

# *Cooma and Monaro Progress Association*

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## Economic Evaluation of the Proposed Canberra to Eden Railway



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2024**

## Author's note

Research of the data used in this report was carried out in 2021. The report, begun in 2021, was completed in 2024. Completion of the report entailed developments of evaluation components in the paper, 'Modelling Rural Freight,' in the Australasian Transport Research Forum, 2022. That paper, by the same author as of the present report used the same proposed railway as its primary example. The paper was withdrawn from the Forum website at the author's request prior to completion of the present report. The report does not account for CMPA's proposal in 2023 for a potential rail link from Canberra to Yass (C2Y), which was not included in the Michell/CMPA Concept Plan, which is the subject of this report. While the costs of this C2Y project are not known, by substantially reducing the travel distances and times, it would have large beneficial economic impacts on the Eden rail project.

## Executive Summary

This report has been prepared by R. J. Nairn (Economist) for the Cooma and Monaro Progress Association (CMPA) and contains passenger and freight forecasts, an economic evaluation of the proposal for the restoration of the rail link between Queanbeyan and Bombala and its extension to Eden as proposed in the "Concept Plan for Canberra to Eden Railway" prepared by Edwin Michell of Stormcloud Engineering in 2018 for the CMPA.

The objective of the study is to establish whether the rail link proposed in the Concept Plan is likely to return sufficient economic returns, within agreeable risk profiles, to be viable as a public enterprise.

The summary results of the economic evaluation are shown in the following table. They illustrate that the proposed rail project is marginally viable provided that the discount rate stays low and risks are well managed.

|                              |           |         |         |
|------------------------------|-----------|---------|---------|
| Discount Rate                | 3.0%      | 3.5%    | 4.0%    |
| Benefit-Cost Ratio           | 1.49      | 1.37    | 1.28    |
| Net Present Value \$millions | \$1,326.2 | \$984.8 | \$716.4 |
| Internal Rate of Return      | 5.31%     |         |         |

The risk assessment results indicate that the most probable outcome is an Internal Rate of Return of 4.74% and a Benefit-Cost Ratio at 3% discount rate reduced to 1.39. Discount rates higher than 5% would probably make the project risky. Careful risk management could still ensure that the project remains economically worthwhile.

While it is estimated that rail passenger services would attract many patrons, this alone would not economically justify the cost of the proposed rail improvements. The viability of the proposed railway and its services depends on attracting sufficient freight movements and on the further development at Port Eden and its ability to attract shipping lines to carry this freight traffic.

Conversely, while developing Port Eden with handling facilities for more road freight is estimated to induce added export value, the port is unlikely to reach its full potential without the freight and passenger access provided by the railway. Therefore the Port Eden development and the Canberra to Eden rail proposal need to be treated as mutually dependant.

The commentary in the risk analysis clearly shows that there are a number of important risk factors and uncertainties to be resolved. Shipping scheduling issues mean that, at first, the port at Eden would attract bulk and general cargo with some containers as deck cargo. Later, when congestion and delays at Port Botany and Port Kembla continue to grow, then Port Eden would begin to attract container shipping.

The modelling assumptions and the attitudes of producers and freight forwarders were tested and validated in a series of interviews across the potential catchment area of the proposed railway. While there was, of course,

in some quarters, a degree of scepticism expressed at the probability of the rail proposal being implemented, the commentary very clearly indicated the frustration and cost penalties borne by freight producers and freight forwarders due to congestion and other problems at Port Botany, some of which could be resolved by increased port capacity, be it at Sydney or elsewhere. This is clearly limiting Australia's export market and its economy.

While most of these frustrations were aimed at problems at ports, there were few complaints about rail services excepting where they could not be accessed economically. Several export producers indicated that they could and would expand their international markets and sales if they had access to improved rail services to ports. Where the data available allowed this to be measured it indicated that the added value to the nation's economy far exceeded the costs of the required transport improvements.

Many of the problems facing those producers and freight forwarders interviewed, were not capable of being measured in terms that could be included in the economic or financial computations and, in this respect, the economic results should be considered to be conservative and not fully representative of the complete benefit spectrum available from the proposed rail and port developments.

The lock-down in Canberra and New South Wales due to COVID-19 has meant that it was not possible to interview several other stakeholders with clear interests in the Rail or port proposal. However it is not considered that these omissions would seriously alter the results of the modelling forecasts or the resulting economic results.

## Table of Contents

|   |           |
|---|-----------|
| <b>Author’s note .....</b>  | <b>i</b>  |
| <b>Executive Summary .....</b>  | <b>i</b>  |
| <b>List of Figures .....</b>  | <b>iv</b> |
| <b>List of Tables.....</b>  | <b>iv</b> |
| <b>1. Introduction.....</b>   | <b>1</b>  |
| 1.1 The Project .....   | 1         |
| 1.2 Methodology Overview.....   | 2         |
| 1.3 The relevant potential overseas market for freight.....               | 4         |
| 1.4 The Competing Ports.....  | 5         |
| 1.5 The Potential for Passenger Travel .....                              | 9         |
| <b>2. Socio-economic Profile of the Catchment Area .....</b>              | <b>10</b> |
| 2.1 Population, employment and wealth generation .....                    | 10        |
| 2.2 Rural Industry and Freight Production.....                            | 11        |
| 2.3 Socioeconomic forecasts .....   | 14        |
| 2.4 Rural industry forecasts.....   | 15        |
| 2.5 Australian Capital Territory and Urban Imports and Exports.....       | 17        |
| Source: ACT Economic Indicators .....                                     | 17        |
| <b>3. Passenger and Freight Demand Modelling .....</b>                    | <b>18</b> |
| 3.1 Introduction .....  | 18        |
| 3.2 Freight movement .....  | 18        |
| 3.3 Road / Rail competition.....  | 18        |
| 3.4 Rail freight to Port Eden or other Ports.....                         | 19        |
| 3.5 CARTS model calibration.....  | 19        |
| 3.6 Recent Freight and Passenger Data in the Corridor .....               | 21        |
| 3.7 The Modelled Freight and Passenger Forecasts.....                     | 22        |
| <b>4. Validating the Passenger and Freight Forecasts.....</b>             | <b>24</b> |
| 4.1 Lessons from the freight industry interview surveys .....             | 25        |
| 4.1.1. Rail operations in the Riverina .....                              | 25        |
| 4.1.2. Increased production due to transport improvements .....           | 25        |
| 4.1.3 Road versus rail transport.....                                     | 25        |
| 4.1.4. Current restrictions on industry due to transport problems .....   | 26        |
| 4.1.6. Potential for freight transfer from other ports to Port Eden ..... | 26        |
| 4.1.5. Reported potential for export growth.....                          | 27        |
| 4.1.7. Preparedness for Growth .....                                      | 28        |
| 4.1.8. Potential for induced growth in production .....                   | 28        |
| <b>5. Economic evaluation.....</b>  | <b>29</b> |
| 5.1 The Nature of the Economic Evaluation .....                           | 29        |
| 5.1.1. Introduction .....   | 29        |
| 5.1.2. The Benefits from the Project.....                                 | 29        |
| 5.1.3. The Resources Consumed.....  | 30        |
| 5.1.4. Processing the evaluation .....                                    | 31        |
| 5.2 The results of the economic evaluation.....                           | 31        |
| 5.2.1. The value of the Port at Eden without the Railway .....            | 31        |
| 5.2.2. The Economic Value of the Rail Proposal.....                       | 32        |

**Table of Contents (continued)**

|                     |   |           |
|---------------------|---|-----------|
| 5.3                 | Risk analysis.....                        | 32        |
| 5.4                 | Other Negative Risk Issues .....          | 33        |
| 5.5                 | Positive Risk Issues.....                 | 34        |
| <b>6.</b>           | <b>Conclusions .....</b>                  | <b>35</b> |
| 6.1                 | Introduction .....                        | 35        |
| 6.2                 | The Result of the Economic Analysis ..... | 35        |
| 6.3                 | Issues underlying the Conclusions .....   | 35        |
| <b>Appendix A –</b> | <b>Resume of R J Nairn .....</b>          | <b>37</b> |

**List of Figures**

|           |   |    |
|-----------|---|----|
| Figure 1  | The existing New South Wales rail network in the probable catchment area.....     | 1  |
| Figure 2  | - The proposed route options .....  | 1  |
| Figure 3  | Local Governments in the possible freight catchment area.....                     | 2  |
| Figure 4  | – The relevant part of the Simulated Network .....                                | 3  |
| Figure 5  | - Future changes to the Rail Network.....   | 3  |
| Figure 6  | - The port at Eden .....  | 5  |
| Figure 7  | - Port Botany.....  | 6  |
| Figure 8  | – Value of Agricultural Production – Riverina – 2018/2019 .....                   | 11 |
| Figure 9  | - A Rice Plantation in the Riverina.....  | 12 |
| Figure 10 | - A New South Wales Feedlot      New South Wales Wool Bales ready for Export..... | 12 |
| Figure 11 | - Packaged Plant for Meat and Grains Export .....                                 | 13 |
| Figure 12 | - Australian Wheat Exports .....  | 16 |
| Figure 13 | - Australian Cattle Exports to Indonesia .....                                    | 16 |
| Figure 14 | - Trip Length Frequency Calibration.....  | 20 |
| Figure 15 | - Road Traffic Volume Calibration .....   | 21 |
| Figure 16 | - Logs awaiting shipment at Port Eden.....  | 27 |

**List of Tables**

|          |  |    |
|----------|--|----|
| Table 1  | - Value of Commodity Exports to Eastern Seaboard Countries \$Millions - 2019 .....     | 4  |
| Table 2  | - Value of Imports from Some Eastern Seaboard Countries – 2017/2018 - \$Millions ..... | 4  |
| Table 3  | - Value of Agricultural-related Imports – 2017/2018 - \$Millions.....                  | 4  |
| Table 4  | - Australia’s Seven Busiest Ports – Value of Export Goods Handled - \$Billions .....   | 5  |
| Table 5  | - Eastern Seaboard Ports Freight Value \$Billions .....                                | 6  |
| Table 6  | - Forecast Container Loads at Port Botany – Tons pa Millions.....                      | 8  |
| Table 7  | - Forecast Numbers of Vessels calling to Australian Ports .....                        | 8  |
| Table 8  | - Actual number of Vessels calling at NSW Ports – 2018-19 .....                        | 8  |
| Table 9  | - Tonnage handled at NSW Ports 2018-19 .....   | 8  |
| Table 10 | - Tourism in the catchment area - 2020 .....   | 9  |
| Table 11 | - Population and Productivity of the Catchment Area.....                               | 10 |
| Table 12 | - Catchment Area Employment in Transport and Certain Rural Industries – 2006* .....    | 11 |
| Table 13 | - Value of NSW Rural Produce .....   | 11 |
| Table 14 | - Value of NSW Wool Exports - \$Millions .....   | 12 |
| Table 15 | - Value of NSW Beef Exports - \$Millions .....   | 12 |
| Table 16 | - Value of Global Dairy Imports by certain Countries - \$Trillions – 2013 .....        | 13 |
| Table 17 | - Australian Wine Exports – 2020 - \$Millions .....                                    | 13 |

**List of Tables (Continued)**

Table 18 - Key NSW Forecast Indicators ..... 14

Table 19 - Growth Rates by Town Size – Catchment Area – 2018 to 2021..... 14

Table 20 - Ageing in the Riverina..... 15

Table 21 - Local Government Employment and Relative Household Income – Riverina - 2008..... 15

Table 22 - Regional NSW Freight commodity demand forecasts, 2016-2056, mtpa..... 15

Table 23 - Forecast of Consumption and Transportation for New South Wales Grains - mtpa..... 16

Table 24 - Australian Capital Territory imports and Exports – 2020 \$'000..... 17

Table 25 - Long-run Road/Rail Freight Cross-elasticity ..... 19

Table 26 - Traffic counts on Selected Highways - 2021 AADT ..... 20

Table 27 - Calibration of Port Average Annual Tonnages - '000..... 21

Table 28 - Average Daily Two-way Traffic on Monaro Highway at Bredbo ..... 21

Table 29 - Car-occupancy at Bredbo ..... 21

Table 30 - Truck Loads at Bredbo Count Station..... 22

Table 31 - Freight Types carried past Bredbo Count Station ..... 22

Table 32 - Forecast Freight Average Annual Tonnages at NSW Ports – '000..... 22

Table 33 - Forecast Average Daily Two-way Rail Passenger Loads ..... 23

Table 34 - Probable Source of Forecast Passengers by Rail..... 23

Table 35 - Source of Forecast Freight to Port Eden – Tonnes '000 pa..... 23

Table 36 - Mode of Freight Access to Port Eden – Tonnes '000 pa..... 23

Table 37 - Coastal Shipping Freight Loads – 2018-19 – Millions of Tonnes ..... 27

Table 38 - Benefits from opening Port Eden for Truck Traffic with no Rail - \$Millions ..... 31

Table 39 - Economic evaluation results for the rail proposal - \$Millions ..... 32

Table 40 - Probable Range of Values for Risk Analysis ..... 33

Table 41 - Risk Evaluation Results ..... 33

Table 42 - Results of the Economic Evaluation ..... 35

# 1. Introduction

This report has been prepared by R. J. Nairn (Economist) for the Cooma and Monaro Progress Association (CMPA) and contains passenger and freight forecasts, an economic evaluation of the proposal for the restoration of the rail link between Queanbeyan and Bombala and its extension to Eden as proposed in the “*Concept Plan for Canberra to Eden Railway*” prepared by Edwin Michell of Stormcloud Engineering in 2018 for the CMPA.

The objective of the study is to establish whether the rail link proposed in the Concept Plan is likely to return sufficient economic returns, within agreeable risk profiles, to be viable as a public enterprise.

## 1.1 The Project

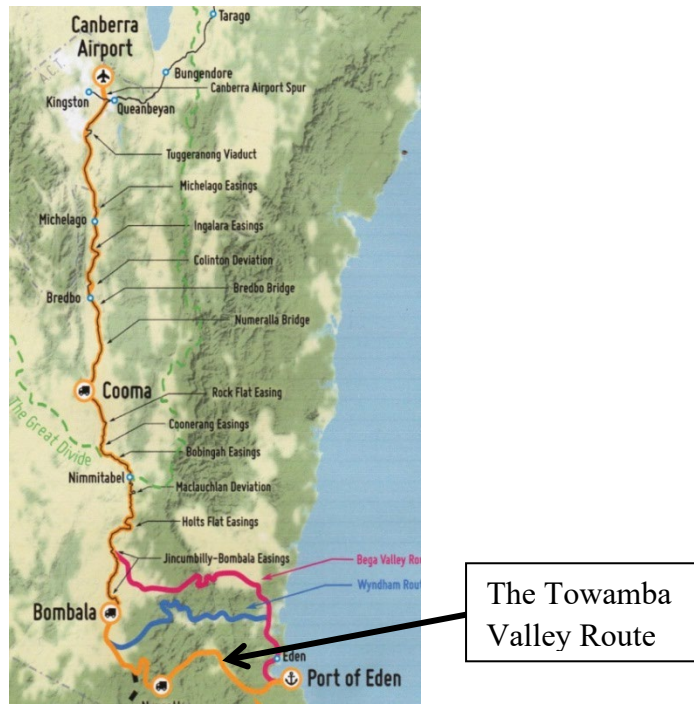
The existing rail network within the potential catchment area of the project is shown in Figure 1.

