



Australian Government  
Infrastructure Australia

# NATIONAL ROAD ASSET REPORTING PILOT

Creating road standards, funding real outcomes, attracting investment and growing GDP.



## Disclaimer

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## Comments and questions:

Mr Luke Fraser  
Principal, Juturna Consulting Pty Ltd  
P 0437 146 274  
E [juturnaconsulting@gmail.com](mailto:juturnaconsulting@gmail.com)  
W [www.juturna.com.au](http://www.juturna.com.au)

Mr John Austen  
Director of Policy Infrastructure Australia  
P 02 8114 1907  
E [john.austen@infrastructure.gov.au](mailto:john.austen@infrastructure.gov.au)  
W [www.infrastructureaustralia.gov.au](http://www.infrastructureaustralia.gov.au)



## Introduction & summary

The state of Australia's roads - or more precisely, the sense that our roads are not as they should be - is a perennial topic of discussion. The problem is, mere discussion seems to be where the problem has always terminated: there has been little productive reform of road financing, charging and investment.

The nation's 800,000 kilometre, \$150 billion dollar stock of roads is not subjected to even cursory national condition assessment. This represents a difference between roads and all other economic infrastructure (energy, telecommunications, rail, water, etc) where to varying degrees and in different ways there is asset condition examination and standards of performance to guide funding choices. In practical terms, and notwithstanding complex road grant funding formulae and different jurisdictional road plans, the lack of any asset reports, or a sense of standards that roads are funded to achieve, means that Australia's entire system of road funding more or less comes down to governments throwing several billion dollars of taxpayer money at the road network each year and hoping that the results will be good. This is not an efficient use of scarce taxpayer money.

A lack of asset reports for roads also spoils the chances of ever reforming road charging along the lines recommended in Australia's recent tax review ('the Henry Review') and by the Productivity Commission: to date, Australian road users have had no way to discern any measurable value for money improvement on the roads they use in return for more funds charged to them for using public roads; in that environment, it is understandably very unlikely that Australian road users will ever accept a move to user charging or higher road use prices overall.

Infrastructure Australia does not believe this state of affairs is good enough for one of the nation's largest, most important and in reform terms, most neglected pieces of infrastructure. But this report is not just about identifying the problem: it is also about offering a practical solution.

There seems to be a better way forward. Australia could develop useful national standards which it expected of its road network - standards that related to the levels of safety, freight efficiency and amenity that different classes of roads might be expected to produce, for money spent. With the right reforms, Australia could begin to measure and report to the public, over time, how more targeted road funding was performing in helping reach and maintain such standards for our roads.

In 2011, in its annual report to Australia's heads of government, Infrastructure Australia advised the Council of Australian Governments that what the nation's road network needed was a national portfolio manager - a small independent body which would

collate regular reports on the actual condition of all roads across Australia, analyse the results, identify the areas of greatest concern for economic efficiency, road safety and community connectedness standards and start to target funding to improving performance against these standards.

Following these recommendations, feedback was received to the effect that such national road asset condition reports would probably never be achieved - in particular, it was suggested by some that Australia's 550-plus local governments could not complete such a task, even if it were ultimately in their own interests to do so. This report set out to test that assertion: 8 local governments in New South Wales and Queensland worked with Infrastructure Australia to produce consistent, transparent and practical collated reports for every road in these jurisdictions. These reports were designed to align directly to internationally-recognised engineering and asset management standards.

After less than 3 months, working on an entirely voluntary, unfunded basis, 7 of the 8 local governments produced compliant road asset condition reports, which are included in detail in the annex to this report. The quality and depth of these reports is unprecedented. Every road was given a rating according to the condition of the bitumen and gravel. The condition of over 2,200 local roads was reported - all to international standards. Over 13,000 kilometres of road were assessed; that equates to 1.5 per cent of Australia's total road network.

The report is a credit to the talent and dedication of the local government engineers, administrators and grader drivers who put the data together. The availability of the reports has allowed this study to produce instructive case studies; more than this, the pilot has proven that with access to accurate asset reports, rigorous business cases can be produced for all road funding proposals, everywhere: nationwide asset reporting would mean that any road proposal would be capable of displaying more rigorous bottom line project net present values, internal rates of return and benefit cost ratios. This is a breakthrough in thinking about road funding proposals and how we could spend money smarter on our road networks, with a better chance of receiving greater benefits.

Doing these things would almost certainly reduce the perceived politicisation and underfunding of roads overall and offer a more efficient use of public funds expended, as well as opening greater opportunities for reliable private investments in the network. The findings of this report are commended to the community, industry and government alike.

**Michael Deegan**  
Infrastructure Coordinator - March 2013

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## PART 1

### Why pursue a national road reporting pilot?



To support the development of measurable standards and outcomes for the road network and road spending, so that Australia achieves greater value for money expended on roads and more certain and efficient road transport outcomes for the community;



To find and test sustainable new private investment mechanisms in road infrastructure and offer guidance to the current Review of the National Access Regime in this respect;



For reasons of national economic significance –to address the acknowledged shortcomings of the current road infrastructure stock that carries much of Australia’s hard and soft commodity production (ie mining, agricultural and pastoral) to market;



Road asset reporting is ‘unfinished (policy) business’ – there is a need to deliver on Infrastructure Australia’s commitment to productive road reform and deliver on outstanding Productivity Commission suggestions in this respect.



To offer practical guidance to current national road reform efforts - to accelerate the delivery of practical results.

### standards and outcomes for the road network and road spending, so that Australia achieves greater value for money expended on roads and more certain and efficient road transport outcomes for the community.

What standards are Australian roads - together, an asset with an estimated replacement cost of perhaps \$150 billion - expected to meet? What standards should these roads offer the community and the market - and how could outcomes be measured against such standards so that Australia's roads could be improved? Should road funding produce better and better roads, where value for money and efficiency is somehow discernible, or is Australia resigned to continue allocating many billions each year to road spending in future without much targeting of those funds, or ability to measure outcomes? Is the community and industry happy to continue having no idea of what value they see for taxpayer funds spent on roads? These are all questions and contentions that have prompted and which shape this report.

The efficiency with which road infrastructure operates and the value for money it offers the taxpayer is of great importance to the overall health of Australia's economy and for public amenity. It is becoming even more important as traditional taxpayer funding levels for roads become harder and harder to procure in the face of competing priorities and (potentially) lower tax revenues; at the same time, in relative terms, building and maintaining modern roads costs more than it used to.

What is Australia getting for the money it spends on roads already? How could Australia improve *measurably* the outcomes of this road spending - achieving higher standards for its roads over time? These were guiding questions for this pilot project.

Following the example of the reformed rail sector in Australia, it has been noted that standards and outcomes can only be brought about by first having a reference point: a clear understanding of the current condition of the road asset. Thinking to date has followed that once the current condition is understood, governments, the community and

parts of the economy that rely on roads can start to attribute standards and outcomes, examine how different from those standards and outcomes the current network is, and then target funding to improve the situation over time. From year to year, as asset reports are updated, governments could begin to measure progress in how actual road infrastructure is developing against the standards and outcomes that the community and market want them to achieve.

A road asset condition reporting pilot to test these issues was seen as a central part of further productive reform of roads and road spending. If it was proven to be practical to report on road conditions, the development of funded standards and outcomes for roads might be achievable; if not, these objectives were probably not realistic and a different approach would be needed.

### How standards and outcomes frame overall infrastructure policy – or the lack of it

The idea of seeking measurable standards and outcomes for infrastructure should not be considered 'abstract': it conditions the overall quality of national infrastructure policy. *'Infrastructure matters'* - as a most insightful recent analysis suggested, *'because it is the route to market...and the route to companies for key factor inputs (to the economy)'*.<sup>1</sup> This same analysis - conducted in relation to British infrastructure - raised concern over the failure for overall government planning that occurs when infrastructure assets are not interrogated, planned, structured and regulated transparently and effectively, with standards and outcomes in mind:

*'Why is British infrastructure so apparently bad? And so expensive? The pervasiveness of the problems point to generic rather than merely case-by-case difficulties. These generic issues include: the institutional structures and the (lack of) coordination; the role of government; and the allocation of risks which cause high costs of capital, which in turn distort the time horizons and raise the infrastructure costs of users. For unlike the macroeconomic and microeconomic pillars of economic policy, Britain has no coherent overarching infrastructure policy.'*<sup>11</sup>

A project to test the efficacy of road asset condition reporting would, it was hoped, shed light on how road infrastructure might be better structured, analysed and funded in an Australian setting, to inform wider objectives for road national infrastructure standards and outcomes.

## 02

## To find and test sustainable new private investment mechanisms in road infrastructure and offer guidance to the current Review of the National Access Regime in this respect;

The need to attract ready private capital to infrastructure investments has been acknowledged globally as a social and economic priority. However, relatively meagre levels of private investment in transport asset classes to date suggest that many economic infrastructure assets – roads foremost among them – are yet to develop the sort of institutional arrangements and robust ‘deal structures’ that would encourage greater private investment.

A road reporting pilot should contribute to further reform in this respect. One of its key objectives was to try to reflect in Australian road investment the World Economic Forum’s definition of the conditions that make private infrastructure investments successful:

*‘...creating a political, legal and economic environment that is conducive to investment; establishing a program of opportunities; having a contractual and regulatory framework that deals with issues effectively and fairly; having forums for stakeholders to share experiences and involving the public at all stages’.<sup>III</sup>*

For this objective to become reality in the roads sector – that is, for ‘a program of opportunities’ in roads to be discernible to the market – a clear and available picture of the asset in question is a fundamental precursor. It is therefore an objective of this pilot to test this asset reporting mechanism for its potential value in attracting greater and lower-risk private capital involvement in Australia’s stock of road infrastructure.

In this respect the road pilot’s motivation does not represent ‘new ground’: in 2003 Australia’s federal transport agency: Australia’s federal transport department acknowledged a similar need to create more private investment in roads, in a review in 2002<sup>IV</sup>. At that time, the department concluded that the key challenges for local government in financing infrastructure from the private sector were the ability to:

- offer the right infrastructure components to the private sector;
- transfer the appropriate risks to the private sector for the right price;
- price community service obligations if and when necessary; and
- achieve all of this in a transparent, binding and, if required, a long-term contractual arrangement.

Part of the intention of this project was to follow through on these decade-old objectives, by deriving commercial case studies from the road asset data collected in the pilot. This in turn would help to deliver on Infrastructure Australia’s recent suggestion to the *Review of the National Access Regime* that commercial access arrangements to economic infrastructure should finally be extended to the road network, perhaps via nationwide adoption of an access undertaking. In its submission to this *Review*, Infrastructure Australia argued that a road access undertaking that encouraged private investment in productive freight roads would have the effect of:

*‘incentivising road infrastructure managers to provide improved and prompt information on road asset costs, condition and use. Users would need this information in considering both potential investments and any associated incremental road user pricing’.<sup>V</sup>*

## 03

### **For reasons of national economic significance – to address the acknowledged shortcomings of the current road freight infrastructure stock that carries much of Australia’s hard and soft commodity production (ie mining, agricultural and pastoral) to market.**

The roads pilot was also pursued because certain roads are generally thought to be of ‘national significance’ to some of Australia’s most important economic sectors, but at present, these sectors – notably mining, agriculture and pastoral (which are generally more remote from ports and capital cities and therefore more susceptible to the business cost pressures that poor roads represent) – have little to no effective means of influencing better outcomes on their particular supporting road networks; traditionally, these industries have been forced to rely on ‘blanket’ historical public sector road funding and planning solutions. By general recognition, these funding strategies have often failed to do much to improve the situation for these sectors. Some of the causes of the problem are relatively well known:

- Transport technology advances (and hence loading on infrastructure) have not been matched by increased (road) capacity;
- Reduced availability of funding leaves scant resource for new or upgraded infrastructure and in turn, pressure builds to reduce the construction costs and therefore the effective life cycle of new road constructions; this in turn creates larger road sustainability problems for the future;
- The dispersed nature of regional industry does

not match well with government boundaries and structures, as a result, discrete road infrastructure upgrades can be difficult to justify economically and hard to prosecute when road funding and access responsibilities flow across several government boundaries;

- Roads are managed by organisations not directly involved in other transport or logistic activities or modes and this limited the ability of ‘freight and freight infrastructure needs’ to receive sufficient priority planning or investment – road freight outcomes tend to only progress at the level of broader spending priorities for roads (such as for passenger vehicle outcomes or public transport objectives). Historically, while regional development of Australia (especially in the early years of Federation) often focussed on improving roads to rail heads and ports, more recent practice has been to neglect this principle in favour of upgrading roads that compete with or substitute for rail lines – this seems to be because other public objectives for these roads – private passenger connectivity and amenity and public transport service quality – have overtaken freight considerations.
- There has been relatively little private sector development and investment in these road networks compared to investment in urban toll roads<sup>VI</sup>

To these concerns must be added the earlier point about a lack of condition reports for the roads themselves, and the fact that this prevents any sensible debate or investment occurring around achieving better standards for this infrastructure. As a result, this pilot was seen as a particularly useful opportunity to examine this underappreciated aspect of the dilemma facing rural hard and soft commodity supply chains.

