

LODDON SHIRE COUNCIL

Bridges Asset Management Plan
July 2010



LODDON
SHIRE

ADOPTION OF PLAN

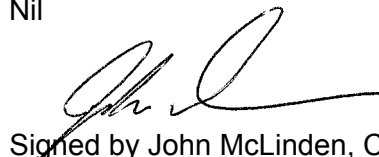
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A handwritten signature in black ink, appearing to read 'John McLinden', is written over the text 'Signed by John McLinden, Chief Executive Officer'.

Signed by John McLinden, Chief Executive Officer
27 July 2010

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EXECUTIVE SUMMARY

Loddon shire Council is custodian of an extensive range of community assets that it provides to facilitate the delivery of its services to the community. Bridges are an important component of Council's asset portfolio.

Council needs to ensure that there is an appropriate level of funding to enable assets to be maintained and renewed to an acceptable standard.

Council will use the Bridge Asset Management Plan, along with other Asset Management Plans, to balance levels of service, community expectations and affordability of its services and assets.

The plan covers 213 bridges, structures and major culverts on Loddon Shires local road network.

When considering the renewal or replacement of an existing bridge or structure Council will review the need for a structure and the standard of the road on which the structure is located. The options for replacement may include bridge or road closure, replacement with a lower standard of structure or replacement with a new bridge. Renewal and replacement options are detailed in strategies in sections 8.2, 8.3, 6.4 and 8.5

This plan establishes the need for an annual renewal expenditure of \$120,000 over the next 20 years.

1 INTRODUCTION

1.1 General

This asset management plan relates to:

- bridges
- major culverts
- floodways
- structures,

on Council's local road network.

This Asset Management Plan has been developed to document Council's asset management processes, to guide the planning, acquisition, operation, maintenance, renewal and disposal of assets with an objective to maximise service delivery potential and manage related risks and costs over entire asset lives.

1.2 Objectives of this Plan

Council's bridge infrastructure represents a significant investment by the community and is vital to its health and well being. The overall objective of asset management is:

To enable Council to meet its responsibilities to

- provide services to current and future generations
- provide and maintain community infrastructure within the municipal area
- enhance community safety and promote access

The specific purpose of this plan is to:

- demonstrate responsible stewardship;
- define and articulate how the infrastructure is and will be managed to achieve Council's objectives;
- provide a basis for customer consultation to determine the appropriate levels of service;
- manage risk of asset failure;
- achieve savings by optimising whole of life costs; and
- support long term financial planning.

1.3 Scope of This Plan

The Loddon Shire is located in Central Victoria adjacent to the City of Bendigo and surrounded by the Shires of Central Goldfields, Northern Grampians, Buloke, Gannawarra, Campaspe and Mount Alexander.

The Shire covers an area of 6,700 square kilometres with a population of 8,095 spread over eighteen towns or communities and rural areas.

The topography of the Loddon Shire varies from rolling hill country in the south to broad, flat, slightly undulating grassland in the East and North. The municipality is dissected by the Loddon River, which flows from catchments in the south through to the Murray River.

The Council over a number of years has built up a considerable asset base to enable it to provide services to the community.

The Council's Annual Report to 30th June 2009 details non-current assets to a total written down value of \$207,887,938 including :

Land and Buildings	\$ 34,686,534
Plant, furniture & equipment	\$ 4,020,832
Infrastructure (roads, kerbs, footpaths, bridges, drains	\$168,692,119
Capital works in progress	\$ 488,453

The scope and current replacement value, at the 30 June 2009, of assets covered by this plan are summarised in the following table:

Bridge Type	Number	Deck Area sq m	Renewal Value \$
Concrete bridges	73	11,596	17,066,972
Timber Bridges	23	1,606	924,457
Concrete Major Culverts	84	4,392	5,824,913
Timber major culverts	6	151	157,619
Concrete Floodways	3	185	59,806
Stone Floodways	7	5992	209,720
Major Structures	2	NA	41,412
Concrete Foot Bridges	5	36	25,633
Timber Foot Bridges	6	91	87,195
Minor Concrete Culverts	4	105	113,960
Total	213	24,182	24,511,686

1.4 The Asset Management Plan

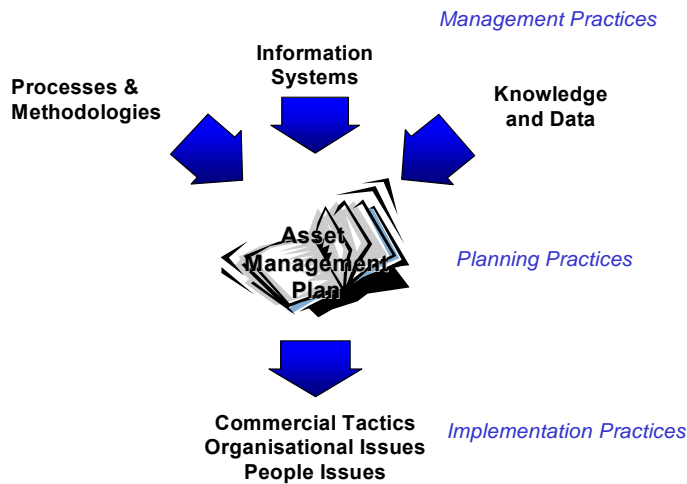
The AM Plan is a tool combining management, financial, engineering and technical practices to ensure that the level of service required by customers is provided at the most economical cost to the community.

The AM Plan is a tactical plan that translates broad strategic goals and plans into specific goals and objectives relevant to a particular activity for the organisation. It may be regarded as a tactical plan for implementing infrastructure related strategies, which arise from the strategic planning process.

Tactical planning involves the development of separate sub-plans that allocates resources (natural, physical, financial, etc.) to achieve strategic goals through meeting defined levels of service.

The plan is the medium by which the Council articulates its management of infrastructure to achieve the desired outcomes.

Figure 1-1: Asset Management



Plan: The scope of the AM Plan relates to the four broad AM plan inputs and outputs.

Processes: The processes, analysis and evaluation techniques needed to support effective lifecycle AM.

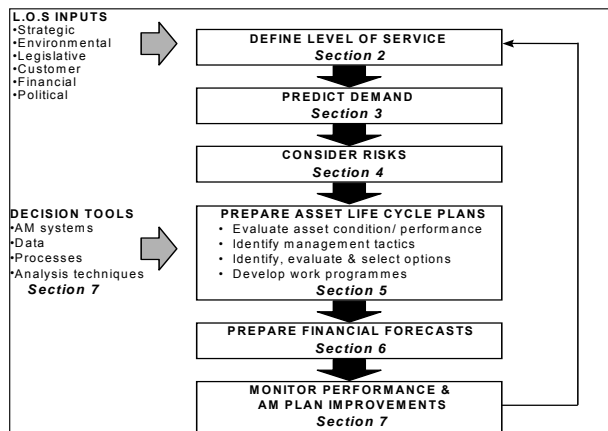
Information Systems: The information systems to support AM processes and manipulate data.

Data: Appropriate, accessible and reliable data for manipulation by information systems to produce the outputs required.

Implementation Tactics: Including organisational contractual and people issues.

1.5 Plan Format

The figure below follows the logic of the AM planning process and illustrates the relevant AMP section references in this plan.



1.6 Key Stakeholders

This plan is intended to demonstrate to stakeholders that the Council is managing its assets responsibly. The key stakeholders include:

- community/ ratepayers
- users and user groups
- Federal and State government
- Councillors
- visitors
- utilities/ developers
- employees/ volunteers
- contractors/ suppliers
- insurers.

1.7 Legislative Requirements

Council has stewardship over a large range of assets, as required by Legislation, that includes:

- Local Government Act 1989
- Road Management Act 2004
- Road Safety Act 1986
- Subdivisions Act 1993
- Transport Act 1983
- Planning and Environment Act 1987
- Environment Protection Act 1997
- Occupational Health and Safety Act 1985
- Councils Local Laws

Other relevant references include Australian Standards and Codes.

1.8 Relationship with Other Plans

AM Plans are a key component of the Council planning process linking with a number of Council documents that influence the Asset Management Plan and priorities allocated to infrastructure asset capital, renewal ,refurbishment and replacement expenditure.

The following are important resource documents:

- Loddon Shire Council Plan 2009-2013 – “The Loddon Plan” sets out Council’s objectives and strategies under six key delivery areas.
- Strategic Resource Plan 2009- 2013. This plans sets out a projection of financial resources for the period of 1st July 2009 to 30th June 2013.
- Corporate Risk Management Policy CS9 (September 2005). The Loddon Shire Council is committed to adopting management principles that will successfully identify, analyse, assess, treat, monitor and review risks associated with its operations.
- Council Annual Budget.

- Community Plans – 18 in number setting local community priorities
- Road Management Plan 2004
- Road Maintenance Plan: Risk Matrices, Intervention Levels, Inspection Forms
- Road Asset Management Plan 2008
- Road Safety Strategy 2004

1.9 Rationale for Asset Ownership

The Council exists principally to supply core services that meet the needs of its community. What services are provided, and how they are provided, depends on the level of service required by the community.

One of Council's core functions is to provide bridge infrastructure coordinated with the road network throughout the municipality in accordance with engineering standards and planning objectives and which meet the requirements of the Road Management Act 2004 and the Local Government Act 1989.

Transportation including the provision of an effective road and bridge network are regarded as an essential function associated with enhancing the municipality's economy and accessibility.

2 LEVELS OF SERVICE

2.1 Introduction

Levels of Service provide the basis for the life cycle management strategies and works program identified within the AMP. They support the Council's strategic goals and are based on customer expectations and statutory requirements.

Road and bridge assets serve the community and enable

- movement of people and goods
- access to properties

With the use of this broad description of service as a guide, a key objective of this Asset Management Plan is to define the levels of service for safety, quality, amenity and efficiency.

The levels of service in this section will be used to:

- inform stakeholders of the type and level of service offered by Loddon Shire in its bridge network
- formulate life cycle management strategies to deliver the desired levels of service.
- enable stakeholders to assess suitability, affordability and equity for the services offered.

The levels of service outlined in this section are based on:

- research and community expectations.
- strategic and corporate goals.
- legislative requirements
- standards and Codes of Practice

2.2 Research and Community Expectation

Council's customer research into community infrastructure needs and satisfaction has included:

- Community forums
- Annual Local Government Community Satisfaction Survey.

The outcomes of the community satisfaction survey undertaken in May 2009 were as follows:

Percentage of respondents who rated performance for Local Roads and Footpaths as:

Excellent	Good	Adequate	Needs improvement	Needs a lot of improvement
5%	31%	22%	20%	22%

58% of respondents were satisfied with the service for local roads and footpaths. The primary reasons for "needs improvement", which may have any relevance to this plan was "improve the quality of maintenance on roads and footpaths" (9 respondents).

2.3 Strategic and Corporate Goals

2.3.1 Loddon Plan 2009 - 2013

The Council Vision for the Shire is:

“Loddon will be a proud community leading rural Australia as a great place to live, work and visit”

The work of Council is delivered under six key direction areas.

The objective of Key Direction Area No 3. Works and Infrastructure:

“To provide infrastructure that meets the needs of our community while being affordable for current and future generations”

Strategies include:

- complete the Loddon Shire Asset Register for all classes of public assets in the municipality.
- implement the Local Road Asset Management plan that was adopted in 2008.
- complete a Parks and Gardens Asset Management Plan that responds to the continuing dry climate conditions.
- complete a Building Asset Management plan for all public buildings in which council has an interest.
- complete a Bridge Asset Management Plan
- complete a Footpath Asset Management Plan.

2.3.2 Asset Management Policy and strategy

The Council has adopted an Asset Management Policy and Strategy reviewed and updated in February 2006.

“Stewardship of infrastructure is a core Council function. Sound asset management is necessary to enable Council to meet its responsibility to:

- provide services to current and future generations
- provide and maintain community infrastructure within the municipal area.
- enhance community safety and promote access”.

The principles identified in Council’s Asset Management Policy and Strategy are that Loddon will:

- provide its community with a level of service that is responsive to the community’s needs.
- ensure its community plays an active role in setting the standard of infrastructure provided. This will be through consultation and information exchange between Loddon Shire and its community.
- maximise the potential life of infrastructure through efficient and effective Asset Management practices.
- ensure asset management is an integral part of the Council’s business cycle and will :-
 - be consistent with its goals and objectives
 - help to manage business risks
 - provide tangible benefits
 - be integrated and sympathetic with other components of the business
 - be sustainable
- develop an Asset Management Plan incorporating sub-plans for each class of Council asset to ensure that the defined level of service can be maintained now and into the future at an affordable cost to council and the community.
- incorporate the Asset Management Plans into Council’s overall Financial Plan

- develop and maintain systems and procedures to support asset management including a centralised database of Council assets linked to a Geographic information System (GIS), where appropriate.
- develop and use a Project Evaluation method incorporating lifecycle costing, social, environmental and economic factors to guide investment decision.
- determine potential asset renewal funding gap and develop responses to address any such gap that are responsible, affordable and meet reasonable community expectations.

