

# DEVELOPING INNOVATION TOOLS FOR USE IN INFRASTRUCTURE PROJECTS

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## ABSTRACT

North Shore City Council is committed to innovation in terms of management, technology and planning, to meet its business objectives and the needs of its stakeholders. This paper addresses the reasons why North Shore has chosen to focus on innovation; the development of innovation tools and processes for council, the specific selection and modification of innovation tools for use in wastewater network projects and the development of a quality assurance system which integrates innovation processes into project processes.

The paper covers the exploration of areas in a wastewater network infrastructure project where innovation can be applied, from feasibility through to construction, and explores how the innovation tools used vary from stage to stage, and within each stage. The paper also explores challenges of uptake of the innovation tools and solutions.

## KEYWORDS

**Innovation, Project Management**

## 1 INTRODUCTION

North Shore City Council(NSCC) is striving to be an innovative council. It has a history of embracing leading edge technologies and new solutions to meet project management and delivery challenges. The Council recognises that its principal innovation resource is its own staff, alongside a few key contractors and consultants. By way of an innovation programme, it has recently been actively seeking more ways of enabling and utilising these resources; seeking out ideas and opportunities that will enable North Shore City Council to:

- Reduce costs,
- Improve customer satisfaction,
- Provide better solutions,
- Improve processes and ways of working together,
- Improve project certainty (including consentability), and
- Improve staff morale.

## 2 ORGANISATIONAL INNOVATION

Organisational innovation is based on using and applying innovation principles at an organisational level to leverage existing resources in order to maximise performance. Organisational innovation not only deals with new products and services but encompasses other aspects of business systems, such as team work, process improvement, business models, customer channels and strategy. Innovation is now being viewed as a valuable core business discipline.

Ideas Accelerators innovation methodology focuses on two key aspects of innovation in order to develop an organisational innovation framework;

1. The development of an innovation system; for the capture, categorisation, assessment and launch of new products, services, and performance improvements.
2. The development of an innovation culture program - training and communications; to support the innovation system and develop a culture of innovation performance.

“In the end sustainable development can’t be achieved without innovation and innovation is best achieved in a culture that embraces and fosters learning and change”. (Senge, 1999).

## **2.1 THE DEVELOPMENT OF AN INNOVATION MANAGEMENT SYSTEM**

The first step in this process is to understand more about the organisational structure and ways of working through interviewing key stakeholders and integration specialists (HR, Communications, IT, Strategy and Planning) in order to determine how an innovation system may integrate across divisions and into the business as usual processes:

- System Review – Understanding your organisation’s existing systems and processes to ensure that the design of the innovation system fits with your BAU processes.
- Innovation System Design – Mapping and developing an innovation system (stage and gate process) to fit your organisation’s strategy and program requirements.
- Innovation System Implementation – Developing and implementing either an innovation resource manual or internet platform to assist through the stage and gate process.

## **2.2 THE DEVELOPMENT OF AN INNOVATION CULTURE PROGRAM**

The first step in this process is to identify communication touch points based on existing programs. Stakeholder requirements are then identified in order to design and develop communications and innovation training programs which aimed to engage different stakeholder groups in innovation activities across all levels of the organisation:

- Creativity Training – Design and Develop innovation training. Developing practical tools to help assist staff in developing ideas ready for launch.
- Innovation System Training – Developing training programs for program launch ensuring that the entire organisation understands the need for innovation, what innovation means for the organisation and the value hoped to be gained.
- Innovation Metrics – Developing system and processes that measure financial targets, cost savings and cultural value gains as a direct result of the program.

## **3 NORTH SHORE CITY COUNCIL - EUREKA PROGRAM**

Subsequently this innovation management methodology has been applied to North Shore City Council and with the support of John Brockies, Chief Executive and Geoff Mason, General Manager, Infrastructure Services, an Innovation Board was formed comprising representatives from across council.

In 2007 North Shore City Council engaged Louise Webster at Ideas Accelerator to develop an innovation framework based on the organisational methodology outlined above and then to provide specialist advice and support through the program development and implementation phases - this work is ongoing.

