Road Controlling Authorities Forum

Road Controlling Authorities Forum (New Zealand) Incorporated

with assistance from

New Zealand Water and Wastes Association

presents

Managing Stormwater and Road Run-off Tools, Techniques and Devices

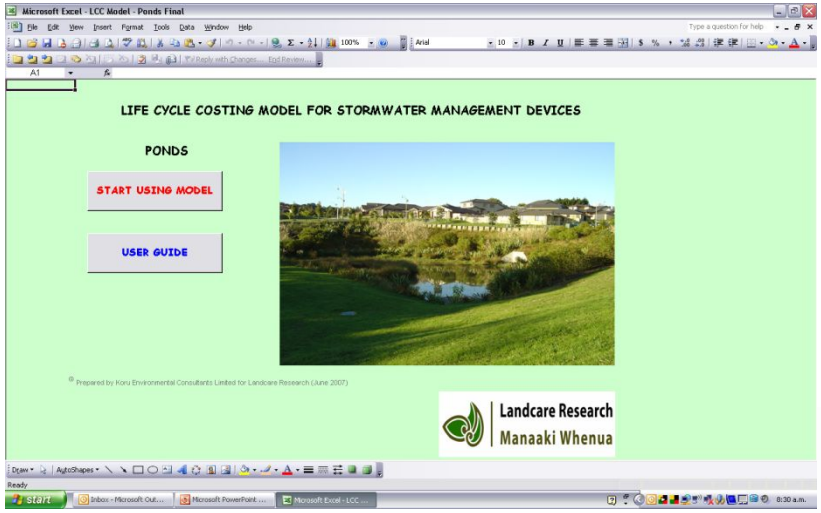
nzwwa

New Zealand Water & Wastes Association

Waiora Aotearoa

Life Cycle Costing of Stormwater Treatment Devices

Prepared by Koru Environmental Consultants Ltd for Landcare Research



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Talk Outline

- What is Life Cycle Costing?
- Benefits of Life Cycle Costing
- Previous Research
- Background to this project
- Model Development and Results
- Where to from here…….

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Costs of Stormwater Management

- Potentially high costs of stormwater management
- Cost as a selection criteria
- Legal responsibilities – RMA & LGA

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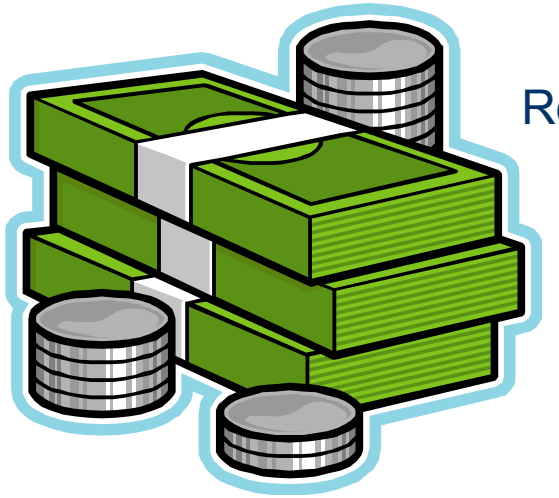
Life Cycle Costing of Stormwater Devices

Definition:

"…..the process of assessing the cost of a product over its life cycle or a portion thereof….."



Ref: Australian/New Zealand Standard 4536:1999

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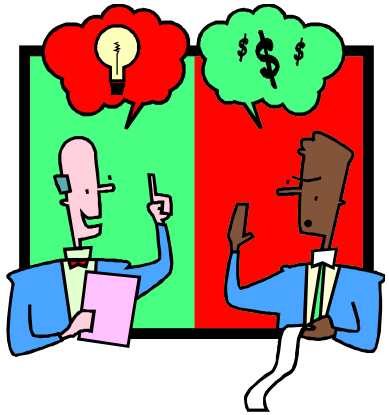
Terminology



- Unit Costing – price elements of construction or maintenance using average tender rates
- Total Acquisition Costs – design & construction related costs
- Routine and Corrective Maintenance Costs
- Decommissioning Costs

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Benefits of a LCC Approach

- Relative comparison of costs of one device against another;
- Balancing performance (benefits) against cost;
- Budgeting, reporting, auditing; and
- A consistent platform for discussion between parties.

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Challenges…….

Data is notoriously difficult to obtain due to:

- financial sensitivity;
- variability; and
- lack of data capturing systems/ protocols

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Previous Research

- Australia - Centre for Catchment Hydrology development of a costing module for MUSIC.
- US/ UK Sustainable Urban Drainage Systems programme – development of performance and unit cost models for BMPs.

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Background to this Project

- LIUDD Programme - FRST Programme to facilitate more sustainable development practices, including improved urban stormwater management
- Key Part of this Programme is to investigate the cost of constructing and maintaining stormwater management devices throughout New Zealand
- Individual NZ Model - Unit Costing Approach

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Current Project

Taking a Unit Costing Approach to LCC…..