**Figure 1 The existing New South Wales rail network in the probable catchment area**



The proposed upgrade and three different potential rail alignments between Bombala and Eden were identified in the report cited above and are shown in Figure 2. The alignment strongly preferred in the above Concept Plan is the Towamba Valley route, which is the subject of this economic evaluation.

**Figure 2 - The proposed route options**



Source: “*Concept plan for Canberra to Eden railway*” Stormcloud Engineering 2018.

The evaluation relies on an assumption that the port development in future, together with the social and economic infrastructure within the town of Eden, will be extended to support this development. Some part of the passenger and freight traffic supporting this future development will be induced by the rail development – other development will occur as natural growth.

Similarly socio-economic growth will occur at intermediate towns along the proposed rail routes and they also will contain induced elements. It is assumed that both the port and townships development will keep pace with the expected demand for socio-economic services so that rail commerce will not be constrained by social or terminal capacity limitations in future. The natural growth of towns and the port, while essential to the success of the rail proposal, does not form a part of the economic assets of the rail proposal although the value of a part of any new rural growth and industrial production, induced by improved rail services, has been included within the benefit stream.

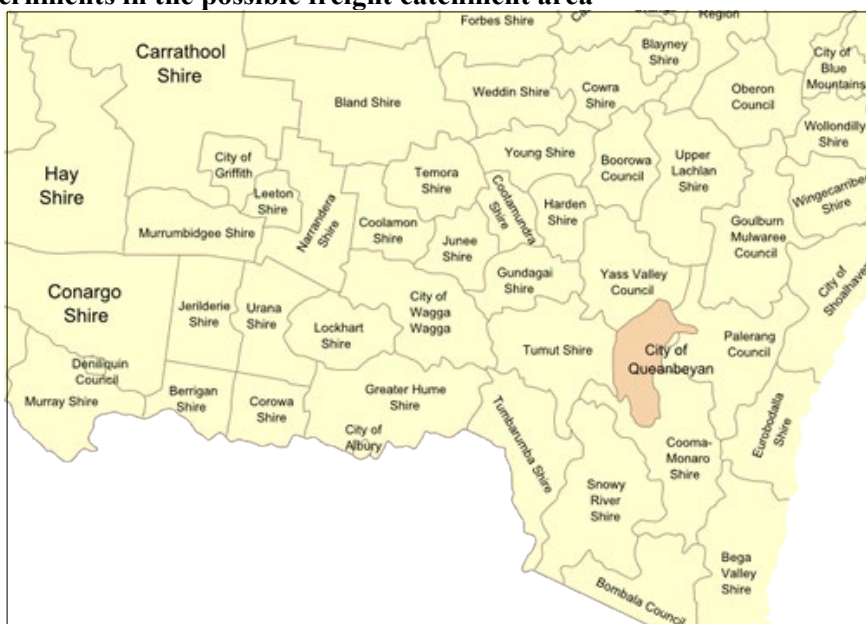
## 1.2 Methodology Overview

The passenger and freight demand forecasts have been assessed with the assistance of the CARTS model, which is a State-wide multi-modal transport forecasting model which incorporates estimates of road/rail competition, rail route diversion and rural industry growth potential induced by improved freight transport facilities. It also incorporates facilities for the economic evaluation of options in accordance with all appropriate Government Guidelines. The model contains a network of all road and rail routes in New South Wales with inventory details.

The towns of Queanbeyan, Michelago, Bredbo, Cooma, Nimmitabel, Bombala and Eden are located on the proposed rail route and would form the most probable primary potential rail passenger catchment, although passengers from Bega, Merimbula, Pambula and other towns in the area may also seek the opportunity for rail travel to Canberra, Sydney and other parts of the catchment area and the reverse.

While the proposed rail improvements will connect into the National Rail network and is therefore able to accept passengers and freight loads from any part of the country, is therefore imperative that the model should embrace the whole area of the State at least. However, the most probable freight loads are likely to eventuate from within the catchment area shown in Figure 3 which stretches from Dubbo and Carathool Shire to Bega Valley Shire. It is probable that areas as far north as Dubbo could also be included.

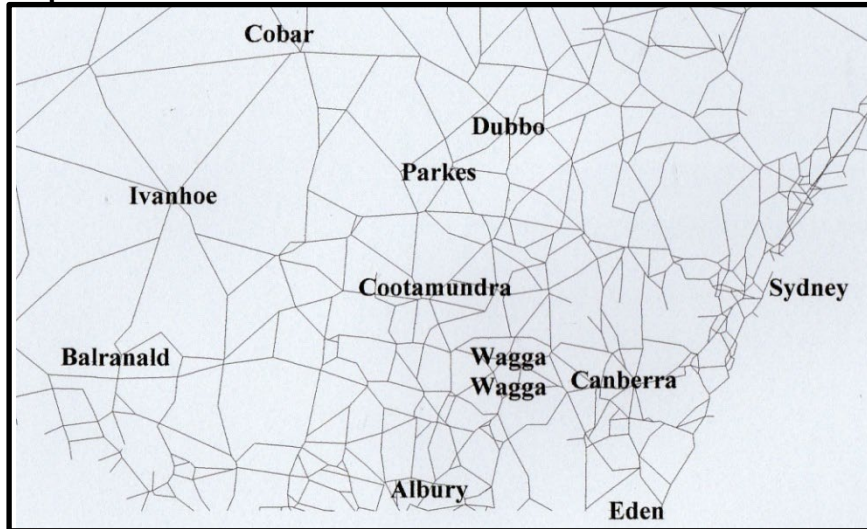
**Figure 3 Local Governments in the possible freight catchment area**



The coded network used in the simulation modelling covers the whole State of New South Wales and therefore incorporates the entire project catchment area as shown in Figure 4.



Figure 4 – The relevant part of the Simulated Network



The CARTS model utilises socioeconomic data from each of the Local Government Areas in the State to simulate the passenger and freight road and rail loadings on this network and is calibrated so that these loadings approximate the actual loadings on the real network in the “base” year, in this case 2021. The calibration acknowledges any network congestion and serious bottlenecks causing delays. However few details of rail traffic were available. Cootamundra is the focal point for rail transit in the Riverina. It is about 60 Km closer to Port Botany than Port Eden and Port Kembla with Melbourne not much further.

The calibration does not of course include the proposed rail or port improvements in the network. The proposed route, and its characteristics, is then coded into the network for testing in future years.

The first simulation test encompasses just the necessary improvements to the port at Eden, which may include both bulk and some container handling facilities, but without the rail improvements. This establishes the degree to which the port improvements will continue to attract freight by road. While the ensuing economic benefits from this test are not attributable to the rail project, it provides a basis for examining the degree to which the rail project, when tested, will induce freight transfers from road transport. Testing the rail route proposal can then proceed.

The future traffic forecasts depend on forecasts for the socioeconomic parameters of each Local Government District. They include population, employment, rural industry and agricultural production, mining, manufacturing and tourism. These forecasts are assembled for several future years. Applying these to the CARTS simulation model, together with the upgraded networks, in each future year, provides the demand forecasts. The forecasts also depend on future changes to the transport network. Although some rail changes are expected in the Riverina, the only significant new rail line is the Inland Rail shown in Figure 5.

Figure 5 - Future changes to the Rail Network



Source: “Concept Plan for Canberra to Eden Railway” prepared by Edwin Michell of Stormcloud Engineering

The resulting modelling forecasts also provides predictions that, as a result of the improved transport access, growth in rural production and tourism may be induced, thus adding to the traffic forecasts. For the same reason, there may be some shifts in residential population.

### 1.3 The relevant potential overseas market for freight

In view of the importance of freight haulage to the rail proposal, the potential market for exports and imports from the catchment area is a primary focus. The primary export products from the catchment area are agricultural products. The top three agricultural commodities produced nationally ranked by export value in 2018-19 were: Cattle and calves (\$9.485 billion), Wool (\$4.159 billion) and Wheat (\$3.676 billion). Out of the \$62.2 billion worth of food and fibre Australian farmers produced in 2018-19, 79 per cent (\$49.2 billion) was exported.

The pre-COVID value of export sales of commodities produced in the catchment area to countries most easily served from the eastern seaboard in the year 2019 is shown in Table 1.

**Table 1 - Value of Commodity Exports to Eastern Seaboard Countries \$Millions - 2019**

| Commodity      | China         | Vietnam      | Japan        | Korea        | Malaysia   | NZ         | USA          | HK         | S'pore     | Total         |
|----------------|---------------|--------------|--------------|--------------|------------|------------|--------------|------------|------------|---------------|
| Foodgrains     | 693           | 373          | 552          | 38           | 225        | 56         | 0            | 0          | 33         | 2,470         |
| Meat/Cattle*   | 3,974         | 629          | 2,836        | 1,759        | 319        | 148        | 3,353        | 300        | 270        | 13,588        |
| Dairy Products | 643           | 61           | 514          | 74           | 149        | 87         | 38           | 101        | 173        | 1,840         |
| Cotton         | 1,116         | 114          | 23           | 1            | 44         | 2          | 0            | 0          | -          | 1,300         |
| Alcoholic Bevs | 1,239         | 41           | 56           | 31           | 71         | 171        | 448          | 143        | 177        | 2,377         |
| Timber         | 1,497         | 7            | 524          | 7            | 41         | 9          | 3            | 1          | -          | 2,089         |
| Wool           | 2,433         | 0            | 17           | 83           | 13         | 1          | 7            | 0          | -          | 2,554         |
| <b>Total</b>   | <b>11,595</b> | <b>1,225</b> | <b>4,522</b> | <b>2,393</b> | <b>862</b> | <b>574</b> | <b>3,849</b> | <b>545</b> | <b>653</b> | <b>26,218</b> |

\*includes live animals Source:- Department of Foreign Affairs and Trade Pivot Tables

Table 2 illustrates the value of all major imports from the countries in Table 1 of higher exports to Australia.

**Table 2 - Value of Imports from Some Eastern Seaboard Countries – 2017/2018 - \$Millions**

| Category/Country                     | China           | USA             | Japan           | Thailand        | Korea           | World            |
|--------------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Minerals & Fuels                     | \$ 3,138        | \$ 2,218        | \$ 220          | \$ 1,256        | \$ 250          | \$22,922         |
| Agriculture, Forestry & Fisheries    | \$ 1,562        | \$ 1,284        | \$ 4,020        | \$ 211          | \$ 5,395        | \$41,322         |
| Manufactures                         | \$72,499        | \$28,779        | \$16,597        | \$12,725        | \$ 6,237        | \$231,704        |
| Other Goods                          | \$ 1,046        | \$ 1,697        | \$ 1,414        | \$ 394          | \$ 566          | \$10,720         |
| <b>Total</b>                         | <b>\$78,246</b> | <b>\$33,978</b> | <b>\$22,251</b> | <b>\$14,587</b> | <b>\$12,448</b> | <b>\$306,668</b> |
| <b>Growth Rate %pa 2006/7-2017/8</b> | <b>6.4%</b>     | <b>2.0%</b>     | <b>2.8%</b>     | <b>4.5%</b>     | <b>7.0%</b>     | <b>4.7%</b>      |

Source:- Department of Foreign Affairs and Trade Pivot Tables

These five countries are Australia's largest import partners accounting for 53% of total imports. Four other Eastern seaboard countries (Malaysia, Singapore, New Zealand and Vietnam) account for another 13%. The value of agriculture related imports is shown in Table 3.

**Table 3 - Value of Agricultural-related Imports – 2017/2018 - \$Millions**

| Import                       | Value \$millions | Growth Rate* |
|------------------------------|------------------|--------------|
| Petroleum products           | \$ 249.63        | 4.7%         |
| Motor Vehicles and parts     | \$ 5,395.28      | 14.1%        |
| Tractors and Farm machinery  | \$ 6,237.22      | 1.4%         |
| Fertilisers and Insecticides | \$ 565.99        | 1.6%         |

\* Average 2006/2007 to 2017/2018 Source:- Department of Foreign Affairs and Trade Pivot Tables

## 1.4 The Competing Ports

The seven Australian ports, which handle the greatest value of export trade, are listed in Table 4

**Table 4 - Australia's Seven Busiest Ports – Value of Export Goods Handled - \$Billions**

| Year    | Dampier | Port Hedland | Melbourne | Hay Point | Newcastle | Brisbane | Sydney Ports | All   |
|---------|---------|--------------|-----------|-----------|-----------|----------|--------------|-------|
| 2006-07 | \$15.5  | \$6.8        | \$21.1    | \$10.4    | \$6.6     | \$10.4   | \$11.4       | 144.4 |
| 2015-16 | \$33.2  | \$26.3       | \$22.4    | \$12.1    | \$13.5    | \$13     | \$11.7       | 218.4 |
| Growth  | 8.8%    | 16.2%        | 0.7%      | 1.7%      | 8.3%      | 2.5%     | 0.3%         | 4.7%  |

Source: BITRE – Australian Sea Freight – 2015-16

Possibly the greatest causes of uncertainty for freight exporters or importers in New South Wales are the questions of reliability of Port Botany, which is the possible cause of its slower growth.

The Port of Eden, shown in Figure 6, is the southernmost deep water harbour in NSW and is situated equidistant between Sydney and Melbourne. The Port provides a Harbour Master, 24 hour pilotage services, management of a Navy wharf and port security functions. There is also a deep inner anchorage.

**Figure 6 - The port at Eden, Snug Cove**



There are three wharves in the Port of Eden precinct: A privately owned woodchip terminal, multi-user Navy wharves, and the breakwater wharf.

- The private wharf is operated by Allied Natural Wood Exports Pty Ltd and is located at Jews Head. It is used principally for woodchips (however it may be used for other bulk commodities).
- The Multi-Purpose (Navy) Wharf is located in East Boyd Bay. This wharf is used principally for logs, containers, general cargo and naval operations. It is a modern, concrete decked wharf with a face length of 200m and width of 30m and is licensed to handle Class 1 Dangerous Goods (explosives).
- The breakwater wharf is located in Snug Cove and is suitable for smaller ships. It is principally used by fishing vessels and anchor handing tug supply (AHTS) vessels for general cargo and bunkering. It is a fenced, concrete wharf with a length 105m and a depth of 3m at the inner end.

The port also owns and manages an eight hectare cargo storage facility. The major users of the port are the Royal Australian Navy, wood chippers, cargo ships for logs and cruise ships. The Port Charges include Navigation, Pilotage, Site Occupation and Wharfage and are competitively priced with respect to other Ports in New South Wales. A project to create a 110m wharf extension at Port Eden to prepare the port for visits from some of the world's largest cruise ships has recently been completed at a cost of \$44 million and the Breakwater Wharf Extension Project will allow the biggest cruise ships – over 300m in length – to berth in Snug Cove instead of having to anchor in the harbour and ferry passengers to and from shore by tender. Further work is being carried out to repair building substructures.

The Port of Eden in the major, southern lobe of Twofold Bay includes facilities at Snug Cove in the north, and two freight berths on the southern shore. Snug Cove, which adjoins the town of Eden includes

- the Breakwater wharf, 105 m;
- Cruise Ship berth, 325 m (including 105 m wharf);
- Mooring jetty, 150 m; and
- another shorter jetty used by the fishing fleet.

