SCIRT Rebuilding Infrastructure

LEARNING LEGACY

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

Project Prioritisation Management Plan

Story: SCIRT Management Plans

Theme: The SCIRT Model

A plan which describes the framework, principles and process for determining project prioritisation and the sequence in which those projects are carried out.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz

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SCIRT
Rebuilding Infrastructure

Project Prioritisation Management Plan

Review:

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Authorisation:

Name	Position	Date	Signature
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ACRONYMS, ABBREVIATIONS AND DEFINITIONS

Term	Definition
AA	Alliance Agreement
AOC	Actual Outturn Cost
ADN	Alliance Defect Notice
BAU	Business as usual
CCC	Christchurch City Council
CERA	Canterbury Earthquake Recovery Authority
CHIRP	Christchurch Horizontal Infrastructure Rebuild Programme (The Works)
DMP	Design Management Plan
DTL	Delivery Team Leader
GM	Executive General Manager
EMP	Environmental Management Plan
EOC	Estimated Out-turn Cost
FAT	Factory Acceptance Test
FMP	Financial Management Plan
FOC	Forecast Out-turn Cost
FFTC	Forecast Final Target Cost
GST	Goods and Services Tax
HIRAC	Hazard Identification, Risk Analysis and Control
HIRS	Horizontal Infrastructure Recovery Strategy
HRMP	Human Resources Management Plan
IST	Integrated Services Team
IDV	Independent Design Verifier
IE	Independent Estimator
IFA	Independent Financial Auditor
IRMO	Infrastructure Rebuild Management Office
ITP	Inspection and Test Plan
IWMS	Integrated Work Method Statements
JDE	JD Edwards Accounting System
KPI	Key Performance Indicator
KRA	Key Result Area
NZTA	New Zealand Transport Agency
NOP	Non Owner Participant
OPS	Overall Performance Score
PMP	Programme Management Plan
PMS	Programme Master Schedule
QMP	Quality Management Plan
RFQ	Request for Quote
SA	Supply Agreement
SAT	Site Acceptance Test
SCIRT	Stronger Christchurch Infrastructure Rebuild Team
SCHIRP	Stronger Christchurch Horizontal Infrastructure Rebuild Plan
SWG	Specialised Working Group
TLG	Tactical Leadership Group
TMTG	Tactical Management Traffic Group
TOC	Target Out-turn Cost
USC	Utility Service Coordinator

1.0 PURPOSE

The purpose of this document is to describe the framework, principles and process of defining projects and in determining the prioritisation and the sequence in which those projects are carried out.

2.0 OBJECTIVES

Doing the right thing at the right time is one of the key value propositions of a programme management approach. In order for us to achieve this outcome, we need to understand and manage the influences on the programme whilst completing the most important projects first.

3.0 REQUIREMENTS

There are no specific requirements imposed by the AA or by legislation. SCIRT is free to determine an appropriate management system that aligns with the relevant AA objectives.

4.0 RELATIONSHIP TO OTHER MANAGEMENT PLANS

- **Asset Investigation Plan**- Asset condition information is required to determine the Asset Condition Score which is a preliminary step in the prioritisation process.
- **Risk and Opportunity Management Plan** – describes how programme and project risks and opportunities are identified, managed and quantified where necessary for prioritisation and other processes.
- **Schedule Management Plan** – details how the rebuild works are scheduled to occur within the duration of the rebuild programme, taking into account priorities, resource availability, construction interdependencies and other constraints.

