
NARROMINE SHIRE COUNCIL
ORDINARY MEETING BUSINESS PAPER – 13 JULY 2022
REPORTS TO COUNCIL – INFRASTRUCTURE AND ENGINEERING SERVICES

1. WORKS REPORT

Author	Director Infrastructure and Engineering Services
Responsible Officer	Director Infrastructure and Engineering Services
Link to Strategic Plans	CSP – 4.3.4 Ensure Council's property assets are monitored and well managed

Executive Summary

This report provides information regarding works undertaken for the given period in regards to both operational and capital works.

Report

The Works Report (**Attachment No. 1**) for the period 9 June 2022 to 6 July 2022 is presented to Council for information.

Financial Implications

Council has provision for these services in its Operational Budget.

Legal and Regulatory Compliance

Local Government Act 1993
Roads Act 1993

Risk Management Issues

Nil

Internal/External Consultation

Nil

Attachments

1. Works Report

RECOMMENDATION

That the information be noted.

2. PUBLIC EXHIBITION OF DRAFT ROADS MANAGEMENT STRATEGY

Author	Director of Infrastructure and Engineering Services
Responsible Officer	Director Infrastructure and Engineering Services
Link to Strategic Plans	CSP – 4.3.4 Ensure Council's property assets are monitored and well managed

Executive Summary

This report seeks endorsement to place the updated Narromine Roads Management Strategy on public exhibition for 28 days.

Report

Council conducted a comprehensive review with regards to its roads planning, design, construction and operational activities. As such, the previously endorsed Roads Strategy, which was adopted by Council on 11 December 2013 (Resolution No 2013/459), has been updated to bring it inline with current standards, guidelines and technologies. A review has also been conducted with regards to the Roads Hierarchy and proposed levels of service for Council's rural roads. This Draft Strategy is therefore presented to Council for endorsement and public exhibition, prior to final adoption.

Financial Implications

Improved rural road quality, with increased useful life within Council's allocated budget.

Legal and Regulatory Compliance

Local Government Act, 1993
NSW Local Government (General) Regulation, 2021
Roads Act, 1993
Roads (General) Regulation 2018
Biodiversity Conservation Act, 2016
Environmentally Hazardous Chemicals Act 1995
Environmentally Hazardous Chemicals Amendment Act 1996
Environmental Planning and Assessment Act 1979
NSW Work Health and Safety Act 2011
Mine Health and Safety Act 2004
Dangerous Goods Act 1975

Risk Management Issues

Provides the framework for the, planning, design and management of Council's road network.

Internal/External Consultation

Executive Leadership Team
Councillor Workshop

It is recommended that Council staff hold a number of targeted stakeholder engagement sessions/workshops during public exhibition.

2. PUBLIC EXHIBITION OF DRAFT ROADS MANAGEMENT STRATEGY (Cont'd)

Attachments

1. Draft Roads Management Strategy (**Attachment No. 2**)

RECOMMENDATION

That Council endorses the Draft Roads Management Strategy for public exhibition prior to final endorsement.

3. DRINKING WATER SUPPLY TO TOMINGLEY

Author	Manager Utilities
Responsible Officer	Director Infrastructure and Engineering Services
Link to Strategic Plans	CSP – 4.3.4 Ensure Council's property assets are monitored and well managed

Executive Summary

This report provides information regarding the status of the Tomingley water supply system and to seek resolution with regard to the supply of drinking water to Tomingley.

Report

In 2019 Council received a grant via the NSW Safe Secure Water Program (SSWP080) for the construction and replacement of a water treatment plant to service Tomingley. The existing plant had reached the end of its useful life and had been down-rated from a drinking water status to non-drinking in 2013 as a result of multiple E.coli detections.

The design and construction of all new water treatment plants are governed by Section 60 of the Local Government Act 1993. Any new facility must receive a Section 60 Approval which certifies its capability of delivering drinking water that meets both the Australian Drinking Water Standards and the NSW Health requirements. The NSW Government Safe Secure Program does not co-fund non-drinking treatment systems.

The Tomingley water treatment plant has now reached practical completion, has been commissioned and has undergone a period of Process Proving to ensure it meets all the required standards. A Section 60 approval has been issued by DPE - Water and, following completion of an initial Forensic and Analytical Science surveillance program during Process Proving, the plant has been added to the NSW Health Drinking Water Monitoring Program.

Tomingley is located adjacent to a highway with a high thoroughfare of interstate travellers. Council is aware that significant growth such as 2 major service station developments is currently being experienced in Tomingley, resulting in a higher water demand and water quality requirement. Tomingley currently does not have a drinking water supply and resolution is now required to determine whether Tomingley should be provided with drinking water.

3. DRINKING WATER SUPPLY TO TOMINGLEY (Cont'd)

Financial Implications

Council has contributed 25% of the total capital budget for this project and provision for these services has been made in the Operational Budget. User charges for the 2022/2023 financial year are based on provision of a non-drinking water supply.

The reticulation network will require disinfection and minor modifications before it is converted to a drinking water supply system.

Should Council resolve to provide Tomingley with drinking water, the current fees and charges will need to be reconsidered by Council in accordance with the DPE-Water Best Practice Regulatory Framework July 2022 and the NSW-IP&R Guidelines under the NSW Local Government Act 1993.

The recommended increase in consumption charges would be 7 cents (\$0.07) per kilolitre for the remainder of the 2022-2023 financial year (date of Council resolution) with charges then reviewed as part of the annual IP&R process.

Legal and Regulatory Compliance

Section 60 NSW Local Government Act 1993
Public Health Act 2010 No 127
Public Health Regulation 2012
Water Management Act 2000 No 92

Risk Management Issues

This service will allow Council to provide a drinking water supply to Tomingley, however it will be at an increased cost.

Internal/External Consultation

Council can resolve to supply drinking water to Tomingley and reconsider the fees and charges for provision of such. Should Council resolve to do this, it will need to place its revised fees and charges on public exhibition for comment.

Alternatively, Council could invite written submissions from Tomingley residents and business owners to determine their expectations and ability to pay increased charges.

Attachments

1. DPE-Water Section 60 Letter of approval (**Attachment No. 3**)

RECOMMENDATION

That Council invites written submissions from Tomingley residents and business owners to determine their expectations and ability to pay increased charges.

André Pretorius
Director Infrastructure and Engineering Services

Attachment No. 1

	<p>MONTHLY WORKS REPORT</p> <p>Wednesday 6 July 2022</p>	<p>Infrastructure and Engineering Services Narromine Shire Council Tel: 02 6889 9999 Fax: 02 6889 9998 mail@narromine.nsw.gov.au</p>
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Road and Park users are to proceed with caution at all work sites and observe work signs to ensure safety. Speed zones are enforceable with possible short delays.
 For all enquiries, please contact Council's Infrastructure and Engineering Services Department on 6889 9999

URBAN ROADS	Narromine - Maintenance
Various Streets	<ul style="list-style-type: none"> Gravel patches around kerb and gutter caused by heavy vehicle movement. Pot hole patching around town

URBAN ROADS	Trangie - Maintenance
Various Streets	<ul style="list-style-type: none"> General maintenance

URBAN ROADS	Tomingley - Maintenance
Various Streets	<ul style="list-style-type: none"> General maintenance

UNSEALED ROADS NETWORK	Maintenance – Map 1
Various Unsealed Roads	<ul style="list-style-type: none"> Belmont Road – Drainage works Sharkeys Lane – Maintenance Grade


UNSEALED ROADS NETWORK	Capital
Various Unsealed Roads	<ul style="list-style-type: none"> Nil

UNSEALED ROADS NETWORK	Inland Rail (P2N)
Various Unsealed Roads	<ul style="list-style-type: none"> Works completed

UNSEALED ROADS NETWORK	Capital – Storm/Flood Funding Repair – Map 2
Various Unsealed Roads	<ul style="list-style-type: none"> Culvert cleaning – Belmont Road, Tantitha Road, Farrendale Road

UNSEALED ROADS NETWORK	Biosecurity
Various Unsealed Roads	<ul style="list-style-type: none"> Inspections carried out on previous areas sprayed checking for kill rate. Wet weather has hampered the application of chemicals for road side spraying

Attachment No. 1

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SEALED ROADS NETWORK	Maintenance
Various Sealed Roads	<ul style="list-style-type: none"> • Backwater Road – Shoulder widening • Cold mix patching of potholes


SEALED ROADS NETWORK	Capital
Sealed Roads	<ul style="list-style-type: none"> • Road realignment near Oaks Bridge

SEALED ROADS NETWORK	Biosecurity
Various Sealed Roads	<ul style="list-style-type: none"> • Inspections carried out on previous areas sprayed checking for kill rate. Wet weather has hampered the application of chemicals for road side spraying

SWIMMING POOLS	
Narromine Pool	<ul style="list-style-type: none"> • Closed • Managed by Contractor
Trangie Pool	<ul style="list-style-type: none"> • Closed • Managed by Contractor

PARKS & OPEN SPACE NETWORK CBD Gardens, Parks Ovals, Villages	
Narromine CBD	<ul style="list-style-type: none"> • Ongoing vegetation management • Mulching of garden beds
Narromine Parks & Reserves	<ul style="list-style-type: none"> • General maintenance and mowing • Weed control in all small parks ongoing • Mulching of garden beds
Narromine Sports Grounds	<ul style="list-style-type: none"> • General maintenance, spraying and mowing
Narromine Streets	<ul style="list-style-type: none"> • General maintenance • Street sweeping continues • Street tree pruning • Replacement of dead or unhealthy street trees • Weed spraying town gutters, footpaths, railway crossing

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PARKS & OPEN SPACE NETWORK CBD Gardens, Parks Ovals, Villages	
Trangie CBD	<ul style="list-style-type: none"> • General maintenance and weed control • Vegetation mowing and slashing continuing • Mulching of garden beds
Trangie Parks	<ul style="list-style-type: none"> • General maintenance and mowing
Trangie Sports Grounds	<ul style="list-style-type: none"> • General maintenance, spraying and mowing
Trangie Streets	<ul style="list-style-type: none"> • General maintenance • Street sweeping weekly on Tuesdays • Replacement of dead or unhealthy street trees • Street tree pruning • Weed spraying – drains.


PARKS & OPEN SPACE NETWORK CBD Gardens, Parks Ovals, Villages	
Tomingley Village	<ul style="list-style-type: none"> • General maintenance by Contractor

AERODROME	
Narromine Aerodrome	<ul style="list-style-type: none"> • General maintenance • Mowing • Weed Control

BUILDING MAINTENANCE	
All Buildings	<ul style="list-style-type: none"> • General maintenance as required
Vandalism	<ul style="list-style-type: none"> • Graffiti continues in both Narromine and Trangie
Narromine Medical Centre	<ul style="list-style-type: none"> • General maintenance as required
Council Administration Buildings	<ul style="list-style-type: none"> • General maintenance as required

PUBLIC CONVENIENCES	Narromine
Rotary Park Public Toilets	<ul style="list-style-type: none"> • Toilet facilities cleaned daily • Planning for new toilets has commenced
Burraway Street Public Toilets (adjacent to Pool)	<ul style="list-style-type: none"> • Toilet facilities cleaned daily
Manildra Street Toilets (Saleyards)	<ul style="list-style-type: none"> • Toilet facilities are open 24 hours a day, 7 days a week and are cleaned daily • Toilet and showers have been upgraded
Aerodrome Toilets	<ul style="list-style-type: none"> • Toilet facilities cleaned daily • Now on automatic locks. Toilets open 6am to 7pm
Wetlands	<ul style="list-style-type: none"> • Toilet block secured and cleaned daily • Now on automatic locks. Toilets open 6am to 7pm

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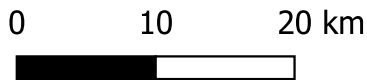
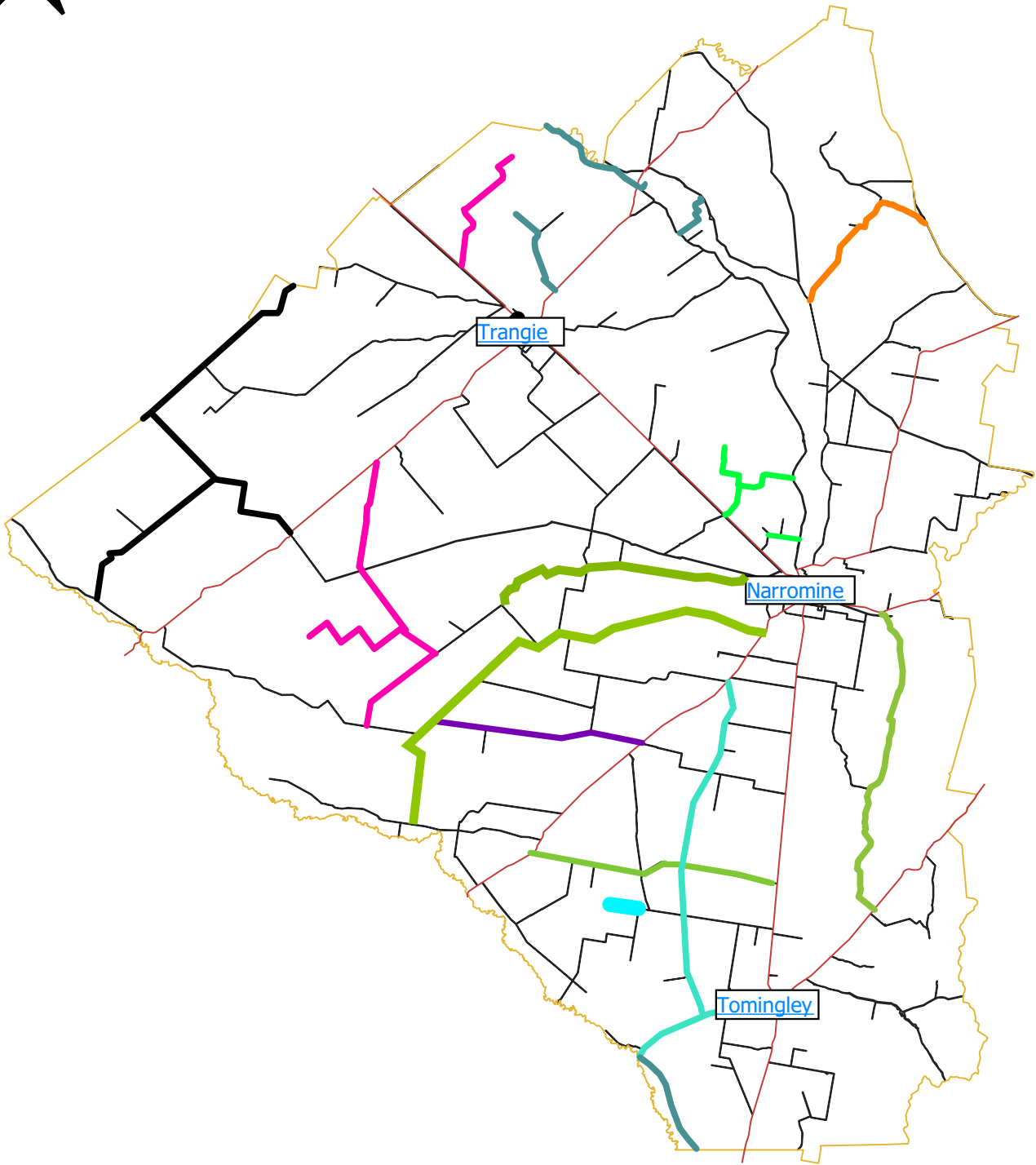
PUBLIC CONVENIENCES	Trangie
Argonauts Park Public Toilets (Goan Waterhole)	<ul style="list-style-type: none"> Toilet facilities cleaned every Tuesday, Thursday and Saturday
Dandaloo Street Public Toilets (adjacent to Bakery)	<ul style="list-style-type: none"> Toilet facilities cleaned every Monday, Wednesday and Friday Planning for new toilets has commenced
Burns Oval Toilets	<ul style="list-style-type: none"> Toilet facilities cleaned every Monday, Wednesday and Friday Now on automatic locks. Toilets open 6am to 7pm
Trangie Truck Stop	<ul style="list-style-type: none"> Checked daily with a main clean every Tuesday and Thursday and either late Saturday or Sunday morning over weekends
Trangie Truck Wash	<ul style="list-style-type: none"> Stakeholder/ users group drop in session was held on 30 June 2022.

CEMETERIES	
Narromine Cemetery	<ul style="list-style-type: none"> General maintenance, mowing and weed spraying Topping-up of subsiding graves continues
Trangie Cemetery	<ul style="list-style-type: none"> General maintenance, mowing and weed spraying Topping-up of subsiding graves continues

WATER AND SEWER	
Narromine	<ul style="list-style-type: none"> Staff continue daily operational Drinking Water Quality Testing as required by legislation. Staff continue reticulation system maintenance. Staff continue regular sewer pump station and STW system maintenance as required. Staff are continuing installation of water meters under the ongoing replacement program.
Trangie	<ul style="list-style-type: none"> Staff have continued with reticulation maintenance. Staff continue regular sewer pump station and STW system maintenance as required. Staff continue daily operational Drinking Water Quality Testing as required by legislation. Staff are continuing installation of water meters under the ongoing replacement program.
Tomingley	<ul style="list-style-type: none"> Regular maintenance at the old water treatment plant. Staff have completed process proving and water quality testing of the new treatment plant and have now commenced routine monitoring as prescribed by NSW Health. Staff have commenced major maintenance of the Tomingley Water Supply storage tanks.















MAINTENANCE ROAD WORKS BY NSC



MAP UPDATED 7 JULY 2022

Narromine Shire Council

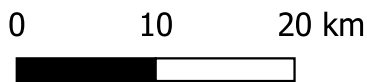
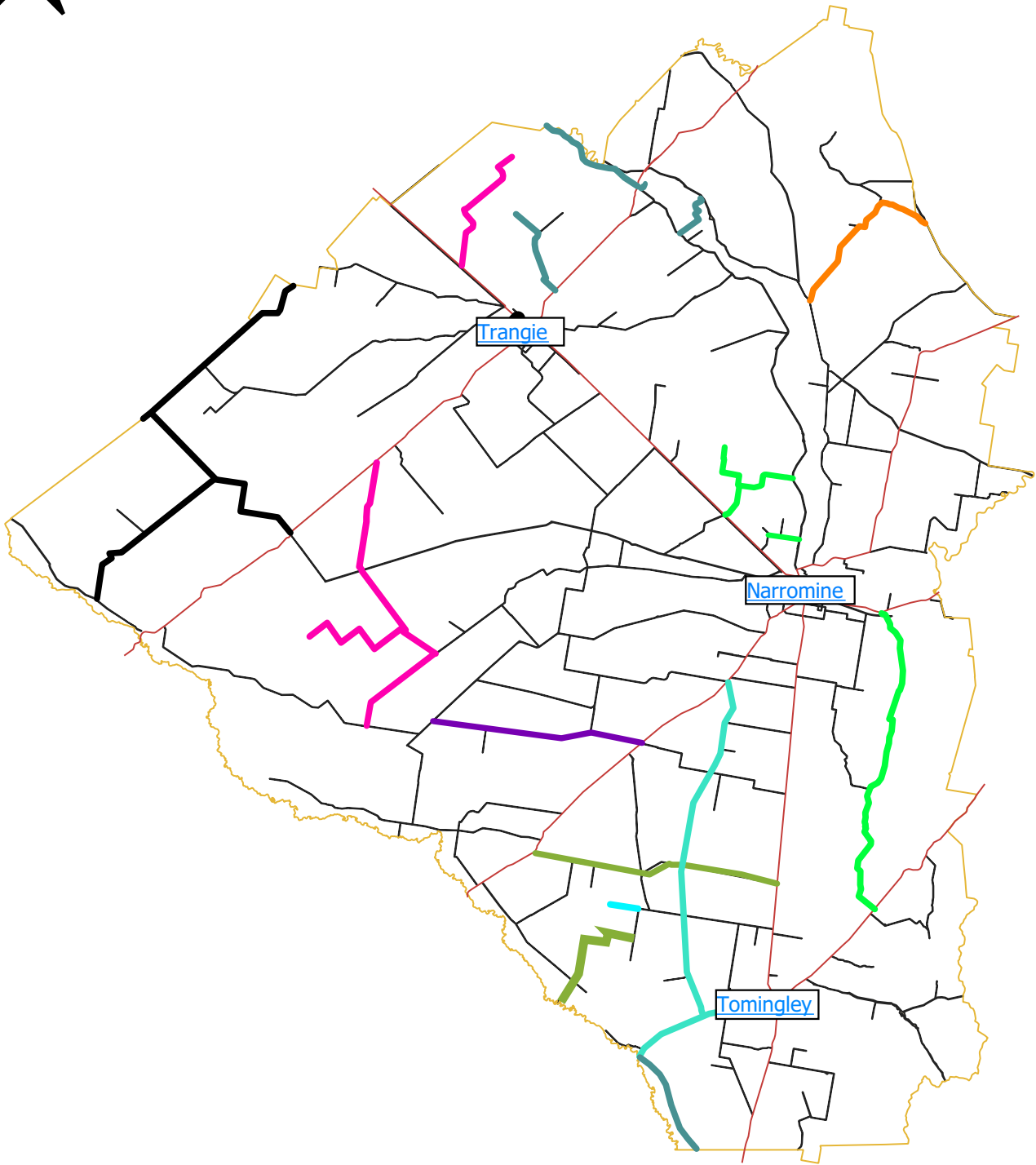
 June	 February	 October
 May	 January	 September
 April	 December	 August
 March	 November	 July



Note

- the roads highlighted are visual purposes only and may not be the exact location of work
- Storm / Flood work is dashed

CAPITAL ROAD WORKS BY NSC



MAP UPDATED 7 JULY 2022

Narromine Shire Council

June	February	October
May	January	September
April	December	August
March	November	July



Note

- the roads highlighted are visual purposes only and may not be the exact location of work
 Reports to Council - Infrastructure and Engineering Services



ROADS MANAGEMENT STRATEGY



JULY 2022

Adopted by Council:

Resolution Number:

Next Revision Due: 2025

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Document Status and Control

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Roads Management Strategy

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Roads Management Strategy

Owner	Narromine Shire Council Infrastructure and Engineering
Prepared by	André Pretorius, Infrastructure and Engineering Services Director
CM 9 Ref	SC561

Document Control

Rev	Description	Created by	Checked By	Authorised By	Date
1.0	Document Created	EMC			June 2013
2.0	Document updated following community consultation	EMC			December 2013
3.0	Document updated following restructure				September 2017
4.0	Document reviewed, formatted and updated based on current guidelines and information – DRAFT Document issued for public exhibition.	AP			July 2022

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Acronyms and Definitions

General Terms

Authorised person or officer	<p>a. An employee of a council generally or specially authorised by the council in respect of or whose duty it is to deal with, or to act in regard to, any acts, matters or things in relation to which the expression is used, or</p> <p>b. An employee in the service of TfNSW who is authorised by TfNSW to exercise the functions of an authorised officer under this Act or that provision, or</p> <p>c. An employee of any other roads authority who is authorised by the road's authority or by TfNSW to exercise the functions of an authorised officer under this Act or that provision, or</p> <p>d. A person of a class prescribed by the regulations who is authorised by TfNSW or any other roads authority to exercise the functions of an authorised officer under this Act or that provision, or</p> <p>e. A police officer.</p>
Council	The council of an area, and includes an administrator.
Councillor	An elected member of a local authority or council.
NSC	Narromine Shire Council

Road Terminology

Term	Definition / Usage
AADT	Average Annual Daily Traffic, which is the most common method used by road agencies, being the total volume of traffic passing a roadside observation point over the period of a calendar year, divided by the number of days in that year (365 or 366 days). The percentage of commercial vehicles within the total volume of traffic is also reported, and can be further broken down into different heavy vehicle types as per the Austroads vehicle classification system.
AEP	Annual Exceedance Probability. The probability that a given rainfall total accumulated over a given duration will be exceeded in any one year.
AMIS	Asset Management Information System

Term	Definition / Usage
ARI	Average Recurrence Interval. The Average Recurrence Interval (ARI) and the Annual Exceedance Probability (AEP) are both a measure of the rarity of a rainfall event. Refer to AEP.
ARRB	Australian Road Research Board
Base course	<p>Layer(s) of material forming the uppermost structural element of a pavement and on which the surfacing may be placed.</p> <p>The layer immediately beneath the wearing course. It provides additional load distribution and contributes to drainage. Base courses are usually constructed out of crushed aggregate or other approved material.</p>
Bound material	A granular or subgrade material to which a binder has been added to improve structural stiffness.
CAD	Computer Aided Design Software
CBR	California Bearing Ratio. It is the measure of the strength of the subgrade of a road or other paved area, and of the materials used in its construction. The ratio is measured using a standardized penetration test.
CoR	Chain of Responsibility. The Chain of Responsibility (CoR) law ensures everyone who works with heavy vehicles – from the business that employs a driver to the place where goods are delivered – is accountable for safety.
CRM	Customer Request Management
DA	Development Application to obtain Development Consent from Council.
DESA	Design Equivalent Standard Axles. An Equivalent Standard Axle is defined as a Dual Tyred Single Axle transmitting a load of 80kN (or 8.2 tonne) to the pavement. Designs are based on equivalent number of standard axles.
ES	Engineering Services
ESA	Equivalent Single/Standard Axle
FAG	Financial Assistance Grant

Term	Definition / Usage
Flexible pavement	A pavement which obtains its load-spreading properties from intergranular pressure, mechanical interlock and cohesion between the particles of the pavement material.
Formation	Refers to the ground conditions upon which the road is constructed, cut (excavation), fill, cut to fill, or natural surface.
Footpaths	Footway has the meaning as contained in the Roads Act 1993 and is hereinafter referred to as "footpath". Used to keep pedestrians, strollers etc., off the road onto a walking path for safe an easy access around town.
HVAG	Heavy Vehicle Axle Group
ID	Infrastructure Delivery
IES	Infrastructure and Engineering Services
Kerbs	The kerb is the raised edge of a pavement which separates it from the road. It provides structural support to the pavement. A kerb is used to direct surface water from the road surface to the drainage system. It provides aesthetic to the road pavement. Kerbs provide safety and security for both carriageway and pedestrian.
LGA	Local Government Area
LOS	Level of Service. LOS is the defined service quality for a particular activity (i.e. roads) or service area (i.e. streetlighting) against which service performance may be measured. Service levels usually relate to quality, quantity, reliability, responsiveness, environmental acceptability and cost.
Pavement	<p>Material used to provide strength to the road in allowing it to withstand traffic, usually gravel layers of differing thickness and properties for roads.</p> <p>Road pavement is one type of hard surface made from durable surface material laid down on an area that is intended to carry vehicular or foot traffic.</p>

Term	Definition / Usage
PBS	<p>Performance Based Standard vehicle. PBS vehicles offers the heavy vehicle industry the potential to achieve higher productivity and safety through innovative and optimised vehicle design.</p> <p>PBS vehicles are designed to perform their tasks as productively, safely and sustainably as possible, and to operate on networks that are appropriate for their level of performance.</p>
Public road	Public road has the meaning as contained in the Roads Act 1993 and is hereinafter referred to as “road”.
Road	<p>Includes—</p> <ol style="list-style-type: none"> a. The airspace above the surface of the road, and b. The soil beneath the surface of the road, and c. Any bridge, tunnel, causeway, road-ferry, ford or other work or structure forming part of the road
Roads Authority	Means a person or body that is, by or under the Roads Act, 1993, declared to be a roads authority and, in relation to a particular public road, means the roads authority for that road.
Road Reserve	Road Reserve is a legally described area within which facilities such as roads, footpaths, and associated features may be constructed for public travel. It is the total area between boundaries shown on a cadastral plan.
Road work	Road work has the same meaning as contained in the Roads Act 1993. It includes any kind of work, building or structure (such as a roadway, footway, bridge, tunnel, road-ferry, rest area, transitway station or service centre or rail infrastructure) that is constructed, installed or relocated on or in the vicinity of a road for the purpose of facilitating the use of the road as a road, the regulation of traffic on the road or the carriage of utility services across the road, but does not include a traffic control facility, and carry out road work includes carry out any activity in connection with the construction, erection, installation, maintenance, repair, removal or replacement of a road work.
REF	Review of the Environmental Factors. A REF is an environmental assessment undertaken to assist in meeting the requirements of Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

Term	Definition / Usage
Sealed surface	Usually bituminous seals or asphalt placed over the pavement, to protect the surface of the pavement from damage under traffic and due to weather or other environmental factors. Also known as the wearing course.
Subbase	Material laid on the subgrade (or selected material), below the base, either for the purpose of making up additional pavement thickness, to prevent intrusion of the subgrade into the base, or to provide a working platform. The subbase course is typically a granular borrow that is placed between the base and subgrade.
Subgrade	<p>Subgrade is that portion of the earth roadbed which after having been constructed to reasonably close conformance with the lines, grades, and cross-sections indicated on the plans, receives the base material.</p> <p>The subgrade may contain a layer of selected subgrade material in the Selected Material Zone (SMZ) and other layer(s) on top of the natural subgrade.</p>
TfNSW	Transport for NSW
Unbound material	A granular material with no significant capacity to resist tensile stresses.
Wearing course	Usually bituminous seals or asphalt placed over the pavement, to protect the surface of the pavement from damage under traffic and due to weather or other environmental factors. Also referred to as sealed surface.
WOL	Whole of Life. It is the total cost of ownership over the life of an asset. The concept is also known as life-cycle cost (LCC) or lifetime cost, and is commonly referred to as "cradle to grave" or costs.

