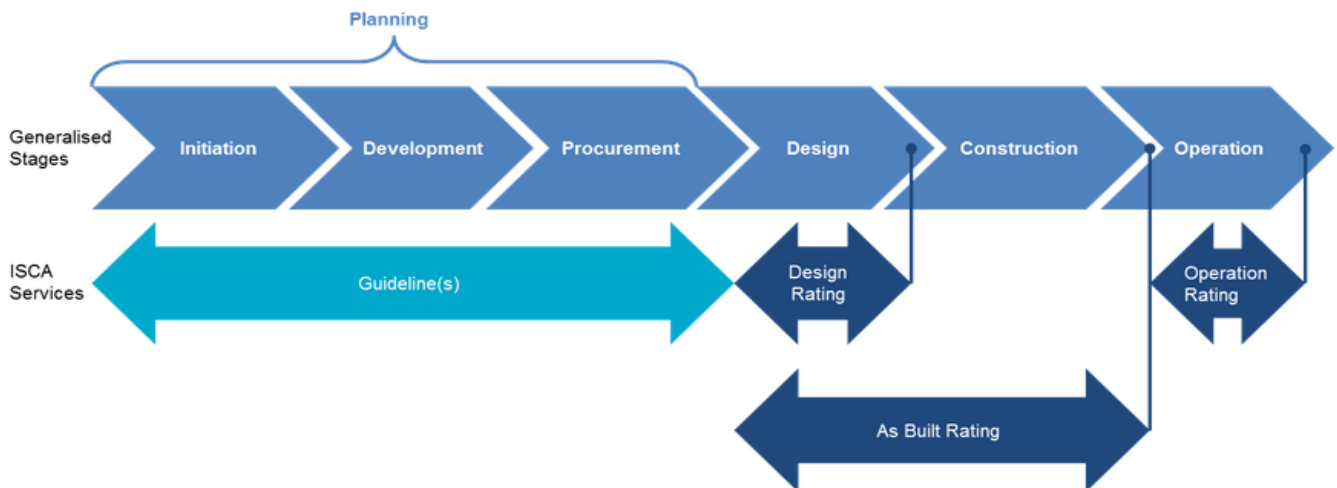


Figure 3: Application of the IS rating tool across the project life cycle (ISCA, 2014).

### 3 UK PROGRESS

The UK has progressed significantly in its attitude and legislation towards the implementation of sustainable development. There are a number of legal requirements in its planning development, construction of infrastructure and operation of plant (specifically relating to the water industry in this paper) which enforce the consideration of sustainability as a major project influence. Some of these requirements are discussed in the subsections below.

### **3.1 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) DIRECTIVE**

The European Union's (EU) EIA Directive has been applied in the UK since its establishment in 1985.

EIAs are not mandatory for all projects and only apply to a small proportion of projects under consideration. They are required if there is likely to be significant environmental effects as a consequence of the project works. EIAs ensure that the local planning authority is aware of the project side effects and allow the public to partake in the decision making procedures during the planning stages.

The EIA process is staged as follows:

- Screening whether the works will have a significant effect, and therefore if an EIA is required;
- Scoping the extent of the issues to be evaluated in the EIA;
- Preparation of an Environmental Statement, which includes a sufficient level of information for assessment of the works to be undertaken;
- Preparation of a planning application and public consultation regarding the proposed works;
- Final decision on whether to award consent by the local planning authority or/and the Secretary of State.

Since 1985 more all-inclusive approaches to assessing the effects of a project have been established in the UK to consider the impact from a sustainable development point of view, for example sustainability appraisals and sustainable development indicators (European Commission, 2015).

### **3.2 SUSTAINABILITY APPRAISALS**

When preparing local plans in the UK, sustainability appraisals are a mandatory accompaniment, as per the Planning and Compulsory Purchase Act 2004. Local plans detail the vision and framework for the future development of an area, and sustainability appraisals ensure these plans consider the environmental, economic and social objectives thoroughly. Full consideration of these aspects in the planning stage leads to identification and mitigation of potential issues, which improves the level of sustainable development in the final plan. The sustainability appraisal should be treated as iterative process, with the outcomes being fed back into the local plan (Department for Communities & Local Government, 2014).

