

**Ararat Rural City Council**  
Bridges and Major Culverts  
Asset Management Plan

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## 1 Plan Intention and Structure

The intent of this document is to outline the approach used by Ararat Rural City Council in managing its bridge network. This plan covers the entire lifecycle of all elements of managing the bridge network including but not limited to:

- Construction and Capital Works.
- Maintenance.
- Inspection and Health Assessment.
- Asset Register and Data.
- End of life/Renewal.
- Valuation.
- Incident Management.
- Reporting.

Ararat Rural City Council will execute the management of its bridge network aligned with the approach outlined in this plan.

This plan is structured into components representing operational areas of the council called 'services'. The responsibilities that exist within those services combine towards a whole of organisation approach to bridge asset management.

Council service lines included in this plan are:

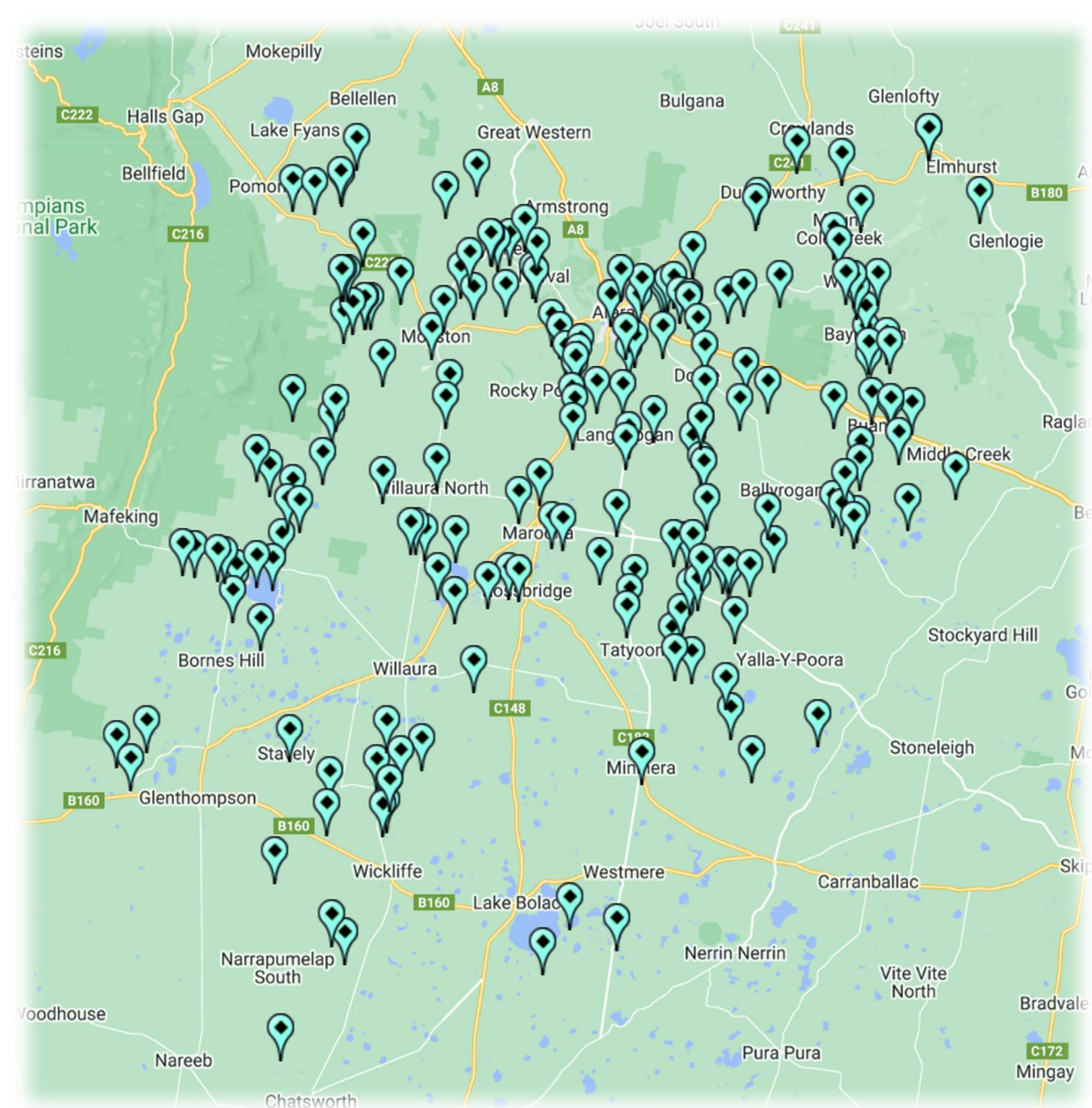
- Asset Management
- Depot Operations
- Finance
- Engineering
- Procurement
- Customer Services
- Governance
- Occupational Risk and Safety
- Organisational Transformation

