The North-West Freight Network

A local government-sponsored program to bring greater efficiency, productivity, sustainability and agricultural investment certainty to the north-west New South Wales road network

APRIL 2015


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Contents

Executive Summary

The **North-West Network ('the Network')** is a road investment and sustainability program designed for a 57,000 square kilometre agricultural powerhouse region of north-western New South Wales. It has two main features:

1. **Road productivity - a productive $160 million aspirational capital upgrade program to the region's core road freight network (BCR range 0.67 - 1.67 @7% discount rate, mean BCR 1.16)** to produce lower overall freight costs to cotton and grain growers, to increase the productivity of the Inland Rail project and to give land use investment certainty to local industry which relies on predictable and efficient transport planning.

2. **Roads sustainability - willingness to examine best practice global approaches to sustain the region's overall 12,000 kilometre local road network.** This includes considering commercial and partnered financing and operational approaches, provided they can demonstrate transparently better value for money to the community and industry.

The program has been developed collegiately by local governments working together to support more efficient and sustainable road and rail infrastructure in the interests of more productive regional communities. The authors are the five local governments that make up the region - Gwydir, Moree Plains, Gunnedah, Warrumbungle and Narrabri Shire Councils. These governments all face the same basic road challenges: they are each home to very productive agricultural economies and strong communities, but they are burdened by a costly and hard-to-sustain road asset base which will need to attract greater investment and be subject to better prioritisation if it is to continue to support local industry productivity, road-user safety and community connectedness. The network - over 12,000 kilometres of roads - has little opportunity to secure major new capital funds from governments in the prevailing fiscal climate. Yet at the same time, the public sector roads 'system' does not offer significant avenues for productivity-based funding allocations. This program has been designed to be submitted to Infrastructure Australia and in turn to the New South Wales government and Infrastructure NSW for formal recognition as a 'national infrastructure priority list' project, based on:

1. **National agricultural productivity:** The Network services one of Australia's most productive agricultural regions: the North-West produces over $2 billion in mostly grains, cotton and cattle annually: smart freight improvements can bring much greater efficiency to a nationally-significant task.

2. **Inland Rail:** The Network offers a direct and significant improvement to the productivity and supply chain alignment of the Inland Rail project - itself a project of national significance, which becomes more profitable in direct proportion to railhead road transport cost savings.

3. **Innovative market investment approach to financing roads:** The Network is open to a commercial road investment and operational model which has not yet been employed in Australia, but has proven productive for markets and communities alike in other places such as Europe and the USA.

4. **Economic Merit -** the economic analysis of the potential of these freight network upgrades suggests that the Network could deliver productive gains for the regional economy. The business case has limited itself to being justified by the efficiency gains from cotton and grain freight flows alone**.** Gains should therefore be considered conservative. Additional benefits that could be modelled include 1) gains to the Inland Rail project in terms of price at railhead differential; b) gains to adjoining local government area commodities; c) gains to wider regional commodities.

5. **Deliverable -** the Network is deliverable through potential commercial operational models, thanks to the preparatory work that this region completed for Infrastructure Australia in 2013 regarding baseline condition of network. Proposal is fully compliant with Infrastructure Australia's Bingara Accord on productive road investment agreed in 2014 (http://www. infrastructureaustralia.gov.au/publications/files/The_Bingara_Accord.pdf).

North-West Network major feature # 1 - NPV-positive capital upgrades to improve freight productivity and shape a better system

- A market and local government-identified high-productivity road freight network which actively complements mainline rail infrastructure rather than competes with it. It modelled the impact of placing very high productivity vehicles (up to 2AB Quad category)onto a core upgraded regional road network. The upgrades were provided by engineering divisions of the participating councils to reflect the cost of bringing roads up to safe access standards for higher productivity vehicles.
- A detailed economic analysis of the region was conducted; this suggested a targeted $160 million dollar capital upgrade to the core freight network to allow for very high productivity vehicle access and lower freight costs to the region's agricultural producers.
- The project has been assessed as having a mean benefit cost ratio 1.16 at a discount rate of 7% with modelling suggesting a high (80%) probability of a productive outcome)
- Full economic benefits of developing such a network are likely to be significantly higher over time, as the simulation only considered the business case for local grain and cotton production. Extension of the network will result in positive scale implications, with the potential to reduce the cost of freight significantly for the wider region (ie Dirranbandi, St George, Tamworth, Glen Innes, Inverell, Liverpool Plains, etc)

North West Network major feature # 2 - Considers best practice alternatives for sustainable road standards and costs

- Analysis of current average road operations, maintenance and renewal budgets suggest the region faces a real accumulated local roads operations and maintenance liability of approximately **$2.775** billion dollars within 30 years.

- The authors want to open debate about the sustainability of this model - what quality of roads it is capable of providing in the decades ahead and possible best practice alternatives for achieving efficiencies.

- In the United Kingdom, commercial road services upgrade and maintenance contracts (known as Design, Build Finance Maintain PPPs) have been found to be between 20 and 35 per cent more efficient than government models over 30-year concessions, because the market can provide the finance for significant up-front road upgrades to deliver a better network in the long term, managed and audited to contracted performance standards.

- A similar model applied to the North-West road network for the next three decades would on this basis yield efficiencies of **between $555 and $925 million dollars** by 2045.

Proponent strategic objectives

The authors share four broad objectives for their transport infrastructure, which have shaped this proposal:

- **Roads should deliver cheaper and safer road and rail freight** - this occurs through upgrading key networks for safe and sustainable access by the most productive road freight combinations, designed as a network so that road and rail complement each other, not compete with one another.
- **Roads must promote more reliable and efficient industry land use and development choices** by defining a clear high-productivity road and mainline rail freight network which gives investors long-term confidence when investing in facilities nearest to the lowest-cost freight solutions.
- **Roads need to find a more sustainable way to be maintained and financed** by working together as a region and being open to different approaches, including market-based approaches, if they provide transparently better community value for money and service levels.
- **Local governments should work together actively**, along with higher governments and markets to find solutions to achieve the greatest road infrastructure benefits. Realistic net freight savings to transport users should drive the decision making process.

Proponent enabling policies

The authors have developed and followed a clear 6-point strategy to achieve their broad goals:

- **Identify the core road freight network** of the region, which must include heavy road freight working in partnership with mainline rail freight, not in competition with it. Where possible the most efficient road freight flows are coordinated to major mainline railheads.

- Develop a productive business case for a **$160 million-dollar capital upgrade** to this core network to allow for higher productivity vehicle access (ie more, cheaper, safer freight) on these routes, which helps growers, wider industry and governments prioritise their future road infrastructure and land use choices for cheaper freight outcomes.

- Encourage communities outside the region to join the planning and investment effort to **spread the benefits** even further afield.

- Consider market investment models in the entire regional road network that could bring **multi-million dollar operating efficiencies and new capital upgrades** to the region's roads, as opposed to simply accepting the current unsustainable government-led funding model for the road network.

- Explain objectives and merits in **a single 'plain English plan'** (this document).