The Eureka Innovation Program has now been running for 8 months and has successfully engaged and encouraged staff to actively contribute to innovation initiatives and improve innovation performance across all areas of Council. This has been achieved by:

- Establishing a culture of innovation and best practice,
- Applying innovation principles to all aspects of organisational systems and processes,
- Using an innovation system to select projects for development,
- Improving business performance in order to reinvest savings, and
- Providing provision for training on innovation principles and tools.

The two most recent Eureka Program initiatives to be launched are: an ‘Innovation Challenge’, which is a council wide competition to raise the awareness of innovation and to identify possible improvements following the formation of the upcoming new Auckland Council, and the development of an innovation and communications training program that aims to assist teams in finding better ways of working together using innovation tools and techniques to challenge ideas and develop better solutions. This training is currently being rolled out through Ideas Accelerator.

## **4 INNOVATION APPLIED TO INFRASTRUCTURE PROJECTS**

Part of the challenge was also to consider how innovative approaches could be encouraged in the infrastructure projects that Council undertakes. Whilst a great deal of creativity and innovation is embedded in the day to day management of infrastructure projects; managers and contractors naturally focus efforts on risk mitigation and delivery, after the preferred option is agreed.

The Water Services department of Council has developed a strong culture of ‘continuous improvement’ since the instigation of an ISO 9000 Management system in the 90’s. In the last five years or so innovation tools and methodologies have been investigated and applied to organisational systems and processes as opportunities have arisen.

To ensure that water Services was *‘getting the best results’* the following objectives were identified for the implementation of an Innovation Framework within the Water Services department:

- Continuous improvement,
- Better, or more appropriate, solutions to problems,
- Reduced cost of solutions,
- Increased benefits from solutions, and
- Development of a process to enable these objectives to be achieved consistently

*The steps / phases that enabled the achievement of these objectives were as follows:*

1. Develop an innovation tool kit / resources.
2. Integrate innovation tools into the project development processes.
3. Identify opportunities for improvements, benefits or cost savings.

## 4.1 DEVELOPING THE TOOLS

To ensure the project objectives were met, Ideas Accelerator and SKM with subconsultants Opus designed and developed the following resources for use and application in the Water Services department. There are three main innovation resources:

1. **Idea Initiation - 'Cloud 9 File'**; The Cloud Nine file is a place where ideas, problems, opportunities and issues are collected (in a physical file) added to by others in the team prior to development. This physical file is circulated around a team; the file is read, added to and passed on and should reach each member at least once a month.
2. **Idea Development Resource Kit**; The Idea Development Resource Kit contains resources and tools to assist in developing ideas from the Cloud 9 File. It will also be used to assist discussions at stages that have been identified in the Project Guidelines.
3. **Project Guidelines**; The Project Guidelines resource has been developed by the Water team to assist with and clarify the project development process. The set of resources will be used by team members to help guide them through the various meetings, workshops and challenges that they face over the course of a project. The Project Guideline contains;
  - A step by step process guide for the development of projects from Concept Design through to Operations Maintenance and Demolition
  - A meeting / workshop guide outlining the purpose, objectives and deliverables for each meeting and or workshop through the project development process
  - A set of tools and templates that will assist the team to align thinking, make crucial project decisions and ensure that the project is ready to proceed to the next stage of development

## 4.2 IDENTIFYING EARLY INNOVATION SUCCESSES

In the following examples innovation was used at an early stage to identify and find solutions for problems and issues that would not normally have been identified until much later in the design and construction process. As a result of this thinking, there were three major projects that provided an opportunity to utilise innovation – two initial projects and one ongoing:

**Rosedale Effluent Tunnel & Outfall Project - Total value \$116 M**; This project was at the stage of tender preparation and consideration of innovation led to the use of a 'Strategic Foresight' strategy where one 'stands in the future and looks back to the present'. Assistance was given to Council with this strategy by NEXT Corporation and through the use of two full day 'workshops', it was found that the basis of the project needed to be reviewed in a number of areas. This was done and the original concept went ahead, but with improved confidence that the best solution had been selected.

