

COOMA AND MONARO PROGRESS ASSOCIATION

CONCEPT PLAN FOR CANBERRA TO EDEN RAILWAY

PART 3B — SOCIOECONOMIC COST / BENEFIT ANALYSIS



INTRODUCTION

In Part 3A of the Concept Plan, the financial appraisal of the Canberra–Eden railway indicated that a substantial public subsidy would be required in order to make construction of the line attractive to a private-sector participant; the present value of this subsidy is estimated at \$1.3 billion, comprising \$950 million for construction over 5 years, and \$340 million over 30 years as a cost-recovery subsidy for the passenger rail operation. This document details the external benefits that will be generated by the railway, which justifies such a level of public spending.

In order to make a preliminary estimate of the cost/benefit ratio for the project, plausible values for various benefit classes have been identified in reliable literature. It should be noted that these estimates are of a general nature and are no substitute for a rigorous cost/benefit analysis specific to this case, however they are sufficient to ascertain the broad magnitude of the economic impact of the railway.

All figures have assumed future growth of freight and passenger traffic as detailed in Part 3A. The discount rate for all forward estimates has been set at 7%, in accordance with typical Australian government practice for cost-benefit analysis. All dollar figures have been converted to 2018 AUD, except where otherwise noted.

EXECUTIVE SUMMARY

The external Net Present Benefit of the railway is estimated at \$3.32 billion over 30 years, far exceeding the public expenditure of \$1.29 billion; the Benefit–Cost Ratio is 2.58 and the payback period (at which net discounted public benefits exceed net discounted public costs) is 8 years. The magnitude of the BCR is not materially dependent on the selected discount rate; this reflects the strong early-year benefit stream due to the provision of affordable housing options.

The great majority of benefits (about 60%) accrue to passengers, either directly, or as a result of improved access to affordable housing. Long-distance passengers gain the most direct benefits from improved travel time.

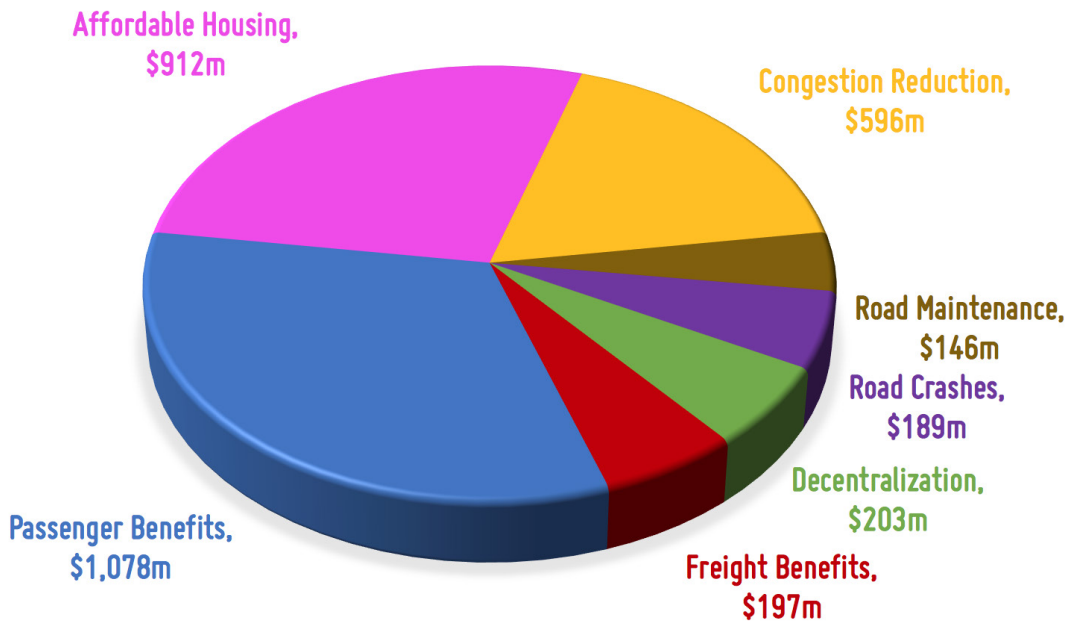
Freight users see only modest external direct benefits, as the majority of the freight benefits are internalized through higher access charges.