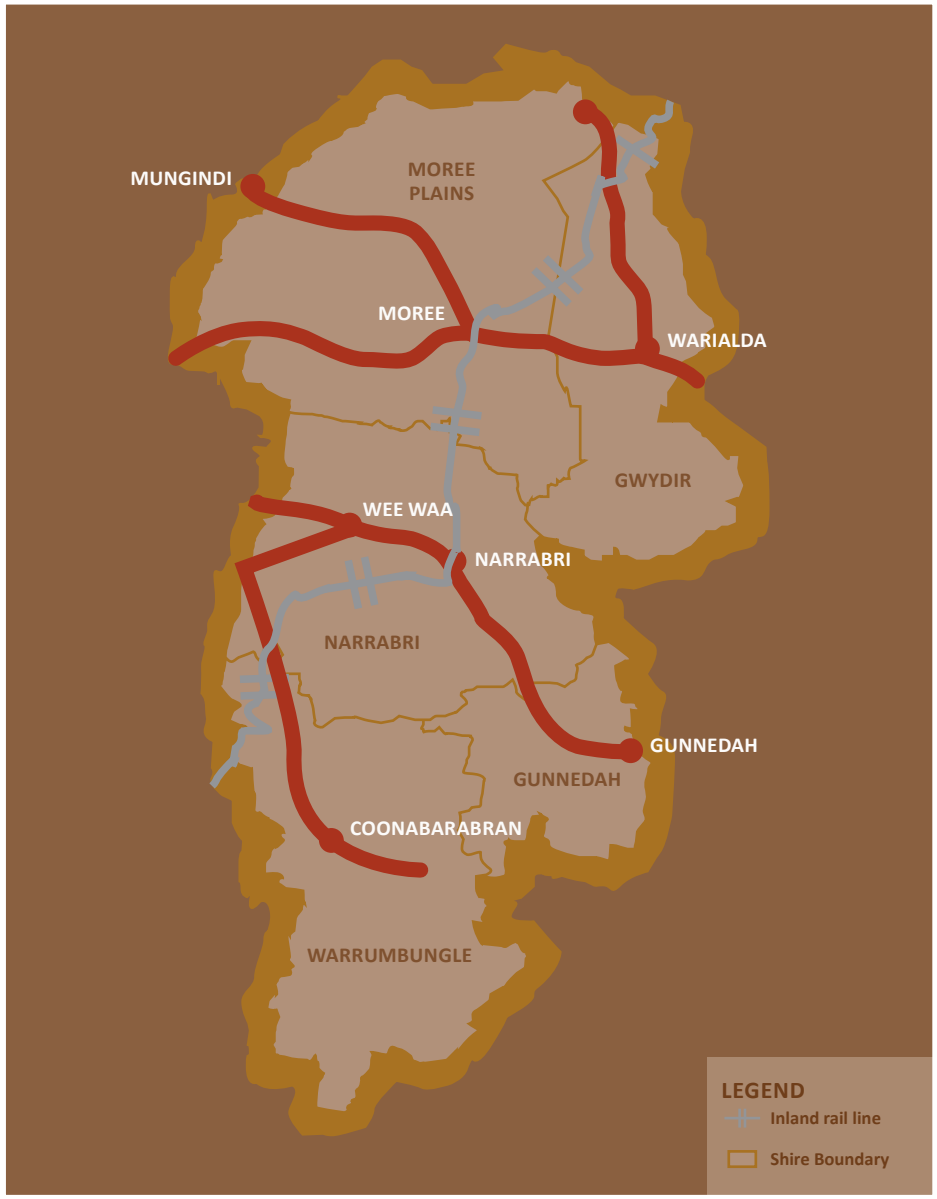
About the proponent

The North-West Freight Network has been authored by five local government areas (LGAs) - Gwydir, Moree Plains, Warrumbungle, Gunnedah and Narrabri - in the north west of New South Wales.

The region has a combined jurisdictional land area of 57,000 square kilometres - making it almost twice the size of Belgium, for comparative purposes. It is one of Australia's richest cropping zones, and of strategic agricultural importance to the nation for its sustained growing capacity, particularly in cotton and grains. It is home to around 50,000 people. The region's agricultural freight is generally between 4-500 kms distant from its seaports. As such, the efficiency of its road and freight task is of paramount importance to regional prosperity.

Table 1: Proponent region - leading Australian agricultural producer, catchment for the Inland Rail project

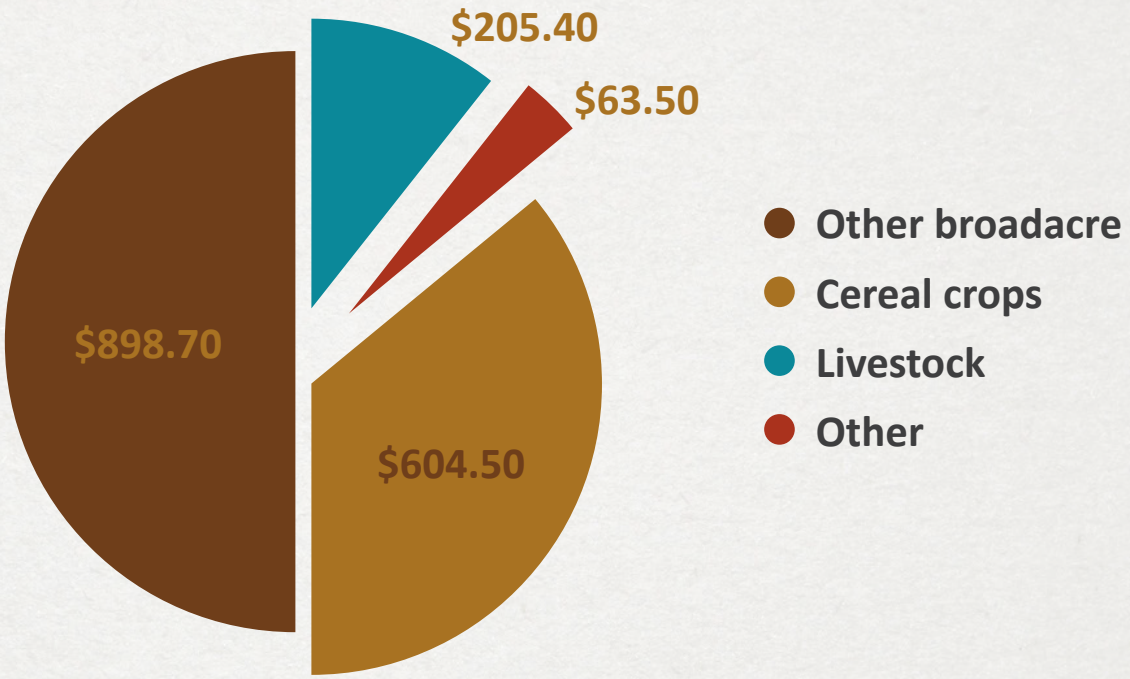
Table 2: The North West network - the region, showing key road and rail routes (proposed HPV arteries in red)



A nationally-significant agricultural economy

The region covered by the Network ranks as one of the richest agricultural zones in the nation. In 2011, the last available census year, it produced almost $1. 8 billion in agricultural production. Several of the participating shires rank as the most productive agricultural local government areas in Australia.