# 04

## Road asset reporting is 'unfinished (policy) business'

**– there is a need to deliver on Infrastructure Australia's commitment to productive road reform and deliver on outstanding Productivity Commission suggestions in this respect.**

This pilot was commissioned by Infrastructure Australia in late 2012. In part, the work was intended to test in practice the road infrastructure reforms previously advanced by Infrastructure Australia to the Council of Australian Governments in 2011:

*'A National Roads Portfolio Manager should be established. Its remit would extend not only to local government roads, but also to roads that are a shared responsibility between local government and state/territory governments, and the national highway network. The roles of the Road Portfolio Manager could include:*

- independent high-level verification of asset management plans prepared by local government and other road agencies;
- working with councils that are experiencing significant difficulty in their asset management systems to ensure they receive suitable engineering and other support with the development and implementation of their asset management plans;
- analysis of asset management plans to identify emerging trends; and
- providing advice to other bodies, including Infrastructure Australia, on policy matters and on potential investment decisions'.<sup>VII</sup>

For the past 6 years since the Productivity Commission recommended reforms (Productivity Commission *Inquiry into Road and Rail Infrastructure Pricing*, December 2006), the Council of Australian Governments has been pursuing changes to the way in which Australia prices roads and recovers the cost of road provision from the heavy vehicle sector (ie *COAG Road Reform Project*, renamed the *Heavy Vehicle Charging and Investment Reform Project* in 2012).

Three major problems that the Council of Australian Governments charged this reform project with fixing were:

- Network average road user charges under PAYGO (ie 'Pay-As-You-Go' fuel excise and vehicle registration charges) do not provide any signals whatsoever to road users about the costs of using particular roads, or to road providers about the demand of different roads;
- Australia's road charges are not linked to Australia's road spending, which can lead to inefficient decisions, and encourage public sector road providers to 'preserve' road assets, or to undertake lower-order priority improvement and construction at the expense of more timely and efficient works; and
- Government provision of road infrastructure is unlikely to provide an incentive framework for providing road infrastructure services efficiently.

Australia's current road pricing system – that is, the fuel excise and registration fees which go in part towards future road funding – has been found to be reasonably good at recovering the costs of past road spending. However, it is very poor at delivering answers about what *should* be spent on roads, or in helping to understand whether Australia is getting the roads it needs. This prevents Australia moving towards a road system that is actually responsive to changing market and community preferences for road use.

Both Infrastructure Australia and the Productivity Commission have noted that Australia's road pricing system, while it claims to be a 'full cost recovery system', is more accurately described as a 'full expenditure recovery' system. Put simply, the current system just recovers the total value<sup>VIII</sup> of past government expenditures in the system through current user charges (diesel and excise), but there is nothing to say that this amount is the right amount of money that should be raised to deliver an effective road network. The Productivity Commission noted in 2007 that:

*'Even if road transport agencies were somehow to be assured of receiving the revenue generated from...charges, there would be no direct connection between the revenues they would receive and (appropriately evaluated) efficient future levels of road spending...'. IX*

An important drawback of the current road funding system is that there is no mechanism to redress the possibility of too little being spent to maintain important roads. In this respect Infrastructure Australia pointed to a number of inconsistencies in the 'road story': for example; how do restrictions on heavy vehicle access sit with cases of roads being damaged by trucks? How can the system be a true cost recovery one if there is a roads maintenance deficit?

Part of the present national pricing reform effort is associated with 'direct charging' for road use, or as close to this as is deemed practical. But for any direct charging system to work there needs to be an assessment of actual asset condition: what is the basis of the price being charged?<sup>X</sup> Does it reflect an accurate assessment of the cost of that road? In many direct charging systems (such as for rail) the 'floor price' is associated with wear and tear on existing assets, and this can vary over network segments. Also, relevant network segments can straddle jurisdictional borders. Having a clear understanding of the actual asset condition is vital to effective direct pricing.

## 05

## To offer practical guidance to current national road reform efforts to accelerate the delivery of practical results.

The pilot sought to build a picture of the asset base that would allow road reformers to test direct pricing outcomes. Given pre-existing patterns of transport, and 'least cost' pathway theories of freight movements, understanding asset conditions on specific routes - as distinct from wider 'network averages' - is important to the economic use of roads. Similar comments can be made about social, safety and amenity issues confronting roads - it might be convenient to deal in averages and generalisations, but real outcomes - whether fair direct pricing of trucks, or safety improvements to a particular black spot, or noise and congestion challenges - occur on real roads, not on 'network averages'.

These matters appear to be a sharper focus than current reform efforts, which have spent the bulk of their resources since 2007 examining how more discrete forms of 'network averaged' user charging will send signals to users on road use. Australia to date has no clear understanding of its roads and road reformers have not indicated an interest in pursuing such condition reporting. It is seen for the most part as too difficult, costly and time consuming. The reform effort to date has not yet delivered results, although it might at some future point.

Regardless, it is worth learning from other infrastructure reform experiences where the importance of asset reporting was proven to be very significant, such as rail: the NSW Grain Infrastructure Advisory Committee report in 2004 attempted to deal with predominantly rail infrastructure challenges facing rural industry in NSW<sup>XI</sup>. It demonstrated that rail asset condition - borne of rail asset condition reports - can be a more important determinant of rail routing than access pricing; that is to say, *pricing should ensure funds are provided specifically to the assets that matter most.*

On this matter, the Productivity Commission itself made it clear in 2007 that one of the biggest issues facing road reform is how road user prices can be reinvested for better road transport outcomes:

*'There may be some modest gains, in terms of improving the efficiency of use of the existing network, from refining the current cost allocation methodology (ie user-pricing). However, the much greater gains are likely to come over time from more efficient pricing arrangements and from improving the linkages between demand and investment'.<sup>XII</sup>(author's emboldening)*

Standards and outcomes for road infrastructure would need to flow from some basic understanding of road condition. To date, road funders have had no reliable asset condition reporting in place that would offer a view on how targeted funding was improving the achievement of such standards and priorities over time. The pilot sought to address that and thereby contribute to more productive reform.

Infrastructure Australia has also noted that the level of traffic, in particular freight traffic, would logically have implications for road charging: as the OECD has noted:

*'The increasing introduction of user fees into economic infrastructure will require careful case-by-case examination of the specific features of the infrastructure to which they may be applied, so as to ensure that the economic costs (including the transaction costs, which can be quite high) and the social costs of moving to user fees do not outweigh the benefits'.<sup>XIII</sup>*

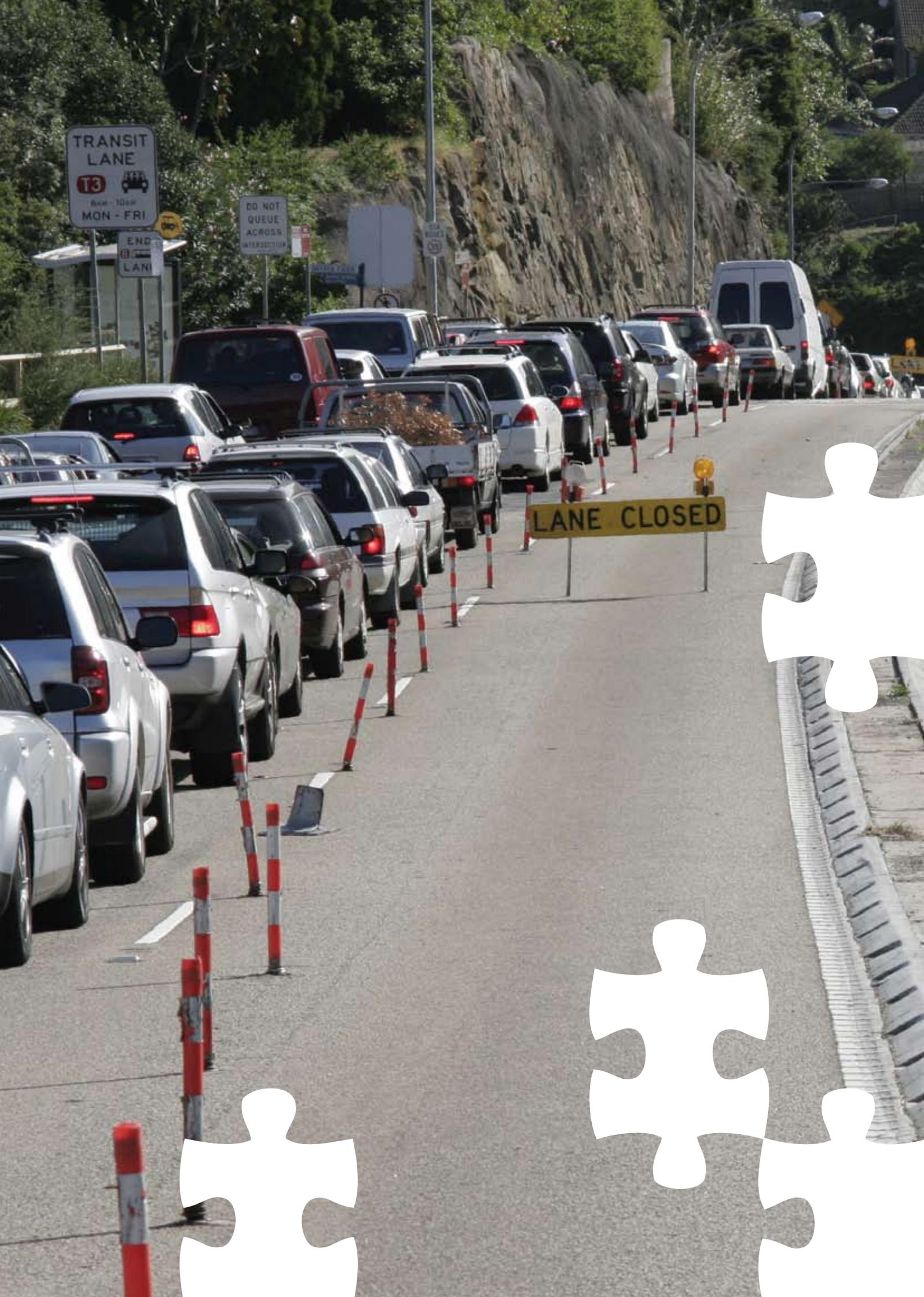
This was another policy motivation for testing whether road-by-road asset assessment information could be collated and maintained to a standard that would allow route-specific road pricing and investment reform along lines recognisable and accepted in all other economic infrastructure.

