Bridges
Asset Management Plan (2017)

Revision 3 Scenario 1 Version 4

February 2017
<table>
<thead>
<tr>
<th>Rev No</th>
<th>Date</th>
<th>Revision Details</th>
<th>Author</th>
<th>Reviewer</th>
<th>Approver</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nov 2014</td>
<td>First edition TRIM 14/347572</td>
<td>AGL</td>
<td>MBL</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Feb 2015</td>
<td>Revision 2 Version 6 TRIM 14/347572</td>
<td>AGL</td>
<td>MBL</td>
<td>AMCtte 18 March 2015</td>
</tr>
<tr>
<td>3</td>
<td>Feb 2017</td>
<td>Revision 3 Version 4</td>
<td>AGL/CDA</td>
<td>SHU/JCO</td>
<td>AMCtte 20 March 2017</td>
</tr>
</tbody>
</table>
# TABLE OF CONTENTS

TABLE OF CONTENTS................................................................................................................................................. 3

1. **EXECUTIVE SUMMARY................................................................................................................................. 5
   1.1 What does it Cost?......................................................................................................................................... 5
   1.2 What We Will Do......................................................................................................................................... 6
   1.3 What We Cannot Do................................................................................................................................. 6
   1.4 Managing the Risks ................................................................................................................................. 6
   1.5 Confidence Levels....................................................................................................................................... 6
   1.6 The Next Steps .......................................................................................................................................... 6
   1.7 Questions you may have ......................................................................................................................... 7

2. **INTRODUCTION............................................................................................................................................... 8
   2.1 Background................................................................................................................................................ 8
   2.2 Goals and Objectives of Asset Management ......................................................................................... 11
   2.3 Plan Framework....................................................................................................................................... 11
   2.4 Core and Advanced Asset Management ............................................................................................... 13
   2.5 Community Consultation....................................................................................................................... 13

3. **LEVELS OF SERVICE................................................................................................................................. 14
   3.1 Customer Research and Expectations ............................................................................................... 14
   3.2 Strategic and Corporate Goals ........................................................................................................... 14
   3.3 Legislative Requirements .................................................................................................................... 15
   3.4 Community Levels of Service ........................................................................................................... 15
   3.5 Technical Levels of Service ................................................................................................................ 16
   3.6 Environmental Principles .................................................................................................................... 19

4. **FUTURE DEMAND..................................................................................................................................... 20
   4.1 Demand Drivers ....................................................................................................................................... 20
   4.2 Demand Forecast ..................................................................................................................................... 20
   4.3 Demand Impact on Assets .................................................................................................................... 20
   4.4 Demand Management Plan .................................................................................................................. 22
   4.5 Asset Programs to meet Demand ........................................................................................................ 24

5. **LIFECYCLE MANAGEMENT PLAN........................................................................................................ 25
   5.1 Background Data .................................................................................................................................... 25
   5.2 Infrastructure Risk Management Plan ............................................................................................... 30
   5.3 Routine Operations and Maintenance Plan .......................................................................................... 31
   5.4 Renewal/Replacement Plan .................................................................................................................. 34
   5.5 Creation/Acquisition/Upgrade Plan ...................................................................................................... 37
   5.6 Disposal Plan ......................................................................................................................................... 39
   5.7 Service Consequences and Risks ......................................................................................................... 40

6. **FINANCIAL SUMMARY............................................................................................................................ 41
   6.1 Financial Statements and Projections ................................................................................................. 41
   6.2 Funding Strategy .................................................................................................................................... 46
   6.3 Valuation Forecasts .................................................................................................................................. 46
   6.4 Key Assumptions made in Financial Forecasts .................................................................................. 48
   6.5 Forecast Reliability and Confidence ..................................................................................................... 48

7. **PLAN IMPROVEMENT AND MONITORING.......................................................................................... 50
   7.1 Status of Asset Management Practices ............................................................................................. 50
   7.2 Improvement Plan .................................................................................................................................. 52
   7.3 Monitoring and Review Procedures .................................................................................................... 53
   7.4 Performance Measures ........................................................................................................................ 53

8. **REFERENCES.............................................................................................................................................. 54

9. **APPENDICES............................................................................................................................................. 55
   Appendix A  **Maintenance Response Levels of Service** ........................................................................... 56
   Appendix B  **Projected 10 year Maintenance Program (16/221026)** ...................................................... 57
   Appendix C  **Projected 10 year Upgrade Works Program (16/221026)** .................................................. 58
   Appendix D  **Projected 10 year Renewal Works Program** ...................................................................... 59
   Appendix E  **Budgeted Expenditures Accommodated in LTFP** ............................................................... 60
Appendix F  Example of Repair Program for Bridge 29 and Bridge 30 – West Lakes
Appendix G  Abbreviations ................................................................. 62
Appendix H  Glossary ........................................................................ 63
1. EXECUTIVE SUMMARY

Context
The City of Charles Sturt embraces some of Adelaide’s oldest suburban developments with many residential and business facilities dating back many years. Over time and under Council guidance the area has grown to include many diverse services utilising a mixture of infrastructure assets. For many years the City has grown both in size and demand; when reflecting the State’s 30 year plan for growth, the expectation for coming years is no different. Asset age, and therefore intervening investment to ensure condition and service levels are maintained, continues to provide the Council and its staff with a complicated challenge. Asset Management Plans assist in setting the scene as the City of Charles Sturt continues to balance investment in both growth and maintenance.

What does it Cost?
These infrastructure assets as March 2015 had a replacement cost of $23.04M. Since that time an additional 27 bridges have been included in the Bridge Asset Register. These are contributed assets handed over to council by state government, WPTW project and as part of infill developer construction etc. An extra asset value of $1.2M has been included in this plan bringing the total asset value as at January 1 2017 to $24.26M.

The projected outlays necessary to provide the services covered by this AMP (including operations, maintenance, renewal and upgrade of existing assets) over the 10 year planning period is $7,433,000 or $743,000 on average per year.

The current LTFP allows for an average annual expenditure of $428,000 per year.

Expenditure as below;

<table>
<thead>
<tr>
<th>Asset Category</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornamental Overpass</td>
<td>3</td>
</tr>
<tr>
<td>Pedestrian Overpass</td>
<td>40</td>
</tr>
<tr>
<td>Shared Use Overpass</td>
<td>13</td>
</tr>
<tr>
<td>Shared Use Underpass</td>
<td>5</td>
</tr>
<tr>
<td>Vehicular Overpass</td>
<td>6</td>
</tr>
</tbody>
</table>

This Bridge Asset Management Plan (AMP) continues to contribute to achieving the appropriate balance of social, cultural, environmental and economic services which are the keys to sustainability. Whilst asset planning is about the condition of assets, at the forefront to this planning is our community expectation of these assets, the current and future users.

Councils Bridge Infrastructure consists of 67 bridges throughout the council area that can be categorised as follows:

<table>
<thead>
<tr>
<th>Asset Category</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornamental Overpass</td>
<td>3</td>
</tr>
<tr>
<td>Pedestrian Overpass</td>
<td>40</td>
</tr>
<tr>
<td>Shared Use Overpass</td>
<td>13</td>
</tr>
<tr>
<td>Shared Use Underpass</td>
<td>5</td>
</tr>
<tr>
<td>Vehicular Overpass</td>
<td>6</td>
</tr>
</tbody>
</table>
What We Will Do
We plan to provide Bridge services for the following:

- Operation, maintenance, renewal and upgrade of bridges to meet changing demand and service levels set within the AMP (additional funding required).
- Repair as necessary those bridges identified as requiring significant maintenance to minimise risk to users.
- Upgrade identified bridges (through auditing and planned repair programs) that have structural issues or a surface of a substandard condition, and make them fit for purpose within the 10 year planning period.
- Build a new suspended concrete boardwalk at the River Torrens Linear Park (RTL) alongside the Hindmarsh Cemetery to replace the current non-conforming bridge in 2018/2019.
- Build a new shared use overpass bridge at the Grange Lakes in Nash Street, Grange in 2021/2022.

What We Cannot Do
We do not have enough funding to provide all services at the desired service levels or provide new services. Works and services that cannot be provided under present funding levels are:

- Change the overall condition rating of the bridge asset to reflect the desired level of service.
- Add additional new bridges to the network based on resident requests.
- Maintain new assets that council may inherit from developments and sub divisions without additional funds.

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 to be:

- Insufficient funding to undertake planned maintenance programming; leaving bridges in conditions that could give rise to potential risk. (Closure, lack of access/amenity etc.).
- Insufficient resources (funding, equipment, crews etc.) to renew assets in accordance with the assets estimated useful life expiration or poor condition assessment where applicable.
- Potential personal injury due to structure failures.

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

- Undertaking a general condition and catalogue audit every 7 years (currently due in June 2017).
- Continuing to prioritise the upgrade program based on demand and strategic alliances.
- Continuing a citywide scheduled maintenance program to maintain existing bridges in a safe and serviceable condition.
- Continuing the Rapid Response Program to attend and make safe all reported hazards associated with hazards on bridges within 24-hours.

Confidence Levels
This AMP is based on the following level of confidence information.

Condition – High
Function – Reliable
Capacity – Uncertain

In Table 6.5 the quality of the data is assessed as being Highly Reliable as the data set is small, the entire asset class was audited in 2010 and any changes are actioned by one person only. A further more detailed audit was conducted in December 2015. The Dataset is complete and estimated to be accurate ± 2%

The Next Steps
The actions resulting from this asset management plan are:

- Begin rolling out a planned maintenance program for all bridge assets.
- Undertake specific maintenance repair programs for bridges requiring major maintenance as trialled on the West Lakes Footbridges (Grange Lakes Bridges, RTL Bridges).
- Improve processes to keep the Asset Register and financial General Ledger consistent with each other and up to date using the Works and Assets system.
- Continue to implement alternative material options into renewal projects.
• Introduce a process to write off assets due to strategic decision, or impacting works, causing need to bring forward the renewal of a bridge.
• Engage with community on managing expectations.
• Review the process for recording, monitoring, and actioning reported hazards for data integrity and improved responsiveness. From this review implement a management program to minimise hazards.

Questions you may have

What is this plan about?
This asset management plan covers the bridge infrastructure assets that serve the City of Charles Sturt community’s transport needs. These assets include trafficable bridges, throughout the community area that enable people to commute from one point to another in a safe and efficient manner.

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

Asset management plans detail information about infrastructure assets including actions required to provide an agreed level of service in the most cost effective manner. The plan defines the services to be provided, how the services are provided and what funds are required to provide the services.

Why is there a funding shortfall?
We inherit assets from developers, or have undertaken extensive construction programs in response to phases of rapid urban development, changes in community expectation and the availability of funds during peak of economic cycles, or by accessing government grants. In past decades, little thought was given to ongoing operations, periodic and annual maintenance, repairs and eventual renewal (replacement) needs.

As assets reach the end of their useful life, many show decreased service and function while requiring increased maintenance. This is reflected in an increased cost burden, which draws funds and effort away from the renewal activity.

When there is a funding shortfall, it means that funding levels are insufficient to continue to provide existing services at current levels in the medium to long term.

What options do we have?
Resolving the funding shortfall involves several steps:
1. 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.
2. Improving our efficiency in operating, maintaining, renewing and replacing existing assets to optimise life cycle costs.
3. Identifying and managing risks associated with providing services from infrastructure.
4. Making trade-offs between service levels and costs to ensure that the community receives the best return from infrastructure.
5. Identifying assets surplus to needs for disposal to make saving in future operations and maintenance costs.
6. Consulting with the community to ensure that bridge services and costs meet community needs and are affordable.
7. Developing partnership with other bodies, where available to provide services.
8. Seeking additional funding from government and other bodies to better reflect a ‘whole of government’ funding approach to infrastructure services.

What happens if we don’t manage the shortfall?
A funding shortfall means that there is likely to be a decrease in one or more of the asset conditions. For bridges, the service level reduction may include assets that cannot be maintained, closure of unsafe structures, potential catastrophic failure resulting in personal injury to users.

What can we do?
With an increased maintenance budget we can develop planned and strategic maintenance options for extending the useful life of the assets and prioritise what bridges require services.

Consult with the community to plan future services to match the community service needs with ability to pay for services and maximise community benefits against costs.
2. INTRODUCTION

2.1 Background

This Asset Management Plan (AMP) has been prepared 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 over a 20 year planning period.

The AMP follows the format for AMPs recommended in Section 4.2.6 of the International Infrastructure Management Manual1.

The AMP is to be read with the organisation’s Asset Management Policy, Asset Management Strategy and the following associated planning documents:

- City of Charles Sturt Community Plan 2016-2027 – Charles Sturt – a leading, liveable City
- City of Charles Sturt Corporate Plan 2016-2020 – Charles Sturt – a leading, liveable City
- City of Charles Sturt ‘Living Green to 2020
- City of Charles Sturt Engineering & Open Space Guidelines
- City of Charles Sturt Environmental Sustainability Policy
- City of Charles Sturt Asset Accounting Policy
- City of Charles Sturt Asset Fund Policy
- City of Charles Sturt Crime Prevention Through Environmental Design Policy

The infrastructure assets covered by this AMP are shown in Table 2.1. These assets are used to provide point to point trafficable services to the community.

<table>
<thead>
<tr>
<th>Asset category</th>
<th>Count</th>
<th>Replacement Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornamental – Overpass</td>
<td>3 of</td>
<td>$89,444</td>
</tr>
<tr>
<td>Pedestrian – Overpass</td>
<td>40 of</td>
<td>$9,801,432</td>
</tr>
<tr>
<td>Shared Use – Overpass</td>
<td>13 of</td>
<td>$6,035,705</td>
</tr>
<tr>
<td>Shared Use – Underpass</td>
<td>5 of</td>
<td>$5,512,664</td>
</tr>
<tr>
<td>Vehicular – Overpass</td>
<td>6 of</td>
<td>$2,821,651</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>67 of</td>
<td><strong>$24,260,896</strong></td>
</tr>
</tbody>
</table>

Financial values audit was undertaken in 2014/15 based on City of Charles Sturt, Asset Accounting Policy.

NOTE: new assets included as per this AMP have been based on actual construction costs, the valuations will be further refined in future years financial audit.

---

1 IPWEA, 2011, Sec 4.2.6, Example of an Asset Management Plan Structure, pp 4|24 – 27.
Key stakeholders in the preparation and implementation of this asset management plan are: Shown in Table 2.1.1.

Table 2.1.1: Key Stakeholders in the AMP

<table>
<thead>
<tr>
<th>Key Stakeholder</th>
<th>Role in Asset Management Plan</th>
</tr>
</thead>
</table>
| Councillors                                          | • Represent needs of community;  
• Allocate resources to meet the organisation’s objectives in providing services while managing risks;  
• Ensure organisation is financially sustainable.                                                                                                                                                                                                                                                    |
| Chief Executive Officer (CEO)                       | • Allocate resources to meet the organisation’s objectives in providing services while managing risks;  
• Ensure organisation is financially sustainable.                                                                                                                                                                                                                                                                                                                 |
| General Manager of Asset Management Services        | • Overall responsibility for Asset Management;  
• Ensure funds are invested appropriately to ensure best value for money is delivered to the community;  
• Provide leadership in influencing decision making processes related to Asset Management.                                                                                                                                                                                                                                                                  |
| Asset Management Portfolio Managers                 | • Provide Leadership for effective Asset Management;  
• Identify resource requirements for delivering various assets management services to the community;  
• Ensuring Asset Management services are provided in accordance with Corporate Plan and organisation priorities;  
• Deliver services in a cost effective and sustainable manner.                                                                                                                                                                                                                                                                                                     |
| Asset Managers of the Asset Classes                  | • Identifying resource requirements for specific asset classes;  
• Responsible for reviewing and keeping AMP up to date;  
• Responsible for preparing budget submissions in accordance with the AMP;  
• Delivering nominated renewal, upgrade projects;  
• Responsible for Asset Officer;  
• Coordinate with Asset officers and field Workgroup Leaders to identify areas of need, process improvement.                                                                                                                                                                                                                                           |
| Asset Officers and Data Owners                       | • Custodian of Asset data;  
• Responsible for keeping asset data up to date;  
• Preparation of AMP;  
• Financial accounting for assets.                                                                                                                                                                                                                                                                                                                          |
| Field workgroups and their leaders                   | • Operation and Maintenance management to meet agreed levels of service;  
• Highlight issues requiring attention of senior management.                                                                                                                                                                                                                                                                                                 |
| Internal users of Asset Services (e.g. Library and Community Servicers) | • Provide timely advice as to future asset usage and requirements;  
• Communicate asset condition and maintenance requirements as needed.                                                                                                                                                                                                                                                                                     |
| The community (residents, businesses, property owners) | • Be aware of service levels and costs;  
• Participate in consultation processes;  
• Provide feedback on services.                                                                                                                                                                                                                                                                                                                            |
| State and Federal Government                         | • Provide Leadership in promoting Best Practice Asset management;  
• Facilitate Training and Education Re: Current AMP;  
• Recognising the importance of LG Assets to community and provide funding and other assistance to sustain.                                                                                                                                                                                                                                                    |
Our organisational structure for service delivery from infrastructure assets is detailed below:
2.2 Goals and Objectives of Asset Management

The organisation exists to provide services to its community. Some of these services are provided by infrastructure assets. We have acquired infrastructure assets by ‘purchase’, contract, internal construction and by donation of assets constructed by developers and others to meet increased levels of service.

