

Shire of Toodyay

INFRASTRUCTURE

Asset Management Plan (Comprehensive)





Document Control		 Shire of Toodyay Asset Management Plan			
Document ID : Infrastructure Asset Management Plan					
Rev No	Date	Revision Details	Author	Reviewer	Approver
	September 2018		Manager Corporate Services & Manager Works and Services	CEO	
	September 2018		Manager Corporate Services & Manager Works and Services	CEO	

© Copyright 2017 – All rights reserved.
The Institute of Public Works Engineering Australasia.
www.ipwea.org/namsplus



TABLE OF CONTENTS

1.	EXECUTIVE SUMMARY	1
1.1	The Purpose of the Plan	1
1.2	Asset Description	1
1.3	Levels of Service	1
1.4	Future Demand	1
1.5	Lifecycle Management Plan	1
1.6	Financial Summary	1
1.7	Asset Management Practices	1
1.8	Monitoring and Improvement Program	1
2.	INTRODUCTION	2
2.1	Background	2
2.2	Goals and Objectives of Asset Ownership	3
2.3	Core and Advanced Asset Management	5
3.	LEVELS OF SERVICE	7
3.1	Customer Research and Expectations	7
3.2	Strategic and Corporate Goals	8
3.3	Legislative Requirements	9
3.4	Customer Levels of Service	10
3.5	Technical Levels of Service	10
4.	FUTURE DEMAND	14
4.1	Demand Drivers	14
4.2	Demand Forecasts	14
4.3	Demand Impact on Assets	14
4.4	Demand Management Plan	15
4.5	Asset Programs to meet Demand	15
5.	LIFECYCLE MANAGEMENT PLAN	16
5.1	Background Data	16
5.2	Operations and Maintenance Plan	19
5.3	Renewal/Replacement Plan	22
5.4	Creation/Acquisition/Upgrade Plan	25
5.5	Disposal Plan	26
6.	RISK MANAGEMENT PLAN	27
6.1	Critical Assets	28
6.2	Risk Assessment	28
6.3	Infrastructure Resilience Approach	32
6.4	Service and Risk Trade-Offs	32
7.	FINANCIAL SUMMARY	33
7.1	Financial Statements and Projections	33
7.2	Funding Strategy	35
7.3	Valuation Forecasts	35
7.4	Key Assumptions Made in Financial Forecasts	36
7.5	Forecast Reliability and Confidence	36
8.	PLAN IMPROVEMENT AND MONITORING	38
8.1	Status of Asset Management Practices	38
8.2	Improvement Plan	38
8.3	Monitoring and Review Procedures	39
8.4	Performance Measures	39
9.	REFERENCES	40
10.	APPENDICES	40
	Appendix A - Projected 10-year Capital Renewal and Replacement Works Program	41
	Appendix B - Projected Upgrade/Exp/New 10-year Capital Works Program	42
	Appendix C - Budgeted Expenditures Accommodated in LTFP	43
	Appendix D - Abbreviations	45
	Appendix E Glossary	46

1. EXECUTIVE SUMMARY

1.1 The Purpose of the Plan

Asset management planning is a comprehensive process to ensure delivery of services from infrastructure is provided in a financially sustainable manner.

The Infrastructure Asset Management Plan details information about Infrastructure assets including actions required to provide an agreed level of service in the most cost effective manner while outlining associated risks. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services over a 10-year planning period.

The Infrastructure Asset Management Plan is the link between the Council's corporate, strategic and operational objectives, interpreted as the provision of specific infrastructure to the community for their enjoyment of agreed Levels of Service for various community and lifestyle activities.

This plan combines the strategic planning, continuous improvement and operational management factors to provide Levels of Service associated with community needs and to a certain degree, community expectations, (although it is fully acknowledged that community expectations may never be fully realised).

The plan provides the guidelines for management of the Infrastructure assets and services to ensure:

- Best appropriate practice asset and services management for Shire of Toodyay;
- Competent decision-making based on quality information and contemporary management techniques;
- Consistent service provision according to needs based criteria.

The plan relates all relevant regulatory, legislative and reasonable practices against the Levels of Service and risk management framework.

This plan also acknowledges that:

- Determining the sustainability of existing programs may involve the review of all current assets against the Levels of Service to identify and address any 'gaps'.

- From time to time there will be external strategies, e.g. new Government policy or climate change initiatives which may materially impact on the Infrastructure assets; and
- Technology changes may also impact on the asset management regime.

1.2 Asset Description

The Infrastructure network comprises:

- Roads – 658.33km
- Footpaths – 10.73km
- Bridges – 29 (number)
- Parks and Ovals
- Other (Drainage, cemetery)

These assets have a replacement value of \$119,839,714.

1.3 Levels of Service

Our present funding levels are insufficient to continue to provide existing services at current levels in the medium term.

The main services from Infrastructure assets are:

- Transport related services;
- Stormwater drainage networks; and
- Recreation facilities and open spaces to community.

1.4 Future Demand

The main demands for new services are created by:

- Strategic and Corporate Goals;
- Demographic changes and consumer preferences;
- Regulations;
- Technological changes;
- Environmental awareness.

These will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management.

1.5 Lifecycle Management Plan

What does it Cost?

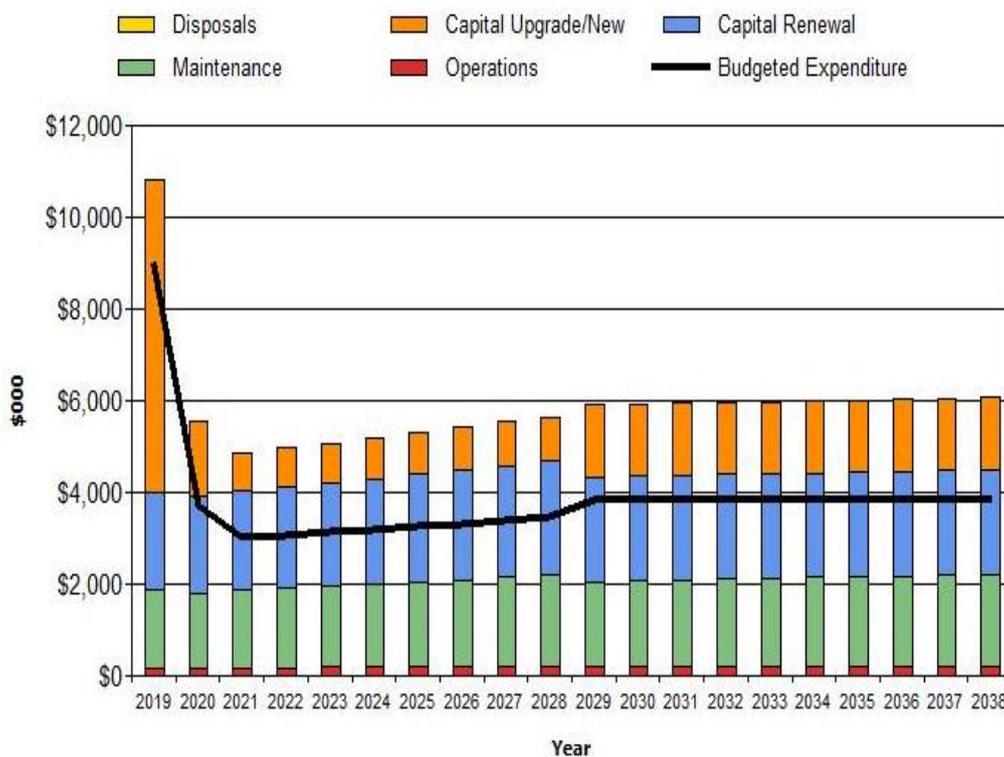
The projected outlays necessary to provide the services covered by this Infrastructure Asset Management Plan includes operations, maintenance, renewal and upgrade of existing infrastructure assets over the 10-year planning period is \$51,998,424 or \$5,199,842 on average per year.

1.6 Financial Summary

What we will do

Estimated available funding for this period is \$46,425,525 or \$4,642,552 on average per year which is 89% of the cost to provide the service. This is a funding shortfall of \$557,298 on average per year. Projected expenditure required to provide services in the Infrastructure Asset Management Plan compared with planned expenditure currently included in the Long Term Financial Plan are shown in the figure below.

Projected Operating and Capital Expenditure



We plan to provide Infrastructure services for the operation, maintenance, renewal and upgrade of Roads, Footpaths, Bridges, Parks and Ovals and other infrastructure assets to meet service levels set by in annual budgets within the 10-year planning period.

What we cannot do

Council does **not** have enough funding to provide all services at the desired service levels or provide new services.

Managing the Risks

There are risks associated with providing the service and not being able to complete all identified activities and projects. We have identified major risks as:

- Insufficient resources including funding to replace/renew infrastructure assets in accordance with renewal forecasts;
- Insufficient funding to increase asset stocks
- Safety of sealed and unsealed roads that provide access to residents and rural properties; and
- Quality of drainage infrastructure assets.

We will endeavour to manage these risks within available funding by:

- Promoting use of safe roads to relevant standards;
- Improving asset knowledge so that data accurately records the asset inventory, how assets are performing and when assets are not able to provide the required service levels;
- Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure;
- Improving our efficiency in operating, maintaining, replacing existing and constructing new assets to optimise life cycle costs; and
- Seek new funding for renewals as required and monitor trends of maintenance.

1.7 Asset Management Practices

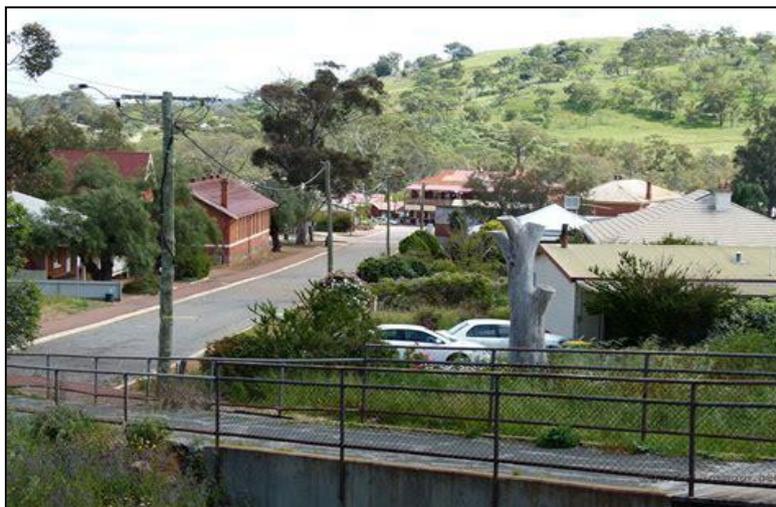
Our systems to manage assets include:

- Synergy soft
- RAMM (Roman 2)

1.8 Monitoring and Improvement Program

The next steps resulting from Infrastructure Asset Management Plan to improve asset management practices are:

- Define the delivered customer service levels and develop performance measures;
- Continue to monitor infrastructure assets condition and make service level based decisions;
- Review annual budget preparation to recognise target levels of service and condition assessments of assets;
- Review the Shire's current Infrastructure assets management staffing structure against work requirements; and
- Monitor performance of the Infrastructure Asset Management Plans service levels.



2. INTRODUCTION

2.1 Background

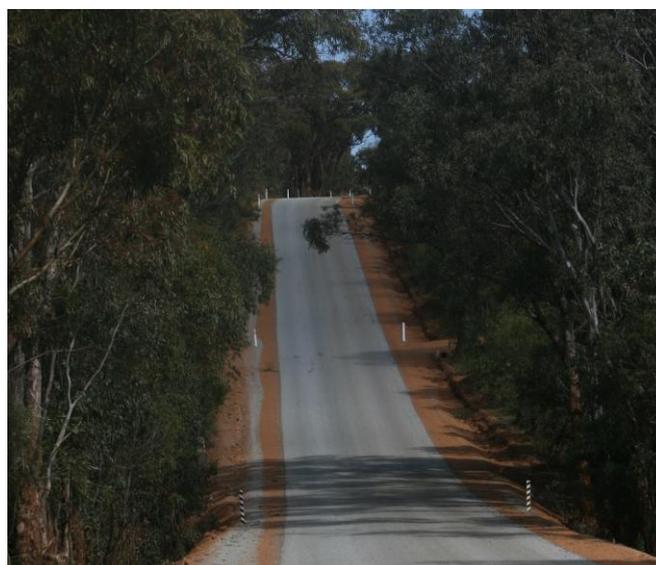
The Infrastructure Asset Management Plan communicates the actions required for the management of assets (and services provided from assets), compliance with regulatory requirements, and funding needed to provide the required levels of service over a 10-year planning period.

The Infrastructure Asset Management Plan is to be read with the following Shire of Toodyay associated planning documents:

- [Strategic Community Plan](#): sets out the long term strategic direction of the council
- [Corporate Business Plan](#): outlines the council's key priorities and actions over the next four years
- [Long Term Financial Plan](#): outlines all aspects of key financial strategic objectives and commitments over a 10 year period
- [Annual Budget](#): outlines how future expenditure will be funded
- [Infrastructure Preservation Plans](#): details current levels of service, strategies and information requirements that feed into work instructions, contract specifications and reporting requirements.
- [2018 Works & Services Review](#).

The infrastructure assets covered by Infrastructure Asset Management Plan are shown in Table 2.1.

ASSET CATEGORY	DIMENSION	DEPRECIATED REPLACEMENT VALUE
Roads	658.33 (kilometres)	\$93,175,887
Footpaths	10.73 (kilometres)	\$841,477
Bridges	29 (number)	\$23,029,234
Parks and Ovals		\$1,765,662
Other (Drainage, cemetery, etc.)		\$1,082,865
TOTAL		\$119,895,125



Key stakeholders in the preparation and implementation of Infrastructure Asset Management Plan are shown in Table 2.1.1.

KEY STAKEHOLDER	ROLE IN ASSET MANAGEMENT PLAN
Councillors	<ul style="list-style-type: none"> • Represent needs of community, • Allocate resources to meet planning objectives in providing services while managing risks, • Ensure services are sustainable.
Executive Team	<ul style="list-style-type: none"> • To ensure that Asset Management policy and strategy is being implemented as adopted, • To ensure that long-term financial needs to sustain the assets for the services they deliver are advised to Council for its strategic and financial planning processes.
Community User Groups	<ul style="list-style-type: none"> • Users of facilities, • Consultation on key issues.
Council Staff	<ul style="list-style-type: none"> • As the designated strategic custodian of Infrastructure assets, responsible for the overall management of the assets, • To ensure provision of the required/agreed level of maintenance services for asset components, • To ensure design and construction of assets meets required/agreed standards, • To ensure that risk management practices are conducted as per Council policy, • To ensure that adequate financial information is provided to Council to the relevant asset managers to facilitate sound management of the assets.
Insurance Provider	<ul style="list-style-type: none"> • Partner in insurance and risk management issues.
State and Federal Government Departments	<ul style="list-style-type: none"> • Periodic provision of advice, instruction, grants funding to assist with the provision of community assets.



2.2 Goals and Objectives of Asset Ownership

Shire of Toodyay exists to provide services. Some of these services are provided by Infrastructure assets.

The framework of the Infrastructure Asset Management Plan is based on the following principles:

- Accountability for Assets – refers to strengthening of the ‘ownership’ of the assets and services to increase performance and accountability;
- Planning and Budgeting – the current and future financial needs, specifically the Renewal Profile for the assets and alignment with the respective depreciation calculations;
- Acquiring Assets – describing the processes of increasing asset stocks, including assets described in the Council’s Capital Works Program;
- Operating and Maintaining Assets – maintenance and operation of assets is the primary activity;
- Disposing of Assets – this section has limited application because the majority of Infrastructure assets have only salvage value at the end of their useful life; and
- Asset Recording, Valuing and Reporting – including statutory recording and valuing, and performance reporting.

Our goal in managing infrastructure assets is to meet the defined level of service (as amended from time to time) in the most cost effective manner for present and future consumers. The key elements of Infrastructure asset management are:

- Providing a defined level of service and monitoring performance,
- Managing the impact of growth through demand management and infrastructure investment,
- Taking a lifecycle approach to developing cost-effective management strategies for the long-term that meet the defined level of service,
- Identifying, assessing and appropriately controlling risks, and
- Linking to a long-term financial plan which identifies required, affordable expenditure and how it will be financed.