Table 3. Annual value of agricultural production for the North-West Network ($m)



Source: NSW Agriculture Census (2011), NSW Department of Trade and Investment gross value added figures.

When additional cotton and grain which flow into the network from west and north are accounted for, the total area of agricultural production reaches well over **$2 billion dollars** (ie inclusive of representative cotton and grain flows from Walgett and Balonne LGAs, 2011 Census data).

Trade-exposed regional economy drives the search for freight efficiencies

Its specialisation in agriculture means that the region's economy is highly trade-exposed. In turn, recent research has established that transport costs represent on average around 30 per cent of the total production cost of agricultural commodities such as grains (Australian Export Grains Industry Research Organisation (2014)). For these reasons, extracting more productivity from road and rail freight is considered a vital priority for North-West regional governments in support of their economy.

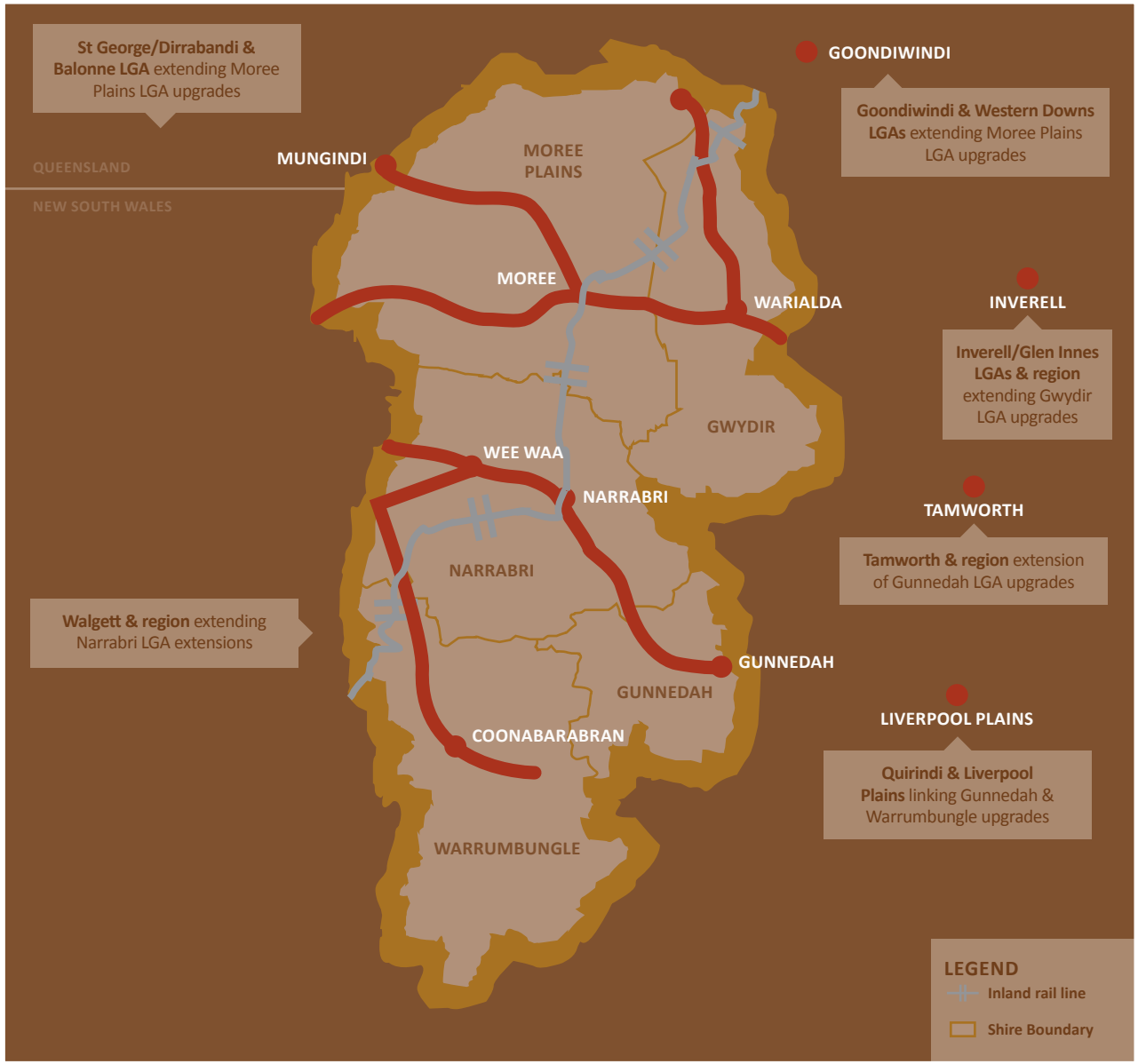
Regional transport infrastructure: at a glance

The region comprises approximately 12,000 kilometres of sealed, gravel and black soil local roads, as well as highways which are managed by local governments on behalf of the New South Wales State governments. The region also contains several rail branch lines, some of which remain in use for grain freight. This mainline network is proposed to be upgraded and added to so as to create a heavy mainline interstate freight railway between the ports of Brisbane and Melbourne, running west of Australia's Great Dividing Range. This is known as the 'Inland Rail' project.

Broader freight connections - a broader network of roads

The region and its freight arteries are also a strategic 'catchment' for a much wider agricultural region. The Network can therefore be added to at its extremities in order to extend benefits to wider rural communities.

Table 4: Likely Network extensions and economic beneficiaries beyond the 5 participating LGAs



North West roads: challenges and responses

1. Economy constrained by inconsistent road conditions and road freight access arrangements

Traditionally the region has suffered from poor and uncertain road infrastructure and a lack of coordinated, efficient rail expenditure. Much of the region lies on black soil, which is highly fertile for agriculture but can present challenges for road building. In many cases, rains can stop community and industry use of the network for weeks or in some cases even months at a time. An Infrastructure Australia study in 2013 (National Road Asset Reporting Pilot (2013)) revealed that this adds significant bank interest holding costs to affected growers who cannot move crops off farm after harvest and cannot bring some input freights onto farm.

The patchwork quality of road assets across the 5 local government areas and even variations within each local government area limits the size of truck-trailer combinations that can move freight across the entire network.

Because road freight responds to economies of scale, a 'patchwork network' of different levels of truck and trailer access destroys opportunities for general lower-cost freight prices, because at times the networks for the most productive vehicles are limited and do not reach key destinations, such as major mainline railheads. A recent Infrastructure Australia case study using the region's roads showed that moving to a higher productivity vehicle (from double road train to 2AB Quad trailer combination) would offer over 60% net freight savings to the customer, even after the cost of facilitating road upgrades was accounted for (National Road Asset Reporting Pilot (2013)).

2. Freight savings to growers on offer from higher productivity truck-trailers on improved road networks

Higher productivity vehicles, if provided with suitable networks, can dramatically reduce the cost of road freight to growers and in turn reduce the cost of road and railed freight combinations, by reducing freight costs at the railhead.