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# PART 02

## Questions to address

### Why local government roads were chosen for the pilot?

Infrastructure Australia set out to test whether these aims could be delivered upon by developing an asset condition assessment for over 2,000 local government roads stretching across 8 local government areas in northern New South Wales and southern Queensland. It was felt that testing the prospects for such reform at this regional level was of primary importance for three main reasons:

1. Local government road networks were the most numerous and complex: there are over 550 local governments, controlling approximately 600,000 kms of Australia's total 800,00 km road network; many of these routes involve control by more than one local government across the length of the route;
2. Local government roads represented the 'beginning and end' of many journeys, so a failure to understand these assets in a national road portfolio would only add to the problem of 'first mile' and 'last mile' heavy vehicle access problems, as they are known, and cloud network investment choices. In this respect, the Productivity Commission found that 'as *'local access' constitutes a significant portion of overall spending, the Commission strongly endorses...further work (on local government roads) to ensure that it is appropriately quantified*<sup>XV</sup>
3. Generally local roads experience the lowest traffic volumes and therefore are the most susceptible to a lack of data and reporting on asset uses and condition.
4. There has been doubt expressed in the past from higher governments that local governments would have the resources or expertise to draw practical, professional and consistent road asset condition reports together, and that this would prevent the development of a useful national asset picture to be established for roads.
5. Local government in the past had potentially suffered financially from not having asset

condition reports available to inform higher government charging decisions: for example, in the decade past, the National Transport Commission, which sets heavy vehicle user charges, levied additional road charges to local government of over \$4 billion dollars over several years, on the 'somewhat loose' basis that these funds were probably more appropriately levied against local governments than against road users. These decisions raised concern with the Productivity Commission's 2006 inquiry for not being based sufficiently on an understanding of local road condition.<sup>XVI</sup>

### How would road reports relate to the OECD's economic infrastructure principles?

In its most recent review of economic infrastructure across the 30 OECD member nations and BRIC economies, the OECD set out some clear principles that would need to find their way into practical policy responses, in order to meet the future infrastructure challenges ahead:

*'Expanding access to additional private and public sector sources of finance will make a significant contribution to bridging the infrastructure gap. However, it will not suffice on its own. The challenges facing governments are simply too diverse and complex. In the coming years, policy makers will in addition need to:*

- Improve efficiency in the construction and operation of infrastructures
- Increase efficiency levels in the use of infrastructures through better management of demand;
- Ensure infrastructures are reliable and resilient;
- Strengthen life-cycle management of infrastructure assets as the focus of investment turns increasingly to maintenance, upgrade and refurbishment of existing facilities and networks
- Raise the effectiveness of infrastructure

development both in meeting multiple objectives - economic, social, environmental, etc. - and in allocating resources to create maximum value'.<sup>XVII</sup>

The structure of this pilot was developed to test how these principles could be reflected in roads. It is observed that most of these OECD principles have as their common denominator a close and current understanding of the physical infrastructure asset itself: its condition, its cost and its remaining useful life. With that in mind, the pilot's approach has been to examine the areas that will be most important to forming a reliable picture of road assets.

### How is 'value for money' to be achieved in road expenditure?

What do taxpayers get for the billions spent on roads and why would the market invest more in roads in future? The preceding OECD policy objectives (see above) point overwhelmingly to the need for measurable standards to be applied, if 'value for money' is to be achieved from these assets. In that context, the need for base data on road assets to be collated and interrogated is vital. The pilot project needed to determine whether road asset data was even capable of being generated, and if so, whether it could also be collated for scrutiny. These questions formed part of the approach and also drove an approach to commercial case studies found later in the report.

### What road information is available now - and could more be obtained in future?

In contrast to asset information for almost all other classes of Australia's economic infrastructure (water, energy, telecommunications, rail, etc), not even the most rudimentary nationally-consistent information is available about Australia's road network, much less about its actual condition, its fitness for purpose, or whether, road by road, the asset might have been underfunded, or even overfunded (ie over-engineered) over time, relative to the task it is being used for today:

- There is no national or even consistent state-level reporting available about the condition of all road assets - what they are, their current condition, their rate of degradation, significant looming expenditure challenges, etc. At a federal level, the annual *National Local Government Report* can state only the total kilometres of local roads, and what respective

percentages of these roads are gravel-sheeted or bitumen-sealed.

- The Institute of Public Works and Engineering Australia Reports in NSW (ie successive *State of the Asset* reports) produces condition and cost pressure estimates across many shires, but these reports too are to varying degrees aggregated assessments of council management works plans - that is, they do not give visibility of road by road conditions; the predominant purpose of such reports appears to be educational: to provide somewhat aggregated figures of the estimated cost pressures facing the network, in order to draw attention to the funding shortfall and its implications. While such reports are valuable, they do not appear tailored to drive mechanisms for setting standards and measuring outcomes on roads, or for gauging the value for money of funds spent on individual roads to date.
- The road funding system at all levels of government is not tied to any clear, discrete condition reports of each road, or any sense of minimum standards therein or of outcomes that are expected of roads; higher governments have no detailed metrics available on the 'health' of the road asset or whether it is performing its intended task well or poorly.
- In the case of Commonwealth funding of local government roads, the formula used to distribute these grants to the States and Territories is historical and not in any sense interested in actual road conditions<sup>XVIII</sup>: road grants are awarded as a function of a complex algorithm, relating (amongst other things) to size of local government population, how 'relatively disadvantaged' that population is considered to be (aspects of which are unrelated to roads), how remote the local government area is and how many kilometres of road stock it is responsible for. Commonwealth road funding therefore is not necessarily related at all to the condition of roads, or the performance of governments in relation to road asset management, implications of road availability (ie commercial, social or economic,) or whether there is potential to gather road funds from other tiers of government or from the private sector. These grants seek to spread funds out with equitable allocations in mind. They are not

interested in sending funds to roads that might be in most need, or where funding attention could deliver the biggest benefits. There is as yet no overall visibility of the actual road asset that could target this sort of funding.

## What are the implications of the lack of road-by-road asset condition reports?

### 1. Lack of private capital investment and efficiency in the road network

No transparent road condition data translates to little or no private investment opportunity; specifically, a lack of easily accessible data which is consistent across jurisdictions has in the past prevented road agencies from being able to develop higher productivity freight routes funded through private sector investment.

For example, in 2011 COAG trials sought to test whether trucking operators could pay a little more for use of specific road networks in return for being granted (more productive) heavier freight loads on these roads (ie truckers paying the surcharge would be allowed to travel at weights slightly above those available to the general trucking industry - a rudimentary form of avoidable cost pricing as seen in rail access arrangements). These road agency trials were overwhelmingly unsuccessful: they were abandoned altogether in some jurisdictions because the basic information about the road and bridge network itself that the trucking industry indicated it wanted heavier access to was deemed 'too hard to find and collate' by state road agencies. Such failures - which are in fact typical of unreformed monopoly infrastructure - lock out private investment.

### 2. 'Politicisation' of road spending becomes hard to avoid

In the absence of clear and empirical road data, standards and priorities for the road network can be almost impossible to set. Road spending is viewed as quite politicised as a direct result of this lack of data and prioritisation, a fact which successive state and federal parliamentary inquiries have acknowledged. Without any detailed information on the asset forthcoming, it is hard to see how the system could be improved fundamentally, because:

- A lack of accurate road condition and usage data makes it harder for governments to set priorities for roads (irrespective of how those

priorities might be addressed)

- It leaves open the potential for over and under-spending, with also potential for severe unanticipated capacity constraints arising generally or on specific segments of important routes;
- It makes it very difficult for governments to commit to providing 'unrestricted access' over any road for any particular time, for instance, for ever-heavier and larger truck combinations that might wear out the road more rapidly
- It is not possible to introduce charges that are related to current condition, or future (needed) works on the asset related to use.
- It is not possible for private users to influence road condition other than through political process - unlike arrangements for commercial users of rail, for example, road freight operators have no structured or reliable way for seeking to access the road with higher productivity vehicles if that access would require road upgrade or deteriorate the road quicker - this holds even if the road freight investor was willing to pay their own money into accessing and improving the road with a better vehicle, as occurs under rail access seeker arrangements.
- There is a misalignment between roads and their economic and social uses - boundaries can risk becoming political rather than based on any transport need that might be discernible from a close understanding of the road asset itself.

## What would be the key qualities necessary for an effective national road asset report?

At present, notwithstanding Infrastructure Australia's 2011 recommendations on road reform (see above), there is neither a requirement nor an intent from road agencies or treasuries in Australia to collate useful detailed information about the cost and condition of the national road asset that would inform more efficient and effective road funding decisions. Even if it were to become seen as desirable in future, at first blush the task is a complex one: there are over 550 local government areas in Australia, most with funding, planning and upkeep responsibility for hundreds of roads. There are 6 state and 2 territory road agencies

with similar responsibilities for dozens of highway networks, while the Federal government has taken on some planning and funding responsibility for the intercapital highways. The challenge therefore lies in establishing a national asset report that is:

**Sufficiently-detailed** - enough about the condition of the asset is presented to be of use to generate robust analysis and assist in direct funding and planning decisions;

**Robust** - it is capable of being replicated on a regular basis (probably annually or biennially) so as to provide a picture of standards or trends across the whole national road asset;

**Portable** - it is not beyond the skillset and training resources of all of the 560 governments that would need to pursue it in order for a national road asset portfolio picture to be established.

**Transparent and fair** - the methodology is understandable to all and considered fair while results are readily accessible by all those who might be affected by them.

**Auditable** - the professional opinions on road conditions that underpin national road asset reports should be subject to some form of audit to engender government, community and market confidence in the accuracy of reports produced.

## Can road report data collection accord with international standards for road assets?

To meet Infrastructure Australia's objectives, the data collected would for preference be of an internationally-benchmarked standard.

Australia's civil engineers across its 560-plus jurisdictions do not yet work entirely consistently in this respect: most work to the National Asset Management System (NAMS) - a form of asset management register developed initially in Australia and New Zealand which was adopted subsequently by the UK and USA and which is now the accepted international standard for infrastructure asset management. Some jurisdictions (parts of Victoria, Queensland, Western Australia, for example), use different systems. Nevertheless, all of the approaches meet these similar common standards, and compliance levels for training in and use of these systems across engineering departments is growing<sup>XIX</sup>. Any future asset report would need to be developed with these standards in mind in order to be considered valid.

## Can precedents and purpose be found for assessments of actual infrastructure condition?

It has been noted by Infrastructure Australia that a movement towards establishing and monitoring standards in road provision would align road infrastructure with the experience of rail in Australia, which since competition reforms of the 1990s has developed transparent and objective asset standards for many rail lines across the country. Such condition reports have been made regularly and independently; they have then been measured against the objective standard to underpin safety and facilitate better user pricing outcomes.

Such measures have beneficial effects, especially for a government's ability to prioritise spending, where the actual overall condition of the network is not known, or where the network is known to be generally below the desired standard. In 2004-05, the Independent Transport Safety Regulator in NSW drew attention to the risks of not providing such clarity, but instead relying on only aggregated, summarised assessments of the infrastructure:

*'...for a network that has been deteriorating, higher level reporting (that is, aggregated or summarised information undertaken instead of pursuing thorough, asset-by-asset condition reports) can mask poor general network condition, large and escalating backlogs and major current problems that may require large financial injections'.<sup>XX</sup>*

## Can collated road data be made transparent to community and potential market investors?

Another hurdle for road asset management to overcome would be how key information is to be made accessible for scrutiny by governments, the general community, those dependent on roads and the 'market' for potential road investment, particularly for that most market-driven feature of road use, the road freight task. A feature in Australia's competition reform as applied to most other economic infrastructure sectors has been the general availability of summary key condition reports for the underlying assets: energy, water, telecommunications and rail, for example, all produce and maintain asset reports for their sectors and these are usually subject to regulatory scrutiny to some degree. Sometimes, these reports can be subject to independent audit, such as for the Australian Rail Track Corporation's rail asset reports. It would be useful to develop road

reports keeping in mind that in the longer term road reports should be capable of perhaps random audit to ensure the accuracy of the advice being provided on road assets.

The roads pilot would be a first attempt to bring roads in line with an asset reporting approach - it would determine how information about roads could be made available not only to government but - importantly - also to any 'market' for investment in roads for freight purposes, as well as wider community interests, so that future road planning and funding might more directly reflect market intentions and community priorities. This availability gives potential investors access to the crucial asset cost and condition data that they need as an input to business decisions about whether to invest in road fleets, what sort of truck-trailer combinations should be invested in, siting of operational locations for trucking depots and warehouses and the most cost-effective locations for upgrade of the existing road network.

### **Can a pilot move focus away from arguments over funding and towards road 'standards'?**

Infrastructure Australia's tasking made it clear that this pilot should not produce simply another audit of a region's road condition and cost pressures, with a large maintenance bill attached for governments to fund.

There are many such reports already in circulation. But funds for roads are scarce, and such reports generally offer governments no clear, cost-benefit or rate of return basis for prioritising one road funding shortfall over another.

