



Inland Queensland Roads Action Project

*Driving Productivity, Economic
Development and Safety*

Inland Queensland Road Network Strategy

JULY 2018



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Front cover: Carnavon Highway, photo courtesy of Balonne Shire Council

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Regional Queensland is an economic powerhouse

Regional Queensland outside Greater Brisbane contributes more to the national economy than South Australia, Tasmania and the Northern Territory combined.

(.id consulting pty ltd; National Economic Indicators 2015/16)
(Greater Brisbane includes Ipswich, Logan, Moreton Bay and Redland)

\$154 billion of Gross State Product (GSP) is generated outside Greater Brisbane. That is equal to 49% of Queensland's annual GSP and 9% of Australia's Gross Domestic Product (GDP).

(.id consulting pty ltd; National Economic Indicators 2015/16)
(Greater Brisbane includes Ipswich, Logan, Moreton Bay and Redland)

The IQ-RAP partner local government areas alone contribute \$43.5 billion to the national economy – nearly as much as Tasmania and the Northern Territory combined at \$47.3 billion.

(.id economics; National Economic Indicators 2015/16)

The minerals and energy sector contributes \$55 billion to the Queensland economy, accounting for 17% of Gross State Product and employs 282,634 people, accounting for 12% of Queensland's employment.

(Queensland Resources Council; Economic Contribution of the Minerals and Energy Sector to the Queensland Economy 2016/17)

The tourism industry contributes \$25 billion to the Queensland economy, accounting for 7.8% of Gross State Product and employs 138,000 people accounting for 5.8% of Queensland's employment. The sector contributes \$7.4 billion to export earnings and is the third largest export earner in Queensland after coal and food.

(Tourism and Events Queensland; Queensland Tourism Economic Key Facts 4 April, 2018)

The agriculture and food industries' Gross Value of Production in Queensland is \$19.9 billion and the total supply chain employs 434,100 people, accounting for 18% of Queensland's employment.

(Dept of Agriculture and Fisheries; Queensland Agricultural Snapshot 2018)

Queensland exported \$70 billion of goods in the year ending February 2017. Coal, minerals, meat and other food products produced in regional Queensland made up the bulk of these exports.

(Queensland Government Statistician's Office; Exports of Queensland Goods overseas, February 2018)



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Cr Tom Gilmore
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Foreword

Community leaders who are passionate about the future of regional Queensland have driven the development of this strategy for economic development.

Many communities have been enduring droughts, downturns in the mining sector, up to 61% youth unemployment¹ and high levels of socio-economic disadvantage. Many local governments have been facing challenges associated with financial sustainability, especially those that rely heavily on roads funding. The Queensland Roads and Transport Investment Program (QTRIP) provides guidance for the next four years but this doesn't meet the needs of local governments in developing their 10 year asset management plans and community development goals, nor does it give confidence for long-term retention of skilled workers and their families.

Despite these challenges, many of the regional local government areas contribute far above the Queensland average in terms of economic output and can see there are bright opportunities for expanding agricultural and cattle production, mining, value-adding to these industries and diversifying local economies such as through tourism.

Analysis of the industry, business and local government challenges led stakeholders to assess the opportunities for developing an initiative that can have far-reaching economic and social benefits. The Inland Queensland Road Network Strategy (IQRNS) is the result.

This is an economic development initiative to drive:

- » **jobs growth;**
- » **productivity increases for businesses to remain competitive and grow;**
- » **improvements in safety and a reduction in economic and social costs associated with road accidents;**
- » **opening up of new opportunities for tourism; and**
- » **resilient connectivity for the delivery of goods and services and people to access employment, health, education and recreation.**

Everyone relies every day on roads in some way. We believe that a collaborative long-term strategy that focuses on developing a stronger road network for freight and tourism through prioritised, fit-for-purpose investments in roads and bridges will deliver the desired outcomes. This road network will complement the rail, port and airport network across Queensland and will strengthen connectivity to other states.

There is a strong economic rationale for investing in regional Queensland. Queensland is a decentralised state, with 49% of Gross State Product (GSP) generated outside Greater Brisbane.² Industries such as mining, resources and energy, agriculture, and tourism contribute significantly to GSP and employment, primarily in regional Queensland.

The scope of the IQRNS covers the 28 local governments that have funded this project with five Regional Development Australia Committees and RACQ. The area is 1,260,080 km², which equates to 73% of Queensland and 16% of Australia, an area more than 18 times the size of Tasmania. However, the impact of the proposed strategy is far wider than these

¹ Queensland Government Statistician's Office; Regional Youth Unemployment, February 2018

² .id economics; National Economic Indicators 2015/16 (Greater Brisbane includes Ipswich, Logan, Moreton Bay and Redland)

28 local government areas. Residents throughout Queensland will benefit directly or indirectly from this initiative as will consumers and tourists from other states, as per the following examples.

One example is Brisbane Markets Limited, which operates in Brisbane but relies on the regional road network to bring produce from regional areas to their markets for distribution to retailers and consumers in Brisbane and across Queensland. Their turnover is \$1.3 billion per annum. More than 7,000 growers supply 600,000 tonnes of product; 4,000 people work or do business at the markets each day for 100 employers.

Similarly, JBS Australia at Dinmore relies on the regional road network to deliver 3,350 cattle per day for processing at their abattoir. They are the largest employer in Ipswich, with 2,000 staff.

Transport companies operating from Cairns to Melbourne prefer to use more direct inland routes to shave more than 500 km off the coastal journey. Produce arrives faster, fresher and at lower cost for consumers in Melbourne with better financial returns to producers.

Inland routes primarily pass through smaller population centres that are traditionally welcoming of road transport and benefit significantly from transport-related industries. More inland roads are designated road train routes which allow for higher freight productivity and fewer heavy/light vehicle interactions.

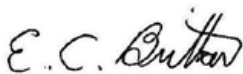
Efficient and effective inland routes reduce congestion on the more populous coastal strip which is served by the Bruce Highway where coastal terrain, major rivers and more extreme climatic events require significantly higher levels of road infrastructure funding to achieve similar levels of operational efficiency.

This strategy seeks a more strategic, long-term planning and funding commitment for inland Queensland roads. The strategy provides stakeholders with:

- » a high-level assessment of the current road infrastructure in the region;
- » a clear understanding of the future road transport priorities for inland Queensland; and
- » a prioritised and staged approach to funding the required improvements.

We urge all stakeholders of regional Queensland's future to consider the opportunities this strategy presents and the recommendations we make in the following pages that can take Queensland and Australia into the next century of prosperity.

In closing, we would like to thank all of the 34 funding partners for their vision and unity of purpose in such a unique project, the Department of Transport and Main Roads for the provision of valuable data, the Inland Queensland Roads Action Project Working Group for their guidance throughout this project and RDA Townsville and North West Queensland staff for providing extensive in-kind support as the Secretariat to manage this project.



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- » Balonne Shire Council
- » Banana Shire Council
- » Barcaldine Regional Council
- » Barcoo Shire Council
- » Bulloo Shire Council
- » Boulia Shire Council
- » Burke Shire Council
- » Carpentaria Shire Council
- » Central Highlands Regional Council
- » Charters Towers Regional Council
- » Cloncurry Shire Council
- » Croydon Shire Council
- » Etheridge Shire Council
- » Flinders Shire Council
- » Gladstone Regional Council
- » Isaac Regional Council
- » Longreach Regional Council
- » Maranoa Regional Council
- » Mareeba Shire Council
- » McKinlay Shire Council
- » Mount Isa City Council
- » Murweh Shire Council
- » Paroo Shire Council
- » Quilpie Shire Council
- » RACQ
- » Regional Development Australia Darling Downs South West
- » Regional Development Australia Far North Queensland and Torres Strait
- » Regional Development Australia Fitzroy Central West
- » Regional Development Australia Mackay-Isaac-Whitsunday
- » Regional Development Australia Townsville and North West Queensland
- » Richmond Shire Council
- » Tablelands Regional Council
- » Townsville City Council
- » Winton Shire Council

The following organisations have also provided information and advice:

- » Queensland Government Department of Transport and Main Roads
- » Bowen Basin Regional Roads and Transport Group
- » Far North Queensland Regional Roads and Transport Group
- » Gladstone Regional Roads and Transport Group
- » North Queensland Regional Roads and Transport Group
- » North West Queensland Regional Roads and Transport Group
- » Outback Regional Roads and Transport Group
- » South West Queensland Regional Roads and Transport Group

Executive Summary

The vision for the Inland Queensland Road Network Strategy is to increase the quality and accessibility of the road network to maximise the economic prosperity of inland Queensland, thereby contributing to Australia's productivity, quality of life, safety and equity.

Queensland is a decentralised state with its wealth-producing centres scattered widely along the coastal strip and throughout the interior – from major ports and airports through agriculture and mining to tourism and services. Queensland is also a critical supplier of resources, including perishable foods, to the major population centres in the south of our continent.

Historically, traffic volumes and investment have focussed on the Bruce Highway as a single coastal link with east-west 'ribs' serving the hinterlands. This approach has produced congestion on the coastal network and disruptions during extreme weather events. The coastal network is also not designed or appropriate for the operation of Freight Efficient Vehicles (FEV), which maximise the productivity of the freight task, but are not compatible with high volumes of passenger cars.

After initial work on this project to develop the Inland Queensland Roads Action Plan in 2016, the goals of improving productivity and safety on the inland Queensland road network, along with sustaining regional local governments and communities, has encouraged an on-going alliance of 28 local governments, five Regional Development Australia (RDA) Committees and Royal Automobile Club of Queensland Limited (RACQ) to collaborate as a working group to develop a bi-partisan approach to the prioritisation of funding and the development of inland Queensland roads. This strategic alliance has developed this strategy to identify the network and prioritise a program of works over fifteen years and beyond. Each of the partners has contributed financially to the project. Road data was provided by the Department of Transport and Main Roads (TMR).

The Inland Queensland Road Network Strategy (IQRNS)

The strategy aims to strengthen the transport 'backbone' in the eastern zone of Queensland by providing quality inland links connecting northern Australia to Sydney, Melbourne and Adelaide. For the western zone, the strategy aims to prioritise the improvement of 'ribs'

servicing the west's industry and communities by improving access to the 'backbone.'

The proposed strategy for network improvement builds on previous work of TMR, recent studies, and knowledge from local governments. It will improve connectivity to communities, wealth-generating regions and tourism destinations to the west of the Bruce Highway and outside South East Queensland.

Prioritised investment in the inland Queensland road network is necessary to enhance connectivity between communities in western and northern Queensland and address a range of challenges associated with the current condition of, and the changing demands on the network. It will also deliver benefit to industry and support Australian Government strategies to enhance the productivity of northern Australia, thus contributing to the Australian economy through providing improved and more direct connectivity to southern markets. For example, the beef industry is highly dependent on the transport network for the timely and efficient movement of stock but climatic extremes cause delays that directly impact productivity.

Methodology

Rather than taking a piecemeal approach through selecting only one or two types of roads for consideration, the Working Group and partners identified the 16,200 km of strategic freight routes of the inland Queensland road network that would generate regional economic benefits. The network consists of inland Queensland's National Road Network together with Other State-Controlled Roads (OSCR), Local Roads of Regional Significance (LRRS) as well as local government roads (LG) that are key to development of this vast area. Together, these roads represent the core network of inland Queensland.

This strategy provides a strategic level analysis and prioritisation over an extensive network and a methodology that can be used to monitor the infrastructure gap and review priorities. It analyses existing data on road and bridge conditions against established TMR intervention

and vision standards, and prioritises investment based on the following values:

- » Economic value – Supports economic activity across all industries, and is able to carry heavy freight efficiently in most weather conditions;
- » Strategic intent – Provides a stimulus to economic development;
- » Safety – Carries traffic safely;
- » Access – Ensures roads within the network are of a consistent and adequate quality with predictable travel conditions; and
- » Social value – Connects communities for education, health, employment, business and recreation.

The needs and aspirations of road users were considered in the identification and prioritisation of works, which called for:

- » a robust network of inland roads connecting to and providing viable alternative routes to the Bruce Highway, as well as servicing those seeking an inland route to southern states;
- » roads to be built and maintained to 'fit for purpose' standards; and
- » a prioritised program of works resulting in timely improvements, to meet industry development and operational needs, and continuity of work for dedicated local workforces.

This strategy provides stakeholders with a high-level assessment of the current road infrastructure in the region, a clear understanding of the future road transport priorities for inland Queensland, and a prioritised and staged approach to funding the required improvements.

Achievement of a realistic program of works based on this plan will improve transport links both within inland Queensland and to the rest of Australia, and it will also reduce heavy vehicle impacts on Queensland's populous coastal strip.

The strategy has potential to be an ongoing initiative that will monitor progress and respond to new economic and community developments and needs. Future reviews of the strategy could see the network refined to ensure new links essential to community connectivity and economic development are included as further planning and updated data are considered.