Table 5: Indicative commercial gains to the grower from combination upgrades include

Combination upgrade	Commercial freight savings to the customer per tonne moved
B-double to B-triple	22%
Double road train to 2AB Quad	40%

Source FREIGHTMETRICS statistical data combined with transport rate feedback from regional cotton and grain operators. Loading assumptions are detailed in the assumptions to the business case (see below)

The authors of the Network want to construct key freight arteries that can accommodate the largest, most productive road freight under safe and sustainable conditions for the roads and for other users - concentrating more freight in less places can make the overall network less costly to maintain.

3. Costly lack of coordination between regional road and rail plans

Historically, the region - although very productive agriculturally - has suffered from poorly-planned and funded road and branch rail networks.
To date, the two transport modes have largely been planned in isolation to one another, across many different local governments, and at state level, within different road and rail agencies, without a sense of a masterplan that delivers least-cost freight solutions. This echoes the time when both modes were controlled by government and rail freight was governed by strong protectionist policies. In more recent decades, the rail and road agencies still plan their networks largely in isolation - a point noted in the NSW Review of Grain Freight (2009). There remains no single government document which explains a strategy for regional and rural road freight planning and spending relative to regional branch line rail maintenance and upgrades. This is a source of deep inefficiency in how funds are spent on transport solutions for rural areas.

The first step to securing greater freight efficiency from road and rail is to design an overall system which sees both modes working to complement each other and deliver lowest-cost freight to growers. The authors of this Network set out to achieve this objective.

The Network high productivity road upgrades contained in this program are expressly designed to complement the ambitious rail infrastructure objectives for the region: upgrades have been chosen in part to 'channel' road freight to the Inland Rail Project - the heavy mainline railway which is to bisect the region. The Network is designed to improve rail efficiency directly by producing much lower-cost road freight delivered to the rail head in higher-productivity road freight vehicles. The Network upgrades have been planned to service these mainline railheads, rather than substitute for and compete with rail as a transport mode to the region's seaports - as has occurred. The road freight network design is intended to deliver best practice agricultural freight systems such as seen in North American road/short line railway/mainline freight railway combined freight solutions.

These outcomes are particularly important for the grain, cotton and cattle industries which are the heart of the regional economy: being highly-trade exposed goods they are extremely sensitive to price. Even marginal freight efficiencies can have significant gains to a $2 billion dollar annual agricultural freight task.

4. Spiralling road costs place pressure on better prioritisation of future road network investments

All of the participant local governments have very extensive road networks, many of which were laid down over 70 years ago. Road construction and maintenance costs are growing at a long-term annual rate that is almost double the consumer price index average (cf Reserve Bank Consumer Price Index measures and Bureau of Infrastructure, Transport and Regional Economics Road Construction and Maintenance Index). This means that the cost of roads is increasing in real terms every year, relative to the wider economy.

This suggests that in the longer-term, not all existing roads in the network will be capable of experiencing continued upgrades. For this reason there is a strong incentive to minimise the network for best vehicle/cheapest freight movements - that is, to attract more freight and lower cost freight to fewer roads. The authors are therefore intending to follow well-understood freight economics principles with their capital upgrade strategies, which sees most freight gravitate to the 'least-cost' network (that is, the places where the largest truck and trailers can operate).

The Network proposed in the capital upgrades in the accompanying business case is the beginning of the least cost freight network. It will bring incentives for the wider network to be planned and upgraded more efficiently and selectively over time. The economic analysis and business case for network upgrades takes this into account in its modelling (see below).

5. Fiscally unsustainable: new thinking is required about how roads are financed and operated

The authors appreciate that there is no point in elaborate plans without having secure and timely road finance. The Network requires a large amount of money, which is hard to find from the taxpayer in difficult fiscal circumstances. The authors also recognise that even this investment, while it is vital for freight productivity, does not solve the whole problem, as many council roads are reaching the end of their useful life and there are insufficient public funds to fully finance their replacement and renewal.

Over a series of years, the authors and local industry reliant on freight have pointed out the shortcomings of the current public funding and planning model for roads: it is not leading to optimal outcomes, eroding the productivity of local economies and compromising safety and connectedness (see Australian Rural Roads Group Going Nowhere Report 2011).

Clearly, current levels of funding are not resulting in significant network improvements: in 2010 Engineers Australia (Infrastructure Scorecard (2010)) rated the nation's 700,000 kilometres of local government roads as only 'D-Plus' standard, and warned that 'the gap is widening between the funds required to maintain and improve local roads, and what is actually being spent'; the local road spending shortfall has been independently estimated to total several billion dollars annually (Access Economics and Municipal Association of Victoria National Financial Sustainability Study of Local Government (2006); Australian Rural Roads Group (2011).) Public demand for a better roads system therefore appears well-founded.

More efficient market-based financing solutions appear worthy of consideration

In the financial sense, the local government road network itself represents an unsustainable asset under the current system, which relies on year-to-year government road grants and local government own-source revenue. The lack of certainty over stable amounts of funding over the life of these road assets comes at a price: it reduces the efficiency of economic infrastructure by between 10 and 20 per cent (UK National Audit Office Maintaining Strategic Infrastructure: Roads (2014)). In 2006 Australia's Productivity Commission (Inquiry into Road and Rail Freight Infrastructure Pricing 2006)) noted that this occurs because infrastructure budget managers are forced by lack of funding stream certainty to limit access to higher productivity vehicles or make short term asset operations, maintenance and capital renewal decisions, where access to up front finance would result in more efficient long-term decisions.

Previous inquiries into the sustainability of local government (NSW Local Government Financial Sustainability Inquiry (2005)) have made the point that rural local governments find it difficult to generate enough own-source revenue to maintain effective road networks.

What is the size of the regional road funding challenge?

In overall terms the funding challenge facing the North-West Network is very significant. When typical long-run Australian road construction and maintenance annual growth rates of 5% are taken into account, the region's local road network faces a real accumulated maintenance cost of almost **$2.775 billion** over the coming three decades.

Table 6: Local road lengths indicative annual maintenance and renewal budgets - long term (real) cost estimate

Shire	Local road length kms*	Est annual road maintenance and renewal expenditure($m)*	Est 30-year accumulated maintenance and renewal expenditure @5% annual road construct/maintenance growth ($m)
Moree Plains	2,893	8. 6	297
Narrabri	2,307	5. 1	176.42
Gwydir	2500	9. 1	314.8
Gunnedah	1,400	11. 4	394.36
Warrumbungle	2,988	5. 7	197.18
TOTAL	**12,088**	**39. 9**	**$2,775.24**

*Includes State-owned roads which are maintained by the LGA but not State Highways

Part of the motivation of the authors is, as has already been discussed, the poor outcomes of the current road planning and funding system, which is not coordinated, does not tackle the underlying maintenance liability for the existing network and which does not provide sufficient allocations to deliver real productivity and safety dividends to the community.