## 2 Introduction – Bridge Asset Class

Bridge – “A structure that is built over a road, railway, river, etc. so that people, vehicles, etc. can cross from one side to the other.” Oxford Dictionaries.

Bridge infrastructure is spread throughout Ararat Rural City Council with bridge volume exceeding 200 units. Bridges within the municipality are typically providing the purpose of road linkage over a body of water such as a river or stream. The Hopkins River and its associated tributaries such as the Fiery Creek and Mt Emu Creek account for a significant number of bridge crossings within the municipality.

The following graphic shows general bridge location and distribution across the municipality with concentrations of bridges existing within natural water traversal routes.



### 3 Asset Management

The Asset Management service is responsible for the delivery of the following core items.

- Asset Management System.
- Asset Class Definition.
- Asset Data Structure and Schema.
- Intervention Definitions.
- Condition Definition and Inspection.
- Asset Attribute Data Collection and upkeep.
- General Asset Reporting.

#### 3.1 Asset Management System

Ararat Rural City Council uses an Asset System called Confirm. Confirm has two modules that act as extensions to the Confirm software, Confirm Connect and Confirm WorkZone.

Confirm Connect is a mobility enabled software module that is built for the specific purpose of 'in the field' use. The software works on a tablet or phone and can work in both online (internet connected) and offline (blackspot or offline) modes. Primarily the software is used by operators to complete 'in the field' activities such as condition inspections, defect inspections or asset attribute data collection.

Confirm WorkZone is used as a management interface to schedule works. This allows for works in similar locations to be grouped, so works can be executed by a crew whilst in a specific region or zone.

#### 3.2 Bridge Class Definition

Ararat Rural City Council bridges are broken down into seven different classes. This breakdown serves as both a separator for type and also a means to value the bridge network. Each class has a different unit rate of replacement applied allowing a bridge to be valued by multiplying the unit rate of the bridge by the area of the structure (see Asset Valuation Policy for more information).

CODE	DESCRIPTION
1	Narrow Low Flat Slab Bridge
2	Wide Low Flat Slab Bridge
3	Narrow, Medium Height Flat Slab Bridge
4	Wide, Medium Height Flat Slab Bridge
5	Narrow High Bridge
6	Medium High Bridge
7	Muti-span High bridge

### 3.3 Bridge Data Schema

The following structure outlines the mandatory and optional attribute data collected specific to the Ararat Rural City Council Bridge Network

#### **MANDATORY DATA**

Site (Road Name)  
Bridge Number  
Bridge Class  
Major Culvert or Bridge  
Coordinates (latitude and Longitude)  
Construction date  
Overall Length  
Overall Width  
Height Clearance  
Condition  
Photos  
As constructed plans  
Condition of railing (good, poor, none, etc.)

#### **OPTIONAL DATA**

Width of Seal  
Load Limit  
Last Inspection date  
Crossing Name (if named)  
Structure Material  
Height of cells of culvert  
Number of Spans of bridge

#### 3.3.1 Spatial Data

The Ararat Rural City Council bridge network is captured spatially by position (latitude and longitude) and can be displayed on a mapping environment however the spatial representation of the bridge as a three-dimensional model (using LiDAR etc) is not available at this time.

### 3.4 Condition Inspection

Condition inspections occur via one of the following methods.

- Level 1: Routine Maintenance inspection (Asset Officer or Maintenance Staff)
- Level 2: Condition Inspection (Asset Officer or Engineer)
- Level 3: Detailed Engineering inspection (Certified)

Level 1 inspections are used to identify defects requiring maintenance.

Level 2 Inspections are used to identify how far through an Assets useful life it is for valuation purposes.

