

Project business case evaluation summary

North Coast Connect

Location

Brisbane to Sunshine Coast, QLD

Geography

Fast-growing cities

Category

Regional Connectivity

Capital cost

\$5,305 million (P50, undiscounted)

Indicative timeframe

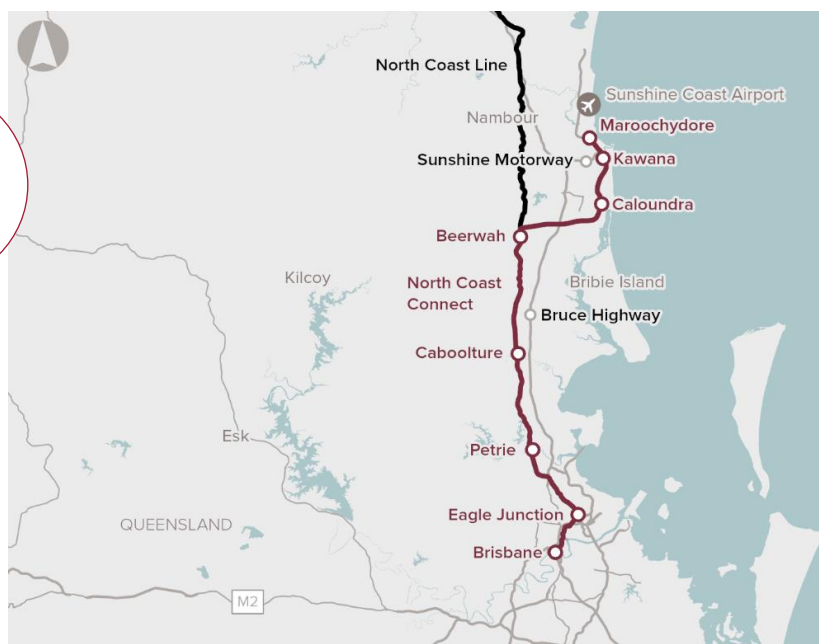
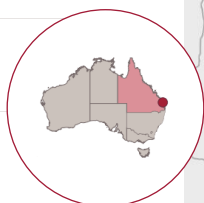
Construction Start: 2025
Project completion by: 2034

Proponent

North Coast Connect Consortium

Evaluation date

8 December 2020



1. Evaluation Summary

Growing travel demand across Brisbane, Moreton Bay and the Sunshine Coast is expected to place significant pressure on the existing transport network. A number of problems are expected without rail investment, including slower regional and urban growth, rail infrastructure constraints affecting efficient rail operations, and unsustainable reliance on road transport leading to congestion and safety issues. Infrastructure Australia recognises the need for additional investment in this part of the Queensland rail network, with the Beerburum to Nambour Rail Upgrade Project added to the Infrastructure Priority List in February 2018.

The North Coast Connect proposal aims to reduce rail journey times Brisbane and the Sunshine Coast by around 25 minutes, from 75 to 50 minutes. It includes a new dedicated rail track along the existing North Coast Line (NCL) between Brisbane and Beerwah, and a new rail corridor to connect coastal population centres including Maroochydore, Kawana and Caloundra.

Our review found that the project aligns with government policies to support regional connectivity, reduce urban congestion, and improve sustainability by providing an attractive alternative to private vehicle trips. However, the North Coast Connect project is not currently identified in Queensland's transport strategy, and it is unclear how the proposal aligns with the Queensland Government's passenger rail plans. The corridor for the Beerwah to Maroochydore section of this proposal is protected by the Queensland Government for future public transport options.

The proponent's business case reports that the costs of the project will outweigh the social, economic and environmental benefits, with a benefit cost ratio (BCR) of 0.47 and a net present value (NPV) of -\$1,651.5 million (7% discount rate). The proposal estimates that the wider economic benefits (WEBs) may increase the total benefits by 6.2%.

The challenging terrain in sections of the proposed route, the presence of environmentally sensitive sites within the project area, and the level of design detail present project delivery risks. The proponent has indicated that they will not be leading the delivery of the project and has not confirmed who will be responsible for delivery. This contributes to project delivery risks.