2.4 Legislative Requirements, Codes of Practice and Standards

Whilst Council is acting as a trustee for the community assets and is obliged to provide services at a level agreed with the community, it is also required to provide a minimum level of service as defined by legal requirements, Standards, and Codes of Practice.

The following legislative requirements, Standards and Codes of Practice, with respect to levels of service, are to be taken into account:

REFERENCE	DETAILS
Transport Act 1983	<p>Council's responsibility for main roads within its municipal district (Clause 5(4) of Schedule 5) is modified according to the Road Management Act 2004</p> <p>Empowers Council to carry out 'permanents works' (Clause 16 of the Schedule 5)</p>
Road Safety Act 1986	<p>Provides Council with the power to erect major traffic control items (MTCI's) on roads other than declared main roads and the power to erect minor traffic control items on minor roads. (Section91).</p> <p>Empowers Council with regard to parking</p>
Local Government Act 1989	<p>Section 6.0 outlines the purpose of a Council. The purposes of a Council are:</p> <ul style="list-style-type: none"> • To provide equitable and appropriate service and facilities for the community and to ensure that those services and facilities are managed efficiently and effectively. • To manage, improve and develop the resources of its district efficiently and effectively. <p>Section 7.0 outlines the objectives of Council to seek its purposes. In seeking to achieve its purposes, a Council has the following objectives:</p> <ul style="list-style-type: none"> • To facilitate the involvement of members of the community, users of facilities and services and Council staff in the development, improvement and

REFERENCE	DETAILS
	<p>coordination of local government;</p> <ul style="list-style-type: none"> • To co-ordinate with other public bodies to ensure that services and facilities are provided and resources are used efficiently and effectively; • To ensure adequate planning for the future of its municipal district; • To represent and promote the interests of the community and to be responsive to the needs of the community; • To formulate comprehensive policies and set performance targets; • To develop, implement and monitor its strategic plans and budgets. <p>Section 205 outlines Council's care and management. The Road Management Act 2004 place a duty of care on Council with regard to its roles as a road authority</p>
Environment Protection Act 1970	The legislative framework for the protection of the environment in Victoria. Legal requirements in relation to stormwater quality from building and construction work sites.
Occupational Health and Safety Act 1985	<p>Legal requirements for employers/employees in relation to workplace safety.</p> <p>Requirements on those who design, manufacture, import or supply any plan for use in the workplace.</p>
Water Act 1989	Provides for the liability of any person who causes unreasonable flows, which result in damage or injury. (Section 16(1)).
Subdivisions Act 1988	Provides for engineering plans to be provided for developments in accordance with relevant standards.
Health Act 1958	Legal Requirements regarding nuisance
Austroads Road Design Guidelines	Design guidelines published by the Australasian Association of Road and Traffic Authorities.
Australian Rainfall and Runoff Guidelines	Guidelines for design flood estimation.
<p>Design Manuals and Works Specifications</p> <p>Road Design Standards:</p> <ul style="list-style-type: none"> • Traffic Engineering Manual Vol. 1 Traffic Management 	<p>Design and development standards and guidelines relating to civil infrastructure.</p> <ul style="list-style-type: none"> • Details the standards to which traffic engineering works may be undertaken. Designed to reflect the requirements of "Road Rules – Victoria" and the Road

REFERENCE	DETAILS
<ul style="list-style-type: none"> • Traffic Engineering Manual Vol. 2 Signs and Markings • VicRoads Worksite Traffic Management (Roadwork Signing). Code of Practice. • VicRoads Road Design Guidelines Parts 1 -12. 	<p>Safety (Road Rules) Regulations 1999.</p> <ul style="list-style-type: none"> • The primary reference for road signs, markings and delineation in Victoria. Incorporates the Australian Standard Manual of Uniform Traffic Control Devices AS172. • Adopts the Manual of Uniform Traffic Control Devices AS 1742.3 Traffic Control Devices for Works on Roads. • Incorporates VicRoads Road Design Standards
<p>AS 5100 Pts 1-7 2004 Bridge Design (AUSTROADS) AP-G15.1/04</p>	<p>Requirements for design of road, rail, pedestrian and bicycle path bridges.</p>
<p>Road Management Act 2004)</p>	<p>The principals of the new Act:</p> <ul style="list-style-type: none"> • Set out the powers, duties and function of the highway authorities in relation to the inspection, maintenance and repair of roads • Establishes the legal framework for the management of roads and define the rights, powers and duties of road authorities and other persons and bodies (such as utilities) which install, maintain or operate infrastructure on roads or carry out such works on roads. • Enables authorities to develop and publish management plans to incorporating the performance of their duties in relation to the inspection, maintenance and repair of roads, having regard to the type of road, the resources available to the authority and its budgetary and policy priorities.

2.5 Current Target Levels of Service

Service levels are divided into two types:

- community based, and
- technical based.

Community based levels of service relate to the function of the service provided and how the customer/ user receives the service in terms of;

- appearance
- safety
- useability
- availability

Technical based levels of service relate to the technical measures and the outputs the customer receives in terms of:

- quality
- quantity
- maintainability
- reliability and performance
- responsiveness
- capacity
- environmental impacts
- cost/affordability (including whole of life costs)

The levels of service detailed in this Bridge Asset Management Plan reflect the existing service levels provided by Council driven by available budget funding and based on historic practices.

The level of service provided to the community for bridges is as described in 5.4 Defect Response Times and as detailed in the table in Appendix 14.2 Bridge Maintenance Defect Risk Matrix Summary.

2.6 Principles Adopted in This Plan

The principles adopted in delivering levels of service in relation to bridge assets are detailed as principles and tactics in Section 6 Acquisition Plan, Section 7 Operations and Maintenance Plan and Section 8 Renewal and Replacement Plan.

2.7 Design and Construction Standards for

New and replacement bridges will be designed in accordance with:

- AS 5100 Pts 1-7 2004 Bridge Design also known as (AUSTROADS) AP-G15.1/04
- Vicroads Design Guidelines Part 3 Cross Sectional Elements Section 3.7 Structures

3 DEMAND FORECAST

3.1 Introduction

This section of the plan analyses factors affecting demand including population growth, social and technology changes and impacts on new and existing infrastructure.

3.2 Growth Trends

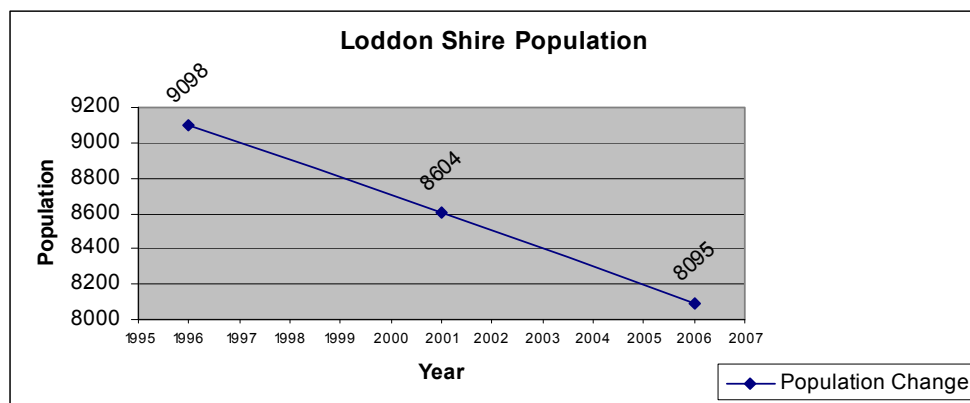
The key drivers of demand for bridge infrastructure are:

- population growth
- residential development.
- commercial development
- development of new community facilities
- demographic change.

3.3 Population

The Department of Planning and Community Development – Victorian Population Bulletin – October 2007 has been used as the source of information for Shire of Loddon population predictions.

Year	Information Source	Estimated Resident Population	Average Annual Growth	
			Period	%
1996	Victorian Population Bulletin – October 2007	9098		
2001	Victorian Population Bulletin – October 2007	8604	1996-2001	-1.1
2006	Victorian Population Bulletin – October 2007	8095	2001-2006	-1.2



3.4 Demographic Change

The Council's Aged and Disability Strategy 2006/7 highlights key population changes that are predicted to occur over the next twenty years.

They include:

People aged 65 years and over will almost double from 19% of total population to 37.5%.

People aged 20- 65 years will decrease from 54.5% to 43%.

People aged 85 years and older will increase from 258 (in 2001) to 548 in (2031)

The impact of these trends on bridge assets will be minimal.

3.5 Industry and Agricultural Impacts

Farm sizes in the north and eastern areas of the shire are increasing to create more viable enterprises where further mechanisation of farming operations results in bigger machinery and trucks travelling on the road and bridge network.

3.6 Grain Transport Impacts

The closure of many grain storage silos scattered throughout the municipality, along with the establishment and expansion of 'central receival points' at Boort, Bridgewater, Dunolly, Mitiamo, and Tandarra, has resulted in increased truck traffic on bridges on local roads servicing the central receival facilities.

3.7 Dairy industry

The dairy sector continues to undergo restructure where farm sizes, dairy herd numbers and production are continually increasing. Milk processing companies are progressively upgrading to larger, heavier milk transport trucks.

3.8 Changes in Traffic Composition











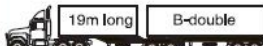
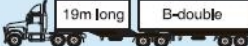





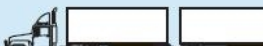
Changes in traffic composition involve heavier vehicle loads than those anticipated in the original design and provision of bridges. These factors in turn have an effect on planned renewal or upgrade of these assets.

While forecasts indicate a current decline in population heavy vehicle use is expected to increase on strategic routes.

High productivity vehicles, such as B-Doubles and vehicles at Higher Mass Limits are important to the efficiency of the freight task locally and regionally. The larger capacity of these vehicles reduces the number of vehicles required to transport a given amount of freight.

The extent of the potential benefit of these vehicles is related to the degree of access to the road network. Access to local roads within the municipality is allowed where these vehicles can operate safely with other traffic and where infrastructure, including road pavements and bridges, is capable to carry legal load limits. The current legal loads were adopted in Victoria in July 1999, and are detailed in the figure below.

Table 1 - Local Road Access Status

General Mass Limits			Higher Mass Limits (Road Friendly Suspension)		
Vehicle Type Column 1	Mass limit (tonnes) Column 2	Local Road Access Column 3	Vehicle Type Column 1	Mass limit (tonnes) Column 2	Local Road Access Column 3
 6.0t 9.0t	15.0	Yes	 6.0t 10.0t	16.0	Yes
 6.0t 16.5t	22.5	Yes	 6.0t 17.0t	23.0	Yes
 6.0t 9.0t 16.5t	31.5	Yes	 6.0t 10.0t 17.0t	33.0	Yes
 6.0t 16.5t 16.5t	39.0	Yes	 6.0t 17.0t 17.0t	40.0	Yes
 6.0t 16.5t 20.0t	42.5	Yes	 6.0t 17.0t 22.5t	45.5	Approved routes
 6.0t 16.5t 16.5t 16.5t 19m long B-double	50.0	Yes	 6.0t 17.0t 17.0t 17.0t 19m long B-double	57.0	Approved routes
 6.0t 16.5t 16.5t 16.5t 26m long B-double	55.5	Approved routes	 6.0t 17.0t 17.0t 17.0t 26m long B-double	57.0	Approved routes
 6.0t 16.5t 16.5t 20.0t	59.0	Approved routes	 6.0t 17.0t 17.0t 22.5t	62.5	Approved routes
 6.0t 16.5t 20.0t 20.0t	62.5	Approved routes	 6.0t 17.0t 22.5t 22.5t	68.0	Approved routes

Mass Limits by Vehicle Type

In column 3 approved routes means that a local road may only be used if the road is listed in the VicRoads publication ‘Local Roads Approved for B-Double and Higher Mass Limits Trucks’, or the operator has written support from Council and a permit from VicRoads. Otherwise, a “Yes” in column 3 means the vehicle has access to all local roads in Victoria subject to safe travel requirements.

Industry, in particular the grain and dairy sectors, are continually upgrading their transport fleets from semi-trailers operating at General Mass Limits to similar vehicles operating at Higher Mass Limits as a means to achieving operational efficiencies and reducing transport costs,. There is also increased demand for the use of 19-metre and 25-metre B-Double transports operating at Higher Mass Limits on the local road network.

Heavy vehicle use of the road network infrastructure impacts very significantly on its performance and its ability to be maintained. Council works in conjunction with these industries

to allow the use of heavier vehicles on the road network where bridge capacities allow and where the safety of other road users is not compromised.

The suitability of Council's road bridges for use by Higher Mass Limit vehicles was initially assessed by VicRoads Principal Bridge Engineer in a desktop study. Further field testing has also been carried out on some bridges to enable their structural performance to be further understood.