The remainder of the benefits accrue to the wider public:

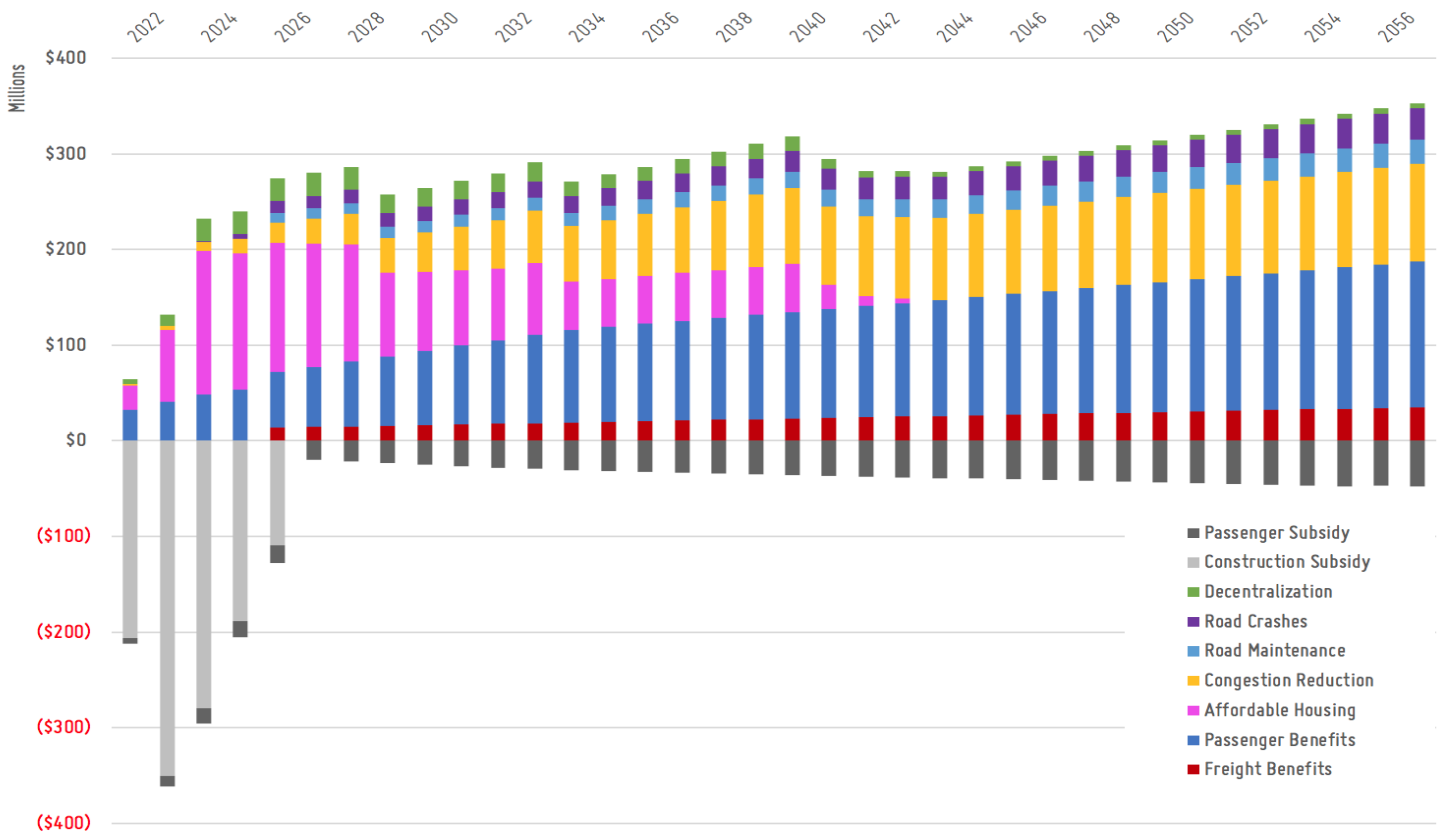
- **Congestion reduction** in Canberra through diversion of population growth to regional townships with near-zero marginal cost of congestion;
- **Road maintenance** reduction on highways and rural roads, due to diversion of freight from trucks to rail;
- **Road crash** related expenses are reduced due to diverting freight and passenger traffic to rail, for which the crash-related expense per vehicle-km is close to zero;
- **Decentralisation** goals of increased population and business activity in regional centres