Level 3 Inspections are used to ensure public safety and/or to plan for asset renewal.

#### 3.4.1 Condition Definition

Condition Rules (1-5 overall general condition values with definitions)

Refer Pg.42 ARRB Bridge management best practice guide – Table 2.2 condition statements.

Condition State	Subjective Rating	Description	Action
1	Good ('as new')	Free of defects with little or no deterioration evident	No action required in foreseeable future
2	Fair	Free of defects affecting structural performance, integrity and durability Deterioration of a minor nature in the protective coating and/or parent material is evident	No action required until at least next programmed inspection
3	Poor	Defects affecting the durability/serviceability which may require monitoring and/or remedial action or inspection by a structural engineer Component or element shows marked and advancing deterioration including loss of protective coating and minor loss of section from the parent material is evident Intervention is normally required	Action required prior to next programmed inspection
4	Very Poor	Defects affecting the performance and structural integrity which require immediate intervention including an inspection by a structural engineer, if principal components are affected Component or element shows advanced deterioration, loss of section from the parent material, signs of overstressing or evidence that it is acting differently to its intended design mode or function	Action required as soon as possible.



5	Unsafe	This state is only intended to apply to the overall structure rating Structural integrity is severely compromised, and the structure must be taken out of service until a structural engineer has inspected the structure and recommended the required remedial action	Action required before bridge can be returned to service
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### 3.4.2 Condition Inspection Routine

INSPECTION DESCRIPTION	RATE
Within one year of construction	Twice annually (At least one Level 3)
Within two to five of construction	Once annually
Condition 2 and Condition 3	Once every two years
Condition 4	Twice annually (At least one Level 3)
Condition 5	Quarterly (Level 3) (consider weather events)

### 3.5 Attribute Collection

Asset staff will utilise Confirm Connect to check current asset attribute data and update as necessary whilst in the field assessing / visiting an asset (i.e. for a condition inspection) New assets will be recorded in confirm based on design specifications and then checked and updated in the field. Asset Attribute data collection will be in line with mandatory data collection requirements.

### 3.6 General Asset Reporting

Asset staff are required to provide annual asset reporting for valuations and grant application requirements. These specific reports include but are not limited to:

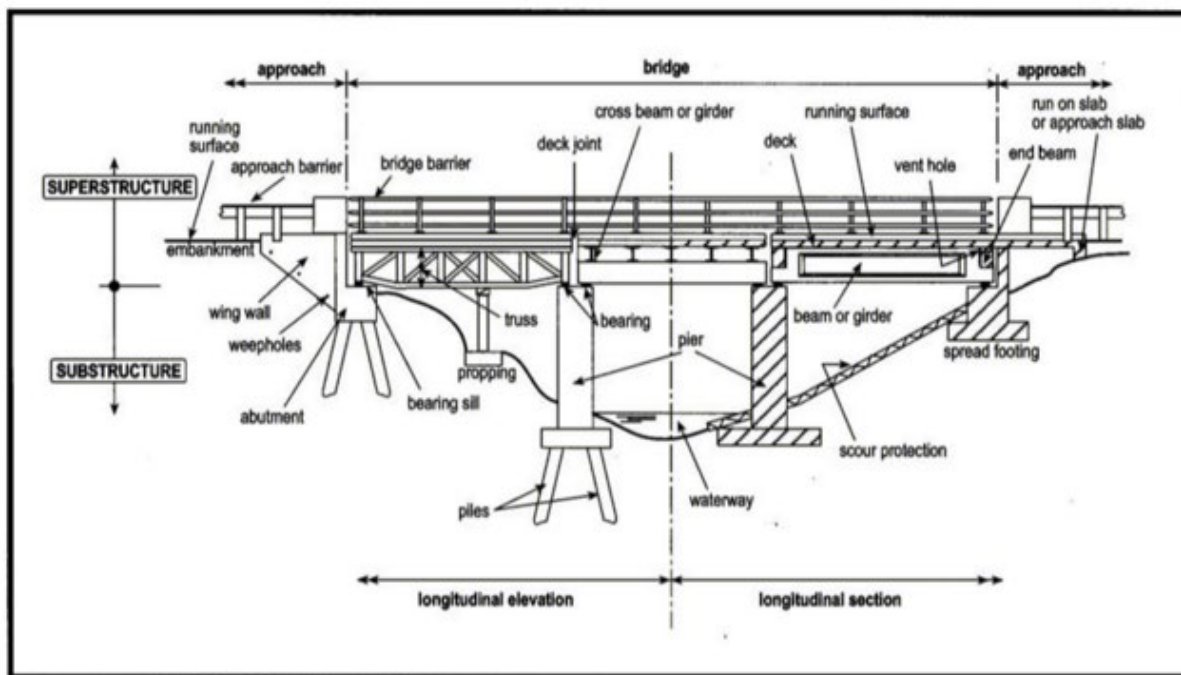
- Bridge asset listing including attributes.
- Bridge spatial mapping.
- Bridge condition report by class.
- Bridge maintenance report.