Bridges have been assessed for suitability for use by Higher Mass Limit vehicles as:

- adequate
- adequate but needs monitoring
- further assessment needed
- inadequate

See list in Appendix 14.1 Schedule of Bridges

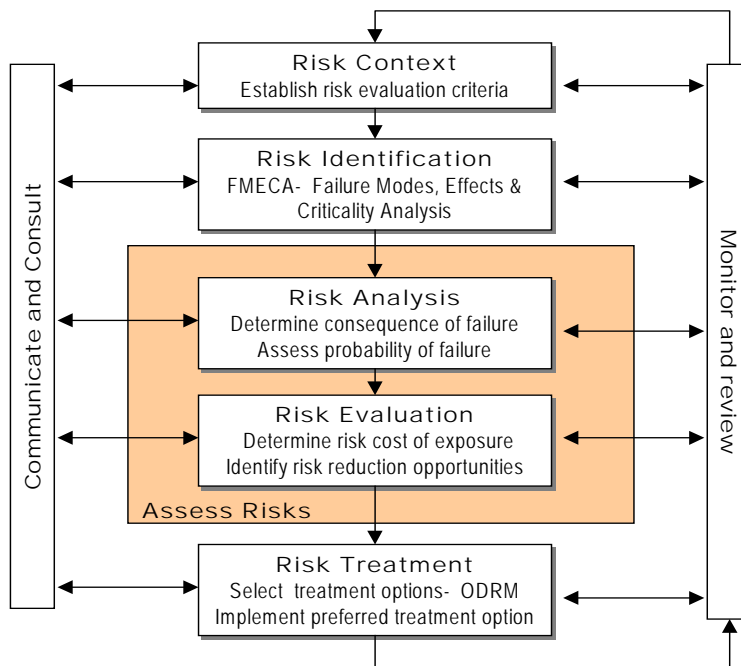
4 RISK MANAGEMENT

4.1 Introduction

The overall objectives of a formal risk management approach are to:

- outline the process by which Council will manage risk associated with its bridge assets, so that all risks can be identified and evaluated in a consistent manner.
- identify operational and organisational risks at a broad level.
- allocate responsibility for managing risks to specific staff to improve accountability.
- prioritise the risks to identify the highest risks that should be addressed in the short to medium term.

A risk management approach that is consistent with the process outlined in the Australian/ New Zealand standard AS/NZS 4360: 1999 has been adopted to achieve these objectives. The process is illustrated in the figure below.



4.2 Risk Management Framework within Council

Council's Risk Management framework consists of a Risk Management policy, a Risk Management Implementation Plan and is supported by a risk register. The Council is subject to corporate, strategic and operational risks as detailed below.

4.2.1 Corporate Risk

Council has in place corporate processes to manage risks within the organisation comprising:

- corporate risk register
- risk policy
- risk register.

4.2.2 Risk Management Policy

Council through its Risk Management Policy, Policy CS 09, adopted by Council on 27th November 2006,

“Is committed to adopting management principles that will successfully identify, analyse, assess, treat, monitor and review risks associated with its operations. Council will utilise a combination of proactive and reactive methods to ensure its risks are kept to a minimum.”

4.2.3 Risk Management Implementation Plan

Council maintains risk management implementation plans for principal infrastructure and services to minimise the likelihood of non-achievement of critical business objectives.

The risk management implementation plan is designed to ensure that:

All significant operational and organisational risks are understood and identified.

The highest risks within a one year planning horizon are identified and addressed.

Risk reduction treatments are implemented which best meet business needs.

Responsibilities for implementing and managing risks are allocated to specific staff.

4.3 Risk Assessment Process

Council has undertaken a review for potential risks. The risks identified have been described and their potential impacts and current controls assessed in the corporate Risk Register.

On the road and bridge network, risks are identified by undertaking inspection regimes as detailed in Council’s Road Management Plan. Bridge defects identified during programmed inspections are recorded in the field utilising table computers.

The risk analysis considers both the likelihood and consequences of events and asset risk.

The following Risk Analysis Matrix included in Council’s Road Management Plan is an adaptation of a qualitative Risk Analysis Matrix to suit Council’s Road Hierarchy. See section 5.13 Asset hierarchy for descriptions of individual road hierarchies.

Roads Streets & Footpaths - Overall Risk Matrix

Local Roads and Street - Overall						
Level of Risk						
Road Hierarchy	Likelihood	Consequences				
		Insignificant	Minor	Moderate	Major	Catastrophic
RSC	Unlikely	VL	L	ML	M	H
TSC	Unlikely	VL	L	ML	M	H
RSA	Rare	VL	L	ML	M	H
TSA	Rare	VL	L	ML	M	H
RGC	Rare	VL	L	ML	M	H
RGA	Rare	VL	L	ML	M	H
TGA	Rare	VL	L	ML	M	H
RGM	Rare	VL	L	ML	ML	M
TGM	Rare	VL	L	ML	ML	M
RF	Rare	VL	L	L	ML	ML
TF	Rare	VL	L	L	ML	ML
RUF	Rare	VL	VL	L	L	L
TUF	Rare	VL	VL	L	L	L

Council's Road Management Plan refers to risk matrices with predetermined levels of risk for each road and footpath defect type. These are detailed in Council's "Road Maintenance Plan: Risk Matrices, Intervention Levels, Inspection Forms."

A risk matrix for bridge maintenance defects is included in Appendix 14.2 Bridge Maintenance Defect Risk Matrix Summary.

Hazard Inspection forms referred to in Council's Road Management Plan are detailed in Council's Road Maintenance Plan: Risk Matrices, Intervention Levels, Inspection Forms define hazards and the associated level of risk. A sample is included in Appendix 14.3

The following table summarises levels of risk for specified hazards for bridges on the various road hierarchies.

Hazard	Risk Level			
	Road Hierarchy			
	RSC, TSC, RSA, TSA	RGC, RGA, TGA	RGM, TGM	RF, TF
Damage affecting structural performance	H	H	H	M
Load limit signs missing, illegible or damaged making signs substantially ineffective	H	H	H	M
Broken timber deck plank	H	H	M	M

The risk tables for defect types are used in Council's Maintenance Management program, Road Asyst, to allocate orders for works to be completed within documented response times, detailed in the following table

Level of Risk		
Result	Description	Action
H	High risk - urgent response	rectify if possible or provide appropriate warning by end next working day rectify within 5 working days or provide appropriate warning
M	Medium risk	rectify within 4 working weeks or provide appropriate warning
ML	Medium to low risk	rectify within 3 months or provide appropriate warning
L	Low risk - routine procedures	rectify in annual maintenance program but as resources permit
VL	Very Low risk	rectify as resources permit

4.4 Project Risks

Council has developed and utilises a Project Scoping and Prioritising process to prioritise capital projects for bridge construction and renewal programs. The process utilises the following criteria as appropriate:

- Road hierarchy

- Traffic volume
- Commercial vehicle count
- School bus routes
- Significant business or industry route
- Load Limit
- Bridge Condition (Moloney) or Level2 Inspection recommends replace
- Level of maintenance required
- Benefit contribution available

A scoring system is used for each of the criteria enabling a total score to be calculated for each project proposal.

See Appendix 14.5

4.5 Operational Risks

Operational risks are addressed through:

- Occupational Health and Safety processes.
- Safe working practices.

These include safety committee inspections of work places, pre-start checks of major plant items and “tool box “meetings at the commencement of projects.

4.6 Contingency Plans

The objectives of Council's Disaster Recovery and Business Continuity Plan (1st February 2008) are:

- to define procedures to effectively minimise losses from disasters.
- to provide a mechanism for re-establishment of services and operations as quickly and efficiently as possible after an incident.
- to minimise the affects on the public, staff and Council.

4.7 Risk Accounting and Authority

Risk management accountability and authority within council for identifying and managing risk is described in the Council's Risk Management policy CS09.

The policy details the responsibility for the Manager Organisational development, Executive Managers, Managers, the Risk Committee and all Employees.

In relation to all employees the Policy states:

“Employees are responsible to work in co-operation and consultation with Management to ensure ongoing active prevention of damage or loss of any property due to fire, water, theft or burglary or other means. Employees are also accountable for the property and assets in their direct control, and should operate and maintain this property in accordance with approved Council procedures”.

5 LIFECYCLE MANAGEMENT PLANS

5.1 Introduction

This section of the plan outlines what is planned in order to manage and operate the assets at the agreed level of service, as defined in the plan, while optimising the lifecycle costs.

5.2 Work Category Definitions

Work categories used in the lifecycle plan are defined below.

Operations

Asset operations activities are necessary to keep the asset appropriately utilised.

Operational expenditure is not clearly distinguished from maintenance expenditure in Council's financial systems.

Typical operational activities include:

- inspections
- emergency callout.
- storm cleanup

Routine Maintenance

Is the day to day work required to keep assets operating at required service levels. Council undertakes maintenance of its bridge and major culvert assets utilising its in-house works teams.

Routine maintenance falls into two broad categories:

- Planned (proactive) Maintenance: Proactive inspection and maintenance works planned to prevent asset failure.
- Unplanned (reactive) Maintenance: Reactive action to correct asset failures on an as required basis. (i.e. emergency repairs)

Renewals

These works are defined as being:

- the renewal and rehabilitation of existing assets to their original size and capacity, or
- the replacement of the entire component of the asset with the equivalent size or capacity, or
- that portion of the replacement component of the capital works which restores the assets to their original size and capacity.

Renewal expenditure includes the following:

- replacing bridge components
- replacing part of a bridge
- replacing an entire bridge.

New Works

New works include acquisition, purchase, or inheritance of an asset.

Projects for the extension or upgrading of assets required to cater for growth or improved levels of service are treated as new works and include:

- works which create an asset that did not exist in any shape or form, or
- works which improves an asset beyond its original size or capacity.

Asset Disposal

Costs associated with the removal or disposal of decommissioned bridges

5.3 Inspections

Inspections are undertaken to identify defects that create a risk of damage or inconvenience to the public. The inspections are aligned with road hierarchy.

Personnel undertaking the inspections have been trained and are conversant with the Council's inspection procedures and safety requirements.

Council works inspectors undertake Level 1 Bridge Inspections at six monthly frequencies as shown in its Road Management Plan. Level 1 Bridge Inspections are routine maintenance visual inspections to check the general serviceability of a bridge and to identify any emerging defects.

A Level 1 Bridge Inspection form is shown in Appendix 14.4

Level 2 Bridge Inspections are visual inspections to identify significant defects in structural members above ground level and to record the extent and severity of defects and the appropriate remedial actions.

As Loddon's concrete bridge structures are generally relatively new and not subject to major deterioration a longer inspection cycle is considered appropriate.

Conversely Loddon's timber structures are older and can deteriorate relatively quickly and therefore a shorter inspection cycle is appropriate.

Level 2 Bridge inspections are carried out by qualified consultants at the following frequencies:

Bridge Type	L2 Bridge Inspection Frequency
Concrete bridges	4 years
Concrete Major Culverts	4 years
Major Structures	4 years
Timber Bridges	2 years
Timber Major Culverts	2 years
Concrete Floodways	No L2 Inspection unless instigated by L1 Inspection
Stone Floodways	No L2 Inspection unless instigated by L1 Inspection
Minor Culverts	No L2 Inspection

Bridge condition for asset management, planning and valuation purposes, is assessed at the time of undertaking Level 2 Bridge inspections. Additional asset condition inspections may be required to coincide with asset revaluation requirements.

Level 3 Inspections are detailed engineering inspections carried out on an as needs basis to assess the structural condition and capacity of a bridge. This type of inspection may include material testing, structural analysis or load testing in addition to visual inspection to assess and quantify condition, behaviour and rate of deterioration of a structure.

Level 3 Inspections are undertaken by suitably qualified and experience structural engineers or bridge practitioners.

5.4 Defect Response Times

Defect response times support the service levels provided to the community as they define the response time for defect to be repaired.

Details of response times for defect repairs are shown in Response Times table in Appendix 14.2 Bridge Maintenance Defects Risk Matrix Summary

5.5 Performance Monitoring

The following activities are undertaken in the monitoring of bridge assets.

Asset condition surveys and Level 2 inspections will continue to be carried out on a programmed basis.

5.6 Consultation Process

For managing and operating bridge assets public consultation is undertaken in a number of ways including:

- community surveys
- customer request system
- community forums
- Annual Local Government Community Satisfaction Surveys

Community comment will be sought on the Draft Bridges Asset Management Plan with feedback considered as part of finalising the plan.

5.7 Council Ownership Functions

Council has the standard ownership functions of construction and maintenance of bridges.

5.8 Objectives and Overview

Council's objective for bridges and major culverts is to provide access across rivers, waterways and open drainage lines, subject to strategies in this plan, for

- vehicles on roads or
- pedestrian on footpaths

The asset group can be divided into

- bridges
- major culverts

- concrete floodways
- stone floodways
- major structures

See section 13 Glossary for definitions of the various structures.