As was the case for the financial appraisal, the external benefits of the railway are strongly dependent upon the value-capture development strategy, which is critical to the provision of affordable housing. If half the affordable housing benefits are achieved, the BCR falls to 1.22. If no affordable housing at all is provided, BCR falls below 1, to 0.87. Value capture is therefore critical — it makes the difference between a project with strongly positive net public benefits, or a project that has either marginal or negative net benefits.

NET PRESENT VALUE OF EXTERNAL BENEFITS



COST/BENEFIT BY YEAR



FREIGHT COST SAVINGS

The majority of the benefits that accrue to freight customers are captured in the pricing structure of the railway provider. This pricing structure actually results in higher rail access charges on a per-kilometre basis, resulting in a slight net disbenefit for existing rail customers, on an access-charge basis. However, the railway will not only capture market share from existing railway routes, but also from road freight, for which the savings are substantial.

Part 3A of the Cost Benefit Analysis estimated that 902 million Net-Ton-Km would be captured from existing rail operators, and 391 NTK would be captured from road. The net benefit of this diversion is estimated at \$4.8 million/annum in the first full year of operation.

- **Diverted from Rail**
 - 902 million NTK/annum
 - \$10.41/000-NTK higher cost than existing rail freight
 - Annual disbenefit of \$9.4 million
- **Diverted from Road**
 - 391 million NTK/annum
 - \$36.38/000-NTK lower cost than existing road freight
 - Annual benefit of \$14.2 million

DIFFERENTIAL PORT COSTS

The connection of the Port of Eden to the national rail freight network will allow freight customers to take advantage of the lower port costs at Eden compared to other major ports. Considering the breakdown of bulk and containerized freight that is forecast to use an upgraded Port of Eden, and the existing difference in port and wharfage costs detailed in Part 3A, the initial annual savings expected are \$2.0 million dollars for bulk freight operators, and \$6.9 million dollars for containerized freight operators.

In aggregate therefore, the net direct benefits for freight operators therefore come to \$13.7 million per annum, which represents a net present benefit of \$197 million over 30 years.

PASSENGER COST SAVINGS

The railway brings both costs and benefits for passengers — on the one hand, the significant costs of private automobile travel are avoided, but on the other, rail fares add a substantial cost of their own.

We will assume that 67% of passengers (2,353 passengers per day) represent mode shifts from daily commuting within Canberra. The average commute in Canberra is 12km and 18 minutes long. Applying generally accepted costs for car usage, time and parking results in a cost per one-way commute of \$19.84, representing a \$17.0 million saving to commuters annually. Applying the same assumptions to the rail service results in a total cost per one-way rail trip of \$25.75, or \$12.4 million per year for all passengers. The result is a net disbenefit to users of \$5.0 million annually (note that this is more than offset by the net benefit of improved access to affordable housing, of well over \$100 million dollars annually in the early years of the project).¹