The tender documents were written requiring innovation and partnering principles to be part of the 'design-build' contract. Interactive tendering was also utilised for the purpose of obtaining the best concept design from each of the tenderers.

This project is currently being constructed by McConnell Dowell Constructors and is due for completion in mid 2010. The construction has utilised partnering principles and the design and construction methodology has been innovative in many ways.

**Birkdale Sewer Amplification Project – Total value \$16M**; This project commenced after the Rosedale project and also utilised a workshop approach to identify innovation opportunities at an early stage. The key finding from the workshop was the identifying of the need to utilise an integrated approach in respect to wastewater needs and stormwater needs as well as the importance of keeping environmental and community impacts to a minimum. This project was fast-tracked because of the fact that the old sewer system was not meeting community needs and it is due for completion in December 2010. The project has successfully applied

innovation principles in many areas - a good example is the saving of approximately \$0.5M by utilising a newly imported high capacity horizontal drilling machine to install a sewer for a shorter distance and under a sensitive native bush area that otherwise would have been seriously impacted.

**North Shore City Council's Wastewater Network Strategic Improvement Project;** This project commenced in the year 2000 and is ongoing – its aim is to achieve Network Consent by 2021. There are many challenges affecting the implementation of this ambitious city-wide improvement project in a densely populated, urban environment, with iconic beaches and reserves and amenity much valued by the residents. This has necessitated an innovative approach to problem solving from initial identification of solutions through to implementation. The project was identified as an ideal testing ground to build innovation tools into the project process. SKM in association with Opus is Principal Consultant for this project, working in a co-located team in NSCC offices. The Principal Consultancy also commenced in 2000, so the team currently has 9 years ongoing involvement in the project.

## 5 INTEGRATING INNOVATION TOOLS INTO THE PROJECT DEVELOPMENT PROCESS

### 5.1 EXISTING ENGINEERING PROJECT FRAMEWORK

As part of aligning the QA processes of the Project Office towards NSCC's own Quality System, being developed based on Prince2 (UK Office of Government and Commerce, 2009), SKM and subconsultants Opus had been documenting the project processes and developing flow charts and templates to add a project-specific level of detail to North Shore's project management processes.

The projects undertaken by the project office had been separated into:

- **Concept and Preliminary Design;** where choices of different concepts to solve wastewater network problems, such as increasing storage, augmenting existing pipelines, or diverting/transferring flows, or where choices of initial decisions in implementing a concept, such as location and route, are identified and a preferred option chosen. This phase tends to concentrate on idea generation and comparison. The challenges of this phase are to demonstrate that full consideration has been given to a number of options, so that Council has fulfilled its objectives under the Resource Management Act 1989, and that it has applied Quadruple Bottom Line assessments as part of that process, to fulfil its obligations under the Local Government Act 2002 Amendment Act 2006.
- **Detailed Design;** where the details of how an improvement project is going to be built and operated are identified and resolved with end users, often including stages of consenting, and of preparing tender documents to enable the improvement projects to be tendered and built. This phase tends to focus on risk management to achieve construction targets. The challenges of this phase are again appropriate idea generation, but this time focussed at identifying risks and their mitigation measures. Workshops are held with end users to confirm operational requirements, buildability and procurement approaches, and future connections for long term capacity management in the network.
- **Construction;** where the asset is constructed under the supervision of the Council and its agents. The focus at this stage is on a high level of scrutiny involving many routine tasks on a daily, weekly or monthly basis. However the principal challenge at this stage is the quick resolution of problems when they arise on site, so as not to affect programmes or outturn costs with time delays.

External to the wastewater network strategic improvement project are also the phases of operation and maintenance, and demolition.

For each phase, a flow chart had been developed to identify critical stages and NSCC sign offs. This includes workshops to sign off various stages. A significant challenge for a project of this size, encompassing many individual improvement projects, is to ensure a consistent approach and consistent deliverables for work delivered from the project office and elsewhere, and to ensure that lessons are learnt from previous projects and used as part of the continuing improvement process for new projects.

