Cross River Rail project

Coordinator-General's change report – whole of project refinements 2019

June 2019

COORDINATOR-GENERAL

Queensland Government

The Department of State Development, Manufacturing, Infrastructure and Planning

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Synopsis

The Cross River Rail Project (the project) is a rail link from Dutton Park to Bowen Hills, including a 5.9 km tunnel under the Brisbane River and Central Business District (CBD).

The project was originally approved on 20 December 2012 by the Coordinator-General, subject to conditions as detailed in the Coordinator-General's evaluation report (2012 CGER) on the environmental impact statement (EIS) for the project. The project has undergone a number of changes since this 2012 approval, with each change evaluated and approved, subject to conditions, via Coordinator-General change reports (CGCR). The project as approved by the 2012 CGER and subsequent CGCRs in the 'evaluated project'.

On 1 May 2019, the Cross River Rail Delivery Authority (CRRDA, the proponent) lodged a further project change application (the April 2019 project change application) with me for assessment. The key changes to the evaluated project proposed by the proponent in this change application include:

- changes to the vertical and horizontal alignments of the tunnels and relocation of the stations to remove curves resulting in a change to the volumetric property impact of the project
- realignment of rail infrastructure through Mayne Yard, including the construction of a new rail bridge across Breakfast Creek
- minor realignment of the underground Roma Street station further east, with changes to the design and construction methodology of the tunnel and station cavern at Roma Street
- realignment of the Inner Northern Busway (INB) at Roma Street and integration of the busway station with the underground Roma Street Cross River Rail station
- relocation of the proposed underground Albert Street (80 m north-west) and Woolloongabba stations (70 m west) with changes to design and construction methodology of the tunnel and station caverns.
- a new Albert Street station entry at 142 Albert Street which will require the acquisition of a new commercial property
- minor horizontal and vertical realignment changes to the location of the Boggo Road station, including a new elevated surface pedestrian and cycle bridge from the PA Hospital to the Boggo Road Urban Village
- an upgrade to the existing Dutton Park station including an extension to the existing platforms further south under Annerley Road, which would require the acquisition of two multi-unit residential properties comprising thirteen individually owned units in Cope Street
- upgrades to existing surface railway stations at Salisbury, Rocklea, Moorooka, Yeerongpilly, Yeronga and Fairfield which include raising and extending the existing platforms to improve access for people with a disability
- a new stabling facility at Clapham Yard (Moorooka), which would lead to operational improvement for the rail network, and construction of a new rail bridge over Moolabin Creek

- associated changes to construction worksites, including configuration, access, haulage, and workforce parking
- changes to the Imposed Conditions for the project to facilitate the proposed changes, simplify reporting requirements and reflect requirements stipulated in relevant standards.

During the public notification period, 86 submissions were received – 28 from public organisations, 54 from private submitters and 4 from local and state advisory agencies. Following the conclusion of the public notification period a further 3 submissions were received – 1 from a public organisation, 1 from a private submitter and 1 from a state advisory agency. I have considered all submissions in my evaluation of the proposed changes.

Traffic and transport

The proposed changes to the project will increase some potential traffic and transport impacts compared to the evaluated project. These are largely due to the increase in spoil to be removed from worksites, the additional construction worksites for the Fairfield to Salisbury station upgrades, and the proposal to divert INB buses onto Roma Street.

I have made recommendations in relation to further quantification and management of potential traffic and transport impacts across the project alignment, including requirements for ongoing consultation with key stakeholders and Directly Affected Persons. This will include further traffic impact analysis for intersections in the vicinity of the Roma Street worksite, which was a key issue raised in submissions. My imposed conditions require that the findings from the additional analysis must be incorporated into site specific Construction Traffic Management Plans (CTMPs) for each construction worksite, including mitigation measures developed in consultation with key stakeholders and Directly Affected Persons.

I have amended the existing project wide Imposed Conditions to authorise project work at the Fairfield to Salisbury stations including Clapham Yard and Dutton Park. I am satisfied that the Imposed Conditions (Appendix 1), combined with site specific CTMPs, which are consistent with the Outline Environmental Management Plan (OEMP) for the project, remain appropriate to manage the potential impacts of the project. I require the proponent to update the OEMP to reflect the changes to the project as required by the Imposed Conditions.

Noise and vibration

The proposed changes will result in changed construction noise and vibration impacts to nearby sensitive receptors due to some changes in the location and construction methodology of both surface and tunnelling works.

I consider that the proposed changes to the project will be managed in accordance with Imposed Conditions and the mitigation measures included in the OEMP. I require that detailed site-specific mitigation measures be developed in response to further noise and vibration modelling as the demolition and construction methodologies for each worksite are refined. These site-specific mitigation measures will be included in the Construction Environmental Management Plans (CEMPs) for each worksite and will be consistent with

the OEMP as required by my conditions of approval. I require that the proponent updates the OEMP to reflect the changes to the project.

I am satisfied that the Imposed Conditions, including the proposed amendments to the conditions for the project, are appropriate to manage the proposed changes to the project.

Hydrology

The key potential hydrological impacts of the changed project relate to the construction of new rail bridges at Moolabin Creek and Breakfast Creek, and the construction of a new stabling facility at Clapham Yard, with reduced fill requirements compared to the original project.

I am satisfied that the existing project wide Imposed Conditions remain appropriate to manage potential hydrological impacts across the project alignment. I have recommended that detailed hydraulic modelling be conducted in consultation with Brisbane City Council as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek, to mitigate any potential property impacts associated with hydrological changes.

Social environment

The potential social impacts of the changed project are generally consistent with the evaluated project. The changed project will require additional surface residential and commercial property acquisitions in the vicinity of Dutton Park and Albert Street station, which will be managed through the *Acquisition of Land Act 1967* and the *Cross River Rail Delivery Authority Act 2016*. The changed project would reduce overall the number of properties impacted compared to the evaluated project; and deliver enhanced network reliability and accessibility.

To address the potential impact on the delivery of essential community services for homeless people at Emma Miller Place, I have recommended that the proponent work with community service providers in finding an alternative location to operate for the duration of construction.

I am satisfied that the project change application has been informed by adequate community and stakeholder engagement. My existing Imposed Conditions apply to the project change which require the preparation and implementation of a Community and Stakeholder Engagement Plan as a sub-plan of the OEMP, which I require the proponent to update. This plan must provide an iterative and practical framework for delivery of community and stakeholder engagement activities, including early and ongoing engagement with directly affected stakeholders.

Coordinator-General's conclusion

I am satisfied that the requirements of Part 4 of the *State Development and Public Works Organisation Act 1971* has been met and that sufficient information has been provided to enable the evaluation of the proposed changes to the project.

I consider that the changes to the project and the conditions imposed (Appendix 1) for the works stated in this report will result in overall acceptable outcomes for the project's delivery and that the potential impacts can be adequately managed.

I approve the changes to the project and I have amended the Cross River Rail project wide Imposed Conditions accordingly (Appendix 1). I have also amended Coordinator-General's recommendations for the Cross River Rail project to reflect the changes to the project (Appendix 2).

Appendix 1, 2 and 3 of this report replace Appendix 1, 2 and 3 of the March 2019 CGCR (Roma Street demolition works), therefore Appendix 1, 2 and 3 of the March 2019 CGCR no longer have effect.

In accordance with section 35 of SDPWO Act, this report will lapse on 31 December 2024.

A copy of this report will be provided to the proponent and relevant state government agencies and will also be made publicly available at: **www.dsdmip.qld.gov.au/crr**.

Barry Broe

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Barry Broe
Coordinator-General

26 June 2019

1. Introduction

This change report has been prepared pursuant to section 35I of the *State Development and Public Works Organisation Act 1971* (Qld) (SDPWO Act) and provides an evaluation of the proposed changes to the Cross River Rail project (the project) outlined in the project change application received by the Coordinator-General on 1 May 2019 (the April 2019 project change application; the project change application). The proponent's project change application specifies the proposed changes to the project and these are summarised in Section 3 of this report.

This report does not re-evaluate the project as a whole. Further, it is not intended to revisit all the matters that were identified and subsequently addressed in the project's environmental impact statement (EIS) assessment process. Rather, this report concentrates on the particular issues identified in the project change application. The change report:

- summarises the change report process
- summarises the proponent's proposed changes to the project
- summarises the key issues associated with the proposed changes
- presents an evaluation of the proposed changes, based on information contained in the project change application, submissions received and the proponent's response to the submissions
- provides a set of revised conditions under which the project may proceed.

2. About the project

2.1 The proponent

The proponent for the project is the Cross River Rail Delivery Authority (CRRDA), an independent statutory body established under the *Cross River Rail Delivery Authority Act 2016* (CRRDA Act) to facilitate and manage the delivery of the project. The CRRDA commenced operation on 14 April 2017.

2.2 The project

The project is a 10.2 km north-south rail line connecting Dutton Park to Bowen Hills with 5.9 km of tunnel under the Brisbane River and Central Business District (CBD). The project also includes stations at Boggo Road, Woolloongabba, Albert Street, Roma Street and the Exhibition Showgrounds.

Further information on the project and changes that have occurred since originally approved in 2012 are detailed in:

- the Coordinator-General's evaluation report on the EIS dated 20 December 2012 (2012 CGER; the original project)

- the Coordinator-General's change report dated 9 June 2017 (June 2017 CGCR)
- the Coordinator-General's change report dated 31 August 2018 (August 2018 CGCR)
- the Coordinator-General's change report dated 13 March 2019 (March 2019 CGCR).

The changes to the project since 2017 (which includes the June 2017 CGCR, the August 2018 CGCR and the March 2019 CGCR) are referred to as 'the evaluated project', while the proposed changes to the project (as detailed in the project change application) are referred to as 'the changed project'.

3. Change report process

The proponent submitted the April 2019 change application in accordance with section 35C of the SDPWO Act. The April 2019 change application addresses the requirements of section 35E of the SDPWO Act, in that the written application describes the proposed changes and its effect on the project and states reasons for the proposed changes.

3.1 Proponent's reason for change

On 4 April 2019, the preferred contractors to deliver the project were announced. The project's major work packages are proposed to be delivered in two packages:

- the Tunnel, Stations and Development, which includes the underground section of the project including the tunnel from Dutton Park to Normanby and the construction of the new underground Boggo Road, Woolloongabba, Albert Street and Roma Street stations
- the Rail, Integration and Systems, which will deliver the design, supply and installation of the supporting rail system and integration of the project into Queensland Rail's (QR) network, and the upgrade to Exhibition station and upgrades to the stations from Fairfield to Salisbury.

The project proposals included additional and innovative works that require changes to be made to the project as approved in the previous evaluation and change reports. As a result of the additional and innovative works, the proponent is seeking changes to the project to:

- realign the underground stations to allow opportunities for co-location with stations for the Brisbane Metro Project
- realign the underground Woolloongabba station to provide an increased plaza area to better accommodate event crowds
- incorporate a replacement and upgrade of the Roma Street section of the Inner Northern Busway (INB) to allow the station to be integrated into the underground Roma Street station
- upgrade surface stations between Fairfield and Salisbury to support enhanced rail services across the network

- realign the underground stations and tunnels to reduce curvature and provide for shorter, straighter tunnels, resulting in faster rail services and reduced maintenance costs
- provide for broader network improvements with the provision of larger stabling facilities at Mayne Yard, and new stabling facility at Clapham Yard and new bridges at Breakfast Creek and Moolabin Creek.

The proponent is also seeking to amend the existing project wide conditions to reflect the changes to the project. The project change application seeks the evaluation and approval of the proposed changes, the effects on the project and other related matters.

3.2 Project change details

The proposed changes to the project include:

- changes to the vertical and horizontal alignments of the tunnels and relocation of the stations to reduce curvature, resulting in a change to the volumetric property impacts of the project (see Figure 3.1)
- realignment of rail infrastructure through Mayne Yard, including the construction of a new rail bridge across Breakfast Creek
- minor realignment of the underground Roma Street station further east, with changes to the design and construction methodology of the station cavern at Roma Street
- realignment of the INB at Roma Street and integration of the busway station with the underground Roma Street Cross River Rail station
- relocation of the proposed underground Albert Street (80 m north-west) and Woolloongabba stations (70 m west) with changes to design and construction methodology of the station caverns
- a new Albert Street station entry at 142 Albert Street which will require the acquisition of a new commercial property
- minor horizontal and vertical realignment changes to the location of the Boggo Road station, including a new elevated surface pedestrian and cycle bridge from the Princess Alexandra (PA) Hospital to the Boggo Road Urban Village
- an upgrade to the existing Dutton Park station including extension of the existing platforms further south under Annerley Road, which will require the acquisition of two multi-unit residential properties comprising thirteen individually owned units in Cope Street
- upgrades to existing surface railway stations at Salisbury, Rocklea, Moorooka, Yeerongpilly, Yeronga and Fairfield which include raising and extending the existing platforms
- a new stabling facility at Clapham Yard (Moorooka), which will lead to operational improvement for the rail network
- construction of a new rail bridge over Moolabin Creek
- associated changes to construction worksites, including configuration, access, haulage, workforce parking

- changes to the Imposed Conditions for the project to align with the proposed changes, simplify reporting requirements and reflect requirements stipulated in relevant standards.

Detailed site-specific changes to impacts are provided in Section 5 of this report.

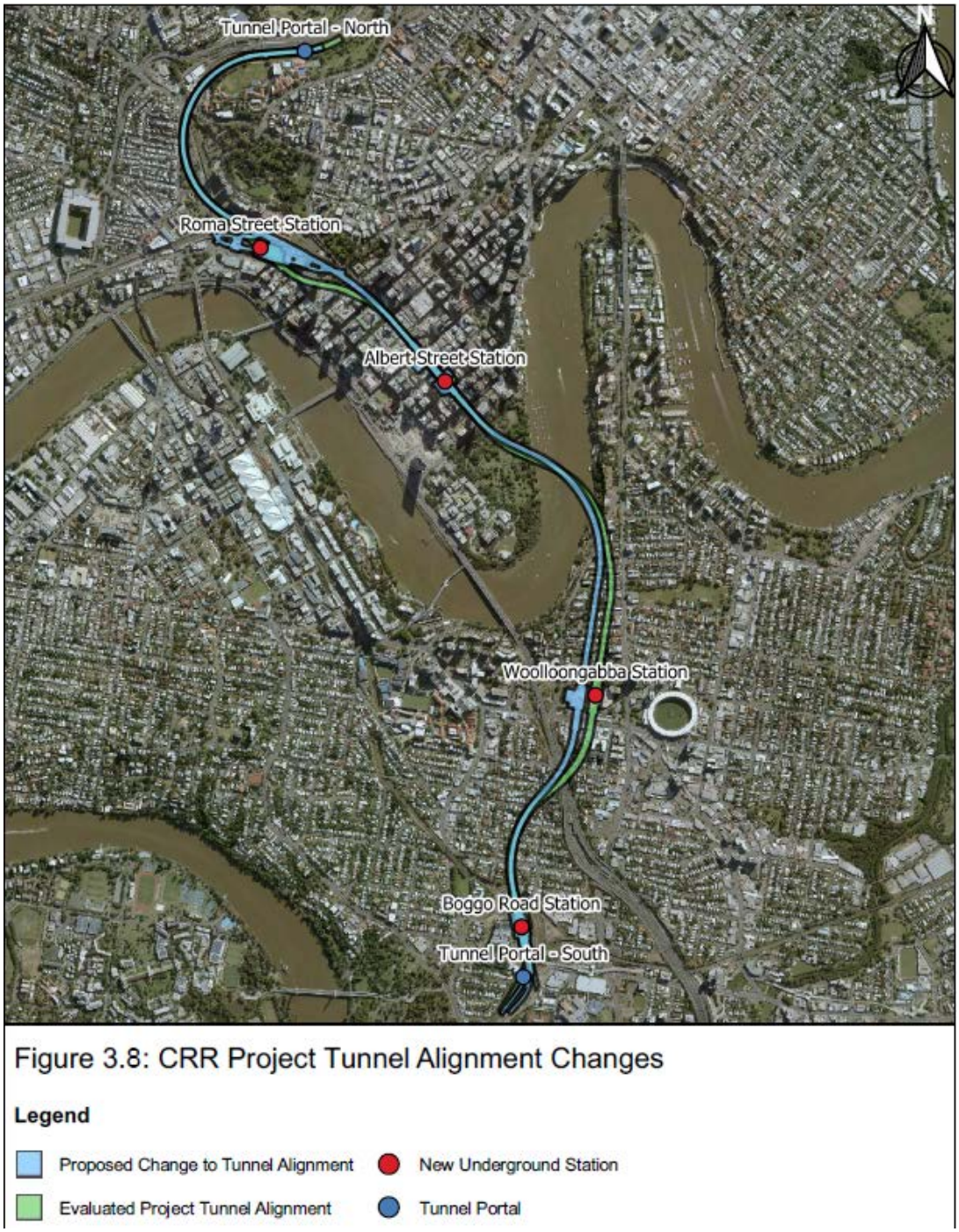

Figure 3.1 Changes to the tunnel alignment

3.2.2 Changes to the project alignment, station locations and construction methodology

Fairfield to Salisbury stations

The new Fairfield to Salisbury station upgrades will improve accessibility to the existing Fairfield, Yeronga, Yeerongpilly, Moorooka, Rocklea and Salisbury stations.