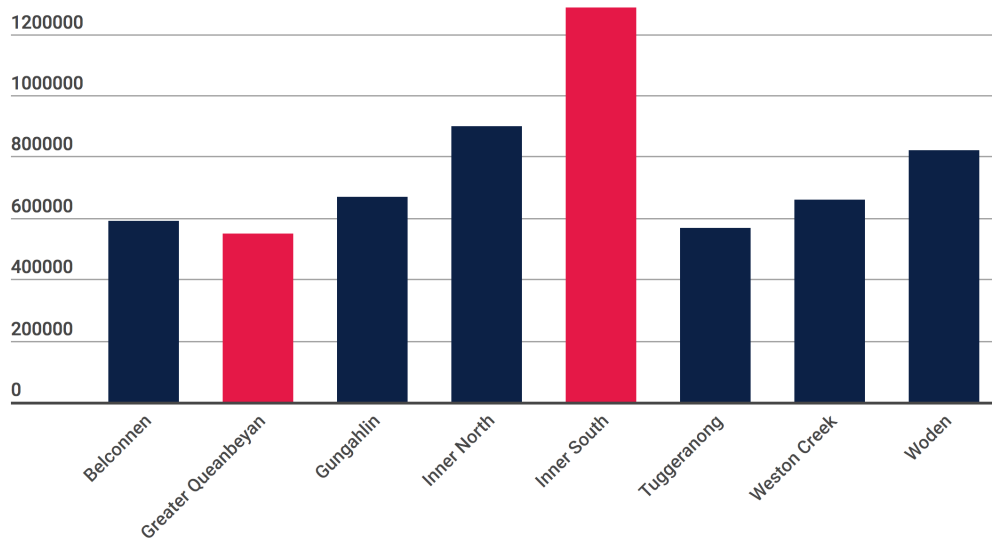
Put another way, the net disbenefit of switching from a suburban car to an exurban rail commute, twice per day for 48 weeks per year, is just over \$2,800 per year. The net present cost of this disbenefit over 30 years is under \$50,000 at 4% discount (or as low as \$35,500 at a 7% discount), in any case easily exceeded by the up-front saving of \$150,000 in more affordable housing options.

The other 33% of passengers are assumed to represent mode shift from long-distance intercity driving. Adapting the RMS traffic volume data from Part 3A, the average trip is 253km and 162 minutes long, which would represent a one-way driving cost of \$212 using the same assumptions as above. Likewise, the average train journey of 251km and 114 minutes would have a total cost of \$79, giving a net benefit of \$133 per passenger. Multiplied by 1,130 passengers per day, the annual benefit to long-distance passengers totals \$55.0 million per year.

The total net benefit to passenger direct costs is therefore \$48.5 million per annum in the third year, with the great majority of the benefits accruing to long-distance travelers. Over 30 years, the NPV of the benefit is \$1.08 billion.

ACCESS TO AFFORDABLE HOUSING

Median house price by ACT region (March 2018 quarter)



Canberra is one of Australia’s most unaffordable cities for housing, with a median house price of over \$753,516 in December 2017 (well ahead of all other capitals except Sydney and Melbourne).² Currently the median house price in the regional townships that would be served by the railway ranges from 210,000 to \$450,000.³ With over 40,000 new dwellings in eight regional townships, this represents a large provision of affordable housing.

While the price gap would be expected to close somewhat with the advent of the fast railway and high quality developments, it is reasonable to assume that an initial price advantage of \$150,000 per dwelling would be achieved in regional townships, with the difference gradually reducing to \$100,000 over 10 years. This benefit would accrue directly to the purchasers of these new dwellings as they are released to the market over 20 years of development, representing a net present benefit of \$912 million.

A NOTE ON VALUE CAPTURE

“Value Capture” is not included as a potential external benefit, as it has been adopted as the primary financing method for the railway proponent, and is thus an internal financial benefit. In Part 3A it was proposed that existing stations and railyards become medium-density mixed-use development precincts, with the profits therefrom to accrue to the railway proponent. Apart from these central “village centre” style nodes, no change is proposed to the overall density and spatial footprint of townships.

This differs from the type of value capture proposed in the recent Federal Government report on a national settlement strategy, “Building Up and Moving Out”,⁴ in which it is proposed that in cities connected to fast rail, adjacent farmland or low-density housing shall be progressively rezoned to medium- or high-density residential, with a capital gains tax style surcharge levied upon the beneficiary of the resultant value uplift. This strategy is predicated on a very substantial population increase in affected communities, rising over several decades to many multiples, possibly even orders of magnitude greater than the township’s present population.