On the southern shore of the bay is

- the private Woodchip jetty with 235 m berth across the end; and
- the multipurpose (Navy) wharf, 200 m long at end of jetty (including 185 m berth), with 8 hectare storage yard nearby.

**Port Botany**, the largest port in New South Wales, is the seventh largest in Australia but is growing more slowly than any other major port despite the fact that Australia’s eastern coast ports handle about two-thirds of all freight and are growing faster than the average as shown in Table 5.

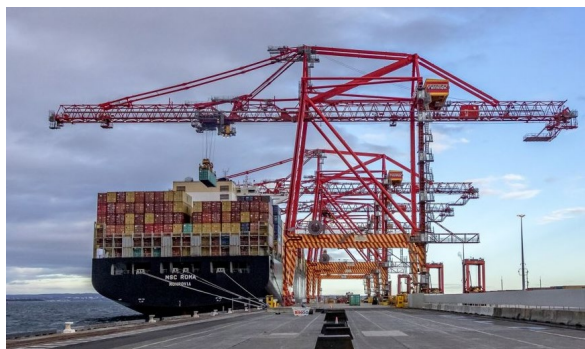
**Table 5 - Eastern Seaboard Ports Freight Value \$Billions**

| Year        | Eastern Seaboard Ports | Port Botany | All Ports | % Eastern Ports |
|-------------|------------------------|-------------|-----------|-----------------|
| 2006-07     | \$ 90.0                | \$ 11.4     | \$ 144.4  | 62.3%           |
| 2015-16     | \$ 143.1               | \$ 11.7     | \$ 218.9  | 65.4%           |
| Growth rate | 5.3%                   | 0.3%        | 4.7%      |                 |

Source: BITRE – Australian Sea Freight – 2015-16

Port Botany is largely geared to handle containers and imported fuel products, such as petroleum, bitumen, LPG and bulk chemicals.

**Figure 7 - Port Botany**



Source; Sheep Central

Media reports about the operations at the Port have included issues such as:-

- Queues of up to ten ships waiting off Sydney due to Port delays and industrial action,
- Vessels schedule delays at Port Botany of up to 12 days, due to a combination of adverse weather conditions, infrastructure upgrades and industrial action,
- Ships have been diverted to Melbourne, Brisbane, Adelaide and Perth, and
- The world's biggest freight line, Maersk, has stopped sending ships to Sydney.

The Freight & Trade Alliance (FTA) and Australian Peak Shippers Association (APSA) reported that:-  
 “Port Botany congestion, due to a combination of operational events and prolonged waterside worker industrial action, has created the ‘perfect storm’ of disruption to New South Wales supply chains, risking product shortages and other implications to the Australian economy. Vessels are now by-passing Port Botany discharging goods interstate and leaving importers to organise and pay massive logistics costs to move freight across state borders back to Sydney. Those with cargo discharged in Sydney are now subject to extensive delays at the port and are facing Sydney congestion surcharges’ from the major international shipping lines.

Once cargo is received, importers are then facing the difficulty of returning the empty containers to a shipping line contracted and nominated depot. With the failure of shipping lines to evacuate surplus empty containers, Sydney's depots are at capacity with transport operators passing on costs for redirections, waiting times, futile trips and storage of containers. Further to the local logistics concerns, we are also seeing shortages of the required equipment in some Asian ports to meet export demand to Australia and other destinations. NSW exporters are faced with a critical reduction in available capacity and irregular services to meet current commercial obligations and seriously jeopardising forward contracts for grain, beef, pork and lamb. Furthermore, the new surcharges alone add direct costs to primary produce eroding margins and crushing farmers who have seen bumper crops after years of drought".

They also reported that the impact of these port delays and problems on Australian businesses include:-

- "Four international shipping lines (Mediterranean Shipping Company, CMA CGM ANL, Pacific Asia Express-Mariana Shipping and Hapag Lloyd) have introduced a Sydney Port Congestion Surcharge without consultation and with insufficient lead times negating importers and exporters the ability to factor in 'landed costs' in forward contracts;
- Shipping lines have commenced what is expected to be an increase in re-scheduling with vessels by-passing Port Botany – this has the obvious impact of restricting options for New South Wales exporters to reach overseas markets and meet contractual obligations;
- By-pass vessels are discharging containers in Melbourne or Brisbane forcing importers to transport goods to Sydney and return the empty container back to the port of discharge at their own expense;
- More than 30,000 more import containers came in through Port Botany than were exported during May, June and July due to shipping lines minimising the use of 'sweeper' vessels to evacuate the surplus empty containers;
- Once import containers are unloaded, the empty container must be de-hired (returned) to an empty container park – ECPs are congested due to the imbalance of import versus export containers;
- Extra costs being incurred by transport operators with redirections of empty containers from one ECP to another as each park becomes full are being passed on in the form of new surcharges;
- In many instances these containers are held in transport operator's yards – these transport yards are also quickly reaching capacity;
- Some shipping lines have now issued notices that they will not be accepting certain types of containers on de-hire and asking importers to hold onto them – some other shipping lines have suggested returning empties to Melbourne or Brisbane – however, we have seen only one line offer relief via an extension of "free time" before container detention kicks in".

Rail is the major means of delivering containerised agricultural freight including grain, pulses, cotton and meat to Botany's three portside container terminals as operated by DP World, Hutchison, and Patrick. It has been reported that:-

"Trains at Botany can wait for 12 hours to unload. If that train can't get to the port window to unload in time for the vessel, it goes next door to DP World. To get it from DP World to Patrick it might cost you \$340 per box.....A 20-foot container carries roughly 24 tonnes of grain or pulses, so around \$15/t to carry between terminals, plus \$8/t for container-park access is the extra cost until the export supply chain for containers out of Sydney improves".

Coastal movement of non-containerised freight is expected to continue to grow steadily throughout the forecast period. The forecast growth of both container and bulk carriers to Australian Ports is a strong indication that any improvements to Port Eden would be well utilised, particularly any new container or bulk handling facilities.

Container volumes have historically been relatively volatile, leading to substantial uncertainty in their forecasts. However the TfNSW forecast for the growth of container movements to be handled at Port Botany is shown in Table 6.

**Table 6 - Forecast Container Loads at Port Botany – Tons pa Millions**

| Direction | Port Botany Containers |      |      | Growth Rate pa | Overall Increase |
|-----------|------------------------|------|------|----------------|------------------|
|           | 2016                   | 2036 | 2056 |                |                  |
| Import    | 9.2                    | 17.2 | 27.0 | 2.7%           | 193%             |
| Export    | 5.2                    | 8.4  | 11.7 | 2.0%           | 125%             |
| Total     | 14.4                   | 25.5 | 38.6 | 2.5%           | 168%             |

Source: TfNSW Freight Commodity Forecasts – 2016-2056

Table 7 displays the current forecasts, prepared by BITRE, for vessel calls to Australian Ports.

**Table 7 - Forecast Numbers of Vessels calling to Australian Ports**

| Vessel Type     | Year    |         |         | % Growth |       |
|-----------------|---------|---------|---------|----------|-------|
|                 | 2007-08 | 2012-13 | 2029-30 | 08-13    | 08-30 |
| Container Ships | 7,161   | 6,910   | 11,200  | -0.7%    | 2.1%  |
| Bulk Carriers   | 14,439  | 15,500  | 23,100  | 1.4%     | 2.2%  |
| General Cargo   | 3,633   | 3,710   | 4,080   | 0.4%     | 0.5%  |
| Other           | 2,201   | 2,242   | 2,475   | 0.4%     | 0.5%  |
| Total           | 27,434  | 28,362  | 40,855  | 0.7%     | 1.8%  |

Source: Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2010, Australian Maritime Activity to 2029–30,

The actual number of vessels that called at ports in New South Wales in 2018-19 is shown in Table 8 and the total tonnage of these ports is listed in Table 9.

**Table 8 - Actual number of Vessels calling at NSW Ports – 2018-19**

| Vessel Type       | Botany | Kembla | Newcastle | Eden | Yamba | Total |
|-------------------|--------|--------|-----------|------|-------|-------|
| Dry Bulk          | -      | 310    | 1,910     | 25   | -     | 2,245 |
| Container         | 1,149  | 23     | 22        | -    | -     | 1,194 |
| Bulk Liquid & Gas | 349    | 41     | 135       | -    | -     | 525   |
| Car Carrier       | -      | 368    | 1         | -    | -     | 369   |
| General Cargo     | 2      | 48     | 172       | 25   | 31    | 278   |
| Total             | 1,500  | 790    | 2,240     | 50   | 31    | 4,611 |

Source: Ports Australia Trade Statistics

**Table 9 - Tonnage handled at NSW Ports 2018-19**

| NSW Port tonnage - 2018-19 – '000 Tonnes |        |         |         |
|--|--------|---------|---------|
| Port                                     | Import | Export  | Total   |
| Botany                                   | 15,500 | 9,579   | 25,079  |
| Newcastle                                | 5,420  | 161,718 | 167,138 |
| Kembla                                   | 8,412  | 7,820   | 16,232  |
| Eden                                     | -      | 263     | 263     |
| Total                                    | 29,332 | 179,380 | 208,712 |

Source: Ports Australia Trade Statistics

**Port Kembla**, situated in Wollongong and 90 Km south of Port Botany, also handles bulk liquids and has New South Wales' largest grain export terminal. It handles motor vehicle imports and mining product exports, such as coal.

Port Kembla has been approved by the NSW Government as the site of New South Wales' next container terminal once Port Botany nears capacity. Its proximity and access to Sydney's west and south west means Port Kembla is well positioned to handle the expected growth in freight volumes.

**The port at Newcastle** is primarily a coal loading port but it has facilities for other types of cargoes. Recent initiatives to establish larger container handling facilities have been thwarted by a Federal Court decision so that this Port is limited to 30,000 TEU per annum (about 350,000 Tonnes).

The potential for a Port at Eden to attract shipping will therefore depend on congestion at Port Botany, future plans for container facilities at Port Kembla, on the expected growth of shipping and the probability of Port Eden being developed to cope with an extra types and tonnages of freight handling.

### 1.5 The Potential for Passenger Travel

The potential for a regular passenger service to attract patronage encompasses:-

- Commuting to Canberra and elsewhere for work,
- Day-trips for business,
- Commuting to Canberra for educational purposes, particularly TAFE and University, and
- General travel to Canberra and elsewhere for shopping, medical purposes or entertainment

This patronage is modelled in the CARTS model. In addition, there has been an accelerating trend for residents to move out from Canberra into surrounding small towns in New South Wales. This is predicted to continue and, in addition, it is likely that any rail passenger service would induce further ex-urban relocation.

**Tourism** presents another major source for rail patronage, particularly snowfields patrons from Sydney and Canberra. About 17.7 million tourists visited the catchment area in 2020 as shown in Table 10. They spent about \$4.27 Billion.

**Table 10 - Tourism in the catchment area - 2020**

| Region          | Tourists       | No '000 | Expenditure \$M | % Car | NSW Residents |
|-----------------|----------------|---------|-----------------|-------|---------------|
| South Coast     | Domestic Day   | 6,100.0 | \$ 533.6        | 92%   | 78%           |
|                 | Domestic Night | 3,700.0 | \$ 1,700.0      | 96%   | 96%           |
|                 | International  | 87.8    | \$ 91.9         | 98%   | na            |
| Snowy Mountains | Domestic Day   | 694.5   | \$ 537.3        | 98%   | 76%           |
|                 | Domestic Night | 452.7   | \$ 56.5         | 98%   | 71%           |
|                 | International  | 11.1    | \$ 9.2          | 98%   | na            |
| Riverina        | Domestic Day   | 900.0   | \$ 330.8        | 88%   | 65%           |
|                 | Domestic Night | 1,300.0 | \$ 96.0         | 96%   | 94%           |
|                 | International  | 15.2    | Na              | 97%   | na            |
| Capital Country | Domestic Day   | 1,200.0 | \$ 384.3        | 92%   | 77%           |
|                 | Domestic Night | 2,700.0 | \$ 284.2        | 98%   | 76%           |
|                 | International  | 17.6    | \$ 247.5        | 87%   | na            |
| Murray          | Domestic Day   | 410.0   | \$ 2.80         | 89%   | 34%           |
|                 | Domestic Night | 163.9   | \$ 0.16         | 98%   | 52%           |
|                 | International  | 14.4    | na              | 69%   | na            |

Source: Destination New South Wales

The fact that they travelled mostly by car and generally came from within New South Wales suggests that there is potential for tourists to utilise rail services in this corridor.

Tourism in the coastal areas is highly seasonal but the snow country peaks at different times than the coastal beaches. Given the high proportion of visitors who are residents of New South Wales and their dependence on car travel, the potential for attracting rail passengers, particularly to the snow fields, is substantial.

## 2. Socio-economic Profile of the Catchment Area

### 2.1 Population, employment and wealth generation

Table 11 shows the primary socio-economic features of Local Governments in the catchment area.

**Table 11 - Population and Productivity of the Catchment Area**

| Region                       | Local Government    | Area Km2 | Population 2018 | Population 2021* | Growth Rate | Gross Regional Product \$m |
|------------------------------|---------------------|----------|-----------------|------------------|-------------|----------------------------|
| Riverina                     | Bland               | 8,558    | 5,985           | 5,612            | -2.12%      | \$381                      |
|                              | Carrathool          | 18,935   | 2,802           | 2,500            | -3.73%      | \$118                      |
|                              | Coolamon            | 2,431    | 4,368           | 4,209            | -1.23%      | \$114                      |
|                              | Gundagai            | 3,981    | 11,260          | 11,081           | -0.53%      | \$407                      |
|                              | Griffith            | 1,639    | 26,882          | 26,240           | -0.80%      | \$1,303                    |
|                              | Hay                 | 1,326    | 2,979           | 2,952            | -0.30%      | \$112                      |
|                              | Junee               | 2,030    | 6,631           | 6,226            | -2.08%      | \$182                      |
|                              | Leeton              | 1,167    | 11,436          | 11,868           | 1.24%       | \$459                      |
|                              | Lockhart            | 2,896    | 3,295           | 2,905            | -4.11%      | \$98                       |
|                              | Murrumbidgee        | 6,881    | 3,961           | 3,559            | -3.50%      | \$86                       |
|                              | Narrandera          | 4,116    | 5,931           | 5,713            | -1.24%      | \$202                      |
|                              | Tumut               | 8,959    | 14,532          | 14,965           | 0.98%       | \$513                      |
|                              | Temora              | 2,802    | 6,274           | 5,705            | -3.12%      | \$218                      |
| Wagga Wagga                  | 4,825               | 64,820   | 69,461          | 2.33%            | \$3,154     |                            |
| Murray                       | Albury              | 306      | 53,767          | 54,495           | 0.45%       | \$2,657                    |
|                              | Balranald           | 21,691   | 2,340           | 2,211            | -1.87%      | \$159                      |
|                              | Berrigan            | 2,066    | 8,707           | 8,343            | -1.41%      | \$452                      |
|                              | Edward River        | 8,884    | 8,995           | 8,407            | -2.23%      | \$488                      |
|                              | Federation          | 5,685    | 12,462          | 12,698           | 0.63%       | \$591                      |
|                              | Greater Hume        | 2,220    | 10,686          | 10,338           | -1.10%      | \$488                      |
|                              | Murray River        | 11,864   | 12,118          | 11,886           | -0.64%      | \$512                      |
|                              | Wentworth           | 26,256   | 7,042           | 6,894            | -0.71%      | \$570                      |
| South East                   | Bega Valley         | 6,279    | 34,348          | 34,893           | 0.53%       | \$1,529                    |
|                              | Eurobodalla         | 3,428    | 38,288          | 39,468           | 1.02%       | \$1,452                    |
|                              | Goulburn Mulwaree   | 3,220    | 30,852          | 31,079           | 0.24%       | \$1,450                    |
|                              | Hilltops            | 7,141    | 18,782          | 18,821           | 0.07%       | \$923                      |
|                              | Queanbeyan Palerang | 5,319    | 59,959          | 67,263           | 3.91%       | \$2,238                    |
|                              | Snowy Monaro        | 15,164   | 20,733          | 21,079           | 0.55%       | \$1,190                    |
|                              | Upper Lachlan       | 7,127    | 7,961           | 7,519            | -1.89%      | \$448                      |
|                              | Yass Valley         | 3,995    | 16,953          | 18,743           | 3.40%       | \$589                      |
| Australian Capital Territory |                     | 2,358    | 414,400         | 464,900          | 4.05%       | \$39,440                   |

\*Estimated Source:- NSW Govt. Health Statistics & ACT Government

This data, together with Local Government employment data is coded into the CARTS model to provide a basis for estimating passenger and tourism travel by road and rail. Table 12 provides some of this data about employment in some industries in the catchment area.