The works at these stations are being delivered by the proponent to provide a consistent design across the stations and to enhance integration of the project with the existing rail network. The works include:

- new platforms and new platform canopies at each station
- raised platform heights to accommodate New Generation Rollingstock
- removal and replacement of the existing pedestrian overpasses at each station
- new station buildings (ticket office, staff facilities and accessible staff and commuter public toilets where necessary)
- installation of new lifts and stairs, kiss ‘n’ ride infrastructure and cyclist facilities
- provision of designated accessible parking bays and short-term commuter parking facilities at each station
- improvements to end of trip facilities and vehicle access
- ancillary components including balustrade and screens, furniture, signage and wayfinding and track maintenance access.

The proposed changes to the project also include track reconfigurations and surface works within the rail corridor from Fairfield to Salisbury to improve operational network capacity. Construction worksites would be required at each of the stations and will be located predominantly within the existing rail corridor. Construction worksite details are as follows:

- Fairfield station: new satellite worksite required for approximately 16 months, located within the QR corridor off Equity Street, with site access and delivery area off Mildmay Street
- Yeronga station: new satellite worksite required for approximately 17 months, accessed via the north west of the station through the existing commuter car park and QR access gate
- Yeerongpilly station: new satellite worksite required for approximately 15 months, located on the eastern side of that station in the rail corridor within a security fenced area
- Moorooka station (the main ‘Southern area’ worksite): new worksite required for approximately 38 months (to also allow for the Clapham Yard stabling construction), comprising office accommodation for up to 20 people, meeting rooms, crib huts, change room, first aid facility and storage facilities
- Rocklea station: new satellite office required for approximately 14 months, located east of the station on existing QR land
- Salisbury station: new satellite office required for approximately 15 months, located in the existing rail corridor with access from Dollis Street.

Upgrades to the new Moolabin Traction power feeder station located to the north of Moorooka station are also proposed, including additional plant component being placed onto the existing QR concrete slab and hosted equipment.

Clapham Yard stabling

The proposed works at Clapham Yard (Moorooka) includes new stabling facilities for 6-car and 9-car trains and the relocation of the dual gauge loop to the west of Clapham Yard. An additional track and bridge are proposed across Moolabin Creek between the existing bridges, with the piers aligned to reduce potential afflux impacts. Pedestrian access from the surrounding road network and Moorooka station will be upgraded with a new footbridge east to west over the rail corridor. The footbridge would also facilitate staff access throughout the Clapham Yard facilities.

The level of the proposed stabling track would be no lower than the mainline rail level over Moolabin Creek. All infrastructure, including stabling roads, will be designed and constructed in a manner to be resilient to flooding impacts, with critical infrastructure being designed and constructed to achieve a 1 in 100 AEP flood immunity.

Compared to the 2011 EIS design, the changes have a reduced footprint and reduced fill volumes with no requirement for the viaduct, embankment or new bridge structure.

Dutton Park station

The proposed upgrades to the existing Dutton Park station will be consistent with the evaluated project, with the exception of a key change involving the lengthening of the platform 60 m to the south of Annerley Road and the construction of a new covered pedestrian bridge south of the Annerley Road bridge. The proposed changes also include a temporary platform extension to ensure the station remains operational during construction.

Consistent with the evaluated project, the delivery of the Dutton Park station upgrade will require the demolition of the existing access ramp, station building, the northern extent of the existing island platform and the side platform off Cornwall Street. The existing station shelters will be relocated or demolished. This platform extension will impact properties located to the south of Annerley Road in Cope Street.

Boggo Road station and southern portal

The trough structure associated with the Southern tunnel portal is proposed to be relocated approximately 60 m south on the ‘Up’ line and 100 m south on the ‘Down’ line. This would result in the portal for the Cross River Rail track on the eastern site of the site shifting further towards the east when compared to the evaluated project. This proposed change will increase the separation between the Southern portal and the existing Port of Brisbane line freight flyover foundations and achieve a level platform at Boggo Road station.

Boggo Road station is proposed to be constructed approximately 2 m lower than previously proposed and the station cavern would be extended, which will shift the station box and platforms north-west by approximately 25 m. This will also avoid conflict with the Eastern Busway and the freight flyover on the Port of Brisbane line. The rail alignment has also been flattened and lowered to create a level platform to improve

safety and operations. Plant and services for the station would also be relocated underground, minimising above ground land requirements.

The proposed construction methodology at Boggo Road station will change from cut and cover at the northern end of the station box to mined, which the proponent anticipates will assist in reducing potential noise, dust and vibration impacts for sensitive receivers. The construction method for the remainder of the station box and southern station cavern remains consistent with the evaluated project (cut and cover).

The previously proposed pedestrian underpass connection will be replaced with a new elevated surface pedestrian and cycle link (bridge) from the PA Hospital to the Boggo Road Urban Village. The new bridge will span from Joe Barker Street over the rail line, providing a 4.5 m clearance, connecting with the existing cycleway adjacent to Boggo Road Busway.

Woolloongabba station

The proposed changes to the project include the relocation of the Woolloongabba station towards Leopard Street 70 m west from the previously proposed location. The surface entrance building would also be located further to the south on the former Go-Print site compared to the evaluated project, increasing the distance to The Gabba by 320 m.

This proposed change to the station entrance will provide more space for the shared public areas, support pedestrian management of event crowds, facilitate connectivity with the Woolloongabba precinct, improve integration with the Woolloongabba bus station and will accommodate the Brisbane Metro project at Woolloongabba. The plaza connection across the existing busway has been reconfigured, with a new pedestrian access bridge between Woolloongabba station and Stanley Street over the busway. Construction methodology remains consistent with the project.

Entry to the station is now proposed to be provided within a pavilion building, rather than multiple individual entry points from an open public space. The proposed increase to station cavern size also allows for a public circulation mezzanine, which will improve flow and movement of passengers and improve pedestrian circulation in the underground station.

The straightening of the tunnel alignment from Woolloongabba station to Albert Street station results in the tunnel alignment under the Botanic Gardens moving slightly to the east before tying back into the previously proposed alignment at Albert Street. The vertical alignment in this area has also been deepened to increase rock cover under the Brisbane River.

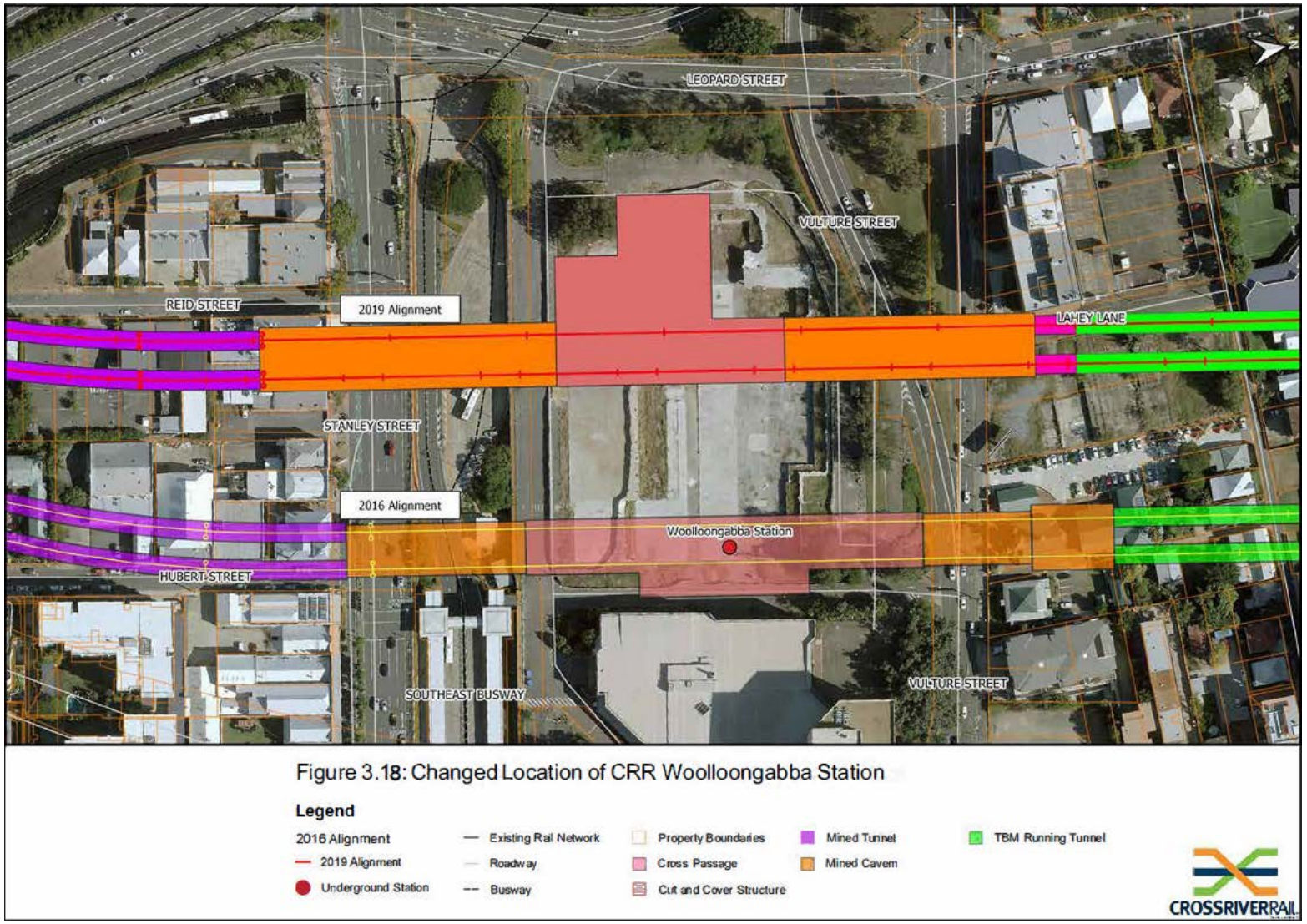

Figure 3.2 Changed Woolloongabba station location

Albert Street station

The Albert Street station is proposed to be relocated 80 m north west towards Roma Street, with the station construction methodology changing from predominantly cut and cover construction (via a central shaft with mined excavations) to a fully mined cavern as shown in Figure 3.3. The elimination of the cut and cover method at Albert Street will reduce the spoil volume to be extracted, the amount of construction work required on the surface and significantly reduce the interface with existing underground utilities.

The Albert Street station cavern will increase in size to provide a mezzanine level, with the previously proposed multiple street entrances consolidated into two plaza entrances. The southern station plaza footprint would be approximately 250m^2 and be contained within one lot on the south-western corner of Albert Street and Mary Street. The southern entrance to the station would be located at the junction of Albert Street and Mary Street and a new northern entrance would be located at 142 Albert Street. This will require the acquisition and demolition of the existing buildings at 142 Albert Street.

From Albert Street station the tunnel alignment will change, following Albert Street towards the existing Roma Street station, and avoiding the need to pass underneath the Brisbane Magistrates Court and the Supreme Court. These changes reduce the overall length of the tunnel, allowing 80 km/hr speeds to be maintained through the tunnel which would reduce journey time by 19 seconds in both directions.

Roma Street station

The straightening of the tunnel alignment from Albert Street results in the relocation of the proposed Roma Street station to the east compared to the project, it will now be located entirely under the existing rail yards, as shown in Figure 3.4.

The Roma Street station construction methodology will also change from a large central cut-and-cover cavern with extended mined caverns to a predominantly mined cavern, supported from two deep cut-and-cover shafts. This will relocate major construction works underground, allowing for 24/7 works (subject to compliance with the Imposed Conditions) and allow for the demolition of the Brisbane Transit Centre (BTC) and Hotel Jen to occur simultaneously with station construction activities. A temporary construction access shaft will also allow road header excavations to start prior to the demolition of the BTC and Hotel Jen.

The changes to the project will result in increased opportunities for improved integration with existing and planned transport infrastructure at Roma Street including the INB, Brisbane Metro, suburban and regional rail services, and the long-distance coach terminal.

The proposed changed project also includes works to extend Herschel Street across Lot 60 at Roma Street to connect with Parkland Boulevard. The proposal includes converting the Hotel Jen carpark access from Roma Street into an access which ties into the existing roundabout on Parkland Boulevard. This will allow a connection from Herschel Street via the Hotel Jen carpark access to Parkland Boulevard at the existing roundabout. The Parkland Boulevard roundabout will remain a three-legged roundabout with the existing signalised access to Roma Street removed.