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,
- Having a long-term financial plan which identifies required, affordable expenditure and how it will be financed.\(^2\)
- Sustainability - “meeting the needs of the present without compromising the ability of future generation to meet their own needs.” (World Commission on Environment and Development. (1987). Our Common Future. The Bruntland Commission, UNESCO)

2.3 Plan Framework

Key elements of the plan are

- Levels of service – specifies the services and levels of service to be provided by the organisation,
- 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 defined levels of service,
- Financial summary – what funds are required to provide the defined services,
- Asset management practices,
- Monitoring – how the plan will be monitored to ensure it is meeting the community’s objectives,
- Asset management improvement plan.

A road map for preparing an asset management plan is shown over page.

\(^2\) Based on IPWEA, 2011, IIMM, Sec 1.2 p 1|7.
Road Map for preparing an Asset Management Plan

Source: IPWEA, 2006, 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 Plan.
  - Gain organisation commitment.

- REVIEW/COLLATE 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)
  - Optimize maintenance strategies

- FINANCIAL FORECASTS
  - Lifecycle analysis
  - Financial forecast summary
  - Valuation Depreciation
  - Funding

- IMPROVEMENT PLAN
  - Assess current/desired practices
  - Develop improvement plan

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

- DEFINE SCOPE & STRUCTURE OF PLAN

- IMPLEMENT IMPROVEMENT STRATEGY

- AM PLAN REVIEW AND AUDIT

- INFORMATION MANAGEMENT, and DATA IMPROVEMENT
2.4 Core and Advanced Asset Management

This Asset Management Plan (AMP) is prepared as a ‘core’ AMP over a 20 year planning period in accordance with the International Infrastructure Management Manual\(^3\). 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 AMP 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 in a financially sustainable manner.

2.5 Community Consultation

This ‘core’ AMP is prepared to facilitate community consultation initially through feedback on public display of draft AMPs prior to adoption by Council. Future revisions of the AMP will incorporate community consultation on service levels and costs of providing the service. This will assist Council and the community in matching the level of service needed by the community, service risks and consequences with the community’s ability and willingness to pay for the service.

Currently, feedback and information from customer requests indicate that an acceptable service level for bridges is between a condition 2 or 3.

\(^3\) IPWEA, 2011, IIMM.
3. **LEVELS OF SERVICE**

3.1 **Customer Research and Expectations**

The organisation has not carried out any targeted research on customer expectations with regards to preparing this plan. This will be investigated for future updates of the AMP.

It should be noted however that initial outcomes from the recent community consultation surrounding the new long term community plan revision has been incorporated where applicable.

The organisation uses this information in developing its Strategic Plan and in allocation of resources in the budget.

3.2 **Strategic and Corporate Goals**

This AMP is prepared under the direction of the organisation’s Community, Sustainability and Corporate Plans. Relevant organisation goals and objectives and how these are addressed in this AMP are:

**Table 3.2: Organisational Strategies and how these are addressed in this Plan**

<table>
<thead>
<tr>
<th>Goal</th>
<th>Strategy</th>
<th>How Goal and Objectives are addressed in AMP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Our Liveability</strong></td>
<td>City assets and infrastructure are developed and well maintained on a strategic and equitable basis.</td>
<td>• Planned maintenance.</td>
</tr>
<tr>
<td></td>
<td>Drive and integrated, responsive transport system and network.</td>
<td>• Programmed renewal and upgrade of bridges.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Align the Asset Management plan with the Transport Plan addressing future growth and community aspiration for safe transport networks with high level of transport choice.</td>
</tr>
<tr>
<td></td>
<td>Enhance the quality and diversity of open space.</td>
<td>• Continued responsive safety and vandalism responses.</td>
</tr>
<tr>
<td><strong>Our Leadership</strong></td>
<td>Adaptive and sustainable management of the City’s finances.</td>
<td>• Undertake planned maintenance programs to ensure assets achieve their useful life.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Develop and regularly review the Long Term Financial Plan to ensure long term financial sustainability.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Regularly review asset management plans for council approval.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Implement asset renewals in line with asset management plans so that the overall condition of assets is not deteriorating.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manage the growth of new assets in response to community demand in a financially responsible way as forecast through the Long Term Financial Plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Establish and monitor internal controls in accordance with legislative requirements,</td>
</tr>
</tbody>
</table>
The organisation will exercise its duty of care to ensure public safety in accordance with the infrastructure risk management plan prepared in conjunction with this AMP. Management of infrastructure risk is covered in Section 5.2

### 3.3 Legislative Requirements

The organisation has to meet many legislative requirements including Australian and State legislation and State regulations. These include:

**Table 3.3: Legislative Requirements**

<table>
<thead>
<tr>
<th>Legislation</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Australian Local Government Act 1999</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>South Australian State Records Act 1997</td>
<td>To ensure the City of Charles Sturt records and stores all relevant information as set out by the State Government of SA</td>
</tr>
<tr>
<td>Environment Protection Act 1993</td>
<td>To ensure that all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment having regard to the principles of ecologically sustainable development</td>
</tr>
<tr>
<td>Work Health and Safety Act 2011</td>
<td>To take a constructive role in promoting improvements in work health and safety practices whilst assisting in the preservation of public health and safety in all undertakings of the organisation.</td>
</tr>
<tr>
<td>Development Act 1993</td>
<td>An act to provide for planning and regulate development in the state; to regulate the use and management of land and building and for other purposes</td>
</tr>
<tr>
<td>Public And Environmental Health Act 1987</td>
<td>An Act Dealing With Public And Environmental Health; To Repeal The Health Act 1935, The Noxious Trades Act 1934 And The Venereal Diseases Act 1947; And For Other Purposes.</td>
</tr>
<tr>
<td>Australian Road Rules</td>
<td>An act which gives road authorities in each state delegated power to establish standards for all aspects of roadways, including bridges and shared use paths.</td>
</tr>
<tr>
<td>Disability Discrimination Act 1992</td>
<td>Provides protection for everyone in Australia against discrimination based on disability. It encourages everyone to be involved in implementing the Act and to share in the overall benefits to the community and the economy that flow from participation by the widest range of people.</td>
</tr>
</tbody>
</table>

The organisation will exercise its duty of care to ensure public safety in accordance with the infrastructure risk management plan linked to this AMP. Management of risks is discussed in Section 5.2.

### 3.4 Community Levels of Service

Service levels are defined service levels in two terms, customer levels of service and technical levels of service.

Community Levels of Service measure how the community receives the service and whether the organisation is providing community value.

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

- **Quality**: How good is the service?
- **Function**: Does it meet users’ needs?
- **Capacity/Utilisation**: Is the service over or under used?

The organisation’s current and expected community service levels are detailed in Tables 3.4 and 3.5. Table 3.4 shows the agreed expected community levels of service based on resource levels in the current long-term financial plan and community consultation/engagement.
### Table 3.4: Community Level of Service

<table>
<thead>
<tr>
<th>Service Attribute</th>
<th>Service Objective</th>
<th>Performance Measure</th>
<th>Current Performance</th>
<th>Expected position in 10 years based on current LTFP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>COMMUNITY OUTCOMES</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality</td>
<td>Provide bridges of an appropriate standard.</td>
<td>Retain overall condition rating scores compiled following audit in 2010.</td>
<td>66% of bridges with very good/good condition rating. (Level 1 or 2)</td>
<td>Minimum condition 2. Can be achieved only if maintenance is increased, but desirable for a steady decline in the number of complaints over the 10-year planning period.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>The number of requests for maintenance/repairs on the condition of existing bridges.</td>
<td>34% of bridges with Condition rating 3 or 4. (Maintenance required)</td>
<td>Nil bridges Cond 5</td>
</tr>
<tr>
<td>Function</td>
<td>Provide bridges that meet user requirements.</td>
<td>Requests for bridges to be upgraded. E.g.; from a single lane to a shared use path.</td>
<td>Number not currently recorded. This will be measured using Customer Request Management system (CCNIS).</td>
<td>Steady decline in the number of requests over the 10-year planning period.</td>
</tr>
<tr>
<td>Capacity/Utilisation</td>
<td>Provide bridges that meet user requirements.</td>
<td>Complaints about crowded bridges, or for platforms to be widened. E.g.; from 1.2 metres to, say 1.95 metres.</td>
<td>Number not currently recorded. This will be measured using Customer Request Management system (CCNIS).</td>
<td>Steady decline in the number of requests over the 10-year planning period.</td>
</tr>
</tbody>
</table>

### 3.5 Technical Levels of Service

**Technical Levels of Service** - Supporting the community service levels are operational or technical measures of performance. These technical measures relate to the allocation of resources to service activities that the organisation undertakes to best achieve the desired community outcomes and demonstrate effective organisational performance.

Technical service measures are linked to annual budgets covering:

- Operations – the regular activities to provide services such as opening hours, cleansing, mowing grass, energy, inspections, etc.
- Maintenance – the activities necessary to ensure an asset reaches its useful life and retain an asset as near as practicable to an appropriate service condition (e.g. road patching, unsealed road grading, building and structure repairs)
- Renewal – the activities that return the service capability of an asset up to that which it had originally (e.g. frequency and cost of road resurfacing and pavement reconstruction, pipeline replacement and building component replacement),
- Upgrade/new – the activities to provide a higher level of service (e.g. widening a road, sealing an unsealed road, replacing a pipeline with a larger size) or a new service that did not exist previously (e.g. a new library).
Service and asset managers plan, implement and control technical service levels to influence the customer service levels.4

Table 3.5 shows the technical level of service expected to be provided under this AMP. The agreed sustainable position in the table documents the position agreed by the Council following community consultation and trade-off of service levels performance, costs and risk within resources available in the long-term financial plan.

Table 3.5: Technical Levels of Service

<table>
<thead>
<tr>
<th>TECHNICAL LEVELS OF SERVICE</th>
<th>Key Performance Measure</th>
<th>Level of Service Objective</th>
<th>Performance Measure Process</th>
<th>Current Level of Service</th>
<th>Optimal Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td>Current Budget: $2,000</td>
<td>Proposed Budget: $5,000</td>
<td>Shortfall: $3,000</td>
<td>(See Notes 1 &amp; 2 below)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>To ensure services provided are best value for money. Ensure that bridges are well maintained.</td>
<td>Number of requests for maintenance on bridges condition and hazards. That bridges and lead up areas are safe, well lit, and accessible 24hrs per day. Walking platforms and hand rails are free of hazards.</td>
<td>Predominantly adhoc based on Customer Request Management system or referral from Elected Members.</td>
<td>Requests to make minor repairs to ensure bridges are safe to be completed within appropriate timeframes.</td>
<td>Note: Work is required to determine what community see as an acceptable level of service.</td>
</tr>
<tr>
<td>Planned Maintenance</td>
<td>Current Budget: $20,000</td>
<td>Proposed Budget: $110,000 (Avg)</td>
<td>Shortfall: $90,000</td>
<td>(See Notes 1, 3, 4, 5 below)</td>
<td></td>
</tr>
<tr>
<td>(programed)</td>
<td>Ensure that bridges are well maintained.</td>
<td>That bridges and lead up areas are safe, well lit, and accessible 24hrs per day. Walking platforms and hand rails are free of hazards and maintained to reach optimum life span through programmed maintenance. The average unit rate cost.</td>
<td>Undertake maintenance of bridge structures that have signs of premature ageing such as wood rot or rust. An updated annual maintenance program has been developed as part of this AMP. All bridges are proposed to be included on an annual maintenance schedule planned for their entire useful life. The previous maintenance schedule was based on the initial maintenance required from the initial 2010 Bridge Audit. Note: current unit rate costs have been established by review of actual costs achieved in recent years. There has been a reduction in costs which has reduced the assets total value</td>
<td>Undertake maintenance of bridge structures that have signs of premature ageing such as damaged concrete, wood rot &amp;rust, in accordance with the council annual maintenance program. Note: Work is required to determine what community see as an acceptable level of service.</td>
<td>Note: current unit rate costs have been established by review of actual costs achieved in recent years. There has been a reduction in costs which has reduced the assets total value</td>
</tr>
</tbody>
</table>

4 IPWEA, 2011, IIMM, p 2.22
### Capital

<table>
<thead>
<tr>
<th>Upgrade/New</th>
<th>Current Budget: Ave $234,350 pa</th>
<th>Proposed Budget: (As required based on the Upgrade program in the bridge asset register and LTFP – Ave 202,500pa)</th>
<th>Surplus: $31,850</th>
<th>(See Notes 1 &amp; 7 below)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop a safe network of well-connected walking and cycling routes.</td>
<td>New Bridges built to satisfy community demand. Note: This excludes inherited bridge assets. The average unit rate cost.</td>
<td>Based on recommendations from Condition Audits and strategic changes due to functionality.</td>
<td>All walking and cycling desire routes are linked with sealed platform meeting current Australian Standards and compliant with relevant legislative requirements.</td>
<td></td>
</tr>
<tr>
<td>Renewal</td>
<td>Current Budget: $51,000</td>
<td>Proposed Budget: (As required based on renewal year and LTFP - Ave $53,000 pa)</td>
<td>Shortfall: 2,000</td>
<td>See Notes 1, 4, 5 &amp; 6 below</td>
</tr>
<tr>
<td>Maintain a safe network of connected walking and cycling routes.</td>
<td>Bridges replaced as required through bridge renewal capital projects. The average unit rate cost.</td>
<td>Poor Condition bridges or not fit for purpose, are replaced using formal audit data to assist with priority selection on an annual basis.</td>
<td>Step 1: Identify bridges in poor condition through condition audits.</td>
<td></td>
</tr>
</tbody>
</table>

### Notes: Explanation of Financials in Levels of Service Table 3.5 above

1. Current forecast are in **BOLD** and are averages based on required spending over 10 year planning period.
2. Currently there is a $2,000 budget allocated to property maintenance for reactive maintenance (customer requests). It is proposed the budget is increased to $5,000 per year for requests for adhoc repairs (e.g. repairing of planks, tightening screws etc).
3. Council’s current planned maintenance budget is $20,000. As part of the updated planned maintenance schedule we have investigated the expenditure and effort required to manage these assets and found that we have previously underestimated effort involved. The planned maintenance program (Appendix B) has been developed to ensure bridges achieve optimal useful life. To achieve this, the average cost over the next 10 year planning period, an average of $110,000 per year for all assets is required.
4. On review of Council’s current maintenance practices it has been determined that $51,000pa is budgeted for major maintenance works of high cost (e.g. repainting large steel bridges, large concrete patch repairs, bearing replacement, handrail replacement etc). This is funded through the LTFP Renewal budget but the repairs are not considered renewal works – this has been in practice due to a shortfall in funds for larger maintenance.
5. As part of the AMP it is proposed the LTFP is altered and the current renewal budget line is altered and added to the current recurrent maintenance budget line. The altered maintenance budget has been based on an asset stock of 40 Bridges that require $1,275pa to maintain each bridge and does not reflect actual renewal costs or dates of bridges in the asset register. To cater for a 40% increase in asset stock it is proposed the $51,000pa budget is increased to $110,000 (Avg). This means the maintenance budget line for bridges will be increased from $20,000 to $110,000 (Avg).
6. The budget line for renewals will be altered to reflect ONLY actual renewal dates and costs for bridges reaching the end of their useful life or in poor condition identified through ongoing condition audit data and represented in the bridge asset register.
7. The budget line for new/upgrades will be altered to reflect ONLY bridges that will be upgraded to provide a new function or demand to the community (e.g. bridge widened from 1m to 3m).
8. In order to continually optimise and refine the updated planned maintenance program and upgrade/renewal program we propose to continue to undertake condition audits of part of network (on a 7 year basis) for $75,000 (next due 2017/18) along with a more stringent Structural Audit and planning of maintenance repair program of those structures identified as requiring further works in the following year for $10,000 (commencing 2018/2019). *NOTE: A specific maintenance repair program was undertaken for the West Lakes Footbridges in 2014/2015 with high success of planning over future years maintenance required to optimise the life of the bridges. This is provided in Appendix E.*

### 3.6 Environmental Principles

The general principles applying to this Asset Management Plan that assist to deliver the objectives of ‘Living Green to 2020’ are:

- Sourcing local materials
- Using material sourced from recycled products
- Selecting stable material with long EULs
- Selecting material with lower carbon emission in production
- Selecting material with high imbedded carbon content
- Choosing to use energy efficient equipment
- Choosing to use energy efficient construction techniques
- Designing infrastructure to minimise the need to remove material
4. **FUTURE DEMAND**

4.1 **Demand Drivers**

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

4.2 **Demand Forecast**

The present position and projections for demand drivers that may impact future service delivery and utilisation 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 utilisation of assets are shown in Table 4.3.