## 4 Depot Operations

The core responsibilities of council's depot operations with relation to bridges is; the identification of bridge defects and the rectification of those defects through routine and responsive maintenance. Defects are identified through an inspection process and assessed against intervention definitions.

### 4.1 Defect Inspection

The general physical structure of a bridge is shown below. These are the elements that are assessed when undertaking a defect inspection.



#### 4.1.1 Defect Definition

The following table is used to identify if any defect exists when undertaking a bridge defect inspection.

Should a defect be identified it is logged as a defect within Confirm Connect which will trigger the creation of the job for works to be undertaken to rectify the defect identified.

#### TASK

##### Signs and Delineation

- Missing/damaged/orientation/cleanliness.
- Loose and missing bolts.

##### Road Approach

- Settlement of approach slab
- Depressions, rutting, shoving ect
- Cracking

**Alignment barriers**

- Loose and missing bolts
- Missing/damaged spacer blocks or barrier
- Corrosion
- Correct rail height and alignment

**Bridge Railing**

- Loose and missing bolts
- Corrosion
- Paint stripping
- Missing/damaged railing

**Deck and Footpath Surface**

- Cracking
- Uneven Surface

**Expansion Joint**

- Missing, loose or damaged joint
- Missing, loose or damaged bolts
- Dirt/debris accumulation

**Bridge Drainage**

- Debris accumulation on deck/footpath
- Debris accumulation in scuppers/gutters/drains

**Embankments**

- Erosion/scour/voids
- Cracked or missing protection works
- Vegetation growing in protection works

**Abutments**

- Weepholes clean
- Vegetation clear
- Accumulation of dirt and debris

- Cracking
- Splitting/spalling

#### **Piers**

- Accumulation of dirt and debris
- Cracking
- Splitting/spalling
- Corrosion/pitting
- Paint stripping

#### **Girders/Beams**

- Accumulation of dirt and debris
- Cracking
- Splitting/spalling
- Excessive vibrations
- Dampness and staining
- Corrosion/pitting
- Paint stripping

#### **Bearings**

- Accumulation of dirt and debris
- Cracking/splitting
- Excessive vibration
- Dislocated

#### **Vandalism/Graffiti**

- Vandalism
- Graffiti

#### **Signs and Delineation**

- Missing/damaged/orientation/cleanliness.
- Loose and missing bolts.

#### **Road Approach**

- Settlement of approach slab
- Depressions, rutting, shoving etc
- Cracking pavement at culvert

#### **Protection Works/Wingwalls**

- Erosion/scour/voids
- Cracked or missing protection works
- Vegetation growing in protection works
- Gaps between protection works, pavement and structure
- Cracking, spalling, or drummy concrete on wingwalls

#### **Culvert**

- Accumulation of dirt and debris
- Cracking, spalling, or drummy concrete on culvert legs, base slab, culvert soffits
- Cracked pipes
- Spalling of concrete pipes, particularly at joints
- Dislocated pipe joints
- Deformed (seriously out of round) pipes
- Loss of Galvanising from surfaces of corrugated metal pipes
- Corrosion of invert steel pipes
- Signs of corrosion perforation of the steel pipe wall due to corrosion against the soil
- Exposure of the coarse aggregate on concrete surfaces in the inverts and base of culverts legs

#### **Stream**

- Trees, rocks, structures or natural features and scours that could create erosive eddies and scour during large floods
- Erosion of the stream channel at the outlet that could threaten to undermine the outlet structure
- Realignment/meander/blockage of the upstream channel causing the streamflow to be misaligned with the culvert opening

#### **4.1.2 Defect Inspection Routine**

The following table outlines the defect inspection timeframe intervals.

