OPPORTUNITIES FOR YOUR STORMWATER PROJECTS THROUGH SUSTAINABILITY ASSESSMENT

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ABSTRACT (300 WORDS MAXIMUM)

The great challenge to value intangible benefits associated with infrastructure projects is being tackled around the world. Valuing intangibles can be driven by wanting to justify trying something new, or through government or organisational commitments to a goal of sustainability. These intangibles include valuing biodiversity, eco-system services and community well-being. Some of these benefits are also not realised for years to decades after the project is completed.

Sustainability assessment and decision frameworks are not new. However, there are now a number of tried and tested systems available for infrastructure projects. Some of these are being piloted and adopted by key infrastructure organisations in New Zealand. These infrastructure providers are now able to evaluate the sustainability of their projects and are finding that in addition to project outcomes, the opportunity for organisational benefits are far wider than the project.

This paper discusses the fundamentals of sustainability assessment systems and summarises the experiences of some of those organisations piloting the use of these systems in New Zealand, in addition to describing the value that these organisations have derived from Sustainability Assessment processes. A specific focus has been put on the value for the stormwater aspects of their works. Outcomes have surprised the pilot organisations and include what might be considered the 'holy grail' of Sustainability – organisations in transition to integrating sustainable practices into their business as usual.

KEYWORDS

Infrastructure Sustainability, Reporting, Benefits, Intangible Value

PRESENTER PROFILE

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1 INTRODUCTION

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (WCED 1987)

The development of technical and social systems since the industrial revolution has led to great advances in lifestyle, human health and infrastructure development. These

advances have been coupled with unparalleled population growth and associated resource use. The current global average of resource use is currently 1.5 times the estimated capacity of the planet and climbing (Global Footprint Network). This means it now takes the Earth one year and six months to regenerate what we use in a year. UN scenarios suggest that if current trends of population and consumption increase continue we will need the equivalent of two Earths to support us by 2030's.

'Infrastructure' is the fixed, long-lived structures that facilitate the production of goods and services and underpin many aspects of quality of life (New Zealand Government 2011). Infrastructure is crucial to sustainability due to its role in configuring society and the way it functions. Annual infrastructure investment in New Zealand is many billions of dollars (New Zealand Government 2011). Therefore a more sustainable approach to infrastructure influences sustainable outcomes.

Infrastructure is all around us and involved in so many things that we do, particularly in providing our basic needs. Therefore ensuring infrastructure is undertaken in a sustainable way is important for both its contribution to sustainable outcomes and as part of a greater move towards sustainability. (ISCA)

A key step in adding this sustainable development dimension is an assessment methodology that measures success in the various area of sustainability of a project, programme of works, or organisation, throughout its lifecycle. This approach is called sustainability assessment.

This paper aims to illustrate the benefits of sustainability assessment for infrastructure projects. Based on the realisation that infrastructure development contributes to society's over-consumption of resources, sustainability assessment has a basic role to measure and communicate improvements that can be achieved. In addition, by using the lens of sustainability assessment there are many benefits that can drive improved integration and alternative infrastructure patterns, including improved valuation of intangible benefits.

On a broader level this approach can contribute to more efficient natural resource use, or the preservation of Natural Capital. Natural resources are special economic goods because they are not produced. As a consequence, natural resources will yield economic profits- rents - if properly managed (World Bank 2006)

Whilst many business-as-usual approaches already target efficiencies relating to resource use and sustainability impacts, sustainability assessment ensures consistency throughout the project lifecycle to maximise these efficiencies. Furthermore there is potential for great innovation, savings and added benefit to be achieved through the lens of sustainability assessment. This paper describes some examples of sustainability assessment tools available, outlines some of the opportunities for stormwater infrastructure and highlights some case studies for sustainability assessment.

2 SUSTAINABILITY ASSESSMENTS

There are a raft of assessment methodologies and tools that provide a lens to understand the sustainability impacts and opportunities of design options or infrastructure projects. In this section, three representative frameworks are described to provide a basis of understanding for the range of sustainability assessment tools that are available and the type of information and indicators used in the assessments. It should be noted that the scale of a project does influence the ability for successful sustainability assessment, particularly with respect to available resources. In addition the ability to allocate

ownership of certain credits within a project team or across an organisation may also influence effective outcomes.