Based on the business case and evidence available, Infrastructure Australia has not included the North Coast Connect proposal on the Infrastructure Priority List at this time. We would welcome the opportunity to review a revised business case that includes a stronger case for the proposal, a balance of the costs and benefits, and which illustrates how the delivery risks can be managed.

2. Context

North Coast Connect proposes faster rail services between Brisbane, Moreton Bay and the Sunshine Coast, achieved through a combination of new rail track, alignment enhancement, new and improved stations, rail infrastructure systems and level crossing upgrades (or removal).

Population growth within the North Coast Connect study area, including Brisbane, Moreton Bay and the Sunshine Coast, has historically exceeded the state average, accounting for close to half of Queensland's total population growth from 2011 to 2017. This strong growth is expected to continue into the future, with forecasts predicting that the population in the study area will grow by around 54%, from 3.5 million in 2016 to 5.4 million in 2041.

The mode share between the Sunshine Coast and Brisbane is currently dominated by private vehicles, which accounts for approximately 91% of total trips (compared to only around 9% for public transport). The additional travel demand generated by the growth in population and employment is expected to put pressure on the existing transport network. Modelling undertaken by the Queensland Department of Transport and Main Roads shows increased congestion on the Bruce Highway in the morning and afternoon peaks in 2031, and deteriorating further by 2041.

The North Coast Connect will largely follow the existing NCL corridor between Brisbane and Beerwah. This section of the NCL is being upgrade and duplicated under the Queensland Government's Beerburrum to Nambour Rail Upgrade Project, which is currently a Priority Project on the Infrastructure Priority List. There is a potential for works on the North Coast Connect to interact with the Beerburrum to Nambour Rail Upgrade Project works.

3. Problem description

The business case has identified three overarching problem areas:

- Catering for regional and urban growth: population and employment is forecast to grow significantly over time, which is expected to increase travel demand. The business case states that an additional 58,000 people will commute daily from Moreton Bay and Sunshine Coast to Brisbane, growing from 94,000 people in 2016 to around 152,000 people in 2041. Without intervention, this growth will put pressure on access to employment, recreation, goods and services, amenity and liveability from deteriorating travel time and reliability.
- Unsustainable reliance on road transport: uncompetitive public transport services compared to private vehicles is contributing to the low public transport usage currently observed. For example, travelling from Maroochydore to Brisbane in a private vehicle is around an hour faster compared to public transport services, which involves a bus connection to rail services on the NCL. The overreliance on private vehicles will lead to a range of problems including worsening congestion, safety, environmental and community impacts.
- Rail infrastructure constraints: existing rail infrastructure is constrained by various alignment and speed limitations. The average speed of 56 kilometres per hour on the NCL between Nambour and Brisbane compares poorly with other commuter railways in the Faster Rail Prospectus. Further, the NCL does not directly service the Sunshine Coast's key population and employment centres (such as Maroochydore, Caloundra, and Kawana), which restricts the population's access to a range of employment and social opportunities.

Together, these problems are likely to have impacts on the existing transport network and hinder the ability to meet a variety of service needs, including:

- The future growth of the region and the realisation of urban growth and land use objectives, including infill opportunities identified in ShapingSEQ, the regional plan for South East Queensland (SEQ)
- Access to employment opportunities
- Productivity of the labour force
- The region's liveability
- The ability of the existing road network to cater for the growing passenger transport task
- Accessibility to a broad range of housing options.

4. Options identification and assessment

The approach to options identification included:

- A long list of options, assessed based on a Strategic Merit Test
- A short list of options, assessed based on a quantitative Multi-Criteria Analysis (MCA) and rapid social cost-benefit analysis.

A long list of 10 options was developed including a range of infrastructure and non-infrastructure options. This covered reform, better use of existing assets (demand management), improving existing infrastructure (low cost capital works), and new infrastructure. These were then assessed based on a Strategic Merit Test, where each option was assessed against the identified problems and objectives of the Faster Rail Initiative.

The option that was best aligned to the criteria was the combination of the new and upgraded rail network to enable faster travel speeds, new infrastructure options – option 2. Infrastructure Australia recommends that the options assessment should have considered costs at each stage. Not accounting for costs at each stage has likely discounted the options related to reform, better use and improving existing infrastructure, and lead to the selection of higher-cost infrastructure solutions.