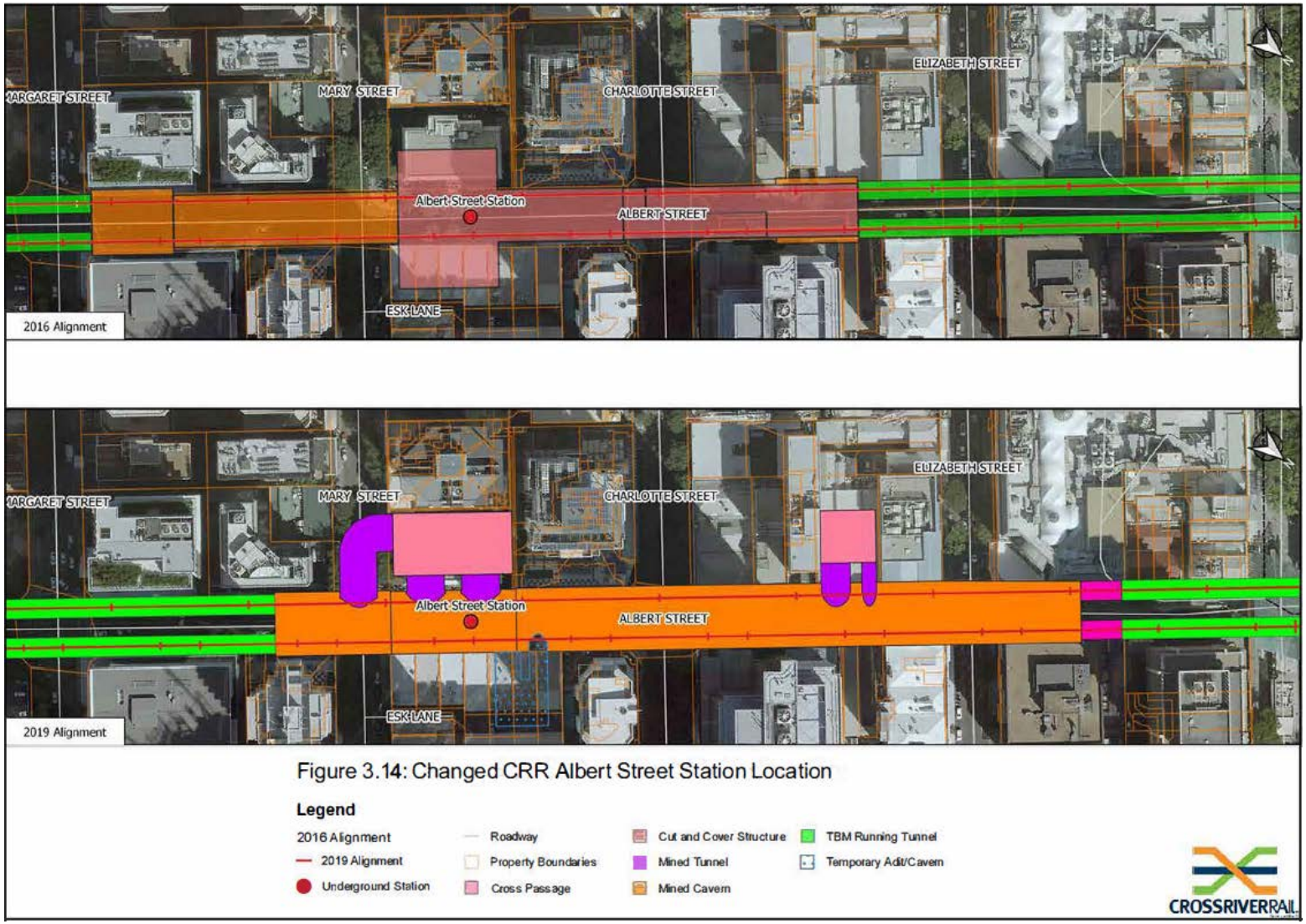

Figure 3.3 Changed Albert Street station location

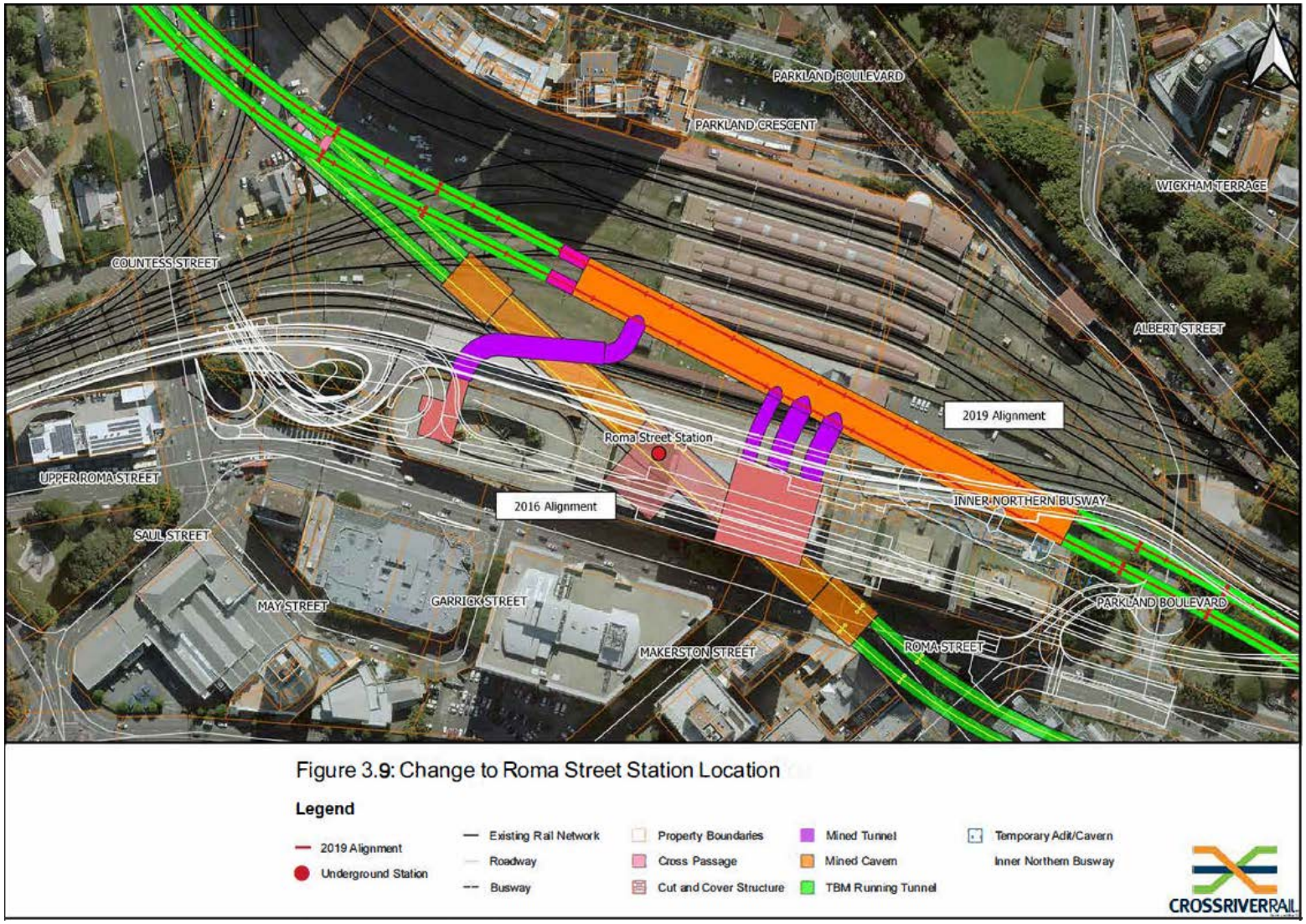

Figure 3.4 Changed Roma Street station location

The existing median on Roma Street will be replaced with an additional right-hand turning lane from Roma Street to the new intersection, and a pedestrian crossing will be introduced at the northern and eastern approach of the new intersection. Access to Roma Street from Parkland Boulevard will be provided via the signalised intersection with Herschel Street.

Relocation of the Inner Northern Busway

The change application considers that the existing Roma Street section of the INB is constrained by operational inefficiencies due to vertical grades and sub-optimal platform lengths. The proposed changes to the project include the lowering of the Roma Street section of the INB to co-locate with the new underground Roma Street station.

The new underground section of the INB will require a cut-and-cover tunnel that will run generally parallel with Roma Street at the southern edge of the BTC site. As there is structural dependency with the BTC and the current INB, buses will be diverted to Roma Street for approximately three years while the BTC is demolished and the new INB section is constructed.

The proposed new INB alignment consists of an eastern tie-in at the existing signalised busway intersection below the eastern corner of Emma Miller Place, and a western tie-in at a reconfigured intersection at the Countess Street busway overpass/underpass.

The new Roma Street station plaza would serve as a single entrance point providing connections to the INB, underground Cross River Rail station and the existing surface rail platforms. The busway will be located below and integrated with the new Roma Street station plaza to provide enhanced connectivity at Roma Street. The new underground busway station will provide new inbound and outbound platforms and will have lift and escalator connections directly from plaza to platform level.

The change application considers that the relocation of the existing busway will allow for significantly improved outcomes for the future redevelopment of the precinct by removing potential conflicts with the proposed Brisbane Live entertainment area, provide an improved integration of transport infrastructure and renew the ageing INB.

Exhibition station

The proposed works at Exhibition station include an upgrade of the existing station (comprising the construction of a new centre island platform to accommodate 9-car trains 220 m in length), additional track to the north of the station, and new pedestrian access to the platform via under-platform viaducts with stairs leading up to the platform. The island platform design with a ground level plaza entrance is to include dual lifts and multiple stair access points.

The change in platform design at Exhibition station compared to the evaluated project will improve access for pedestrians. The proponent has indicated that the new design will maximise customer circulation and wayfinding, and will facilitate the dispersal of patrons as they enter and exit the station. The station plazas will also improve safe buffer areas for dealing with large passenger movements at peak times.

Northern portal

The proposed Northern portal design includes repurposing of existing tracks within Normanby Yard. This would result in the 'Up' Exhibition line being relocated from the northern side of the rail corridor to the southern side within the rail corridor and approximately 25 m from the Brisbane Girls Grammar School (BGGS) Sports Centre. This change would result in the rail lines being located approximately 40 m closer to BGGS, which is necessary to ensure the ongoing operation of the rail corridor during the construction activities.

Mayne Yard

The proposed works at Mayne Yard are to include a new stabling facility for 14, 6-car trains at Mayne Yard north, a graffiti removal track, expansion of the existing stabling facilities and associated earthworks in the existing Mayne Yard area. Existing buildings in Mayne Yard (including the diesel locomotive facilities and demountable buildings) will be demolished.

The proposed changes also include additional track work north of Breakfast Creek, with realignment of the previously proposed Cross River Rail line and crossovers within Mayne Yard. New overpass bridges for the Mayne Yard east and Mayne Yard north access roads would also be constructed. The previously proposed underpass (trough structure) has been removed.

A new rail bridge is proposed to be constructed over Breakfast Creek, with construction works to include piling and installation of the bridge (50 m west of the existing crossing) and dredging of approximately 3,000 m^3 of material to enlarge the creek and minimise flooding impacts. The existing eastern two track rail bridge (suburban line bridge) will be demolished. The proposed additional surface works at Mayne Yard will all be undertaken within the existing rail corridor.

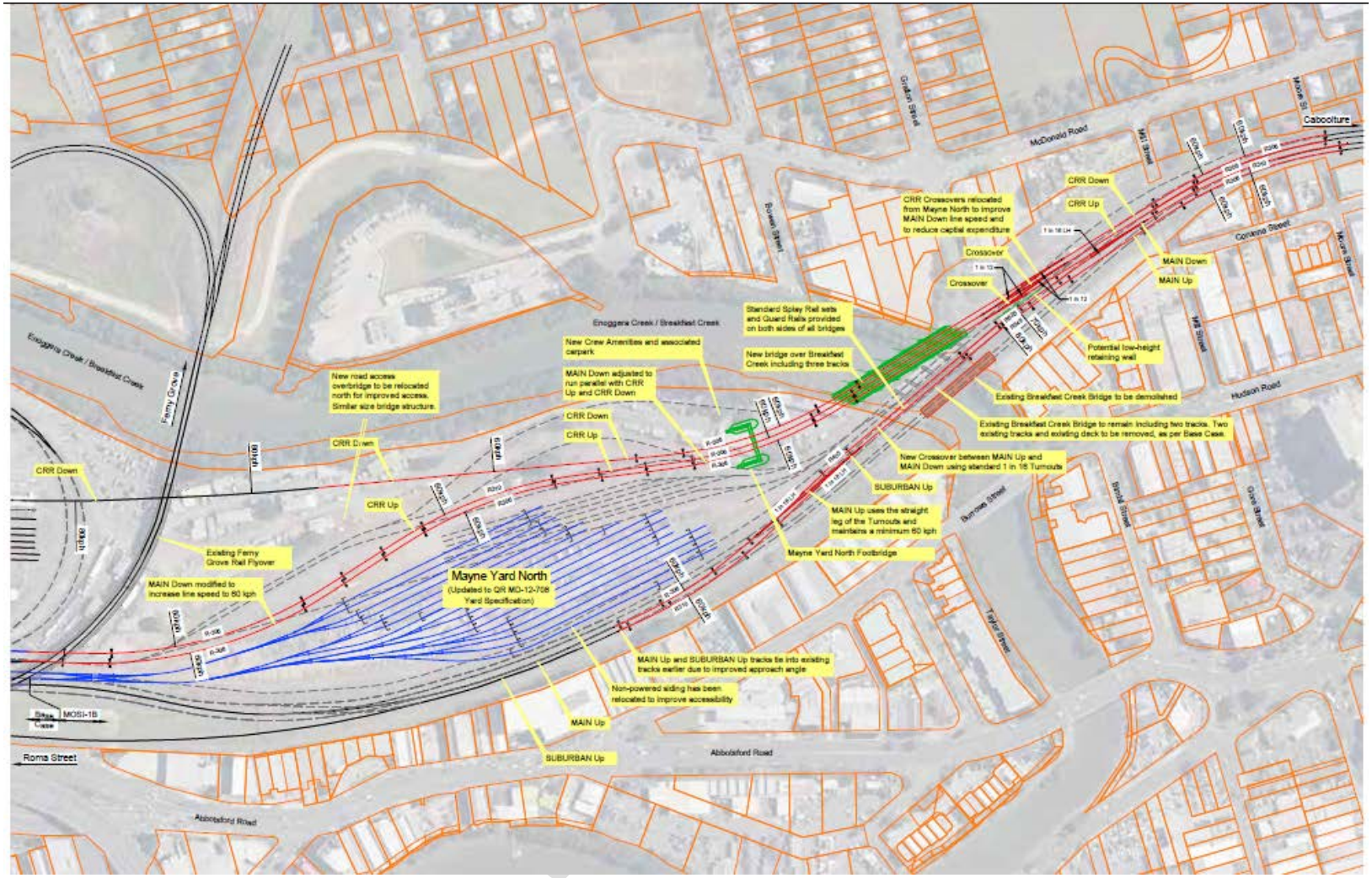

Figure 3.5 Mayne Yard north proposed changes and new Breakfast Creek bridge

3.2.3 Changes to the Imposed Conditions for the project

The proponent has also requested changes to Imposed Conditions for the project as follows:

- amendment to Imposed Condition 1 to apply the existing Imposed Conditions to the proposed changes to the project
- an amendment to Imposed Condition 6 to provide a two-week extension to the monthly reporting periods to allow for quality assurance processes to be followed
- an amendment to Imposed Condition 10 to provide for construction hours for the new worksites, including for Clapham Yard and the Fairfield to Salisbury station upgrades
- a change to Environmental Design Requirement 3 (noise and vibration) to align with QR standards and specify that the criteria applies to underground stations and rail.

My assessment of the proposed changes to the conditions is provided in Section 6 of this report.

3.3 Public notification

In considering the project change application, I determined that the project should be publicly notified. The proponent's project change application was made available for public comment from 20 May 2019 to 14 June 2019.

During the public notification period, 86 submissions were received – 28 from public organisations, 54 from private submitters and 4 from local and state advisory agencies. Following the conclusion of the public notification period a further 3 submissions were received – 1 from a public organisation, 1 from a private submitter and 1 from a state advisory agency. The following key issues were raised in submissions:

- traffic and transport impacts in the vicinity of the Roma Street station worksite during construction, including the diversion of the INB
- opposition to the proposed acquisition of residential properties at Dutton Park
- construction impacts to the operation of businesses located in the vicinity of the Albert Street construction worksite
- human health impacts due to excessive noise, vibration and dust impacts
- increased operational rail noise impacts from the removal of the noise barrier at Dutton Park
- property value, use and development impacts due to surface and volumetric acquisition requirements
- flood risk at Mayne Yard and impacts to adjacent properties
- concerns regarding the hours of work at construction worksites
- commuter safety at stations after hours
- construction traffic and parking impacts at Cope Street
- impact to the provision of social services adjacent to Emma Miller Place during construction
- ensuring operational activities can be maintained Mayne Yard during construction

- the scale, location and design of the new stations, particularly in relation to aligning with the character of local neighbourhoods
- potential structural integrity impacts to heritage properties across the alignment
- impacts to freight operations during construction
- perceptions of insufficient clarity and comprehensiveness of information presented at the proponent's staffed 'drop in' engagement sessions
- reduced access and connectivity for public transport users, vehicles, pedestrians and cyclists at Roma Street and Parkland Boulevard during construction
- cyclist safety considerations associated with increased spoil haulage vehicles.

I have considered all issues raised in submissions made on this change application.

The proponent provided the following documents which I have also considered in my assessment:

- Proponents response to submissions June 2019
- Consultation report June 2019.

4. Project approvals

4.1 Australian government approvals

On 6 June 2017 the Cross River Rail project (as described in the February 2017 project change application) was referred to the Commonwealth Minister for the Environment and on 13 July 2017 it was determined the project was not a 'controlled action'.

4.2 Other state government approvals

As a result of changes to the Cross River Rail project and regulatory changes since the release of the CGER in December 2012 and the June 2017 CGCR, I have provided a revised table of approvals for the delivery of the project.

This report provides a whole of government assessment and evaluation of the project change. The proponent would be required to obtain other approvals in accordance with other legislation.

Table 4.1 provides a list of subsequent approvals that may be required for the project to proceed.