<b>Roads</b>	<b>Defect Inspection Interval</b>	<b>Customer Request Inspection</b>
Link	1 year	5 days
Collector	2 years	5 days
Access Dwelling	2 years	10 days
Access Property	2 years	15 days

- Link inspections occur at least every 12 months.
- Preventative maintenance includes proactive maintenance and planned maintenance. Simple maintenance tasks
- Reactive maintenance includes corrective maintenance and unplanned maintenance. This will extend the life of asset instead of further deterioration.

## 4.2 Bridge Maintenance

Bridge Maintenance is triggered via response to a complaint, enquiry or event (reactive maintenance) or is routine in nature, based schedule of maintenance events.

**Figure 6.2: Intervention standard for routine maintenance**

### 4.10.1 Intervention Standard

<b>Defect/ Prescribed Action</b>	<b>SN 4 - 6</b>	<b>SN 1 - 3</b>
(1) Clean blocked bridge and tunnel scuppers within:	1 day	1 day
(2) Clear litter and debris from bridge or a bridge-sized culvert when the cross sectional area of a waterway is obstructed within 10 metres upstream or downstream by more than:	20 per cent	20 per cent
(3) Repair minor damage to deck footways and pedestrian lifts likely to be hazardous to pedestrian or vehicular traffic within:	1 day	2 days
(4) Make temporary repairs to any railings and traffic barriers damaged by vehicular impact within:	4 hours	1 day

Source: RMS (2013).

Bridge inspections are aligned with the Victorian State Government's Road structures inspection manual.

[Road Structures Inspection Manual 2022 \[PDF 17.9 Mb\]](#)

### 4.2.1 Routine Maintenance

Routine maintenance is scheduled maintenance applied to a bridge outside of reactive maintenance, where a bridge maintenance team will visit a bridge onsite and complete any maintenance works required on the bridge structure where any defects exist outside of intervention levels.

Routine maintenance scheduling operates as per the table below:

<b>Roads</b>	<b>Maintenance Interval</b>	<b>Responsibility</b>
Link	1 year	Depot Operations
Collector	2 years	Depot Operations
Access Dwelling	2 years	Depot Operations
Access Property	2 years	Depot Operations

#### 4.2.2 Reactive Maintenance

Reactive bridge maintenance is undertaken by the depot operations team. It is packaged via a works coordinator who distributes jobs using Confirm WorkZone for execution by crews in Confirm Connect based on identified defects through the inspection process.

<b>Roads</b>	<b>Timeframe</b>	<b>Responsibility</b>
Link	5 days	Depot Operations
Collector	5 days	Depot Operations
Access Dwelling	10 days	Depot Operations
Access Property	15 days	Depot Operations

## 5 Engineering and Projects

### 5.1 Bridge Intervention Definitions

The purpose of bridge intervention definitions is to describe the level of a defect which subsequently requires maintenance to rectify.

The following table outlines the response time to a bridge defect dependant on the road hierarchy that the bridge resides within. Roads with higher utility are graded with higher response objectives specific to items requiring maintenance:

<b>Defect Description</b>	<b>Intervention Response Time</b>			
<b>Road Hierarchy</b>	<b>Link</b>	<b>Collector</b>	<b>Dwelling Access</b>	<b>Property Access</b>
Property Access Deformation in approach greater than 100mm under 2.4m straightedge.	10 days	1 month	3 months	3 months
Cracking greater than 15mm wide and 200mm in length.	10 days	1 month	3 months	3 months
Spalling greater than 40mm in length	10 days	1 month	3 months	3 months
More than 20% silted culvert	1 month	3 months	3 months	3 months
Missing signs.	3 months	3 months	6 months	6 months
Missing safety rail.	3 months	3 months	6 months	6 months
Blocked Scuppers	1 month	3 months	3 months	6 months
Loss of Beaching	1 month	3 months	3 months	6 months
Exposed Reinforcement	10 days	1 months	3 months	6 months
Road defect over Bridge or Major Culvert	10 days	1 months	3 months	6 months

Intervention response times apply from the time of defect identification by council that exceeds the stated intervention level. Identification by Council may be through proactive inspection, reactive inspection following a customer request, or other responsive notification. Where an interim response has been made, the intervention response time shall apply from the time the interim response is completed.

