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</tbody>
</table>
TABLE OF CONTENTS

ABBREVIATIONS...................................................................................................................i

GLOSSARY............................................................................................................................ii

1. EXECUTIVE SUMMARY .................................................................................................1
   What Council Provides ........................................................................................................1
   What does it Cost? ................................................................................................................1
   Plans for the Future .............................................................................................................1
   Measuring our Performance ..............................................................................................1
   The Next Steps ...................................................................................................................1

2. INTRODUCTION .............................................................................................................3
   2.1 Background ..................................................................................................................3
   2.2 Goals and Objectives of Asset Management ...............................................................5
   2.3 Plan Framework ...........................................................................................................6
   2.4 Core and Advanced Asset Management ......................................................................7

3. LEVELS OF SERVICE ...................................................................................................9
   3.1 Customer Research and Expectations ..........................................................................9
   3.2 Legislative Requirements .............................................................................................10
   3.3 Current Levels of Service ............................................................................................11

4. FUTURE DEMAND .......................................................................................................13
   4.1 Demand Forecast .........................................................................................................13
   4.2 Changes in Technology ...............................................................................................14
   4.3 Demand Management Plan .........................................................................................14
   4.4 New Assets from Growth ............................................................................................15

5. LIFECYCLE MANAGEMENT PLAN ...........................................................................16
   5.1 Background Data .........................................................................................................16
     5.1.1 Physical parameters ..............................................................................................16
     5.1.2 Asset capacity and performance ..........................................................................17
     5.1.3 Asset condition ......................................................................................................18
     5.1.4 Asset inspections ..................................................................................................18
     5.1.5 Asset valuations ...................................................................................................19
   5.2 Risk Management Plan ...............................................................................................19
   5.3 Routine Maintenance Plan ..........................................................................................20
     5.3.1 Maintenance plan ..................................................................................................20
     5.3.2 Standards and specifications .................................................................................21
     5.3.3 Summary of future maintenance expenditures .....................................................21
   5.4 Renewal/Replacement Plan .......................................................................................22
     5.4.1 Renewal plan .........................................................................................................22
     5.4.2 Renewal standards ..............................................................................................23
     5.4.3 Summary of future renewal expenditure ..............................................................23
   5.5 Creation/Acquisition/Upgrade Plan ............................................................................23
     5.5.1 Selection criteria ....................................................................................................23
     5.5.3 Summary of future upgrade/new assets expenditure ............................................24

6. FINANCIAL SUMMARY .................................................................................................24
   6.1 Financial Statements and Projections ..........................................................................24
     6.1.1 Sustainability of service delivery ...........................................................................26
   6.2 Funding Strategy ..........................................................................................................26
   6.3 Valuation Forecasts .....................................................................................................26
6.4 Key Assumptions made in Financial Forecasts ........................................27

7. ASSET MANAGEMENT PRACTICES ..........................................................29
   7.2 Asset Management Systems ...............................................................29
   7.3 Information Flow Requirements and Processes .................................29
   8.1 Current position statement ...............................................................30
   8.2 Recommendations ...........................................................................32
   8.2.1 Maintenance recommendations .....................................................32
   8.2.2 Renewal recommendations ............................................................32
   8.2.3 Upgrade and new asset recommendations .....................................32
   8.2.3 Asset management recommendations ............................................33

8. PLAN IMPROVEMENT AND MONITORING ............................................34
   8.1 Performance Measures ....................................................................34
   8.2 Improvement Plan ...........................................................................34
   8.3 Monitoring and Review Procedures .................................................34

REFERENCES ................................................................................................35
## ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>AAAC</td>
<td>Average annual asset consumption</td>
</tr>
<tr>
<td>AMP</td>
<td>Asset management plan</td>
</tr>
<tr>
<td>ARI</td>
<td>Average recurrence interval</td>
</tr>
<tr>
<td>BOD</td>
<td>Biochemical (biological) oxygen demand</td>
</tr>
<tr>
<td>CRC</td>
<td>Current replacement cost</td>
</tr>
<tr>
<td>CWMS</td>
<td>Community wastewater management systems</td>
</tr>
<tr>
<td>DA</td>
<td>Depreciable amount</td>
</tr>
<tr>
<td>DoH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>EF</td>
<td>Earthworks/formation</td>
</tr>
<tr>
<td>IRMP</td>
<td>Infrastructure risk management plan</td>
</tr>
<tr>
<td>LCC</td>
<td>Life Cycle cost</td>
</tr>
<tr>
<td>LCE</td>
<td>Life cycle expenditure</td>
</tr>
<tr>
<td>MMS</td>
<td>Maintenance management system</td>
</tr>
<tr>
<td>PCI</td>
<td>Pavement condition index</td>
</tr>
<tr>
<td>RV</td>
<td>Residual value</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended solids</td>
</tr>
<tr>
<td>vph</td>
<td>Vehicles per hour</td>
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GLOSSARY

**Annual service cost (ASC)**
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 operating, maintenance, depreciation, finance/ opportunity and disposal costs, less revenue.

**Asset class**
Grouping of assets of a similar nature and use in an entity's operations (AASB 166.37).

**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 management**
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.

**Assets**
Future economic benefits controlled by the entity as a result of past transactions or other past events (AAS27.12).

Property, plant and equipment including infrastructure and other assets (such as furniture and fittings) with benefits expected to last more than 12 month.

**Average annual asset consumption (AAAC)**
The amount of a local government's asset base consumed during a year. This may be calculated by dividing the Depreciable Amount (DA) by the Useful Life and totalled for each and every asset OR by dividing the Fair Value (Depreciated Replacement Cost) by the Remaining Life and totalled for each and every asset in an asset category or class.

**Brownfield asset values**
Asset (re)valuation values based on the cost to replace the asset including demolition and restoration costs.

**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 funding**
Funding to pay for capital expenditure.

**Capital grants**
Monies received generally tied to the specific projects for which they are granted, which are often upgrade and/or expansion or new investment proposals.

**Capital investment expenditure**
See capital expenditure definition

**Capital new expenditure**
Expenditure which creates a new asset providing a new service to the community that did not exist beforehand. As it increases service potential it may impact revenue and will increase future operating and maintenance expenditure.

**Capital renewal expenditure**
Expenditure on an existing asset, which returns the service potential or the life 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 has no impact on revenue, but may reduce future operating and maintenance expenditure if completed at the optimum time, eg. 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. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

**Capital upgrade expenditure**
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 operating and maintenance expenditure in the future because of the increase in the council's asset base, eg. widening the sealed area of an existing road, replacing drainage pipes with pipes of a greater capacity, enlarging a grandstand at a sporting facility. Where capital projects involve a combination of renewal, expansion and/or upgrade expenditures, the total project cost needs to be allocated accordingly.

**Carrying amount**
The amount at which an asset is recognised after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.
Class of assets
See asset class definition

Component
An individual part of an asset which contributes to the composition of the whole and can be separated from or attached to an asset or a system.

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, plus any costs necessary to place the asset into service. This includes one-off design and project management costs.

Current replacement cost (CRC)
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.

Current replacement cost “As New” (CRC)
The current cost of replacing the original service potential of an existing asset, with a similar modern equivalent asset, i.e. the total cost of replacing an existing asset with an as NEW or similar asset expressed in current dollar values.

Cyclic Maintenance**
Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, cycle, replacement of air conditioning equipment, etc. This work generally falls below the capital/ maintenance threshold and needs to be identified in a specific maintenance budget allocation.

Depreciable amount
The cost of an asset, or other amount substituted for its cost, less its residual value (AASB 116.6)

Depreciated replacement cost (DRC)
The current replacement cost (CRC) 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.

Fair value
The amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties, in an arms length transaction.

Greenfield asset values **
Asset (re)valuation values based on the cost to initially acquire the asset.

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 of the entity or of another entity that contribute to meeting the public's need for access to major economic and social facilities and services, eg. roads, drainage, footpaths and cycleways. 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 market value.