Table 4.1 Subsequent approvals required for the project

Project component	Approvals/permit name	Legislation	Description
Early works	Accepted development requirements (ADR) for operational work that is the removal, destruction or damage of marine plants	Planning Regulation 2017	For survey and geotechnical investigations in Breakfast Creek requiring marine plants disturbance
	Excluded work (Coastal)	Planning Regulation 2017	For geotechnical investigations in Breakfast Creek (tidally influenced and within coastal management district)
	Natural Assets Local Law 2003 (NALL) Approval to Interfere with Protected Vegetation	Natural Assets Local Law 2003	Exempt with offsets to be developed in consultation with Brisbane City Council (BCC) to mitigate impacts
	Accepted development requirements (ADR) for operational work that is constructing or raising waterway barrier works - temporary	Planning Regulation 2017	For geotechnical investigations in Breakfast Creek (grey waterway), Moolabin Creek and Rocky Water Hole (both green waterways).
Whole of project	Compliance with Approved Cultural Heritage Management Plan (CHMP)s	*Aboriginal Cultural Heritage Act 2003*	Applicable to construction activities that have potential to interfere with Aboriginal heritage or spiritual culture
	Species Management Program (SMP) – Low Risk	Nature Conservation (Wildlife Management) Regulation 2006	For vegetation removal that impacts breeding places of least concern species only (excluding special least concern and colonial breeders)
	Clearing Permit (protected plants)	Nature Conservation (Administration) Regulation 2017	Clearance of all endangered, vulnerable or near threatened (EVNT) species within the project corridor

Project component	Approvals/permit name	Legislation	Description
	Exempt clearing notification (protected plants)	Nature Conservation (Wildlife Management) Regulation 2006	For clearance of vegetation within blue high-risk area of flora survey trigger map
	Approval to take native wildlife (removal of wildlife)	*Nature Conservation Act 1992*	For construction activities that require the take of protected animals
	Accepted building works for *Building Act 1975*, the Queensland Development Code and the Building Code of Australia	*Building Act 1975*	For demolition of train station buildings and heritage structures and construction of new buildings and structures
	Natural Assets Local Law 2003 (NALL) Approval to Interfere with Protected Vegetation	Natural Assets Local Law 2003	Exempt with offsets to be developed in consultation with BCC to mitigate impacts
	Soil Disposal Permits for Contaminated Land	*Environmental Protection Act 1994*	Movement of soil from lots on the Environmental Management Register/Contaminated Land Register
	Weed and pest management plan	*Biosecurity Act 2014*	Construction activities within areas where restricted matters exist or where prohibited matters are located
Mayne Yard area	Quarry material allocation notice	*Coastal Protection and Management Act 1995*	Removing quarry material from State coastal land under tidal water (construction of new bridge piers)
	Operational works (removal, destruction or damage of marine plant, constructing or raising waterway barrier works, prescribed tidal works) development permit	Planning Regulation 2017	For removal and replacement of QR suburban track bridge (truss bridge) within Breakfast Creek (new Development Application to be lodged)

Project component	Approvals/permit name	Legislation	Description
	Operational works (removal, destruction or damage of marine plant and prescribed tidal works) development permit	Planning Regulation 2017	For drainage outlets, excavation and demolition of existing buildings over Mayne Yard
	Accepted development requirements (ADR) for operational work that is constructing or raising waterway barrier works – temporary waterway barrier works	Planning Regulation 2017	For Breakfast Creek construction activities
	Flying-fox roost management permit (FFRMP) or Code of practice – low impact activities	Nature Conservation (Administration) Regulation 2017	For vegetation removal associated with drainage outlets, excavation and demolition of existing buildings over Mayne Yard
	Operational works (removal, destruction or damage of marine plant, constructing or raising waterway barrier works, prescribed tidal works) development permit	Planning Regulation 2017	• For construction of new bridge, excavation within waterway and construction of bund • Removal of existing QR bridge (no replacement) • Removal of bridge deck from existing unusable QR Sidings bridge Sought instead of operational works permit for the replacement of QR suburban bridge
	Quarry material allocation notice	*Coastal Protection and Management Act 1995*	Removing quarry material from State coastal land under tidal water (for construction of Bridge and flood mitigation)
	Flying-fox roost management permit (FFRMP) or Code of practice – low impact activities	Nature Conservation (Administration) Regulation 2017	For vegetation removal associated with construction of bund on northern bank of Breakfast Creek

Project component	Approvals/permit name	Legislation	Description
Northern area	Material change of use on contaminated land for commercial use with accessible underground facility	Planning Regulation 2017	Exhibition station underground plaza
	Development on Queensland Heritage Place by the State or Exemption Certificate to carry out work on a place listed on Heritage Register	*Queensland Heritage Act 1992*	Construction and permanent works over Brisbane Exhibition Grounds and Ekka train station
	Exemption Certificate or development on Queensland Heritage Place by the State	*Queensland Heritage Act 1992*	Construction and permanent works over Victoria Park
	Impacts to public passenger transport facilities permit	*Transport Infrastructure Act 1994*	Construction activities under Inner Northern Busway Bridge off Bowen Bridge Road
Southern area and Fairfield to Salisbury area	Biosecurity Instrument Permit or General Biosecurity Obligation (GBO)	*Biosecurity Act 2014*	For earthworks within fire ant biosecurity zone 2 (Yeronga, Yeerongpilly, Moorooka and Salisbury)
	Operational works (constructing or raising waterway barrier works) development permit	Planning Regulation 2017	For Moolabin Creek Bridge (north of Moorooka station) – green waterway
	Accepted development requirements (ADR) for operational work that is constructing or raising waterway barrier works – temporary waterway barrier works	Planning Regulation 2017	For Moolabin Creek construction activities (i.e. bed level crossing)

5. Evaluation of the change application

In accordance with section 35I of the SDPWO Act, I have prepared this change report following an evaluation of the environmental effects of the proposed change, its effects on the project and any other related matters. I have considered:

- the nature of the proposed change and its effects on the project, as identified in the project change application
- project documentation, as currently evaluated, including the 2012 CGER, the June 2017 CGCR, the August 2018 CGCR and the March 2019 CGCR
- technical reports

- submissions received
- advice from the proponent.

The following is an evaluation of the environmental effects of the proposed changes to the project.

5.1 Land use and tenure and soils

5.1.1 Introduction

As a result of the changes to the alignment and locations of stations, the changed project will result in increased surface property requirements and reduced volumetric property requirements. The changes will also increase the risk of encountering contaminated areas and actual or potential acid sulphate soils (ASS) in some locations.

Increased surface property acquisitions will be required to accommodate the new northern Albert Street station entry at 142 Albert Street, the changed Victoria Park construction access and the upgrade to Dutton Park station.

In total, the changed project will require 201 property acquisitions, comprising 49 properties for surface acquisition and 152 properties for volumetric acquisition. The changes to the project would reduce the number of volumetric acquisitions by 43 and increase surface acquisitions by 18 when compared to the evaluated project, as summarised in Table 5.1.

Table 5.1 Change in surface and volumetric property acquisitions

Property acquisition land use type	2011 EIS	Project evaluated in the June 2017 CGCR	Proposed changes
Surface acquisition – number of properties			
Residential	39	0	2
Commercial/ industrial	60	17	30
Other (park, showground etc)	9	14	17
Total – surface acquisition	108	29	49
Volumetric acquisition – number of properties			
Residential	235	141	104
Commercial/ industrial	50	38	33
Other (park, showground etc)	19	16	15
Total – volumetric acquisition	304	195	152
Total properties requiring acquisition	**412**	**224**	**201**

Across the majority of the project alignment, settlement risk has either remained consistent with the evaluated project or has reduced. Settlement impacts above station caverns is also expected to be similar to that previously assessed.

Areas in which increases in settlement risk have been identified are discussed below. The modelling identifies 19 buildings at ‘slight risk’ of damage (not including Hotel Jen

which is to be demolished) that will require further analysis during detailed design, as shown in Table 5.2. The change application indicates that 'slight risk' is categorised as likely to result in crack widths up to 5 mm which are easily treated, and doors and windows may stick slightly.

Table 5.2 Properties across the alignment with 'slight risk' of settlement damage

Location	Settlement risk
41 Boggo Road Dutton Park QLD (Ecosciences)	Slight
Park Road station Platform	Slight
735-741 Stanely Street	Slight
743 Stanely Street	Slight
79 Albert Street	Slight
80 Albert Street	Slight
70 Mary Street	Slight
83 - 109 Albert Street (Lot 2 to be demolished as part of project)	Slight
89 Charlotte Street	Slight
95 Charlotte Street	Slight
160 Albert Street	Slight
106 Elizabeth Street	Slight to very slight
103 Elizabeth Street	Slight to very slight
186 Albert Street	Slight
138 Elizabeth Street	Slight
144-156 Elizabeth Street	Slight
118 Charlotte Street - 153 Elizabeth Street	Slight
131-145 Elizabeth Street	Slight
Existing Roma Street Railway station building and above ground platforms	Slight
159 Roma Street (Hotel Jen)	Slight to very slight

Land use, tenure and soil impacts at the Northern portal worksite would be consistent with the evaluated project. The works proposed at Fairfield to Salisbury stations are being undertaken within the existing rail corridor and are not likely to require ground disturbance works that would encounter or spread contaminated or ASS.

5.1.2 Impacts and mitigation

Clapham Yard

Additional land will be required for the new stabling facilities at Clapham Yard, Moorooka, with approximately 10 additional properties required for surface acquisition. The land is currently partially used for industrial purposes, with the remainder being rail corridor land.

The existing rail yard is listed on the Environmental Management Register (EMR) and three additional sites listed on the EMR would be impacted by the changed project along Chale Street. The change application has indicated that further site contaminated land investigations will be undertaken prior to construction to determine the level of contamination and required management measures. Consistent with the evaluated project, any contaminated land that is encountered through construction activities will need to be remediated or disposed of to an approved landfill under a Department of Environment and Science (DES) approved soil disposal permit. Contaminated land will be managed in accordance with the Outline Environmental Management Plan (OEMP) and the Contaminated Land Management sub-plan, which I require the proponent to update based on the proposed changes to the project.

The new rail bridge to be constructed at Moolabin Creek will be constructed within the existing rail corridor. The Moolabin Creek area falls within land mapped with a low probability of ASS occurrence. Subject to contamination assessment by a suitably qualified person, the excavated material at Clapham Yard will be reused on site to achieve cut/fill balance and prevent a reduction in Brisbane River floodplain capacity. Any unsuitable contaminated material will be remediated or removed and disposed of to an approved landfill site.

Dutton Park station

The extension of the existing Dutton Park rail platform will necessitate the acquisition of two properties comprising thirteen separate allotments on Cope Street, Annerley. The properties located on Cope Street required as part of the Dutton Park station upgrade works are not listed on the EMR.

Submissions raised concerns regarding the proposed southern extension of Dutton Park station and associated residential property acquisition. Property acquisitions required for the project will be undertaken in accordance with the CRRDA Act and the *Acquisition of Land Act 1967*.

Southern portal and Boggo Road station

The changed station location will be located closer to the ESA Leukaemia Village, private residences and Dutton Park State School, which may experience increased construction impacts compared to the evaluated project.

There will be an increased permanent impact to the surface and subsurface of land zoned as Specialised Centre – Major Education and Research of approximately 4,132 m^2 and 481 m^2 of land zoned as Mixed Use (Corridor) in the vicinity of Boggo Road station. Both impacted parcels are owned by the State of Queensland (represented by the Department of Housing and Public Works). The Ecosciences precinct will also have an increased volumetric impact at the north-eastern corner of the property.

Additional land has been identified for optional use on Joe Baker Street adjacent to the Eastern Busway station for laydown during construction. The land is currently vacant open space located between Boggo Road and the Eastern Busway. If utilised, potential impacts including noise, dust and changes to access routes may be experienced during construction.

The additional parcels of land identified for the project on Peter Doherty Street, Joe Baker Street and within the road reserve of Boggo Road are not listed on the EMR. Previously required land parcels to the northern side of the rail corridor currently used as commuter and employee parking are no longer required for the changed project.

Settlement depths at Boggo Road station may be up to 10 mm more than predicted for the evaluated project, which estimated settlement could be up to 50 mm above the station. The change application indicated that settlement within the Southern drive/portal and Boggo Road station area will require further analysis during detailed design.

Consistent with the evaluated project, settlement risk will be managed in accordance with mitigation measures outlined in the OEMP and Land Management sub-plan, which will include tailored management measures to manage settlement risk along the alignment. I require the proponent to update the OEMP based on the proposed changes to the project. Mitigation measures could include:

- additional modelling and investigations of potential settlement risk
- consultation with potentially affected owners to undertake dilapidation surveys where modelling indicates damage as a consequence of the project is likely
- monitoring building and asset conditions for settlement from the commencement of sub-surface construction works and dewatering and where necessary
- damage caused by project works is repaired at no cost to the asset owner.

In addition, Imposed Condition 12 requires that:

- prior to the commencement of project works, predictive modelling must be undertaken of potential ground movement that may be caused by the project works
- where predictive modelling indicates the project works would lead to impacts above the vibration goals, the proponent must prepare and submit a property damage sub-plan as part of the Construction Environmental Management Plan (CEMP). The property damage sub-plan must set out the procedure for:
  - advance communication with potentially Directly Affected Persons
  - procedures for building condition surveys both in advance of and following project works
  - monitoring to be undertaken for potential impacts to property; and
  - mitigation measures
- where post-construction building condition surveys identify that property damage has occurred as a result of project works, the damage must be repaired as soon as practicable by the proponent at no cost to the property owners.

Boggo Road station to Woolloongabba station

The extent of the volumetric alignment between Boggo Road and Woolloongabba is unchanged, however the volumetric alignment has shifted slightly east from Quarry Street to Ross Street resulting in different sensitive receptors being impacted compared to the evaluated project. From Ross Street to Peterson Street, the volumetric alignment has straightened, reducing impacts to previously affected properties.

From Peterson Street the volumetric alignment has shifted west, meaning new residential and commercial properties in Reid Street will be impacted volumetrically. Different commercial properties in Stanley Street will be impacted, with properties previously volumetrically impacted no longer impacted.

Woolloongabba station

The changes to the project would reduce the infrastructure footprint at Woolloongabba station by approximately 400 m^2. The South East Busway station will be impacted by a new overhead pedestrian connection from Woolloongabba station to Stanley Street.

The Go-Print building, Landcentre building and former South Brisbane Dental Clinic have been demolished. Remediation of the Woolloongabba worksite has commenced with the intention to remove the site from the EMR. The changes to the project would result in greater volumetric impact on the western portion of the Go-Print site and reduced impact on the eastern portion. Settlement at Woolloongabba station (predicted to have 'slight risk') will require further analysis during detailed design.

Woolloongabba station to Albert Street station

The St Nicholas Russian Orthodox Church is no longer impacted by the changed project, however alternative land slightly west on Vulture Street will be impacted by the changes to the project. The underground tunnel may have an impact on the future development potential of the site however compensation will be payable where there is a volumetric requirement in accordance with the provisions of the *Acquisition of Land Act 1967* and the *Cross River Rail Delivery Authority Act 2016*. Minor settlement impacts for the tunnel alignment between Woolloongabba station and the Brisbane River may occur, which were not identified for the evaluated project. Settlement risk will be managed in accordance with mitigation measures outlined in the OEMP and Land Management sub-plan that I require the proponent to update based on the proposed changes to the project.

There will be additional temporary volumetric impacts on properties located in Mary Street to the west of the Albert Street intersection and in Albert Street for temporary rock anchoring during construction.

Albert Street station

The changes to the project will reduce the infrastructure footprint at Albert Street station by approximately 50 m^2. The changed construction methodology at Albert Street station would also assist in reducing the amount of spoil to be excavated in an area with the potential to contain ASS when compared to the evaluated project. The change in construction methodology for the station is also predicted to reduce settlement risk for the station.

The new second pedestrian entrance to Albert Street station near the intersection of Elizabeth Street will result in permanent surface and volumetric land requirements from two additional properties at 142 Albert Street. The properties are privately-owned medium-rise commercial buildings. Properties that are adjacent to the new second entrance that were previously unaffected would now be impacted by volumetric requirements.

The majority of the Albert Street road reserve surface between Charlotte Street and Elizabeth Street will be required during construction, where previously it was required from Mary Street to Elizabeth Street. As a result, the Myer Centre carpark ramp in Albert Street (located on Albert Street between Charlotte Street and Elizabeth Street) is no longer required to be permanently removed.

Submissions raised concerns regarding the proposal at Albert Street to locate a laydown area and containers for electrical reticulation on the Albert Street frontage between Charlotte Street and Mary Street. Issues raised related to blocking visibility to commercial sites, ultimately affecting trading to the public as well as construction noise and dust impacting on the amenity and use of the premises. The proposal to close off a section of Albert Street was also raised in the context that it would stop the flow of pedestrians from Albert Street to Mary Street.

In its response to submissions the proponent advised that the Social Amenity Management sub-plan that forms part of the OEMP for the project requires that the project must avoid, or minimise and mitigate, impacts from construction activities on local businesses and the social environment. This includes maintaining safe access to businesses, advance notification to businesses and procedures for making complaints about project works. The Community and Stakeholder Engagement sub-plan (CSEP) also requires that early and ongoing notification with business owners near construction worksites or other construction works is undertaken. Safe access must also be maintained to businesses in accordance with Construction Worksite Management sub-plans.

Submissions also raised concern with the potential for the existing fire exit for the Festival Towers building in the proposed section of Albert Street to be closed during construction. The existing project wide Imposed Conditions require that practicable access is maintained to adjacent properties throughout the construction phase.

Following the completion of construction activities at Albert Street, future development will be managed in accordance with the requirements of the Albert Street Cross River Rail Priority Development Area (PDA).

Albert Street station to Roma Street station

There will be a reduction in permanent volumetric impacts on commercial properties on Mary Street to the east of the Albert Street intersection. There will also be slightly increased volumetric requirements under properties in Albert Street between Elizabeth Street and Queen Street.

The alignment of the tunnel between Albert Street station and Roma Street station will straighten as a result of the changes to the project, allowing the tunnel to pass under King George Square and Emma Miller Place and avoid Brisbane City Hall and the Brisbane Supreme and District Courts Complex, reducing the impacts previously identified for the evaluated project in this location.