Key elements of the planning framework are:

- Levels of service – specifies the services and levels of service to be provided,
- Future demand – how this will impact on future service delivery and how this is to be met,
- Life cycle management – how to manage its existing and future assets to provide defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices – how we manage provision of the services,
- Monitoring – how the plan will be monitored to ensure objectives are met,
- Asset management improvement plan – how we increase asset management maturity.

Other references to the benefits, fundamentals principles and objectives of asset management are:

- International Infrastructure Management Manual 2015
- ISO 55000

The primary issues for the Infrastructure assets are:

- Good data – dimensional and condition data stored in an Asset Inventory that can be uploaded to the Asset Register;
- Increasing the strategic and tactical management of the assets and services – understanding the renewal and maintenance needs for the network and actively managing those needs, both operationally and financially;
- Documentation of the Levels of Service for the Infrastructure assets, expressed as Service Standards and Service Targets;
- An appreciation of the cost of provision of the services;
- The future demand for the assets and services, understanding the growth and change factors that influence the management regime;
- Forecasting the renewal and maintenance costs for the next 10+ years, and understanding the affordability and sustainability of the assets and services to the current levels.

2.3 Core and Advanced Asset Management

This Infrastructure Asset Management Plan is prepared as a 'core' asset management plan over a 10 year planning period. It is prepared to meet minimum legislative and user requirements for sustainable service delivery and long term financial planning and reporting. Core asset management is a 'top down' approach where analysis is applied at the system or network level.

Future revisions of this asset management plan will move towards 'advanced' asset management using a 'bottom up' approach for gathering detailed asset information for individual assets to support the provision of activities and programs to meet agreed service levels in a financially sustainable manner.

Advanced asset management will show features such as:

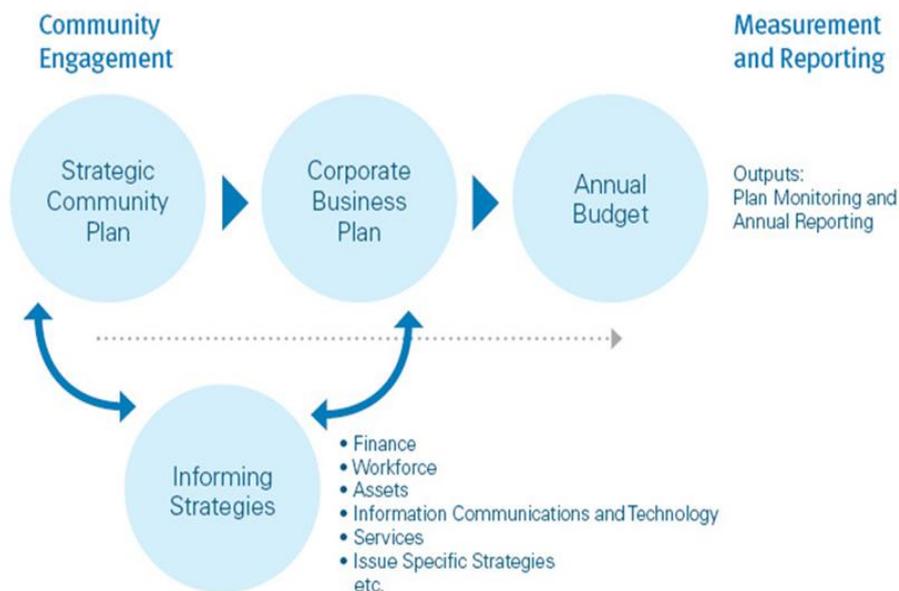
- Long term optimised lifecycle,
- Corporate objectives and asset performance that are aligned and complimentary,
- Information systems that are integrated and used effectively, and
- Strategies are risk based, with appropriate use of predictive models, problem solving and iterative continuous improvement.

Ideally these will begin to involve community consultation for input and testing of community willingness to pay for any increases in the level of service to be provided, recognising that different intervention options will have different costs.

As the Shire moves into a more 'advanced' phase it will address the whole portfolio of infrastructure assets and more formally apply critically and risk management principles to better determine the frequency and scope of condition assessment inspections. The Shire will collect more detailed data with greater breakdown into various components and will apply quality standards to test the level of service being provided and use this to assist the condition assessment process in deciding on future needs. The resultant data will be more rigorously analysed and optimised decision making typically employed to determine priorities for works. The analysis will give a more accurate picture on the remaining life of the infrastructure assets down to their various components, their current replacement cost and their depreciated replacement cost.

The Integrated Planning and Reporting Framework provides the basis for improving the practice of strategic planning in Local Government. Asset Management is a key component of the Integrated Planning and Reporting Framework, as it clearly links to the Strategic Community Plan, Corporate Business Plan and Annual Report, enabling these documents to be influenced by the development of integrated planning elements such as Asset Management Plans.

Elements of Integrated Planning and Reporting Framework



3. LEVELS OF SERVICE

3.1 Customer Research and Expectations

This section of the Infrastructure Asset Management Plan describes the Levels of Service framework development process for Infrastructure assets and services for the Shire of Toodyay. The framework recorded was derived from interpretation of Council's corporate objectives and strategies, perceived customer 'needs' and relevant statutory requirements.

To both fully understand and deliver on desired Levels of Service requires suitable asset and services management policies, guidelines, inspection regimes, condition assessment programs, customer inquiry systems and asset and services management practices and processes, plus the development and implementation of various audits to validate the outputs.

Statistical indicators show that over the past four years, the Shire of Toodyay has had a static population base. There has been a significant change in age structure with less young people, less mid lifers and significantly more aged people. This confirms the need to now specify the Levels of Service for defined service programs on behalf of the community. Likewise the need to understand the affordability of the programs becomes an imperative for the organisation and the community.

Levels of Service represent a balance between funding, physical resources and customer needs. The Levels of Service framework includes the following elements, (defined as):

Levels of Service: the service quality for a particular activity against which service performance may be measured - a high level statement linking strategic objectives with service delivery;

Service Standards: the manner of provision of the services, (in quantitative terms, e.g. function, design and amenity / presentation).

Service Targets: the targets for the services required to achieve and maintain the Service Standards, measured as intervention criteria and response times. The Service Targets are used to calculate the level of resources, costs and performance required to achieve against the needs.

This Infrastructure Asset Management Plan introduces the framework concept to account for Levels of Service according to whole of life programs for the assets.

The Levels of Service defined in this Plan will be used to:

- inform stakeholders of the proposed type and Levels of Service to be offered;
- identify the costs and benefits of the services offered;
- enable stakeholders to assess suitability, affordability and equity of the services offered;
- measure the effectiveness of the Infrastructure Asset Management Plan, and;
- focus the asset and services management strategies required and developed to deliver the required Levels of Service.

The Levels of Service framework is to be based on:

- Research and needs – predominantly historical information;
- Strategic and Corporate Goals - identifying the specific objectives which the organisation wishes to achieve from the Levels of Service, together with guidance to define the scope of current and future services offered and the manner of the service delivery;
- Legislative requirements – the legislation, regulations, environmental standards and industry and Australian Standards that impact on the way assets are managed; and
- Design Standards and Codes of Practice - Australian Design Standards provide a set of design parameters for the delivery of infrastructure.

Future revisions of the Infrastructure Asset Management Plan will incorporate community consultation on service levels and costs of providing the service.

3.2 Strategic and Corporate Goals

This Infrastructure Asset Management Plan is prepared under the direction of the Shire of Toodyay vision, mission, goals and objectives.

Our vision is:

“We are a vibrant rural community that celebrates our past and embraces a sustainable future.”

Our mission is:

“Local Government and community working together to obtain the best possible social, economic and environmental outcomes for the Toodyay Shire.”

Table 3.2: Goals and how these are addressed in this Plan

GOAL	OBJECTIVE	HOW GOAL AND OBJECTIVES ARE ADDRESSED IN AM PLAN
<p>Built environment: Our buildings, roads and transport</p>	<p>Objective 1: Ensure safe and sustainable transport options. <i>S 1.1: Apply metrics to local road upgrades and maintenance to ensure best value for expenditure.</i> <i>S 1.2: Continue to invest in local road infrastructure.</i> <i>S1.3: Continue to advocate for investment into State roads and drainage systems.</i> <i>S 1.4: Improve footpaths and streetscapes.</i></p> <p>Objective 3: Improve processes to support the built environment. <i>S 3.2 Implement asset rationalisation and consolidation.</i></p>	<p>Optimisation of Asset condition – maintaining the asset condition equitably throughout the network of infrastructure assets.</p> <p>Upgrade of Unsealed Roads – construct sealed roads in accordance with traffic management, safety issues and whole of life costs.</p> <p>Drainage and stormwater assets - ensuring that residents have safe access to their properties through sufficient drainage infrastructure.</p>
<p>Built environment: Our buildings, roads and transport</p>	<p>Objective 2: Ensure our built environment meets community needs. <i>S 2.2: Upgrade local infrastructure to cater for seniors.</i> <i>S 2.3: Ensure appropriate facilities to engage and retain young people.</i> <i>S 2.5: Enhance and maintain our parks, gardens and public green spaces.</i></p>	<p>Recreational Facilities and Open Spaces - ensuring that residents and visitors shall have accessible, safe and attractive recreational facilities and open spaces.</p>

The Shire of Toodyay will exercise its duty of care to ensure public safety in accordance with the Risk Management Plan prepared in conjunction with this Infrastructure Asset Management Plan. Management of risks is covered in Section 6.

3.3 Legislative Requirements

Table 3.3: Legislative Requirements

LEGISLATION	REQUIREMENT
<i>Local Government Act 1995</i>	Sets out role, purpose, responsibilities and powers of local governments including the preparation of a Long Term Financial Plan supported by Asset Management Plans for sustainable service delivery. The Act also provides guidance on the rules around local governments who derive revenue from operations such as non-core business.
Main Roads WA – Code of Practice for traffic management for works on roads (April 2011)	To promote safe and consistent traffic management practice at work sites on roads in accordance with state legislation and national standards. Requires general compliance with the Australian Standard 1742.3-2009 and associated field guides, provides details of additional requirements necessary to meet WA requirements. Also outlines the competency requirements for personnel responsible for managing traffic on work sites.
<i>Environmental Protection Act 1986</i>	Require permit and flora survey prior to vegetation removal, relates to the prevention of pollution - either to land air or water. Defines two types of harm - material environmental harm or serious environmental harm.
<i>Environment Protection Act (unauthorised discharges) Regulations 2004</i>	States that pesticides cannot be discharged into the environment.
<i>Contaminated Sites Act 2003</i>	Provides for the identification, recording, management and remediation of contaminated sites, to consequentially amend certain other Acts and for related purposes.
<i>Fire and Emergency Services Authority of WA Act 1998</i>	Establishes an Authority with functions relating to the provision and management of emergency services, and for related purposes.
<i>Aboriginal Heritage Act 1972</i>	Preservation of the community places and objects used by traditional owners
Aboriginal Heritage Regulations 1974	Preservation of the community places and objects used by traditional owners.
<i>Native Title Act 1999</i>	Regulations and requirements that the Shire must comply with in relation to the use of land.
<i>Dangerous Goods Safety Act 2004</i>	Relates to the safe storage, handling and transport of dangerous goods.
<i>Poisons Act 1964</i>	Regulates the possession and use of poisons.
<i>Health Act 1911</i>	Discharging causing pollution to waterways.
<i>Wildlife Conservation Act 1950</i>	Provides for the conservation and protection of native flora and fauna.
<i>Road Traffic Act 1974</i>	Laws and legislations surrounding road networks.
<i>Main Roads Act 1930</i>	The power to legislate the maintenance and works on public roads.
<i>Disability Services Act 1993</i>	An Act for the establishment of the Disability Services Commission and the Ministerial Advisory Council on Disability, for the furtherance of principles applicable to people with disabilities, for the funding and provision of services to such people that meet certain objectives, for the resolution of complaints by such people, and for related purposes.
Disability Services Regulations 2004	Current amendments to Disability Services Act (1993).
<i>OSH Act 1984</i>	The guidelines for employees and employers to undertake within the work environment.
OSH Regulations 1996	The guidelines for employees and employers to undertake within the work environment.
Accounting Standards	AASB 5 Non-Current Assets Held for Sale and Discontinued Operations AASB 13 Fair Value Measurement AASB 116 Property, Plant and Equipment AASB 118 Revenue AASB 119 Employee Benefits AASB 136 Impairment of Assets AASB 138 Intangible Assets AASB 1051 Land Under Roads
Other Standards and Regulations	Other relevant documents include, but are not limited to: AS/NZS 4360: 1995 Risk Management, all other relevant State and Federal Acts & Regulations, all Local Laws and relevant policies of the organisation.

3.4 Customer Levels of Service

Service levels are defined service levels in two terms, customer levels of service and technical levels of service. These are supplemented by organisational measures.

Customer Levels of Service measure how the customer receives the service terms of safety, quality, quantity, reliability, responsiveness, cost/efficiency and legislative compliance and whether value to the customer is provided.

Customer levels of service measures used in the asset management plan are:

Quality: How good is the service ...
What is the condition or quality of the service?

Function: Is it suitable for its intended purpose
Is it the right service?

Capacity/Use: Is the service over or under used ...
Do we need more or less of these assets?

Council has not carried out research on customer expectations at a community-wide level. This will be investigated for Plan updates. Council will use this information in developing specific Levels of Service and in the allocation of resources in the Annual Budget. Council engineers and technical officers have traditionally been trained to work to an assumed level of service that is likely to be expected by the community. During any future consultation process Council will test this premise to make sure that it is correct or amend it accordingly.

The current and expected customer and technical service levels are detailed in Table 3.5.

Technical Levels of Service supporting the community service levels to ensure that the minimum community levels of service are met. These technical measures relate to service criteria such as:

- Quality - Smoothness of roads
- Quantity - Area of parks per resident
- Availability - Distance from a dwelling to a sealed road
- Safety - Number of injury accidents

3.5 Technical Levels of Service

Technical Levels of Service: Supporting the customer service levels are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities to best achieve the desired customer outcomes and demonstrate effective performance.

Technical service measures are linked to the activities and annual budgets covering:

- Operations – the regular activities to provide services (e.g. cleaning, inspections, signage, storm clean up, litter removal).
- Maintenance – the activities necessary to retain an asset as near as practicable to an appropriate service condition. Maintenance activities enable an asset to provide service for its planned life (e.g. shoulder repairs, crack sealing, patching, drainage cleaning, tree pruning),
- Renewal – the activities that return the service capability of an asset up to that which it had originally (e.g. component replacement),
- Upgrade/New – the activities to provide a higher level of service (e.g. rehabilitating infrastructure components) or a new service that did not exist previously (e.g. a new road, new playground).

Service and asset managers plan, implement and control technical service levels to influence the customer service levels.

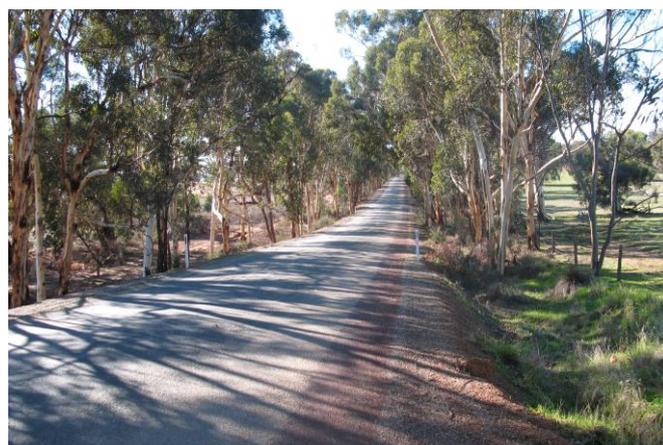


Table 3.5 shows the customer and technical levels of service expected to be provided under the Infrastructure Asset Management Plan.

