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*Cooma and Monaro Progress Association works to promote the economic
development and social wellbeing of the region*

**COOMA AND MONARO PROGRESS ASSOCIATION (CMPA)
REVIEW OF
FEASIBILITY STUDY on CANBERRA TO EDEN RAILWAY**

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CONTENTS

1. Summary
 2. Background
 3. Introduction
 4. Physical findings of the Report
 5. Financial and economic findings of the Report
 6. Freight catchment area
 7. Government optimism
 8. Essentials
 9. Specialists' reviews
 10. Particulars of some errors in the Report
 11. Conclusion
- Appendices
- A Specialists' reviews, with map
 - B Outline of structure of the Report
 - C Executive summary of the Report

1. Summary

CMPA recommends: setting aside the financial and economic findings of the Canberra to Port of Eden Rail Feasibility Study; and preparing a transparent assessment of the Concept Plan for Canberra to Eden Railway, 2018, on transparent terms of reference.

2. Background

In 2018, on publication of the concept of a railway from Canberra to Eden, it was described as visionary. Six weeks later, the Premier, the Deputy Premier and the Transport Minister announced a commitment of one million dollars to a feasibility study on a proposed railway to link Canberra to the Port of Eden. The concept is to improve the existing disused railway between Canberra and Bombala via Cooma; and to create a new line down the escarpment of the South Coast Range from the Monaro at Bombala to the Port of Eden. Eden is a minor port in one of the best harbours in Australia. The Concept Plan author, Edwin Michell, completed a cost estimate and two cost/benefit analyses of the railway in 2018 after the initial document. CMPA, who had commissioned the plan, published the four documents in print and at coomansw.com.au. The railway is proposed to take export freight from the NSW Riverina and Central West to the ocean, relieving congestion

approaching and in other ports; and to take commuters from the Monaro to Canberra. An achievement in the concept plan is the arrangement of curves and switchbacks on the line from Bombala to Eden. They keep the gradient to less than two percent on a difficult stretch of mountainous terrain. This while providing a design speed of 115 kilometres per hour for freight trains and 160 for tilting passenger trains. The Feasibility Study began in May 2019 and was practically complete by November 2019.

3. Introduction

An unpublished Report on the Feasibility Study on Canberra to Eden railway **[the Report]** by Ontoit, written for Transport for NSW, is dated 29 October 2019. The Report was provided to Snowy Monaro Regional Council on 18 September 2020. The Summary dated May 2020 of the Report was published in September 2020 at: transport.nsw.gov.au – Projects – Programmes – Fixing Country Rail – scroll down. There were reportedly no changes of substance between the Report of 29 October 2019 and the Summary of May 2020. The forerunner Concept Plan for Canberra to Eden Railway **[the Concept Plan]** by Edwin Michell was published in four parts by CMPA, July to November 2018. It can be read via the websites of the State and National libraries, and at: coomansw.com.au – Articles and Projects – scroll down.

		<u>Date</u>	<u>Author</u>
The revisions page of the Report records:	Final	13/09/2019	
	Final V1	11/10/2019	TfNSW comments
	Final V2	29/10/2019	PJH/TM.

4. Physical findings of the Report

The Report validates the engineering feasibility of the railway and confirms the ample scope of the Port of Eden for upgrades.

5. Economic and Financial findings of the Report

The economic and financial conclusions of the Report are compromised by the following combination of disabling errors and unexplained disparities with the Concept Plan:

- Seven-fold disparity between the Study and Concept in the number of freight trains per day to Eden
- Mistaking the origin of freight trains to Eden. Most export freight on these trains will be railed through Queanbeyan to Eden, not consolidated in Canberra
- Misunderstanding the passenger imperative of the railway. A purpose is to take commuters by rail to Canberra; the existing Canberra station is an eligible alternative to the airport; the ACT government will need to be consulted for their decision on this
- Seven-fold disparity between the Report and the Concept Plan in revenue from sale of State land for housing near stations
- A two-fold disparity between the Report and the Concept Plan in the estimated project cost without mention of the Concept Plan estimate in the Study Report
- Evincing a pessimistic, defeatist stance; Neutral description of an option with disabling cost
- Keeping to the century-old rail alignment at tortuous sections – misunderstanding commuters, and ignoring benefits of reduced transit time for freight
- Absent accounting for reduced congestion in and on the approaches to ports Botany and Kembla
- Absent accounting for decentralisation
- Avoiding level crossings by changing existing rail levels instead of road levels.

Particulars of some of the errors are provided in this review, which is submitted for the recommended attention of the Government. Records of a number of readings of the Report are appended. The Report was read by members and nominees of CMPA, in Snowy Monaro Regional Council Chambers. There were no further readings by CMPA members and nominees once the arrangements for reading were reported to be inadvertent. The confidence of the experienced reader in the Report reached a tipping point at which confidence fails basically. The financial and economic conclusions of the Report are considered to be invalid.

6. Freight Catchment Area

Beginning in mid-2019, CMPA were repeatedly informed: for freight from the inland, the railway does not fit in with existing plans of Transport for NSW and of their country rail agent (John Holland Rail).

However, the decision to undertake the Feasibility Study can naturally result in fresh options for that freight. The new railway and the Port of Eden can cooperate in competing successfully with the alternative more congested ports and their approaches.

The Report, Appendix D, page 51 states: *As the time horizons for the planning and construction of the project are likely to extend over 20 years, it is reasonable to expect that existing contracts would elapse and new contracts would be negotiated during the lead up period to full rail operation.* The principle here is correct, however the planning and construction time is excessively pessimistic.

7. Government Optimism

In a speech at the announcement of a \$1m commitment to the feasibility study on a railway between Canberra and Eden, at Cooma, on 22 August 2018, the NSW Minister for Transport said:

We had the Federal Government – it was the Howard government – develop a multipurpose wharf at Eden. And it's underutilised. The Navy uses it. But we're also very keen to look at what we can do in terms of throughput, both in terms of freight in and freight out.

The Inland Rail itself: one of the key challenges for us as a State is to make sure we've got good east-west links off the Inland Rail project to our ports. And Eden is the hidden gem. It's one of the best ports in the country. But it's undeveloped.

And what this feasibility work will look at is what options we've got in terms of throughput of freight, not only from the South East through the ports and through the international airport, but even the Central West.

In conversation on the occasion, the Minister volunteered: on the Concept Plan, of which only the first part had then been published: *We've had our heads in it for the last two weeks;* and separately: *This is not a project for a feasibility study: it's a project for a railway to begin with a feasibility study.*

In a speech on the same occasion, the Premier said, *We are a government committed to opening up the regions but we can't do that unless we can move people, goods and services throughout our regions... The opportunities for us now are once-in-a-generation, and we intend to use every opportunity we have.*

8. Essentials

The Feasibility Report should have emphasised for the Canberra to Eden railway that:

- for passengers, the main purpose is to take passengers to and from Canberra, but not via the existing Queanbeyan railway station;

- for freight, the main purpose is to take freight to and from Eden through Queanbeyan, not via Canberra.

The railway into Canberra from the south should deviate from the existing line into Queanbeyan. As in at least one other case, the Report should have if necessary and with explanation varied from the words of the brief, providing a map. The option of the railway turning to join the existing line into Canberra railway station should be considered. As foregoing, the ACT government will need to be consulted on this.

9. Specialists' reviews

Appended are contributions from railway adviser Dale Budd, former logistics manager Nicholas Kilpatrick, and transport economists Colin S Mellor and R J Nairn.

10. Particulars of some errors in the Report

Principal disparity in the agricultural freight volume from the inland to Eden

Three explanations of shortage in the Report quantity of export freight on the railway were noticed:

1. Not including any export freight capture from the ports of Brisbane and Melbourne
2. Not including any substantial export volume from the Central West of NSW
3. Of its assumed total of 660 k tons/year from Wagga Wagga to the ports of Botany and Kembla, counting only 260 k tons/year (40%) as capturable to Eden [Appendix D, Table 44 (page 65)]

In comparison, the Concept Plan reckoned a total of 2,160 k tons/year of agricultural produce from the inland (principally the Riverina and Central West of NSW) to Eden. [Part 3A, page 11]

Thus, the Concept Plan reckoned 8 times more than the Feasibility Study in agricultural produce to be railed to Eden. In line with this, the Concept Plan took at least 8 times more than the Feasibility Study in *total* rail freight to Eden. [7-8 trains per day, each carrying 2,000 net tons bulk (Part 3A, page 11, compared with the Feasibility Study: one full service (freight train carrying 1,600 tons) per day (Report, page 61)].

The Feasibility Study Report made no comment on the disparities between its freight volumes and those in the 2018 Concept Plan.

In the Feasibility Study, the quantities of agricultural freight from Wagga Wagga were an afterthought: the Report, page 66, Section 8.2.3 states: As the assessment of Option 1A, 2A and 3A produced poor financial and economic outcomes, three alternative scenarios have been assessed and included in this report. These include:

- Option 1B – a more optimistic freight forecast than assumed in Option 1A.

Describing the alternate scenarios, the same section included:

- omitting the Queanbeyan to Canberra Airport Link
- allowing for an upgrade of port facilities at Eden, to optimise the potential that could theoretically transfer from other NSW ports.

The words *allowing, optimise, theoretically, NSW* lead the reader to doubt a readiness of the Study to find feasibility. This, in conjunction with adding the separate-business costs of the port upgrade into a benefit-cost ratio of the railway. The CMPA response during the Study proposed: assuming that the Port of Eden will be developed so as to enable freight to and from Eden to be unconstrained by port capacity.