5.0 PROJECT PRIORITISATION PROCESS

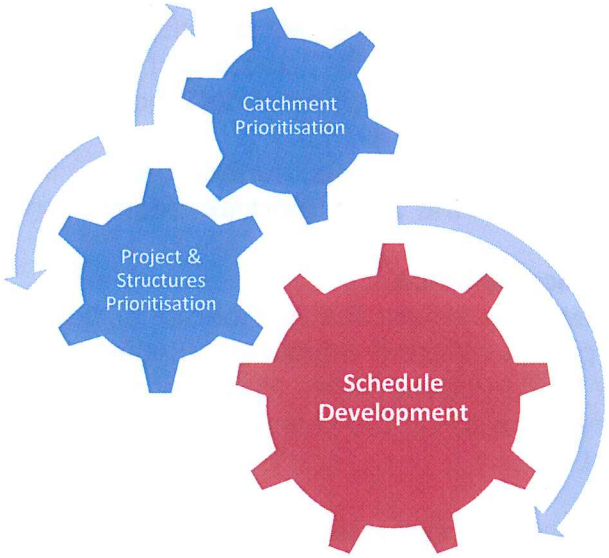
A transparent, robust and consistent methodology of prioritising projects is important for several reasons:

- To give the SCIRT management team control over the Programme.
- The nature of the programme means that different groups and individuals will have conflicting priorities, and projects will have different significance to different stakeholders. An agreed framework which can be communicated and followed gives a fair and visible validation for project prioritisation.

The Prioritisation of Projects occurs through 2 stages of development before scheduling occurs:

1. Prioritisation of hydraulic catchments for network assets (wastewater, storm water, water supply & roading) to initiate Concept Design
2. Prioritisation of projects for network assets (once Concept design is complete) and the prioritisation of structures.

The inter-relationship between the prioritisation process and the schedule development can be seen below.



The prioritisation process is undertaken by applying 4 separate criteria – Numerical calculation of operational priorities, determination of interdependencies between assets, and the consideration of both community priorities and external factors. This is outlined below:

5.1 Operational prioritisation

The first step in the prioritisation process is to use a Multi Criteria Analysis (MCA) tool based on engineering principles and field data analysis to assign assets an Operational Priority Score.

The scoring of assets is primarily done without taking into consideration any constraints, to give us a systemic or "operational requirements" based order in which the rebuild should occur.

Within the MCA tool, the specific attributes of the asset will be used to calculate a prioritisation score based on the condition, criticality, level of service and on-going maintenance costs for each individual asset. This information, held within the GIS database is collected from various sources and updated as the rebuild progresses.

The attributes used for prioritisation calculation will be reviewed by SCIRT periodically to ensure the process is optimised in terms of supporting SCIRT's objectives. Each individual parameter considered in the overall score can be seen below:

- **Asset Condition Score**
  Condition ratings have been developed to identify earthquake related damage based on the threshold levels described in the 'Infrastructure Rebuild Technical Standards and Guidelines' document (IRTSG) for each specific asset type. A score is allocated to each asset dependant on the level of damage.

  The Asset Investigation Plan further defines the collection, on-going monitoring and updating of the asset condition information.

- **Asset Criticality Score**
  These generally reflect the number of customers dependent on this asset. Each asset type has different attributes, i.e. criticality for the Road network is a function of daily traffic volume, while for water reticulation, wastewater and storm water, criticality is based on the diameter of pipe i.e. how many customers or areas are serviced.

  This information is collected through the various asset databases provided by the Clients.

- **Post-Earthquake Level of Service Score**
  Level of service affects residents in different ways dependant on the asset type. The level of service score will give a higher priority to the less functional asset to restore service to customers, or to reduce environmental risk. This includes scoring for the early operation of sewage overflows, assets which run through the Red Zone but connect Green Zoned residents, high levels of infiltration, road vibration issues, high number of earthquake Customer Service Requests made to the CCC, or weight restrictions to bridges.

  The score has been calculated using the Operational teams records of current levels of service for the relevant network assets. These records will be updated during the rebuild process as network improvements are made or assets deteriorate prior to rebuild.

- **Asset Maintenance Cost Score**
  The score for the 3 waters network is a measure of the increased maintenance costs associated with earthquake damage compared to normalised maintenance cost curves for pre earthquake (BAU) costs. The MCA score is calculated on the cost difference (higher the change, higher the score). This accounts for increased cleaning activities, over-pumping or on-going repairs to maintain service levels to the network.