This is the first review of the original Inland Queensland Roads Action Plan (March 2016). It has added several strategic links, has incorporated works completed and committed since then, has reprioritised the network using a revised multi-criteria assessment (MCA) incorporating additional criteria such as the Australian Road Assessment Program (AusRAP) safety data and CSIRO Transport Network Strategic Investment Tool (TraNSIT) report and updated the program accordingly.

IQRNS proposed program of investment

The strategy recognises road projects that are funded in the current Queensland Roads and Transport Investment Program (QTRIP) and prioritises works beyond the forward program into the 4, 10, 15 and 15+ year program horizons as demonstrated in Table 1.

The proposed program is not constrained by available funds, and hence provides a quantitative basis for funding submissions to realise essential improvements to the inland Queensland road network.

Achievement of a realistic program based on this work will prove the maxim that 'What's good for inland Queensland is good for Australia'.

Table 1 shows the IQRNS upgrades excluding those identified in other programs such as QTRIP. Note that these costs are all in \$2018. No allowance for discounting of future costs has been made in these figures and all are indicative estimates subject to planning and design considerations.

Table 1 Summary of proposed IQRNS investment

RRTG	Strategic estimate \$m	Future investment \$m			
		1-4yrs	5-10yrs	11-15yrs	15+yrs
Bowen Basin	1,252	82	500	670	
Far North	862	46	254	374	188
Gladstone	61		17	44	
North Queensland	334	32	140	162	
East Zone sub-total	2,509	160	911	1,250	188
North West	1,008	93	369	423	123
Outback	797	69	281	404	43
South West	833	78	326	344	85
West Zone sub-total	2,638	240	976	1,171	251
Total Proposed Investment	5,147	400	1,887	2,421	439

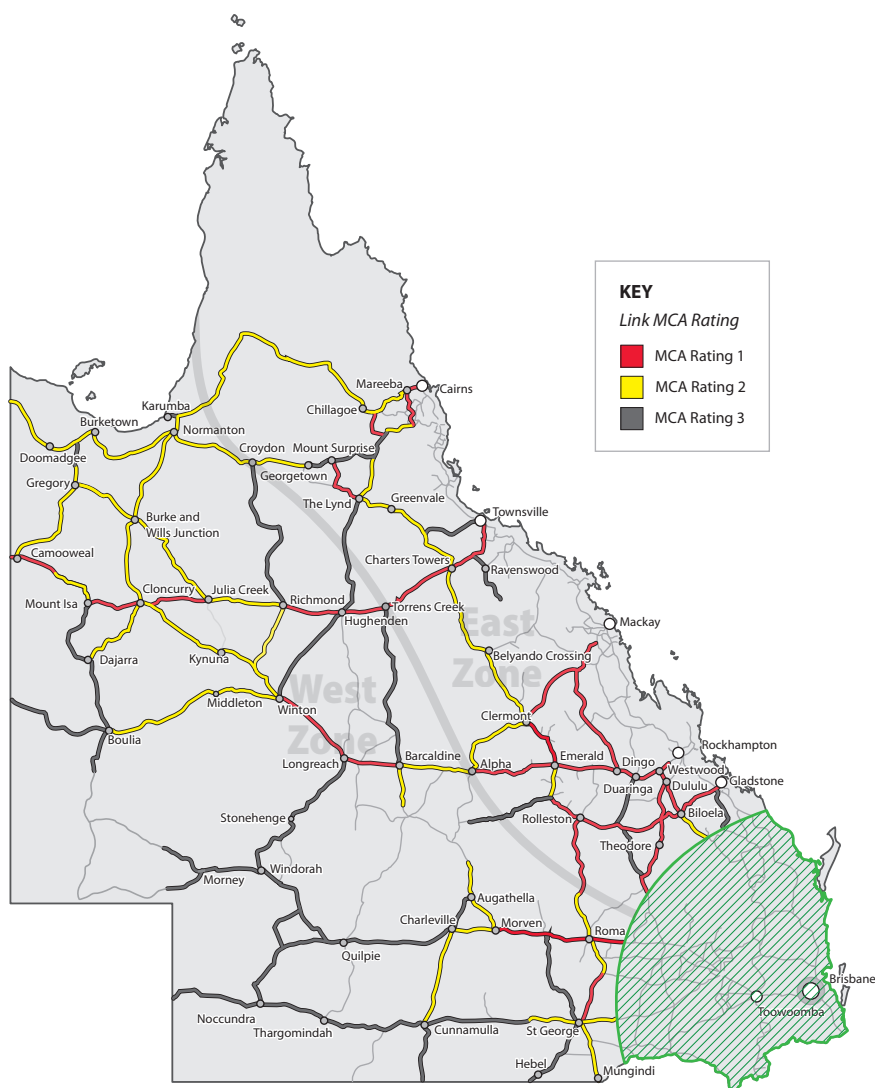


Figure 2 IQRNS Priorities based on the multi-criteria assessment

The map indicates the strategic freight routes, as identified by partner councils, in the area west of the Bruce Highway as per the scope of the project and the prioritisation of investment into 4, 10 and 15+ year program horizons to reach vision standards based on MCA. MCA Ratings 1, 2 and 3 indicate meeting vision standards in 4, 10 and 15+ year horizons respectively. This means some projects should be commenced and completed in four years, while others are recommended to start in coming years, but continue construction over several years to achieve vision standard over 10 - 15+ years, therefore making the best possible impact on local employment.

Recommendations

The Inland Queensland Roads Action Project (IQ-RAP) partners recommend:

- » the Australian Government reference this strategy and the significant work completed to inform the roll out of the 10 year Roads of Strategic Importance (ROSI) initiative as announced in the 2018 Budget;
- » the high priority projects in the strategy be considered in the next update of the QTRIP and other priorities continue to be rolled into future QTRIP programs and new funding opportunities;
- » the strategy be referenced as an input to future Regional Transport Plans (RTPs) and economic development planning processes across Queensland;
- » the strategy be referenced as an input to investment plans to implement the RTPs and provide longer term direction for future road investment and to bridge the gap between the four year QTRIP and the 15 year State Infrastructure Plan (SIP);
- » the local governments in this project work with the Department of Transport and Main Roads to ensure priorities are included in regional plans;
- » the Australian and Queensland governments consider the IQRNS as a new methodology for prioritising regional roads investment;
- » the Australian and Queensland governments consider undertaking research projects that develop an improved methodology for assessing the economic and social benefits of investment into strategic regional road networks, better suited than the current benefit cost ratio model that is more relevant to urban projects; and
- » the Queensland Government considers making long-term funding programs for regional roads.



Boulia Road in flood
Image courtesy of Boulia Shire Council

1. Introduction

The goals of improving productivity and safety on the inland Queensland road network, along with sustaining regional local governments and communities, has led to the formation of a strong strategic alliance of 28 local governments, five RDA Committees and RACQ.

The Harrison Infrastructure Group (HIG) was engaged by the IQ-RAP Working Group through the Secretariat, provided by the RDA Townville and North West Queensland Committee (RDA TNWQ), to prepare the IQRNS.

HIG was also previously engaged to deliver the Inland Queensland Roads Action Plan in February, 2016 and this strategy serves as an update to that original plan with additional data that is now available.

The development of the strategy has been undertaken with in-kind cooperation from TMR, which has provided data for analysis and planning, and all funding partners.

The IQRNS identifies the strategic freight and tourism network, provides a gap analysis and prioritises a program of works over fifteen years and beyond.

1.1 The initiation of the Inland Queensland Roads Action Project (IQ-RAP)

Based on consultation with 15 local governments across north and north west Queensland, and the advice that long-term planning and funding to upgrade roads and bridges is fundamentally important to the sustainability of local governments, businesses and communities – RDA TNWQ in partnership with RDA Committees for Far North Queensland and Torres Strait, Mackay-Isaac-Whitsunday, Fitzroy Central West and Darling Downs South West convened a Roads Forum in Longreach in December, 2013. The forum acknowledged the success of the Bruce Highway Action Plan (BHAP) and its partnerships in securing long-term funding commitments from the Australian and Queensland governments. More than 50 key stakeholders from local governments, TMR, industry, LGAQ, RACQ and RDAs attended to discuss challenges associated with road investment as a key economic development enabler.

The outcome of the forum was a consensus of opinion amongst local governments and industry that there was an opportunity for better outcomes on inland Queensland roads through greater cross-regional collaboration, strategic long-term planning and increased long-term funding. This would ensure greater certainty for budgeting and execution of works, sustaining the regional workforce and equipment needed to maintain and upgrade roads in inland Queensland.

An Interim Working Group was formed and another forum was held in Mount Isa in August 2014. At this meeting, the Regional Roads and Transport Groups (RRTGs) committed to contributing financially to establish the Secretariat. This was further supported financially by the Northern Queensland Strategy Alliance (made up of the four northern Queensland RDA Committees).

In October 2014, an ongoing Working Group was formed with the election of the Working Group Chair and appointment of representatives from the participating RRTGs, RDAs and RACQ. The Working Group and their delegates have been the steering committee for the development and outputs of the project.

During November 2014 to July 2015, RRTGs and their local governments were approached and funding commitments were made by 33 local governments. A tender by invitation process was managed and the HIG was engaged in August 2015. The Inland Queensland Roads Action Plan was launched in February 2016.

Throughout 2016 and 2017, advocacy work was undertaken by the Working Group executive and Secretariat. The project has secured strong support from a range of stakeholders with letters of support received from parliamentarians and peak industry organisations. For more details, refer to the Appendices J and K.

Feedback from various key stakeholders has been incorporated into this new Inland Queensland Road Networks Strategy (IQRNS).

A range of new information has also become available, facilitating a more robust analysis, including:

- » CSIRO's TraNSIT which provided further detail on the logistical issues surrounding the agricultural industry; and
- » AusRAP published by the Australian Automobile Association which proactively highlights safety design ratings rather than reacting to crashes.

This new information, along with updated road data provided by TMR, has been used to re-run the multi-criteria assessment prioritisation on a refined list of roads and incorporated into this new strategy.

1.2 The role of this strategy

This strategy represents a key milestone in forming a joint vision for the inland Queensland road network and a platform for a united voice to governments.

In commissioning this strategy, the Inland Queensland Roads Action Project Working Group has sought to quantify the problem with Queensland's inland road network through identifying:

- » the extent and condition of the elements of an agreed network of local, regional and main roads;
- » the deficiencies in that network compared with desirable minimum standards;
- » the cost of upgrading the network to remove the deficiencies; and
- » a prioritised program of work recognising developmental pressures, community expectations, and workforce needs.

This strategy not only provides a prioritised program of work, but also a methodology for continuing to understand the problem, evaluate priorities and review the program. The multi-criteria prioritisation tool and planning process can continue to provide credible analysis and results on which to base road network prioritisation in inland Queensland. The methodology can also be applied to other jurisdictions.

This 2018 strategy has refined the prioritised program with additional information and has used updated traffic and roughness data which reflects the actual development and growth of the economies and communities in inland Queensland.

It is our hope that the IQRNS will deliver benefit to regional industries and communities. It does support Australian and Queensland government strategies to sustain and grow regional economies and communities, to enhance

productivity and safety, and to open up new opportunities for economic diversification such as tourism and logistics. Implementation of recommendations will contribute to the Australian economy through providing improved and more direct connectivity to markets and ports for exports.

For example, as demonstrated in the CSIRO TraNSIT analysis, the beef cattle industry is highly dependent on the transport network for the timely and efficient movement of stock, but climatic extremes cause delays that directly impact productivity. The horticultural industry relies on quality roads and connectivity to ensure products arrive at markets in good condition. The mining sector relies on roads for the safe movement of oversized equipment that cannot be transported by rail and the tourism sector relies on safe, sealed roads.

1.3 Practical limitations

A whole of network approach to needs-assessment necessarily involves:

- » a desktop review of significant volumes of existing available data, some of which was dated and limited in detail;
- » where detailed information was not available, adoption of average costs for upgrading treatments (which cannot easily take account of local factors); and
- » consultation with local governments, RRTGs and TMR on standards, deficiencies, priorities, planned projects and costs.

TMR infrastructure data and prior planning undertaken for TMR and local governments have been used to understand the scope and cost of works required. It is anticipated that more detailed planning and business case development will follow for priority projects.

1.4 Inland Queensland road network challenges and opportunities

1.4.1 Queensland's size and dispersed communities and economic resources

Regional, rural and remote roads throughout inland Queensland carry a significant portion of the export and domestic freight task, as well as supporting key rural industries such as mining, agriculture and tourism and connecting communities for emergency and day-to-day requirements.

49% of Queensland's annual Gross State Product is generated outside Greater Brisbane. 53% of the Queensland population lives outside Greater Brisbane.³

Queensland exports \$70 billion of goods overseas each year, with exports to Asia growing particularly fast.⁴ Queensland's 15 trading ports handled 339.5 million tonnes of product in 2015/16, an increase of 29% on trade in 2011/12.⁵ All of these ports are reliant on both rail and road networks for the movement of exports and imports.