**Table 12 - Catchment Area Employment in Transport and Certain Rural Industries – 2006\***

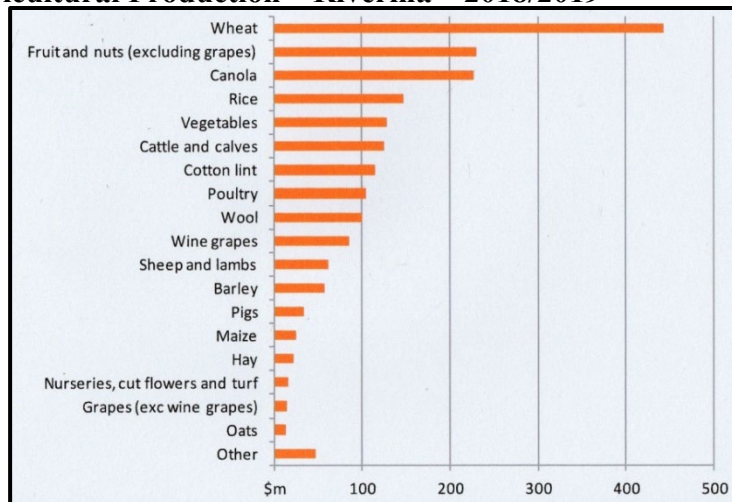
| Transport Mode     | Employment    | Rural Industry  | Employment    |
|--------------------|---------------|-----------------|---------------|
| Road               | 8,000         | Agriculture     | 20,600        |
| Rail               | 750           | Forestry        | 1,350         |
| Air                | 1000          | Fishing         | 800           |
| Other              | 100           | Mining          | 4,900         |
| Transport Services | 3,600         | Food processing | 600           |
| <b>Total</b>       | <b>13,450</b> | <b>Total</b>    | <b>28,200</b> |

\*Rounded Source:- BTIRE Industry Structure Database

## 2.2 Rural Industry and Freight Production

Similarly, major mineral, crop and other rural industry production in each Local Government Area is coded into the CARTS model to provide a basis for forecasts of freight movements to cities and ports by road, rail or intermodal travel. The location of ports, abattoirs and major grain-handling sites are also coded into the model as are major fuel distribution depots to aid in tracing movements from cities and ports to the rural towns. In 2018–19, the gross value of agricultural production in the Riverina region was \$2.5 billion, which was 21 per cent of the total gross value of agricultural production in New South Wales (\$11.7 billion). The value of each agricultural crop grown in the Riverina is shown in Figure 8.

**Figure 8 – Value of Agricultural Production – Riverina – 2018/2019**



Source: Australian Bureau of Statistics, cat. no. 7503.0, Value of agricultural commodities produced, Australia 2020

NSW yearly produces 52 kilotons of rice, 755 kilotons of cotton lint and seed, and 4,750 kilotons of wheat. Regional NSW supplies agricultural commodities, food and beverages to the world’s largest and growing consumer markets in Asia, the Pacific Rim and Europe. Table 13 shows the value and growth rates of rural production in New South Wales.

**Table 13 - Value of NSW Rural Produce**

| Agricultural Industry         | \$Millions pa | Growth rate |
|-------------------------------|---------------|-------------|
| Cropping                      | \$ 2,498      | Variable    |
| Meat                          | \$ 4,671      | 4.0%        |
| Livestock products Incl. Wool | \$ 2,062      | 4.0%        |
| Fishing                       | \$ 181        | 2.1%        |
| Food products                 | \$ 30         | 5.0%        |
| Wine                          | \$ 2          | Variable    |

Source: ‘NSW Primary Industries – Performance, Data and Insights 2019’

At present all export wheat is carried to port by rail, some to Port Geelong and some to Port Kembla. Most rice, cotton and nut crops in the Riverina are currently forwarded to Melbourne and this will continue unless the rail service is renewed to Hay and/or Tocamwul. Figure 9 shows a vast rice plantation.

**Figure 9 - A Rice Plantation in the Riverina**



Source: Google Earth

Cattle farms and/or Feedlots in New South Wales of various sizes. Cattle in the Riverina are currently processed through Wagga Wagga but the Abattoir at Cootamundra is due to reopen.

**Figure 10 - A New South Wales Feedlot**

**New South Wales Wool Bales ready for Export**



Source; Farm Transparency Project

China is the greatest buyer of wool grown in New South Wales as shown in Table 14 and is the fastest growing market for beef from New South Wales as shown in Table 15.

**Table 14 - Value of NSW Wool Exports - \$Millions**

| Year           | 2015-16 | 2016-17 | 2017-18 | 2018-19 | 2019-20 |
|----------------|---------|---------|---------|---------|---------|
| <b>Total</b>   | 583.6   | 673.1   | 870.8   | 807.5   | 527.5   |
| <b>China</b>   | 441.7   | 532.1   | 719.5   | 684.7   | 435.4   |
| <b>% China</b> | 75.7%   | 79.1%   | 82.6%   | 84.8%   | 82.5%   |

Source: DPI, NSW Research

**Table 15 - Value of NSW Beef Exports - \$Millions**

| Year         | 2015    | 2016    | 2017    | 2018    | 2019    | 2020    | %      | Growth Rate |
|--------------|---------|---------|---------|---------|---------|---------|--------|-------------|
| <b>Total</b> | \$1,720 | \$1,580 | \$1,300 | \$1,480 | \$1,800 | \$2,110 | 100.0% | 4.2%        |
| <b>China</b> | \$ 180  | \$ 210  | \$ 150  | \$ 250  | \$ 500  | \$ 750  | 20.4%  | 33.0%       |
| <b>Japan</b> | \$ 320  | \$ 320  | \$ 360  | \$ 380  | \$ 400  | \$ 410  | 21.9%  | 5.1%        |
| <b>USA</b>   | \$ 630  | \$ 460  | \$ 250  | \$ 280  | \$ 270  | \$ 330  | 22.2%  | -12.1%      |
| <b>Korea</b> | \$ 220  | \$ 240  | \$ 230  | \$ 200  | \$ 240  | \$ 220  | 13.5%  | 0.0%        |
| <b>Other</b> | \$ 380  | \$ 340  | \$ 320  | \$ 360  | \$ 390  | \$ 400  | 21.9%  | 1.0%        |

Source: DPI, NSW Research

**Figure 11 - Packaged Plant for Meat and Grains Export**



There is further potential for the export of Dairy produce from the Bega and the Murray-Goulburn areas where producers are already exporting dairy produce. The world market for dairy products is set out in Table 16.

**Table 16 - Value of Global Dairy Imports by certain Countries - \$Trillions – 2013**

| Country      | WMP            | Milk           | IMF            | Cheese         | Total          | %             |
|--------------|----------------|----------------|----------------|----------------|----------------|---------------|
| China        | \$ 2.60        | \$ 0.23        | \$ 1.23        | \$ 0.23        | \$ 4.29        | 51.5%         |
| Hong Kong    | \$ 0.31        | \$ 0.09        | \$ 0.02        | \$ 0.07        | \$ 0.49        | 5.8%          |
| Singapore    | \$ 0.38        | \$ 0.05        | \$ 0.02        | \$ 0.06        | \$ 0.50        | 6.1%          |
| Sri Lanka    | \$ 0.25        | -              | -              | \$ -           | \$ 0.25        | 3.0%          |
| Indonesia    | \$ 0.21        | \$ 0.01        | -              | \$ -           | \$ 0.22        | 2.7%          |
| Taiwan       | \$ 0.22        | \$ 0.03        | \$ 0.09        | \$ 0.12        | \$ 0.46        | 5.5%          |
| Thailand     | \$ 0.14        | \$ 0.00        | \$ 0.18        | \$ 0.04        | \$ 0.36        | 4.3%          |
| Malaysia     | \$ 0.08        | \$ 0.02        | \$ 0.79        | \$ 0.08        | \$ 0.97        | 11.6%         |
| Sth Korea    | \$ 0.01        | \$ 0.01        | \$ 0.03        | \$ 0.37        | \$ 0.42        | 5.1%          |
| Philippines  | \$ 0.12        | \$ 0.07        | \$ 0.11        | \$ 0.08        | \$ 0.37        | 4.5%          |
| <b>Total</b> | <b>\$ 4.32</b> | <b>\$ 0.52</b> | <b>\$ 2.45</b> | <b>\$ 1.05</b> | <b>\$ 8.33</b> | <b>100.0%</b> |

Source: DPI, NSW Research Note: WMP is Milk Powder, IMF is Infant Formulae

NSW has diverse wine regions which vary from large regions such as the Riverina that produces large volumes of wine for commercial (and other) wine companies to small regions such as Tumbarumba with a focus on premium wine production. Exports of NSW wines totals more than \$520m, which makes it NSW’s 4th largest primary industry. Australian wine exports in 2020 are shown in Table 17.

**Table 17 - Australian Wine Exports – 2020 - \$Millions**

|               |         |       |
|---------------|---------|-------|
| China         | \$1,071 | 37.6% |
| USA           | \$445   | 15.6% |
| Great Britain | \$409   | 14.4% |
| World Total   | \$2,847 | 100%  |

Source: Statista 2021

In 2019-20, NSW timber product exports were \$181.4 million, up 9% year-on-year 94. China was the largest destination, with exports valued at \$158.3 million (up 12%), followed by Taiwan (\$9.4 million, up 13%) and South Korea (\$5.5 million, up 11%)<sup>1</sup>.

<sup>1</sup> NSW Department of Primary Industries

### 2.3 Socioeconomic forecasts

The population forecasts are based on several sources and reflect several influences on growth. Table 18 provides several key NSW forecast indicators.

**Table 18 - Key NSW Forecast Indicators**

| Year            | 2018-19   | 2030-31    | 2040-41    | 2050-51    |
|-----------------|-----------|------------|------------|------------|
| Population '000 | 8,087     | 8,960      | 9,835      | 10,688     |
| % 65 and Over   | 16.3%     | 20.3%      | 22.0%      | 23.3%      |
| % Employed      | 50.4%     | 50.4%      | 50.7%      | 50.2%      |
| GSP Billion     | \$ 629    | \$ 984     | \$ 1,566   | \$ 2,430   |
| GSP/Capita      | \$ 77,779 | \$ 109,821 | \$ 159,227 | \$ 227,358 |

Source: NSW Intergenerational Report 2021-22

The COVID pandemic has resulted in substantial revisions to population forecasts. For instance Major regional cities population forecasts are affected by<sup>2</sup>:-

- **International student intake** - effects major regional cities with tertiary campuses.
- **Restrictions on immigration** - Typically, major regional cities attract large numbers of new residents from other areas within the State, particularly from metropolitan capital cities. Levels of net immigration could increase, particularly for major regional cities in proximity to metropolitan capital cities because a high proportion of overseas born residents move to major regional cities only after having already lived in metropolitan capital cities.
- **Natural increase** - Fewer births in the short-term as fertility typically declines in times of economic uncertainty. Major regional cities with current high levels of fertility, coupled with the loss of family-making age groups through less migration, will be impacted more severely than other areas.
- At the small area level, the key factors of population change are the age structure of the existing population. Migration is also one of the most important factors and is volatile, often changing due to housing market preferences, economic opportunities and changing household circumstances.

Increasing housing prices in the larger cities, especially Canberra, have induced a shift in population to rural towns and this has accelerated during the COVID pandemic. 2020 figures show accelerating net movement from Sydney to regional areas.

However the more remote towns continue to lose their younger members so that, throughout the whole catchment area the smaller towns have been losing population while the larger ones having been growing faster than the State population as illustrated in Table 19.

**Table 19 - Growth Rates by Town Size – Catchment Area – 2018 to 2021**

| Town Population | Growth Rate |
|-----------------|-------------|
| < 3,000         | -2.50%      |
| 3,000-6,000     | -2.24%      |
| 6,000-9,000     | -1.66%      |
| 9,000-12,000    | -0.26%      |
| 12,000-20,000   | 1.27%       |
| 20,000-35,000   | 0.71%       |
| > 35,000        | 1.93%       |

Many areas of rural New South Wales have older populations than the NSW average and are growing older faster than the average, not just the many coastal towns that have growing numbers of retired persons but, as

<sup>2</sup> Id informed decisions – demographic centre

illustrated in Table 20, it is also true of areas in the Riverina. Similarly, employment opportunities and household incomes vary considerably throughout the catchment area as illustrated in Table 21.

**Table 20 - Ageing in the Riverina**

| Local Govt Area        | Age compared to NSW Ave. | Growth Rate |
|------------------------|--------------------------|-------------|
| Cobar                  | 94.3%                    | 1.6%        |
| Dubbo                  | 95.1%                    | 1.1%        |
| Balranald              | 103.0%                   | 1.6%        |
| Carrathool             | 104.3%                   | 1.9%        |
| Central Darling        | 104.6%                   | 2.0%        |
| Hay                    | 106.0%                   | 1.3%        |
| Narrandera             | 112.5%                   | 1.4%        |
| <b>New South Wales</b> | <b>100.0%</b>            | <b>0.5%</b> |

Source: HealthStats NSW

**Table 21 - Local Government Employment and Relative Household Income – Riverina - 2008**

| Local Govt Area     | % Employed | Income cf State Average |
|---------------------|------------|-------------------------|
| Cobar (A)           | 44%        | +22%                    |
| Dubbo (C)           | 45%        | +6%                     |
| Central Darling (A) | 37%        | +2%                     |
| Bourke (A)          | 39%        | About equal             |
| Narrandera (A)      | 34%        | -5%                     |
| Carrathool (A)      | 43%        | -7%                     |
| Hay (A)             | 39%        | -10%                    |
| Balranald (A)       | 38%        | -11%                    |

Source:- BTIRE Industry Structure Database

Overall the Intergenerational Report forecasts that Australia’s population will grow more slowly and age faster than previously expected.