Investment property
Property held to earn rentals or for capital appreciation or both, rather than for:
(a) use in the production or supply of goods or services or for administrative purposes; or
(b) sale in the ordinary course of business (AASB 140.5)

Level of service
The defined service quality for a particular service against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental, acceptability and cost).
Life Cycle Cost **
The life cycle cost (LCC) is average cost to provide the service over the longest asset life cycle. It comprises annual maintenance and asset consumption expense, represented by depreciation expense. The Life Cycle Cost does not indicate the funds required to provide the service in a particular year.

Life Cycle Expenditure **
The Life Cycle Expenditure (LCE) is the actual or planned annual maintenance and capital renewal expenditure incurred in providing the service in a particular year. Life Cycle Expenditure may be compared to Life Cycle Expenditure to give an initial indicator of life cycle sustainability.

Loans / borrowings
Loans result in funds being received which are then repaid over a period of time with interest (an additional cost). Their primary benefit is in 'spreading the burden' of capital expenditure over time. Although loans enable works to be completed sooner, they are only ultimately cost effective where the capital works funded (generally renewals) result in operating and maintenance cost savings, which are greater than the cost of the loan (interest and charges).

Maintenance and renewal gap
Difference between estimated budgets and projected expenditures for maintenance and renewal of assets, totalled over a defined time (eg 5, 10 and 15 years).

Maintenance and renewal sustainability index
Ratio of estimated budget to projected expenditure for maintenance and renewal of assets over a defined time (eg 5, 10 and 15 years).

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
An item is material is its omission or misstatement could influence the economic decisions of users taken on the basis of the financial report. Materiality depends on the size and nature of the omission or misstatement judged in the surrounding circumstances.

Modern equivalent asset.
A structure similar to an existing structure and having the equivalent productive capacity, which could be built using modern materials, techniques and design. Replacement cost is the basis used to estimate the cost of constructing a modern equivalent asset.

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 to the Council, eg. parks and playgrounds, footpaths, roads and bridges, libraries, etc.

Operating expenditure
Recurrent expenditure, which is continuously required excluding maintenance and depreciation, eg power, fuel, staff, plant equipment, on-costs and overheads.

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

Planned Maintenance**
Repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown criteria/experience, prioritising scheduling, acting on the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

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

Rate of annual asset consumption*
A measure of average annual consumption of assets (AAAC) expressed as a percentage of the depreciable amount (AAAC/DA). Depreciation may be used for AAAC.

Rate of annual asset renewal*
A measure of the rate at which assets are being renewed per annum expressed as a percentage of depreciable amount (capital renewal expenditure/DA).

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

Reactive maintenance
Unplanned repair work that carried out in response to service requests and management/supervisory directions.

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 operating and maintenance expenditure.

Recurrent funding
Funding to pay for recurrent expenditure.

Rehabilitation
See capital renewal expenditure definition above.

Remaining life
The time remaining until an asset ceases to provide the required service level or economic usefulness. Age plus remaining life is economic life.

Renewal
See capital renewal expenditure definition above.

Residual value
The net amount which an entity expects to obtain for an asset at the end of its useful life after deducting the expected costs of disposal.

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, eg public halls and theatres, childcare centres, sporting and recreation facilities, tourist information centres, 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 capacity to provide goods and services in accordance with the entity’s objectives, whether those objectives are the generation of net cash inflows or the provision of goods and services of a particular volume and quantity to the beneficiaries thereof.

Service potential remaining
A measure of the remaining life of assets expressed as a percentage of economic life. It is also a measure of the percentage of the asset’s potential to provide services that is still available for use in providing services (DRC/DA).

Strategic Management Plan (SA)**
Documents Council objectives for a specified period (3-5 yrs), the principle activities to achieve the objectives, the means by which that will be carried out, estimated income and expenditure, measures to assess performance and how rating policy relates to the Council’s objectives and activities.

Sub-component
Smaller individual parts that make up a component part.

Useful life
Either:
(a) the period over which an asset is expected to be available for use by an entity, or
(b) 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 council. It is the same as the economic life.

Value in Use
The present value of estimated future cash flows expected to arise from the continuing use of an asset and from its disposal at the end of its useful life. 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 new cash flows, where if deprived of the asset its future economic benefits would be replaced.

Source: DVC 2006, Glossary
Note: Items shown * modified to use DA instead of CRC
Additional glossary items shown **
1. EXECUTIVE SUMMARY

What Council Provides
Council provides a drainage network to enable the safe and effective transport of storm water to the

The drainage network consists of:
- Approximately 181 km of pipe
- Approximately 6400 pits
- Approximately 366 headwalls
- 4 gross pollutant traps (GPT)
- 11 Retention basins

What does it Cost?
There are two key indicators of cost to provide the drainage network.
- The life cycle cost being the average cost over the life cycle of the asset, and
- The total maintenance and capital renewal expenditure required to deliver existing service levels in the next 10 years covered by Council's long term financial plan.

The life cycle cost to provide the drainage network is estimated at $896,427 per annum. Council's planned life cycle expenditure for year 1 of the asset management plan is $401,895 which gives a life cycle sustainability index of 0.45.

The total maintenance and capital renewal expenditure required to provide the drainage network over the next 10 years is estimated at $3.391 million. This is an average of $339,100 per annum.

Council's maintenance and capital renewal expenditure for year 1 of the asset management plan of $401,895 giving a 10 year sustainability index of 1.19.

Plans for the Future
Council plans to operate and maintain the stormwater network to achieve the following strategic objectives.
1. Ensure the stormwater network is maintained at a safe and functional standard as set out in this infrastructure asset management plan.
2. Ensure the network is planned appropriately to cater for future growth.
3. Maximise an asset’s useful life whilst minimising lifecycle expenditure.
4. Maintain a high level of community satisfaction in the delivery of stormwater drainage services.

Measuring our Performance

Quality
Drainage network assets will be maintained in a reasonably usable condition. Defects found or reported that are outside our service standard will be repaired.

Function
Our intent is that an appropriate drainage network is maintained in partnership with other levels of government and stakeholders to ensure public health is upheld and the environment is not compromised. Key functional objectives are met:
- Safe and efficient transport of stormwater.
- Maintenance and renewal of the network is within budget.

Safety
Council will react to complaints and requests regarding the drainage system according to response times. These are prioritised according to the risk the complaints present.

The Next Steps
This actions resulting from this asset management plan are:
- Improve the database on drainage conditions.
- Improve the collection of physical data pertinent to the maintenance of the drainage system.
- Improve financial data collection.
- Improve valuation and depreciation projections.
- Improve the Council’s customer request system to more accurately record the nature, extent, severity and location of defects within the drainage network.
- Investigate the need for a condition inspection regime covering drainage assets.
2. INTRODUCTION

2.1 Background

This asset management plan is to demonstrate responsive management of assets (and services provided from assets), compliance with regulatory requirements, and to communicate funding needed to provide the required levels of service.

The drainage system provides a basic and essential service – the collection and safe removal of stormwater to receiving waters. Any rain that falls on roofs or is collected via paved areas such as drive ways, roads or footpaths is called stormwater. The drainage network within Bathurst is a combination of pits, pipes, open channels, natural waterways and road reserves, which carry the stormwater and dispose it in creeks, and eventually the Macquarie River. In achieving this, a number of other objectives are met:

- Stabilisation of landform and minimisation of erosion;
- Convey stormwater to receiving waters with minimal damage, danger and nuisance;
- Enhancement of the urban landscape, whilst allowing the maximum land area to be urbanised and
- Maintaining the quality of the receiving waters.

Bathurst, as a result of its period of development, has not evolved in a manner that has all roads and properties serviced by constructed drainage systems. Due to a lack of extensive hydrological modelling, past drainage assets may not have been of adequate size to cope with the rainfall intensity patterns experienced in the Bathurst area.

Drainage systems are usually designed as two separate elements. The underground piped network transports stormwater flows for minor storm events (generally flows of up to 1 in 5 ARI). The piped network has sufficient capacity to contain nuisance flows and reduces the frequency and quantity of surface flows. Minor drainage system assets include the pipe network, pits, catch basins drainage channels and gross pollutant traps.