2.1 INFRASTRUCTURE SUSTAINABILITY COUNCIL OF AUSTRALIA

The Infrastructure Sustainability Council of Australia (ISCA). Has developed an Infrastructure Sustainability (IS) rating tool for infrastructure. The ISCA IS tool is based around a set of categories where credits can be obtained to provide an overall rating for a project at three lifecycle milestones, Design Rating, As-built Rating (covering design and construction) and Operation Rating. The fifteen categories are organised into six themes as indicated in Table 1. The assessments are compared to a base-case or a traditional design representative of a business as usual approach.

Table 1- ISCA IS Rating Categories

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

A formal certification from the ISCA is necessary for the user or any other party to promote the IS rating achieved. Pilot projects using the ISCA IS tool are underway including the Auckland Transport City Rail Link, the Waterfront Auckland Madden and Pakenham Streets Upgrades, the Bay of Plenty Regional Council's Stormwater Program and the Auckland Airports Operations: Asset Benchmarking and Master Planning.

2.2 CEEQUAL

The Civil Engineering Environmental QUALity Assessment & Awards Scheme (CEEQUAL) is a sustainability assessment tool that was established by a team led by the UK Institute of Chartered Engineers (ICE) including Professor Roger Venables, and has been operating for 12 years. It was developed for the sustainability assessment of all types of civil engineering, infrastructure, landscaping and public realm projects and contracts. CEQUAL uses evidence-based assessment criteria, and external verification, to provide an assessment result that can be made public and used in publicity. In addition, integration of the question set in the development of projects and contracts is claimed to be able to very positively influence design and construction management and often leads to significantly better outcomes than would otherwise have been the case.

CEEQUAL has a set of questions that are answered, with evidence, by the project team and verified by an independent verifier. The underlying CEEQUAL methodology was used where appropriate in the development of the ISCA tool. Therefore there are similarities in some of the assessment items from those of ISCA listed in Table 1. The most recent version, Version 5, completed the transition of CEEQUAL as an environmental assessment and awards scheme (Version 4) to a sustainability assessment and awards scheme. One of the most material changes in the recent version is the inclusion of an optional Project Strategy Assessment, which covers how the project team has related their project to the wider sustainability agenda surrounding civil engineering and infrastructure projects, and their contribution to sustainable development. This is optional as it is often beyond the scope of the projects influence.

2.3 GREENROADS

Greenroads is a sustainability rating system for roadways applicable to the two milestones of design and construction. It is a voluntary third-party rating system which seeks to recognise and reward roadway projects that exceed public expectations for environmental, economic and social performance. It was established in 2010 in the United States and since then has been utilised in over 120 design and construction projects across different types, scales and stages of design and construction.

The Greenroads rating system is a collection of sustainable roadway design and construction best practice credits which, when achieved, earn points toward a total score for the project which can be used as an indicator of sustainability for the roadway.

There are an additional 11 Project Requirements that carry no point value but have to be incorporated in order for a roadway to be considered a Greenroad. There are also a number of additional voluntary credits that people can choose to pursue or not. The points associated with the Voluntary Credits achieved are totalled to provide a Greenroads score and can be used to pursue levels of certification: Bronze, Silver, Gold, and Evergreen.

Greenroads is being used in New Zealand by NZTA on various projects (Greenroads website):

- Peka Peka to Otaki Expressway - Wellington
- Wellington Inner City Improvements - Buckle Street Underpass - Wellington
- SH16 Causeway Upgrade Project - Auckland (*Pilot Project)*
- SH2 Papatawa Realignment - Manawatu Wanganui (*Pilot Project)*
- SH6 - Marlborough (*Pilot Project)*
- Te Rapa Bypass - Hamilton City, Waikato (*Pilot Project)*

3 STORMWATER OPPORTUNITIES

3.1 BUSINESS CASE

It is at the business case or concept design stage where a project is initiated and a funding stream secured, that a focus on sustainability can have the biggest impact. If sustainability is a key part of the stated objectives at the business case stage, this focus is likely to flow on through the project, particularly through the procurement of design and then construction services. Committing to sustainability objectives from project inception and ensuring sustainability is integrated throughout design, construction and operation provides the greatest prospect for lowering project costs (Stapledon 2012). Therefore establishment of a business case should include the requirement for ongoing sustainability assessment throughout the project. Without this establishment commitment the further stages of design and construction are less likely to achieve maximised resource and cost efficiencies. It is notable that Sustainability Assessment as a process may facilitate a project to go beyond the minimum performance required by legislation.