Roading scores differ to this due to maintenance programmes being focused in areas with the least amount of rebuild work is required. Only pothole repairs, or resolution of drainage issues/levelling work are undertaken to hold the network until SCIRT have undertaken the underground and roading repairs. For this reason, the initial recovery costs are used to compare road sections, as an indicator of risk for high future maintenance costs (higher the initial recovery cost, the more liquefaction clearance and temporary make safe repairs undertaken, and hence pavement life significantly reduced).

This information will be provided to SCIRT from the Client organisations operational teams and uploaded onto the GIS for use within the maintenance score calculation.

5.2 Interdependencies

The second step in our process is to understand and manage interdependencies between assets. Once assets have an Operational Priority Score, interdependencies will be identified and applied.

There are two main types of interdependencies:

- Network assets such as wastewater and storm water pipes can only be designed by considering the damage to the hydraulic catchment area. Due to the widespread ground settlement, individual lengths of pipe cannot be replaced in isolation. This is because gradients have changed and in some cases no longer meet hydraulic capacity, or self-cleansing velocity requirements. Therefore all wastewater and storm water assets must be designed within independent hydraulic catchment areas. Because of this, the first process for prioritisation is to group all interdependent assets together to calculate a cumulative prioritisation score for a Catchment area, with the score applied per urban hectare.

- Proximity dependencies – At a project level, priority assets are grouped with other assets in geographical proximity to achieve a target project size of $10M, or to achieve a one pass approach. SCIRT's GIS capability will be used extensively to ensure these types of dependencies are well understood and defined.

5.3 Output from the MCA and Interdependencies

Catchments can now be compared through their priority score and ranked for release into Concept Design. A Ranking Map is produced to allow the Design and Delivery teams to assess priorities and produce a high level initial schedule for the 5 year rebuild programme (See the Schedule Management Plan).

On the completion of the Catchment Studies, the catchment is then broken up based on the Proximity dependencies for the targeted one pass, $10M project size targets. These are then also given a secondary cumulative priority score for use by the Scheduling team for determining the order of rebuild within the catchment area.

Individual structures including Bridges, Reservoirs, Pump Stations (where repaired in isolation of network requirements) and Retaining Walls can be prioritised as individual stand-alone projects using their own MCA tools. Once again, to meet the Proximity dependencies, structures may be grouped together with other structures or network assets to provide value or SCIRT targets.

5.4 MESHT Priorities

Other factors can significantly influence the order of the rebuild programme for Concept Design, or later for Detailed Design and the Construction Delivery process.

Some categories of building/institutions require a higher priority and these will be taken into account based on advice from the Client Organisations. Proximity to the following may increase the priority ranking of nearby projects to ensure services are maintained to these important facilities or transportation requirements:

- Medical & Emergency
- Schools
- Hospitals
- Transport - key public transport links and strategic routes

Generally, these will only be applied at a project level and have little influence on the catchment priority. However, in some cases, the Client organisations may wish to reprioritise catchments, and hence projects due to these facilities to support wider city recovery plans. SCIRT will be provided specific MESHT priorities by the Client organisations as and when required to meet community needs.

5.5 External Factors (Geographic and Temporal)

Client organisations may have geographical, time or schedule related goals and targets that may affect prioritisation generally, or to support specific requirements of the wider recovery process. These factors are external to the SCIRT Programme. SCIRT will engage with Clients and other organisations to understand external influences, which may include:

- Social, economic or environmental priorities
- Strategic plan requirements such as the Christchurch Transport Plan
- Government legislation or political influence
- Central City Blueprints and Anchor Project delivery
- Other works programmes

These may impact on the order of both catchments and project areas. It is important that decisions influenced by external factors are documented and transparent. The process will also demonstrate the effects these influences have on the overall project ranking in the programme.

5.6 Output from MESHT and External Factors

Applying these factors will provide the second and final cut of priorities for scheduling.

The final weightings, parameters and how external factors are applied will be finalised and agreed with the Client organisations prior to priorities being passed to the Scheduling Team.

Where a MESHT or External Factor has revised the priority order, a sensitivity analysis to consider effects on the programme along with the operational risk may be undertaken.