<table>
<thead>
<tr>
<th>Table 4.3: Demand Drivers, Projections and Impact on Services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demand drivers</strong></td>
</tr>
<tr>
<td>Population change</td>
</tr>
<tr>
<td>2011</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Demographic change</th>
<th>Age/Year</th>
<th>2011</th>
<th>Age/Year</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>Marginaly increased demand for wider bridges with improved compliance with Disability Discrimination Act design and construction requirements.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>6%</td>
<td>0-4</td>
<td>6%</td>
<td>5%</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>5-14</td>
<td>10%</td>
<td>5-14</td>
<td>11%</td>
<td>11%</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>13%</td>
<td>15-24</td>
<td>12%</td>
<td>12%</td>
<td>12%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25-44</td>
<td>28%</td>
<td>25-44</td>
<td>27%</td>
<td>26%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-64</td>
<td>26%</td>
<td>45-64</td>
<td>25%</td>
<td>26%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>65-74</td>
<td>9%</td>
<td>65-74</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75+</td>
<td>10%</td>
<td>75+</td>
<td>9%</td>
<td>10%</td>
<td>11%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Community expectation change</th>
<th>Community accepts bridges without demand for cleaning and maintaining surfaces.</th>
<th>Anticipate increased demand for clean and serviceable bridges reflecting the value and condition of properties. Increased high amenity developments e.g. St Clair, West.</th>
<th>Requirement to establish a bridge cleaning and maintenance program.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Legislative change</th>
<th>Bridges provided, constructed according to current legislation.</th>
<th>Bridges provided, constructed (and possibly) maintained according to future legislative requirements.</th>
<th>Unknown, likely to be greater regulation.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>More litigious society</th>
<th>Claims against Council for personal injury on bridges are low.</th>
<th>Claims against Council for personal injury and incidence that occur on bridges could increase.</th>
<th>Increased cost in defending Council actions and payments to claimants.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Land use densification</th>
<th>Much of the Council area has low, or low/medium density land uses being residential and industry.</th>
<th>Delivery of the North West Growth Corridor in accordance with the ’30-Year Plan for Greater Adelaide’ will replace industrial areas mixed-uses including medium/high density residential.</th>
<th>Greater activity on all bridges in the growth corridor.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Urban consolidation</th>
<th>Much of the Council area has low, or low/medium density residential land uses with older housing stock not suited to current expectations.</th>
<th>Increasing demolition of houses and subdivision into 2-3 allotments, most applicable outside the growth corridor. Increase in large developments e.g. St Clair, West, Woodville West</th>
<th>Installation of utility services under bridges causing loss of integrity of bridge structure or permanent damage.</th>
</tr>
</thead>
</table>

CITY OF CHARLESSTURT – BRIDGES ASSET MANAGEMENT PLAN FEBRUARY 2017
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Related Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunication advances</td>
<td>Properties serviced primarily by the Telstra network with some other minor companies.</td>
<td>Installation of National Broadband Network. Installation using bridge infrastructure causing loss of integrity of bridge structure, damage, poor fixing, or not reinstated.</td>
</tr>
<tr>
<td>Transport changes</td>
<td>Very high use of motor vehicles for most trips.</td>
<td>High cost motor vehicle trips substituted with active alternatives, especially for local trips and the journey. Increased demand for an extension to the bridge network, change to bridge function and capacity.</td>
</tr>
<tr>
<td>Lifestyle changes</td>
<td>Community just becoming aware of health benefits of physical activity such as walking and cycling starting to undertake more of these activities.</td>
<td>Increasing recreational walking and cycling and public life activities on bridge network. Change in bridge function and capacity, and Increased demand for responsive maintenance, repairs and establishing resurfacing regime.</td>
</tr>
<tr>
<td>Council financial sustainability</td>
<td>Council Long Term Financial Plan has been able to meet the required budgets to deliver most components to manage the bridge assets.</td>
<td>Limited revenue growth in Council rates and reduced size of grants from other tiers of government not matching required asset expenditures. Decreased ability to fund timely renewal and upgrade of poor/very poor condition asset, and Increased need for maintenance and repairs.</td>
</tr>
<tr>
<td>Council operational &amp; services priority changes</td>
<td>Local government is inheriting services from State and Federal governments, and taking up new operations and services in response to community demand.</td>
<td>This trend is likely to accelerate, but there is limited revenue growth to fund them placing pressure on all operations and services including asset provision and maintenance. Decreased ability to fund timely renewal and upgrade of poor/very poor condition asset, and Increased need for maintenance and repairs.</td>
</tr>
<tr>
<td>Ageing workforce</td>
<td>CCS employs approximately 168 field staff with a median age of 47 years.</td>
<td>Many of these staff and their skills will be lost. Increased shortage of skilled people to replace them. Inefficient operations and services decreasing responsiveness, and Increasing risk of poor workmanship requiring return visits.</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Bridges are constructed to withstand existing environmental conditions.</td>
<td>More frequent extreme weather events and increased exposure to radiation effects. More rapid deterioration of bridges, increasing frequency of inspections and maintenance and repairs.</td>
</tr>
</tbody>
</table>
### 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 the organisation to own the assets 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 aquatic centres and libraries that may be in another community area or public toilets provided in commercial premises.

Opportunities identified to date for demand management are shown in Table 4.4. Further opportunities will be developed in future revisions of this asset management plan.

**Table 4.4: Demand Management Plan Summary**

<table>
<thead>
<tr>
<th>Demand Driver</th>
<th>Impact on Services</th>
<th>Demand Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population change</td>
<td>Increased demand for an extension to the bridge network, change to bridge function and capacity.</td>
<td>Review current development and transport documents for impacts on walking and cycling strategies in the CCS transport Plan.</td>
</tr>
<tr>
<td>Demographic change</td>
<td>Increased width of bridges and better compliance with Disability Discrimination Act design and construction requirements.</td>
<td>Increase basic widths of bridges to suit two people with walking aids, or other mobility devices, so they can move along a bridge together.</td>
</tr>
<tr>
<td>Subdivision</td>
<td>CCS is creating a number of higher density locations by subdivision AAMI Stadium “West,” St. Clair, Bowden and Woodville West developments are underway. Woodville Road and precinct development is proposed but not yet commenced.</td>
<td>Increased assets will be created impacting maintenance and renewal.</td>
</tr>
<tr>
<td>Community expectation change</td>
<td>Roll out a planned maintenance program</td>
<td>Find ways of continually improving the maintenance and Upgrade/renewal programs</td>
</tr>
<tr>
<td>Legislative change</td>
<td>Unknown, likely to be greater regulation.</td>
<td>Be aware of any proposed changes to legislation, or introduction of new legislation that may impact on bridges, and advocate for reasonableness of intent and impact. Maintain membership of peak industry bodies such as IPWEA (Institute of Public Works Engineering Australasia)</td>
</tr>
<tr>
<td>More litigious society</td>
<td>Increased cost in defending Council actions and payments to claimants.</td>
<td>Improve work recording and retrieval systems. Leverage the electronic Works and Assets System of Council. Improve the responsiveness and timelines of maintenance and repair activities.</td>
</tr>
</tbody>
</table>

---

5 IPWEA, 2011, IIIM, Table 3.4.1, p 3|58.
<table>
<thead>
<tr>
<th>Demand Driver</th>
<th>Impact on Services</th>
<th>Demand Management Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land use densification</td>
<td>Greater activity on all bridges in the growth corridor.</td>
<td>Review development transport strategies for clear understanding of walking and cycling needs associated with the level of density and how they integrate with the surrounding areas.</td>
</tr>
<tr>
<td>Urban consolidation</td>
<td>Installation of utility services under bridges causing loss of integrity of bridge structure, damage, poor fixing, or not reinstated.</td>
<td>Council endorsements of the &quot;North west Growth Corridor Transport Study&quot; and further development of the recommendations therein. For areas outside the Growth Corridors, monitor the level of urban consolidation for triggers to upgrade existing bridges, or construct new bridges.</td>
</tr>
<tr>
<td>Telecommunication advances</td>
<td>Installation of utility services under bridges causing loss of integrity of bridge structure, damage, poor fixing, or not reinstated.</td>
<td>Monitor activities and follow up any poor workmanship, including re-inspection within 12 months. Seek Memorandum of Understanding dealing with operational and communication procedures and works specifications with the service providers.</td>
</tr>
<tr>
<td>Transport changes</td>
<td>Increased demand for an extension to the bridge network, change to bridge function and capacity.</td>
<td>Raise the priority of bridge renewal, or upgrade on the walking &amp; cycling routes used by commuters in accordance with the CCS Transport Plan. Where there are walking routes between public transport stops, install new bridges linking the stops.</td>
</tr>
<tr>
<td>Lifestyle changes</td>
<td>Change in bridge function and capacity, and Increased demand for responsive maintenance and repairs.</td>
<td>Raise the priority of bridge renewal, or upgrade on the walking &amp; cycling routes used by commuters in accordance with the CCS Transport Plan. Investigate what needs to be done and how these additional services can be resourced.</td>
</tr>
<tr>
<td>Council financial sustainability</td>
<td>Decreased ability to fund timely renewal and upgrade of poor/very poor condition asset, and Increased need for maintenance and repairs.</td>
<td>Advocate the importance of the bridge network to community wellbeing, personal health and prosperity.</td>
</tr>
<tr>
<td>Council operational &amp; services priority changes</td>
<td>Decreased ability to fund timely renewal and upgrade of poor/very poor condition asset, and Increased need for maintenance and repairs.</td>
<td>Advocate the importance of the network to community wellbeing, personal health and prosperity.</td>
</tr>
<tr>
<td>Ageing workforce</td>
<td>Inefficient operations and services decreasing responsiveness, and Increasing risk of poor workmanship requiring return visits.</td>
<td>Ensure that Field Services are known for their ‘Constructive’ behavioural culture so we are a workplace of choice. Identify ways to improve employee training.</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>More rapid deterioration of bridges, increasing frequency of inspections and maintenance and repairs.</td>
<td>Establish an ‘Environmental Framework’ for material selection and work practices.</td>
</tr>
</tbody>
</table>
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 by the organisation. New assets constructed/acquired by the organisation are discussed in Section 5.5. The cumulative value of new contributed and constructed asset values are summarised in Figure 1.

_Figure 1: Upgrade and New Assets to meet Demand_

It is important to note that this is a cumulative growth chart. I.e. bridges will be upgraded in 2017, 2018, 2019; this will add that figure to the total value of the asset.

In this revision of the AMP council has acquired an increase in 40% of bridge asset stock; this is particularly due to the inclusion of a new asset class (boardwalks etc.) and the donation of assets (St Clair, WPTW etc.). This is much higher than projected in the last AMP and is projected to continue to rise in future years.

In February 2015 it was expected that a 12% increase in asset stock would occur between 2016 and 2019. This was not taking into account that a new asset class would be incorporated in the asset register.

The increase in assets require the organisation to commit increased funding to ongoing operations, maintenance and renewal costs for the period that the service provided from the assets is required. In particular boardwalk type assets require a commitment of cyclic maintenance to ensure they achieve their estimated useful life.

As can be seen in figure 1 after 2021 all new assets handed over to council are projected to be contributed assets.

These future ongoing 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 organisation 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
The assets covered by this asset management plan are shown in Table 2.1. They consist of assets specific to area needs, e.g.:

Ornamental (Overpass) as shown in the photo below. Ornamental bridges are typically located within reserves.

Pedestrian overpass only as shown in the photo below. Pedestrian overpasses provide functions for only walking, cycling is not permitted over these bridges (bikes need to be walked over the bridge).
Shared use overpass/underpass as shown in the photo below. Shared use overpasses/underpasses provide a function for cyclists and pedestrians.

Vehicular Overpass as shown in the photo below. Vehciular bridges provide function for vehicles only to join roads together.
Boardwalks as shown in the photo below. Boardwalks are similar to pedestrian overpasses but are generally only made of timber and provide a walking function for smaller spans.

Or Viewing Decks as shown in the photo below. Viewing decks provide a platform that spans out over embankments or sand dunes for people to view surrounding scenery.

The age profile of the assets include in this AMP is shown in Figure 2.

*Figure 2: Asset Age Profile*
Plans showing the location of bridge assets are available through council’s Geographic Information system.

5.1.2 Asset capacity and performance

The organisation’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>Service Deficiency</th>
<th>Achieved since 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricted access for people using a mobility aid needing a constructed footpath and wide enough bridge.</td>
<td>Most new and renewal construction has occurred in line with Disability Discrimination Act requirements</td>
</tr>
<tr>
<td>Approach abutments are not to standard</td>
<td>Risk assessment undertaken and identified for improvement (new hand rails, fencing etc)</td>
</tr>
<tr>
<td>Slope non-compliant</td>
<td>Future renewals and new bridge construction to occur in line with Disability Discrimination Act requirements where feasible.</td>
</tr>
<tr>
<td>Level 2 recreational trail – non DDA compliant</td>
<td>In conjunction with open space, include bridges in parks and connections through master plans and in line with Disability Discrimination Act requirements.</td>
</tr>
<tr>
<td>Bridges constructed with widths that no longer meet demand.</td>
<td>All new and renewed bridges are constructed a minimum of 1500mm (for shared use bridges width increased to 3000mm) and areas abutting the bridge widened where space is available.</td>
</tr>
<tr>
<td>Bridges constructed with widths and design that do not support current types of use (inappropriate function).</td>
<td>Bridge renewal priority to be established in future Asset Management Plan</td>
</tr>
<tr>
<td>Potential Hazards identified, but unable to be rectified under resource allocation</td>
<td>Hazards identified in 2010 audit, and additional funds for maintenance improvements proposed in 2015/16 budget.</td>
</tr>
<tr>
<td>Lack of connectivity across major roads, Rail Lines or the River Torrens for pedestrians and cyclists.</td>
<td>Identified within TPP’s and Northwest Corridor Transport Strategy. The State Government is also addressing this through initiative such as the “Greenway” projects.</td>
</tr>
</tbody>
</table>

The above service deficiencies were identified from 2010 Bridge Assets audit and review, plus Council’s Customer Request Management (CRM) system.
5.1.3 Asset condition

Condition is monitored on a 7-year basis, supplemented by further inspections by recognised professionals on structures where potential faults have been noted, and inspection by staff in the field as appropriate. All new assets handed over to CCS have been inspected and a visual audit undertaken on them. It is proposed that the conditions of the new bridges added to the register as part of this AMP will be further refined in the 2017/2018 audit. It is expected that there will be little change to condition profile in the 2017/2018 audit as data is of high confidence.

It is important to note that the condition profile of bridge assets has begun to reduce to a large amount of condition 2-3 assets. This is due to the introduction of some minor planned maintenance practices in 2015/2016. The condition profile of our assets is shown in Figure 3.

*Fig 3: Asset Condition Profile*

![Asset Condition Profile](image)

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

*Table 5.1.3: Simple Condition Grading Model*

<table>
<thead>
<tr>
<th>Condition Grading</th>
<th>Description of Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Very Good: only planned maintenance required</td>
</tr>
<tr>
<td>2</td>
<td>Good: minor maintenance required plus planned maintenance</td>
</tr>
<tr>
<td>3</td>
<td>Fair: significant maintenance required</td>
</tr>
<tr>
<td>4</td>
<td>Poor: significant renewal/rehabilitation required</td>
</tr>
<tr>
<td>5</td>
<td>Very Poor: physically unsound and/or beyond rehabilitation</td>
</tr>
</tbody>
</table>

5.1.4 Asset valuations

The value of assets recorded in the asset register as at June 2014 covered by this asset management plan is shown below. Assets were last revalued in June 2014. Assets are valued at actual replacement cost where known or estimated renewal cost based on fair value by independent estimate.

Current Replacement Cost $24,261,000
Depreciable Amount $23,043,000

---

6 IPWEA, 2011, IIMM, Sec 2.5.4, p 2/79.
Depreciated Replacement Cost \(^7\) $17,177,000

Annual Depreciation Expense $325,000

Useful lives were reviewed in 2010 by independent auditor.

Key assumptions made in preparing the valuations were:

- Valuation figures are based on 2014 independent valuation.
- Straight line depreciation has been used.

Various ratios of asset consumption and expenditure have been prepared to help guide and gauge asset management performance and trends over time.

<table>
<thead>
<tr>
<th>Ratio Description</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rate of Annual Asset Consumption(^) (\text{Depreciation/Depreciable Amount})</td>
<td>1.4%</td>
</tr>
<tr>
<td>Rate of Annual Asset Renewal(^) (\text{Capital renewal exp./Depreciable amount})</td>
<td>1.1%</td>
</tr>
<tr>
<td>Rate of Annual Asset Upgrade/New(^) (\text{Capital upgrade exp./Depreciable amount})</td>
<td>0.1%</td>
</tr>
<tr>
<td>Rate of Annual Asset Upgrade/New(^) (\text{including contributed assets})</td>
<td>0.3%</td>
</tr>
</tbody>
</table>

In 2015 the organisation plans to renew assets at 76.9% of the rate they are being consumed and will be increasing its asset stock by 0.3% in the year.