Table 3.5: Customer and Technical Levels of Service

SERVICE STATEMENT	Infrastructure assets meet demands for performance, reliability, affordability, environmental outputs and safety for the community.	
SERVICE FACTORS	CUSTOMER LEVELS OF SERVICE	TECHNICAL LEVELS OF SERVICE
QUALITY		
Council Needs	<p>Infrastructure matches needs at an affordable cost.</p> <p>Roads meet user requirements for road width, use of traffic control devices, accessibility.</p> <p>Footpaths have good walking surface, suitable network, adequate width.</p> <p>Play equipment is well maintained and safe to use.</p> <p>Drainage network has large enough capacity to carry storm water away from road pavement.</p>	<p>Regular liaison with Council staff to ascertain and confirm Infrastructure needs.</p> <p>Quality Infrastructure assets to specifications and comply with technical and legal requirements.</p> <p>Infrastructure asset replacement/ renewal cycle aligned with good industry standards and affordability.</p>
Available Resources/ Funding	Only essential Infrastructure is invested in.	Actively seeking funding for programmed Infrastructure upgrades – decreasing reliance on Council resources.
Organisational Profile and Policies	Infrastructure assets are safe to use.	Infrastructure assets match Council standards for performance and safety levels.
Commercial Realities	Keep Infrastructure asset management and operational costs as low as possible	<p>Infrastructure assets maintained by preventative maintenance/routine servicing and good operational standards.</p> <p>Hire rates and arrangements for works on infrastructure assets are consistent with private market forces.</p>
FUNCTION		
Design Standards	Infrastructure design standards meet the needs of community and have reasonable operating costs.	Infrastructure design meets or exceeds Council's functional specification and remains within cost parameters for investment and operation.
Safety	<p>Infrastructure assets provide the required degree of safety for the public.</p> <p>Footpaths are free from trip hazards, obstructions and separated from traffic.</p> <p>Bridges and drainage have structural integrity, are adequate and reduce flooding and property damage.</p> <p>Road network is safe to drive, meets relevant safety standards and adequate consideration to black spot locations during prioritisation of civil works.</p> <p>Signage provides clear messages to users in day and night conditions.</p>	<p>Infrastructure assets conforms to manufacturer's specifications – no unauthorised modifications.</p> <p>Infrastructure assets maintained according to industry standards.</p> <p>Infrastructure assets designed and maintained to relevant Workplace Health & Safety provisions.</p> <p>Maintenance and construction crew maintain licences and skills through ongoing training.</p>

SERVICE FACTORS	CUSTOMER LEVELS OF SERVICE	TECHNICAL LEVELS OF SERVICE
Availability/ Reliability	Infrastructure assets are reliable and available for use. Sealed Roads provide safe and smooth travel.	Capacity of Infrastructure assets matches or exceeds requirement for specified operating demands. Infrastructure assets quality matches capacity and operating needs and affordability. Maintenance and construction crew trained and experienced to optimise the performance and output from the Infrastructure assets. Routine maintenance/servicing/repair programs and times optimise availability and output.
Environmental Standards	Infrastructure assets match or exceeds Council's current environmental standards.	Infrastructure asset design alternatives favour high environmental outcomes. Maintenance and construction crew training matches preferred environmental outcomes.
Economy	Infrastructure assets offer good operating economy, both from a maintenance and operational perspective.	Regular inspections of Infrastructure assets.
Maintenance and Operational Activities	All maintenance can be done by Council staff.	Majority of maintenance able to be undertaken by Council.
CAPACITY/ USE		
Presentation/ Amenity	Infrastructure assets maintained in clean and tidy condition – presentation to community at appropriate standards.	Infrastructure asset maintenance, operation and presentation actions contribute to lower operating costs – responsible manager to ensure high standards are maintained.
Utilisation	Utilisation of infrastructure assets meets required need or demand.	Utilisation is maximised. Universal access to Recreational Facilities and Open Spaces.

It is important to monitor the service levels provided regularly as these will change. The current performance is influenced by work efficiencies and technology, and customer priorities will change over time. Review and establishment of the agreed position which achieves the best balance between service, risk and cost is essential.

In addition to levels of service, performance is also measured by Key Performance Indicators (KPI's) provided in the asset management guidelines for Western Australian local governments to measure and report on overall asset management sustainability. The KPI's include three asset sustainability ratios to measure asset management efforts of the local government. The KPI's for Shire of Toodyay are detailed below.



Asset Consumption Ratio: highlights the aged condition of assets.

MEASURE	VALUE
Depreciated Replacement Cost of Assets (DRC)	\$119,839,714
Current Replacement cost of Depreciable Assets (CRC)	\$163,847,425
Current Asset Consumption Ratio (DRC/CRC)	73%
Target Asset Consumption Ratio (DRC/CRC)	50% and 75%

A ratio below 50% indicates rapid deterioration and under investment, and a ratio greater than 75% is considered to be over investment in renewals.

Asset Sustainability Ratio: indicates whether Council is spending adequately on asset renewals to match depreciation to ensure long term sustainability of infrastructure assets.

MEASURE	VALUE
Renewal Expenditure over 10 years	\$28,893,569
Depreciation expense over 10 years	\$39,241,150
Current Asset Sustainability Ratio	74%
Target Asset Sustainability Ratio	90% and 110%

A ratio below 90% indicates underinvestment and above 110% indicates overinvestment in asset renewals.

Asset Renewal Funding Ratio: measures the Council's ability to fund its projected asset renewals in the future.

MEASURE	VALUE
10 year proposed expenditure	\$28,893,569
10 year required expenditure	\$51,998,424
Current Asset Renewal Funding Ratio	56%
Target Asset Renewal Funding Ratio	75% and 110%

4. FUTURE DEMAND

4.1 Demand Drivers

Drivers affecting demand include population change, regulations, changes in demographics, seasonal factors, vehicle ownership rates, consumer preferences and expectations, technological changes, economic factors, agricultural practices, environmental awareness, etc.

4.2 Demand Forecasts

The present position and projections for demand drivers that may impact future service delivery and use of assets were identified and are documented in Table 4.3.

4.3 Demand Impact on Assets

The impact of demand drivers that may affect future service delivery and use of assets are shown in Table 4.3.

Table 4.3: Demand Drivers, Projections and Impact on Services

DEMAND DRIVERS	PRESENT POSITION	PROJECTION	IMPACT ON SERVICES
Economic Demand	Increasing cost of maintaining infrastructure assets.	Anticipated to continue to increase.	Increasingly difficult to maintain the current level of service.
Social Demand	Shire of Toodyay has had a static population base over the last four years. Analysis of demographics shows an ageing population and less young people in the Shire.	Increase in demand for infrastructure assets.	Universal access will be required. Review and document levels of demand.
Technology	Condition monitoring and Asset Management systems – the need to manage data in the form of inventories, condition ratings, financial performance etc.	Anticipated to continue to change	Possible changes in construction techniques and maintenance practices.
Environment	Preference for environmentally friendly assets with lower whole of life costs. Climate change risks – increased risk of wild fire, increased frequency and intensity of extreme rainfall and wind is likely to cause significant damage to infrastructure assets.	Anticipated to continue	Cost of compliance: managers will have to ensure that assets are maintained at increasingly environmentally sustainable levels.

4.4 Demand Management Plan

Demand for new services will be managed through a combination of managing existing assets, upgrading of existing assets and providing new assets to meet demand and demand management. Demand management practices include non-asset solutions, insuring against risks and managing failures.

Non-asset solutions focus on providing the required service without the need for asset ownership and management actions including reducing demand for the service, reducing the level of service (allowing some assets to deteriorate beyond current service levels) or educating customers to accept appropriate asset failures. Examples of non-asset solutions include providing services from existing infrastructure such as insuring against risks and managing failures.

Opportunities identified to date for demand management are shown in Table 4.4. Further opportunities will be developed in future revisions of Infrastructure Asset Management Plan.

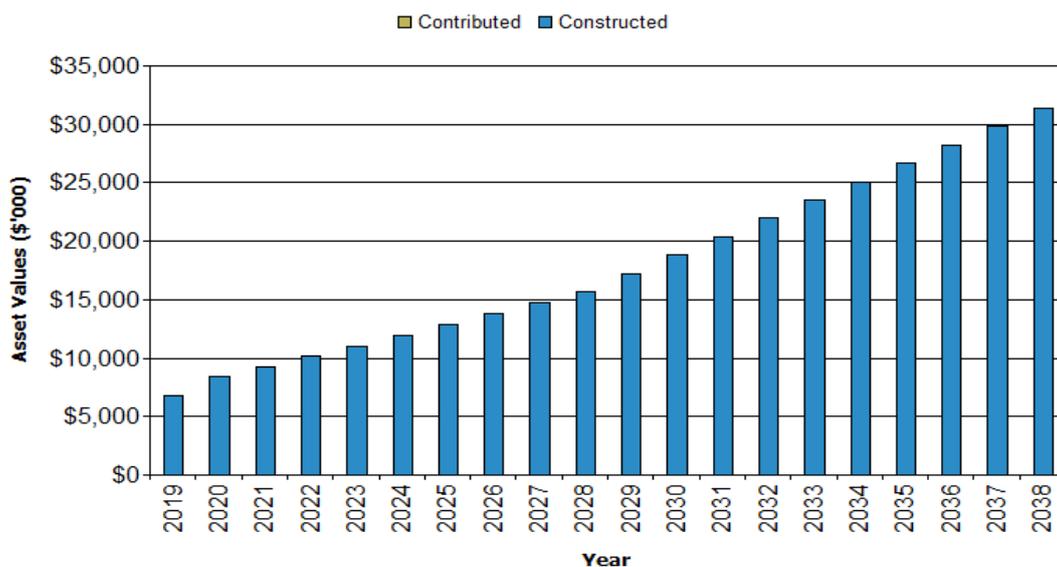
Table 4.4: Demand Management Plan Summary

DEMAND DRIVER	DEMAND MANAGEMENT PLAN
Economic Demand	Roads and bridges renewal managed through Main Roads WA.
Social Demand (Population, demographics, social disadvantage, participation rates)	Council acquires new infrastructure assets through the subdivision development process. Road and footpath upgrades and network extensions to meet population growth demand and changes identified in review reports and planning studies. Provide access for wheeled mobility devices, pedestrians, cyclists and tourism growth.

4.5 Asset Programs to meet Demand

The new assets required to meet growth will be acquired free of cost from land developments and constructed/acquired. New assets constructed/acquired are discussed in Section 5.4. The summary of the cumulative value of new contributed and constructed asset values is shown in Figure 1.

Figure 1: Upgrade and New Assets to meet Demand – (Cumulative)



Acquiring these new assets will commit Council funding to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. These future costs are identified and considered in developing forecasts of future operations, maintenance and renewal costs in Section 5.

5. LIFECYCLE MANAGEMENT PLAN

The lifecycle management plan details how the Shire of Toodyay plans to manage and operate the assets at the agreed levels of service (defined in Section 3) while managing life cycle costs.

Life Cycle Management is recognised by the Shire of Toodyay as an essential component of the provision and management of assets and services. Life Cycle Management is primarily about using the data and processes to effectively provide, manage, maintain, renew, (and upgrade), existing infrastructure assets and services.

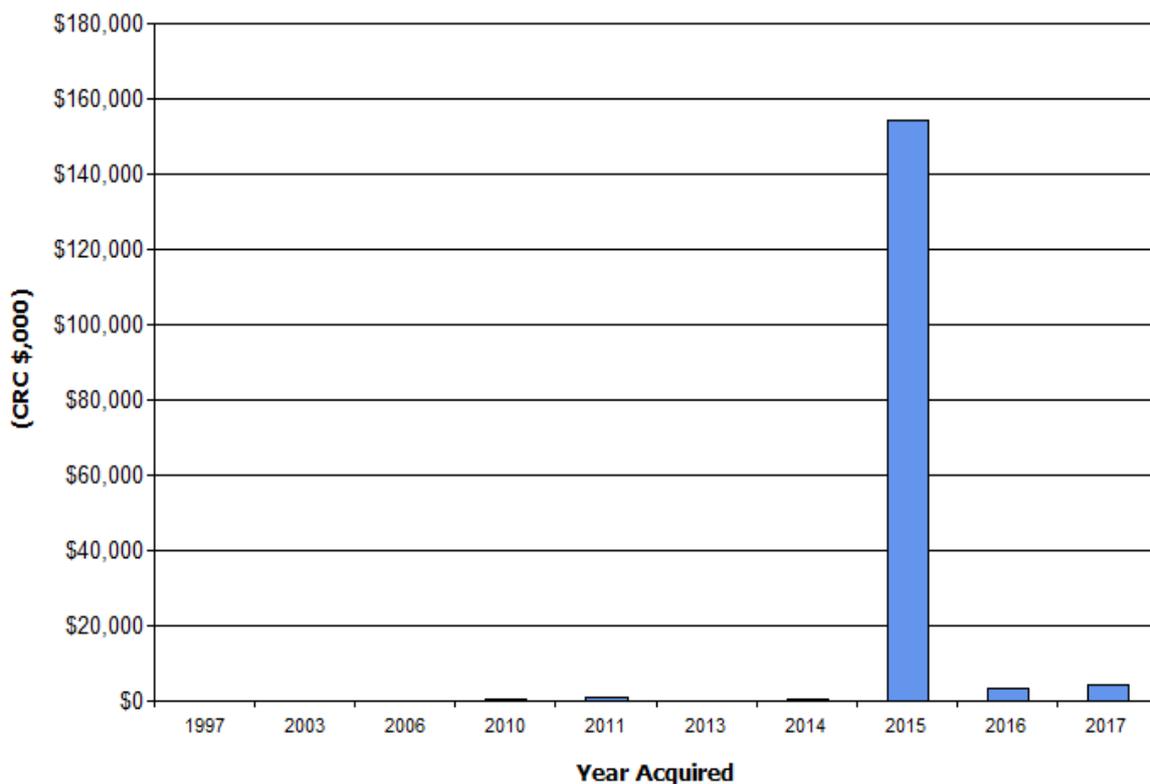
Lifecycle asset management means considering all management options and strategies as part of the asset lifecycle, from planning to disposal, (whole of life analysis). The objective of managing the assets in this manner is to look at long-term cost impacts, (or savings), when making asset and services management decisions.

5.1 Background Data

5.1.1 Physical Parameters

The age profile of the assets included in the Infrastructure Asset Management Plan are shown in Figure 2.

Figure 2: Asset Age Profile



5.1.2 Asset Capacity and Performance

Assets are generally provided to meet design standards where these are available.

Locations where deficiencies in service performance are known are detailed in Table 5.1.2.

Table 5.1.2: Known Service Performance Deficiencies

LOCATION	SERVICE DEFICIENCY
Road Surfacing	Council has focused on Resheeting (Renewal) rather than sealing (Upgrade) which would have provided safer roads and have a lower whole of life cost.
Maintenance Pruning	Pruning Program is significantly behind schedule. There is a need to review the quality of the current program, level of service expected from community and resources allocated to this program (plant and equipment, and workforce).
Drainage	Insufficient information on existing drainage network, drainage under-capacity, and lack of pollution control devices.
Maintenance Road Grading	Road Grading Program is significantly behind schedule. There is a need to review the quality of the current program, level of service expected from community and resources allocated to this program (plant and equipment, and workforce).