## 2.4 Rural industry forecasts

Table 22 provides forecasts for various rural commodities produced in New South Wales.

**Table 22 - Regional NSW Freight commodity demand forecasts, 2016-2056, mtpa**

| Commodity       | 2016 | 2036 | 2056 | Growth Rate | Total Increase |
|-----------------|------|------|------|-------------|----------------|
| Grains          | 8.4  | 10.6 | 12.9 | 1.1%        | 54%            |
| Oilseeds        | 1.3  | 1.7  | 2.1  | 1.2%        | 62%            |
| Edible oils     | 0.2  | 0.3  | 0.4  | 1.7%        | 100%           |
| Livestock meals | 0.5  | 0.7  | 0.9  | 1.5%        | 80%            |
| Livestock       | 1.4  | 3.1  | 3.9  | 2.6%        | 179%           |
| Red meat        | 0.6  | 1.3  | 1.6  | 2.5%        | 167%           |
| Horticulture    | 1.5  | 1.8  | 2.2  | 1.0%        | 47%            |
| Forestry        | 3.2  | 3.4  | 3.2  | 0.0%        | 0%             |
| Cotton lint     | 0.4  | 0.5  | 0.7  | 1.4%        | 76%            |
| Dairy           | 2.2  | 2.8  | 3.5  | 1.2%        | 60%            |
| Grapes and wine | 0.8  | 0.9  | 1.1  | 0.8%        | 38%            |

Source: TfNSW Freight Commodity Forecasts – 2016-2056

These forecasts were coded into the CARTS model. Some of this production is consumed domestically. For instance some grains are fed to cattle in feedlots and some is used by consumers at home. Table 23 provides some guidance on domestic consumption and the transportation method for NSW Grains.

**Table 23 - Forecast of Consumption and Transportation for New South Wales Grains - mtpa**

| Transportation | User     | 2016 | 2036 | 2056 | Growth Rate | Overall Growth |
|----------------|----------|------|------|------|-------------|----------------|
| Bulk           | Domestic | 4.6  | 6.2  | 7.6  | 1.26%       | 65.2%          |
|                | Export   | 2.6  | 2.7  | 3.2  | 0.52%       | 23.1%          |
| Container      |          | 1.1  | 1.7  | 2.2  | 1.75%       | 100.0%         |
|                | Total    | 8.3  | 10.6 | 13.0 | 1.13%       | 56.6%          |
| % Exported     |          | 45%  | 42%  | 42%  |             |                |

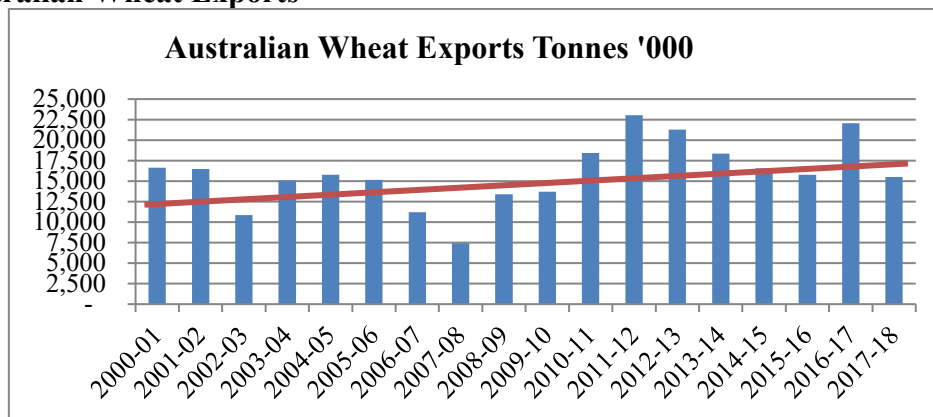
Source: TfNSW Freight Commodity Forecasts – 2016-2056

It is important to know the proportion of each rural produce which is exported because the CARTS model consigns export production to the ports in New South Wales and it is assumed that each port has the necessary bulk and/or container handling facilities. Domestic consumption, after farm retention, is consigned to the various cities and towns in New South Wales.

The CARTS model recognises that some part of each consignment may be by road transport and then by rail. It is designed to assign freight in at least two stages. Thus it can, for instance, model cotton being carried by truck to a loading bay and then being railed in containers to port. Or conversely it can model fuel being railed in bulk from port to a fuel depot and then being delivered by road tanker to service outlets.

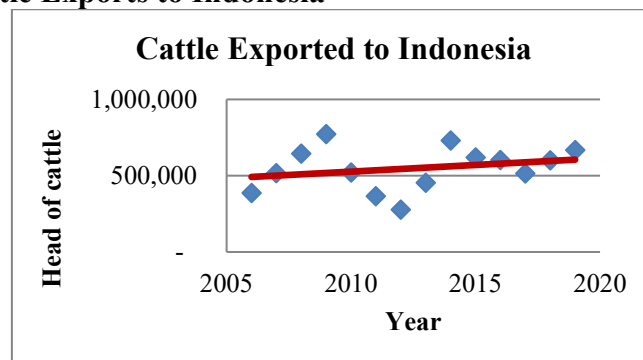
The rural industry forecasts for the probable catchment area are also fraught with difficulties. For instance, wheat contributes the greatest value of the Riverina’s export commodities but is highly volatile both in volume and price as shown in Figure 12. Cattle exports are also volatile as illustrated in Figure 13.

**Figure 12 - Australian Wheat Exports**



Source: ABARES - Research report 19.7 May 2019

**Figure 13 - Australian Cattle Exports to Indonesia**



Source: Reportlinker

The climate and labour factors creating forecast uncertainty include:-

- Droughts in recent years, so that less wool, livestock and grain is carted to markets and abattoirs, while stocks are rebuilding,
- Bushfires and flooding,
- Yields are down for all crops,
- There have been shortages of seasonal labour,
- There have been problems with live cattle exports,
- Diplomatic relations have affected trade agreements.

In addition several pricing factors have affected the costs of production:-

- The price of fuel has risen sharply during the past few years,
- Freight vehicles are now carrying heavier loads as more roads are designated for B-Doubles, which has resulted in reduced freight prices, and
- The value of the Australian Dollar has affected export and import prices.

### 2.5 Australian Capital Territory and Urban Imports and Exports

The rail proposal includes the provision of a multi-modal transfer terminal in the Australian Capital Territory. It is anticipated that this would attract rail traffic from Sydney and other parts of New South Wales that provide, or depend on, goods and services from Canberra. While this trade is of little relevance to the rail proposal, except insofar that these goods and services derive from or to the Monaro region, it nevertheless means that this suggested multi-modal terminal need not be fully costed into the rail proposal.

Apart from the freight carried into and from Canberra from Sydney and other parts of New South Wales, the ACT is involved in active international trade as shown in Table 24. This trade is of direct relevance to the rail proposal in that a substantial portion could be directed through Port Eden.

**Table 24 - Australian Capital Territory imports and Exports – 2020 \$'000**

| <b>International Exports</b> |                  | <b>International Imports</b> |                 |
|------------------------------|------------------|------------------------------|-----------------|
| Mining                       | \$ 3,382         | Manufactures                 | \$ 786          |
| Manufactures                 | \$ 6,496         | Household goods              | \$ 267          |
| Arms & Ammunition            | \$ 12,365        | Instruments                  | \$ 1,455        |
| Coins                        | \$ 829           | Other                        | \$ 1,149        |
| Other                        | \$ 29,042        |                              |                 |
| <b>Total</b>                 | <b>\$ 52,114</b> | <b>Total</b>                 | <b>\$ 3,657</b> |

Source: ACT Economic Indicators

### 3. Passenger and Freight Demand Modelling

#### 3.1 Introduction

The forecasts have been assessed with the assistance of the CARTS model, which is a State-wide multi-modal transport forecasting model which incorporates estimates of road/rail competition, rail route diversion and rural industry growth potential induced by improved freight transport facilities. It also incorporates facilities for the economic evaluation of options in accordance with all appropriate Government Guidelines.

**Functions of the CARTS model.** The CARTS computer simulation model requires a network and inventory of all rural roads and rail routes for the whole of New South Wales together with socio-economic data and rural industry data for all Local Government Areas in the State and it carries out the following functions:-

- It computes changes in transport prices for passengers or freight due to the transport improvements, considering road or rail operating costs, passenger time, delays and tariffs/fares where appropriate.
- It computes an O/D trip matrix for base and test cases in three evaluation years 2021, 2036 and 2051 using the forecasts of population and economic activity indicators described above,
- It loads this freight or trips onto the network to estimate traffic volumes on all road and rail links. Truck and rail traffic, including empty back-loads, are loaded separately in a two-stage process from station to processing plant and then to port, by the preferred mode, for export and the reverse,
- It computes passenger travel benefits, general freight movement benefits and rural industry producer surplus benefits and it estimates road accident costs and changes in road or train operating costs and road and rail passenger time costs for each evaluation year,
- It interpolates the missing years for each cost or benefit component making allowance for deferment due to the construction staging program and the delays in induced rural industry production and
- It computes net present values and B/C ratios at three discount rates and the internal rate of return.

#### 3.2 Freight movement

In estimating and forecasting freight movement the study considered three different forms of movement namely:

- the movement of agricultural goods from each rural zone to its nearest market or processing zone and then, after allowing for local consumption, the movement of processed farm produce to the nearest port for export. The freight tonnage moved from farm to market is reduced to allow for weight loss due to processing for export before it is moved from the processing zone to port. Agricultural freight tonnage accounts for a large proportion of rail freight movement in this area,
- the reverse movement of imported goods, such as fuels and oils, fertilizers, steel for construction and general supermarket or packaged goods, from the ports in New South Wales to the inland population centres, distributed through the main business zones, and
- the movement of locally produced goods from the manufacturing centres to other population centres.

#### 3.3 Road / Rail competition

The CARTS model estimates the extent of road / rail competition by comparing the pricing of road and rail freight movements. It then applies elasticity data to assess the degree to which reductions in the price of one mode affects the freight shifted from the other mode. Pricing includes the estimated value of delays and loss or damage to freight as well as the actual loading and carriage charges. Choice for freight travel is partly determined by the availability of loading/unloading and storage facilities and charges, delivery time and costs, potential risk of breakages or loss and the reliability of services.

Table 25 shows the cross freight elasticity values used to assess the degree to which changes in the perceived rail prices would lead to transfer of freight from road to rail over various distances.



**Table 25 - Long-run Road/Rail Freight Cross-elasticity**

|      | Short-distance |       | Medium-distance |       | Long-distance |       | All corridors |       |
|------|----------------|-------|-----------------|-------|---------------|-------|---------------|-------|
| Mode | Road           | Rail  | Road            | Rail  | Road          | Rail  | Road          | Rail  |
| Road | -0.36          | 0.35  | -0.43           | 0.33  | -1.08         | 0.66  | -0.46         | 0.58  |
| Rail | 0.88           | -0.93 | 1.08            | -1.15 | 0.42          | -0.78 | 1.04          | -1.66 |

Source: BITRE estimates.

Rail plays a specialised role in servicing ports and other dedicated facilities. These pricing components vary between commodities and whether they are forwarded as container, bulk or general cargoes.

Similarly, the choice of mode for container or bulk freight is different from perishable or refrigerated freight, where access and travel times are dominant. Each commodity group is priced in the model for both freight modes.

Most commodities are initially carried by truck and may involve intermodal handling. The model provides for two-stage consignment from mode to mode. Of the export commodities grown in the catchment area, food grains (wheat, barley, maize etc), timber (woodchips, logs etc), cotton and wool are usually bulk cargoes but dairy products, wines<sup>3</sup>, canned vegetables and meat products (with the exception of live cattle) are carried in containers.

All of these commodities may be initially carried by truck but are potential rail freight markets, although live cattle and woodchips may be loaded directly onto railcars. Some then go to a silo or railhead.

Rail freight is suited to high-volume, container-packed or bulk commodities over both long and short distances. Accordingly, rail has traditionally dominated the freight market for bulk agricultural and mining commodities.

### 3.4 Rail freight to Port Eden or other Ports

The CARTS model estimates the degree to which Port Eden attracts freight traffic from other Ports by comparing the freight pricing from its origin to other Ports in NSW. The “price” perceived by forwarders includes not only the estimates of direct access, loading, insurance, rail and Port charges but also weighting for uncertainty, delays and damage to goods. It then applies elasticity data to assess the degree to which reductions in the price of each Port affects the freight shifted from another Port to Port Eden.

### 3.5 CARTS model calibration

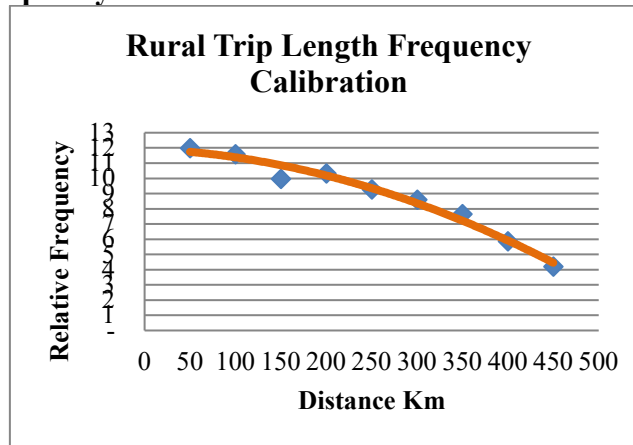
The CARTS model was carefully calibrated to replicate road travel conditions in New South Wales as follows:-

- After the network was coded, it was edited by computer and shortest paths were traced from selected zones to all other zones. This serves as a check on network connections and distances,
- The travel speed model was then calibrated using the network inventory, classified traffic counts and travel times, and
- The predicted traffic assignments to the road network were then compared with actual traffic counts provided by the Roads and Traffic Authority of New South Wales. The traffic assigned to the road links in the network consists of trucks carrying rural produce, trucks carrying general freight and other vehicles primarily carrying passengers.

Travel elasticities vary with trip lengths so the model needs to be calibrated against trip length frequency data. Figure 14 shows the result of this calibration.

<sup>3</sup> McWilliams wines in Griffith ship grape juice by rail to Sydney for bottling before exporting.

**Figure 14 - Trip Length Frequency Calibration**



Source: CARTS model

Truck and freight movement is predicted quite separately from passenger travel, which is predicted from each zone to every other and depends on its population, its vehicle ownership rate, the employment available at the destination zone and the perceived travel price between them.

The personal travel prediction model has been calibrated by successive adjustment until the predicted traffic flows on the existing network are as close as possible to the estimates of AADT on as many links of traffic count data as was available.

Table 26 lists some of the average annual daily traffic counts in 2021.