It is envisaged that all external factors will be stipulated or agreed with the Client organisations before being applied to the priority order. This will be recorded on Client External Factor Forms for formal inclusion into the prioritisation process.

6.0 SCHEDULE DEVELOPMENT

See the Schedule Management Plan

7.0 PRIORITISATION GOVERNANCE

By nature of the programme, new information and data will become available on a regular basis, however, in order to ensure the efficient management of the design pipeline, assets and projects cannot be constantly reprioritised.

The Prioritisation process will be run at three monthly intervals. This means we reprioritise the programme a regular basis to demonstrate value for money and ensure that we are doing the "right things at the right time".

Prioritisation criteria and their individual weightings used in the MCA tool will be re-evaluated as more information becomes available or should circumstances change.

8.0 PRIORITISATION / SCHEDULE RELATIONSHIP

9.0 PRINCIPLES

Priorities established by the Prioritisation Process will form the basis for the order of works upon which the Programme Schedule is developed.

For network assets, the highest priority catchments will be given precedence in the schedule and allocation of resources will be undertaken accordingly to the priority order of the projects within the catchment area.

Structures will be scheduled based on their own stand-alone priority order for allocation of resource.

Priorities will be reviewed at regular intervals and the Schedule will be adjusted accordingly if appropriate.

10.0 PERFORMANCE MONITORING AND EVALUATION

10.1 MONITORING

Stakeholders are expected to frequently scrutinise and challenge the priorities assigned by SCIRT when this information is regularly provided to them. These challenges will influence development of the MCA and hence the quarterly reruns where appropriate. However the implications of a change in emphasis or the introduction of new or different criteria will be applied globally to preserve the integrity of the process. This will provide some measure of control against individual projects being promoted for reasons that are not well-aligned with overall SCIRT objectives.

10.2 EVALUATION

The results obtained from monitoring and measuring will be evaluated to

- Correct poor performance
- Identify the reasons for poor performance
- Address the potential likelihood of future poor performance
- Understand programme ramifications from delays of accelerated progress

From the monitoring activities, conformity with the processes and procedure in the management plan set will be evaluated. Non-conformances will be identified and addressed utilising the systems defined in the Quality Management Plan.

The results of monitoring will be evaluated against the programme objectives and targets in identify opportunities for improvement, again, addressing utilising the systems defined in the Quality Management Plan.

These evaluation processes will operate independently of any internal or external audit/review function, and are a core management responsibility.

The topics of non-conformance and opportunities for improvement will be agenda items in regular management meetings and significant issues discussed in reports (see reporting section)

Embedded in the prioritisation process is a final step "Sense Check" which guards against results that are obviously out-of-step with SCIRT objectives. In this sense evaluation will take place with every quarterly prioritisation rerun.

As described in monitoring the periodic review of Multi-Criteria Analysis (MCA) criteria and weighting will be based on an evaluation of the effectiveness of recent prioritisation outcomes.

11.0 MANAGEMENT PLAN CONTROL

11.1 AUTHORISATION

Initial authorisation is in accordance with the AA, Section 6.1.1. All plans are also authorised by the GM and will be submitted to the Board for approval in the first Board meeting following the execution of the AA.

Subsequent revisions to plans will be authorised by the GM unless the GM deems the revision requires endorsement by the Board.

11.2 DISTRIBUTION

The Plan is a controlled document and shall be distributed and revised in accordance with the SCIRT Quality Management Plan. Hardcopies are Un-Controlled copies. The Controlled copies are maintained in "Project Centre" which is a secure website which supports various project management functions for the Programme including "configuration management" i.e. version control of documents.

11.3 AUDITING

Systematic internal audits will be undertaken to monitor the Plan for suitability, relevance and effectiveness. The auditor will be a person who is independent of the activity being audited.

Various audits are undertaken, including but not limited to:

- Internal Audits (System)

Refer to Quality Management Plan.

12.0 MANAGEMENT PLAN REVIEW AND REVISION

This management plan is a dynamic document that is current at the time of issue. The process for monitoring and review of the Plan or its implementation and operation are detailed within the SCIRT Quality Plan.