The sustainability appraisal uses 'remaining with the existing situation' as a benchmark (referred to as baseline information) to compare the planned works and reasonable alternatives with. Assessment of reasonable alternatives, including the benchmark situation, are required to ensure the most appropriate development is advanced.

The level of detail to be included in a sustainability appraisal is determined by what is appropriate for the specific plan. It only needs to cover the content which is relevant to the proposed works – concentrates on the environmental, economic and social aspects which have the potential to be significantly affected by the plan.

The process of preparing the sustainability appraisal and its interaction with local plan preparation is displayed in the flow chart below.

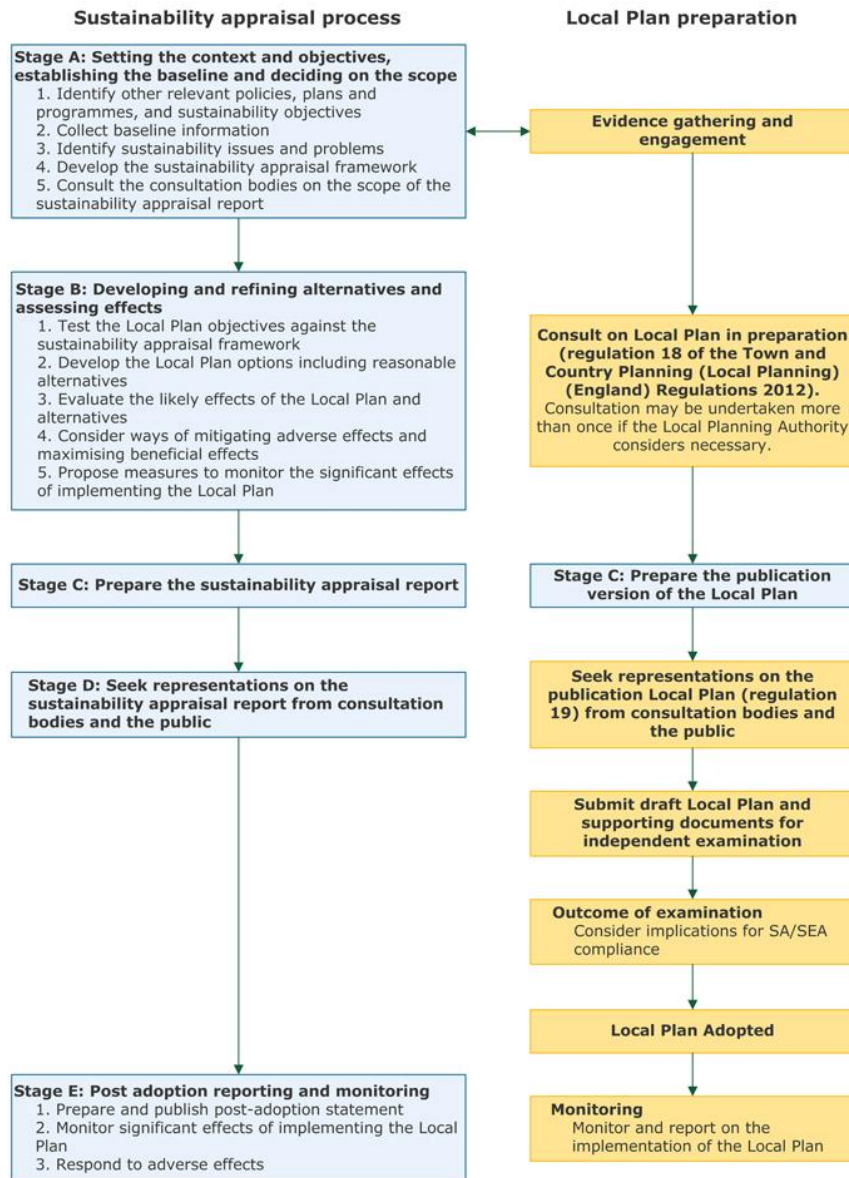


Figure 4: Sustainability appraisal and local plan preparation process (Department for Communities & Local Government, 2014).