- **Develop unit cost data collection protocols**
- **Collect unit construction and maintenance costs**
- **Develop an excel-based LCC Model**
- **Allow for future linkages between the LCC Model and stormwater treatment model being developed by NIWA**
- **Peer review and user workshops**

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Model Development

AIM – to build an easy to use, accurate life cycle costing model which would:

- **assist decision-makers in comparing the relative costs of different stormwater management devices;**
- **assist designers in quantifying and comparing costs of different devices; and**
- **complement the Contaminant Load Model (therefore allowing stakeholders to compare cost and device performance).**

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Methodology

Data collection protocols were sent to:

- all 7 Auckland TLAs
- Transit NZ
- TLAs across NZ (of which 4 were able to provide data: Tauranga City Council, Nelson City Council, Capacity (Wellington) and Christchurch City Council)
- Contractors (initially declined to participate)
- Worked with two engineering consultancies to assist with development of the construction protocol and provision of costs

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Devices

- ***Ponds***
- Wetlands
- ***Rain Gardens***
- Swales/ Filter Strips
- Sand Filters
- Infiltration Trenches
- Rain Tanks
- Proprietary Devices

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Key Costing Assumptions

- Real Costs & the Real Discount Rate
- Base Year is 2007
- Inflation Calculator is provided
- Life Span – how long the device will function before it is decommissioned
- Life Cycle Analysis Period – the time period over which you want to do the analysis.

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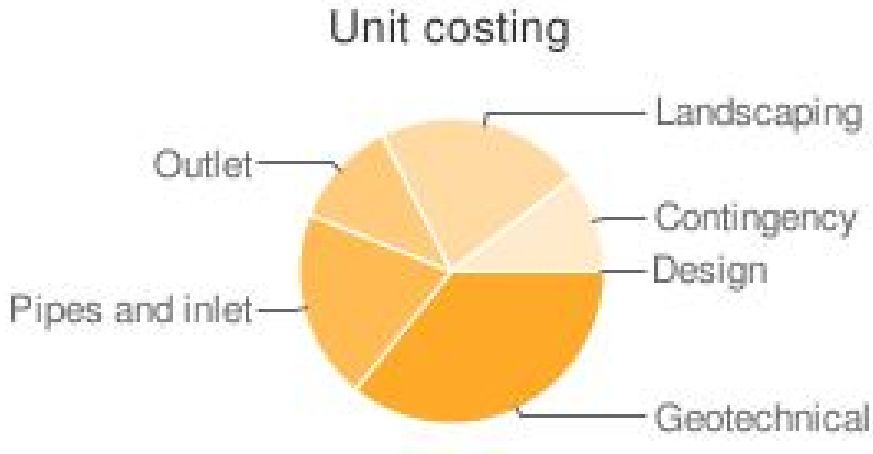
Total Acquisition Costs

- **Ponds – statistical relationship and unit costing approach available in the model. No cost options given for the unit cost approach due to high variability of components.**
- **Rain Gardens – only unit costing approach is available as an option in the model. High and low default costs are provided.**



Maintenance Costs

- Ponds – High, mean and low default costs are provided. RMC were annualised and based on frequencies given in TP10.
- Key issue for corrective maintenance costs was working out the cleanout frequencies.
- Rain Gardens – High and low default costs are provided. RMC were annualised and based on frequencies given in TP10.

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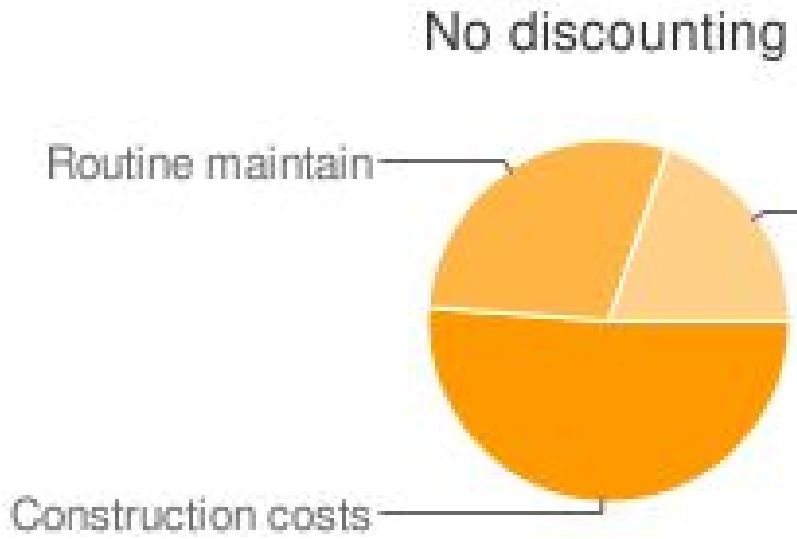

