

Project Evaluation Summary

Waurm Ponds Duplication: Stage 2

Proponent Victorian Government
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1. Summary

Infrastructure Australia has not included the **Waurm Ponds Duplication Stage 2** as a project on the Infrastructure Priority List at this time. The proponent’s business case, as currently presented, shows that the costs of the project are likely to exceed the benefits.

The project is part of a broader three-stage package of infrastructure works. If the three stages of investment are completed, the capacity along the transport corridor to Melbourne will be expanded in addition to improved local services within the Greater Geelong region.

Infrastructure Australia recognises the importance of regional rail transport for the Greater Geelong region and would welcome a revised business case for a more cost-effective solution to the problems and opportunities identified. We also recommend that the proponent develop a program business case which considers the costs and benefits of all three stages of the project.

The Barwon South West corridor caters for some of Victoria’s fastest growing municipalities and local government areas, and there has been substantial rail passenger growth from 2004 to 2016, although this is from a low base.

The Waurm Ponds Duplication Stage 2 involves the duplication of 13 kilometres of track between South Geelong and Waurm Ponds, station precinct improvements at South Geelong and Marshall, bridge duplications at Barwon River and Waurm Ponds Creek, and grade separations at Fyans Street and Surf Coast Highway. The project would increase the frequency of services from Waurm Ponds to Geelong, and improve the passenger experience, but it will not enable new services between Melbourne and Geelong, limiting the benefits on the wider network. Improvement between Geelong and Melbourne would be considered in Stage 3 of the three-stage package.

The project primarily benefits local rail users and, as there is currently minimal road congestion in the area, the benefits of increased rail patronage and grade separations will only have limited benefits on the road network.

The proponent’s stated net present value (NPV) for the project is negative \$212 million, with a benefit-cost ratio (BCR) of 0.6 using a 7% real discount rate and P50 cost estimate. Infrastructure Australia concurs with the proponent’s business case which shows that, based on the current evidence, the costs of the project outweigh its benefits.

2. Strategic context

Victoria has become Australia's most centralised State with 80% of its economic activity taking place in Melbourne. Population growth in regional Victoria means it is increasingly important that there are direct transport links from outer regions to Melbourne. The regional transport network also provides access for tourism visitors.

The Barwon South West corridor caters for some of Victoria's fastest growing municipalities and local government areas, including areas such as Armstrong Creek, Lara and Highton which are increasing in population and demand for public transport. The population in Greater Geelong is also estimated to grow from 350,000 to 390,000 in 2036. State-wide patronage on regional trains has grown by 8.5% per annum over the past ten years, with the regional rail network providing 19.3 million passenger trips per annum. The Geelong rail line has seen an increase in patronage of 18.3% per annum between 2012/13 and 2016/17. The Barwon South West corridor experienced passenger growth of 10.7% per annum between 2004 and 2016, although this is from a low base as Waurn Ponds station was only opened in 2014. Further passenger growth of 6.4% per annum is forecast over the next ten years but at a much lower rate beyond that. The Barwon South West corridor is forecast to provide 35 million annual passenger trips by 2046. Additional rail capacity and increased service levels will be required on the transport corridor to achieve the forecast growth in rail passenger trips or trips will need to be accommodated on the road network.

3. Problem description

There is significant demand on the Victorian regional rail network from growing populations in the south west of Victoria. Development and population growth in the Barwon South West corridor is occurring in Armstrong Creek and towards Torquay, located south of Geelong.

The 13 kilometre single track line between South Geelong and Waurn Ponds limits capacity and increase reliability issues. The problems identified by the proponent include:

- Poor reliability and resilience of the network which leads to more frequent and lengthy delays for passengers:
 - **Punctuality** - Services on the Barwon South West line have been consistently below the V/Line target rate of 92% on-time arrival. This performance has been trending downwards since 2003/04 and has occasionally been below 80%.
 - **Reliability** - Barwon South West has consistently met the 96% scheduled service measure, but this has also been trending downwards since 2000.
 - **Resilience** - The ability to recover from service or infrastructure failures has been diminishing on the corridor since 2008.
- The current rail service frequency limits the rail network's ability to service commuters from south of Geelong, particularly for employment in Melbourne.
 - **Consistency of services** - Currently, not all trains run past Geelong in the peak periods. Journey time variability impacts on people's travel decisions and the location at which they access rail services.
 - **Access to services** - Access to public transport can impact on the ability of individuals to access education, employment and services, which can directly impact on their quality of life and can entrench socio-economic disadvantage. This is becoming increasingly important as regional employment opportunities reduce and more jobs are in the CBD. In the Geelong region, this has occurred with the decline of the manufacturing industry.
- The current stations at Marshall, Waurn Ponds and South Geelong lack cover, surveillance and lighting, and a lack of amenity and personal safety at stations discourages the use of public transport. There is also a requirement for stations to be compliant (to 90%) with the Disability Discrimination Act by 2022.