The business case acknowledges that a package based on a combination of options from the long list would likely be needed to maximise project benefits and achieve the desired outcomes. It states that a combination of non-infrastructure, better-use and infrastructure solutions is expected to achieve these outcomes and were considered throughout the evolution of the options development process.

A quantitative multi-criteria analysis was applied to assess the nine shortlisted options on their performance on the following criteria: cost; transport performance and logistics; construction and constructability; environmental impact; social factors; and land use / value capture.

A rapid social cost-benefit analysis was then undertaken on the four best performing options from the MCA, including:

- Option 4: Brisbane to Maroochydore CBD (existing NCL alignment to Beerwah and the corridor identified in the Caboolture to Maroochydore Corridor Study (CAMCOS) for the section from Beerwah to Maroochydore)
- Option 5: Brisbane to Sunshine Coast Airport (existing NCL alignment to Beerwah and CAMCOS)
- Option 6: Brisbane to Sunshine Coast Airport (North West Transport Corridor and CAMCOS)
- Option 9: Brisbane to Nambour and Sunshine Coast Airport (North West Transport Corridor, existing NCL to Nambour and CAMCOS).

The detailed social cost-benefit analysis considered the two options identified by the rapid analysis:

- Option 4 was developed into the 60 minutes to Sunshine Coast reference project (NCC-60). This option involves faster rail to Maroochydore via the existing NCL and CAMCOS corridor, and is described in further detail below
- Option 6 was developed into the 45 minutes to Sunshine Coast reference project (NCC-45). This option involves faster rail to the Sunshine Coast Airport via the North West Transport Corridor, joining the NCL south of Pine River to Beerwah and on to the CAMCOS corridor.

Operational modelling was undertaken to develop concept timetables, fleet size requirements, annual kilometres and crewing requirements. In order to meet project objectives, the service frequency was established at 30 minutes during peak and 60 minutes during off peak periods. Rollingstock options were also assessed against performance requirements, which identified the need for a six car tilt train with a maximum speed of 165 kilometres per hour and a length of 145 metres for the preferred NCC-60 option.

The options assessment process is comprehensive and largely consistent with the Australian Transport Assessment and Planning (ATAP) guidelines and the Infrastructure Australia Assessment Framework. However, as Infrastructure Australia observed, the costs were not considered at each stage, which represents a limitation in the options assessment process, and contributed to the progression of higher cost infrastructure solutions to the detailed business case.

5. Proposal

The key features of the preferred NCC-60 option include:

- Narrow gauge track
- Stand-alone track from Northgate Station to Maroochydore Station
- An alignment that uses existing track from Roma Street via Exhibition line, then from Northgate on a new track following existing NCL with some minor curve easing from Northgate to Beerwah before following the gazetted CAMCOS corridor to Maroochydore
- A total of 650 metres of tunnels, including a tunnel at Little Mountain, north of Caloundra
- A total of 22.7 kilometres in new rail bridge structures
- Three new stations at Caloundra, Kawana, and Maroochydore, and integration with the five existing stations of Roma Street, Eagle Junction, Petrie, Caboolture, and Beerwah.
- Works at 17 existing stations to accommodate additional tracks: Roma Street, Virginia, Sunshine, Geebung, Zillmere, Carseldine, Bald Hills, Strathpine, Lawnton, Petrie, Dakabin, Burpengary, Morayfield, Elimbah, Beerburrum, Glasshouse Mountains, and Beerwah
- A maximum speed of 165 kilometres per hour.

Criteria were developed based on consultation with industry and drawing on previous approaches for other projects to inform the staging for the reference project. This led to the following stages for the NCC-60 option:

- Stage 1: Beerwah to Caloundra (18.9 kilometres)
- Stage 2: Caloundra to Maroochydore (18.0 kilometres)
- Stage 3: Northgate to Petrie (17.7 kilometres)
- Stage 4: Petrie to Caboolture (21.8 kilometres)
- Stage 5: Caboolture to Beerwah (25.8 kilometres).

During the delivery of the NCC-60 from Stages 1 to 4 there would be some interaction with the infrastructure provided by the Beerburrum to Nambour Rail Upgrade Project. In particular, the proposed project would share the upgraded section with the Citytrain and Freight train network until the completion of Stage 5, at which point a new separate track would be built.