Mistaking the origin of freight trains to Eden

The Report yields the record in the Summary at page 9:

One full [freight train] service per day southbound with a carrying capacity of 1,600 tonnes could run from Canberra all the way to Port of Eden ...

These words miss the point of rail freight from the inland, the principal source of export freight in the Concept Plan. Canberra does not produce trainloads of exports, nor is it the best place for consolidating them.

Disparity in revenue from sale of State land for housing near stations

The Report at page 72 includes a developer margin of \$100,000 per dwelling on the sale of 1,000 dwellings over 50 years, yielding a total of \$100 m. The Concept Plan part 3A page 9 included the land for an optimistic 10,000 dwellings over 20 years with a benefit of \$75,000 per dwelling to the State, yielding a total of the order of \$1 billion. The Report made no comment on the disparity.

Disparity in estimated project cost

The estimated project cost of \$6.3 b in the Report is high in relation to the \$2.95 b estimate in the Concept Plan. The Report made no comment on the disparity.

Evincing a pessimistic, defeatist stance; neutral description of an option with disabling cost

Two of the Bombala-Eden route option summaries in the Report, Appendix A, are compared:

Towamba Valley Route (p 79)

... The line requires a combination of large bridges/viaducts and tunnels to traverse the South East Forests National Park and enter the Towamba Valley. Construction of this section of the line would come with enormous challenges. ... [In the Towamba Valley] the route is likely to come under scrutiny and is unlikely to be granted access or ownership of the land for the required corridor.

Bombala River Route

... The national park will see little to no evidence of the railway line and is therefore more viable. ... an 18 km tunnel is required to implement the solution. This comes at a considerable cost and access to this point of the line is challenging.

The first description evinces a pessimistic, defeatist view of the option when compared with the second. A reader can sense that the Report, in its use of the words *enormous, likely, unlikely* wants this option dismissed. The length of tunnels is 11 km and the P50 total estimate is \$5.8 b. (For further comparison, the earlier Concept Plan chose the Towamba Valley route, with 2 km of tunnels and a P50 total estimate of \$1.6 b)

The second description evinces a comparatively neutral view. But the length of tunnels is a completely prohibitive 28 km and the P50 total estimate is \$8.2 b. The Report has left the reader to dismiss this option on finding these two statistics.

(For further comparison, the Report statistics for the Imlay Road option are a zero length of tunnels and a P50 estimate of \$3.0 b. Informed by the Report numbers alone, the reader must select the Imlay Road option; the reader who feels pushed to dismiss the Towamba Valley route option may seek the Concept Plan on the internet, finding it on the National or State library websites or by the link in the Report.)

Evincing a pessimistic, defeatist stance

The Report records in the Conclusion:

A strong amount of community enthusiasm was observed at the stakeholder engagement sessions but there was limited information provided to support the railway.

But the four-part 72-page Concept Plan had previously been provided to Ontoit (the provision was not acknowledged in the Report), and in response to the stakeholder questionnaire, a suggestion-packed page was provided by CMPA which was not specifically addressed in the Report.

On the extension of the railway from Bombala to Eden, the Report page 34 records the *level difference from the height of the Monaro Ranges (around 1,000 metres) down to sea level*. This is an unwarranted exaggeration by about one-third of the actual challenge. Routes should tend to be picked for the lowest pass in a range to begin with. The Towamba Valley route in the Concept Plan begins to descend from the Monaro at an elevation of 750 metres. The pass heights of other routes, if closer to 1,000 metres, show that these routes are less favourable from the outset. The exaggeration sows the seed of doubt in the mind of the reader.

Keeping to the century-old rail alignment at tortuous sections – misunderstanding commuters, and ignoring benefits of reduced transit time for freight

The Report records at page 65 *... this report does not recommend adopting the approach of realigning the existing corridor to improve speeds and curvature.*

But the freight and passenger railway between Queanbeyan and Cooma was completed in 1889. The extension to the terminus at Bombala was completed in 1921. The Concept Plan for renewal of the line of this old railway with a new extension to Eden, to take freight to the world and commuters to Canberra, was made in 2018. It is a self-evident truth that the alignment of the new railway should be improved at tortuous points on the old line. But the Feasibility Study Report used cost-effectiveness for passenger travel only, and at one tortuous section only, to avoid recommending improvement of the existing alignment. No account was taken of the potential savings in freight operations. The locations for alignment improvement are in the Concept Plan. Adoption of these improvements is recommended.

Avoiding level crossings by changing existing rail levels instead of road levels (p 49)

The Report mentions the need for grade separation of railway and road where there was a level crossing of the previous railway and a road such as the Monaro Highway:

Grade separation would be required at these locations which therefore requires the lowering or raising of the railway line and the costly construction of either a bridge or tunnel as a way of crossing the Monaro Highway.

The Concept Plan included several grade separations. The Feasibility Report refrains from mentioning the usual means of grade separation by changing the road level - building a road bridge, and leaving the railway at the previous level. With train gradient limits much lower than for road vehicles, it is usual for the level change to be applied to the road, as usual in the Concept Plan, rather than the railway.

11. Conclusion

Cooma and Monaro Progress Association recommends:

- setting aside the financial and economic findings of the Canberra to Port of Eden Rail Feasibility Study; and
- preparing a transparent assessment of the Concept Plan for Canberra to Eden Railway, 2018, on transparent terms of reference.

APPENDIX A

SPECIALISTS' REVIEWS, with map

Reviews by:

R J Nairn 10pp

Dale Budd 2pp

Nicholas Kilpatrick 2pp

Colin S Mellor 2pp

Map by

Edwin Michell 1p

Peer Review of “Canberra to Eden Rail Feasibility Study”

R J Nairn B.E., B.Ec. FIEAust, EngExec, LFITE – December 18th 2020

1. Introduction

This peer review concerns the report entitled “*Canberra to Eden Rail Feasibility Study*” dated 29th October 2020 by Ontoit as commissioned by John Holland Rail and Transport for New South Wales. Ontoit is a specialist project management and advisory consultancy and was assisted by Aalto Economics.

The subject of the feasibility study is a proposed restoration of the rail line, and its passenger and freight services, between Queanbeyan and Bombala and its extension to Canberra in the north and to the Port of Eden in the south. It includes any necessary improvements to the Port of Eden to accommodate any increased portage.

A copy of the report was made available for inspection at the offices of the Cooma Monaro Regional Council on the morning of Wednesday 18th November 2020.

This peer review has been carried out by R J Nairn at the invitation of Cooma and Monaro Progress Association (CMPA) and is conducted in accordance with the procedure set out in Appendix A. This review is limited in scope to the modelling, forecasting, economic and financial components of the report as those are fully within the competence of the reviewer.

2. Does the report address the statement of the objectives?

The primary purpose of a rail project is to grow the State’s economy by improving access for passengers and freight. The client’s study brief to tenderers outlined in considerable detail what was required and the report provided that information. However, while the client’s brief was very detailed in respect of the engineering, environmental and operational components of the projects feasibility, the stated requirements for the demand estimates and the financial and economic components left considerable scope for consultant interpretation.

In view of the stated limits in scope for this review, no comment is made regarding the compliance or competence of the report’s railway engineering, environmental and operational components of the projects feasibility. However, it is noted that the report states that rail overpasses are required over several highways, without reference to the actual highway/rail volumes and the standards appropriate for grade separations between rail and road, rather than the various at-grade safety measures normally employed. However it does seem reasonable to accept grade separations where the railway crosses NSW state highways (Monaro and Princes Highways and arterial roads in the ACT).

3. Does the report comprehensively address the modelling, forecasting, economic and financial aspects of the proposed projects feasibility?

Accurate demand modelling is the underlying key to the provision of reliable forecasts and economic results. The demand model consists of five components namely **Trip generation and attraction, Trip distribution, Modal split, Trip assignment to route, and the Assessment of operational requirements.**

4. Is the demand modelling logical?

The modelling process consists of the following steps:-

- **Development,**
- **calibration and validation,**
- **Forecasting,**
- **Analysis, and**
- **Sensitivity testing and Risk Analysis.**

4.1. Model Development - Passenger and Freight Generation and Attraction

Freight travel is the most difficult area to assess because, although origin and destination data is maintained for various freight commodities for rail, ship and air, there are few reliable intrastate statistics describing road-based freight origins and destinations. It is therefore difficult to assess potential diversion of road freight to rail, which is an important element in defining the feasibility of this project. For the “base case” the analysis relied on the client’s database for rail freight, and the author has since affirmed that this database was “independently reviewed by Intoit and tested with various stakeholders to validate the base data. It was identified as the best available source of freight movement for the study”.

Estimates of freight generation were made for several regions within the State which credibly might contribute freight to the proposed line to Eden. However the estimates were based on stated assumptions which have not been supported by data or interview material in the report. This does not mean they are incorrect but does raise doubts as to their veracity.

Some data is available as there are several sources for road-based freight travel, one from the University of Wollongong giving inter-regional freight matrices by freight type, and others from interviews with freight producers in the Riverina or earlier surveys of inter-state freight companies. Freight producers in Griffith, for instance, accounting for 55% of the town’s employment, exported wine, foodstuffs and manufactured goods. While these data are out-of-date, they nevertheless provide some guidance about potential new road freight generation in NSW. Perhaps the short period of time permitted for the study is the reason why these sources were not tapped.

Similarly, given the extent of the Canberra defence industry and the current use of Eden Port by the Royal Australian Navy, it is by no means certain that the intermodal terminal should be dismissed from the freight generation equations. Intermodal freight terminals facilitate the logistic chain and would materially assist Canberra’s industry. There are several successful intermodal freight terminals from which performance data could be derived.