The major drainage system caters for flows in excess of the piped network and usually consists of flood-ways, road reserves or natural waterways. The major drainage system prevents stormwater damage to properties and transports the stormwater to the receiving waterways. The frequency at which the overland drainage system operates is determined by the design criteria of the piped network.
Urban Drainage System

There are a number of State Government Acts and regulations that effect the collection and disposal of stormwater:

- Local Government Act 1993
- Protection of the Environment Operations Act 1997
- Water Management Act 2000
- Catchment Management Authorities Act 2003

Supporting the legislation are a number of guidelines that Council adheres to. These are prepared both by State Government authorities and by the Council. These include:

- 2009 Bathurst Urban Waterways Management Plan
- Bathurst Regional Council 2011 *Guidelines for engineering works*, Bathurst Regional Council
- Bathurst City Council 1996 *Stormwater management plan*, Bathurst City Council
- NSW Department of Water and Energy 2006 Code of Practice for Plumbing and Drainage

A further document was used to prepare this asset management plans valuations and life cycle predictions:

- Department of Primary Industries Office of Water 2012 *NSW Reference Rates Tables for Valuation of Water Supply, Sewerage and Stormwater Assets*

This asset management plan covers the following infrastructure assets:
### Table 2.1. Assets covered by this Plan

<table>
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<tr>
<th>Asset category</th>
<th>Dimension</th>
<th>Replacement Value ($M)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage pipe network</td>
<td>181 km</td>
<td>$47.516</td>
</tr>
<tr>
<td>Drainage pits</td>
<td>6401</td>
<td>$14.357</td>
</tr>
<tr>
<td>Drainage headwalls</td>
<td>366</td>
<td>$0.188</td>
</tr>
<tr>
<td>Gross pollutant traps</td>
<td>4</td>
<td>$0.539</td>
</tr>
<tr>
<td>Retention basins</td>
<td>11</td>
<td>$3.695</td>
</tr>
<tr>
<td>Pumps</td>
<td>15</td>
<td>$0.262</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>$66.557</strong></td>
</tr>
</tbody>
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Key stakeholders in the preparation and implementation of this asset management plan are:

<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Role</th>
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<tbody>
<tr>
<td>The Councillors</td>
<td>Formulate policy for the allocation of resources to maximise benefit to the community whilst minimising the Council’s exposure to risk.</td>
</tr>
<tr>
<td>The Council</td>
<td>To manage the implementation of policy in a timely and cost effective manner. To ensure resources are effectively utilised</td>
</tr>
<tr>
<td>General Public</td>
<td>The stormwater network is designed, constructed and maintained to provide adequate protection to the residents of Bathurst from flooding associated with rainfall events</td>
</tr>
<tr>
<td>Catchment Management Authority</td>
<td></td>
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### 2.2 Goals and Objectives of Asset Management

The Council exists to provide services to the community. Some of these services are provided by infrastructure assets. Council has acquired infrastructure assets by ‘purchase’, by contract, by construction from council staff and by donation of assets constructed by developers and others to meet increased levels of service.

Council’s goal in managing infrastructure assets is to meet the required level of service in the most cost effective manner for present and future consumers. The key elements of infrastructure asset management are:

- Taking a life cycle approach,
- Developing cost-effective management strategies for the long term,
- Providing a defined level of service and monitoring performance,
- Understanding and meeting the demands of growth through demand management and infrastructure investment,
- Managing risks associated with asset failures,
- Sustainable use of physical resources,
- Continuous improvement in asset management practices. ²

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² IIIM 2006 Sec 1.1.3, p 1.3
This asset management plan is prepared under the direction of Council’s vision, mission, goals and objectives.

Council’s vision:

“To enhance the lifestyle and environment through effective leadership, community involvement and commitment to service.”

Council’s mission:

“The equitable development and maintenance of services provided for the general health and well-being of the citizens of the Bathurst Region and the adjustment of these services to meet changing needs.”

Relevant Council goals and objectives and how these are addressed in this asset management plan are:

| Table 2.2. Council Goals and how these are addressed in this Plan |
|---------------|--------------------------------------------------|
| Goal | Objective | How Goal and Objectives are addressed in IAMP |
| To provide a safe, reliable and cost effective drainage network. | To meet the needs of residential, commercial and industrial clients and caters for the economic growth of the area. | Implementing programs for compliance with the Department of Water and Energy Best Practice Guidelines |
| Adequate infrastructure for projected population 80,000 by 2050 | To have in place quality infrastructure that meets the needs of the community by providing adequate facilities for a population of 80,000 by the year 2050. | Land developers are wholly responsible for the disposal of all stormwater run off which passes over or through the respective properties, roads and reserves. |
| To enhance the lifestyle of residents by providing a clean and safe environment and by promoting the principles of ecologically sustainable development | Ensure adequate stormwater infrastructure is in place to provide water sensitive urban design. | Principles of water sensitive design are being implemented in current and future plans of development. |

The key issues of the drainage network asset management plan are:

- Deterioration of network
- Potential pollution of environment
- Loss of amenity
- Regulatory control
- Community concern

2.3 Plan Framework

Key elements of the plan are

- Levels of service – specifies the services and levels of service to be provided by council.
- Future demand – how this will impact on future service delivery and how this is to be met.
- Life cycle management – how Council will manage its existing and future assets to provide the required services.
- Financial summary – what funds are required to provide the required services.
- Asset management practices
- Monitoring – how the plan will be monitored to ensure it is meeting Council’s objectives.
- Asset management improvement plan

A road map for preparing an asset management plan is shown over.
2.4 Core and Advanced Asset Management

This asset management plan is prepared as a ‘core’ asset management plan in accordance with the International Infrastructure Management Manual. It is prepared to meet minimum legislative and organisational 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 asset information for individual assets to support the optimisation of activities and programs to meet agreed service levels.
Road Map for preparing an Asset Management Plan

Source: IIMM Fig 1.5.1, p 1.11

CORPORATE PLANNING
Confirm strategic objectives and establish AM policies, strategies & goals.
Define responsibilities & ownership.
Decide core or advanced AM Pan.
Gain organisation commitment.

REVIEW/COLLABORATE ASSET INFORMATION
Existing information sources
Identify & describe assets.
Data collection
Condition assessments
Performance monitoring
Valuation Data

ESTABLISH LEVELS OF SERVICE
Establish strategic linkages
Define & adopt statements
Establish measures & targets
Consultation

LIFECYCLE MANAGEMENT STRATEGIES
Develop lifecycle strategies
Describe service delivery strategy
Risk management strategies
Demand forecasting and management
Optimised decision making (renewals, new works, disposals)
Optimise maintenance strategies

FINANCIAL FORECASTS
Lifecycle analysis
Financial forecast summary
Valuation Depreciation
Funding

IMPROVEMENT PLAN
Assess current/desired practices
Develop improvement plan

ANNUAL PLAN / BUSINESS PLAN

IMPLEMENT IMPROVEMENT STRATEGY

INFORMATION MANAGEMENT, AND DATA IMPROVEMENT

AM PLAN REVIEW AND AUDIT

DEFINE SCOPE & STRUCTURE OF PLAN

IS THE PLAN AFFORDABLE?
Reconsider service statements
Options for funding
Consult with Council
Consult with Community

ITERATION

BATHURST REGIONAL COUNCIL DRAINAGE ASSET MANAGEMENT PLAN

ASSET MANAGEMENT PLAN – Urban Drainage Network
1 May 2014, Ver.1.2
3. LEVELS OF SERVICE

3.1 Customer Research and Expectations

The main function of the drainage network system is collection and transport of stormwater in a particular catchment to a basin or waterway where it can be safely removed. Due to the basic functional nature of the drainage network system, customer expectations at a high level are simple. The relation of stormwater function to rainfall events should also be taken into account when assessing levels of service expectations. In periods of low rainfall expectations of the drainage system are very low. The peaks in Fig. 3.1 correspond to large rainfall events and the associated requests for assistance.

