

Tatiara District Council



Community Waste Water Management System (CWMS)



‘Core’ Infrastructure Risk Management Plan

Version 2

June 2017



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Asset Management for Small, Rural or Remote Communities Practice Note

The Institute of Public Works Engineering Australia.

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1. INTRODUCTION

1.1 Aim

The purpose of this core infrastructure risk management plan is to document the results and recommendations resulting from periodic identification, assessment and treatment of risks associated with providing services to the community from infrastructure, using the fundamentals of International Standard ISO 31000:2009 *Risk management – Principles and guidelines*.

Risk Management is defined in ISO 31000:2009 as: “coordinated activities to direct and control an organisation with regard to risk”¹.

1.2 Objectives

The objectives of the plan are:

- to identify risks to the Tatiara District Council that may impact on the delivery of services from infrastructure
- to select credible risks for detailed analysis,
- to analyse and evaluate risks in accordance with ISO 31000:2009,
- to prioritise risks,
- to identify risks requiring treatment by management action,
- to develop risk treatment plans identifying the tasks required to manage the risks, the person responsible for each task, the resources required and the due completion date.

1.3 Community Wastewater Management System Infrastructure Risk Management

This CWMS Infrastructure Risk Management Plan has been designed to be read as a supporting document to the infrastructure and asset management plan. It has been prepared using the fundamentals of International Standard ISO 31000:2009 *Risk management – Principles and guidelines*.

1.4 Scope

This plan considers risks associated with delivery of services from CWMS infrastructure.

1.5 The Risk Management Context

We have implemented many management practices and procedures to identify and manage risks associated with providing services from infrastructure assets. These include:

- operating a reactive maintenance service for all assets and services,
- operating a planned maintenance system for key assets,
- monitoring condition and remaining service life of assets nearing the end of their service life,
- renewing and upgrading assets to maintain service delivery,
- disposing of assets not providing the required service level, and
- acquiring or constructing new assets to provide new and improved services.

Council undertakes service delivery using its day labour workforce and specialised contractors when required.

We have assigned responsibilities for managing risks associated with assets and service delivery to the following departments.

- Council’s Technical department is responsible for CWMS service delivery activities to service levels and budgets approved by council

1.6 Risk Management Process

The risk management process used in this project is shown in Figure 1.6 below.

It is an analysis and problem solving technique designed to provide a logical process for the selection of treatment plans and management actions to protect the community against unacceptable risks.

The process is based on the fundamentals of International Standard ISO 31000:2009.

¹ ISO 31000:2009, p 2.

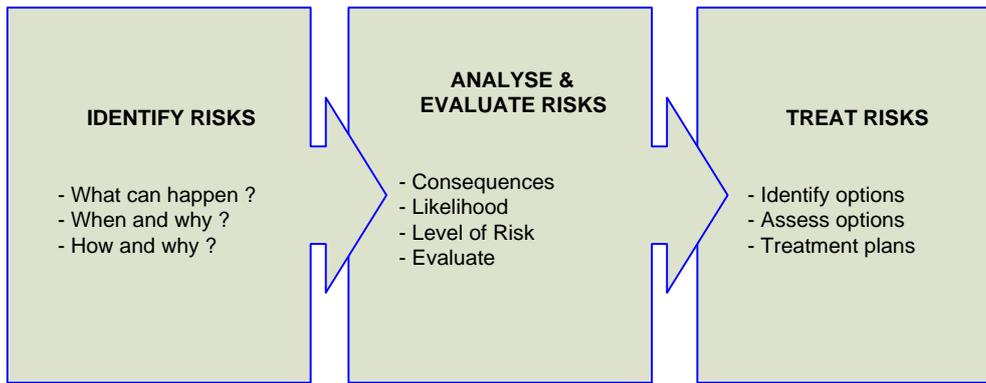


Fig 1.6: Risk Management Process – Abridged
Source: Adapted from ISO 31000:2009, Figure 1, p vii

2. COMMUNICATION AND CONSULTATION

Risk communication and consultation is “continual and iterative processes that an organisation conducts to provide, share or obtain information and to engage in dialogue with stakeholders regarding the management of risk”².

‘Appropriate communication and consultation seeks to:

- Improve people’s understanding of risks and the risk management processes,
- Ensure that the varied views of stakeholders are considered, and
- Ensure that all participants are aware of their roles and responsibilities.’³

The development of this infrastructure risk management plan was undertaken using a consultative team approach to:-

- Identify stakeholders and specialist advisors who need to be involved in the risk management process,
- Discuss and take into account the views of stakeholder and specialist advisors, and
- Communicate the results of the risk management process to ensure that all stakeholders are aware of and understand their roles and responsibilities in risk treatment plans.