Commuters continuing to drive to stations south of Geelong will place more demand on the road network. While congestion within the Greater Geelong area is not currently an issue, the road network will experience more pressures with population growth.

The limited rail service frequency and poor station amenity also encourages longer road journeys to and from the Greater Geelong region via the Princes Freeway, particularly for trips located in outer Melbourne. The Freeway currently has limited congestion outside of the metropolitan Melbourne area. However, growth in commuting from Geelong towards the Melbourne CBD for employment will increase road vehicle movements which will put pressure on travel times on the Princes Freeway.

4. Proposal

The overall Waurm Ponds Duplication project is made up of 3 stages:

- Stage 1 - an additional platform and pedestrian link at Waurm Ponds Station
- Stage 2 - track duplication between South Geelong and Waurm Ponds, including station upgrades at South Geelong and Marshall
- Stage 3 - the duplication of the Geelong rail tunnel and expansion of the Waurm Ponds stabling facilities.

The proposal is for Stage 2 works which specifically involves:

- Duplication of the rail track between South Geelong and Waurm Ponds, including associated infrastructure and signalling. The distance of track duplication is approximately 13 kilometres.
- Station precinct improvements at South Geelong and Marshall, including station facilities, improved access and amenity, new second platforms, platform canopies and car parking.
- Bridge duplications at Barwon River and Waurm Ponds Creek.
- Grade separations at Fyans Street and Surf Coast Highway.

The project would result in 6 additional trains per hour in the peak period to travel through to Waurm Ponds and an additional 255 services per week. It would result in an additional 235 services per week at Marshall and 45 additional services per week at South Geelong. However, these services are only an extension of those currently operating between Melbourne and Geelong. The project will not enable additional services between Melbourne and Geelong, which limits the benefits to be realised on the wider network.

The project will result in improved service frequencies for trains originating at Waurm Ponds, with 12-minute peak frequency, 20-minute inter-peak frequency and 40-minute frequency on weekends.

The duplication of the Geelong rail tunnel, which is planned for Stage 3, and the resolution of a number of network constraints between Melbourne and Geelong, would enable more services between the region and Melbourne. The costs and benefits of this stage have not been included in the business case and therefore the benefits of Stage 2 are potentially understated because the improvements associated with Stage 3 are not included.

5. Options identification and assessment

The proponent initially undertook Investment Logic Mapping (ILM) to identify the specific problems and benefits an option would be required to address. The proponent then assessed a long list of ten strategic options in response to the problems identified. These strategic options were categorised into three groups:

- Non-asset solutions to reduce and manage demand for public transport use
- Refurbishment and upgrade of existing infrastructure to improve productivity of existing public transport assets
- New infrastructure to increase supply of assets.

The strategic options were combined into five response options which were assessed for their feasibility and capacity to address the problems identified. The five response options included:

- Option 1: Do nothing
- Option 2: Travel demand reduction
- Option 3: Improve productivity of existing assets
- Option 4: Rail infrastructure and service improvements
- Option 5: Road infrastructure improvements.

The options were assessed and shortlisted using a multi-criteria analysis (MCA) approach. The recommended option from the MCA process was rail infrastructure and service improvements (Option 4), as the proponent considered it to be the best response to the problems identified in the ILM. It was also consistent with Victorian government policy supporting public transport and met community expectations.

The proponent undertook a scoping and staging process to more fully develop Option 4, which resulted in the following rail infrastructure and service improvement sub-options:

- Stage 2 (light): track duplication and station upgrade.

- Stage 2a: Stage 2 plus new bridge crossings at the Barwon River and Waurm Ponds Creek.
- Stage 2b: Stage 2a plus grade separation at Fyans Road.
- Stage 2c: Stage 2a plus grade separation at Surf Coast Highway.
- Stage 2d: Full scope inclusive of all previous options.

The proponent selected Stage 2d as the preferred option to avoid potentially higher costs should the work be completed in the future. However, this has resulted in an option with the highest capital costs.