In a road funding environment where there are no agreed standards of road provision and nobody can agree on what different roads are expected to 'achieve' in terms of outcomes, the answer is usually 'send all roads much more money'. This obscures efficiency: when the answer is always 'more money' without any hard evidence being produced on how effective individual roads are now at doing the task they are expected to support, it is impossible to know what an 'efficient' or 'acceptable' amount of funding might be.

Infrastructure Australia too had noted in its earlier reform experiences around freight infrastructure (*National Ports Strategy, National Freight Network and Strategy*) that most debates with jurisdictions about better approaches to road infrastructure

always degenerated rapidly into funding debates - 'how do I get more money' (inevitably, at someone else's expense), 'who will fund *my* outstanding road problems', etc.

In this sense, road funding in Australia today remains significantly out of step with the approaches to other parts of economic infrastructure, which might not be perfect, but are at least usually constrained by some agreed performance standards and objectives for the infrastructure in question.

With these risks in mind, a guiding question for this roads pilot would be "what do you want your road to do?" 'rather than "do you need more money for your roads?"; in this way, future funding might be better harnessed to measurable outcomes for the community and economy - perhaps even to the point of Australia starting to develop some basic *agreed service levels* for roads.

Previous attempts by industry and community groups to highlight the challenges of road infrastructure have also placed an emphasis on claimed large funding shortfalls. For example, the Institute of Public Works and Engineering Australia has for some years conducted a benchmarking assessment of local road and bridge conditions throughout NSW (*State of the Asset* reports); more recently the Australian Local Government Association has drawn on similar local government cost management reports to offer a similar assessment of 55 local government areas.<sup>XXI</sup>

However, such assessments appear to draw on collated estimates of maintenance and renewal funding shortfalls, and their predominant objective appears not to be the listing of asset condition on a road-by-road, but to highlight the funding challenges facing roads. Such shortfalls are estimated from claimed maintenance costs - they can be interpreted that funds available to roads (from all sources - not merely governments or indirect charges) are inadequate, or that too many roads have been created. These sort of reports add to the knowledge of the problem, but the absence of transparent actual road by road condition reports means it is hard for these efforts to inform efforts to develop standards for roads, encourage commercial investment or measure value for money in road expenditure over time.

This tendency to pursue more funding rather than come to grips with the policy structures that are creating the problem is understandable - there is a sense from most parties that roads in total *quantum* are underfunded (noting the potential inference that some roads might well have been overfunded).

But which roads need funding first, and what amount is the right amount? Too much focus on funding deflects attention from these questions. This roads pilot wanted to advance the discussion around the more basic questions of road standards relative to agreed service levels. This would only be brought about by first ignoring the funding challenge, and getting to grips with the road's actual condition, relative to some understanding of what we expect that asset to achieve.

### **Can a roads pilot improve on previous attempts to identify economic benefits in roads?**

In commissioning this pilot, Infrastructure Australia was also conscious of a trend that has emerged in recent years of 'extensive freight industry consultation' as a means of securing road funding priority. Most often, this has involved local governments or other government agencies working with the local or regional road freight industries and their customers to identify particular routes and networks that apparently would do most to stimulate economic activity.

Typically, these efforts are seeking government funding - they have not been mechanisms to encourage private investments in the road network. As such, these studies probably do not see much need to develop rigorous cost benefit analysis on the rates of return or net present value of additional spending made on these roads. Most often, these reports do a good job of highlighting the shape and overall value of a regional economic task - such as grain, or logging, or manufacturing - but generally they do not reconcile this to the initial and ongoing cost of road upgrade entailed, and to what extent (if at all) this funding represents a cost-effective outlay when examined as a formal business case.

However, Infrastructure Australia wanted the pilot project to improve on these approaches, by linking the market for more productive roads and road freight to actual asset condition and then carrying out cost-benefit analysis, such that the likely dollar value of these discrete road funding decisions could

be made plain to government and private sector funders alike.

The pilot region chosen by Infrastructure Australia has received considerable attention on its road freight networks of late, but efforts to date have not made very thorough cost benefit cases for the additional funding sought:

- In 2012 a Western *NSW Regional and Local Roads Plan* was released; it covered the area of this report's pilot (and more regions still) and had been developed by working closely with local governments, civil engineers, road-builders, trucking operators and freight customers in the area. This report detailed a very extensive prioritised road and bridgeworks budget that would achieve many positive outcomes - greater industry productivity and safety being prominent among them.
- In 2012 a separate *Northern Inland Region of NSW Freight Study* was commissioned by RDA Australia Northern Inland division. Similarly, it presents a series of priority candidates for road upgrades in the region. The client's tasking for the consultancy in this report was explicitly to 'come up with a \$40 million priority program that would benefit all local governments in the participating region'<sup>XXII</sup>; the consultant's report indicated that it found far more than \$40 million worth of high priority road projects in these regions and project proposals were capped as a result.
- Both reports drew on extensive consultation with local government engineers, freight operators and their customers. Detailed costs for road upgrades were established. The first report gave little to no evidence of cost-benefit estimates for its proposed upgrades. The second study did apply a cost-benefit approach, but it was not clear from the report whether this was done in a manner that offered government or industry any clarity on the genuine commercial bottom line of pursuing these road upgrades for the freight task as opposed to pursuing other objectives with the funds available: no rankings of the expected net present value or internal rate of return for these projects were offered, for example.
- More importantly, the benefits sought by these reports was more funds for local

governments- that is, there was no clear and targeted means demonstrated of how funding would make a quantifiable difference to the local community, much less to individual rural producers who could add to national product and provide better incomes and employment opportunities in the local area.

Typically, Infrastructure Australia priority funding project candidates require the following features:

- Demand modelling assumptions and outputs
- Base case assessments
- Economic model parameter costs
- Economic model parameter benefits
- Benefit-cost ratio, internal rate of return and net present value of project
- Sensitivity testing around these results
- Non-monetized benefits and costs
- Need for government funding (ie does a market exist or can one be introduced to pay for services?)
- If not, why does a market failure exist?<sup>XXIII</sup>

This level of detail might seem excessive for small road funding projects, but the absence of detailed cost-benefit case studies in some of the 'market-driven' road funding proposals that are now emerging might suggest that there is a sense that business case standards of rigour are not required when seeking road funding. If this contention held, it would condemn road funding to an ongoing accusation of politicised spending decisions and would not bode well for any future private investment in the road network.

### **Recent 'demand-driven' road planning is positive – but how can these efforts be built on?**

Notwithstanding a lack of rigorous cost benefit data, it is clear from these more recent approaches to the problem that road owners are recognising the value of allowing the market and community preferences to shape funding of the road network, driven by an understanding of what these roads are used for now and where they would prefer funds to be spent in future. It is also clear that industry

engagement is bringing together extremely useful demand input data for road business case development. Infrastructure Australia wanted to encourage that development further, by determining:

- whether investment-grade business case rigour could be applied to individual road funding candidates, drawing on both market-driven road use information and condition reports and costings of the roads, and how the two interact;
- whether some road funding opportunities might not in fact represent straight commercial access and investment propositions for the private sector; and
- what the net commercial and/or economic benefits of such cases would be.

This report endeavoured to answer those questions through reports and economic and commercial case studies.

# PART 03

## Pilot methodology

The road asset reporting trial was scoped and established in September-October 2012. Infrastructure Australia's expert services panel member Juturna PL was engaged to conduct the trial. By agreement with Infrastructure Australia, the pilot was broken into 5 work phases:

### Phase 1

**Select a pilot region, preferably encompassing more than one state or territory and multiple Local Government Associations (LGAs)**

**Task road engineering departments within each LGAs to develop asset condition reports for their entire stock of roads.**

### Phase 2

**Collate the road asset reports from each LGA into a single road portfolio report, offering best practice standards of road asset condition assessment in a uniform manner across the portfolio of all LGA roadstock in the pilot**

### Phase 3

**Based on the outcomes of the pilot, draw conclusions on the merits of this sort of reporting and analysis regime for supporting the road reform planning and funding objectives outlined by Infrastructure Australia (*see above*)**

### Phase 4

**Identify and pursue market-driven case studies (ie arithmetic proofs of concept) that demonstrate the practical value of road asset reporting for growing GDP and becoming more efficient in road asset spending decisions:**

- **Invite elements of the market for road freight services (ie road freight operators and freight customers in the pilot region) to collaborate with engineering personnel using the road condition reports as a guide to commercial investment potential**
- **Consider discrete opportunities for market investment in more productive freight infrastructure and operations on the existing road network, and opportunities for more efficient public road spending that would come from a market-driven sense of road use priorities and costs.**

### Phase 5

- **Offer concluding findings to Infrastructure Australia in this respect, including recommendations for effective national structures that might improve outcomes.**

### The pilot region identification and coordination process

8 local government areas across northern NSW and southern QLD were selected for participation in the pilot:

- Balonne LGA (QLD)      Goondiwindi LGA (QLD)      Gunnedah LGA (NSW)      Gwydir LGA (NSW)
- Moree Plains LGA (NSW)      Narrabri LGA (NSW)      Southern Downs LGA (QLD)      Warrumbungle LGA (NSW)



**Participating local government areas**

These regions were selected as they represented a cross-border population, but also because of their demonstrated willingness to develop asset-based reporting through their seminal involvement with the Australian Rural Roads Group ([www.austwideruralroads.com](http://www.austwideruralroads.com)) a policy reform group which has advocated strongly for road portfolio reporting in the past, and whose reports Infrastructure Australia has drawn upon in advocating national road portfolio reporting previously.

With unlocking greater productivity being an overriding goal of the pilot, this region was also chosen because it is perhaps the richest grain and cotton growing region in Australia. These LGAs produced over \$2 billion in agricultural production<sup>XXIV</sup>, with Moree Plains Shire being the most productive agricultural LGA in Australia at around half a billion in agricultural production: intuitively, there were large productivity gains on offer for these economies through more efficient road outcomes.

An initial meeting of engineering and executive personnel from these LGAs as well as interested parties in the road freight and primary production sector, Infrastructure Australia executives and the project consultancy was held in Moree in early October 2012. A committee was established to coordinate the process. Mr Richard Jane, Head of Engineering and Technical Services at Gwydir LGA, undertook to develop a consistent road asset condition reporting methodology and assisting participating LGAs in collating their reports.

### **Road condition reporting methodology employed**

The preferred methodology to undertake the assessments was developed in a 'top-down, bottom-up' approach: this approach advocates that the quality and accuracy of an engineering department's overall reporting is maximised by drawing on the intimate knowledge of the people who undertake the maintenance of the particular road asset on daily basis: in other words, the data that found its way to the report would represent an informed and current view of the actual condition of every single road assessed; in some cases, this would be further disaggregated into condition reports for multiple sections of a road.

### **Approach taken to gravel-sheeting and bitumen seal road inspections**

The preferred approach advocated to the reporting group was that gravel road assessments be performed by way of a visual assessment of each segment of the road, and that for strong preference this be conducted by the council's grader operator in conjunction with the work supervisor.

The pilot advocated that for bitumen seal roads, the maintenance supervisor and works supervisor undertake this work jointly to achieve a condition assessment that drew on the most current expert knowledge as well as the supporting data of past works and current maintenance requirements.

Although the gravel and bitumen assessments were undertaken visually, having the grader operator undertake the assessment provided quite accurate information on the condition of the depth of gravel on the road, because the grader operator is generally the individual with the most intimate knowledge of the age of that gravel resheet and is required to do the best that they can when the gravel depth is thin. An aim of the pilot was to develop reports which - however widely they might travel in a management reporting and analysis sense - could always be relied upon to represent the most informed and accurate view of a local specialist on the condition of every assessed road.

### **Approach to scoring and ranking the road condition**

While the best available expert advice would develop the condition assessment, the structure of that assessment itself needed to be in keeping with Australian and international best practice asset management reporting standards. Therefore, all condition assessments were converted to the National Asset Management System (NAMS) IIMM 1-5 scoring system. An example is attached. The 1-5 scoring system provides a simple, yet sufficiently detailed method of assessing the condition of small segments of roads and provides a simple method of aggregating the information to provide whole of network condition assessment for the particular local government area. As the findings of this report discuss below, this information can be further aggregated to regions, states and, potentially, the entire nation, for analysis and reporting purposes.