A program for a broader faster rail network in South East Queensland could potentially strengthen this proposal by providing synergies through rolling stock inter-operability, shared stabling and/or maintenance facilities, and other operating efficiencies.

6. Strategic fit

The North Coast Connect project aligns with relevant jurisdictional plans, including at the national, state and local level. At the national level, the project aligns with Smart Cities, the South East Queensland City Deal Statement of Intent, Faster Rail Prospectus, 20-Year Faster Rail Plan, and the Australian Infrastructure Plan. There is also alignment with state plans and priorities including:

- Advancing Queensland's Priorities – enhancing connectivity between residents and employment opportunities to unlock the potential for employment growth in the Sunshine Coast, Moreton Bay and Brisbane
- Queensland State Infrastructure Plan – improving liveability, supporting productivity and connectivity, as well as sustainability by providing an alternative to private vehicles
- ShapingSEQ (the South East Queensland Regional Plan) – supporting growth through encouraging the development of housing diversity within the corridor, connecting residents to employment nodes, integrating with the region's existing rail network and unlocking identified infill and urban growth fronts in the northern corridor
- The Draft South East Queensland Regional Transport Plan, Queensland Transport Coordination Plan 2017 and the South East Queensland's Rail Horizon.

There is alignment between the North Coast Connect project and plans of the Sunshine Coast Council, Moreton Bay Regional Council and Brisbane City Council. It is also aligned with the ConnectedSEQ campaign of the Council of Mayors (SEQ), which sets out a vision for a SEQ Fast Rail network, including the delivery of a new urban passenger rail connection between Beerwah and Maroochydore along the corridor recommended by the CAMCOS.

However, Infrastructure Australia found that the North Coast Connect project is not identified in current Queensland Government transport infrastructure plans. The Queensland Government adopted the CAMCOS recommendation to preserve the future public transport corridor from Beerwah to Maroochydore and on to the Sunshine Coast Airport and have not published plans for construction on that corridor at the time of evaluation.

North Coast Connect is not currently an Initiative on the Infrastructure Priority List. However, the proponent's business case states that it is complementary to the Beerburrum to Nambour Rail Upgrade Project, which is a Priority Project on the Infrastructure Priority List.

The business case acknowledges North Coast Connect's relationship with other major infrastructure projects, such as the Beerburrum to Nambour Rail Upgrade Project and the CAMCOS options. Infrastructure Australia recognises the potential for North Coast Connect to build upon these other projects. We understand that stages 1 to 4 of the North Coast Connect would involve some interaction with the infrastructure provided by the Beerburrum to Nambour Rail Upgrade Project, where it would share the upgraded NCL section with the Citytrain and Freight train network.

As part of the evaluation, we identified that a number of committed projects were excluded from the base case network, including the European Train Control System signalling upgrades, the Beerburrum to Nambour Rail Upgrade Project, New Generation Rollingstock, Rail Station Upgrades and Open Level Crossing Eliminations. These projects were included in the North Coast Connect base case, but not included as part of the base case network in the modelling. The proponent advises that this was due to uncertainty around the status of the projects at the time of modelling. Excluding these projects, particularly the Beerburrum to Nambour Rail Upgrade Project, from the base case network could overstate benefits as they would likely account for at least some of the road to rail mode shift reported in the North Coast Connect project case.

7. Economic, social and environmental value

The proponent's analysis found that the quantified social, economic and environmental benefits of the preferred option (NCC-60) are lower than its costs, with total economic benefits of \$1,348.9 million against costs of \$3,090.4 million, in real present value terms using a real discount rate of 7% per annum and P50 capital cost estimate. This results in a project benefit-cost ratio of 0.47 and a net present value of -\$1,651.5 million.

Non-user benefits and road network benefits account for the majority of project benefits. The non-user benefits include externality cost savings, urban consolidation benefits and crash cost savings, while the road network benefits include avoided road maintenance and road decongestion.

The NCC-45 option is expected to generate a NPV of -\$3,796 million and a BCR of 0.31 (with a 7% discount rate). The proponent selected NCC-60 as the preferred project option on this basis.