### 3.3 OFWAT

The Water Services Regulation Authority (Ofwat) was established as an independent economic regulator for the water industry when the UK water sector underwent privatization in 1989. Ofwat has a duty to contribute to sustainable development. As a consequence its role drives deeper than just managing the financial aspect of the water industry, and also contributes to the protection of the environment and society.

The Department for Environmental Food and Rural Affairs (Defra) produced a strategic policy statement as a social and environmental guidance for Ofwat; *Defra's strategic policy statement to Ofwat – Incorporating social and environmental guidance*. In terms of the sustainability duty of Ofwat in this policy, Ofwat are required to report annually to the Secretary of State on the progress of the Government's sustainable development objectives. The water industry is marked against the Government's *Sustainable Development Indicators*, which consists of 12 headline indicators and 23 supplementary indicators. These headline and supplementary measures are categorized under economical, societal and environmental aspects, as listed in the table below. These indicators are rated based on long and short term assessments.

Table 2: Defra sustainable development indicators – headline and supplementary measures (Defra, 2013)

Aspect	Headline Measures	Supplementary Measures
Economy	Economic prosperity	Population demographics
	Long term unemployment	Debt
	Poverty	Pension provision
	Knowledge and skills	Physical infrastructure
		Research and development Environmental goods and services sector
Society	Health life expectancy	Avoidable mortality
	Social capital	Obesity
	Social mobility in adulthood	Lifestyles
	Housing provision	Infant health
		Air quality Noise Fuel poverty
Environment	Greenhouse gas emissions	UK CO <sub>2</sub> emissions by sector
	Natural resource use	Energy consumed in the UK from renewable sources
	Wildlife: bird population indices	Housing energy efficiency
	Water use	Waste
		Landuse and development
		Origins of food consumed in the UK
		River water quality
		Fish stocks
		Status of species and habitats
		UK biodiversity impacts overseas

### 3.4 WATER FOR LIFE

The UK Government’s vision for the water industry is detailed in the *Water White Paper: Water for Life*. This document/policy was established to deal with the risks of increasing population, over abstraction, pollution and climate change to secure water supply for future generations. To quote the document; “*This White Paper is a call to action. It describes a vision for future water management in which the water sector is resilient, in which water companies are more efficient and customer focused, and in which water is valued as the precious resource it is. And it explains that we all have a part to play in the realization of this vision.*”

The white paper details the proposed strategic direction of the water industry based on the following key commitments:

- Reform of the abstraction regime;
- Increasing interconnection and the trading of bulk supplies of treated water;
- Improving water quality;
- Develop an action plan for tackling current unsustainable abstraction;
- Aligning plans;
- Evaluate quality and capacity of water infrastructure and future requirements;

- Ensure strategic approaches to wastewater and drainage are applied;
- Affordability of water supply;
- Reducing high household bills in the south west;
- Reforming the market for business customers;
- Encourage and incentivise wise water usage;
- Delivery of the White Paper.

### **3.5 OUTCOMES**

The importance of sustainable development and operation is strongly instilled in the UK now days, with a clear vision on how to ensure sustainability issues are addressed.

The use of sustainability metrics is common in the UK and CEEQUAL has been applied to many projects, with it being recognized as a robust sustainability evaluation tool.

The *Water White Paper: Water for Life* provides robust objectives for the water industry, while Ofwat's annual sustainability reporting provides measurable progress indicators. The combination of these two factors leads to strong platform for sustainable development for and operation within the water sector.

## **4 NZ PROGRESS**

Sustainability in New Zealand focuses on the four pillars; environmental, economic, social and cultural. The cultural aspect is not necessarily solely concentrated on when assessing the sustainability of a development, project or operation overseas. Overseas it is more common to include consider cultural impacts as part of social sustainability. New Zealand has a rich cultural history, with Māori tradition and beliefs at its back bone. As a consequence it is extremely important for New Zealanders to consider this pillar of sustainability separately.

Sustainable development requires each pillar to be satisfied and if one aspect is given the veto, there is no longer sustainable development. In New Zealand the veto can commonly be applied to the environmental aspect (i.e. green lobby dissatisfied by the environmental impact), cultural aspect (influence on Māori culture is unacceptable) and economical aspect (financially too expensive for Local Council). It is important that all of the aspects of sustainable development are able to be balanced, so a project is not bias towards only one or two aspects, which leads to unsustainable development. However, it can be difficult to balance the pillars against each other at times, especially when one of them is not able to be measured against a metric (the cultural pillar).