It is reasonable to dismiss the possibility for rail freight generation to and from Victoria however freight to and from the Riverina was also summarily dismissed. This is unfortunate as two of the interview surveys previously mentioned directly provide overseas-bound freight data which could possibly be diverted from Botany Port in view of the reported congestion there. It is possible that data may not have been made available from recent rail improvements in the Riverina area if it was considered to be “commercial-in-confidence”. If so that is most unfortunate in the public interest.

The study brief required that the study team “*engage with key stakeholders and particularly with relevant rail operators and freight logistics organisations in order to substantiate the estimated freight and passenger demand*”.

The report states that stakeholder interviews were conducted with CMPA, Canberra Airport, Port of Eden, the Australian Railway Historical Society and with Queanbean-Palerang Regional Council, Snowy Monaro Regional Council and Bega Valley shire. However, there is no evidence in the report which shows that interviews were conducted with existing or potential freight forwarding or freight generating businesses, or rail operators, to identify freight which may be diverted to the proposed line or which may increase their production as a result of improved access. The author has since affirmed that “a database of potential stakeholders was compiled and all were contacted, but showed limited interest in the study either in response to issued questionnaires (seeking data) or attendance at three stakeholder sessions”.

For **passenger travel**, the forecast population and employment trip generation modelling process is in accordance with common practice. However there are omissions.

The trip generation and attraction modelling appears to have been based on urban travel characteristics obtained from ABS Journey-to-work data and on data obtained from the client’s database. Again the short period of time permitted for the study could have prevented much research but there is data available for intrastate personal travel by mode for Canberra and other areas of New South Wales which does not appear to have been accessed. Intrastate travel has different characteristics than urban travel. Although the calibration process somewhat obviates some of the need for concern about this matter for the base year, it provides no basis for confidence in the forecasts.

In addition, the report does not consider commuting to Canberra for tertiary education, when Canberra has three large Universities serving an extensive hinterland. It dismisses travel by secondary-school boarders in Canberra. These are direct sources for rail travel. It also dismisses travel to Canberra for speciality retail purposes and does not consider the potential for ski travel from Sydney/Canberra to Cooma or week-end travel from Canberra to the coast.

This does not mean that there is an adequate passenger demand to justify services but simply that their dismissal has not been justified in the report. The author has since affirmed that “we found near zero interest in, or demand for a passenger line, and noted that the line would only be able to be justified for freight – passengers may benefit, if the infrastructure was there, but demand would be limited (perhaps as far as Cooma, if Canberra growth was moved to this corridor) and could easily be serviced by buses. Passenger rail needs to be heavily subsidised even where demand is strong, and has limited viability in regional areas of Australia”.

4.2. Model development – Trip distribution

The report states that the distribution of freight and passengers between their origins and destinations was achieved using a “Gravity Model”. The use of such a modelling form has been superseded for some time by demand models, which also directly permit prediction of induced demand. However, given the relatively few destinations defined for this study, the distribution allocation should be reasonable for normal travel provided that other logical means are adopted to assess induced demand.

The distribution of travel depends on the route condition. It should be noted that multi-modal rural demand models for New South Wales are available and have been used successfully in the past. They typically derive data at Local Government level and describe the road and rail networks in full detail, including their rated speed, condition and capacity.

There are areas of rail track in NSW where lack of capacity is beginning to cause constraints and it is not clear from the report if these have been adequately considered.

4.3. Model development – Modal choice

Passengers choose between car and public transport based on their perceived cost of travel which includes fares, travel time, means of access, comfort and vehicle operating costs for cars. The unit prices used in the report to derive passenger perceived costs are in accordance with current NSW standards however the computation of the parameters defining their values (time, fares etc.) is opaque. This is also so for road truck travel.

Comparisons between these perceived costs are normally carried out in a multi-logit model including car, truck, bus, train and air (if available). Diversion between existing and proposed modes is established in this process. The mathematical form of model described in the report is not in accord with best practice although the limited description of its calibration suggests that it may be adequate. The author has since explained that, as the study found no base demand then a typical logit choice model cannot be viably developed or calibrated. This is of course true for the proposed rail line by itself but calibration should be applied throughout the entire surrounding road/rail network.

However, a good calibration only ensures that the “Base Year” is accurately modelled. It does not ensure that all aspects of the modelling are fully robust or that the forecasts are valid. A particularly sensitive determinant of passenger choice is travel distances and this needs to be calibrated.

Choice for freight travel is determined by delivery time and costs, potential risk of breakages or loss, load/handling arrangements and reliability of services. There is no mention of the derivation of perceived travel costs for rail freight. The choice of mode for container or bulk freight is widely different from perishable or refrigerated freight, where access and travel times are dominant. It might be expected that different models would be used for freight travel but it appears from the report that mode choice for rail freight capture was assessed by assumption with no supporting evidence. This is deficient practice as logical techniques and several reports of detailed analysis of rail/road freight competition in NSW are available. Rail competes quite well against road haulage with longer distance rural-to-urban or rural-to-port freight movements in NSW.

4.4. Model development – Trip assignment to route

Passengers and freight choosing to travel by rail are then normally assigned to the various route options in recognition of their length, travel speeds, capacity and road/track geometry. Passenger and freight diversion between existing and proposed routes is established by this method.

Rural freight travel is seldom direct but usually involves several stages. For example, grains may be carried from Farm-to-Silo by truck and then Silo-to-Port by rail. Similarly, rural freight carriers sometimes must cope with special demands. For example, live cattle can only travel a maximum of eight hours without watering and feeding.

This means that rural trip assignment models are normally much more complex than urban ones and need more detailed attention to the nature of rural industry. Models do exist for multi-staged assignment and it is not clear if these issues were properly considered.

It is also not clear from the report if rail track capacity has been fully considered. The author has since explained that, with the study’s estimate of only one (additional) train per day, track capacity was not a constraint. In particular the destination Port capacity is of critical importance in this study and, while this is discussed, it is not enumerated to the extent necessary to assess the validity of the modelling. Port delays are an important part of the logistic chain.

4.5. Model calibration and validation

Model calibration tests that the model’s predictions agree with observed data within reasonable limits. The calibration of expected modal share was illustrated in the report and shows reasonable agreement. However, there is no evidence of the calibration of trip or freight generation rates, nor of travel distances by mode. This does not mean that the calibration of these factors was not carried out but simply that it was not reported. Nevertheless it is good practice to illustrate complete calibration details.

Validation of a model compares the model’s predictions with an alternative set of data and establishes validity by the use of a series of statistical measures. At this time only the State of Victoria has issued guidelines for the statistical expectations for model validation and, although this is widespread internationally, the lack of any validation data in the report should not be considered unusual in Australian practice. Nevertheless omission of validation cannot be considered “World’s Best Practice”.

4.6. Model Forecasting

The **basic growth** rate forecasts for freight and trip generation and attraction (population and employment) used in the model are in accordance with normal practice.

The report also makes estimates of the likely redeployment of population along the proposed route due to the improved access and these estimates are considered to be reasonable. The degree to which redeployed passenger travel adds to the economic value involves risk and perhaps should therefore be identified separately.

However, it is also normal to provide an economic profile of the various generating centres in order to identify potential new freight options. For instance, while existing shipments of grains and wines from the Riverina to Sydney may be subject to growth, rice and cotton may present new **induced opportunities** for rail freight movement from the Riverina. Similarly mineral, live animal and dairy product exports from the region may present opportunities. While these industries may not, of themselves, warrant additional transport infrastructure, they would accumulatively add sufficient freight tonnage to warrant their investigation. Rural industry profiles have not been provided in the report and there is no indication that other potential industries have been identified and considered.

Even for existing freight markets the extent to which **new production is induced by transport network improvements is of critical importance**. The Gravity model described does not, of itself, produce **induced** freight or passenger travel. Demand-based models do this. The method by which any induced passenger travel has been generated in the report is opaque and induced freight haulage is assessed by assumption with no supporting evidence.

Even relatively small volumes of induced freight, having to incur relatively large average freight costs, can generate substantial economic benefits.

4.7. Sensitivity Testing and Risk Analysis

Sensitivity testing tests the effect of changed assumptions about critical demand parameters on the resulting total demand. Some sensitivity tests were reported which illustrated the extent of potential error due to assumptions not being realised. This is normal competent practice.

Risk analysis of demand forecasts goes further by recognising that several potential estimating errors may compound and have a more pronounced combined effect on the results than the sensitivity tests for individual assumptions, treated separately, indicate.

This analysis is usually expanded to identify the probability of particular risks occurring and potential mitigation measures to reduce the potential consequences. There is no evidence in the report that this form of risk analysis has been carried out.

5. Is the economic evaluation logical?

The project's objective is to grow the State's economy by improving access for passengers and freight. Freight access includes reducing delivery time and charges, increasing reliability, reducing freight damaged and delays and improving safety and security.

A clear statement of how the project intends to achieve these economic objectives, with evidence that the public would respond to the opportunities it presents, would help to clarify the report. For instance, interviews with freight producing companies in Griffith, providing 80% of the region's employment, showed that freight access improvements, which address these issues, would induce additional economic production equal to 2.2 times the cost of those improvements.

The reviewer is not competent to comment on the cost estimates except to say that, when computing the economic cost, it is necessary to deduct components such as taxes and transfer payments from the estimated financial costs. This does not appear to have been done although these components typically account for about 9-10% of the cost estimates. These transfer costs are relevant to the financial evaluation but must be excluded from the economic costs.

Similarly that part of the contingency component which is simply due to uncertainty should be dealt with in the risk analysis, not included in the direct costs, although some contingencies can be valued and included.