Where multiple defects exceeding intervention levels are identified, intervention shall be prioritised in asset hierarchy order. Where resources are constrained (availability of funds, materials, specialist contractors or specialist equipment), the intervention response times may be extended subject to risks being managed through temporary treatment provisions.

For dwelling and property access roads that are of natural surface or without formation, the intervention standard for natural surface road or track shall apply regardless of the road's hierarchy.

The identification of a defect that exceeds the stated intervention level does not oblige Council to upgrade or maintain the asset to a standard higher than that which it was constructed.

Refer to [Road Structures Inspection Manual 2022 \[PDF 17.9 Mb\]](#) Part 4 Condition State Guidelines and Photographs.

Any visual damage that may affect structural performance or road users or public safety there will be a response time of 24 hours.



Council endeavours to identify defects that exceed the stated intervention thresholds. Where intervention thresholds are exceeded, treatment will be undertaken in accordance with the timeframes identified and subject to available resources.

From the level one and two inspections conducted, the results of these inspections will be up to the engineer's discretion whether a level three bridge inspection is required.

This level of inspection will be conducted by external contractors with the relevant qualifications and certificates.

The level three bridge/culvert Inspection Report will detail a full structural engineering survey and analysis of the structure. Depending on the scenario of each specific structure, this may include bridge modelling (structural analysis), load testing, coring (in concrete bridges and culverts) and other destructive and non-destructive testing methods.

A Level three Inspection gives full details of the structure and failure processes and provide full management recommendations to aid in the completion of the structure management planning process.

## 5.2 Renewal and Capital Works Planning

- Council bridge assets approaching end-of-life or no longer meet community needs, will be considered for renewal.
- Priority of renewal will be determined based on the following factors:
  - Average traffic volume
  - Significance of the asset to the surrounding road network (are there nearby alternative routes?)
  - Significance of asset for agricultural and other key industries
  - Serviceability of the existing structure
  - Date from which the asset has been identified as eligible for renewal
- Renewal of bridge assets will consider foreseeable road network growth, and potential expansions of asset use in the future. Bridges will be designed to meet all current standards and industry best practice documents, including:
  - AS 5100
  - Austroads Guide to Bridge Technology: Set
  - VicRoads Supplement to the Austroads Guide to Bridge Technology
  - VicRoads Bridge Technical Notes
- Risk Assessment based on priority of renewal factors by engineers.
- Decision matrix based on the priority of renewal factors with relevant scaling decided by the engineers.

## 5.3 Renewal Project Management

Bridge renewals will be undertaken as individual projects. Ararat Rural City Council Engineering staff will be responsible for overseeing successful project completion, in accordance with industry best practice standards for project management, and this document.

Key stages of the project are:

- Monitor bridge regularly up to engineers' specification
- Survey of the bridge – with full cross-sectional details of the river and approaches of bridge

- Quote design and construct tender to relevant specifications AS5100

## 6 Contracts and Procurement

### 6.1 Tender Process

The tender process for the renewal of a bridge will be in accordance with Council's Procurement Policy. [Procurement Policy FINAL 30 May 2023.pdf](#)

### 6.2 Financial Tracking of Renewal Projects

Financial Tracking of contracts is undertaken through Council's financial system and associated tracking numbers.

### 6.3 Project Milestone Reporting

Project Milestone Reporting will be undertaken in compliance with funding milestone requirements and contract hold points and key performance indicators.

## 7 Finance and Valuations

This section references councils Valuations Policy – Major Asset Classes

### 7.1 Asset Valuation

Ararat Rural City Council has a responsibility to financially represent its network of bridge assets to fair value. Bridge valuation is conducted using a structure of bridge classes (refer to section 3.2), assigning unit rates to those classes on an annual basis based on real word values and multiplying the area of each individual bridge structure to the assigned unit rate.

### 7.2 Asset Capitalisation

All bridge assets captured and represented within the Asset Management System are capitalised assets within councils financial reporting.

### 7.3 Asset Written Down Value

The current written down value of the bridge asset is defined as the current cost of replacement minus the amount the asset has already depreciated.

### 7.4 Recurrent and Non-Recurrent Assets

All bridge assets are treated as recurrent and financially planned for as a renewal asset.