Members of the team responsible for preparation of this risk management plan are:

- Aaron Hillier – Asset Systems Coordinator
- Surya Prakash – Manager Technical Services

- Colin Hunt – West Ward Supervisor
- Andrew Pollock – Works Manager
- Frank Mastrangelo – Technical Officer

3. RISK IDENTIFICATION

3.1 General

Potential risks associated with providing services from CWMS infrastructure were identified at meetings of the organisation’s infrastructure risk management team.

Team members were asked to identify “what can happen, where and when” to the organisation’s various services, at the network level and for critical assets at the asset level, then to identify possible “why and how can it happen” as causes for each potential event together with any existing risk management controls.

Each risk was then tested for credibility to ensure that available resources were applied to those risks that the team considered were necessary to proceed with detailed risk analysis

The assets at risk, what can happen, when, possible cause(s), existing controls and credibility are shown in Appendix A – Risk Register.

Credible risks are subjected to risk analysis in Section 4.4.5. Risks assessed as non-credible were not considered further and will be managed by routine procedures.

² ISO 31000:2009, p 3

³ HB 436:2004, Sec 3.1, p 20

4. RISK ANALYSIS

4.1 General

Credible risks which have been identified during the risk identification stage were analysed. This process takes into account the ‘likelihood’ and the ‘consequences’ of the event. The objective of the analysis is to separate the minor acceptable risks from the major risks and to provide data to assist in the assessment and management of risks.

The risk analysis process is applied to all credible risks to determine levels of risk. The process acts as a filter by applying a reasoned and consistent process. Minor risks can be eliminated from further consideration and dealt with within standard operating procedures.

The remaining risks will therefore be of such significance as to consider the development of risk treatment options and plans.

4.2 Likelihood

Likelihood is a qualitative description of chance of an event occurring. The process of determining likelihood involves combining information about estimated or calculated probability, history or experience. Where possible it is based on past records, relevant experience, industry practice and experience, published literature or expert judgement.

4.3 Consequences

Consequences are a qualitative description of the outcome of an event affecting objectives. The process of determining consequences involved combining information about estimated or calculated effects, history and experience.

4.4 Method

The risk analysis method uses the risk rating chart shown in Section 4.4.3. This process uses a qualitative assessment of likelihood/probability and history/experience compared against a qualitative assessment of severity of consequences to derive a risk rating.

The qualitative descriptors for each assessment are shown in Tables 4.4.1 and 4.4.2.

Table 4.4.1: Likelihood Qualitative Descriptors

Likelihood	Descriptor	Probability of occurrence
Rare	May occur only in exceptional circumstances	More than 20 years
Unlikely	Could occur at some time	Within 10-20 years
Possible	Might occur at some time	Within 3-5 years
Likely	Will probably occur in most circumstances	Within 2 years
Almost certain	Expected to occur in most circumstances	Within 1 year

Table 4.4.2: Consequences Qualitative Descriptors

Consequence	Injury	Service Interruption	Environment	Finance	Reputation
Insignificant	Nil	< 4 hrs	Nil	< \$20k	Nil
Minor	First Aid	Up to 1 day	Minor short term	\$20k - \$100k	Minor media
Moderate	Medical treatment	1 day – 1 week	Wide short term	\$100k - \$500k	Moderate media
Major	Disability	1 week – 1 month	Wide long term	\$500k - \$1M	High media
Catastrophic	Fatality	More than 1 month	Irreversible long term	> \$1M	Censure/Inquiry

4.4.1 Risk Assessment

The risk assessment process compares the likelihood of a risk event occurring against the consequences of the event occurring. In the risk rating table below, a risk event with a likelihood of 'Possible' and a consequence of 'Major' has a risk rating of 'High'.

This rating is used to develop a typical risk treatment in Section 5.3.

Table 4.4.1: Risk Assessment Matrix

Risk Rating					
Likelihood	Consequences				
	Insignificant	Minor	Moderate	Major	Catastrophic
Rare	L	L	M	M	H
Unlikely	L	L	M	M	H
Possible	L	M	H	H	H
Likely	M	M	H	H	VH
Almost Certain	M	H	H	VH	VH

Ref: HB 436:2004, Risk Management Guidelines, Table 6.6, p 55.

4.4.2 Indicator of Risk Treatment

The risk rating is used to determine risk treatments. Risk treatments can range from immediate corrective action (such as stop work or prevent use of the asset) for 'Very High' risks to manage by routine procedures for 'Low' risks.