The project benefits such as savings in travel time, accidents, environmental damage, road maintenance and vehicle operating costs have been calculated in accordance with common practice and their unit costs are in accord with NSW standards. The residual value benefit is also in accord with common practice.

The report states that the Port of Eden has ample capacity, but may need additional works to cater for the additional freight types and/or tonnage. The Feasibility Study report includes a total of \$800 million for Port of Eden improvements, without describing what they might be. If these additional works improve Port clearance times for existing Port operations, then additional benefits should be included in the whole project. Similarly, any reduced Port delays for freight diverted from other more congested Ports should be included in the benefit stream.

Also if bulk or container handling facilities were developed to handle the rail freight traffic, there is no reason why these facilities could also be accessed by road freight hauliers, thus increasing the value of the Port’s operations. These benefits should be included but are not in evidence in the report.

The report assigns benefits due to increased property values in areas adjacent to the proposed route and particularly around stations. The report provides estimates of these increased property values but no proof of a direct statistical and causal relationship to the additional access provided by the transport improvement. Most economists do not accept the concept that these values should be assigned as benefits although some (relatively inconclusive) evidence exists that the effect may be slightly positive. These benefits are appropriate in the financial evaluation but should be regarded as dubious in the economic evaluation.

The largest and most critical component of the economic value to be derived from the project is **induced freight production**. As these investigations truly reflect the primary aim of transport improvements, to help grow the economy, it is of core importance in this study. This has nothing to do with diverted freight but can occur both from the reduced transport cost of rural production inputs or from the reduced costs of their outbound freight. This is normally called “producer surplus”.

The extent of these benefits has simply been assumed as being roughly inversely proportional to the proximity of the origin to the Port of Eden. Conversely, it might be expected that longer freight haulages would have a higher probability for cost reductions, not the reverse.

The computation for producer surpluses normally requires on-site investigations into the production costs and constraints resulting in credible evidence as to the capabilities and willingness of producers to increase production.

In addition, if this **induced production is exported** then the **at-Port net value of induced international exports** (after production and transport to Port costs) add an **additional set of benefits** to the normal project benefits.

Similarly, the report states that it derives passengers’ consumer surplus from ticket sales. Consumer surplus derives from **induced passenger travel** and it is unclear how this can be identified solely from ticket sales, which includes diverted patronage. Consumer surplus is normally calculated as being equal to the induced number of new travellers multiplied by their average perceived travel cost (before and after). For rural travel, their perceived travel costs are quite large so that relatively small amounts of induced travel can produce significant benefits.

Economic risk analysis usually reduces the resulting Net Present Value and Benefit-to-Cost ratio while providing better project management guidance but has not been included in the analysis.

6. Is the financial evaluation logical?

It has to be assumed that the financial analysis accepts that the project will be fully undertaken and operated by the State Government as there is no discussion about the potentially separate financial interests of those who are responsible for the track or those who will operate the passenger and/or freight rail services.

While it is understood that the feasibility study report is not a full business case, nevertheless an analysis of leverage, risk and debt recovery would normally be expected for each of these agencies.

No feasibility statement is complete without a clear statement describing the project’s business structure.

7. Are the conclusions convincing?

The reviewer is aware that a very short time (twelve weeks) was permitted for the whole study and is cognisant of all of vast amount of environmental, engineering and rail operational work which has been completed by the consultants. However, irrespective of the limitations imposed by time or budget, the report must stand on its own merits.

This review has identified areas where the work reported has been fully in accordance with normal practice and also where the modelling and economic evaluation is questioned or considered to be deficient. For instance

- some potential passenger and freight generating sources have been dismissed,
- the travel generation characteristics relied on urban surveys whereas more appropriate intrastate travel data is available from several sources,
- the travel distribution model employed does not, of itself, generate vitally important induced travel and this demand has just been assumed without supporting evidence,
- the mode choice also was made by assumption for freight movements,
- there is no mention of the derivation of perceived travel costs for rail freight,
- there are no regional economic profiles designed to identify new rural production opportunities, or to explain why they should have been considered to be unimportant,
- the multi-staged complexity of rural freight movements seems not to have been understood, and
- The enumeration of constraining effects of any potential problems with network road, rail or port capacity, have not been discussed adequately.

The review has pointed to areas where assumptions have been made which, however reasonable they may be thought to be, are not supported by any data or evidence. The most critically important of these assumptions are those describing capture of road freight for rail and for induced freight production. It is not good practise that these choices should just be assumed when modelling techniques are available for their logical assessment. Whether the assumptions are reasonable is not the issue, as the case for or against the proposed rail project needs to be established with the best science available. This does not mean that the results from these assumptions are inaccurate but they are an inadequate basis on which to assess potential freight demand and transfer.

Further, it is important to recognize that a report’s conclusions may be realistic even if the modelling processes are deficient or their descriptions are opaque. However, it is not sufficient simply to have apparently realistic conclusions, because the various stakeholders need to be convinced that all issues have been fully and professionally addressed. This means that the methodology employed needs to be logical, comprehensive and adequately explained.

The report fails to provide detailed explanations of much of the modelling process and the derivation of such critical economic components as consumer and producer surpluses.

It is stressed that this review is limited in scope and makes no comment on the immense amount of work that was carried out by the consultants on the engineering, environment and railway operations aspects of the project. However, each aspect of the project’s feasibility must be established before it can be considered feasible or shown to be unfeasible.

Therefore, within these scope limits, it is regretted that the reviewer must conclude that the modelling and economics conclusions in the report are not convincing and the report, in these respects, has not shown that the feasibility of the proposed rail line has been established, or, in this case, **not** proven it to be **not** feasible. This does not mean that the proposed project is, or is not, feasible, simply that the question of its feasibility has not yet been answered.

Appendix A – Procedure for Peer Reviews

The Peer review is to be clearly directed in the public interest and conducted totally within the reviewer’s competence. Issues of professional differences need to be tactfully discussed, in the recognition that different professionals hold different views about the significance or validity of various issues, before the peer review can be concluded. Nevertheless, if the methodology is considered to be sufficiently deficient that the conclusions are unsubstantiated, this needs to be stated.

In carrying out a peer review of the reports for projects, it is necessary to take an holistic view. It is first necessary to focus on the original intentions expressed in the objectives and brief and, in particular, ask if the current proposals for the project reflect the principles and issues raised in the initial planning studies. It is then necessary to enquire whether the reports answer all likely questions within their scope, and pay attention to the following:-

- Do the reports **clearly state the objectives** and the assumptions on which they are based?
- Does the report **comprehensively address** these objectives?
- Does the report provide **support for the assumptions** involved?
- Is the **methodology employed logical?** and
- Are the **conclusions convincing?**

The projects normally will have been carried out within an historic or political framework, and according to strict budgets and terms-of-reference. While the briefing limitations or budget shortages may have limited the scope of those concerned, it is necessary to take the view that **each report must stand on its own merits as it stands, irrespective of any limitations** imposed on its authors.

In safeguarding the public interest, all assumptions must be fully documented and supported by evidence, or, if no evidence can be established, by competent risk analysis.

A peer review seeks to compare the content in a report, including its methodology, with known best practice. It is normal to comment upon issues by using the following terminology:-

- **Best Practice** – The reviewer knows of no better methodology;
- **Common Practice** – The methodology used is commonly found in other similar work carried out by other practitioners, but is not the best practice available;
- **Acceptable Practice** – The methodology used may involve different ideas, which lack the support of being in common practice, but are considered to be acceptable; and
- **Deficient** – the methodology used, or the explanation provided, is thought to be insufficient, or flawed by the reviewer.

The methodology may be flawed but the conclusions may appear to be correct. Nevertheless, it is not sufficient that the conclusions appear to be correct, as stakeholders need to be assured that they have been established logically, within stated risk limits, and documented clearly.

Notes on the Ontoit report on the Canberra to Eden railway November 2020

Introduction

There is a great deal of material in the report whose validity can be questioned or challenged. In my view it has two particular weaknesses.

Lack of clarity about the structure of the project

The report is confused as to whether it is evaluating the project as a vertically integrated railway business - operation of the trains together with ownership and management of the infrastructure - or whether it is assessing the project from the perspective of a track owner. There is no statement of what assumption has been adopted. The CMPA proposal does not specify the structure of the project, but an analysis such as that done by Ontoit must be clear on this.

Examples of this confusion include the following. The report includes figures for passenger revenue - ticket sales - but nothing for freight income. And access charges for freight are excluded; access charges would be paid to a track owner. So there is no freight income which would be received by an operating company; and freight access charges, which would be received by a track owner, are also excluded - they are described as having "little impact". Specification of whether the project is being assessed as an integrated business (in which case freight charges paid by customers would be counted) or as a track owner (receiving access payments) is essential.

The report refers to (and sets a cost figure for) the purchase of two complete freight trains - locomotives and wagons. One gains the impression that these trains will run between Canberra and Eden. But in reality freight trains will originate in remote centres - the Riverina, for example, and will use the existing rail network to access the line to Eden. The equipment will be owned and operated by existing train operating companies - Pacific National, SCT etc.

There may be merit in accounting for the costs of freight trains needed for the line in an economic analysis, but it should be stated that this is the basis for including them. It is unrealistic to suggest that trains will be purchased to run solely between Canberra and Eden.

In my view the most likely structure for the railway is that the infrastructure would be owned by the NSW government, with the railway becoming part of the NSW country regional network; passenger trains would be operated by the NSW government, as are regional services throughout NSW; and freight trains would be run by third parties which could be existing or new train operating companies. Again this would be consistent with current practice throughout NSW.

But whatever structure is assumed, it needs to be clearly identified.

