

2015 - 2020

Bridge Strategy

Version Control

Vers	Authored	Date
1	Manager Works	1 April 2015

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Introduction

The bridge network is constructed from timber, concrete and composite materials. To achieve a safe, efficient and effective transport network Council must provide continued linkages over many gullies, streams, creeks and rivers via the provision of bridges.

Bridges are crucial components of the transport network by virtue of their high capital value, strategic and operational importance, and the effect on the road network, especially in instances when a structure is taken out of service. Any bridge failure, apart from severely disrupting traffic movements in key areas with consequent inconvenience and economic loss to the community, may also lead to injury or in extreme cases loss of life and resultant property damage. In the region's largely rural road network, where alternative water course crossings are in some cases non-existent, bridge service restrictions can have significant economic and social impacts.

Council maintains a total of 131 bridges, with an asset value in excess of \$48million. The majority of these bridges are traditional timber structures (84 bridges), some of which were constructed in excess of 60 years ago when traffic loads were traditionally lower than those imposed by modern freight vehicles.

This Strategy is to provide guiding principles and key strategic areas which influence all other plans, policies and strategies associated with the efficient and sustainable management of the bridge infrastructure within the transport network of the Scenic Rim region.



Strategy Context

This Strategy has been developed with consideration to the linkages with a range of strategic documents, legislation, guidelines and standards relating to Council's provision of transport network through bridge infrastructure.

The below figure shows the interconnection of the Bridge Strategy with other existing documents of Council.



Corporate Strategy Documents

The Scenic Rim Community Plan 2011 – 2026 has been prepared following extensive consultation with the community. It is the overarching plan for the future of the Scenic Rim region in that it provides a shared vision and plan for the region's future and will guide Council, other levels of government and community action on issues including the environment, economic development, social well-being, infrastructure and governance.

A theme in the Community Plan which focuses on Accessible and Serviced Region is appropriate to this Strategy. One of the outcomes in this theme is *Infrastructure and services keep pace with growth and changing needs and are compatible with our environment.*

The Corporate Plan Statement of Intent for Accessible and Serviced Region states *Council will provide and advocate for infrastructure and services in accordance with the prioritised needs of our growing community.* This Strategy must respond to assessment of the prioritised needs of the community.



Legislative Requirements

The Local Government Act 2009 has been developed with the purpose to provide for "the way in which a local government is constituted and the nature and extent of its responsibilities and power; and a system of local government in Queensland that is accountable, effective, efficient and sustainable"

As defined in *Chapter 3 Part 3* of the *Local Government Act 2009*, a road is "an area of land that is dedicated to public use as a road; or an area of land that – is developed for, or has as one of its main uses, the driving or riding of motor vehicles; and is open to, or used by, the public; or a footpath or bicycle path; or a bridge, culvert, ford, tunnel or viaduct."

The Act outlines the control of roads and bridges by Council, the ability to acquire land for a road or bridge, closure of bridges, and unauthorised works on roads and bridges, amongst other items associated with roads and bridges.

In addition to the above State legislation there may be applicable legal or policy requirements under the common law, local government planning schemes, local laws and/or road and transport guidelines and codes.



Council Local Laws and Policies

Local Law No. 4 (Local Government Controlled Areas, Facilities and Roads) 2011, has the purpose to protect the health and safety of persons using local government controlled land, facilities, infrastructure and roads; and preserve features of the natural and built environment and other aspects of the amenity of local government controlled land, facilities, infrastructure and roads. The Local Law achieves this by regulating access to roads (including bridges), and prohibiting or restricting certain activities.

Further to Local Law No. 4, a number of Subordinate Local Laws are relevant to road use, these include Subordinate Local Law No. 1.1 (Alteration or Improvement to Local Government Controlled Areas and Roads) 2011. Subordinate Local Law No. 1.2 (Commercial Use of Local Government Controlled Areas and Roads) 2011, Subordinate Local Law No. 1.7 (Gates and Grids) 2011, Subordinate Local Law No. 1.14 (Undertaking Regulated Activities on Local Government Controlled Areas and Roads) 2011. Subordinate Local Law No. 1.15 (Carrying Out Works on a Road or Interfering with a Road or its Operation) 2011. Subordinate Local Law 4 No. (Local Government Controlled Areas, Facilities and Roads) 2011.