Domestic freight is also a significant user of the road network. The Australian Logistics Council noted in its 2014 report *The Economic Significance of the Australian Logistics Industry* that:

- » in 2011–12 the Bureau of Infrastructure, Transport and Regional Economics (BITRE) estimates that the domestic freight task totalled almost 600 billion tonne kilometres –equivalent to about 26,000 tonne kilometres of freight moved for every person in Australia;
- » Australia's freight task is projected to increase by 80 per cent between 2010 and 2030 with this rate of growth seeing freight triple by 2050;
- » on a number of inter-capital and regional corridors, road freight has increased its share of the freight task; and
- » higher productivity road freight vehicles will have an important role in accommodating this freight growth.

Safe and reliable access is essential to sustaining growth and to the health of regional and rural communities and economies, contributing significantly to the state and national economy.

1.4.2 Road network conditions lagging community and industry expectations

Rapid changes in communication technology are having enormous impacts on the well-being of rural communities – audio and video communication, business transactions, household purchasing and financial dealings, health and education, and farm and business management.

However, there have not been similar 'giant leaps forward' in the transport network. While excellent progress has

been made in the completion of sealing and upgrading of some major highways, investment in inland road networks has fallen well behind community expectations.

Industry and the travelling public expect a level of connectivity and reliability and safe driving conditions on links between towns, and the predictability of being able to undertake a journey, even in wet weather.

1.4.3 Safety

The inland Queensland road network experiences a range of safety problems. Long travel times between remote communities leads to fatigue which becomes deadlier in a less forgiving road environment that has narrow seal widths, inadequate sight distance, a lack of overtaking opportunities or unsealed and single lane sealed roads. As shown in Figure 3, the road deaths in regional and remote areas are disproportionately high relative to the rest of Australia.⁶

The inland Queensland road network also has extensive sections of narrow roads and numerous narrow and/or weaker bridges that constrain safe access for Freight Efficient Vehicles (FEV). FEV provide increased efficiencies in the movement of freight by having greater payload being hauled by one driver.⁷ While these larger vehicles are able to move freight more efficiently they also have a greater impact on the fragile inland roads which are not designed for these loads.



Figure 3 Road deaths per 100,000 persons in major cities vs regional and remote Australia (BITRE)

1.4.4 Changing pressures on the existing road network

There have been major developments in rural Australia impacting the condition and adequacy of the transport network including:

³ .id consulting pty ltd; National economic indicators for local government areas, 2015/16 (Greater Brisbane includes Ipswich, Moreton Bay, Logan, Redland)

⁴ Queensland Government Statistician's Office; Exports of Queensland goods overseas; February 2018

⁵ Department of Transport and Main Roads; Trade Statistics for Queensland Ports; 2015/16

⁶ Bureau of Infrastructure, Transport and Regional Economics, Road Safety in Australia, 2017

⁷ TMR Guideline for Multi-combinational vehicles: "Type 1" uses either a rigid truck hauling unit towing one trailer with a combination length of no longer than 31.5m or a prime mover hauling unit towing two trailers with a combination length no longer than 36.5m or B-triple and AB-triple combinations up to 36.5m. "Type 2" uses either a rigid truck hauling unit towing two trailers with a combination length no longer than 47.5m or a prime mover hauling unit towing three or four trailers with a combination length no longer than 53.5m or AB-triple combinations longer than 36.5m and up to a length of 44.0m.

- » coal, gas and minerals exploration and facility development;
- » growth in drive tourism;
- » demand for more reliable accessibility for cattle transport to domestic and live export centres;
- » reduction in reliability and use of rail in some areas, including for mining product;
- » general mining development and utilisation of larger and more freight efficient vehicle combinations;
- » sugar industry expansion increasing use of road transport of sugar cane to mills; and
- » increasing reliance on roads for bulk movement of grain direct to ports, bypassing local bulk grain storage facilities. Current development of the CQ Inland Port facility, just east of Emerald, with direct access to the Gregory and Capricorn Highways and rail line to the east will facilitate "bulk and containerised aggregation, intermodal transfers and efficient distribution" of agricultural and other products.

1.4.5 Climatic pressures

Variability in climate, such as long periods of drought, major storms and flooding also impact the road network, particularly unsealed roads, by:

- » disrupting access and reliability;
- » increasing the movement of livestock to agistment;
- » reducing allowable loadings on wet roads; and
- » diverting resources from upgrade and maintenance to repair tasks.

The analysis undertaken for this strategy has considered the duration of road closure in the last five years in order to prioritise funding on links that are regularly disrupted, reducing access for community and economic travel.

1.4.6 Pressures on local government

Local governments have traditionally undertaken a vital third-tier role in the building and management of roads throughout Australia, and particularly in rural areas. In Queensland, this amounts to 152,827 km of road that is the responsibility of local government.⁸

Local governments hence rely heavily on road funding in their annual budgets. They must also develop 10 year asset management plans; however, the QTRIP only provides confirmation of funding two years in advance and tentative funding of two years beyond that. And many rural councils do not get funding allocations every year in QTRIP.

Limited revenue-raising capacity, coupled with the uncertain availability of funding from year to year from other levels of government, can create the following difficulties:

- » maintaining a stable workforce – this is essential for maintaining capabilities and knowledge in building roads in remote areas, as well as supporting the viability of struggling rural centres;
- » local governments are often limited to projects that are urgent and reactive, rather than a program of strategic road projects; and
- » the interconnectedness of local government networks to the networks of neighbouring local governments is reliant on cross-boundary consistency and investment.

1.4.7 Equitable access for remote communities

Remote communities rely on transport routes for access to specialist health services and education services that are typically found in larger population centres along the coast. A recent Regional Australia Institute report "Pillars of communities: Service delivery professionals in small Australian towns 1981 – 2011" emphasised the gap in service delivery in small towns across Australia. This highlights the need for safe, reliable road transport infrastructure to access services.

"The scale of the service gap in small towns is clear. Small towns, on average, have 83 doctors per 100,000 people, well under half the national average of 202. The gap in psychologists is even greater – just 29 per 100,000 small town residents compared with a national average of 87. This is despite the well-studied importance and prevalence of mental health needs and issues in regional areas. Social welfare professional numbers in small towns are also well below the national average."

While telehealth solutions play a role, they do not fill this service gap and fully replace the need to travel to see medical practitioners.

1.4.8 Australian Government focus on the development of northern Australia

The Australian Government has assigned a high priority to the development of northern Australia and has announced funding commitments designed to assist the region in harnessing its potential. Under the Northern Australia Roads and Beef Roads programs, priorities in the 2016 Inland Queensland Roads Action Plan were successful in securing funding:

⁸ http://regional.gov.au/local/publications/reports/2013_2014/INFRA2466_LGMR_2013-14.pdf

- » 15 projects in Queensland have secured \$56 million from the \$100 million Northern Australia Beef Roads Fund, which was made available for targeted upgrades to key roads necessary for transporting cattle.
- » 10 projects in Queensland have secured \$223.8 million under the \$600 million Northern Australia Roads Program, which provides 80% of project costs with private sector, state or local government providing the remainder.

In 2018, the Australian Government announced a new 10 year regional roads program – the Roads of Strategic Importance (ROSI) which has an allocation of \$3.5 billion, \$1.5 billion of which is allocated for northern Australia.

In addition to the road infrastructure programs:

- » The \$5 billion Northern Australia Infrastructure Facility (NAIF) will provide concessional loans for major infrastructure in northern Australia. The loans are provided to build the economic capacity and to create a longer-term expansion of industry and population in northern Australia.
- » The Northern Australia Infrastructure Audit⁹ assessed critical economic infrastructure to identify gaps to meet projected northern Australia population and economic growth through to financial year 2031. The audit only included National Network roads, much of which form part of the inland Queensland road network. The audit identified a range of improvements required to address capacity, safety and reliability issues.
- » The Northern Australia Infrastructure Audit states that "Over half of the North Queensland (National) network exceeds the theoretical design life and an increasing proportion, currently one third, of network seals are older than the target optimum."¹⁰

1.5 Reports and initiatives

1.5.1 Regional Roads and Transport Groups (RRTGs)

Established in 2002, the Roads and Transport Alliance (RTA) is a partnership which seeks cooperative governance arrangements between TMR, the Local Government Association of Queensland (LGAQ) and local governments to plan, invest in and regionally manage the Queensland transport network.

Local governments are working collectively as RRTGs in overcoming an insular approach based on boundaries and jurisdictions, and to promote the need for a better, smarter and more sustainable approach to the management of Queensland's inland road network.

RRTGs played a critical role in financially committing to the Inland Queensland Roads Action Project to seed its formal commencement.

1.5.2 Existing reports

There is considerable background information available through recent reports prepared by industry transport groups, government departments and economic development groups. These provide significant insights into drivers for system upgrading, the deficiencies that exist and their impacts, the structural challenges of managing such a significant asset across various jurisdictions and the needs of a range of stakeholder groups. These reports have informed sections 3 and 4 of this plan.

1.5.3 Queensland Transport Roads Investment Program

Since publication of the initial Inland Queensland Roads Action Plan a number of significant prioritised projects with a total value of \$0.52 billion have been added to TMR's QTRIP as summarised in Table 2. These projects have been considered in the development of the IQRNS program to avoid duplication.

Table 2 Current level of investment on prioritised roads shown in respective 2016–17 to 2019–20 and 2017–18 to 2020–21 QTRIPs. This table includes both committed and indicative funding.¹¹

RRTG	NN \$m	State \$m	LG \$m	TOTAL \$m
Bowen Basin/Gladstone		108.8	0.0	108.8
Far North		30.1	11.4	41.5
North Queensland	18.3	82.7	0.5	101.5
North West	60.0	65.8	9.7	135.5
Outback	38.6	25.5	5.3	69.4
South West	0.2	57.6	4.3	62.1
TOTAL	117.1	370.5	31.2	518.8

⁹ http://infrastructureaustralia.gov.au/policy-publications/publications/files/IA_Northern_Australia_Audit.pdf

¹⁰ http://regional.gov.au/local/publications/reports/2013_2014/INFRA2466_LGNR_2013-14.pdf

¹¹ QTRIP identifies firm funding commitments for the first two years for Queensland Government funded projects, and for the first year for projects funded by the Australian Government. It identifies indicative funding for the remaining years of the four-year program.

2. The Inland Queensland Road Network

2.1 Overview

The inland Queensland road network was identified to consider and develop a pathway forward for future funding of roads west of the Bruce Highway and outside South East Queensland.

With inputs from RRTGs, local governments and the Working Group, HIG has identified the key network of existing roads for inclusion in the IQRNS network. The network is based on previous work of TMR, other studies and local knowledge from local governments. A network was chosen that connects communities, wealth generating regions and tourism destinations west of the Bruce Highway. The full list of roads is contained in Appendix A.

A number of other studies have examined these roads, including the Queensland Transport and Logistics Council (QTLIC) Inland Highway Strategy. However, these studies have been limited to either a particular section of the network or a specific strategic intent (e.g. freight, tourism or mining alone).

The IQRNS is a strategic level analysis and prioritisation on the inland network spanning nearly 16,200 km of rural roads. The network and subsequent program have been divided into an eastern and western zone.

In the eastern zone traffic volumes are generally higher, driven by the inter-relationship between the more populated eastern regional areas of Queensland and connectivity to ports. The eastern zone includes Far North Queensland, Bowen Basin, Rockhampton and Gladstone RRTGs and Northern RRTG members of Charters Towers Regional Council and Townsville City Council. The north-south links of this network aim to provide a 'backbone' that is a quality link connecting northern Australia to Sydney, Melbourne and Adelaide.

The western zone reflects the rural and outback economies and includes the areas covered by the North West Queensland, Outback and South West Queensland RRTGs. Investment in the western zone provides the 'ribs' that connect to the 'backbones' to the east and supports industry, development and access for western communities and economic centres.

The Working Group believes these two areas should be considered separately to ensure that, instead of simply



Brolga Street, Diamantina Development Road
Image courtesy of Quilpie Shire Council

allocating funds based on traffic volumes, investment occurs to support equitable growth in western Queensland communities and access to critical services and employment opportunities.

The patchwork quality of this road network has been addressed by this strategy. Missing links have been identified and a prioritised program developed to fill these gaps.

The inland Queensland road network consists of the National Road Network for inland Queensland together with Other State Controlled Roads (OSCR) and Local Roads of Regional Significance (LRRS). In total, this network represents the strategic freight and tourism road network of inland Queensland.

2.2 Network needs

The inland Queensland road network has a number of issues that limit the network's effectiveness in meeting community and industry needs. These include:

- » existing road condition and configuration, with deficiencies such as road roughness, sharp corners and crests and narrow seals and pavements that reduce travel speed and increase vehicle operating costs. These factors increase the potential for vehicle damage and more frequent and severe road crashes;
- » roads not sufficiently wide for the safe operation of Freight Efficient Vehicles (FEV); and
- » lack of an all-weather surface, with approximately 2,100 km of the network currently unsealed, or low-

level flood-ways/culverts/bridges causing unpredictable travel times – with the road frequently inaccessible or closed due to flooding and/or wet conditions or damage resulting from flooding. During the dry season, dust is a major issue impacting visibility for safety, local communities, crops and animal welfare.