## Complete (and deliberate) absence of cost estimates from this pilot

The pilot made no enquiry as to the value of the roads inspected, their depreciation arrangements and status or the likely rehabilitation and renewal costs facing these roads. This decision was deliberate - it relates to the earlier discussion (see above) about how quickly useful discussions around asset condition and purpose usually degenerate into an often politicised contest for funding and preferment.

This pilot was to test whether asset reporting was feasible, and how it could be used for productive purposes if it was. It therefore did not risk clouding or politicising these outcomes by placing a 'price tag' on the report. What has been achieved as a result is therefore not led by funding motives, but only by straightforward expert assessments of the road asset condition. The 'no-costings' aspect of this plan drew particular praise from several of the participating engineering offices and council executives (see *lessons learned* below).

## Collation

The collection of the asset data, from the seven of eight councils who provided data, was considered by the engineering coordinator for the pilot (Mr Richard Jane) to be of a good standard and all data was easily converted to a standard format consistent with the NAMS IIMM condition assessment method using commonly available computer software.

Collation began in mid-November 2012 and took most councils around 6 weeks to conduct. In some cases it took longer, but this was understandable, given that the pilot was not a funded and agreed priority in the work program of these engineering offices, and several staff had already organised leave over the Christmas/New Year period when efforts began. However, best efforts were made. Some reports took until February 2013 to be completed. In all, 7 of the 8 participating LGAs produced detailed assessments of their entire shire road networks. Warrumbungle LGA did not undertake any assessment report. 6 of the reports are collated in this pilot. Gunnedah LGA has submitted a fully-compliant asset report, but it was delayed and could not be represented in the summary tables that accompany the report.

The collated reports of the 7 participating LGAs (data for 6 of which is collated here) presents an

unprecedented picture of part of Australia's road network:

These collated facts about the network can be harnessed to drive powerful social, economic and even commercial outcomes, as the case studies and findings of this report will outline.

## About the annex to this report

An annex to this report details the road-by-road condition status for all 2,263 roads assessed in this report - proof that this sort of data can be collated to standards that are:

**Sufficiently-detailed** - enough about the condition of the asset is presented to be of use to generate robust analysis and assist in direct funding and planning decisions;

**Robust** - it is capable of being replicated on a regular basis (probably annually or biennially) so as to provide a picture of standards or trends across the whole national road asset;

**Portable** - it is not beyond the skillset and training resources of all of the 560 governments that would need to pursue it in order for a national road asset portfolio picture to be established.

**Transparent and fair** - the methodology is understandable to all and considered fair while results are readily accessible by all those who might be affected by them.

**Auditable** - the professional opinions on road conditions that underpin national road asset reports should be subject to some form of audit to engender government, community and market confidence in the accuracy of reports produced.

# PART 04

## The results

	No. Local Roads	Sealed Length (km)	Gravelled Length (km)	Total Length (km)	RESEAL AREA (sq.m)	RESEAL LENGTH (km)	RESEAL AS % OF SEALED LENGTH
NARRABRI	219	381.9	1503.6	1885.5	1011465	144.5	37.8%
SOUTHERN DOWNS	986	1080.2	1577.9	2658.0	989621	204.9	19.0%
GOONDIWINDI	512	772.0	1728.7	2500.7	1001875	193.6	25.1%
BALONNE	116	202.3	1767.5	1969.8	N/A	N/A	0.0%
GWYDIR	218	312.3	1453.8	1766.1	319091	49.9	16.0%
MOREE	212	442.2	1889.7	2331.9	346680	54.5	12.3%
<b>TOTAL</b>	2263	3190.9	9921.1	13112	3668732	647.3	20.3%

TOTAL LENGTH OF ROADS ASSESSED	13111 km
TOTAL NUMBER OF ROADS ASSESSED	2263
%AGE OF NETWORK SEALED	24.3%
%AGE OF SEALED SURFACE PAST USEFUL LIFE	20.3%
%AGE OF SEALED PAVEMENT PAST USEFUL LIFE	10.4%
% OF GRAVEL PAVEMENT PREDICTED TO BE IMPASSABLE AFTER 20mm RAIN (as a % of the length of gravel road)	34.4%
% OF GRAVEL PAVEMENT PREDICTED TO BE IMPASSABLE AFTER 20mm RAIN (as a % of the length of both sealed and gravel roads)	26.0%

### Notes -

RESEAL AREA AND LENGTH represents the amount of total sealed road stock judged to be at condition 3 (i.e requiring reseal)

HEAVY PATCH AREA represents the amount of total sealed road stock judged to be at condition 4 (i.e requiring heavy patching)

REHAB LENGTH represents the amount of total sealed road stock judged to be at condition 5 (i.e requiring rehabilitation)

IMPASSIBILITY represents gravel sheeted roads judged to be at condition 5 (i.e very little useful gravel coverage on the road)

HEAVY PATCH AREA (sq.m)	REHAB LENGTH (km)	ROAD CONDITION RANKING					% OF GRAVEL PAVEMENT PREDICTED TO BE IMPASSABLE AFTER 20mm RAIN (as a % of the length of gravel road)
		1 (km)	2 (km)	3 (km)	4 (km)	5 (km)	
68715	61.3	48.4	765.5	395.6	19.9	0	27.6%
N/A	N/A	68.6	475.0	904.5	160.2	9.5	10.8%
N/A	N/A	553.1	408.7	336.0	75.7	349.8	24.6%
N/A	21.9	0.0	0.0	999.4	630.1	1655.7	93.7%
45460	43.7	392	353.1	260.6	86.4	232.9	22.0%
0	12.7	352.6	468.1	525.0	356.1	66.6	22.4%
114175.0	139.6	1414.8	2470.3	3421.2	1328.5	2314.5	

### Bitumen and gravel road condition ranking matrix employed by the pilot

#### BITUMEN SEAL CONDITION

- |   |                         |
|---|-------------------------|
| 1 | As new                  |
| 2 | Satisfactory            |
| 3 | Requires Reseal         |
| 4 | Requires Heavy Patching |
| 5 | Requires Rehabilitation |

#### GRAVEL SHEETING CONDITION

- |   |                      |
|---|----------------------|
| 1 | As new               |
| 2 | Satisfactory         |
| 3 | Requires maintenance |
| 4 | Requires repairs     |
| 5 | Requires replacement |

### Alignment with best practice professional standards

Importantly, both 1-5 ranking systems have been designed by civil engineers to equate directly to scoring conditions recognised in Australia's National Asset Management System (NAMS). This approach also equates well to Independent Transport Safety and Reliability New South Wales' views on railtrack condition assessment.

### Converting condition reports to funding pressures

This pilot has deliberately avoided attributing dollar values to condition reports, but this is very easy to do and can form an important part of overall asset management planning and budgeting for local governments.

## PART 05

### Case studies derived from the pilot report

Beyond offering the chance to learn more about the true state of the network, what does road asset reporting really offer Australia in practical terms?

For road funding to begin delivering better value for money in a way that is measurable to governments, industry and community, at least part of future road funding should aspire to business case levels of rigour. What does spending money on a particular route offer freight customers? Will it reduce the cost of their goods to market? By how much? Does it put money back in the community's pocket? If a truck operator is to be charged more to use some roads, can they measure a real benefit to their business? Where will safety improvements offer the biggest returns? How should competing road projects be measured against each other for funding? Can we measure the likely benefits of all projects consistently, in terms of a rate of return, a net present value and a benefit-cost ratio?

Quite understandably, until Australia's treasuries and private investors can measure the benefits of targeted or increased road spending, road funding and road outcomes are not likely to improve much.

The case studies that follow provide further evidence that the availability of transparent road asset reporting affords the chance to move beyond

politicised road spending, or road spending based on unquantified 'hunches' about where more productive investments would deliver the most economic growth. Publicly-available asset reports allow a market for economic and even commercial road improvements and even community or safety groups into practical business case development process with the road asset owners - the local government road engineering departments and state road agencies. The case studies that follow reveal how these discussions lead very directly to business cases showing a rate of return, a net present value and a benefit cost ratio - in other words, all that is needed for Australia to move towards targeted and efficient road funding.

The other major finding of the following case studies is how powerful an effect the introduction of higher productivity freight vehicles on key freight routes can have on the economic viability of road upgrades. In the cases that follow, the roads in question would remain unfunded and without upgrades for a long time to come, but high productivity vehicle access opens the way for these roads to be financed through the increased productivity of the freight task that the better trucks offer. This has nationwide implications for the efficiency of many industries and the state of their facilitating road networks.



- A poor standard gravel road servicing 30 farms - farms producing 100 - 150,000 tonnes of grain per annum.
- Closed to rain for around 1 month each year; damaging to freight vehicles.
- The poor standard is costing the farms \$350,000 per annum in extra freight/storage charges.
- How understanding road asset costs and conditions can offer more productive solutions.

### Case studies: how road asset condition reports can help markets and governments make the best funding decisions

The case studies focussed on a small road network in a grain growing area and its linkage to a railhead - in total around 80 kms of roads. Asset condition reports for this road were assessed and growers and freight operators interviewed to determine what the poor level of the road was costing the local economy. Simple and consistent business cases - each with bottom line Net Present Values, Internal Rates of Return and Benefit-Cost Ratios were then conducted to test whether:

- The freight levels on this road - using existing freight vehicles - would themselves cover

the cost of a bitumen seal (necessitating the upgrade of the underlying gravel pavement) to reduce the costs of the poor road to the local economy

- The freight levels on this road - using much more productive trucks, with the road upgraded specifically to accommodate these trucks safely - would pay for the cost of the upgrade.

The second test was further refined to look at different take-up levels of the more productive truck and different freight destinations from this road. This is discussed in more detail below.

## The 2AB QUAD- Commercial saviour for concentrated road-rail freight solutions?

Highly-efficient road freight vehicles with a pedigree in the mining sector

The 2AB quad is a very large truck-trailer combination first developed in the 1990s for the mining sector mineral haulage task in Western Australia and Queensland - it is a common sight on roads in and around Kalgoorlie, Cloncurry and Geraldton, where it is a standard vehicle which shares public roads in these more remote areas of these states.

The vehicle is more expensive to run than the sort of road train currently used in northern NSW: it requires a somewhat more expensive prime mover and trailer set and uses more fuel, being heavier, but the additional lift capacity of the 2AB Quad is impressive - modelling for these case studies estimated each vehicle would have a carrying capacity of 124 tonnes - 73 tonnes more than the current road train vehicles on these roads can carry.

63% productivity gains for grain commodity transports

When all of the extra costs of upgrade from a double road train to a 2AB Quad were taken into account, the 2AB Quad was found to offer 63% greater productivity in net terms to grain growers and rail freight customers than the current grain transport vehicles on offer.

No extra damage implications for the road, but some additional costs of entry

The 2AB Quad is a longer vehicle than the Type 1 road train that currently runs in northern NSW, but it is not more damaging to the road network - it has tri-axle dolly axles, which displace the trailer weight better than the tandem dolly axles of most of the current road trains (using Equivalent Standard Axle analysis). Both case studies added in to their modelling the cost of upgrading the road network (pavement width and intersection turning circles) to accommodate this larger vehicle. These costs were added in to the case studies.

- What would more productive road freight vehicles matched to upgraded roads do for the freight task?
- The 2AB Quad truck-trailer operates on public roads in parts of rural and remote QLD & WA.
- If applied to the NSW grain task, it offers a 63% net productivity gain on the current road train.
- The case studies have modelled upgrading the roads for the 2AB Quad to deliver more efficient sustainable results.



**The road in question** – Sandholes Road is 43 kilometre-long, poor-standard gravel shire road in north-west New South Wales. It supports a slightly larger network (around 80kms) which is home to around 30 predominantly grain-growing farms. The farms in this network together produce between 100,000 - 150,000 tonnes of grain *per annum*. The road is around 80 kilometres from the railhead at Goondiwindi on the Queensland border, which takes the grain to the port of Brisbane for export, while other grain travels to domestic uses. Sandholes Road is in particularly poor condition even for gravel standards - travel speeds are sometimes limited to 20km/h. The road is frequently closed to heavy vehicle traffic after even minor rain events. This in effect can make the road impassable for heavy freight vehicles for whole months of the year and this costs the graingrowers who live along this road, as the modern grain market dictates that they grow, harvest and move their products to 'just in time' trading arrangements.