While there would certainly be an option for future governments to pursue such a benefit stream if a development goal of this magnitude were adopted, its omission in this document demonstrates the economic viability of the proposal even without a radical re-imagining of the communities affected.

DECENTRALISATION

There is presently a push to incentivise settlement in regional Australia, especially by new migrants, with a number of grants available that directly reward individuals, households, or businesses for relocating to a regional area. This enables us to estimate the value placed upon regional population growth by state and federal governments (although it should be noted that the actual cost-benefit ratio of such incentives is a subject of debate).

We can use opportunity cost of related government programs to estimate an imputed value that government assigns to the decentralization of population out of capital cities. Recent decentralisation efforts by government include:

- **Regional NSW Investment Attraction Package** — Grants to businesses to move skilled workers from metropolitan areas to regional NSW, capped at \$10,000 per worker. ⁵
- **Northern Territory's "Population Growth Strategy"** — Cash payments and other benefits totaling up to \$15,000 per household, upon moving to the Northern Territory. ⁶
- **Victoria's "Great South Coast Economic Migration"** pilot project aims to relocate 20 families to Warrnambool Shire at a cost of \$162,000, making an average of \$8,100 per household. ⁷
- **Relocation of the Australian Pesticides and Veterinary Medicines Authority** – \$25 million budget to move 100 staff from Canberra to Armidale. Assuming a typical household size of 2.2 persons, this implies a cost per resident resettled to regional Australia of \$114,000 (although a majority of this cost would presumably be costs directly related to setting up the new facility, rather than as an imputed value of regional population growth) ⁸

The examples above place a reasonable value per resident resettled to regional Australia somewhere in the low five figures. In Part 3A, we estimated that approximately 43,000 extra residents would move to the Monaro and Far South Coast regions as a direct result of the railway. Taking a conservative value of \$10,000 per additional resident as our benchmark, the net present value of decentralisation goals is \$203 million over 30 years.

CONGESTION REDUCTION

Canberra-Eden rail will reduce congestion primarily by diverting private automobile traffic from Canberra to regional townships, where the marginal cost of congestion is effectively zero. While freight operations will also have some impact on congestion, it is considered here to be negligible in value due to the low marginal cost of congestion on most rural highways, which is where the majority of freight will be captured from.

The avoidable social costs of congestion in Canberra are projected to reach \$414 million per year by 2025.⁹ This represents an average per-capita congestion cost of \$650, however the *marginal* cost of congestion is significantly higher. Based on a median ABS population growth projection of 7,600 people per year, and the year-on-year rise of avoidable congestion costs of \$17.7 million per year, this implies a marginal congestion cost of \$2,329 per additional resident in the 2025 financial year.

Conservatively projecting the marginal cost of congestion to remain constant, the net present benefit of avoiding or deferring 43,000 extra residents in metropolitan Canberra is \$596 million over 30 years.

ROAD CRASHES & MAINTENANCE

The economic cost of road crashes in Australia is estimated at \$27 billion per annum. The last major government report into the cost of road crashes per vehicle-kilometre travelled (VKT) was in 2006 by the Bureau of Infrastructure, Transport and Regional Economics¹⁰ (data shown below); since that time, the number of road crashes has generally decreased while vehicle kilometres travelled have continued to increase for all vehicle classes, therefore the costs per VKT would now be somewhat lower.¹¹ However in the absence of more contemporary data, we will use the 2006 data but without adjusting for inflation — in effect, discounting the cost per VKT by the rate of CPI, about 2.5% per annum.

Vehicle Class	Road Crash Cost Per VKT
Motorcycle	\$0.202
Car	\$0.083
Rigid Truck	\$0.048
Articulated Truck	\$0.04

For cars, Canberra–Eden Rail is projected to replace 2,353 daily commutes (average length 12km), and 1,130 daily long-distance drives (average length 253km). Annually, this will avoid \$797,000 in commute-related road crash costs, and \$8.7 million in relation to long-distance trips.