The multi-criteria assessment of available data has been designed to identify roads that have a poor roughness (from TMR data), safety issues (crash cost data from TMR and AusRAP star rating), inadequate widths (from TMR) and extensive historical road closures (from TMR).

The impacts from closed and flooded networks include delayed deliveries, lack of access to health services, reduced business and tourism, ruined fresh produce and an inability to attend jobs.¹²



Bulloo River crossing Quilpie, Diamantina Development Road. Image courtesy of Quilpie Shire Council

2.3 Stakeholder perspective

A review of relevant reports published in the past five years has been undertaken to inform the development of a vision for the IQRNS and capture the perspectives of the transport industry, agricultural sector, local governments and other government authorities.

2.4 Transport industry

It is well documented that the current inland Queensland road network presents a range of challenges for the transport industry that, unless addressed, will continue to constrain economic development and productivity. These issues build the case for the implementation of the IQRNS.

A report from the Mount Isa to Townsville Economic Zone (MITEZ) identifies the example of the Flinders Highway and in doing so describes the poor road conditions experienced on many key rural routes.

Speed restrictions due to poor ride quality, lack of passing lanes, no shoulders for emergency stops, narrow bridges, and reduction in allowable axle loads during the wet season all impact transport operations.

MITEZ identifies permitted access to roads by 'much higher productivity road freight vehicles' with the corresponding upgrading of roads and bridges as needed for inland Queensland.¹³

The Queensland Transport and Logistics Council¹⁴ sees the upgrade of a Queensland inland highway as an important initiative to provide an alternative to the Bruce Highway. There are capacity issues on the Bruce Highway and heavy vehicles from coastal Queensland to Melbourne/ Adelaide and points in between would find an inland highway an attractive alternative as it offers considerable distance savings.

One improvement to a candidate route raised by the RDA in its report¹⁵ is the extension of the triple road train route from Clermont to Emerald. This implies a through-route approach to road upgrading in terms of standards and priorities.

The Transport and Infrastructure Council also supports the "establishment of a national rural and remote arterial road network development plan that focuses on key regional strategic secondary roads".¹⁶ In its recent report "National Remote and Regional Transport Strategy", the council is seeking to "maximise investment opportunities in transport infrastructure and services (through) appropriate funding methodology and investment partnerships (and) better coordination across borders and between governments... The strategy sees the establishment of a national rural and remote arterial network development plan that focuses on key regional strategic secondary roads to complement the national freight networks..."

¹² Queensland Transport and Logistics Council 2015

¹³ Mount Isa to Townsville Economic Development Zone and AMSTEC Design 2010

¹⁴ Queensland Transport and Logistics Council 2015

¹⁵ Northern Queensland Strategy (Northern Queensland RDA Alliance) Business Cases, Cummings Economics, 2014

¹⁶ Transport and Infrastructure Council 2015



Figure 4 Queensland industry map highlighting interstate and international road and port connectivity (developed from a similar map in the State Infrastructure Plan 2016)

2.5 Agricultural sector

88.4% of land in Queensland is used for agriculture and grazing with Queensland being Australia's largest beef-producing state or territory. The agriculture and food industries' Gross Value of Production is \$19.9 billion and the total supply chain employs 434,100 people, accounting for 18% of Queensland's employment.¹⁷ Queensland's most significant agricultural exports are beef, sugar, grains, horticultural products and seafood. Nationally the agricultural and food sector is worth \$60 billion per annum and the National Farmers' Federation has goals to increase this to \$100 billion.



Harvesting tractor hauling cane in North Queensland
Image courtesy of Wlimar Sugar Australia Limited

"Road reliability is of paramount importance to the agricultural industry... the ability to access markets when the price is right and the produce is ready is essential for financial success."¹⁸

Moving cattle in the north involves some of the longest land transport distances of any Australian commodity.¹⁹ The long distances raise costs (up to 40% of livestock market price is contributed by its transport)²⁰ and increase risks – road closures due to climatic conditions can isolate producers from markets for extended periods of time.

The importance of the transport network to the beef industry is also acknowledged by the Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), recognising the potential of improved profitability in the beef and cattle industry by allocating road funding "to better reflect where road use and road damage occur".²¹ Their report recommends the development of a user-pays model, supported by analysis of road use and maintenance costs.

The 2017 AgriFutures report "Research activities on rural roads" provides further guidance on improved analysis techniques for investment servicing the agricultural sector. It demonstrates that there are substantial benefits for agricultural producers from rural road upgrades which are not normally captured in benefit/cost analyses.

The 2017 CSIRO report "TraNSIT: Unlocking options for efficient logistics infrastructure in Australian agriculture", provides a powerful tool for justification of road investment which supports the agricultural industry. It uses vast amounts of data on actual commodity movements throughout all major sectors across Australia. It enables calculation of commodity-specific benefits arising from road improvements.

"Hancock Prospecting's agricultural division is a major investor in Queensland, particularly with properties across the southern area of the state.....Unsealed and poor quality roads and bridges increase our travel time, increase our maintenance costs and reduce our return on investment. Furthermore, severe weather events and their impact on the road freight network can cause major delays and costs that cannot be recovered. This influences our bottom line and ability to grow and employ more people in regional Queensland." Adam Giles, General Manager, External Relations Agriculture, Hancock Prospecting letter to the IQ-RAP Working Group



Stock crossing Carnarvon Highway near St George
Image courtesy of Balonne Shire Council

¹⁷ Department of Agriculture and Fisheries; Queensland Agriculture Snapshot 2018

¹⁸ Infrastructure Australia 2015

¹⁹ http://minister.infrastructure.gov.au/wt/releases/2015/September/wt286_2015.aspx

²⁰ <https://www.csiro.au/en/Research/LWF/Areas/Landscape-management/Livestock-logistics/TRANSIT>

²¹ Australian Government Department of Agriculture and Water Resources 2015



Mining dump truck being transported on low loader
Image courtesy of Quilpie Shire Council

2.6 Mining and energy sector

The minerals and energy sector, including direct and indirect benefits, was valued at \$55 billion in 2016/17, contributing 17% of GSP and employing 282,634 people, accounting for 12% of Queensland's employment.²² Mining companies critically rely on the road network for the delivery of over-sized equipment that can only travel by road and services that are delivered at mine sites by regional suppliers.

While the bulk movement of coal and minerals is primarily by rail, mining and port developments place local demands on road infrastructure to facilitate access to sites. Similarly, while export LNG is transported by pipeline, the development of wells and compressor stations requires widespread access to a quality road network. During the project development stage, the resource industry relies on heavy plant and equipment to be transported to the sites by road, usually by over-dimensional vehicles.

While the industry is currently facing soft commodity prices on global markets, the long-term fundamentals for Queensland resources are very positive. China has committed to doubling per capita income between 2010 and 2020. Much of that economic growth is fuelled by

Queensland resources. While the rate of growth for China has recently "slowed" to 6.7% in 2016, our neighbours in India and South East Asia are just stepping on the growth accelerator.

The International Energy Agency (IEA) states in its 2016 *World Energy Outlook* that global energy demand is set to grow by 37% by 2040 driven by the 1.3 billion people without current access to energy gaining access in this period. This supply will be divided into four almost equal parts: low carbon technologies (renewable energy and nuclear); oil; natural gas and coal.

- » Queensland is in a strong position to meet much of the demand for natural gas, thermal and metallurgical coal, as well as developing its own renewable energy sector.

The resources and energy sector will continue to be a major contributor to the Queensland economy well into the future. A productive and safe road network will be vital for this industry's growth.

²² Queensland Resources Council; Economic Contribution of the Minerals and Energy Sector to the Queensland Economy 2016/17



Tourists sightseeing at Town Common, North Queensland
Image courtesy of Townsville Enterprise

2.7 Tourism sector

The tourism industry contributes \$25 billion, equating to 7.8% of GSP and employs 138,000 people accounting for 5.8% of Queensland's employment. The sector contributes \$7.4 billion to export earnings and is the third largest export earner in Queensland after coal and food.²³

The Queensland Government's Advancing Tourism 2016-20 Strategy prioritises investment into infrastructure and access and recognises the importance of the drive tourism market. \$30 million under this strategy is committed to drive tourism support and road access to attractions.

"High quality, safe, efficient and sustainable road infrastructure is required to support tourism's on-going growth and the market competitiveness of Queensland as a destination. Investing in and appropriately prioritising the infrastructure upgrading needs of the inland Queensland road network is crucial for the development of tourism and regional economic development in Queensland."
Daniel Gschwind, Chief Executive, Queensland Tourism Industry Council

2.8 Local government

The vast majority of the inland Queensland road network is made up of State Controlled Roads (SCR) with only 7% (by length) being local government roads.

Local governments in rural areas have a low rate base with little scope for revenue raising through licensing and fines so are often reliant on grants from other levels of government to manage their road network. An upgrade in one local government area generally delivers limited benefits unless the neighbouring local government delivers improvements on its section of the link so the whole corridor is improved.

Structural change to how this nationally significant asset group (rural local roads) is planned, managed and funded²⁴ has been identified as a key reform. A MITEZ report suggests that

"With long lengths of deficient road, increasing community expectations and limited funds, it is imperative that identification, planning and prioritisation of road improvements are done in a fully cooperative manner involving government, industry and the community. This

²³ Tourism and Events Queensland; Queensland Tourism Economic Key Facts 4 April, 2018

²⁴ Australian Rural Road Group 2010

is even more critical in major transport corridors... to create... a transparent hierarchy of timely, efficient and sustainable plans and investments..."²⁵

A number of reports have identified the need for a strategic road network upgrade program. The Outback RRTG²⁶ identifies the need for a program of work on a priority road network and this road network would include links that are critical for tourism, livestock, mining and community access.

The North West Queensland RRTG highlights the importance of a funding boost to deliver such a program to "facilitate vital capital roadwork programs... to drive the economy of the region, stop migration out of communities... and respond to natural disasters".²⁷

A funded strategic road network upgrade program would be a key enabler in the retention of skilled regional road workforces by local governments to deliver road projects, efficiently respond to natural disasters and contribute socially and economically to these communities.²⁸ Many local government workforces deliver works on OSCR in addition to their own local government program and are available locally when required for emergency works.

A funded forward program provides the certainty for local governments to retain a critical skill set in regional Queensland. Such ongoing programs of work in rural areas by the local workforce can often provide a more cost-effective and higher quality outcome, compared to undertaking a more 'bulked up' program of works when large funding allocations are made to address natural disasters and contract resources are brought in from outside the local area. Retaining a level of local knowledge and experience is critical for cost-effective road maintenance and management of external resources when required.

An ongoing investment in upgrading the regional road network will improve the resilience of the road network against major climatic events and thus minimise the exposure of all levels of government (i.e. local, state and federal) to the cost of major adverse weather events.

Improving connectivity for local governments and their economies and communities is a key outcome of a funded strategic program, particularly equitable access to specialist health services, which are typically in the major population centres. For example, the sealing of the

remaining sections of the Hann Highway between The Lynd and Hughenden as part of an important north-south transcontinental route (i.e. the Cairns to Melbourne/Adelaide route)²⁹ would enable the full potential of this link to be realised.



Road works at Mt Larcom
Image courtesy of Gladstone Regional Council

2.9 Other government authorities

A range of government agencies have expressed an interest in the improvements to the inland Queensland network, including the following examples:

- » The Australian Government has a significant military presence in regional Queensland with Australia's largest army base in Townsville, Lavarack Barracks, and a navy presence in Cairns. Defence exercises are held across regional Queensland, requiring the movement of specialist vehicles and equipment.
- » Infrastructure Australia identifies the need to widen narrow seals, renew weak pavements, upgrade bridges, improve horizontal and vertical alignments, improve flood immunity, expand capacity in high traffic areas, and deliver other safety-related improvements. This program of work needs to be supported by a list of critical road projects.³⁰
- » The Northern Queensland RDA Alliance's 2014 Northern Queensland Strategy identifies the need to "Improve the NQ road system to reduce travel times, vehicle operating costs and wet weather susceptibility, improve safety and connectivity to support major new developments. In particular, extend the triple road train route from Clermont to Emerald and complete sealing the Aramac-Torrens Creek Road and the Hann Section of the Kennedy Developmental Road."³¹ The report strongly recommends the development of a

²⁵ Mount Isa to Townsville Economic Development Zone and AMSTEC Design 2010

²⁶ Outback Regional Roads and Transport Group 2010 and 2015

²⁷ North Western Queensland Regional Roads and Transport Group 2014

²⁸ Outback Regional Roads and Transport Group 2013, North West Queensland Regional Roads and Transport Group 2014

²⁹ Etheridge Shire Council, Flinders Shire Council and Cummings Economics 2008

³⁰ Infrastructure Australia, Price Waterhouse Coopers and GHD 2015

³¹ Northern Queensland Strategy (Northern Queensland RDA Alliance) Business Cases, Cummings Economics, 2014



Caravan tourist on Cloncurry River Bridge
Image courtesy of Cloncurry Shire Council

Queensland Western Roads Action Plan which became known as the Inland Queensland Roads Action Plan 2016.