Charvat (2003) covers advantages and disadvantages of templates – main advantages are simplicity and ease of use – disadvantages are need for custom tailoring and risk of an ineffective format. For the wastewater network project, 9 years experience on the project reduced the risk of ineffective format. The scale of the project made custom tailoring an advantage. To ensure consistency of approaches, from questions asked at project start up through to deliverables, Project Management Templates were developed for the various project stages, which included:

- Start up meeting agenda, meeting minute's template and task statement to record project objectives, set programme and deliverable targets and budget, identify key stakeholders, plan communications and identify project risks and mitigation. The task statement was used to commence each significant project task within the overall network improvement project,
- Progress meeting agenda and minutes,
- Multi-Criteria Analysis template (incorporating NSCC's Quadruple Bottom Line requirements),
- Reporting templates for deliverables,
- Meeting plans for communications planning meetings, procurement planning and tender assessment meetings, consenting planning meetings, and close out and lessons learned meetings,
- Meeting plans for decision-making meetings with stakeholders - option identification workshops and option selection workshops, design sign off workshops,
- Risk Register templates – starting with generic project risks for each stage, as a starting point to identify project-specific risks,
- Change Management recording templates,

Site supervision templates are also used, including standard NSCC templates, safety audits, weekly and monthly reporting, meeting agendas and minutes for start up, progress and close out meetings.

## **5.2 DEVELOPING INNOVATION TOOLS FOR THE WASTEWATER NETWORK PROJECT**

The first stage of the innovation project was to discuss each project stage, to define the purpose, outcomes and challenges as detailed above, and to look for opportunities to formally bring in innovation techniques. It was agreed that we would start by trialling innovation processes in concept and preliminary design stage, based on the idea of having maximum innovation impact early on in projects.

From an engineering or project perspective; innovation can be applied anywhere solutions are need to be identified and weighed up. As engineering of infrastructure comprises defining and solving a problem, innovation tools could theoretically be applied at each problem solving stage of 'idea generation' or 'idea testing' where the preferred solution is selected. However, the process of idea generation tends to be fairly constrained by the existing understanding of the problem, the challenges of including divergent thinking in design have been recognised. (Cooperrider, 2008)

### **5.2.1 SELECTING INNOVATION TOOLS**

There are many innovation and creativity tools and techniques that can be used for the identification of problems and opportunities, the generation of ideas, the development of ideas and the evaluation and assessment of ideas.

These tools and techniques aim to provide different perspectives in order to challenge and review the project opportunities and issues throughout the development process; either by encouraging divergent thinking in order to open up and develop new ideas or convergent thinking to analyse and assess ideas for further development.

Applying these tools and techniques in a pragmatic way to a very structured environment can have its challenges as there are many barriers that make it difficult for innovation at this level to prosper. There are strong organisational barriers including: a risk averse culture, lack of resources - time and money to implement and personal barriers such as lack of willingness to change, fear of failure, and lack of motivation to pursue new ideas.

This means that in order for staff to adopt an innovation approach; it is essential to develop a set of tools and resources that integrates with the existing project development process and that is easily adapted and applied in a team situation, without taking up valuable resources, time and money.

Using the SKM Opus process flow charts, we established that the decision-making meetings ie start-up, option generation and option identification meetings were the most suitable parts of the project to bring in formal innovation processes, because these meetings are focussed on exploring ideas with key stakeholders, to ensure ultimate agreement to the process used and the option chosen.

In order to increase the likelihood of adoption of the adapted project guidelines by the wastewater networks projects team Ideas Accelerator chose two innovation tools; one that assists in the generation of ideas – divergent thinking and one that assists with the assessment or analysis of ideas – convergent thinking.