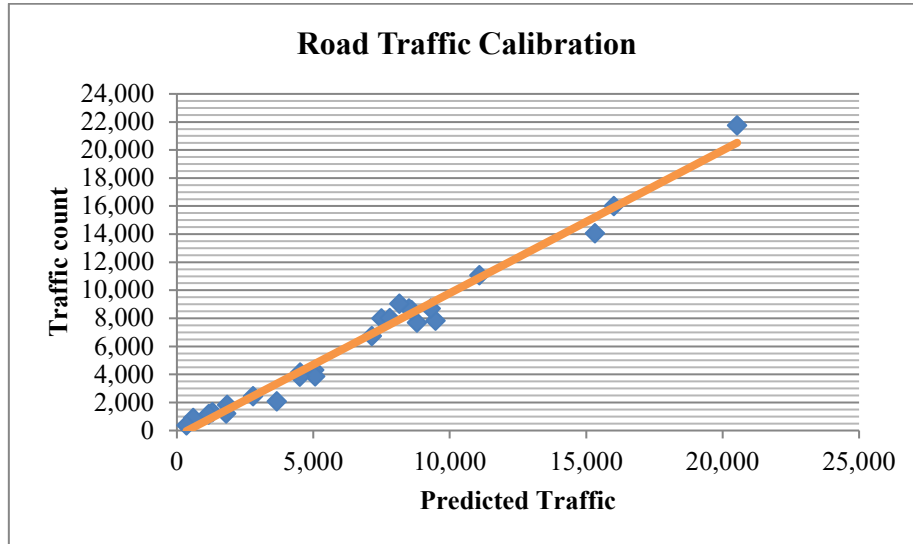
**Table 26 - Traffic counts on Selected Highways - 2021 AADT**

| Highway                 | AADT   |
|-------------------------|--------|
| Monaro Highway          | 1,178  |
| " " " "                 | 4,900  |
| " " " "                 | 5,033  |
| Snowy Mountains Highway | 4,522  |
| " " " "                 | 3,662  |
| " " " "                 | 8,802  |
| " " " "                 | 1,810  |
| Hume Highway            | 20,531 |
| " " " "                 | 8,596  |
| " " " "                 | 11,083 |
| " " " "                 | 16,018 |
| Newell Highway          | 1,846  |
| Sturt Highway           | 1,306  |
| " " " "                 | 1,163  |
| Federal Highway         | 15,320 |
| Kings Highway           | 5,071  |
| Princes Highway         | 7,150  |
| " " " "                 | 9,484  |

Source: NSW Traffic viewer

Figure 15 shows the results of the road traffic calibration.

**Figure 15 - Road Traffic Volume Calibration**



Source: CARTS model & TfNSW Traffic Counts

Of particular interest is the calibration of traffic to the various New South Wales ports. This is shown in Table 27. In view of the uncertain future for coal mining, coal exports from Newcastle have been omitted.

**Table 27 - Calibration of Port Average Annual Tonnages - '000**

| Port      | Actual 2018-19 | Estimated 2021 | Modelled 2021 |
|-----------|----------------|----------------|---------------|
| Botany    | 25,079         | 25,230         | 24,950        |
| Newcastle | 10,840*        | 9,470*         | 11,900*       |
| Kembla    | 16,232         | 17,896         | 18,700        |
| Eden      | 263            | 284            | 300           |

Source: TfNSW and CARTS model Note: \*excludes coal exports

### 3.6 Recent Freight and Passenger Data in the Corridor

The current road traffic on the Monaro Highway, which parallels the rail line, is of obvious interest. Table 28 shows that heavy vehicle traffic on the Monaro highway at Bredbo is increasing rapidly.

**Table 28 - Average Daily Two-way Traffic on Monaro Highway at Bredbo**

| Year / Growth % | 2017  | 2015-17 | 2021  | 2017-21 |
|-----------------|-------|---------|-------|---------|
| All Vehicles    | 4,857 | 0.82%   | 4,900 | 0.22%   |
| Heavy Vehicles  | 550   | 2.87%   | 833   | 10.94%  |

Source; TfNSW traffic counts

About 7,000 people travelled in light vehicles through this count station each day and about another 170 travelled in buses. The average car-occupancy was 1.72 as shown in table 29.

**Table 29 - Car-occupancy at Bredbo**

| Car Occupancy     | %      |
|-------------------|--------|
| 1                 | 35.9%  |
| 2                 | 57.0%  |
| 3                 | 5.5%   |
| 4 or more         | 1.6%   |
| Total             | 100.0% |
| Average Occupancy | 1.72   |

Source: Counts during this study

The traffic counts at Bredbo also show that approximately 12 thousand tonnes of freight was carried by road that day or about 3.4 million tonnes per annum as shown in Table 30.

**Table 30 - Truck Loads at Bredbo Count Station**

| Truck Tare       | %      | Tonnes |
|------------------|--------|--------|
| Empty/Near empty | 10.0%  | 166    |
| 5-8 Tonnes       | 10.0%  | 581    |
| 8-12 Tonnes      | 13.9%  | 1,154  |
| 12 tonnes & over | 66.2%  | 9,931  |
| Total            | 100.0% | 11,831 |

Source: Counts during this study

Table 31 shows the type of freight carried in trucks past the station at Bredbo. Many of the empty trucks were returning for quarried stone and gravel loads. Most of the trucks of greater than 12 tonne tare were B-Doubles and sand, stone and gravel bound for Canberra accounted for about 0.6 Million tonnes per annum.

**Table 31 - Freight Types carried past Bredbo Count Station**

| Freight Type                     | %      |
|----------------------------------|--------|
| General freight/ Bulk            | 38.7%  |
| Stone, Gravel Building Materials | 21.3%  |
| Fuel, Gas                        | 7.1%   |
| Machinery, Vehicles              | 7.1%   |
| Containers                       | 3.9%   |
| Livestock, Hay                   | 3.2%   |
| Passenger Coaches                | 2.6%   |
| Timber                           | 1.3%   |
| Empty, Part empty                | 14.8%  |
| Total                            | 100.0% |

Source: Counts during this study

### 3.7 The Modelled Freight and Passenger Forecasts

The model forecasts for future freight tonnages to New South Wales ports in the modelled years are shown in Table 32.

**Table 32 - Forecast Freight Average Annual Tonnages at NSW Ports – ‘000**

| Port      | 2021 Before <sup>+</sup> | 2021 After | 2036    | 2051    | 2021-36 | 2036-51 |
|-----------|--------------------------|------------|---------|---------|---------|---------|
| Botany    | 24,950                   | 23,900     | 25,000  | 26,100  | 0.30%   | 0.28%   |
| Newcastle | 11,900*                  | 11,700*    | 18,550* | 26,850* | 3.12%   | 2.50%   |
| Kembla    | 18,700                   | 17,900     | 25,200  | 27,100  | 2.30%   | 0.50%   |
| Eden      | 300                      | 2,350      | 6,500   | 13,950  | 6.97%   | 5.26%   |
| Total     | 55,850                   | 55,850     | 75,250  | 94,000  | 2.00%   | 1.50%   |

Source CARTS model Note: \*excludes coal exports <sup>+</sup>Without the railway

Table 33 provides the CARTS model estimate for the passengers which would travel by a daily rail service on each leg from Canberra to Eden.

**Table 33 - Forecast Average Daily Two-way Rail Passenger Loads**

| Journey leg      | 2021 | 2036  | 2051  |
|------------------|------|-------|-------|
| Canberra-Cooma   | 515  | 830   | 1,180 |
| Canberra-Bombala | 140  | 230   | 330   |
| Canberra-Eden    | 40   | 70    | 90    |
| All Passengers   | 700  | 1,130 | 1,600 |

Source: CARTS model

Table 34 shows the expected source of the rail passengers.

**Table 34 - Probable Source of Forecast Passengers by Rail**

| Source of passengers | By Rail |
|----------------------|---------|
| New trips generated  | 21%     |
| Re-distributed trips | 10%     |
| Diverted from car    | 46%     |
| Transferred from bus | 23%     |
| Total rail trips     | 100.0%  |

Source: CARTS model

Approximately 7.8% of car travellers and 90% of bus travellers are expected to be diverted to travel by rail. It is estimated that two passenger trains each way per day would be necessary to accommodate this traffic.

Table 35 shows the forecast expected source of total freight handled at Port Eden.

**Table 35 - Source of Forecast Freight to Port Eden – Tonnes ‘000 pa**

| Source of Freight –Port Eden | 2021  | 2036  | 2051   |
|------------------------------|-------|-------|--------|
| Existing Freight             | 300   | 350   | 400    |
| New Freight generated        | 50    | 150   | 350    |
| Transferred from other Ports | 2,000 | 6,000 | 13,200 |
| Total Freight                | 2,350 | 6,500 | 13,950 |

Source; CARTS Model

Some freight will still be transported to Port Eden by truck. Table 36 shows the forecast amount of freight bound for Port Eden by each mode.

**Table 36 - Mode of Freight Access to Port Eden – Tonnes ‘000 pa**

| Mode  | 2021  | 2036  | 2051   |
|-------|-------|-------|--------|
| Truck | 300   | 650   | 1,150  |
| Rail  | 2,050 | 5,850 | 12,800 |
| Total | 2,350 | 6,500 | 13,950 |

Source; CARTS Model

It is estimated that up to five freight trains each day could be necessary to accommodate this traffic by the year 2051.

## 4. Validating the Passenger and Freight Forecasts

Despite careful model calibration, which may reflect current operations sufficiently well, the forecast socio-economic conditions and the forecasts for agricultural and other rural production involve a large number of assumptions. This leads to some risk in trusting the forecasts.

In addition, demand modelling assumes that all passengers and freight forwarders behave according to defined economic principles. In practice there are a variety of reasons why some people behave differently. Similarly, the forecasting parameters involve estimates and risks which create variability throughout the whole analysis. In addition, passenger and freight movement forecasts, in particular, are influenced by uncertainty, which is difficult to include in the modelling.

Therefore, before continuing the economic and financial analysis it has been considered necessary to conduct an extensive series of field interviews, with freight producers, freight forwarders, freight carriers and stevedoring companies, directed to checking the model's assumptions about rail operations, pricing, transit time, frequency and other service characteristics such as reliability, as well as testing their potential responses to the benefits that the network improvements are intended to provide to them.

A number of interviews were conducted throughout the catchment area to validate, amend and thereby add credibility to the passenger and freight modelling forecasts and reduce the risk inherent in the results of this analysis. 30 stakeholders were visited where interviews took place throughout the catchment area. Initially these visits usually were with Local Government Officials who helped to identify people with freight interests and who could provide information about their Council's attitudes. Invariably these Council officers were very helpful and voiced strong support for improved rail services in rural New South Wales.

The intention of the interview series included the validation of the model's assumptions in simulating existing freight logistic chains. For instance, it confirmed that

- Graincorp Ltd carries most of the exported Wheat, Darum, Barley, Canola, Sorghum, Pulses and Maize from the Riverina by rail to Port Kembla;
- Some of the wine from the Riverina is currently railed in bulk to Sydney although Casella Wines in Griffith send their wine by rail to Melbourne for export, and
- Rice, cotton and nuts grown in the Riverina and Murray areas are railed to Victoria and, unless a rail service is extended to Hay and beyond, they will continue to do so.

The interviews also sought to confirm, or otherwise, the assumptions regarding the potential growth in rural production and the assumptions built into the perceived freight pricing. They also recognised that the freight forecasts are largely dependent on the ability of the proposed rail line to induce commodity exporters to either:-

- transfer from truck haulage, or
- transfer exports/imports from other ports to Port Eden or
- Produce more goods for export.

Therefore the interviews, although informal, usually included the following questions:-

- What factors would induce freight generating firms to transfer to rail?
- Why and how should a port at Eden successfully compete with Port Botany and Port Kembla?
- What advantages would an expanded port at Eden offer to induce freight generating firms to take advantage of the additional access to the port?
- What is the potential in the export market for commodity growers in the catchment area to expand their production?
- Would commodity growers take advantage of this potential to expand their production?

## 4.1 Lessons from the freight industry interview surveys

### 4.1.1. Rail operations in the Riverina

Griffith is the hub for rail freight from the Riverina area.

**Bulk Freight** - Both FreightCorp and Freight Australia provide the bulk haul service from Tabbita. The 5-6 trains required for the operation are focused over a two-week period. From Tabbita, the grain is hauled by a 48 Class locomotive as far as Griffith<sup>4</sup>. In Griffith Yard the locomotive is exchanged for an 81 Class locomotive for the rest of the journey to the seaport.

FreightCorp and Freight Australia also provide bulk grain rail services to the area, with the latter focussing on services to Goolgowi. Ricegrowers Co-operative has also been a major user of freight transport services in the region. The movement of wheat and barley within the Lower Murrumbidgee region (Leeton, Narrandera and Hillston) typically requires 5-6 trains in a fortnightly period.

**Container Freight** – Freight to/from Hillston, Leeton and Yenda is hauled by rail to Griffith. The rail wagons generally carry three containers (TEUs – Twenty foot Equivalent Units) for hauling to Cootamundra. The Riverina Freight Terminal is used to transfer containers from road to rail vehicles.

In addition to the bulk grain movements, export grain is also packed into shipping containers from Tabbita. Export rice is loaded into containers and onto rail at the Leeton mill and a proportion of export rice is despatched by road from the Coleambally mill to the Riverina Freight Terminal at Griffith, bound for Sydney Ports.

### 4.1.2. Increased production due to transport improvements

As an overall indication of the value of transport improvements in helping industry to grow, freight producing businesses earlier surveyed in Griffith reported that freight damage or delay caused total losses of about 2% of their annual turnover. The local freight industry's turnover was just under 6% of the annual turnover of these businesses. The businesses interviewed estimated that, if freight cost, delays and damage could be reduced by 20%, they would be able to expand their business turnover by almost 3% more than their current marketing plans. This value of this induced production would be 2.4 times the cost of the improvements in transport services. Producers clearly would respond to improved freight services.

It was also reported that those rice, cotton and nuts growers in Murray Shire and the lower Riverina were seriously restricted through the lack of rail services and currently trucked their produce to rail services in Victoria.

### 4.1.3 Road versus rail transport

The respondents to the Griffith surveys were primarily non-agricultural freight producers or consumers and they mostly responded in terms of their use of road transport. Most were more interested in improving road transport than thinking about changing their freight to rail.

The outbound flows of freight from the Griffith region and its surrounding areas are predominantly to Sydney and Melbourne (70%). Except for the export movements to port, all other movements are typically by road. The following operational and infrastructure factors were voiced as the reasons for this.

- Customers' schedules do not match rail timetables;
- Perishable products are not suitable for rail transport, including fresh horticulture and chicken products;
- Elapsed time for road movements to Sydney is 6-7 hours and Melbourne is 4-5 hours, direct to door. Rail is in excess of 12 hours;

<sup>4</sup> Griffith Road Rail Interchange Report – Maunsell - 2002

- Rail linkages to Melbourne and Adelaide are not direct, so domestic movements are at a price and time disadvantage;
- The movement of consumable products for the Griffith and surrounding areas are smaller consignments. This provides “back-loading” opportunities with which rail cannot compete, and
- Farm despatches of horticulture products for Melbourne and Sydney markets are too late. Road vehicles need to be despatched in the early evening for arrival at the market by 2am the next morning. Market sales commence around 4am.

Rail market share is less than 10% of domestic wine freight movements, which are carried by tanker from Yenda to McWilliams at Chullora in Sydney.

The comparative advantage for rail for export supply chains is its ability to achieve direct accessibility to port terminals and therefore close proximity to ship. Export commodities, such as rice and packaged wine, move in greater volumes, which allows for a lower unit operating cost for rail over road, where the latter is limited to 25 tonnes per journey.