The 'do-nothing' option (base case) and the five Stage 2 options were included in the economic evaluation for the business case. While the proponent has called their base case a "do nothing" option, they have included ongoing maintenance costs for the existing single track and that it appears to be a "do minimum" base case, which Infrastructure Australia recommends. The options selection process is consistent with approaches detailed in the Infrastructure Australia Assessment Framework, although a more sophisticated scoring process would have been preferred. It would have been useful for a non-rail solution to be assessed in the cost-benefit analysis (CBA) to ensure that rail is clearly the best solution for the identified problems. Infrastructure Australia also recommends that the proponent develop a program business case which considers the costs and benefits of all three project stages.

6. Economic evaluation

The proponent's stated BCR for the preferred sub-option (Stage 2d) is 0.6, with an NPV of negative \$212 million using a 7% real discount rate and P50 cost estimate when evaluated over a 50-year operational period. Although service levels and frequency increase between Waurm Ponds and Geelong, the BCR result is impacted by the high capital costs, a lack of service increase between Geelong and Melbourne which limits the benefits to localised trip and mode shift outcomes.

The proponent states that the major economic benefits of the project are increased reliability for rail passengers (\$133.6 million), improved station amenity (\$72.5 million) and reduced wait time at stations (\$47.5 million).

Infrastructure Australia's analysis of the economic appraisal identified issues that are likely to impact on the proponent's estimate of the project's economic costs and benefits. The downside risks identified are as follows:

- **No benefits ramp up period** – The full value of project benefits commence when the project is completed in 2022. In reality, individuals will take time to change their travel behaviours. Not accounting for the delay in people switching from using their cars to instead using rail moderately overstates the benefits of the project.
- **Residual value approach** – The residual value has been calculated using a future net benefits approach. While supported by the Australian Transport Assessment and Planning (ATAP) guidelines, this approach may not be appropriate for this project due to capacity and service constraints on the rail network. Over time, with more patronage and potentially more services on the network, the impact of over-crowding, decreasing reliability and reduced amenity, the benefits of the project may diminish. In order to sustain the ongoing benefits, it is likely that the network would require significant major periodic maintenance, which has not been included in the evaluation. This approach slightly overstates the BCR of the project.
- **Lower passenger demand** – There has been significant growth on the regional rail network over the past decade. Patronage growth of 5.4% per annum is assumed along the Geelong line and the economic evaluation uses 3.7% p.a. patronage growth in the study area over the evaluation period. This patronage growth over the evaluation period may be overly optimistic as population growth is averaging around 1.5%. This will result in moderately overstating the benefits associated with the project.

Infrastructure Australia's analysis found that some benefits were not quantified in the economic analysis. The proponent undertook additional sensitivity testing to measure the potential impacts of these benefits:

- **Network punctuality and reliability improvements** - As the Geelong line connects with the Ballarat and Bendigo rail lines, improvements in reliability and punctuality on the Geelong line will have flow on benefits for Ballarat and Bendigo rail services. Including these benefits would increase the project's NPV by \$50 million.
- **Unexpected delays caused by short-running services** - The single line section of track between South Geelong and Waurm Ponds results in poor network resilience. Waurm Ponds services can terminate early at Geelong due to infrastructure faults or to restore the timetable. This creates longer journey times for South Geelong, Marshall, and Waurm Ponds passengers as they are forced to wait for the next train to reach their destination. Including these benefits would increase the project's NPV by \$51 million.

- **Reduced access time to stations** - Some of the new users at Marshall and Waurn Ponds stations in the Stage 2 options are existing park-and-ride users of Geelong Station in the Base Case. Given train travel times from Marshall and Waurn Ponds to Geelong are faster, these users will save time on their journey. Including these benefits would increase the NPV of the project by slightly over \$1 million.

Taking these downside risks and upside issues into account, Infrastructure Australia considers that, based on the current evidence available and the project option selected for consideration as the preferred option (Stage 2d), the costs of the project outweigh its benefits.

The following table presents a breakdown of the proponent's stated costs and benefits for the project option (Stage 2d).