5.9 Life Cycle issues

Some of the current life cycle issues relating to bridges include:

- increased demand on bridges to cater for transport vehicles operating at Higher Mass Limits will most likely shorten the useful life of structures.
- several bridges suffer from corrosion of reinforcing steel (concrete cancer) which will shorten the useful life of a bridge unless prompt remedial action is instigated. Steel corrosion may result from
 - limited concrete cover over reinforcing steel
 - porous concrete
 - saline environment
- the significant number of timber and steel bridges, including some constructed using non-descript technology, have created challenges to ensure ongoing serviceability of these structures.
- many bridges have substandard bridge rails and approach rails. Programmed provision of approach rails is required. Bridge rails may be upgraded at the time of bridge deck upgrading or widening.
- there are significant numbers of Goulburn Murray Water bridges and culverts on local roads which are unsuitable for use by Higher Mass Limit trucks. This limits approval of various routes for higher mass limit vehicles. While under the Road Management Act 2004 Goulburn Murray Water is responsible for bridges and culverts over its channels and drains, it is doubtful that Goulburn Murray Water will upgrade Higher Mass Limit deficient structures in the near future.

5.10 Boundary Bridges

Council's road network connects to those of seven other adjoining municipalities identified below:

- Gannawarra Shire
- Campaspe Shire
- Greater Bendigo City
- Mount Alexander Shire
- Central Goldfields Shire
- Northern Grampians Shire
- Buloke Shire

Boundary Agreements with adjoining municipalities were formulated and adopted in the late 1990's. Under agreements operational responsibility for specific sections of boundary road are allocated to an individual municipality. Bridges on a section of road are maintained by the responsible shire. Any capital works required are to be undertaken on a 50:50 basis with the adjoining municipality.

Structure number 266, on Greenings Rd, is maintained by Loddon Shire Council. Capital works required will be shared with the adjoining Central Goldfields and Mt Alexander Shire Councils.

The boundary with Northern Grampians Shire is the centre of the Avoca River, over which there are five bridges on local roads. Northern Grampians Shire undertakes the operational responsibilities for these bridges, with maintenance and capital costs being equally shared with Loddon Shire Council.

There are no bridges on the boundary with Buloke Shire.

Bridges on Appin South Rd and Mansbridges Bridge Rd are the responsibility of Gannawarra Shire Council who are responsible for maintenance works. Required capital works will be shared on 50:50 basis.

Part of the boundary with Campaspe Shire is the western bank of the Bendigo Creek. Bridges over the Bendigo Creek are therefore solely in Campaspe Shire and thus the full responsibility of Campaspe Shire Council.

There are no boundary bridges with the City of Greater Bendigo.

5.11 Culverts over Community Drains

For community drainage schemes, constructed in the northern and eastern parts of the municipality, using Department of Primary Industry funding, the drains now come under the management of Goulburn Murray Water while the road culverts are the responsibility of Council.

5.12 Bridges with Load limits

The following bridges on local roads have load limits.

Bridge #	Road Name	Bridge Type	Road Hierarchy	Existing Load Limit
164	Baileys Rd	Timber Bridge	RF	7
26	Boort Yando Rd	Timber Bridge	RF	4
184	Burkes Flat Wehla Rd	Timber Bridge	RGA	3
29	Caldwells Rd	Timber Bridge	RGA	12
230	Kingower Brenanah Rd	Timber Bridge	RGA	12
299	Olssons Rd	Timber Bridge	RGM	10
149	Punton Rd	Timber Bridge	RGA	5
66	Ring Rd (Boort)	Concrete Bridge	TSA	15
237	Sloans Rd	Timber Bridge	RGA	8
141	Tarnagulla Laanecoorie Rd	Concrete Bridge	RSC	12
216	Unnamed St Inglewood	Timber Bridge	TGM	5

The replacement of existing bridges with load limits will be as per tactics in section 8.4 Replacement Strategy.

5.13 Asset Hierarchy

The objective of developing an asset hierarchy is to provide a suitable framework for assets, which segments the asset base into appropriate classifications.

The intent of the asset hierarchy is to provide the framework in which data is collected, information is reported and decisions are made.

Level of service for Bridges is aligned with the hierarchy of the particular roads on which they are located. The road hierarchy adopted and detailed in Council's Road Management Plan is defined in the following table.

Road Hierarchy

Hierarchy Code	Hierarchy	Function	Comments
----------------	-----------	----------	----------

RURAL ROADS

RSC	Sealed Collector	Sealed Collector roads distribute traffic between arterials and primary access roads.	
RSA	Sealed Access	Sealed Access roads provide primary access to residential properties or other developments or provide for service or tourist traffic.	
RGC	Gravel Collector	Gravel Collector roads distribute traffic between arterials and primary access roads	
RGA	Gravel Access	Gravel Access roads provide primary access to residential properties or other developments or provide for service traffic, tourist traffic, school buses, or milk tanker traffic.	
RGM	Minor Gravel	Minor Gravel roads provide access to rural properties, or alternative access to rural residential properties.	These roads will not be rehabilitated in the future.
RF	Formed	Rural formed roads provide access to rural properties	
RUF	Unformed	Rural unformed roads provide access to rural properties	
RFA	Fire Access	Rural Fire Access roads provide access for fire fighting purposes	Generally located on 'unused' road reserves.

TOWN STREETS

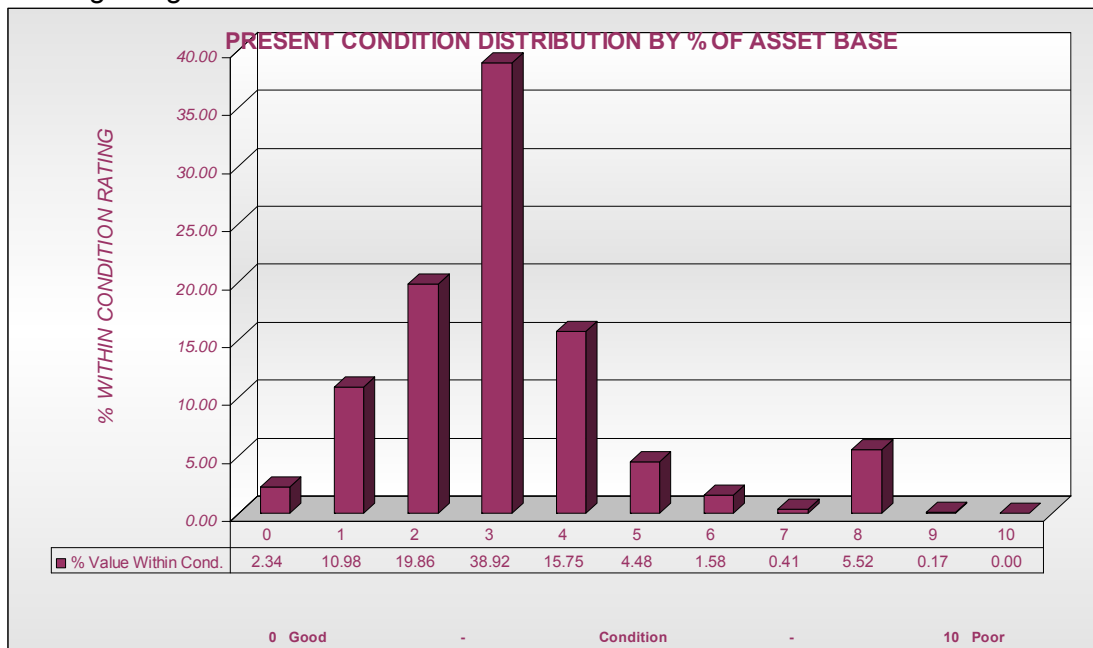
TSC	Sealed Collector	Sealed Collector Streets distribute traffic between arterials and primary access roads.
TSA	Sealed Access	Sealed Access streets provide primary access to residential areas or other developments or provide for service or tourist traffic.
TGA	Gravel Access	Gravel Access streets provide primary access to residential property or other developments or provide for service or tourist traffic.
TGM	Minor Gravel	Minor Gravel streets provide alternative access to properties.
TF	Formed	Formed streets provide access to properties.
TUF	Unformed	Unformed streets provide access to properties.

5.14 Asset Condition

Bridges are subject to programmed condition inspections.

A condition rating system is used to assist in determining the renewal expenditure required and the renewal gap. The condition of structures may range between 0 (excellent condition) through to 10 (extremely poor condition.)

Existing Bridge Condition



Bridges are generally in a good to fair condition.

5.15 Asset Replacement Value

The replacement value for bridges as at 30 June 2009 is \$24,511,686

5.16 Historical Expenditure

The table below summarises the historical expenditure for bridges over recent years.

Bridge Expenditure				
	2006-7 Actual	2007-8 Actual	2008-9 Actual	2009-10 Budget
Maintenance expenditure	\$115,635	\$83,754	\$101,182	\$89,956
Renewal	\$547,900	\$206,955	\$101,371	\$265,771

5.17 Bridge Renewal

In the condition graph in 5.11 it can be seen that 5% of the bridges are in condition 8 or worse and need renewal in the next few years. Thereafter there is a decline the number of bridges needing renewal.

6 ACQUISITION PLAN

6.1 New and upgrade Works

New and upgrade works are those works that create a new asset that did not previously exist, or works that upgrade or improve an asset beyond its existing size or capacity.

New and upgrade works may include:

- construction of a new bridge at a new location
- adding a new span to an existing bridge
- widening a bridge
- providing new approach railing
- upgrading existing bridge railings
- constructing a deck overlay to increase capacity
- strengthening to provide for higher mass limits vehicles

6.2 New and Upgrade Works Strategies

Upgrade works such as

- increasing load capacity
- widening

may be undertaken when renewal is carried out.

Projects such as provision of approach guard railing and upgrading bridge railing may be undertaken as projects under Council's Safety Program or Bridge and Culvert Construction Program.

Bridge projects for consideration in Council's budget consideration process may originate from various sources including:

- customer complaints or requests
- formal inspections by works team leaders
- one-off inspections by team leaders or other staff
- requests from Council Meetings
- various staff inputs
- community plans.

New and upgrade works proposals for bridges are prioritised using a Project Scope and Budget Bid scoring process. See Appendix 14.5

Factors considered in the prioritising process include

- road hierarchy
- traffic volume
- commercial vehicles per day
- whether school bus route
- significant business/industry route
- load limit
- condition/Level 2 inspection recommendation
- level of maintenance required
- contribution available

6.3 New Works Expenditure

The Council's expenditure on new and upgrade bridge works is as follows:

2008/09 - Actual \$55,513
2009/10 –Budget \$68,999

7 OPERATIONS AND MAINTENANCE PLAN

7.1 Operations

Operations are carried out by Council's in-house works teams
Operational activities include:

- emergency callout.
- cleaning
- asset inspections

7.2 Maintenance

Maintenance activities relate to the repair of defects to ensure ongoing serviceability and to prevent premature deterioration or failure of bridges.

Council's maintenance management process includes

- regular inspections
- keeping records
- effective execution by scheduling of maintenance operations

7.3 Maintenance Strategy

Loddon Shire Council carries out bridge maintenance during the service life of a structure to:

- maintain its design load capacity, functionality and serviceability
- protect the investment in the asset by ensuring that the structure attains its designed service life
- ensure safety to public.

Maintenance includes both reactive and proactive activities that preserve the condition of a structure or its components to reduce the long term need for expensive rehabilitation or replacement works.

7.4 Routine Maintenance

Routine bridge maintenance may be reactive or proactive (identified in Level1 Bridge inspections).

Routine maintenance works, which generally do no change the condition, include clearing of drainage, localised repairs to approaches at abutments, repairs to the deck surface, cleaning and adjusting deck joints, removal of debris, painting and sign maintenance.

Bridge maintenance activities are carried out by Council's in-house works teams.

7.5 Programmed Maintenance

Programmed bridge maintenance comprises activities identified from bridge inspections which maintain serviceability of the structure but fall outside the scope of routine maintenance.

Works may include the replacement of isolated timber bridge members and non-load bearing components in structures. Programmed maintenance activities include painting of steelwork, repair of deck joint seals, barrier repairs, repair of scour damage to stream beds and batters.

7.6 Maintenance Performance

Maintenance performance is as described in 5.2 Defect Response Times and in the Response Times table in Appendix 14.2.

7.7 Financial Forecast

Council's average expenditure for bridge maintenance over the past 3 years has been \$100,000 per annum.

As the level of basic routine maintenance is unlikely to substantially increase, provided minimal renewal effort is continued, it is proposed that the long term allocation for bridge maintenance be \$100,000 per annum.

8 RENEWAL/ REPLACEMENT PLAN

8.1 Physical Data

The number of bridge structures on various road hierarchies is summarised in the following table.

Bridge Type	Road Hierarchy						Foot way	Total No
	F	GM	GA	GC	SA	SC		
Concrete bridges	1	7	17	13	3	32		73
Timber &/or Steel Bridges	3	7	11	0	1	1		23
Concrete Major Culverts	2	9	15	9	7	42		84
Timber Major Culverts	1	1	2	0	1	1		6
Concrete Floodways	1	2	0	0	0	0		3
Stone Floodways	4	2	1	0	0	0		7
Major Structures	0	0	1	0	0	1		2
Concrete Foot Bridges	0	0	0	0	0	0	5	5
Timber Foot Bridges	0	0	0	0	0	0	6	6
Minor Concrete Culverts	0	0	1	1	0	2		4
Total	12	28	48	23	12	79	11	213

It can be seen that there are significant numbers of timber/steel bridges mainly on Loddon's unsealed road network.