Assessment of freight demand

The report is highly theoretical in its assessment of freight demand. It is stated that "as limited data was available from the John Holland Rail or Transport for NSW client team, a process has been adopted to source available data from web-based sources..." There was no contact with consignors of freight, or freight forwarders, or train operating companies. The only person in the freight industry who was contacted was the Harbourmaster at Eden, with whom initial discussions were

held by phone. The report would have much greater value if it had included information from those actually involved in consigning freight, particularly to a port; or importing freight via a port.

Contact with those involved in sending or carrying freight would have greatly strengthened the forecast of freight to be carried on the railway. These industry participants would have been able to provide information on their expectations of pricing, transit time, frequency and other service characteristics such as reliability.

Such contact with potential customers might have indicated the problem which the railway could have with competition from road transport. This is a reality. If the port of Eden was developed to include container handling facilities, there would be no reason why these could not be accessed by road transport, as is the case with Port Botany, for example. Knowledge of the competition, and of what drives participants in the freight industry to choose between rail and road, would indicate what the railway would need to do to compete effectively.

Dale Budd

11 November 2020

Dale Budd is senior adviser on the Melbourne to Brisbane Inland Rail project, a past director of the Australian Rail Track Corporation, former chief of staff to Prime Minister Malcolm Fraser, and a graduate mechanical engineer.

**Notes on Ontoit Report on
Canberra to Port of Eden Rail Feasibility, 29 October 2019, from a Freight Logistics Viewpoint**

- (1) The initial Stakeholder engagement involved one meeting with CMPA; one meeting with the Planning Officer at Canberra Airport; a telephone hook up with The Eden Harbour Master; and three follow up meetings at the premises of NSW Local Government Councils on the route. The Australian Historical Railway Society was used for information on geometry of the existing Queanbeyan to Bombala line.
- (2) The assumed tonnage on the proposed network was taken as a best assessment of current volumes inbound to NSW Ports. A percentage of the freight from the Wagga and Yass/Goulburn regions was assessed. It was assumed that freight from Lachlan Valley would be too expensive to divert to Eden. Figures of approximately 445 kt per year were proposed for the current situation with a potential of 743 kt per year in 2031. There was no discussion of whether this freight would travel as bulk commodities or containerised. There is a large difference in intermodal costs and requirements depending on this breakdown. At current costing rail is only preferred over road freight where large tonnages are involved.
- (3) I cannot see how the capital costs for rolling stock were derived. A cost of \$407 million was supplied, with 4 passenger sets and 2 freight sets being required. I would expect an acquisition price of some \$25 million for each freight set and perhaps \$6 million on passenger sets although I have no personal experience in passenger operations. There is no indication of what else has contributed to the \$407 million cost.

I believe that the Report seriously underestimates or under reports the freight set rolling stock required. A 1000 tonne configuration travelling up or down a 1 in 40 grade will mandate 4 locomotives. The implied track clearance of ESC 215 narrow electric will not permit larger units to operate. (A mistake most recently discovered with trains from South Korea in the Blue Mountains tunnels.) I have assumed they intend returning the one train set along the network every day hence the requirement of 4 locomotives. The first set of wagons would be left in Eden to be stripped and reloaded ready to return on the following days train. There would be an additional requirement for a locomotive to provide shunting operations at Eden. There is also a need to allow periodic maintenance, requiring access to additional hauling capacity.
- (4) If intermodal operations are required at Bombala and Cooma shunting operations need to be factored into the operation. Most likely this will entail additional rolling stock and container handling or bulk loading equipment. It would not be efficient to delay the train to allow loading in transit.
- (5) On the financial assessment I note several anomalies. Firstly the Report compares costs incurred over a 50 year time period versus benefits obtained on a 30 year period. This is incorrect. The final financial difference would however not be greatly different. In the assessment of Marketing and demand there was an assumption that there would be no passenger demand for shopping and education. This is unrealistic. Again the financial difference would be small. There was an assumption of 200 people per train with 3 return trips per day.

There was a derived annual usage of 260,000 persons per year. This roughly correlates with the above of 600 person return trips per day. Revenue was assessed to be \$1.2 million per year or \$6 per return trip. That does not compute. The quoted cost of \$5 for 20 km or \$15 for 80 km and \$25 for further distances would result in significantly higher returns. This does not include any government assistance. In NSW the typical subsidy approaches 4 government dollars for every passenger dollar. If those passenger volumes were achieved I would expect returns closer to \$10 million if subsidy is provided.

(6) I cannot see anywhere in the financial statement an expected return on the freight travelling on the route. Costs such as vehicle operating costs; travel time saving and road maintenance costs are included as an economic benefit to the government. The operator would be focussed wholly on their return from costs outlaid.

(7) I include my thoughts on ocean freight. My recent employer was the single largest mover of container freight in Port Botany. Our shipping providers on one occasion were forced to move some volume ex Port Kembla when wharf activity in Botany precluded access. This was on a temporary basis. Although this presented a cost and logistical benefit to our Nowra based operation we could elicit no interest in doing this on a permanent basis even though we could have given the providers a couple of thousand tonnes per week. There was not an economic return to them for the extra Port Visit. My experience in break bulk freight is that the MINIMUM freight movement viable was 10,000 tonnes per trip. The implication of this is that the freight volume ex Eden would perhaps justify a pick up once per fortnight but more likely on a monthly basis. This would be similar to wood chip operations. This requires storage of freight for that period and a storage area. It also means sufficient intermodal resources to load that freight in a timely manner to the ships. This arrangement has some limitations for more sensitive agricultural products and for cash flow for suppliers.

Nicholas Kilpatrick

Nicholas Kilpatrick was until recently logistics manager for 20 years for the Manildra Group, Nowra NSW, the largest single mover of container freight in Port Botany. A metallurgy graduate, he served for 10 years as a metallurgist in BHP.

Memorandum by Transport Economist Colin S Mellor

From a further look on 16 October 2020 into the Feasibility Study (FS) headed Ontoit, some brief comments follow:

1. LAND SALES FOR AFFORDABLE HOUSING

The FS assumes 1,000 dwellings might be sold, and so far as can be seen, these are not classed as "affordable housing" *per se*. The implication is that the railway proponent would develop these, and sell the 1,000 dwellings at an average of \$500,000 each, and get a developer's margin of 20%, meaning the net profit would be 20%, leading to an amount of \$100 million for 1,000 dwellings - $1,000 \times 500,000 \times 1/5 = \100 million. All these would be built and sold over 4 years, at the beginning of the project.

In contrast, the Concept Plan of 2018 assumed some 10,000 dwellings might be sold, generating a financial benefit of some \$1 billion, and released over a period of 15-20 years from the beginning of the project.

It seems we need to highlight this major discrepancy between the FS, and the Concept Plan. So far as can be seen, the FS does not indicate how they arrived at the figure of 1,000 dwellings which can be sold. If there is confidence that the 10,000 dwellings figure can be reasonably justified, then this indicates a major weakness in the FS.

2. INTERNAL INCONSISTENCIES, CONFUSIONS, AND INCOHERENCE IN THE FS

It is important to be aware that the FS contains several inconsistencies, confusions, and incoherence. Clearly, the final FS has been put together in a careless manner, though it is not clear how or why this happened. However, we can say the following:

1. While the FS has been put together by Ontoit, it seems Aalto did the economic analysis.
2. When Aalto did their calculations, they used a 50 year assessment period, being 7 years planning, design, and construction, and 43 years of operation.
3. In contrast, Ontoit appears to have used a 30 year assessment period, being 7 years planning, design, and construction, and 23 years of operations.
4. Comparatively, the Concept Plan of 2018 used a 37 year assessment period, being 7 years planning, design, and construction, and 30 years of operations.
5. In the final results for the 30 year assessment period, the FS erroneously used the input data calculated on a 50 year assessment period; two clear examples are the data used for passenger revenue, and residual values. Hence, there are serious errors in the FS.

6. In the case of the residual value data only, and using the assumptions from the FS, this means that the assessed economic benefits from this factor alone have been undercounted in the FS by more than \$1 billion.

7. A further point is that the Project Options as numbered and defined by Aalto are not the same as those numbered and defined by Onto; these unfortunate inconsistencies, confusions, and incoherence further suggest the careless nature of the FS.