- » The Austroads report "Reforming Remote and Regional Road Funding in Australia" provides guidance on improving the assessment of benefits from upgrades to rural roads, both for agricultural producers and the wider community (e.g. health and education).

Often the local government transport network provides a crucial role in connecting mining and agricultural areas to strategic state and national freight networks.³² Therefore it is critical to ensure that not only the main transport spines are developed, but also that the connecting links are of an adequate standard to provide access to the priority routes.

2.10 Conclusion

Recent research into funding and provision of roads in rural and remote areas indicates the following needs.

- » Targeted upgrading is required to reflect the highest priorities. The CSIRO TraNSIT tool quantifies total actual demand for transport of agricultural commodities and hence can calculate potential traffic demand which

would divert to particular routes, or transfer from other modes (e.g. rail) if roads were upgraded, as well as quantifying the benefits of upgrading in a benefit/cost analysis.

- » Improved methodologies are required for assessing the economic and social benefits which could be delivered to all industry sectors and the wider community (e.g. health and education) by road upgrades, and the inclusion of those benefits in benefit/cost analyses. Current methodologies favour metropolitan areas and do not adequately take into account economic and social factors that are relevant to regional areas, subsequently disadvantaging them in funding applications. The IQ-RAP Working Group has created a list of proposed research projects and submitted these to the Australian Government for consideration in addressing this issue.

³² TMR 2013

3. The case for investment west of the Bruce Highway

Queensland is a decentralised state and hence requires a well-developed transport network, including a hierarchy of roads that serve major centres and facilitate connectivity to remote areas.

3.1 Role and development of the Bruce Highway

The Bruce Highway is the arterial route connecting the coastal cities and towns of Queensland. It is located at the eastern margin of the state, and services a relatively narrow coastal strip, particularly in the north.

The Bruce Highway is subject to frequent wet weather disruption. It carries high volumes of truck traffic, which together with local traffic, seasonal tourist and local sugar cane traffic, is experiencing capacity and safety problems.

In 2011, the North Queensland Roads Alliance made up of northern Queensland Mayors and RACQ commissioned the AEC Group to assess the "Economic Impacts for North Queensland of Closures of the Bruce Highway".³³ Its findings were that a 24-hour loss of trade on the Bruce Highway resulted in negative economic impacts in both North Queensland and South East Queensland of:

- » Direct Impacts of \$3.3 million in Output; \$1.6 million in Gross Value Added; \$0.9 million in income and twenty-one Full-Time Equivalent employment (FTE) positions; and
- » Indirect Impacts of \$2.1 million in Output; \$0.9 million in Gross Value Added; \$0.5 million in Income and eight FTEs.

In the same report, there was a noted correlation between weather events and business confidence, seasonal spikes in unemployment and tourism visitation. There were noted to be extensive closures of the Bruce Highway due to flooding between 2010 and 2012.

Upgrading to address these issues is continuing, supported by the 2012 report 'Bruce Highway Action Plan – Out of the Crisis'.³⁴ The funding commitment is a welcome acknowledgement from the Queensland and Australian governments that catch-up investment is required to support the population and economy of northern Australia.

"While the 10 year upgrade program to the Bruce Highway will overcome current deficiencies, upgrades will not necessarily provide for a longer-term solution to cater for substantial (forecast) growth."³⁵



Cattle road trains exporting live cattle through Townsville Port
Image courtesy of Port of Townsville Limited

3.2 Complementary role of the inland network

The inland network offers a range of advantages and has an important role in complementing the Bruce Highway.

The eastern section of the IQRNS network provides a number of diversion routes to the Bruce Highway for when it is closed to traffic due to flooding or an incident. This provides for increased resilience in the network to enable the continued supply of goods to communities and decreasing potential economic impacts in times of natural disaster.

The inland road network also provides an alternative route to avoid and subsequently decrease congestion on the Bruce Highway as well as provide distance and time savings across a range of routes between regional centres, agricultural and mining centres and interstate cities such as Sydney and Melbourne.³⁶

³³ AEC Group/ North Queensland Roads Alliance, Economic Impacts for North Queensland of Closures of the Bruce Highway 2012

³⁴ TMR, Bruce Highway Action Plan – Out of the Crisis, 2012

³⁵ Queensland Transport and Logistics Council, A Focus on Freight on Queensland's Inland Highway, January 2015

³⁶ Queensland Transport and Logistics Council, 2015

A trip between Melbourne and Cairns on an inland route can save more than 500 km and more than four hours travel time compared to travel via the Bruce and Pacific Highways. From Melbourne to Mount Isa the inland route provides a saving up to 1,170 km and 15 hours travel time.³⁷

Travel from Melbourne to western and northern Queensland is most efficient via Cunnamulla; travel from Sydney is most efficient via St George. With 49% of Queensland's GSP generated outside Greater Brisbane,³⁸ inland routes would offer considerable economic benefit as well as safety and distance benefits during normal conditions, increasing in times of natural disaster.

Removing some of the freight flows from the Bruce Highway will also deliver substantial safety benefits for the remaining local and tourist traffic. Quality inland alternative routes may one day result in the Bruce Highway losing its moniker as Australia's most dangerous highway.



Blackwater Rolleston Road

Image courtesy of Central Highlands Regional Council

"Further analysis of the economic benefits of an established QIH (Queensland Inland Highway) indicates that the potential productivity benefits (travel time and vehicle operating cost savings) in shifting heavy vehicle traffic (from the Bruce Highway) to an inland highway would be approximately \$642 million over 30 years. Adding safety and environmental benefits, the total benefits over the 30 year period would be \$689 million." Queensland Transport and Logistics Council

3.3 Adequacy of the inland network

The inland network is largely in place. East-west arterial links feed into the port cities of Cairns, Townsville, Mackay, Rockhampton and Gladstone as well as to the Northern Territory and South Australia.

Similarly, the north-south links are in place connecting major inland centres to Brisbane and southern states. Together these form an effective grid with the east-west roads. The advantages identified from an appraisal by QTLC of the current roads considered in their report (and making up a component of the IQRNS network) include:

- » lower current freight volumes than the Bruce Highway, with lower traffic volumes;
- » existing levels of access for high productivity vehicles, with opportunities to increase current access levels;
- » higher levels of road safety performance;
- » superior flood resilience across the majority of the inland road network; and
- » time and distance advantages on a number of routes to Melbourne.

Although these advantages are recognised, the potential of the inland Queensland network is negatively impacted by the current standard of the network. A range of opportunities and issues in meeting the potential of the IQRNS network have been identified through review of recent relevant reports as summarised below.

- » Productivity in the livestock industry would be enhanced by the upgrading of critical links (i.e. sealing, improving flood immunity) to improve reliability for transporting animals from remote properties to ports and markets. This, in turn, will enhance Queensland's reputation on world markets.
- » Industry-specific upgrading of mine access roads would allow the use of the network by higher productivity road freight vehicles.³⁹
- » Local governments could liaise with tourism authorities to include low-cost improvements in road upgrading schemes to benefit the drive tourism market. These might include safety messages about driving among heavy vehicles and straying animals, as well as fatigue management through provision of rest areas and scenic stops.
- » Significant improvements to the safety of rural roads can be achieved through removal of isolated hazards. These include sharp curves, hidden dips (particularly those subject to water ponding), poor ride quality (especially at culverts in black soil country), straying stock, isolated narrow bridges, slow-moving heavy vehicles on steep grades, unsealed shoulders making emergency parking off the carriageway dangerous in wet weather, and poorly aligned intersections.
- » Safety on roads with high head-on crash rates can be improved at low cost through seal widening and

³⁷ Queensland Transport and Logistics Council; A Focus on Freight – Queensland's Inland Highway; January 2015

³⁸ .id consulting pty ltd, National Economic Indicators 2015/16

³⁹ Mount Isa to Townsville Economic Development Zone and AMSTEC Design 2010

the use of a wide centreline (Refer to 'Bruce Highway Action Plan' 2012). Recent ARRB research shows that "smoothing the rough surfaces that makeup about 30 percent of the Newell (Highway) could significantly reduce crashes... by as much as 43 percent".

- » Liaison with industry and the community can identify short sections of road for initial sealing to overcome dust (school bus routes and near houses), gravel loss, bogging (and formation loss and damage) and other environmental problems.
- » Upgrading of roads will normally be required to support new mining, agricultural and tourist developments, and will be project specific and may be funded from developer contributions.
- » Targeted pavement strengthening and formation raising on priority routes can minimise periods of reduced allowable axle loads and speed limits (in the wet season).
- » Defence bases in Townsville and Far North Queensland may require specific improvement of roads connecting through inland Queensland to Brisbane and interstate.
- » Short term or permanent changes to the mode of transport of bulk commodities (for example from rail to road on the Mount Isa-Townsville corridor following a change to transport contracts) may require appropriate protective measures (short-term) or upgrading (long-term).
- » The ongoing cost of maintaining the network is an issue, specifically for unsealed and narrow sections. Upgrading these roads to vision standards would deliver improvements to the resilience of the road asset and a decrease in frequency and cost of ongoing maintenance.

3.4 Management of the network

The Inland Queensland Roads Action Project funding partners are looking to "establish a platform for a coordinated stakeholder approach to advocacy efforts relating to funding of Queensland's Regional Roads."⁴⁰

As already highlighted, the complexities associated with the ongoing management of the inland Queensland road network are often associated with funding availability and competing priorities and needs across all levels of government and local government boundaries. The Australian Rural Road Group (ARRG)⁴¹ strongly urges genuine reform in the planning, management and

funding of the rural local road network across the three levels of government.

A vision and strategy for the inland Queensland road network that is agreed with stakeholders will assist with addressing stakeholder needs by providing:

- » a consistent voice to advocate for funding and the strategic benefits of link upgrades, based on a national approach to 'evaluation and assessment methodologies (which) better reflect the benefits of remote and regional transport projects',⁴²
- » a cross-boundary approach to prioritisation and program development on agreed strategic routes; and
- » a consistent approach to intervention standards and 'fit for purpose' vision standards, generating realistic programs and improving the overall performance of the network.

At a delivery level, the RRTGs have contributed to further cross-boundary management with the identification of LRRS and prioritisation of TMR's Transport Infrastructure Development investment for RRTG regions.

3.5 Total Asset Management

There is growing pressure to achieve better outcomes from infrastructure investment in a sustainable way.

A key component of managing investment across the IQRNS network is to adopt a Total Asset Management approach where road assets are built, operated and maintained taking into account, and where practicable, minimising whole of life costs. This is reflected in the aim of the Transport and Infrastructure Council's "National Remote and Regional Transport Strategy" which is to 'facilitate access to transport infrastructure in remote and regional areas that is fit-for-purpose (appropriate design and quality), suitable to local needs, appropriately funded (based on whole of life costs) and well maintained.'

This approach involves consideration of low-cost solutions before new capital works are adopted. These solutions include rehabilitation or overlaying of existing pavements and widening of existing formations. These aim to build in resilience to improve accessibility and reduce maintenance costs. A Program Management approach is integral to achieving this outcome.

⁴⁰ Queensland Western Roads (and subsequently IQ-RAP) Interim Working Group 2014

⁴¹ Australian Rural Road Group 2010

⁴² Transport and Infrastructure Council report: "National Remote and Regional Transport Strategy"

4. Identifying the infrastructure gap

4.1 Overview

This section identifies the network vision for the IQRNS and how that vision has influenced the process undertaken to:

- » determine appropriate intervention standards and vision standards;
- » undertake an initial gap analysis to identify links that require intervention;
- » identify the scope of works to meet vision standards; and
- » review the gap analysis using inputs from other programs, to refine the scope of works and costs.

This process is shown graphically in Figure 5.