**Scamper** Is used as a check list of questions to spur ideas and help solve problems. It helps to open our minds to new possibilities by assisting us to think of changes that could be made to an idea and thus helps us to generate new ideas. Developed by Bob Eberle, the changes SCAMPER stands for are;

- **S - Substitute** - components, materials, people, what else? What other methods? What other materials? What other ingredients? Other perspectives, tone of voice? Who else?
- **C - Combine** - mix, combine or integrate, what ideas can be combined? What combinations of service / methods can we use? What technologies can we use and adapt?
- **A - Adapt** - alter, change function, what else is like this? What could we copy? What other processes could be adopted? What other projects and other approaches have been used?
- **M – Modify / Magnify** - increase or reduce in scale, change shape, what can be made larger / extended? What can be added, stronger, higher, longer, more volume, more pressure?
- **P - Put to another use** - what else could be made from this? Other markets, other extensions, new ways to use it? How can we use this in other projects?
- **E - Eliminate / Escape** - remove elements, simplify, reduce to core functionality, what can you condense, leave out, and reduce? Make more cost effective, time effective.
- **R - Reverse / Rearrange** - turn inside out, can we change the sequence or order of implementation? Other sequences? Change of pace and time? Change of schedule?

This method is used to challenge ideas, and gather more information for future research and subsequent implementation. (Mindtools, 2009)

**De Bono's Six Thinking Hats;** Six Thinking Hats is used to develop and assess ideas and opportunities; by using parallel thinking to help us to analyse ideas from six different perspectives. Parallel thinking is when our thinking focus is split into specific directions, thus avoiding potential adversarial situations (when different 'perspectives' are being applied to one idea at one time). The method is attributed to Dr. Edward de Bono and is the subject of his book, *Six Thinking Hats* (de Bono, 1999).

The premise of the method is that the human brain thinks in six distinct ways. Each of these ways is represented by a coloured hat, that indicates the thinking style that you should adopt when thinking from that mode;

- **White Hat;** what information, fact and figures are available? What analytical fact and figures, data, tests do we need to carry out?

- **Black Hat;** Caution, judgment or devils advocate, used to identify flaws or barriers. Who will oppose the idea? What are the risks associated with the idea?
- **Red Hat;** Emotions, feelings and instinctive gut reaction. How does everyone feel about the idea? What is your gut feel or intuition?
- **Yellow Hat;** Benefits, the optimist, seeking harmony. Who will support the idea? What benefits does it have for you and your customers?
- **Green Hat;** Creativity, ideas and statements of provocation and investigation. How could we do it in a different way? How could the plan be improved to increase its success?
- **Blue Hat;** Strategy, blue sky thinking and next steps. What are the next planning steps? How do we make this happen? Who is doing what? Are we solving the problem?

Using De Bono's six thinking hats in a structured way improves a team's ability to think from a range of perspectives in order to develop many and varied solutions, by role playing each hat in turn.

Both of these tools allowed for adaptation whilst still ensuring that a range of different perspectives had been applied to the idea, either to generate more ideas or to challenge and test existing ideas prior to development.

## 5.2.2 ADAPTING THE INNOVATION TOOLS FOR IDEA GENERATION

It was agreed that the existing templated system would be used, with the intention of making the innovation process so easy to use that it would be easier to use it than not use it. For idea generation, SKM and Ideas Accelerator brainstormed the overall ideas of SCAMPER – substitute, combine, adapt, which was merged with modify/magnify, put to other uses, eliminate/escape and reverse/rearrange, and what they actually meant in engineering terms. Terminology was kept as broad as possible, with a view to being able to adopt the ideas across Council projects if the trial was successful, e.g flows could be taken to mean fluid flows, or traffic flows. As SKM's Project Manager is also the Sustainability Practitioner for NZ, sustainability questions were incorporated where appropriate to add value to solutions.

The following questions were developed for each criterion:

**Substitute:** This criterion was used to explore available technologies and materials, and also whether we could move flows into other areas where they may not create the same scale of problem.

- What other methods could we consider to construct a solution?
- What materials would we use, and what is their lifespan?
- What technologies could we use to solve the problem?
- What resources are we relying on, and are there others?
- What control systems are available?
- Where can we source materials and resources from?
- Where else could the flow be sent to?

**Combine:** This criterion was aimed at encouraging consideration of combined solutions, and also thereby encouraging less 'ownership' of individual solutions.

- What technologies could we combine or adapt to solve the problem?



- What combinations of methods could we use?
- What ideas could be combined?

**Adapt/Modify/Magnify:** This criterion includes height/depth modifications, which could potentially avoid clashes with other council assets, whether there is benefit in making the asset larger (eg storage or future-proofing), how flexible the asset could be to future change, and also whether the options could have staged implementation to reduce initial capital expenditure.