The reduction in the average number of complaints per month may be associated with a reduction in the overall rainfall experienced by Bathurst. It may also be a result of Council’s program of stormwater system improvements. It is most likely a combination of both factors.

The Council does not intend to carry out any specific customer research into the drainage network it maintains.

**Fig 1. Customer requests relating to drainage**

![Customer requests relating to drainage](image)

**NOTES on Fig 1.**
- Average number of drainage related complaints has remained consistent since 2009. The peak in 2012 aligns with the first 3 months being higher than average rainfall. The remainder of the year was drier than average which brought the annual average down.

<table>
<thead>
<tr>
<th>Year</th>
<th>Complaints</th>
<th>Annual Rainfall (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>27</td>
<td>530</td>
</tr>
<tr>
<td>2010</td>
<td>28</td>
<td>1088</td>
</tr>
<tr>
<td>2011</td>
<td>31</td>
<td>738</td>
</tr>
<tr>
<td>2012</td>
<td>52</td>
<td>703</td>
</tr>
<tr>
<td>2013</td>
<td>30</td>
<td>603</td>
</tr>
<tr>
<td>Averages</td>
<td>33.6</td>
<td>732.4</td>
</tr>
</tbody>
</table>
3.2 Legislative Requirements

Council has to meet many legislative requirements including Australian and State legislation and State regulations. The primary acts and regulations relating to the drainage network are:

**Table 3.2. Legislative Requirements**

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Government Act</td>
<td>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.</td>
</tr>
<tr>
<td>Water Management Act 2000</td>
<td>Legislates the sustainable and integrated management of water resources for NSW</td>
</tr>
<tr>
<td>Environmental Planning and Assessment Act 1979</td>
<td>The principal planning instrument in NSW – specifies environmental considerations required for all development activities.</td>
</tr>
<tr>
<td>Local Land Services Act 2013</td>
<td>Seeks to co-ordinate policies, programs and activities within a catchment area that have an effect on the environment</td>
</tr>
<tr>
<td>Civil Liabilities Act 2002</td>
<td>Sets out the provisions that give protection from civil liability and the responsibilities of Council and public alike.</td>
</tr>
<tr>
<td>Protection of the Environment Act 1997</td>
<td>To protect, restore and enhance the quality of the environment having regard to the need to maintain ecologically sustainable development.</td>
</tr>
</tbody>
</table>
### 3.3 Current Levels of Service

Service levels can be defined by two terms.

Community Levels of Service relate to how the community receives the service in terms of safety, quality, quantity, reliability, responsiveness, cost/efficiency and legislative compliance.

Supporting the community service levels are operational or technical measures of performance developed to ensure that the minimum community levels of service are met. These technical measures relate to service criteria such as:

<table>
<thead>
<tr>
<th>Service Criteria</th>
<th>Technical measures may relate to</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality</td>
<td>The reliability of the drainage network (number of pit surcharges, etc).</td>
</tr>
<tr>
<td>Quantity</td>
<td>The extent of the drainage network</td>
</tr>
<tr>
<td>Availability</td>
<td>The rainfall event that the stormwater system is planned to meet (generally 1 in 5 year AEP for piped network)</td>
</tr>
<tr>
<td>Safety</td>
<td>Consequences of network failure or exceedance</td>
</tr>
</tbody>
</table>

Notes:
1. The number of complaints and requests relating to the drainage system is directly related to rainfall events (refer Fig 1).
2. Level of service performances are for the most part measured through assessing customer requests and complaints.

#### Table 3.3. Current Service Levels

<table>
<thead>
<tr>
<th>Community Levels of Service</th>
<th>Key Performance Measure</th>
<th>Level of Service</th>
<th>Performance Measure Process</th>
<th>Performance Target</th>
<th>Current Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Quality</strong></td>
<td>Network is adequately maintained to prevent flooding</td>
<td>Complaints relating to blocked or partially blocked pipes or pits causing local flooding</td>
<td>Complaints are limited to &lt;70 complaints per year</td>
<td>An Average of 34 per year</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stormwater is clean when entering receiving waters</td>
<td>Complaints relating to the level of gross pollutants reaching the receiving waters</td>
<td>Nil complaints regarding stormwater related gross pollutants</td>
<td>Nil</td>
<td></td>
</tr>
<tr>
<td><strong>Availability</strong></td>
<td>Stormwater system capacity is adequate for a 1 in 5 year event</td>
<td>Complaints relating to blocked drains and inadequate drainage network components</td>
<td>Complaints are less the 10 per year</td>
<td>8 complaints</td>
<td></td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td>The drainage network design is such that safety to the public is maintained</td>
<td>Complaints or incidents of compromised safety relating to drainage structures</td>
<td>0 insurance claims resulting to stormwater assets</td>
<td>0 insurance claims relating to stormwater assets</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Localised flooding of urban roadways is minimised</td>
<td>Complaints relating to water over road during rainfall events of 1 in 5 years</td>
<td>0 complaints relating to water over road during rainfall events of 1 in 5 years</td>
<td>Nil</td>
<td></td>
</tr>
</tbody>
</table>
## Technical Level of Service

<table>
<thead>
<tr>
<th>Key Performance Measure</th>
<th>Level of Service</th>
<th>Performance Measure Process</th>
<th>Performance Target</th>
<th>Current Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Trade waste is disposed of correctly into the sewer system and not the drainage network</td>
<td>Trade waste discharging businesses are correctly connected to the sewer and are not discharging to stormwater</td>
<td>no businesses connected incorrectly to stormwater</td>
<td>no businesses connected incorrectly to stormwater</td>
</tr>
</tbody>
</table>

### Quality

<table>
<thead>
<tr>
<th></th>
<th>Outflow to receiving waters is free of gross pollutants</th>
<th>Gross pollutant traps are cleaned regularly and are sufficient to collect pollutants</th>
<th>Bi-annual cleaning and maintenance of GPT</th>
<th>GPT cleaned as necessary</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Drainage pipes and pits are maintained to ensure free flow of stormwater</td>
<td>Nuisance flooding in areas serviced by the drainage system is minimised.</td>
<td>Inspect and clean 5% of network p.a.</td>
<td>No proactive inspections of pits</td>
</tr>
</tbody>
</table>

### Availability

|                          | Drainage pipes and pits are large enough to ensure free flow of stormwater (1 in 5 year AEP) | Pit surcharge is limited to rainfall events > 1 in 5 AEP | zero reported pit surcharge from rainfall events < 1 in 5 AEP | Nil |

### Cost Effectiveness

|                          | Maintenance of stormwater network is within budget | Drainage maintenance is within allocated budgets | Expenditure is ±10% of budget | 100% |

### Condition

|                          | Majority of drainage assets are in reasonable condition | Condition rating of drainage assets | Age of assets are not exceeding their predicted life | Nil assets exceeding predicted life |

---
4. FUTURE DEMAND

4.1 Demand Forecast

The major factor affecting demand is overall average rainfall and the intensity of rainfall events.

The primary factor affecting the extent of the drainage network is the development of residential and industrial land within the Bathurst City boundary. This in turn is influenced directly by population change. The Bathurst Region growth rate at the last census (2011) was 1.7%. The annual average growth rate for since 2003 has been 1.3%, peaking at 2.5% in the 2009.

Other factors that may affect the demands include changing seasonal weather patterns and the implementation of water sensitive urban design.