Roma Street station

The proposed changes to the project will reduce the infrastructure footprint at Roma Street station by approximately 500 m^2. The change application predicts that land use

impacts will be reduced for mixed residential and commercial properties located on George Street between Herschel Street and Makerston Street, however there will be an increased interface with the INB, due to its relocation during construction. The relocated INB will improve future flexibility of land uses for properties along Roma Street.

To facilitate the INB works, Emma Miller Place will be temporarily impacted during construction. The land will also be permanently impacted volumetrically by the underground tunnel. The State owned land immediately east of the BTC building will be the site of permanent infrastructure associated with Roma Street station. This parcel will be required permanently rather than temporarily as previously proposed. Additional land will also be required for a permanent volumetric cavern at the far western end of what is currently the carpark ramp for the BTC to be used as a plant and equipment room for the underground station. Overall the changes to the project will require increased volumetric impacts at Roma Street however impacts will be confined to State-owned land.

Platform 2 and 3 of Roma Street station are required to be temporarily decommissioned to facilitate demolition of the existing long-distance coach terminal attached to the BTC. While closed, new foundations will be installed at Platforms 2 and 3 and to support these works access will be required to an additional temporary construction area directly adjacent to the state heritage listed Roma Street station building. Additional construction areas will be required to support this work on land adjoining the existing rail corridor which is currently used for railway employee carparking, operations and maintenance.

For the Roma Street station area, minor road works (footpath and kerb modifications/upgrades) are proposed along Makerston Street and Herschel Street which are adjacent to land on the EMR. The notifiable activity adjacent to the site includes petroleum products, oil storage and service stations. In addition, the excavation required for the lowering of the INB increases the potential to disturb contaminated soils. Consistent with the evaluated project, any contaminated land that is encountered through construction activities will need to be remediated or disposed at an approved landfill under a DES approved soil disposal permit. Contaminated land will be managed in accordance with the OEMP and the Contaminated Land Management sub-plan that I require the proponent to update based on the proposed changes to the project.

The additional cut and cover required for the INB will increase erosion risk in the Roma Street area, and there will be reduced settlement risk at the State law courts complex due to the relocated tunnel alignment. The proponent has advised that the construction contractor will be required to update the predicted settlement model with refined inputs for the Roma Street area. A Building Effects Report will be produced following detailed design to inform the CEMP, and will outline monitoring and mitigation measures required to manage ground movement and tunnel convergence during the construction works, including for the INB.

The use of the College Close carpark at Roma Street as a satellite worksite previously proposed is no longer required for the project.

With regards to planning considerations at Roma Street for Brisbane Live, which was also raised by submitters, the final planning and development intentions for the Roma Street precinct will be determined through the declaration of a PDA, subject to the Minister of Economic Development Queensland declaring the Cross River Rail PDA.

Otherwise, development in this precinct will be subject to the Brisbane City Plan 2004 or, if transport related infrastructure, it would be considered under the *Transport Infrastructure Act 1994*.

Roma Street station to Exhibition station

Potential land use impacts within Victoria Park are expected to be similar or improved compared to the evaluated project due to the change in proposed construction site access via the Department of Health's Biomedical Technology Services (BTS) building. The demolition of the existing BTS building is a new impact resulting from the changes to the project. The area would be used as a construction access and temporary worksite or laydown area. The change application considers that the acquisition of the BTS building will avoid impacts on the BTS operation and services.

Additional land at the eastern end of Victoria Park will be required for the widening and extension of access from Gregory Terrace and the establishment of additional construction workspaces on the southern side of the rail corridor.

The area between the Northern portal and Exhibition station could be affected by the Energex substation located off Bowen Bridge Road, which is identified on the EMR for notifiable activity 'petroleum product or oil storage. Consistent with the project, any contaminated land that is encountered through construction activities would need to be remediated or disposed of to an approved landfill under a DES approved soil disposal permit. Contaminated land would be managed in accordance with the OEMP and the Contaminated Land Management sub-plan that I require the proponent to update based on the proposed changes to the project.

Exhibition station to Mayne Yard

The proposed temporary construction area at Exhibition station adjoining the rail corridor would be relocated for the changed project, from the area known as sideshow alley to part of the site fronting O'Connell Terrace. The temporary construction area would also be expanded to approximately one hectare in this new location. The change application indicates that land use impacts at the RNA Showgrounds would increase as a result of the changes to the project, however the relocation of the temporary construction area would reduce impacts on showground operations.

Land previously identified for permanent use on the northern side of O'Connell Terrace would only be temporarily required as a construction workspace as a result of the changes to the project. The temporary worksite located in Campbell Street would also be expanded to include the full subject parcel rather than part of the parcel as per the previous proposal.

Mayne Yard and Albion station

Land use impacts will increase from the evaluated project at Mayne Yard to encompass the QR maintenance centre, which will be demolished. To the north of Breakfast Creek, works within the existing rail corridor will be extended to the Albion Road underpass. Some commercial and residential properties north of Breakfast Creek may experience additional construction impacts including noise, dust and lighting as a result of these additional works.

Approximately 76,900 m^3 of material will be removed from Mayne Yard for surface works including the construction of a new stabling facility in Mayne Yard North, which is more than twice the amount of spoil to be removed from this area when compared to the evaluated project. There would be an increase in the number of properties on the EMR directly impacted and adjacent to the works, which will increase the volume of contaminated soil requiring treatment or disposal. Any contaminated land encountered through these works would be remediated or disposed of to an approved landfill under a DES approved soil disposal permit.

Erosion risk in the vicinity of Mayne Yard will increase as a result of the changes to the project due to the proposal to demolish the existing QR downstream rail bridge and the construction of a new bridge over Breakfast Creek. The demolition of the eastern rail bridge and construction of a new rail bridge at Breakfast Creek is located on unallocated State land. The Imposed Conditions require that an erosion and sediment control sub-plan is prepared that is consistent with the Guidelines for Best Practice Erosion and Settlement Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads (DTMR) Technical Standard MRTS51 – Environmental Management.

The bridge construction works and additional surface works within Mayne Yard would also increase the quantity of potential ASS to be disturbed by the project. Imposed Condition 19 requires that ASS must be managed in accordance with the methods and requirements of the latest edition of the *Queensland Acid Sulfate Soil Technical Manual*. Mitigation measures remain consistent with the evaluated project and are detailed in the OEMP and ASS Management Plan sub-plan that I require the proponent to update based on the proposed changes to the project.

5.1.3 Coordinator-General's conclusion: land use and tenure and soils

I am satisfied that the proponent has assessed the potential land use, tenure and soil impacts of the changed project. I note that the changed project would require additional surface residential and commercial property acquisitions, however I am satisfied that the impacts associated with these resumptions would be managed through the *Acquisition of Land Act 1967* and the *Cross River Rail Delivery Authority Act 2016*.

I note that the level of settlement risk predicted is generally consistent with the approved project, with the exception of the Boggo Road station cavern. I am satisfied that the Imposed Conditions, combined with the additional settlement analysis to be undertaken by the proponent for a number of properties at slight risk of settlement impacts and the implementation of the mitigation measures in the OEMP for the project would address settlement risk for the project. I require the proponent to update the OEMP based on the proposed changes to the project.

I am satisfied that the the existing project wide Imposed Conditions remain appropriate to manage the potential ASS and contaminated land impacts of the changed project. Any contaminated land encountered through these works will be remediated or disposed of to an approved landfill under a DES approved soil disposal permit.

5.2 Traffic and transport

5.2.1 Introduction

The key proposed changes to the project that will influence the traffic and transport impacts previously evaluated include:

- an increase in the amount of spoil being removed from worksites due to a change in construction methodology and station design
- relocation of the INB at Roma Street and the associated diversion of buses
- station upgrade works at Fairfield to Salisbury.

The increase in the amount of spoil to be removed for the changed project, particularly from the Roma Street worksite, results in increased construction vehicle movements as shown in Table 5.3.

Table 5.3 Change in spoil volumes and associated peak construction traffic and spoil haulage vehicle movements

Precinct	Change in spoil volumes generated at worksites		Peak construction traffic movements (loads/hour) (one way)		Peak spoil haulage vehicle movements (loads/day) (one way)	
	Project[1]	Changed project	Project	Changed project	Project	Changed project
Mayne Yard	36,000	76,000	8	11	20	83
Northern portal	65,000	48,000	5	10	31	40
Exhibition station	N/A[2]	N/A	4	11	N/A	24
Roma Street station	112,000	300,000[3]	6	15	39	110
Albert Street station	135,000	200,000	5	13	32	80
Woolloongabba station	470,000	580,000	11	23	142	150
Boggo Road station	119,000	175,000	6	24	46	95
Southern portal	39,000	45,000	3	9	12	30
Dutton Park station	N/A	N/A	N/A	Max 5	N/A	N/A
Fairfield to Salisbury stations	N/A	N/A	N/A	Max 5 per site	N/A	N/A
Clapham Yard	N/A	N/A	9	17	N/A	41

[1] Measured in Bank Cubic Metres
[2] Not applicable
[3] This includes spoil generated from the lowering of the INB

Precinct	Change in spoil volumes generated at worksites		Peak construction traffic movements (loads/hour) (one way)		Peak spoil haulage vehicle movements (loads/day) (one way)	
	Project[1]	Changed project	Project	Changed project	Project	Changed project
Total spoil generated	**0.976 million BCM**	**1.425 million BCM**				
Estimated trucks (loads)	**77,000**	**114,000**				

The changes to the project have the potential for additional impacts to the surrounding traffic and transport network, including public transport and pedestrian and cyclist movements. My evaluation of the changed project is provided below.

I note that the proponent's assessment presents an indicative worst-case scenario in terms of vehicle volumes and impacts to the associated intersection, with peak construction traffic volumes and peak period volumes applied in the modelling. For areas in which the Imposed Conditions prevent spoil haulage and equipment delivery during peak traffic periods, the assessment therefore provides a conservative estimate with actual impacts equivalent or improved from what is predicted during the AM and PM peaks.

The key traffic and transport issues raised in submissions are discussed in Section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitters issues as part of my evaluation below.

5.2.2 Impacts and mitigation

Fairfield to Salisbury stations

The traffic and transport impacts of the changed project between Fairfield and Salisbury include minor increases to peak construction vehicle movements and temporary changes to the layout and function of the stations at worksites during construction.

The proponent has advised that the peak construction vehicle movements at the Fairfield to Salisbury station worksites will be approximately four to five vehicles per hour, which is a minor increase from the three vehicles per hour evaluated in the 2012 CGER. The change application predicted that the construction vehicle movements associated with the station upgrades will not impact the road network, given the scale of the works proposed and the number of hourly vehicle movements.

As the construction works associated with the upgrade of the stations between Fairfield and Salisbury will be undertaken within the existing rail corridor, no significant and ongoing closures or diversions of local streets are expected. Commuter carparking availability will be affected at the majority of the worksites, however the proponent considers that the temporary loss of these carpark spaces will be re-accommodated within adjacent local streets or offset in the vicinity of work zones during construction works in these locations. At the completion of construction all commuter carparks affected will be returned, with additional carparks provided in some locations.

Where required, major construction activities such as crane lifts will be undertaken at night to minimise disruptions to the transport network. Consistent with the evaluated project, construction vehicle access to worksites, heavy vehicle haulage routes and traffic management measures (including management measures for risks to cyclists and pedestrians) will be managed through Construction Traffic Management Plans (CTMPs) consistent with the OEMP for the project. I require the proponent to update the OEMP based on the proposed changes to the project, including any additional mitigation measures for the new worksites.

I note that submissions raised concerns relating to safety, particularly late at night, at the upgraded stations. The proponent's response to submissions indicated that the design of the Fairfield to Salisbury station upgrades is consistent with the Crime Prevention Through Environmental Design (CPTED) Guidelines for Queensland. The stations will feature open station design with clear views to entry and exit points, well-lit internal and external pathways, stairs, entrances and exits and will include CCTV surveillance and emergency and Disability Assistance Phone systems.

Clapham Yard, Moorooka

Principal construction vehicle access routes to the Clapham Yard site will be consistent with the evaluated project evaluated in the 2012 CGER (Clapham Yard works were removed for the project evaluated in 2017), being from Ipswich Road, Fairfield Road and Chale Street.

Compared to the project evaluated in 2012, the changed project will result in an increase in hourly peak construction vehicle movements at Clapham Yard from nine to 17. The SIDRA assessment undertaken by the proponent predicts that the Fairfield Road/ Palomar Road/ Chale Street intersections will operate at acceptable levels of service with the additional construction traffic (Level of Service (LOS) D or better). The assessment predicts that the proposed Chale Street entrance will not affect access by heavy vehicles to the surrounding industrial land.

The proponent has indicated that the impacts of construction vehicle movements to the surrounding network will be subject to further consideration in the CTMP, which will include additional traffic modelling to inform mitigation measures required to address the potential impacts. In consultation with BCC, the proponent must further investigate the need for upgrades to the existing signalised intersection at Chale Street and Fairfield Road.

In its submission, DTMR requested that the design of Clapham Yard accommodates DTMR's Clapham Stapling Yard Master Plan which is currently under development. I expect that the proponent continues ongoing consultation with DTMR during the detailed design of the Clapham Yard stabling facilities, including in relation to ensuring access by heavy vehicles to the surrounding industrial land is facilitated.

Dutton Park station

The change application indicates that there will be a maximum of five construction vehicle movements per hour at Dutton Park station during construction. A temporary platform is proposed at Dutton Park station to enable the station to remain operational

throughout the construction period, which avoids the previously proposed requirement to close the station for up to two years during construction.

The changed project will also relocate the previously proposed covered pedestrian overpass at Dutton Park station so that it is setback from Annerley Road. This change application considers that the relocated overpass will result in reduced impacts to pedestrian and vehicular traffic associated with Annerley Road and Dutton Park State School.

I note that submitters raised concern with the use of Cope Street to access the Dutton Park station construction worksite, particularly in relation to impacts to property access, service vehicle access and impacts to the availability of street parking. In its response, the proponent advised that construction vehicle access to Dutton Park station will be provided from Annerley Road, with a detailed CTMP developed for each work zone to identify and address potential traffic impacts resulting from construction. The proponent is also required to develop CTMP's in consultation with stakeholders and emergency services.

Submissions also requested that the proponent consider widening footpaths in the vicinity of the Annerley Road bridge to improve pedestrian and cyclist safety. The Environmental Design Requirements for the project require that new footpaths, pedestrian walkways and pedestrian road crossings in the vicinity of stations are designed, in consultation with BCC and emergency services authorities, to allow safe and efficient pedestrian movement during peak periods.

I have also made a recommendation that in developing the CTMPs for construction worksites, the proponent must consider the appropriate spoil haulage and materials equipment delivery hours at worksites in the vicinity of schools, taking into consideration student drop-off and pick-up hours between 7-9 am and 2-4 pm on school days.

Southern portal

Peak construction vehicle movements at the Southern portal worksite will increase from a maximum of three vehicles per hour to nine. Two site access points on Kent Street are proposed; one for light vehicles and one for heavy vehicles. Consistent with the evaluated project, light vehicles will access the Southern portal worksite via the Kent Street/Cornwall intersection (the 'southern gate'). Also consistent with the evaluated project, heavy vehicles will access the site from the Boggo Road busway and exit from Kent Street next to the PA Hospital 'laundry building' in a circular, one-way loop (the 'northern gate'). The temporary heavy vehicle access and egress bridge previously proposed is no longer required.

The SIDRA analysis undertaken for the assessment indicates that the intersections that will be impacted will not operate within acceptable limits, both with and without construction vehicle traffic (LOS E & F). The traffic impacts surrounding the Southern portal worksite will be subject to further consideration in the CTMP which will be developed in consultation with relevant stakeholders. This will include additional traffic modelling to inform mitigation measures required to address the potential impacts.

The change application considers that the proposed approach to access and exit the Southern portal construction worksite will avoid closures to the local road, pedestrian

and cycle networks. Imposed Condition 14 requires that access for emergency services to project worksites and adjoining properties must be maintained throughout the construction phase.

The proponent has indicated that discussions with DTMR are ongoing regarding the proposal to use the existing eastern busway on-ramp in the vicinity of the PA Hospital to enter the Southern portal worksite. If use of the busway is approved by DTMR, additional civil roadworks are proposed including construction of heavy vehicle access to connect the busway (on the eastern side of the rail corridor) to the Southern portal worksite for removal of spoil. Short-term closures of the westbound busway lanes will be required to allow construction vehicle access to the Southern portal worksite during construction, although this will be undertaken during the night-time to minimise disruptions to the bus network. The proponent has indicated that it is working with the construction contractor, DTMR and Translink to establish an agreement and conditions associated with using the busway, including mitigation measures to avoid impacts to busway operations. This will also include conducting a road safety audit and condition survey.