8. In summary, there seems to have been a combination of careless errors in the Feasibility Study.

3. BROAD COMMENTS ON OTHER POINTS

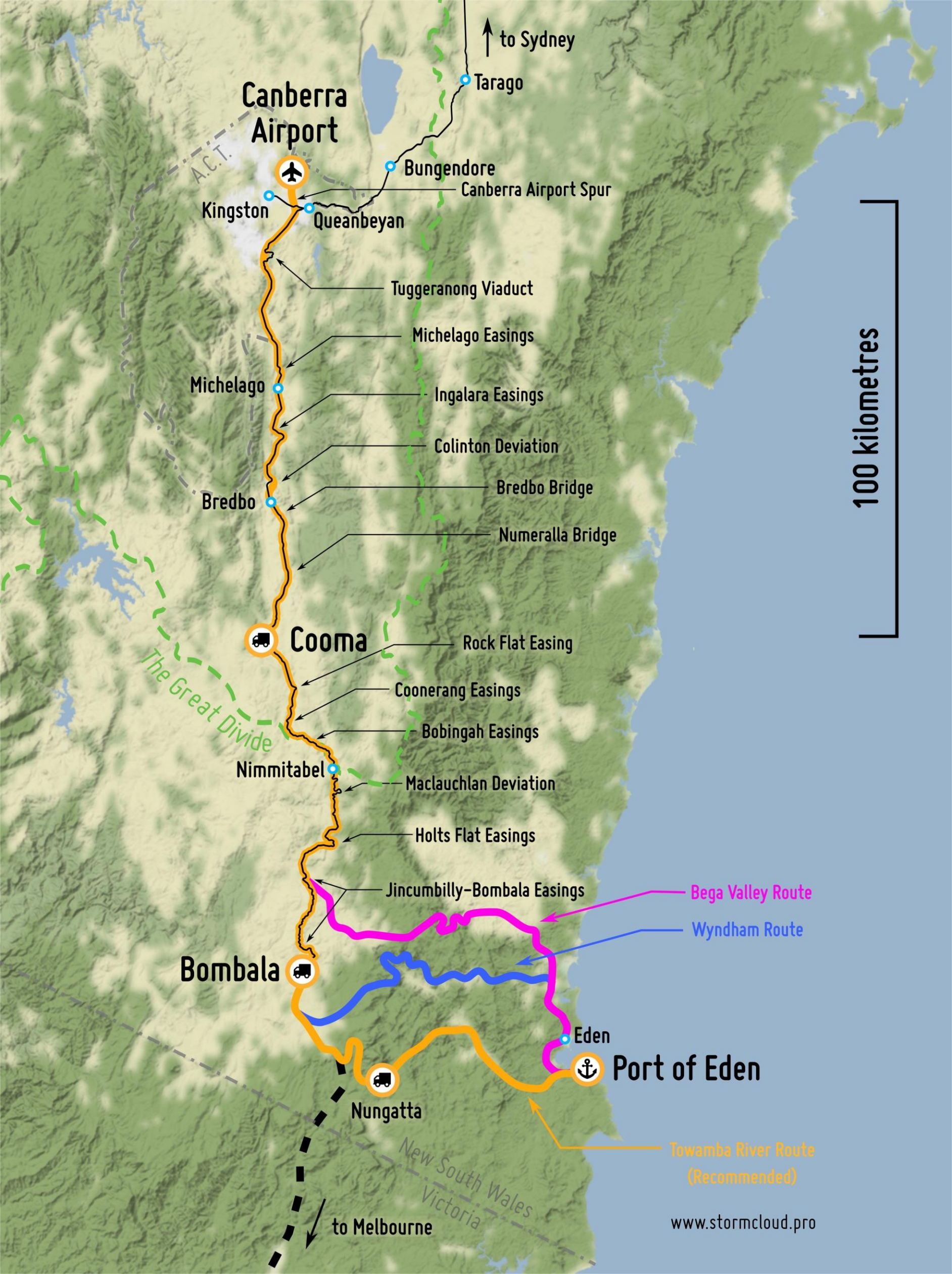
1. Construction costs in the FS are more than double those in the Concept Plan. Hopefully this and other matters below can be addressed separately.

2. Both passenger numbers, and passenger revenue, appear to be considerably underestimated. Likewise, freight volumes and freight revenue.

3. Operating cost estimates need to be reviewed.

4. While the FS purports to present both financial and economic appraisals of the project, the approaches to both appear to be identical, which is simply incorrect. For example, to the extent that the economic costs include any taxes, tariffs, and/or other financial transfers, these should be deleted from the economic costs, but there is no evidence that this has been done.

Colin S Mellor is an internationally practising consultant as transport economist, transport planner, financial specialist, and infrastructure planner with 20 years' experience as a professional employee in private and public entities and 20 years as an independent consultant.



Canberra Airport

Kingston

Queanbeyan

Bungendore

Canberra Airport Spur

Tuggeranong Viaduct

Michelago Easings

Michelago

Ingalara Easings

Colinton Deviation

Bredbo

Bredbo Bridge

Numeralla Bridge

Cooma

Rock Flat Easing

Coonerang Easings

Bobingah Easings

Nimmitabel

Maclauchlan Deviation

Holts Flat Easings

Jincumbilly-Bombala Easings

Bombala

Bega Valley Route

Wyndham Route

Eden

Port of Eden

Nungatta

Towamba River Route
(Recommended)

to Melbourne

New South Wales
Victoria

100 kilometres

www.stormcloud.pro

Ontoit report on
Canberra to Port of Eden Rail Feasibility

John Holland Rail Pty Ltd and Transport for NSW

comprising

I. A comb-bound volume of c 100 pp last dated 29 Oct 2019, containing:

Executive Summary viii pp

1. Introduction p 1

2. Data Collection p 7

A – OPTIONS ASSESSMENT

3. Key Issues and Considerations p 10

4. Canberra Airport to Queanbeyan p 13

5. Queanbeyan to Bombala p 21

6. Corridor Extension to Port of Eden p 34

B – PROJECT EVALUATION

7. Market and Demand Assessment p 45

8. Financial Assessment p 63

9. Economic Assessment p 75

10. Stakeholder Engagement p 84

and

II. A comb-bound volume of c 550 pp last dated 28 Oct 2019, containing Appendices:

A – Engineering and Costing: Route Development and Costing Report, 11 Oct 2019, 107 pp

B – Environmental Assessment, 13 Sep 2019, 32 pp

C – Demand Analysis, 13 Sep 2019, 69 pp

D - Economic and Financial Assessment by Aalto, 28 Oct 2019: report, 87 pp; CBA model, 206 pp

E – Stakeholder Engagement, 13 Sep 2019, c 70 pp

Reference: Concept Plan for Canberra to Eden Railway by Edwin Mitchell, Cooma and Monaro Progress Association, 2018.

Costs were estimated as direct costs for various items, quantities and rates, and then totalled.

Additional costs as a percentage of total direct cost were added: for Contingencies (P 50): 25%;

Preliminary and General: 20%; Client Costs: 15%. The Report includes at p 10:

- Rates were developed by Ontoit based on reference to past projects such as the Inland Rail studies
- Rates were reviewed by JHR, then re-assessed and updated by Ontoit.

Rates

Earthworks:	cut or fill	[Appendix A] \$32.37 / cu m
	mass haul	\$2.49 / cu m
Track:	construction	\$1,375,301.03 / km
	upgrade	\$1,500,828.50 / km
Tunnel (new)		\$80,106.29 / m
Grade separation (each)		\$11,723,399

Estimate for Bombala to Eden, Imlay Rd route (\$m)

[App. A, Attachment 1, p 4]

Track	109 km		149.9	
	loop		<u>1.5</u>	151.4
Earthworks	cut	9,137,480 cu m	295.8	
	fill	10,004,362 cu m	323.8	
	mass haul		<u>47.7</u>	667.3
9 viaducts, 943m to 3860m, (total over 16 km)				946.0
39 culverts @\$50,010.95 each, noting av. length assumed=12.5				24.6 (sic)
Level and grade-sep. Xings, <u>3@\$11.7.</u> m + 15@\$1m + other minor Xings				51.0
Signalling				7.8
Fencing: 6.4; drainage: 5.1				11.5
Land	872 ha			17.4
Road works				<u>7.4</u>
Total direct cost				1,884.5
plus:	P 50 contingency	25%		
	P&G	20%		
	Client costs	<u>15%</u>	60%	[... x 1.6]
				<u>3,015.2</u>

Comparison of Bombala to Eden routes

[Report p 41 etc; Concept Plan]

Route Item	Bega Valley	Wyndham	Towamba Valley	Bombala River	Imlay Rd	Concept Plan
Length (km)	122	120	112	137	109	106
Gross Estimate (\$b)	5.0	6.9	5.8	8.2	3.0	1.6
Tunnels (km)	13	9	11	28	0	2

The Gross Estimates include the P 50 contingency.



Canberra to Port of Eden Feasibility Study

Executive Summary

Contents

1. Executive Summary	3
2. Objectives	3
3. Corridor analysis	4
3.1 Canberra Airport to Queanbeyan	4
3.2 Queanbeyan to Bombala section	5
3.3 Connection to the Port of Eden	6
4. Demand analysis – passenger	8
5. Demand analysis – freight	8
6. Financial analysis	9
7. Economic analysis	10
8. Conclusion	10

1. Executive Summary

The Canberra to Port of Eden Rail Feasibility Study has found that the project is not viable.

The economic assessment of the project options returns a BCR of 0.0 (discounted at 7% real). This means there would be little if any, return on investment. Project benefits are derived primarily from the freight and passenger demands that can be attracted to the corridor and directed to the Port of Eden. Even on the most optimistic demand assumptions with significant freight diverted from other NSW ports the demand projections for the full project, from Canberra Airport to Port of Eden, only generate benefits of \$225.8m over the life of the project, compared against a cost to achieve this benefit of \$5,447.6m (both in present value terms, discounted at 7% real). This includes the upfront and ongoing costs of providing the necessary rail infrastructure and the services and port facilities required to deliver and manage this freight through the Port of Eden.

The proposed railway is over 300 kilometres long and passes through challenging terrain as well as areas of significant environmental value including major National Parks. These constraints mean that the project design involves major tunnels and bridges/viaducts, particularly on the section from Bombala down to Port of Eden, and the Canberra Airport connection, that contribute significantly to the estimated capital cost of \$6.3b to deliver the railway (representing the Full Project P50 case; the P90 Case would be significantly higher), plus any allowance to expand existing port operations. Even if freight demand was doubled from the most optimistic scenario, project costs would need to be reduced or offset by 80 per cent or greater before any of the considered project options could deliver a BCR approaching 1.0.

2. Objectives

A rail link between Canberra and the Port of Eden was identified as a potential opportunity to generate economic value to the Snowy Monaro region and the south west region of NSW.