Council has adopted a policy on the Provision of Road Network, which outlines Council's position on a number of areas such as extensions to road network, road and street construction standards, road and street maintenance standards, signage and traffic control devices, stormwater infrastructure in road reserves, vehicles parking within road reserves, vegetation within road reserves, private access entrances, utility services within a road reserve, and works within a road reserve.

Guidelines and Standards

The Austroads Guidelines are the standards used by Council for the design and management of the transport network. Complementing the Austroads Guidelines, are ARRB (Australian Road Research Board) Guidelines and Australian Standards in particular the Bridge Code.

New bridges are required to be designed and constructed in accordance with these standards and guidelines to ensure the community is provided with a safe and efficient network to current standards.

Notwithstanding the above technical documents, Registered Professional Engineers (Qld) assume full legal responsibility for all designs. This is a State legislative requirement, under the *Professional Engineers Act*.

Disaster Management

Bridges are generally positioned in major watercourses and therefore commonly subjected to flooding. Largely bridge infrastructure is, in most cases, only provided to manage watercourse flows resulting from higher frequency events. The transport network will not be available for use during lower frequency events such as that seen during natural disasters.

Recovery of the bridge network following natural disasters is prioritised based on community needs and levels of service. At times, due to funding restrictions and other priority work, the bridge network may function at a lower level of service for a period of time; this is minimised through the use of detours, low level side-tracks and load limits.

The Natural Disaster Relief and Recovery Arrangements (NDRRA) is a joint funding initiative of the Commonwealth and State Governments to provide disaster relief and recovery payments for infrastructure restoration to help communities recover from the effect of natural disasters.



Following a declared disaster event, there is a period of emergent works whereby Council will rectify the priority areas of the infrastructure network to ensure the immediate safety and connectivity of the community. The remainder of the work to restore the road network to its previous level of function is completed in the restoration period, whereby Council assesses the damage, and submits proposals for approval under NDRRA Guidelines. Once approved, Council (or its contractors) complete the restoration of the network.

Town Planning

The preparation of the region's Planning Scheme is an opportunity to promote the importance of a sustainable transport network through land use planning.

Efficient land use planning must consider suitable network connectivity between different land uses, for now and into the future. Natural features such as ridges and gullies should be considered in the development and transport network planning.

Development assessment plays a significant part in the process to ensure suitable alignment of transport corridors. Conditioning of development application approvals allow for the designers to achieve efficient development in terms of sustainable transport network whilst ensuring bridge structural capacity meets the requirements of the development.

Asset Management Plans

Council has developed Asset Management Plans for all of the major infrastructure classes it manages. Asset Management Plans underpin Council's approach to managing community assets, with the purpose of providing a strategic view of Council's assets in a way that promotes sustainable service provision. This is achieved by assessing the long-term asset related funding requirements (demand) against proposed spending levels (expenditure). An overall funding shortfall in



The Bridge Asset Management Plan (AMP) recognises timber, concrete, steel and composite bridges as a bridge asset class.

Council's Bridge AMP indicates a majority of region's existing bridge asset base is reaching the end of its useful life; consequently current funding levels are utilised for both the replacement of existing structures, as well as the undertaking of major asset rehabilitation to extend the network's useful life.

Council must continue to examine its operations and maintenance practices, as well as explore options to increase the life of the asset, and overall improvements to the whole of life costs. Additionally, the level of service provided on the different transport linkages throughout the network requires continual monitoring and review.





Strategic Priority Areas

Strategic Priority Areas have been developed to provide an efficient and effective transport network, through the provision of bridge structures.

The provision of a safe transport network provides a link for visitors and residents to commute throughout the Scenic Rim region.