Revisions to any management plan will always involve the Quality Manager who will take responsibility for ensuring the management plan set remains co-ordinated when revisions occur.

The document may be revised and updated in response to areas identified for improvement, such as;

- Changes in the Requirements and Minimum Standards defined in Schedule 5 of the AA
- Substantial changes in design or scope, construction sequence, staging, methodology, process or resource

- Requests by any Statutory Authority
- Internal and external audits
- Suggestions and comments from personnel
- Preventative action following a non-conformance
- Necessity for corrective action
- Senior management review
-

13.0 RECORDS AND REPORTING

13.1 PROJECT INFORMATION, DATA & RECORDS MANAGEMENT

Conventional records of this process will not be produced in this programme. Rather as the process is dynamic, the current outputs of the prioritisation processes will be evident in GIS and the resultant Scoping Documents as follows:

- Asset Condition Data from the Asset Assessment Team (GIS)
- Criticality Data from Client Asset Databases (GIS)
- Serviceability Data from Asset Owners Operational Teams (GIS)
- Maintenance Cost Data from Asset Owners Operational Teams (Project Centre)
- Hydraulic Catchment Boundaries (GIS from Hydraulic Models)
- MCA score Pairwise Process (GIS)
- MESHT Information from Client Organisations
- Client External Factor Forms (to be agreed on release of externality data)

Layers are continually updated or changed as more information becomes available.

For management, storage and archiving of project data please refer to Administration Plan. For IT Systems, including support, security, licenses and usage, please refer to Administration Plan.

13.2 REPORTING

13.2.1 Monthly report to ALT

During the rebuild programme, SCIRT is committed to providing a monthly prioritisation progress report via the Asset Owner Interface Group.

Significant Non-conformance with this plan will be included in the Monthly report to the Board.

14.0 ROLES AND RESPONSIBILITIES

Project Prioritisation Management Plan	Responsibility										
Role	Alliance Manager	Human Resources Manager	Community Stakeholder Manager	SQE Manager	Delivery Managers	Project Definition Manager	Professional Services Manager	CCC Interface Manager	Value for Money Manager	Commercial Manager	Business Systems Manager
Plan Issue/Revision authorisation	Own										
Prioritisation Process						Own					
Monthly Report Content						Own					
Monitoring/Review											Own

Stronger Christchurch
Infrastructure Rebuild Team

Multi Criteria Analysis Asset Prioritisation Tool - Networks

Revision: 1.0

Date: 30/11/2012

Contents

Revision History

Revision	Date	Name	Brief Description of Change
1.0	31/05/2012	Keith Hastings	Version 1

1. Introduction

This document outlines the general processes involved in the Multi Criteria Analysis Asset Prioritisation tool.

It also talks about assumptions made, potential gaps, and is dynamic in the sense that there will be new sections added to incorporate updates to the tool as new data, or revisions based on validation come to hand.

2. Software

The tool has been developed completely within the Feature Manipulation Engine (FME) software provided by Safe Software.

This software provides a flow model environment where spatial and database functions and processes can be chained together to form a continuous chain process. This process can be constrained or modified by using user specified parameters at the start of any process 'run'.

3. Model Philosophy

The SCIRT GIS team maintains a large set of Spatial (and some non-spatial) databases as part of its core business. In most cases these databases are updated on a weekly basis, and form the basis of the web mapping layers as they are always the most current data that SCIRT has.

These databases form all the inputs to the MCA tool. Every time the tool is run it always reads the data from these databases, so is always based on the latest information SCIRT has access to.

In general terms, the tool then takes all of this input data, and manipulates it by joining, analysing and applying factors to it to create the final MCA priority database.

The final prioritisation score is based on 4 factors: condition, criticality, level of service and maintenance costs. These individual factors are collected for each individual asset, stored, and then added together at the end of the process to produce a total prioritisation score. These total scores are then sorted and ranked.

The model has been designed so that the user can select to use either a Linear or Fibonacci sequence for the scoring range.

The user can also apply different weightings to each of the separate factors.

By default all weightings are set to 100%, and the scoring range uses the Fibonacci sequence.