1 EXECUTIVE SUMMARY

This Roads Management Strategy (the Strategy) has been developed to ensure the operational functions of Council are in line with:

- The legislative requirements such as the NSW Roads Act 1993, and Roads Regulations 2008;
- Relevant guidelines and standards to ensure a consistent and industry adopted approach in terms of road planning, road design, road construction and road maintenance;
- Strategic directions adopted by Narromine Shire Council Asset Management Strategy, Asset Management Plans and Long-Term Financial Plans;
- Community (Residential, Commercial and Industrial) needs and expectations;
- NSW Government Future transport Strategy 2056; and
- Draft Central West and Orana Regional Transport Plan, October 2021

This Strategy describes how Council manages its road network to ensure that Council has a consistent, clear and sustainable approach to its road management and roads operations.

It principally addresses matters relating to roads and streets which are the responsibility of Council as the Roads Authority. These include:

- Regional Roads;
- Local Rural Roads;
- Local Urban Streets;
- Bridges and culverts; and
- Other ancillary infrastructure (roadside drainage, signs, line marking, traffic islands, pedestrian crossings, guard rails, etc.).

The Strategy provides a transparent sustainable management approach for Narromine Shire Council to construct and maintain roads under its control which reflect the needs of the community as the road network authority, to provide infrastructure that allows safe, convenient and comfortable travel to, from, and within the Region. This involves both maintaining existing roads and planning for future improvements. This Strategy seeks to consolidate and define a number of procedures such as:

- Roles and responsibilities for different departments within Council;
- Road hierarchy descriptions, standards and requirements;
- Customer query, complaint, and request management;

- Frequency based inspection regimes;
- Programmed maintenance and intervention standards;
- Capital works identification and prioritisation;
- Levels of service and response guidelines for defects;
- Reporting guidelines, content and audience; and
- Implementation and quality control of road work.

The Local Government Area will experience significant growth over the coming years as a result of the construction of Inland Rail (N2N), which will require temporary accommodation, haul roads, etc., as well as various developments within the Local Government Area, expansion of the mine at Tomingley, and development approximately 8km south of Narromine near Narwonah Road.

Further to this, growing attention to extreme weather events and the long-term impacts of climate change have begun to focus efforts nationally and internationally on the ability of society and infrastructure to adapt to and recover from future changed conditions and associated disasters. The term “*resilience*” has generally come to represent this adaptation/recovery ability. In the last decade, resilience has become a priority consideration in the planning, design, construction, operations, and maintenance of infrastructure.

In the transportation sector, a shift in focus has begun to develop guidance on how scientific climate change predictions can be expected to impact transportation infrastructure and operations. More recently, this guidance has included how resilience can be integrated into infrastructure as a means to address both long-term climate change impacts and short-term extreme events.

It is Council’s objective to have all roads with hierarchy 1-3 fully sealed by 2050.

2 INTRODUCTION

The Roads Management Strategy (the Strategy) describes how Council manages its road network to ensure that Council has a consistent, clear and sustainable approach to its road management and road operations. This Strategy details the management system that the Council proposes to implement its duty to inspect, maintain and repair public roads for which the Council is responsible by:

- Establishing a management system for the road functions of Council which is based on policy, operational objectives, funding, and available resources; and
- Specifying the relevant standards in relation to the discharge of duties in the performance of those road management functions.

This Strategy principally addresses matters relating to roads and streets which are the responsibility of Council as the Roads Authority. These include:

- Regional Roads;
- Local Rural Roads;
- Local Urban Streets;
- Bridges and culverts; and
- Other ancillary infrastructure (roadside drainage, signs, line marking, traffic islands, pedestrian crossings, guard rails, etc.).

The Local Government Area will experience significant growth over the coming years as a result of the construction of Inland Rail (N2N), which will require temporary accommodation, haul roads, etc., as well as various developments within the Light Industrial Precinct, expansion of the mine at Tomingley, and development approximately 8km south of Narromine near Narwonah Road.

Further to this, growing attention to extreme weather events and the long-term impacts of climate change have begun to focus efforts nationally and internationally on the ability of society and infrastructure to adapt to and recover from future changed conditions and associated disasters. The term “*resilience*” has generally come to represent this adaptation/recovery ability. In the last decade, resilience has become a priority consideration in the planning, design, construction, operations, and maintenance of infrastructure.

In the transportation sector, a shift in focus has begun to develop guidance on how scientific climate change predictions can be expected to impact transportation infrastructure and operations. More recently, this guidance has included how resilience can be integrated into infrastructure as a means to address both long-term climate change impacts and short-term extreme events.

2.1 Roads Classifications in NSW

2.1.1 State Roads

State Roads have the followings function in NSW:

- Links major commercial, industrial and residential areas and distribution centres and ports within the Sydney, Newcastle, Wollongong and Central Coast urban centres;
- Links major NSW towns (pop. 10,000-100,000) with the Sydney, Newcastle, Central Coast and Wollongong urban centres;
- They link these major NSW towns with each other where there is significant interaction; and
- Links major regions throughout the State with each other.

2.1.2 Regional Roads:

Regional Roads have the following functions in NSW:

- Links smaller towns within the State Road network;
- Connects smaller towns with each other;
- Performs a sub-arterial function in major urban centres by:
 - Supplementing the State Road network for significant intra-urban flows; and
 - Providing access for significant flows to other commercial and industrial centres.
- Provides access from the State Road network to major recreation and tourist areas of State significance;
- Provides a town or suburban centre relief route for significant flows of through traffic, especially freight vehicles;
- Provides access for significant flows of freight vehicles to major rural intermodal interchanges and urban distribution areas.

The above list is the broad summary of the criteria and it is noteworthy that there are additional tests for function that are too numerous to provide in this Strategy.

2.1.3 Local Roads

Local Roads have the following functions in NSW:

- Comprise the remaining council-controlled roads which provide for local circulation and access; and

- Responsibility of Councils to fund, determine priorities and carry out works.

The State Government provides only limited assistance under special programs (e.g. Urban Bus Routes).

The Federal Government has a long-standing role in providing road funds to councils. It provides annual financial assistance grants to councils that include a significant identified roads component. In 2000, the Federal Government introduced the Roads to Recovery Program to provide additional funding to councils. Councils have discretion to use their Federal funds for works on any category of road.

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The figure¹ below provides a graphical representation of the roads classification system in NSW.

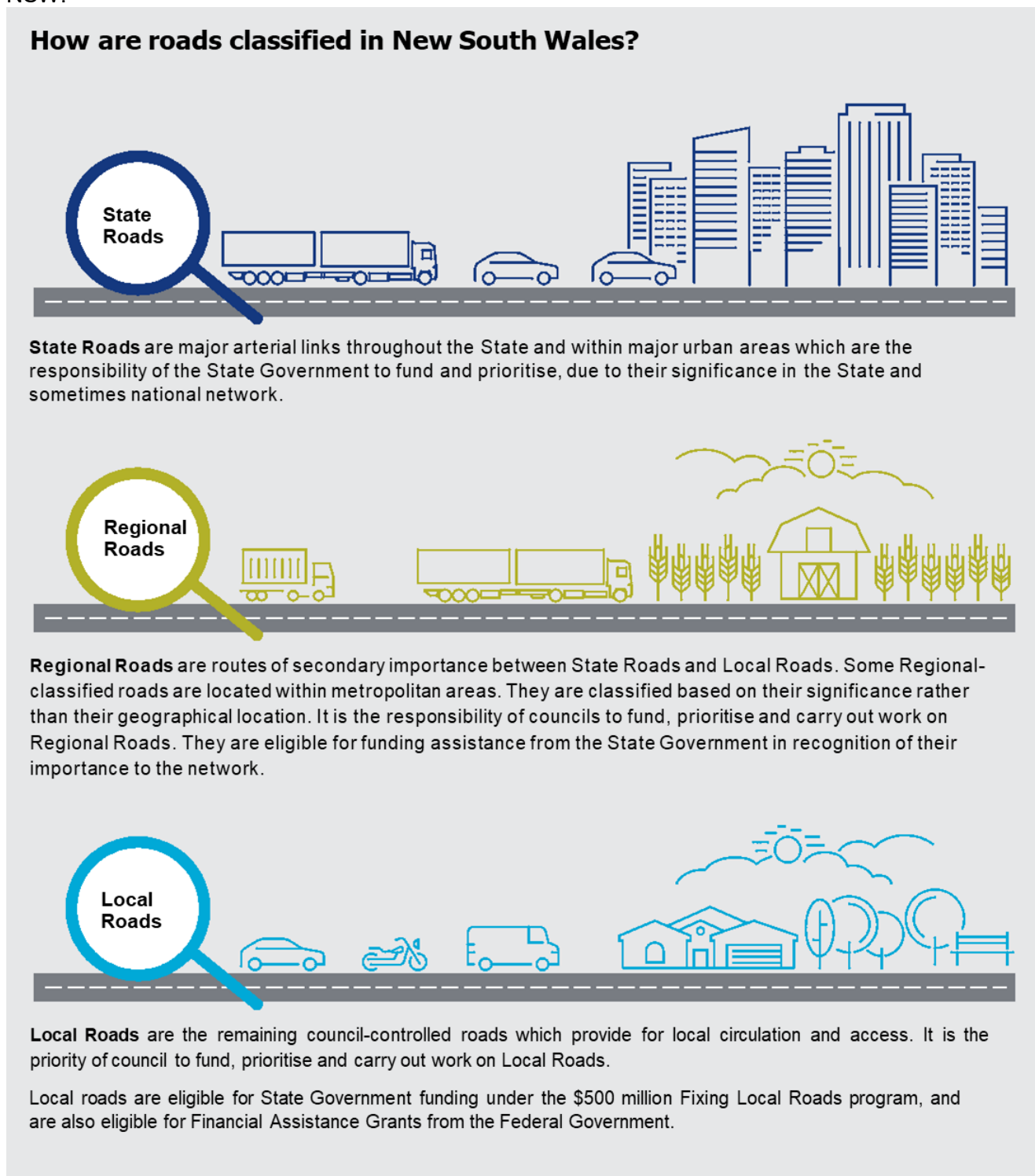


Figure 1 Roads classification system in NSW

¹ Transport for NSW: NSW Road Classification Review and Transfer 2020 information sheet

3 LEGISLATIVE REQUIREMENTS

The following is a summary list of legislation and Acts that are applicable to the Roads Assets at Narromine Shire Council, but not limited to:

- Local Government Act, 1993;
- Roads Act, 1993;
- Roads (General) Regulation 2018;
- Biodiversity Conservation Act, 2016;
- Environmentally Hazardous Chemicals Act 1995;
- Environmentally Hazardous Chemicals Amendment Act 1996;
- Environmental Planning and Assessment Act 1979;
- NSW Work Health and Safety Act 2011;
- Mine Health and Safety Act 2004;
- Dangerous Goods Act 1975; and
- All regulations, awards, codes and/or guidelines pursuant to any of such Acts and any enactments in lieu of such Acts as may be repealed.

4 RESPONSIBILITIES

The roles and responsibilities and their relationships within Council is presented in the cycle diagram below.

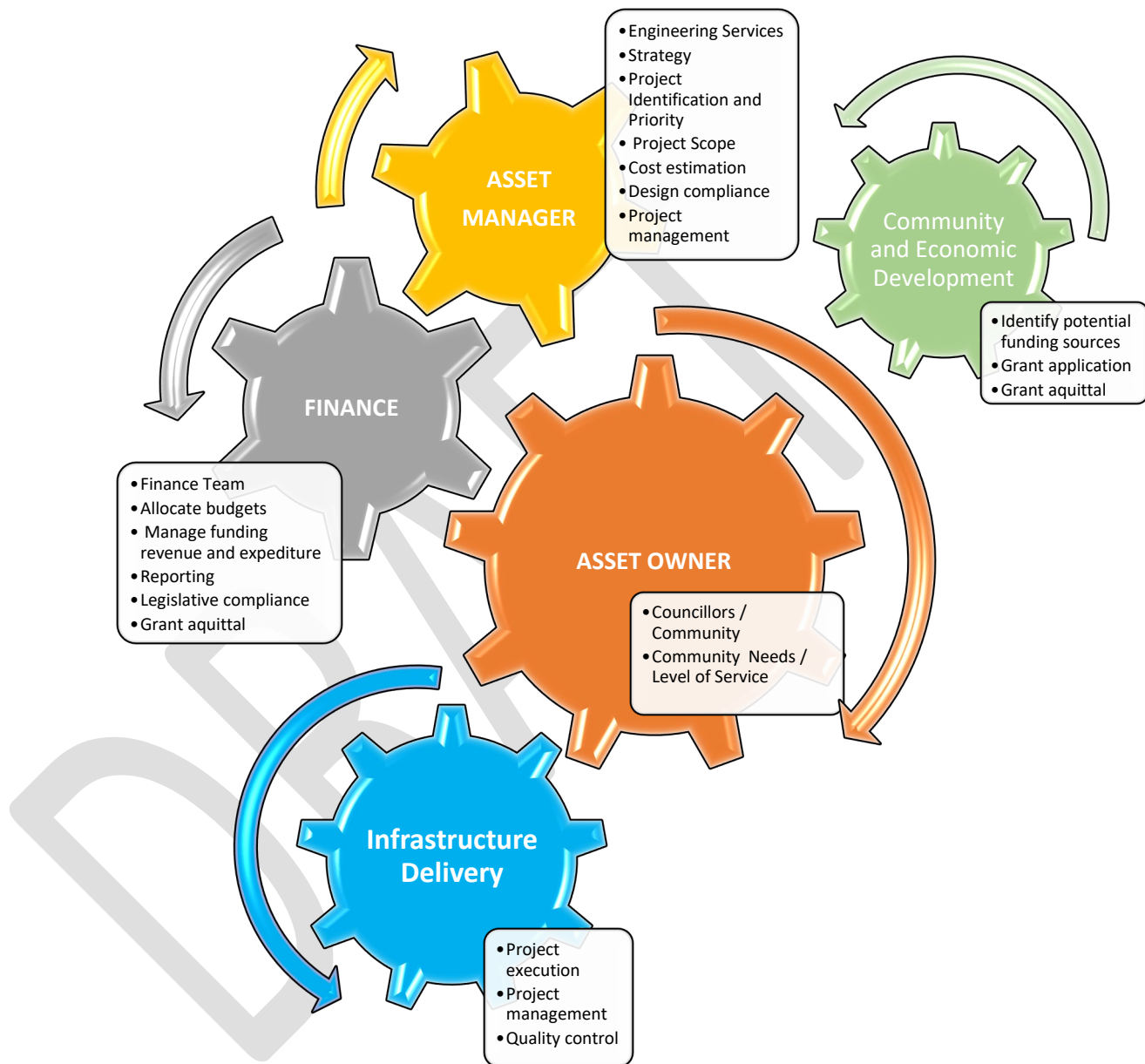


Figure 2 Council inter-relationship diagram

A broader description of inter departmental roles and responsibilities are presented in the table below:

Table 1 Inter-departmental roles and responsibilities

Description	Role	Responsibility
Councillors	Determine level of service, and needs of the community.	Review all considerations and make decisions. Actively participate at relevant Section 355 Committees or working groups.
Mayor		Ensure decisions are made by councillors. Lobby for support at all levels of Government.
General Manager	Ensure Council staff are aware of their roles and responsibilities with regards to roads planning and operations	Implement decisions of council.
Director of Finance and Corporate Strategy	Ensure staff are aware of their responsibility, and have appropriate skills and qualifications.	Advise what funding is available for Capital and Operating budgets Manage funding revenue and expenditure.
Director of Infrastructure and Engineering Services	Ensure staff are aware of their responsibility, and have appropriate skills, competencies and qualifications.	Identify works and operational programs in consultation with various stakeholders and management plans for implementation Ensure relevant documentation and strategies are reviewed and updated to align with best practice, market trends and current technology while satisfying Council's risk appetite. Allocated projects delivered on time, to specified quality and budget.

Description	Role	Responsibility
Director Community & Economic Development	Ensure staff are aware of their responsibility, and have appropriate skills, competencies and qualifications	Assist with grant applications or other funding sources in consultation with the Director of Infrastructure and Engineering.
Infrastructure Delivery Manager / Works Manager	Management of the engineering side of road infrastructure operation, maintenance and capital works.	Allocated projects delivered on time, to specified quality and budget. Operations are constantly reviewed in line with current best practice and working environment.
Manager Engineering Services	Responsible for design of capital works, preparation of detailed project plans, monitoring and control of project quality and delivery.	Detailed planning and design, signing off when project milestones are achieved. Investigation and prioritisation of projects. Preliminary planning and costing
Manager Projects and Contracts	Coordinate Contracts and Project related documentation with relevant staff.	Assist in ensuring relevant project and contract related documentation, business cases, and the like is defensible, and that correct procurement methods have been followed.
Engineering Liaison Officer	Assist with Contract Management and supervision. Liaison with public and relevant teams in the Engineering and Infrastructure Section	Assist with the coordination of Contractors, and supervise contract work relating to roads.
Road Overseer	Deliver project plans	Day to day project management, supervision and leadership of crews and contractors on site.

Description	Role	Responsibility
Asset and Fleet Coordinator	Ensure staff are aware of their responsibilities, Maintain asset management plans, and strategies	Maintaining asset registries, creating annual Capital and Operational plans, and programs. Developing Long term financial plans
Civil Designer	Design support	Project investigations, prepare cost estimates, and scope of work from which a detailed plan can be formulated.
Asset Inspector	Conduct inspections and recommend corrective actions.	Planned condition assessment inspections, and customer enquiries.

The Roads Management of Council is divided within the Infrastructure and Engineering Services (IES) Section between the Engineering Services (ES) and Infrastructure Delivery (ID) groups. Internal support is further obtained or given to Council's Finance and Economic Development departments.

4.1 Engineering Services

ES has a role in the asset management across all categories of Council assets. For Roads the ES is responsible, under the direction of the Director, for:

- The strategic planning of the road network;
- Determination and allocation of budgets for capital works (new and renewal) under the guidance of Finance and Corporate Strategy;
- Grant funding applications to relevant State and Federal roads agencies as well as through the assistance of the Economic Development section to other external funding streams;
- Inspection of network to determine asset performance, condition, replacement and maintenance;
- Creation of Capital Works and Maintenance Programs in consultation with the Infrastructure Delivery group;
- Supporting the relevant sections with Asset Revaluations;
- Financial reporting and acquittal of grants with assistance from the Finance Section; and

- Capturing and recording relevant financial and Asset Management Information System (AMIS) for reporting.

4.2 Infrastructure Delivery

The ID, under the direction of the Director, is responsible for:

- Implementing the asset management plans prepared by the ES;
- Implementation of relevant works programs; and
- Recording of relevant data for the Asset Management Information System (AMIS).

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5 STAKEHOLDERS

The table below shows stakeholders and how stakeholder input is managed.

Table 2 Stakeholder input

Stakeholder	Stakeholder matters	Key messages	Participation and feedback options
State and Federal Government	<ul style="list-style-type: none"> Provides funding. 	<ul style="list-style-type: none"> Grant application to meet set criteria and submitted on time. Equitable distribution of funds between local government areas. 	<ul style="list-style-type: none"> Regular consultation. Project updates. Local Traffic Committee Meetings. Road Safety Audits.
Councillors	<ul style="list-style-type: none"> Have a say in proposed strategy. Endorse this Strategy by Council Resolution. Create awareness and supports the implementation of this Strategy. 	<ul style="list-style-type: none"> This Strategic plan is a communication tool and a pathway to a sustainable fair network with no extra burden to residents, business, or industry within financial constraints of Council. 	Councillor Workshop and community consultation.
Residents	<ul style="list-style-type: none"> Have a say in proposed strategy. Perception of fairness. Getting value for money. “All weather service” regardless of location. Responsiveness to request for service. 	<ul style="list-style-type: none"> The system determines what is required and the priority of the work. Regular benchmarking and quality management. KPI’s measured ensures Council is getting value for money. 	Community consultation.
Commercial Businesses	<ul style="list-style-type: none"> Have a say in proposed strategy. 	<ul style="list-style-type: none"> There is a strategy, and a fair planning 	Community consultation.

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Stakeholder	Stakeholder matters	Key messages	Participation and feedback options
	<ul style="list-style-type: none"> Perception of fairness. Getting value for money. 	<ul style="list-style-type: none"> and delivery mechanism Certainty and trust that projects will be delivered when they are proposed. 	
Industry	<ul style="list-style-type: none"> Have a say in proposed strategy. Perception of fairness. Getting value for money. 		Community consultation.
Agriculture Producers	<ul style="list-style-type: none"> Have a say in proposed strategy. Responsiveness to request for service. Drainage “All weather service” regardless of location. Perception of fairness Getting value for money 		Community consultation.
Council indoor staff	<ul style="list-style-type: none"> Have a say in proposed strategy. Minimal additions to current workloads 	<ul style="list-style-type: none"> This Strategic plan is a communication tool and a pathway to a sustainable fair network with no extra burden to residents, business, or industry within financial constraints of Council. 	Engineering and Assets team reviews, Councillor workshop.
Council outdoor staff	<ul style="list-style-type: none"> Have a say in proposed strategy. Structured programs. Want to understand place in process. 	<ul style="list-style-type: none"> The system determines what is required and the priority of the work. Regular benchmarking and quality management. KPI's 	Team leader workshops. Engineering and Assets team reviews.

Stakeholder	Stakeholder matters	Key messages	Participation and feedback options
		<p>measured ensures Council is getting value for money.</p> <ul style="list-style-type: none"> • There is a strategy, and a fair planning and delivery mechanism • Mechanism to ensure projects will be delivered when they are proposed. • Environment that foster new technology and innovation 	

5.1 Community Needs

Generally, for the purpose of road use the community can be divided into four categories:

- **Local Residents** - Generally local residents would like to have roads that reduce noise and air pollution, are aesthetically pleasing, enhance vehicular, pedestrian and bicycle safety, and maintain mobility and access.
- **Commercial / Industrial Sector** - To aid the operation of business in general, the commercial / industrial sector requires roads that are aesthetically pleasing, enable easy and safe access to and from their business, provide sufficient parking to potential customers, and provide safe pedestrian access to their premises.
- **Agriculture** - To aid the operation of business in general, the agriculture sector requires roads that are aesthetically pleasing, enable easy and safe access to and from the origin, have a high survivability pavement in terms of heavy vehicle movements and with adequate drainage in place.
- **Those passing through the Council area** - Generally, road users passing through the Council area require safe roads that minimise delays.

6 REQUEST FOR SERVICE OR COMPLAINTS MANAGEMENT

6.1 General

Engineering Services will address Customers or Community concerns regarding current asset condition, desired asset condition, intervention levels, strategy, and future proposed works on specific assets.

Infrastructure Delivery will address customers concerns regarding current quality of workmanship during recent completed work, delivery of current work, technical matters, and Road closures/ Road work set up.

6.2 Customer Requests

Customers can lodge a request for service by either personal visit, phone call, email, letter or a smart device application “APP” such as “NeatStreets” or “SnapSendSolve”. Customer requests and enquiries are entered and captured in our Customer Request Management (CRM) system or Records Management system, currently Content Manager 9 (CM9), and work-flowed to the responsible officer for investigation, actioning and close out. CRMs and CM9 requests are generally completed as per Council’s Customer Service Policy

6.3 Customer Complaints

Where Council failed to address a CRM or the customer is not satisfied with a response or action, then that customer may lodge a complaint to the General Manager for further investigation in accordance with Council’s Complaint Handling Policy. Note, a request for service is not a complaint.

6.4 Defects

Defects can be recorded by trained staff by either routine asset inspections through our defects reporting software “Reflect” or “Konect”. Urgent work is then recorded in the CRM system. Non-urgent work is programmed to be actioned as part of ongoing operational and capital works programs. General inspection data is captured via “iAuditor” software.

7 ASSET PLANNING and ASSET LIFECYCLE

7.1 General

Transport for NSW (TfNSW) is the Responsible Road Authority for fully funding and managing the arterial road network (State Roads) that passes through Narrromine Shire which consists of:

- Mitchell Highway (National Route 39) and its corresponding road reserve; and
- Newell Highway (National Route 32) and its corresponding road reserve.

Narrromine Shire Council, if successful, is in the process of reclassifying and transferring the following roads to the state:

Table 3 Proposed roads for reclassification

Road Name	Proposed Status	Current Status	Length (km)	Average Annual Daily Traffic (AADT)	% Heavy Vehicles
Peak Hill Rd (MR 89)	State	Regional	37.5	1019	35
Manildra Culling	State	Local	1.6	1992	49
Warren Rd	State	Local	0.7	TBA	TBD
Eumungerie (MR 572)	State	Regional	34.77	770	46
Trangie-Dandaloo (MR 347 D)	State	Regional	31.09	423	25
Trangie- Collie (MR 347 C)	State	Regional	44.66	695	25
Tullamore Road (MR 354)	State	Regional	41.18	787	48
Gainsborough ²	Regional	Local	1.8	Approx. 787	Approx. 48

² Gainsborough Road has been identified to be upgraded to convey heavy vehicles from Tullamore Road to Tomingley / Peak Hill Road (MR 89) through Narrromine.

Narromine Shire Council is the Responsible Road Authority for managing the remaining road network within the Narromine shire boundaries. Narromine's Road network is classified into 3 categories:

- State Roads managed by Transport for NSW with capital works funded by the State Government;
- Regional Roads managed by Council with capital works majority funded by State Government while maintenance works are funded by Council;
- Local Roads managed by Council and majority funded by Council with some federal assistance.

Generally, Town Streets (Narromine, Trangie, and Tomingley) managed by Council and funded entirely by Council

Funding sources are described in detail in Section 19 of this document. Council may apply to funding bodies for grants for capital works activities within towns.

Council's Road Register includes details of public roads for which Council is responsible. Council is generally responsible for the overall management and development of the Council's local road network. Council does not maintain privately owned roads.

The Register of Public Roads establishes a Council road classifications or "hierarchy" which is based on the function that each road performs. The road hierarchy adopted by Council reflects the perceived risk associated with the vehicle usage of each road type and is used to differentiate service levels and maintenance standards. Local circumstances such as the influence of schools, hospitals, community facilities or particular concentrations of older, disabled or other potentially vulnerable users are also considered.

Inspections of the road network form the cornerstone of the maintenance or renewals program and are undertaken on a regular basis to ensure that the road assets are being maintained in an appropriate manner and that adopted intervention levels are being met.

This plan assumes that existing levels of service targeted by Council will generally be to the satisfaction of the community once the whole network is brought into line with its required standard within the hierarchy.

There is a need to seek a balance of the economic, social, safety and environmental expectations of the community as well as the requirements of the Act and regulations to achieve 'reasonable' service targets. A combination of road risk analysis, road hierarchies, and road condition assessments are used to determine the response times for road maintenance or renewals.

As community expectations change and/or budgetary constraints are realised, it will be necessary to review the levels of service stated in this Strategy, and other supporting documentation such as the Roads Asset Management Plan and Policies, including associated hierarchy. Response times and Level of Service targets will be reviewed at agreed intervals.

7.2 Asset Planning Philosophy and Objectives

“The management of the road network recognises the importance of the Council’s road system in catering for the economic and social activities of the Community and that the effectiveness of management practices reflects on the wellbeing and prosperity of the Shire’s residents and businesses.”

The figure below illustrates Council’s Roads Asset Planning Philosophy

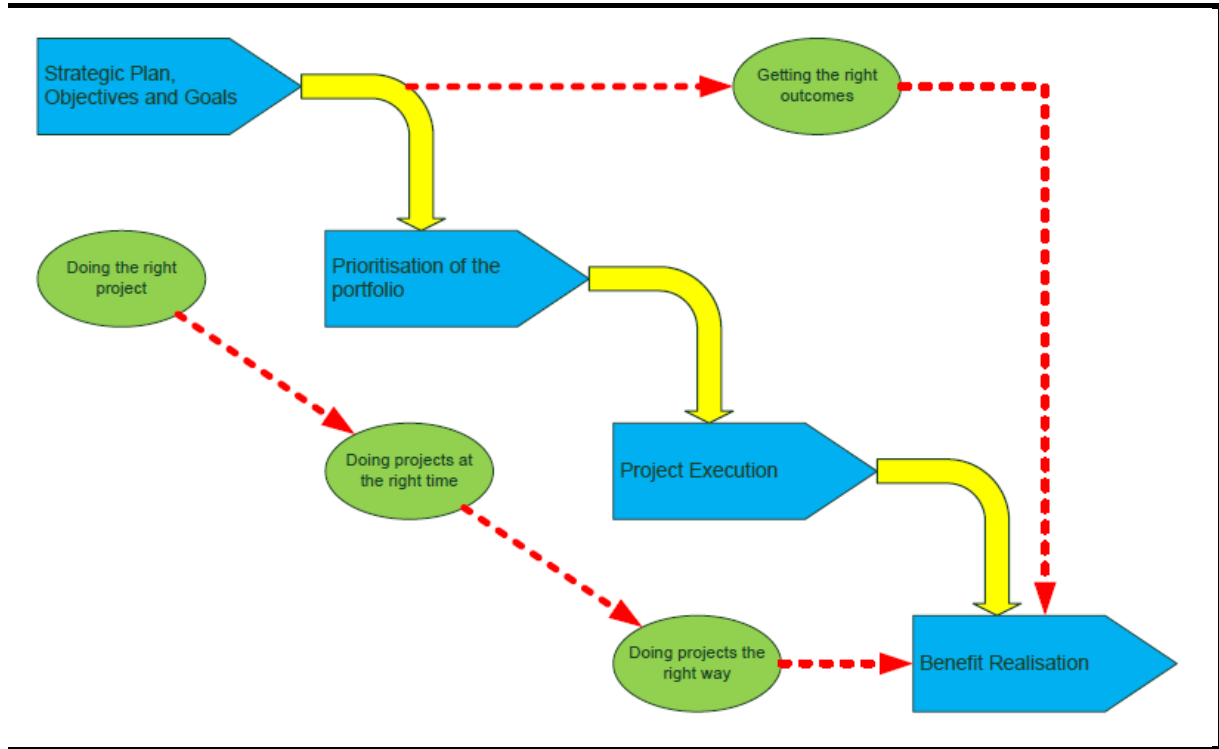


Figure 3 Roads and Asset planning philosophy

The road asset planning objectives are presented in the diagram below.