#### Results of asset condition reports and market analysis on the road in question

The 30 farms on the road incur 'deadweight' costs because the road is in such poor condition that it dramatically accelerates the wear and tear on trucks that use it and in turn, trucking operators charge the Sandholes Road growers a surcharge for bringing their trucks to this road. It also increases storage fees for grain, because on average the poor gravel road is shut to road freight for at least a month each year due to rain events - farmers have no choice but to store this grain at extra cost and wait for the roads to dry.

**Estimated cost of additional 'poor road freight surcharges' (levied by trucks to cover accelerated wear and tear and additional grain storage hold-over fees (fee representing shrinkage of grain in extended storage and the extra storage costs): \$350,000 per annum**

These figures are extra resource charges to the Australian economy that come about because of poor road condition. They cannot be measured in national accounts, but they are nonetheless 'real' insofar as they are an additional cost on primary producers. If they were replicated around the country across the grain task, as well as across other freight tasks that rely on poor roads, the total economic effects would most likely be very significant for the national economy.

### Business cases for this road network derived from market-driven road asset analysis

1. Project to remove these deadweight costs by sealing the road, create all weather access, using current vehicles

**Net Present Value**            **\$-4.3 m**  
**Internal Rate of Return**   **1%**  
**Benefit Cost Ratio**         **0.51**

*Comment: under this scenario, the road upgrade to seal condition is not quite covered by the increased freight productivity using the current freight vehicles on offer on this road, but the \$350,000 annual resource cost to the growers is avoided.*

2. Project to upgrade the network to Goondiwindi railhead to allow for much higher productivity road freight to carry the task - but Sandholes road remains gravel, so the extra costs to growers (surcharges and holding costs) remain

**Net Present Value**            **\$5.6m**  
**Internal Rate of Return**   **53.0%**  
**Benefit Cost Ratio**         **5.0**

*Comment: under this scenario, the road is not upgraded to a seal, but only re-engineered to take a much higher productivity freight vehicle (the 2AB Quad). In doing so, the grower costs of bad road surcharge and holding costs due to rain will remain, but the productivity of the task overall increases significantly.*

3. Project to upgrade the network to Goondiwindi to allow for much higher productivity road freight to carry the task - and the road is upgraded to bitumen seal, removing the extra costs to growers
- 3a. Where some of the trucks upgrade to the higher productivity vehicle and some of the grain takes advantage of the extra freight productivity and goes to the railhead, with the rest going elsewhere and not taking advantage of the higher productivity network

**Net Present Value**            **\$1.3 m**  
**Internal Rate of Return**   **8.2%**  
**Benefit Cost Ratio**         **1.2**

*Comment: under this scenario, the road network would be sealed in bitumen as well as re-engineered to allow for operation of much higher productivity trucks (2AB Quad). However, this scenario assumes that a portion of the freight will still be required to be transported by existing vehicles and that some of the freight won't go to destinations that could utilise these higher productivity vehicles (see assumptions, below).*

3b. 3b. Where all of the trucks upgrade to the higher productivity vehicle and all of the grain takes advantage of the higher productivity network

**Net Present Value**            **\$6.1 m**  
**Internal Rate of Return**   **12.3%**  
**Benefit Cost Ratio**         **1.6**

*Comment: under this scenario, the road network would be sealed in bitumen as well as re-engineered to allow for operation of much higher productivity trucks (2AB Quad). This scenario assumes that all of the freight will take advantage of the 2AB quad and that all of the freight will benefit from the upgrade.*

**The results suggest that:**

Poor roads are not just irritating and dangerous - they incur direct resource costs on the economy for businesses that rely on them;

Rigorous and internally consistent business cases can be derived for different road and vehicle upgrade scenarios, and this can help governments or private investors find the best projects, or the best mix of projects;

The judicious use of higher productivity freight vehicles, matched to upgraded roads, has a major effect on the productivity of the freight task and on the merits of the project; and

The final scenario (3b) provides an upper limit of potential static productivity gains available for this network - all freight pulled by much higher productivity vehicles, using an upgraded bitumen road that reduces the 'deadweight' resource costs of lesser roads. At first glance, this last case study might seem fanciful, but there are grounds to suggest that it might be close to achievable. In economic terms, all of the scenarios measure *static gains*: they assume current production levels and current patterns of freight transport. However, the advent of such a high productivity network might

well have a dynamic effect on the freight task in the region. Such effects could create dynamic efficiency gains, meaning this last scenario might not be as extreme a value proposition for the economy as it might first appear.

**Methodological approach taken to case studies: transparent asset reports promote collaboration**

In both case studies examined, both the 'demand' (freight market) and 'supply' (government road owner) sides of the road freight task were consulted in detail and brought together to form robust business cases:

On the **demand side** of the road freight task, discussions were conducted with primary producers and road and rail freight operators around total production levels and size of road freight task, types of higher productivity vehicles desirable for access on particular roads.

On the **supply side** of the road freight task local government road engineering departments were consulted about the roads that the market had identified for potential upgrade. This was made easier by these offices having ready access to current condition reports for all roads. These reports were consulted and the costs of upgrade for better vehicles were estimated and discussed, including road widening, additional culverts, bridge strengthening, seal widening, depth of road base, etc).

In all case studies, the local government engineers worked very positively to best accommodate market intentions to find the most efficient outcome for the improvements sought: for example, engineers undertook comparative analysis on the life cycle costs of improved gravel versus full bitumen seal upgrades to offer the cheapest life cycle solution to the commercial road proponent.

The case studies illustrate how this cooperative approach to accommodating road freight demand can work far better when all parties have access to authoritative road asset condition reports.

## The 2AB Quad and the grain task – putting money back in farmer's pockets

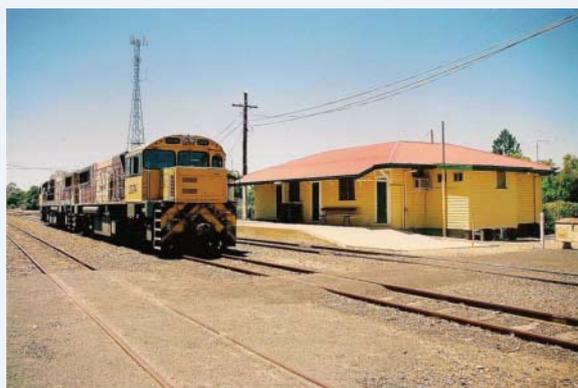
The idea of these case studies was to employ the lessons of the mining sector – namely, that the 2AB quad offers a very significant productivity advantage to road freight of minerals – to the grain logistics sector, in order to see how much more productive the task to the Goondiwindi rail head could become from the Sandholes Road grain region.

The question for the case studies was simple enough – can a productivity enhancing vehicle like the 2AB Quad in effect pay for its own road upgrades to allow it to operate on the grain task safely, while still offering productivity benefits to growers? The answer was that employing this vehicle on these tasks more than paid for the road upgrades to support its introduction on key freight routes – in other words, the taxpayer would not need to pay a cent for road upgrades for these vehicles – they deliver enough extra productivity to present a straight commercial opportunity to the market to pay for their introduction and sympathetic upgrades to allow them to operate on some routes.

### 'Horses for courses' matching roads to the best available freight vehicles pays dividends for roads

Vehicles like the 2AB Quad are patently not appropriate for all roads, but their great contribution to mining productivity over many years and the evidence of these case studies suggests that the judicious matching of freight intensive, low-trafficked roads and the most productive trucks can create additional productivity that would more than pay for the cost of upgrading a road.

As Infrastructure Australia has already noted, there are various practical funding models available for such freight upgrades. The opportunity now is for more thinking to occur on where such vehicles might be inserted to offer the greatest sustainable benefits nationwide.



## Hub and spoke in grain freight – closer to reality through a commercial road upgrade model?

This case study attempts to achieve what is sometimes referred to as a 'hub and spoke' road/rail network, where much higher productivity trucks would aggregate freight to a mainline railhead in a more cost-effective fashion than by using small trucks, or perhaps rail branch line that is too expensive to maintain for the purpose.

The historic challenge to such 'hub and spoke' arrangements has been that governments have not had a means of providing the extra funding necessary for upgrading the roads in questions and until recently, unlike other competition reformed parts of infrastructure like rail, energy and telecommunications, there has been no clear and reliable way for industry to invest in such outcomes, even if they could identify them. But this case study used transparent asset reports and willing engineering departments in the local government to work with market preferences to develop an efficient series of road freight upgrade scenarios.

## **Disclaimer: limitations of this case study – only one leg of a challenging journey to market**

The case studies were an arithmetic proof of concept exercise for making the freight more viable through a commercial upgrade to accept higher productivity vehicles. It did not examine the freight task from Goondiwindi onwards. It is important to recognise that the road network under analysis is only one leg of a longer supply chain journey, being the movement of freight between Goondiwindi and the port of Brisbane, either by rail, or by road. During the course of this case study feedback made clear that there were considerable capacity and operational challenges on the Goondiwindi-Brisbane leg of this grain freight journey for both road and rail. *The case study below does not address these 'downstream' challenges. It only examines one part of the journey. This should be considered when examining the wider commerciality of the case study numbers that follow. A more complete case study could examine the efficacy of a series of high productivity road freight upgrades in to the port of Brisbane, to cater for the region's cotton and grain task. Equally, the merits of a similar high productivity network linking to the less-constrained Moree railhead would offer an important comparative study.*

## **Assumptions: a note on modelling the tonnage and vehicle choices for these case studies, and the approach to cost estimates**

The overall production for the area assumed to be served by the high productivity vehicle network (namely, Sandholes road, plus Coolan Lane from Weemelah to the junction with Sandholes Road up to and including the town of Weemelah to the west of Sandholes Road and the Garah-Boomi Road to the east) was estimated at around 180,000 tonnes per annum. This in reality might be considered conservative, as there is significant storage on the Mungindi-Moree main road close to Weemelah which might also use this high productivity network - these tonnages were not included in the modelling.

One of the challenges for grain freight case studies is in understanding what destination the product will travel to, because the quality of grain can split destinations in any given year. Feedback from stakeholders in this case study suggested that there were considerable swings in how much of the total average production would travel to Goondiwindi (typically for export) whereas grain for domestic milling and livestock-grade grain for feedlots would travel in different directions away from the network being examined. To overcome this difficulty the case study applied a Monte Carlo simulation to offer a distribution of where different portions of the overall average production were likely to travel in a given year.

Similarly, the rate of uptake to 2AB Quad vehicles across the total freight task was also considered an important question for both case studies. For this reason the Monte Carlo simulation also included distributions for the take-up rates of freight customers for the 2AB Quad high productivity truck-trailer. The Monte Carlo simulation results imply that there was a 99 per cent chance of generating a positive Net Present value for the project at a 7 per cent discount rate<sup>1</sup>. Simulations give the case study more confidence that the final NPV, IRR and BCAs represent a reasonable picture of what would occur in the case of these upgrades proceeding.

Freight charges in grain transport can also vary considerably from region to region and from high to low season. In the case of freight rates, storage levies and 'bad road' trucking surcharges, efforts were made to gain a seasonal range for these costs for comparative purposes, but this was not always possible. Further analysis around the freight rates in this region would offer useful sensitivity analysis around these projects.

***Note:** further enquiries about the input assumptions of these case studies should be directed to Infrastructure Australia in the first instance.*

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<sup>1</sup> This also implies there was a 99 per cent chance of the project generating a benefit cost ratio greater than 1 and an internal rate of return of greater than 7 per cent.



## PART 06

### Findings

#### Road asset reporting can facilitate growth in Australia's Gross Domestic Product

Using road asset condition reports as the basis for a third-party road freight access and improvement mechanism as currently applies in the Australian rail sector holds demonstrated promise for growing national wealth by reducing the freight costs of transported goods. When used to deliver targeted, productivity-enhancing freight upgrades of specific roads, it can help to reduce the price of domestic and imported goods to domestic consumers, while also making Australian exported goods more competitive in the international marketplace.