Infrastructure Australia's evaluation found that some of the benefits in the economic appraisal may have been overstated:

- Benefits beyond the last modelled year of 2041 were extrapolated using a relatively high rate of annual growth, which would lead to a highly congested road and rail network by the end of the evaluation period. This would result in overstated benefits as such high levels of network congestion would reduce benefits received by road and rail users
- The business case excluded a number of projects from the base case network, which would lead to overstated benefits as this would likely account for at least some of the road to rail mode shift reported in the project case.

However, there were also some areas identified where the economic appraisal was considered to be conservative, such as:

- The potential benefits associated with allowing for additional freight movements were not directly captured as part of the economic appraisal

- The methodological approach used to estimate the vehicle operating costs for road users only used freeway parameters, which led to slightly understated benefits.

Our evaluation found that the public transport benefits are smaller than the benefits to road users. For a significant investment in rail project such as this, it would be expected that high public transport benefits would be achieved. Moreover, the economic appraisal does not appear to have explicitly captured benefits associated with reduced crowding, which does not align to the problems of a capacity constrained rail network.

Overall, the analysis generally aligned with the requirements of the Infrastructure Australia Assessment Framework, and the issues identified above are unlikely to materially impact the results and overall conclusions of the economic appraisal.

The following table presents a breakdown of the benefits and costs as stated in the business case.

Benefits and costs breakdown

Proponent's stated benefits and costs	Present value (\$m, 2019) @ 7% real discount rate	% of total
Benefits		
Travel Time Savings	\$70.5	4.9%
Vehicle Operating Cost Savings	\$150.2	10.4%
Non-User Benefits ¹	\$439.4	30.5%
Road Network Benefits ²	\$424.0	29.5%
PT Amenity Benefits	\$35.5	2.5%
Farebox	\$173.3	12.0%
Ramp-up Benefits	\$136.5	9.5%
Residual Value	\$9.6	0.7%
Total Benefits³	\$1,438.9	(A) 100%
Capital Expenditure	\$2,178.9	70.5%
Contingency	\$692.5	22.4%
Rail Maintenance	\$147.1	4.8%
Rollingstock capex	\$71.9	2.3%
Total Costs³	\$3,090.4	(B) 100%
Net benefits - Net present value (NPV)⁴	-\$1,651.5	n/a
Benefit-cost ratio (BCR)⁵	0.47	n/a

Source: Proponent's business case

(1) Includes externality cost savings, urban consolidation benefits and crash cost savings

(2) Includes avoided road maintenance and road decongestion.

(3) Totals may not sum due to rounding.

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

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

The business case identifies a number of potential environmental and heritage impacts associated with the project. This includes impacts on land currently used for conservation, natural environments and water, potential impacts to flora and fauna, regional ecosystems, high ecological significance wetland and Koala assessable development areas.

Mitigation measures identified as part of the business case includes minimising the land clearing footprint, identifying previously cleared areas that can be used, designing waterway crossing structures to minimise disturbance of waterways and wetlands and integrating fauna crossings to maintain connectivity and escape opportunities. It is understood that the project cost estimates have an allowance for items that are reasonably unknown including environmental mitigations.

Sections of the North Coast Connect project north of Pine River are located in areas subject to Native Title Claims. The business case identifies a number of Aboriginal Cultural Heritage Sites, High Risk Areas for Aboriginal Cultural Heritage and Non-Indigenous Cultural Heritage Sites within the project area.

A range of mitigation measures involve communication and consultation with stakeholders and the need to develop a Cultural Heritage Management Plan. Infrastructure Australia understands that the mitigation measures for the environmental and heritage risks will be further explored as part of the readiness for market phase.

The reported capital costs and funding is presented in the following table.

Capital costs and funding	
Total capital cost	\$5,305 million (P50, undiscounted) \$5,726 million (P90, undiscounted)
Proposed Australian Government funding contribution	Not specified
Other funding	Not specified

Source: Proponent's business case

The Australian Government funded the development of the business case under the Faster Rail Prospectus. The Queensland Government provided the Beerburrum to Nambour Rail Upgrade Project business case to the North Coast Connect Consortium as an in-kind contribution to the development of their proposal. No further funding has been committed to the North Coast Connect project at the time of evaluation.

As the farebox revenue generated from the project will not be sufficient to pay a return on capital investment, the proponent indicated that options for government funding and financing support will be further investigated once the project's scope and objectives are confirmed by the government.