However infrastructure sustainability is not exclusive to projects that are inherently "sustainable". Assessments can be applied to any project, regardless of the sustainability outcomes envisaged from the business case. This means that all projects can access an enhanced sustainability performance in comparison to a base case or business as usual approach.

Sustainability assessment provides a comprehensive and clear framework that can be useful in better communication of a project's objectives. The assessment framework informs and articulates the story underpinning the project need. This story can extend to stakeholders and permeate all parties interacting with the project, including:

- Informs procurement,
- Bottom up due diligence Environmental, Social and Governance (ESG) assessment framework for investors,
- Stream-line approvals,
- Consistent industry language and benchmarks, thus reducing costs and improving procurement,
- Reduces risks for clients, and
- Increases certainty for tenderers.

The ability to influence Quadruple Bottom Line (QBL) outcomes decreases the further a project progresses. The four bottom lines are considered to be economic, social, environmental and cultural outcomes. At the planning and business case stage there is the most opportunity to set a direction for the project to achieve positive outcomes. Using a sustainability assessment tool helps to establish a QBL governance and performance framework including measureable and quantifiable targets which can be pulled through each project phase. Infrastructure sustainability assessments facilitate the multiple outcome approach by rewarding multiple criteria analysis at the options assessment stage.

Sustainable infrastructure meets multiple objectives, resulting in improved overall system sustainability, however often different agencies or parts of an organisation have different responsibilities for meeting only some of these objectives. Therefore more integrative projects often cannot meet feasibility tests at business case or other gateways and without cross party collaboration or shared funding arrangement, may not proceed. Alternative options or additional elements that provide benefit to another party, or that achieve wider objectives, would typically be more expensive than a solution that meets

only the first party's core objectives. However the integrated solution may readily be cheaper than two separate projects to achieve two separate objective sets. For example a stormwater project with a raingarden and overland flowpath may be cheaper than two projects to provide separately; a) a sandfilter and conveyance pipeline with secondary flow path, and b) a streetscape project including street trees, gardens open spaces for aesthetic, climate and wellness benefits to a city.

Integration and multi-party co-founding and collaboration could best be established at the business case stage in order to develop and support a multiple objective project for less cost than separate isolated projects. An example of this could be the utilising of spare capacity in a wastewater conveyance or treatment scheme to treat first flush stormwater from high contaminant load sites, instead of large scale separate treatment devices. Similarly the integration of a stream corridor cycleway with stream restoration jointly funded, rather than a cycleway away from the stream and separate erosion and water quality treatments conducted elsewhere.

This type of integrated project can only proceed with an up-front understanding of the otherwise intangible benefits associated with some options and then identifying the symbiotic benefits that these could give to another project or funded objectives program. Similarly, accurate and open minded financial assessment is necessary to develop the business case and test the financial benefits of integrating.

There is the tendency to rush into a solution to a problem that is not necessarily ready to be solved, or can easily be deferred without causing major issues. The benefit of deferral can be to wait for conditions that may support a more holistic or system level solution, to take advantage of evolving social systems that provide a simpler and less resource intensive solution (such as a law change or management approach), or until with greater understanding, innovation or technological advances a more sustainable solution may come about.

The National Infrastructure Plan (NIU 2011) calls for infrastructure investment to be well analysed and take sufficient account of potential changes in demand. It is at the inception of projects that appropriate forward thinking should be undertaken including whole of life cost evaluations, consideration of demand throughout the life of the assets created by the project and potential changing conditions that may jeopardise the appropriateness of a solution. The risk of not doing this is a "white elephant" asset that becomes unsatisfactory early in its life cycle and possibly locks in configurations that rule out further expansion. An example of this could be Auckland's Orakei Sewer Scheme commissioned in 1919 with council already resolved to find a better alternative in 1929, which then took a further 30 years to implement. (Fitzmaurice 2009). A shorter term option or "Band Aid" may be appropriate if significant political pressure exists for a short term remedy, allowing time to be bought for a more significant solution. An example of this could be the Christchurch flood taskforce temporary flood defence options (CCC 2014).

3.2 DESIGN

The detailed design phase is the optimal stage to influence materials and waste. However while this is the stage where significant decisions are made, there is often strict constraints on the scale of investigation, modelling and design assessment that can be made. By appropriate investment in design, total project costs can be reduced across the lifetime of the project (CII 2012).