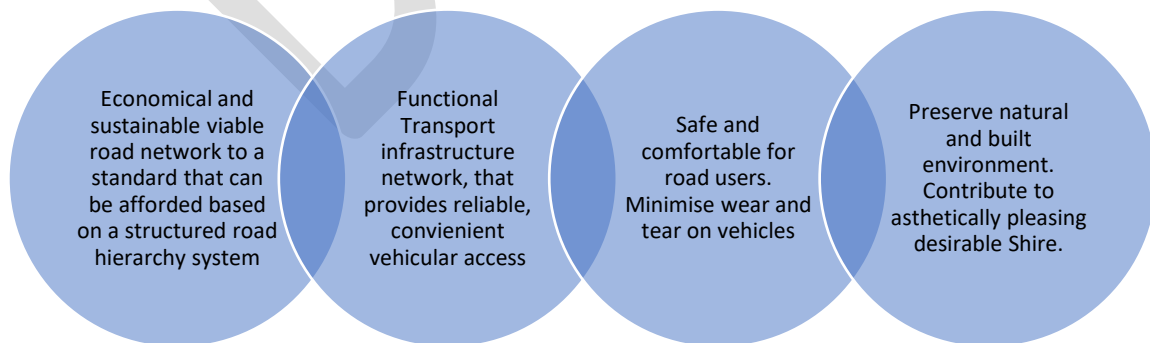


Figure 4 Road asset planning objective

7.3 Road Asset Lifecycle

Council's Road Asset Lifecycle is based on:

- Asset Planning which is based on this Strategy and 10-year plans;
- Asset design, where the road asset is designed to meet relevant standards and Level of Service (LOS);
- Asset Construction where the road asset is constructed as per the design and to the desired quality;
- Asset Maintenance where the road asset is maintained as per the planned maintenance strategy for that asset; and
- Asset Renewal / Disposal where the road asset is either renewed, upgraded or disposed as per the renewal strategy.

The figure below illustrates the Road Asset Lifecycle

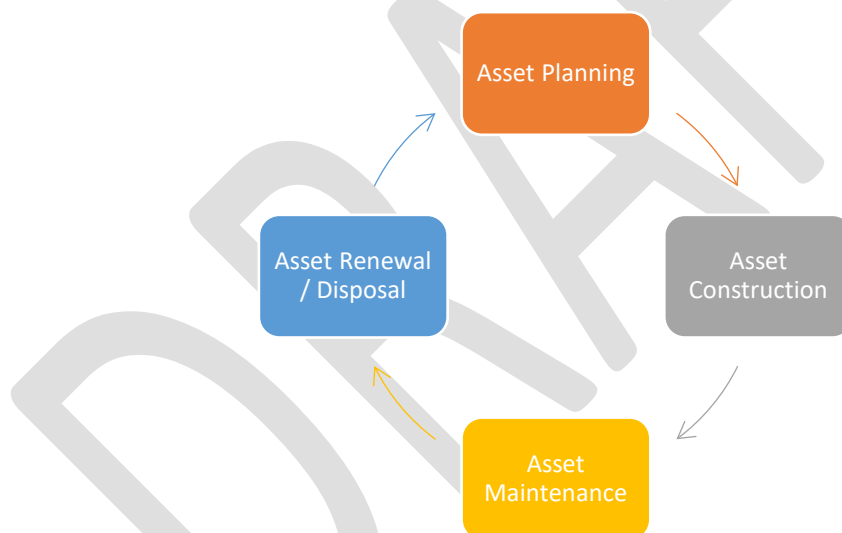


Figure 5 Road asset lifecycle

In the past Council has been minimising road renewal or maintenance works to meet the allocated budget. This has been achieved by:

- Utilising available resources on the more strategically important roads;
- Deferring or reducing renewals and planned maintenance due to a range of factors; and
- Assigning a lesser importance to road drainage during construction and maintenance activities.

The effects of these practices are minimal in the short term and seem to benefit Council in terms of cost savings or satisfying a specific road user group. However, the long-term effects on future generations can be significant.

This is best displayed by a simple theoretical “Life Cycle Cost” analysis on 1km of an average rural road. The theoretical deterioration of a maintained and unmaintained road pavement is shown graphically in the figure below, under ideal conditions and discounting external factors (e.g change in traffic behaviour and environmental conditions).

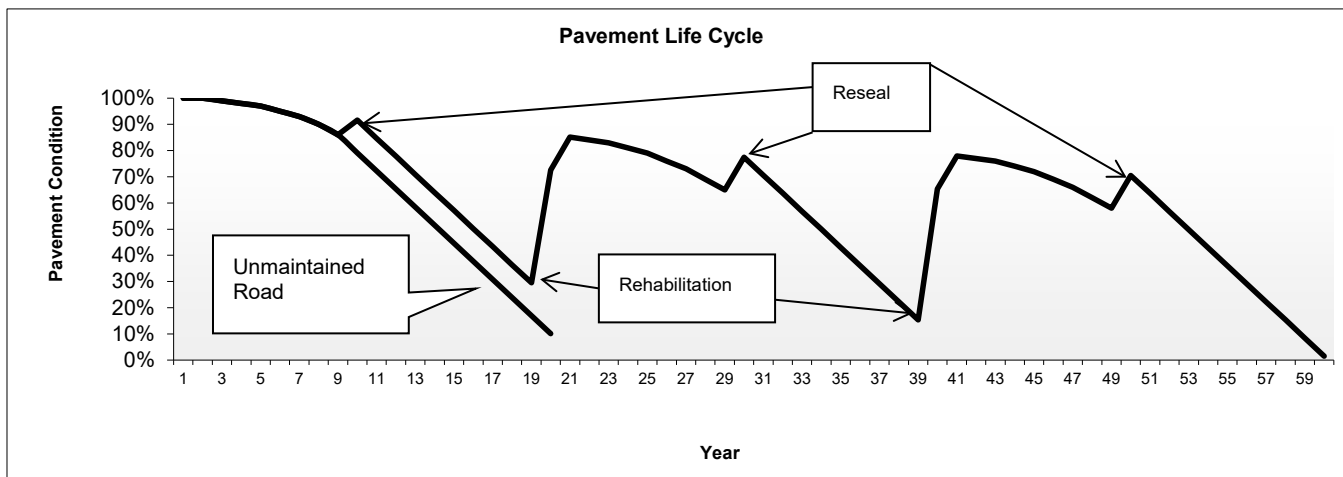


Figure 6 Theoretical pavement lifecycle

This graph shows that by undertaking regular periodic maintenance (reseal every decade and pavement rehabilitation every 20 years) the actual theoretical physical life of a road pavement could be extended from its intended design life of 20 years to about 60 years.

Using this graph as a guide, the difference in yearly costs associated with carrying out sufficient renewals versus not carrying out sufficient renewals on a road is outlined in the table below.

Table 4 Cost comparison between a maintained and unmaintained sealed rural road

1km of Average Rural Road with a Spray Seal, Granular Pavement with a 30-year Design			
Road not Maintained (estimated physical life of 20 years)		Road Maintained (estimated physical life of 60 years) with periodic maintenance carried out.	
Initial Construction Cost	\$350,000	Initial Construction Cost	\$350,000
Total Routine Maintenance Cost (average of \$3,200/km/a maintenance grade)	\$96,000	Total Routine Maintenance Cost (average of \$2,500/km/year)	\$150,000
Reconstruction Cost at year 20	\$290,000	Total Resealing Cost (every 10 yrs for 8m wide seal @ \$2.50/m ²) excl traffic control.	\$80,000

1km of Average Rural Road with a Spray Seal, Granular Pavement with a 30-year Design			
Road not Maintained (estimated physical life of 20 years)		Road Maintained (estimated physical life of 60 years) with periodic maintenance carried out.	
Total Cost over physical life	\$736,000	Total Rehabilitation Cost (every 30 yrs.)	\$290,000
		Reconstruction Cost at year 60	\$290,000
		Total Cost over physical life	\$1,160,000
Cost per year	\$36,800	Cost per year	\$19,666

In summary, the above table shows:

- That by using periodic renewal practices (resealing and rehabilitation) it is possible over time to halve the cost of maintaining a road;
- Periodic maintenance will also improve the average condition (ride quality, surface condition, etc) of the road network;
- Routine maintenance costs will reduce when adequate resealing programmes are implemented; and
- That by not maintaining the road adequately may result in Council needing to fully reconstruct (replace) the road and pavement in about 20 year's time. This could place a financial burden on future generations of anything up to \$100,000,000 (at today's prices) to salvage the road network.

7.4 Sustainability

Consideration must be given to reduce dependence on non-renewable natural resources such as gravel.

A circular economy that uses a systems-focused approach and involves industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest value for as long as possible, and aim for the elimination of waste through the superior design of materials, products, and systems (including business models) should be adopted. It is a change to the model in which resources are mined, made into products, and then become waste. A circular economy reduces material use, redesigns materials to be less resource intensive, and recaptures "waste" as a resource to manufacture new materials and products.

Circularity is embraced with the sustainable materials management. The figure below illustrates the concept of a circular economy.

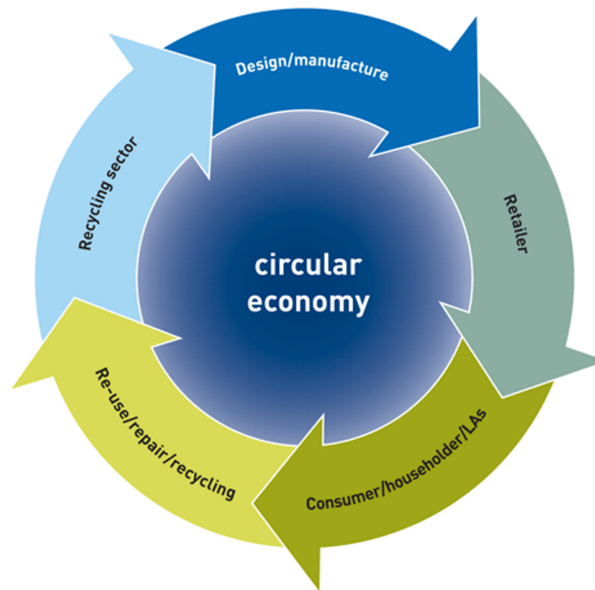


Figure 7 Circular economy

Council encourages the consideration and use of emerging technologies to ensure road assets are designed, constructed and maintained by using current technologies with the aim to reduce and extend asset renewals, improvements or upgrades.

Road Procurement activities within Council should consider sustainable practices and sound environmental principles.

Council will work collaboratively with its partners in all phases of the project life-cycle to consider the use of sustainable practices, especially to lead the region by example. This will include (but not be limited to):

- Natural resources selection and management;
- Water use;
- Energy use (including reduction in greenhouse gas emissions);
- Waste management;
- Fleet management;
- Sustainable procurement practices which include, but are not limited to, supply chain and operations, modern slavery (as defined in the Modern Slavery Act, 2018), etc.;
- Pollution control;
- Cultural and Heritage management; and
- Environmental compliance.

7.5 Road Project Delivery Framework

Council's Road Project Delivery Framework comprises of the following phases:

- Initiation phase where the preliminary planning such as review and confirmation of condition of assets, scope defining and preliminary cost estimates occur;
- Planning phase where the detailed site investigations, detailed designs, design safety reviews, construction specifications, project plans are created and distributed;
- Execution phase where the project is delivered as per the endorsed design to the quality, cost and time specifications; and
- Reviewing phase where shared learning, improvement opportunities are gathered, reviewed and implemented.

The figure below illustrates the Project Delivery Framework for Roads

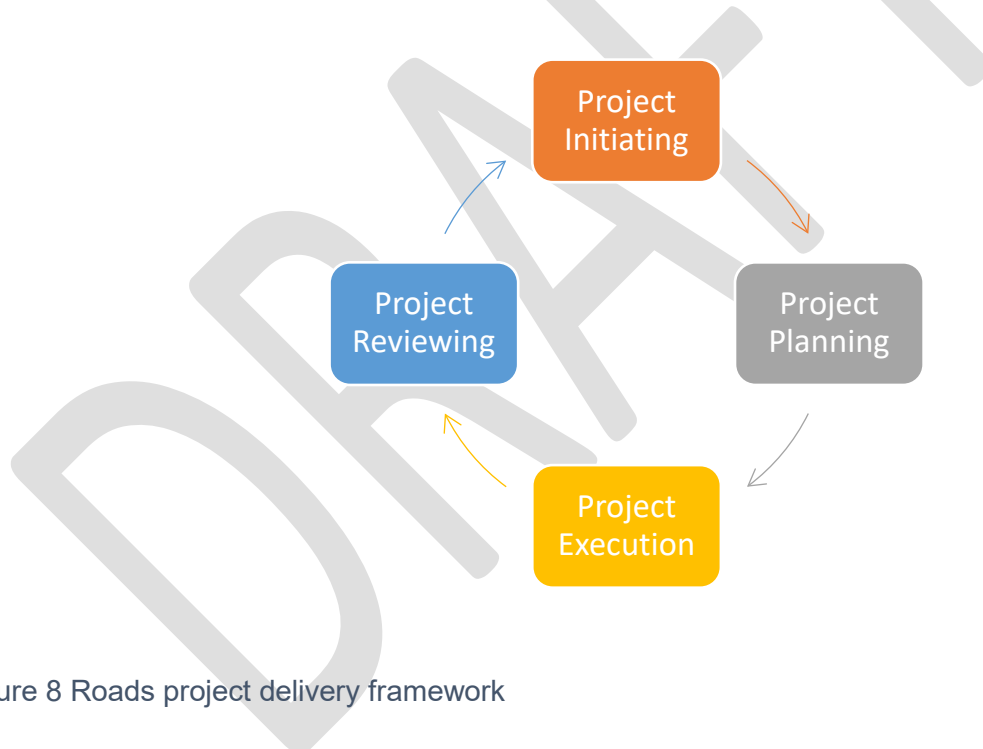


Figure 8 Roads project delivery framework

8 ROAD DESIGN

8.1 General

Road designers should consider a range of design criteria and standards to ensure that serviceability and survivability criteria are met. Consideration should also be given to road user safety, ride quality, time savings, reduction in maintenance and road closures, etc. to ensure these criteria are met and maintained.

Thought should be given to the road's current and future intended use and purpose, design vehicle, traffic volumes and flow, and environmental conditions.

The majority of rural roads have flexible pavements with rutting, cracking, potholes, shoving, revelling and upheavals as the most common failure modes. These failures are generally caused by:

- Moisture (ingress or egress);
- Poor pavement material selection during design;
- Loss of fines or gravel (unsealed road);
- Insufficient or lack of quality control during construction;
- Poor drainage;
- Change in traffic behaviour meaning that the theoretical useful life is reduced or extended;
- Change in design vehicle (i.e. larger or longer vehicle with more load carrying capacity and different requirement in road pavement and geometry);
- Overloading of vehicles; and
- Lack climate resilient pavements at critical locations, therefore impacting on pavement survivability.

Design life for a road, **which will remain unsealed**, should be designed accordingly. Design standards for unsealed roads should be greater than sealed roads because the lower surface friction values will require larger radius curves, longer sight distances, etc. compared with a sealed road. However, a road which is to be sealed at a later date should still be designed initially with a higher standard of alignment required for when it is sealed as it is best to set the alignment at the beginning of a road's life rather than later.

The designer should be aware of the likely maintenance standards to be adopted and design the road in keeping with the maintenance level envisaged. Since the maintenance of the road can lead to an effective rebuilding of it (e.g. resheeting), supervisors should be briefed as to the purpose of various design features of the road. One of the more obvious design features which requires attention throughout the life of the road is the provision of 3–5% crossfall on

straight sections.

Ongoing maintenance of drainage structures such as swales and table drains, pipes and culverts should be considered and included in annual maintenance programs.

8.2 Effects of Overloaded Vehicles on Pavement Life

The damaging effects of overloaded axles on a pavement include fatigue, which reduces the design life of a pavement, and rutting, which causes the serviceability problem in the pavement. Damage to roads as a result of overloading leads to higher maintenance and repair costs and shortens the life of a road or structure which in turn places an additional burden on the state as well as law-abiding road users who ultimately carry the costs of careless and inconsiderate overloading. Overloaded vehicles could also exceed safe design limits of bridges and culverts.

The Heavy Vehicle National Law (HVNL) prohibits drivers, and persons permitting drivers to drive from driving heavy vehicles that, together with their loads do not, or whose components do not, comply with mass requirements. These mass requirements extend to other CoR parties who also have the capacity to control, eliminate or minimise such mass breaches and associated safety risks by reason of the principle of shared responsibility and the primary duty.

8.2.1 Application of the 4th Power Rule

The fourth power law (also known as the fourth power rule) states that the stress on a road by a motor vehicle is greater, the greater the axle load of the vehicle in question. The stress on the road increases proportionally to the fourth power of the axle load of the vehicle traveling on the road. This rule is what is widely used by road authorities worldwide, but can be conservative sometimes.

A numerical example below illustrates how differently, according to the above law, a car and a truck affect the pavement of a road.

- Passenger car (total weight 2 tonnes, 2 axles): load per axle: 1 tonne
- Truck (total weight 30 tonnes, 3 axles): load per axle: 10 tonnes

The load on the road from one axle (2 wheels) is 10 times greater for a truck than for a car. However, according to the above-mentioned series of tests, the stress (damage) on the road by one vehicle axle is the same for the truck. Thus;

$10^4 \times 10 \times 10 \times 10 \times 10 = 10,000$ - times as big

as with the car. Because of the three axles of the truck, this value triples, but since the car has not just one but two axles, the comparison value is reduced by half again, so that the following difference (relationship) in load results for both vehicles:

Truck: cars = 15,000: 1

This means that the car only causes as much damage after 15,000 passes as the truck does when driving on the road once. From this it can be deduced that a large part of the damage

on the roads is caused by heavy vehicle traffic and that cars only contribute a very small part. This is amplified when heavy vehicles are overloaded as indicated in the figure below.

% overload on "Standard Axle"	%increase in damage	Working life of 20 year pavement reduced to (years)
10	45	13.8
20	105	9.8
30	185	7.0
40	285	5.2

Figure 9 Effect of overloading on pavement life

The effect of 20% overloading, halves pavement life by fatigue loading.

8.3 Design Guidelines and Standards

For pavement design purposes, the following (heavy vehicle) axle group types are identified:

- Single axle with single tyres (SAST);
- Single axle with dual tyres (SADT);
- Tandem axle with single tyres (TAST);
- Tandem axle with dual tyres (TADT);
- Triaxle with dual tyres (TRDT); and
- Quad-axle with dual tyres (QADT).

All tyres referred to are conventional tyres. In order to consider axle groups fitted with wide super single tyres in the design of flexible pavements, axle loads ³which cause the same pavement damage as a Standard Axle should be used.

When designing a road or traffic facilities, the following guidelines or Standards will be used or considered:

- Austroads guidelines⁴;
- Relevant Australian Standards;
- Australian Road Research Board (ARRB)⁵;

³ Table 7.8 of Austroad's Guide to Pavement Technology Part 2, Pavement Structural Design

⁴ <https://austrroads.com.au/about-austrroads/austrroads-guides>

⁵ <https://www.arrb.com.au/bestpracticeguides>

- Australian Rainfall and Run-off; and
- TfNSW/RMS guidelines/standards.

The following will apply where no Australian guideline or Standard exist:

- Relevant International Standard(s);
- Relevant Technical Standards from the US Department of Transportation such as: Federal Highway Administration for Hydraulic structures; and
- Research publication(s) applicable to the project, subject to Director's approval.

It is to be stressed that, although a pavement is designed to provide satisfactory service over a specified design period, this service can only be expected if actual cumulative traffic over the period does not exceed the estimated cumulative traffic. Hence, the likely period of satisfactory service is controlled by the value adopted for the design traffic and not by the value adopted for the design period.

8.4 Safety in Planning and Design

The geometric design of unsealed roads presents a unique challenge because very low traffic volumes and reduced number of crashes make the design standards normally applied to higher volume roads less cost-effective. The design philosophy adopted for low volume roads indicates that because of their unique characteristics design guidelines can be less stringent than those used for higher volume roads. Whilst the number of crashes on unsealed roads are typically less than on sealed roads the crash rates (based on usage) are typically higher, whilst reduced design values can be applied to unsealed roads it is critical to consider the safety implications

The geometric design of an unsealed road should be the result of a careful balance between the purpose of the road, traffic volumes, terrain, design standards, costs and the standard of maintenance to be adopted.

It is important to understand what factors lead to the occurrence of crashes, and what measures may be undertaken to minimise them. Guidance on practical and low-cost techniques for improving road safety and reducing potential litigation at the planning and design stages of a road project should be obtained as part of this process

8.5 Design Vehicle

Consideration must be given to future proof roads to ensure the most practical and economical outcome is achieved that causes unnecessary upgrades in future. Design vehicles have changed over time and there is a tendency to move away from Semi-trailers to a larger vehicle that can carry larger loads. Typical examples are Common Type 1 Road Trains Class 2 \leq 36.5m or even Common Type 2 Road Trains Class 2 \leq 53.5m. Consideration should be given to agricultural vehicles and technological advances such as airbags in vehicles/trailers, Performance Based Standards (PBS) vehicle, and driverless vehicles that would enable future platooning.

Further consideration must be given to live-stock vehicles and livestock routes, since they have a higher centre of gravity and higher than 4.3m.

8.6 Design Speed

The design speed should not be less than the operating 85%tile speed for that road. The Infrastructure and Engineering Services Director must be consulted when determining a design speed for a particular road.

8.7 Theoretical Design Life - Survivability

The road may be constructed in stages to make the cost appropriate to the traffic demand. The first stage cross-section should allow for the maximum future reuse of pavements and underground drainage, and facilitate construction to the ultimate width, e.g. use of pavement stubs. The initial stage and ultimate stage of a design should provide for the safe and efficient movement of all relevant road users including pedestrians and cyclists.

New roads generally require a large investment in structures, land acquisition and earthworks. In urban areas the cost of service relocation can also be significant. Therefore, in order to avoid expensive future alterations, the cross-section of a facility should be based on the estimated AADT at the end of the theoretical design life. Theoretical design lives of road assets are provided in the table below.

Table 5 Theoretical design life of roads

Work type	Theoretical design life (years)
New unsealed roads	10
Pavement rehabilitation	20
Widening	30
New sealed road	30
New bridge	100
Future bridge widening	50

Note: Because of the difficulty of predicting development and change over a long period, these estimates may be assessments rather than extrapolations of current trends.

8.8 Road Crossfall

Crossfall is the slope of the surface of a carriageway measured normal to the design line or road centreline. The purpose of crossfall is to drain the carriageway on straights and curves and to provide superelevation on horizontal curves. The pavement crossfall on straights for various pavement types is given in the table below.

Table 6 Typical pavement crossfall on straight sections

Type of pavement	Crossfall (%)
Earth, loam	5
Gravel, water bound macadam	4

Type of pavement	Crossfall (%)
Bituminous sprayed seal	3
Asphalt	2.5–3
Portland cement concrete	2–3

Crossfalls flatter than 2% do not drain adequately, and even 2% should only be prescribed for concrete pavements where levels and surface finish are tightly controlled. Unless compaction and surface shape are well controlled during construction, pavements with less than 2.5% crossfall will hold small ponds on the surface, which may cause potholes to develop and hasten pavement failure. Rutting of the pavement is also more likely to hold water, increasing the risk of pavement deterioration and vehicle aquaplaning when the pavement crossfall is less than 3%.

8.9 Rural Road Widths

The desirable lane width on rural roads is 3.5m. This width allows large vehicles to pass or overtake without either vehicle having to move sideways towards the outer edge of the lane. The lane width and the road surface condition have a substantial influence on the safety and comfort of users of the roadway. In rural applications the additional costs that will be incurred in providing wider lanes will be partially offset by the reduction in long-term shoulder maintenance costs. Narrow lanes result in a greater number of wheel concentrations in the vicinity of the pavement edge and will also force vehicles to travel laterally closer to one another than would normally happen at the design speed. Drivers tend to reduce their travel speed, or shift closer to the lane/road centre (or both) when there is a perception that a fixed hazardous object is too close to the nearside or offside of the vehicle. When there is a perceived fixed hazard, there is a movement by the vehicle towards the opposite lane line.

8.10 Single Carriage Ways

On many roads in Australia, traffic volumes are less than 150 vehicles per day. Some of these are arterial roads passing through sparsely settled flat country where the terrain leads to a high operating speed. Where traffic volumes are less than 150 vehicles per day and, particularly, where terrain is open, single lane carriageways could be considered.

A detailed “whole-of-life analyses” must be conducted to determine whether this approach is feasible since an increase in road shoulder maintenance could occur. Safe passing of heavy vehicles must be considered, especially where the centre of gravity of the vehicle is high or where a potential exists where unsealed shoulders could be “soft”.

The traffic lane width adopted on such roads should be at least 3.7m. A width of less than 3.7m can result in excessive shoulder wear. A width greater than 4.5m but less than 6.0m may lead to two vehicles trying to pass with each remaining on the seal. This potentially increases head-on accidents. The width of 3.5m ensures that one or both vehicles must have the outer wheels on the shoulders while passing. On two lane sealed roads, the total width of seal should desirably be not less than 7.2m to allow adequate width for passing.

Table 7 Single carriage way rural road width

Element	Design AADT				
	1–150	150–500	500–1000	1000–3000	> 3000
Traffic lanes ⁽¹⁾	3.7	6.2	6.2–7.0	7.0	7.0
	(1 x 3.7)	(2 x 3.1)	(2 x 3.1/3.5)	(2 x 3.5)	(2 x 3.5)
Total shoulder	2.5	1.5	1.5	2.0	2.5
Minimum shoulder seal ^{(2),(3),(4),(5),(6)}	0	0.5	0.5	1.0	1.5
Total carriageway	8.7	9.2	9.2–10.0	11.0	12.0

- 1 Traffic lane widths include centerlines but are exclusive of edge-lines.
- 2 Where significant numbers of cyclists use the roadway, consideration should be given to fully sealing the shoulders. Suggest use of a maximum size 10 mm seal within a 20 km radius of towns.
- 3 Wider shoulder seals may be appropriate depending on requirements for maintenance costs, soil and climatic conditions or to accommodate the tracked width requirements for Large Combination Vehicles.
- 4 Short lengths of wider shoulder seal or lay-bays to be provided at suitable locations to provide for discretionary stops.
- 5 Full width shoulder seals may be appropriate adjacent to safety barriers and on the high side of super elevation.
- 6 A minimum 7.0 m seal should be provided on designated heavy vehicle routes (or where the AADT contains more than 15% heavy vehicles).

8.11 Typical Road Cross Sections

The figures below show typical road/pavement cross sections

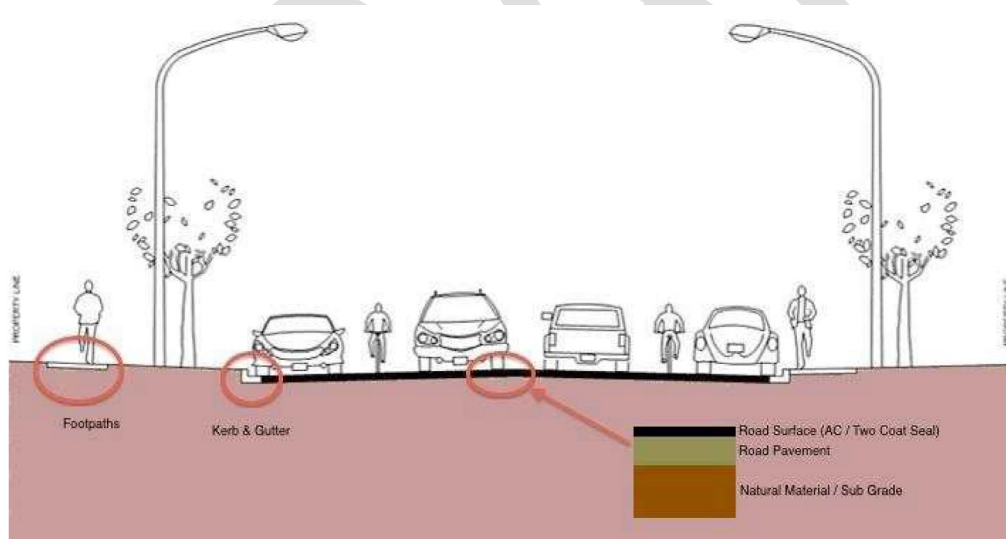


Figure 10 Typical town cross section

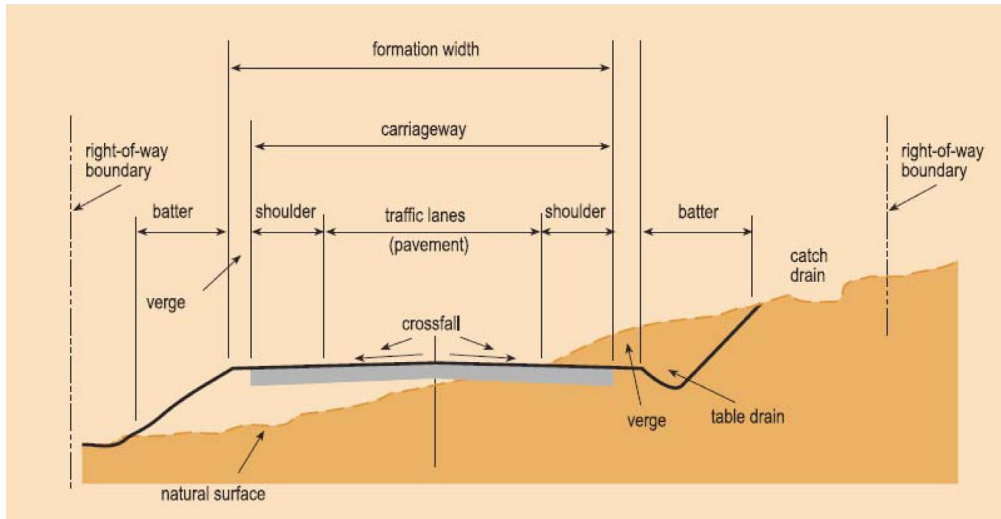


Figure 11 Typical rural road cross section

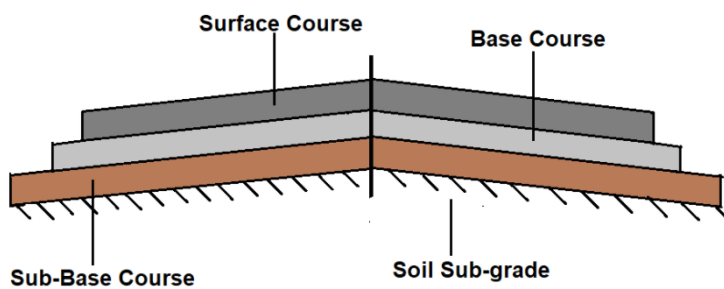


Figure 12 Typical cross section of pavement layers

8.12 Sealing of Unsealed Rural Roads

Sealing of an unsealed road is usually initiated to reduce the road agency's ongoing maintenance costs, allow all-weather access and to reduce the dust from trafficking for safety reasons. Justification for sealing an unsealed road should be grounded in an economic analysis, considering the costs and benefits of the expected outcome in terms of agency costs, vehicle operating costs and road user costs, and other costs including safety.