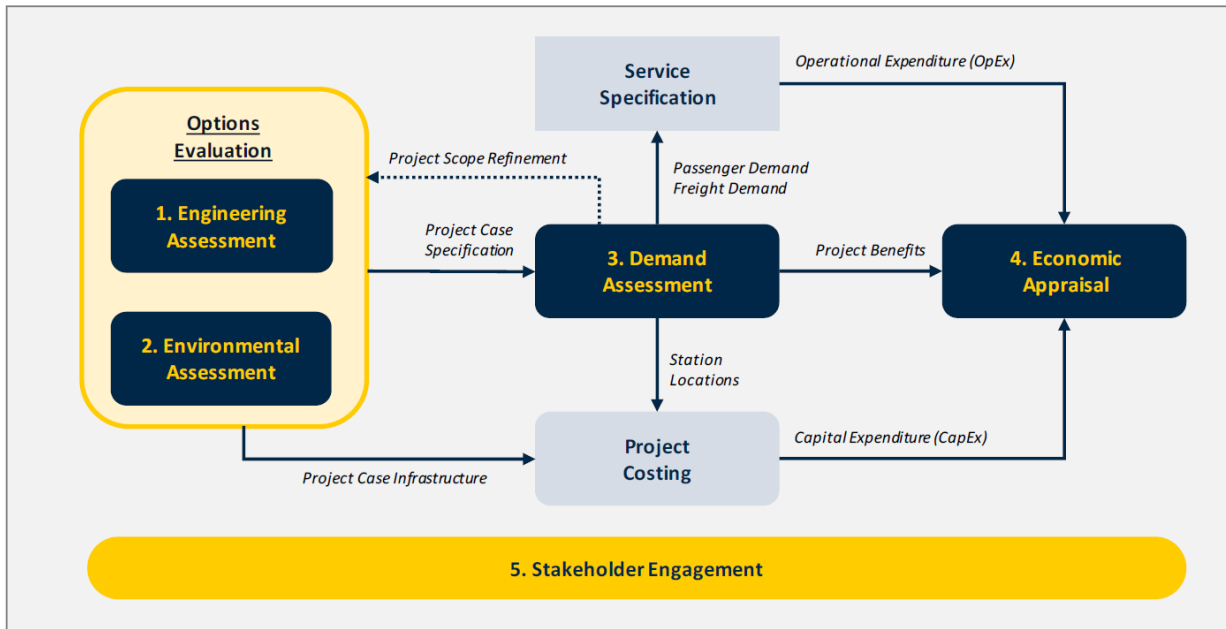
There is a non-operational existing rail line corridor from Queanbeyan to Bombala via Cooma. This line was progressively made non-operational between 1986 and 1990. Sections have served as limited heritage/tourist operations. However, the line is currently in non-trafficable condition as its age and non-operational status has led to several issues including rail breakage, sleeper degradation, timber bridge deterioration/removal and discontinuation of the rail line at several locations (including level crossings).

With the desire to connect Canberra to the Port of Eden, a concept was developed to rebuild the non-operational rail line between Queanbeyan and Bombala and then build two new extensions on either end to connect the line to the anticipated end points at Canberra Airport and the Port of Eden. These extensions are Queanbeyan to Canberra in the north and Bombala to Port of Eden in the south-east. Each of the three sections has their own specific characteristics regarding topography, built up environment and rail network condition.

Two key objectives of the proposed rail link between Canberra and Port of Eden were developed:

- To provide an efficient rail solution for passengers
- To provide a cost-effective rail freight solution.

The approach to the study included several parallel and interdependent streams of work, providing an overarching project appraisal framework as shown below.



The scope of the report was to assess the feasibility of completing the following three sections:

- A new connection from Canberra Airport to Queanbeyan
- Restoration of the existing Queanbeyan to Bombala rail line
- Extension of the rail line to the Port of Eden along a new rail corridor.

Each of the segments of a Canberra Airport to the Port of Eden railway line would be required to be suitable to operate passenger and freight services. Additional facilities would be required at each end and at key locations along the corridor in order to deliver freight and passengers to their destinations.

3. Corridor analysis

3.1 Canberra Airport to Queanbeyan

The Canberra Airport to Queanbeyan section would be the northern end of the proposed corridor. The proposed section between Canberra Airport and Queanbeyan would pass through an urban built up environment. Depending on route selection, it would cross a major highway, the existing rail track and the Molonglo River. A passenger railway would also need to consider how to provide pedestrian access to the (new) Canberra Airport passenger terminal building, while a freight line would need to cross Pialligo Avenue to access a possible intermodal terminal site at Fairbairn on the eastern side of the airport site.

The topography and the technical considerations mean that while is a relatively short section of the proposed track it would be challenging and expensive to construct. The route would also need to negotiate sensitive environmental areas and existing land uses.

Four potential options were identified that would provide rail access from the existing rail corridor to the Canberra Airport passenger terminal. The Symonston Route and the Harman Route branch off the Queanbeyan to Bombala rail corridor in the vicinity of Jerrabomberra and take alternate routes across the Molonglo River. They would terminate at a proposed passenger terminal on the western side of Pialligo Avenue in the vicinity of the proposed 'Travelport' on the eastern side of the main terminal building thereby future proofing connectivity to the potential light rail and high speed rail that has been accommodated in the Canberra Airport Master Plan.



The Beard Route and the Pialligo Route both branch off the existing rail corridor to the west and the east of the Queanbeyan Railway Station respectively. Both routes are designed to avoid the crossing of Canberra Avenue, with the Beard Route linking the Queanbeyan to Bombala corridor to the existing rail corridor via a tight bend. It then branches off the existing line to follow the Symonston Route to the proposed passenger terminal. The Pialligo Route branches off the existing rail corridor to the east of Queanbeyan Station, meaning it is the only route that provides access to Queanbeyan station, before crossing the Molonglo River and follows the alignment of Pialligo Avenue around to the proposed passenger terminal.

The recommendation for passenger travel on this section is that services from Bombala and Cooma terminate at Queanbeyan Station, where connecting (possibly enhanced) bus services can provide connections with Canberra Airport and popular destinations in the City of Canberra. The dispersion of employment across Canberra diminishes the potential passenger demand on the railway and is a direct result of the success of the city planning for Canberra and the ACT. The lack of a significant CBD-type employment hub means that provision of fixed heavy rail is less viable than a monocentric city with a strong CBD.

Nevertheless, a full project option has been developed and assessed in this report that includes the rail connection to Canberra Airport. This assumes that the land-use and environmental challenges will be able to be addressed and a suitable engineering solution could be developed.

3.2 Queanbeyan to Bombala section

The Queanbeyan to Bombala section is the spine of the proposed corridor and currently comprises around 214 kilometres of non-operational track between Queanbeyan and Bombala.

There are many civil infrastructure assets along this line, including some major bridges and viaducts, many culverts and a tunnel. This existing corridor crosses significant portions of farmland and connects to several major townships in the Snowy-Monaro region.

There are two alternate types of solutions for the reinstatement of the line involving:

- Upgrade and restoration of the existing railway line retaining the existing line configuration.
- Upgrade and restoration of the existing railway line, incorporating realignments to improve speeds, curvature or grades.

The most cost-effective way to deliver the railway from Queanbeyan to Bombala would be to retain the existing alignment. An assessment of the condition of the existing track assets determined that the extent of degradation of the line would require it to be completely rebuilt.

Analysis of a potential realignment of the line through Tuggeranong Valley was assessed (as a case study) on top of rebuilding the line and deemed to reduce travel distance by around 1.7km and travel time by around three minutes. This small travel time benefit is unlikely to attract any significant additional demand and as the capital cost of these works would be significant it is not considered a viable investment.



3.3 Connection to the Port of Eden

The proposed rail connection between the Bombala railway corridor and the Port of Eden is a greenfield route without an existing reservation, that would need to negotiate some challenging terrain and would potentially cross several national parks to access the coast. Given the presence of national parks and coastal location of the intended Eden terminus, it is likely that significant environmental constraints would need to be considered when assessing routes through this area. Route options would need to achieve the desired operational rail specifications, while minimising environmental impacts and overall capital works costs.

The assessment of potential solutions between the existing Queanbeyan to Bombala railway corridor and the Port of Eden included:

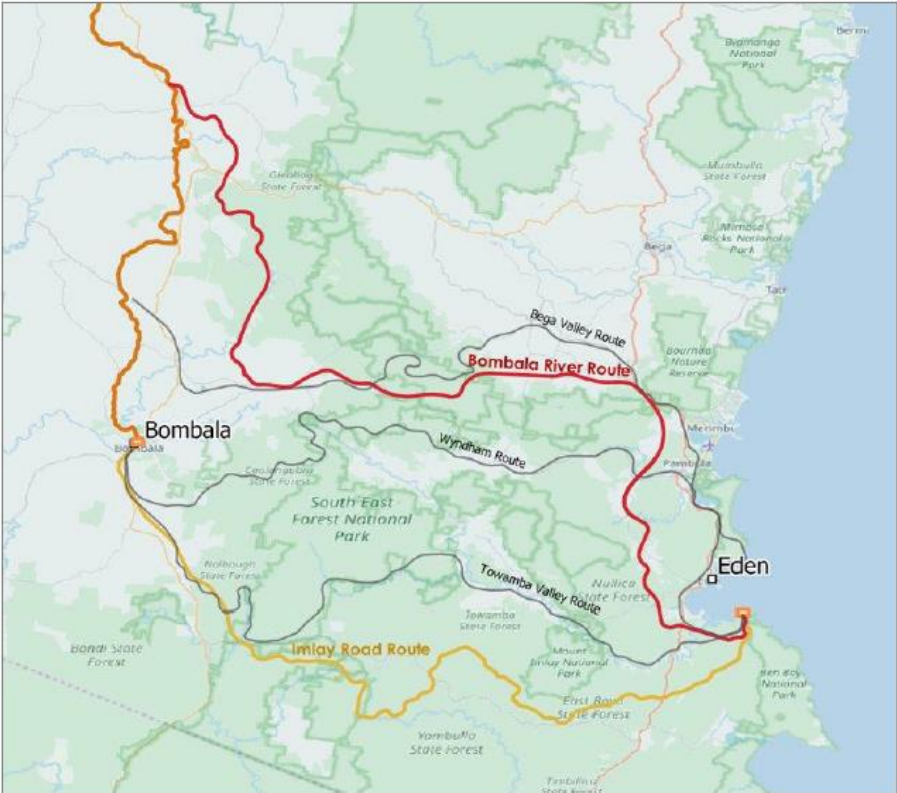
- The assessment of three previously identified routes, defined in the project brief, and
- The development and assessment of additional routes.