In order to ensure the ongoing provision of such a network to meet transport needs, it is necessary to manage the bridge network through a variety of documents, including a Bridge Strategy which outlines the key Strategic Areas of focus.

This Strategy covers the Strategic Priority Areas of:

Community Service Levels

Ensure the region's bridge network provides a level of service that meets the needs of the community.

Bridge Network Infrastructure

Provide a network of roads and bridges to service the range of needs of the community throughout the region in a sustainable manner.

Infrastructure Operation and Maintenance

Ensure the constructed infrastructure operates in an efficient and effective manner to meet the service level expected of the infrastructure over the life of the asset.

Resource Capability

Recognition of the continued need to have a skilled workforce, appropriate resources and source materials to continue to support the provision of the bridge network.

Land Use Planning

Ensure land use planning delivers development that has a focus on sustainable and efficient transport network.

Project Prioritisation

Ensure renewal, upgrades and new bridge infrastructure projects are prioritised according to network needs.

Private and Utility Infrastructure in Road Reserve

Ensure the installation of private and utility infrastructure in road reserves does not compromise the function and safety of the bridge.



Strategic Priority Area 1: Community Service Levels

Ensure the region's bridge network provides a level of service that meets the needs of the community.

Community service levels must be established through defining the objectives which the road infrastructure must achieve and to link the design standards to these service levels.

Austroads, ARRB, Australian Standards (via the Bridge Code) and Queensland's Transport and Main Roads provide guidelines on the assessment of bridge infrastructure; and provide clear direction on the design of bridge infrastructure.

Strategies

- 1.1 Align levels of service with the bridge infrastructure to identify minimum acceptable service standards of existing infrastructure and required service standards, when replaced for bridges across the region.
- 1.2 Program bridges for rehabilitation or replacement depending on their ability to meet the minimum acceptable service standard based also upon condition and relationship within the transport network hierarchy.
- 1.3 Provide suitable alternative routes for bridges that, do not meet minimum acceptable service standards, and where there is to be a delay in replacement or rehabilitation, either via detour or construction of a side-track.
- 1.4 Design and construct new and reconstructed bridges in accordance with the Bridge Code (Australian Standard) and Council standards, as outlined in Council's Design and Construction Manual and Standard Drawings.

Strategic Priority Area 2: Bridge Network Infrastructure

Provide a network of roads and bridges to service the range of needs of the community throughout the region in a sustainable manner.

The provision of bridges to service transport demand is essential to ensure the sustainability of the transport network. Whilst there may be a desire to have all timber bridges replaced within the region; this is not a sustainable option for a responsible asset owner to maintain and renew, given the funding levels and the communities ability to pay. As such, bridges are aligned according to their use, and associated truck configuration, known as Minimum Acceptable Load Limit.

There are currently 84 traditional timber bridges considered to be maintained by Council. A number of timber bridges are no longer used by road traffic, and are therefore excluded from future analysis. There are also a further 47 non-timber bridges under Council control; the majority of which were built after 1980.

Council is committed to working towards the best appropriate practice in asset management. An Asset Management Plan has been developed for the bridge network.

New bridges, either constructed by Council or donated to Council through private development, are required to meet the requirements of the Bridge Code (Australian Standard).

Strategies

- 2.1 Review the bridge Minimum Acceptable Load Limits regularly.
- 2.2 Maintain a Bridge Asset Register which lists all Council controlled bridges. Bridges that are not on the Register are not considered Council assets, and will not be maintained by Council.
- 2.3 Review and assess the existing bridge network for conformance with current standards and develop a program subject to funding to replace the infrastructure.



- 2.4 Revise Bridge Asset Management Plans as appropriate to ensure the above strategies are reflected in the investment plans.
- 2.5 Recognise funding for renewal of bridges and available funds, and monitor long term sustainability of the bridge network.



Strategic Priority Area 3: Infrastructure Operation and Maintenance

Ensure the constructed infrastructure operates in an efficient and effective manner to meet the service level expected of the infrastructure over the life of the asset.