It has the following benefits:

- Reduce vehicle operating costs, due to lower fuel consumption, less tyre wear, minimal depreciation, and a lower rate of vehicle repair;
- Improve the rideability of these roads;
- Provide an acceptable all-weather surface with less disruption due to road closures;
- Reduce travelling time; and

- Enhance road user safety.

An economic analysis used by the ARRB compared savings in travelling time, accident costs and vehicle operating costs on a sealed pavement with increased maintenance and rehabilitation cost over the life of an un-sealed pavement to determine a cost benefit. The analysis indicated that it is not economically viable to seal a road if the annual average daily traffic (AADT) volume **is less than 70 to 85 vehicles per day**. Additionally, the sealing of an unsealed road should only be considered if Council is committed to providing future funding for timely maintenance, resealing, rehabilitation and reconstruction.

An economic analysis should consider the following if Council considers in sealing an unsealed road:

- The long-term maintenance costs of the existing unsealed road;
- The expected long-term costs of maintaining a sealed road replacement;
- The existing traffic levels (AADT and % heavy vehicles) and expected future traffic growth;
- The strategic importance of the road;
- Confirmation, or otherwise, that the existing alignment (horizontal and vertical) and lane widths are adequate for future traffic; and
- The additional costs of realignment, lane width and surface drainage upgrade, if required.

Many of the costs of upgrading the unsealed road are highly variable, depending on access to suitable gravels, or substitute marginal materials, and the haulage distances involved.

8.13 Drainage

8.13.1 General

Drainage is a major component that must be considered in road design and construction. With technological advances in farming practises, land use has changed and agricultural land have been profiled (“land-planed”) to increase production. As a result, drainage and overland flow paths as well as catchment run-off characteristics have changed which have resulted in a change in overland flow.

Climate change (prolonged drought, shorter and more intense wet periods) is a contributing factor that affects the performance of current roadside drainage.

Biosecurity and vegetation control at roadside drainage should be considered in roadside drainage planning and design.

The hydraulic design of waterway structures (bridges, culverts and floodways) is of considerable economic importance, as these structures can consume up to 30% of the total

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road construction costs. The selection of the appropriate design flood and good practice in the design of these structures determines the initial cost, ongoing maintenance costs, the provision of the desired level of serviceability to traffic, and the safety of the road user. Washouts at bridge approaches, in roads adjacent to culverts and at floodways can create hazards and delays to the road user. Major damage or failure of a bridge as the result of scour not only poses a safety hazard to motorists, but also causes large social impacts and economic losses over a long period of time.

The appropriate design of these structures should minimise these impacts and reduce the cost of flood damage.

In designing stream crossings and associated waterway structures, there are several aspects of the design that may require the use of design floods with different average recurrence intervals. These various aspects of design are as follows:

- Overall design of the total waterway of a stream crossing, including protection works to bridge abutments, culvert inlets and outlets, and floodways;
- Level of service to be provided to traffic;
- Serviceability limit states (SLS) for the bridge/culvert structure;
- Ultimate limit states (ULS) for structural strength and stability of the bridge/culvert structure; and
- Environmental impact of the waterway structure on the stream and its environment.

The table below provides guidance on selecting recurrence intervals for various road elements.

Table 8 Proposed ARIs for various road elements

Element	Austrroads road classification	Suggested ARI ⁽²⁾
Cross drainage (culverts & bridges)	Controlled Access Highways Includes: Motorways & Freeways (National/State/Territory)	100 years
	Arterial Roads Classes 1 & 2 ⁽¹⁾ Includes: National/State/Territory Highways, Urban Arterial Roads	50–100 years
	Arterial Road Class 3 ⁽¹⁾ Includes: State/Territory main roads	50 years
	Local Roads Classes 4 & 5 ⁽¹⁾	10–20 years
	Urban Collector/Distributor Roads	10–50 years
	Urban Local Roads	10 years
Diversion channels	All roads	Adopt the ARI for cross drainage
	Arterial Road Class 3 ⁽¹⁾	20 years

Element	Austrroads road classification	Suggested ARI ⁽²⁾
Cross drainage (floodways)	Local Roads Classes 4 & 5 ⁽¹⁾	5–10 years
	Urban Local Roads	5–10 years
Road surface (network drainage including kerb and channel with inlet pit & pipe systems, bridge decks)	All roads other than Local Roads	10 years ⁽⁴⁾
	Local Roads	5 years ⁽³⁾
Trapped flows (roads where there is no escape path for water including at a sag in cut)	All roads	50 years
Longitudinal open drainage (table drains, diversion drains, catch drains and banks etc.)	All roads	10 years (unless cross drainage ARI is less, then adopt the lesser value)

¹ For description of road classes, refer *Guide to Road Design Part 2: Design Considerations (AGRD Part 2) Austrroads (2006)*.

² Road and/or drainage authorities can change suggested ARIs based on link requirements, road importance and inundation risk, for example:

- For a local road connecting communities where no alternate route is readily available, an increase in cross drainage ARI from 20 to 50 years could be specified.
- For an important motorway where operation during flood events is a key requirement, road surface drainage could be specified as ARI 20 years with clear traffic lanes and/or ARI 50 years with no more than 1 m encroachment into outside traffic lanes.
- For a floodway on a local road where alternate routes are readily available, the ARI specified could be reduced to two years.

³ See the requirements of the relevant Municipality for roads under their control.

⁴ In South Australia urban areas, five year ARI is used.

Source: Adapted from *VicRoads (2003)*.

AS 5100.1 specifies the ARI for flood immunity and SLSs for bridges and major culverts. However, owing to the wide variation in conditions throughout Australia and the different standards adopted by the various road agencies, it is at the discretion of the relevant agency to select an appropriate ARI for a specific design.

Table 9 below illustrates the Australian Rainfall Runoff terminology and difference between ARI and AEP.

Table 9 Australian Rainfall Runoff terminology

Australian Rainfall and Runoff terminology					
Frequency Descriptor	EY	AEP (%)	AEP (1 in x)	ARI	Uses in Engineering Design
Very frequent	12				Water sensitive urban design
	6	99.75	1.002	0.17	
	4	98.17	1.02	0.25	
	3	95.02	1.05	0.33	
	2	86.47	1.16	0.50	
Frequent	1	63.2	1.58	1.00	Stormwater/pit and pipe design
	0.69	50.00	2	1.44	
	0.5	39.35	2.54	2.00	
	0.22	20.00	5	4.48	
Infrequent	0.2	18.13	5.52	5.00	Floodplain management and waterway design
	0.11	10.00	10.00	9.49	
	0.05	5.00	20	20.0	
Rare	0.02	2.00	50	50.0	Floodplain management and waterway design
	0.01	1.00	100	100	
	0.005	0.50	200	200	
Extremely Rare	0.002	0.20	500	500	Design of high-consequence infrastructure (eg major dams)
	0.001	0.10	1000	1000	
	0.0005	0.05	2000	2000	
Extreme	0.0002	0.02	5000	5000	Design of high-consequence infrastructure (eg major dams)
			↓		
			PMP		

Therefore, for Council Roads the following design AEP should be used:

Table 10 Council Design Annual Exceedance Probability for Roads

Hierarchy	Annual Exceedance Probability (AEP) (%)	Average Recurrence Interval (ARI) (1:x)
Hierarchy 2	2	50
Hierarchy 3	2	50
Hierarchy 4	5	20
Hierarchy 5	5	20

Council as the Roads Authority may, for the purpose of draining or protecting a public road, carry out drainage work in or on any land in the vicinity of the road. Council will discuss road drainage options with relevant stakeholders, including landholders to ensure the best outcome is achieved.

8.13.2 Floodways

Road serviceability and survivability (Road Hierarchy) will form part of the decision-making process when floodways are designed or renewed. Floodways will be designed in accordance with the relevant Austroads Guidelines and where possible will be designed and constructed as rigid or flexible sealed pavements (including approaches) to:

- Protect the road pavement and wearing course;
- Increase road trafficability;
- Reduce maintenance costs; and
- Reduce environmental harm by reducing the mobilisation of soils during wet weather events.

Studies have shown that while pavements that remain submerged over extended periods or is exposed to frequent inundation had an increase in roughness, a far inferior useful service life have been observed that required earlier intervention.

Floodways with rigid pavements have demonstrated superior useful service life that required less intervention.

8.13.3 Serviceability

The level of serviceability to be provided to traffic at a stream crossing will be determined by a risk-based approach where the total road system is of main interest. The probability of closure of the total road system will be much greater than that at an individual site and is difficult to determine. In addition, the closure of a railway or major road due to flooding of any one of many stream crossings will cause closure of the route. As a result, it is normal practice to design each stream crossing on a road link for some predetermined level of serviceability (Ball et al. 2016).

It is worth noting, however, that techniques and data are now available to assess and link flood performance in Australia.

The selection of the level of serviceability to be provided at each waterway structure (as distinct from the stream crossing) on a road link is generally based on the following criteria:

- The level of serviceability expected by the community;
- The availability of alternative routes and period of closure;
- The importance of the road as access in emergency situations, such as to hospitals, airports, etc;
- The relationship between traffic density and composition, and the wet season, especially in northern Australia; and
- Economic considerations, i.e. the cost and benefit of providing a higher level of serviceability.

In addition, the requirements of local authorities, the Environment Protection Agency (EPA) and those responsible for navigation and flood control will also influence the size and type of waterway structures and, hence, impact on the level of service provided.

Where it is likely that a higher level of serviceability will be required on a road in the future, consideration should be given to staging the construction of the waterway structures at stream crossings. This can be achieved by designing the initial stage so that it can be upgraded without major structural changes.

Australia is a large continent with a wide range of climates, topography and density of population. Hence, the levels of serviceability provided on roads in Australia vary considerably from jurisdiction to jurisdiction and even within jurisdictions. Design engineers should, therefore, consult the relevant road agency to determine the level of serviceability required, prior to commencing the design of a road and any associated waterway structures.

There are two interrelated aspects to be considered when determining the level of serviceability:

- The frequency with which the road is closed to traffic; and
- The time of closure.

It should be noted that for a particular class of road, frequent closures of short duration may be acceptable, whereas, long duration closures of the same frequency may not be. Conversely, there are situations where long duration, very infrequent closures may not cause problems.

AS 5100.1 specifies the ARI and levels of flood immunity and SLSs, subject to approval by the relevant authority.

8.14 Bridges and Major Culverts

A bridge or major culvert is a structure built to span a physical obstacle (such as a body of water, valley, road, or rail) without blocking the way underneath. It is constructed for the purpose of providing passage over the obstacle, which is usually something that is otherwise difficult or impossible to cross.

Bridges play a vital role in regional NSW, supporting growth and development, as well as providing access to critical services. These benefits and connections stimulate the economy and promote the social wellbeing of our communities.

Better bridges mean improved access to schools, towns, hospitals and jobs, increased efficiencies for our primary producers, easier movement of freight and better outcomes for road safety in regional and rural communities. The Program is also helping to build a transport network that is more resilient to natural disasters and provide more reliable connections.

Council has a number of bridges and major culverts in its AMIS and endeavours to inspect them at the required intervals by appropriate and qualified inspectors.

Council does not own any timber bridges in its asset portfolio

8.14.1 Types of Bridge Inspections

The Council's bridge inspection regime includes four levels of inspections namely:

- Level 1 inspections which are drive-by inspections which identify obvious safety issues on a bridge.
- Level 2 inspections which are condition rating inspections that are carried out in accordance with the Bridge Inspection Procedure by trained bridge inspectors
- Level 3 inspections are structural engineering inspections carried out by an experienced structural engineer with a Council trained bridge inspector.
- Level 4 inspections involve load assessment due to proposed changes in legal loading, new vehicle types, or the need to confirm the structural capacity of a bridge. Other specialist inspections may be required from time to time and will be arranged as required in consultation with Council.

8.15 Road Geometry

As part of an ongoing improvement program and where the road geometry does not meet current design standards, improvements to the horizontal alignment (i.e., straightening sharp bends etc) and vertical alignment (i.e., flattening crests etc) can be considered and incorporated during the project initiation and planning and phase. Detailed topographical and feature surveys and road geometric designs will be required to ensure the new alignment fits within road reserves or whether additional land would be required.

Improvements can be carried out whilst undertaking road reconstruction works. Accordingly, the cost for this item is covered by the allocation for road reconstruction.

8.16 Pavement Depth for Sealed Roads

Council's method of rehabilitating an unsealed road is to follow the Austroads design guidelines, which for the majority of Councils unsealed roads mean:

- Use a CBR of 3 if field data is not available;
- Determination of design ESAs (DESA) over the life of the pavement considering a potential change in land use, design vehicle and traffic behaviour;
- Determination of granular pavement depth using with a thin bituminous surfacing (For asphaltic surfaces >40mm use applicable design methodologies i.e. Circlay) for the applicable DESA;
- Consider alternative construction methodologies (such as geogrids, geotextiles, etc) to reduce Council's dependence on natural resources;
- Consider the use of alternative technologies such as polymers or admixtures to reduce or minimise operational and maintenance costs;

- Consider the use of alternative technologies such as polymers or admixtures to reduce or minimise the loss of fines and the dependence on natural resources;
- Insitu stabilise to minimum 150mm deep, including shoulders if required. This method both strengthens and deepens the road pavement. Hence, over time the approved minimum pavement depths will be achieved. Therefore, the cost of this item is covered under maintenance;
- Overlay the existing road with required gravel thickness; and
- Seal the new surface

8.17 Pavement Depth for Un-sealed Roads

Council's method of rehabilitating a sealed road is to follow the ARRB design standards, which for the majority of Councils roads mean:

- Use a CBR of 3 if field data is not available;
- Determination of design ESAs (DESA) over the life of the pavement considering a potential change in land use, design vehicle and traffic behaviour;
- Determination of granular pavement depth using with a thin bituminous surfacing for the applicable DESA;
- Consider alternative construction methodologies (such as geogrids, geotextiles, etc) to reduce Council's dependence on natural resources;
- Consider the use of alternative technologies such as polymers or admixtures to reduce or minimise operational and maintenance costs and to prevent the loss of "fines";
- Insitu stabilise to minimum 150mm deep, with the inclusion of imported gravel, and shoulders if required; and
- Overlay the existing road with required thickness of gravel.

This method both strengthens and deepens the road pavement, by providing a homogeneous wearing course or basecourse. Hence, over time the approved minimum pavement depths will be achieved. Therefore, the cost of this item is covered under maintenance.

8.18 Road Width

Reconstruction projects also provide an opportunity to increase formation, pavement and seal widths, based on the Road Hierarchy. Hence, the cost for this item is also covered in road construction costs.

8.19 Reduction of Roadside Hazards

8.19.1 General

Council, as the Road Authority, has the power to remove any roadside object that may be considered to be detrimental to the safety of motorists. Therefore, to ensure transparency Council has a consistent approach to remove these hazards. There are three types of roadside hazards that this approach seeks to remove:

- Those hazards blocking the vision which is vital to enable motorists to drive a vehicle in a safe manner;
- Those hazards that are likely to cause a distraction to road users (i.e. roadside lighting or glare, signage, etc.);
- Those hazards that are likely to be hit by a motorist causing property damage and possible injury / loss of life; and
- Those that have the potential to injure road users or occupiers of the land adjacent to the roadway and/or cause damage to their property.

Furthermore, the provision of roads can cause soil erosion, reduce wildlife habitat, and remove endangered species and significant cultural sites. This approach seeks to minimize the impacts on these.

8.19.2 Hazards Obstructing Vision

When considering a motorist's vision, a line should be drawn from a height of 1.15m (average eye height of a driver in a car) to a point 200mm above ground level (the item being viewed).

8.19.2.1 Stopping Sight Distance – Unsealed Roads

Due to the nature and behaviour of unsealed road pavements, the current edition of the ARRB's Unsealed Roads Best Practice Guide should be consulted.

8.19.2.2 Stopping Sight Distance – Sealed Roads

A driver's reaction to an emergency isn't immediate. The delay includes a period for perception and identification of the emergency, a period to judge what reaction is needed, and the reaction itself. The sum of these is the "Reaction Time". The TfNSW/RMS recommends the following reaction times:

- **1.5 seconds:** For drivers travelling on a road with a speed limit less than or equal to 100km/h, where access is uncontrolled and drivers travel in conditions that will assume alertness for the unexpected.
- **2.5 seconds:** For drivers travelling on a road with a speed limit 100km/h or more, where access is controlled and drivers travel in conditions of free speed and are not alert for the unexpected.

In addition to the reaction time a motorist also needs time for the vehicle to stop after the brakes have been applied. This is called the “breaking distance”.

“Stopping sight distance” is the minimum distance needed by a driver of a vehicle to react and stop before hitting an object. The stopping sight distance on bitumen or concrete surfaces is obtained from the table below.

Table 11 Stopping sight distance

Speed Limit	Distance Travelled During Each Period (m)			Stopping Sight Distance (m)	
	Reaction Time Distance		Breaking Distance (m)	1.5 seconds	2.5 seconds
	1.5 seconds	2.5 seconds			
50	20		25	45	
60	25		35	60	
70	30		50	80	
80	35		65	100	
90	40		80	120	
100	45	70	105	150	175

8.19.2.3 Sight Distance at Curves – Unsealed Roads

Due to the nature and behaviour of unsealed road pavements, the current edition of the ARRB’s Unsealed Roads Best Practice Guide should be consulted.

8.19.2.4 Sight Distance at Curves – Sealed Roads

The minimum distance for two drivers approaching in opposite directions, need to see each other at a curve is determined by the Stopping Sight Distance indicated above. Therefore, the minimum area to be cleared of obstructions to maintain required sight distances at a bend is given in the diagram below:

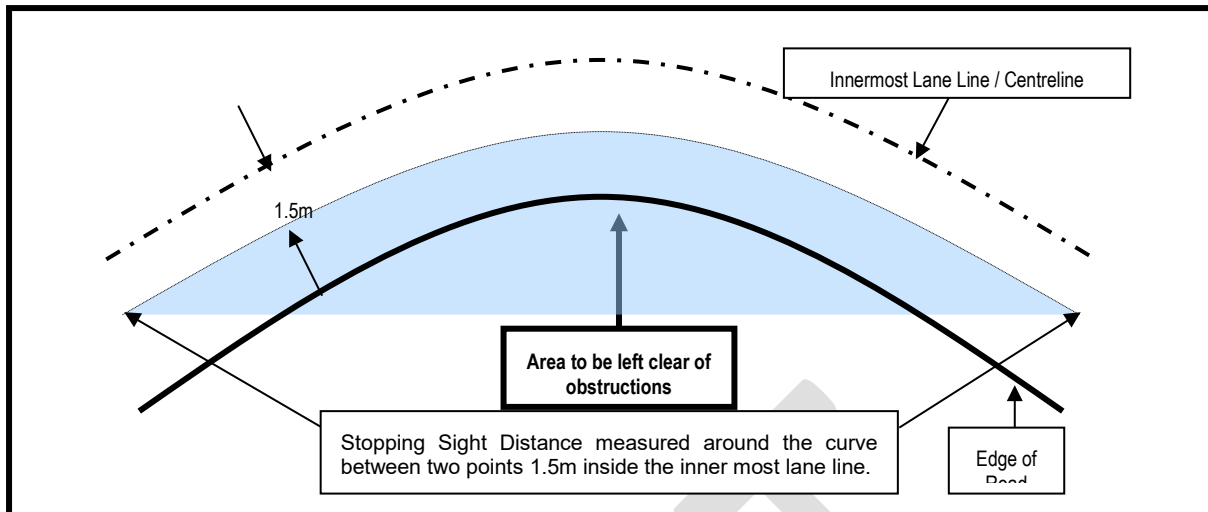


Figure 13 Required sight distance at curves

8.19.2.5 Sight Distances at Intersections

Approach sight distances at intersections is the distance that must be available at each approach to an intersection, to enable road users to clearly see and understand the layout of the intersection and can be further described as:

- **Entering Sight Distance:** Is the distance that a driver in a minor road at an intersection must have to react to an acceptable gap, start up and enter or cross the major traffic flow.
- **Safe Intersection sight distance:** Is the distance that vehicles in the main road need to see a vehicle from the minor road move into the intersection, and be able to stop prior to collision.

The area to be cleared at an intersection is shown in the diagram below:

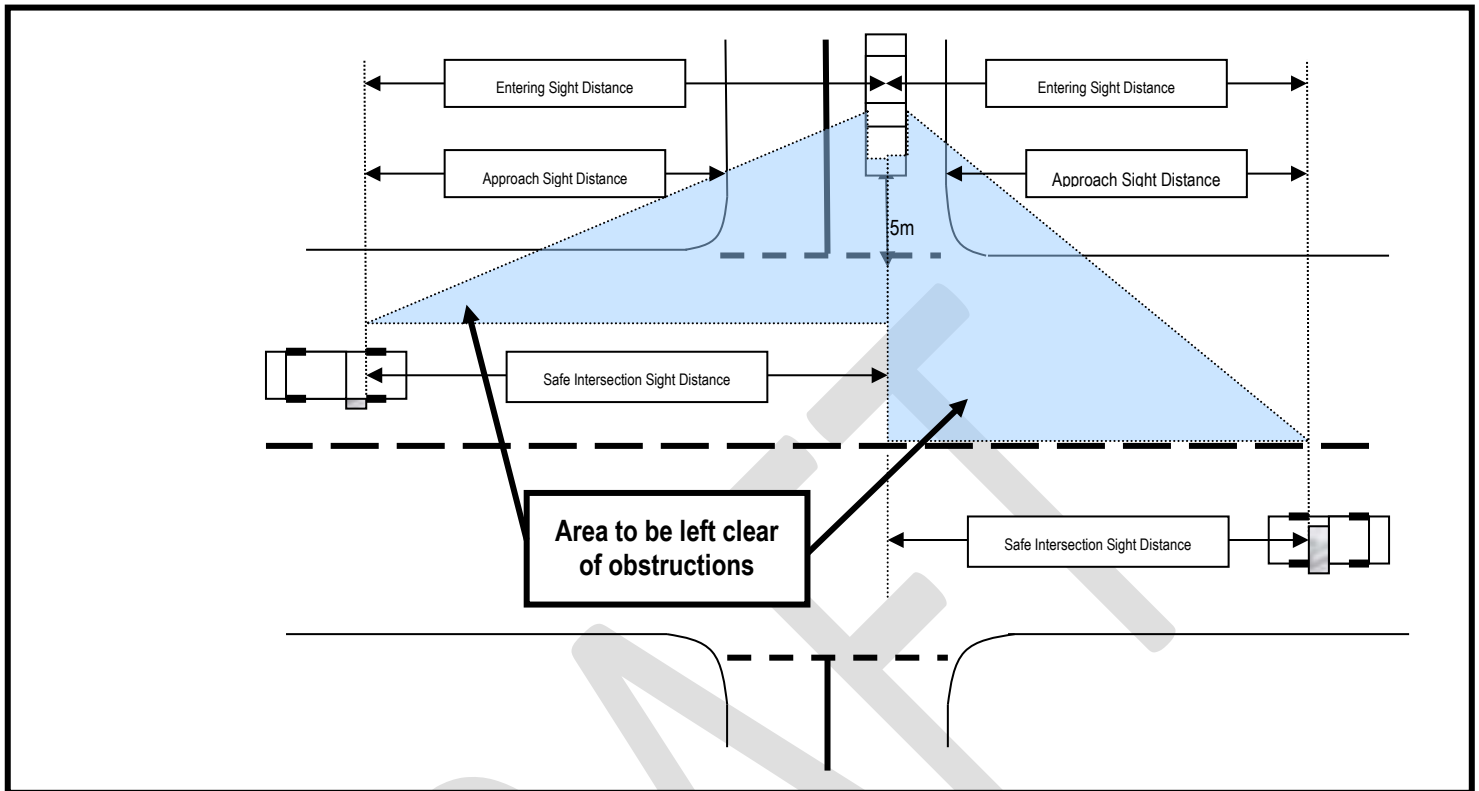


Figure 14 Sight distances at intersections

The table below illustrates intersection sight distances at various speeds.

Table 12 Intersection sight distances at various speeds

Speed Limit or Design Speed	Approach Sight Distance (m)		Safe Intersection Sight Distance (m)		Entering Sight Distance (m)
	1.5 seconds	2.5 seconds	1.5 seconds	2.5 seconds	
40	30		60		80
50	40		80		100
60	55		105		135
70	70		130		185
80	90		160		225
90	115		190		345

Speed Limit or Design Speed	Approach Sight Distance (m)		Safe Intersection Sight Distance (m)		Entering Sight Distance (m)
	1.5 seconds	2.5 seconds	1.5 seconds	2.5 seconds	
100	145	170	225	255	470

8.20 Clear Zones

The Clear Zone is the area outside the edge of a road that is available for emergency use by errant vehicles. The edge of the road is considered to be an edge line if marked, edge of bitumen / AC / concrete if edge line isn't marked, or edge of gravel on an unsealed road. The basic premise of a clear zone is to provide a forgiving road environment in which an errant road user has a chance of regaining control of his/her vehicle. A clear zone should have a maximum slope as presented in the table below, at an embankment:

Table 13 Safe clear zone slopes

Slope		Description
Trucks	10:1	Is recoverable for trucks
	6:1	is traversable for trucks
	4:1	Cannot be safely traversed by trucks
Cars	6:1	Is recoverable for cars
	4:1	Is traversable for cars
	>/3:1	Cannot be safely traversed by cars

It follows that a safe roadside should ideally have flat fore slopes, particularly if they are to be safe for errant trucks.

The relevant Austroads Guidelines should be consulted when clear zones are determined.

8.20.1 Obstructions within clear zones

Roadside furniture and vegetation can obstruct the view that a road user has of sign posts that is meant to warn about road hazards or deficiencies. This increases the risk of an accident occurring. Guideposts also play an important part in guiding a road user as to where to place his/her vehicle and to judge the alignment of the road (especially at night or on gravel roads). Roadside vegetation such as long grass or roadside furniture can reduce the vision that a motorist has of this important element of the road environment.

8.21 Hazard Reduction Works – Reduction in Fuel Loads

Council can apply for grants from the Rural Fire Service (RFS) for Hazard Reduction work annually on identified roads. These works can involve mechanical works, spraying and hand clearing to reduce fuel loads from vegetation.

Consideration should be given to vegetation control along road shoulders and drains to provide safe stopping areas for road users and to avoid potential ignitions sources, since exhausts of modern-day vehicles (i.e diesels with diesel particulate filters) could operate at higher temperatures.

8.22 Hazards at Risk of Being Hit by a Road User

Based on Australian data compiled by TfNSW, the social cost, per crash, of hitting some of the different types of roadside hazards are outlined in the table below:

Table 14 Roadside hazards being hit by road users

Roadside Hazard	Size of Hazard	Speed Limit or Design Speed	% of Crashes involving fatalities	Social Cost per crash
Post, Poles & Trees	100mm diameter	< / = 70km/h	0%	\$ 7,451
		80 – 90 km/h	0%	\$ 11,301
		> / = 100 km/h	0%	\$ 15,451
	200mm diameter	< / = 70km/h	2%	\$ 48,974
		80 – 90 km/h	5%	\$ 99,132
		> / = 100 km/h	13%	\$ 206,977
	300mm diameter	< / = 70km/h	3%	\$ 68,060
		80 – 90 km/h	8%	\$ 139,512
		> / = 100 km/h	30%	\$ 438,043

It is clear from the above table that once the base of a hazard is 200mm wide or more, the consequences of hitting this hazard in terms of fatalities and social costs increase significantly. However, this cut off point is considered to be too fine a line between whether a fatality may or may not occur. Therefore, objects wider than 150mm in the clear zone should be considered for removal.

Vegetation that is considered hazardous due to decay, disease and/or other circumstances can leave Council exposed to legal action due to branches or the whole tree falling onto

persons and/or property. Any vegetation that may be at risk of such an occurrence should be referred to Council's Engineering Department for assessment.

8.23 Environmental Factors

8.23.1 General

Endangered or significant trees or vegetation, valuable landmarks such as historic markers and Aboriginal sites may be present within the road reserve. Generally, where this occurs a Review of the Environmental Factors (REF) assessment should be conducted to determine which treatment option and approvals process is required to remove or protect the object.