This result is in keeping with Infrastructure Australia's emerging understanding in this field that there are latent economic and even financial investment opportunities 'hidden' across the current road network, but that the only means of discerning these opportunities is for a putative 'market' for road investment to have a clear understanding of the underlying condition of the current road infrastructure (and thereby the cost of upgrade), in order that accurate cost-benefit analysis of proposed investments - at the individual road or route level - can be developed.

#### Australia in 2013 has no understanding of its \$150 billion road asset, but this could change

One aspect of roads that the pilot exercise - and especially the feedback from all parties involved - has made extremely clear is the complete absence of measurable standards or priorities for the Australian road network, and an associated inability to fund the road network with any measurable degree of efficiency on behalf of the market and community.

In 2013 governments at all levels are spending unprecedented funds on roads and this work is presumably being acquitted appropriately, but in a real sense, all that governments are doing is handing out money on the condition that there is proof of acquittal: there are no outcomes being

measured from year to year in roads, because there are no standards agreed for what different roads should be achieving. Until now, it has been assumed that there would be no way to keep track of the condition of all of Australia's roads over time, so that progress in road outcomes and standards could be monitored and even audited.

The absence of these features was a particular point of frustration for the engineers in the pilot regions, who do the best they can to maintain roads to professional standards on limited budgets, but who are never afforded an opportunity to bring about measurable and consistent upgrades and improvements to the network in any strategic sense, over time. Most feedback concluded that 'we chase our tails from year to year and nobody can point to any consistent or planned improvement over time because nobody looks at the historical spending patterns or targets funds to any agreed standards or outcomes'.

This pilot has demonstrated in principle that road asset condition reports *can* be produced for two thirds of the kilometre length of the nation's roads - the local road network. Moreover, these condition reports can be done in a way that links to internationally-recognised engineering standards for these assets and can elicit commercial and economic investment candidates. What is more, the pilot reports were produced voluntarily, within around 8-10 weeks, by a handful of engineering and roadworks personnel. The reports gave accurate condition assessments for 2,263 roads across multiple local government areas, all to a professional, consistent and auditable standard that could be applied nationwide.

#### Practical and measureable road standards and outputs can be derived for roads and adherence to them would offer significant benefits

What the roads pilot makes very clear is that some roads are more important than others, and certainty about their continued serviceability is important for outlays as well as on long-term



patterns of industry and land uses eg. where to invest in and plan for industrial parks, commodity storage and trucking depots. But what the pilot also reveals is that even minor roads have expectations placed on them: ratepayers need local roads to access their properties; some roads are of importance in flood zones as a key route in or out for communities. Ratepayers have understandable expectations that their roads will offer them basic access to essential community services, but this is still not always the case. The pilot project demonstrated in a quantified way that even minor rain episodes will prevent access across significant parts of a road network.

The pilot's authors heard how children can be prevented from going to school due to even minor rain episodes stranding the school bus; how flooding can cut off a regional indigenous community from supplies and services for long periods; how key mining and agriculture regions can be stranded from their markets for inefficient amounts of the year: their commodities might have already been 'sold forward' to overseas buyers, yet they remain stranded in the paddocks where they were produced, sometimes for months, with wet or flooded roads closed. A grain consignor raised the multi-million dollar demurrage fees paid to train providers who schedule a train for grain that doesn't arrive due to road closures. All of these things undermine community prosperity and amenity.

The pilot shows that the condition of Australian

roads can be measured. In turn, different roads could be ascribed basic national standards that they might be expected to deliver, and outcomes could be measured and analysed over successive reports for progress. It is not a big step from this measurement to linking some element of funding to that end, so that over time, governments can demonstrate to taxpayers a greater adherence to agreed standards of road provision, or a better percentage of roads delivering the outcomes that are expected of them.

### **Road asset reporting offers promise for more widespread commercial road investment**

Roads to date have been seen as things for the public to fund, but where economic benefits are obtainable, particularly from more productive road freight. The two case studies conducted both suggest that some freight upgrades on existing road networks might not only be economic, but indeed could be entirely commercial - that is, a private investor, such as a freight operator, or freight customer, or their financiers, could invest in projects that will deliver an acceptable return 'on and of' capital outlay, probably under concession arrangements. Previous reports to Infrastructure Australia have also revealed that some governments already have in place effective third-party access and improvement models for the road network, which even accommodate multi-party access<sup>XXV</sup>.

## A future set of standards and outcomes for roads is not yet clear, but there are no shortage of candidates worthy of measurement and funding through national road asset reporting

Road asset reports offer a way for government to develop aspirational standards around roads, fund these standards and measure progress on their attainment as outcomes. The sort of standards that might be envisaged under such arrangements might include the four issues that follow here. There are almost certainly more areas of road improvement that could benefit from such analysis and targeted funding than those below. Such a process does not assume any greater funding *quantum* being required from either government or private sector. It is simply a matter of developing a system wherein current expenditure can be measured for its efficiency and value for money in attaining economic and social outcomes.



### Better flood-proofing of Australia's roads: national passability standards

Harnessing the sort of road condition reports seen in this pilot, Australia could choose to develop standards to reduce the overall percentage of roads of different classes that are nominally impassable after different levels of rain.

It is not only major floods that cost communities and economies. Where say a gravel road fronts a rural property, an aspirational standard might be to make such roads passable after 20mm of rain. The road assessment method used in this pilot can determine the extent of the roads in this condition both for individual roads and for entire networks: as a result of its asset condition reports, Gwydir Shire, for example, can already demonstrate that around 14% of its road network is rendered impassable after 20 millimetres of rain.

Other standards such as the length of time that the road is cut by a particular level of flooding

can be considered. For example, a road that is cut for 3 days in a flood of 20 years average return interval may be considered to be acceptable for a particular standard of road, but unacceptable for a major arterial route. As the case study earlier in the report has shown, freight customers like farmers incur very significant extra costs from roads being so poor as not to be passable after relatively minor rain events. In these ways, over time, Australia could aim to produce roads that better served economic activity and community amenity in the face of weather events.

The results of this pilot suggest that progress against such aspirational standards is entirely measurable. A national asset condition report would give a picture of how the current road network shapes up against this target, and funding could be allocated for such ends and progress measured over time.



## \$27 billion up for grabs: achieve higher safety standards in road engineering

The Australian Government estimates that road trauma costs the economy \$27 billion annually. Could safety be engineered into roads to create savings? Australia is already an acknowledged leader in road safety. However, Australia is not as advanced in engineering better safety outcomes into the very maintenance and renewal of its roads as some other countries: in Holland, for example the *Sustainable Safety* road program<sup>XXVI</sup> looks at road safety very differently: it acknowledges that humans will often be to blame for accidents. It therefore seeks to 'build' greater safety and survivability 'into' road networks themselves (across their design, construction, maintenance and renewal stages), to ensure that when drivers make mistakes (as, it is argued, they inevitably will), the results of the mistakes are much less likely to be fatal or otherwise costly.

Australia has research institutes in this field that are considered global leaders, such as the Monash University Accident Research Centre.

Such research has shown that there are many aspects of Australian road engineering that could be bettered along the lines of Holland's *Sustainable Safety* Approach, to save more lives:

- \*Treating roadside hazards such as tree trunks and lightpoles inside the road verge can reduce collisions with such obstacles by 68%<sup>XXVII</sup>;
- \*Clearer road markings at intersections and right turns from highways (which 'channel' traffic more clearly) reduce casualty crash frequency by 36%<sup>XXVIII</sup>;
- \*Crash rates can be reduced by 20% for every one metre increase in road seal width (shoulder sealing)<sup>XXIX</sup>; and
- \*Roundabouts at rural intersections can reduce casualty crash risk by 70-80% and the cost of such crashes is reduced by 90% when roundabouts are present.<sup>XXX</sup>



### **The most productive trucks in the right places, sustainably; identify demand-driven freight efficiency and investment opportunities, including commercial road upgrades**

As the case studies demonstrate, road condition reports form a clear basis for rigorous business cases to be developed for higher productivity road freight access. When combined with accurate data on current freight levels and demand, as well as an understanding of the capacity of more modern heavy freight vehicles, condition reports give investors a clear sense of where road improvements and better access make the most sense. Some of these assessments might show economic benefits such that government would be wise to invest in such

outcomes; genuine commercial opportunities can also be discerned through access to road asset condition reports.

A national approach that supported this sort of scrutiny could see many current freight routes opened to greater productivity. It holds particular promise for addressing many of the 'first and last mile' access problems of the freight task, where restrictions on heavy vehicle access on smaller roads at the beginning and end of journeys can damage the overall productivity of the task.



### Measure and reduce the cost of rough roads to the economy and environment

As the cost of fuel increases and as the environmental impacts of vehicle carbon emissions become better understood, road agencies, civil engineering and in particular freight operators have become increasingly aware that rough roads result in higher financial and economic costs - that is, greater fuel consumption and vehicle wear and tear, slower travel times and increased carbon emissions. There is an established global body of research showing a positive correlation between road roughness and fuel consumption <sup>XXXI</sup>.

The costs of this to individual companies, such as large trucking fleets, is not insignificant: for instance, Australian research has suggested that travelling on a road that is only in fair to poor condition versus travelling on a very good road can differ the fuel consumption costs on a B-double by over 50% <sup>XXXII</sup>. Such hidden cost increases are passed on to customers in the form of increased freight prices, which in turn result in higher cost of domestic and exported goods.

State and local government civil engineering

bodies have accurate and internationally-recognised roughness indicators and attempt to maintain roads to levels that will not cause uncomfortable, unsafe or economically costly driving conditions. But these standards remain invisible to governments and the community, not measurable nationally and not linked in any way to road funding objectives. This combined with no transparency in road asset conditions virtually guarantees that road roughness, while known to be a very significant financial, economic and environmental cost to Australia, cannot be improved upon in any measurable, efficient way.

By making simple road roughness assessments that would become possible as part of national road condition reports, Australia would gain a picture of the depth and breadth of this problem - and its likely true financial and economic cost to the nation. It could start to target standards for roughness and direct funding year by year to reduce the overall roughness of the network, thereby bringing about reliable, quantifiable financial economic and environmental benefits to the nation.

## Asset reporting offers an efficient alternative to imposing productivity restrictions on 'cash-strapped' road assets

The corollary of more private investment is that public funding pressures on roads might reduce at the margins, or if not, at least some GDP-enhancing road investments would be made over and above what otherwise might have been possible with taxpayer funds alone. This is important. More productive use of the road asset wears it out more quickly. A key feature of historical road provision has been that when road funding becomes scarce, the instinct of road agencies is to 'preserve the asset' for as long as possible at the expense of furthering freight productivity - put simply, truck weights in particular are restricted; as roads deteriorate but maintenance funds are scarce, trucks carrying weights which are heavier and therefore more productive, but also more wear-inducing will often be refused access to the road, as they would consume the road asset more quickly without additional public funds being able to offset this accelerated wear. The Productivity Commission's inquiry into the matter in 2007 made this same point:

*'Road agencies cannot be certain of receiving adequate funding of road expenditure from general revenues, In response, road agencies and local governments often regulate access road access by heavy vehicles to contain road maintenance and replacement costs. Such blunt mechanisms have the potential to significantly constrain freight transport productivity'.*

*(Productivity Commission Inquiry into Road and Rail Infrastructure Pricing final report p.347)*

In this sense, road funding pressures do cause economic efficiency levels to be actively restrained; this acts as a 'hidden' brake (or a 'non-price barrier') on the economy. But the case studies in this report are important evidence that there is a 'way out' from this crippling situation, at least for some roads: giving 'the market for freight' the opportunity to examine the network and make its own more efficient access arrangements and complementary infrastructure investments *is both realistic and can drive GDP higher.*

## Road reporting and the move to standards and outcomes for roads has a rail precedent

The national adoption of road asset reporting would involve some structural change, although the experience of the pilot suggests that the scale of the change involved might have been overestimated in the past. In any event, the change would have a close precedent in the Australian rail sector, most of which also works to agreed standards and outcomes for its infrastructure, and which has these standards and outcomes underpinned by auditable asset reports:

For example, in 1997, Australia's transport ministers set the following standards and outcomes for the national rail network:

*'Ministers envisage that this network should provide the following levels of service within five years:*

- *less than 2% of track subject to temporary speed restrictions;*
- *at axle loads up to 21 tonnes, maximum speed of 115kph; average speed of 80 kph;*
- *at axle loads between 21 and 25 tonnes a maximum speed of 80kph and average speed of 60kph; and*
- *1800m train lengths on the east-west corridor, 1500m on the north-south corridor.*

*In the longer term the system should deliver:*

- *at axle loads up to 21 tonnes, a maximum speed of 125 kph and an average speed of 100kph; and at axle loads between 21 and 25 tonnes a maximum speed of 100 kph and an average speed of 80 kph;*
- *increased clearances to allow double stacking' <sup>XXXIII</sup>.*

The anticipated timeframes for achieving these rail standards might seem overly ambitious in hindsight, but the fact remains that since this time much of Australia's railfreight network has been *measured, funded and reassessed with such standards and outcomes in mind* and over time, more of the network has stood to achieve transparently better service levels. Harnessing the skills and experience of the rail sector in this respect would be of value for the development of similar approaches in road.