The bridge network requires regular operational and maintenance activities to maximise the life of the asset and reduce the whole of life costs.

The funding required to maintain the service level should be provided based on the condition level of the asset; inadequate funding for maintenance and operations may result in the condition of the asset worsening beyond an acceptable service level by accelerating the deterioration, and consequently an increased renewal cost for the asset. A Bridge Strategy Report has been developed to provide guidance and consistency for the programming, and prioritisation of rectification of bridge defects, in the region. This manual has resulted in reducing the number of bridge related outages. Regular inspections of the network have also improved identification and programming of works.

Council operates under an accredited Quality Management System for the construction and maintenance of bridges. The elements the Quality Management System covers include quality management, environmental management, forms, workplace health and safety management, and an operations manual.

- 3.1 Review Bridge Strategy Report annually.
- 3.2 Continue an operational and maintenance inspection program to ensure defects are logged and rectified.
- 3.3 Review Council's Quality Management System and maintain accreditation.
- 3.4 Develop Rehabilitation Program annually.





Strategic Priority Area 4: Resource Capability

Recognition of the continued need to have a skilled workforce, appropriate resources and source materials to continue to support the provision of the bridge network.

The future supply of timber for bridge maintenance and rehabilitation has been identified as a possible future limitation for the continued maintenance of timber bridges. Sources within the timber bridge industry have suggested that the future supply of timber girders in South East Queensland may be below demand and this will be reflected in delays in supply and significant cost increases.

A future risk identified in many areas is the loss of skills, knowledge and craftsmanship of timber bridge carpenters as this occupation progressively diminishes through generations over the next 50 years, or longer. The number of experienced timber bridge carpenters within the industry has significantly reduced over recent years due to diminishing numbers of timber bridges on the national road network.

Council needs to ensure that expertise is maintained by identifying employees as suitable candidates for succession in these positions. Any deficiencies in skills and abilities need to be identified, and effective training initiated so that staff are competent when the vacancies occur.

As the balance of bridges shift from timber towards concrete construction, and maintenance of older concrete bridges becomes more prevalent, Council's bridge gang will require skills in these areas as well as the traditional timber bridge methods.

Strategies

- 4.1 Continue to explore sources for current and alternative material to ensure the continued provision of the bridge infrastructure is sustainable.
- 4.2 Retain a skilled workforce capable of undertaking bridge work, of all types/structures.

Strategic Priority Area 5: Land Use Planning

Ensure land use planning delivers development that has a focus on sustainable and efficient transport network.

Land Use Planning is an appropriate tool to determine the function of transport routes within the network, and to provide suitable locations for future linkages between current and future development areas.

Planning for the future growth of the region allows the location of the road corridors to be determined, for both new roads, and any widening of existing roads. This is important to allow Council to secure the road reserves and to ensure the acceptable level of service from the transport network is sustained.

- 5.1 Develop the Scenic Rim regional Planning Scheme with consideration of the principles and key actions of this Strategy.
- 5.2 Ensure development in the Scenic Rim region is sustainable with a reliable appropriate transport network created.
- 5.3 Integrate Priority Infrastructure Plans with other strategic Council documents to ensure the transport network is maintained appropriately.
- 5.4 Ensure Infrastructure Agreements (IAs) provide the appropriate levels of funding for bridge assets.





Strategic Priority Area 6: Project Prioritisation

Ensure renewal, upgrades and new bridge infrastructure projects are prioritised according to network needs.

As identified in Strategic Priority Area 2: Bridge Network Infrastructure, there is a current funding need for the bridge network given its current age and condition.

The actions in this Strategy are intended to mitigate the gap as far as possible; however there remains a need to prioritise the renewal, upgrade, and new works based on risk assessment of the network to determine which roads will remain within the acceptable service level.

A project prioritisation model has been developed which assesses the bridges based on community service levels, traffic volumes, available alternative routes, and the overall condition of the bridge structure. These categories are ranked, and from these rankings the Ten Year Capital Works Program is developed.