Rail dominates the export freight market and its market share is about 80%. Most of the exporters in Griffith used rail and reported that they were satisfied with their service. They included grain and wine producers and some manufacturing firms.

In summary, road transport has about a 17% cost advantage over rail for domestic freight in the region but rail has about a 7-8% cost advantage over trucks for the export market. It is estimated that the rail advantage for exports could increase to a minimum of about 9.5% for shipment at Port Eden.

#### 4.1.4. Current restrictions on industry due to transport problems

**Road Users** - Almost all respondents commented on the state of the roads. Some drew attention to the lack of B-Double routes. Many commented on the road width and lack of passing lanes on the roads. Some referred to the condition of the roads during roadworks being particularly difficult for trucks. The diesel fuel levee was mentioned and lack of EPA credits for responsible fleet management. The need for uniform road rules was mentioned. Several asked for Government assistance to get Insurance Company acceptance of safety accreditation and general recognition of Quality Assurance accreditation. Safety training was considered by several respondents to be of paramount importance.

**Rail Users** - Several rail users complained about the lack of flexibility due to the short windows of access to Port Botany. This is exacerbated by traffic congestion through Metropolitan Sydney on route to the Port. There were frequent mentions of their complete dependence on Port Botany for container export and the lack of choice and strategic resilience when incidents happened at that port.

#### 4.1.6. Potential for freight transfer from other ports to Port Eden

As Graincorp carries a high percentage of the grain crop in the catchment area by rail to Port Kembla, their possible interest in transferring business to Port Eden was sought. They did not wish to be interviewed. Similarly the Australian Farmers Federation did not wish to be interviewed.

The Queanbeyan-Palerang Council reported that their agricultural, mining and manufacturing industries produced \$227 Million of international exports in 2019-2020. Similarly, the Comma Monaro Shire's international exports are estimated to be approximately \$170 Million and those for Bega Valley Shire are assessed at over \$300 Million. Eurobodella Shire exported about \$120 Million.

While it is unlikely that their domestic freight would divert through Port Eden, there is a strong potential for some of their international exports to do so.

There is a substantial difference between the domestic freight loaded at NSW ports and that discharged in NSW as shown in Table 37.



Port Eden may well be able to alleviate some of this imbalance by accepting inbound coastal shipping freight otherwise bound for Port Botany.

**Table 37 - Coastal Shipping Freight Loads – 2018-19 – Millions of Tonnes**

| State | Loaded | Discharged |
|-------|--------|------------|
| NSW   | 1.7    | 10.4       |
| Vic   | 4.7    | 8.8        |
| Qld   | 19.0   | 22.5       |
| SA    | 7.9    | 5.0        |
| WA    | 9.9    | 2.9        |
| Tas   | 5.6    | 4.7        |
| NT    | 5.3    | 0.1        |

Source: BITRE – Australian Sea Freight 2018-19

Further, The Government inquiry into Freight and Supply Chain Priorities reported that “With a relaxation of coastal sea freight restrictions and/or the introduction of autonomous ships, coastal shipping could offer an attractive option for inter- or intra- state logistics” Coastal shipping only carries about 17% of Australia’s freight task and is dominated by bulk cargo (87%).

4.1.5. Reported potential for export growth

Excello, Nugan Quality Foods and Parle Foods use rail for export and reported that they have plans for growth in their export markets.

Logs wood chips are shipped from the ANWE wharves at Port Eden. A representative of the timber industry confirmed that supplies were devastated by the 2019-20 bushfire season, with more than 50,000 hectares of the state’s pine plantations burnt. Regrowing has commenced with more than 14.5 million trees to be replanted yearly across the State from 2021<sup>5</sup>. The industry was modelling the potential for premature harvesting of softwood plantations. Difficulties with specifications imposed by China have limited the potential exports of hardwood from natural forests.

**Figure 16 - Logs awaiting shipment at Port Eden**



Supplying the domestic market will mean depleted export sales in the short term however there is a world shortage of timber products so the longer term export market is strong.

China’s actions to refuse to accept Australian woodchips has been easily replaced by markets in Korea and India. Wood chips are being replaced by wood fibres used to replace plastics so their supply for the export market may diminish in favour of fibre.

<sup>5</sup> Minister Barilaro press statement

Easy rail and port access may lead to growth potential from the timber forests near Bombala to replenish supplies for the international market.

#### 4.1.7. Preparedness for Growth

Interviews with the Eden Harbourmaster and others using the port confirmed after inspection that the harbour could be expanded with adequate draft and wharf space to accommodate the largest expected ships. At present ships up to 50,000 tons use the Port. Some further break-water works may be required as well as wharf extensions, handling facilities and storage areas and eventual seabed excavation.

Interviews with Eden Chamber of Commerce people confirmed that the town of Eden is willing and able to accommodate an expanding workforce and, although there is currently a housing shortage, there is ample land available for development at Boyd town and Two-fold bay. The town's retail and other facilities currently accommodates up to 2,000 cruise ship passengers on shore trips.

It became clear during these interviews that, until sufficient liner shipping with diverse destinations called at Port Eden the shipping of containers might be restricted to deck cargo on bulk carriers. However, as bulk loads have a uniform composition and a single destination shipping schedules are not limitations on bulk loads being forwarded from the Eden harbour. With this in mind, the models were adjusted to retard the otherwise expected early growth of Port Eden container shipping in favour of bulk loads.

Pentarch Stevedoring manages the stevedoring requirements for Pentarch Forestry and provides bulk shipping stevedoring services at Eden for third parties as required. It is understood that stevedoring is not usually required at Snug Cove, that Pentarch provides services at the woodchip wharf and that other stevedores could be used elsewhere in the Port if engaged.

#### 4.1.8. Potential for induced growth in production

The existing gold mine operated by Evolution Mining near West Wyalong is currently an open cut operation but underground mining is being contemplated. There is also optimism about exploration activities between West Wyalong and Temora coupled with recent shareholder expansion. Improved access to port services would materially enhance their probable expansion.

Several freight consumers and producers expressed their enthusiasm and willingness to cooperate if a multimodal terminal were developed in Canberra. The greater freight tonnage to be handled at such a terminal would primarily be freight imported to Canberra by rail from Sydney but, as listed in Table 24, there is a substantial quantity of export freight from Canberra which could be attracted to the rail access to Port Eden.

## 5. Economic evaluation

### 5.1 The Nature of the Economic Evaluation

#### 5.1.1. Introduction

The economic evaluation compares the capital costs of undertaking the project with the benefits it creates. The net benefits are defined as the gross benefits created by the project less the economic resources consumed in achieving them.  $\text{Net Benefits} = \text{Gross Benefits} - \text{Resources}$  used in achieving them

The **gross benefits** of the project include all of the following:-

- Personal travel benefits, including tourism,
- Induced residential relocation benefits,
- Freight movement benefits,
- Induced rural industry production benefits, and
- Induced export or import replacement benefits.

These types of economic benefit are all valued in perceived prices because they value the personal satisfaction (or industry response) created by the transport improvement. Care must be exercised in ensuring that benefits are not double-counted. The **resources** consumed in achieving these gross benefits, which are valued in resource prices rather than perceived prices, include the following:-<sup>6</sup>

- The total implementation cost, including track, rolling stock, stations, signalling and part of the port expansion cost,
- Changes in annual road and rail maintenance<sup>7</sup> costs,
- Changes in annual road accidents,
- Changes in annual train and vehicle operating costs.
- Changes in emissions,
- Changes in annual transport user travel time.

#### 5.1.2. The Benefits from the Project

**Personal travel benefits** - A proportion of the transport task is the transportation of people - tourists, local people or business visitors. The logic for valuing personal travel consumption benefits is that travel is a necessary, if unwanted, ingredient in economic and social participation in tourism, business, school, market, shopping and social or sporting activities and in the delivery of education, health, security and other social services. It is valued at the perceived price paid for it, with consumer surplus included. It follows that suppression of personal travel due to factors such as excess delays or uncertainty must lead to diminished opportunities for regional economic and social development.

**Induced residential relocation benefits** – There is an existing trend for people to relocate out from the major cities due to the high prices of housing, accelerated by the Corona Virus. These movements do not create added benefits for the project other than their use of passenger rail services. However, the increased accessibility created by the project will induce more people to relocate. Their relocation benefit must be at least equal to their perceived cost of the added travel they incur.

**Freight movement benefits** - The transporters of general freight and supplies benefit through transport improvements. This mechanism involves reduced perceived transport costs for freight carriers through a reduction in delivery times, portage, improved reliability and reduced damage to goods, or the ability to gain greater vehicle fleet utilisation through reduced travel times or down-time.

<sup>6</sup>The value of time, accidents, vehicle operating, road maintenance and environmental impacts are taken from NSW Guidelines

<sup>7</sup> The unit costs for rail operations and maintenance are taken from the Concept Plan Part 3A

**Induced rural industry production benefits** - If the price or uncertainty of freight movement can be reduced, then people will be induced to produce more. These cost reductions are partly passed on to consumers in the form of lower freight prices and, if this is so, this can result in higher rates of general consumption for these goods. The freight industry is sufficiently competitive that cost reductions normally translate into freight price reductions.

This form of evaluation estimates the marginal additional production induced by reduced farm-gate prices for freight due to transport improvements. The basis for assessing agricultural production benefits is that lower transport prices will induce an increase in agricultural production, the net value of which can be attributed as a benefit to the rail improvement project. Rural production is valued at its export price (fob) less the domestic costs incurred in transporting it to port. Thus any reduction in transport prices is the equivalent of an increase in the "farm-gate" price offered to the agricultural producer, provided it is passed on by the freight carriers. Additional production induced by this increased farm-gate price is assessed using estimates of production price elasticity for each crop or produce. These long term elasticities need to embrace changes in technology, replanting, bad seasons and other agricultural risk variables and therefore are averaged over a long period<sup>8</sup>.

**Induced export or import replacement benefits** – Part of this increased rural production is exported and, as this adds to the general national wealth creation, and does not displace production in other areas, an additional benefit can be attributed to the project. This is valued at the ex-port net value at export prices less all production and transport costs. The elasticity of the production function is usually taken to be the long-term export price elasticity. These induced rural industry benefits are a very important part of the economic evaluation. This also applies to import replacement consumption.

**Improved environmental conditions** – Inducing more passengers and freight to be moved by rail instead of by road transport reduces fuel and greenhouse emissions.

There are other minor benefits from the project. For instance, at present the rail freight moving south to Victoria is three times that moving north from Victoria into New South Wales. Adding northbound freight to the rail service could increase efficiency through potential back-loading of existing services. It should be noted that improved land prices beside the rail alignment are not generally recognised as a benefit to the project although there is some evidence that they occur.

### 5.1.3. The Resources Consumed

The cost estimates for the project are contained in a report entitled "*Concept plan for Canberra to Eden railway Part 2 - Preliminary estimate of construction costs*". These reports have been used as the engineering alignment and estimating basis for the evaluation contained in this report.

The actual construction cost includes track, signalling, earthworks, bridges, tunnels, land acquisitions, stations and other civil works, including a part of the cost of the port improvements.

This overall cost is called the financial cost and this is the amount actually paid for the work. The financial price, however, does not properly represent the economic cost of the work. This is because the price may include taxes, tariffs, GST, or duties on imported items, or on the 'profit' of the contractor. It may contain many forms of subsidised prices.

The effect of these taxes and subsidies must be removed to establish the 'economic' cost of the work. They have been calculated to be about 15%-18% of the financial price of the project. Similarly contingency estimates are omitted to form the economic price but these are dealt with in the risk assessment.

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<sup>8</sup> The methodology for the economic evaluation of induced agricultural production (called the producer surplus approach) was clearly set out in the WORLD BANK Technical Bulletin No. 241.

Other rail costs include rail rolling stock, track maintenance and train operating costs, which have been adopted from the concept plan reports. These costs have also been adjusted to remove contingencies and taxes etc. Rail rolling stock and operating costs take into account that some trains are privately operated.

As the project causes some transfer of passengers and freight from car or truck to rail, there are savings in resources due to savings in road maintenance costs, road accidents and road vehicle operating costs.

In addition, there are savings in green-house emissions. Also passengers save time in travelling as the facilities improve. These savings will be partly offset by induced travel and freight haulage by road or rail.

5.1.4. Processing the evaluation

The travel and freight movement forecasts on which the economic evaluation is based are predicted into the future. The 'base' year is 2021 and specific forecasts are made for 15 years ahead, in the year 2036, and also for 30 years ahead, for the year 2051. Intermediate years are interpolated from these forecasts. All costs and prices are in constant prices – inflation is not included.

The total net flow of benefits and costs is arrayed year by year and then discounted back to the present using a discount rate and summed to provide the 'present value' of these streams. For the B/C criteria the stream of benefits is discounted separately from the stream of costs, the present value of benefits being then divided by the present value of costs to give the B/C ratio. Only capital costs are designated 'cost' in this computation.

There are three criteria by which to judge whether a project is economically viable. They are all computed for this report and are as follows:-

- The benefit/cost ratio (B/C),
- The net present value (NPV), and
- The internal rate of return (IRR).

In these computations the values of all costs and benefits after the final year are included as benefits in perpetuity in the computations. Prices are considered to be constant throughout the period of evaluation.

**5.2 The results of the economic evaluation**

5.2.1. The value of the Port at Eden without the Railway

It should be noted that any improvements to the port at Eden may induce road freight movements, even if the rail project does not proceed. These benefits are not attributable to the rail project in the economic evaluation and need to be deducted from the total benefits stream. However they allow for a reduction in the cost of port improvements to be limited to those which result directly from adding the rail services. Therefore, the first test was to establish the economic value of providing the port at Eden with all facilities for truck traffic for some container and bulk loads without the rail improvement. This test was also necessary to be able to examine the extent of freight transfer from road to rail when the rail was constructed.

There were benefits to freight handlers and there were savings in road maintenance, road accidents and vehicle operating costs. User time costs were minor. Rural production was forecast to increase by 6.8% in the catchment area as a result of the improved port facilities. The results are shown in Table 38.

**Table 38 - Benefits from opening Port Eden for Truck Traffic with no Rail - \$Millions**

|                         |         |
|-------------------------|---------|
| Road Maintenance Costs  | \$6.20  |
| Accident Costs          | \$2.10  |
| Vehicle Operating Costs | \$11.00 |
| Freight Benefits        | \$27.50 |
| Rural Industry Benefits | \$30.30 |
| Net Benefits \$millions | \$38.50 |

Source: CARTS model

Thus it is estimated that approximately half of the cost of the improvements at Port Eden would be justified if it were fully provided with facilities for road traffic alone.

### 5.2.2. The Economic Value of the Rail Proposal

The result of the economic evaluation for the Rail Proposal is shown in Table 39.