8.23.2 Habitat Protection Zone

In many areas, the road reserve is the only remaining habitat for native fauna and flora species. Roadside vegetation should only be removed to satisfy the criteria of road user safety and providing a forgiving roadside environment. The Areas of Outstanding Biodiversity Value register (previously known as the "Register of critical habitat"), kept by the NSW Department of Planning and Environment should be used to determine if vegetation falls into this category.

8.23.3 Erosion and Sediment Control

Better management of stormwater will:

- Reduce pollution to downstream areas and receiving waters;
- Reduce land degradation;
- Raise an awareness of ecologically sustainable development principles and applying these to development;
- Improve the health, ecology and amenity of urban streams, rivers, estuaries and beaches.
- Reduce risk of damage to the road pavement, culvert inlets and outlets; and
- Reduce the risk of undermining of bridge foundations.

Managing Urban Stormwater: Soils and Construction⁶, is resource is a guide for local councils and the development industry on stormwater management, mainly erosion and sediment control during the construction-phase of urban development.

Heavy fines may be imposed if soil, earth, mud, clay, concrete washings or similar material wash, or are placed in a position where they are likely to be washed, into stormwater drains.

⁶ <https://www.environment.nsw.gov.au/research-and-publications/publications-search/managing-urban-stormwater-soils-and-construction-volume-1-4th-edition>

8.24 Road Safety Audits

Road Safety Audits are the mechanism by which the safety factors of this Strategy can be implemented. A road safety audit is the examination of an existing/proposed road by a qualified examiner, which aims to identify any unsafe elements to prevent or reduce the severity of accidents. Thereby, enabling Council to be pro-active in the reduction of accidents, instead of merely taking reactive remedial action, should an accident occur.

A Road Safety Audit should be undertaken for all new road renewals or upgrades and that the recommendations be considered and incorporated into the final design.

It is recommended to develop a Road Safety Audit Plan as part of the annual works programs, where roads are nominated for Road Safety Audits.

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9 NATURAL RESOURCES for ROAD CONSTRUCTION: GRAVEL and WATER

9.1 Gravel

The NSW State Environmental Planning Policy (Transport and Infrastructure) 2021, under Section 2.108 (3) states that:

*“In this section and section 2.111, a reference to development for the purpose of **road infrastructure facilities** includes a reference to development for any of the following purposes if the development is in connection with a road or road infrastructure facilities—*

- (a) construction works (whether or not in a heritage conservation area), including—*
 - (i) temporary buildings or facilities for the management of construction, if they are in or adjacent to a road corridor, and*
 - (ii) creation of embankments, and*
 - (iii) extraction of extractive materials and stockpiling of those materials, if—*
 - (A) the extraction and stockpiling are ancillary to road construction, or*
 - (B) the materials are used solely for road construction and the extraction and stockpiling take place in or adjacent to a road corridor, and*
 - (iv) temporary crushing or concrete batching plants, if they are used solely for road construction and are on or adjacent to a road corridor, and*
 - (v) temporary roads that are used solely during road construction,*
- (b) emergency works or routine maintenance works,*

Note—

See section 2.7(4) regarding emergency works and routine maintenance works on land to which clauses 10 and 11 of [State Environmental Planning Policy \(Coastal Management\) 2018](#) apply.

- (c) alterations or additions to an existing road (such as widening, narrowing, duplication or reconstruction of lanes, changing the alignment or strengthening of the road),*
- (d) environmental management works, if the works are in or adjacent to a road corridor.”*

Council has identified a number of sources within its LGA from which to source gravel for road building. If Narromine Shire Council assumes responsibility for the operation of a site and is not the owner of the site, then Narromine Shire Council is the sole party that is allowed to source gravel from that site.

Council has recently completed a Narromine Quarry Gap Analyses⁷ where quarry sites have been ranked and prioritised as part of the overall strategy.

In addition to the sites, Council has contracts in place for the supply, crushing and winning of material from various suppliers.

The table below indicates Council's managed quarries:

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⁷ Luffman, 2021, Narromine Quarry Gap Analysis

Table 15 Council managed gravel sites

Quarry	Operator	Comment on status, operation and products	Comment on ability to supply materials	Lot and DP Number
Collyburl	NSC	Borrow pit	Medium, used in road renewal/ restoration where appropriate.	Lot 1 DP 117366
Fairview		Quarry	Medium, no recent workings or stockpiles evident	Lot 46 DP 755105
Merrylands		Borrow pit, weathered granite	Limited, further exploration required to define resource	Lot 39 DP 755121
Lot 90		Quarry	High, based on neighbouring Macquarie Manor operation. No workings yet. Recently obtained confirmation regarding land- use.	Lot 90 DP 727134

9.2 Water

Council gravel sites are usually also sites for water extraction. Council can and does get water from numerous sources, by prior arrangement, which includes abstraction from private dams, irrigation channels, streams, bores, and from the town water supply

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10 NARROMINE SHIRE COUNCIL'S TOWN STREETS

The table below lists all the town streets within the Local Government Area (LGA).

Table 16 Town streets within the Narromine LGA

Town	Street name	No.	Town	Street name	No.
Narromine	FIRST AVENUE	301	Narromine	WATTLE CRESCENT	351
Narromine	SECOND AVENUE	302	Narromine	WARREN RD ACCESS	352
Narromine	THIRD AVENUE	303	Narromine	WRIGHT ROAD	353
Narromine	FOURTH AVENUE	304	Narromine	CROSSLEY DRIVE	355
Narromine	FIFTH AVENUE	305	Narromine	BOWDEN FLETCHER DR	356
Narromine	SIXTH AVENUE	306	Narromine	TOM PERRY DRIVE	357
Narromine	A'BECKETT STREET	307	Narromine	SIXTH AVENUE LANE WAY	360
Narromine	ALGALAH STREET	308	Narromine	FIFTH AVENUE LANE WAY	361
Narromine	OLD BACKWATER ROAD	309	Narromine	THIRD AVENUE LANE WAY	362
Narromine	BIRCH STREET	310	Narromine	DANDALOO STREETLANE WAY	363
Narromine	BOOTH STREET	311	Narromine	MERILBA STREET LANE WAY	364
Narromine	BURRAWAY ST	312	Narromine	TEMOIN STREET LANE WAY	365
Narromine	CATHUNDRIL STREET	313	Narromine	MERYULA STREET LANE WAY	366
Narromine	COMMODORE CRES	314	Narromine	ALAGALAH STREET LANE WAY	367
Narromine	CULLING ST	315	Narromine	MANILDRA STREET LANE WAY	368
Narromine	DANDALOO ST	316	Narromine	BOOTH STREET LANE WAY	369
Narromine	DAPPO RD	317	Narromine	CULLING STREET LANE WAY	370
Narromine	DAVIS DRIVE	318	Narromine	ELLENGERAH STREET LANE WAY	371
Narromine	DERRIBONG AVE	319	Narromine	KINGSFORD SMITH PLACE	372
Narromine	DERRIBONG ST	320	Narromine	NANCY BIRD-WALTON DRIVE	373
Narromine	DUFFY STREET	321	Narromine	EWEN WAY	378
Narromine	ELLENGERAH STREET	322	Narromine	POWELL PLACE	379
Narromine	ELM CLOSE	323	Narromine	HAYDEN CIRCUIT	377
Narromine	GARDEN AVENUE	324	Narromine	MURGAH STREET LANE WAY	375
Narromine	INDUSTRY AVENUE	325	Trangie	ALBERT STREET	401
Narromine	JERRY SMITH STREET	326	Trangie	ALLEN STREET	402
Narromine	KURRAJONG PARADE	327	Trangie	BELGROVE STREET	403
Narromine	MACQUARIE DRIVE	328	Trangie	BIMBLE BOX LANE	404
Narromine	MANILDRA STREET	329	Trangie	BURRAWAY STREET	405
Narromine	MAPLE CRESCENT	330	Trangie	CAMPBELL STREET	406
Narromine	MERILBA STREET	331	Trangie	CROUDACE STREET	407
Narromine	MERINGO STREET	332	Trangie	DANDALOO STREET	408
Narromine	MERYULA STREET	333	Trangie	DERRIBONG STREET	409
Narromine	MINGELO STREET	334	Trangie	ENMORE STREET	410
Narromine	MINORE STREET	335	Trangie	GEORGE STREET	411
Narromine	MOSS AVENUE	337	Trangie	GOAN STREET	412
Narromine	MURGAH STREET	338	Trangie	HARRIS STREET	413
Narromine	NELLIE VALE ROAD	339	Trangie	JOHN STREET	414
Narromine	NYMAGEE STREET	340	Trangie	MCLEAN STREET	415
Narromine	OAK CRESCENT	341	Trangie	MULLAH STREET	416
Narromine	PAYTON CLOSE	342	Trangie	MUNGERY STREET	417
Narromine	PEGALE PLACE	343	Trangie	NICHOLAS STREET	419
Narromine	SCOTT COURT	344	Trangie	POINCAIRE STREET	420
Narromine	SHORT STREET	345	Trangie	SWIFT STREET	421
Narromine	SUNGIFT AVENUE	346	Trangie	VICTOR STREET	423
Narromine	TANCRED STREET	347	Trangie	WEEMABAH STREET	424
Narromine	TEMOIN STREET	348	Trangie	ENMORE STREET LANE WAY	425
Narromine	TERANGION STREET	349	Trangie	MULLAH STREET LANE WAY	426
Narromine	TRANGIE ROAD	350	Trangie	SWIFT STREET LANE WAY	427

Town	Street name	No.
Trangie	WEEMABAH STREET LANE WAY	428
Trangie	MACLEAN DRIVE LANE WAY	429
Trangie	GOAN STREET LANE WAY	430
Trangie	DANDALOO STREET LANE WAY	432
Trangie	VICTOR STREET LANE WAY	433
Trangie	NARROMINE STREET LANE WAY	434
Tomingley	BIRIDOO STREET	441
Tomingley	BUDGERIE STREET	442
Tomingley	BURRELL STREET	443
Tomingley	GENANAGIE STREET	444
Tomingley	GUNDONG STREET	447
Tomingley	MERILBA STREET	445
Tomingley	MYALL STREET	446
Tomingley	YAROBIL STREET	448

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11 SCHOOL BUS ROUTES

School bus routes will be confirmed every 4 years, with new routes added and routes no longer in service removed. The map below shows current school bus routes.

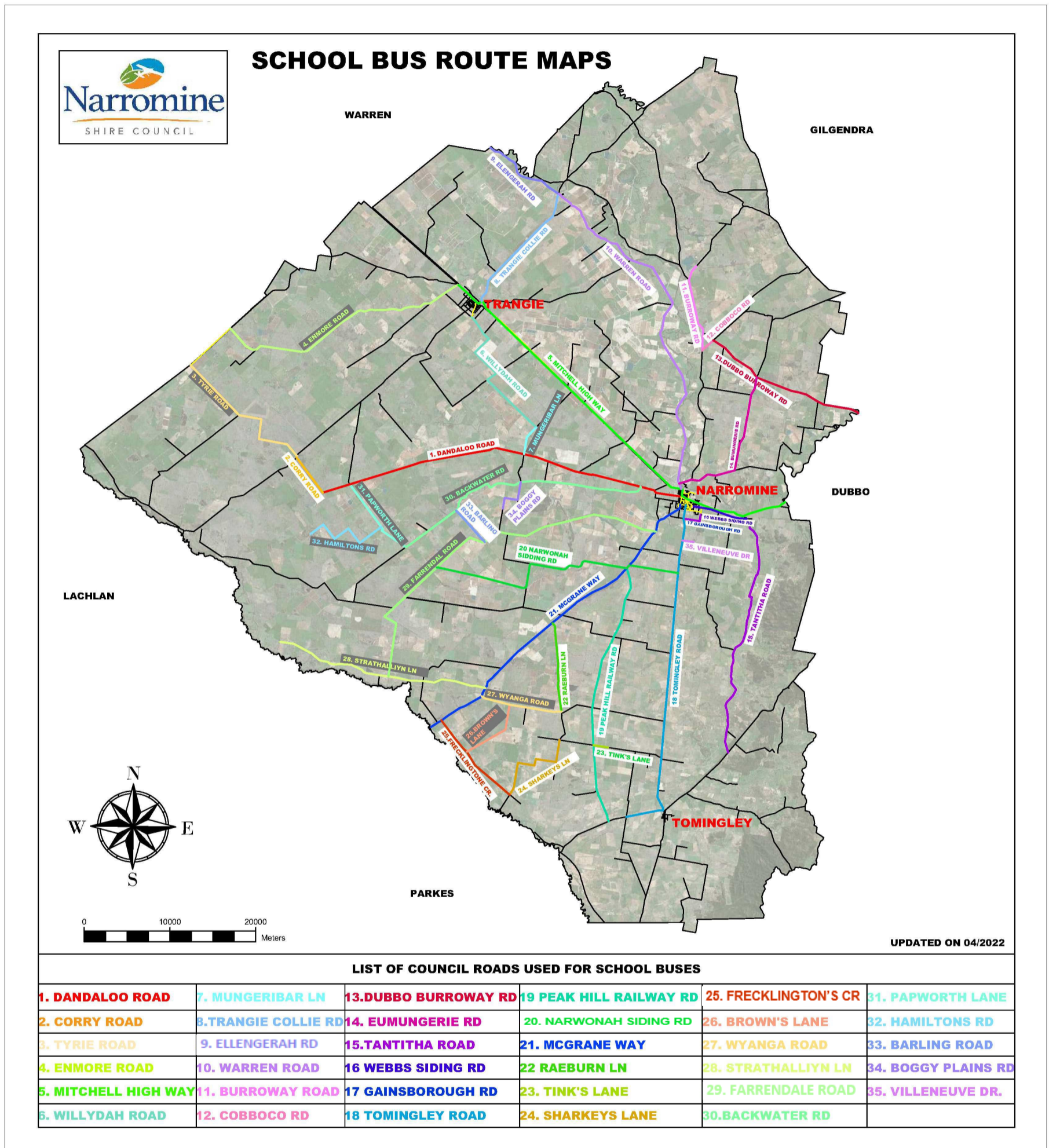


Figure 15 School bus routes as at 29 April 2022

12 NARROMINE HEAVY VEHICLE ROUTE

It is well known that the Tomingley (MR 89) and Eumungerie Roads (MR 572) is the preferred alternative heavy vehicle route to the Newell Highway bypassing Dubbo. Not only is there considerable time savings, but financial and reduced maintenance benefits to operators using this route. Narromine is experiencing a steady growth in interstate heavy vehicle movements.

Therefore, Narromine Shire Council in the medium term and in conjunction with all relevant stakeholders should develop a long-term heavy vehicle bypass strategy for Narromine. Future versions of this document should reflect the preferred long-term options and a corresponding funding mechanism to ensure it is delivered.

The map below shows the current short-term strategy in terms of heavy vehicle movements through Narromine.



Map 1 Heavy vehicle route through Narromine

13 ROAD HIERARCHY

Narromine Shire Council's road hierarchy endeavours to match the class of road to its function and to the needs of the community.

The objective of the road hierarchy is to seek a fair and sustainable system based on the variables listed below. Consideration should be given to the road's intended purpose and traffic behaviour i.e. constant or seasonal (intensity-frequency-duration).

The Road Hierarchy is presented in Table 17 Road hierarchy, below. The desired design standard is achieved by using current guidelines (Austroads, ARRB, IPWEA, research papers, etc.) and is based on environmental, geotechnical and other relevant technical criteria for a particular segment of road.

Maintenance frequency as well as affordability must be considered to ensure level of services are maintained. Road users should be informed regarding maintenance frequencies, especially to obtain "buy in" or ownership of a particular road as well as to manage expectations of those particular road users. This is to ensure that all roads receive the required maintenance as per the agreed standards and intervals therefore ensuring an equitable allocation.

13.1 Primarily Variables






The Average Annual Daily Traffic (AADT) which is an international standard measurement based on vehicles per day (VPD) / Average Daily Traffic (ADT) converted to a standard two axle vehicle.

13.2 Secondary Variables


Secondary variables for roads on the cusp of meeting the AADT requirements for a higher classing include:

- % of heavy vehicles as a function of the AADT (i.e. high ratio heavy/light vehicles);
- Horizontal and vertical alignment of the road (i.e. hilly or curved);
- Used heavily by harvest traffic / livestock transport;
- No alternate routes that could be taken;
- Having no gates / grids on the road;
- Proximity to School Bus runs; and
- Roadside drainage and proximity / location of floodways

Table 17 Road hierarchy⁸

Class	Description	Image	Function	Desired Design Standard	~Km's of Network
1	Arterial Road		Primary: <ul style="list-style-type: none"> • AADT > 500 Secondary: <ul style="list-style-type: none"> • Traffic movement between regions and service centres. • Permanent School Bus Route • Important heavy vehicle route 	<ul style="list-style-type: none"> • 11m wide pavement and appropriate formation width • Bitumen sealed surface, minimum 9m wide • Two lane carriageways minimum 3.5m each • Minimum 1m stabilised and sealed shoulder • Pavement designed by specialist • Longitudinal and cross drainage. • Line marked centre and edges • Guideposts and other traffic facilities • Guardrail where applicable 	190.1km Sealed 0km Unsealed
2	Sub-Arterial Roads		Primary: <ul style="list-style-type: none"> • 150 < AADT < 499 Secondary: <ul style="list-style-type: none"> • Traffic movement between collector or access road and arterial road. • Permanent School Bus route • Important heavy vehicle route 	<ul style="list-style-type: none"> • 10m wide pavement and appropriate formation width • Bitumen sealed surface, minimum 8m wide • Two lane carriageways minimum 3.5m each • 0.5m/0.5 Sealed/ unsealed shoulder - stabilised • Pavement designed by specialist • Longitudinal and cross drainage. • Line marked centre • Guideposts and other traffic facilities • Guardrail where applicable 	178.21km Sealed 0km Unsealed
3	Collector Road		Primary: <ul style="list-style-type: none"> • 70 < AADT < 149 Secondary: <ul style="list-style-type: none"> • Traffic movement between access road and arterial or sub-arterial road. • Permanent School Bus route 	<ul style="list-style-type: none"> • Depending on the function and WOL cost of the road: <ul style="list-style-type: none"> ○ Consider single carriage way; or ○ 8m wide pavement and formation • Bitumen sealed surface: <ul style="list-style-type: none"> ○ minimum 3.5m wide; or ○ 7m wide • Stabilised unsealed shoulder • Pavement based on design ESA for Heavy Vehicles with CBR of 3 • Longitudinal and cross drainage. • No line marking • Guideposts and other traffic facilities 	316.7km Sealed 172km Unsealed
4	Access Road		Primary: <ul style="list-style-type: none"> • 20 < AADT < 69 Secondary: <ul style="list-style-type: none"> • Road to access limited properties where people actually reside (rural: ≥ 4 houses). • Permanent School Bus OR Route used to access permanent school bus 	<ul style="list-style-type: none"> • 8m wide formation where appropriate • Unsealed surface, minimum 7m wide gravel • Pavement based on design ESA for Heavy Vehicles with CBR of 3 • Longitudinal and cross drainage • Guideposts and other traffic facilities 	67.92km Sealed, 302.59km Unsealed
5	Convenience Links		Primary: <ul style="list-style-type: none"> • AADT < 19 Secondary: <ul style="list-style-type: none"> • Road to access limited properties where people actually reside (rural: ≤ 3 houses) • Route used to access a permanent school bus 	<ul style="list-style-type: none"> • 8m wide formation where possible • Unsealed surface, minor gravelled sections by exception • Longitudinal and cross drainage • Guideposts and other traffic facilities • Pavement based on design ESA for Heavy Vehicles with CBR of 3 	5.2km Sealed, 272km Unsealed

⁸ Consult Austroads and Council's Engineering Section for Urban or Town Streets regarding design criteria

6	Service Track		<p>Primary:</p> <ul style="list-style-type: none"> • AADT<5 <p>Secondary:</p> <ul style="list-style-type: none"> • Access to Private or single property 	<ul style="list-style-type: none"> • Not maintained by Council • Unformed • No Longitudinal and cross drainage • User pays for any grading/maintenance 	<p>1.94km Sealed</p> <p>76.7km Unsealed</p>
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Table 18 Roads Hierarchy, Inspections and Maintenance Grading Strategy for Council Rural and Regional Roads ⁹

Road Name	Road No.	Group	School Bus Route (Yes/No)	Number of Road Defect Inspections per year	2022 Road Classification Sealed Section	2022 Road Classification Unsealed Section	2016 Road Class	Proposed Hierarchy Change	~AADT Used	~AADT 2016	Freq of Grade (grade/yr.)	Freq of Shoulder grade or maintenance (grade/yr.)
Burroway Road	014	13	Yes	2	2		2	No Change	108		-	once/3yrs
Corry Road	130	1	Yes	2	2		2	No Change			-	once/3yrs
Dandaloo Road	026	1	Yes	2	2		2	No Change	251	251	-	once/3yrs
Dubbo-Burroway Road	029		Yes	2	2		2	No Change			-	once/3yrs
Gundong (Obley) Road	066		No	2	2		2	No Change			-	once/3yrs
Trangie Saleyard Road	109	4	No	2	2		2	No Change			-	once/3yrs
Wambianna Road	097		No	2	2		2	No Change	178	178	-	once/3yrs
Warren Road	088		Yes	2	2		2	No Change	69		-	once/3yrs
Backwater Road	002	2	Yes	1	3	3	3	No Change	72	72	once/yr	once/3yrs
Bulgandramine Road	012	7	No	1	3		3	No Change			-	once/3yrs
Dubbo Collie Road	030	13	No	2	2		2	No Change			-	once/3yrs
Enmore Road	037	4	Yes	1	3		3	No Change	65	55	-	once/3yrs
Euromedah Road	038	3	No	1	3	4	3	No Change	20		once/yr	once/3yrs
Farrendale Road	042	6	Yes	1	3	3	3	No Change	44		once/yr	once/3yrs
Harris Street (Rural section)	413	18	No	1		4	3	Downgrade			once/3yrs	once/3yrs
Highpark Road	141	5	No	1	3		3	No Change			-	once/3yrs
Jefferies Road	112	8	No	1	3		3	No Change			-	once/3yrs
Jones Circuit	139	16	No	1	3	3	3	No Change			once/2yrs	once/3yrs
McNamara's Lane	004	14	No	1	3		3	No Change			-	once/3yrs
Mungeribah Lane	059	2	Yes	1	3	3	3	No Change	85	85	once/yr	once/3yrs
Narwonah Road	063	6	Yes	1	3	3	3	No Change			once/yr	once/3yrs
Old Backwater Road	103	16	No	1	3		3	No Change	82	82	-	once/3yrs
Peak Hill Railway Road	070	6	Yes	1	3		3	No Change			-	once/3yrs
River Drive	140	5	No	1	3		3	No Change			-	once/3yrs
Rosebank Road	148	13	No	1	3		3	No Change			-	once/3yrs
Sahara Road	154	18	No	1	3	4	3	No Change			once/3yrs	once/3yrs
Tantitha Road	080	11	Yes	1	3	3	3	No Change	75	75	once/yr	once/3yrs
Tomingley West Road	116	20	No	1	3		3	No Change			-	once/3yrs
Trangie Rubbish Tip Road	136	18	No	1		3	3	No Change			once/2yrs	once/3yrs
Trangie Showground Road	085	18	No	1		3	3	No Change			once/yr	once/3yrs
Tyrie Road	083	10	Yes	1	3	3	3	No Change	87	87	once/yr	once/3yrs
Villeneuve Road	164	15	Yes	1	3		3	No Change	87	87	-	once/3yrs
Webb's Siding Road	094	16	Yes	2	2		3	Upgrade	112			once/3yrs
Weemabah Road	089	21	No	1	3		3	No Change	53	53	-	once/3yrs
Widgeree Road	090	4	No	1	3		3	No Change	115	115	-	once/3yrs
Willydah Road	091	5	Yes	1	3		3	No Change	85	85	-	once/3yrs
Alison's Road	001	6	No	1		4	4	No Change			once/2yrs	once/3yrs
Back Tomingley West Road	005	7	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Barling's Road	153	6	Yes	1		5	4	Downgrade			once/3yrs	once/3yrs
Belmont Road	003	6	No	1		4	4	No Change			once/yr	once/3yrs
Belowrie Road	006	9	No	1		4	4	No Change			once/3yrs	once/3yrs
Boggy Plains Road	009	2	Yes	1		4	4	No Change			once/yr	once/3yrs

⁹ Subject to funds being available

Road Name	Road No.	Group	School Bus Route (Yes/No)	Number of Road Defect Inspections per year	2022 Road Classification Sealed Section	2022 Road Classification Unsealed Section	2016 Road Class	Proposed Hierarchy Change	~AADT Used	~AADT 2016	Freq of Grade (grade/yr.)	Freq of Shoulder grade or maintenance (grade/yr.)
Buddah Lake Road	016	2	No	1		4	4	No Change			once/2yrs	once/3yrs
Bundemar Road	013	8	No	1		4	4	No Change			once/3yrs	once/3yrs
Cathudral Bogan Road	018	4	No	1	3	4	4	No Change	65	65	once/2yrs	once/3yrs
Cathudral Road	017	4	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Ceres Siding Road	019	19	No	1		4	4	No Change			once/2yrs	once/3yrs
Cobboco Road	020	13	Yes	1	3	4	4	No Change			once/2yrs	once/3yrs
Cornucopia Road	022	19	No	1		4	4	No Change			once/2yrs	once/3yrs
Craigie Lea Lane	023	11	No	1		4	4	No Change			once/2yrs	once/3yrs
Currington's Road	024	7	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Dappo Road	027	16	No	1	3	5	4	Downgrade			once/3yrs	once/3yrs
Dilladerry Road	028	11	No	1		4	4	No Change			once/2yrs	once/3yrs
Dulla Dulla Road	031	3	No	1		4	4	No Change			once/2yrs	once/3yrs
Ellengerah Road	036	8	Yes	1	3	4	4	No Change			once/2yrs	once/3yrs
Eureka Road	106	17	No	1		4	4	No Change			once/3yrs	once/3yrs
Ewenmar Road	039	13	No	1		4	4	No Change			once/2yrs	once/3yrs
Fairview Siding Road	041	20	No	1		4	4	No Change			once/2yrs	once/3yrs
Foreman's Lane	043	8	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Frecklington's Crossing	044	5	Yes	1	3	4	4	No Change			once/yr	once/3yrs
Gainsborough Road	142	16	Yes	12	1	1	4	Upgrade			once/yr	once/3yrs
George Street	162	16	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Gibson's Lane	045	8	No	1		4	4	No Change			once/yr	once/3yrs
Glenroy Road	159	18	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Haberworth Lane	048	6	No	1	5	5	4	Downgrade			once/3yrs	once/3yrs
Hamilton's Road	123	2	Yes	1		4	4	No Change			once/2yrs	once/3yrs
Jamea Road	113	10	No	1		4	4	No Change			once/2yrs	once/3yrs
Kyalite Road	050	7	No	1	3	4	4	No Change			once/yr	once/3yrs
Lincoln Lane	052	13	No	1		4	4	No Change			once/3yrs	once/3yrs
Lovers Lane	053	20	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Macquarie View Road	122	3	No	1		4	4	No Change			once/2yrs	once/3yrs
McLeod's Lane	054	12	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Merrinong Road	058	13	No	1		6	4	Downgrade			Slash once/year	Slash once/year
Merritt's Lane	057	13	No	1		4	5	Upgrade			once/2yrs	once/3yrs
Momo Road	065	11	No	1		4	4	No Change			once/3yrs	once/3yrs
Morgan Street	163	16	No	1		3	4	Upgrade			once/yr	once/3yrs
Mumble Peg Road	061	13	No	1		4	5	Upgrade			once/2yrs	once/3yrs
Newhaven Road	064	2	No	1	3	3	4	No Change			once/yr	once/3yrs
O'Leary's Lane	067	7	No	1		4	4	No Change			once/yr	once/3yrs
Papworth Lane	069	2	Yes	1		3	4	No Change	2		once/yr	once/3yrs
Pinedene Road	071	11	No	1	3	3	4	Upgrade			once/yr	once/3yrs
Pineview Road	072	13	No	1		4	4	No Change			once/2yrs	once/3yrs
Raeburn Lane	073	5	Yes	1	3	5	4	Downgrade			once/3yrs	once/3yrs
Richardson's Road	074	6	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Rocky Point Road	075	21	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Sharkey's Lane	076	5	Yes	1		4	4	No Change			once/2yrs	once/3yrs
Strathallyn Lane	125	6	Yes	1	3	4	4	No Change			once/2yrs	once/3yrs