For trucks, we exclude traffic that is diverted from other rail services. Dividing Ton-Kms per year by VKTs for trucks from the BITRE 2006 data gives an average value for net-tons per truck of 11 tons; we can therefore convert our expected traffic in net-ton-kms to Vehicle Kilometres Travelled, and thus apply the BITRE data for road trauma cost per VKT. Assuming 500km as the typical distance of each truck trip replaced, this results in an annual road crash cost saving of \$3.3 million.

In aggregate therefore, by the time it is fully operational the railway is expected to save \$12.7 million per year in road-crash related costs, with a net present benefit of \$189 million over 30 years.

ROAD MAINTENANCE

Canberra–Eden rail is expected to divert 391 million net-ton-km from road to rail. This represents an annual diversion of approximately 31 million truck-km, or 98,000 truck trips over the 313-km rail corridor. However the actual length of truck trips diverted to rail would be substantially higher than this; for example, the distance from the Bombala forests to the Tumut mills via the Monaro, Federal, Hume and Snowy Mountains highways is 420km, while Sydney–Melbourne containerized freight travels 878km. Additionally, the gross vehicle mass is substantially higher than the net tons carried, typically by a factor of 2.2. Assuming a typical journey length of 500km for the diverted freight, Canberra–Eden rail could potentially divert up to 1.19 billion gross-ton-km from the nation's highways.

The cost impact of trucks on highway maintenance is severe — a B-Double can be up to 20,000 times more damaging to roads than a typical family car.¹² A 2006 study by CRA International estimated the wear-and-tear costs caused by trucks to be \$8.47 per thousand GTK.¹³ Applying this cost to our diverted freight mass in GTK gives an annual maintenance saving of \$10.0 million dollars in the first full year of operation, with a total net present benefit of \$146 million over 30 years.

The Port of Eden is a major Royal Australian Navy facility. It is of particular importance as the navy's base for reloading ammunition following live-fire exercises or overseas deployments. The facility has the capability to perform up to 47 ammunitioning/de-ammunitioning operations per year, based on a maximum of 30 tons Net Explosive Quantity (NEQ) per operation.¹⁴ A 2017 defence white paper identified the need for wide-ranging review of Australia's explosive ordnance logistics network, in order to improve the efficiency and safety of the network. It has been suggested that a railway may be an effective means to improve transport of munitions to the base, due to its efficiency and segregation from the public road network.

Data for the cost of road transport of munitions is sparse, however a 1997 parliamentary report indicated that the transport cost implications of an ammunitioning facility at Eden would be in the order of \$1.6 million per year in contemporary dollars (including the cost of detouring ships to Eden, as well as the road transport of munitions).¹⁵ It is therefore evident that the direct economic benefits of switching munitions transport to rail is small in comparison to the other benefits we have investigated. Nevertheless, the strategic and security benefits of the move may still make it a desirable goal for the government.

REFERENCES

1

Julieta Legaspi and Neil Douglas (2015) “Value of Travel Time Revisited — NSW Experiment”, Australasian Transport Research Forum, 30 September — 2 October 2015, Sydney, Australia, URL = <https://www.transport.nsw.gov.au/sites/default/files/media/documents/2017/Value%20of%20Travel%20Time%20Revisited%20-%20NSW%20Experiment.pdf>

2

Lucy Bladen (2018) “Canberra’s median house price surges to record high: Domain report”, AllHomes.com.au, February 2018, URL = <https://www.allhomes.com.au/news/canberras-median-house-price-surges-to-record-high-domain-report-20180201-h0rce3/>

3

Realestate.com.au “Explore Australian Suburbs”, URL = <https://www.realestate.com.au/neighbourhoods/cooma-2630-nsw>

4

Parliament of Australia (2018) “Building Up & Moving Out – Inquiry into the Australian Government’s role in the development of cities”, House of Representatives Standing Committee on Infrastructure, Transport and Cities, September 2018, URL = https://www.aph.gov.au/Parliamentary_Business/Committees/House/ITC/DevelopmentofCities/Report