3.1. Initial Scope of Model

The model was built initially to analyse only 3 of the asset types, Roads, Wastewater & Water Supply. It was decided that, at least in the initial versions of the tool, Stormwater would not be included, as it had very little collected data that could be used to assess priority, and was also deemed to not be a large driver of future project prioritisation.

The Model is flexible enough so that Stormwater can be added at any time.

At the time of the initial build of the model, and the initial results for the catchment priority blueprints released in February 2012, data for level of service and maintenance costs was not

available. The model therefore only uses condition and criticality to assess priority for this initial blueprint release.

4. Model Details

For an explanation of the detailed mappings between the factors and their resultant scores please refer to Appendix A MCA Weighting Matrix.

Below is a very brief explanation of how each of the individual factors are calculated.

4.1. Wastewater

4.1.1. Condition

Condition data for Wastewater is partly sourced from Infonet data feeds, updated weekly. Only some assets have Infonet assessed information, i.e. those that have been through the CCTV review process. The remaining assets have a 'derived' condition that incorporates age, material and ground liquefaction. This derivation is calculated within the FME model.

A Design Life score is also calculated based on remaining asset life.

The final Condition score is taken as the greater of the Infonet and Design Life scores.

4.1.2. Criticality

Criticality data for Wastewater is sourced directly from the assets pipe diameter.

4.1.3. Level Of Service

Level of Service data for Wastewater is sourced from the assessed pipe fragility. This assessment was first created as a map by the condition assessment team.

4.1.4. Maintenance Costs

Maintenance Costs for Wastewater is sourced from a January 2012 BECA report that gives a maintenance cost for each asset type broken down to a catchment level. For the purposes of this model these costs have been applied to each asset within the catchment evenly.

4.2. Water Supply

4.2.1. Condition

Condition data for Water Supply is sourced from CityCare's CAMMS database. This is updated weekly and contains all repair jobs undertaken to date. In the model the individual repair jobs are assigned to the particular pipe assets and summarised to form an asset total repair count.

4.2.2. Criticality

Criticality data for Water Supply is sourced directly from the assets pipe diameter.

4.2.3. Level Of Service

Level of Service for Water Supply has been universally assigned as low.

4.2.4. Maintenance Costs

Maintenance Costs for Water Supply is sourced from a January 2012 BECA report that gives a maintenance cost for each asset type broken down to a catchment level. For the purposes of this model these costs have been applied to each asset within the catchment evenly.

4.3. Roads

4.3.1. Condition

Condition data for Roads is sourced from RAMMS. Christchurch City Council have recorded road damage throughout the city, and have interpolated a road damage score for each road section between 1 and 5. NZTA roads have been separately assessed to the same rating system by the Condition Assessment team.

4.3.2. Criticality

Criticality data for Roads is sourced from the daily vehicle traffic estimates recorded in RAMMS.

4.3.3. Level Of Service

Level of Service data for Roads is sourced from the rebuild priority of the Strategic Roads as identified by the Christchurch Strategic Roads group.

4.3.4. Maintenance Costs

Maintenance Costs for Wastewater is sourced from a January 2012 BECA report that gives a maintenance cost for each asset type broken down to a catchment level. For the purposes of this model these costs have been applied to each asset within the catchment evenly.

5. Future Notes & Development

There have been several areas identified where improvements may be made to the model. These are:

5.1. Derived Wastewater Condition

Currently those assets that have not undergone a CCTV review receive a derived condition score that uses a sensible, but fairly simplistic model.

The Wastewater Condition Assessment team have already developed a far more complex model for assessing derived condition for non-reviewed assets. An obvious next step for the asset prioritisation model is to incorporate either the data from this wastewater condition model or the model itself.

5.2. Improved Maintenance Cost Data

Initially the maintenance costs have been applied at a catchment level only. This means that all assets within the same catchment receive the same cost score. To give some perspective there are only 11 catchments in the Christchurch area.