Road Name	Road No.	Group	School Bus Route (Yes/No)	Number of Road Defect Inspections per year	2022 Road Classification Sealed Section	2022 Road Classification Unsealed Section	2016 Road Class	Proposed Hierarchy Change	~AADT Used	~AADT 2016	Freq of Grade (grade/yr.)	Freq of Shoulder grade or maintenance (grade/yr.)
Swift's Lane	078	4	No	1	3	5	4	Downgrade			once/3yrs	once/3yrs
Temoin Road	081	4	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Tink's Lane	082	20	Yes	1	3	4	4	No Change			once/yr	once/3yrs
Tomingley Cemetery Road	149	20	No	1	4	6	4	Downgrade	74		Slash once/year	Slash once/year
Tomkin's Road	084	2	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Trangie Cemetery Road	079	20	No	1	3	4	4	No Change			once/2yrs	once/3yrs
Tyrie North Road	114	10	No	1	3	5	4	Downgrade	18	18	once/3yrs	once/3yrs
Waikare Road	086	3	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Waterloo Road	092	6	No	1		4	4	No Change			once/2yrs	once/3yrs
Wilson's Lane	156	16	No	1		3	4	Upgrade	15	15	once/2yrs	once/3yrs
Wingfield Road	137	16	No	1		5	4	Downgrade			once/3yrs	once/3yrs
Wyanga Road	117	5	Yes	1		4	4	No Change			once/2yrs	once/3yrs
Anglebone Road	015	12	No	1		5	5	No Change			once/3yrs	once/3yrs
Ashgrove Road	021	18	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Bignell's Road	124	7	No	1		5	5	No Change			once/3yrs	once/3yrs
Bootle's Road	007	16	No	1		5	5	No Change			once/3yrs	once/3yrs
Brennan's Lane	010	12	No	1		5	5	No Change			once/3yrs	once/3yrs
Brown's Lane	011	5	No	1		5	5	No Change			once/3yrs	once/3yrs
Brummagen Road	008	22	No	1		5	5	No Change			once/3yrs	once/3yrs
Cannon's Road	025	6	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Castle's Road	034	7	No	1		5	5	No Change			once/3yrs	once/3yrs
Davis Road	035	20	No	1		5	5	No Change			once/3yrs	once/3yrs
Dawe's Crossing	110	6	No	1		5	5	No Change			once/3yrs	once/3yrs
Derribong Road	033	10	No	1		5	5	No Change			once/3yrs	once/3yrs
Drew's Road	032	21	No	1		5	5	No Change			once/3yrs	once/3yrs
Edmonstone's Road	040	3	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Elmore Road	131	6	No	1		5	5	No Change			once/3yrs	once/3yrs
Emogandy Road	099	13	No	1		5	5	No Change			once/3yrs	once/3yrs
Gin Gin Weir Road	132	21	No	1		5	5	No Change			once/yr	once/3yrs
Gordon's Lane	046	4	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Hando's Road	096	7	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Hargreaves Road	120	6	No	1		5	5	No Change			once/3yrs	once/3yrs
Herring's Lane	049	12	No	1		5	5	No Change			once/3yrs	once/3yrs
Heywood's Road	126	2	No	1		5	5	No Change			once/3yrs	once/3yrs
Hill's Road	127	17	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Howe's Road	101	2	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Job's Road	107	11	No	1		5	5	No Change			once/2yrs	once/3yrs
Jones Road	051	5	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Links Road	160	18	No	1		5	5	No Change			once/3yrs	once/3yrs
Lockwood Road	108	6	No	1		5	5	No Change			once/3yrs	once/3yrs
McCarron's Road	087	6	No	1		5	5	No Change			once/3yrs	once/3yrs
McNiven's Road	056	7	No	1		5	5	No Change			once/2yrs	once/3yrs
Montgomery's Road	062	4	No	1		5	5	No Change			once/3yrs	once/3yrs
Morris Road	060	19	No	1		5	5	No Change			once/3yrs	once/3yrs
Mungery Hall Road	055	6	No	1		6	5	Downgrade			Slash once/year	Slash once/year

Road Name	Road No.	Group	School Bus Route (Yes/No)	Number of Road Defect Inspections per year	2022 Road Classification Sealed Section	2022 Road Classification Unsealed Section	2016 Road Class	Proposed Hierarchy Change	~AADT Used	~AADT 2016	Freq of Grade (grade/yr.)	Freq of Shoulder grade or maintenance (grade/yr.)
Park Hill Road	157	3	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Rich's Road	150	18	No	1		5	5	No Change			once/2yrs	once/3yrs
Strahorns Access Road	143	11	No	1		5	5	No Change			once/3yrs	once/3yrs
Thornycroft Road	111	7	No	1		5	5	No Change			once/2yrs	once/3yrs
Ward's Road	121	9	No	1		5	5	No Change			once/2yrs	once/3yrs
Westbury Road	093	18	No	1		5	5	No Change			once/2yrs	once/3yrs
Wilson's Lane	118	8	No	1		5	5	No Change			once/3yrs	once/3yrs
Woodleigh Road	133	19	No	1		5	5	No Change			once/2yrs	once/3yrs
Woodside Road	102	12	No	1		5	5	No Change			once/3yrs	once/3yrs
Wynsley Lane	145	22	No	1		5	5	No Change			once/3yrs	once/3yrs
Yagobie Road	151	2	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Young Road	161	18	No	1		6	5	Downgrade			Slash once/year	Slash once/year
Barden's Road	105	4	No	1		6	6	No Change			Slash once/year	Slash once/year
Bywannah Road	104	2	No	1		6	6	No Change			Slash once/year	Slash once/year
Corry Access	147	1	No	1		6	6	No Change			Slash once/year	Slash once/year
Day's Road	115	9	No	1		6	6	No Change			Slash once/year	Slash once/year
Greenvale Road	129	3	No	1		6	6	No Change			Slash once/year	Slash once/year
Griffith's Road	047	2	No	1		6	6	No Change			Slash once/year	Slash once/year
Harrison's Road	119	6	No	1		6	6	No Change			Slash once/year	Slash once/year
Heckendorf's Access	134	4	No	1		6	6	No Change			Slash once/year	Slash once/year
Mandi Road	068	5	No	1		6	6	No Change			Slash once/year	Slash once/year
Ningawalla South Road	135	11	No	1		6	6	No Change			Slash once/year	Slash once/year
Noondoo Road	138	10	No	1		6	6	No Change			Slash once/year	Slash once/year
Ralbi Road	158	8	No	1		6	6	No Change			Slash once/year	Slash once/year
Reid's Road	098	22	No	1		6	6	No Change			Slash once/year	Slash once/year
Rockbourne Road	144	7	No	1		6	6	No Change			Slash once/year	Slash once/year
Schroeder's Access	152	21	No	1		6	6	No Change			Slash once/year	Slash once/year
Sharah's Access Road	146	7	No	1		6	6	No Change			Slash once/year	Slash once/year
Sissian Road	155	18	No	1		6	6	No Change	165	165	Slash once/year	Slash once/year
Springbank Road	128	13	No	1		6	6	No Change			Slash once/year	Slash once/year
Stevenson's Road	077	5	No	1		6	6	No Change			Slash once/year	Slash once/year
Sydney-Smith Road	100	13	No	1		6	6	No Change			Slash once/year	Slash once/year
Wyanga Silo	095		No	1		6	6	No Change			Slash once/year	Slash once/year
Wallaby Road	170	16	No	1		4		Road Renamed (previously part of Dappo road)			once/2yrs	once/3yrs
REGIONAL ROADS												
Eumungerie Road (MR572)			Yes	12	1				692			
Peak Hill Road (MR89)			Yes	12	1				1035			
Trangie Dandaloo Road (MR347 D)			No	12	1				92			
Trangie - Collie Road (MR347 C)			Yes	12	1				266			
Tullamore Road (MR354)			Yes	12	1			Upgrade	891			

14 TEMPORARY CLOSURE OF PUBLIC ROADS

14.1 General

Council as the road agency has a duty of care to all users of the road network that might be adversely affected by its acts or omissions. Note that the requirement of duty of care does not demand that there be no deficiencies in the road system – only that a road agency will do what is reasonable to monitor and remedy any deficiencies.

Court decisions recognise that the resources available to an organisation, including the availability of material, skilled labour and funding, may limit how quickly defects can be addressed. If this results in a delay to remedying a situation which is hazardous for road users, then the road agency should consider other alternatives such as using signs to alert road users of the hazard or, in extreme cases, closing the road. The minimum commitment to road safety is a process for identifying safety issues and prioritising them, a process for remedying these issues within a reasonable time frame and a process for managing unsafe situations until remedial works can be undertaken. Each of these processes must be defensible as ‘reasonable’.

Council also has a duty of care to protect the road asset, and to avoid unnecessary expenditure or burden on ratepayers in fixing roads as a result of road user’s ignorance, in its local government area.

From time to time Council may temporarily close or impose load limits on public roads due to:

- Wet weather;
- Traffic hazards and accidents;
- Planned roadworks;
- Road damage from natural or unnatural circumstances; and
- Street processions or rallies.

The Narrromine LGA is divided into three road zones and the temporary closure of public roads shall be in accordance with adopted Policy.

Some roads have a load restriction of 3.5 tonnes imposed on them when wet conditions are experienced. However, as a general rule, unsealed roads are closed when in excess of 25mm of rainfall has been received within an 8-hour period.

14.2 Liability for Damage to a Public Road

A person who causes damage to a public road, or to any road work on a public road or any traffic control facility on a road or road related area within the meaning could be liable to pay to the roads authority the cost incurred by that authority in making good the damage.

If the damage referred was caused by a motor vehicle or vessel, the owner and the driver of the motor vehicle or, as the case may be, the owner and the master of the vessel are jointly and severally liable for the damage.

Ordinary wear and tear caused by reasonable use of a public road is excluded, except where the road was closed.

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15 ROAD MAINTENANCE

15.1 General

In the past there were less road assets to maintain and these assets were fairly new. Design vehicles had a different composition and used road assets on a lower frequency and duration. Road users' expectations also changed with technological advances and information systems as well as a change in user demographics and requirements. Natural resources to construct a road was more freely available with shorter haulage distances. Hence, in the past these assets:

- Needed less maintenance;
- Were maintained by relying on the recollections of the technical staff, who were obliged to make decisions through their experience, technical competence and "gut feelings"; and
- Were designed to be "fit for purpose" without a real appreciation of future growth or uses.

Often staff were forced to wait for a major problem to occur instead of being proactive in endeavouring to ensure that problems were corrected whilst they were still minor, relatively less expensive to fix and didn't present a safety hazard to the public.

Sometime in the past, the decision was made in council to maximise the length of seal by narrowing its width to 3m with the aim of providing a sealed road to every farm gate. These narrow-sealed roads do not meet any modern standard, are a major safety hazard, and are now nearing the end of their design life. Hence, if additional maintenance funding is not provided in the near future, these roads will require full reconstruction. It should be remembered that it can cost a lot more to reconstruct a road than it does to carry out periodic maintenance on a road.

15.2 Road Maintenance Planning

As sealed road assets grow in number and age, it is vital that a road maintenance system be formulated that enables staff to present a more accurate picture of the assets under Council's control. By having a system of standards, practices and processes:

- Staff can provide Council with a good picture of the state of the road assets;
- Staff can identify and align asset renewals and upgrades with current trends in changes in land use, traffic behaviour and safety aspects;
- Council can be proactive in preventing expensive major construction works; and
- Staff will be able to clearly identify and quantify the best opportunities that allow Council to meet stated objectives and missions from a financial and technical sense (getting more value for money).

However, a road asset maintenance system will only provide meaningful and beneficial outputs if the political and social aspects of managing a community asset, such as roads, are also included (e.g. levels and types of service expected by the community and costs to be paid for each level of service).

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16 METHODOLOGY FOR IDENTIFYING AND PRIORITISING ROAD WORKS

16.1 General

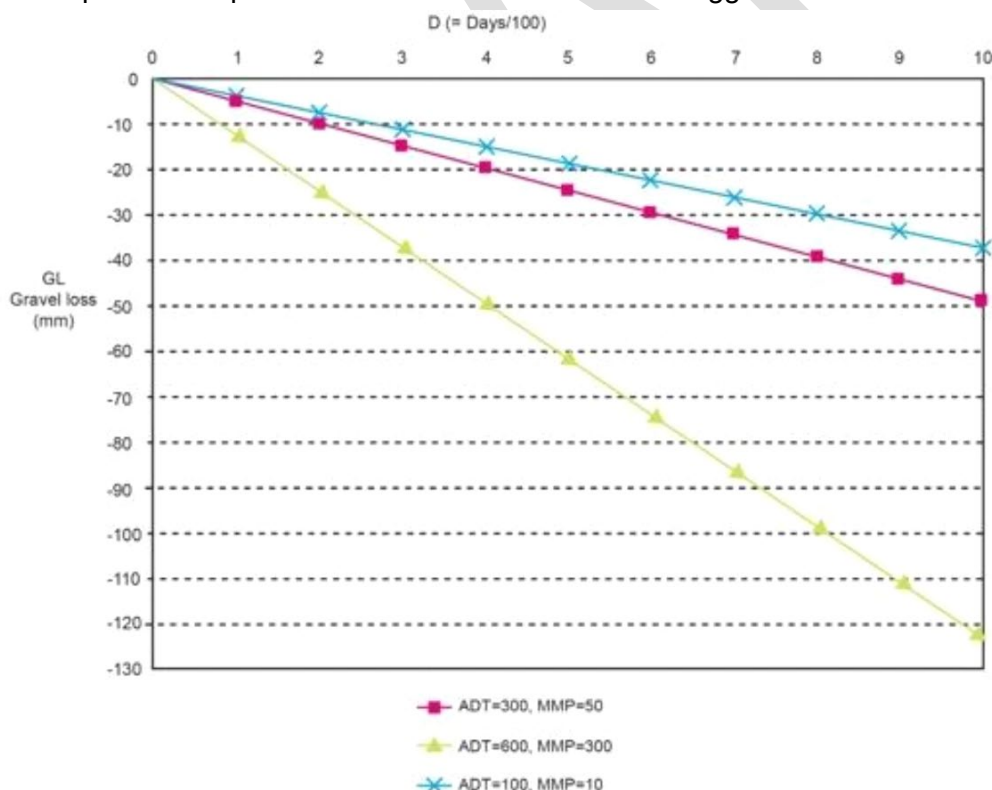
Council is using a points-based system considering the road hierarchy, multiple risk factors and the condition assessment of a particular road.

It is an industry practice adopted approach to identify and prioritise risks associated with the condition of Council’s road network, and hence where programmed work will sit in the prioritised list of work. It is a simple, quick, repeatable and reliable method that can be used by both skilled and semi-skilled staff that could provide evidence that Council has demonstrated to the best of its ability the duty of care and fairness for its rate payers and road users.

This assessment should be done as part of the review of this Strategy.

16.2 Determining Gravel Loss

The variation of the predicted gravel loss (in mm since last maintenance) with changes to the average daily traffic (ADT) and mean monthly precipitation (MMP) is shown in the figure below. The MMP has the most influence on gravel loss compared to the ADT. Plasticity characteristics also have an influence; however, the statistical models show little effect whereas practical experience and international studies suggest this should be stronger.



Source: Martin et al. (2013).

Figure 16 Variation of predicted gravel loss

There are a number of models available that can predict gravel loss. These models could be considered to develop and improve road maintenance and renewal programs, especially for re-sheeting.

16.3 Road Risk Ranking

Calculated Road Risk Ranking Scores used to prioritise roadworks with the highest score having the highest priority.

The formula used to determine the Risk Ranking of a road is:

Road Risk Ranking (/75) = Hierarchy (/25) + Generic Event Risk (/25) + Condition Assessment (/25)

The process in determining the Risk Rating of a particular Road is given below

a. Step 1: Determine Hierarchy Rating (Allocated Points/25)

Table 19 Hierarchy rating

Hierarchy	Description	Allocated Points
Class 1	Arterial Road	25
Class 2	Major collector Road	20
Class 3	Minor collector Road	15
Class 4	Local Access Road	10
Class 5	Convenience link	5
Class 6	Not Maintained by Council	0

b. **Step 2:** Determine the Likelihood and Consequence of the event occurring (**Score/25**)

- **PART A:** Worst case event – Assess the worst that can happen in each category as a result of the asset in its current condition. The worst Assessment becomes the “Consequence”, in the risk matrix in PART B.

Assessment	Public Safety / Danger	Political	Environmental	Financial	Customers	Public Health
Catastrophic Very High impact with very significant Consequences	Fatality or other life threatening incidents.	Sustained adverse media, Loss of confidence in Council. State / Federal MP’s involved.	Large scale adverse impact to Environment. Prosecution for negligent act.	>\$1M Rehab Costs / lost revenue	Affects > 10% Shire, Widespread complaints	Widespread Properties unable to access medical facilities / services
Severe High impact with major Consequences	Hospitalisation with multiple serious injuries	Considerable community concern, adverse local media, Mayor / GM Involved.	Significant adverse impact to Environment. Prosecution.	>\$200k Rehab Costs	Affects 2%-10% Shire. Multiple complaints	Multiple properties unable to access medical facilities / services
Moderate Noticeable Impact with visible Consequences	Injury requiring 1 or more day/s off work	Some public concern, multiple letters / Calls received, multiple Councillors involved	Localised adverse impact to Environment. Compliance breach	>\$50k Rehab Costs / lost revenue	Affects less than 2% (100 people). Some complaints	Few properties unable to access medical facilities / services
Minor Minor impact with some Consequences	Injury requiring medical treatment (e.g. cut require stitches)	Minor public concern, Isolated letters / Calls received. Single Councillor involved	Short term reversible impact to Environment.	>\$20k Rehab Costs/ lost revenue	Affects less than 1% (50 people). Isolated complaints	Single property unable to access medical facilities / services
Insignificant Very Minor impact with Insignificant Consequences	Injury requiring first aid (e.g. Abrasions)	Minimal public concern, single letter / Call received	Temporary Environmental degradation and immediately restored	Minor rehab costs/ lost revenue	Affects less than 10 people. A single complaint	Time to access medical facilities / services is increased

- **PART B:** Decide likelihood of the event occurring and therefore calculate the “Event Risk” score

RISK	Very Likely	Likely	Could Happen	Unlikely	Very Unlikely
	>90% chance in next 12 months	>50% chance in next 12 months	Less than 50% chance in next 12 months	Less than 50% chance ever	Less than 10% chance ever
Catastrophic Very High impact with very significant Consequences	25	20	15	10	5
Severe High impact with major Consequences	20	16	12	8	4
Moderate Noticeable Impact with visible Consequences	15	12	9	6	3
Minor Minor impact with some Consequences	10	8	6	4	2
Insignificant Very Minor impact with Insignificant Consequences	5	4	3	2	1



- Step 3: Condition Assessment Criteria (**Score/25**)

Assess each component issue of the asset in its current condition (Condition assessment score 1-5). The weighting will determine the overall mark out of 25 for the condition of the road.

Table 20 Condition assessment criteria

Condition Assessment			Catastrophic (5)	Severe (4)	Moderate (3)	Minor (2)	Insignificant (1)
Issue	Description	Weighting	Very High impact with very significant Consequences	High impact with major Consequences	Noticeable Impact with visible Consequences	Minor impact with some Consequences	Very Minor impact with Insignificant Consequences
Structural	Drainage	25%	Unshaped or non- existent	Poorly shaped, significant erosion	unevenness, some erosion	minor erosion, works ok	Well formed drains minimal erosion
	Cross Section Shape / Road Profile	10%	Severe Irregularities impeding drainage causing localised ponding. Water flows to the centre on the road.	Obvious development of irregularities that will impede drainage and form depressions	Some unevenness with Camber (Less than 2%)	Good Camber (2%-4%)	Well formed Camber (>4%)
Serviceability	Ride quality / Road Roughness / Corrugations	10%	International Roughness Index Sealed <2 , unsealed <4	International Roughness Index Sealed <4 , unsealed <8	International Roughness Index Sealed <6 , unsealed <12	International Roughness Index Sealed <8 , unsealed <14	International Roughness Index Sealed >8 , unsealed >14
	Local Road Surface Defects	15%	>10% area trafficable area affected. >100mm deep	>10% area trafficable area affected. >50mm deep	5%-10% area trafficable area affected. <15mm deep	1%- 5% area trafficable area affected. <15mm deep	< 1% area trafficable area affected. <15mm deep
	Signage and Furniture, Line marking	5%	Furniture in dangerous condition / location, Road signs & many guide posts missing	Roadside Furniture too close to road, Signs / posts in poor conditions, lines need marking	Road signs, lines, & Furniture in fair condition, though some appropriately placed	Road signs, lines & Furniture in Reasonable condition and appropriately placed	Road signs, Lines & Furniture in good condition and appropriately placed
Safety	Rutting	10%	Extreme Rutting > 4m long, >100mm Deep	Heavy patches > 4m long, >50mm Deep	Moderate patches > 4m long, <50mm Deep	Moderate patches > 4m long, <15mm Deep	Small Localised, < 4m long, <15mm deep
	Edge drop off / Edge Break	25%	Extreme Edge Break > 300mm, drop, >75mm	Heavy Edge Break > 300mm, drop, <75mm	Moderate Edge Break > 300mm, drop, <50mm	Minor Edge Break > 200mm, drop, <30mm	Good Edge Break <100mm, drop, >10mm

100%

17 OPERATIONS

17.1 General

When managing a road network there are two areas where funds need to be injected. They are:

- **Asset Preservation:** Maintenance of the road network, including Reactive Maintenance (i.e., pothole patching), Programmed Maintenance (i.e. Grading), and Renewals (i.e. Resealing and Resheeting); and
- **Asset Enhancement:** Improvements to the road network, including improvements to geometry, pavement strengthening, road widening and sealing of unsealed roads (ie, road reconstruction)

Strategies that are currently adopted for the road network include:

- An annual roads inspection program to identify and assess the condition, quality, function and safety of the roads surface as well as drainage, signage, and to log and report any defects.
- Ongoing vehicle count program to keep up to date information on road usage and heavy vehicle monitoring.
- An unsealed road maintenance grading program which seeks to achieve each road in the shire graded either every year, every second year or every third year with an average return frequency of 18 months but no longer than three (3) years.
- Road maintenance grading for unsealed roads to commence after harvest season (based on road hierarchy), in preparation for the following maintenance grade or harvest season. This ensures that the longevity of the road asset is maintained. Council may consider the frequency and duration of harvests and adjust its maintenance program accordingly.
- A shoulder maintenance grading programme which is integrated with the bitumen resealing programme where possible to achieve the serviceability benefits of a wider seal.
- Capital works road construction program to widen existing sealing to the correct standards, and lay new seal on identified unsealed roads.
- Laser profiling program to get an independent, accurate gauge of the roads roughness that can be used to compare roads, prioritise work and aid in grant applications.
- Grid removal program to remove cattle grids that are no longer required and/or are not up to standard and/or a safety hazard.
- Road side verge slashing program funded by the RFS to reduce fire hazards.

- Road side tree lopping/vegetation removal program to proactively remove potential hazards or debris that could fall on the road, or reduce road safety.
- Road side verge spraying program, to kill off, inhibit and prevent growth of grass and weeds on the sides of the road and at intersections. This intends to aid in shoulder grading on sealed roads, protect drainage, reduce the fire risk, increase sight distances and encourage animals to stay away from the road.
- A bitumen resealing programme to ensure the protective bitumen surface course of any road doesn't attain an age of more than 20 years in the local road, 15 years on Regional roads, and 10 years in the more highly trafficked town street areas. This is dependent on the condition of the existing seal.
- An over-arching Council objective of sealing all roads with hierarchy 1-3 fully sealed by 2050.
- A kerb and gutter construction and reconstruction programme to ensure that every residential property in the urban area (excluding rural residential areas) has a kerbed and guttered frontage and that the road contains stormwater runoff to prescribed service level standards.
- Footpath construction and reconstruction programme to ensure that every residential street in the urban area (excluding rural residential areas) has a designated footpath on at least one side of the street to prescribed service level standards.
- Temporary closure of public roads to ensure road user safety and to protect the road asset.

17.2 Road Zones

Narromine LGA has been divided into three road zones which is illustrated in the figure below.

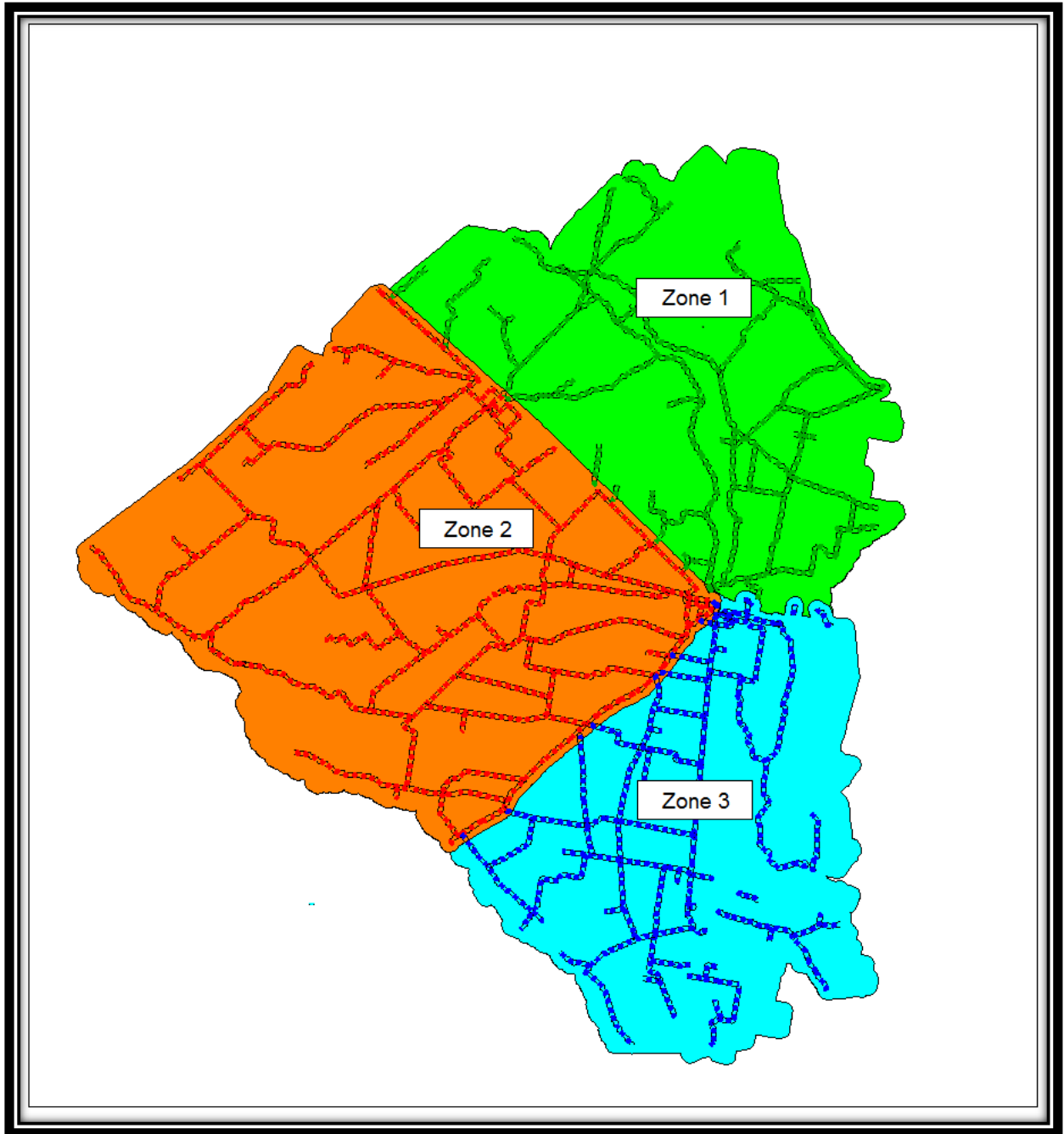


Figure 17 Road zone areas

17.3 Roads Inspection Program

Table 18 in shows the inspection frequency for the Council's roads.

- Hierarchy 1 roads will be inspected every month except:
 - Eumungerie Road (MR 572) – Fortnightly; and
 - Tomingley / Peak Hill Road (MR 89)- Fortnightly
- Hierarchy 2 roads will be inspected every 6 months; and
- All other roads will be inspected every 12 months.

17.4 Road Count Program

A rolling 3 year program will run indefinitely gathering up to date information about usage on Council's road network.

Information gathered includes:

- AADT (Average annual daily traffic) measured as two axle pairs;
- VPD (Vehicles per day) measured as vehicle regardless of axles;
- Speed of vehicles;
- Direction of vehicles;
- % heavy vehicles;
- Vehicle class
- Design Equivalent Single Axis

17.5 Capital Road Works: New Road Construction or Upgrades

The 10 Year capital works programs are locked in only for the current and next financial year. Roads identified for capital works from year 2 to year 10 will have to go through an annual re-ranking based on:

- Priority due to safety;
- Condition assessments based on the current year's road inspection data; and
- Future growth or change in traffic behaviour.

The Capital works program is entirely dependent on external grant funding, and is susceptible to year to year fluctuations depending on what grant money is received from state and federal governments.

The program itself is located within the Roads Asset Management Plan (AMP 6), and is referenced in the Long-Term financial Plan as a line item.

17.6 Road Renewals

17.6.1 Resealing

The aim of the Resealing program is to upgrade /renew the entire sealed network. The renewal program is based on condition assessment of the wearing surface. Where possible the following criteria will apply:

- Once every 20 years for Local roads;
- Once every 15 years for regional roads; and
- Once every 10 years for town streets in Narrormine, Trangie, and Tomingley.

The 10 Year Resealing programs are “locked in” only for the current and next financial year. Roads identified for Resealing from year 2 to year 10 will have to go through an annual re-ranking based on priority due to safety and condition assessments based on the current year’s road inspection data.

17.6.2 Resheeting

The 10-Year resheeting programs are “locked in” only for the current and next financial year. Roads identified for resheeting from year 2 to year 10 will have to go through an annual re-ranking based on priority due to safety and condition assessments based on the current year’s road inspection data.

17.6.3 Reactive Road Maintenance

There is an annual budget set for reactive roads maintenance based on history of previous years. This budget allows for work such as pot hole repair, road patching, removal of debris, and to address imminent safety issues that may present during the year that require immediate attention.

17.6.4 Programmed Road Maintenance

The programmed maintenance program for roads is a rolling 3-year program whereby each road, depending on its hierarchy, will receive appropriate maintenance required to keep it up to the minimum standard, subject to funds being available. “Win rows” and “back cuts” will be levelled to increase road user safety.

a. Sealed roads

Sealed roads will receive shoulder grading and drainage and vegetation clearing in the table drains (on average 6 passes with a grader on each side). It is budgeted that on average a grader crew will complete 2km /day on each side.

b. Unsealed roads

Unsealed roads will receive a full width maintenance grade including the drainage and vegetation clearing in the table drains (on average 9 passes with a grader). It is budgeted that on average grader crew will complete 2km /day for an average 8m wide formation, since the majority of Council's roads require major formation work.