## Road asset reports can facilitate useful and far reaching road funding reform

The outcomes of this road asset reporting pilot suggest there are genuine opportunities for Australia to move to a more reliable funding and measurement model for road infrastructure. This model would be characterised by agreed national standards and priorities, regular asset reporting and with progress against these standards measured over time and funding targeted accordingly.

The Productivity Commission inquiry into road infrastructure pricing of 2007 touched on alternative road funding models, but ultimately found shortcomings in available models:

*'There are two main approaches (to a road fund):*

- *Formula-based system - this would involve allocating funds based on network and traffic characteristics. For example, specific parameters could include the length of road, vehicle volumes, vehicle numbers or just population*
- *Cost-benefit analysis - this would involve allocating funds based on a more careful assessment of road network needs. Road projects would be evaluated using a cost-benefit analysis and ranked according to expected net benefit and overall priority. This is the approach used in New Zealand' XXXIV.*

The success of collated road condition reporting perhaps offers a 'third approach' to a road fund - one that is neither *backward-looking*, such as a formula-based system that relies on historic road spends and traffic data to fund future roads, nor *too daunting* in that not every road need be subjected to cost-benefit analysis.

A third approach enabled by national asset reports could involve setting some aspirational national productivity, safety and amenity standards for the road network and providing targeted funds to these ends, based on an understanding of existing road condition relative to the standards aspired to. Outcomes could be monitored with reference to successive condition reports and funding and standards fine-tuned over time. Such a model would allow for cost-benefit and net present value and rate of return analysis to be conducted on potential

projects, but these would often be 'demand-driven' and therefore, *ceteris paribus*, more reliably profitable than many current government or 'supply-driven' efforts.

This sort of funding system might not need to replace the current grants funding and allocation system altogether - for example, initially, a targeted funding of national standards for roads might constitute only a minor element of the existing roads budget and this might alter over time depending on the demonstrated value of early outcomes.

## A national road portfolio manager would be a logical 'clearing house' for this system

The efficacy of collated road asset reporting to a high standard, as seen in this pilot, suggests that Infrastructure Australia's previous advice to the Council of Australian Governments regarding the establishment of a national road portfolio manager *is practical and has merit*: it is clear that there are road asset reports worth collating. A central portfolio manager for Australia's \$150 billion dollar, 800,000 kilometre road network would be best placed to collate and analyse these reports and use them to develop worthwhile national standards and outcomes for roads over time.

There would seem to be merit in the portfolio manager being an independent statutory body, removed from governments, to avoid claims of road budget and standard politicisation, but also to avoid tensions between different levels of government over funding issues.

Physically, a national road portfolio manager would likely be modest in size, perhaps located in a regional centre (there seems no need for it to be located in Canberra, for example). Funding for the office might be expected to come from contributions from the federal department of Transport and Infrastructure, the National Transport Commission and Austroads - all of which are in part funded to pursue better road infrastructure outcomes.



## Likely tasks for a road portfolio manager:

- Develop and maintain national asset reporting templates
- Collate mandatory asset reports from owners (ie 560+ governments) (annual/biennial/triennial?)
- Develop draft national road standards and outcomes for government consideration
- Publish asset reports and standards (ie web-based) for market and community scrutiny
- Coordinate market access and improvement proposals for roads in consultation with sovereign road asset owners (ie state and local governments)
- Responsibility for allocating a portion of total road funds to the achievement of agreed road standards across jurisdictions as necessary
- Monitor and measure outcomes for progress against standards and acquittal of targeted funds for the purposes prescribed, supervise occasional audits of condition reports
- Provide annual reporting to governments on progress against agreed standards.

## Road Map: a path to the future

Moving towards targeted funding of national road standards will take time; perhaps a sensible first step would be to make a modest portion of overall road funds available for targeting to projects and standards identified in an initial national road asset condition report. From there, progress could be measured over time. In any event, the following steps seem a sensible path to follow:

**Establish national road standards and outcomes** determine what is expected from roads nationally, in terms of outcomes that are measurable and can be improved through application of targeted funding over time;

**Mandate road asset condition reporting at all levels** receive collated and consistent reports to international best practice standards about the current condition of all of Australia's roads on a recurrent basis;

**Make the road funding system responsive to standards and outcomes** - start to target and tie an element of the total road funding budget to

the achievement of the standards and measure the outcomes regularly by reference to the asset reports to gauge progress and check on proper acquittal of these funds;

**Offer market and community access to road asset reports** - allow demand-driven interests to inform commercial road access and improvements as well as (economic) business cases that seek public funding; allow community preferences to provide guidance on the sort of standards and outcomes aspired to for the road network; and

**Establish a national road portfolio manager** - to manage the business of report collation, measure outcomes in relation to agreed national road standards over time and coordinate market access and investment proposals for the road network with asset owners (ie local and state governments).

**Publish standards and outcomes** make road asset condition reports, the standards established for roads and progress against funding these outcomes available to the public to provide scrutiny on progress.

## ENDNOTES

- i. Helm, Dieter *Infrastructure Investment, the Cost of Capital and Regulation: An Assessment* Oxford Review of Economic Policy, Volume 25, Number 3, 2009. p.308
- ii. Ibid
- iii. World Economic Forum USA prepared in collaboration with PriceWaterhouseCoopers *Paving the Way: Maximising the Value of Private Finance in Infrastructure* August 2010 preface, p.vii
- iv. Commonwealth Department of Transport and Regional Services quoted in Parliament of the Commonwealth of Australia, House of Representatives Standing Committee on Economics, Finance and Public Administration *Rates and Taxes: A Fair Share for Responsible Local Government* ('The Hawker Review') (2003) p. 73
- v. Infrastructure Australia/GHD *Draft Submission to the Productivity Commission Inquiry into the National Access Regime* (March 2013) see *Executive Summary*
- vi. These dot points largely replicate those raised in the *Rural and Regional Transport Infrastructure Project* a concept paper developed by the Warren Centre for Advanced Engineering, Sydney University (2008)
- vii. Infrastructure Australia *Communicating the Imperative for Action* Report to COAG (June 2011) (p. 56)
- viii. That is, 'the cost on and of capital'.
- ix. Productivity Commission *Road and Rail Freight Infrastructure Pricing Report No 41* (December 2006) *Inquiry* final report p. 254
- x. Early COAG Road Reform Program papers implied the view that direct charges would be based on marginal engineering costs - that is, costs associated with the degradation of the road due to its use by a truck. Even in this circumstance, understanding actual asset condition is pivotal - it is necessary to determine expected condition pre-truck use and condition post-truck use - this precise difference being the 'marginal wear and tear.
- xi. Grain Infrastructure Advisory Committee *Report on Road/Rail Options for Grain Logistics* Department of Transport NSW (2004) <http://www.transport.nsw.gov.au/sites/default/file/publications/GIAC-Report.pdf>
- xii. Productivity Commission Op Cit p.127

- xiii. OECD *Infrastructure to 2030: Volume 2: Mapping Policy for Electricity, Water and Transport* (2007) p. 39; see also the annual reports of the Independent Transport Safety and Reliability New South Wales (Annual Reports 2003-5; 2008-9) as they relate to rail track condition, reporting on this condition and safety and performance outcomes.
- xiv. As this report goes on to explain, 7 of the 8 shires filed returns; 6 of the 7 returns were collated in time for this report. There were 2,263 roads included across this network of 6 local governments.
- xv. Productivity Commission Op Cit Finding 5.2
- xvi. Ibid pp. 95-99
- xvii. OECD Op Cit p.26
- xviii. Parliament of the Commonwealth of Australia, House of Representatives Standing Committee on Economics, Finance and Public Administration *Rates and Taxes: A Fair Share for Responsible Local Government* ('The Hawker Review') (2003) p. 63
- xix. The Institute of Public Works and Engineering Australia provides asset management training and monitors take up rates for professional asset management and reporting across local governments. It has reported significant uptake of this training and these programs in recent years. See also IPWEA National Asset Management Strategy Committee *Report and Decisions Paper* (2010)
- xx. Independent Transport Safety and Reliability New South Wales *Annual Report 2004-05 Comments and Outlook for 2005-06*
- xxi. Jeff Roorda and Associates *National State of the Assets Pilot a Report for the Australian Local Government Association* (2012) [http://www.jr.net.au/Downloads/Reports/ALGA\\_StateOfTheAssets2012.pdf](http://www.jr.net.au/Downloads/Reports/ALGA_StateOfTheAssets2012.pdf)
- xxii. Peece Pty Ltd *Northern Inland Region of NSW Freight Study* a report commissioned by Regional Development Australian Northern Inland (2012) see chairman's foreword to the report.

## ENDNOTES

- xxiii. Infrastructure Australia *Reform and Investment Framework: Guidelines for making submissions to Infrastructure Australia's Infrastructure Priority List* - May 2012 Template 7: [http://www.infrastructureaustralia.gov.au/publications/files/IA\\_Submission\\_Template\\_Stage7\\_May\\_2012.pdf](http://www.infrastructureaustralia.gov.au/publications/files/IA_Submission_Template_Stage7_May_2012.pdf)
- xxiv. ABS and census production statistics by LGA refer.
- xxv. South Australia has developed very promising deed arrangements between the Solicitor-General, Transport SA and the access seeker for allowing mining companies commercial improvement and access rights on public road networks; in some cases this accommodates multi-party access arrangements. See Juturna Consulting *COAG Road Freight Incremental Pricing Trials: a report to Infrastructure Australia 2011* [http://www.infrastructureaustralia.gov.au/publications/files/COAG\\_Road\\_Freight\\_Incremental\\_Pricing\\_Trials.pdf](http://www.infrastructureaustralia.gov.au/publications/files/COAG_Road_Freight_Incremental_Pricing_Trials.pdf)
- xxvi. See the Netherlands Institute for Road Safety Research's Sustainable Safety factsheet: [http://www.swov.nl/rapport/Factsheets/UK/FS\\_Sustainable\\_Safety\\_principles.pdf](http://www.swov.nl/rapport/Factsheets/UK/FS_Sustainable_Safety_principles.pdf)
- xxvii. Tziotis, M: *Evaluation of mid-block accident "Black Spot" treatments*. Monash University Accident Research Centre Report No 48 (1993)
- xxviii. Newstead S and Corben B *Evaluation of the 1992-96 Transport Accident Commission-funded black spot treatment program in Victoria* Monash University Accident Research Centre Report No 182
- xxix. McLean J *Review of accidents and rural cross section elements including roadsides* ARRB Transport Research Report No ARR 297 (1996)
- xxx. Newstead S and Corben B *Op Cit*
- xxxi. For example, see Than, F; Thoresen, T; and Evans, C; *Review of Vehicle Operating Costs and Road Roughness: Past Current and Future* a published paper from the ARRB national conference in Perth 2012: <http://www.arrb.com.au/admin/file/content128/c6/Tan.pdf>
- xxxii. Ibid p. 8: the definition of road conditions used here, such as 'poor' or 'good', relates to the *International Roughness Index*
- xxxiii. Communique of the Australian Transport Council's *National Rail Summit 1997* <http://www.atcouncil.gov.au/communique/atc4.aspx>
- xxxiv. Productivity Commission *Op Cit* p.282





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