Table 4.1. Demand Factors, Projections and Impact on Services

<table>
<thead>
<tr>
<th>Demand factor</th>
<th>Present position</th>
<th>Projection</th>
<th>Impact on services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>41,051 (2011 census)</td>
<td>51,083 (2031)</td>
<td>Increased population results in a greater developed area requiring stormwater management.</td>
</tr>
<tr>
<td>Climate Change(^3)</td>
<td>Developing awareness in community and profession</td>
<td>Predicted decline in overall rainfall with an increase in severe rainfall events</td>
<td>An increase in exceedance events may require a review of the minimum drainage requirements as network capacity is reduced</td>
</tr>
<tr>
<td>Water sensitive urban design</td>
<td>An increasing awareness of the value of urban wetlands and their overall role in a healthy environment</td>
<td></td>
<td>A change from stormwater removal to stormwater recovery An increase in environmental controls to increase water quality An associated increase with the costs of maintenance</td>
</tr>
<tr>
<td>Environmental Standards</td>
<td>The NSW Environmental Protection Authority through the discharge licensing system dictates the allowable discharge from the sewage treatment plant.</td>
<td></td>
<td>As new legislation demands council is required to ensure that all stormwater transport is compliant with the relevant sections of the Government acts</td>
</tr>
<tr>
<td>Urban consolidation</td>
<td>Increasing popularity of multiple dwelling allotments</td>
<td></td>
<td>Increase in impermeable areas Potential increase of pollutants in the stormwater system</td>
</tr>
</tbody>
</table>

\(^3\) CSIRO 2007, Climate change in the Central West catchment NSW Government, Sydney
4.2 Changes in Technology

Table 4.2. Changes in Technology and Forecast effect on Service Delivery

<table>
<thead>
<tr>
<th>Technology Change</th>
<th>Effect on Service Delivery</th>
</tr>
</thead>
</table>
| Water sensitive urban design              | Reduced flow rates from new developments  
Higher quality of runoff  
Greater detention, storage and reuse of stormwater  
Increased cost of maintenance.                     |
| Increased range of pre-fabricated inlet and outlet structures | Reduction in construction time and a possible reduction in the construction costs of a given section of the network |
| Improvements in maintenance techniques    | The continuing development of in-situ pipe renewal systems and advancements in pipe cleaning methods. These new technologies reduce the cost of renewing pipes at the end of their useful life, e.g. relining of pipes. |

4.3 Demand Management Plan

The future management of stormwater services and the demand on them is somewhat difficult to predict as much depends on the severity climactic changes and the effect they have in rainfall distribution.

Opportunities identified to date for demand management are shown in Table 4.3. Further opportunities will be developed in future revisions of this asset management plan.

Table 4.3. Demand Management Plan Summary

<table>
<thead>
<tr>
<th>Service Activity</th>
<th>Demand Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rainwater collection tanks</td>
<td>Council, along with the State Government is administering the BASIX (Building Sustainability Index) program - this includes the mandatory installation of rainwater collection tanks on all new residences. This will reduce the overall load on the network.</td>
</tr>
<tr>
<td>Water sensitive urban design</td>
<td>WSUD includes the use of natural surface drainage channels as a lower cost alternative to subterranean pipe and pit networks. The resulting runoff is generally of higher quality than a conventional drainage network.</td>
</tr>
<tr>
<td>Use of detention basins</td>
<td>Using detention basins can reduce the capacity of pipe reaches required to remove runoff as a result of a large rainfall event.</td>
</tr>
<tr>
<td>Discharge to storm water</td>
<td>A comprehensive public education campaign including marking kerb inlets for stormwater only and the importance or reducing phosphorous in storm water.</td>
</tr>
<tr>
<td>Inflow to receiving waters</td>
<td>Increased use of engineered wet lands to provide bio-filtering of effluent prior to discharge into receiving waters.</td>
</tr>
<tr>
<td>Increasing urbanisation</td>
<td>Investigate the need for future developments to consider the drainage required not only the area of development but for downstream sections of the network.</td>
</tr>
</tbody>
</table>
4.4 New Assets from Growth

The new assets required to meet growth will be acquired from land developments and constructed by Council. The new asset since 2003 are summarised in Fig 2.

**Fig 2. New Assets 2003 to 2013**

Since 2003 the average length of pipe added to the drainage network was 3.8km each year. As can be seen from the above graph, 2003-2005 were extraordinary years in terms of growth. By excluding those years a more realistic figure of 2.2km of pipe is added each year.

**Fig 3. Predicted new assets**

Acquiring these new assets will commit council to fund ongoing operations and maintenance 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 operating and maintenance costs.
5. LIFECYCLE MANAGEMENT PLAN

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

5.1 Background Data

5.1.1 Physical parameters

*Table 5.1a – pipe network*

<table>
<thead>
<tr>
<th>Pipe Diameter (mm)</th>
<th>Length (m)</th>
<th>% of network</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>1756</td>
<td>0.97%</td>
</tr>
<tr>
<td>150</td>
<td>1442</td>
<td>0.80%</td>
</tr>
<tr>
<td>200</td>
<td>116</td>
<td>0.06%</td>
</tr>
<tr>
<td>225</td>
<td>1568</td>
<td>0.86%</td>
</tr>
<tr>
<td>300</td>
<td>10228</td>
<td>5.64%</td>
</tr>
<tr>
<td>375</td>
<td>58064</td>
<td>32.02%</td>
</tr>
<tr>
<td>400</td>
<td>140</td>
<td>0.08%</td>
</tr>
<tr>
<td>450</td>
<td>21889</td>
<td>12.07%</td>
</tr>
<tr>
<td>525</td>
<td>10142</td>
<td>5.59%</td>
</tr>
<tr>
<td>600</td>
<td>11286</td>
<td>6.22%</td>
</tr>
<tr>
<td>675</td>
<td>4096</td>
<td>2.26%</td>
</tr>
<tr>
<td>750</td>
<td>4617</td>
<td>2.55%</td>
</tr>
<tr>
<td>825</td>
<td>992</td>
<td>0.55%</td>
</tr>
<tr>
<td>900</td>
<td>6985</td>
<td>3.85%</td>
</tr>
<tr>
<td>1050</td>
<td>3052</td>
<td>1.68%</td>
</tr>
<tr>
<td>1200</td>
<td>2892</td>
<td>1.59%</td>
</tr>
<tr>
<td>1350</td>
<td>2746</td>
<td>1.51%</td>
</tr>
<tr>
<td>1500</td>
<td>966</td>
<td>0.53%</td>
</tr>
<tr>
<td>1650</td>
<td>136</td>
<td>0.07%</td>
</tr>
<tr>
<td>1800</td>
<td>458</td>
<td>0.25%</td>
</tr>
<tr>
<td>Box culvert</td>
<td>1068</td>
<td>0.59%</td>
</tr>
<tr>
<td>Not assessed</td>
<td>36593</td>
<td>20.18%</td>
</tr>
<tr>
<td>Other</td>
<td>105</td>
<td>0.06%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>181337</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

*Table 5.1b – Pits and headwalls*

<table>
<thead>
<tr>
<th>Asset</th>
<th>Asset Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kerb inlet pits</td>
<td>3801</td>
</tr>
<tr>
<td>Junction pits</td>
<td>1200</td>
</tr>
<tr>
<td>Field inlet pits</td>
<td>1402</td>
</tr>
<tr>
<td>Headwalls</td>
<td>366</td>
</tr>
</tbody>
</table>
Notes on system age and data reliability

Many parts of the drainage network have little or no data recorded. Some of the network may be over 100 years old, though this would be a very small proportion of the whole network. The modern network is a mixture of both original and modern reinforced concrete pipes and new plastic pipes. There is also a small amount of original brick arched box culvert. Record keeping has been patchy over the last 95 years, and accordingly it is not possible to verify the age and condition of many pipes. New network pipes laid for new subdivisions and developments are generally uPVC inter-allotment pipes and reinforced concrete pipes for trunk drainage pipe as per the engineering guidelines.

Council has no reliable way of predicting blockages and network failures due to asset failure.

Fig 4. – Reticulation pipe network age profile (similar profile for pit age)

![Graph showing the number of pipes installed by decade of construction.]

NOTES on Fig 4.
- Approximately 30% of the network age has been estimated by using the approximate dates of development.
- Drainage records since 2000 are more reliable than previous decades. Scanned images of Works As Executed (WAE) drawings are meticulously recorded as each subdivision is completed.