In its submission, BCC advised that subject to structural and servicing considerations by DTMR, the use of the existing busway ramp will not impact BCC's transport networks. I am satisfied that the potential impact of construction vehicles on bus movements resulting from the use of the busway ramp will be addressed through the implementation of a site-specific CTMP. Imposed Condition 14 requires that the CTMP includes traffic management measures developed in consultation with DTMR and BCC.

Boggo Road station

Peak construction vehicle movements will increase at the Boggo Road station worksite from 6 trucks per hour to a maximum of 24 trucks per hour. This increase in impact is proposed to be managed through providing a second entrance to the Boggo Road station worksite via Boggo Road to disperse the concentration of construction traffic at the worksite. This will require the long-term partial closure of Joe Baker Street, instead of the previously proposed partial closure of Boggo Road. The change application predicts that the impact of this change will be mitigated through traffic control management to coordinate access to driveways on Joe Baker Street. The proponent has indicated that discussions with BCC have commenced regarding a new right hand turn from Annerley Road into Peter Doherty Street to facilitate the new additional site access route.

The SIDRA analysis undertaken for the assessment predicts that the changed project will result in traffic impacts that are within the capacity of the existing intersections surrounding the Boggo Road worksite, which will operate with LOS B or better. The assessment further considers that the proposed modification of the Annerley Road intersection with Peter Doherty Street will result in improved accessibility outcomes to Peter Doherty Street following the completion of construction. Imposed Condition 14 requires that:

- spoil haulage and material equipment deliveries activities are not undertaken during typical peak traffic periods in the Boggo Road area, therefore avoiding impacts during the busiest traffic periods
- the proponent must ensure practicable access is maintained to adjacent properties throughout the construction phase

- the CTMP must include local traffic management measures developed in consultation with BCC for key intersections including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road.

In its submission, BCC requested the CTMP for the Boggo Road station worksite consider construction impacts on the new Inner South Secondary College. The proponent responded that the CTMP will consider potential construction traffic and transport impacts for the intersection of Annerley Road and Peter Doherty Street which is adjacent to the proposed location of the school. I have also made a recommendation that the proponent must consider the appropriate spoil haulage and materials equipment delivery hours at worksites in the vicinity of schools, taking into consideration student drop-off and pick-up hours between 7-9 am and 2-4 pm on school days.

New pedestrian and cyclist overpass

The changed project includes the construction of a new stair free pedestrian and cyclist overpass (instead of the previously proposed subterranean walkway) from the new Boggo Road station connecting to the PA Hospital. The proponent considers that the new overpass will improve both pedestrian and cyclist connectivity between the two precincts, and presents a safer and more efficient link from the new Boggo Road station to the PA Hospital, Boggo Road Urban Village, the Ecosciences Precinct and surrounding Universities. The overpass would also enhance connectivity to the western suburbs and link sections of the South-East Cycleway, Eastern Cycleway and the future upgrade of the Brisbane Veloway on Annerley Road. The previously proposed new pedestrian bridge across Park Road station is also no longer included as a result of the changes.

Submissions raised concern with the design and location of the new pedestrian and cyclist overpass at Boggo Road station, particularly in relation to the distance between the new Boggo Road station and the PA Hospital. It its response to submissions, the proponent advised that the overpass design presented as part of the change application is a preliminary concept that will continually be refined in consultation with BCC, Ecosciences, DTMR, the PA Hospital and other relevant stakeholders. I have therefore recommended that the proponent refine the design and location of the proposed Boggo Road pedestrian connection in consultation with these stakeholders to ensure connectivity between precincts is maximised.

Woolloongabba station

Peak haulage vehicle movements at the Woolloongabba station worksite will increase from 11 per hour to 23 per hour. Consistent with the evaluated project, there may be minor disruptions to adjacent roads and the South-East busway at Woolloongabba during construction, however any disruptions required will be undertaken during the night or during off-peak periods to minimise impacts.

The SIDRA analysis undertaken for the assessment indicates that the intersections that will be impacted by the changed project generally do not operate within acceptable limits (LOS D or lower), with the exception of the Leopard Street/ Stanley Street intersection, both with and without the additional construction vehicle traffic. The Main Street/ Vulture Street intersection AM volumes will change from LOS D (acceptable) to LOS E

(unacceptable) as a result of the changed project. The Main Street/Vulture Street AM and Main Street/ Stanley Street PM volumes will change from LOS D to LOS E. The impacts will be subject to further consideration in the CTMP for the site, which will include additional traffic modelling to inform mitigation measures required to address the potential impacts.

Imposed Condition 10 does not permit spoil haulage and material/equipment deliveries to be undertaken during peak traffic hours at the Woolloongabba worksite, which will prevent construction traffic impacts at the scale predicted during the busiest traffic periods. Imposed Condition 14 also requires that the CTMP must include local traffic management measures developed in consultation with BCC for key intersections including Leopard Street, Stanley Street, Vulture Street and Main Street.

I note that the change application has identified that the greatest reduction in construction workforce carparking will be at the Woolloongabba worksite, reducing workforce carparking availability from 300 carparks to 90. Consistent with the evaluated project and with Imposed Condition 14, construction workforce parking on local streets will be avoided, with parking to be made available within the construction worksites where practicable. The change application indicates that carpooling and on-demand buses will be utilised to reduce the use of private vehicles by the construction workforce, and use of public transport will be encouraged, an approach consistent with the Imposed Conditions for the project.

New pedestrian connections

An additional pedestrian connection will be provided throughout construction connecting Stanley Street to the northern side of the existing busway pedestrian access overbridge (the Stanley Street plaza bridge). The assessment considers that the Stanley Street plaza bridge over the busway will assist to minimise impacts to the busway during construction. Lane closures of Stanley Street may be required to facilitate the construction of the pedestrian bridge, and pedestrian movements will be diverted around the worksite. Minor roadworks will also be required on the Vulture Street off-ramp to improve access to the site.

The assessment has considered the potential increase in pedestrian volumes at Woolloongabba that will result from the new station, finding that there will not be significant impacts to the footpath and pedestrian network. The proponent considers that the provision of additional pedestrian connections and the additional distance provided between the new station and Woolloongabba stadium will assist to disperse pedestrians as they enter and exit the new station precinct.

In its submission Queensland Health raised concerns with the connectivity for pedestrians and workforce to the Queensland Children's Hospital. I expect that the proponent continues to consult with Queensland Health during detailed design to enhance connectivity from Woolloongabba station to surrounding precincts.

Albert Street station

Peak construction vehicle movements at the Albert Street station worksite will increase from five per hour to 13 per hour. SIDRA analysis undertaken for the assessment

estimates that all 10 inner city intersections assessed in the vicinity of the Albert Street station worksite will continue to operate within acceptable limits (LOS D or better).

The proposed changes also include increasing the number of access points to the Albert Street worksites from two to four. Gates will provide access points to and from Mary Street and Albert Street; the main construction site access will be provided from two points on the Mary Street frontage with access from Albert and Mary Streets. The third and fourth gates will be located on the north and southern side of Charlotte Street (at the Albert Street intersection) to provide access to the main and second site. A fifth access/egress gate will be provided at the new northern construction site (142 Albert Street) from Elizabeth Street. The changed project also includes connections for construction vehicles to access the CBD from the Riverside expressway via Elizabeth Street (for the northern worksite) or Margaret Street (for the main Albert Street worksite) via Albert Street. Construction traffic will exit via Albert and Mary Streets.

A key change for traffic management surrounding the Albert Street worksite relates to the proposal to close the section of Albert Street between Charlotte Street and Elizabeth Street for the duration of construction, except to allow vehicles to access the carpark of the Royal Albert Hotel. This will be a reduction in the proposed closure of a section of Albert Street, where it was previously proposed to close the section of Albert Street between Mary Street and Elizabeth Street during construction. The CTMP will manage the potential impacts to local businesses located on the section of Albert Street to be partially closed during construction. Additional roadworks will be required in Mary Street and Charlotte Street to facilitate changes to traffic signalling and improve pedestrian flow during construction.

The change application considers that the changed project will result in reduced impacts to the intersection of Albert and Charlotte Street. In addition, the Myer Centre park ramp will now be retained, rather than removed as previously proposed.

Submissions raised pedestrian safety as a concern in relation to the proposed construction pedestrian route in Albert Street. Concerns were also raised in submissions for the potential to transform Albert Street into an undesirable route for pedestrians during construction activities, reducing its use as a thoroughfare between the upper and lower parts of the city. The proponent response indicated that the OEMP requires the development of a CEMP that addresses safe pedestrian movements through worksites. In addition, Imposed Condition 14 requires that project works must be designed, planned and implemented to maintain acceptable footpath and cycle paths in areas adjacent to project worksites.

Change to haulage routes

The change application identified that Elizabeth Street is currently mapped as restricted for haulage vehicles; however, consultation with BCC has indicated that construction vehicles may be able to access the new northern Albert Street worksite via Elizabeth Street. The use of Elizabeth Street for haulage will be confirmed through the development of the CTMP. Imposed Condition 14 requires that designated haulage routes for each worksite must be developed in consultation with DTMR and BCC.

SIDRA analysis undertaken for the assessment estimates that key intersections to be impacted by this change will experience impacts within the capacity of the existing

intersections. Consistent with the evaluated project, haulage will be managed as part of the CTMP and will be informed by a road safety assessment. Imposed Condition 14 requires that the CTMP must include local traffic management measures developed in consultation with BCC for key intersections including Albert Street and Charlotte Street.

A road safety assessment will be completed for spoil haulage routes prior to the commencement of construction and a CTMP will be prepared for each construction site that, in accordance with the OEMP that I require the proponent to update based on the proposed changes to the project. Temporary delays to the network caused by construction site access points will be managed through implementing traffic management control in accordance with current best practise, including use of GPS tracking for major deliveries to minimise conflicts and prevent queuing on public roads.

Closure of Albert Street between Mary Street and Charlotte Street

The changed project includes changes to the previously proposed section of Albert Street to be closed for pedestrian use and local access only once construction is completed. The pedestrian use only zone will change from the section of Albert Street between Mary Street and Elizabeth Street (for the evaluated project) to closure between Mary Street and Charlotte Street. The closure of part of Albert Street for pedestrian use remains consistent with BCC's 'Albert Street Vision'.

Due to the permanent closure of Albert Street between Mary and Charlotte Street, the layout of the existing Albert Street/ Charlotte Street intersection will be changed. Drivers will be required to turn right onto Albert Street (and not continue straight southbound along Albert Street as is the current case) when exiting the Myer Centre carpark ramp.

A revised SIDRA analysis has been undertaken for the proponent's assessment which determined that the changes will result in impacts which are generally consistent with the evaluated project, with no exceedances of the existing capacity of the intersections during both AM and PM peak periods (all intersections performing at LOS D or better). However, some geometric modifications may be required to cater for projected traffic demands in the area in the year 2036. The assessment noted that compared to the previous assessment (where greater diversion was required along Albert Street), some intersections will have comparatively improved performance as a result of the changes to the project. The proponent has committed to ensure that changes will be implemented in consultation with BCC and DTMR during detailed design.

The assessment noted that the modelling undertaken has considered the increase of passenger volumes added by the proposed Brisbane Metro Project and is therefore is an indicative assessment for other development in the CBD such as the 'Albert Street Vision', Queens Wharf and the final Brisbane Metro design, as these developments are expected to significantly influence the results of the assessment. The Cross River Rail TIG and Traffic Management Liaison Group will continue to liaise with BCC and DTMR to incorporate any recommendations resulting from cumulative traffic impact analysis.

Once operational, the new Albert Street station will also result in increased passenger movements in the vicinity of the station and along adjacent streets including Charlotte Street and Mary Street. The proposal to permanently close a section of Albert Street between Charlotte Street and Mary Street for pedestrian use only will also assist the safe dispersal of pedestrians from the new station into the CBD. The station will also act to

redistribute peak passenger volumes from nearby key interchanges including the existing surface Roma Street station and Central station, which is likely to result in greater dispersal of peak passenger volumes across the CBD public transport network.

Roma Street station

Construction impacts – additional construction traffic and long-distance coach terminal vehicles and the Inner Northern Busway diversion

The change application indicates that the lowering of the Roma Street section of the INB will require the diversion of buses onto Roma Street for approximately three years during the construction period. The change application estimates that approximately 2,000 buses use the INB at Roma Street each day.

Peak construction vehicle movements at Roma Street will increase from six per hour to 15 per hour. This increase includes the additional truck movements required to remove spoil associated with the relocation of the Roma Street section of the INB.

I note that multiple submitters, including BCC, raised concerns regarding planning for the permanent location of the long-distance coach terminal and Brisbane Metro as part of the proposed changes to the project at Roma Street. The proponent responded that it is working with BCC to accommodate metro bus platform requirements as part of the relocation of the Roma Street section of the INB.

Submissions also raised concerns regarding the potential traffic and transport impacts during construction in the vicinity of the Roma Street worksite. Maintaining access to the residential properties on Parkland Boulevard was raised as a particular concern, as was the proposal to divert buses from the INB onto Roma Street in terms of cumulative impacts to vehicular traffic, cyclists and pedestrians.

The proponent has provided additional assessment of the potential traffic and transport impacts at Roma Street. The proponent assessed the combined impact on general traffic of the INB diversion onto Roma Street with construction haulage traffic and coach movements from the relocated long-distance coach terminal. The assessment considered a number of bus diversion layouts, however has focussed on an option that includes the operation of a number of new on-street bus stops, bus priority at intersections and the addition of a bus lane along Roma Street in each direction between George Street and a new signalised access of the INB at Countess Street.

The LOS assessment was conducted on an 'approach by approach' basis as well as the average for the whole intersection. For each approach, the average delay across the peak hour was calculated over five simulations, with an average taken from the five model simulation runs. This average delay was then compared to AUSTROADS criteria for delays at signalised intersections to determine LOS. This assessment included haulage traffic and long-distance coach movements, which were added to the BCC traffic model.

The assessment considered peak heavy vehicle movements at Roma Street (15 trucks entering and 15 trucks existing during the peak hour) as well as peak coach movements (15 coaches entering and 15 coaches existing per hour). Imposed Condition 10 restricts heavy vehicle movements at Roma Street during peak hours (7:30 am to 9:00 am, 4:30

pm to 6:30 pm), and peak coach movements are known to occur outside of peak traffic hours at Roma Street, the assessment presents an indicative worst-case scenario.

Table 5.4 presents the summary of worst-case intersection performance impacts at each intersection along Roma Street that will be impacted by the INB diversion.

Table 5.4 Construction intersection performance summary – Roma Street

Site	Peak	Without construction or bus diversion	With construction and bus diversion
Parkland Boulevard	AM	LOS B	LOS B
	PM	LOS B	LOS B
Herschel Street	AM	LOS B	LOS C
	PM	LOS B	LOS C
Makerston Street	AM	LOS B	LOS C
	PM	LOS A	LOS B
Countess Street	AM	LOS D	LOS D
	PM	LOS C	LOS D

The assessment predicts that all intersections will remain at LOS D or better during the AM and PM peak hours:

- the intersection of Parkland Boulevard and Roma Street will remain at LOS B in both AM and PM peak periods
- the intersection of Herschel Street and Roma Street worsens slightly from LOS B to LOS C
- the intersection of Makerston Street and Roma Street (left in and left out only) worsens slightly from LOS B to LOS C in the morning peak hour and from LOS A to LOS B in the evening peak hour
- the intersection of Countess Street and Roma Street remains at LOS D in the morning peak hour and increases from LOS C to LOS D in the PM peak hour.

Considering the CBD location of these intersections the performance of each of these intersections in the peak periods is considered acceptable (LOS D or better) by the proponent.

Table 5.5 presents the detailed performance of each intersection during the morning peak hour, including LOS for each approach at each intersection.