### 7.5 Asset Depreciation

Bridge Asset Depreciation is the value (\$) of the already consumed portion of the bridge asset. For example, if the bridge asset is expected to last 100 years and it is currently 50 years old then it is determined that 50% of the asset is already depreciated. It is calculated in by taking the current unit rate of replacement and multiplying it against the unit rate of replacement connected to the asset and then against the percentage of the asset already consumed.

### 7.6 Representation of Asset Costings within Finance System

Bridge renewal projects are tracked within the council finance system using 'tracking categories'. Maintenance and general works expenses are tracked at a network layer within the finance system; however, individual works costs can also be reported through the Asset Management System (Confirm).

## 8 Customer Service

### 8.1 Complaints

Complaints will be logged via Council's customer request management system (CRMS).

### 8.2 Request for Service

Customer request for service will be logged via Council's customer request management system (CRMS). Examples of request for service specific to bridges are:

- Potholes on approach, or against abutment.
- Damaged guardrail
- Overgrown surrounds

#### Feedback

General feedback is captured by customer service via email.

### 8.3 Customer Request Management System (CRMS)

Council's customer request system (CRMS) will be used to report and record customer/public requests related to Council assets, including bridges and major culverts. Customers have the ability to log a request online, or phone the request into customer service, who log the request on the customer's behalf. The request is then assessed by the responsible member of staff, and work scheduled accordingly. Once the request is complete, Council staff will notify the customer.

## 9 Risk/Occupational Health and Safety

### 9.1 Safety and Risk Management

All management and operational work related to bridges and major culverts (including risk, incident reporting and safe work methods) will be undertaken in accordance with Council's OH&S Policy and associated procedures. [OHS Policy FINAL 19 January 2021](#)

## 10 Governance/CEO's Office

### 10.1 Management of Plan

This plan will be adopted and managed on a formal four-year cycle of review.

This plan will be stored under councils Governance SharePoint policy manual, owned by the Office of the CEO and be subject to out of cycle review at the discretion of the CEO.

### 10.2 Audit

This plan will be available for all standard audit requirements.

## 11 Organisational Transformation

### 11.1 Asset Digital Monitoring

Taking a 'Smart Cities' approach Ararat Rural City Council looks to take advantage of technology that supports the use of Asset Monitoring in particular the ability to:

- Enhance the accuracy of estimated remaining useful life.
- Enhance the accuracy of current asset condition.
- Enhance the accuracy of measuring asset health.

It is Ararat Rural City Councils intent to trial and implement Bridge Monitoring technology on a bridge structure within the next 12 months.

### 11.2 Asset Alerting Services

Taking a 'Smart Cities' approach Ararat Rural City Council looks to take advantage of technology that supports the use of automated alerting specific to council assets.

Current examples of this include alerting when a public bin along Barkly Street reaches a fullness threshold, or when certain storm water systems exceed volume and flow thresholds.

It is Ararat Rural City Councils intent to trial and implement flood Monitoring technology mounted underneath bridge structures within the next 12 months.

### 11.3 Public Data Access

Road based bridge structures are publicly displayed through the public roads register.

Ararat Rural City Council is currently undertaking an assessment to establish additional data sets related to bridges that may be considered for future public access including

- Condition.
- Attribute.
- Defect.
- Maintenance.
- Financial.
- Spatial.
- Civil and Design.

### 11.4 Predictive Asset Management

The Rural Councils Transformation Program is a state government funded initiative that is funding the current development of Ararat Rural Councils predictive asset management platform. The platform is intended to have development completed in Q3 2023 ready for testing and organisational use in Q4 2023. The core functions of the predicative asset management platform are

- Analytics at both a network and individual asset level to determine if useful life estimates are trending accurately to current useful life valuation predictions.
- Asset in the annual construction of asset financial valuations for calculated assets.



- Forward predict a rolling 10-year roads and bridge capital works program based on current degradation rates of council assets.
- Detailed reporting including spatial insights across asset classes.

### 11.5 Key Performance Indicator Platform

The management of all Council's assets will be measured and tracked via Council's service level key performance indicator system within PowerBI. This system will enable monthly tracking of data identified as critical to success related to the Assets service. This key performance indicator information is viewed and monitored by the CEO.