### **4.1 ASSESSMENT OF ENVIRONMENTAL EFFECTS (AEE)**

In New Zealand the AEE is required as part of the resource consent application. AEEs have been used in New Zealand since 1974, however have only been mandatory as part of resource consent applications since 1991 when the Resource Management Act (RMA) was passed. They are the considered to be the equivalent of the EU's EIA.

The detail of the AEE must be proportional to the potential effects of the activity. It should outline all the identified effects of the activity, including the economic and social effects, and detail how they are being avoided, remedied or mitigated. To achieve this consultation with the affected parties, it is advised and usually required by the council, to obtain approval.

AEEs are also used by the local government to determine what form of notification is required, and after consultation arising from notification, if the activity can be approved.



For smaller activities with lesser potential effects, environmental effects may be addressed entirely by the applicant. With larger projects with greater potential effects, professional input may be required, for example producing an ecologists report.

## **4.2 RESOURCE MANAGEMENT ACT (RMA)**

In 1991 the RMA was implemented and it collated resource management regimes which were applied throughout different agencies at the time. The purpose of the Act is for sustainable management of resources – enable social, economic, and cultural needs while protecting the longevity of the resources and avoiding, remedying or mitigating any adverse effects on the environment. The RMA also outlines the matters of national importance which should be protected, and the aspects which require particular regard.

Along with the Local Government Act (LGA) 2002, the Acts give local governments the right to approve or deny resource applications. The LGA includes an emphasis on sustainable development, and encourages and enables the public to have input in the development of their community. They are also required to have long term plans on how they are managing their resources to meet matters of national importance in the RMA.

Applications must address social and cultural impacts through consultation with affected parties. The affected parties should be identified pre application, and consulted with before and during the application process.

With the RMA in place, sustainable management of resources is a task of local governments, rather than the central government. Local governments are responsible for making plans to enable the use of the resources available in a region, while recognising the matters of national importance as set out in the RMA.

Some RMA fundamentals successfully promote the sustainable management of resources and these include (Parliamentary Commissioner for the Environment, 1998):

- Acknowledgment of fundamental values;
- Enables allocation of minimal ecological limits;
- Including communities as part of the environment;
- Issuing communities environmental goals.

Between the years of 1980 and 1996 the New Zealand population rose by 15.5%. With this population rise, the use of resources also increased, with 44% more consumer energy required and 95% more solid waste in the Auckland region (Parliamentary Commissioner for the Environment, 1998). These statistics hammer home how important raising the profile and implementing sustainable development in New Zealand is.

New Zealand's approach to sustainable development is largely reactive as opposed to preventative. Instead of setting national goals for environmental performance and future vision, most regulations and management is based on dealing with the environmental effects.

Although the RMA has been identified as an innovative Act addressing sustainable management, the concept of sustainable management does not seem to be well understood in New Zealand, leading to potentially ineffective use of the RMA.

## **4.3 THE SUSTAINABILITY SOCIETY (TSS)**

TSS (previously known as NZSSES) is a New Zealand learned society formed to promote sustainability in engineering through a variety of mediums to encourage sustainable engineering; workshops, international conferences, seminars and forums (TSS, 2015).

It is a technical interest group of IPENZ (Institution of Professional Engineers New Zealand) and is currently working with IPENZ on a number of matters:

- Developing a new practice note on sustainability for IPENZ (a working group has been established to develop this document);
- Organizing a symposium on climate change for engineers;
- Submitting on the Unitary Plan.

Examples of recent activities which have been TSS initiatives are discussed in the following subsections.

#### **4.3.1 INFRASTRUCTURE SUSTAINABILITY (IS) WORKSHOPS**

The IS Workshops were held to “*promote, discuss and stimulate discussion and advancement of infrastructure sustainability in New Zealand*”. The workshops were based on the ISCA IS rating scheme (details of which are discussed in Section 2.2).