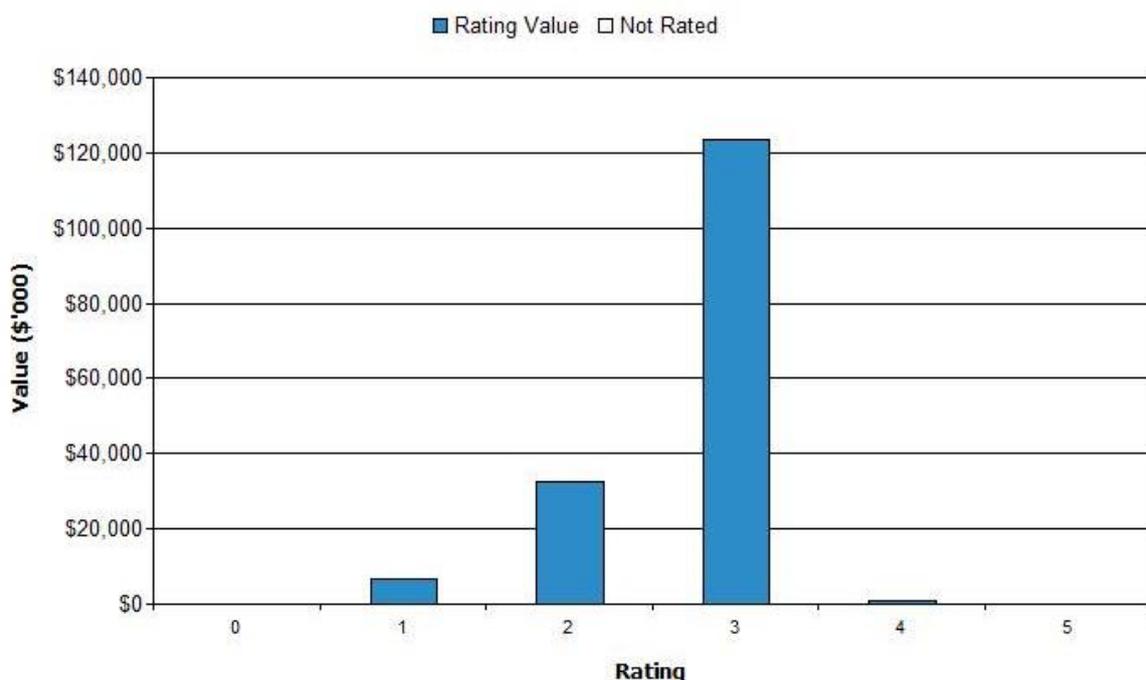
5.1.3 Asset Condition

Current Infrastructure asset conditions were last assessed in 2017. Asset condition profiles are based on condition rating inspections carried out by Council staff. Council data on asset ages is incomplete, with considerable work being undertaken to research construction dates.

Condition of assets are rated using a 1-5 rating system with 1 being new and 5 representing an asset that has failed completely and cannot be used for the purpose it was in service for.

The condition profile of our assets is shown in Figure 3.

Fig 3: Asset Condition Profile



Condition is measured using a 1 – 5 grading system as detailed in Table 5.1.3.

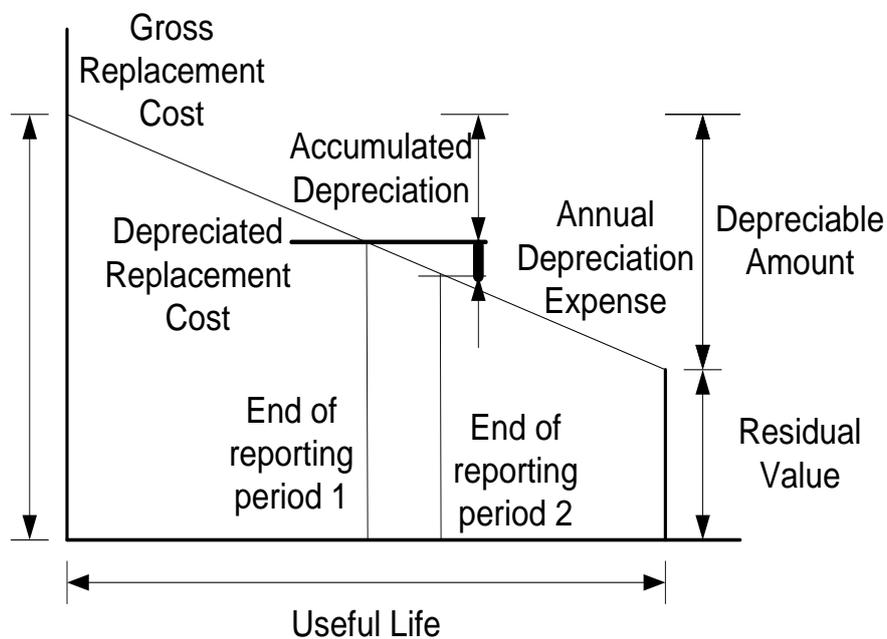
Table 5.1.3: Simple Condition Grading Model

CONDITION GRADING	DESCRIPTION OF CONDITION
1	Very Good: only planned maintenance required
2	Good: minor maintenance required plus planned maintenance
3	Fair: significant maintenance required
4	Poor: significant renewal/rehabilitation required
5	Very Poor: physically unsound and/or beyond rehabilitation

5.1.4 Asset Valuations

The value of assets recorded in the asset register as at 30 June 2017 covered by the Infrastructure Asset Management Plan is shown below.

Gross Replacement Cost	\$163,687,139
Depreciable Amount	\$163,687,139
Depreciated Replacement Cost	\$119,839,714
Annual Average Asset Consumption	\$3,924,115



5.1.5 Historical Data

Assets were last revalued at 30 June 2018. This Asset Management Plan uses audited revalued figures as at 30 June 2015. Assets are valued at Fair Value.

ASSET	GROSS REPLACEMENT COST	DRC (FAIR VALUE)	ANNUAL DRC	CUMULATIVE DEP
Footpath - all other Total	\$19,303	\$7,896	\$643	\$11,407
Footpath - asphalt Total	\$561,185	\$191,988	\$14,650	\$369,197
Footpath - brick paving Total	\$508,880	\$222,209	\$6,361	\$286,672
Footpath - concrete Total	\$843,501	\$475,080	\$12,050	\$368,421
Road - Pavement - Sealed - Access Total	\$29,625,033	\$25,236,194	\$259,219	\$4,388,839
Road - Pavement - Sealed - Distributor Total	\$2,713,856	\$2,296,669	\$23,746	\$417,188
Road - Pavement - Sealed - Regional Distributor Total	\$28,852,441	\$19,346,116	\$252,459	\$9,506,324
Road - Pavement - Unsealed Total	\$18,509,595	\$9,778,389	\$863,781	\$8,731,207
Road - Built Total	\$25,597,347	\$25,597,347	\$0	\$0
Road - Formed Total	\$68,223	\$68,223	\$0	\$0
Road - Pavement Surface - Asphalt Total	\$1,758,857	\$1,248,777	\$63,319	\$510,081
Road - Pavement Surface - Spray Seal Total	\$19,829,817	\$9,524,381	\$1,189,789	\$10,305,436
Road - Kerb Barrier Total	\$767,561	\$671,643	\$19,189	\$95,918
Road - Table Drain (Shallow) Total	\$1,921,571	\$880,549	\$192,157	\$1,041,022
Bridges	\$27,675,000	\$24,765,000	\$872,018	\$0
Other	\$870,000	\$870,000	\$79,758	\$0
Parks and Reserves	\$665,500	\$665,500	\$42,461	\$0
Grand Total	\$160,787,670	\$121,845,960	\$3,891,600	\$36,031,709

5.2 Operations and Maintenance Plan

Operations include regular activities to provide services such as pothole repairs, crack sealing and shoulder maintenance.

Routine maintenance is the regular on-going work that is necessary to keep assets operating, including instances where portions of the asset fail and need immediate repair to make the asset operational again.



5.2.1 Operations and Maintenance Plan

Operations activities affect service levels including quality and function through the types and timing of activities, and the design of the infrastructure. Examples of these include street sweeping and tree pruning frequency, etc.

Maintenance includes all actions necessary for retaining an asset as near as practicable to an appropriate service condition including regular ongoing day-to-day work necessary to keep assets operating. E.g. road patching but excluding rehabilitation or renewal. Maintenance may be classified into reactive, planned and specific maintenance work activities.

Reactive maintenance: is unplanned repair work carried out in response to service requests and management/supervisory directions.

Planned maintenance: is repair work that is identified and managed through a Preservation Plan. The Preservation Plan applies to roads only and includes inspection, assessing the condition against failure/breakdown experience, priority of works, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance. Planned maintenance for other infrastructure assets is currently behind schedule.

Specific maintenance: is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, replacing air conditioning units, etc. This work falls below the capital/maintenance threshold but may require a specific budget allocation.

Maintenance expenditure levels are considered to be inadequate to meet projected service levels, which may be less than or equal to current service levels. Where maintenance expenditure levels are such that will result in a lesser level of service, the service consequences and service risks have been identified and service consequences highlighted in the Infrastructure Asset Management Plan and service risks considered in the Risk Management Plan.

Assessment and priority of reactive maintenance is undertaken by staff using experience and judgement.

5.2.2 Operations and Maintenance Strategies

The Shire of Toodyay will operate and maintain assets to provide the defined level of service to approved budgets in the most cost-efficient manner. The operation and maintenance activities include:

- Scheduling operations activities to deliver the defined level of service in the most efficient manner,
- Undertaking maintenance activities through a planned maintenance system to reduce maintenance costs and improve maintenance outcomes. Undertake cost-benefit analysis to determine the most cost-effective split between planned and unplanned maintenance activities (50 – 70% planned desirable as measured by cost),
- Maintain a current infrastructure risk register for assets and present service risks associated with providing services from infrastructure assets and reporting Very High and High risks and residual risks after treatment to management and Council,
- Review current and required skills base and implement workforce training and development to meet required operations and maintenance needs,
- Review asset use to identify under used assets and appropriate remedies, and over used assets and customer demand management options,
- Maintain a current hierarchy of critical assets and required operations and maintenance activities,
- Develop and regularly review appropriate emergency response capability,
- Review management of operations and maintenance activities to ensure best value for the resources used.

Asset Service Hierarchy

An asset service hierarchy provides a framework for structuring data in an information system to assist in collection of data, reporting information and making decisions. The hierarchy includes the asset class and component used for asset planning and financial reporting and service level hierarchy used for service planning and delivery.

Council has not yet developed an asset service hierarchy, this will be developed for future plans.

Critical Assets

Critical assets are those assets which have a high consequence of failure but not necessarily a high likelihood of failure. By identifying critical assets and critical failure modes, investigative activities, maintenance plans and capital expenditure plans can be targeted at the appropriate time.

Operations and maintenances activities may be targeted to mitigate critical assets failure and maintain service levels. These activities may include increased inspection frequency, higher maintenance intervention levels, etc. Critical assets failure modes and required operations and maintenance activities will be included in future plans.

Standards and specifications

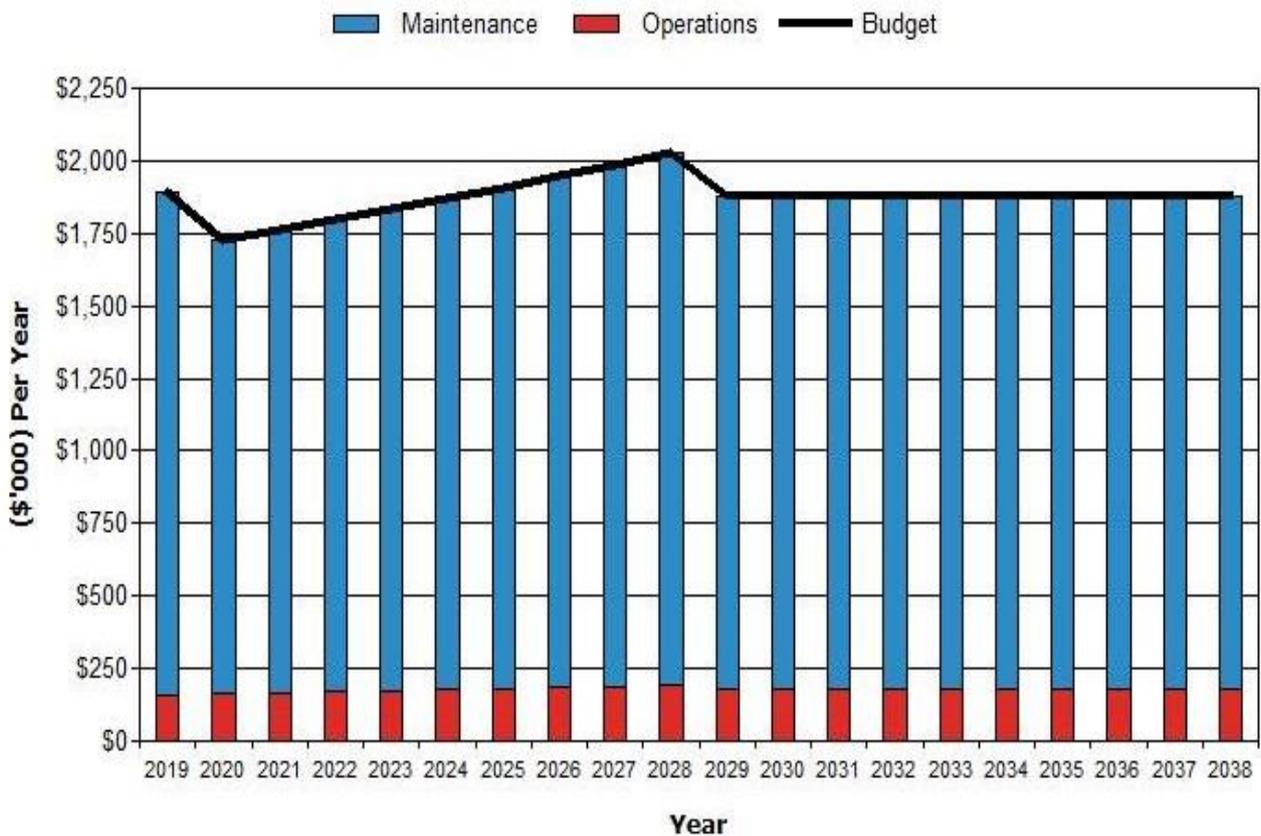
Maintenance work is carried out in accordance with the following Standards and Specifications.

- Australian Standards relevant to the works being undertaken
- Occupational Health and Safety Standards
- Main Roads standards
- Aust Roads

5.2.3 Summary of future operations and maintenance expenditures

Future operations and maintenance expenditure is forecast to trend in line with the value of the asset stock as shown in Figure 4. Note that all costs are shown in current dollar values (i.e. real values).

Figure 4: Projected Operations and Maintenance Expenditure



Deferred maintenance, i.e. works that are identified for maintenance and unable to be funded are to be included in the risk assessment and analysis in the infrastructure risk management plan.

Maintenance is funded from the operating budget where available. This is further discussed in Section 7.

5.3 Renewal/Replacement Plan

Renewal and replacement expenditure is major work which does not increase the asset's design capacity but restores, rehabilitates, replaces or renews an existing asset to its original service potential. Work over and above restoring an asset to original service potential is upgrade/expansion or new works expenditure resulting in additional future operations and maintenance costs. Replacement and rehabilitation of existing infrastructure is primarily driven by asset condition and performance.

Renewal works fall into the following categories:

- **Rehabilitation:** Involves the repair of a short length of infrastructure asset that has prematurely failed or is close to doing so. This rehabilitation work does not provide for a planned increase in the operating capacity or design loading. It is intended to enable the asset to meet the current standards of service.
- **Renovation:** Involves work that increases the strength of the existing asset by a stabilisation process (such as use of a bitumen, cement or lime stabiliser, then re-compaction of the base course material). As for rehabilitation, renovation does not provide for a planned increase in the operating capacity or design loading, simply enabling the asset to meet the current standards of service.
- **Reconstruction:** Involves reconstructing the infrastructure asset to provide a new asset with the equivalent size or capacity (i.e. does not provide for a planned increase to the operating capacity or design loading). Some minor increase in capacity may result from the process of renewal, but a substantial improvement is needed before system development is considered to have occurred.

5.3.1 Renewal plan

The general renewals strategy is to rehabilitate or replace assets when justified by assessing the following elements in conjunction with the renewal priority criteria outlined below:

Risk: The risk of failure and associated financial and social impact justifies action (e.g. impact and extent of resulting inability to achieve access along the road, probable extent of damage to business, any health risk arising from the impediment to access).

Asset performance: Renewal of an asset when it fails to meet the required level of service. Non-performing assets are identified by the monitoring of asset

reliability, capacity and efficiency during planned maintenance inspections and operational activity.

Indicators of non-performing assets include:

- constant closures due to impassability;
- roughness causing damage to vehicles and produce;
- risk to safety is rated high on an increasing frequency

Economics: It is no longer economic to continue repairing the asset (i.e. annual cost of repairs exceeds the annualised cost of renewal).

Infrastructure assets or their components requiring renewal are identified from condition assessments, on-going maintenance requests or proposals from Managers, and the investigation of customer requests. Infrastructure asset condition assessments form the basis of the renewal expenditure forecasts within this Plan.

Council has not yet reviewed the useful lives of infrastructure assets. This will be done in the next infrastructure asset revaluation and will be incorporated into future plans.