This is a challenge for all roads, but particularly for the 12,000 kilometres of local roads inside the Network. As the following table of per kilometre road budgets reveals, local roads receive far less funding than state roads:

Table 7: Gwydir Shire Stock of Roads and Road Budgets by Type of Road 2013-14

	Kilometres	Budget Per Kilometre
Total State Roads(1)	147	$19,190.00
Total Regional Roads (2)	261	$6,691.00
Total Shire Roads (3)	1,763	$2,632.00

Notes

(1) Denotes State highways which are the sole funding responsibility of state government
(2) Denotes highways and other roads where the LGA shares funding responsibility with State
(3) Denotes all other roads which are sole funding responsibility of the LGA

State-owned highways are indeed more heavily engineered and may require more intensive maintenance given heavier traffic levels. However, it is also accurate that LGA construction and maintenance costs are generally significantly lower than State road building contracts.

6. Learning from innovative best practice elsewhere

This reality has driven innovation in this project. In observed best practice in Europe and the United States, specialist road engineering and operations companies can Design, Build, Finance, Operate (DBFO) road networks for greater value for money and certainty than by state and local road agencies. Typically, these projects are based on' availability payments' where the road services company's revenues are linked to service level and infrastructure availability to the community. This ensures that reliable service levels are on offer; it can also involve 'up front' capital upgrades to the network which are unlikely ever to occur under a government provider model given the scarcity of taxpayer funds.

The authors are open-minded about considering sustainable commercial investment interest for such upgrades or for other innovative approaches by the market, provided that this can satisfy tests of transparency and community value for money

Increasingly in the United Kingdom, for example, commercial investors are taking 30-year concessions to upgrade and maintain entire city road networks on behalf of local governments, in return for regular payments from the government. These programs in cities such as Sheffield and Birmingham (the 'Streets Ahead program) have:

- reduced the cost of road provision to the taxpayer/ratepayer by between 20-35%, because a long term investor can make more efficient road maintenance choices over longer periods (eg 30 years) than governments can provide budget certainty
- put in place verifiable standards and performance levels which the commercial road services manager is then held to in order to secure ongoing payments from government.
- Allowed for a significant front-loaded expenditure on the road network at the beginning of the contract, in order to bring the roads up to the desired new standard for ongoing maintenance (ie in many cases it is cheaper in the long run to upgrade roads up front to reduce overall maintenance costs in the long run. Governments - especially rural local governments - rarely have the spare capital available to commit to these efficiency strategies, so that roads remain of a lower standard with a higher maintenance liability in the long term.

7. A commitment to locally-led, demand-driven action, based on acknowledged best practice asset management

The reform challenges outlined above have as yet not been met. For this reason the local governments and industry of the North West Freight Network have collaborated to develop a reformed approach themselves - one that is consistent with the latest understandings about best practice in road planning and investment.

The authors are ideally placed to pursue such innovation, as these local governments were the first in Australia to establish and publish consistent road asset condition reports for their entire networks, reported to consistent international standards, for Infrastructure Australia in 2013, as part of that organisation's National Road Asset Reporting Pilot. The region therefore has a strong, recent and detailed appreciation of its asset base and can move quickly with the New South Wales government and potential commercial investors to establish commercial standards and service levels, to gauge genuine market interest in such a solution and the efficiencies that it might offer.

North-West Freight Network Capital Upgrades Business Case (Servicing Regional Cotton and Grains Sector)

To deliver lower freight prices and a more sustainable and productive road and rail network into the future, the 5 participating local governments worked with the agriculture and road freight sectors to prioritise a $160 million suite of capital upgrades to the network to allow for longer, more productive truck/trailer combinations to access these key networks and service the main railheads - bringing cheaper freight to regional growers. This included development of a detailed economic input output model of the 57,000 square kilometre regional agricultural economy, to ensure that the business case would take into account the variability of seasonal production levels and profitability variations.

Table 8:Capital upgrade modelling input assumptions, distribution information for treatment of variables and bases for discrete assumptions

Modelling input assumption	Discrete distribution?	Explanation/basis for assumption
Grains and cotton production in each region	**Yes**	**Basis:** 2011 census year, official statistics. Production varies by crop, by year. Distributions to reflect this were based on DPI data for the Northern shires and Cotton Australia data for the Australian crop. Some proportion of annual grain and cotton commodity flows from outside the network was also included for simulation purposes. This extended only to Walgett LGA (NSW) and Balonne LGA (QLD), as these regions can at least nominally already cater for the higher productivity vehicles being proposed for the Network due to the lower traffic densities in these regions and the implications for lower engineering construction requirements for very high productivity vehicle access in such places. The amount of commodity assumed to flow into the network is based on feedback to the project on historical flows of commodities from these regions. In contrast, no production flows were assumed for outlying local governments where capital works were deemed required to facilitate higher productivity vehicle access to the Network (ie Tamworth, Inverell, Glen Innes, Liverpool Plains region, etc)
Capital upgrade construction works costings and discrete project identification	**Yes**	$160 million of capital upgrades to core network, plus or minus 15%. These figures were built by the engineering and technical services offices of each participating council. Full business cases for each of these projects are at Attachment A.
Gross truck productivity gains from capital upgrades to the Network:	**No**	Allowed for higher productivity 2AB quad vehicle class access, giving the following tonnage gains per full load in comparison to a Type 1 Double Road Train: a) **grains, cotton seed, oilseeds** 50 tonnes to 98 tonnes; b) **raw cotton** 12 modules to 21 modules; d) **ginned cotton** 58 tonnes to 116 tonnes.
Road freight rates for the Network:	**No**	Double road train $3.99/km (raw cotton, ginned cotton),$4.20/km grains etc. b) 2AB Quad $5.59/km (raw cotton, ginned cotton),c. $5.89/km grains etc **Basis:** Developed using FREIGHTMETRICS truck-trailer cost calculator and local operator advice

Commodity production levels endogenous/ exogenous to Network and levels of grower access to proposed higher productivity Network	**No**	**Basis:** 2 strategies were used to estimate regional commodity production levels which transited within and outside the network and grower access levels to the network: firstly, **grower surveys** were conducted across the network, distributed by local government officers utilising their own grower database, to establish where cotton and grain production moved and most importantly, how much of production was likely to remain within the network. The survey form included a map of the Network. Surveys sought grower advice on how much of their annual production stayed within the network and how much moved outside the network. Approximately 30 surveys were received from local growers to inform this analysis. Second, the region's engineering and technical services personnel worked with the consultancy to examine the location of actual farms relative to the core network to be upgraded for higher productivity vehicles. Informed estimates were then arrived at. Across the 5 local government areas, a representative average calculation as follows was applied: first year of Network upgrades - assume 55% of commodities have access; up to 5 years after Network upgrades - assume 65% access, based on local government and individual growers prioritising road works to access the core network; after 5 years - assume 80% access, based on local government and individual growers further prioritising road works to access network.
Proportion of existing grain and cotton task on Type 1 road trains	**No**	Based on distribution of vehicle classes used for the grain task available from chain of responsibility site records for Moree 2014 (supplied by Moree Plains Shire Council)
Average commodity distances travelled within network (including to railheads):	**No**	Based on local industry advice on the average length of journeys within the network and on a known core network of 1296 kilometres, being all state and regional highways intersecting the region and accessing major railheads.
Maintenance saving on wider Network due to upgrades.	**Yes**	$3.8 million plus or minus 15%, based on local government technical services expert advice of a likely 10% overall efficiency dividend in maintenance and operating costs to the wider network. This is anticipated from a redistribution of freight flows to the core freight arteries by upgrading the latter for much higher productivity vehicles and diverting tonnages away from the wider network due to lower freight prices achieved on the core Network.