These workshops have formed a platform for using the IS rating tool in New Zealand, with it already well established in Australia. The tool has been implemented as a pilot trial on a couple of projects in New Zealand; Waterfront Auckland Madden and Pakenham Street Upgrades, and Auckland Transport City Rail Link. Some of the outcomes of applying the IS rating tool to these projects are as follows (Clarke, C & Lees, G, 2015):

- The level of documentation required at an early stage lead to early identification of issues and they were dealt with ahead of usual programme;
- Improved auditing and reporting on the four pillars;
- Improved team dynamics as all parties work towards achieving the project objectives;
- Challenges experienced with the IS rating tool requiring adaption to suit the New Zealand context, for example the New Zealand version includes Te Tiriti o Waitangi, and lot of the stakeholder consultation included in the Australian version is already undertaken in New Zealand as a requirement of the RMA.

The exposure of the IS rating tool through these workshops and practical feedback from the pilot projects provide a solid stepping stone for the application of this tool to become widespread in the New Zealand industry.

The fact that the IS rating tool is well established in Australia makes the use of it in New Zealand more attractive. This will reduce aversion to the tool for the many companies which operate in both countries, as other branches of the same company may already have exposure to IS rating.

#### **4.3.2 WATER SENSITIVE CITY FORUMS**

Water sensitive cities are defined as “*resilient, livable, productive and sustainable, which interact with the urban hydrological cycle in ways that: provide the water security essential for economic prosperity through efficient use of the diversity of water resources available; enhance and protect the health of watercourses and wetlands; mitigate flood risk and damage; and create public spaces that harvest, clean and recycle water*”.

TSS hosted water sensitive city forums in Hamilton and Wellington in 2014. These focused on the water sensitive vision of each city and their game plan for reaching these goals. The forums were attended by a variety of representatives from the water community in each region.

The key themes which resulted from the discussions in the forums are as follows (TSS, 2014):

- Promoting awareness in the community of the natural hydrology of the area;
- Promoting water as a valuable resource within the community and relate the importance of water using different mediums, such as artwork and storytelling;

- Communicate the numerous benefits of undertaking work with the water cycle;
- Improved water efficiency and management.

These forums have provided a basis in the water industry for promoting sustainable development and usage within the Hamilton and Wellington communities, and successful initiatives in these regions can hopefully be applied throughout New Zealand.

### **4.3.3 SUSTAINABILITY CODE OF PRACTICE**

TSS has been working with IPENZ to produce a sustainability code of practice. This code of practice is based on the World Federation of Engineering Organizations' (WEFO) code of practice, which was adopted in 2013.

*“The WFEO Model Code of Practice and its Interpretive Guide are intended to explain the link between ethics and professional practice by considering engineering in the wider context of sustainable development and environmental stewardship.”* (WEFO, 2015).

The WFEO code of practice consists of ten principals, which have been developed and adapted to be specific for the New Zealand application. For example the code makes reference to Māori culture and the RMA.

Endorsement by IPENZ of the importance of sustainability in engineering provides an effective instrument to raise the profile of sustainability amongst engineering professionals.

### **4.4 OUTCOMES**

New Zealand has some of the fundamentals in place to move towards incorporating sustainable development in its planning and construction industries. However at this point in time, sustainability initiatives are being driven by engineers, as opposed to the public and politicians. In order to get effective buy in to sustainable development, its profile needs to be raised and the nation needs to better understand the fundamentals of it.

Currently there is not an emphasis on using sustainability metrics to assess the effects of a project. However with workshops undertaken within the past year and IS rating scheme pilot trials underway, the use of these is likely to progress considerably.

## **5 UK AND NZ COMPARRISION**

The UK has been formalizing their approach to sustainability over the past decade with a lot of emphasis placed on rating the sustainability of a project with metric schemes, mandatory sustainability appraisals, and implementation of sustainability related policies.

New Zealand is well behind the UK with its approach to sustainable development from a legal point of view. In addition to this, placing a metric against sustainability and developing a united vision for the water industry in New Zealand are lagging behind where the UK are currently positioned.