5.3.2 Renewal and Replacement Strategies

Council will plan capital renewal and replacement projects to meet level of service objectives and minimize infrastructure service risks by:

- Planning and scheduling renewal projects to deliver the defined level of service in the most efficient manner,
- Undertaking project scoping for all capital renewal and replacement projects to identify:
- the service delivery 'deficiency', present risk and optimum time for renewal/replacement,
- the project objectives to rectify the deficiency,
- the range of options, estimated capital and life cycle costs for each options that could address the service deficiency,
- and evaluate the options against adopted evaluation criteria, and
- select the best option to be included in capital renewal programs,
- Using 'low cost' renewal methods (cost of renewal is less than replacement) wherever possible,
- Maintain a current risk register for assets and service risks associated with providing services from infrastructure assets and reporting Very High and High risks and residual risks after treatment to management and Council,

- Review current and required skills base and implement workforce training and development to meet required construction and renewal needs,
- Maintain a current hierarchy of critical assets and capital renewal treatments and timings required ,
- Review management of capital renewal and replacement activities to ensure the best value for resources used is obtained.

5.3.2 Renewal and Replacement Strategies

Council will plan capital renewal and replacement projects to meet level of service objectives and minimize infrastructure service risks by:

- Planning and scheduling renewal projects to deliver the defined level of service in the most efficient manner,
- Undertaking project scoping for all capital renewal and replacement projects to identify:
 - the service delivery 'deficiency', present risk and optimum time for renewal/replacement,
 - the project objectives to rectify the deficiency,
 - the range of options, estimated capital and life cycle costs for each options that could address the service deficiency,
- and evaluate the options against adopted evaluation criteria, and
- select the best option to be included in capital renewal programs,
- Using 'low cost' renewal methods (cost of renewal is less than replacement) wherever possible,
- Maintain a current risk register for assets and service risks associated with providing services from infrastructure assets and reporting Very High and High risks and residual risks after treatment to management and Council,
- Review current and required skills base and implement workforce training and development to meet required construction and renewal needs,
- Maintain a current hierarchy of critical assets and capital renewal treatments and timings required ,
- Review management of capital renewal and replacement activities to ensure the best value for resources used is obtained.

5.3.3 Renewal Ranking Criteria

Asset renewal and replacement is typically undertaken to either:

- Ensure the reliability of the existing assets to deliver the service it was constructed to facilitate, or
- To ensure the assets are of sufficient quality to meet the service requirements.

It is possible to get some indication of capital renewal and replacement priorities by identifying assets or asset groups that:

- Have a high consequence of failure,
- Have high use and subsequent impact on users would be greatest,
- Have a total value represents the greatest net value,
- Have the highest average age relative to their expected lives,
- Are identified in the Infrastructure Asset Management Plan as key cost factors,
- Have high operational or maintenance costs, and
- Have replacement with a modern equivalent asset that would provide the equivalent service at a savings.

The ranking criteria used to determine priority of identified renewal and replacement proposals takes into consideration technical standards (obsolescence or increase risk), Strategic Plan Objectives, cost and community impact.

5.3.4 Renewal and Replacement Standards

Renewal work is carried out in accordance with the following Standards and Specifications.

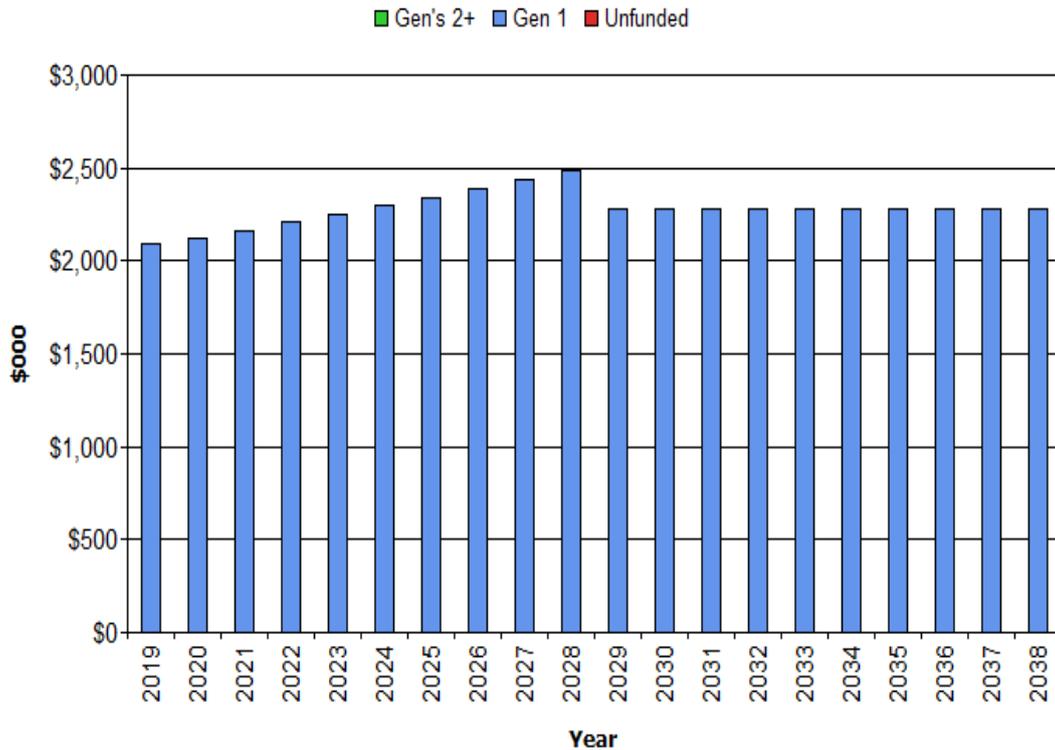
- Australian Standards relevant to the works being undertaken
- Occupational Health and Safety Standards
- Main Roads standards
- Aust Roads

5.3.5 Summary of Future Renewal and Replacement Expenditure

Projected future renewal and replacement expenditures are forecast to increase over time when the asset stock increases. The expenditure is required is shown in Fig 5. Note that all amounts are shown in real values.

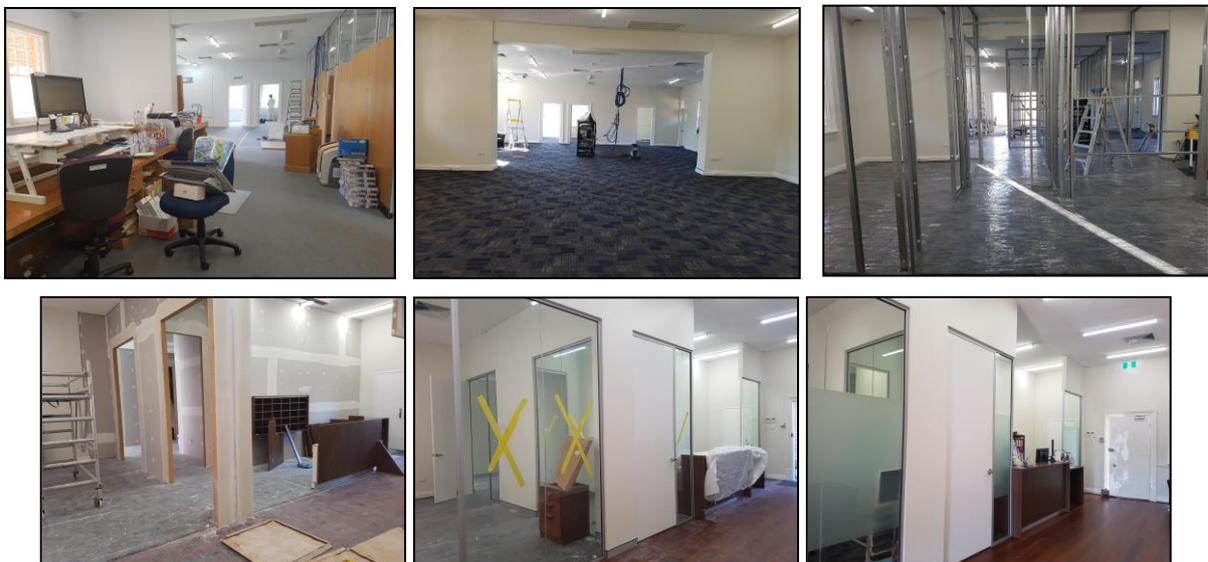
The projected capital renewal and replacement program is shown in Appendix B.

Fig 5: Projected Capital Renewal and Replacement Expenditure



Deferred renewal and replacement, i.e. those assets identified for renewal and/or replacement and not scheduled in capital works programs are to be included in the risk analysis process in the risk management plan.

Renewals and replacement expenditure in the capital works program will be accommodated in the Long Term Financial Plan. This is further discussed in Section 7.



5.4 Creation/Acquisition/Upgrade Plan

New works are those works that create a new asset that did not previously exist, or works which upgrade or improve an existing asset beyond its existing capacity. They may result from growth, social or environmental needs. Assets may also be acquired at no cost. These additional assets are considered in Section 5.4.1.

5.4.1 Selection Criteria

Council has to give careful consideration to any new capital works and to consider them in terms of “asset management” principles and “whole of life” costs. Generally a more expensive asset means a more expensive maintenance and replacement cost.

This also applies to the road network, however it has to be recognised that the higher use unsealed roads get to the point where it is more economical to seal the road rather than to maintain and resheet the road as an unsealed road.

Other benefits for extending the sealed road network are amenity benefits (a heavily used unsealed road can become rough to ride on between maintenance grading), dust suppression (dust is a hazard to other road users and a nuisance to dwellings or businesses adjacent to an unsealed road), more sustainable use of resources (loss of and replacement of the gravel wearing course is a poor use of resources), improved safety, and improved all weather access.

In formulating the plan and priorities across the Council area the following variants have been taken into consideration:

- All residential and commercial streets (primary access) to be bitumen sealed.
- Rural roads will be assessed for sealing based on the road’s hierarchy (function), traffic management and safety issues.
- High safety risk roads.
- High road maintenance cost areas.
- Known black spot areas.

Provision of new or upgraded works fall into the following categories depending upon the extent and type of works:

- Council funded, or
- Developer funded as part of subdivisional development, or

- Contribution to the cost by either the developer and/or Council.

Where possible, developers of new subdivisions are required, as part of the development approvals process, to provide the basic road infrastructure to the standard appropriate for that development. As Council acquires new assets through the subdivision development process it is important that the consequential costs are established and allowed for in future budgets.

The priority ranking criteria for new assets and upgrade/expansion of existing assets will be developed in future plans.

5.4.2 Capital Investment Strategies

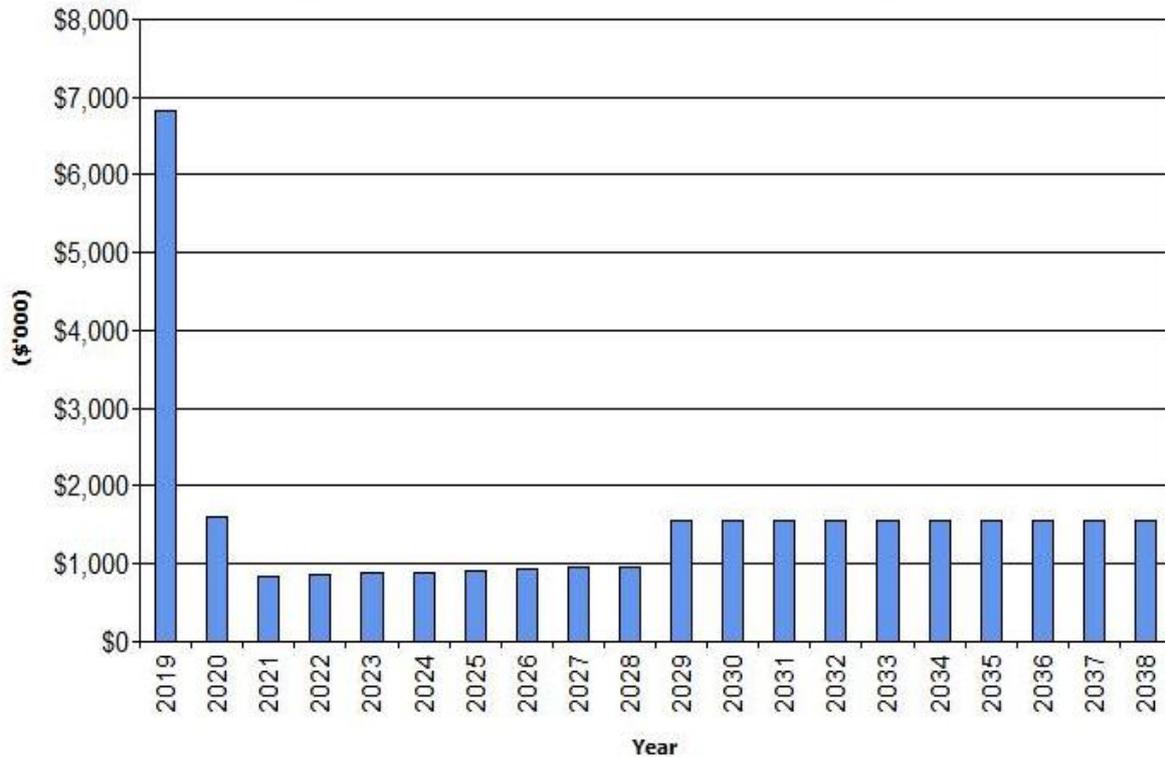
Capital upgrade and new projects will be planned to meet level of service objectives by:

- Planning and scheduling capital upgrade and new projects to deliver the defined level of service in the most efficient manner,
- Undertake project scoping for all capital upgrade/new projects to identify:
 - the service delivery ‘deficiency’, present risk and required timeline for delivery of the upgrade/new asset,
 - the project objectives to rectify the deficiency including value management for major projects,
 - the range of options, estimated capital and life cycle costs for each options that could address the service deficiency,
 - management of risks associated with alternative options,
 - and evaluate the options against evaluation criteria adopted by Council, and
 - select the best option to be included in capital upgrade/new programs,
- Review current and required skills base and implement training and development to meet required construction and project management needs,
- Review management of capital project management activities to ensure Council is obtaining best value for resources used.

5.4.3 Summary of Future Upgrade / New Assets Expenditure

Projected upgrade/new asset expenditures are summarised in Fig 6. The projected upgrade/new capital works program is shown in Appendix C. All amounts are shown in real values.

Fig 6: Projected Capital Upgrade/New Asset Expenditure



These new assets will commit the funding of ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required.

Expenditure on new assets and services in the capital works program will be accommodated in the Long Term Financial Plan. This is further discussed in Section 7.2.

5.5 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. These assets will be further reinvestigated to determine the required levels of service and see what options are available for alternate service delivery, if any. Any costs or revenue gained from asset disposals is accommodated in the Long Term Financial Plan.

Any cash flow projections from asset disposals will be developed in future revisions of the Infrastructure Asset Management Plan.

6. RISK MANAGEMENT PLAN

The purpose of risk management is to document the results and recommendations resulting from the periodic identification, assessment and treatment of risks associated with providing services from infrastructure assets, 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 with regard to risk”.

An assessment of risks associated with service delivery from infrastructure assets has identified critical risks that will result in loss or reduction in service from infrastructure assets or a ‘financial shock’. The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

Risk management is one of the fundamentals of asset and services management, and is observed to the highest possible level using industry standard practices. It is appropriate that formal risk management processes be applied to support decision making in all areas and at all levels of the organisation. The processes need to be ingrained in the daily activities for the organisation.

Risks can typically be categorised as:

Natural Events. *Council has virtually no control over the timing or extent of the event, however, the probabilities may be understood;*

External Impacts. *Council has some control over these risks, associated with other organisations providing goods and services to Council;*

Physical Failure Risk. *Where conditions or performance of an asset could lead to failure. Council can control these risks through maintenance and renewal funding levels;*

Operational Risk. *Where management of the asset or asset management activities might impact on an asset. Council can control these risks through maintenance and renewal funding levels.*

Through risk management, the Shire of Toodyay aims to:

- Protect the quality of the property portfolio
- Protect users of property assets
- Reduce the Shire’s exposure to risk
- Promote effective financial and asset management practices

This will be achieved through:

- Identifying, decreasing the likelihood, and mitigating the consequences of, risk within the constraints of sensible commercial objectives and practices
- Applying risk based practices to the management of property assets and associated decision making
- Maintaining safe and reliable plant, equipment and infrastructure
- Preparing appropriate contingencies
- Reviewing the risk profile of the property portfolio at appropriate intervals and when circumstances dictate
- Maintaining an up to date Infrastructure Asset Management Plan.