- What could be made larger or extended?
- Could the option be raised or lowered, and what would the impact be?
- Could anything else be added (including increasing time to construct)?
- How do we make the option more flexible to cope with future changes in demand?
- What happens if there is an increase in volume, pressure?

**Put to Other Uses** – for NSCC this criterion was used to explore the interface of the proposed asset with the community and other council departments, and to consider opportunities for multi-functional projects or combined works which minimise overall disruption to a community.

- How can the solution benefit the community?
- Is there scope for combining use of any buildings or structures?
- What else does the community want/need in this catchment?
- Who else is planning projects in this catchment?
- How can we use what we learn from this in other projects?
- Are there new ways to use the proposed asset?
- How can we engage with the community about this solution?

**Eliminate/Escape:** This criterion focussed on how we could make the solution most effective, and how we could seek to influence or reduce potential risk areas for council such as safety, odour, overflows, where Council has targets to achieve in terms of reduction.

- Can we make it safer to build, operate and maintain (and demolish)?
- Could we reduce the load in the system?
- Could we change the timing/spread of the peaks?
- Can we cope with low flows?
- Can we reduce corrosion and odour?
- How do we reduce the impact of overflows (even overflows above the design standard)?

- How can we make this less disruptive to the community?
- How can we reduce cost?
- How can we reduce environmental and cultural impacts?

**Reverse/Rearrange:** This criterion aimed at encouraging consideration of what flows came into the system, whether changing these could reduce problems, and the priority of each part of the solution.

- Can we change the sequence of flow?
- Can we change the order of implementation of the work?
- Can we change the pace or timing of implementation?

The questions were refined into a single sheet for use during idea generation and to become part of the project guide and toolkit. The Project Guidelines were designed so all resources; process flow maps, planning guides and meeting and workshop templates, were available for use in one place. The Generate Concepts Guide (based on the Scamper concept) was integrated into each process phase and was listed for use as part of the meeting and workshop template process.

*Use this set of questions when developing design options to generate ideas and concepts*

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What materials can we use?  
 What can be made more flexible?  
 What life span / sustainability do the materials and or technology have?  
 What are the impacts of climate change?  
 What technologies can we use or adapt?  
 What resources / technologies are we relying on?

Can we increase the time?  
 Can we increase the volume?  
 Can we reduce the load?  
 Can we change the sequence / order of the flow?  
 Can we change the timing of the peaks?  
 Can we cope with low flows?  
 Where else could we send the flow?  
 Can we reduce corrosion / odour?

What other methods can we use? eg gravity, pumped, stored  
 What combinations of methods can we use?  
 Can we change the sequence / order of implementation?  
 What ideas / options can be combined?  
 Can we create other extensions?  
 What can we condense, leave out, reduce?  
 What can we make; lower, higher, shorter, larger, more cost effective, more time effective?

Can we change the pace or time?  
 Can we change the schedule?  
 How else can it benefit the community?  
 What else does the community want / need in this catchment?  
 Can this resource have a combined use? eg building design  
 Can we make it less disruptive to the community, culture, Society?  
 How can we use this in other projects? eg Lessons Learned

Figure 1 Innovation Tool to Generate Concept Design Ideas

### 5.2.3 ADAPTING THE INNOVATION TOOLS FOR OPTION EVALUATION

For option analysis, SKM Opus and Ideas Accelerator reviewed the criteria required by NSCC’s Quadruple Bottom Line analysis, and the criteria used in SKM’s multi-criteria analysis, as well as the option agreement workshop agenda and meeting objectives. We determined that for preliminary and concept design, the meeting had 6 stages, which could be developed into a series of questions based on the six hats principles. These stages are;

- Weighing up each option in terms of the multi- criteria analysis, ie summing the relevant facts for each option (White hat). The options would be scored.
- Considering whether the option meets NSCC objectives, and whether it has any additional benefits or reasons for supporting it, outside the multi-criteria analysis and the objectives (yellow hat).
- Considering the risks associated with the option, including reasons for the option not garnering council or community support (black hat).