5.1.2 Asset capacity and performance

Council’s services 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

<table>
<thead>
<tr>
<th>Location</th>
<th>Service Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>CBD</td>
<td>There are numerous areas within the CBD where pipes have insufficient capacity resulting in flooding during high intensity rainfall events. The most serious capacity constraint in the CBD is the large drainage pipes on the eastern side of Bentinck Street.</td>
</tr>
<tr>
<td>Numerous locations</td>
<td>Individual drainage reaches have not been designed with possible future development taken into account. Subsequent development has discharged into an existing system that has not been designed for the new total catchment area resulting in capacity constraints.</td>
</tr>
</tbody>
</table>

5.1.3 Asset condition

The condition profile of the sub-surface parts of the drainage network is difficult to ascertain. In lieu of condition information the age of the pipe network (see Figure 4) will be used to estimate the condition.

**Figure 5. Asset Condition**

Condition is measured using a 1 – 5 rating system.

**Rating**

1. Excellent condition: Only planned maintenance required. <10 yrs old
2. Good: Minor maintenance required & planned maintenance. 10 – 30 yrs old
3. Average: Significant maintenance required. 30 – 60 yrs old
4. Poor: Significant renewal/upgrade required. 60 – 80 yrs old
5. Bad: Unserviceable. >80 yrs old

Average age of drainage pipes is 34 years

5.1.4 Asset inspections

Currently, Council only carries out inspections on the drainage system assets in response to complaints or during large rainfall events to assess possible capacity constraints or blockages. There are no regular inspections. Due to this there is no comprehensive information on the overall network condition.
In response to predicted increases in rainfall intensities a more proactive drainage network inspection regime may be required to identify problem areas within the network. The potential consequences of an asset failure within the network will increase with increasing rainfall event intensity.

An inspection program will also allow the condition of drainage network components to be assessed as they approach their theoretical end of life. If inspections do not show significant deterioration within the network subsequent inspections may be spaced at 5 year intervals. If asset condition is showing significant deterioration an annual or biannual inspection regime should be implemented.

Inspections may take the form of visual inspections for pits and limited use of CCTV inspections for strategic pipe reaches.

5.1.5 Asset valuations

The value of assets as at 30 June 2013 covered by this asset management plan is summarised below. Assets are valued at greenfield rates.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Replacement Cost</td>
<td>$66.559 million</td>
</tr>
<tr>
<td>Depreciated Replacement Cost</td>
<td>$50.311 million</td>
</tr>
<tr>
<td>Annual Depreciation Expense</td>
<td>$0.644 million</td>
</tr>
</tbody>
</table>

Sustainability reporting reports the rate of annual asset consumption and compares this to asset renewal and asset upgrade and expansion.

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asset Consumption</td>
<td>0.45%</td>
</tr>
<tr>
<td>Asset renewal</td>
<td>&lt;0.1%</td>
</tr>
<tr>
<td>Annual Upgrade/expansion</td>
<td>&lt;0.1%</td>
</tr>
</tbody>
</table>

5.2 Risk Management Plan

An assessment of risks associated with service delivery from infrastructure assets has identified critical risks to Council. 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.

Critical risks, being those assessed as ‘Very High’ - requiring immediate corrective action and ‘High’ – requiring prioritised corrective action identified in the infrastructure risk management plan are summarised in Table 5.2.
Table 5.2. Critical Risks and Treatment Plans

<table>
<thead>
<tr>
<th>Risk</th>
<th>What can Happen</th>
<th>Risk Rating</th>
<th>Risk Treatment Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open drainage channels</td>
<td>During large rainfall events open channels may convey large quantities of runoff at dangerous speeds</td>
<td>Ex</td>
<td>Install signs warning of the potential danger of flooding In some circumstances a man proof fence may be used to limit access.</td>
</tr>
<tr>
<td>Detention basins</td>
<td>During large rainfall events detention basins are designed to fill with runoff</td>
<td>Ex</td>
<td>Install signs warning of the potential danger of flooding</td>
</tr>
<tr>
<td>Environment and public health</td>
<td>Illegal stormwater discharge from business and industry can cause environmental damage and be a possible source of contamination</td>
<td>H</td>
<td>Council’s trade waste section inspects all business classified as discharging to ensure correct connection to sewer system rather than the stormwater system</td>
</tr>
<tr>
<td>Nuisance flooding</td>
<td>Through insufficient capacity or blockage of pipes or pits localised flooding can occur during rainfall events</td>
<td>H</td>
<td>Reacting promptly to complaints of flooding caused by network failure. Inspecting known problem areas during rainfall events</td>
</tr>
<tr>
<td>Damaging flooding</td>
<td>Through insufficient capacity or blockage of pipes or pits localised flooding can occur during rainfall events that may cause property damage.</td>
<td>Ex</td>
<td>New drainage is designed for 1 in 5 AEP.</td>
</tr>
</tbody>
</table>

5.3 Routine Maintenance Plan

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.

5.3.1 Maintenance plan

Maintenance includes reactive, planned and cyclic maintenance work activities. The intermittent and unpredictable nature of the load placed on the drainage network requires that the majority of maintenance is reactive.

Reactive maintenance is unplanned repair work carried out in response to service requests and management/supervisory directions. The majority of drainage network is reactive. Reactive maintenance to the drainage network includes:

- Clearing pit and pipe blockages.
- Repairing or replacing broken pipes.
- Replacing damaged pit lids and grates.

Planned maintenance is repair work that is identified and managed through a maintenance management system (MMS). MMS activities include inspection, assessing the condition against failure/breakdown experience, prioritising, scheduling, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance. There is very little planned maintenance on the stormwater network. Planned maintenance includes:

- Periodic cleaning of gross pollutant traps.
- Routine Inspection (not currently performed)
- Routine flushing (not currently performed)

Cyclic maintenance is replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, building roof replacement, etc. This work generally falls below the capital/maintenance threshold. Cyclic maintenance of the drainage network includes:
• Street sweeping

Maintenance expenditure trends are shown in Table 5.3.1

Table 5.3.1. Maintenance Expenditure Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Maintenance Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010/11</td>
<td>$ 225,000</td>
</tr>
<tr>
<td>2011/12</td>
<td>$ 229,460</td>
</tr>
<tr>
<td>2012/13</td>
<td>$ 242,079</td>
</tr>
<tr>
<td>2013/14</td>
<td>$ 251,983</td>
</tr>
</tbody>
</table>

Maintenance expenditure levels are considered to be adequate.

Assessment and prioritisation of reactive maintenance is undertaken by Council staff using experience, training and judgement.

5.3.2 Standards and specifications

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

• Bathurst Regional Council 2004, Guidelines for engineering works, Bathurst Regional Council
• NSW Office of Water 2006 Code of Practice for Plumbing and Drainage
• Pilgrim, D.H. (Ed) 1987 Australian rainfall and runoff : a guide to flood estimation, Institution of Engineers, Barton

5.3.3 Summary of future maintenance expenditures

Future maintenance expenditure is forecast to trend in line with the value of the asset stock as shown in Fig 6. Note that all costs are shown in current 2013 dollar values.

Fig 6. Planned 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 process in the infrastructure risk management plan.

If maintenance requirement and budgetary trends continue a gap between the projected maintenance expenditure requirements and the planned maintenance budget may be expected to develop.

Maintenance is funded from Council’s operating budget and grants where available. This is further discussed in Section 6.2.

5.4 Renewal/Replacement Plan

Renewal 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.

5.4.1 Renewal plan

Drainage pipes do not have an explicit life published, however pipes complying with AS4058 and installed to AS3725 assures a design life of 100 years. The expected life of uPVC pipes is expected to be well in excess of 100\(^4\) years when installed to the manufacturer’s recommendations. The intermittent runoff is generally low in corrosive elements. The nature of the runoff moved by the drainage network is not sufficient to cause damage to the network. Therefore, in reality the actual life of many of the components will be greater than 100 years. However for the purpose of determining the useful life of drainage assets, we have adopted 100 years for the components. It can be determined at a later date if this figure is correct or not.

Possible future drainage asset inspections (Section 5.1.4) will provide renewal candidates and a process of prioritisation based on Table 5.4.1. will allow programming of renewals.