Table 5.5 Detailed AM peak construction intersection performance summary – Roma Street

Site	Peak	With construction and bus diversion					Without construction or bus diversion	
		Light vehicles	Heavy vehicles	Bus and coach vehicles	Average delay (secs)	LOS	Average delay (secs)	LOS
Roma Street and Parkland Boulevard	Parkland Boulevard (N)	225	17	15	52.2	D	51.7	D
	Roma Street (E)	343	13	61	23.1	C	12.9	B
	Roma Street (W)	847	48	142	6.3	A	5.0	A
	Intersection total	**1415**	**78**	**218**	**17.3**	**B**	**14.3**	**B**
Roma Street and Herschel Street	Hotel Jen (N)	0	0	0	0.0	A	2.1	A
	Roma Street (E)	318	12	61	38.0	D	36.0	D
	Herschel Street (S)	124	6	0	55.0	D	25.7	C
	Roma Street (W)	729	42	143	15.1	B	3.9	A
	Intersection total	**1171**	**60**	**204**	**25.0**	**C**	**13.6**	**B**
Roma Street and Makerston Street	Roma Street (E)	875	36	72	33.7	C	9.9	A
	Makerston Street (S)	42	2	0	78.7	E	39.3	D
	Roma Street (W)	735	43	144	17.2	B	11.2	B
	Intersection total	**1652**	**81**	**216**	**26.9**	**C**	**11.3**	**B**
Roma Street and Countess Street	Countess Street (N)	3780	170	28	36.1	D	29.5	C
	Roma Street (E)	368	16	22	97.9	F	48.1	D
	Upper Roma Street (W)	410	17	48	88.9	F	79.2	E
	Intersection total	**4558**	**203**	**98**	**46.5**	**D**	**36.2**	**D**

The proponent has predicted that with the additional construction vehicles, buses diverted from the INB and long- distance coach vehicles, all approaches are estimated to operate at LOS D or better, with the exception of:

- the southern approach from Makerston Street to Roma Street (left-only turn). This movement is estimated to operate at LOS E due to the impact of the bus lane (and stops) restricting the capacity of the left turn out of Makerston Street, although is

noted that this is for a very small number of vehicles (412 across the morning peak hour)

- the eastern and western approaches along Roma Street at Countess Street operating at LOS F due to the priority provided to the high demand approach from Countess Street at this intersection. This intersection also has the highest average delay (and LOS) without the addition of construction vehicles, INB buses and coach vehicles, with the approach from the west operating at LOS E. Overall this intersection is estimated to operate at LOD D with and without construction and the bus diversion in place.

Management of impacts

Consistent with Imposed Condition 10, haulage activities are not permitted during peak periods at Roma Street, which will minimise the traffic impact of the additional construction vehicles during peak hours.

The proponent has indicated that some changes may be required to signalised intersections in the vicinity of the Roma Street worksite, including pedestrian crossing points, during the diversion of the INB onto Roma Street. The impacts of this change on the traffic network are currently subject to a detailed study being undertaken by BCC including consideration of mitigation options, such as diversions and changes to land configurations and signalling. The outcomes of the study, including mitigation measures, will be captured in the Roma Street CTMP which will be prepared in consultation with BCC.

In its response to submissions the proponent also advised that additional Roma Street traffic modelling, including SIDRA or other suitable modelling, will occur to inform the Roma Street CTMP. Further consideration will be given to manage intersections during construction in the development of the CTMP as an option to minimise impacts to service levels at the Roma Street/ Parkland Boulevard intersection and the Parkland Boulevard residents' interaction with construction and coach movements. The CTMP is required to be endorsed by the Independent Environmental Monitor 20 business days prior to relevant project works commencing in Roma Street area. The proponent has advised that the design will ensure there is no less favourable conditions for vehicles, cyclists and pedestrians wherever practicable. The design will also consider access and gateway requirements to Roma Street Parkland.

The proponent has also advised that it is part of a cumulative stakeholder working group, the Traffic Management Liaison Group (TMLG) which includes BCC, Translink, and DTMR. The TMLG is ongoing and will inform ongoing and will inform CTMPs developed throughout different stages of inner city projects, ensuring that concerns and impacts from multiple projects are considered together to best manage traffic impacts.

I therefore recommend, in developing the CTMPs for the project, that the proponent:

- continues to participate in the Traffic Management Liaison Group with BCC, Translink and DTMR
- undertakes detailed analysis and modelling of the proposed temporary closure and diversion of the INB at Roma Street

- provides the outcomes of that analysis to BCC and Translink to inform further public transport timetable management to accommodate the temporary diversion
- considers the concurrent construction of other projects in the central business district in determining the appropriate spoil haulage hours in the CBD through the CTMP.

Imposed Condition 14 requires that practicable access is maintained to adjacent properties throughout the construction phase. Project construction traffic at Roma Street (and for the wider project) must also be managed to avoid or minimise adverse impacts on road safety and traffic flow, public transport, freight rail movements, pedestrian any cyclist safety and property access.

Herschel Street/ Roma Street intersection modification

The SIDRA analysis undertaken for the assessment found that the modification of the intersection will maintain the general capacity of the surrounding vehicle network at an acceptable level of service. For pedestrians, the assessment predicted that the proposed changes for the Roma Street/ Herschel Street intersection will operate within capacity for the AM peak period based on traffic growth rates and pedestrian volumes provided. The assessment noted that there will be a need to coordinate signal timings with nearby intersections, which may act to potentially reduce performance.

Submissions raised concerns relating to the proposed alignment of Parkland Boulevard. The proponent responded that as part of the detailed design and construction planning, additional traffic modelling and further refinement will be undertaken for the Parkland Boulevard / Roma Street intersection. Measures required for intersection safety and capacity will be developed based on the outcome of modelling and detailed planning, and captured in a CTMP developed in consultation with DTMR, TransLink and QR.

Northern exit onto College Road

Submissions requested consideration of potential modifications to the intersection between Parkland Boulevard, College Road, Gregory Terrace and Wickham Terrace as an alternative way to access and exit Parkland Boulevard during the construction period.

In its response to submissions, the proponent advised that any resulting changes to the intersection will be analysed through a road safety audit and measures implemented through CTMPs, which must be endorsed by the Independent Environmental Monitor 20 business days prior to relevant project works commencing in Roma Street area. This additional area, as it is currently outside of the project footprint, will need to be assessed in consultation with BCC. This will occur as part of the work undertaken by the TMLG if deemed necessary.

I have also recommended that the proponent investigate the feasibility of upgrading access to the Roma Street Parklands Boulevard Apartments to the external road network, with particular emphasis given to considering whether amendments to the College Road/Wickham Terrace/Gregory Terrace/Parkland Boulevard intersection could accommodate an alternative egress point for Roma Street Parklands residents.

Pedestrian, cyclist and rail network impacts

Consistent with the evaluated project, impacts to existing pedestrian footpaths and cycle lanes will occur within the vicinity of all construction worksites, including at Roma Street.

Pedestrians and cyclists will be required to follow detours around worksites and experience temporary delays in the vicinity of construction access and exit points to ensure the safety of pedestrians and cyclists during heavy vehicle movements.

The proponent has committed to maintaining safe and functional access for pedestrians (including the elderly, children and people with mobility difficulties) and cyclists will near all project works, and access will consider relevant CPTED principles. The CTMP will detail specific mitigation measures to address any potential pedestrian and cyclist impacts, including signage, line-marking, installation of pedestrian gantries and use of traffic controllers. Non-signalised site access points will be manned to control pedestrian and construction vehicle movements.

Pedestrian access through Emma Miller Place will be impacted by the changes to the project, as Emma Miller Place will become a temporary construction worksite to accommodate the cut and cover works required for the relocation of the INB. The temporary and incremental impact to pedestrian access through Emma Miller Place will be managed through the CTMP. Works to improve footpaths and pedestrian mobility will also be required in Herschel Street, Makerston Street and Roma Street during construction. Imposed Condition 14 requires that project works maintain acceptable footpath and cycle paths in areas adjacent to project works.

Imposed Condition 9 requires that, as part of the CEMP a CSEP is developed and provides for local communities near project works to be informed about the nature of construction, including the timing, duration and predicted impacts of the works in advance of their commencement. The CSEP must also provide for information to be provided to public transport, road users, pedestrians and cyclists about the predicted effects of project works on road, rail and pedestrian and cycle network operations, in advance of their commencement. Additionally, the CSEP must incorporate a complaints management system which is available 24 hours per day, seven days per week during project works, that must deliver a prompt response to community concerns.

Disruptions to the rail network resulting from construction works at Roma Street will be limited and will be planned to occur during off-peak periods. Replacement services (rail buses and replacement bus services) will be implemented to mitigate the impact.

Submissions raised concerns with the proposal to haul spoil through the Parkland Boulevard intersection during construction, particularly in relation to pedestrian and cyclist safety. The proponent responded that Spoil haulage will be conducted as per the Imposed Conditions for the project. The construction contractor will undertake a full Road Safety Assessment and spoil Haulage Route analysis to inform the CTMP prior to construction works commencing. This plan must be endorsed by the Independent Environmental Monitor. In addition, Imposed Condition 14 requires that project works must be designed, planned and implemented to maintain acceptable footpath and cycle paths in areas adjacent to project worksites in terms of capacity, legibility and pavement condition.

Additional worksite access

The changes to the project also include an additional worksite access to the BTC/ Hotel Jen site via a gate from Roma Street with egress via Parkland Boulevard. These new gates are within evaluated routes and traffic controllers will ensure safety to footpath and

road users throughout construction without creating significant impacts to traffic. Additional access gates will also be required to access the construction worksite at the eastern end of the BTC site; these accesses will further mitigate potential traffic impacts and will be considered in the CTMP in consultation with BCC and DTMR. Imposed Condition 14 requires that the CTMP includes local traffic management measures developed in consultation with BCC for key intersections including at Roma Street.

Northern portal

The changed project will increase the peak construction vehicle movements at the Northern portal worksite from five vehicles per hour to 10 per hour. Consistent with the evaluated project, primary access to the construction worksite will be from Gregory Terrace. The changed project will include an additional access via the western side of Bowen Bridge Road (via Energex).

The assessment predicts that the additional access point will alleviate previously predicted impacts to public bus services and the Inner City Bypass ramp access from Bowen Bridge Road, as the additional access will disperse the concentration of construction traffic at the worksite. Any impacts to the road network resulting from the additional access are expected to be managed through the implementation of traffic management control as part of the CTMP, which will be developed in consultation with relevant stakeholders including BCC and DTMR.

Exhibition station

The project change application indicates that the peak hourly construction vehicle movements will increase from four per hour to 11 per hour at the Exhibition station worksite. Multiple accesses are proposed for the Exhibition station construction worksite, and these will change through the different phases of construction, with primary access consistent with the evaluated project via O'Connell Terrace through multiple gates at the showgrounds.

Compared to the evaluated project, additional accesses will be required through Gregory Terrace and via the western side of Bowen Bridge Road. The new access point via the western side of Bowen Bridge Road (via the Energex facility) is proposed as a secondary access point. The new access point replaces the proposed access point from Bowen Bridge Road via the Inner City Bypass ramp, mitigating potential impacts to public bus services previously identified.

The changed project also includes additional internal haul roads within the Exhibition Showgrounds to access the worksite. Consistent with the evaluated project, any impacts during construction to the RNA Showgrounds and side show alley will be managed through consultation with RNA and TransLink to avoid impacting the Ekka and other major events.

The SIDRA analysis for the assessment found that the Gregory Terrace/ Bowen Bridge Road/ Brunswick Street intersections do not operate within acceptable limits, with or without construction traffic (LOS F). The impact to the road network from the new Gregory Terrace access is expected to be minimal and manageable with traffic control. Imposed Condition 14 requires that the CTMP includes local traffic management

measures developed in consultation with BCC for key intersections in Bowen Hills including Bowen Bridge Road, College Road and O'Connell Terrace.

The previously proposed entrance to the Northern portal worksite adjacent to Victoria Park is now considered a potential additional access for the Exhibition station worksite. Signalisation of the intersection at O'Connell Terrace at the Victoria Park entrance is expected to manage the impacts associated with these additional site access points, with the assessment predicting that traffic will operate at an acceptable level of service as a result of the proposed changes. An alternative route to the worksite through Victoria Park (though consistent with the previous proposed entry point via Gregory Terrace) is now proposed, which requires the demolition of the existing Queensland Health BTS building.

Queensland Health and BCC raised concerns in submissions with the provision of connectivity between the upgraded Exhibition station and the Herston health precinct; particularly the proposed design of the Bowen Bridge Road footbridge which will connect the station to Bowen Bridge Road near Herston Road. The proponent has committed to consulting with BCC during the detailed design phase with regards to enhancing connectivity between the station and the Herston Health precinct.

Queensland Health also raised concerns relating to the availability of parking for staff of the Herston Health Precinct and the public during construction, given the proximity to the Northern portal and Exhibition station worksites. I am satisfied that Imposed Condition 14, which requires that construction workforce carparking must be provided and managed to avoid parking on local streets, will address this matter.

Mayne Yard

Peak hourly construction vehicle movements will increase from eight trucks per hour to 11 trucks per hour at Mayne Yard. As the majority of construction vehicle movements will be occurring internally within the Mayne Yard construction worksite which is located within the existing rail corridor, the assessment considers that this will not result in a significant impact to the road network.

The proposed access points to the Mayne Yard construction worksite are consistent with the evaluated project (via Lanham Street, Mayne Road and Abbotsford Road), with the addition of an access point to the north of Breakfast Creek via McDonald Road which was previously considered optional. This change application considers that this additional access point will significantly reduce the number of construction vehicles passing through Mayne Yard.

Submissions raised concerns relating to the potential impacts of heavy vehicles over the (not yet constructed) North Brisbane Bikeway. The proponent responded that any potential conflicts between project construction traffic and bikeways, including the North Brisbane Bikeway project at Mayne Yard, will be managed through the CTMP. Additionally, Imposed Condition 14 requires that the proponent ensures that project works maintain acceptable footpath and cycle paths in areas adjacent to project worksites, and that the proponent must consult with BCC and QR about changes in pedestrian and cycle paths required to facilitate project works.

In terms of potential impacts across the operational rail network, including within Mayne Yard, the proponent advised that it has established the freight users working group to inform the final design and delivery of the project. The proponent and QR will work with freight operators to ensure the potential impacts from the project on operations are managed.

Cumulative traffic and transport impacts

The changed project may contribute to cumulative traffic and transport impacts due to the potential for overlapping construction timeframes for a number of major infrastructure projects planned in Brisbane. The projects include Brisbane Live, Brisbane Metro and the Queens Wharf development.

The change application has indicated that the potential cumulative impacts of the major infrastructure projects are being considered through the Cross River Rail Transport Integration Group (TIG), the Traffic Management Liaison Group and the Brisbane City Centre Coordination Steering Group. The Cross River Rail TIG comprises senior officers from Cross River Rail, DTMR, QR and BCC representatives with the aim of assessing transport and traffic impacts to the public, with cumulative considerations from Brisbane Metro. The Cross River Rail TIG will focus on:

- Cross River Rail public transport used impacts specific to the Roma Street, Woolloongabba, Boggo Road, Dutton Park and Exhibition precincts
- road user, cyclist and pedestrian impacts
- Cross River Rail and Brisbane Metro construction impact management and coordination for transport and traffic matters
- operational readiness coordination
- schedule coordination for transport and traffic matters.

The Brisbane City Centre Coordination Steering Group being led by BCC aims to ensure that open and strategic collaboration is maximised across agencies, with oversight of significant projects within areas of major growth and investment including Cross River Rail and Brisbane Metro.

The existing project wide conditions also require that specific traffic management measures are developed with key stakeholders regarding traffic management in the Queens Wharf Brisbane PDA.

5.2.3 Coordinator-General's conclusion: traffic and transport

I am satisfied that the proponent has assessed the potential traffic and transport impacts of the changed project. I note that the proponent's assessment of potential impacts from the additional construction haulage vehicle movements has been undertaken for the AM and PM peak periods. In some locations spoil haulage in peak traffic hours is not permitted by the conditions that I have imposed on the project. Accordingly, the actual traffic impacts will be reduced from what has been predicted at those worksites where haulage during peak traffic hours is prohibited.

Where the proponent has identified that the changed project will contribute to existing unacceptable local traffic and transport conditions, I am satisfied that the implementation

of CTMPs consistent with the OEMP (which I require the proponent to update based on the changes to the project) will address the impacts identified. However, I have made a number of recommendations which require the proponent to further refine and mitigate potential impacts (Appendix 2).

I note that multiple submitters raised concerns with the potential construction impacts at Roma Street, particularly in relation to Parkland Boulevard. The proponent has indicated that construction impacts arising from the combined effect of additional construction haulage vehicles, INB buses and long-distance coach terminal vehicles on general traffic, cyclists and pedestrians on Roma Street are subject to further consideration in the CTMP. This CTMP will include additional modelling and mitigation measures developed in consultation with key stakeholders including BCC and DTMR including TransLink.

Imposed Condition 7 also requires that the proponent must engage an independent entity as the Environmental Monitor for the duration of construction. The Environmental Monitor must monitor compliance with the Imposed Conditions, CEMP and sub-plans during the construction of the project. The Environmental Monitor must also endorse the CEMP and consistent with the OEMP and complying with the Imposed Conditions.