### 5.1.5 Historical Data

Historical data regarding bridge conditions, useful lives and renewal forecasts can be found in the City of Charles Sturt’s previous Asset Bridge Register TRIM document 12/106136. This document has now been updated (TRIM document 16/221026) to form the Bridge Asset Register, Planned Yearly Maintenance Program, Upgrade Program and Renewal Program. This is provided in Appendix B and will be endorsed with this AMP. The document will be rolled out and updated as new data and comes to fruition.

### 5.2 Infrastructure Risk Management Plan

An assessment of risks\(^8\) 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’ to the organisation. 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, together with the estimated residual risk after the selected treatment plan is operational are summarised in Table 5.2. These risks are reported to management and Council.

---

\(^7\) Also reported as Written Down Current Replacement Cost (WDCRC).

\(^8\) The City of Charles Sturt uses a framework that has been approved and is in accordance with International Standard ISO31000:2009
### Table 5.2: Critical Risks and Treatment Plans

<table>
<thead>
<tr>
<th>Service or Asset at Risk</th>
<th>What can Happen</th>
<th>Risk Rating (VH, H)</th>
<th>Risk Treatment Plan</th>
<th>Residual Risk *</th>
<th>Treatment Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridges</td>
<td>Damage to bridge infrastructure resulting in displaced or failed sections that can result in personal injury.</td>
<td>H</td>
<td>Reconstruct affected sections or monitor regularly for structural integrity.</td>
<td>L</td>
<td>Average $110,000pa over the next 10 years</td>
</tr>
<tr>
<td>Bridge renewal</td>
<td>Reduced amenity or exclusion of “at risk” residents accessing community or vital services.</td>
<td>H</td>
<td>Damaged or old bridges renewed in a timely manner so as to meet the local demand and relevant Community Plan.</td>
<td>L</td>
<td>Average $53,000 over the next 10 years</td>
</tr>
<tr>
<td>New Bridges</td>
<td>Exclusion of people with reduced mobility from cheap access to community or vital services.</td>
<td>H</td>
<td>Ensure new bridges are constructed in a timely manner.</td>
<td>L</td>
<td>$1,000,000 forecast for 2021/22</td>
</tr>
</tbody>
</table>

Note * The residual risk is the risk remaining after the selected risk treatment plan is operational.

### 5.3 Routine Operations and Maintenance Plan

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

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 Operations and Maintenance Plan

Operations activities affect service levels including quality and function through street sweeping and grass mowing frequency, intensity and spacing of street lights and cleaning frequency and opening hours of building and other facilities.

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 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.

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.

Actual past maintenance expenditure is shown in Table 5.3.1.
### Table 5.3.1: Maintenance Expenditure Trends

<table>
<thead>
<tr>
<th>Year</th>
<th>Planned and Specific</th>
<th>Unplanned</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011/2012</td>
<td>$40,731</td>
<td>Not specifically recorded</td>
</tr>
<tr>
<td>2012/2013</td>
<td>$40,564</td>
<td>Not specifically recorded</td>
</tr>
<tr>
<td>2013/2014</td>
<td>$62,620</td>
<td>$3,963</td>
</tr>
<tr>
<td>2014/2015</td>
<td>$45,736.33</td>
<td>$6,061</td>
</tr>
<tr>
<td>2015/2016</td>
<td>$112,264</td>
<td>$4,218</td>
</tr>
<tr>
<td>2016/2017 (projected figure)</td>
<td>$90,000</td>
<td>$5,000</td>
</tr>
</tbody>
</table>

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 this AMP and service risks considered in the Infrastructure Risk Management Plan.

Planned maintenance work is currently 98% of total maintenance expenditure. It is important to note that most Bridge Maintenance needs to be planned and specific. Maintenance on bridges needs to be planned for repairing of specific bridge components to ensure that the bridge asset reaches its full expected useful life.

Reactive maintenance is carried out in accordance with response levels of service detailed in Appendix A.

### 5.3.2 Operations and Maintenance Strategies

The organisation 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 utilisation to identify underutilised assets and appropriate remedies, and over utilised 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 Council is obtaining best value for resources used.

### Asset hierarchy

An asset 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.

The organisation’s service hierarchy is shown in Table 5.3.2.
### Table 5.3.2: Asset Service Hierarchy

<table>
<thead>
<tr>
<th>Service Hierarchy</th>
<th>Service Level Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

NOTE: All assets in this group are serviced based on safety and risk, no hierarchy for service currently applies. Refer to service levels in table 3.4. In future years it is intended to apply a hierarchy to reflect areas of more intensive use, such as around shopping precincts, schools, hospitals and retirement homes.

### 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, organisations can target and refine investigative activities, maintenance plans and capital expenditure plans at the appropriate time.

Operations and maintenance 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 are detailed in Table 5.3.2.1.

### Table 5.3.2.1: Critical Assets and Service Level Objectives

<table>
<thead>
<tr>
<th>Critical Assets</th>
<th>Critical Failure Mode</th>
<th>Operations &amp; Maintenance Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ornamental – Overpass</td>
<td>Failure resulting in loss of amenity. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
<tr>
<td>Boardwalk/viewing deck</td>
<td>Loss of amenity. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
<tr>
<td>Pedestrian – Overpass</td>
<td>Loss of amenity. Failure resulting in inability for users to conduct daily business. Risk of Isolation. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
<tr>
<td>Shared Use – Overpass</td>
<td>Loss of amenity. Failure resulting in inability for users to conduct daily business. Risk of Isolation. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
<tr>
<td>Shared Use – Underpass</td>
<td>Loss of amenity. Failure resulting in inability for users to conduct daily business. Risk of Isolation. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
<tr>
<td>Vehicular – Overpass</td>
<td>Loss of amenity. Failure resulting in inability for users to conduct daily business. Risk of Isolation. Injury risk to users.</td>
<td>Formal Audit undertaken every 7 years – From Audit results specific maintenance planned and budgeted. Renewals scheduled at appropriate times</td>
</tr>
</tbody>
</table>

### Standards and Specifications

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

- Austroads ‘Guide to Road Design’ Parts 6, 6A, 6B and ‘Cycling Aspects of Austroads Guides’
- Disability Discrimination Act 1992, including the Public Transport Regulations
- Councils Internal Standards including NATSPEC specification.
- Australian Standards AS5100 Bridge Standards.
5.3.3 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 2016 dollar values (i.e. real values).

Figure 4: Projected Operations and Maintenance Expenditure

Currently there is a budget shortfall for projected operations and maintenance to bridge assets. 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 but in recent years the renewal budget has been funding maintenance due to the maintenance backlog. This is further discussed in Section 6.2.

5.4 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 or lesser required 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

Assets requiring renewal/replacement are identified from one of three methods provided in the ‘Expenditure Template’.

- Method 1 uses Asset Register data to project the renewal costs using acquisition year and useful life to determine the renewal year, or
- Method 2 uses capital renewal expenditure projections from external condition modelling systems (such as Pavement Management Systems), or
- Method 3 uses a combination of average network renewals plus defect repairs in the Renewal Plan and Defect Repair Plan worksheets on the ‘Expenditure template’.

Method 1 was used for this asset management plan. It is expected that renewals will be achieved and possibly pushed back with planned maintenance on all bridges.
The useful lives of assets used to develop projected asset renewal expenditures are shown in Table 5.4.1. Asset useful lives were last reviewed in 2014.9

Table 5.4.1: Useful Lives of Assets

<table>
<thead>
<tr>
<th>Asset (Sub)Category</th>
<th>Useful life</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal Boardwalks/Shared Use Path</td>
<td>25 Years</td>
</tr>
<tr>
<td>Pedestrian Bridge over Freshwater</td>
<td>30 Years</td>
</tr>
<tr>
<td>Bridge with DuraComp Frame with Timber Deck</td>
<td>33 Years</td>
</tr>
<tr>
<td>Shared Use Bridge over Freshwater</td>
<td>45 Years</td>
</tr>
<tr>
<td>Bridges associated with River Torrens Linear Park (containing wood support)</td>
<td>50 Years</td>
</tr>
<tr>
<td>All other structures (Steel and concrete)</td>
<td>100 Years</td>
</tr>
</tbody>
</table>

5.4.2 Renewal and Replacement Strategies

The organisation will plan capital renewal and replacement projects to meet level of service objectives and minimise 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 evaluation criteria adopted by the organisation, 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 infrastructure risk register for assets and service risks associated with providing services from infrastructure assets and reporting Very High, High 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 Council is obtaining best value for resources used.

Renewal ranking criteria

Asset renewal and replacement is typically undertaken to either:

- Ensure the reliability of the existing infrastructure to deliver the service it was constructed to facilitate (e.g. replacing a bridge that has a 5 t load limit), or
- To ensure the infrastructure is of sufficient quality to meet the service requirements (e.g. roughness of a road).10

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 a high utilisation and subsequent impact on users would be greatest.
- The total value represents the greatest net value to the organisation.

---

9 Based on Bridge Asset Register TRIM Ref 12/106136
10 IPWEA, 2011, IIMM, Sec 3.4.4, p 3|60.
• Have the highest average age relative to their expected lives.
• Are identified in the AMP as key cost factors.
• Have high operational or maintenance costs and
• Where replacement with modern equivalent assets would yield material savings.  

The ranking criteria used to determine priority of identified renewal and replacement proposals is detailed in Table 5.4.2.

Table 5.4.2: Renewal and Replacement Priority Ranking Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>When bridge reaches end of useful life</td>
<td>4</td>
</tr>
<tr>
<td>When Road Redesign will adversely affect existing bridge</td>
<td>4</td>
</tr>
<tr>
<td>Addressing special needs of people with a disability; the aged; or others using mobility aids</td>
<td>4</td>
</tr>
<tr>
<td>Where there are coexisting concentrations of pedestrian and motor vehicle traffic and potential for conflict</td>
<td>4</td>
</tr>
<tr>
<td>In land use areas/precincts generating high demand (examples being near shops, schools and community facilities)</td>
<td>3</td>
</tr>
<tr>
<td>Located in areas where crowds use bridges from time to time (walking distance of large sporting and entertainment venues – examples being, Hindmarsh Soccer stadium, Adelaide Entertainment Centre)</td>
<td>3</td>
</tr>
<tr>
<td>Forming part of a regional asset used by many visitors (in State or Council strategy or Development Plan – examples being the River Torrens Linear Park, Coast Park)</td>
<td>3</td>
</tr>
<tr>
<td>Providing access to public transport</td>
<td>3</td>
</tr>
<tr>
<td>Along arterial road, local distributors and collector streets</td>
<td>2</td>
</tr>
<tr>
<td>In, or next to precinct redevelopment areas</td>
<td>2</td>
</tr>
<tr>
<td>Bridges in local access streets and reserves</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: 4 is the highest ranking with the greatest weight. These weightings are consistent with those used in other Transport related Asset Management Plans.

Renewal and replacement standards
Renewal work is carried out in accordance with the following Standards and Specifications.
• AS5100.1-7. as relevant.
• AS1428.1.
• Austroads ‘Guide to Road Design’ Parts 6, 6A, 6B and ‘Cycling Aspects of Austroads Guides’
• Disability Discrimination Act 1992, including the Public Transport Regulations.
• Councils Internal Standards including NATSPEC specification.
• Other Standards as relevant to Bridge structures.

5.4.3 Summary of future renewal and replacement expenditure
Projected future renewal and replacement expenditures are forecast to increase over time as the asset stock increases from growth. The expenditure is summarised in Fig 5. Note that all amounts are shown in real values.

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

---

11 Based on IPWEA, 2011, IIMM, Sec 3.4.5, p 3|66.
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. Currently the renewal of Port Road Underpass and South Road Underpass are planned but remain unfunded (2021 and 2022).

It is proposed that the condition and useful life of the Port Road Underpass is reviewed after maintenance is conducted to the bridge in March/April 2017 and the next bridge condition audit is complete (due in June 2017). It is proposed that the renewal of the South Road Underpass is reviewed after the T2T project is complete. Both bridges have also been included in a submission for unfunded infrastructure to the DPTI RTLP audit team.

Renewals and replacement expenditure in the organisation’s capital works program will be accommodated in the long term financial plan in the renewal budget line. This is further discussed in Section 6.2.

**NOTE:** a second generation of renewal is shown in figure 5 (green line) due to the life achieved on the Point Malcom boardwalk. The boardwalk requires renewal so the system has automated it requiring renewal again in 12 years. Once renewed and maintained the useful life of the asset will be 25 years or greater and hence can be ignored for the purpose of this plan

### 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 organisation from land development. These assets from growth are considered in Section 4.4.

#### 5.5.1 Selection criteria

New assets and upgrade/expansion of existing assets are identified from various sources such as Councillor/Director or community requests, proposals identified by strategic plans or partnerships with other organisations. Candidate proposals are inspected to verify need and to develop a preliminary renewal estimate and whole of life cost. Verified proposals are ranked by priority and available funds and scheduled in future works programmes. The priority ranking criteria is detailed below.
Table 5.5.1: New Assets Priority Ranking Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identified as bridge required as part of strategic route</td>
<td>4</td>
</tr>
<tr>
<td>When Road Reconstruction provides an opportunity to construct upgraded,</td>
<td>4</td>
</tr>
<tr>
<td>or new bridges.</td>
<td></td>
</tr>
<tr>
<td>Addressing special needs of people with a disability; the aged; or others</td>
<td>4</td>
</tr>
<tr>
<td>using mobility aids</td>
<td></td>
</tr>
<tr>
<td>Being a ‘missing link’ between existing suburbs and open space areas</td>
<td>4</td>
</tr>
<tr>
<td>Where there are coexisting concentrations of pedestrian and motor vehicle</td>
<td>4</td>
</tr>
<tr>
<td>traffic and potential for conflict</td>
<td></td>
</tr>
<tr>
<td>Providing access to public transport as required in the Disability</td>
<td>3</td>
</tr>
<tr>
<td>Discrimination Act Public Transport Regulations.</td>
<td></td>
</tr>
<tr>
<td>In land use areas/precincts generating high demand (examples being near</td>
<td>3</td>
</tr>
<tr>
<td>shops, schools and community facilities)</td>
<td></td>
</tr>
<tr>
<td>Located in areas where crowds use bridges from time to time (walking</td>
<td>3</td>
</tr>
<tr>
<td>distance of large sporting and entertainment venues – examples being</td>
<td></td>
</tr>
<tr>
<td>Hindmarsh Soccer stadium, Adelaide Entertainment Centre)</td>
<td></td>
</tr>
<tr>
<td>Forming part of a regional asset used by many visitors (in State or</td>
<td>3</td>
</tr>
<tr>
<td>Council strategy or Development Plan – examples being the River Torrens</td>
<td></td>
</tr>
<tr>
<td>Park, Coast Park)</td>
<td></td>
</tr>
<tr>
<td>Along arterial road, local distributors and collector streets</td>
<td>2</td>
</tr>
<tr>
<td>In, or next to precinct redevelopment areas</td>
<td>2</td>
</tr>
</tbody>
</table>

Note: 4 is the highest ranking with the greatest weight. These weightings are consistent with those used in other Transport related Asset Management Plans.

5.5.2 Capital Investment Strategies

The organisation will plan capital upgrade and new projects 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.

Standards and specifications for new assets and for upgrade/expansion of existing assets are the same as those for renewal shown in Section 5.4.2.
5.5.3 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

Expenditure on new assets and services in the organisation’s capital works program will be accommodated in the long term financial plan in the new and upgrade budget lines. This is further discussed in Section 6.2.

5.6 Disposal Plan

Disposal includes any activity associated with disposal of a decommissioned asset including sale, demolition or relocation. Assets identified for possible decommissioning and disposal are shown in Table 5.6, together with estimated annual savings from not having to fund operations and maintenance of the assets. 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 revenue gained from asset disposals is accommodated in Council’s long term financial plan.

Where cash flow projections from asset disposals are not available, these will be developed in future revisions of this asset management plan.

Table 5.6: Assets Identified for Disposal

<table>
<thead>
<tr>
<th>Asset</th>
<th>Reason for Disposal</th>
<th>Timing</th>
<th>Disposal Expenditure</th>
<th>Operations &amp; Maintenance Annual Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nash Street Bridge</td>
<td>End of Life-No longer meets service requirements. Requires replacement with new and upgraded bridge.</td>
<td>2021/2022</td>
<td>$50,000</td>
<td>Nil – New Bridge to be built in similar location</td>
</tr>
</tbody>
</table>
5.7 Service Consequences and Risks

The organisation has prioritised decisions made in adopting this AMP to obtain the optimum benefits from its available resources. Decisions were made based on the development of 3 scenarios of AMPs.

Scenario 1 - What we would like to do based on asset register data

Scenario 2 – 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 AMP.

Scenario 3 – What we can do and be financially sustainable with AMPs matching long-term financial plans.