Table 18 illustrates programmed roads maintenance strategy, subject to available funding.

DRAFT

18 LEVELS OF SERVICE

18.1 General

This section defines maintenance service levels for each road hierarchy class to ensure that the appropriate appearance and functional performance of each road is met.

18.2 Road Network Inspections

A planned inspection system is considered essential to:

- Effectively manage the maintenance program;
- Enable Council to be proactive in maintaining the road infrastructure (thereby reducing complaints and enhancing Council's public image); and
- Provide a risk management system in order to reduce public liability claims.

In deciding if a defect is a hazard, the following needs to be considered:

- The road hierarchy and function (condition, geometry, formation / sealed widths, etc);
- The location of the defect (i.e., in wheel path);
- The effect on pedestrians, cyclists and motor cyclists and other road users;
- The position or proximity in relation to schools, hospitals, aged care facilities, businesses, pedestrian and cycle paths etc;
- Traffic volume (AADT);
- Sharp bends or crests i.e. sight distance issues;
- Speed limit; and
- Weather conditions, soil conditions, vegetation and the environment.

18.3 Intervention Levels

The standard of deterioration at which remedial action is initiated and assigned a corresponding response time. The Intervention levels for each road class, which are as follows:

- Defects to be repaired under planned maintenance (road or shoulder grading) or within a planned program of work (renewal or capital).
- Defects that require immediate action as they may be hazardous or represent a risk of asset deterioration. These are done as reactive maintenance (patching, filling pot holes).

Where possible, defects that require immediate action is dealt with by repairing or making safe the defect at the time of inspection/identification. If this isn't possible, the ensuing action must involve prompt erection of warning signs (as outlined in Council's standard "Traffic Control Plans) followed by repair as soon as practicable.

18.4 Remediation Options

If a road is listed on a funded rehabilitation program, then it would be irresponsible to undertake minor repair works only to have the pavement reconstructed shortly after. Therefore, in these situations warning signage may be used for defects that are outside intervention levels, until the pavement is rehabilitated.

While Council will endeavour to meet the response times as noted in the following tables, if at any time available resources are not sufficient to ensure maintenance works are carried out within the response times then warning signage and/or safety barricading will be installed until such time as the work is completed. Warning signage is not seen as a permanent solution and will be utilised for a maximum of 3 months (depending environmental conditions) during which time the maintenance work will be undertaken, with the exception roads on the rehabilitation program as defined in the note above.

18.5 Response Times

The response time aims to provide Council with the flexibility to efficiently schedule work, considering the extent and priority of the work to be carried out. Response times are the maximum permitted time to fix a defect.

If the defect is reported by as a service fault through the Customer Service Centre there will be a two staged response.

- a. Inspection and assessment of the service fault by the Assets Inspector.
- b. Repair by a follow up maintenance crew.

If the defect is reported by Council staff in most cases there will be no need for an inspection and assessment of the service fault by the Assets Inspector

This Strategy seeks to work within Council's allocated budget. If the Reactive Maintenance budget is likely to be exceeded:

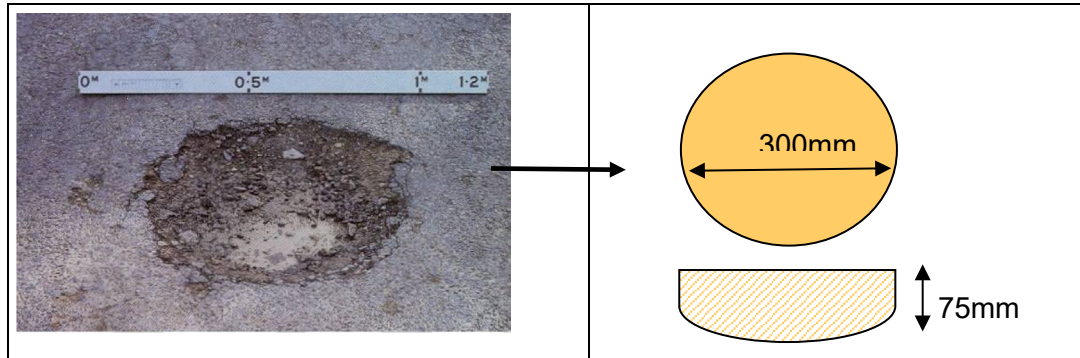
- Discretion can be applied to intervention levels, or the response times pushing them into the following financial year
- However, intervention levels must be adhered to if they relate to public safety.

18.6 Performance Target

The Performance Target is the KPI for Council to achieve the outcome of the measure, under ideal conditions, and is described further below.

18.7 Maintenance Guidelines

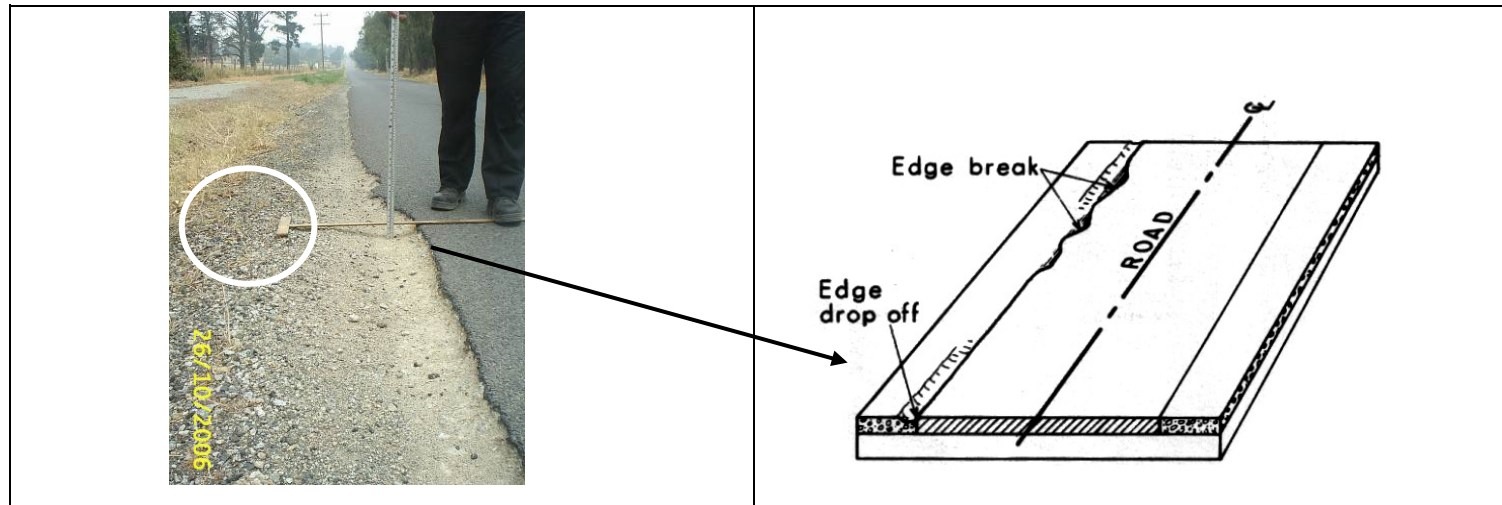
18.7.1 Sealed Road – Pot-holes



Intervention Level	Caused by	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> Greater than 300mm in diameter and/or Depth is a minimum of 50mm. 	Chunks of pavement material have separated and pulled out by the wheels of passing vehicles resulting in a hole.	Temporary: <ul style="list-style-type: none"> Fill with cold mix or Jet patcher Permanent: <ul style="list-style-type: none"> Reconstruct section of road (Excavate & Replace Seal). 	1	2 days	10 days	90%
			2	2 days	15 days	
			3	7 days	20 days	
			4 and lower	7 days	60 days	

Notes: All times noted in working days.

18.7.2 Sealed Road – Edge Drop

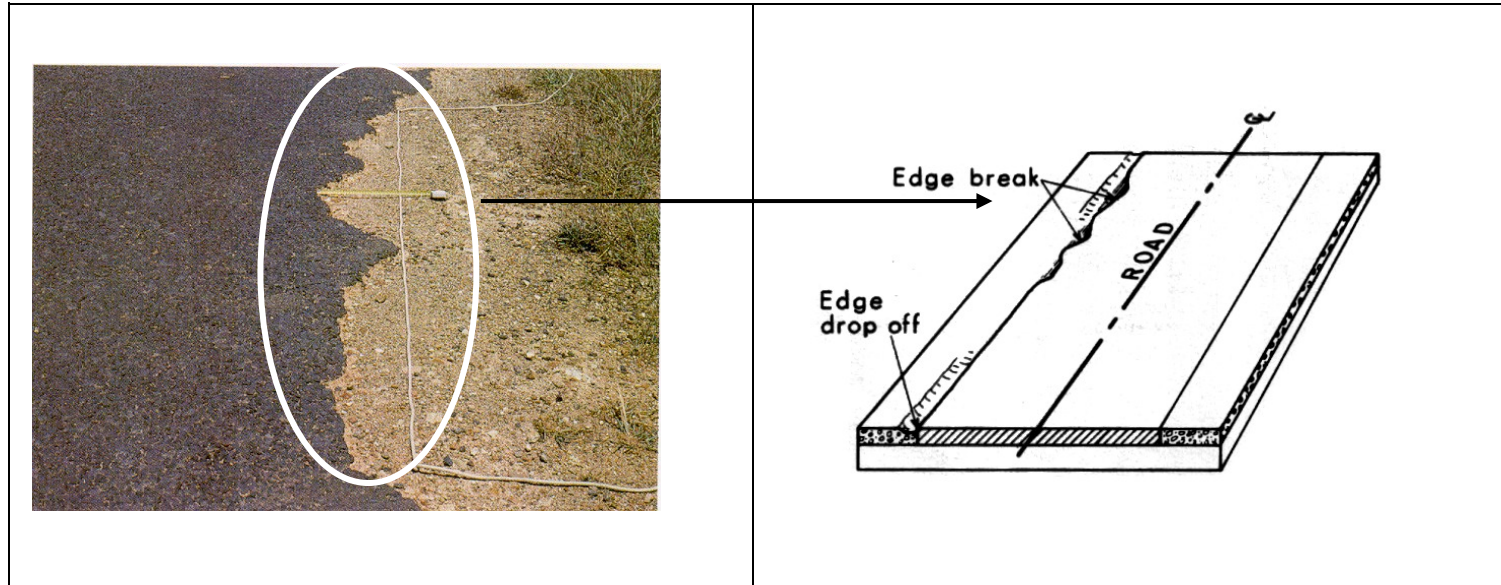


Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Greater than 75mm drop off for a continuous length of 2m up to 100m	Drop at a typically sealed roads with unsealed shoulders at the edge of the sealed road	Temporary: <ul style="list-style-type: none"> Shoulder Grading Repair with Jet patcher Permanent: <ul style="list-style-type: none"> Reconstruct section of road (Excavate & Replace Seal). Consider stabilisation. 	1	2 days	10 days	90%
			2	2 days	1 month	
			3	7 days	3 months	
			4 and lower	NA	6 months	

Notes: All times noted in working days.

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18.7.3 Sealed Road – Edge Break



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Fretting and breaking of sealed edge, greater than 150mm on average within a 2 m section which also has an associated 75mm edge drop off.	Where the sealed surface has broken away or where there is a vertical displacement between the surface and shoulder.	Temporary: <ul style="list-style-type: none"> Shoulder Grading Repair with Jet patcher Permanent: <ul style="list-style-type: none"> Reconstruct section of road (Excavate & Replace Seal). Consider stabilisation. 	1	2 days	10 days	90%
			2	2 days	1 month	
			3	7 days	3 months	
			4 and lower	7 days	6 months	

Notes: All times noted in working days.

18.7.4 Sealed Road – Pavement Failure



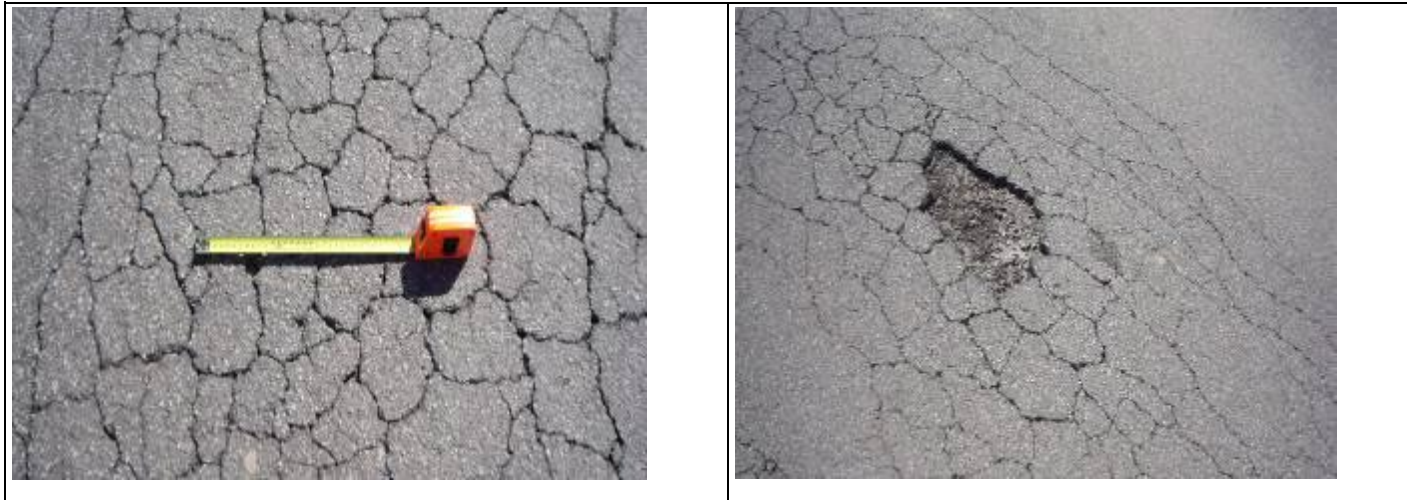
Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> • Surface area less than 60m² • Greater than 2m wide at narrowest point • Greater than 75mm depth 	Isolated failed surface or pavement represented by loss of shape or structure and showing deformities. Failure of trench patches. Failed general patches.	Temporary: <ul style="list-style-type: none"> • Traffic control • Patch as pot hole to make safe • Reseal with Jet patcher • Temporary load restriction or road closure Permanent:	1	2 days	3 months	90%
			2	2 days	6 months	
			3	7 days	12 months	
			4 and lower	7 days	24 months	

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		<ul style="list-style-type: none">• Reconstruct section of road (Excavate & Replace Seal). Consider stabilisation.				
--	--	--	--	--	--	--

Notes: All times noted in working days.

18.7.5 Sealed Road – Crocodile cracking



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
100mm plate sized cracks or > 1m ² of crocodile cracking	Interconnected or interlaced cracks forming a series of small polygons resembling a crocodile hide	Temporary: <ul style="list-style-type: none"> • Reseal with Jet patcher Permanent: <ul style="list-style-type: none"> • Wearing surface renewal • Reconstruct section of road (Excavate & Replace Seal). Consider stabilisation. 	1	2 days	3 months	90%
			2	2 days	6 months	
			3	7 days	12 months	
			4 and lower	7 days	24 months	

Notes: All times noted in working days.

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18.7.6 Sealed Road – Pavement rutting / Shoving



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> • Depth greater than 75mm under; and/or • Total area less than 25m². 	Curved like bowls located within the one or two wheel paths. Bulging of the road surface generally parallel to the direction of traffic and/or horizontal displacement of surfacing.	Temporary: <ul style="list-style-type: none"> • Monitor • Reseal with Jet patcher Permanent: <ul style="list-style-type: none"> • Review drainage • Reconstruct section of road (Excavate & Replace Seal). Consider stabilisation. 	1	7 days	12 Months	90%
			2	7 days	18 Months	
			3	7 days	24 months	
			4 and lower	7 days	36 months	

Notes: All times noted in working days.

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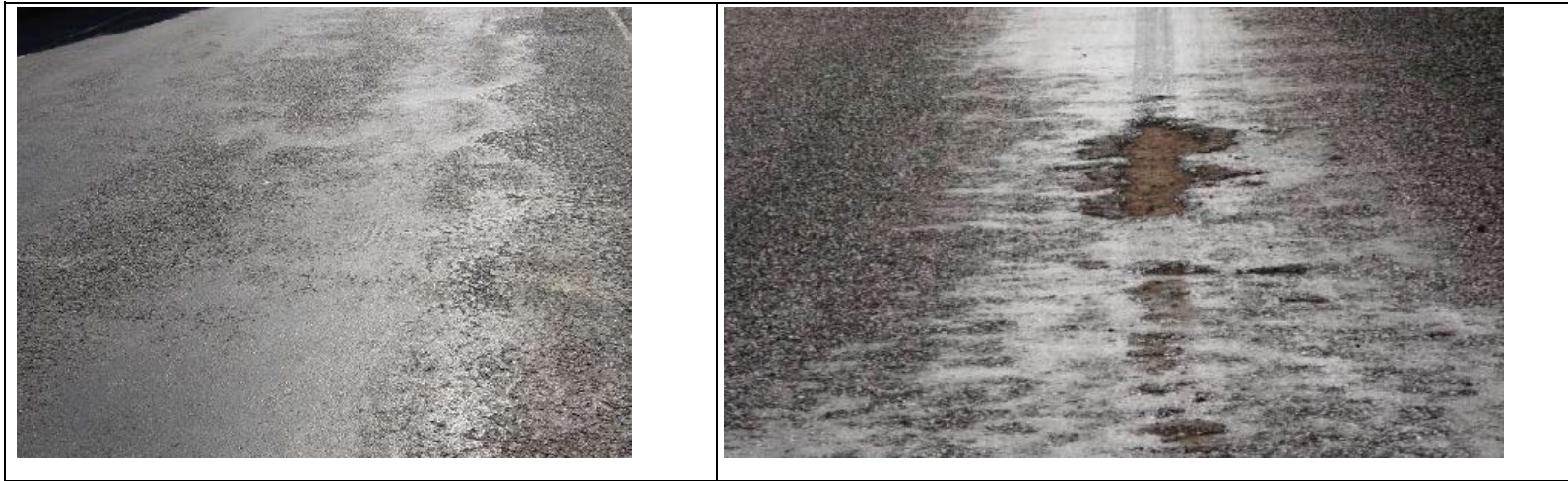
18.7.7 Sealed Road – Shoulder Defects



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Any defect present on shoulder including scour channels, loose material, debris, ruts and ponding	Defects present on the shoulder	<ul style="list-style-type: none"> Shoulder Grading Shoulder Resheeting Reconstruct section of road. Consider stabilisation. 	1	2 days	6 months	90%
			2	2 days	12 months	
			3	7 days	24 months	
			4 and lower	7 days	36 months	

Notes: All times noted in working days.

18.7.8 Sealed Road – Flushing / Bleeding



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> • Where hazardous to traffic • Sticky strip exceeds 10m on a horizontal curve or approach or within an intersection • 20%+ of any lane 	Immersion, partially or completely of aggregates into the bituminous binder resulting in a black and brilliant aspect	Temporary: <ul style="list-style-type: none"> • Reseal with Jet patcher Permanent: <ul style="list-style-type: none"> • Reseal • Reconstruct section of road 	1	2 days	3 months	90%
			2	2 days	6 months	
			3	7 days	12 months	
			4 and lower	7 days	24 months	

Notes: All times noted in working days.

18.7.9 Sealed Road – Loose stone



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> Loose stone build up is > 25mm on a bend or intersection. Loose stone build up is > 40mm on any other part of the road 	Loose materials, gravel or sand sitting on top of the sealed surface	Temporary: <ul style="list-style-type: none"> Street Sweeping Permanent: <ul style="list-style-type: none"> Reseal section of road Reconstruct section of road 	1	2 days	1 month	90%
			2	2 days	1 month	
			3	7 days	NA	
			4 and lower	7 days	NA	

Notes: All times noted in working days.

18.7.10 Sealed Road – Fitting surface levels



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Fitting above or below road way level plus or minus 30 mm relative to surrounding surface	Service fitting / Pit Cover level that does not match with the surface levels	Temporary: <ul style="list-style-type: none"> • Fill with cold mix Permanent: <ul style="list-style-type: none"> • Reseal or Reconstruct section of road around pit 	1	2 days	10 Days	90%
			2	2 days	30 Days	
			3	7 days	3 months	
			4 and lower	7 days	6 months	

Notes: All times noted in working days.

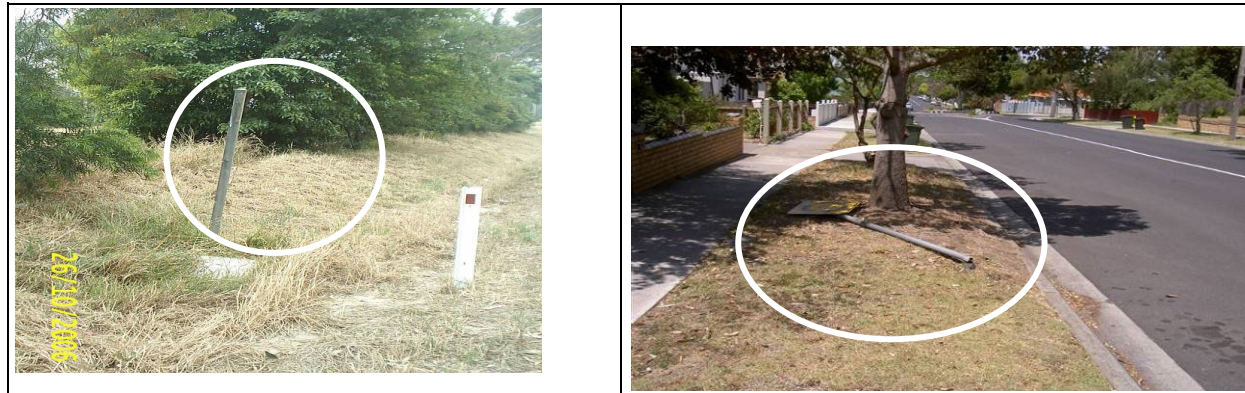
18.7.11 Road Guide Posts Deficiency



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Where there is lack of guide posts on sharp bends or at road side culverts.	Post missing, fallen over or broken or obscured by vegetation	<ul style="list-style-type: none"> Replace Post 	1 or 2	2 days	3 months	90%
			3 and lower	2 days	6 months	

Notes: All times noted in working days.

18.7.12 Road Signs Deficiency



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Regulatory sign (AS1742.1) is: <ul style="list-style-type: none"> missing damaged bent twisted obscured by vegetation 	Regulatory sign missing, fallen over or broken or twisted obscured by vegetation	<ul style="list-style-type: none"> Replace / Repair Sign 	All	2 days	20 Days	90%
All other signs that are missing or damaged / out of alignment.	General sign missing, fallen over or broken or twisted obscured by vegetation	<ul style="list-style-type: none"> Replace / Repair Sign 	All	2 Days	90 Days	90%

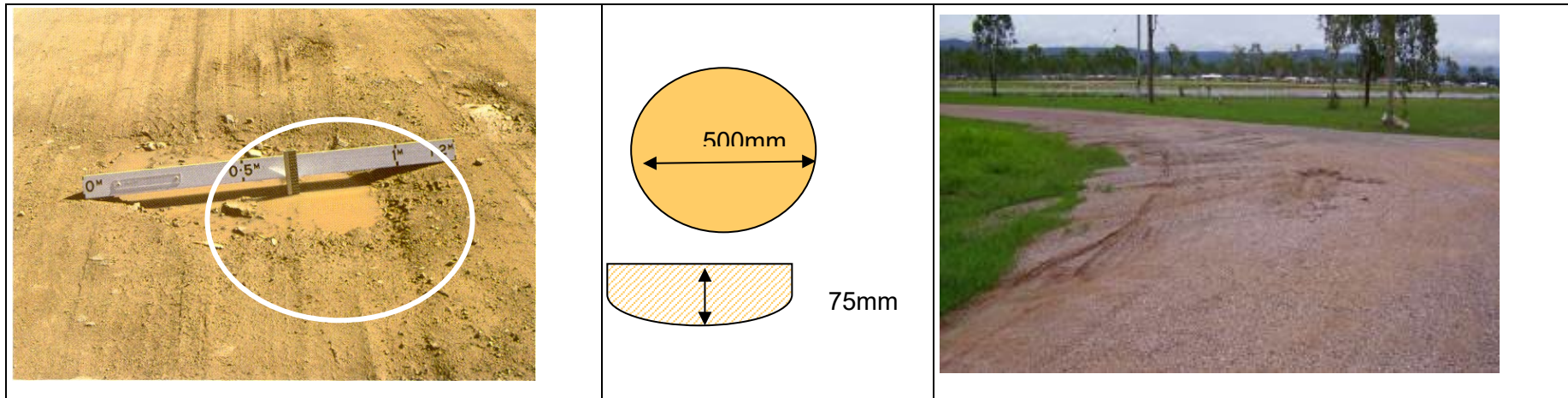
Notes:

1. All times noted in working days.
2. Inspector will only identify missing/damaged signs, where it is clearly evident that a sign is missing.

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- Inspector is not investigating or assessing the ‘need’ for signage at any location. The assessment of ‘signage needs’ is an Engineering investigation and inspection.

18.7.13 Unsealed Road – Pot-hole / Roughness



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> Greater than 500mm in diameter and/or Depth is a minimum of 75mm. 	Irregularities in the pavement surface that adversely affect the ride quality of a vehicle	Temporary: <ul style="list-style-type: none"> Maintenance Grade Gravel Patching Permanent: <ul style="list-style-type: none"> Resheet road 	3 or higher	2 days	6 months	90%
			4 and lower	5 days	12 months	

Notes: All times noted in working days.

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18.7.14 Unsealed Road – Corrugations



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Serrated and corrugated surface with predominant corrugations greater than 50mm over at-least 50m.	Corrugation in the pavement surface that adversely affect the ride quality of a vehicle	Temporary: <ul style="list-style-type: none"> • Maintenance Grade • Gravel Patching Permanent: <ul style="list-style-type: none"> • Resheet road 	3 or higher	2 days	6 months	90%
			4 and lower	5 days	12 months	

Notes: All times noted in working days.

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18.7.15 Unsealed Road – Rutting



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> Depth Displacement greater than 100mm 	Longitudinal depressions in the pavement surface that occur in the wheel paths of a roadway	Temporary: <ul style="list-style-type: none"> Maintenance Grade Gravel Patching Permanent: <ul style="list-style-type: none"> Resheet road 	3 or higher	2 days	6 months	90%
			4 and lower	5 days	24 months	

Notes: All times noted in working days.

18.7.16 Unsealed Road – Scouring



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
<ul style="list-style-type: none"> • Greater than 500mm in diameter and/or • Depth is a minimum of 100mm. 	Bulging of the road surface generally parallel to the direction of traffic and/or horizontal displacement of surfacing materials	Temporary: <ul style="list-style-type: none"> • Maintenance Grade • Gravel Patching Permanent: <ul style="list-style-type: none"> • Resheet road 	3 or higher	2 days	12 months	90%
			4 and lower	5 days	24 months	

Notes: All times noted in working days.

18.7.17 Unsealed Road – Water ponding



Intervention Level	Visual Features	Remediation options	Response Time			Performance Target
			Hierarchy	Inspect	Repair	
Water Ponds greater than 20m in length covering more than 75% road width.	Distortion in the form of depression, dip or hump as a result of deformations, potholes and depressions which creates a reservoir for trapped surface water on the road surface	Temporary: <ul style="list-style-type: none"> • Maintenance Grade • Gravel Patching Permanent: <ul style="list-style-type: none"> • Resheet road 	3 or higher	2 days	6 months	90%
			4 and lower	5 days	12 months	

Notes: All times noted in working days.

18.7.18 All Roads – Debris on Road

In addition to the above, the following list of specific defects regarding debris on road that warrants an Emergency Response.

Note: This does not apply to road hierarchy 6 – Service Track

Defect	Response Time
Fallen tree obstructing traffic path of roadway.	1 working day
Hazardous material such as oil, fuel, concrete or dangerous chemicals spilt on road.	
Isolated section of loose stones greater than 10m ² on a sealed road surface in 100km/h speed zone and in the near vicinity of a bend. Excluding roads sealed/resurfaced in the week prior to defect identification.	
Dead animal located on trafficable path of roadway.	
Road Pavement Deficiency greater than 150mm deep within one square metre.	
Street Furniture obstructing trafficable path.	
Significant erosion of road pavement due to culvert failure.	

19 DISPOSAL OF ASSETS

Assets identified for disposal that is nearing its intended useful life, or lost its functionality will be assessed and disposed of in accordance with the relevant Policy or Plan.

20 FINANCE

20.1 General

Narromine Shire Council's general funding strategy for Roads is to use "rate based" revenue for maintenance/operational activities and "grant based" revenue for the construction of new roads and reconstruction programs. Grants and programs include:

- The Roads to Recovery (Capital works on Local Roads);
- Financial Assistance Grants (Capital or Maintenance on Local Roads);
- R.E.P.A.I.R Program (Capital works Regional Roads);
- RFS- Hazard reduction;
- Fixing Local Roads Program;
- Fixing Country Roads Program;
- Fixing Country Bridges Program;
- Section 7.11 and Section 7.12 Contributions;
- Local Roads and Community Infrastructure Program; and
- Any other programs such as Drought Communities Program, etc.

Council spends rate income on road maintenance and construction. The rate income is included in the General Fund. The General Fund also includes the "untied" component of the Financial Assistance Grant (FAGs). The table below shows the total rate income and the amount of the rate income spent on roads. The figures do not include the Roads Component of the FAGs but may include "untied" FAGs expenditure from the General Fund.