6.1 Critical Assets

Critical assets are defined as those which have a high consequence of failure causing significant loss or reduction of service. Similarly, critical failure modes are those which have the highest consequences. An assessment of risks associated with service delivery from infrastructure assets has identified the critical risks that will result in significant loss, 'financial shock' or a reduction in service.

Critical risks are those assessed with 'Very High' (requiring immediate corrective action) and 'High'

(requiring corrective action) rating identified in the Risk Management Plan. The residual risk and treatment cost after the selected treatment plan is operational. These risks and costs are reported to management and Council.

Research on critical assets has not yet been undertaken. This will be investigated in future updates of the asset management plan. By identifying critical assets and failure modes investigative activities, condition inspection programs, maintenance and capital expenditure plans can be targeted at the critical areas.

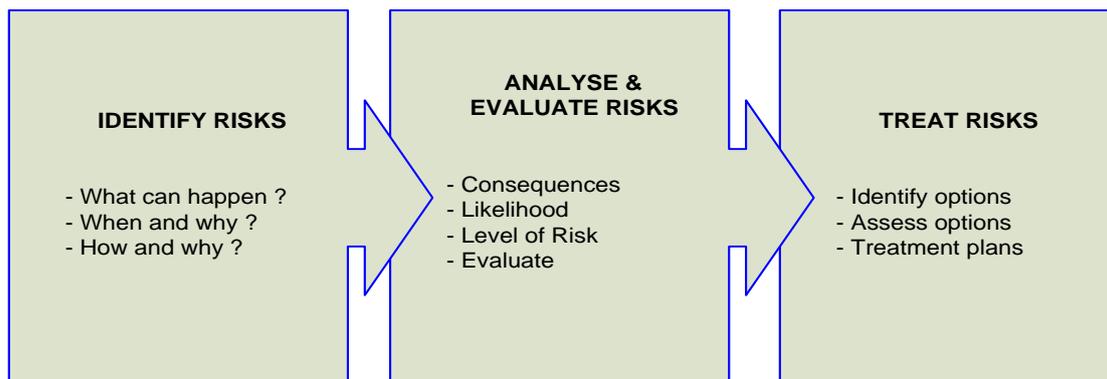
6.2 Risk Assessment

The risk management process used in this project is shown in Figure 6.2 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 ISO risk assessment standard ISO 31000:2009.

Fig 6.2 Risk Management Process – Abridged



The risk assessment process identifies credible risks, the likelihood of the risk event occurring, the consequences should the event occur, develops a risk rating, evaluates the risk and develops a risk treatment plan for non-acceptable risks.

The only practicable means of identifying risk is by undertaking an inspection regime of the infrastructure assets. This process should enable significant risks to be discovered and remedied in advance of possible injury. Safety audits need to be undertaken where specific risks are identified.

Safety issues may be detected either as the result of the programmed defect inspection or by observation followed by notification to Council by members of the community or council employees while undertaking

their normal work duties. A subsequent reactive safety inspection will then be conducted by an appropriate council officer.

A four-tier inspection regime covers the key aspects of safety, incidents, defects and condition:

Reactive Inspections: Response to customer enquiries or notifications. Inspections of all reported defects are undertaken following notification by members of the community or Council employees. The subsequent inspection will be conducted by an appropriate Council representative;

Programmed Inspections: determine if the asset complies with the specified levels of service. In the case of roads, they are to be undertaken by under a formal timetable regime;

Incident Inspections: enables an incident condition report to be prepared for use in legal proceedings and the gathering of information for the analysis of the causes of accidents and the planning and implementation of asset management and safety measures; and

Condition Inspections: identify deficiencies in the structural integrity of the infrastructure assets, which if untreated, are likely to adversely affect their values. The deficiencies may well impact short-term serviceability as well as the ability of the component to continue to perform for the duration of its intended life span. They are also under a formal timetable regime however at a lesser frequency than the abovementioned programmed inspections.

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' as shown in Table 6.3

Table 6.3: Risk Rating Matrix

Risk Rating					
Likelihood	Consequences				
	Insignificant - 1	Minor - 2	Moderate - 3	Major - 4	Catastrophic - 5
Rare - 1	L	L	M	M	H
Unlikely - 2	L	L	M	M	H
Possible - 3	L	M	H	H	H
Likely - 4	M	M	H	H	VH
Almost Certain - 5	M	H	H	VH	VH

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

ASSET AT RISK	WHAT IS THE POSSIBLE PROBLEM?	WHAT IS THE CAUSE?	WHAT WOULD HAPPEN AS A RESULT?	LIKELIHOOD	CONSEQUENCES	RISK RATING	RISK TREATMENT PLAN	RISK AFTER TREATMENT	RESPONSIBLE	BY WHEN
Sealed Road Network	Minor to moderate damage to surface, loss of sealed surface Roads deteriorate to a lesser service standard and higher risk situation	normal wear and tear, inadequate renewal program, loss of sealed surface integrity, increased pavement failures	Cost to Council of repairs. Interruption to services. Death or Injury to users.	4	4	H	<ul style="list-style-type: none"> • Reseal program • Reactive maintenance • Maintain warning signs • Planned maintenance • Annual inspections • repair of defects within budget limits 	M	Manager Works & Services	Ongoing
Unsealed Roads	Loss of gravel pavement Roads deteriorate to a lesser service standard and higher risk situation	High rainfall activity, normal wear and tear, inadequate renewal program	Death or injury to users; Loss of all-weather access.	4	4	H	<ul style="list-style-type: none"> • Sealing Program targeted to high traffic routes • Resheet program; • Disaster Management Plan updated and current; • Ability to evacuate residents 	M	Manager Works & Services	Ongoing
Drainage and Culverts	Failure,	Lack of capacity, inadequate cover over pipes, ageing drainage, blockages	Major flooding to roads and properties. Interruption to services.	3	3	H	<ul style="list-style-type: none"> • Planned maintenance • Reactive maintenance • Regular inspection of drains and culverts • Adequate drainage designs conducted as a part of road renewal/upgrade works 	M	Manager Works & Services	Ongoing
Footpaths	Injury on footpath	Trip hazard not recognised and repaired	Injury to user.	3	2	M	<ul style="list-style-type: none"> • Regular inspection of footpaths. • Planned maintenance program 	L	Manager Works & Services	Ongoing

ASSET AT RISK	WHAT IS THE POSSIBLE PROBLEM?	WHAT IS THE CAUSE?	WHAT WOULD HAPPEN AS A RESULT?	LIKELIHOOD	CONSEQUENCES	RISK RATING	RISK TREATMENT PLAN	RISK AFTER TREATMENT	RESPONSIBLE	BY WHEN
Bridges	Major damage or destruction of bridges Structural or functional failure	Ageing bridges, speed of approaching vehicles, heavy vehicle damage to bridge	Bridge collapse.	n/a	n/a	n/a	<ul style="list-style-type: none"> Planned maintenance Regular inspection of bridges and signage Adequate signage; Close bridge Repair defects within budget limits 	n/a	Main Roads WA	Ongoing
All Infrastructure Assets	Decreasing frequency of maintenance	Maintenance costs increasing due to inadequate renewal program	Assets deteriorate to a lesser service standard and higher risk	4	4	H	<ul style="list-style-type: none"> Planned maintenance program Planned renewal program 	M	Manager Works & Services	Ongoing
All Infrastructure Assets	Asset renewals not funded when required	Insufficient funding	Asset conditions deteriorate and funding shortfall grows due to higher cost renewal treatments being required	4	3	H	<ul style="list-style-type: none"> Renewal works undertaken when identified or listed for works budget 	M	Manager Works & Services	Ongoing
All Infrastructure Assets	Asset failure	Inappropriate technical practices employed for maintenance resulting in failure of asset	Risk to health and safety of users and personnel Significant cost for rectification works	3	4	H	<ul style="list-style-type: none"> Construction and maintenance standards to be followed 	M	Manager Works & Services	Ongoing
All Infrastructure Assets	Asset failure	Fire, flooding	Risk to health and safety of users and personnel Significant cost for rectification works Asset conditions deteriorate	4	5	VH	<ul style="list-style-type: none"> Emergency Management Plan Insurance Disaster Funding 	H	CEO, Manager Works & Services, CESM	Ongoing

6.3 Infrastructure Resilience Approach

The resilience of our critical infrastructure is vital to our customers and the services we provide. To adapt to changing conditions and grow over time we need to understand our capacity to respond to possible disruptions and be positioned to absorb disturbance and act effectively in a crisis to ensure continuity of service.

To enhance our capacity to manage unforeseen or unexpected risk to the continuity of operations we take an infrastructure resilience approach using an 'all hazards' methodology.

The 'all-hazards' approach involves:

- An initial assessment of critical assets;
- A resilience assessment for these assets; and
- Identification of related improvements or interventions

Resilience is built on aspects such as response and recovery planning, financial capacity and crisis leadership.

6.4 Service and Risk Trade-Offs

The decisions made in adopting this Infrastructure Asset Management Plan are based on the objective to achieve the optimum benefits from the available resources by taking into consideration:

- What we would like to do based on asset register data;
- What we should do with existing budgets and identifying level of service and risk consequences (i.e. what are the operations and maintenance and capital projects we are unable to do, what is the service and risk consequences associated with this position). This may require several versions of the AM Plan; and
- What we can do and be financially sustainable with AM Plans matching long-term financial plans.

The Infrastructure Asset Management Plan provides the tools for discussion with the Council and customers/community on trade-offs between what we would like to and what we should be doing with existing budgets by balancing changes in services and service levels with affordability and acceptance of the service and risk consequences of the trade-off position.

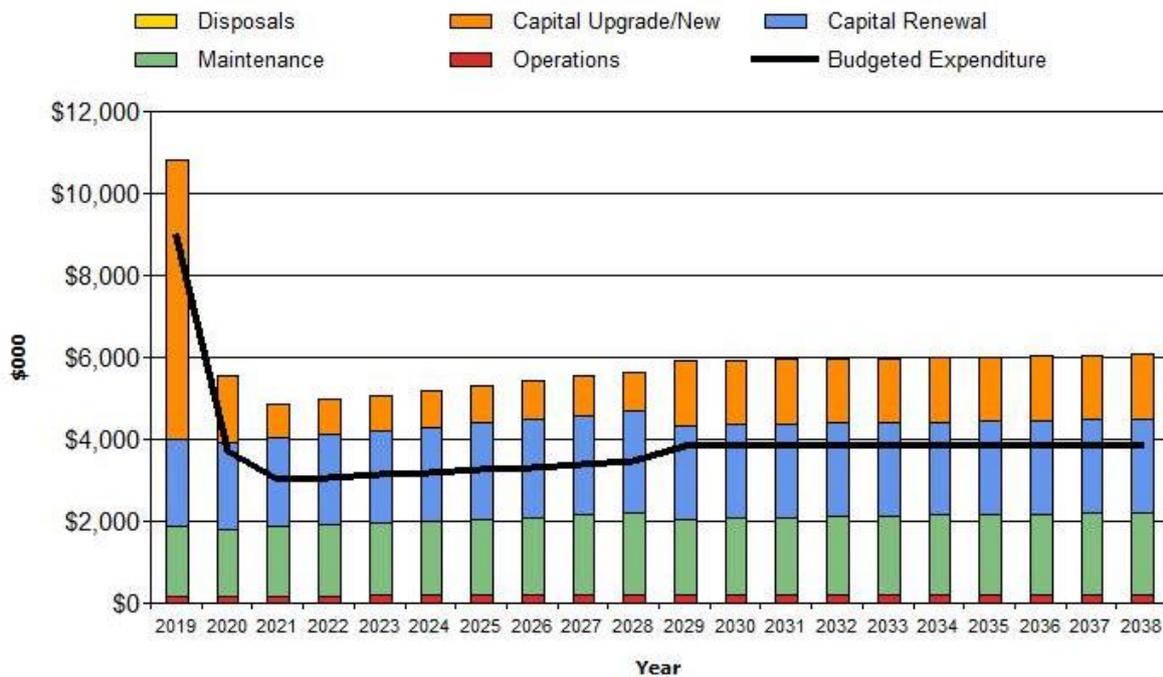
7. FINANCIAL SUMMARY

This section contains the financial requirements resulting from all the information presented in the previous sections of this Infrastructure Asset Management Plan. The financial projections will be improved as further information becomes available on desired levels of service and current and projected future asset performance.

7.1 Financial Statements and Projections

The financial projections are shown in Fig 7 for projected operating (operations and maintenance) and capital expenditure (renewal and upgrade/expansion/new assets). Note that all costs are shown in real values.

Fig 7: Projected Operating and Capital Expenditure



7.1.1 Sustainability of Service Delivery

There are four key indicators for service delivery sustainability that have been considered in the analysis of the services provided by this asset category, these being the asset renewal funding ratio, long term life cycle costs/expenditures and medium term projected/budgeted expenditures over 5 and 10 years of the planning period.

7.1.2 Asset Renewal Funding Ratio

The Asset Renewal Funding Ratio is the most important indicator and reveals that over the next 10 years of the forecasting that we will have 56% of the funds required for the optimal renewal and replacement of assets.

7.1.3 Long term - Life Cycle Cost

Life cycle costs (or whole of life costs) are the average costs that are required to sustain the service levels over the asset life cycle. Life cycle costs include operations and maintenance expenditure and asset consumption (depreciation expense).

Life cycle costs can be compared to life cycle expenditure to give an initial indicator of affordability of projected service levels when considered with age profiles. Life cycle expenditure includes operations, maintenance and capital renewal expenditure. Life cycle expenditure will vary depending on the timing of asset renewals.

The life cycle costs and life cycle expenditure comparison highlights any difference between present outlays and the average cost of providing the service over the long term. If the life cycle expenditure is less than that life cycle cost, it is most likely that outlays will need to be increased or cuts in services made in the future.

Knowing the extent and timing of any required increase in outlays and the service consequences if funding is not available will assist in providing services to their communities in a financially sustainable manner. This is the purpose of the asset management plans and Long Term Financial Plan.

7.1.4 Medium Term – 10 Year Financial Planning Period

The Infrastructure Asset Management Plan identifies the projected operations, maintenance and capital renewal expenditures required to provide an agreed level of service to the community over a 10 year period. This provides input into 10 year financial and funding plans aimed at providing the required services in a sustainable manner.

These projected expenditures may be compared to budgeted expenditures in the 10 year period to identify any funding shortfall. In a core asset management plan, a gap is generally due to increasing asset renewals for ageing assets.

The projected operations, maintenance and capital renewal expenditure required over the 10 year planning period is \$5,199,842 on average per year.

Estimated (budget) operations, maintenance and capital renewal funding is \$4,642,552 on average per year giving a 10 year funding shortfall of \$557,289 per year. This indicates 89% of the projected expenditures needed to provide the services documented in the asset management plan.

Providing services in a sustainable manner will require matching of projected asset renewal and replacement expenditure to meet agreed service levels with the corresponding capital works program accommodated in the Long Term Financial Plan.

A gap between projected asset renewal/replacement expenditure and amounts accommodated in the LTFP indicates that further work is required on reviewing service levels in the Infrastructure Asset Management Plan (including possibly revising the LTFP) before adopting the asset management plan to manage required service levels and funding to eliminate any funding gap.

We will manage the 'gap' by reviewing future service levels and resources required to provide these services to the community.