At this stage, the meeting leader would adjust the scores, to identify the preferred option and any close runners up to be considered further. The attendees would then brainstorm to check the outcome, as follows:

- Reviewing whether the option could be improved, and how it could be improved (green hat)
- Checking that everyone is happy, and in agreement (red hat)

The final stage, to close the meeting, is to agree on what happens next

The Evaluate Options Guide was developed as above based on using De Bono’s Six Thinking Hat method to challenge thinking from six perspectives, but without incorporating role play. The Evaluate Options Guide was integrated into each process phase and was listed for use as part of the meeting and workshop template process.

<i>Use this set of questions when evaluating and assessing design options to challenge assumptions</i>		200912
What additional information do we need? What questions need to be answered? What is missing; more information, data, checking assumptions? What tests do we need to carry out? What budgets are available in OPEX and CAPEX? What resource consents do we need? What landowner consents do we need? How easy is it to build? Can we operate and maintain it safely?	What is valuable about the option? Where is the value? Who will support the option? eg roads, parks, storm water, community What benefits does it have for NSCC? What benefits does it have for the community? Does it meet NSCC's objectives?	2
What is the downside if each option? Who will oppose the idea / option? What are the risks associated with each option?	How can we improve the option or do it in a different way? How can we combine options; make it easier, more cost effective, less disruptive? How can we increase the success of the project? What else is possible?	3

Figure 2: *Innovation Tool to Evaluate Options*

## **6 TRIALLING AND EMBEDDING THE INNOVATION PROCESS**

### **6.1 TRIALLING THE GENERATE CONCEPTS TOOL**

A key lesson in identifying innovation tools was that we were missing the opportunity to bring stakeholders into the project at ideas generation stage. A consequence of that was that potentially, stakeholders would be dissatisfied at a later stage with the range of options considered, which could impact on selecting a preferred option, or even on likelihood of attaining Landowner or RMA consent for the option implementation.

SKM and subconsultants Opus had just commenced a task to undertake concept design for a new pumping station to service a major growth area in the North of North Shore City. Preliminary assessments in the early 1990s had identified a potential site within a recreational reserve, and some geotechnical investigation had been undertaken, but no agreements had been reached with NSCC Parks as landowner. In addition, the area was developing significantly, and NSCC roading were planning several transport initiatives in the area, including developing a 'park and ride' facility.

NSCC Water and SKM Opus agreed that we would modify our option generation meeting to include potential in-Council stakeholders from Roading and Parks, as well as NSCC's Water stakeholders from Wastewater Planning, Projects and Operations, and Stormwater Planning.

To cater for a varying extent of familiarity with the area, we agreed that the option generation meeting should be held on site. This would enable everyone to see elements such as local topography, extent of tree cover and other potential constraints to options.

The project team held a planning meeting to establish the goals for the option generation meeting – these were:

- Gain buy in from all stakeholders that a range of options have been considered.
- Gain an understanding of what each stakeholder's objectives were for the area, and any particular sites identified as option sites – in particular our objective was to identify any significant opportunities or constraints that should be included in our multi-criteria analysis.
- Convey to all stakeholders an appreciation of engineering objectives and constraints in identifying and appraising suitable sites for a pump station.
- Communicating the option appraisal process, and the ongoing involvement of stakeholders in working towards a preferred solution.

We agreed that the site meeting should comprise an initial briefing stage, to establish the problem to be solved and summarise the work done to date on identifying a solution, and to encourage the others to talk about their plans for the area. This would be followed by a tour of potential sites identified by the project team, and any other sites identified by the team and the stakeholders whilst on site. The meeting would then re-convene to consider the idea generation concepts in the Innovation Toolkit. Briefing documents were prepared, comprising aerial photographs of the area, with existing wastewater network and potential sites identified so far overlaid, and an explanation of the option generation and option appraisal process.

Prior to the meeting, four areas had been identified as potential sites, some with two potential locations within a site. The group identified nine specific sites in total, and discussed the advantages and disadvantages of each site and specific issues as they went along.