An event with a 'High Risk' rating will require 'Prioritised action'. This may include actions such as reducing the likelihood of the event occurring by physical methods (limiting usage to within the asset's capacity, increasing monitoring and maintenance practices, etc), reducing consequences (limiting speed of use, preparing response plans, etc) and/or sharing the risk with others (insuring the organisation against the risk).

Table 4.4.1: Risk Assessment Matrix

Risk Rating	Action Required and Timing	
VH	Very High Risk	Immediate corrective action
H	High Risk	Prioritised action required
M	Medium Risk	Planned action required
L	Low Risk	Manage by routine procedures

4.4.3 Analysis of Risk

The team conducted an analysis of credible risks identified in section 3.1 using the method described above to determine a risk rating for each credible risk.

The credible risks and risk ratings are shown in Appendix A – Risk Register.

4.5 Risk Evaluation

The risk management team evaluated the need for risk treatment plans using an overall assessment of the evaluation criteria shown in Table 4.5 to answer the question "is the risk acceptable?"

Table 4.5: Risk Evaluation Criteria

Criterion	Risk Evaluation Notes
Operational	Risks that have the potential to reduce services for a period of time unacceptable to the community and/or adversely affect the council's public image.
Technical	Risks that cannot be treated by the organisation's existing and/or readily available technical resources.
Financial	Risks that cannot be treated within the organisation's normal maintenance budgets or by reallocation of an annual capital works program.
Legal	Risks that have the potential to generate unacceptable exposure to litigation.
Social	Risks that have the potential to: - cause personal injury or death and/or - cause significant social/political disruption in the community.
Environmental	Risks that have the potential to cause environmental harm.

The evaluation criteria are to provide guidance to evaluate whether the risks are acceptable to the council and its stakeholders in providing services to the community. Risks that do not meet the evaluation criteria above are deemed to be unacceptable and risk treatment plans are required to be developed and documented in this Infrastructure Risk Management Plan, for consideration by Council.

“Decisions on managing risk should take account of the wider context of the risk and include consideration of the tolerance of the risks borne by parties, other than the organisation that benefits from the risk. Decisions should be made in accordance with legal, regulatory and other requirements.

In some circumstances, the risk evaluation can lead to a decision to undertake further analysis. The risk evaluation can also lead to a decision not to treat the risk in any way other than maintaining existing controls. This decision will be influenced by the organisation's risk attitudes and the risk criteria that have been established.”⁴

5. RISK TREATMENT PLANS

5.1 General

The treatment of risk involves identifying the range of options for treating risk, evaluating those options, preparing risk treatment plans and implementing those plans. This includes reviewing existing guides for treating that particular risk, such as Australian and

State legislation and regulations, International and Standards and Best Practice Guides.

Developing risk treatment options starts with understanding how risks arise, understanding the immediate causes and the underlying factors that influence whether the proposed treatment will be effective.

One treatment option is to remove the risk completely by discontinuing the provision of the service.

Risk treatment options can include:

- a) avoiding the risk by deciding not to start or continue with the activity that give rise to the risk,
- b) taking or increasing the risk in order to pursue an opportunity,
- c) removing the risk source,
- d) changing the likelihood,
- e) changing the consequences,
- f) sharing the risk with another party or parties (including contracts and risk financing),
- g) retaining the risk by informed decision.⁵

⁴ ISO 3100:2009, Sec 5.4.4, p 18.

⁵ ISO 3100:2009, Sec 5.5.1, p 19

5.2 Risk Treatment Options

The risk treatment options selection process comprises 5 steps.

Step 1. Review causes and controls

The risk identification process documented in Section 3 included identifying possible causes and documenting existing controls.

Step 2. Develop treatment options

Treatment options include those that eliminate risk, reduce the likelihood or the risk event occurring, reducing the consequences should the risk event occur, sharing of the risk with others and accepting the risk.

Step 3. Assess risk treatment options against costs and residual risk

The method of assessment of risk treatment options can range from an assessment by a local group of stakeholders and practitioners experienced in operation and management of the assets/service to detailed risk cost and risk reduction cost/benefit analysis involving assessment of the likelihood and consequences to determine the residual risk and analysis of the reduction in risk against the costs for each treatment option.

Step 4. Select optimum risk treatment

Step 5. Develop risk treatment plans

5.3 Risk Treatments

The risk treatments identified for non-acceptable risks are detailed in Appendix A – Risk Register.

5.4 Risk Treatment Plans

From each of the risk treatments identified in Appendix A – Risk Register, risk treatment plans were developed.

The risk treatment plans identify for each non-acceptable risk:-

1. Proposed action
2. Responsibility
3. Resource requirement/budget
4. Timing
5. Reporting and monitoring required

The risk treatment plan is shown in Appendix A – Risk Register.