Cost of upgrade to higher productivity network truck trailer combinations (2AB Quad):	**Yes**	Calculated cost plus or minus 15%;
Productivity improvement due to 2AB Quad adjusted for potential differences in vehicle weight: (grains & cotton seed)	**Yes**	**Basis:** plausible commercial truck costs were developed using the recognised FREIGHT METRICS heavy vehicle freight cost and road impact calculator, augmented with more detailed regional information from local cotton and grain freight carriers where relevant; added to this were known vehicle carrying capacities, loading configurations for different commodities and legal weight combinations for same in NSW
Productivity improvement due to 2AB Quad: (raw cotton).	**Yes**	**Basis:** plausible commercial truck costs were developed using the recognised FREIGHT METRICS heavy vehicle freight cost and road impact calculator, augmented with more detailed regional information from local cotton and grain freight carriers where relevant. Local cotton carrier information advising 6 bales per 40-foot deck. Lower bound minus 1 bale to reflect different loading patterns. Plus 10% upper bound to reflect different bale weights.

Simulation methodology

A simulation was undertaken consisting of 100,000 runs of the input output model of this region, which had been specifically constructed for this exercise.

Disclaimer

The results are provided under the usual conditions: that is, while all due care has been taken in the preparation of the spreadsheet used to generate the results, it is based on many assumptions regarding key parameters for which there is limited information. Consequently, no guarantee can be provided regarding the accuracy of the results obtained through the use of the spreadsheet. Accordingly in no event shall any parties be liable for any loss of profit, data or time or any commercial damage, including but not limited to, special, incidental, direct or indirect, consequential or other damages associated with the use of the results generated by the model.

As with any simulation, further discrete distributions for some items will build confidence levels in the analysis produced. Distributions could be extended to examining a lower level of high productivity vehicles accessing the eastern side of the network, for example.

Simulation results

The simulation results generated imply a mean for the project of approximately $22 million using a 7 per cent real discount rate. There is approximately an 80 per cent probability the project would have a positive NPV at a 7 % real discount rate (see graph below & attached spreadsheet).

Table 9: Benefit Cost Ratio of Network HPV freight upgrades to provide cheaper freight to regional cotton and grains sector, mainline rail

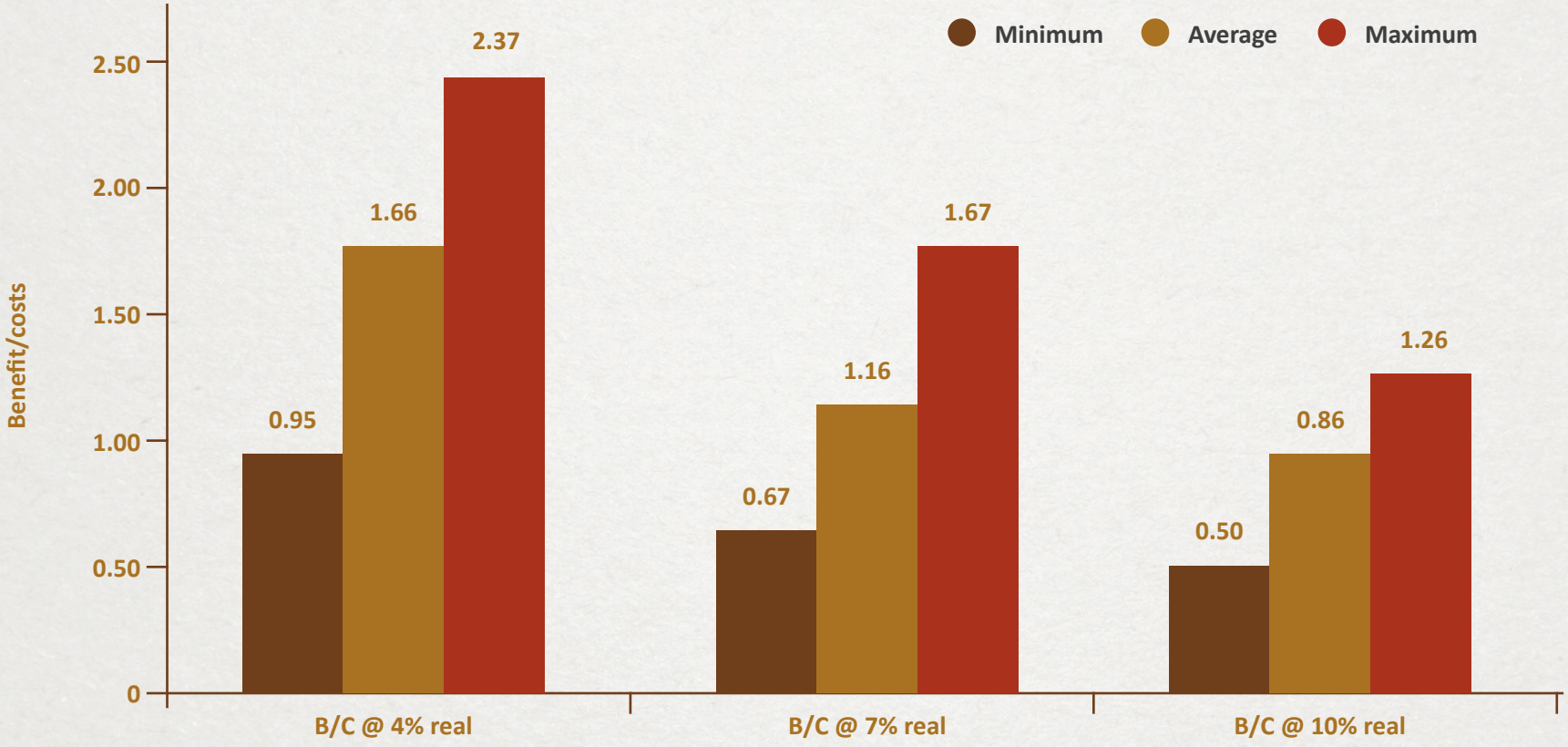
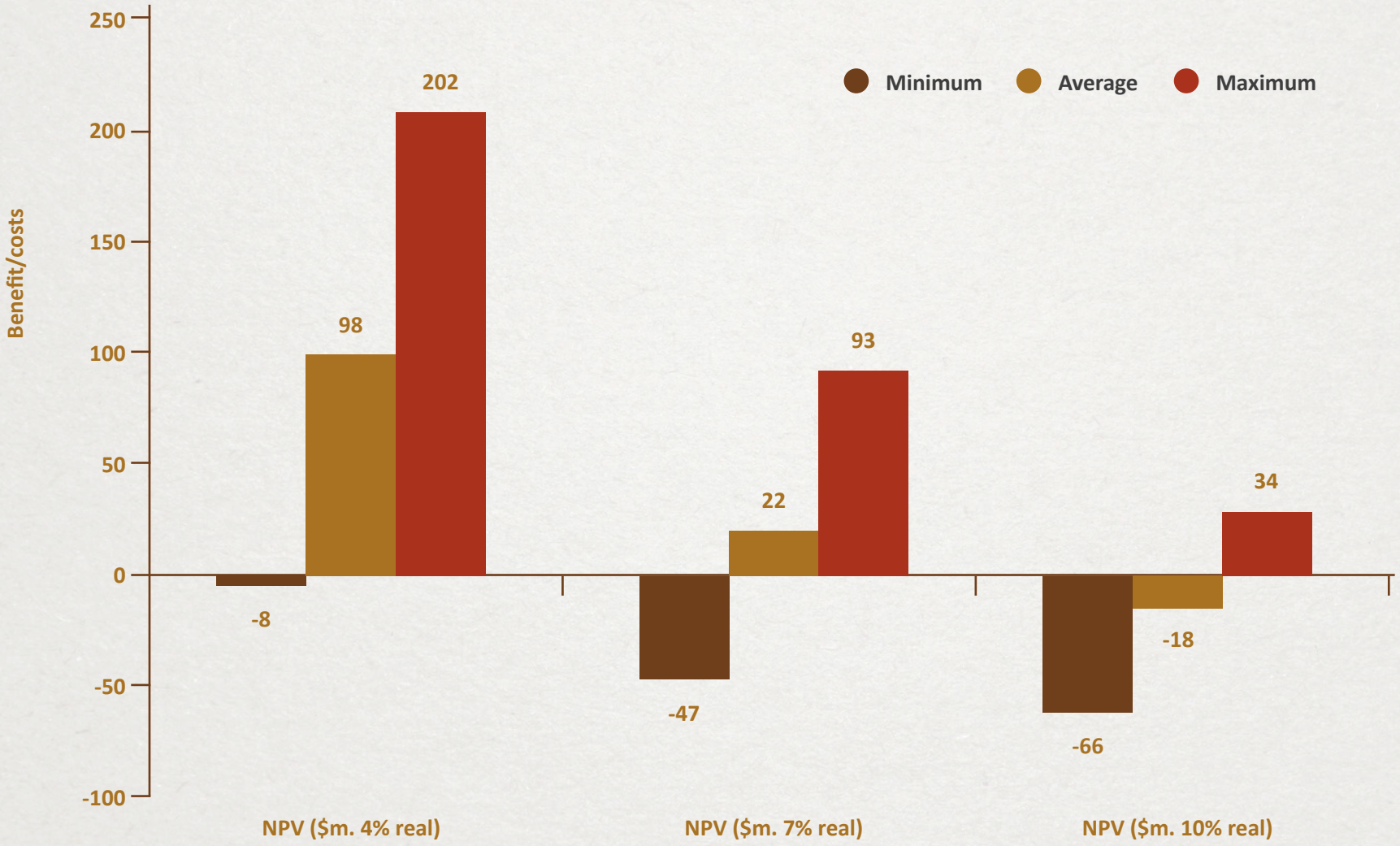