Each proposed route has been assessed for its individual viability, to determine the most feasible option. There are any number of potential routes that could be considered but all must negotiate two significant issues in connecting to Port of Eden. The first is the wide, continuous 'band' of National Park that extends along the south east coast of NSW. That National Park is not only environmentally sensitive, but it sits on the edge of the escarpment that also follows the coast. These two factors mean that any route option should endeavour to find a vertical and horizontal alignment that freight trains can negotiate but it must also find a way through, around or under sensitive environmental areas of the National Park.

Since the initial site visit was conducted, further investigations have been undertaken to identify other potential paths where the rail corridor could achieve an operable connection between the existing corridor and the Port of Eden. This included discussions with client team and stakeholders at a meeting with the Municipal Councils. The result of these processes was the addition of two other alternative routes that seek to determine the most feasible path for the railway corridor extension and the optimal balance between capital cost and environmental impact.

The routes are referred to as the Bombala River Route and the Imlay Road Route. As shown on the diagram these routes were developed as refinements of the Bega Valley Route and the Towamba Valley Route respectively.

Following concept design and analysis the Imlay Road Route was adopted as the preferred solution and was used as the basis for the demand analysis and the financial and economic analysis.



4. Demand analysis – passenger

A market assessment of potential passenger demand was conducted, and it was determined that commuter demand was the only viable market. Tourism demand was explored including passenger demand from cruise ships at Eden and also as an alternate mode of access to the ski fields, however this was later discarded due to the infrequency of cruise demand and lack of any direct connection to the ski fields at Jindabyne.

Two scenarios were developed for testing the proposed Canberra to Port of Eden rail line. These were:



Scenario 1: Rail Line - To quantify the impact of implementing the rail line in the transport network based on consistent land use and demographic assumptions from the reference year models. This was to isolate the impact and demand for the proposed line in the absence of any broader changes in the study area.

Scenario 1 results - Assuming passenger train capacities of 200 passengers per train the derived demand levels translate to numbers of train services for the peak periods, in (both) 2026 and 2035 forecast years:

- AM Peak: Two trains outbound and one train inbound between Canberra and Cooma
- PM Peak: One train outbound and two trains inbound between Canberra and Cooma.



Scenario 2: Rail Line with Land Use Uplift - To quantify the impact of land use changes in the region from the rail line shifting growth out of Canberra and into the regions. It therefore represents an alternative scenario whereby the rail line coming online induces a population change down the corridor, by providing people with a rail connection back to work in Canberra, whilst being able to live in the region and access more affordable housing.

Scenario 2 results - With changes in the land use assumptions for the region, the rail line was modelled for both 2026 and 2036 future year scenarios, assuming the same transport network as Scenario 1. The results suggest the numbers of train services for each of the peak periods:

- AM Peak: Two trains outbound in 2026/2036 and four trains inbound, doubling to eight by 2036
- PM Peak: Four trains outbound, doubling to eight by 2036, and two trains inbound in 2026/2036.

5. Demand analysis – freight

Three scenarios were developed for testing the potential freight demand for the Canberra to Port of Eden Rail Line comprising:



Scenario 1: freight redistribution to the new rail line

The first scenario looked at the potential for rail capture from the implementation of the rail line.



Scenario 2: Redistribution to rail line with induced demand

The second scenario looked at the induced freight demand that could be generated in the region as a result of the rail line coming online.



Scenario 3: Port import/export redistribution to Port of Eden

The third scenario looked more broadly at capturing freight movements to/from the study area heading to/from the neighbouring ports in NSW at Botany/Kembla and redirecting these freight movements through the Port of Eden. This scenario therefore represents an optimistic freight future.

Scenario 3 provides the most optimistic freight demand forecasts. Scenario 1 and Scenario 2 delivered very little freight rail demand to the corridor. The demand identified in Scenario 3 was converted to equivalent daily tonnages to estimate the required frequency of freight rail services, assuming trains with a carrying capacity of 1,600 tonnes:

- One full service per day southbound could run from Canberra all the way to Port of Eden, with the Cooma to Port of Eden section likely requiring one extra freight train service per week by 2051.
- One service per week northbound from Eden to Canberra, increasing to three per fortnight by 2051.

6. Financial analysis

Three 'central' project options have been considered as part of this assessment. The first two (Option 1A and Option 2A) are based on the implementation of a railway between Queanbeyan and Port of Eden as the section from Canberra Airport to Queanbeyan was not considered feasible. However, the full project has also been considered as Option 3A, as it was necessary to consider the full project, including a connection to Canberra Airport. While the analysis indicates that there is limited demand for such a service, and there are significant environmental risks that would need to be addressed as well as significant engineering challenges that would result in a very high cost per kilometre for this section, it would deliver the full connection from Canberra Airport to Port of Eden. Note that none of the options include passenger rail to Eden township.

The three central case options comprise:

- **Option 1A** considers the reinstatement of the rail corridor from **Queanbeyan to Bombala**, with a new railway line running from **Bombala to Port of Eden** via the Southern Imlay Road Route1.
- **Option 2A** would result in a similar new railway from **Queanbeyan to Port of Eden** but allows for an **upgrade of the port facilities at Eden**, to optimise the potential freight that could theoretically transfer from other NSW ports.
- **Option 3A** would deliver the **full project**, being a new railway from **Canberra Airport to Port of Eden** including an **upgrade of the port facilities at Eden**, to optimise the potential freight that could theoretically transfer from other NSW ports.

Additional options were also assessed to consider the impact of an alternate freight forecast capturing more freight from other NSW ports plus a reduced capital expenditure option building only to Bombala:

- **Option 1B** is the same as Option 1A but with an alternate freight forecast capturing more freight from the other NSW ports.
- **Option 2B** is the same as Option 2A but with an alternate freight forecast capturing more freight from the other NSW ports than Option 1A but less than Option 2A.
- **Option 3B** considers the reinstatement of the rail corridor from Queanbeyan to Bombala only.

Option 1A has the lower net present cost of the considered central case project scenarios, at an estimated real cost of \$5.7b, or \$3.9b in present value terms (discounted at 7% real) while Option 3A has the highest cost at \$7.9b, or \$5.4b present value terms (discounted at 7% real).

7. Economic analysis

The discounted benefits, or Net Present Benefits (NPB), over the 30-year assessment period at the nominated discount rate of 7%. The benefits analysis suggests an aggregate benefit of \$160m for Option 1A, \$221m for Option 2A and \$225.8m for the full project Option 3A (at a 7% discount rate).

Table 1 – Economic Benefits (\$m) for Option 1A, 2A and 3A (7% discount rate)

Component	Option 1A	Option 2A	Option 3A
Total Benefits – Real	\$1,306.4	\$1,691.0	\$1,822.7
Present Value Discounted @ 4%	\$338.8	\$456.5	\$475.8
Present Value Discounted @ 7%	\$160.0	\$221.0	\$225.8
Present Value Discounted @ 10%	\$90.9	\$127.5	\$128.7

The Cost Benefit Analysis (CBA) has generated the economic Net Present Values (NPV) and Benefit Cost Ratios (BCR) for the central case project options, Option 1A, 2A and 3A.

Component	Discounted @ 4%	Discounted @ 7%	Discounted @ 10%
Option 1A – Central Case, Queanbeyan to Port of Eden excludes port expansion, induced freight and transferred freight			
Economic NPV	-\$4,128.0	-\$3,745.9	-\$3,394.4
BCR	0.1	0.0	0.0
Option 2A – Central Case, Queanbeyan to Port of Eden includes port expansion, induced freight and transferred freight			
Economic NPV	-\$4,927.8	-\$4,458.6	-\$4,033.0
BCR	0.1	0.0	0.0
Option 3A – Central Case, Full Project from Canberra Airport to Port of Eden includes port expansion, some induced freight and transferred freight			
Economic NPV	-\$5,753.3	-\$5,235.4	-\$4,756.9
BCR	0.1	0.0	0.0

None of the options are shown to be economically viable. All have BCRs that are much less than 1. The present value of benefits is far outweighed by the present value of costs in all options considered.

8. Conclusion

A strong amount of community enthusiasm for the railway was observed at the stakeholder engagement sessions but there was limited information provided to support the railway.

The costs of reinstatement of the non-operational railway are significant and the cost to construct the railway down to Port of Eden are extremely high due to the topographical challenges and the environmental constraints. While the sections from Queanbeyan to Bombala to Port of Eden are expensive and difficult to achieve, they could be delivered with a substantial investment.

The analysis suggests that it is impractical to construct a railway to Canberra Airport due to the significant land-use, environmental and infrastructure/engineering challenges. Nevertheless, the analysis has been undertaken including the Canberra Airport connection to deliver a full project outcome all the way from Canberra Airport to the Port of Eden.

The financial/economic analysis demonstrates that none of the project options are viable due to the high costs and low benefits delivering BCR of less than 0.1 in all cases.