6. MONITORING AND REVIEW

The program for monitoring and review of the infrastructure risk management plan is shown in Table 6.

Table 6: Monitoring and Review Program for Infrastructure Risk Management Plan

Activity	Review Process
Review of new risks and changes to existing risks	Annual review by team with stakeholders and report to council
Review of Risk Management Plan	3 yearly review and re-write by team and report to council
Performance review of Risk Treatment Plan	Action plan tasks incorporated in council staff performance criteria with 6 monthly performance reviews. Action plan tasks for other organisations reviewed at annual team review meeting

7. REFERENCES

- IPWEA, 2015, *International Infrastructure Management Manual*, 2006, Institute of Public Works Engineering Australia, Sydney, www.ipwea.org.au.
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- ISO, 2009, *ISO 31000:2009, Risk management – Principles and guidelines*, Standards Australia, Sydney.
- Standards Australia, 2004, *AS/NZS 4360:2004, Australian/New Zealand Standard, Risk Management*, Sydney (superseded by ISO 31000:2009).
- Standards Australia, 2004, *HB 436:2004, Risk Management Guidelines, Companion to AS/NZS 4360:2004*, Sydney.

APPENDIX A RISK REGISTER

RISK IDENTIFICATION							RISK ANALYSIS					RISK TREATMENT			RISK TREATMENT PLAN				
Risk No.	Service or Asset at Risk	What can happen?	When can it occur?	Possible cause	Existing controls	Is risk credible ?	Likelihood	Consequences	Risk rating	Action required	Is risk acceptable ?	Treatment option(s)	Residual risk	Risk treatment plan	Actions	Responsibility	Resources	Budget	Date due
1	Pump Station	Service failure, pump stops working, sump failure	Anytime in the future	Aging infrastructure (sumps), pump fault or power failure.	All pumps have been upgraded to modern day standards. 24 hours monitoring via SCADA. All pumps stations have generator plugs and parts across all pumps stations have been standardised	Yes	Possible	Moderate	High	Prioritised action required	Yes								Oct-17
2	Pump Station	Injury caused by inadequate WHS measures at PS's	Anytime in the future	Changing standards, inadequate training	Staff and contractor training and education of SOP and SWMS. All PS have been upgraded to modern day WHS standards.	No	Unlikely	Minor	Low	Manage by routine procedures	Yes								
3	Pump Station Storage Sump	Ingress of floodwater from Tatiara Creek via overflow pipes	Anytime in the future	High creek flow and absence of non-return valve	None	Yes	Almost certain	Insignificant	Medium	Planned action required	No	Install non return valves	Low	Install non return valves	Install non-return valves	Asset Systems Coordinator	Staff Time	\$500	Jun-18
4	Rising main	Rising main fails	Anytime in the future	Substandard rising main class and soil movement	Contact plumbers as required or call appropriate staff and CCTV condition assessment	Yes	Almost certain	Minor	High	Prioritised action required	No	Replace rising mains, install air valves. Monitor the number and location of breaks	Low	Monitor breaks to ascertain viability of replacing problems mains	Monitor breaks to ascertain viability of replacing problems mains	Asset Systems Coordinator/Supervisors	Staff time		2017 - 2020

5	Gravity line	Blockage, failure, cracking	Anytime in the future	debris intrusion into system, root intrusion, aging infrastructure	Gravity drain flushing regime, contact plumber as required, some CCTV monitoring	Yes	Almost certain	Minor	High	Prioritised action required	No	Ensure ongoing maintenance plan and continue to monitor pipe condition via CCTV video capture programs and record of failures	Medium	Ensure ongoing maintenance plan and continue to monitor pipe condition via CCTV video capture programs and record of failures	Monitor gravity line condition by recording all failures and their locations. Allocate budget to reassess pipes via CCTV assessment in 5-7 years time.	Asset Systems Coordinator	Staff time		2017 - 2022	
6	Pump Station Storage Sump	In event of pump or power failure retention times do not meet minimum requirements	Anytime now	Inadequate storage capacity at PS	24 hour monitoring via SCADA and Pump inhibit functionality results in conformance with the storage standards	No			#N/A	#N/A	Yes									
7	CWMS Resources	Staff unavailability, cannot find replacement parts for gravity lines	Anytime now	Lack of staff particularly during periods of holidays, no access to replacement parts	Phones provided to critical staff, Contingency plans.	Yes	Likely	Minor	Medium	Planned action required	No	Continually update contingency plan and monitor staff availability. Use contract labour	Medium	Continually update contingency plan, monitor staff availability and consider contract labour	Allocate resources to ensure available staff and ensure succession planning. Consider contract labour if necessary	MTS	Staff time			
8	Gravity line	Effluent backflow into residents	Anytime in the future	Failure to install and maintain gully traps,	Desktop approval of gully traps	Yes	Rare	Minor	Low	Manage by routine procedures	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
9	Pump Stations	Power outage	Anytime now	loss of supply, from natural disaster, planned power outage etc	Adequate storage in the system and 1 emergency generator available to run pumps if required - all pumps have generator sockets. Contracts in place with liquid waste contractors for emergencies	Yes	Likely	Minor	Medium	Planned action required	No	Investigate options to purchase additional suitable generators	Low	Investigate options to purchase additional suitable generators	Investigate options to purchase additional suitable generators	Operations Supervisor	Staff Time and budget allocation	\$10,000	Jun-18	