Many aspects of design require the implementation of design guidelines and conformity with standards. If these standards direct the design towards less sustainable materials

selections and asset configurations, it can be difficult to achieve innovation opportunities and overall sustainability improvements. A solution may be a focus on undertaking sustainability assessment of alternatives at the time of infrastructure guideline and standard development or completing specific review with an infrastructure sustainability assessment lens.

A benefit of sustainability assessment tools such as the ISCA tool is that they incorporate a materials assessment module. This provides designers with clear direction on advantageous materials for specification, which can form some of the low hanging fruit of sustainability improvements, although significant redesign from traditional approaches may be required

A major advantage of a formal process for sustainability assessment through the design stage increasing the likelihood of unlocking design solutions which can meet objectives fit for purpose, cost and sustainability whole of life expectations and outcomes.

The use of a sustainability assessment tool provides a consistent reporting platform linking back to agreed business case objectives. It doesn't replace a process of Assessment of Environmental Effects, however may act as a checklist of AEE throughout the design process, and provide potential to design impacts out of the project.

One key aspect of interrelation between Sustainability Assessment for any project and Stormwater Infrastructure is the understanding of the Best Practicable Option (BPO) within any particular catchment, especially if this was not already programmed for implementation. This may provide similar benefit to the integration opportunities discussed in Section 3.1. The knowledge of BPO's can help a project to identify the best way to contribute to stormwater outcomes when trying to meet sustainability assessment criteria. This could also broach stormwater offsetting where the BPO may not be within the project boundary, but contributing to it would be the best way for a project to enable stormwater enhancement. Therefore there is a potential benefit in the BPO being clearly defined through catchment management processes.

3.3 CONSTRUCTION

Issues for sustainability improvements at construction phase are often dominated by commerciality, meeting a low margin tender price dominated by a procurement process that does not facilitate innovation and added value approaches. Even weighted attributes methodologies are difficult to differentiate high quality tenders other that on price. Therefore the opportunities from sustainability assessment during construction include:

- A framework which can be used to identify and value resource efficiency, innovation and other environmental and community opportunities,
- Informs project KRA's/KPIs and associated targets,
- Centralises and maintains sustainability ownership during delivery,
- Common industry sustainability language,
- Voluntary and outcomes based, therefore can be a project culture enhancer, and
- Influences subcontractor procurement and supply chain.

3.4 OPERATION

The potential for reductions in operational cost are some of the key benefits from a sustainability focussed design and construction phase, with infrastructure sustainability assessment allowing enhanced interrogation of asset performance.

Issues for implementing sustainability improvements at the operational phase also include meeting a low margin tender price through a procurement process often lacking innovation and added value approaches. Also the existing infrastructure constrains or 'locks-in' operators to unsustainable or less sustainable on-going practices. Opportunities from sustainability assessment through the operation phase include:

- Value creation and risk identification for investors,
- Baseline asset/network QBL performance for asset owner/operators,
- Testing ground for new technologies and solutions can be created on a small scale and implemented on larger capital projects once tested,
- Facilitates identification of risks and opportunities and informs continuous improvement targets, and
- Informs corporate reporting.

4 CASE STUDIES

4.1 WATERFRONT AUCKLAND – MADDEN & PAKENHAM STREET UPGRADES

4.1.1 BACKGROUND

Waterfront Auckland is a Council controlled organisation responsible for leading the revitalisation of Auckland's waterfront within the inner city. Waterfront Auckland has taken a design led approach to the development of streetscapes, public space and private and commercial facilities. The organisation is required to focus on consultation and balancing stakeholder interests. Partnership organisations are sought for development of building infrastructure but the responsibility for the infrastructure required to support those facilities is with Waterfront Auckland. This case study is based on an interview with Dr Viv Heslop, the Sustainability Manager for Waterfront Auckland.

Waterfront Auckland released its Waterfront Auckland Plan in 2012 and a Sustainable Development Framework in 2013. These documents outlined the direction and leadership role Waterfront Auckland wanted to take in sustainability in Auckland. Waterfront Auckland adopted the GreenStar rating tool for all of the office buildings (developments must achieve a 5-star rating on all office buildings) and HomeStar rating tool for all of the apartment buildings (developments must achieve a 7-star on all apartment buildings) within their development area. More recently they have chosen to pilot the ISCA Infrastructure Sustainability rating tool for their current infrastructure project, the Madden and Pakenham Streets Road Upgrade.