8.2 Renewal/Replacement Principles

The following strategies have been adopted in preparing this renewal/replacement plan.

This Bridge Asset Management Plan reflects the general principles adopted in Council's Road Asset Management Plan i.e. that Minor Gravel Roads, Formed Roads and Unformed Roads will receive very limited levels of service.

8.3 Renewal Strategy

Bridges open to traffic need to be maintained to keep them serviceable and safe for traffic use.

Concrete bridges, open to traffic, may be renewed using the strategies for replacement shown in section 8.4.1.

For timber bridges on sealed roads renewal may be undertaken using the strategies for replacement in section 8.4.3.

For timber bridges on unsealed roads only limited renewal will be undertaken. At the time of project development consideration will include:

- cost to renew timber bridge or its components
- standard after renewal
- expected remaining life after renewal
- cost to replace structure with the replacement configuration develop as in 8.4 Replacement Strategy

8.4 Replacement Strategy

In the following sections a structure is due for replacement when:

- it is unable to be used for the purpose for which it is currently required
- maintenance and rehabilitation works are not economically viable

The following strategies are adopted for replacement of bridges.

8.4.1 Concrete bridges

- on sealed collector and access roads existing structures will be replaced with concrete bridges when due for replacement
- on gravel collector and access roads existing structures will be replaced with concrete bridges (or concrete major culverts) when due for replacement. SN 16 on Grose Rd now located on private property will be relocated on to the road reserve when replaced.
- on minor gravel, formed or unformed roads existing structures may not be replaced with concrete bridges, but will be individually assessed, when replacement is imminent. Options to be explored may include road/bridge closure, replacement with major culvert, floodway or bridge.

8.4.2 Concrete major culverts

- on sealed collector and access roads existing structures will be replaced with concrete major culverts when due for replacement
- on gravel collector and access roads existing structures will be replaced with concrete major culverts when due for replacement
- on minor gravel, formed or unformed roads existing structures may not be replaced with concrete major culverts but will be individually assessed when replacement is imminent. Options to be explored may include road/culvert closure, replacement with major culvert or floodway.

8.4.3 Timber and/or steel bridges

- on sealed collector and access roads existing structures will be replaced with concrete bridges or major culverts when due for replacement.
- on gravel access roads existing structures will be replaced with concrete major culverts (or a bridge where required by site conditions) when due for replacement. However:
 - where excessive major works are required to replace the structure and an alternative all weather access route is or can be made available for flood events, the bridge may be replaced with a floodway (concrete where erosion is likely) when due for replacement, or
 - where excessive major works are required to replace the structure and an alternative arrangement for all weather access is or can be made available, the bridge may be closed when due for replacement.
- of historic construction on a gravel access road may be replaced with a similar type of structure when due for replacement
- on minor gravel, formed or unformed roads in rural areas existing structures will be replaced with floodways (concrete if erosion is likely) when due for replacement. However,
 - where replacement with a floodway requires excessive works and a viable alternative access arrangement is, or can be made available, the bridge crossing may be closed when due for replacement.
- on minor gravel streets within a town area existing structures may be replaced with a concrete major culvert when due for replacement.

8.4.4 Timber major culverts

- on sealed collector or access roads will be replaced with concrete major culverts when due for replacement
- on gravel collector or access roads will be replaced with concrete major culverts when due for replacement
- on minor gravel, formed or unformed roads will be replaced with floodways when due for replacement.
 - however at community drains they will be replaced with concrete major culverts when due for replacement.

8.4.5 Heritage Bridges

- Heritage bridges will be assessed at the time the bridge is due for replacement.

8.4.6 Floodways

- concrete and stone floodways will be replaced with like floodways when due for replacement.

8.4.7 Major inlet/outlet structures

- may be replaced with similar structures when due for replacement.

8.4.8 Foot bridges

- concrete foot bridges may be replaced with concrete foot bridges when due for replacement
- timber foot bridges may generally be replaced with concrete foot bridges when due for replacement, except that architectural type timber foot bridges may be replaced with similar style timber footbridges when due for replacement.

8.4.9 Minor concrete culverts

- may be replaced with concrete culverts when due for replacement.

8.5 Project Development for Bridge Replacement

In addition to the Project Scope and Budget Bid process for prioritising Renewal and Replacement works shown in Appendix 14.5, the following additional factors are considered when developing bridge replacement projects:

- traffic patterns
- review of individual road hierarchy
- review the functional need for the bridge
- assessment of standard required including the consideration of one lane bridges.

8.6 Asset Lives

The effective asset lives adopted in the renewal plan are as in the following table:

Table of Effective Asset Lives	
Asset Type	Asset Life in Years
Concrete Bridges	100
Timber Bridges	80
Concrete Major Culverts	100
Timber major culverts	80
Concrete Floodways	100
Stone Floodways	100
Major Structures	100

8.7 Financial Forecast

Assumptions

While this plan provides that concrete bridges on minor gravel and formed roads may not be replaced with concrete bridges, to allow for renewal of components of existing concrete structures, renewal projections are based on the replacement value of existing concrete structures.

As it is considered that renewal of existing structural components of timber bridges will be limited their renewal/replacement is based on the proposed replacement configuration for each timber bridge.

9 DISPOSAL PLAN

The replacement of bridges and changes to road alignment at bridge sites may bring about the retirement of some old bridge structures, however no disposal strategy is provided in this plan.

Under Section 8 Renewal/Replacement Plan for concrete bridges, timber bridges and concrete major culverts on minor gravel, formed or unformed roads options for future replacement include road or bridge closure.

Proposals for closure will involve public consultation and will be subject to detailed investigation including;

- assessment of availability of suitable alternative access
- consideration of remoteness from nearest alternative access

Rationalisation is introduced in Section 8 Renewal/Replacement Plan by proposing downgrading of the type of replacement structure in various situations (refer to Section 8 for details).

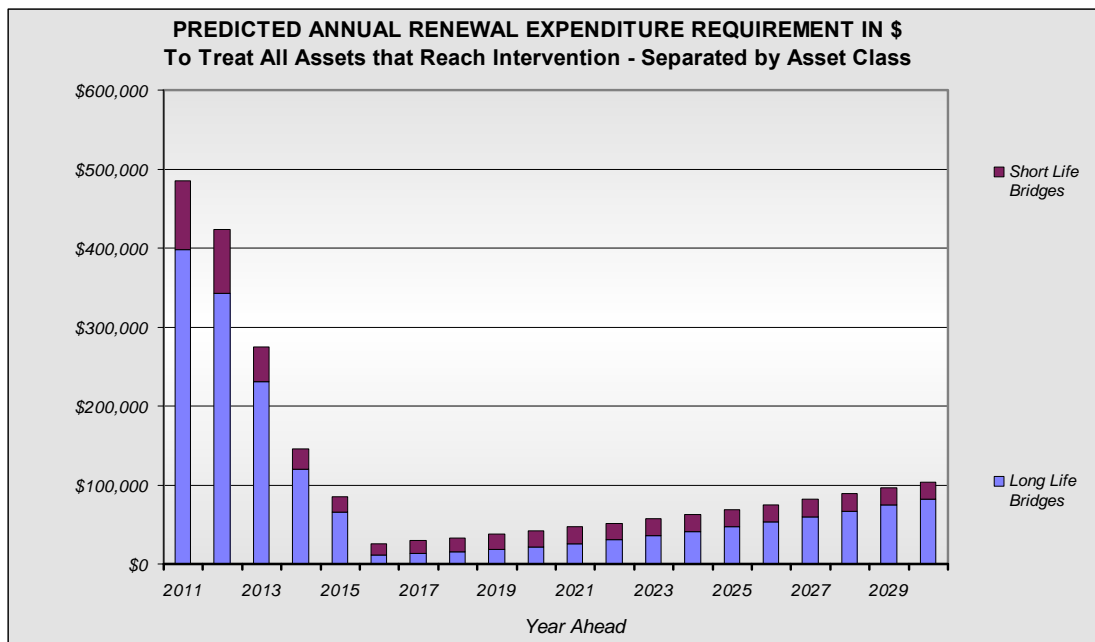
10 FINANCIAL FORECAST

10.1 Key Assumptions

Gap modelling is based on renewal values for the proposed replacement configuration for timber bridges subject to the considerations in section 8 Renewal/Replacement Plan.

10.2 Predicted Renewal Funding Required

The following graph shows predicted renewal expenditure required for all bridges over the next 20 year period. The renewal expenditure required is determined using Moloney modelling used in the MAV Renewal Gap project derived from the cost of proposed bridge replacement configurations, present condition distribution and standard condition degradation curves for bridges.

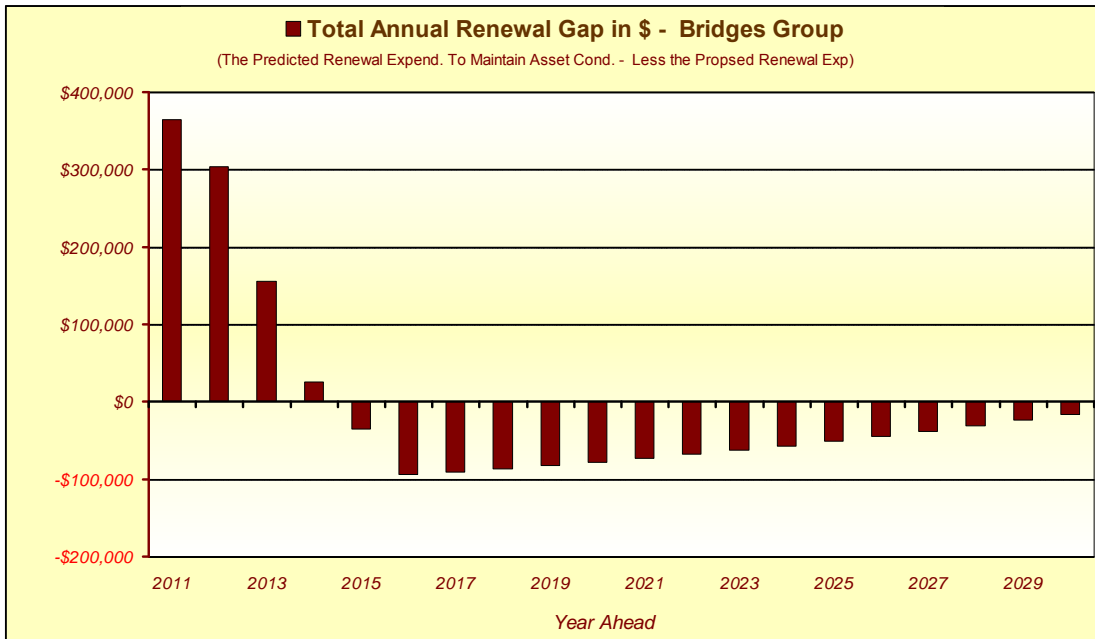


The graph indicates that an average renewal expenditure of \$340,000 per annum is required over the next 4 years while for the 20 year period an average renewal expenditure of \$116,000 per annum is required.

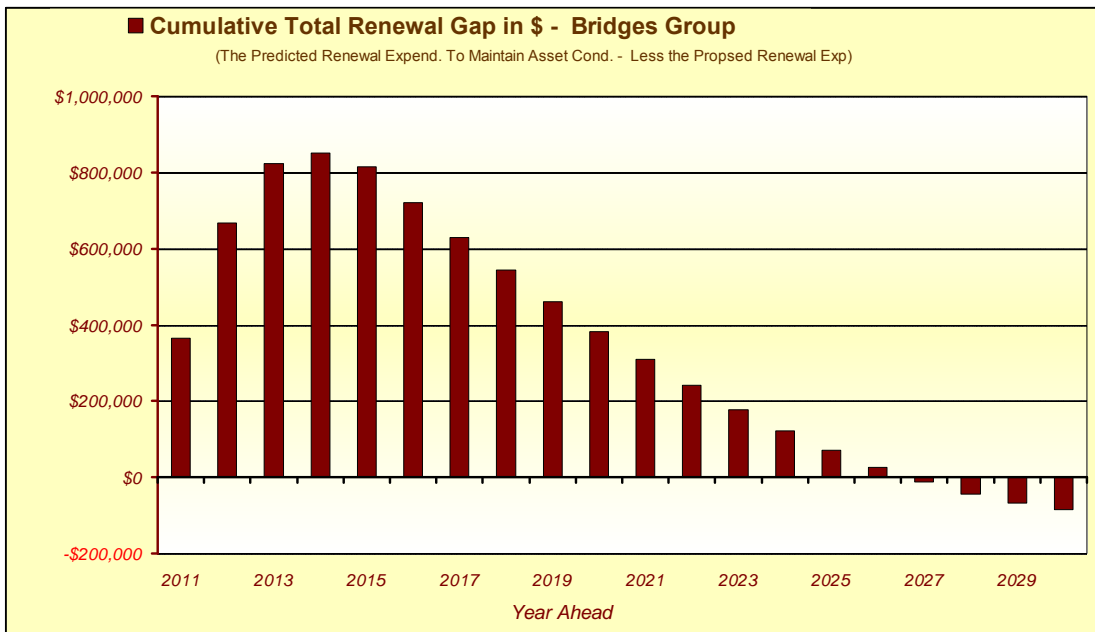
10.3 Forecast Results

The forecast results are as graphed based on average annual renewal funding of \$120,000 as detailed in sections 10.4 funding strategy.