Table 5.4.1 Renewal Priority Ranking Criteria

\(^4\) Plastics Industry Pipe Association of Australia *Life expectancy for plastics pipes*
### 5.4.2 Renewal standards

Renewal work is carried out in accordance with the Bathurst Regional Council's engineering guidelines. Future renewal work should take into account predicted changes in rainfall patterns, including an increase in the intensity of storms Bathurst may be subject to.

### 5.4.3 Summary of future renewal expenditure

Projected future renewal expenditures are forecast to increase over time as the asset stock ages. As the age of the bulk of the drainage network is less than 100 years, there is little renewal projected for the next 20 years. Small sections of pipe or individual pits that may require replacement will generally be renewed through the maintenance program. Other sections of drainage will be renewed as part of road reconstruction and as such are not programmed into a separate drainage renewal program.

### 5.5 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 to the Council from land development. These assets from growth are considered in Section 4.4.

#### 5.5.1 Selection criteria

New drainage network assets are constructed as new growth dictates. Drainage assets include pipes, collection pits, pollutant traps and retention basins.

Necessary upgrades of individual pipes or pits or entire reaches are identified through comprehensive computer modelling of the drainage network as a result of customer complaints or known system deficiencies. These network areas are identified as those with insufficient capacity to avoid flooding or excessive erosion during wet weather events. There are relatively few upgrade candidates and the prioritisation of them is not generally an issue. For future programming of upgrades Table 5.5.1 can be used as a prioritisation guide.

#### Table 5.5.1 Upgrade Priority Ranking Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity constraint</td>
<td>40%</td>
</tr>
<tr>
<td>Importance in network</td>
<td>20%</td>
</tr>
<tr>
<td>Catchment area serviced</td>
<td>20%</td>
</tr>
<tr>
<td>Land use</td>
<td>20%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
5.5.2 Standards and specifications

New work is carried out in accordance with the Bathurst Regional Council’s engineering guidelines.

5.5.3 Summary of future upgrade/new assets expenditure

In order to better understand the expenditure patterns, Fig 7 shows the previous 5 years capital expenditure on planned drainage projects and actual drainage projects.

*Fig 7. Planned and Actual Capital Upgrade/New Asset Expenditure since 2007*

### Financial Summary

This section contains the financial requirements resulting from all the information presented in the previous sections of this 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.

6.1 Financial Statements and Projections

The financial projections are shown in Fig 8 for planned operating (operations and maintenance) and capital expenditure (renewal and upgrade/ expansion/new assets).
Fig 8. Planned Operating and Capital Expenditure

NOTE: Assumptions made

- Note that all costs are shown in 2013 dollar values.
- The projection is for 10 years only as the available data is not sufficient to provide a useful long term prediction.
6.1.1 Sustainability of service delivery

There are two key indicators for financial sustainability that have been considered in the analysis of the services provided by this asset category, these being long term life cycle costs and medium term costs over the 10 year financial planning period.

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 longest asset life. Life cycle costs include maintenance and asset consumption (depreciation expense). The annual average life cycle cost for the services covered in this asset management plan is $896,427.

Life cycle costs can be compared to life cycle expenditure to give an indicator of sustainability in service provision. Life cycle expenditure includes maintenance plus capital renewal expenditure. Life cycle expenditure will vary depending on the timing of asset renewals. The life cycle expenditure at the start of the plan is $401,895.

A gap between life cycle costs and life cycle expenditure gives an indication as to whether present consumers are paying their share of the assets they are consuming each year. The purpose of this asset management plan is to identify levels of service that the community needs and can afford and develop the necessary long term financial plans to provide the service in a sustainable manner.

The life cycle gap for services covered by this asset management plan is $494,532 per annum. The life cycle sustainability index is 0.45.

Medium term – 10 year financial planning period

This asset management plan identifies the estimated maintenance and capital expenditures required to provide an agreed level of service to the community over a 20 year period for input into a 10 year financial plan and funding plan to provide the service in a sustainable manner. This may be compared to existing or planned expenditures in the 20 year period to identify any gap. In a core asset management plan, a gap is generally due to increasing asset renewals.

Council’s long term financial plan covers the first 10 years of the 20 year planning period. The total estimated capital works and maintenance expenditure required over the 10 years is $7.825 million.

This is an average expenditure of $782,500 pa. Estimated maintenance and capital works expenditure in year 1 is $561,700. The 10 year sustainability index is 0.72. In the medium term the funding of the drainage network is low.

6.2 Funding Strategy

Council’s current management practices are resulting in a level of service acceptable to the customer as indicated by the declining number of complaints received. The stormwater network is unique in terms of the assets owned by Council. The assets within the network have such a long life (100 years) and they are relatively young, there are no assets replacements required until 2030.

Drainage upgrade to some of the network in the older parts of the city is required. In those locations the original drainage system was not designed for the development that has taken place in later decades.

- Is the level of service offered to the customer appropriate? Recent flooding of homes in some areas has highlighted that system does have limits to what it will cope with in an intense rain event. In each case of minor flooding, the rain events in which these homes were affected were greater than the 1% Annual Exceedance Probability (AEP) adopted by Council for the design of the Stormwater Network. The cost associated with increasing the capacity of the drainage network would be too great and would not give a sufficient return on the investment.

6.3 Valuation Forecasts
Asset values are forecast to increase as additional assets are added to the asset stock from construction and acquisition by Council and from assets constructed by land developers and others and donated to Council. Fig 10 shows the projected replacement cost asset values over the planning period in current 2013 dollar values.

**Fig 10. Projected Asset Values**

![Projected Value of Pits and Pipes $ million](image)

6.4 **Key Assumptions made in Financial Forecasts**

This section details the key assumptions made in presenting the information contained in this 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 this asset management plan are:

- Useful life and value of assets are calculated using the NSW Reference Rates Manual for Valuation of Water Supply, Sewerage and Stormwater Assets published by the Ministry for Energy and Utility in 2003. Updates on rate changes are published annually to keep valuations current.

- Depreciation is calculated using the straight line method.

- Assets with unknown details required for valuation have been standardised using the following

<table>
<thead>
<tr>
<th>Asset type</th>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drainage Pit</td>
<td>Pit size</td>
<td>900mm x 900mm</td>
</tr>
<tr>
<td></td>
<td>Pit depth</td>
<td>1 - 2 m</td>
</tr>
<tr>
<td></td>
<td>Pit age</td>
<td>15 years</td>
</tr>
</tbody>
</table>
### Pit Cover

- **Pit cover**: Galvanised steel

### Kerb Lintel

- **Kerb lintel size**: 2400mm

### Drainage Pipe

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipe size</td>
<td>375mm</td>
</tr>
<tr>
<td>Pipe material</td>
<td>Reinforced concrete</td>
</tr>
<tr>
<td>Pipe depth</td>
<td>1 - 2 m</td>
</tr>
<tr>
<td>Pipe age</td>
<td>21 years</td>
</tr>
</tbody>
</table>

Accuracy of future financial forecasts may be improved in future revisions of this asset management plan by the following actions:

- Improving the accuracy of unit rates by collecting more detailed financial information from construction work and comparing and adjusting the unit rates derived from the Department of Utilities and Energy (now Department of Water and Energy).
- Development of condition based depreciation method that satisfies accounting standards.
- Collection of condition data through either a randomised sample or a comprehensive network survey.
7. ASSET MANAGEMENT PRACTICES

Council currently uses Civica Authority as the primary Corporate System Administrator: IT manager

Relevant accounting standards are:

- AASB 136 Impairment of Assets
- AASB 1021 Depreciation of Non-Current Assets
- AASB 1041 Accounting for the reduction of Non-Current Assets
- AAS 1015 Accounting for acquisition of assets
- AAS 27 Financial reporting by Local Government

7.2 Asset Management Systems

Council uses CONFIRM asset management software. The current version is 12.10a.AM.4172

CONFIRM team:
Team leader: Administration Engineer
Administrator: Asset Engineer
Data entry: 2 x Asset Technician
Mobile inspections: Asset Inspector

CONFIRM consists of:
- A comprehensive drainage inventory;
- Data Management, with reporting procedure to present inventory and assessment information;
- Asset Accounting, AAS27 reporting capability and life cycle costing
- MapInfo GIS system linked to CONFIRM.