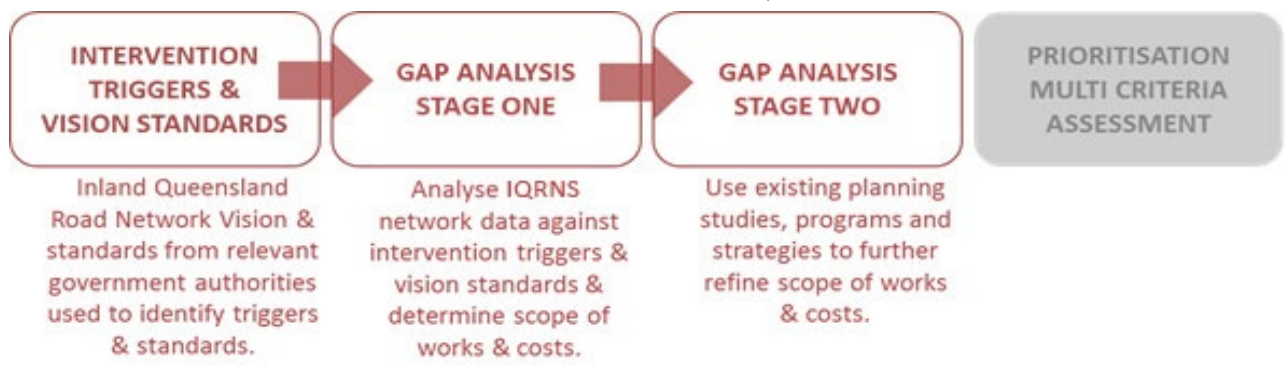


Figure 5 Process for identifying the infrastructure gap

Inland Queensland is faced with specific transport challenges due to its diverse resource, agricultural and tourism base, with a relatively small population separated by vast distances, increasing freight demand and the effect of climatic extremes.

Through continued long-term targeted investment, the vision for the IQRNS is to increase the standard and transport accessibility on this network to maximise economic prosperity of inland Queensland, thus contributing to Australia's productivity, quality of life, safety and equity.

This vision was based on the prioritisation criteria developed at the stakeholder meeting in Longreach in December 2013. Inland Queensland's regional, RRTGs, local governments, rural and remote RDA committees and other stakeholders workshopped and agreed to a set of criteria suited to inland Queensland needs. The criteria included economic value (improving productivity and supply chains), safety, strategic intent, access and social

value. They form the basis of the prioritisation process outlined in section 6.

4.2 Network objectives

The investment objectives of the IQRNS are broadly to:

- » reduce roughness to improve rideability and reduce travel times;
- » reduce the time of road closure due to flooding and rain events;
- » address safety outcomes including known 'blackspots';
- » sealing of unsealed roads and widening of narrow seals to suit the function and traffic volume on these roads;

- » provide bridge widths and structural strength suitable for high productivity vehicles; and
- » provide adequate rest stops for heavy vehicles and travellers, locals and tourists.

4.3 Intervention standards and vision standards

To assess the network and determine the scope of works required to achieve the network vision, a consistent suite of intervention standards was required.

An intervention standard is the condition a road must meet to be identified as not requiring works. For those requiring works, a standard to which intervention works should deliver was also identified. This is the vision standard.

The intervention and vision standards used in the initial gap analysis are outlined below. The standards adopted were selected to comply with relevant road authority guidelines, particularly the minimum standards for the



Boulia to Winton Road
Image courtesy of Boulia Shire Council

National Transport Commission's (NTC) Performance-Based Standards Scheme Network Classification Guidelines 2007 and TMR's Gap Analysis Guidelines V9 (2009).

Different standards were adopted across parts of the network to recognise that roads with higher strategic function – either through heavy vehicle volumes or general traffic volumes – require higher standards. For instance, the highest vision standards achieve a two-lane sealed carriageway capable of carrying FEV, while the lowest vision standards provide single lane seal and adequate gravel formation.

4.4 Width

4.4.1 National Network roads

Road width is critical to ensure a road can safely and efficiently carry the required volume and type of traffic. Adequate width provides the ability to pass safely without having to move to the left or leave the sealed bitumen surface.

The IQRNS gap analysis methodology identifies sections of the road network that mostly achieve the minimum width and prioritises available funds to widen the remaining sections to achieve a consistent standard throughout. By

doing this the IQRNS prioritisation methodology ensures that maximum benefit is achieved with available funds.

The National Highway Network has higher standards due to the strategic nature of these road links and the requirement to carry long-distance freight, and thus the width is not necessarily tied to traffic volumes.⁴³

Table 3 shows the intervention and vision seal widths adopted for the National Network, which are greater than for other links where the standards are based primarily on traffic volumes.

Table 3 Intervention and vision seal widths for priority National Network Routes

National Network	Intervention seal width (m)	target vision seal width (m) ¹
Warrego Hwy (Miles to Morven) Flinders Hwy (Townsville to Charters Towers)	9	10
Landsborough Hwy Barkly Hwy Flinders Hwy (Charters Towers to Cloncurry)	8	9

⁴³ Subject to meeting TMR's 'Guidelines for Road Design on Brownfield Sites' considering economic, environmental, traffic composition and safety parameters.

4.4.2 Other roads

Table 4 shows the intervention and vision seal width adopted for road links that are not part of the National Network.

Table 4 Intervention and seal widths for other routes

Annual average daily traffic (vehicles per day)	intervention seal width (m)	target vision seal width (m) ³⁹
> 2000	8	9
500 to 2000	8	8
150 to 500	7.0 seal on 8.0 formation	
< 150	4.0 seal on 7.0/8.0 formation	

4.5 Roughness

In addition to road width, the IQRNS gap analysis methodology also considered road roughness.

Pavement roughness is a measure of the 'bumpiness' of the road surface caused by irregularities in the pavement surface and is assessed through the NAASRA Roughness Meter (NRM). Road roughness data has been provided by TMR.

Roughness is important because it affects not only ride quality but also safety, travel times, fuel consumption and maintenance costs. For freight vehicles, roughness can also cause damage to the product being transported.

Very smooth new asphalt is typically scored in the range of 40-50; roads become rougher in the range of 50-110. 110 is the intervention level at which TMR considers reconstruction. Scores of over 150 indicate a quite rough ride in a car and a very rough ride in a truck.

Table 5 shows the range of roughness values used in the gap analysis.

Table 5 Adopted roughness triggers

Annual average daily traffic (vehicles per day)	Low (NRM)	High (NRM)
0 to 500	130	160
500 to 1000	110	130
1000 to 10000	95	110

While it is desirable to intervene at the lower roughness values it is generally not affordable to treat all sections

that do not meet these intervention standards, particularly where there are isolated sections of rough road.

An initial assessment has been undertaken using the low intervention roughness values. Where these intervention standards identified isolated sections of road, then the higher roughness trigger has been adopted for those sections. If there are long sections of road that do not exceed the intervention standard, then that level was retained.

Road widening and bridge upgrades, rather than road roughness improvements, have been found to be the major driver of cost in this gap analysis. Sections of road with narrow seal widths tend to allow higher levels of water ingress which lead to poor pavement roughness, and so narrow width and poor roughness are typically correlated. The IQRNS gap analysis has identified that only a small portion of the road network meet the roughness trigger without also meeting the width trigger.

4.6 Bridges

4.6.1 Bridge width

Bridge width is an important consideration because inadequate width can lower safety levels, increasing the risk of heavy braking, head-on collisions, confusion and driver over-reaction. Narrow bridges require drivers to adjust their speed and lateral position in a lane.

The gap analysis used geometric data provided by TMR for the nearly seven hundred bridges across the IQ-RAP network.

Table 6 shows the intervention and vision bridge widths with relation to traffic volumes based on TMR's Strategic Road Network Planning – Gap Analysis Guidelines (June 2009).

Where a bridge on a lower order road is to be replaced it has been assumed that it would be upgraded to a two-lane bridge with a minimum width of 8.0 m. The National Network has a vision width of 9.2 m for bridges.

Table 6 Bridge widths (intervention and vision)

Annual average daily traffic (vehicles per day)	intervention width (m)	vision width (m)
< 150	4.0	8.0
150 to 500	7.6	8.0
> 500	8.4	8.6

4.6.2 Bridge capacity

Bridge capacity refers to the load a bridge is designed to withstand over the life of the structure. Bridge design standards have been increased over time to reflect the longer and heavier truck and trailer combinations, such as FEV, now used. Use of FEV results in a more productive road transport industry.

TMR provided load rating data for the bridges within the IQRNS network for use in the gap analysis.

Any bridge on a link nominated as a priority freight route has been assumed to require upgrading within the 15 year vision period if it does not currently meet the SM1600 standard.

All timber bridges (i.e. pre-1954) or bridges with an HS2016 load rating (i.e. pre-1976 design) have also been assumed to require upgrading within the 15 year implementation timeframe.

Table 7 Bridge capacity

Design class	Date	Comment
SM1600	2004 +	Desirable standard on all freight routes
T44	1976 to 2004	Bridges not on freight routes assumed to be able to be strengthened rather than replaced
H20S16	1954 to 1976	All bridges with this loading will have exceeded a 50 year design life by the end of the 15 year IQ-RAP and should be replaced
Timber (Class A and Class B)	1922 to 1954	Timber bridges should be replaced as a priority

4.6.3 Time of closure

TMR has provided time of closure data for more than eight hundred rainfall events between 2012 and 2015.

Flooding causes closures through inundation, as well as through damage to roads and bridges including washaways, undermining, rutting and bogging. This data has been used in the prioritisation process to maximise access as well as deciding whether a bridge requires widening or replacement.

Where a link has significant closures around bridge crossings it has been assumed that a bridge will require upgrading and raising to provide improved flood immunity rather than simply widening the structure.

4.7 Gap analysis

4.7.1 Overview

The level of investment required to meet the network vision across the nearly 16,200 km of the IQRNS network has been determined using a two-stage gap analysis process:

- » Stage 1 - Identify the road sections and bridges that require works to meet the intervention standards. Where upgrading works are triggered it has been assumed they will be constructed to meet vision standard. Estimated costs of works to address the gap have been calculated using cost per kilometre rates associated with the classification of the road.
- » Stage 2 - Review prior planning and programs to identify other proposed works (e.g. overtaking lanes, bypasses, intersection upgrades, safety improvements etc.) and more accurate cost estimates based on more detailed investigations carried out by RRTGs or TMR.

4.7.2 Road hierarchy and costs

The gap analysis has been reported against the road hierarchy descriptions detailed in Table 8. These are based on TMR's Priority Road Network (PRN) map as shown in Figure 6.

The analysis used an average cost per kilometre across the network differentiated between the National Network (NN) and the Priority Road Network level 1 roads as they have different vision standards and hence different costs to upgrade. Costs used in the analysis are shown in Table 8 below. These have been indexed up at a rate of 5% p.a. since the first Inland Queensland Roads Action Plan was published in 2016 based on 2015 data.

Table 8 Road hierarchy description and upgrade costs

Road	Description	\$m/km
NN	National Network	1.74
PRN 1	Priority one roads (other than NN)	1.39
PRN 2	Priority two roads	1.16
PRN 3	Priority three roads	1.04
OSCR	Other state controlled roads	0.93
LRRS	Local Roads of Regional Significance	0.81

4.7.3 Stage 1 – Preliminary gap analysis

Road width and roughness

Table 9 shows the extent of road segments that meet the intervention standard for width and/or roughness based on the review of TMR's ARMIS data. For local government roads where data was not available seal status and width was estimated based on aerial imagery and Street View.

Table 9 Extent triggered by width and roughness on TMR network

PRN	length (km)	\$m/km	intervention (km)	% intervention	cost (\$m)
NN	2,399	1.74	145	6%	252
PRN 1	1,169	1.39	94	8%	130
PRN 2	1,866	1.16	254	14%	294
PRN 3	2,635	1.04	175	7%	182
OSCR	4,302	0.93	1,445	34%	1,339
LRRS	1,915	0.81	709	37%	575
All	14,287		2,822	20%	2,771

A higher proportion of the lower order roads meet the intervention standards (36% of OSCR and 40% of LRRS) compared to the higher order roads (6% of NN and 8% of PRN 1). To date, the priority for investment has been on the higher order roads, so it appears to be time for a broader network consideration.

Bridges

Table 10 shows the number of bridges that require treatment due to width or capacity issues, and the estimated cost to upgrade.

More than half of the bridges across the network have been identified as requiring upgrading during the 15 year vision period.

A rate of \$10,500/m² has been assumed for widening and \$8,100/m² for a new bridge construction where costs have not been calculated in other documents. These costs have been indexed at a rate of 5% p.a. from the costs used in the original IQ-RAP analysis and report. This upgrade cost does not include approach works which are hard to quantify at this level, and hence the costs in this report are likely to be underestimates.

Table 10: Bridges identified due to width and/or capacity on TMR network

PRN	total #	# require upgrading	% require upgrading	cost (\$m)
NN	145	42	29%	197
PRN 1	131	49	37%	106
PRN 2	122	77	63%	128
PRN 3	122	82	67%	347
OSCR	69	39	57%	126
LRRS	63	42	67%	251
All	652	331	51%	1,156

Where the vision width is more than 30% greater than the existing bridge width or the bridge experiences long times of closure due to flooding it has been assumed that the bridge will be replaced, otherwise, it has been assumed the bridge will be widened.

Where a bridge is replaced, an increase in bridge length of 30% has been allowed to improve flood immunity. A nominal allowance has also been included for works on the approach to the bridge.

Summary of stage 1 gap analysis

Table 11 summarises the costs to upgrade those roads and bridges which do not meet the intervention standards to achieve the vision standards using the gap analysis process and generalised unit rates for road widening and bridge widening and replacement.

Nearly 3,000 km of road and more than 300 bridges require improvement to achieve the network vision.