The Madden and Pakenham Streets Road upgrade project, with a budget of around $15M, is located within the Wynyard Quarter. Wynyard Quarter is billed as Auckland's newest waterfront area and urban community. The project includes a road upgrade of existing Madden Street and Pakenham Street West to support improved stormwater management, future development and street life. The site challenges for the project

include highly contaminated land, minimal availability of head for stormwater hydraulics, on-going development on the properties served by the infrastructure projects, and the high profile and high use intentions for the area.

Waterfront Auckland see the use of these tools (ISCA, GreenStar and HomeStar) as a method to evaluate and prove they have delivered on their goals made in the earlier 2012 and 2013 plans. Waterfront Auckland also wanted to change how the design and construction industry viewed and engaged with sustainability. Piloting the ISCA IS tool also means that designers and contractors can gain some experience with the tool as larger projects using sustainability assessment come on streamThe ISCA tool is now getting a lot of traction in New Zealand and Waterfront Auckland feel justified in choosing this approach.

4.1.2 CURRENT STATUS

At the time of writing Waterfront Auckland are in the middle of procuring a construction partner. Specifically they are awaiting price based tenders for the project from a selected panel of construction contractors. These contractors were shortlisted through an expression of interest phase using weighted attributes. A sustainability questionnaire was 10% of the weighting and was used to understand the contractor's commitment to sustainability as a company. Contractors were also asked to contribute their ideas towards how the project could maximise the rating under the tool which was given 20% of the weighting. Waterfront Auckland feel this process really differentiated the companies who had a real commitment to sustainability as the large contractors interested in this work all compared fairly evenly in other attributes such as relevant experience.

The design team were contracted more than a year ago in a similar way with the requirements of the ISCA tool laid out in the procurement process for design services.

4.1.3 RESULTS

The ISCA tool requires documentation of the decisions being made at all stages of the project development and implementation. There is also a need to develop a model for energy and materials inputs and then compare that to a baseline (reference design). Then it is necessary to update that model as the design progresses, to prove the goals are being achieved under relevant credits. Using the ISCA tool has also meant that the project team were required to document everything early so that the expectations and requirements of the designers, contractors and the internal project team were clear. It has also meant that sustainability issues were raised early, much earlier than normal in a project like this, so although some of the costs of dealing with these issues have been brought forward, the overall increase in cost to date has been estimated to be 3-5% (similar to the cost of implementing GreenStar on a project). The project team can't yet measure accurately what the project savings (and other benefits) will be over the life of the project.

The project team have found that the major benefit of implementing the IS scheme is how it has focused their work practices to deliver better auditing and reporting on a quadruple bottom line standing. It has also allowed communication to the community the level of commitment to sustainability in the infrastructure Waterfront Auckland will deliver, including openness to have this rated by an independent body.

The major difference to business as usual so far has been the procurement process as described above. The use of the ISCA tool has also instilled a sense of partnership and shared responsibility for achieving project goals between all parties. However, it will remain to be seen if the physical road and stormwater system is any different from the

street upgrades completed before piloting the ISCA tool. In hindsight the separate earlier procurement of design services could have been more specific about the inputs to prepare evidence for the ISCA process, as some additional work outside of the original scope has been required.

The material calculator is an integral part of the ISCA IS tool and gave the project team some perhaps surprising results on the road surfacing. It showed that due to a number of calculated factors including, lower maintenance requirements and the ability to include recycled materials, concrete has been selected over asphalt for the road surfacing.

Through the procurement process contractors were asked to suggest ways to better achieve the ISCA rating. This meant that rather than the client imposing requirements on the contractor, the contractors have willingly offered their innovations for the benefit of the project and therefore it feels easier to achieve some of the seemingly major changes in "business as usual" practices. For example in the procurement process a number of contractors suggested the use of bio-diesel in their equipment rather than fossil fuels.

The design team is excited to be on target for an excellent rating. Uniquely with the ISCA rating tool you apply for a design rating and then the as-built rating but if you don't achieve the as-built rating they take away your design rating. So the contractor's commitment is essential and means that sense of partnership is much stronger.

4.2 AUCKLAND TRANSPORT - CITY RAIL LINK

4.2.1 BACKGROUND

The City Rail Link (CRL) will extend Auckland's passenger rail system past Britomart to connect to the existing regional rail network at Mt Eden. The project is estimated at $2.4B and includes twin 3.4km long tunnels up to 33 metres below city centre streets. It is estimated it will take five and a half years to build.