Table 21 Total rate income and % of rates spend on roads

Description	Year			
	2018	2019	2020	2021
General Ledger Income (Excluding Water, Sewer and Waste)	\$5,6541,913	\$4,794,287	\$4,598,287	\$5,376,685

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Description	Year			
	2018	2019	2020	2021
General Ledger Expenditure (Excluding Water, Sewer Waste and depreciation)	\$7,632,701	\$7,530,708	\$7,997,705	\$7,773,686
Net Council Cost	\$1,990,788	\$2,736,421	\$3,399,647	\$2,397,002
Rates Generated Revenue	\$5,578,365	\$5,563,705	\$5,703,616,86	\$5,823,520
Percentage (%) of rates spent on Roads	36%	49%	60%	41%

In addition to rates, Council receives funding for roads from a number of other sources. These are detailed below. The Grants provide a consistent amount of funding to the roads program. Council funds tend to balance between years when special grants (e.g. REPAIR or Flood) are not received.

It should be noted that income from funding has not increased over the years, however assets have deteriorated due to usage and environmental factors.

Note: There is a requirement under Roads to Recovery Program to maintain the level of Council funding for roads.

20.1.1 Financial Assistance Grant (Federal)

These grants are currently provided under the [Local Government \(Financial Assistance\) Act 1995](#).

Financial Assistance Grants (FAGs) consist of two components:

- a. A general purpose component which is distributed between the States and Territories according to population (i.e., on a per capita basis), and
- b. An identified local road component which is distributed between the States and Territories according to fixed historical shares.

Both components of the grants are untied in the hands of local government, allowing councils to spend the grants according to local priorities.

Local government grants commissions have been established in each State and the Northern Territory to recommend the distribution of the Financial Assistance Grants to local governing bodies in accordance with the Act and the National Principles for allocating grants.

The allocation for each state and territory is based on population, road length and historic road funding allocations. Each council's allocation is based on the recommendations of the Local Government Grants Commissions in the states and the Northern Territory for the local roads component of the Financial Assistance Grants. They reflect each council's relative needs for road expenditure.

The grants are paid in quarterly instalments to State and Territory Governments for immediate distribution to local governing bodies.

<https://www.infrastructure.gov.au/territories-regions-cities/local-government/financial-assistance-grant-local-government>

There is no requirement for a report on expenditure on the roads component of the grant.

The Grant does not require application for funding, however the grants commission requires a return report each year in order for allocation of following years money. It is indexed annually by the Federal Government and the Grants Commission and Council is advised of its overall allocation and the Roads Component of the overall allocation.

20.1.2 Roads to Recovery (Federal)

The Roads to Recovery Program commenced in 2001 and operates uniformly across Australia. Each council is guaranteed a share of the total pool under a formula funding arrangement. Money is paid directly from the Australian Government to councils under simple administrative procedures and spending decisions are made locally.

The quantum of the grants pool changes annually in line with changes in population and the Consumer Price Index, so as to maintain its real per capita value. Any road construction can qualify for Roads to Recovery funding.

Councils receive payments quarterly in advance. The quarterly payment is based on the councils' reported spending to date against each project and the projected expenditure in the next quarter, up to their annual limit.

An important condition of the Roads to Recovery programme is that councils continue to spend their share of rates revenue on roads and do not use Australian Government funds to replace their own (Council Funds), which would mean no appreciable improvement in the local road network as a result of the programme.

Expenditure on the Roads to Recovery Grant is reported to the Federal Government. Reports are made quarterly (Sept, Dec, Mar Jun) with payment, generally, in the following month. **The annual report is due by 31 October.**

The Roads to Recovery Grant does not require application for funding. The Federal Government advises on a 5-yearly basis the amount available over the 5-year period, which Council can take up at any time during the period. Council nominates the works to be carried out during each financial year.

20.1.3 Regional Roads Block Grant (State)

Transport for NSW provide block grants to Council as a contribution towards the cost of works on Regional Roads, under the terms of the Block Grant Agreement. Block Grants may be

spent on preservation, restoration and enhancement works to the extent provided for in the Block Grant Agreement.

Every Council has entitlement to an annual block grant. The grant comprises a roads component and a supplementary component (both available for works on Regional Roads) and a traffic facilities component (which may be spent on works on Regional Roads as well as traffic facilities on Local Roads).

The Block Grant is paid quarterly.

<http://www.RMS.nsw.gov.au/doingbusinesswithus/lgr/downloads/programs/blockgrant.html>

Expenditure on the Regional Roads Block Grant is reported to TfNSW. Reports are made monthly with payment, generally, in the following month. **The annual report is due by 1 September.**

The Regional Roads Block Grant does not require application for funding. The amount is indexed by the State Government and Council advised of its allocation.

20.1.4 RFS- Hazard reduction

Council can annually apply for hazard reduction works along pre-approved roads. These hazard reduction works include:

- Mechanical removal (slashing);
- Chemical application;
- Hand clearing; and
- Mechanical application – grading works.

Grant applications usually opens in March and approved works needs to be completed by the end of the particular financial year.

<https://funding.rfs.nsw.gov.au/my.policy>

20.1.5 Fixing Local Roads Program

Councils can apply for funding to complete vital works to improve journeys for regional communities, farmers and freight. The Program will assist councils to accelerate upgrades and reduce their local roads maintenance backlogs.

Fixing Local Roads will provide funding to councils to repair, maintain or seal priority or important local roads. In recognition of the changing economic environment and need to stimulate regional economies, we have refined the outcomes for the Fixing Local Roads Program to ensure applications for the best-suited projects are submitted.

<https://roads-waterways.transport.nsw.gov.au/business-industry/partners-suppliers/lgr/grant-programs/fixing-local-roads.html>

20.1.6 Fixing Country Roads Program

The Fixing Country Roads program is about moving freight more efficiently, supporting jobs, economic growth and productivity of regional NSW by reducing the cost of getting goods to market. As costs come down, consumers benefit at the till of their local supermarket and exporters become more competitive.

The program looks to repair, strengthen, widen, seal and improve guttering and pavements on country roads. Other projects funded through the program include the construction of new roads, strengthening, widening, or replacing an existing bridge or culvert, building heavy vehicle rest areas and upgrades to improve the flood resilience of the network.

The projects delivered under this program enhance access for High Productivity Vehicles, which are heavy vehicles which can move more freight more efficiently, to and from key freight hubs including; silos, saleyards, rail heads, distribution centres, ports, industrial parks and depots. These projects make it easier for regional commodities and products to get to a global market and for our regional communities to have access to products from anywhere in the world.

<https://www.transport.nsw.gov.au/projects/programs/fixing-country-roads>

20.1.7 Section 7.11 and Section 7.12 Contributions

The Section 7.11 Contributions Plan seeks contributions towards the additional costs of road maintenance from developments which generate frequent heavy haulage vehicle movements. Accordingly, certain developments will be levied because of their impact on the frequency of road maintenance, determined by a consistent methodology based on heavy vehicle usage. The Plan applies to developments that generate heavy haulage vehicle movements arising from extractive or mining industries. The primary purpose of this Plan is to authorise the levying of contributions that will assist Council to provide public services and amenities to ensure roads are maintained in a reasonable condition for users as a result of damage caused by developments that generate frequent heavy haulage movements.

The purpose of the Section 7.12 Contributions Plan is:

- To authorise the Council to impose a condition on certain development consents and complying development certificates requiring the payment of a contribution pursuant to Section 7.12 of the Act;
- To require a certifying authority (the Council or an accredited private certifier) to impose, as a condition of issuing a complying development certificate, a requirement that the applicant pay to Council a levy determined in accordance with this Plan;
- To assist the Council to provide public facilities and amenities which are required to maintain and enhance amenity and service delivery within the area;
- To state the purposes for which the levies are required, and
- To provide for the governance of the contributions and their application in accordance with the Act and Regulations.

20.1.8 REPAIR Program (State)

The REPAIR Program provides additional funds for high merit projects to supplement block grants. Funds are available on a dollar for dollar basis for councils to undertake larger works of rehabilitation, and some development work on Regional Roads in order to minimise the long term maintenance costs commensurate with road function and usage, and where benefits of such projects exceed the cost.

Councils nominate specific projects which are then prioritised on a merit basis up to the available funding allocation through a regionally based council consultative committee in a transparent, peer review process.

http://www.RMS.nsw.gov.au/doingbusinesswithus/lgr/downloads/programs/repair_program.html

Expenditure on the REPAIR Program is reported to TfNSW as part of the Block Grant.

Council applies for funding to TfNSW annually in October and is advised of outcome of the application in May. The assessment of applications has been agreed by the local councils and TfNSW. Council proposals are generally funded every second year.

20.1.9 Natural Disaster

Natural Disasters include; flood; storm; bushfire; cyclone; earthquake. Funding is subject to the State Government offering assistance and whether the area has been declared as a disaster affected area.

<https://www.nsw.gov.au/disaster-recovery/natural-disaster-declarations>

Assistance is available to local councils to restore essential public assets that have been damaged as a direct result of a natural disaster.

For assistance to restore public roads, road infrastructure and bridges, council should contact their regional representative in Transport for NSW

For assistance to restore other essential public assets, councils should contact their regional representatives in Public Works Advisory.

Regional and Local roads are to be restored to the currently accepted technical standards appropriate to the road's function and usage in the affected Council area (generally pre-damage standard or service level).

<https://www.nsw.gov.au/disaster-recovery/disaster-relief-and-support>

Applications for natural disasters are made as the need arises. Expenditure on Natural Disasters is reported to TfNSW and payment made on the assessed claim. Claims may be made progressively and are generally made on a monthly basis. Works claimed are assessed by TfNSW.

20.1.1 Fixing Country Bridges Program

The Fixing Country Bridges Program is a \$500 million NSW Government program, enabling councils to replace hundreds of **timber bridges** in poor condition and better connect regional

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and rural communities. Some of these timber bridges were built during the 1940s and 1950s and need to be replaced.

Council does not own any timber bridges in its asset's portfolio and any bridge maintenance, replacement or upgrade is required to be funded from Council funds or grants.

<https://roads-waterways.transport.nsw.gov.au/business-industry/partners-suppliers/lgr/grant-programs/fixing-country-bridges-program.html>

20.1.2 Miscellaneous Grants

Council can apply for grants for items such as; Safety improvements, Traffic Facilities, Pedestrian Access, Bicycle paths etc, when available.

20.2 Expenditure

The figure below shows how funds may be expended (from the sources of income) against the different road categories and activities.

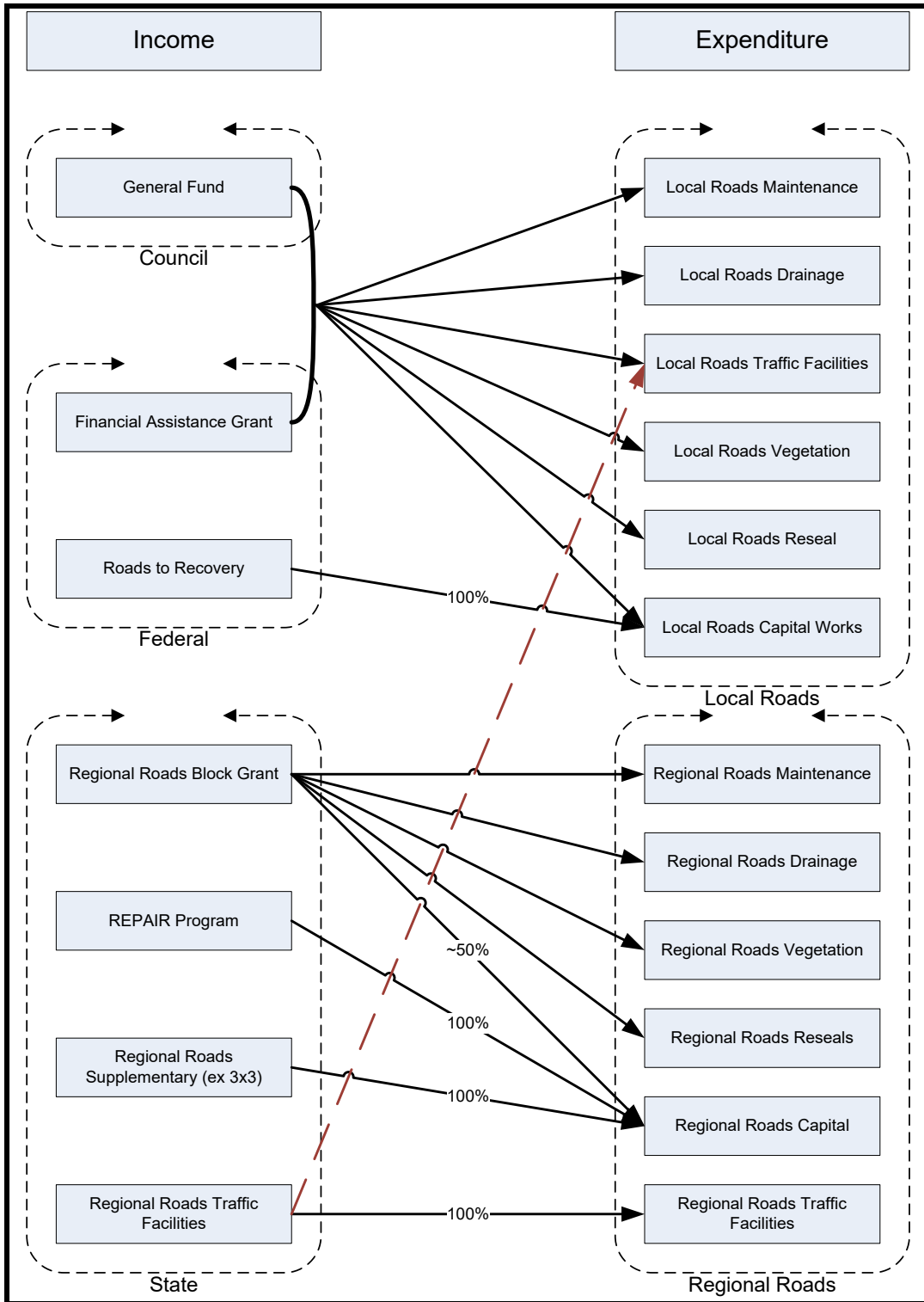


Figure 18 Income and Expenditure streams

The following table shows income and expenditure for the financial years from 2018 to 2021.

Table 22 Income and Expenditure for years 2018 to 2021

June Actual YTD Balance Sheet	Master Account	Coating Ledger Account	Resource (desc)	Posting Year	2018	2019	2020	2021	Grand Total				
Operating (desc)	(desc)	Account	Resource										
Engineering	Rural Roads	O			1,009,817	877,619	388,284	714,903	2,990,623				
	Rural Roads	O	I		- 1,759,511	- 1,768,400	- 1,584,679	- 1,563,898	- 6,676,488				
	Rural Roads	O	I	01340.0200.0188	Operating Revenue	188	Interest Subsidy Income	- 69,728	- 61,659	- 53,182	- 44,098	- 228,667	
	Rural Roads	O	I	01340.0200.0249	Operating Revenue	249	Other Sundry Income	-	-	-	- 26,395	- 26,395	
	Rural Roads	O	I	01340.0200.0266	Operating Revenue	266	Roads - RMS Grant Non Recurrent	- 263,285	-	-	- 263,285	- 263,285	
	Rural Roads	O	I	01340.0200.0267	Operating Revenue	267	Financial Assistance Grant - Roads Compo	- 1,426,498	- 1,463,741	- 1,504,497	- 1,493,404	- 5,888,140	
	Rural Roads	O	I	01340.0200.0251	Operating Revenue	251	Comm'th Grants - Operating non-recurrent	-	- 243,000	- 27,000	-	- 270,000	
	Rural Roads	O	I	01340.0200.0255	Operating Revenue	255	State Grants - Operating non-recurrent	-	-	-	-	-	
	Rural Roads	O	E		2,769,327	2,646,019	1,972,963	2,278,801	9,667,110				
	Rural Roads	C			589,728	1,154,932	448,191	261,482	2,454,334				
	Rural Roads	C	I		- 1,250,812	- 1,181,925	- 1,367,378	- 2,200,566	- 6,000,681				
	Rural Roads	C	I	01340.0600.0260	Capital Revenue	260	Roads to Recovery Funding	- 1,250,812	- 1,105,050	- 1,361,253	- 1,364,535	- 5,081,650	
	Rural Roads	C	I	01340.0600.0999	Capital Revenue	999	Budgets Only	-	-	-	-	-	
	Rural Roads	C	I	01340.0600.0266	Capital Revenue	266	Roads - RMS Grant Non Recurrent	-	76,875	-	-	76,875	
	Rural Roads	C	I	01340.0600.0257	Capital Revenue	257	State Grants - Capital non-recurrent	-	-	6,125	-	486,945	493,070
	Rural Roads	C	I	01340.0600.0253	Capital Revenue	253	Comm'th Grants - Capital non-recurrent	-	-	-	349,086	- 349,086	
	Rural Roads	C	E		1,840,540	2,336,857	1,815,570	2,462,048	8,455,015				
	Rural Roads Total				1,599,544	2,032,551	836,476	976,385	5,444,956				
	Bridges - Local Rds	O			146,933	146,932	129,333	140,660	563,857				
	Bridges - Local Rds	O	E		146,933	146,932	129,333	140,660	563,857				
	Bridges - Local Rds	C			405,425	-	-	45,000	360,425				
	Bridges - Local Rds	C	I		- 400,000	-	-	45,000	- 445,000				
	Bridges - Local Rds	C	I	01250.0600.0256	Capital Revenue	256	State Grants - Capital	- 400,000	-	- 400,000	- 400,000		
	Bridges - Local Rds	C	I	01250.0600.0253	Capital Revenue	253	Comm'th Grants - Capital non-recurrent	-	-	45,000	- 45,000		
	Bridges - Local Rds	C	E		805,425	-	-	-	805,425				
	Bridges - Local Rds Total				552,358	146,932	129,333	95,660	924,283				
	Bridges - Regional	O			95,908	95,908	82,342	58,234	332,391				
	Bridges - Regional	O	E		95,908	95,908	82,342	58,234	332,391				
	Bridges - Regional Rds Total				95,908	95,908	82,342	58,234	332,391				
	Urban Streets				1,183,569	1,152,101	1,090,778	1,044,269	4,470,717				
	Regional Roads	O			355,693	327,622	553,545	296,824	1,533,685				
	Regional Roads	O	I		- 1,159,863	- 1,148,000	- 1,171,000	- 1,171,000	- 4,649,863				
	Regional Roads	O	I	01360.0200.0254	Operating Revenue	254	State Grants - Operating	- 25,000	-	- 25,000	- 25,000		
	Regional Roads	O	I	01360.0200.0263	Operating Revenue	263	Roads Regional Block Grant	- 955,000	- 976,000	- 998,000	- 998,000	- 3,927,000	
	Regional Roads	O	I	01360.0200.0264	Operating Revenue	264	Roads Regional Block Grant Supplementary	- 96,000	- 96,000	- 96,000	- 96,000	- 384,000	
	Regional Roads	O	I	01360.0200.0265	Operating Revenue	265	Roads Regional Block Grant - Traffic Fac	- 74,000	- 76,000	- 77,000	- 77,000	- 304,000	
	Regional Roads	O	I	01360.0200.0266	Operating Revenue	266	Roads - RMS Grant Non Recurrent	- 9,863	-	-	-	- 9,863	
	Regional Roads	O	E		804,170	820,378	617,455	874,176	3,116,178				
	Regional Roads	C			1,044,972	731,807	875,622	710,664	3,363,066				
	Regional Roads	C	I		- 400,000	- 623,125	- 400,000	- 34,200	- 1,457,325				
	Regional Roads	C	I	01360.0600.0256	Capital Revenue	256	State Grants - Capital	- 400,000	- 400,000	- 400,000	- 34,200	- 1,234,200	
	Regional Roads	C	I	01360.0600.0266	Capital Revenue	266	Roads - RMS Grant Non Recurrent	-	223,125	-	- 223,125	- 223,125	
	Regional Roads	C	I	01360.0600.0257	Capital Revenue	257	State Grants - Capital non-recurrent	-	-	-	-	-	
	Regional Roads	C	E		1,444,972	1,354,932	1,275,622	744,864	4,820,391				
	Regional Roads Total				689,280	404,185	322,077	413,840	1,829,381				
	Road Structures	O			282	13,366	13,366	12,855	39,868				
	Road Structures	O	E		282	13,366	13,366	12,855	39,868				
	Road Structures Total				282	13,366	13,366	12,855	39,868				
	Grand Total				4,120,941	3,845,043	2,474,371	2,601,243	13,041,597				

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21 REPORTING

The table below illustrates the different reporting types and frequencies that is required to maintain Council's Roads assets.

Table 23 Reporting types and frequencies

Infrastructure and Engineering - Assets				
Report	Description	Purpose	Report to	Frequency
Roads Management Report	Report prepared by IPWEA Roads and Transport Directorate from survey of all local government. Report has been published every 2 years.	Benchmarking gross costs and Asset Management maturity.	Council	2 yearly
Road Count Report	AADT updates for each road in the Council area of operations	Used to determine community needs based on usage and frequency	Manager Engineering Services / Infrastructure and Engineering Services Director	3 yearly
Roads inspection Report	Condition ratings and years of remaining life for each segment of road in council area of operations	Used to determine priority of future work	Manager Engineering Services / Infrastructure and Engineering Services Director	Annually
Expenditure	Financial Report	Comparison with budget	Council	Quarterly
Accomplishment	Works accomplished during the period	Summary to Council on works completed for the quarter	Council	Monthly or Quarterly with annual summary
Unit Rate Report	Unit rates per job	Benchmarking	Infrastructure and Engineering Services Director	Quarter
Valuation and Depreciation	Re-valuation and depreciations of the roads network	Calculate fair value of Road network, and hence depreciation	Council	4 yearly
Infrastructure Delivery				
Non-conformance	Instances where the standard in relation to time, cost and quality have not been met	Identify issues to improve performance	Infrastructure and Engineering Services Director/ General Manager	Quarterly
Down time	Time lost to various effects (weather, breakdown, planning delay etc)	Identify issues to improve performance	Infrastructure and Engineering Services Director /General Manager	Quarterly
Compaction testing Reports	Scientific geotechnical studies determine whether or not the road is at desirable compaction levels	Quality Control to determine if more work is required to achieve desired compaction as per design.	Engineering Services Manager/ Infrastructure Delivery Manager/ Infrastructure and Engineering Services Director	Each Job
Review of Environmental factors (REF)	A list of environmental factors and suggested methods of controls associated with the proposed scope of work	Ensure council is protected from Environmental prosecution when clearing vegetation during roadworks	Infrastructure and Engineering Services Director/Manager Planning	Each Job
Gravel usage / Stockpile reports	Shows how much Gravel is used on a job and what is currently stockpiled at the quarry.	Advice on remaining stockpile and also what to pay to the quarry in royalties.	Infrastructure and Engineering Services Director/ Infrastructure Delivery Manager	Each job

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Infrastructure and Engineering - Assets				
Report	Description	Purpose	Report to	Frequency
Capital Projects Progress Report	Track progress and expenditure of capital projects and projected competition dates	To determine if variations in funding are required	Manager Engineering Services / Manager Contracts and Projects / Infrastructure and Engineering Services Director	Monthly
WHS Report	Number of LTI's, MTI's, near misses and first aid	Allows Council to track incidents and identify and address future reoccurring incidents	WHS officer	Monthly
Other (Fleet Manager)				
Plant Utilisation (Internal)	Road plant utilisation		Infrastructure and Engineering Services Director	Quarterly
Plant Utilisation (external)	Hired plant utilisation		Infrastructure and Engineering Services Director	Quarterly

22 IMPLEMENTATION

22.1 General

Implementation of roads operations generally comprise of the following:

- Maintenance Works – Generally from July to December
- Capital Works – December to June

Capital works are conducted in the warmer summer months when the majority of harvest traffic has decreased, and temperatures are high enough for road pavement seals, without the requirement to use excessive additives.

22.2 Working Arrangements

The Infrastructure Delivery work teams usually works a 38-hour week as per the NSW Local Government (State) Award 2020. Consideration must be given to environmental conditions such as sunrise and sunset, fog and inclement weather to ensure road users and council workers are kept safe during work hours. For example, roadworks cannot start if light conditions inadequate, since extra effort would be required to set up or remove appropriate “night” signage, provide additional worksite “task lighting” or implement additional traffic control.

Occasionally teams will work overtime when the workload demands it and funding is available.

22.3 Grading

Council has grading/resheeting teams as well as a construction/capital works grading team. From time to time and when the budget allows, an extra grading team or external contractors could be used.

22.4 Contract Plant

Generally long-term contract plant is engaged by Council under a period contract. Other plant may be engaged under a Council order.

22.5 Contract Works

The major contracts for roadwork are:

- Bitumen sealing contract, including supply of sealing aggregates;
- Emulsion supply (for bitumen patching etc);
- Line Marking;
- Tree Lopping;
- Gravel Testing;

- Stabilisation works;
- Traffic Control; and
- Winning, crushing, pushing and supply of gravel.

Some works (typically culverts, kerb and gutter, footpaths, traffic islands, fencing) are undertaken by (generally) local contractors under Council supervision.

23 MANAGEMENT SYSTEMS

23.1 General

The plans for implementation are developed through the creation of Project Management Plans for the overall operation of the roads function and Site Management Plans for individual activities. Monitoring, and reporting, achievement in terms of time, cost and quality will identify areas where improvement can be made.

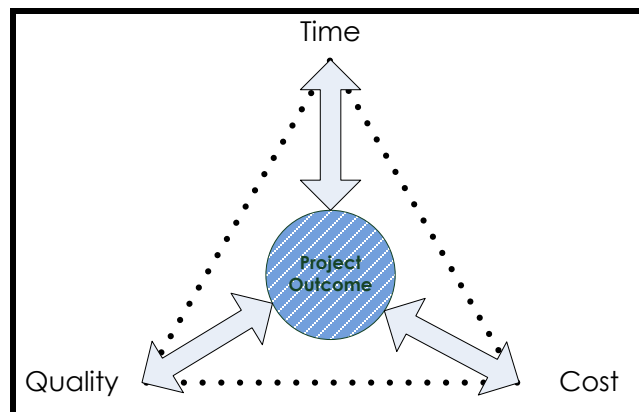


Figure 19 Project outcome

Quality, in this context, is level of compliance with the Management Systems (technical, quality, WHS etc).

The overarching element of Management System is the quality management system. The QMS includes elements for:

- Management review;
- Competence, awareness and training;
- Determination of the requirements related to the product;
- Review of the requirements related to the product;
- Design and development;
- Purchasing;
- Control of production and service provision;
- Validation of processes for production and service provision;
- Customer satisfaction;
- Monitoring and measurement of processes;
- Monitoring and measurement of product;
- Control of non-conforming product;

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- Analysis of data;
- Continual improvement;
- Corrective action; and
- Preventive action).

By following the requirements of these elements full control over time, cost and quality can be achieved.

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Department of Planning and Environment

Mrs Jane Redden
General Manager
Narromine Shire Council
PO Box 115
Narromine NSW 2821

Our ref: 22/48444

4 March 2022

Attention: Andre Pretorius, Director Infrastructure and Engineering Services

Subject: Tomingley Water Treatment Plant – Section 60 Approval

Dear Mrs Redden,

I refer to Council's application for approval under Section 60 of the Local Government Act 1993 to construct a new 30 kL/d Water Treatment Plant for Tomingley Water Supply. The treatment plant is to be located on Lot 7301 DP1152484 in the township of Tomingley within Narromine Shire local government area.

Consideration of the application is based on the following documents submitted to Department of Planning and Environment:

- Construction Issue Site plans and General Arrangement Drawings
SITE-GA-EXPLODED VIEWS, TOMINGLEY WTP-01_02 Rev B
211139-HL-01 Sheet 1 of 1 Rev 0
A-10085-01 Sheet 1 of 2 Rev 2, A-10085-01 Sheet 2 of 2 Rev 2
NSC -TOM 03 Tomingley WTP Plan View Version 1.0
NSC -TOM 04 Tomingley WTP Western Elevation Version 1.0
NSC -TOM 05 Tomingley WTP Eastern Elevation Version 1.0
NSC -TOM 06 Tomingley WTP Northern & Southern Elevations Version 1.0
271016-01-01 Sheet 1 of 1 Rev B
- Construction Issue P&ID Drawings
211139-PID-01 Sheet 1 of 8 Rev 5
211139-PID-02 Sheet 2 of 8 Rev 5
211139-PID-03 Sheet 3 of 8 Rev 5
211139-PID-04 Sheet 4 of 8 Rev 5
211139-PID-05 Sheet 5 of 8 Rev 5

Department of Planning and Environment

211139-PID-06 Sheet 6 of 8 Rev 5

211139-PID-07 Sheet 7 of 8 Rev 5

211139-PID-08 Sheet 8 of 8 Rev 5

- Construction Issue Written Control Philosophy
Tomingley WTP Control Philosophy Project No: 211139 Rev 1

Schedule

The works comprise of:

- 30 kL/d Membrane-Filtration Plant
- UV Disinfection
- Chlorine Disinfection
- Wastewater and Sludge Management
- Chemical Dosing

Conditions of Approval

Approval of the works is granted subject to the following conditions:


1. The works are undertaken in accordance with the details listed in the above documents.
2. Any proposed significant amendment to the design must be submitted in writing to Department of Planning and Environment for review and approval.

Note

- Council is reminded of the need to comply with all other relevant statutory provisions.

Please continue to liaise with Michael Holmes [REDACTED] or Cindy Houston [REDACTED] should there be any queries or proposed significant changes to the approved works.

Yours sincerely,



Bill Ho

**Manager Water & Sewerage
Water Utilities
Water Operations Division**