Table 10: Net Present Value of Network HPV freight upgrades to provide cheaper freight to regional cotton and grains sector, mainline rail



Detailed capital upgrade program: engineering and technical services business cases

The current submission commissioned economic analysis of the viability of $160 million in higher productivity freight upgrades to the most important agricultural road freight networks for region.

The $160 million figure was arrived at from prioritising a longer list of freight priority upgrades for the Network, totalling $275 million.

The following table summarises 23 discrete shire, regional and state highway road upgrades that together create this longer list of seamless high productivity road freight network servicing the Inland Rail mainline in the region. Priority projects for the $160 million initial business case are highlighted. The balance of projects will form a prioritised program to support the core network and link more growers to lower cost freight, over time.

Table 11: List of Priority and Wider High Productivity Planned Upgrades to provide cheaper freight to cotton and grain growers, rail

Shire /Discrete Projects	Cost ($m)	Kilometres (total route length, not upgrade works length)
Warrumbungle Shire		
1. Premer to Coonabarabran (Priority)	9.350	70
2. Coonabarabran to Bugaldie (Priority)	7.800	35
3. Bugaldie to Baradine (Priority)	0.900	15
4. Baradine to Gwabegar (Priority)	3.000	25
Gunnedah Shire		
1. Grain Valley Road (Priority)	7.760	38
2. Clifton Road (Priority)	8.670	25
3. Bloomfield Street (Priority)	5.890	3
Moree Plains Shire		
1. Boonangar Road	7.091	55
2. Carnarvon Highway (Priority)	13.000	120
3. Carrigan Road	37.986	160
4. Croppa-Moree Road (Priority)	3.600	28

5. Morialta Road (Priority)	15.414	54
6. Tapscotts Road	1.200	2
7. Gwydir Highway (Priority)	4.400	160
Narrabri Shire		
1. Pilliga Road (Priority)	26.100	59
2. Cypress Way (Priority)	16.200	33
3. Millie Road	10.4	77
4. Spring Plains Road	4.500	54
5. Harparary Road	10.000	30
Gwydir Shire		
1. Getta Getta Road- Newell Hwy (Priority)	17.838	48
2. Yallaroi-Croppa-Moree Road (Priority)	18.684	59
3. Boggabilla-North Star-Gwydir Hwy	26.725	82
4. Oregon-Gil Gil -Terling Park Road	19.044	64
PRIORITY TOTAL (WIDER PROGRAM TOTAL)	**158.6067 (275.552)**	**1,296**

A nationally-significant program on several counts

1. **National agricultural productivity:** The Network services one of Australia's most productive agricultural regions: the North-West produces over $2 billion in mostly grains, cotton and cattle annually: smart freight improvements can bring much greater efficiency to a nationally-significant task.

2. **Inland Rail:** The Network offers a direct and significant improvement to the productivity and supply chain alignment of the Inland Rail project - itself a project of national significance, which becomes more profitable in direct proportion to railhead road transport cost savings.

3. **Innovative market investment approach to financing roads:** The Network is open to a commercial road investment and operational model which has not yet been employed in Australia, but has proven productive for markets and communities alike in other places such as Europe and the USA.

4. **Economic Merit -** the economic analysis of the potential of these freight network upgrades suggests that the Network could deliver productive gains for the regional economy. The business case has limited itself to being justified by the efficiency gains from cotton and grain freight flows alone**.** Gains should therefore be considered conservative. Additional benefits that could be modelled include 1) gains to the Inland Rail project in terms of price at railhead differential; b) gains to adjoining local government area commodities; c) gains to wider regional commodities.

5. **Deliverable -** the Network is deliverable through potential commercial operational models, thanks to the preparatory work that this region completed for Infrastructure Australia in 2013 regarding baseline condition of network. Proposal is fully compliant with Infrastructure Australia's Bingara Accord on productive road investment agreed in 2014 (http://www. infrastructureaustralia. gov. au/ publications/files/The_Bingara_Accord. pdf).