The development of scenario 1 and scenario 2 AMPs provides the tools for discussion with the Council and community on trade-offs between what we would like to do (scenario 1) and what we should be doing with existing budgets (scenario 2) by balancing changes in services and service levels with affordability and acceptance of the service and risk consequences of the trade-off position (scenario 3).

5.7.1 What we cannot do

If the planned maintenance program is not undertaken and planned renewals are not completed within the next 10 years;

- We will not meet our maintenance objectives as highlighted in formal audit.
- Due dates for renewals pushed out.
- Insufficient resources for managing any projects.
- New Assets not built to meet demand.
- Contributed/discovered assets not included in current Asset Register.

5.7.2 Service consequences

Operations and maintenance activities and capital projects that cannot be undertaken will maintain or create service consequences for users. These include:

- Potential closures
- Restrictions on use
- Premature failure of structural components
- Isolation
- Potential injury risk
- Lack of amenity

5.7.3 Risk consequences

The operations and maintenance activities and capital projects that cannot be undertaken may maintain or create risk consequences for the organisation. These include:

- Increased customer complaints regarding lack of renewal of bridges.
- Damage to organisation brand.
- Reputation damage to Asset Manager.

These risks have been included with the Infrastructure Risk Management Plan summarised in Section 5.2 and risk his management plans actions and expenditures included within projected expenditures.
6. **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 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*

There is a large spike in 2021 and 2022 of renewals that are unfunded by the LTFP. These spikes are the Port Road and South Road underpasses.

Major maintenance work is proposed for the Port Road Underpass in March 2017; the condition and renewal date for the timber bridge will then be reviewed in the 2017/2018 condition audit. South Road Underpass remains unfunded due to uncertainty of the scope of the Torrens to Torrens upgrade of South Road and what impact it will have on the underpass. The condition will be continually reviewed during and at the end of the T2T project.

Both Port Road and South Road Underpasses have been included in a submission for unfunded infrastructure to the DPTI RTLP Asset Management Audit Team. Should external funding be successful in future years, Council’s contribution to both underpasses will be prioritised over the new bridge at Nash Street planned for 2021.

Note: Upgrade/New shown in 2017 and 2021 in Orange is for the upgrade of the Hindmarsh cemetery boardwalk bridge and a new bridge at Nash Street in Grange respectively.

6.1.1 **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.

*Asset Renewal Funding Ratio*
The Asset Renewal Funding Ratio is the most important indicator and reveals that over the next 10 years, Council is forecasting that it will have 16% of the funds required for the optimal renewal and replacement of its assets.

**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). The life cycle cost for the services covered in this asset management plan is $505,000 per year (average operations and maintenance expenditure plus depreciation expense projected over 10 years) very similar to $508,000 in the 2015 AMP.

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 expenditure over the 10 year planning period is $195,000 per year (average operations and maintenance plus capital renewal budgeted expenditure in LTFP over 10 years) a decrease from $298,000 per year in the 2015 AMP.

A shortfall between life cycle cost and life cycle expenditure is the life cycle gap. The life cycle gap for services covered by this asset management plan is -$309,000 per year (-ve = gap, +ve = surplus).

Life cycle expenditure is 39% of life cycle costs lower than 58% life cycle cost in the 2015 AMP.

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 organisations 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.

**Medium term – 10 year financial planning period**

This 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 $541,000 on average per year.

Estimated (budget) operations, maintenance and capital renewal funding is $195,000 on average per year giving a 10 year funding shortfall of -$345,000 per year. This indicates that Council expects to have 36% of the projected expenditures needed to provide the services documented in the asset management plan over the next 10 years.

**Medium Term – 5 year financial planning period**

The projected operations, maintenance and capital renewal expenditure required over the first 5 years of the planning period is $218,000 on average per year.

Estimated (budget) operations, maintenance and capital renewal funding is $195,000 (an increase from $101,000 in 2015 AMP) on average per year giving a 5 year funding shortfall of -$23,000. This indicates that Council expects to...
have 89% (increased from 15% in 2015 AMP) of projected expenditures required to provide the services shown in this asset management plan over the next 5 years.
Asset management financial indicators

Figure 7A shows the asset management financial indicators over the 10 year planning period and for the long term life cycle.

Figure 7A: Asset Management Financial Indicators

Providing services from infrastructure in a sustainable manner requires the matching and managing of service levels, risks, projected expenditures and financing to achieve a financial indicator of approximately 1.0 for the first years of the asset management plan and ideally over the 10 year life of the Long Term Financial Plan.

Figure 8 shows the projected asset renewal and replacement expenditure over the 20 years of the AMP. The projected asset renewal and replacement expenditure is compared to renewal and replacement expenditure in the capital works program, which is accommodated in the long term financial plan. The graph depicts high peaks due to bridge assets being of high value, with extended longevity.

Figure 8: Projected and LTTP Budgeted Renewal Expenditure
Table 6.1.1 shows the shortfall between projected renewal and replacement expenditures and expenditure accommodated in long term financial plan. Budget expenditures accommodated in the long term financial plan or extrapolated from current budgets are shown in Appendix D.

Table 6.1.1: Projected and LTFP Budgeted Renewals and Financing Shortfall

<table>
<thead>
<tr>
<th>Year</th>
<th>Projected Renewals ($000)</th>
<th>LTFP Renewal Budget ($000)</th>
<th>Renewal Financing Shortfall ($000)</th>
<th>Cumulative Shortfall ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>$0</td>
<td>$250</td>
<td>$250</td>
<td>$250</td>
</tr>
<tr>
<td>2017</td>
<td>$150</td>
<td>$0</td>
<td>$-150</td>
<td>$100</td>
</tr>
<tr>
<td>2018</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$100</td>
</tr>
<tr>
<td>2019</td>
<td>$0</td>
<td>$75</td>
<td>$75</td>
<td>$175</td>
</tr>
<tr>
<td>2020</td>
<td>$128</td>
<td>$0</td>
<td>$-128</td>
<td>$47</td>
</tr>
<tr>
<td>2021</td>
<td>$1,128</td>
<td>$0</td>
<td>$-1,128</td>
<td>$-1,080</td>
</tr>
<tr>
<td>2022</td>
<td>$2,041</td>
<td>$0</td>
<td>$-2,041</td>
<td>$-3,122</td>
</tr>
<tr>
<td>2023</td>
<td>$0</td>
<td>$25</td>
<td>$25</td>
<td>$-3,097</td>
</tr>
<tr>
<td>2024</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,097</td>
</tr>
<tr>
<td>2025</td>
<td>$165</td>
<td>$180</td>
<td>$15</td>
<td>$-3,081</td>
</tr>
<tr>
<td>2026</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,081</td>
</tr>
<tr>
<td>2027</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,081</td>
</tr>
<tr>
<td>2028</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,081</td>
</tr>
<tr>
<td>2029</td>
<td>$150</td>
<td>$0</td>
<td>$-150</td>
<td>$-3,231</td>
</tr>
<tr>
<td>2030</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,231</td>
</tr>
<tr>
<td>2031</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,231</td>
</tr>
<tr>
<td>2032</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,231</td>
</tr>
<tr>
<td>2033</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,231</td>
</tr>
<tr>
<td>2034</td>
<td>$200</td>
<td>$0</td>
<td>$-200</td>
<td>$-3,431</td>
</tr>
<tr>
<td>2035</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$-3,431</td>
</tr>
</tbody>
</table>

Note: A negative shortfall indicates a financing gap, a positive shortfall indicates a surplus for that year.

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.

In previous years there has been a gap between projected asset renewal/replacement expenditure and amounts accommodated in the Long Term Financial Plan. This indicated that further work was required on reviewing service levels, and smoothing expenditure, in the Asset Management Plan (including possibly revising the Long Term Financial Plan) to manage required service levels and funding to eliminate any funding gap.

The LTFP and asset management plan have been revised in a major revision to ensure the Asset Management Plan and LTFP now align together to reflect planned maintenance required to Bridge assets, Renewal/Upgrade dates are represented as bridges reach the end of their useful lives or are not fit for purpose and where new bridges.
6.1.2 Projected expenditures for long term financial plan

Table 6.1.2 shows the projected expenditures for the 10 year long term financial plan.

Expenditure projections are in 2014 real values.

<table>
<thead>
<tr>
<th>Year</th>
<th>Operations ($000)</th>
<th>Maintenance ($000)</th>
<th>Projected Capital Renewal ($000)</th>
<th>Capital Upgrade/ New ($000)</th>
<th>Disposals ($000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>$55</td>
<td>$89</td>
<td>$0</td>
<td>$25</td>
<td>$0</td>
</tr>
<tr>
<td>2017</td>
<td>$55</td>
<td>$109</td>
<td>$150</td>
<td>$500</td>
<td>$0</td>
</tr>
<tr>
<td>2018</td>
<td>$56</td>
<td>$112</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2019</td>
<td>$56</td>
<td>$112</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2020</td>
<td>$56</td>
<td>$112</td>
<td>$128</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2021</td>
<td>$56</td>
<td>$117</td>
<td>$1,128</td>
<td>$1,500</td>
<td>$0</td>
</tr>
<tr>
<td>2022</td>
<td>$57</td>
<td>$140</td>
<td>$2,041</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2023</td>
<td>$57</td>
<td>$140</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2024</td>
<td>$57</td>
<td>$141</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2025</td>
<td>$58</td>
<td>$161</td>
<td>$165</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2026</td>
<td>$58</td>
<td>$161</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2027</td>
<td>$58</td>
<td>$161</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2028</td>
<td>$58</td>
<td>$162</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2029</td>
<td>$58</td>
<td>$162</td>
<td>$150</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2030</td>
<td>$58</td>
<td>$162</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2031</td>
<td>$58</td>
<td>$162</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2032</td>
<td>$58</td>
<td>$163</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2033</td>
<td>$58</td>
<td>$203</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2034</td>
<td>$58</td>
<td>$203</td>
<td>$200</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>2035</td>
<td>$58</td>
<td>$203</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

6.2 Funding Strategy

After reviewing service levels, as appropriate to ensure ongoing financial sustainability projected expenditures identified in Section 6.1.2 will be accommodated in the Council’s 10 year long term financial plan.

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. Figure 9 shows the projected replacement cost asset values over the planning period in real values.
Depreciation expense values are forecast in line with asset values as shown in Figure 10.

**Figure 10: Projected Depreciation Expense**
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. Forecast of the assets’ depreciated replacement cost is shown in Figure 11. 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**

![Projected Depreciated Replacement Cost](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 and risks that these may change are shown in Table 6.4.

**Table 6.4: Key Assumptions made in AMP and Risks of Change**

<table>
<thead>
<tr>
<th>Key Assumptions</th>
<th>Risks of Change to Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forecasted on “today’s” dollars, LGPI is added in the financial budgeting cycle</td>
<td>If LGPI is not added, forecast will be inaccurate</td>
</tr>
<tr>
<td>Staffing needs are resourced adequately</td>
<td>Unable to resource planned asset management activities</td>
</tr>
<tr>
<td>No significant changes in Legislation</td>
<td>Changes may demand unplanned/unbudgeted asset management activities</td>
</tr>
<tr>
<td>Growth in contributed assets for new land divisions is estimated at 2.76% of the</td>
<td>Forecasted growth may demand unplanned/unbudgeted asset management activities</td>
</tr>
<tr>
<td>existing network over a 10 year period.</td>
<td></td>
</tr>
</tbody>
</table>

### 6.5 Forecast Reliability and Confidence

The expenditure and valuations projections in this AMP 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\(^{13}\) in accordance with Table 6.5.

---

\(^{13}\) IPWEA, 2011, IIMM, Table 2.4.6, p 259.
Table 6.5: Data Confidence Grading System

<table>
<thead>
<tr>
<th>Confidence Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Highly reliable</td>
<td>Data based on sound records, procedures, investigations and analysis, documented properly and recognised as the best method of assessment. Dataset is complete and estimated to be accurate ± 2%</td>
</tr>
<tr>
<td>B Reliable</td>
<td>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 ± 10%</td>
</tr>
<tr>
<td>C Uncertain</td>
<td>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 ± 25%</td>
</tr>
<tr>
<td>D Very Uncertain</td>
<td>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 ± 40%</td>
</tr>
<tr>
<td>E Unknown</td>
<td>None or very little data held.</td>
</tr>
</tbody>
</table>

The estimated confidence level for and reliability of data used in this AMP is shown in Table 6.5.1.

Table 6.5.1: Data Confidence Assessment for Data used in AMP

<table>
<thead>
<tr>
<th>Data</th>
<th>Confidence Assessment</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demand drivers</td>
<td>B Reliable</td>
<td>Existing demand drivers are reliably researched</td>
</tr>
<tr>
<td>Growth projections</td>
<td>C Uncertain</td>
<td>Based on State Government 30 year plan and known increases in the short medium term</td>
</tr>
<tr>
<td>Operations expenditure</td>
<td>B Reliable</td>
<td>Based on known expenditure and type of issue</td>
</tr>
<tr>
<td>Maintenance expenditures</td>
<td>B Reliable</td>
<td>Dependent on industry wide cost structure. Recently decreased, but long term average is still increasing. Quotes for works have been sought.</td>
</tr>
<tr>
<td>Projected Renewal exps.</td>
<td>B Reliable</td>
<td>Based on recently completed projects</td>
</tr>
<tr>
<td>- Asset values</td>
<td>B Reliable</td>
<td>Well researched and up-dated yearly</td>
</tr>
<tr>
<td>- Asset useful lives</td>
<td>B Reliable</td>
<td>Well researched</td>
</tr>
<tr>
<td>- Condition modelling</td>
<td>B Reliable</td>
<td>Based on recently undertaken independent audit</td>
</tr>
<tr>
<td>- Network renewals</td>
<td>B Reliable</td>
<td>Based on recently undertaken independent audit</td>
</tr>
<tr>
<td>- Defect repairs</td>
<td>B Reliable</td>
<td>Based on recently undertaken independent audit</td>
</tr>
<tr>
<td>Upgrade/New expenditures</td>
<td>B Reliable</td>
<td>Recently completed projects used as basis for costing new works. Bridges are standalone assets and have individual requirements.</td>
</tr>
<tr>
<td>Disposal expenditures</td>
<td>B Reliable</td>
<td>Well researched and up-dated yearly</td>
</tr>
</tbody>
</table>

Over all data sources the data confidence is assessed as high confidence level for data used in the preparation of this AMP.
7. PLAN IMPROVEMENT AND MONITORING

7.1 Status of Asset Management Practices

7.1.1 Accounting and financial systems
The organisation implemented the TechnologyOne Finance One ERP module during 2002 and 2003. The system has been capturing all operating and capital expenses since that time. In the absence of a job costing application, the chart of accounts was developed to track all of the required information of a project as identified at the time by the project managers.

The capital works chart structure identifies the project, subproject, object and activity codes, and contains within the project and subproject numbers are codes to identify the manager, asset category, new/renew/upgrade and the project objective. The project and subproject define the location and objective of the project, the object code identifies the inputs into it, and the activity code identifies the nature of work being carried out.

The budgets for all our projects are also stored in Finance One at the project and subproject level. Reports are generated on a monthly basis from Finance One comparing actual to estimate. Once works have been completed, the subproject numbers are closed off, and the balance of the subproject is either capitalised into the Finance One Fixed Asset Register, or into a current Asset Management Services Fixed Asset Register, provided it meets the Threshold of Materiality.

Accountabilities for financial systems
The Finance One Fixed Asset Register stores all of the financial information relating to buildings, land, plant and equipment and furniture and fittings. It is used for the generation of depreciation, revaluations and disposal in these asset categories. Other asset categories including Roads, Drainage and Bridges were previously managed in stand-alone systems such as RoadPak, Excel, and GIS. A new consolidated Works and Assets system implemented during 2013 and 2014 has seen these assets consolidated to the one master register in Finance One.

Finance One is also the organisation’s solution for Accounts Payable, General and Project Ledgers, Inventory Management and Purchasing. All Receipting, Accounts Receivable, Land Information and Bank Reconciliations are carried out in the Property and Rating solution. Human Resources is managed in the People One ERP module of the TechnologyOne application.

Infrastructure asset information in the Finance One application is managed by the Finance Department in conjunction with the Asset Management Planning team, and is done so based on information supplied by the asset managers and owners and in accordance with the Asset Accounting Policy.

Plant and Equipment, Land and Buildings, Furniture and Fittings asset information in the Finance One application is managed by the Finance Department, and is done so based on information supplied by the asset managers and owners and in accordance with the Asset Accounting Policy. All other assets are managed by the asset owners in their stand-alone systems.

Accounting standards and regulations
There are many Regulations and Accounting Standards that we must comply with; however, those that are specifically related to Asset Management are:
- South Australian Local Government Act 1999
- AASB 116 Property Plant and Equipment
- AASB 1021 Depreciation
- AASB 1045 Land Under Roads

Capital/maintenance threshold
The organisation has an Asset Accounting Policy that is reviewed annually by the Manager Financial Services. This policy details the expenditure that is to be capitalised, and the associated accounting treatment for non-current assets. It also sets the Threshold of Materiality for all asset categories; these values can be summarised as Land and Buildings at $5,000, Computer Equipment $1,000, Furniture and Fittings $500, Roads, Drains and Bridges $5,000, Mechanical Equipment $1,000 and Vehicles $5,000.

