



Canberra to Port of Eden Feasibility Study

Executive Summary

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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.

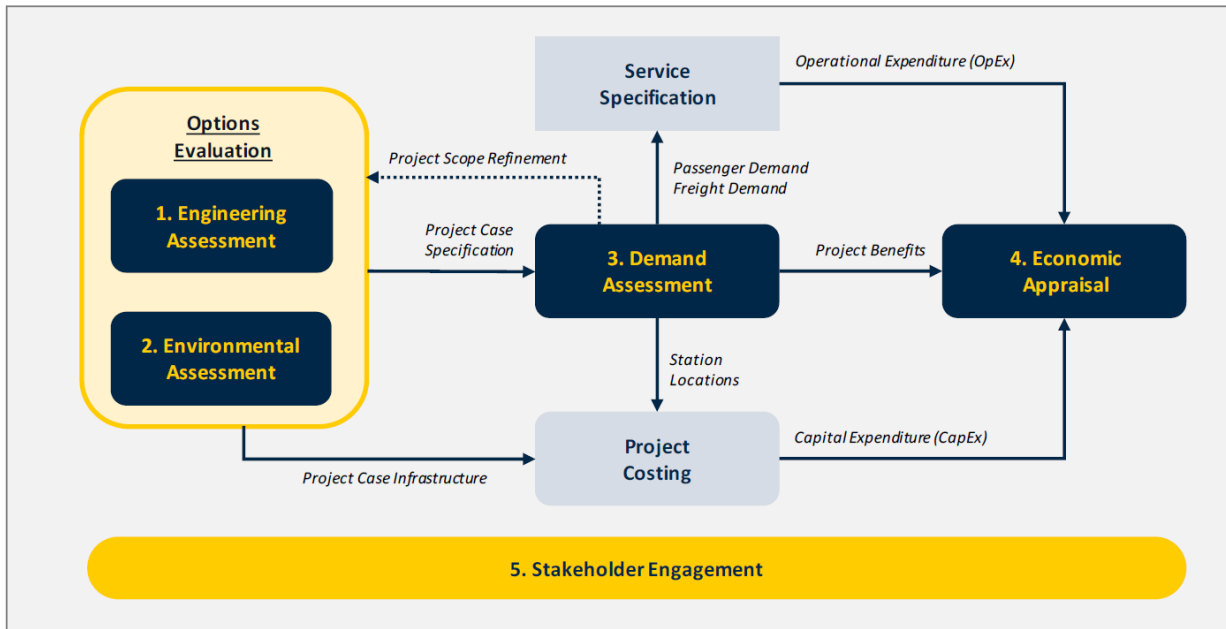
There is a non-operational existing rail line corridor from Queanbeyan to Bombala via Cooma. This line was progressively made non-operational between 1986 and 1990. Sections have served as limited heritage/tourist operations. However, the line is currently in non-trafficable condition as its age and 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:

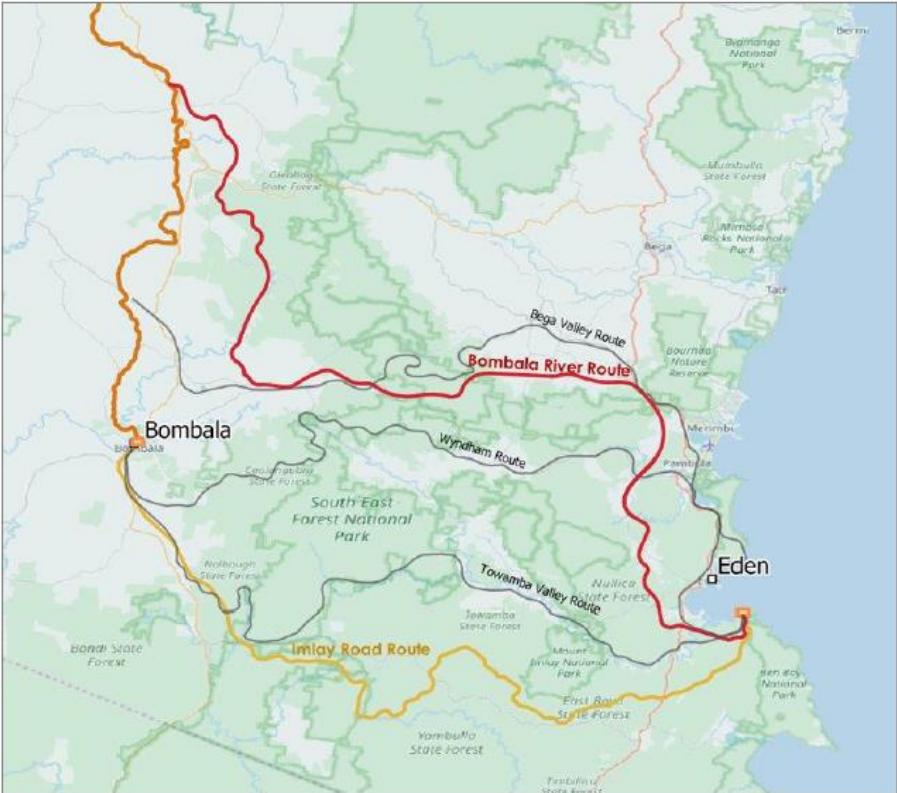
- The assessment of three previously identified routes, defined in the project brief, and
- The development and assessment of additional routes.

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.