5

Mosiqi Acharya (2018) “Special incentives for businesses to move to regional areas”, SBS Hindi, 13 September 2018, URL = <https://www.sbs.com.au/yourlanguage/hindi/en/article/2018/09/13/10000-grants-special-incentives-businesses-move-regional-areas>

6

News.com.au (2018), “\$15,000 on offer to families willing to relocate to the NT”, 23 August 2018, URL = <https://www.news.com.au/finance/economy/australian-economy/15000-on-offer-to-families-willing-to-relocate-to-the-nt/news-story/82c33b3660d509aae1292d47993dfbfd>

7

Jaala Pulford (2018) “Media Release: Migrant families call regional Victoria home”, The Hon. Jaala Pulford, Minister for Regional Development, 8 August 2018, URL = <https://www.premier.vic.gov.au/wp-content/uploads/2018/08/180808-Migrant-Families-Call-Regional-Victoria-Home.pdf>

8

Lucy Barbour (2016) “Relocation of Australian Pesticides and Veterinary Medicines Authority to cost taxpayers \$25.6m”, ABC News, 25 November 2016, URL = <http://www.abc.net.au/news/2016-11-25/pesticides-veterinary-medicines-authority-allowed-to-relocate/7996372>

9

Bureau of Infrastructure, Transport and Regional Economics (2015) “Traffic and congestion cost trends for Australian capital cities”, Australian Government — Department of Infrastructure and Regional Development, URL = https://bitre.gov.au/publications/2015/files/is_074.pdf

10

Bureau of Infrastructure, Transport and Regional Economics (2010) “Research Report 118: Cost of Road Crashes in Australia 2006”, published February 2010, URL = https://bitre.gov.au/publications/2010/report_118.aspx

11

Frederick Litchfield (2017) "The cost of road crashes in Australia 2016: An overview of safety strategies", Report for Senator Alex Gallacher, 26 May 2017, URL = <https://www.aph.gov.au/DocumentStore.ashx?id=a37c13ee-72d4-47a9-904b-360d3e635caa>

12

Philip Laird (2017) "Trucks are destroying our roads and not picking up the repair cost", The Conversation (AU), June 23 2017, URL = <https://theconversation.com/trucks-are-destroying-our-roads-and-not-picking-up-the-repair-cost-79670>

13

Mike Smart and Simon Game (2006) "Two Case Studies on Road vs. Rail Freight Costs", CRA International, Report prepared for Pacific National, 25 May 2006, URL = https://www.pc.gov.au/inquiries/completed/freight/submissions/pacific_national_/sub041attachmentb.pdf

14

Parliamentary Standing Committee on Public Works (2000) "NAVY AMMUNITIONING FACILITY, TWOFOLD BAY, NSW", 22 June 2000, URL = <http://www.aphref.aph.gov.au/house/committee/pwc/twofoldbay/report.pdf>

15

Parliamentary Standing Committee on Public Works (1998) "EAST COAST ARMAMENT COMPLEX, POINT WILSON, VIC" URL = https://www.aph.gov.au/Parliamentary_Business/Committees/House_of_Representatives_Committees?url=pwc/ecac/ecacrep.pdf



This document was prepared by Stormcloud Engineering on behalf of:

Cooma and Monaro Progress Association

PO Box 1239

Cooma, NSW, 2630

It was assisted by a funding grant from the Snowy Monaro Regional Council.

Copyright to this work is owned by:

Stormcloud Engineering

PO Box 138

Bungendore, NSW, 2621

The work is licensed under the Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License. To view a copy of this license, visit:

<http://creativecommons.org/licenses/by-nc-nd/4.0/>

or send a letter to Creative Commons, PO Box 1866, Mountain View, CA 94042, USA.



You may use the work under the following terms:

Attribution — You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.

NonCommercial — You may not use the material for commercial purposes.

NoDerivatives — If you remix, transform, or build upon the material, you may not distribute the modified material.