Use of the SCAMPER-based idea generation questions on site generated ideas such as combining a toilet block into the pumping station if it was located on the reserve, and there was much discussion about community uses or benefits, and opportunities for different council departments to work together. However, the ELIMINATE aspect helped the project team to review whether a pump station was required, or whether capacity issues could be resolved by bypassing some of the flow to further downstream with a new gravity sewer. This bypass option has been added to the option list.

Lessons learned from undertaking the new option generation process and using the new innovation tool are as follows, based on feedback from the team and the stakeholders:

- Involving stakeholders earlier in the project brings in a need to develop briefing materials, and to spend more time explaining the project at an early stage, and in non-technical language.
- Site visits are very useful to communicate constraints, and to identify options which may not be obvious on paper.
- Stakeholders with different drivers will see different sites as suitable – if we bring them in at option generation stage and examine them, even if they are later proved un-viable we do not slow down the process by having to examine them or justify their exclusion later.
- The site visit identified a number of projects flagged for the same Reserve site – doing this at project scoping stage enables synergies to be explored and ensures that all parties are aware of each others plans.
- The use of the ideas list was a little stilted, because it was new to all participants. With familiarity, the meeting leader could probably make sure the questions flowed better and that all were appropriate for the problem being addressed.
- The process achieved all the goals identified above.
- Stakeholders commented favourably on the whole option appraisal process.

The ideas generation questions were also modified by SKM Opus for use in facilitating city-wide issues workshops as part of NSCC's recent update of the Wastewater Network Strategic Improvement Project. The Project Team has adopted both tools for use in ongoing projects, and the Option Evaluation tool is likely to be utilised in the near future.

## 6.2 EMBEDDING INNOVATION TOOLS

To ensure smooth uptake of both the Generate Concepts Guide and the Evaluate Options Guide across NSCC Water, Ideas Accelerator has developed a comprehensive innovation and communications program to help train users on the concepts and methods behind the tools and facilitation techniques that will help them to put them into practice within their teams. Training was broken into four main modules;

**Module One: Innovation and Communication:** A lot of everyday 'innovation' is based on finding better ways of working together, communicating effectively and getting things done.

**Module Two: Identifying Problems and Issues:** Focusing your staff on specific problems and issues can increase the number and variety of ideas and opportunities and the success of the resulting solution.

**Module Three: Generate Ideas and Opportunities:** It is important to focus is on producing as many ideas as possible to solve the problem, rather than limiting team thinking.

**Module Four: Analyse and Assess Opportunities:** Analyzing and assessing ideas and opportunities is best achieved via a cross functional team as it provides different perspectives throughout the assessment process.

## 7 SUMMARY

It is believed that Council has made the first steps to progress from ‘Continuous Improvement’ to ‘Continuous Innovation’. This is in the belief that organisations nowadays cannot afford not to innovate, and if you are not moving ahead, then you are getting behind. Some of the key drivers for innovation in the area of local government that are relevant for North Shore City Council are as follows:

- New demands and expectations from customers (cost reduction, improved efficiency and environmental standards)
- Changes in the legislation/regulatory framework (impending change to new Auckland Council)
- Ongoing technical developments (Information technology, engineering / construction developments)

It is believed that there are significant improvements to be made in these and other areas by tapping into unused human potential as well as provide greater staff satisfaction in order to increase rates of retention.

It is expected that, with the help of its consultants and other stakeholders, the use of the many tools and processes in the area of innovation, such as those covered in this paper, Council will make significant steps towards ensuring that the community receives the best possible services , both now and in the future.

## 8 CONCLUSIONS

North Shore City Council is committed to an Innovation approach across its functions.

Subjecting the Project’s QA processes to scrutiny by explaining them to a third party has identified some improvements, and has reinforced the value of developing a process-based system aligned with NSCC’s processes.

The tools that have been developed are easy to use, and enable the project team to incorporate innovation tools into meetings easily as they have now been integrated as part of a ‘business as usual’ process.

Our experience to date has been that the tools and processes encourage buy in, and provide a good framework for encouraging divergent thinking in option identification and assessment. Innovation has already proven to deliver significant value to the council, its contractors and staff; though project cost reductions, increased efficiency and planning for better use of resources on site.

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