Where an individual asset falls below the threshold, but the assets form part of a network, such as park furniture on a reserve, then consideration will be given to capitalising the aggregated value providing they exceed the threshold. Acquisition costs of less than these thresholds will be expensed.

7.1.2 Asset management system
Assets were previously managed using a variety of systems and tools. In 2012 we commenced a project to consolidate asset data and works scheduling to reduce the risk of using disparate systems and processes. This has now resulted in an asset database which has been “cleansed” of duplicate and out of date data. This will be an on-going process.

Asset registers

The master asset data sits within the TechnologyOne works and assets system. The TechnologyOne core enterprise suite includes the existing Financials module resulting in a consolidated asset register.

Linkage from asset management to financial system

The consolidated asset register sits within the TechnologyOne core enterprise suite. The asset data is stored in the works and assets module with linked asset book data (financial data) in the financials module.

Accountabilities for asset management system and data maintenance

Asset Manager and Asset Officer (Data Owner) in liaison with the Asset Management Planning Business Unit.
### 7.2 Improvement Plan

The asset management improvement plan generated from this asset management plan is shown in Table 7.2.

**Table 7.2: 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>
<td>Adopt auditing processes that will ensure the integrity of the Asset Management Plan so Council can meet its legislative obligations.</td>
<td>AM</td>
<td>Asset Officer Management Accountant Coordinator Asset Management</td>
<td>Completed</td>
</tr>
<tr>
<td>2</td>
<td>Improve processes to keep the Asset Register and financial General Ledger consistent with each other and up to date.</td>
<td>AM</td>
<td>Asset Officer Management Accountant Coordinator Asset Management</td>
<td>Completed</td>
</tr>
<tr>
<td>3</td>
<td>Introduce a process to write off assets due to strategic decision, or impacting works, causing need to bring forward the renewal of a Bridge.</td>
<td>AO</td>
<td>Management Accountant Asset Manager</td>
<td>Completed</td>
</tr>
<tr>
<td>4</td>
<td>Establish an Environmental Framework applicable to bridges that delivers objectives of ‘Living Green to 2020’</td>
<td>AM</td>
<td>Asset Officer Coordinator Sustainability Programs Asset Manager Field Services</td>
<td>Jun 2020</td>
</tr>
<tr>
<td>5</td>
<td>Review and implement improved design and construction standards applying to bridges to reduce maintenance and extend useful life.</td>
<td>AM</td>
<td>Coordinator Design</td>
<td>Completed</td>
</tr>
<tr>
<td>6</td>
<td>Review the process for recording, monitoring, and actioning reported hazards.</td>
<td>AM</td>
<td>Asset Officer Coordinator Engineering Works</td>
<td>Jun 2018</td>
</tr>
<tr>
<td>7</td>
<td>Investigate the relationship between the time that a bridge is identified as not being safe and serviceable and potential hazards or risks.</td>
<td>AM</td>
<td>Asset Officer Coordinator Engineering Works</td>
<td>Dec 2018</td>
</tr>
<tr>
<td>8</td>
<td>Improve the integration of Bridges in projects.</td>
<td>AM</td>
<td>Coordinator Design</td>
<td>Jun 2018</td>
</tr>
<tr>
<td>9</td>
<td>Introduce financial procedures that identify spending on maintenance, repairs and graffiti on bridges.</td>
<td>AO</td>
<td>Asset Officer Management Accountant Coordinator Asset Management</td>
<td>Jun 2018</td>
</tr>
</tbody>
</table>
7.3 Monitoring and Review Procedures

This asset management plan will be reviewed during annual budget planning processes and amended to recognise any material changes in service levels and/or resources available to provide those services as a result of budget decisions.

The AMP will be reviewed annually and revised when required 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 organisation’s long term financial plan.

The Local Government Act 1999 sets out the requirements for the organisation in relation to preparing and reviewing its Asset Management Plans.

Chapter 8 – Administrative and financial accountability Part 1 Strategic management plans

'(1a) A Council must, in conjunction with the plans required under subsection (1), develop and adopt –

(a) A long term financial plan for a period of at least 10 years and

(b) An infrastructure and asset management plan, relating to the management and development of infrastructure and major assets by the council for a period of at least 10 years.

(4) A council may review its strategic plans under this section at any time but must –

(a) Undertake a review of

(i) Its long term financial plan; and

(ii) Any other elements of its strategic management plans prescribed by regulations for the purposes of this paragraph,

As soon as practicable after adopting the council’s annual business plans for a particular financial year and

(b) In an event, undertake a comprehensive review of its strategic management plans within 2 years after each general election cycle.’

Should the annual review cycle identify material changes that either have a significant financial or service delivery impact then the document will be resubmitted to the Asset Management Committee for review and update.

A comprehensive review of the AMP will be conducted every four years within 2 years of each general election cycle as prescribed in the LG Act 1999 unless required before that time.

7.4 Performance Measures

The effectiveness of the asset management plan can be measured in the following ways:

- The degree to which the required projected expenditures identified in this asset management plan are incorporated into Council’s long term financial 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,
- 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 Council’s Strategic Plan and associated plans,
- The Asset Renewal Funding Ratio achieving the target of 1.0.
8. REFERENCES


TechnologyOne - FinanceOne, Corporate Financial System
City of Charles Sturt, Community Plan 2013-2027
City of Charles Sturt, Corporate Plan 2013-2017
City of Charles Sturt, ‘Living Green Environmental Plan 2014-2020’
City of Charles Sturt, Engineering & Open Space Guidelines
City of Charles Sturt, Environmental Sustainability Policy
City of Charles Sturt, Asset Accounting Policy
City of Charles Sturt, Asset Fund Policy


9. APPENDICES

Appendix A  Maintenance Response Levels of Service
Appendix B  Projected 10 year Planned Maintenance Program
Appendix C  Projected 10 year Upgrade Works Program
Appendix D  Projected 10 year Capital Renewal Works Program
Appendix E  LTFP Budgeted Expenditures Accommodated in AMP
Appendix F  Example of Repair Program for Bridge 29 and Bridge 30 – West Lakes Footbridges
Appendix G  Abbreviations
Appendix H  Glossary
### Appendix A Maintenance Response Levels of Service

A specific maintenance response level of service for bridge assess is being developed in conjunction with field services, in the interim the below table is being used as a guideline.

#### 10005 Civil works Maintenance

<table>
<thead>
<tr>
<th>Outcomes (at a corporate level)</th>
<th>Report Frequency: Calendar Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer Satisfaction</td>
<td></td>
</tr>
<tr>
<td>Improved asset and financial management</td>
<td></td>
</tr>
<tr>
<td>Maintain footpaths and bridges to an appropriate standard</td>
<td></td>
</tr>
</tbody>
</table>

#### Sub Activity

<table>
<thead>
<tr>
<th>Specification</th>
<th>Performance</th>
<th>Budget</th>
<th>Job No.</th>
<th>Rate</th>
<th>Qty</th>
<th>Intervention Criteria</th>
<th>Scope of Work</th>
<th>Response Times</th>
<th>Outcomes (Unit Level)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Reduction in risk from hazards to pedestrians/bridge users;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Improving integrity and condition of asset;</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Improved works programming.</td>
</tr>
</tbody>
</table>

#### O04 General Repairs.

Information to be Reported:
- Quantity of Work (m²);
- Value of Work.

<table>
<thead>
<tr>
<th>Monthly KPI reporting.</th>
<th>100050024</th>
<th>Request or referral through CRM, RRT or internal audit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100050024</td>
<td>Vertical Displacement &gt; 20mm; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Failed Slabs &gt; 30% by area; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Failed reinstatements.</td>
</tr>
</tbody>
</table>

Where RRT respond – RRT make safe within 3 days or RRT repair within 10 business days.
Where RRT have made the area safe and not repaired – place in program for repair in future works programs.

- Reduction in risk from hazards to pedestrians/bridge users;
- Improving integrity and condition of asset;
- Improved works programming.

#### O20 Pad Repairs Brick Paving

Information to be Reported:
- Quantity of Work (m²);
- Value of Work.

<table>
<thead>
<tr>
<th>Monthly KPI reporting.</th>
<th>100050020</th>
<th>Request or referral through CRM, RRT or internal audit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100050020</td>
<td>Vertical Displacement &gt; 20mm; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Failed pavers &gt; 30% by area; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Failed reinstatements.</td>
</tr>
</tbody>
</table>

Where RRT respond – RRT make safe within 3 days or RRT repair within 10 business days.
Where RRT have barricaded area and not repaired – place in program for repair in future works programs.

- Reduction in risk from hazards to pedestrians/bridge users;
- Improving integrity and condition of asset;
- Improved works programming.

#### O06 Unmade Paths - Area Patching

(Note Includes Footpaths & reserve paths)

Information to be Reported:
- Quantity of Work (m²);
- Value of Work;
- Number of days to respond.

<table>
<thead>
<tr>
<th>Not recorded separately.</th>
<th>100050006</th>
<th>Request or referral through CRM, RRT; or</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Any Holes; or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Undulating surface &gt; 30mm under 3m straight edge.</td>
</tr>
</tbody>
</table>

Where RRT respond – RRT make safe within 3 days or RRT repair within 10 business days.

- Reduction in risk from hazards to pedestrians/bridge users;
- Improving integrity an condition of asset;
- Pavements uniform in shape with surface free from damage holes undulation, disruptions or displacements;
- Improved Works programming.
## Appendix B

### Proposed 10 year Maintenance Program (16/221026)

<table>
<thead>
<tr>
<th>Asset Number</th>
<th>GIS ID</th>
<th>Asset Description</th>
<th>Material</th>
<th>1/17</th>
<th>1/18</th>
<th>1/19</th>
<th>1/20</th>
<th>1/21</th>
<th>1/22</th>
<th>1/23</th>
<th>1/24</th>
<th>1/25</th>
</tr>
</thead>
<tbody>
<tr>
<td>57911000</td>
<td>3012</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911027</td>
<td>3013</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911054</td>
<td>3015</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911065</td>
<td>3016</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911094</td>
<td>3017</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911109</td>
<td>3018</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911116</td>
<td>3019</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911042</td>
<td>3020</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911060</td>
<td>3021</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911095</td>
<td>3022</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>57911102</td>
<td>3023</td>
<td>Bridges - Unreinforced - MTLP Pedestrian Bridge - Walters</td>
<td>THERM</td>
<td>$20,000.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total: $20,000.00

---

CITY OF CHARLESTOWN – BRIDGES ASSET MANAGEMENT PLAN FEBRUARY 2017
### Appendix C  Proposed 10 year Upgrade Works Program (16/221026)

<table>
<thead>
<tr>
<th>Year</th>
<th>Asset Number</th>
<th>Asset Description</th>
<th>Material</th>
<th>Budget</th>
</tr>
</thead>
<tbody>
<tr>
<td>17/18</td>
<td>010016</td>
<td>Bridge - Shared Use - Overpass - Bartley Tce WLS - box culv sth underpass West Lakes Shore (Design)</td>
<td>STEELCON</td>
<td>$25,000</td>
</tr>
<tr>
<td>18/19</td>
<td>010016</td>
<td>Bridge - Shared Use - Overpass - Bartley Tce WLS - box culv sth underpass West Lakes Shore</td>
<td>STEELCON</td>
<td>$75,000</td>
</tr>
<tr>
<td></td>
<td>010034</td>
<td>Bridge - Shared Use - Overpass - RTLP - Hindmarsh Cemetery - deck bridge Hindmarsh</td>
<td>TIMBER</td>
<td>$425,000**</td>
</tr>
<tr>
<td>19/20</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>20/21</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>21/22</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>22/23</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

**$425,000 does not include 50% contribution by State government open space funding.
Appendix D  Proposed 10 year Renewal Works Program

<table>
<thead>
<tr>
<th>Year</th>
<th>Asset Number</th>
<th>Asset Description</th>
<th>Material</th>
<th>Remaining Life (Years)</th>
<th>Replacement Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/2018</td>
<td>250451</td>
<td>Bridge - Pedestrian - Overpass - Point Malcolm Reserve Semaphore Park</td>
<td>Timber</td>
<td>1</td>
<td>$150,000</td>
</tr>
<tr>
<td>2020/2021</td>
<td>10024</td>
<td>Bridge - Ornamental - Overpass - Greenshields Reserve Torrens Road Ridleyton</td>
<td>Timber</td>
<td>4</td>
<td>$22,490</td>
</tr>
<tr>
<td>2021/2022</td>
<td>10001</td>
<td>Bridge - Shared Use - Underpass - RTLP South Road underpass West Hindmarsh</td>
<td>Timber</td>
<td>5</td>
<td>$1,127,671</td>
</tr>
<tr>
<td>2022/2023</td>
<td>10000</td>
<td>Bridge - Shared Use - Underpass - RTLP Port Road underpass Hindmarsh</td>
<td>Timber</td>
<td>6</td>
<td>$2,041,281</td>
</tr>
<tr>
<td>2025/2026</td>
<td>10011</td>
<td>Bridge - Pedestrian - Overpass - Over Grange Creek behind &amp; McLean St Grange</td>
<td>Steel &amp; Concrete</td>
<td>9</td>
<td>$93,801</td>
</tr>
<tr>
<td></td>
<td>10035</td>
<td>Bridge - Pedestrian - Overpass - RTLP - Apex Pump Station West Beach West Beach</td>
<td>Timber</td>
<td>9</td>
<td>$52,000</td>
</tr>
<tr>
<td></td>
<td>10020</td>
<td>Bridge - Ornamental - Overpass - Parfitt Square Reserve 111 Drayton St Bowden</td>
<td>Timber</td>
<td>9</td>
<td>$19,004</td>
</tr>
</tbody>
</table>

Port Road and South Road Underpasses remain unfunded for complete renewals/Upgrades in the LTFP and have been included in a submission for unfunded infrastructure to the DPTI RTLP audit team.

NOTE: The renewal costs in this table differ from the asset register, LTFP and NAMS template. These costs for renewal in this table are actual replacement costs. The reason for the increased renewal costs in the LTFP and NAMS output is that to renew these bridges the same material will not be used. For example; Point Malcom boardwalk will be renewed with a recycled plastic (REPLAC) deck which is more costly than oiling the existing timber deck. The bridge will provide the same function but to undertake the renewal it will be more costly than the projected replacement cost in the table above.

The RTLP – Hindmarsh Cemetery – Deck Bridge will not be renewed with a like for like structure. The current bridge is only 30m long and 1.5m wide; this does not service the current function and demand along the RTLP path. The bridge will be upgraded to a much longer length and widened to 3m in width. This is an upgrade of the bridge and poses much more costly as the bridge will be bigger, longer and of concrete construction.
## Appendix E  Budgeted Expenditures Accommodated in LTFP

### NAMS.PLUS3 Asset Management

**Charles Sturt CC**

© Copyright 2016. Charles Sturt University. The Institute of Public Works Engineering Australia

**Bridges 2016_S1_V4**

### Asset Management Plan

**First year of expenditure projections 2016**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Expenditure Chalanges included in Long Term Financial Plan (in current $ values)</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>Average of 10 years Expenditure Chalanges from LTFP</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

### Operations and Maintenance Costs

**For New Assets estimated from sources other than Total LTFP**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AM systems budget</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Capital

**Additional Expenditure Chalanges required (e.g. from Infrastructure Risk Management Plan)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Capital Renewal upgrades (years 1-25) (from Form 4)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>

**Forecasts for Capital Renewal using Methods 2 & 3 (Form 2A & 2B) & Capital Upgrade (Form 2C)**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital Upgrade</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
</tbody>
</table>
Appendix F    Example of Repair Program for Bridge 29 and Bridge 30 – West Lakes Footbridges

See attached document (15/181926)
FINAL REPORT ON
BRIDGES 29 AND 30,
AT WEST LAKES

June 2015
Reference Job No 2014 - 134
## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Executive Summary</td>
<td>3</td>
</tr>
<tr>
<td>2. Introduction</td>
<td>5</td>
</tr>
<tr>
<td>2.1 General</td>
<td>5</td>
</tr>
<tr>
<td>3. Bridge Condition Reports 2010</td>
<td>6</td>
</tr>
<tr>
<td>3.1 Introduction</td>
<td>6</td>
</tr>
<tr>
<td>3.2 Bridge 29, Corcoran Reserve, Corcoran Drive, West Lakes</td>
<td>6</td>
</tr>
<tr>
<td>3.3 Bridge 30, Neighbourhood Reserve linking Keppel Grove with Bartley Terrace</td>
<td>6</td>
</tr>
<tr>
<td>4. Visual Inspection by JWC</td>
<td>7</td>
</tr>
<tr>
<td>4.1 Inspection 7/7/2014</td>
<td>7</td>
</tr>
<tr>
<td>4.2 Inspection 2/10/2014</td>
<td>7</td>
</tr>
<tr>
<td>5. Drawings</td>
<td>11</td>
</tr>
<tr>
<td>5.1 Drawings</td>
<td>11</td>
</tr>
<tr>
<td>5.2 Kinnaird Hill DeRohan and Young, 1974</td>
<td>11</td>
</tr>
<tr>
<td>5.3 Department of Road Transport, South Australia, 1992</td>
<td>11</td>
</tr>
<tr>
<td>6. Underwater Inspection of footings</td>
<td>13</td>
</tr>
<tr>
<td>6.1 Introduction</td>
<td>13</td>
</tr>
<tr>
<td>6.2 Conclusions</td>
<td>14</td>
</tr>
<tr>
<td>7. Coating inspection and quotation</td>
<td>15</td>
</tr>
<tr>
<td>7.1 Introduction</td>
<td>15</td>
</tr>
<tr>
<td>7.2 Remaining life of coating</td>
<td>15</td>
</tr>
<tr>
<td>7.3 Expected life of coating if local repairs are carried out</td>
<td>15</td>
</tr>
<tr>
<td>7.4 General comments on maintenance and repairs required for the coatings</td>
<td>16</td>
</tr>
<tr>
<td>7.5 Expected cost of works.</td>
<td>16</td>
</tr>
<tr>
<td>8. Discussion and recommendations</td>
<td>18</td>
</tr>
<tr>
<td>8.1 General repairs</td>
<td>18</td>
</tr>
<tr>
<td>8.2 Covered walkway</td>
<td>18</td>
</tr>
<tr>
<td>8.3 Replacing the bearings</td>
<td>18</td>
</tr>
<tr>
<td>9. Budget Estimates</td>
<td>21</td>
</tr>
<tr>
<td>9.1 Introduction</td>
<td>21</td>
</tr>
<tr>
<td>10. Selected Photographs</td>
<td>22</td>
</tr>
</tbody>
</table>
1. Executive Summary

This final report is a summary of our work over the past 12 months in assessing the condition of the two footbridges. This report covers our investigations with our recommendations for a future maintenance program together with indicative costs of future works over the next few years.