7.2 Funding Strategy

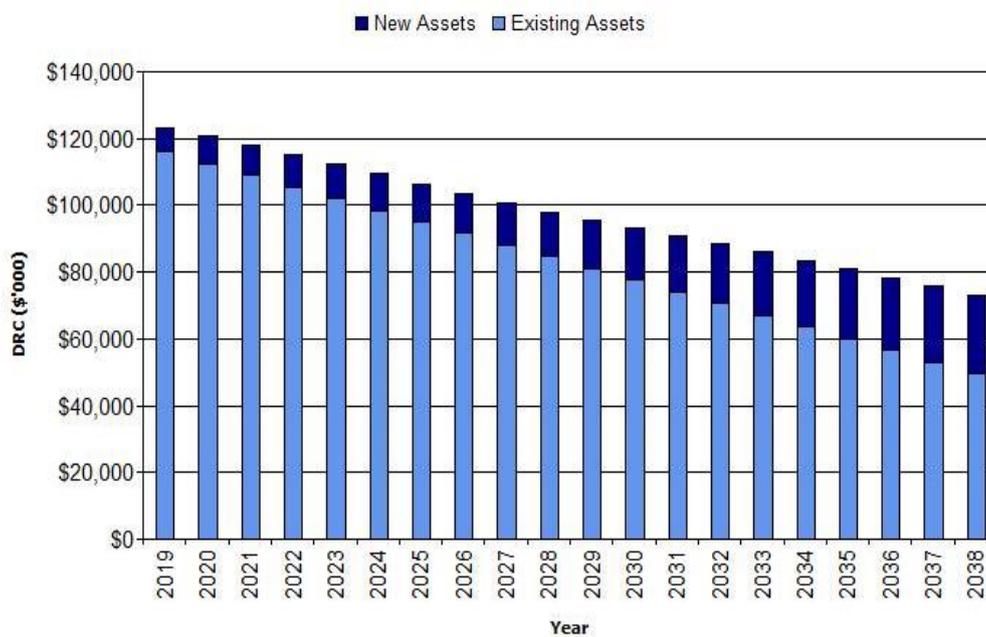
After reviewing service levels, as appropriate to ensure ongoing financial sustainability projected expenditures identified in Appendix C will be accommodated in the 10 year Long Term Financial Plan.

7.3 Valuation Forecasts

Asset values are forecast to increase as additional assets are added to the asset stock from construction and acquisition of assets.

The depreciated replacement cost will vary over the forecast period depending on the rates of addition of new assets, disposal of old assets and consumption and renewal of existing assets. The depreciated replacement cost of contributed and new assets is shown in the darker colour and in the lighter colour for existing assets.

Figure 11: Projected Depreciated Replacement Cost



7.4 Key Assumptions Made in Financial Forecasts

This section details the key assumptions made in presenting the information contained in Infrastructure Asset Management Plan and in preparing forecasts of required operating and capital expenditure and asset values, depreciation expense and carrying amount estimates. It is presented to enable readers to gain an understanding of the levels of confidence in the data behind the financial forecasts.

Key assumptions made in Infrastructure Asset Management Plan and risks that these may change are shown in Table 7.4.

Table 7.4: Key Assumptions made in Infrastructure Asset Management Plan and Risks of Change

KEY ASSUMPTIONS	RISKS OF CHANGE TO ASSUMPTIONS
All Infrastructure assets deteriorate uniformly.	Change short term planning of asset renewal
Renewal programs are based on intervening at Condition 4.	Financial and service impact on maintenance, renewal and upgrades.
Maintenance costs are based largely on historical expenditure and assume there is no significant change in rates (above the rate of inflation).	Financial and service impact on maintenance program.
Continued use of current construction techniques and materials. Changes in technology may bring about future reductions in costs but cannot be assumed in advance for forecasting.	Insignificant

7.5 Forecast Reliability and Confidence

The expenditure and valuations projections in this Infrastructure Asset Management Plan are based on best available data. Currency and accuracy of data is critical to effective asset and financial management. Data confidence is classified on a 5 level scale in accordance with Table 7.5.

Table 7.5: Data Confidence Grading System

CONFIDENCE GRADE	DESCRIPTION
A Highly reliable	Data based on sound records, procedures, investigations and analysis, documented properly and agreed as the best method of assessment. Dataset is complete and estimated to be accurate $\pm 2\%$
B Reliable	Data based on sound records, procedures, investigations and analysis, documented properly but has minor shortcomings, for example some of the data is old, some documentation is missing and/or reliance is placed on unconfirmed reports or some extrapolation. Dataset is complete and estimated to be accurate $\pm 10\%$
C Uncertain	Data based on sound records, procedures, investigations and analysis which is incomplete or unsupported, or extrapolated from a limited sample for which grade A or B data are available. Dataset is substantially complete but up to 50% is extrapolated data and accuracy estimated $\pm 25\%$
D Very Uncertain	Data is based on unconfirmed verbal reports and/or cursory inspections and analysis. Dataset may not be fully complete and most data is estimated or extrapolated. Accuracy $\pm 40\%$
E Unknown	None or very little data held.

The estimated confidence level for and reliability of data used in this Infrastructure Asset Management Plan is shown in Table 7.5.1.

Table 7.5.1: Data Confidence Assessment for Data used in the Infrastructure Asset Management Plan

DATA	CONFIDENCE ASSESSMENT	COMMENT
Demand drivers	B Reliable	Population change is measured and updated, changes in building numbers are monitored, consumer preferences and demands are discussed with relevant Managers
Growth projections	B Reliable	Based on historical records of growth
Operations expenditures	B Reliable	Based on historical records
Maintenance expenditures	B Reliable	Based on historical records
Projected Renewal expenditures:		
- Asset values	B Reliable	Assets revalued in FY2017/18
- Asset useful lives	B Reliable	Matches generally accepted industry standards
- Condition modelling	B Reliable	Carried out during condition assessments
- Network renewals	B Reliable	Based on asset registers and Council cost and resurfacing records
- Defect repairs	B Reliable	Defects identified during condition assessments, planned inspections and Council estimates
Upgrade/New expenditures	B Reliable	Council has identified these in its Long Term Financial Plan
Disposal expenditures	B Reliable	Nil

Over all data sources the data confidence is assessed as high confidence level for data used in the preparation of this Infrastructure Asset Management Plan.

8. PLAN IMPROVEMENT AND MONITORING

8.1 Status of Asset Management Practices

8.1.1 Accounting and Financial Data Sources

The Council's Infrastructure asset management system is primarily Roman 2 and the Council's financial system is Synergy.

Council's Corporate Services Department is responsible for the valuation of all Infrastructure assets and ensuring that depreciation is updated on a regular basis.

The Council must comply with AASB 116 Property, Infrastructure.

That all items, purchased or constructed by Council, with a value greater than \$5,000 (five thousand dollars) be capitalised and placed on Council's asset register. Such assets are to be depreciated at a rate determined with regard to the remaining useful life of the asset and its residual value. Any items with a value of less than \$5,000 (five thousand dollars) are to be expensed in the year of purchase.

There are no required changes to accounting financial systems arising from this AM Plan. Asset management data sources include Asset Registers and Valuation Reports.

8.2 Improvement Plan

The asset management improvement plan generated from the Infrastructure Asset Management Plan is shown in Table 8.2.

Table 8.2: Improvement Plan

TASK NO	TASK	RESPONSIBILITY	TIMELINE
1	Specify and define community levels of service to be determined through community consultation.	CEO	Ongoing
2	Measure performance against defined levels of service.	MWS	Ongoing
3	Review of current infrastructure inventory: assets age profile, condition, traffic volumes and utilisation.	MWS	2019
4	Linking useful lives, whole of life asset costs and condition intervention levels.	MWS	Ongoing
5	Asset Information Systems and Data Management – improve quality of asset data in Roman 2 and use software to its full capacity.	MWS	Ongoing
6	Develop asset service hierarchy and identify critical infrastructure assets with associated risk treatment plans	MWS	2019
7	Roads Sealing Program - as a preventative maintenance strategy. This reduces the maintenance requirements of roads, provides safer roads, as well as reduces whole of life costs.	MWS	2019
8	Drainage Mapping and Improvement – gather information on existing drainage assets and topographical information. This will be used to review Shire drainage requirements and will inform future construction and maintenance programs.	MWS	Ongoing
9	Review Gravel Roads Maintenance Program – currently insufficient and significantly behind schedule. Review plant & infrastructure assets for Grading Program, staffing and quality of service.	MWS	2019

TASK NO	TASK	RESPONSIBILITY	TIMELINE
10	Review Tree Pruning Program – currently insufficient and significantly behind schedule. Look into clearing permits for encroaching vegetation to meet road safety standards, inspect and identify high risk and non-compliant roads. Review plant & infrastructure assets for Pruning Program, staffing and quality of service.	MWS	2019
11	Develop and document standards for construction and maintenance of roads.	MWS	2020
12	Review current and create new Quality Assurance process around works for infrastructure assets acquired through residential developments – drainage inspection, compacting testing, levels checking, pavement thickness, and formal handover procedures.	MWS	2020
13	Review and finalise Shared Path Plan	MWS	2019

8.3 Monitoring and Review Procedures

The Infrastructure Asset Management Plan will be reviewed during annual budget planning processes and amended to show any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

The Infrastructure Asset Management Plan will be updated annually to ensure it represents the current service level, asset values, projected operations, maintenance, capital renewal and replacement, capital upgrade/new and asset disposal expenditures and projected expenditure values incorporated into the Long Term Financial Plan.

The Infrastructure Asset Management Plan has a life of 4 years and is due for complete revision and will be updated at that time.

8.4 Performance Measures

The effectiveness of the Infrastructure Asset Management Plan can be measured in the following ways:

- The degree to which the required projected expenditures identified in Infrastructure Asset Management Plan are incorporated into the Long Term Financial Plan,
- The degree to which 1-4 year detailed works programs, budgets, business plans and corporate structures take into account the full works program trends provided by the asset management plan,
- The degree to which the existing and projected service levels and service consequences (what we cannot do), risks and residual risks are incorporated into the Strategic Plan and associated plans,
- The Asset Renewal Funding Ratio achieving the target of 1.0.

9. REFERENCES

- IPWEA, 2006, 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM
- IPWEA, 2008, 'NAMS.PLUS Asset Management', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/namsplus.
- IPWEA, 2015, 2nd edn., 'Australian Infrastructure Financial Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/AIFMM.
- IPWEA, 2015, 3rd edn., 'International Infrastructure Management Manual', Institute of Public Works Engineering Australasia, Sydney, www.ipwea.org/IIMM.

10. APPENDICES

Appendix A Projected 10 year Capital Renewal and Replacement Works Program

Appendix B Projected 10 year Capital Upgrade/New Works Program

Appendix C LTFP Budgeted Expenditures Accommodated in AM Plan

Appendix D Abbreviations

Appendix E Glossary

Appendix A - Projected 10-year Capital Renewal and Replacement Works Program

Infrastructure Renewal Plan (10 year forecast)		
YEAR	PROJECTS	BUDGET (\$)
2019	Resealing – incl. asphalt (minus \$200k defects)	75,000
2019	Signage	5,000
		80,000
2020	Resealing – incl. asphalt	470,000
2020	Signage	5,100
		475,100
2021	Resealing – incl. asphalt	479,400
2021	Signage	5,202
		484,602
2022	Resealing – incl. asphalt	488,988
2022	Signage	5,306
		494,294
2023	Resealing – incl. asphalt	498,768
2023	Signage	5,412
		504,180
2024	Resealing – incl. asphalt	508,743
2024	Signage	5,520
		514,264
2025	Resealing – incl. asphalt	518,918
2025	Signage	5,631
		524,549
2026	Resealing – incl. asphalt	529,296
2026	Signage	5,743
		535,040
2027	Resealing – incl. asphalt	539,882
2027	Signage	5,858
		545,741
2028	Resealing – incl. asphalt	550,680
2028	Signage	5,975
		556,655
TOTAL		4,714,424

Appendix B - Projected Upgrade/Exp/New 10-year Capital Works Program

Infrastructure Upgrade Plan (10 year forecast)		
YEAR	PROJECTS	BUDGET (\$)
2019	Capital upgrades (roads, drainage, footpaths, car parks)	1,900
2019	Design/survey/investigation	120
2019	Recreation precinct	5,820
		7,840
2020	Capital upgrades (roads, drainage, footpaths, car parks)	1,938
2020	Design/survey/investigation	122
2020	Recreation precinct	585
		2,645
2021	Capital upgrades (roads, drainage, footpaths, car parks)	1,977
2021	Design/survey/investigation	125
		2,102
2022	Capital upgrades (roads, drainage, footpaths, car parks)	2,016
2022	Design/survey/investigation	127
		2,144
2023	Capital upgrades (roads, drainage, footpaths, car parks)	2,057
2023	Design/survey/investigation	130
		2,187
2024	Capital upgrades (roads, drainage, footpaths, car parks)	2,098
2024	Design/survey/investigation	132
		2,230
2025	Capital upgrades (roads, drainage, footpaths, car parks)	2,140
2025	Design/survey/investigation	135
		2,275
2026	Capital upgrades (roads, drainage, footpaths, car parks)	2,183
2026	Design/survey/investigation	138
		2,320
2027	Capital upgrades (roads, drainage, footpaths, car parks)	2,226
2027	Design/survey/investigation	141
		2,367
2028	Capital upgrades (roads, drainage, footpaths, car parks)	2,271
2028	Design/survey/investigation	143
		2,414
TOTAL		28,524

Appendix C - Budgeted Expenditures Accommodated in LTFP

Infrastructure Renewal Plan (10 year forecast)		
YEAR	PROJECTS	FINAL BUDGET (\$'000)
2019	Resealing – incl. asphalt (minus \$200k defects)	75
2019	Signage	5
		80
2020	Footpath renewal	20
2020	Resealing – incl. asphalt	300
2020	Signage	5
		325
2021	Footpath renewal	20
2021	Resealing – incl. asphalt	306
2021	Signage	5
		332
2022	Footpath renewal	21
2022	Resealing – incl. asphalt	312
2022	Signage	5
		338
2023	Footpath renewal	21
2023	Resealing – incl. asphalt	318
2023	Signage	5
		345
2024	Footpath renewal	22
2024	Resealing – incl. asphalt	325
2024	Signage	6
		352
2025	Footpath renewal	22
2025	Resealing – incl. asphalt	331
2025	Signage	6
		359
2026	Footpath renewal	23
2026	Resealing – incl. asphalt	338
2026	Signage	6
		366
2027	Footpath renewal	23
2027	Resealing – incl. asphalt	345
2027	Signage	6
		373
2028	Footpath renewal	23
2028	Resealing – incl. asphalt	351
2028	Signage	6
		381
TOTAL		\$3,251,000

Infrastructure Upgrade Plan (10 year forecast)

YEAR	PROJECTS	FINAL BUDGET (\$'000)
2019	Capital upgrades (roads, drainage, footpaths, car parks)	1,900
2019	Design/survey/investigation	120
2019	Recreation precinct	5,820
		7,840
2020	Capital upgrades (roads, drainage, footpaths, car parks)	1,700
2020	Design/survey/investigation	65
2020	Recreation precinct	585
		2,350
2021	Capital upgrades (roads, drainage, footpaths, car parks)	1,734
2021	Design/survey/investigation	66
		1,800
2022	Capital upgrades (roads, drainage, footpaths, car parks)	1,769
2022	Design/survey/investigation	68
		1,836
2023	Capital upgrades (roads, drainage, footpaths, car parks)	1,804
2023	Design/survey/investigation	69
		1,873
2024	Capital upgrades (roads, drainage, footpaths, car parks)	1,840
2024	Design/survey/investigation	70
		1,910
2025	Capital upgrades (roads, drainage, footpaths, car parks)	1,877
2025	Design/survey/investigation	72
		1,949
2026	Capital upgrades (roads, drainage, footpaths, car parks)	1,914
2026	Design/survey/investigation	73
		1,988
2027	Capital upgrades (roads, drainage, footpaths, car parks)	1,953
2027	Design/survey/investigation	75
		2,027
2028	Capital upgrades (roads, drainage, footpaths, car parks)	1,992
2028	Design/survey/investigation	76
		2,068
TOTAL		\$25,642,000

Appendix D - Abbreviations

ABBREVIATION	DESCRIPTION
AAAC	Average annual asset consumption
AM	Asset management
AM Plan	Asset management plan
GRC	Gross replacement cost
DA	Depreciable amount
DRC	Depreciated replacement cost
IRMP	Infrastructure risk management plan
LCC	Life Cycle cost
LTFP	Long Term Financial Plan
MMS	Maintenance management system
RV	Residual value

Appendix E Glossary

Annual Service Cost (ASC)

1. Reporting Actual Cost

The annual (accrual) cost of providing a service including operations, maintenance, depreciation, finance/opportunity and disposal costs less revenue.