10	Lagoons	Unauthorised access into lagoons	Anytime now	lack of knowledge	6" fence and locked gates	Yes	Possible	Insignificant	Low	Manage by routine procedures	No	Install appropriate signage	Low	Investigate signage requirement and install appropriate signage	Investigate signage requirement and install appropriate signage	Asset Systems Coordinator - Technical Support Officer	Staff time		Jun-18
11	Network infrastructure	Unable to locate network infrastructure	Anytime now	Illegal building work and no easements, road construction	Mapped asset register, DGPS asset locations, enforce easement on new subdivisions	Yes	Likely	Minor	Medium	Planned action required	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
12	Lagoon / wetland	Overflow from wetlands into watercourses	Anytime now	Inadequate storage capacities	Constructed wetlands to cater for major storm events	Yes	Rare	Minor	Low	Manage by routine procedures	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
13	Pipework and pumps	Ingress of solids into the system causing blockages and additional wear and tear on equipment	Within 5 years	Excessive sludge in septic tanks, undersize septic tanks	5 yr desludging program	Yes	Likely	Minor	Medium	Planned action required	Yes	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
14	Gravity Lines	Inability to repair damaged pipework due to obsolescence	Anytime now	changes in standards	None	Yes	Possible	Minor	Medium	Planned action required	No	Purchase adjustable gibaults, stock replacement parts	Low	Purchase adjustable gibaults	Purchase adjustable gibaults	Works Coordinator	Staff time and purchase cost		Sep-17
15	Manholes	Manholes in roadway are not suitable for vehicular traffic and could fail causing an accident	Within 2-3 years	Inadequate standards during installation	2-3 yearly manhole inspections and replace manholes where required	Yes	Rare	Moderate	Medium	Planned action required	No	Replace inadequate manholes with suitable covers	Low	Replace inadequate manholes with suitable covers	Replace inadequate manholes with suitable covers	Operations Supervisor	Staff time and replacement costs	\$15,000	Jun-18
16	CWMS Schemes	Inadequate funds available to replace infrastructure when required	Beyond 20 years	current reserves, incorrect valuations/replacement costs, inability to carry out condition assessment on all pipes	Valuations completed using external resources, Condition assessment on a representative portion of the networks and records of deficiencies in the network and failures	Yes	Unlikely	Moderate	Medium	Planned action required	Yes								

17	CWMS Schemes	Changing legislation/licence conditions requires addition unplanned spending	Within 10 years	Stricter environmental conditions	Currently compliant with existing requirements and good working relationship with all Government agencies	Yes	Possible	Moderate	High	Prioritised action required	Yes								
18	Gravity Lines	Inadequate capacity of gravity lines to accommodate future development	Within 10 years	Unforeseen growth	Growth estimates based past developments	Yes	Rare	Moderate	Medium	Planned action required	Yes								
19	SCADA System	Withdrawal of support from other Councils or current SCADA manager withdraws from managing the system	Within 2-3 years	Differential in perceived benefits for other Councils. Poor financial return for the SCADA manager. Poor written agreements	CWMS user group	Yes	Likely	Minor	Medium	Planned action required	No	Encourage user group to develop written agreements and gain long term commitments. Negotiate a long term agreement with the SCADA manager	Low	Encourage user group to develop written agreements. Negotiate a long term agreement with the SCADA manager	Encourage user group to develop written agreements. Negotiate a long term agreement with the SCADA manager	Asset Systems Coordinator	Staff time	2-5k	Jun-18
20	SCADA System	Communication outage	Anytime in the future	Inclement weather, sabotage, system fault at the service provider	Visible warning system at each PS, Contingency planning	Yes	Possible	Minor	Medium	Planned action required	Yes								