**Table 39 - Economic evaluation results for the rail proposal - \$Millions**

| NPV of Costs and Benefits - \$Millions |                           | Discount rate    |                |                |
|--|---------------------------|------------------|----------------|----------------|
|  |                           | 3%               | 3.5%           | 4%             |
| Rail and Port Construction Cost        |                           | \$1,273.3        | \$1,236.3      | \$1,189.2      |
| Road System                            | Maintenance Savings       | \$8.6            | \$7.8          | \$7.1          |
|  | Accident Costs Savings    | \$202.6          | \$183.1        | \$165.9        |
|  | Veh Op Costs Savings      | \$1,534.3        | \$1,381.5      | \$1,247.2      |
| Rail System                            | Rail Operating Costs      | \$642.3          | \$627.9        | \$603.2        |
|  | Rail Rolling Stock        | \$220.4          | \$213.7        | \$204.4        |
|  | Rail Maintenance Costs    | \$596.3          | \$582.9        | \$570.2        |
| Users                                  | User Time Savings         | \$433.4          | \$390.5        | \$352.8        |
|  | Consumer Surplus          | \$214.7          | \$193.3        | \$174.6        |
| Public                                 | Relocation Benefit        | \$12.4           | \$11.1         | \$10.0         |
|  | Environmental Savings     | \$234.9          | \$211.2        | \$190.4        |
| Industry                               | Freight Industry Benefits | \$764.5          | \$679.2        | \$604.8        |
|  | Rural Industry Benefits   | \$509.5          | \$460.1        | \$416.6        |
|  | Induced Exports Benefits  | \$143.6          | \$127.8        | \$114.0        |
| <b>Net Present Value NPV</b>           |                           | <b>\$1,326.2</b> | <b>\$984.8</b> | <b>\$726.6</b> |
| <b>Benefit-Cost Ratio</b>              |                           | <b>1.49</b>      | <b>1.37</b>    | <b>1.28</b>    |

Source: CARTS model

These results show that the rail proposal is marginally feasible, with an Internal Rate of Return of 5.31%

### 5.3 Risk analysis

While, the analysis has adopted conservative unit rates for pricing, nevertheless the analytical process involves a number of assumptions and is subject, as in all forecasts, to many future unknowns. Risk analysis recognises these potentials for variability. For instance, the COVID pandemic has substantially affected the socioeconomic forecasts embedded in the modelling and, at present, there is no consensus on these forecasts.

The forecasts for rural produce, such as Wheat and Cattle, are normally volatile as they depend on drought, bushfires and numerous other conditions. Similarly the closed borders have affected tourism and foreign trade and have increased the volatility of the export market for produce generated in New South Wales. The time taken to regenerate this export trade is unknown. Therefore the forecasts embedded in the modelling lack the normal reliability.

In particular, these forecasts rely heavily on assumptions regarding the economic growth of Australia's trading partners, particularly China<sup>9</sup>. China features prominently in non-containerised exports, with 43.65% of Australian non-containerised exports<sup>10</sup> but current trade and diplomatic relations with China add another layer of uncertainty.

<sup>9</sup> Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2010, Australian Maritime Activity to 2029–30

<sup>10</sup> Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2010, Australian Maritime Activity to 2029–30

Risk analysis recognises the probability that some combinations of individual variations in important assumptions such as these, used in the modelling process, may occur together and compound each other.

It is usual to employ a Monte Carlo approach by assessing the maximum and minimum variability of a range of the most important input factors and randomly selecting their effect on the result within this range acknowledging that they can be cumulative.

The model was run many times to indicate the probable answer. The potential risks and the probable range are listed in Table 40 together with their effect on the economic indicators.

**Table 38 - Probable Range of Values for Risk Analysis**

| Risk Factor                           | Possible Variability |     | Effect Range |     |
|---------------------------------------|----------------------|-----|--------------|-----|
|                                       | High                 | Low | High         | Low |
| Population Growth Rates               | 105%                 | 90% | 102%         | 96% |
| Rural Production Yields               | 110%                 | 80% | 108%         | 92% |
| Implementation Cost Blowouts          | 120%                 | 95% | 116%         | 96% |
| Variation in Port Costs – Port Botany | 105%                 | 90% | 101%         | 98% |
| Transfer rates from Truck to Rail     | 120%                 | 80% | 110%         | 90% |
| Transfer Rates from other Ports       | 110%                 | 90% | 106%         | 94% |
| Induced Resident Relocation           | 130%                 | 60% | 101%         | 99% |

The risk evaluation model provided the potential risk outcomes as shown in Table 41.

**Table 41 - Risk Evaluation Results**

| Risk analysis results        | Internal Rate of Return | Benefit-Cost Ratio @ Rate |             |             |
|------------------------------|-------------------------|---------------------------|-------------|-------------|
|                              |                         | 3.0%                      | 3.5%        | 4.0%        |
| Modelled Results             | 5.31%                   | 1.48                      | 1.37        | 1.28        |
| <b>Risk Adjusted Results</b> | 4.74%                   | <b>1.39</b>               | <b>1.29</b> | <b>1.19</b> |
| Maximum probable             | 5.07%                   | 1.44                      | 1.32        | 1.23        |
| Minimum probable             | 4.46%                   | 1.31                      | 1.25        | 1.14        |

The risk assessment results indicate that, with the potential range of estimating errors shown in Table 40, the most probable outcome for the rail proposal is an Internal Rate of Return of 4.74% but with a possible worst case of 4.46% if most estimates were too optimistic, and a possible better result of 5.07%, if not too many estimates were wrong.

The Benefit-Cost Ratio at 3% discount rate probably reduces to 1.39 when risks are taken into account but could be as low as 1.31. Discount rates higher than 5% would possibly make the project too risky.

This process does not produce the absolute worst case answer, as it is highly unlikely that all the variables should be in error to the maximum amount at the same time. It does, however, provide a suitably reserved guide for risk assessment.

Careful risk management could still ensure that the project remains economically worthwhile.

### 5.4 Other Negative Risk Issues

Risk analysis usually includes discussion and assessment of external issues over which the stakeholders have little or no control, such as the general economy, and discussing those factors which could not be included in the forecasting process. For instance, there is some uncertainty arising from another plan for the use of the rail corridor as a walk and bike path from Queanbeyan to Bombala.

There are discussions about the feasibility of the bike path being beside the railway in accordance with the rail concept plan.

Of greater significance on the economic results is the fact that it depends to a substantial degree on the diversion of a proportion of the future growth in rail freight from Port Botany and Port Kembla to Port Eden. The forecasts rely on the fact that there is such congestion at the container wharves at Port Botany, both rail and road delivery services being affected by the delays being experienced in port handling. Whether all the reasons for these costs and delays can be overcome in future is questionable. Similarly, while the NSW State Government's stated priority is given to new container facilities at Port Kembla, they have not yet eventuated and uncertainty exists as to whether this will proceed and, if so, when this will occur. Although it is presumed that, should this development go ahead, it will relieve the problems at Port Botany, they may well be of a nature that simply expanding the port facilities, will not solve the problems.

The modelling process assumes that freight producers and forwarders are free to choose the various steps in their logistic chain to or from their international markets. However, NSW Ports, the long-term lessee port management agency for Sydney ports and Port Kembla, is privately owned and is responsible for managing land side tenant leases and port infrastructure. The fact that these ports are privately owned by a single body implies that decisions regarding their development and also that decisions relating to the distribution of cargoes to and from these ports, may be subject to a degree of monopoly control, rather than to free-market choices by the wishes of the relevant freight producers and forwarders or by their arrangements with shipping lines. The privatisation of these ports is contentious. No doubt it has provided opportunities for improvement in economic efficiency and overall operational performance. However, ports in general do display natural monopoly characteristics raising the need to maintain adequate regulatory frameworks to clarify service goals and protect consumer interests.

Similarly, container freight forwarders need to rely on shipping lines that visit many international ports to ensure the wide distribution of their export produce to their relative markets and they want their goods delivered as fast as possible to avoid delivery delay penalties. So they look for shipping lines that visit a large number of international ports but do not stop too often thus causing delays to deliveries. Conversely the shipping lines need to fill their holds and stack their decks while limiting the number of their pickup ports to ensure the fastest delivery times for their clients.

In this environment, Port Eden therefore faces another barrier to entry - until sufficient container shipping lines find it profitable to stop there, many potential freight forwarders will not find the port as attractive as ports such as Port Botany or, if it developed, Port Kembla, where many shipping lines stop. It is not known to what extent the container shipping lines will be prepared to include Port Eden in their itinerary and cautionary measures have been taken in the modelling regarding the early growth of shipping of containers at Port Eden. Port Eden may have to look to the minor shipping lines to initiate their container trade and initially look to ship containers as deck cargo on bulk carriers.

## **5.5 Positive Risk Issues**

As the container storage space at Port Botany becomes more congested in future, it is probable that preference will need to be given to the larger 40-foot containers because, at present, about 80% of all containerized imports through Port Botany travel no more than 40Km from the port. They are mostly white goods and electronic equipment which typically are transported in 40-foot containers. Grain, meat and dairy products, on the other hand, are dense cargoes and are more suited to 20 foot containers (with or without refrigeration). As congestion increases, these cargoes are more likely to be diverted to Port Eden to relieve storage congestion at Port Botany, provided that the port provides appropriate loading facilities.

Uncertainty exists about the future of the expansion of container facilities at the Port of Newcastle due to the Port Commitment Deeds that were entered into as part of the privatisation of Port Botany and Port Kembla. It has been assumed in this report that the current restrictions on expansion of Port Newcastle will be lifted. If not then the freight destined to Port Eden should be greater than that estimated in this report although the probable catchment area of the two ports, Newcastle and Eden, is sufficiently dispersed that changes to Port Newcastle should have only a minor effect on freight to Port Eden.



## 6. Conclusions

### 6.1 Introduction

The fundamental purpose of all investment in transport is to foster economic growth through improved freight productivity and service quality (including improved reliability and resilience), to optimise environmental outcomes and to assist regional social and economic development.

The purpose of this report is to assess whether the railway works proposed in the “*Concept Plan for Canberra to Eden Railway*” prepared by Edwin Michell of Stormcloud Engineering in 2018 for the CMPA to service port improvements at Port Eden, is economically viable.

### 6.2 The Result of the Economic Analysis

The summary results of the economic evaluation are shown in Table 42. They illustrate that the proposed rail project is marginally viable provided that the discount rate stays low and risks are well managed.

**Table 42 - Results of the Economic Evaluation**

|                              |           |         |         |
|------------------------------|-----------|---------|---------|
| Discount Rate                | 3.0%      | 3.5%    | 4.0%    |
| Benefit-Cost Ratio           | 1.49      | 1.37    | 1.28    |
| Net Present Value \$millions | \$1,326.2 | \$984.8 | \$716.4 |
| Internal Rate of Return      | 5.31%     |         |         |

The risk assessment results indicate that the most probable outcome is an Internal Rate of Return of 4.74% and a Benefit-Cost Ratio at 3% discount rate reduced to 1.39. Discount rates higher than 5% would probably make the project risky. Careful risk management could still ensure that the project remains economically worthwhile.

### 6.3 Issues underlying the Conclusions

While it is estimated that rail passenger services would attract many patrons, this alone would not economically justify the cost of the proposed rail improvements. The viability of the proposed railway and its services depends on attracting sufficient freight movements and on the further development at Port Eden and its ability to attract shipping lines to carry this freight traffic.

Conversely, while developing Port Eden with handling facilities for more road freight is estimated to induce added export value, the port is unlikely to reach its full potential without the freight and passenger access provided by the railway. Therefore, the Port Eden development and the Canberra to Eden rail proposal need to be treated as mutually dependant.

The commentary in the risk analysis clearly shows that there are a number of important risk factors and uncertainties to be resolved. Shipping scheduling issues mean that, at first, the port at Eden would attract bulk and general cargo with some containers as deck cargo. If and when congestion and delays at Port Botany and Port Kembla continue to grow, then Port Eden would begin to attract container shipping.

Set beside these risk issues is the commentary encountered in the validation interview surveys. All public projects are subject to community consultation, and, while the stakeholder interviews conducted during this study were not carried out in the formal manner normally required, they are certainly indicative of the degree of public support or opposition the project may encounter.

There was, of course, in some quarters, a degree of scepticism expressed at the probability of the rail proposal being implemented. However, the commentary very clearly indicated the frustration and cost penalties bourn by freight producers and freight forwarders due to congestion and other problems at Port Botany, much of which could be resolved by increased port capacity, be it at Sydney or elsewhere.

This is clearly limiting Australia's export market and its economy. The authors of some of the press reports previously quoted confirmed that these media quotes were accurate.

While most of these frustrations were aimed at problems at ports, there were few complaints about rail services excepting where they had been deemed to be not economically available. As early as 1989 a Parliamentary Committee noted that: "the plain fact is that a greatly increased amount of freight could be carried across the continent by rail more efficiently and with greater safety than it ever could be by road ... rail has been starved of funds and rendered inefficient"<sup>11</sup>

These sentiments were widely expressed throughout the whole area surveyed during this study, where respondents to the interviews repeated expressed support for improved rail access. Many export producers indicated that they could and would expand their international markets and sales if they had access to improved rail services to ports. Where the data available allowed this to be measured it confirmed that the added value to the nation's economy far exceeded the costs of the required transport improvements.

Many of the problems facing those producers and freight forwarders interviewed, were not capable of being measured in terms that could be included in the economic computations and, in this respect, the economic results should be considered to be conservative and not fully representative of the complete benefit spectrum available from the proposed rail and port developments.

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<sup>11</sup> Cited in "A competitive interstate rail freight and passenger network" Conference on Railway Excellence, Laird P, University of Wollongong 2014.

## **Appendix A – Resume of R J Nairn**

R J (Bob) Nairn graduated from Adelaide University in Civil Engineering and Economics majoring in Government Finance and Sociology. His early career was spent with the Highways Department in South Australia, designing bridges and then supervising the construction and maintenance of roads and bridges in country areas of South Australia but included two years in Canada designing freeway interchange structures.

After spending two years in Headquarters planning the South Australian road network he worked on the Adelaide Metropolitan Transportation Study and was subsequently appointed to advise and assist the South Australian Transport Minister for two years.

Seeking new opportunities, he joined the consulting firm of Kinnaird Hill deRohan and Young to head up their feasibility study group where he managed a wide range of infrastructure studies including mining ventures, tall city buildings, major retail and residential developments and tourist centre developments such as that at Ayres Rock.

In 1973 he joined de Leuw Cather of Australia to open their office in Canberra and was appointed a Director. He managed the firm's involvement in the National Growth Centre program and participated in planning the growth of Canberra.

In 1976 he established R J Nairn & Partners, a consulting firm specializing in transport and traffic engineering and transport economics. With the growth of this venture he started exporting services and worked on over 50 different projects in over 20 countries including toll roads, light and heavy rail projects, urban transport studies and area-wide rural development projects as well as conducting training courses at foreign universities. The firm employed several systems analysts and, with their assistance, Bob developed innovative transport analysis software to provide forecasting assistance in these urban and rural studies.

He provided forecasting and economic assessment advice on many of Australia's toll road projects, Light Rail projects and on such innovative projects as Transrapid's bid for the Sydney-Canberra fast rail project. He had a special interest in enhancing the understanding of the rural economic impacts of transport improvements and conducted many studies to seek funding for remote roads in Australia.

In 2000 R J Nairn & Partners merged with the Scott Wilson group to form Scott Wilson Nairn, which Bob managed for four years until he retired. In retirement he took on local consulting projects as a sole practitioner and has written several books on transport planning and economics based on the many professional papers he has published over the years.