2. For Investment Analysis and Budgeting

An estimate of the cost that would be tendered, per annum, if tenders were called for the supply of a service to a performance specification for a fixed term. The Annual Service Cost includes operations, maintenance, depreciation, and finance / opportunity and disposal costs, less revenue.

Asset

A resource controlled by an entity as a result of past events and from which future economic benefits are expected to flow to the entity. Infrastructure assets are a sub-class of property, Infrastructure which are non-current assets with a life greater than 12 months and enable services to be provided.

Asset Category

Sub-group of assets within a class hierarchy for financial reporting and management purposes.

Asset Class

A group of assets having a similar nature or function in the operations of an entity, and which, for purposes of disclosure, is shown as a single item without supplementary disclosure.

Asset Condition Assessment

The process of continuous or periodic inspection, assessment, measurement and interpretation of the resultant data to indicate the condition of a specific asset so as to determine the need for some preventative or remedial action.

Asset Hierarchy

A framework for segmenting an asset base into appropriate classifications. The asset hierarchy can be based on asset function or asset type or a combination of the two.

Asset Management (AM)

The combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost effective manner.

Asset Renewal Funding Ratio (ARFR)

The ratio of the net present value of asset renewal funding accommodated over a 10-year period in a Long Term Financial Plan relative to the net present value of projected capital renewal expenditures identified in an asset management plan for the same period [AIFMM, 2015, Version 1.0, Financial Sustainability Indicator 3, Sec 2.6, p 9].

Average Annual Asset Consumption (AAAC)*

The amount of the asset base consumed during a reporting period (generally a year). This may be calculated by dividing the depreciable amount by the useful life (or total future economic benefits/service potential) and totalled for each and every asset OR by dividing the carrying amount (depreciated replacement cost) by the remaining useful life (or remaining future economic benefits/service potential) and totalled for each and every asset in an asset category or class.

Borrowings

A borrowing or loan is a contractual obligation of the borrowing entity to deliver cash or another financial asset to the lending entity over a specified period of time or at a specified point in time, to cover both the initial capital provided and the cost of the interest incurred for providing this capital. A borrowing or loan provides the means for the borrowing entity to finance outlays (typically physical assets) when it has insufficient funds of its own to do so, and for the lending entity to make a financial return, normally in the form of interest revenue, on the funding provided.

Capital Expenditure

Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months. Capital expenditure includes renewal, expansion and upgrade. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

*Capital Expenditure - Expansion

Expenditure that extends the capacity of an existing asset to provide benefits, at the same standard as is currently enjoyed by existing beneficiaries, to a new group of users. It is discretionary expenditure, which increases future operations and maintenance costs, because it increases the asset base, but may be associated with additional revenue from the new user group, e.g. extending a drainage or road network, the provision of an oval or park in a new suburb for new residents.

Capital Expenditure - New

Expenditure which creates a new asset providing a new service/output that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operations and maintenance expenditure.

Capital Expenditure - Renewal

Expenditure on an existing asset or on replacing an existing asset, which returns the service capability of the asset up to that which it had originally. It is periodically required expenditure, relatively large (material) in value compared with the value of the components or sub-components of the asset being renewed. As it reinstates existing service potential, it generally has no impact on revenue, but may reduce future operations and maintenance expenditure if completed at the optimum time, e.g. resurfacing or resheeting a material part of a road network, replacing a material section of a drainage network with pipes of the same capacity, resurfacing an oval.

Capital Expenditure - Upgrade

Expenditure, which enhances an existing asset to provide a higher level of service or expenditure that will increase the life of the asset beyond that which it had originally. Upgrade expenditure is discretionary and often does not result in additional revenue unless direct user charges apply. It will increase operations and maintenance expenditure in the future because of the increase in the asset base, e.g. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility.

Capital Funding

Funding to pay for capital expenditure.

Capital Grants

Revenue received generally tied to the specific projects or purposes, which are often for upgrade and/or expansion or new investment proposals.

Capital Investment Expenditure

Relatively large (material) expenditure, which has benefits, expected to last for more than 12 months (See capital expenditure definition)

Capitalisation Threshold

The value of expenditure on non-current assets above which the expenditure is recorded as capital expenditure and below which the expenditure is charged as an expense in the year of acquisition.

Carrying Amount

The amount at which an asset is recognised in the balance sheet after deducting any accumulated depreciation / amortisation and accumulated impairment losses.

Component

Specific parts of an asset having independent physical or functional identity and having specific attributes such as different life expectancy, maintenance regimes, risk or criticality.

Core Asset Management

Asset management which relies primarily on the use of an asset register, maintenance management systems, top-down condition assessment, simple risk assessment and defined levels of service, in order to establish alternative treatment options and a long-term cash flow projection.

Cost of an Asset

The amount of cash or cash equivalents paid or the fair value of the consideration given to acquire an asset at the time of its acquisition or construction, including any costs necessary to place the asset into service. This includes one-off design and project management costs.

Critical Assets

Those assets that are likely to result in a more significant financial, environment and social cost in terms of impact on organisational objectives.

Deferred Maintenance

The shortfall in rehabilitation work undertaken relative to that required to maintain the service potential of an asset.

Depreciable Amount

The cost of an asset, or other amount substituted for its cost, less its residual value.

Depreciated Replacement Cost (DRC)

The gross replacement cost (GRC) of an asset less, where applicable, accumulated depreciation calculated on the basis of such cost to reflect the already consumed or expired future economic benefits of the asset.

Depreciation / Amortisation

The systematic allocation of the depreciable amount (service potential) of an asset over its useful life.

Economic Life

See useful life definition.

Expenditure

The spending of money on goods and services. Expenditure includes recurrent and capital outlays.

Expenses

Decreases in economic benefits during the accounting period in the form of outflows or depletions of assets or increases in liabilities that result in decreases in equity, other than those relating to distributions to equity participants.

Fair Value

The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arm's length transaction.

Financing Gap

A financing gap exists whenever an entity has insufficient capacity to finance asset renewal and other expenditure necessary to be able to appropriately maintain the range and level of services its existing asset stock was originally designed and intended to deliver. The service capability of the existing asset stock should be determined assuming no additional operating revenue, productivity improvements, or net financial liabilities above levels currently planned or projected. A current financing gap means service levels have already or are currently falling. A projected financing gap if not addressed will result in a future diminution of existing service levels.

Gross Replacement Cost (GRC)

The cost the entity would incur to acquire the asset on the reporting date. The cost is measured by reference to the lowest cost at which the gross future economic benefits could be obtained in the normal course of business or the minimum it would cost, to replace the existing asset with a technologically modern equivalent new asset (not a second hand one) with the same economic benefits (gross service potential) allowing for any differences in the quantity and quality of output and in operating costs.

Heritage Asset

An asset with historic, artistic, scientific, technological, geographical or environmental qualities that is held and maintained principally for its contribution to knowledge and culture and this purpose is central to the objectives of the entity holding it.

Impairment Loss

The amount by which the carrying amount of an asset exceeds its recoverable amount.

Infrastructure Assets

Physical assets that contribute to meeting the needs for access to major economic and social facilities and services, e.g. roads, drainage, footpaths and cycle ways. These are typically large, interconnected networks or portfolios of composite assets. The components of these assets may be separately maintained, renewed or replaced individually so that the required level and standard of service from the network of assets is continuously sustained. Generally, the components and hence the assets have long lives. They are fixed in place and are often have no separate market value.

Key Performance Indicator

A qualitative or quantitative measure of a service or activity used to compare actual performance against a standard or other target. Performance indicators commonly relate to statutory limits, safety, responsiveness, cost, comfort, asset performance, reliability, efficiency, environmental protection and customer satisfaction.

Level of Service

The parameters or combination of parameters that reflect social, political, economic and environmental outcomes that the organisation delivers.

Levels of service statements describe the outputs or objectives an organisation or activity intends to deliver to customers.

Life Cycle

The cycle of activities that an asset (or facility) goes through while it remains an identity as a particular asset i.e. from planning and design to decommissioning or disposal.

Life Cycle Cost (LCC)

Total LCC The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.

Average LCC The life cycle cost is average cost to provide the service over the longest asset life cycle. It comprises average operations, maintenance expenditure plus asset consumption expense, represented by depreciation expense projected over 10 years. The Life Cycle Cost does not indicate the funds required to provide the service in a particular year.

Life Cycle Expenditure (LCE)

The Life Cycle Expenditure (LCE) is the average operations, maintenance and capital renewal expenditure accommodated in the Long Term Financial Plan over 10 years. Life Cycle Expenditure may be compared to average Life Cycle Cost to give an initial indicator of affordability of projected service levels when considered with asset age profiles.

Maintenance

All actions necessary for retaining an asset as near as practicable to an appropriate service condition, including regular ongoing day-to-day work necessary to keep assets operating, e.g. road patching but excluding rehabilitation or renewal. It is operating expenditure required to ensure that the asset reaches its expected useful life.

Maintenance may be classified as:

- **Planned Maintenance**
Falls into three categories:
 - (i) Periodic – necessary to ensure the reliability or to sustain the design life of an asset.
 - (ii) Predictive – condition monitoring activities used to predict failure.
 - (iii) Preventive – maintenance that can be initiated without routine or continuous checking and is not condition based.
- **Reactive Maintenance**
Unplanned repair work that is carried out in response to service requests and management/supervisory directions.
- **Specific Maintenance**
Maintenance work to repair components or replace sub-components that needs to be identified as a specific maintenance item in the maintenance budget.
- **Unplanned Maintenance**
Corrective work required in the short-term to restore an asset to working condition so it can continue to deliver the required service or to maintain its level of security and integrity.

Maintenance Expenditure *

Recurrent expenditure, which is periodically or regularly required as part of the anticipated schedule of works required to ensure that the asset achieves its useful life and provides the required level of service. It is expenditure, which was anticipated in determining the asset's useful life.

Materiality

The notion of materiality guides the margin of error acceptable, the degree of precision required and the extent of the disclosure required when preparing general purpose financial reports. Information is material if its omission, misstatement or non-disclosure has the potential, individually or collectively, to influence the economic decisions of users taken on the basis of the financial report or affect the discharge of accountability by the management or governing body of the entity.

Modern Equivalent Asset

Assets that replicate what is in existence with the most cost-effective asset performing the same level of service. It is the most cost efficient, currently available asset which will provide the same stream of services as the existing asset is capable of producing. It allows for technology changes and, improvements and efficiencies in production and installation techniques. The modern equivalent asset is evidenced by renewal strategies in asset management plans and financing in a long-term financial plan covering at least 10 years.

*Net Present Value (NPV)

The value of the cash flows associated with an asset, liability, activity or event calculated using a discount rate to reflect the time value of money. It is the net amount of discounted total cash inflows after deducting the value of the discounted total cash outflows arising from e.g. the continued use and subsequent disposal of the asset after deducting the value of the discounted total cash outflows.

Non-Revenue Generating Investments

Investments for the provision of goods and services to sustain or improve services to the community that are not expected to generate any savings or revenue, e.g. parks and playgrounds, footpaths, roads and bridges, libraries, etc.

Operations

Regular activities to provide services such as public health, safety and amenity, e.g. street sweeping, grass mowing and street lighting.

Operating Expenditure

Recurrent expenditure, which is continuously required to provide a service. In common use the term typically includes, e.g. power, fuel, staff, plant equipment, on-costs and overheads but excludes maintenance and depreciation. Maintenance and depreciation is on the other hand included in operating expenses.

Operating Expense

The gross outflow of economic benefits, being cash and non-cash items, during the period arising in the course of ordinary activities of an entity when those outflows result in decreases in equity, other than decreases relating to distributions to equity participants.

Operating Expenses

Recurrent expenses continuously required to provide a service, including power, fuel, staff, plant equipment, maintenance, depreciation, on-costs and overheads.

Operations, Maintenance and Renewal Financing Ratio

Ratio of estimated budget to projected expenditure for operations, maintenance and renewal of assets over a defined time (e.g. 5, 10 and 15 years).

Operations, Maintenance and Renewal Gap

Difference between budgeted expenditures in a Long Term Financial Plan (or estimated future budgets in absence of a Long Term Financial Plan) and projected expenditures for operations, maintenance and renewal of assets to achieve/maintain specified service levels, totalled over a defined time (e.g. 5, 10 and 15 years).

Pavement Management System (PMS)

A systematic process for measuring and predicting the condition of road pavements and wearing surfaces over time and recommending corrective actions.

PMS Score

A measure of condition of a road segment determined from a Pavement Management System.

Rate of Annual Asset Consumption *

The ratio of annual asset consumption relative to the depreciable amount of the assets. It measures the amount of the consumable parts of assets that are consumed in a period (depreciation) expressed as a percentage of the depreciable amount.

Rate of Annual Asset Renewal *

The ratio of asset renewal and replacement expenditure relative to depreciable amount for a period. It measures whether assets are being replaced at the rate they are wearing out with capital renewal expenditure expressed as a percentage of depreciable amount (capital renewal expenditure/DA).

Rate of Annual Asset Upgrade/New *

A measure of the rate at which assets are being upgraded and expanded per annum with capital upgrade/new expenditure expressed as a percentage of depreciable amount (capital upgrade/expansion expenditure/DA).

Recoverable Amount

The higher of an asset's fair value, less costs to sell and its value in use.

Recurrent Expenditure

Relatively small (immaterial) expenditure or that which has benefits expected to last less than 12 months. Recurrent expenditure includes operations and maintenance expenditure.

Recurrent Funding

Funding to pay for recurrent expenditure.

Rehabilitation

See capital expenditure - renewal.

Remaining Useful Life

The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining useful life provides an estimate of useful life.

Renewal

See capital expenditure - renewal.

Residual Value

The estimated amount that an entity would currently obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset were already of the age and in the condition expected at the end of its useful life. Residual value reflects consideration receivable from an asset at the end of its useful life to the entity and accordingly would not include cost savings from the re-use of in-situ materials.

Revenue Generating Investments

Investments for the provision of goods and services to sustain or improve services to the community that are expected to generate some savings or revenue to offset operating costs, e.g. public halls and theatres, childcare facilities, sporting and recreation facilities, tourist information facilities, etc.

Risk Management

The application of a formal process to the range of possible values relating to key factors associated with a risk in order to determine the resultant ranges of outcomes and their probability of occurrence.

Section or Segment

A self-contained part or piece of an infrastructure asset.

Service Potential

The total future service capacity of an asset. It is normally determined by reference to the operating capacity and economic life of an asset. A measure of service potential is used in the not-for-profit sector/public sector to value assets, particularly those not producing a cash flow.

Service Potential Remaining

A measure of the future economic benefits remaining in assets. It may be expressed in dollar values (Fair Value) or as a percentage of total anticipated future economic benefits. It is also a measure of the percentage of the asset's potential to provide services that are still available for use in providing services (Depreciated Replacement Cost/Depreciable Amount).

Strategic Asset Management Plan

A plan that documents and specifies how the organizational objectives are to be converted into AM objectives, the approach for developing AM Plans and the role of the AM system in supporting the achievement of AM objectives.

Strategic Plan

A plan containing the long-term goals and strategies of an organisation. Strategic plans have a strong external focus, cover major portions of the organisation and identify major targets, actions and resource allocations relating to the long-term survival, value and growth of the organisation.

Sub-Component

Smaller individual parts that make up a component part.

Useful Life

Either:

- (i) the period over which an asset is expected to be available for use by an entity, or
- (ii) the number of production or similar units expected to be obtained from the asset by the entity.

It is estimated or expected time between placing the asset into service and removing it from service, or the estimated period of time over which the future economic benefits embodied in a depreciable asset, are expected to be consumed by the entity.

Valuation

The process of determining the worth of an asset or liability. Assessed asset value which may depend on the purpose for which the valuation is required, i.e. replacement value for determining maintenance levels, market value for lifecycle costing and optimised deprival value for tariff setting.

Value in Use

The present value of future cash flows expected to be derived from an asset or cash generating unit. It is deemed to be depreciated replacement cost (DRC) for those assets whose future economic benefits are not primarily dependent on the asset's ability to generate net cash inflows, where the entity would, if deprived of the asset, replace its remaining future economic benefits.

Source: IPWEA, IIMM & AIFMM 2015, Glossary
Additional and modified glossary items shown *