Predicted renewal gap in year 1 is \$365,000 and averages \$215,000 over the first four years.



It can be seen from the cumulative renewal gap graph below that the renewal gap appears to be eliminated by 2027.



10.4 Funding Strategy

In this plan an average of \$120,000 per annum is to be spent on bridge renewal over the next 20 years. However it is recommended that in the first four years an average of \$350,000 per annum be expended on bridge renewal provided that justified projects are available.

11 ASSET MANAGEMENT IMPROVEMENTS AND MONITORING

11.1 Overview

This section identifies future improvements to Council's current asset management practices and outlines the monitoring and review process for the Bridge Asset management plan.

11.2 Asset Management Improvements

Improving the management of the Council's bridge assets is a continual and ongoing process. It is acknowledged that there is always room for improvement and refinement of asset management practices as new knowledge emerges, technology advances and customer expectations change.

Council's Asset Management Policy Statement and Implementation Strategy, February 2006, identifies the following infrastructure asset management improvements beyond the finalisation of an asset management plan for bridges

- Incorporate asset management plans into Council's overall Strategic Resource Plan.
- Investigate and implement systems to facilitate integration of Asset Registers and GIS.

Other improvements that have been identified during the preparation of this plan that relate specifically to the council's bridge assets include the incorporation of the bridge maintenance defect risk matrix developed in this plan into Council's

- Road Management Plan
- Road Maintenance Management program AssetAsyst

11.3 Monitoring and Review Processes

The Bridges Asset Management Plan is a living document that reflects as closely as practical actual practices necessary to manage the bridges under the Council's management.

To ensure the plan remains useful and relevant the following on-going process of Bridges Asset Management Plan review will be undertaken:

- Formal adoption of the Bridges Asset Management Plan including levels of service.
- Review and formal revision by Council of the Bridges Asset Management Plan on a four yearly interval, being once in each council term.
- Data updates will be provided by officers as required.

The following will be monitored to measure the effectiveness of this Bridge Asset Management Plan:

- Bridge condition surveys will continue to be carried out on a programmed basis by council.

12 REFERENCES

Loddon Shire Documents

Asset management Policy Statement and Implementation Strategy – February 2006

Road Management Plan 1.1.1 June 2006

Road Asset Management Plan Version 1.1.1 June 2008

Council Plan

13 GLOSSARY

Road Management Plan is a plan prepared under Division 5 of the Road Management Act 2004.

Bridge is a structure that enables traffic to cross over a waterway or drainage line and

- consist of 2 or more of the following elements:
 - abutment
 - pier
 - beam
 - deck
- is 6 m or greater in length along the road centre line

Note that the bridge definition reflects the definition used in the Victorian Grants Commission return.

Footbridge is a structure that enables pedestrians to cross over a waterway or drainage line.

Major Culvert is a structure that allows traffic to cross over a waterway or drainage line and

- is equal to or greater than 1.5m in diameter or span or
- has a waterway area greater than 3 sq m
- may be a bridge less than 6 m in length along the road centre line

Minor culvert is a structure that allows traffic to cross over a waterway or drainage line and

- is less than 1.5m in diameter or span or
- has a waterway area less than 3 sq m

Concrete Floodway is a low level concreted roadway (with or without minor relieving culverts underneath) that enables traffic to pass through a waterway when dry or when shallow flows permit safe passage by a vehicle.

Stone Floodway is a low level rock roadway (with or without relieving culvert underneath) that enables traffic to pass through a waterway when dry or when shallow flows permit safe passage by a vehicle.

14 APPENDICES

List of appendices

- 14.1 Schedule Bridges
- 14.2 Bridge Maintenance Defects Risk Matrix Summary
- 14.3 Sealed Road and Street Hazard Inspection Form
- 14.4 Level1 Bridge Inspection Report
- 14.5 Project Scope and Budget Bid

14.1 Schedule of Bridges

Abbreviation Explanations					
Bridge Type	Description	Bridge Type	Description	HML Assessment	Description
BC	Concrete Bridge	MCC	Concrete Major Culvert	A	adequate
BST	Timber/steel Bridge	MCST	Timber/steel Major Culvert	MO	adequate but needs monitoring
CC	Minor Concrete Culvert	MS	Major Structure	FA	further assessment needed
CF	Concrete Floodway	NR	Not to be replaced	I	inadequate
FC	Concrete Foot Bridge	SF	Stone Floodway		
FT	Timber Foot Bridge				

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
92	Aitkens Rd	0	Myers Creek	BST	5.0	SF	RGM	I	19,096
28	Appin South Rd	2	Sheepwash Creek	BC	3.0	BC	RSC	MO	144,768
267	Back Eddington Rd	0	Loddon River	MCC	2.0	MCC	RGM	FA	155,811
307	Back Eddington Rd	1		CF	3.0	CF	RGM	MO	9,198
164	Baileys Rd	1	Bullock Creek	BST	6.0	NR	RF	I	44,781
192	Berrimal Wedderburn Rd	10	Sandy Creek	MCC	4.0	MCC	RGA	MO	2,125
107	Biggs Rd	5	Bullock Creek	MCC	2.0	MCC	RGM	A	44,326
219	Boort Fernihurst Rd	1	Kinypanial Creek	BC	3.0	BC	RSC	A	73,573
239	Boort Kurting Rd	4	Kingower Creek	MCC	3.0	MCC	RSC	A	33,408
213	Boort Kurting Rd	4	Forbes Creek	BC	3.0	BC	RSC	A	157,209
212	Boort Kurting Rd	15	Unnamed Creek	MCC	3.0	MCC	RGM	MO	1,974
26	Boort Yando Rd	1	Jacks Ck	BST	9.0	SF	RF	I	9,512
17	Boort Yando Rd	2	Lake Lyndger Outlet	BC	3.0	BC	RSC	A	130,640
18	Boort Yando Rd	11	Venables Creek	BC	3.0	BC	RSC	MO	176,248
19	Boort Yando Rd	12	Unnamed Creek	MCC	4.0	MCC	RSC	A	104,684
20	Boort Yando Rd	16	Western Anabranh to Loddon River	BC	3.0	BC	RGA	MO	195,098
21	Boort Yando Rd	16	Loddon River	BC	4.0	BC	RGA	MO	188,790
22	Boort Yando Rd	18	E A to Loddon River	MCC	3.0	MCC	RGA	A	116,582

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
23	Boort Yando Rd	18	Unnamed Creek	MCC	2.0	MCC	RGA	A	116,582
269	Borong Hurstwood Rd	3	Unnamed Creek	MCC	2.0	MCC	RSC	A	75,537
112	Borong Prairie Rd	0	Bears Lagoon	BC	3.0	BC	RSC	MO	379,610
111	Borong Prairie Rd	1	Serpentine Creek	BC	2.0	BC	RSC	A	312,852
110	Borong Prairie Rd	3	Unnamed Creek	MCC	2.0	MCC	RSC	A	100,795
109	Borong Prairie Rd	8	Kelshs Lagoon	BC	1.0	BC	RSC	A	595,472
108	Borong Prairie Rd	10	Loddon River	BC	3.0	BC	RSC	A	468,930
275	Bridgewater Raywood Rd	1	Myers Creek	MCC	8.0	MCC	RSC	A	93,260
161	Bridgewater Raywood Rd	13	Bullock Creek	BC	3.0	BC	RSC	MO	117,856
272	Buckrabanyule Wychitella Rd	1	Unnamed Creek	MCC	2.0	MCC	RGA	A	19,149
201	Buckrabanyule Wychitella Rd	1	Wychitella Creek	BC	7.0	BC	RGA	MO	59,392
202	Buckrabanyule Wychitella Rd	5	Wychitella Creek	MCC	2.0	MCC	RGA	A	46,147
200	Burkes Flat Wedderburn	6	Wehla Creek	BC	2.0	MCC	RGA	A	300,803
184	Burkes Flat Wehla Rd	0	Unnamed Creek	BST	8.0	MCC	RGA	I	5,600
29	Caldwells Rd	1	Sheepwash Creek	BST	8.0	MCC	RGA	I	3,943
129	Calivil Mail Rd	6	Unnamed Creek	MCC	2.0	MCC	RSA	A	37,867
285	Calivil Mail Rd	7	Unnamed Creek	MCC	2.0	MCC	RSA	A	32,325
132	Campbells Rd	1	Unnamed Creek	MCC	3.0	MCC	RGA	MO	47,937
31	Canary Island Leaghur Rd	3	Lake Leaghur	MCC	2.0	MCC	RSC	A	130,640
32	Canary Island Leaghur Rd	5	Wandella Crk	BC	2.0	BC	RSC	MO	176,248
33	Canary Island Leaghur Rd	7	Loddon River	BC	3.0	BC	RGC	MO	176,248
34	Canary Island Leaghur Rd	8	Western Anabranh to Twelve Mile Ck	MCC	2.0	MCC	RGC	A	86,222
35	Canary Island Leaghur Rd	8	Twelve Mile Creek	BC	1.0	BC	RGC	A	373,709
36	Canary Island Leaghur Rd	8	Eastern Anabranh to Twelve Mile Ck	BC	3.0	BC	RGC	MO	144,768
37	Canary Island Leaghur Rd	9	Western Anabranh to Little Bannacher Ck	MCC	2.0	MCC	RGC	A	86,222
38	Canary Island Leaghur Rd	9	Little Bannacher Creek	BC	3.0	BC	RGC	MO	263,900
39	Canary Island Leaghur Rd	11	Bannacher Creek	BC	3.0	BC	RGC	MO	263,900
40	Canary Island Leaghur Rd	11	Eastern Anabranh to Bannacher Ck	MCC	2.0	MCC	RGC	A	86,222
41	Canary Island Leaghur Rd	11	Penny Royal Crk no 1	BC	3.0	BC	RGC	MO	235,625

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
42	Canary Island Leaghur Rd	12	Penny Royal Crk no 2	BC	3.0	BC	RGC	MO	204,523
43	Canary Island Leaghur Rd	12	Penny Royal Crk no 3	MCC	2.0	MCC	RGC	A	43,111
44	Canary Island Leaghur Rd	13	Penny Royal Crk no 4	BC	3.0	BC	RGC	MO	176,248
45	Canary Island Leaghur Rd	13	Penny Royal Crk no 5	BC	3.0	BC	RGC	MO	176,248
46	Canary Island Leaghur Rd	14	Penny Royal Crk no 6	BC	3.0	BC	RGC	MO	176,248
264	Cemetery Rd (Korong Vale)	0	Korong Creek	MCC	2.0	MCC	RGM	A	58,479
203	Chapel St Wedderburn	0	Nardoo Creek	BC	3.0	BC	TSA	A	594,651
151	Comers Rd	0	Murphy Creek	BC	3.0	BC	RGA	MO	69,426
134	Connors Rd	1	Dry Creek	BST	5.0	MCC	RGA	I	4,868
195	Coonooer Gowar Rd	1	Sandy Creek	BC	3.0	BC	RGC	MO	349,668
127	Cunneens Rd	1	Bullock Creek	BC	3.0	BC	RGM	MO	175,392
114	Dalziels Rd	0	Bears Lagoon Creek	BC	4.0	BC	RSA	MO	173,536
115	Dalziels Rd	2	Serpentine Creek	BC	4.0	BC	RGA	MO	230,144
261	Deeble St Inglewood	0	Town Drain	FT	6.0	FC	NA	NA	2,834
160	Derby Serpentine Rd	2	Spring Creek	BST	6.0	MCC	RGA	I	2,498
166	Derby Serpentine Rd	3	Unnamed Creek	MCC	2.0	MCC	RGA	A	61,149
90	Dingee Rd	9	Bullock Creek	BC	1.0	BC	RSC	A	511,038
91	Dingee Rochester Rd	3	Myers Creek	MCC	2.0	MCC	RSC	A	208,991
270	Dingee Rochester Rd	7	Unnamed Creek	MCC	1.0	MCC	RSC	A	134,593
271	Dingee Rochester Rd	8	Unnamed Creek	MCC	1.0	MCC	RSC	A	104,684
89	Dingee Serpentine Rd	0	Pompapiel Creek	MCC	3.0	MCC	RSC	A	136,841
183	Dunolly Inglewood Rd	0	town drain	MCC	2.0	MCC	RSC	A	118,030
234	Dunolly Inglewood Rd	0	Bullabul Creek	BC	3.0	BC	RSC	MO	255,316
235	Dunolly Inglewood Rd	0	Kangeraar Creek	BC	3.0	BC	RSC	MO	255,316
236	Dunolly Inglewood Rd	10	Bullabul Creek	BC	2.0	BC	RSC	A	127,368
242	Dunolly Orville Rd	0	Murphy Creek	BST	6.0	SF	RGM	I	4,057
169	Dunolly Rheola Rd	2	Bullabul Creek	MCC	4.0	MCC	RSC	A	88,099
170	Dunolly Rheola Rd	3	Unnamed Creek	MCC	3.0	MCC	RSC	A	143,078
152	Eastville Rd	3	Bradford Creek	BC	3.0	BC	RSC	MO	208,626
126	Echuca Serpentine Rd	0	Bullock Creek	BC	4.0	BC	RSC	MO	231,072
303	Eddington Laanecoorie	0	Laanecoorie inlet Ck	MCC	4.0	MCC	RSC	MO	76,558
156	Eddington Laanecoorie	0	Wild Duck Creek	BC	4.0	BC	RSC	MO	202,304