Our report is based on our visual inspection in 2014, our review of the bridge condition inspection reports of May 2010, the drawings provided by the Council, the inspection of footings in the lake and Incospec’s report. The bridges are in fair to reasonable condition but in need of repairs and maintenance, both now and in the longer term.

The sliding bridge bearings on both bridges at one end of each bridge appeared to have failed and are in need of replacement. We have sought a budget price from Granor as we have one from DPTI the latter which seems very expensive, to replace all the bearings on both bridges. The existing fixed bearings seem to be satisfactory subject to review by a bridge engineer and will require some minor maintenance.

There is also concrete corrosion at the underside of the precast panels forming the deck or floor of the bridges mainly to Bridge 29 at Corcoran Drive, but there is also some corrosion at Bridge 30, which also requires repair. Fortunately, most of the work is over land but some will be over water that will require a pontoon and which we understand DPTI have this equipment. There is also some minor corrosion to the concrete kerbs on the concrete bridge deck which also need repair.

There are some minor civil works to both ends of both bridges particularly to the abutment on Bridge 30 which needs scour control and replacement of filling and also cover plates over movement joints and similar.

The paintwork is in reasonable condition, but there is a need of local repairs to prevent further corrosion with complete recoating of the bridges in 10 to 15 years’ time.

There is corrosion particularly at the base plates to the steel columns supported on concrete piers in the lake that are turn are supported on pad footings at the bottom of the lake. From the drawings we have been provided, it appears that the pad footings were constructed in the lake before it was filled.

In conclusion, Council is taking the correct approach to understanding the issues and problems and then programming the necessary works over the next few years to meet budget constraints and monies available for such repairs and maintenance. It is, however, imperative that these repairs and maintenance to be carried out for the long-term life of these facilities.

Each package of work would require some documentation together with tenders or using the Panel Contractor to provide a price with some overall periodic inspections by WC.
This report has been prepared with due care and attention but is subject to the following limitations, which include:

- J Woodside Consulting Pty Ltd has prepared this report in accordance with the usual care and attention of the consulting profession for the use of City of Charles Sturt and only those third parties who have been authorised in writing to rely on this report.
- This report has been written in accordance with the request of the City of Charles Sturt and is for the use of the City of Charles Sturt as owner of the bridges. J Woodside Consulting Pty Ltd will accept no responsibility for the use of this report in other contexts or by other parties without prior written permission. No responsibility or liability to any third party is accepted for any damages arising out of the use of this report by any third party.
- The report is based on generally accepted practices and standards at the time it was written. No other warranty expressed or implied or made as to the professional advice included in this report.
- It is prepared in accordance with the scope of work and for the purpose outlined in the contract dated 1 December 2014 with the City of Charles Sturt.
- Where this report indicates that information has been provided by third parties, J Woodside Consulting has made no independent verification of this information except as expressly stated in the Report. J Woodside Consulting assumes no liability for any inaccuracies in or omissions to that information.
- This report was prepared between July 2014 and June 2015 and is based on the conditions encountered and information reviewed at the time of preparation. J Woodside Consulting accepts no responsibility for any changes that may have occurred after that time.
- This report should be read in its entirety. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not give legal advice.
- To the extent permitted by law, J Woodside Consulting expressly disclaims and excludes liability for any loss, damage, cost or expenses suffered by any third party relating to or resulting from the use of, or reliance on, any information contained in this Report. J Woodside Consulting does not admit that any action, liability or claim may exist or be available to any third party.
- Any estimates of costs, which have been provided, are estimates only as at the date of the report. Any cost estimates that have been provided may, therefore, vary from actual costs at the time of expenditure.

If you become aware of any inaccuracy in or any change to any findings or assumptions found in this report, we strongly recommend that you advise us so that we can assess its significance and that you allow us the opportunity to review our comments and recommendations as required.
2. **Introduction**

2.1 **General**

J Woodside Consulting have been asked to assist the City of Charles Sturt Council in carrying out a structural assessment of the two steel footbridges spanning across to Delfin Island in West Lakes and to report to them on our conclusions.

These bridges were built in about 1974 as part of the West Lakes Development and were subsequently upgraded in 1992, so the bridges are 40 years old.

Both bridges are located in an aggressive environment being near coastal but in the reasonably sheltered area. In accordance with the Australian New Zealand Standard for the guide to the protection of structural steel against atmospheric corrosion by the use of protective coatings, the bridge would be classified as either Category D: high or Category E: very high.

Bridge 29 joins Corcoran Drive to Lockside Drive at the corner of Riverside Golf Club, and the other Bridge 30 is also a footbridge of similar form and joins Keppel Grove to Bartley Terrace.

Both bridges are of similar form being steel footbridge with 850 x 240 steel plate girders with a concrete deck in between the bottom flanges of the steel beams. The bridges are of three spans with the two outer spans being 24.5 m and the middle span being 32.5 m. The bridge are supported on abutments at each end on pad footings, and the two steel columns supported on concrete piers and the piers in turn are supported on pad footing at the bottom of the lake the lake. The bridge has about a 3 m rise from the abutments to the centre of the bridge.

This report covers the assessment of work for repairs and maintenance required for the bridges for the foreseeable future.
3. Bridge Condition Reports 2010

3.1 Introduction
The City of Charles Sturt had arranged for a Queensland specialist bridge inspection firm to carry out inspections of their bridges in 2010, and both bridges were inspected on 29 May 2010. Subsequently reports were submitted on the bridges to the Council, and they were made available to us for our review.

3.2 Bridge 29, Corcoran Reserve, Corcoran Drive, West Lakes
The bridge was given a Condition 2 status with the following comments.

Structure in condition state 2, but the following should be noted:
- This structure is almost in condition state 3/4 due to the corrosion in the abutment bearings
- There is spot rusting in various locations on all steel components
- The approach footways, kerbs and barriers are in poor condition
- There are some deck slabs that are spalling badly

3.3 Bridge 30, Neighbourhood Reserve linking Keppel Grove with Bartley Terrace
The bridge was given a Condition 3 status with the following comments

Structure in condition state 3, due to the following:
- There is severe corrosion in the abutment bearings (condition state would be upgraded if repaired)
- There is a large scour behind abutment two that requires in-fill (condition state would be upgraded if repaired)
- There is spot rusting in various locations on all steel components
- The approach footways, kerbs and barriers are in poor condition

From our inspections on site in October 2014, the only item that appears to have been addressed is the approach footpath and kerbs which have been repaired and replaced at Bridge 30 although local touch-up of the painting may also have been carried out.
4. Visual Inspection by JWC

4.1 Inspection 7/7/2014
A brief inspection was carried out by J Woodside Consulting (JWC) on 7 July 2014 to provide a general overview of the state of the bridges. The bridges appeared to be in reasonable condition but with some visible signs of distress particularly at the bridge bearings and other local areas.

A number of photographs were taken at that time.

4.2 Inspection 2/10/2014
A more detailed inspection was carried out on the morning of 2 October 2014 by J Woodside Consulting by John Woodside and Steve Freeman. This inspection involved a visual inspection both of the underside and top of the bridges using binoculars and a visual inspection to assess the general condition of the bridges together with a record of the defects that were noted. Again a number of photographs were taken of the various matters observed.

From this inspection, we note the following matters.

Bridge 29, Corcoran Reserve Bridge. The bridge was in reasonable condition subject to the following comments and see attached sketch showing the various points noted below

- This bridge is suffering corrosion of the precast concrete decking particularly at the west end closest to Corcoran Drive although there is also corrosion in the central section of the bridge in several places.
- The sliding bearings at the east end of the bridge require replacement and the abutment has cracked at the fixed bearings at the western end requiring repair.
- The expansion joint at the eastern end of the bridge between the bridge deck and the path is about 80 mm wide and requires a cover plate over the joint.
- There is a need for some scour control at both ends of the bridge at the abutments where scouring has occurred.
- There is some corrosion in the concrete kerbs on both sides in a few locations that require repair.
- There is some minor concrete spalling on the kerbs that also require repair.
- There is some local rusting on the handrails again requiring repair.
- There is flaking and damage paint on the inner flanges of the steel beams at the western end requiring some local repairs.
- There is evidence of surface rust on the edge base plates to the central steel columns at both concrete piers where the steel columns are supported just above the water level.

Bridge 30, Keppel Grove Bridge. The bridge was also in reasonable condition subject to the following comments and see attached sketch showing the various points noted below.

- This bridge is suffering corrosion of the precast concrete decking in the end span at the east end of the bridge closest to Keppel Grove.
- The sliding bearings at the western end of the bridge require replacement.
- There is a need for scour control at both ends of the bridge at the abutments, but in particular at the eastern end that has been severely scoured.
- There is some corrosion in the concrete kerbs on both sides in a several locations that require repair.
• There is some minor concrete spalling on the kerbs that require repair.
• There is some local rusting on the handrails again requiring repair.
• There is flaking and damage paint on the inner flanges of the steel beams at the western end requiring some local repairs.
• There is evidence of surface rust on the edge base plates to both concrete piers where the steel columns are located just above the water level.
• there is an approximately 20 mm vertical step between the approach slab on the bridge deck at the eastern end that either requires grinding of the existing bridge deck or build-up of the path locally at this area to avoid this step.

These areas of concern are noted on the following two pages on marked up drawings of the bridge following.
INSPECTION OF KEPPELL GROVE BRIDGE – BRIDGE 30 – 2 OCT 2014 – J Woodside Consulting

- Rust on main beams - north side
- Rust on service pipe - north side
- Severe scouring of abutment - south side
- Concrete spalling - underneath 500-300
- Rust on edges of base plate
- Steel to steel gap between approach slab & bridge deck
- Surface rust on top flange - north side - 300-100
- Web bar rust - north side
- Location of new cross bracing shown thus:

Note: All dimensions and levels are taken from original drawings and are subject to an on-site check.
5. **Drawings**

5.1 **Drawings**
The Council has been able to access drawings both of the original bridge and the upgraded bridge; those drawings have provided valuable information on how the bridges were constructed and modified.

5.2 **Kinnaird Hill DeRohan and Young, 1974**
The consulting engineering firm of Kinnaird Hill DeRohan and Young was formed in 1960, with the partners of Malcolm Kinnaird, Don Hill, Howard Young and Maurice de Rohan and the firm was subsequently known as Kinhill Pty Ltd until KBR acquired it in 1997. They were the original designers of the bridge.

The Council located five drawings of the bridges, and the bridges were designed in June 1974. From the drawings, the pad footings to the bridges that are in the centre of the lake would have been built in the lake prior to filling the lake with water.

The concrete was designed in accordance with Concrete Code of that time, AS CA2-1973 with a concrete strength of 30 MPa and 75 mm cover to the reinforcement.

The pad footings are shown as 6.5 m x 4 m x 800 mm deep with a concrete pedestal 3 m x 800 mm by approximately 4 m in height which in turn support steel columns and the bridges over. Each bridge has footings in the centre of the lake. The steel columns were 203 x 203 x 9.4 RHS with three levels of cross bracing.

The bridge structure is made from two I-beams being plate girders 850 x 240 plates with webs from 12 mm plate and flanges from 25 mm plate with a concrete deck at the bottom flange level. The bridge deck consisted of 100 mm thick slab on Bondek sheeting with F82 fabric.

The original drawings do not show any bearings at either end of the bridge, and the bridge beams appear to be have been bolted to the abutments at each end. It is, therefore, likely that the expansion of the bridge may have cracked the original concrete abutments.

5.3 **Department of Road Transport, South Australia, 1992**
The Council has also discovered further drawings prepared by the Department of Road Transport in 1992 on behalf of the City of Woodville involving upgrading of the bridges. This work involved a new concrete deck, new abutment / bearing and horizontal cross bracing at the underside of the bridge. We have discussed the project with Mr Vic Nechvoglod who was the designer at the time and he has advised that they replaced the concrete deck with precast planks as the Bondek had failed, and they also provided bracing to the bottom chord of the bridge together with upgraded abutments and the replacement of the bearings.

On reviewing the abutments on the site, they appear not to be the original abutments to the bridge.

We have briefly discussed the bridge with Mr Nechvoglod, who confirmed that in those days the Department of Road Transport provided design services to the local councils for various bridge projects. It is assumed that the City of Woodville would have tendered the works and this work was carried out by a contractor, as the bridge we have inspected appears to matches the general details on the 1992 drawings, although we have not checked specific sizes or details.
Expansion (Sliding) bearings were provided on the western end of the western bridge being Bridge 30 and on the eastern end of the eastern bridge being Bridge 29 and are badly rusted. Bearings at the other end of the bridge are fixed and will also need some repair.
6. **Underwater Inspection of footings**

6.1 **Introduction**

An inspection of the footings and four piers in the centre of the lake to the two bridges was carried out by Lawrie Commercial Diving in conjunction with Carmine D’Amico from the City of Charles Sturt and Steve Freeman from J Woodside Consulting Pty Ltd on the 2\textsuperscript{nd} December 2014. Mr Jock Lawrie together with two divers made up the total crew of five people who inspected the four piers.

In order to inspect the four footings and piers, the boat was tendered at each pier and a diver then went overboard and inspected each footing and pier under the water using a video camera which was recorded together with a video screen on the boat which allowed the diver to be directed by Carmine and Steve to look at any areas as required.

The inspection of each pier and footing went from the bottom of the lake to the top of the pier and each face was inspected and selected areas were cleared of growth on each face to see if there were any issues with durability or corrosion of reinforcement.

Separate reports have been prepared by Lawrie Commercial Diving for the inspection work under the water and generally their conclusions were that although the concrete surface was covered with soft marine growth up to 200 mm thick with an underlying layer of growth of approximately 25 mm thick, that there were no visible defects observed. The surface of the concrete was coarse, and there was no scour at the seabed level. The depth from the top of the concrete pier to the seabed varied from about 3 ½ to 4 m. For a full total inspection, this would require the removal of all the marine growth which would be a significant amount of work and was not consider warranted in the circumstances.
Also, Carmine D’Amico and Steve Freeman inspected the top of the piers above water and a number of photographs were taken. Also, there is approximately one hour of video of the underwater inspections taken by Lawrie Commercial Diving.

6.2 Conclusions

The following matters were observed and concluded from this inspection.

- There appears to be no problem with any of the footings or piers underwater other than a substantial amount of marine growth, and there was no evidence of corrosion or similar problems to the concrete below the water line.
- All of the piers showed significant pitting to the concrete exposed above the water line indicating that the marine environment has caused some loss of concrete section of approximately 5 mm to most of the faces of the pier.
- There was also local corrosion at the steel base plates where the steel columns sit on top of the piers which require maintenance. This corrosion had been identified previously by our earlier inspection from the shore, but it was confirmed by close-up inspection and will require repair.