- 6.1 Continue to monitor transport network demands to determine the Minimum Acceptance Load Limit for each bridge.
- 6.2 Review the bridge infrastructure project prioritisation model on an annual basis.
- 6.3 Undertake an annual reassessment of the Ten Year Capital Works Program based on the project prioritisation model.



Strategic Priority Area 7: Private and Utility Infrastructure in Road Reserve

Ensure the installation of private and utility infrastructure in road reserves does not compromise the function and safety of the road.

The installation of private and utility infrastructure within a road reserve has implications for Council. These implications include public safety, liability in the case of an accident, visual impact in terms of the regions image, visual amenity and visibility, as well as potential practical implications on maintenance and access, and strategically in terms of the road network management. A poorly placed structure within the road reserve may restrict Council's ability to provide an adequate level of service from its bridge network.

Examples of infrastructure in road reserve that may impede a bridge's serviceability include:

- Roadside memorials
- Fencing
- Property accesses
- Private pipelines and conduits
- Electrical network above and below ground
- Communication network above and below ground

Council regulates infrastructure within road reserves through Local Laws, Subordinate Local Laws, and the subsequent application and approval processes. This ensures appropriate controls and standards for the installation of private and utility infrastructure in road reserves, that private and utility infrastructure does not adversely impact on Council infrastructure within road reserves, protection to the public from damage that may be incurred from the installation of private and utility infrastructure, and protection of the visual amenity and nature of the region.

- 7.1 Ensure Bridge assets maintain their service levels by monitoring the current and potential impact of private and utility infrastructure in road reserves through the use of standards and permits.
- 7.2 Continue to ensure safe passage by users of the bridge network through standards and permits, to allow only safe structures within the road reserve.
- 7.3 Develop a monitoring and inspection process, based on self-assessment of private and utility infrastructure, in road reserves.











Appendix 2 – Bridge Prioritisation Model and 10 Year Capital Works **Program**

The Bridge Prioritisation Model is based on a set of weighted criteria. These criteria include:

- **Community Service Level**
- Traffic Volumes
- Alternative Route
- **Bridge Condition Assessment**

Project are assessed against these criteria according to a rating, and given a Weighted Score [(Community Service Level x Traffic Volumes x Alternative Route) / 3 + Bridge Condition Assessment]. An aggregate of the weighted category score is then given an overall project score. Projects are then ranked based upon the overall project score.

Criteria are rated on the following basis:

Community Service Level

Total use is calculated by the addition of Community Link, Commercial Link and Interconnector, each multiplied by their relevant weight.

(service level * weighting) combined = community service level score

Community Link is given a value of either 0 or 1. 1 being where the bridge is an important link to a community and cannot be detoured, e.g. Kooralbyn Bridge. (weighting of 5)

Commercial Link is similar to Community link, with 1 being where the bridge is an important link for heavy traffic. (weighting of 5)

Interconnector based on whether the road is an interconnector between other major roads, i.e. it can be detoured, for example Bruxner Bridge. (weighting of 2)

Traffic Volume

Traffic volumes ranges are scored between 5 - 10 as follows:

AADT	Score	AADT	Score
0-20	5	150-500	8
20-50	6	501-1000	9
50-150	7	>1001	10

AADT = Annual Average Daily Traffic

Alternative route

Alternative route is given a subjective rating for alternative routes being non-sidetrack routes and sidetrack routes. (non-sidetrack * sidetrack) = alternative route score. This score gives a measurable rating of inconvenience to the road user as a result of the alternative route provision.

Non-sidetrack (ie alternative route) ranges between 0 - 1, with 0 being the 'ideal' alternate route, 1 being no alternate route, and fractions of this based on the suitability.

Sidetrack is similar to Alternate Route, with 0 being the 'ideal' side track, and 1 being no side track.

Bridge Condition Assessment

Each bridge is given a score using the BridgeGuide scoring system which allows each component to be rated and weighted by type, and then the bridge is given a condition score; this is based on the latest Level 2 condition inspection report.