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
24	Frosts Rd	2	Twelve Mile Creek	BC	3.0	BC	RGA	MO	197,519
113	Fyfes Rd	0	Bears Lagoon	BC	4.0	BC	RGA	MO	188,384
165	Gath Rd	2	Spring Creek	CF	0.0	CF	RF	A	45,880
280	Gladfield Rd	5	Drain	CC	1.0	CC	RSC	A	19,620
294	Gladfield Rd	11	Calivil Creek	MCC	1.0	MCC	RSC	A	58,206
54	Gladfield South Rd	1	Hunts Swamp Inlet	MCC	0.0	MCC	RF	A	32,624
233	Glenablyn Fiery Flat Rd	2	Ryan Ck	CF	2.0	CF	RGM	A	4,728
305	Godfrey St Boort	0	Channel No 3	FT	0.0	FT	NA	NA	54,400
197	Gowar Logan Rd	10	Unnamed Creek	BC	4.0	BC	RGC	A	69,745
181	Grant St Inglewood	0	town drain	MCC	4.0	MCC	TSA	FA	76,908
266	Greenings Rd	2	Deep (Tullaroop) Creek	BC	4.0	BC	RGM	FA	225,388
16	Groses Rd	2	Bannacher Creek	BC	2.0	BC	RGA	MO	272,832
53	Hampsons Rd	1	Calivil Creek	SF	0.0	SF	RGA	MO	19,600
56	Hopefield Rd	2	Nine Mile Creek No 1	SF	0.0	SF	RGM	MO	33,600
57	Hopefield Rd	3	Nine Mile Creek No 2	SF	0.0	SF	RGM	MO	34,650
60	Hopefield Rd	4	E A to Penny Royal Ck	SF	0.0	SF	RF	MO	28,770
61	Hopefield Rd	4	Penny Royal Creek	BC	2.0	BC	RF	MO	173,536
62	Hopefield Rd	4	W A to Penny Royal Ck	MCC	2.0	MCC	RF	A	57,629
63	Hopefield Rd	5	Penny Royal Creek	SF	0.0	SF	RF	MO	25,200
65	Hopefield Rd	6	Penny Royal Creek	SF	0.0	SF	RF	MO	48,300
159	Houliston Rd	0	Spring Creek	MCC	3.0	MCC	RGA	A	100,716
298	Houston St	1	Drain	MCC	1.0	MCC	TSA	A	13,524
215	Inglewood Powlett Rd	1	Town Drain	MCC	2.0	MCC	TSC	A	35,549
284	Inglewood Rheola Rd	3	Unnamed Creek	MCC	1.0	MCC	RSC	A	57,918
224	Inglewood Rheola Rd	4	Kingower Creek	MS	2.0	MS	RSC	NA	13,812
225	Inglewood Rheola Rd	12	Kingower Creek	MCC	2.0	MCC	RSC	A	36,708
226	Inglewood Rheola Rd	12	Kingower Creek	BC	4.0	BC	RSC	MO	60,900
227	Inglewood Rheola Rd	18	Kingower Creek	MCST	3.0	MCC	RSC	I	32,334
228	Inglewood Rheola Rd	19	Kangeraar Creek	BC	5.0	BC	RSC	MO	126,208
281	Inglewood Serpentine Rd	1	Unnamed Creek	CC	1.0	CC	RSC	A	29,921
84	Jarklin West Rd	1	Eastern Anabranh of Serpentine Ck	MCC	3.0	MCC	RGM	MO	50,518

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
85	Jarklin West Rd	1	Serpentine Creek	BC	3.0	BC	RGM	MO	284,200
86	Jarklin West Rd	5	Kelshs Lagoon	BC	2.0	BC	RGM	MO	251,720
268	Kellys Rd	1	Unnamed Creek	MCC	1.0	MCC	RGA	A	22,585
230	Kingower Brenanah Rd	0	Kingower Creek	BST	4.0	BST	RGA	I	25,201
231	Kingower Brenanah Rd	2	Kingower Creek	MCST	4.0	MCC	RGA	I	17,412
232	Kingower Kurting Rd	0	Kingower Creek	MCC	4.0	MCC	RSC	MO	52,200
179	Korong Vale Kinypanial Rd	0	Anabranh of Korong Ck	BC	4.0	BC	RSC	FA	91,205
220	Korong Vale Kinypanial Rd	0	Korong Creek	BST	3.0	BC	RSC	I	75,794
273	Korong Vale Kinypanial Rd	1	Korong Ck Floodway	MCC	5.0	MCC	RSC	A	68,670
155	Laanecoorie Newbridge Rd	1	Unnamed Creek	BC	3.0	BC	RSC	MO	181,830
15	Loddon Park Rd	1	Flume Creek	BC	3.0	BC	RGA	MO	202,638
47	Loddon River Rd	2	Wandella Crk	MCC	2.0	MCC	RGC	A	38,695
300	Logan Bealiba Rd	3	Unnamed Creek	MCC	4.0	MCC	RGM	A	11,033
187	Logan Kingower Rd	0	Wehla Creek	MCC	2.0	MCC	RSC	A	105,818
116	Longs Rd	2	Gannies Lagoon	MCC	2.0	MCC	RGA	A	88,894
117	Longs Rd	2	Serpentine Creek	BC	3.0	BC	RGM	MO	87,725
142	Main Road Laanecoorie	1	Bradford Creek	BC	3.0	BC	RSC	MO	108,576
304	Main Road Laanecoorie	1		MCC	4.0	MCC	RSC	MO	31,117
289	Majors Line Rd	0	Unnamed Creek	MCC	2.0	MCC	RGA	A	25,931
78	Majors Line Rd	2	Loddon River	BC	3.0	BC	RGA	A	455,155
52	Marfleets Rd	0	Calivil Creek	SF	0.0	SF	RF	MO	19,600
174	McCamish Rd	0	Unnamed Creek	BC	7.0	MCC	RGA	FA	40,687
293	Mincha Canary Island Rd	4	Unnamed Creek	MCC	1.0	MCC	RSC	A	29,038
292	Mincha Canary Island Rd	6	Calivil Creek	MCC	4.0	MCC	RSC	A	66,054
77	Mitiamo Kerang Rd	1	Calivil Creek	BC	3.0	BC	RGA	MO	103,675
67	Mitiamo Kerang Rd	1	Seven Months Creek	MCST	8.0	MCC	RF	I	26,327
51	Mologa Durham Ox Rd	3	Mologa West Drain	MCST	6.0	MCC	RGM	I	15,487
49	Mologa Durham Ox Rd	4	Western Anabranh to Bullock Ck	MCC	2.0	MCC	RGA	A	130,640
50	Mologa Durham Ox Rd	5	Bullock Creek	BC	4.0	BC	RGA	MO	173,536
287	Mysia East Rd	0	Unnamed Creek	MCC	4.0	MCC	RGC	A	56,244
150	Neivandts Rd	0	Murphy Creek	BC	4.0	BC	RGA	MO	150,249
262	Newbold St Wedderburn	0	Korong Creek	FT	6.0	FC	NA	NA	9,590

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
79	No 2 Weir Rd	2	Serpentine Creek	BC	3.0	BC	RGM	MO	262,958
214	North St Inglewood	0	Town Drain	MCC	2.0	MCC	TSA	A	52,035
260	Off Sandy Creek Lane T/Gulla	0	Sandy Creek	FT	6.0	FC	NA	NA	5,354
302	Off Sandy Creek Lane T/Gulla	0		FT	0.0	FC	NA	NA	6,480
118	Old Boort Rd [EL]	0	Serpentine Creek	BC	3.0	BC	RSC	A	376,884
282	Old Boort Rd K	13	Unnamed Creek	CC	2.0	CC	RGC	A	32,373
193	Old St Arnaud Rd	3	Unnamed Creek	MCC	3.0	MCC	RSC	A	102,298
299	Olssons Rd	1	Unnamed Creek	BST	9.0	CF	RGM	I	32,888
75	Otters Rd	3	Bullock Creek	BST	5.0	SF	RGM	I	34,003
252	Permona Lane	0	Korong Ck Overflow	MCST	4.0	MCC	RGA	I	29,174
124	Prairie Rd	1	Bullock Creek	BC	4.0	BC	RSC	MO	510,632
123	Prairie Rd	4	Unnamed Creek	MCC	2.0	MCC	RSC	A	43,111
149	Punton Rd	3	Bradford Creek	BST	8.0	NR	RGA	I	90,694
290	Pyramid Cohuna Rd	6	Unnamed Creek	MCC	1.0	MCC	RGC	A	32,054
296	Pyramid Mincha Rd	1	Seven Months Creek	MCC	3.0	MCC	RSC	A	24,797
125	Pyramid Yarraberb Rd	1	Pompapuel Creek	MCC	2.0	MCC	RSC	A	79,134
88	Raywood Durham Ox Rd	2	Bullock Creek	MCC	2.0	MCC	RGM	A	130,640
30	Redgum Rd	2	Loddon River	BST	4.0	BC	RGA	FA	34,350
178	Rheola Llanelly Rd	0	Kangeraar Creek	MCC	3.0	MCC	RSC	A	34,104
171	Rheola Llanelly Rd	13	Bullabul Creek	BC	5.0	BC	RSC	MO	270,077
288	Richards Rd	2	Calivil Creek	MCC	4.0	MCC	RSC	A	71,940
243	Rinder's La Korong Vale	0	Korong Creek	MCC	5.0	MCC	TGA	FA	33,350
66	Ring Rd (Boort)	0	No 2 GMW Channel	BC	3.0	BC	TSA	FA	95,700
87	Rothackers Rd	12	Bullock Creek	MCC	2.0	MCC	RGC	A	155,002
131	Royals Bridge Rd	2	Myers Creek	MCC	2.0	MCC	RGM	A	136,160
291	Rudducks Rd	2	Calivil Creek	MCC	4.0	MCC	RGC	A	66,054
191	Scollaries Rd	0	Anabranh to Avoca River	BC	3.0	BC	RGM	MO	219,603
162	Sebastian Rd	5	Spring Creek	BC	1.0	BC	RSC	A	189,329
163	Sebastian Rd	9	Bullock Creek	BC	5.0	BC	RSC	A	245,630
76	Sidney Watsons Rd	1	Bullock Creek	BST	5.0	SF	RF	I	25,502
301	Simpsons Creeek Lane	0		MCC	4.0	MCC	RSA	MO	19,982
237	Sloans Rd	3	Bullabul Creek	BST	6.0	CF	RGA	I	227,676

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacm't Value \$
189	St Arnaud Dunolly Rd	0	Eastern Anabranh to Avoca River	BC	3.0	BC	RSC	A	354,177
286	Stringers Rd	0	Venables Creek	MCC	4.0	MCC	RGA	A	89,990
240	Sullivan St Inglewood	0	Town Drain	MCC	5.0	MCC	TSC	A	27,521
69	Sylvaterre Rd	2	Blind Creek	MCC	2.0	MCC	RSC	A	34,776
204	Talgitcha St Wedderburn	0	Korong Creek	BC	3.0	BC	TGA	A	128,180
96	Tandarra Elmore Rd	1	Wilkinsons Swamp	MCC	2.0	MCC	RSC	A	43,111
93	Tandarra Elmore Rd	4	Myers Creek	MCC	2.0	MCC	RSC	A	173,751
94	Tandarra Elmore Rd	4	Myers Creek	MCC	2.0	MCC	RSC	A	173,751
95	Tandarra Elmore Rd	6	Drain	MCC	2.0	MCC	RSC	A	117,797
97	Tandarra Serpentine Rd	0	Unnamed Creek	MCC	4.0	MCC	RSC	MO	57,768
251	Tantalla St Wedderburn	0	Reserve Channel	MCC	2.0	MCC	TSA	A	5,712
176	Tarnagulla Eddington Rd	2	Waanyarra Creek	BC	4.0	BC	RGA	FA	133,006
141	Tarnagulla Laanecoorie Rd	0	Loddon River	BC	8.0	BC	RSC	I	1,010,070
297	Tarnagulla Laanecoorie Rd	1	Unnamed Creek	MCC	1.0	MCC	RSC	A	9,223
167	Turnbulls Rd	0	Spring Creek	BST	6.0	SF	RF	FA	5,044
216	Unnamed Rd	0	Town Drain	BST	8.0	MCC	TGM	I	67,697
217	Verdon St Inglewood	0	Town Drain	MCST	3.0	MCC	TSA	I	36,886
255	Verdon St Inglewood N side	0	Town Drain	FC	3.0	FC	NA	NA	5,069
256	Verdon St Inglewood S side	0	Town Drain	FC	1.0	FC	NA	NA	6,221
258	Vernon St Korong Vale	0	Town Drain	FT	5.0	FC	NA	NA	8,536
257	Vernon St Korong Vale	0	Town Drain	FC	5.0	FC	NA	NA	3,007
259	Vernon St Korong Vale	0	Town Drain	FC	1.0	FC	NA	NA	3,071
295	Vernon St Korong Vale	0	Drain	FC	2.0	FC	NA	NA	8,265
168	Webbs Rd	1	Spring Creek	BST	6.0	SF	RGM	FA	3,895
278	Wedd/n Wedderburn Junction R	1	Unnamed Creek	MCC	2.0	MCC	RSC	A	35,759
253	Wedderburn Brenanah Rd	4	Unnamed Creek	CC	2.0	CC	RGA	A	32,046
277	Wedderburn Bukrabanyule Rd	8	Unnamed Creek	MCC	2.0	MCC	RSC	A	47,143
185	Wedderburn Dunolly Rd	5	Brenanah Creek No 1	MCC	3.0	MCC	RSC	A	57,159
229	Wedderburn Dunolly Rd	5	Orville Creek	BC	1.0	BC	RSC	A	145,602
186	Wedderburn Dunolly Rd	5	Brenanah Creek No 2	MCC	3.0	MCC	RSC	A	57,159
221	Wedderburn Serpentine Rd	16	Hope Creek	BC	1.0	BC	RSC	A	399,330
306	Wehla Weddurburn Rd	1		MS	0.0	MS	RGA	NA	27,600