Auckland Transport (AT) did a formal review of available sustainability assessment tools and chose the ISCA tool as appropriate for their organisation over GreenRoads and the NSW Design Guidelines for Rail as AT liked the idea of being able to be able to apply the tool to all different types of infrastructure. They are piloting the tool on the City Rail Link project and at the same time are working on how the use of a tool like this fits into their wider strategic outcomes and where else it (or parts of the tool) could be of value.

This case study is based on interviews with Carl Chenery and Liz Root of Auckland Transport.

4.2.2 STATUS

At the time of writing, two separate tenders for enabling works are due to be awarded in the coming weeks which include ISCA requirements. The CRL team is targeting an excellent rating under the ISCA IS rating tool for these enabling works.

4.2.3 RESULTS

Some of the challenges found in piloting the ISCA tool are in the adaptation of the tool for the New Zealand context. AT is actively addressing this through technical clarifications with ISCA and some on-going discussions. However this is also an opportunity for the CRL team to influence and raise questions for ISCA to follow up in their development of both the New Zealand version of the tool and to contribute back to on-going development and application of the tool in Australia.

One particularly interesting point is how the New Zealand version of the ISCA tool approaches Te Tiriti o Waitangi, which is a significant difference to the Australian context. The exploration of whether a tool like this is the appropriate place to recognise (and verify through third party verification) mana whenua values will be an on-going discussion associated with this tool and it's adaptation to the New Zealand context. While not expecting to resolve this, the CRL team are part of that discussion. Supporting a value case for increasing the mauri of a project area, while potentially partially covered by some of the existing credits, is a potential modification to the tool for consideration to stretch users past business as usual practices and explore more truly sustainability and regenerative focused outcomes.

Another difference with the New Zealand context is that the Australian developed tool includes a significant emphasis on stakeholder engagement but many of these requirements are business as usual in New Zealand through existing resource management and local government legislation.

Some of the benefits of choosing the ISCA tool over some others in the market (apart from not having to convert feet and inches) are: having the technical support of ISCA in a reasonably forgiving time zone; some mutual awareness of the infrastructure context in each country; the precedent of the GreenStar rating tool having been adopted via the Australian Green Building Council to the New Zealand Green Building Council; and the fact that many organisations in the infrastructure industry operate in both New Zealand and Australia. Another benefit of choosing the ISCA tool is that it's established in Australia and getting traction in New Zealand so there are numerous other projects who have used the tool before and plenty of development has happened before this point. Also as the sustainability manager of a project like this, it gives some back up to what should be considered in assessing the project's sustainability impacts, they are not just seen as nice to do's.

From a stormwater perspective, and more broadly across the Auckland Transport programme, another interesting aspect in developing the tool further is the dollar value of implementing a significant improvement in stormwater within the physical project boundary of the project versus investing the same dollar value in stormwater infrastructure further up the catchment for greater benefits (as it's well understood that greater benefits are normally seen when stormwater and potential pollutants are managed as close to the source as possible). This might be assessed in the tool in a similar way to ecological off-setting. This is also interesting to consider how the use of the tool might cross over (spatially) into other AT projects or the programmes of works underway by other parts of Auckland Council.

It's too early to tell what the major successes and benefits might be to come out of using the tool on the CRL but the Management and Governance category, which rewards things like "sustainability leadership and commitment" and "regular, comprehensive and transparent sustainability reporting and review" are seen as a way to instil long term change within the organisation.

4.3 BAY OF PLENTY REGIONAL COUNCIL

The Bay of Plenty Regional Council hosted a one-day workshop in July 2014, facilitated by The Sustainability Society (TSS) and ISCA. The Regional Council invited a broad range of interested infrastructure professionals from local authorities, consultants, government agencies and major industry from around the region. The workshop focused on the value of assessing sustainability impacts and participants gained an understanding of the ISCA IS tool and its application to date in both Australia and New Zealand. Achieving sustainability outcomes strongly aligns with the strategic priorities of the Bay of Plenty

Regional Council and there was strong interest and support from participating organisations to further explore the ISCA IS tool with an appropriate pilot project. At the time of writing, due to other commitments the Bay of Plenty Regional Council haven't started on the process of piloting the tool but have a list of potential projects and hope to start on a pilot in the not too distant future.