8. Deliverability

The business case assumes the following timing assumptions for the different stages of the preferred NCC-60 project option:

- Stage 1: construction start date July 2025; construction end date August 2027
- Stage 2: construction start date August 2027; construction end date December 2029
- Stage 3: construction start date December 2029; construction end date November 2031
- Stage 4: construction start date November 2031; construction end date April 2033
- Stage 5: construction start date April 2033; construction end date November 2034.

The delivery model analysis undertaken is in line with the Queensland Government's Project Assessment Framework Delivery Options Analysis and Building Queensland's Business Case Development framework. The business case recommended a delivery model option that bundles the track, tunnel and station works into two separate greenfield and brownfield packages, with the remaining work components to be delivered as separate stage-aligned packages. The business case recommended the use of a hybrid design and construct/alliance model be used to deliver the brownfield package, and a public-private partnership model for the greenfield package. The business case also states the need for the delivery model recommendations to be reviewed in further detail if the North Coast Connect is approved. Infrastructure Australia considers this recommendation to be appropriate and that the review should be undertaken once the party responsible for the delivery of the project is confirmed.

The business case assumes that Queensland Rail will operate and control the North Coast Connect network and the passenger rollingstock assets that would operate on that network. As such, rollingstock procurement for the North Coast Connect was not investigated as part of the delivery model analysis, and was assumed to be the responsibility of the Queensland Government.

Limited consultation has been undertaken with Queensland Rail during the development of this business case. This raises a number of concerns associated with the lack of State input in regard to overall network integration with related projects, capacity of Queensland Rail to operate and

deliver the service and whether the rollingstock provision considered in the cost-benefit analysis is sufficient to deliver the required service levels. The business case acknowledges that input will be required from Queensland Rail throughout the readiness for market and delivery and operational phases of the Project. To date, the Queensland Department of Transport and Main Roads has acted as the representative and single point of contact for the Queensland Government.

The business case has indicated that the farebox revenue generated from project operations will not be sufficient to pay a return on capital investments. Therefore, the following types of government funding and financing support will be further investigated once the project's scope and objectives are confirmed by the government:

- Capital grants
- Service contracts
- Shadow tolls or access fees for the use of track or tunnel by third parties
- Commercially structured debt and/or equity
- Funds realised from the sale or lease of interests in completed assets (later stages).

The business case has provided limited detail of the Project's risk assessment methodology. However, the detailed risk matrix and project risk register provided suggests that an appropriate risk assessment methodology has been implemented. The project risk register raises a number of environmental and cultural heritage risks, as well as other regulatory and site risks, that could potentially lead to cost overruns as the project design matures.

The cost estimates were conducted in accordance with Queensland Department of Transport and Main Roads Project Cost Estimating Manual and the risk contingency of the cost estimates are considered reasonable. The cost estimates exclude the procurement of rollingstock and escalation. Infrastructure Australia has not received a formal peer review of the cost estimates.

A Benefits Realisation Plan has been provided within the business case, rather than a full Post Completion Review plan. The proponent has stated that a Post Completion Review plan will be developed as part of the readiness for market phase of the project. Infrastructure Australia recommends a Post Completion Review be conducted to evaluate whether the project delivered the expected benefits, and to identify any lessons that could be used to inform future projects.

Consideration of COVID-19

The COVID-19 pandemic has significantly affected the use of infrastructure. Infrastructure Australia has been working collaboratively with the Australian Government to provide advice on a staged response for managing, and recovering from, the impacts of the COVID-19 pandemic.

One critical element of our advice is to maintain a pipeline of nationally significant infrastructure investments. Nationally significant infrastructure projects are long-term investments, typically considering a 30-year view of the project's social, environmental and economic impacts. In making this recommendation, Infrastructure Australia continues to take a long-term view and has also considered the sensitivity of key planning assumptions using the best data available to us.

As noted in the 2019 Australian Infrastructure Audit, we must continue to evolve the way we plan for Australia's infrastructure to embrace uncertainty. There are still many uncertainties regarding the long-term impact of the COVID-19 pandemic on infrastructure use.

We will continue to collaborate with industry, the community and governments at all levels to understand the impacts of the COVID-19 pandemic on infrastructure decisions in Australia.