Bridge No	Road Name	Locn km	Stream	Bridge Type	Condition	Replacm't Type	Road Hierarchy	HML Assessment	Replacem't Value \$
153	Woodstock Rd	1	Murphy Creek	BST	5.0	MCC	RSA	I	114,979
2	Woolshed East Rd	0	Kinypanial Creek	BST	4.0	MCC	RGA	I	29,116
25	Yando Swamp Rd	5	Yando Swamp Inlet	BST	7.0	MCC	RGA	I	3,191
48	Yarrowalla East Rd	5	Unnamed Creek	MCC	1.0	MCC	RGA	A	38,298
279	Yawong Springs Rd	1	Unnamed Creek	BST	4.0	MCC	RGA	I	60,072
274	Yeungroon Nine Mile Rd	1	Unnamed Creek	MCC	4.0	MCC	RGM	FA	36,685
158	Yorkshire Rd	0	Spring Creek	BC	0.0	BC	RGC	A	227,331
	<ul style="list-style-type: none"> Note SN 141 Janevale Bridge on Tarnagulla Laanecoorie Rd, at Laanecoorie, is listed on the Victorian Heritage Register ~ VHR H1986 								

14.2 Bridge Maintenance Defects Risk Matrix Summary

Defect No	Defect	Level of Risk			
		Road Hierarchy			
		RSC, TSC, RSA, TSA,	RGC, RGA, TGA	RGM, TGM	RF, TF
1	Obstructed deck drainage	L	L	L	L
2	Vandalism, Grafitti	L	L	L	L
3	Obstructed stream flow	L	L	L	L
4	Minor scours	L	L	L	L
5	Missing, damaged warning signs	M	M	M	M
6	Mis-orientated signs	M	M	M	ML
7	Dirty signs	ML	ML	ML	L
8	Load limit signs missing, illegible or damaged making signs substantially ineffective (Hazard)	H	H	H	M
9	Deteriorated component requiring further inspection	M	M	M	ML
10	Damage affecting structural performance (Harzard)	H	H	H	M
11	Subsided running surface	ML	KL	ML	L
12	Split, cracked or loose deck planks	M	M	M	ML
13	Broken timber deck plank (Hazard)	H	H	M	M
14	Broken misaligned railing, posts	ML	ML	ML	ML
15	Loose, missing rail connectors	ML	ML	ML	ML
16	Accident damage	ML	ML	ML	ML
17	Spalled concrete above deck	VL	VL	VL	VL

Response Times		
Level of Risk		
Result	Description	Action / Response Times
H	High risk - urgent response	rectify if possible or provide appropriate warning by end next working day rectify within 5 working days or provide appropriate warning
M	Medium risk	rectify within 4 working weeks or provide appropriate warning For defect 9, the action is refer to a higher level inspection
ML	Medium to low risk	rectify within 3 months or provide appropriate warning For defect 9, the action is refer to a higher level inspection
L	Low risk - routine procedures	rectify in annual maintenance program but as resources permit
VL	Very Low risk	rectify as resources permit

HAZARD INSPECTION

RURAL & TOWN - SEALED COLLECTOR & SEALED ACCESS ROADS

Loddon Shire Council

Reference No

Location of Inspection and Inspector Details

Road Name	Date / / Day/Night	Chainage Inspected From To
Inspection carried out by (print name)	Company/VicRoads Section	Weather conditions

Inspection results -SEALED PAVEMENTS

Hazard	Risk Level Response	Item located & Chainage*	Comment & Action taken
Obstructions and Substances in Traffic Lane			
Materials fallen from vehicles, dead animals, hazardous materials on the traffic lane of sealed roads	H	Nil	
Wet clay and other slippery substances, accumulation of dirt or granular materials on the traffic lane of sealed roads	M	Nil	
Ponding of water >300mm, fallen trees, oil spills, stray livestock	H	Nil	
Pavement or Surface Defects			
Potholes in traffic lane of a sealed pavement greater than 300mm in diameter and greater than 100mm deep	M	Nil	
Potholes at tolerable level but located on curves	M	Nil	
Low surface texture indicating a slippery surface.	M	Nil	
Deformations greater than 100mm under a 3m straight Edge.	M	Nil	
Edge drops onto unsealed shoulder greater than 100mm	M	Nil	
Drainage			
Damaged drainage culverts where wide reduced to less than 2 traffic lanes.	M	Nil	

HAZARD INSPECTION

RURAL & TOWN - SEALED COLLECTOR & SEALED ACCESS ROADS

Loddon Shire Council

Reference No

Location of Inspection and Inspector Details

Road Name	Date / / Day/Night	Chainage Inspected From To
Inspection carried out by (print name)	Company/VicRoads Section	Weather conditions

Inspection results - ROADSIDE

Hazard	Risk Level Response	Item located & Chainage*	Comment & Action taken
Vegetation – Trees, Shrubs and Grassed Areas			
Tree limbs or trees that have been classified as in danger of falling	M	Nil	
Trees, shrubs or grasses that restrict design sight distance to intersections or restrict viewing of safety signs.	M	Nil	

Inspection results – ROADSIDE FURNITURE

Hazard	Risk Level Response	Item located & Chainage*	Comment & Action taken
Safety Signs**			
Safety signs missing, illegible or damaged making them substantially ineffective	M	Nil	
Guideposts			
Missing or damaged at a critical location*** making them substantially ineffective	M	Nil	
Islands, Footpaths and Bicycle/Shared Paths			
Defective pedestrian areas with a step greater than 50mm	?	Nil	

Inspection results – STRUCTURE, BRIDGE, MAJOR CULVERT or FLOODWAY

Hazard	Risk Level Response	Item located	Comment & Action taken
Damage affecting structural performance	H	SN#####	
Load limit signs missing, illegible or damaged making signs substantially ineffective	H	SN#####	
Broken timber deck plank	H	SN#####	

Inspection results -Defects with H or M risk level, other than hazards listed above

Defect	Risk Level Response	Item located & Chainage*	Comment & Action taken
		Nil	

*** A critical location is a location where the road alignment and/or pavement width and/or geometry are identified by additional markings or furniture to guide the traveling public (cars, trucks, motor cycles bicycles and pedestrians).
 ** A "safety sign" is a road sign that provides the driver with advice on the safe use of the road.
 * Where no defects are identified 'Nil' shall be written in this column.

Inspectors Signature:

14.4 Level1 Bridge Inspection Report

Road Name Structure No Locationkm
 Stream Name Inspector Inspection date

Page 1

SCORE	LOAD LIMIT:
1 good to 4 failed	COMMENTS/WORK REQUIRED

Bridge Cleaning

Weep / Vent holes		
Drains / Gutters		
Pits		
Graffiti		

Stream Cleaning

Litter		
Vegetation		
Loose Debris		
Wood		
Material / Silt		
Scour within 5m		

Signs & Delineators

All exist		
Complete		
Clean		
Damage		
Movement		
Visibility		

Foundation

Supports		
Spalling		
Cracking		
Staining		
Dampness		
Corrosion		
Termite		
Rotting		
Splitting		
Growth in Joints		
Damage		

Cross Head

Cracking		
Corrosion		
Termite		
Rotting		
Splitting		
Growth in Joints		
Damage		
Wedges		
Bolting		

Stringer

Termite		
Rotting		
Splitting		
Growth in Joints		
Damage		

Cross Beam

Termite		
Rotting		
Splitting		
Growth in Joints		
Damage		

Footway

Even		
Potholes		
Cracking		

Deck

Cracking		
Split		
Distortion		
Loose		
Movement		
Bolts		

Road Approach

Depression		
Potholes		
Cracking		

Wearing Surface

Depression		
Potholes		
Cracking		

Guard Rail

Alignment		
Height		
Spacing		
Rail		
Splay		
Post		
Bolts		
Clamps		
Paint		


Hand Rail

Alignment		
Height		
Spacing		
Rail		
Post		
Bolts		
Clamps		
Paint		

End Wall

Scour		
Structure		
Spalls		

14.5 Project Scope and Budget Bid for Bridges and Culverts

 <p>LODDON SHIRE</p>		<p><u>Project Scope & Budget Bid</u></p> <p>Bridges and Culverts</p>		<p><i>Office Use Only:</i></p> <p>Processed by: <input style="width: 100%;" type="text"/></p> <p>Date: <input style="width: 100%;" type="text"/></p> <p>Project No: <input style="width: 100%; text-align: center; value: LBCC;" type="text"/></p>	
Road/Street Name	<input style="width: 100%;" type="text"/>				
Indicative Location of Project (i.e position to nearest intersection)					
<input style="width: 100%; height: 30px;" type="text"/>					
Precise Location of Project			Datum		<input style="width: 100%;" type="text"/>
Loddways Ref.	<input style="width: 100%;" type="text"/>	VicRoads Ref.	<input style="width: 100%;" type="text"/>	Council Property No.	<input style="width: 100%;" type="text"/>
Project Description					
<input style="width: 100%; height: 40px;" type="text"/>					
Identified By	<input style="width: 100%;" type="text"/>	Works Request Ref.	<input style="width: 100%;" type="text"/>	Council Plan Ref.	<input style="width: 100%;" type="text"/>
Project Rationale					
<input style="width: 100%; height: 40px;" type="text"/>					
Project Scope Author	<input style="width: 100%;" type="text"/>				
Project Scope Detail					
<input style="width: 100%; height: 80px;" type="text"/>					
Comments					
<input style="width: 100%; height: 100px;" type="text"/>					

COSTING & PROJECT PRIORITISATION						
Concept Estimate (includes 20% Contingency)		Length (m)	Width (m)	Area (m ²)	Rate (\$/m ²)	Total (\$)
Detailed Estimate (includes 10% Contingency)		Length (m)	Width (m)	Area (m ²)	Rate (\$/m ²)	Total (\$)
New (%)	Upgrade (%)	Renewal (%)	Maint/Operation (%)	Total (%)	Additional Expenditure (\$) Contingency (10% or 20%)	
0%	100%	0%	0%	100%	TOTAL	
Project Assessment Criteria						Score
Road Hierarchy		<RGA=1, RGA & RG2=2, RSA & RSC=3			0	
Traffic Volume AADT		<100 = 1, 1-200 = 2, >200 = 3			0	
Commercial Vehicles - No per Day		<10 = 1, 10-20 = 2, >20 = 3			0	
School Bus Route		No = 0, Yes = 3			0	
Significant Business - Industry Route		No = 0, Yes = 2			0	
Load Limit (Specify here if known)		No = 0, Yes = 2			0	
Condition Moloney		<6 = 1, 6-6.5 = 2, 6.5-7 = 3, 7-8 = 4, >8 = 5			0	
OR L2 inspection recommendation to replace		Replace = 3			0	
Level of Maintenance Required		>Av = 1, high = 2, v.high = 3			0	
Benefit Contribution Available		Yes = 2, No = 0			0	
Total Rating =						

Assessment Summary:			
Authorised Manager		Authorised Director	
			Approved MEG

Project Delivery			
Cost Centre		Ledger No.	
			Implementation Year
Project Identity			

Financial Details					
Budget	%	Council \$	Grants \$	Contributions \$	Total Cost to Council \$
Labour					
Oncost					
Plant					
Creditors					
Contractors					
Total					

Projected Expenditure & Income Profile													
Month	July	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	April	May	June	July
Income (\$k)													
Expenditure (\$k)													