Further refinement of this data will improve the accuracy of the results. It is likely that at some stage a sub catchment breakdown will become available to further refine the results. For the

purposes of this model the ideal scenario is to have an asset specific breakdown of costs, however this seems very unlikely.

5.3. Model Validation and Calibration using Weightings

Currently no detailed validation of the model has been carried out at an asset level. The only validation has been undertaken at a summarised catchment level, where model results have been compared to real world experience and build expectations of the catchments. This has so far proved to coincide quiet well, but a more detailed validation should be undertaken to assess how the real world situation compares to the model results at the individual asset level.

This validation will also lead to an informed discussion of applying weightings to the individual factors.

Currently all factors are weighted evenly.

6. Tool Versions & Updates

6.1. Initial Build - 17/02/2012

Built for the 18 month Rebuild Programme released on 17/02/2012

This version only incorporates Condition and Criticality data, as other data was not available.

This model has been run assigning the Scores using the Fibonacci sequence.

No weightings have been applied between the different asset factors.

6.2. Version 2 - 29/05/2012

Built for the Second Release Rebuild Programme released on 29/05/2012

Both Level of Service and Maintenance Cost factors were incorporated into this version.

This model has been run assigning the Scores using the Fibonacci sequence.

No weightings have been applied between the different asset factors.

6.3. Version 3 - 30/11/2012

Built for the third release Rebuild Programme released on 30/11/2012.

This version includes updated data for Condition, Level of Service and Maintenance Cost.

The simple model used for condition where no CCTV undertaken was replaced by the SCIRT P.Dat model for predicting damage. A description of this tool can be obtained from the Asset Assessment team.

Level of Service for Wastewater now includes data about pipes that cross through red zone areas and infiltration rates on a sub catchment basis. This replaces the previous data from plans on WW fragility.

Level of Service for Roads now includes road complaints from the CSR database, State Highway condition and data derived from the marked up Operations plans. This replaces the previous data based on SH condition and Strategic Road priority.

Maintenance costs for both Wastewater and Water Supply have been updated to an improved sub catchment level. These costs are based on the 6 months from Sep 2011 – Feb 2012, and have been normalised to represent a cost per household unit for each sub catchment.

7. MCA Weighting Matrix

		Water Supply							Wastewater						Roads					
Linear Weighting	Fibonacci Weighting	Condition - largest of:			Criticality	Level Of Service (all treated as low)	Maintenance Costs		Condition - largest of:		Criticality	Level Of Service	Maintenance Costs		Condition	Criticality	Level Of Service - in order of data availability			Maintenance Costs
		Street Section Repair Count		Design Life reached %	Pipe Diameter (mm)	Fragility	OPEX per HEU (subcatchment)		Infonet Condition Score	Design Life reached %	Pipe Diameter (mm)	Fragility	OPEX per HEU (subcatchment)		RAMM damage assessment	traffic count (vpd)	1. Roading Complaints Count	2. State Highway Rebuild Priority	3. Operating Plan LOS	OPEX per HEU (catchment)
		Mains	Submains																	
1	1			< 10	< 100		0		0	< 10	< 150		0		0	< 250				0
2	2	1	1	< 50		1	< 10			< 50		High Infiltration HI	< 10		1					< 10
3	3			< 70	< 150		< 25		1	< 70			< 25				1			< 25
4	5	2	2		< 300		< 50		2		< 225	Badly Damaged (BD)	< 50		2	< 500	2		4	< 50
5	8			< 85	< 200		< 100			< 85		BD + HI	< 100			< 1000	3			< 100
6	13						< 200		3		< 300	High Failure (HF)	< 200		3	< 1500	4	1 - 3	6	< 200
7	21				< 300		< 400				< 375	HF + HI	< 400			< 2000	5			< 400
8	34	3	3				< 800		4		< 450	HF + BD	< 800		4	< 5000	6	4	8	< 800
9	55	4	4	>= 85	>= 300		< 1600			>= 85	< 600	HF + BD + HI	< 1600			< 10000	7 -9			< 1600
10	89	>= 5	>= 5				>= 1600		5		>= 600		>= 1600		5	>= 10000	>= 10	5	10	>= 1600