From this inspection, it appears that there are some remedial works required to the steel base plates of all of the steel columns to all of the piers, but there are no significant observable defects in the concrete at the time of the inspection. As the concrete is approximately 40 years old, it is recommended that a similar inspection be carried out in say 10 to 20 years’ time, assuming that repair works above the water level are carried out in the next 2 to 5 years.
7. **Coating inspection and quotation**

7.1 **Introduction**

Incospec and Associates were engaged by J Woodside Consulting on behalf of the Council to undertake an assessment of the coating condition of the two footbridges (Numbers 29 and 30) at Delphin Island, West Lakes, Adelaide for the purposes of:

- Determination of the coating thicknesses used on the structures
- Determination of the expected life of the top coat before repainting is required
- Determination of the expected life of the top coat if local repairs are carried out
- Provision of general comments on maintenance and repairs required for the coatings
- Recommendations for future coating including coating systems.
- Other matters relating to the coatings

Excluded from the scope of works was the provision of access equipment to inspect the underside of the foot bridges and the provision of testing or inspection data for steelwork located on the underside of the footbridges that was not accessible from the land or bridge topside.

The inspection was undertaken on 19-03-2015 by David Mavros of Incospec and Associates.

The following words have been taken from that report titled 141004-190315 John Woodside_Delphin_Island_Bridges (LTR) prepared by Incospec.

Also, an order of cost for both the initial repairs and long-term recoating of the bridges were sought from Hartech Pty Ltd based on the above report for inclusion in the costings to the Council.

7.2 **Remaining life of coating**

An assessment of the corrosivity category of the bridges was undertaken in accordance with AS 4312-2008. From this, it was determined that the bridges are located in a C3: Medium category. This corresponds to a corrosion rate for steel of 25 – 50 μm/yr. An assessment of the current coating appears to indicate that it is a zinc rich primer/epoxy intermediate coat/polyurethane top coat system. The thicknesses measured on the existing systems indicate that this system is consistent with a PUR5 system as per AS/NZS2312.1: 2014.

Such systems are given a typical life of 25+ years in a C3 environment. However, in addition to the environmental conditions (i.e. proximity to the coast, the bridge being above a waterway), the coating system is also subject to other factors, including mechanical damage due to traffic across the bridges. These additional factors will result in a shorter expected life of the coating system. Given the nature of the current failures of the top coats, and the current overall condition of the coating system on both bridges. A complete abrasive blast and recoat is currently not justified. Currently, local areas of top coat failure where the intermediate coating is exposed should provide another ten years life until corrosion occurs. However, aesthetically, these locations will appear unsightly to the local residents and passers by.

7.3 **Expected life of coating if local repairs are carried out**

Should localized repairs on the existing coating systems be undertaken, it is anticipated that this would provide an additional ten years life until these locations would require recoating again. An important
note to make on the use of localized repairs is the difficulty that can be presented in attempting to colour match effectively to ensure that repairs do not appear unsightly.

7.4 General comments on maintenance and repairs required for the coatings

For locations where only the top coat has failed, and the exposed intermediate coat that remained intact was sound. A localized repair would require as a minimum, high-pressure water washing over the surface to remove any surface salts and loose flaking coating. Scraping of the surface to remove any additional loose top coat back to sound top coat. Abrasion of the surface with a coarse sandpaper ensuring that edges of the existing top coat are feathered and abraded an additional 50 mm. Following this, the prepared surface shall be wiped down with a solvent wipe to remove surface preparation debris. Following preparation, an approved top coat shall be applied by brush or roller to repair localized top coat failure. A minimum dry film thickness of 75 microns shall be achieved.

For locations where surface corrosion has occurred as a result of coating failure. Further surface preparation would be required to remove any corrosion and to provide a key for a new primer, intermediate coat and top coat. This would involve high-pressure washing to remove any surface

7.5 Expected cost of works.

Mathew Lehman of Hartech Pty Ltd has provided the following advice on budget costings. He advised that Hartech was contracted by the Council to recoat these two bridges in 2006, so they are ten years into their coating life of about 20-25 years.

Corcoran Reserve Bridge 29
- Hand rail on both sides need recoating ( some rust present )
- The last three bays on Corcoran Reserve side need recoating ( Top coat peeling )
- Some minor concrete repairs to the concrete curbing of the bridge. ( Reo rod rusted )
- Recoating the base plates on leg supports. ( work performed from a boat )
- A couple of panels mid-way have signs of blistering ( pop and repair )

Three man team + equipment
Price $18,860 + GST

Keppel Grove Bridge 30
- Hand rail on both sides need recoating ( some rust present )
- Top of I beam on both sides need recoating ( paint peeling )
- Inside of bridge different colours due to painting over graffiti ( recoat whole internal faces )
- Both ends undersides flange lips need recoating ( rust present remove and recoat )
- Recoating the base plates on leg supports. ( work performed from a boat )

Three man team + equipment
Price $22,350 + GST

Specification for rusted areas
- High-pressure water blast (3000psi minimum)
- Hand prep (bristle blaster or hand sand )
- Solvent wash
- Prime, mid coat and top coat

Specification for top coat recoating
- High-pressure water blast (3000psi minimum)
- Hand sand
- Solvent wash
- Top coat

Specification for concrete curbing repairs
- Break away concrete to expose Reo rod
- Abrasive spot blast
- Zinc coat
- Replace concrete
- Re coat

Prices include all equipment, all materials and quality control paperwork on completion

Itemised list of repairs

Price does not include Council permits, public notification or weekend work, access and recoating to underside of bridges or other repairs to the bridge

Estimated price to encapsulate, abrasive blast and recoat bridges in 8-10 years
Estimated price $300,000 - $350,000+GST each bridge.
Estimated time for each bridge six weeks.
8. Discussion and recommendations

8.1 General repairs

With the investigation work carried out to date, there is sufficient information to start to prepare briefs and technical specifications for seeking prices for the following works.

- Replacement of the sliding bridge bearings.
- Concrete repair work to the underside of the precast concrete panels.
- Minor civil works relating to the abutments and joints at the end of the bridges.
- Patching and repairing of the coatings

We would recommend that repair work be carried out by various suitable contractors depending on availability of funds and to suit budget constraints. This work will require the preparation of brief tender documents and a scope of works to allow the Council to seek prices for this repair work.

8.2 Covered walkway

We have been requested to look at covering the ends of the bridges to prevent people jumping off the bridge into the lake. To date, we have not prepared any sketches or sought any costing on this work as discussed as there are insufficient funds for this work in the short term.

8.3 Replacing the bearings

From the original Kinhill drawings, it appears that the bridge did not have bearings at each end. It appears that bearings were included in the upgrade of the bridge in 1992.

The 1992 Highways drawings show that the expansion bridge bearings were Herculon Type D sliding guided bearings that are still available and details of these bearings are shown following.

In the case of fixed bearings, they appear only to require grit blasting and repainting for protection.

The sliding bearings are provided at the east end of the Keppel Grove Bridge and the western end of the Corcoran Reserve Bridge. A total of four bearings will require replacement. From a recent inspection it appears that the bearings to the Corcoran Reserve Bridge may have been replaced with rubber bearings but we will need to do more investigation to confirm that.

We would recommend that appropriately qualified bridge engineer should carry out the design of the bearings with a recommendation and procedures for replacing the bearings which could then be tended to selected bridge repairer/bearing suppliers. We have spoken to Leo Noicos from LN Engineering who we work with from time to time, and they are able to do that design. Leo designed all of the bridge bearings for the Southern Expressway stage I and he could do the design for a sum not exceeding $5,000 compared to the $20,000 suggested by DPTI. Leo has also advised us that at least two civil contractors being Bardavcol and Yorke Civil can do this sort of work. Again we believe the figure $110,000 seems to be excessive for the work involved and suggest that figure of $40-$50,000 would seem more reasonable for the work involved, subject to more detailed design and pricing.

As we understand that the bridge would be jacked off the abutments using flat jacks and the bearings replaced. Flat jacks are usually circular in shape of fairly thin dimensions made from steel plate and are filled with hydraulic oil and jacked to expand.
**Herculan Type D Sliding Guided Bearing**

**Application**

Herculan Type D Sliding Guided (HLD/SG) Bearings (see Fig 3-5) have been developed to fulfill the need for a low friction bearing on corbels and columns where a continuous slipjoint is inappropriate. They can be used under beams and slabs and also under pipes, ducts, conveyors, pressure vessels and small span bridges. These bearings are designed to be removable and to accept a lateral load of 30% of the vertical rated load.

![Diagram of Herculon Type D Sliding Guided Bearing](image)

**Materials**

HLD/SG bearing consists of a mild steel top plate to which is welded a polished stainless steel facing plate. This plate slides against a Herculan coated Hercupad. This in turn is bonded to a mild steel base plate.

**Design**

The following design limitations are recommended:

- Coefficient of friction 0.05 - 0.08 depending on stress.
- Expansion capacity up to ±40 mm.
- Maximum contact stress 10 MPa.
- Maximum rotation up to 0.02 radians.
- Maximum temperature 80°C.

**NOTE**

Higher temperatures can be accommodated by thermally insulating the bearings or by using high temperature materials. Please contact our Technical Department for further information.
Sliding bearing as drawn by the Highways Department for the bridges
9. **Budget Estimates**

9.1 **Introduction**

The following is a broad “guestimate” of possible costs which will be upgraded as we get more information and details and will require the use of the cost planner or budget or tender prices from suitable contractors to provide more accurate budget information as required. These figures should only be taken as possible indicative costs at this time until they are confirmed in more detail, and we are unable to provide budget prices under the terms of our professional indemnity.

J Woodside Consulting will need to submit a fee proposal is for further work based on the proposed extent of repairs and maintenance, once this is established in more detail.

### Possible Indicative Order of Budget Costs for Bridges 29 and 30 West Lakes

<table>
<thead>
<tr>
<th>Task</th>
<th>By</th>
<th>Indicative Cost</th>
<th>Possible Timing</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Visual inspection and review of documents</td>
<td>JWC</td>
<td>$0.00</td>
<td>2014</td>
<td>Completed</td>
</tr>
<tr>
<td>2. Inspect coatings and recommendations</td>
<td>Incospec</td>
<td>$0.00</td>
<td>2014</td>
<td>Completed</td>
</tr>
<tr>
<td>3. Inspect 4 piers in the lake</td>
<td>Jock Laurie</td>
<td>$0.00</td>
<td>2014</td>
<td>Completed</td>
</tr>
<tr>
<td>Report on findings</td>
<td>JWC</td>
<td>$0.00</td>
<td>2014</td>
<td>Completed</td>
</tr>
<tr>
<td>4. Replace bearings to both bridges</td>
<td>DPTI</td>
<td>$130,000.00</td>
<td>2015/6</td>
<td>Very expensive</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$1,000.00</td>
<td>2015/6</td>
<td>Suggest it should be about 1/2 that figure</td>
</tr>
<tr>
<td>5. Concrete repairs</td>
<td>DPTI/Synergy</td>
<td>$50,000.00</td>
<td>2016</td>
<td>In 12-18 months</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$2,500.00</td>
<td>2016</td>
<td></td>
</tr>
<tr>
<td>6. Scour control around abutments</td>
<td>Small Contractor</td>
<td>$15,000.00</td>
<td>2015/16</td>
<td>2015/16</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$2,500.00</td>
<td>2015/16</td>
<td>2015/16</td>
</tr>
<tr>
<td>7. Repairs of bottom steel columns &amp; top piers</td>
<td>DPTI/Synergy?</td>
<td>$0.00</td>
<td>2016</td>
<td>In 12-18 months</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$0.00</td>
<td>2016</td>
<td>Included in Item 8</td>
</tr>
<tr>
<td>8. Local painting the bridges</td>
<td>Hartech?</td>
<td>$42,000.00</td>
<td>2016</td>
<td>In 12-18 months</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$2,500.00</td>
<td>2016</td>
<td>In 12-18 months</td>
</tr>
<tr>
<td>Inspections by Incospec</td>
<td>Incospec</td>
<td>$2,000.00</td>
<td>2016</td>
<td>In 12-18 months</td>
</tr>
<tr>
<td>9. Repainting the bridges</td>
<td>Hartech?</td>
<td>$700,000.00</td>
<td>2025</td>
<td>10-15 years</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$7,500.00</td>
<td>2025</td>
<td>10-15 years</td>
</tr>
<tr>
<td>Inspections by Incospec</td>
<td>Incospec</td>
<td>$5,000.00</td>
<td>2025</td>
<td>10-15 years</td>
</tr>
<tr>
<td>10. Covering the bridges</td>
<td>Small Contractor</td>
<td>$500,000.00</td>
<td>2017</td>
<td>Removed from current budget</td>
</tr>
<tr>
<td>Project management</td>
<td>JWC</td>
<td>$5,000.00</td>
<td>2017</td>
<td></td>
</tr>
<tr>
<td>Design by consultant</td>
<td>W&amp;G?</td>
<td>$5,000.00</td>
<td>2017</td>
<td></td>
</tr>
</tbody>
</table>

**Indicative Cost** $195,000.00 $875,000.00

Possible costs over next 12-18 months $195,000.00
10. Selected Photographs

A general view of Bridge 29

Corrosion to the bottom of the precast slabs at Bridge 29 at the western end
Final Report on Bridge 29 and Bridge 30, West Lakes

**Failure of the bridge bearing and concrete at eastern end of Bridge 29**

**Undermining of approach path at western end of Bridge 29 showing the scour control required.**
Local corrosion to the paintwork of Bridge 29 requiring repair

Local corrosion to the paintwork of Bridge 29 requiring repair
A general view of Bridge 30

A general view of western piers Bridge 30 showing corrosion to the base plates of the columns
A general view of handrails to Bridge 30 which require repainting

A general view of sliding bearings to Bridge 29 which require a new bearing
A general view of sliding bearings to Bridge 30 which require a new bearing

A general view of fixed bridge bearings which require painting
A general view of sliding bridge bearings that require a new bearing
### Appendix G  Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAAC</td>
<td>Average annual asset consumption</td>
</tr>
<tr>
<td>AM</td>
<td>Asset management</td>
</tr>
<tr>
<td>AMP</td>
<td>Asset management plan</td>
</tr>
<tr>
<td>ARI</td>
<td>Average recurrence interval</td>
</tr>
<tr>
<td>ASC</td>
<td>Annual service cost</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>DRC</td>
<td>Depreciated replacement cost</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>LTFP</td>
<td>Long term financial plan</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>SoA</td>
<td>State of the Assets</td>
</tr>
<tr>
<td>SS</td>
<td>Suspended solids</td>
</tr>
<tr>
<td>vph</td>
<td>Vehicles per hour</td>
</tr>
<tr>
<td>WDCRC</td>
<td>Written down current replacement cost</td>
</tr>
</tbody>
</table>
Appendix H  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, plant and equipment 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
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 [AIFMG Financial Sustainability Indicator No 8].

Average annual asset consumption (AAAC)*
The amount of an organisation’s 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 organisation’s 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, which 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 organisation’s 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**
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

**Capitalisation threshold**
The value of expenditure on non-current assets above which the expenditure is recognised 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 after deducting any accumulated depreciation / amortisation and accumulated impairment losses thereon.

**Class of assets**
See asset class definition

**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, job resource management, inventory control, condition assessment, simple risk assessment and defined levels of service, in order to establish alternative treatment options and long-term cash flow predictions. Priorities are usually established on the basis of financial return gained by carrying out the work (rather than detailed risk analysis and optimised decision-making).

**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**
Assets for which the financial, business or service level consequences of failure are sufficiently severe to justify proactive inspection and rehabilitation. Critical assets have a lower threshold for action than non-critical assets.

**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.

**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 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 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.

**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 of organisations or the need for access to major economic and social facilities and services, e.g. 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 separate 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.

**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 defined service quality for a particular service/activity against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental impact, acceptability and cost.

**Life Cycle Cost**
1. **Total LCC** The total cost of an asset throughout its life including planning, design, construction, acquisition, operation, maintenance, rehabilitation and disposal costs.
2. **Average LCC** The life cycle cost (LCC) 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
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.

Loans / borrowings
See borrowings.

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.

- 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, actioning the work and reporting what was done to develop a maintenance history and improve maintenance and service delivery performance.

- 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.

Net present value (NPV)
The value to the organisation 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 to the Council, 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 renewal expenditure definition above.

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

Renewal
See capital renewal expenditure definition above.

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.

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 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 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 is still available for use in providing services (Depreciated Replacement Cost/Depreciable Amount).

**Specific Maintenance**
Replacement of higher value components/sub-components of assets that is undertaken on a regular cycle including repainting, 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.

**Strategic Longer-Term Plan**
A plan covering the term of office of councillors (4 years minimum), which reflects the needs of the community for the foreseeable future. It brings together the detailed requirements in the Council’s longer-term plans such as the asset management plan and the long-term financial plan. The plan is prepared in consultation with the community and details where the Council is at that point in time, where it wants to go, how it is going to get there, mechanisms for monitoring the achievement of the outcomes and how the plan will be resourced.

**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.

**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, 2009, Glossary
Additional and modified glossary items shown *