4.4 LODGE BURN FLOOD ALLEVIATION SCHEME - COLERAINE NORTHERN IRELAND

The Lodge Burn flood alleviation scheme in Coleraine, Northern Ireland, was designed by Atkins and constructed by McLaughlin & Harvey Ltd for the DARD Rivers Agency. The CEEQUAL process was used by the project team to showcasing that traditional flood defence works can easily incorporate environmental enhancement and river restoration elements for added sustainability outcomes. The process allowed the development of plans with the appropriate detail to sustainability performance.

The tool provided specific areas of focus for environmental benefits within the assessment which the project team knew would make the most benefit to the project. The team also found it useful that the project strategy was set at commencement of the project to guide their approach to all environmental matters. Some of the key environmental and social benefits of using the tool are discussed in further detail below.

Waste and material use - After screening for site contamination, much of the soils on the site were reused. To ensure suitability for reuse, the team screened sub-soils and removed inert contaminants (bricks, plastics, concrete etc.). A total of 800m^3 of sub-soil was processed of which only 40m^3 had to be disposed. Of the total 2700m^3 of material excavated for the culvert works, 2160m^3 was reused. This equates to 80% of site won materials. Incorporating recovery and off-site recycling, the Contractor diverted 95% of site wastes from landfill.

Land use and landscape - there were significant opportunities to improve the river corridor and the use of lands adjacent to the watercourse. The team agreed a patterned concrete stone-effect finish in keeping with the surroundings. Local hand dressed stone was used to clad the concrete parapet walls for entirely visual reasons. In addition to landscape planting design, the Designer specified pre-planted coir rolls, with native seed mix, for instant vegetation in the restored river channel.

Ecology & biodiversity - The existing river channel at the Lodge Burn was in poor condition with poor quality habitat and barriers to fish passage which was improved by the project with fish passage and spawning/ resting areas for Atlantic Salmon, Brown Trout and Sea Lamprey. Water quality improvements have been demonstrated globally on the Lodge Burn over the course of the works by an improvement from Bad WFD Status in advance of the works to a Moderate Status during the works.

Community Relations - The construction works were within heavily trafficked town centre areas. Public were kept up to date via a public open day, various leaflet / letter drops and the creation of a project website. The website contained all scheme details / drawings / visualisations, team contact numbers and weekly work ahead bulletins. The site fencing afforded local people the opportunity to observe the construction process and it proved to be popular among local residents to see the works progressing.

The design and reinstatement changed as a result of liaisons with local residents. These changes were captured in the individual riparian agreements drawn up with the affected residents. Examples of changes included additional landscaping or screening vegetation, improved paths / access to rear of properties and improved safety hand-railings.

The team identified opportunities to work with local schools to educate on river environment and used the Salmon in the Classroom activity as a means to get local children engaged in the river restoration of the Burn.

5 CONCLUSIONS

Sustainability assessments are a critical part of achieving benefits across the four well-beings (or the quadruple bottom lines). This includes the necessary outcomes of resource efficiency and protection of natural capital by valuing intangible environmental benefits. It has also been demonstrated by the case studies explored above that significant organisational change can come about as a result of adopting sustainability assessment methodologies. While many aspects of business as usual are evolved to prevent harm to environmental, minimise cost and enhance social and cultural aspects of a project, a crystallised framework for sustainability assessment has potential to add value for consistency and formal measured performance improvement for infrastructure projects.

Various infrastructure sustainability assessment tools have been available and operating for more than a decade, however their uptake in New Zealand has been limited. Recently progress has been made with several Green Roads and ISCA pilots being conducted. There is potential to widen this uptake to ensure sustainable outcomes become business as usual for the stormwater industry. Particular opportunities lie in the tailoring of international tools to local context and the influence on procurement and materials sustainability.

Assessment schemes are inclusive and are generally encouraging enough for any project to make it through and achieve improvement. Infrastructure assessment focuses on processes aimed at delivering good outcomes, not on the outcomes themselves, therefore the unique innovations will vary from project to project.

ACKNOWLEDGEMENTS

The Sustainability Society would like to thank the following contributors:

Dr Viv Heslop -Waterfront Auckland.

Liz Root – Auckland Transport

Carl Chenery – Auckland Transport

David Boothway and Marnie Fornusek – Bay of Plenty Regional Council

Antony Sprigg - Infrastructure Sustainability Council of Australia.

Kerry Griffiths - AECOM.

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