Table 11 Summary of road and bridge costs on TMR network identified by gap analysis

PRN	road (\$m)	bridge (\$m)	total cost (\$m)
NN	252	197	449
PRN 1	130	106	236
PRN 2	294	128	422
PRN 3	182	347	529
OSCR	1,339	126	1,465
LRRS	575	251	826
All	2,771	1,155	3,926

4.8 Refinement of gap analysis using available data

The costing in the initial gap analysis has been refined by reviewing available planning and program information such as TMR's QTRIP and planning reports supplied by councils and RRTGs.

A key input into the IQRNS process has been the recent strategic review of the principal inland freight route by TMR that identifies a suite of investments to improve the western Queensland road network to provide a robust freight network. This network covers approximately half of the IQRNS network and provides more rigorous investigation for these higher order links, including more detailed cost estimates of the works required to bring these up to the necessary standard to fulfil their freight role.

The review undertaken by TMR included requirements for specific bridges as well as identifying rehabilitation, realignments, intersections, culverts and bypasses – all of which are relevant to achieving the network vision.

Where available from any of these sources, more detailed costing data has been adopted in lieu of the generic rates assumed in the gap analysis.

Table 12 shows the refined cost to upgrade the network using such information. These updated values have been used in the prioritisation of the network upgrades.

Table 12 Cost to upgrade network including costs in existing plans and programs

PRN	road (\$m)	bridge (\$m)	other (\$m)	total cost (\$m)
NN	368	201	172	742
PRN 1	188	117	437	742
PRN 2	528	131	160	819
PRN 3	507	329	35	872
OSCR	1,283	126	28	1,437
LRRS	648	25	22	695
LG	\$748	\$20	\$18	786
All	4,269	950	873	6,092

The adoption of costings from other reports and programs increases the value of the required investment across the IQRNS network significantly. This indicates that the values assumed in the gap analysis are not conservative. A larger allocation of funds may be required to meet the desirable standards once more detailed planning investigations are undertaken on individual links.

While the gap analysis suggests that more than \$6 billion of investment is required over the next fifteen or so years to bring it up to appropriate standards, it would not be appropriate for the IQRNS to double up on funding flagged in the current TMR QTRIP.

Table 13 shows the level of funding currently flagged in the TMR QTRIP on for the various RRTGs across the national, state and local government roads.

Table 13 Planned investment on IQRNS links (2016-17 to 2019-20 and 2017-18 to 2020-21 QTRIPs).⁴⁴

RRTG	NN (\$m)	State (\$m)	LG (\$m)	TOTAL (\$m)
Bowen Basin/Gladstone		108.8	0.0	108.8
Far North		30.1	11.4	41.5
North Queensland	18.3	82.7	0.5	101.5
North West	60.0	65.8	9.7	135.5
Outback	38.6	25.5	5.3	69.4
South West	0.2	57.6	4.3	62.1
TOTAL	117.1	370.5	31.2	518.8

Table 14 shows the IQRNS upgrades excluding those identified in other programs such as QTRIP. Note that these costs are all in \$2018. No allowance for discounting of future costs has been made in these figures and all are indicative estimates subject to planning and design considerations.

Table 14 Cost to upgrade network once existing plans and programs are considered

RRTG	Strategic estimate \$m	Future investment \$m			
		1-4yrs	5-10yrs	11-15yrs	15+yrs
Bowen Basin	1,252	82	500	670	
Far North	862	46	254	374	188
Gladstone	61		17	44	
North Queensland	334	32	140	162	
East Zone sub-total	2,509	160	911	1,250	188
North West	1,008	93	369	423	123
Outback	797	69	281	404	43
South West	833	78	326	344	85
West Zone sub-total	2,638	240	976	1,171	251
Total Proposed Investment	5,147	400	1,887	2,421	439

⁴⁴ QTRIP identifies firm funding commitments for the first two years for Queensland Government funded projects, and for the first year for projects funded by the Australian Government. It identifies indicative funding for the remaining years of the four-year program.

5. Prioritising the response

5.1 Overview



The MCA analysis has been used to identify which road links will give the most benefit from investment based on economic value, access and social value, strategic intent, and safety.

These results have then been moderated to provide a program in three tranches reflecting broad categories of decreasing priority for implementation. This approach reflects the reality that the MCA analysis is not an exact science and cannot be taken as providing precise values of relative merit.

Factors which were taken into account in the moderation process include:

- » does the project complete a missing link which provides a consistent driving standard along a link, even though the project itself has a relatively low MCA score?
- » are there community expectations or planned developments not adequately reflected in the analysis which make it desirable to alter relative priorities?
- » is it critical to provide funding in the early years to address sustainability of regional communities, measured through unemployment statistics, and access to key services?

The gap analysis has identified a large investment required to address the gap between existing road conditions and what could be considered a relatively modest overall vision for the IQRNS.

At more than \$6.5 billion, the cost of this vision exceeds historical levels of funding but highlights the shortfall over the proposed 15+ year period, to bring the IQRNS network up to even a modest standard.

The standard process for prioritising potential investments is to identify and evaluate the benefits and costs of competing investments and compare summary measures of net benefits. For government, the measure can be more

complicated because these investments usually have multiple objectives.

This section discusses a MCA process that incorporates the desired objectives of IQRNS partners into an investment prioritisation framework that is transparent, rational, justifiable and evidence-based.

5.2 Values, goals, objectives, outcomes, impacts, evaluation criteria and measurements

The terms 'values, goals, objectives, outcomes, impacts, evaluation criteria and measurements' all refer to the means by which road investments are evaluated. We want to know how a road investment performs and how it delivers what is valued compared to the cost of that investment, and how that would compare to alternative investments.

The gap analysis has identified required investments that are typically formation widening, pavement rehabilitation, initial paving and sealing and/or sealed width improvements and bridge upgrades. These proposed works improve ride quality, safety and vehicle operating costs, and to a lesser degree travel time. Investments in bridge structures to improve safety also reduce average times of closure due to flooding and allow FEV access.

The gap analysis process does not specifically target blackspots but the identified road investments, in terms of formation widening/sealing and bridge structures, would deliver safety improvements. The MCA process considers links that have a poor safety history as well as links that have a low star rating as per AusRAP.

5.3 Multi-criteria assessment

The MCA is a quantitative tool that aids in shortlisting multiple investment options based on a consistent range of criteria. Use of a MCA with agreed criteria ensures that an equitable and merit-based outcome is achieved across the entire network.

A key objective of the IQRNS is to develop a methodology for prioritisation of road network investments for the western and eastern inland zones that focus on the five criteria identified at the Longreach forum. These are:

- » economic value (including improving productivity and supply chains);
- » safety;
- » strategic intent;
- » access; and
- » social value.

5.3.1 Economic value

The primary reason for road investments is to deliver tangible benefits – many of the desired outcomes are in the category of economic value.

The lack of historic investment to meet these criteria has restrained economic development opportunities in inland Queensland. This carefully planned investment could unlock the significant untapped potential for economic growth, as well as opportunities to address wider safety, social and environmental concerns.

For the economic criterion, the overall benefit from each dollar invested to bring the link up to vision standard is calculated. This allows investments to be ranked by the economic benefit derived compared to the costs.

5.3.2 Safety

The AusRAP measures the inherent safety of each road link. That is, the degree to which it includes built-in safety features that prevent crashes from occurring and reduce the severity of those crashes which do occur. Funding for safety upgrades (e.g. Blackspot) is often based on historical crash statistics and costs. Rather than waiting for crashes to occur, AusRAP is a leading indicator that identifies, through a star rating system, which links are likely to cause more crashes.

In addition to the AusRAP star rating, the crash rates and crash cost for each link of the IQRNS network have been considered in the MCA. Links with the highest crash costs score highest for the safety criterion and contribute to a higher ranking in the MCA.

5.3.3 Strategic intent

This criterion considers future catalytic economic and community development opportunities, such as investment attraction into new industries to support economic diversification and creation of jobs. To assess the contribution to strategic intent, the following were considered:

- » Road hierarchy classifications (i.e. National Highways, priority network 1 (PRN1), priority network 1 (PRN2), priority network 1 (PRN3), priority network 1 (OSCR), local roads of regional significance (LRRS) and local government roads (LG); and
- » TMR's strategic investment strategies and assessment of principal freight routes.

5.3.4 Access and social value

A number of the IQRNS stakeholders have questioned the difference between access and social value in the proposed criteria developed in Longreach and hence these have been rolled into one category, particularly given the lack of available data to assess specific improvement in this category.

As an indication of access/social value the MCA has used the time that each link has been closed due to wet weather events. Improvements in bridge structures and drainage, together with the sealing of roads to an 'all weather' standard, will help reduce these closure times in the future and improve access and community amenity.

The Inland Queensland Roads Action Project Working Group has made a submission to the Australian Government to do research to further develop data to support these criteria and the overall case for regional roads investment.

5.3.5 Data used to evaluate the proposed criteria

It is critical for multi-criteria assessment that data used in the evaluation is available for all links. Table 15 identifies the data available and its relevance in the assessment of links against the proposed criteria.

The measures of achievement are broadly consistent with the approach that might be taken if a rapid benefit-cost ratio (BCR) was applied to the road network. This recognises that the estimates of benefits and costs are at a very early stage of development, with limited planning and limited available data. It is acknowledged that there is some overlap between the criteria with some data used to inform measurement of multiple criteria.

Table 15 Available data for assessment against Longreach criteria

Measurement data	Economic Value	Safety	Strategic Intent	Access / Social Value
Traffic volume (PCU)	•	•		•
Growth rate (% p.a.)	•		•	•
Link length (km)	•	•		
Principal freight routes			•	
Road hierarchy			•	
Carriageway width	•	•		
Riding comfort (Roughness)	•	•		
Time of closure	•			•
Crash cost		•		
AusRAP star rating		•		
CSIRO TraNSIT	•		•	

5.4 MCA process

Table 16 shows the data used in the IQRNS MCA along with the weighting for each criterion in the original Inland Queensland Roads Action Plan versus this new strategy. A detailed explanation of the methodology employed for the MCA process is included in Appendix B. It includes the development of criteria, assessing available data against criteria, and testing various scenarios by varying criteria weightings.

Table 16 Data available for assessment against proposed criteria

Criteria	IQ-RAP	IQRNS	Comment
Road benefit	25%	20%	Based on the number of passenger car units (PCUs) using the road vs the cost of the proposed upgrade. PCUs is a function of traffic volume (AADT), % commercial vehicles and historical growth rate. This criterion will prioritise lower cost upgrades and completion of missing links where a road has a substantial amount of commercial and freight use.
Access	20%	7.5%	Based on flooding time of closure/equity. This criterion will prioritise works on links that have experienced significant closure times. (Note: It would be prudent to investigate the basis for these long closure times in the rationalisation of the program.)
Freight	20%	15%	This criterion prioritises works on designated freight routes.
TraNSIT volume	-	7.5%	This criterion is based on the projected number of trailers generated by agricultural demand from CSIRO modelling, in a scale of 1-3 for small to very heavy generated movements, thus supporting regional economic development.
TraNSIT project	-	5.0%	This criterion is based on whether deficiencies and upgrades proposed in IQRNS align with projects flagged by the CSIRO TraNSIT analysis.
Tourism	5%	-	Designated tourist route based on TMR's Tourist Route Map. This was removed in IQRNS as tourism is important to all regions and not just those on the designated routes.
Hierarchy	10%	10%	Based on TMR's network hierarchy. This criterion ensures that all gaps are filled on key network links.
Crash	10%	7.5%	Based on historical crash cost from TMR. This criterion ensures that investment is focussed on links that have a demonstrated crash history.



Road train on Coorabulka Road
Image courtesy of Boulia Shire Council

Criteria	IQ-RAP	IQRNS	Comment
AusRAP	-	7.5%	This criterion focuses investment on links that have a low AusRAP star rating to avoid future crashes.
Width	5%	10%	Based on the proportion of the road that is less than vision width.
Roughness	5%	10%	Based on TMR's ARMIS roughness data. Links with poor roughness are unsafe and have higher maintenance costs.
Total	100%	100%	

The MCA process used the gap analysis and the IQRNS evaluation criteria to prioritise the benefits derived from achieving the vision standard on each link, compared to the cost.

While the gap analysis identified costs to achieve the vision standard, the IQRNS evaluation criteria of economic value, safety, strategic intent, access and social value were used to calculate overall benefits from the investment. Those links scoring highest were evaluated as having the highest priority.

MCA results are presented graphically in Figure 7, which identifies the boundary between the eastern and western zone and shows the prioritisation of links. The MCA rated links into 3 categories:

- » MCA rating 1 – highest priority for delivery in 0 to 5 year timeframe
- » MCA rating 2 – priority for delivery in 6 to 10 year timeframe
- » MCA rating 3 – priority for delivery in 11 to 15 year timeframe

Figure 7 (overpage) demonstrates how the network would be progressively rolled out across the state and highlights the key east-west and north-south routes.