The sustainability requirements from Ofwat (as per *Defra's strategic policy statement to Ofwat – Incorporating social and environmental guidance*) along with the clear sustainable water vision from the government (*Water White Pages: Water for Life*), standardises the UK water companies and provides a united front on sustainable development in the water industry. New Zealand is working at moving towards this point (a clear vision) in the water industry, with pre-emptive steps such as holding water sensitive forums. However getting to a similar place as the UK water industry seems to still be a stretch at this point in time. The implementation of the IPENZ code of practice will raise the profile and importance of sustainability in the water industry, along with the engineering industry as a whole. However it is council, and in turn ratepayer buy in, that is required to fully commit to achieving a sustainable water vision for New Zealand.

Unlike the UK, New Zealand recognises the additional pillar of culture when assessing sustainability. Water has significant cultural importance in New Zealand, with a large emphasis placed on the spiritual aspect of dealing with water. This affects the way water abstraction and effluent discharge is approached, which leads to intensive community consultation prior to undertaking any related works. This in-depth approach to the cultural aspect of water development is not directly comparable to the social consultation required in the UK.

## 6 CONCLUSIONS

- There are a number of established sustainable infrastructure rating schemes available which are able to evaluate the environmental, economic and social effects of a project.
- Sustainable infrastructure rating schemes are commonly applied in the UK.
- The UK has legal requirements in place to incorporate sustainable development in their planning procedures, and have a united vision for the future sustainability of their water industry.
- The New Zealand public needs guidance to better understand and support sustainable development.
- The use of sustainable infrastructure rating schemes in New Zealand is yet to become common place, however with workshops and pilot trials underway, it is anticipated that this will change.
- Together with IPENZ, TSS is working to cultivate a unified vision for sustainable development and operation across the engineering industry in New Zealand.

## 7 ACKNOWLEDGEMENTS

Many thanks to the following people:

- Anita Simpson
- Iain Rabbitts
- Neil Purdie
- Ricky Schamall

## 8 REFERENCES

Venables, R. (2008). 'The use of CEEQUAL in teaching project teams to deliver more sustainable infrastructure'. [Online]. Available: <http://www.thesustainabilitysociety.org.nz/conference/2008/keynotes/Venables.R.pdf>

CEEQUAL (2015). 'CEEQUAL – Improving Sustainability through Best Practice'. [Online]. Available: <http://www.ceequal.com/about.html>

ISCA (2014). 'ISCA – Infrastructure Sustainability Council of Australia'. [Online]. Available: <http://www.isca.org.au/>

European Commission (2015). 'Environmental Impact Assessment'. [Online]. Available: <http://ec.europa.eu/environment/eia/eia-support.htm>

Department for Communities & Local Government (2014). 'Planning Practice Guidance' [Online]. Available: <http://planningguidance.planningportal.gov.uk/>

Defra (2013). 'Defra's strategic policy statement to Ofwat – Incorporating social and environmental guidance'. [Online]. Available: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/221043/pb13884-sps-seg-ofwat-201303.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/221043/pb13884-sps-seg-ofwat-201303.pdf)

Defra (2013). 'Sustainable Development Indicators'. [Online]. Available: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/223992/0\\_SDI\\_s\\_final\\_2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/223992/0_SDI_s_final_2.pdf)

HM Government (2011). 'Water White Pages: Water for Life'. [Online]. Available: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228861/8230.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228861/8230.pdf)

Parliamentary Commissioner for the Environment (1998). 'Towards Sustainable Development – The Role of the Resource Management Act 1991'. [Online]. Available: [http://www.pce.parliament.nz/assets/Uploads/Reports/pdf/towards\\_sd\\_98.pdf](http://www.pce.parliament.nz/assets/Uploads/Reports/pdf/towards_sd_98.pdf)

The Sustainability Society (2015). 'The Sustainability Society – a Technical Interest Group of IPENZ'. [Online]. Available: <http://www.thesustainabilitysociety.org.nz/>

Clarke, C & Lees, G. (2015). 'Opportunities for Your Stormwater Projects Through Sustainability Assessment'. 2015 Asia Pacific Stormwater Conference

WEFO (2015). 'Code of Practice for Sustainable Development'. [Online]. Available: <http://www.wfeo.org/sustainabledevelopment/>