Alignment with Infrastructure Australia Strategic Priorities and claims to Priority Project Status

Infrastructure Australia established 7 Strategic Priorities which were to guide its assessment of national priority list projects:

Table 12:Infrastructure Australia's Strategic Priorities Guiding Project Assessment

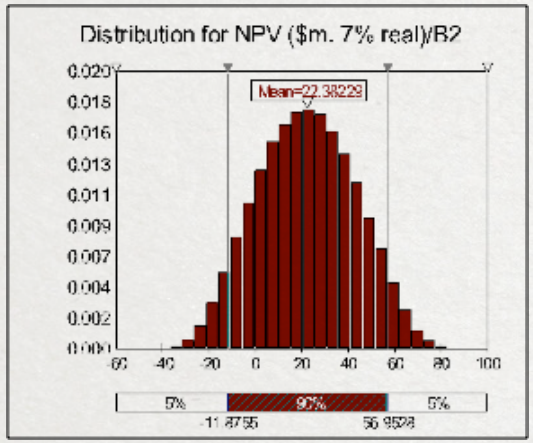
1. Expand Australia's productive capacity
2. Increase Australia's productivity
3. Diversify Australia's economic capabilities
4. Build on Australia's global competitive advantages
5. Develop our cities and/or our regions
6. Reduce greenhouse emissions
7.Improve social equity and quality of life

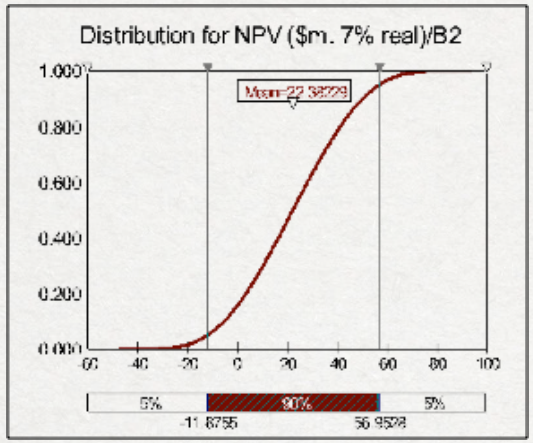
Table 13. Claims to Priority Status against Infrastructure Australia assessment criteria

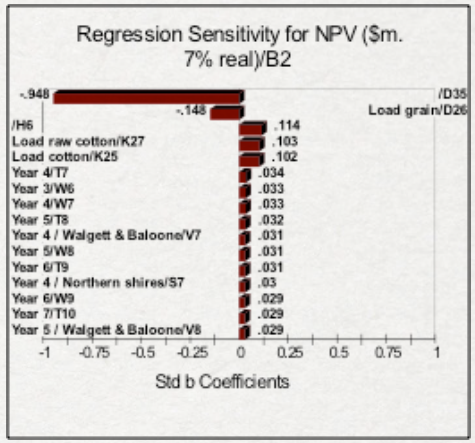
Expand capacity	Lower freight costs reduce marginal cost of production, creating better operating margins/new entrants/value adding opportunities etc
Increase Australia's productivity	The Network carries a multi-billion dollar freight task which stands to become significantly more efficient:the core agricultural commodities of the region are severely adversely affected by high freight costs and uncertain freight networks.
Diversify Australia's economic capabilities	The Network not only reduces the cost of freight but also introduces important new concepts of commercial investment and operation of road networks to identified standards. This concept can enhance expenditure efficiency across Australia and complement scarce taxpayer funds for roads.
Build on Australia's global competitive advantages	As the recent Agricultural Competitiveness White Paper makes clear, agriculture is one of the key competitive advantages of the Australian economy. The Network is centred on some of the most highly-productive agricultural councils in Australia. The scale on offer combined with significantly improved freight outcomes to this sector shows a new way forward for Australia to address its transport challenges in support of agricultural competitiveness.
Develop our cities and/or our regions	The Network stands to create a significant cost effective productivity gain for a region of 50,000 people. By complementing the Inland Rail project, the Network is part of a wider strategy to drastically reduce the price of freight to the region and therefore drive greater business profitability, growth and diversity. It also promotes a safer and more sustainable road network to reduce the road safety risks to the local communities.
Reduce greenhouse emissions	The Network of higher productivity road freight has an expressed objective of increasing mainline rail freight operations by bringing trucking deliveries to the key railheads rather than trucking freight to its destination in competition with rail.
Improve social equity and quality of life	The initial Network offers significantly increased connectivity, road safety and travel amenity to road users. The Network is also modular, so that its benefits can be extended to wider regional New South Wales and to south-west Queensland. Under a commercial model of operation, the Network also has the potential to engineer contracted safety standards and service levels into the roads, giving communities a higher reliable road safety standard

Addendum:

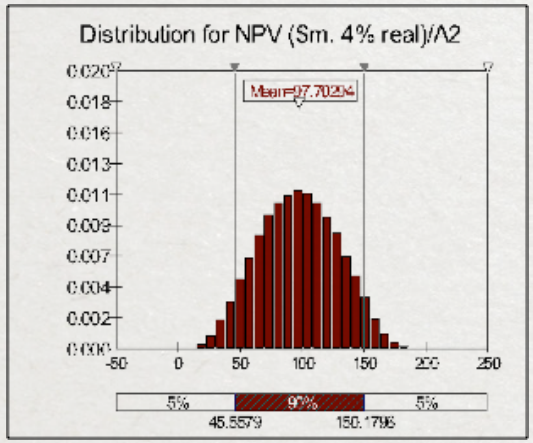
Capital upgrades for HPV network (cotton and grain freights only) - modelling results at 7% real discount rate

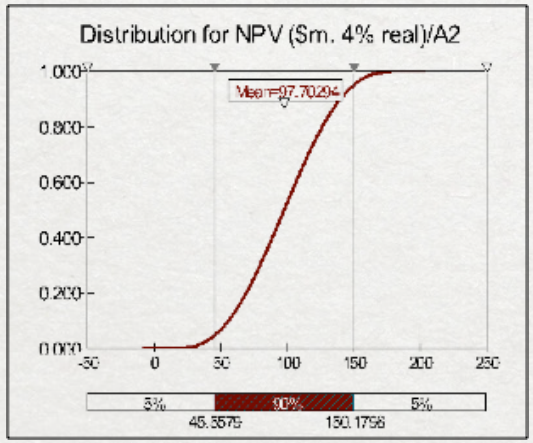


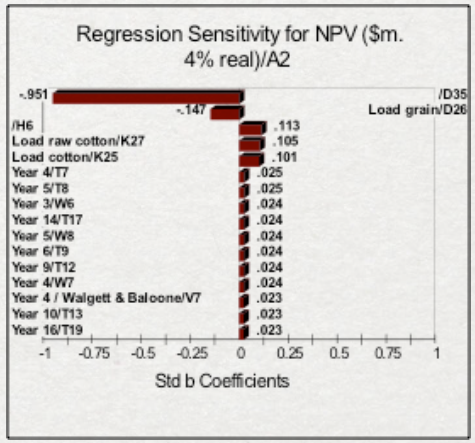




Capital upgrades for HPV network (cotton and grain freights only) - modelling results at 4% real discount rate





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