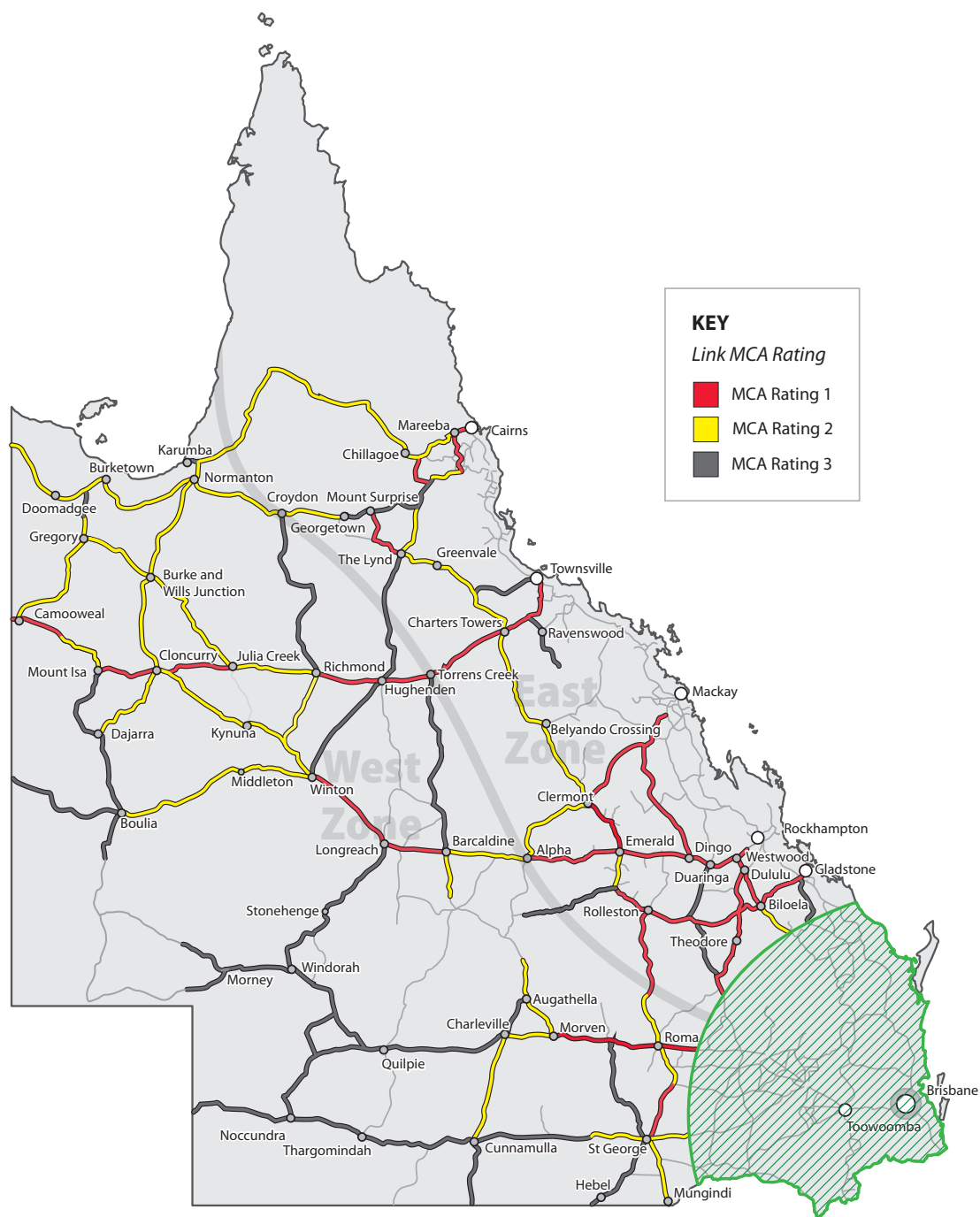


Figure 7 IQRNS Priorities based on the MCA process

The map indicates the strategic freight routes, as identified by partner councils, in the area west of the Bruce Highway as per the scope of the project and the prioritisation of investment into 4, 10 and 15+ year program horizons to reach vision standards based on multi-criteria assessment (MCA). MCA Ratings 1, 2 and 3 indicate meeting vision standards in 4, 10 and 15+ year horizons respectively. This means some projects should be commenced and completed in four years, while others are recommended to start in coming years but continue construction over several years to achieve vision standard over 10 - 15+ years, therefore making the best possible impact on local employment.

6. "The Network Strategy" – A program for investment

6.1 General

Numerous government programs are available for funding works and maintenance on respective road networks. These, sourced from respective government documents, are summarised as:

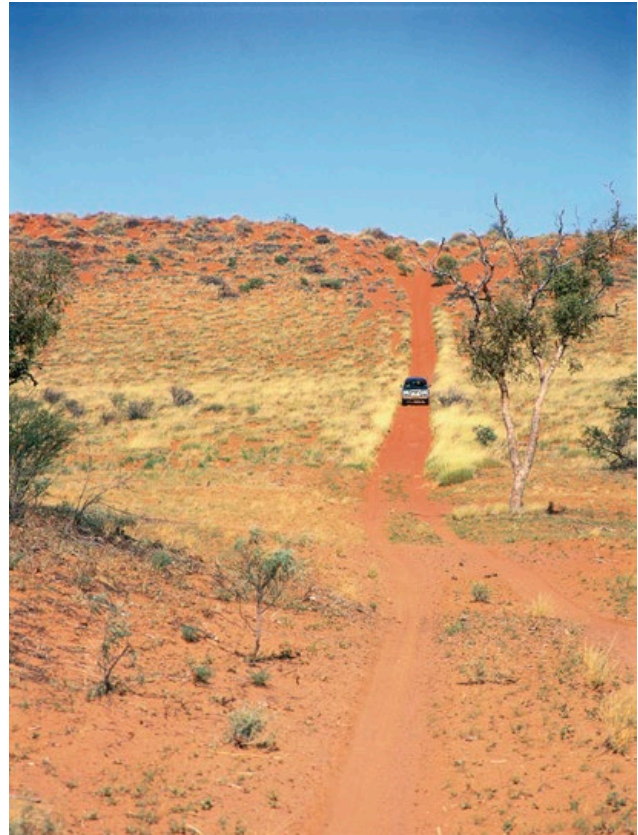
- » On the national land transport network (National Highway) – in partnership with the Australian Government;
- » On the state-controlled network – funding allocations made by the Queensland Government; and
- » RRTGs receive an annual allocation through the Transport Infrastructure Development Scheme (TIDS), to fund projects in accordance with regional priorities regardless of transport network ownership.

Funding is identified in the annual QTRIP developed in accordance with funding allocations identified by the Australian and Queensland governments in their annual budgets and both governments' policy objectives.

Both levels of government have developed guidelines for the planning and delivery of infrastructure projects to promote cross-government consistency and the use of best practice approaches.

Other available programs targeting specific transport objectives include:

- » Natural Disaster Relief and Recovery Arrangements (NDRRA), for infrastructure recovery after disaster events, usually 80% funded by the Australian Government and 20% Queensland Government/Local Government;
- » Australian Government's Northern Australia and Beef Roads Programmes, jointly funded 80% by the Australian Government and 20% by the state/ territory and/or local governments;
- » Australian Government's Black Spot Programme;
- » Queensland Government's Safer Roads Sooner Program;
- » Australian Government's Heavy Vehicle Safety and Productivity Programme, jointly funded by the Australian Government and local governments;
- » Australian Government's Bridges Renewal Programme, jointly funded by the Australian Government and local governments; and
- » Queensland Government's Transport and Tourism Connections Program (Round One).



Dirt road in outback Queensland
Image courtesy of Outback Queensland

6.2 Program development

The proposed program of investment has been developed using a staged approach and has considered:

- » scheduling investment to align with road priority;
- » sustainability of rural and remote communities;
- » maintaining workforce capability;
- » completing links to provide a consistent level of safety and accessibility; and
- » projects that can be delivered with an early timeframe.

At the time of writing, the remaining unknowns include:

- » the amount of available funding;
- » the extent to which the program will need to be tied into other investments (e.g. QTRIP); and
- » the distribution of funding across districts in the state.

QTRIP identifies firm funding commitments for the first two years for Queensland Government funded projects, and for the first year projects funded by the Australian Government. It identifies indicative funding for the remaining years of the four year program.

The intention is that once funding is confirmed, a more detailed program be developed for each link, with greater emphasis on developing a funding stream (e.g. planning, detailed design, construction over a period etc.) for each of the priority links. Further consideration will also need to be given to the availability of labour in the area and the preferred rate of delivery of the works to maximise value for money.

6.3 The proposed program of investment

The following table lists the current projects and the proposed works in the various RRTG areas, as a summary from the MCA process. Detailed programs for each RRTG can be found in Appendices.

Table 17 Summary of proposed IQRNS investment

RRTG	Strategic estimate ⁴⁵ \$m	Future investment \$m			
		1-4yrs	5-10yrs	11-15yrs	15+ yrs
North West	1008	93	369	423	123
Outback	797	69	281	404	43
South West	833	78	326	344	85
West Zone sub-total	2,638	240	976	1,171	251
Bowen Basin	1252	82	500	670	
Far North	862	46	254	374	188
Gladstone	61		17	44	
North Queensland	334	32	140	162	
East Zone sub-total	2,509	160	911	1,250	188
Total Proposed Investment	5,147	400	1,887	2,421	439

⁴⁵ Strategic estimate in \$2018, subject to planning and design considerations

7. Conclusion and Recommendations

The principal output of the IQRNS is the prioritised list of upgrades across the inland road network and for each of the RRTGs for the next 15+ years.

In addition, the Working Group's intention is that stakeholders will have "A high level of understanding of the current road infrastructure in the region, and a clear understanding of the future road transport priorities for inland Queensland".

It is hoped that TMR and other stakeholders will adopt the relevant components of the IQRNS in their work, to extend the collaborative spirit in which it has been developed. The Working Group members and other partners will continue with briefing sessions to explain the project to date and encourage further work to improve inland Queensland roads and the resulting economic impacts.

The project partners make the following specific recommendations:

- » the Australian Government reference this strategy and the significant work completed to inform the roll out of the 10 year Roads of Strategic Importance (ROSI) initiative as announced in the 2018 Budget;
- » the high priority projects in the strategy be considered in the next update of the QTRIP and other priorities continue to be rolled into future QTRIP programs and new funding opportunities;
- » the strategy be referenced as an input to future Regional Transport Plans (RTPs) and economic development planning processes across Queensland;
- » the strategy be referenced as an input to investment plans to implement the RTPs and provide longer term direction for future road investment and to bridge the gap between the four year QTRIP and the 15 year State Infrastructure Plan (SIP);
- » the local governments in this project work with the Department of Transport and Main Roads to ensure priorities are included in regional plans;
- » the Australian and Queensland governments consider the IQRNS as a new methodology for prioritising regional roads investment;
- » the Australian and Queensland governments consider undertaking research projects that develop an improved methodology for assessing the economic and social benefits of investment into strategic regional road networks, better suited than the current benefit-cost ratio model that is more relevant to urban projects; and
- » the Queensland Government considers making long-term funding programs for regional roads.



Truck Hauling cane

Image courtesy of Mareeba Shire Council

Abbreviations

AADT	Annual Average Daily Traffic	MITEZ	Mount Isa to Townsville Economic Development Zone Inc.
ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences	NAIF	Northern Australia Infrastructure Facility
ARMIS	A Road Management Inventory System	NN	National Network
ARRG	Australian Rural Roads Group	NRM	National Association of Australian State Road Authorities (NAASRA) Roughness Meter
AusRAP	Australian Road Assessment Program	NTC	National Transport Commission
BCR	Benefit-Cost Ratio	OSCR	Other State-Controlled Roads
BHAP	Bruce Highway Action Plan	PRN	Priority Road Network
BITRE	Bureau of Infrastructure, Transport and Regional Economics	QTLC	Queensland Transport and Logistics Council
DAF	Department of Agriculture and Fisheries	QTRIP	Queensland Transport and Road Investment Program
FEV	Freight Efficient Vehicles	RACQ	Royal Automobile Club of Queensland Limited
FTE	Full-Time Equivalent	RDA	Regional Development Australia
GRP	Gross Regional Product	RDA TNWQ	Regional Development Australia Townsville and North West Queensland
GSP	Gross State Product	RRTG	Regional Roads and Transport Group
HIG	Harrison Infrastructure Group	RTA	Roads and Transport Alliance
IEA	International Energy Agency	SCR	State-Controlled Roads
IQ-RAP	Inland Queensland – Roads Action Project	TMR	Department of Transport and Main Roads
IQRNS	Inland Queensland Road Network Strategy	TraNSIT	Transport Network Strategic Investment Tool
LGAQ	Local Government Association of Queensland		
LRRS	Local Roads of Regional Significance		
MCA	Multi-criteria assessment		

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Inland Queensland Roads Action Project

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