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m, 2017) @ 7% real discount rate	% of total
Benefits		
Reduced crowding	-\$0.2	0%
Reduced wait time at stations	\$47.6	16%
Increased reliability	\$133.6	45%
Station amenity	\$72.5	25%
Vehicle operating cost savings	-\$0.3	0%
Increased farebox revenue	\$11.1	4%
Car parking	\$0.1	0%
Reduced crash costs	-\$0.2	0%
Reduced environmental externalities	-\$0.2	0%
Fyans Street Level Crossing Benefits	\$5.1	2%
Surf Coast Level Crossing Benefits	\$8.5	3%
Residual value of assets	\$18.3	6%
Total Benefits¹	\$296 (A)	100%
Costs		
Capital costs (P50)	\$461.3	91%
Operating costs	\$46.3	9%
Total Costs¹	\$508 (B)	100%
Net benefits - net present value (NPV)²	-\$212 (C)	n/a
Benefit-cost ratio (BCR)³	0.6 (D)	n/a

Source: Proponent's Business Case

Notes:

(1) Totals may not sum due to rounding.

(2) The net present value (C) is calculated as the present value of total benefits less the present value of total costs (A – B).

(3) The benefit cost ratio (D) is calculated as the present value of total benefits divided by the present value of total costs (A ÷ B).

The business case included sub-options (Stages 2a, 2b and 2c) that are less infrastructure intensive and produce higher BCRs (although still less than 1) but were not selected as the preferred option. The proponent considered Stage 2d as the preferred option because constructing the grade separations concurrently with the track duplication would have less impact on users and the community by not having multiple construction periods and track occupations, as well as improving the safety and efficiency of the local transport network. It is commendable that the proponent has applied best practice by including more than one project option in the CBA.

Infrastructure Australia remains broadly supportive of improving connectivity to regional centres, as indicated in the Australian Infrastructure Plan. Improving transport links to smaller cities can relieve pressure on our larger capitals by absorbing some of their growth, and boost employment opportunities for local residents and businesses.

A breakdown of the proponent’s reported capital costs and funding is presented in the table below.

Capital costs and funding

Total capital cost (nominal, undiscounted)	\$663.0 million (P50) \$688.5 million (P90)
Proponent’s proposed Australian Government funding contribution	\$550.8 million The business case requests an 80:20 split between the Commonwealth and Victoria. The funding contribution includes \$8 million of development funding for Stage 3 (duplication of Geelong rail tunnel).
Other funding (source / amount / cash flow) (nominal, undiscounted)	The Victorian Government would fund the components of the project not funded by the Commonwealth, but will explore a range of alternative funding sources, such as value capture through a Growth Areas Infrastructure Charge

7. Deliverability

The proponent’s risk assessment identified technical risks, demand related risks, financial, implementation and governance related risks, along with mitigating strategies. The proponent notes that the project will be competing for market resources with other major projects within the Victorian transport portfolio, national transport portfolio and other sectors nationally. Potential bidders for the project could be involved in other significant tender processes or the delivery of other projects. This could result in a lack of market interest or an increase in the cost of delivery. The detail included in the risk assessment was consistent with the stage of the project, although significant further work would be required as part of any delivery process.

The Victorian Government has undertaken a preliminary packaging and procurement analysis as part of the business case. This analysis was undertaken in accordance with the relevant guidance for the Victorian Department of Treasury and Finance. Based on this analysis, it is recommended within the business case that the Stage 1 and Stage 2 works be packaged and delivered as part of the Regional Rail Revival program. A range of delivery options were considered, with a Design and Construct (D&C) or Alliance approach being assessed as the preferred method. Based on an initial analysis in the business case, an Alliance delivery model is preferred by the proponent as it has successfully been used previously for rail projects of this type, which would seem a reasonable approach. The preferred delivery approach will need to be reviewed as the scope, risks, costs and market interest are further explored.

At the stage of finalising the submission, the final funding model for the Waurn Ponds Duplication project was not confirmed. The submission indicates that the funding model may contain a mix of contributions from various levels of government. During the development of this submission, negotiations have not commenced with the Australian Government or any other levels of government as to the value, timing or nature of contribution from these funding sources, as the business case is subject to cabinet approval. A range of alternative funding sources could be considered to offset some of the Government contributions, including value capture approaches, such as the Growth Areas Infrastructure Charge.

A high-level Benefits Management Plan has been developed as part of the Business Case. The Benefits Management Plan details the benefits, investment key performance indicators, measures, baselines and targets. The baselines and targets are yet to be set and will need to be further developed during the implementation phase. If the project proceeds, Infrastructure Australia encourages the proponent to undertake and publicly release a post completion review to assess the extent to which expected project benefits and costs have been realised, in order to inform future project development.