As a result of this plan it is intended to improve the Asset management system by:

- Ascertaining more accurate unit rates for work performed in the drainage network.
- Linking of Confirm to Financial Software to gain more accurate costs of works.

7.3 Information Flow Requirements and Processes

The key information flows into this asset management plan are:

- The asset register data on size, age, value, remaining life of the network;
- The unit rates for categories of work/material;
- The adopted service levels;
- Projections of various factors affecting future demand for services;
- Correlations between maintenance and renewal, including decay models;
- Data on new assets acquired by council.

The key information flows from this asset management plan are:

- The assumed Works Program and trends;
- The resulting budget, valuation and depreciation projections;
- The useful life analysis.

These will impact the Long Term Financial Plan, Strategic Business Plan, annual budget and departmental business plans and budgets.
The current communication between financial and asset systems is limited to manually entering the relevant data. It is expected that CONFIRM will provide asset valuations and capitalisations in the future. These figures will be supplied to the finance system for reporting purposes.

CONCLUSIONS

8.1 Current position statement

The provision of drainage network is one of Council's Principal Activities. Council provides the drainage network within the Bathurst City area. This includes the villages of Raglan, Eglinton and Perthville. A limited amount of drainage is present in some of the rural villages and is not covered by this plan.

The current city drainage network consists of 181.34 km of pipes, approximately 6,401 drainage pits, 4 gross pollutant traps and 11 retention basins. Over the last 10 years the network has increased in length at an average of 2.11% p.a. The increases in the network include a substantial amount of inter-allotment drainage. Council is not responsible for the management of inter-allotment drainage and it is not part of the plan. The average age of the pipe and pit drainage assets is 34 years.

The first major drainage works within the Bathurst city area commenced during the early 1930's. There are some original brick arch culverts still forming a functional part of the network, making them at least 80 years old. Approximately 2% of the network has been assessed as in poor condition and 0% in bad condition, based on the age of the pipes.

The current replacement cost of the drainage network is $66.558 million. The annual depreciation expense is $0.644 million. Asset valuations are at greenfield rates and based on rates published by the NSW Department of Primary Industries, Office of Water.

The current maintenance and repair budget for the entire drainage network is approximately $242,079.

Customer requests regarding the drainage network have, on a monthly average stayed constant since 2009. This suggests that the level of service provided by the drainage network is being maintained and current maintenance expenditure is adequate.

In technical terms the current maintenance budget appears to be adequate for the drainage network. The network deterioration rate appears to be inline with or slower than the useful life used to calculate remaining asset life.

The budget for maintenance and repair is currently forecast by adding an additional amount due to CPI on the previous year's budget. This budget is used for basic maintenance caused by tree roots, sediment runoff and miscellaneous damage. It has not been used to replace any of the existing drainage network. In the future more money will need to be set aside to replace old assets as they reach the end of their lives.
As the drainage assets age and the network expands to meet the growth in areas of Bathurst, the expenditure required to meet maintenance needs will increase at a rate higher than the CPI. If the current level of maintenance is not increased inline with the increasing maintenance requirements of the drainage network more minor flooding incidents and a generally lower level of service could be reasonably expected. The effects of this may not be immediately obvious due to the intermittent nature of the load placed on the drainage network.

Although the final assessment on capital renewal of drainage pipes and pits will be based on the criteria in 5.4.1, asset age is the best indicator available to predict the future expenditure required to replace drainage infrastructure that has deteriorated to a point where it is no longer serviceable. There are currently no significant areas within the drainage network requiring widespread renewal. As the drainage network ages a review of the current practice of not inspecting the drainage assets may indicate a need to commence regular inspections on some areas of the network.

The information contained within the asset management plan sets a benchmark for the drainage network. By continuing to collect information on the condition of the network and monitoring the expenditure on maintenance and renewal of the network the performance of the Council’s drainage network strategies can be measured, reported on and improved in the future.
8.2 Recommendations

Council aims to ensure drainage assets are sustainable and appropriate. The key outcomes of this asset management plan are to keep the drains clear, keep the drains working and bring them up to standard.

To ensure that Council can achieve this, the following actions have been identified:

### 8.2.1 Maintenance recommendations

- The current level of maintenance appears to be adequate;
- To supplement the current maintenance regime a proactive flushing program based on asset inspection will assist in keeping pits and pipes clear of blockages;
- Contractor work joining a council maintained stormwater drain should be inspected by a council officer to ensure compliance with the Council standards;
- Maintenance budgetary requirements will increase in real terms as the network expands and ages. An increase of the current budget in real terms of approximately 1% p.a. (this is half the rate of growth in the drainage network over the previous 10 years) be required to maintain the current levels of maintenance; and
- Implementation of water sensitive drainage designs has the potential to markedly increase maintenance costs. This should be monitored and taken into account when designing areas of natural drainage.

### 8.2.2 Renewal recommendations

- A network inspection should be carried out. The inspection should be limited to areas where age and/or condition are known to be an issue. This will identify candidates for renewal;
- A subsequent inspection 5 years after the initial inspection will give an indication of the rate of deterioration of the network;
- A program of asset renewal, based on inspections should be implemented. It is not expected that large numbers of drainage assets will require replacement;
- Relining with uPVC should be considered as a renewal option where replacement is prohibitively expensive or not practical due to above ground development.

### 8.2.3 Upgrade and new asset recommendations

- Developers should model drainage requirements for new development from inlet to discharge into receiving water to ensure previously installed drainage is of sufficient capacity for the new development. Identified capacity constraints upgrades may be joint funded by Council and the developer;
- Changes in climactic conditions, and specifically rainfall intensity will effect drainage design. CSIRO predictions should be considered when designing and constructing new drainage assets;
- Water sensitive urban design should be carefully considered. The maintenance costs required to maintain WSUD when compared to traditional subterranean drainage are significantly higher. The higher maintenance costs should be considered when examining the environmental benefits. Larger scale projects (such as the Hector Park system of drainage ponds) offer greater cost/benefit ratio than smaller street based designs; and
- Designs should aim to minimise impervious ground covering to reduce runoff;

8.2.3 Asset management recommendations
- The maintenance and renewal budgets should be monitored and the programmed budget adjusted according to inspection results;
- A program of drainage asset inspection should be implanted. This should take the form of a sample of assets and aim to inspect the entire network every 10 years;
- Asset inspection results and condition information should be recorded on the Council’s asset management system;
- Maintenance and renewal costs should be closely monitored using the asset management system’s maintenance management capabilities. This will provide more accurate unit rates and better valuation figures.
9. PLAN IMPROVEMENT AND MONITORING

9.1 Performance Measures
The effectiveness of the asset management plan can be measured in the following ways:
- The degree to which the required cash flows identified in this asset management plan are incorporated into council’s long term financial plan and Strategic Management Plan;
- The degree to which 1-5 year detailed works programs, budgets, business plans and organisational structures take into account the ‘global’ works program trends provided by the asset management plan;

9.2 Improvement Plan
The asset management improvement plan generated from this asset management plan is shown in Table 8.2

Table 8.2 Improvement Plan

<table>
<thead>
<tr>
<th>Task No</th>
<th>Task</th>
<th>Responsibility</th>
<th>Resources Required</th>
<th>Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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<td>3.</td>
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<td>4.</td>
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<td>5.</td>
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<td>6.</td>
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<td>9.</td>
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<td>10.</td>
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</tbody>
</table>

9.3 Monitoring and Review Procedures
This asset management plan will be reviewed during annual budget preparation and amended to recognise any changes in service levels and/or resources available to provide those services as a result of the budget decision process.
The Plan has a life of 4 years and is due for revision and updating within 2 years of each Council election.
REFERENCES

- Bathurst Regional Council, ‘Engineering Guidelines’ 6 September 2011
- Department of Primary Industries, Office of Water, Best Practice Guidelines - August 2007