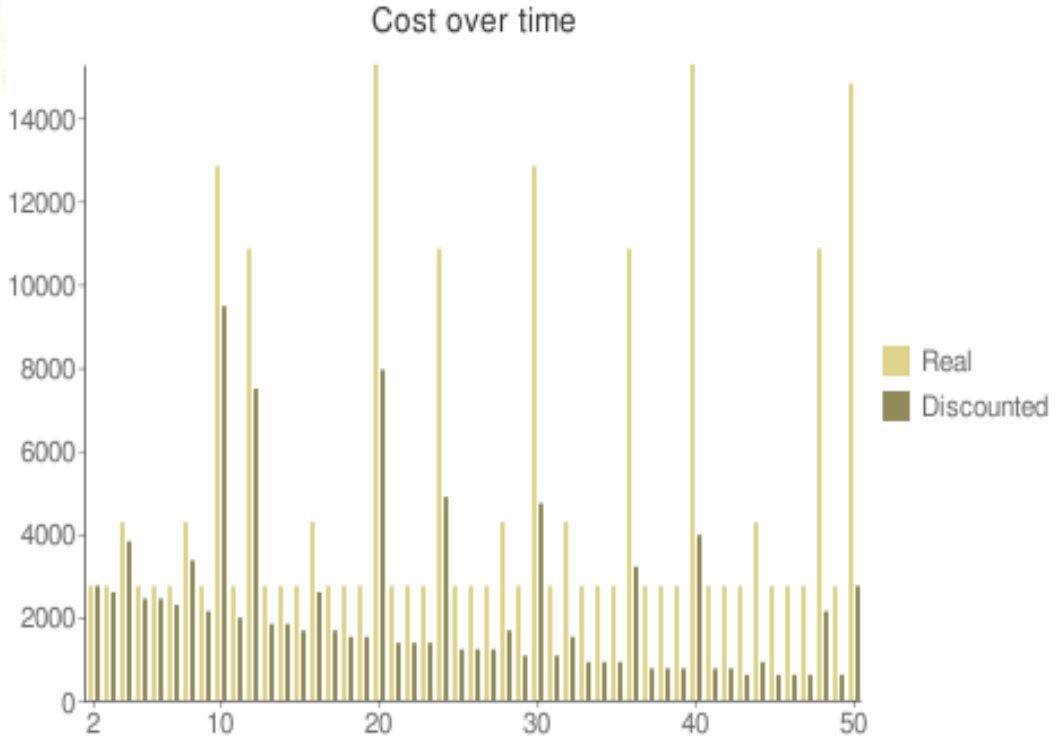

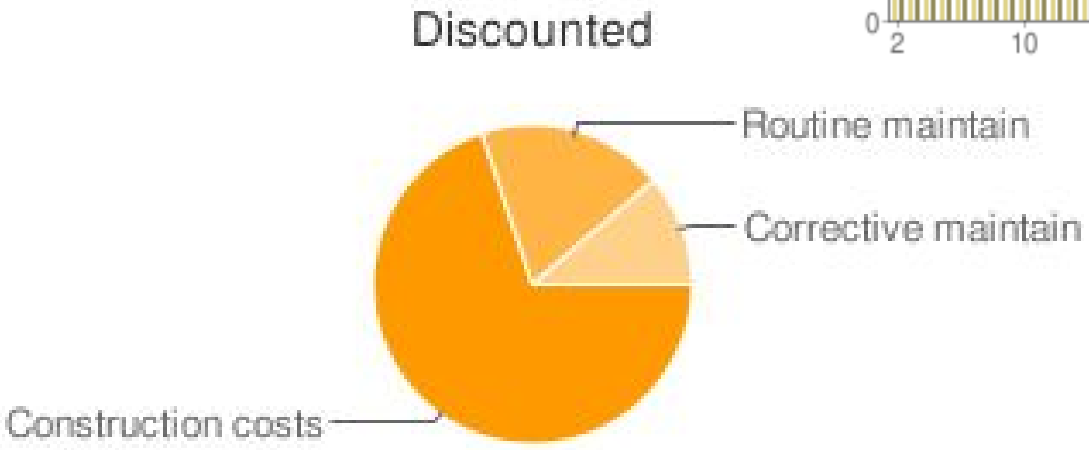

Model Outputs

Where to from here…..?

- Phase 2 – creation of data protocols, collection of data and development of model for the remaining stormwater devices
- Development of a web-based system for collection of actual cost data (to improve statistical relationships & consistency)
- Refinement of models & creation of user manuals
- Workshops & official launch (Feb ‘09)

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FURTHER INFORMATION

For further information about the models, to contribute cost data, or if you are interested in using the models, please contact:

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Speaking of maintenance...

Grafton Gully stormwater maintenance slides

Chris Thorpe

Cleaning the forebay


The inlet pipe


MACKENZIE