The proponent has also advised that it is considering the cumulative impacts of major infrastructure projects in Brisbane through the Cross River Rail TIG, the Traffic Management Liaison Group and the Brisbane City Centre Coordination Steering Group.

I am satisfied that the existing project wide Imposed Conditions remain appropriate to manage the impacts of the changed project. I have amended the Imposed Conditions (Appendix 1) to include the proposed Fairfield to Salisbury works, Dutton Park station works and the additional works at Clapham Yard, Moorooka.

5.3 Noise and vibration

5.3.1 Introduction

The proposed changes to the project that will influence the noise and vibration impacts and the associated sensitive receptors previously evaluated for the project include:

- changes to the tunnel alignment and construction methodology, design and location of the underground stations
- the construction of a new rail bridges at Breakfast Creek and Moolabin Creek
- new and upgraded stabling operations at Mayne Yard
- relocation and integration of the Roma Street section of the INB with the proposed underground Roma Street station
- new pedestrian bridge at Woolloongabba station and a pedestrian and cycle bridge at Boggo Road station
- modifications to the Eastern busway in the vicinity of the Southern portal to allow for the temporary use to haul spoil outside of bus service hours
- changes to the trough structure of the Southern portal shifting the location of the project up rail line to the east

- upgrade works to the existing Dutton Park station, including a new platform and pedestrian bridge
- upgrade works for existing surface stations from Fairfield to Salisbury stations
- inclusion of the Clapham Yard stabling facility and associated track works.

As a result of the proposed changes to the project, the proponent has identified the need to amend the Coordinator-General's Imposed Conditions on the project to include the additional construction worksites and to ensure the environmental design requirements for noise and vibration are consistent with the existing rail network requirements. These amendments have been considered as part of the evaluation of the proposed changes to the project and are presented Appendix 1.

The project change application states that the staged nature of the construction program means that impacts at each site would be limited to a short period of the whole of project works.

As the potential noise and vibration impacts from the proposed works at Exhibition station would be substantially similar to the evaluated project, no further discussion is provided as part of this assessment.

Mitigation measures for impacts are discussed in 5.3.2, noting that further refinement is required as detailed design progresses to select the most appropriate option based on site specific conditions.

Construction traffic noise

As the proposed spoil volume for the changed project is now consistent with the volume identified in the 2011 EIS (1.4 million cubic metres) it is expected the construction traffic noise impacts will not substantially change from the project evaluated in 2012. Truck movements for the 2011 EIS project were predicted to comply with the Project's noise and vibration goals at all worksites.

Operational impacts

The project change application predicts that operational noise generated by the changed project will not result in exceedances of the project's operational environmental design requirements across the majority of the project alignment, with the exception of areas identified in the relevant sections below. In some cases, the tunnel alignment and location of stations has moved further from sensitive receptors, thereby reducing potential operational noise impacts. Additionally, the project change application has indicated that mechanical ventilation noise would be managed through the detailed design phase to achieve compliance with the environmental noise goals.

Changes to the horizontal and vertical alignment of the tunnel would also reduce the potential operational ground-borne noise and vibration impacts for sensitive receptors including the Supreme and Magistrates Courts and residential receptors between Woolloongabba and Boggo Road stations and at Kangaroo Point. The proponent has indicated that potential operational ground-borne noise and vibration impacts will be controlled (to achieve no exceedances of the project's operational ground-borne noise and vibration goals) via use of a selection of high attenuation (HA) and very high attenuation (VHA) trackform in specific locations. Refer to the Rail Alignment Long

Section drawings – Sheet 1 to Sheet 14 for locations to show the proposed locations of the HA and VHA trackform to be used along the alignment.

5.3.2 Site specific impacts and mitigation

Fairfield to Salisbury stations

Noise will be generated during construction at the Fairfield to Salisbury stations from works associated with construction of the new platforms and station buildings and piling and installation of new pedestrian overpasses. Table 5.6 and Table 5.7 summarise the predicted impacts at each station for platform construction and piling works respectively. As Yeerongpilly station already has an existing station overpass no works are proposed for Yeerongpilly station.

Table 5.6 Platform and new station building construction works noise impacts

Location	Sensitive Receptor	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Fairfield station	Midmay Street residential	57 (day) 49 (night)	58-73	16 (day) 24(night)
	Equity Street residential		59-70	13 (day) 21 (night)
Yeronga station	Cowper Street/Shottery Street residential	57 (day) 49 (night)	55-65	8 (day) 16 (night)
	Lake Street residential		59-69	12 (day) 20 (night)
Yeerongpilly station	Wilkie Street residential	57 (day) 49 (night)	55-75	18 (day) 26 (night)
	Yeerongpilly Green residential		46-59	2 (day) 10 (night)
	BCC South Regional Business Centre	75	56-63	-
Moorooka station	Blackburn Street residential	57 (day) 49 (night)	40-52	- (day) 3 (night)
	Chaucer Street residential		45-52	- (day) 3 (night)
Rocklea station	Brooke Street residential	57 (day) 49 (night)	57-69	12 (day) 20 (night)
	John Bright Street residential		45-57	- (day) 8 (night)
Salisbury station	Fairlie Terrace residential	57 (day) 49 (night)	50-65	8 (day) 16 (night)
	Olivia Avenue residential		52-72	15 (day) 23 (night)

Table 5.7 Piling and installation of new pedestrian overpass works noise impacts

Location	Sensitive Receptor	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Fairfield station	Midmay Street residential	57 (day) 49 (night)	73-80	23 (day) 31 (night)
	Equity Street residential		74-82	25 (day) 33 (night)
Yeronga station	Cowper Street/Shottery Street residential	57 (day) 49 (night)	70-73	16 (day) 24 (night)
	Lake Street residential		74-81	24 (day) 32 (night)
Moorooka station	Blackburn Street residential & Chaucer Street residential	57 (day) 49 (night)	Up to 63 dB(A)	6 (day) 14 (night)
Rocklea station	Brooke Street residential & John Bright Street residential	57 (day) 49 (night)	Up to 73	16 (day) 24 (night)
Salisbury station	Fairlie Terrace residential	57 (day) 49 (night)	68-69	12 (day) 20 (night)
	Olivia Avenue residential		71-80	23 (day) 31 (night)

The project change application identifies that surface track works for the adjustment of the track layout at Yeerongpilly will generally be in accordance with the 2011 EIS noise levels which concluded that noise levels will exceed the construction noise goals for receivers in the vicinity of trackworks. Whilst the proponent has committed to all reasonable and feasible noise mitigation being applied, the project change application noted that trackworks is typically short due to the operational requirement to conduct works during rail shutdown periods.

Clapham Yard, Moorooka

Potential construction noise impacts at Clapham Yard are expected to be consistent or less than those identified in the 2011 EIS. The project change application states the worst-case scenario for potential noise impacts is the construction of track works, for which unmitigated noise levels of up to 62 dB(A) are predicted for surrounding residences, which will result in exceedances of the project's noise goals of up to 5 dB(A) in the day and 13 dB(A) at night. The change application identifies potential mitigation measures which are listed in Section 5.3.3 of this report and I expect these to be refined during the detailed design phase and then incorporated into the OEMP and its sub-plans that I require the proponent to update based on the proposed changes to the project.

Changes to operational noise impacts

The project change application states that the additional platforms proposed for the existing surface stations of Fairfield to Salisbury stations will result in a negligible change to existing operational noise levels.

However, the proponent's assessment predicts localised increases of noise levels marginally exceeding the project's operational noise goals at two sensitive receptors at Yeronga station; 601 Fairfield Road, Yeronga by 1 dB(A) and 1 Cook Street, Yeronga by 2dB(A). However, 1 Cook Street, Yeronga is a new three storey apartment building and therefore is not considered noise sensitive for 10 years post construction. These exceedances are as a result of the new crossover connecting the existing dual gauge line to the new auxiliary line. There is also a residual exceedance of the project's operational noise goals predicted at the residence of 3 Ortive Street, Yeerongpilly. The proponent advises that the dominant noise source will be from freight train movements on the dual gauge track, with an increase in noise of less than 3 dB(A). This increase does not trigger the need for additional mitigation in accordance with the QR guidelines.

The new platform and realignment of the dual gauge track passing on the western side of Clapham Yard will result in a decrease in noise levels compared to the existing situation at Moorooka station. This is due to rail movements (particularly freight trains) being further away from the closest sensitive receptors on the eastern side of the rail corridor. The closest sensitive receptors on the western side are more than 500 m away at which point noise levels are predicted to be below the project's operational noise goals.

In addition to the potential impacts identified, potential operational noise impacts in the vicinity of the Fairfield station to Salisbury station will include noise from new station mechanical plant. The proponent anticipates these noise impacts will be mitigated by a selection of noise mitigation measures as detailed design progresses.

Submissions raised concerns regarding potential construction noise impacts in the vicinity of Fairfield to Salisbury station upgrades. Noise will be managed in accordance with the project's Imposed Condition 11, which requires project work to achieve noise goals for human health and well-being. Noise monitoring and reporting will be undertaken in accordance with the Noise and Vibration Management Plan. The Noise and Vibration Management Plan is a sub-plan of the CEMP that must be endorsed by the Environmental Monitor as being consistent with the OEMP and complying with the Imposed Conditions (Construction) prior to the commencement of Relevant Project Work. The CEMP to be submitted to me at least 20 business days prior to the commencement of Relevant Project Works.

Dutton Park station

New noise generating activities at Dutton Park station will arise from the demolition and removal of the existing station building, construction of the new platform and station building as well as piling and installation of the new pedestrian overpass. Table 5.8 shows the predicted noise levels and exceedances of the goals at the closest sensitive receptors for each noise generating activity at Dutton Park station.

Table 5.8 Predicted noise exceedances from the proposed changes at sensitive receptors in close proximity to Dutton Park station

Sensitive Receptor (Station Construction works)	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Demolition works			
Rusk Street/Cornwall Street residential	57 (day) 49 (night)	66-72	15 (day) 23 (night)
Railway Terrace Places of worship	65	76-82	17
Railway Terrace Residential	57 (day) 49 (night)	59-70	13 (day) 21 (night)
Station construction works			
Annerley Road/Cope Street residential	57 (day) 49 (night)	64-70	13 (day) 21 (night)
Noble Street residential	57 (day) 49 (night)	63-69	13 12 (day) 21 20 (night)
Piling works			
Annerley Road/Cope Street residential	57 (day) 49 (night)	72-78	21 (day) 29 (night)
Noble Street residential	57 (day) 49 (night)	71-76	19 (day) 27 (night)

The assessment showed demolition works are predicted to result in exceedances of up to 15 dB(A) in the day and 23 dB(A) at night at surrounding residential receptors and exceedances of up to 17 dB(A) at places of worship on Railway Terrace. No exceedances during demolition works at the PACE building are predicted to occur.

The project change application predicts that station construction works will result in exceedances of up to 13 dB(A) in the day and 21 dB(A) at night for surrounding residential receptors, and piling works will result in exceedances of up to 21 dB(A) in the day and 29 dB(A) at night.

Noise impacts from the removal of the existing noise barrier

The removal of the noise barrier on the eastern side of the rail corridor south of Annerley Road is required as part of the proposed station upgrade works because QR require that noise barriers shall not be built behind station platforms or any connecting pedestrian pathways for safety reasons. The removal of this barrier will result in an increase in noise levels for sensitive receptors on Cope Street, Tamar Street and Sampson Street. The project change application predicts exceedances of the project's operational noise goals at nearby sensitive receptors, with noise levels of up to 94 dB L_{Amax} (exceedance of the goal by 7 dB(A)) and 72 dB(A) $L_{Aeq,24hr}$ (exceedance of the goal 7 dB(A)) predicted at the worst affected sensitive receptors.

To mitigate the potential operational noise impacts, the project change application includes a proposal for the existing noise barrier on the eastern side of the rail corridor to be increased to 6 m in height and to a total length of 345 m, and the barrier on the

western side of the rail corridor increasing in height of up to 6 m and with a total length of 340 m. Even with the proposal to increase the height and length of the noise barrier, the following three properties will still experience exceedances of the project's operational goals by up to 4 dB(A):

- 51 Tamar Street
- 53 Tamar Street
- 47 Wilkins Street West.

An alternative noise barrier configuration with a section of the barrier removed near the new platform (to comply with QR's guideline) was also assessed. The project change application predicted that the following five properties would still experience exceedances of the project's operational goals by up to 4 dB(A) with the alternative proposal:

- 51 Tamar Street
- 53 Tamar Street
- 8 Cope Street
- 10 Cope Street
- 47 Wilkins Street West.

Submissions raised concerns relating to construction impacts and human health impacts due to construction noise and vibration in the vicinity of Dutton Park station. The conditions I have imposed on the project; in particular Condition 11 provide controls for construction noise and vibration impacts to achieve project noise goals for human health and well-being outcomes. During construction monitoring of noise and vibration will be completed in accordance with the Noise and Vibration Management Plan, a sub-plan of the CEMP which is based on the OEMP.

Submissions also raised concerns relating to increased operational noise impacts resulting from the removal of the existing noise barrier for properties located in Cope Street and Annerley Road adjacent to Dutton Park station. The proponent has advised that alternative mitigation measures will be considered in the detailed design of Dutton Park station based on additional noise modelling and in consultation with the nine receptors identified to exceed the goals and QR to develop acceptable solutions to mitigate operational rail noise. The project is subject to Environmental Design Requirement 3 for operational noise and vibration which requires the track surface airborne noise emissions to achieve 65 dB(A) as the 24 hour average equivalent continuous A-weighted sound level pressure and the 87 dB(A) evaluated as a Single Event Maximum sound pressure level.

I have also recommended that where predictive modelling indicates exceedances of the noise goals for railway surface track airborne noise emissions, the proponent consult with QR and residents of Cope Street during detailed design and consider noise mitigation measures that balance achieving compliance with MD-15-317, operational rail requirements and amenity impacts for residents of Cope Street.

Southern portal

The project change application predicts that potential noise impacts for residences on Railway Terrace and the TRI Building will increase due to the greater extent of cut and

cover construction proposed at the Southern portal worksite. The predicted noise level increases will be:

- Railway Terrace residential receptors increase of up to 8.4 dB(A)
- TRI Building increase of 3 dB(A)

For the evaluated project, the closest sensitive receptor to the cut-and-cover structure was 49 Rawnsley Street; for the changed project the closest receptor is 38 Railway Terrace. A noise level of 76 dB(A) has been predicted at 38 Railway Terrace, which would result in exceedances of the noise goals by up to 19 dB(A) during the day and 27 dB(A) at night. The overall change in potential impact as a result of the proposed changes to the project is an increase in construction noise level of less than 1 dB(A) at the closest affected receptor (38 Railway Terrace) when compared to the evaluated project.

The 2017 project change application assessed the TRI building (as part of the PA Hospital) with a predicted noise level during construction of up to 81 dB(A). Taking into account the predicted noise level increase of 3 dB(A), this would result in a 9 dB(A) exceedance at the TRI building due to the revised southern portal location moving to the east and closer to the PA Hospital.

Potential ground-borne noise and vibration impacts from the construction excavation works to the southern portal are predicted by the proponent to be below the noise and vibration goals at all surrounding sensitive receptors. However, the TRI building and PA Hospital may contain vibration-sensitive equipment and the proponent has committed to conducting further investigation into the location and sensitivity of this equipment as part of the detailed construction management.

Changes to operational noise impacts

The change to the location of the Southern portal will result in a minor increase in potential noise impacts to sensitive receptors on the eastern side of the rail corridor with noise level increases at the PA Hospital, TRI building, and PACE building. However, noise levels are still predicted to be below the project's operational noise goals. Previously it was proposed to increase the height and extend the existing noise barrier along Railway Terrace to reduce the operational noise impacts for nearby sensitive receptors. Due to the proposed change in location of the Southern portal, the proposal to modify the barrier would result in a reduction in noise levels at all Railway Terrace receivers compliant with the project's operational noise goals, an improved outcome from the evaluated project, however, the ESA Village Leukaemia Foundation will still experience exceedances of the goals. Consistent with the evaluated project, additional mitigation measures are considered not required for this receptor as the acoustic report that formed part of the development application for this building stated that the façade of this building was to be constructed to account for increases in operational rail noise.

Boggo Road

Station construction

The reduced extent of cut and cover construction works at Boggo Road station will result in a reduced duration for the potential airborne noise impacts for sensitive receptors

when compared to the evaluated project. This is due to a shorter duration for open-air works with a greater proportion of the station construction works occurring underground.

The proponent's assessment predicts that the potential noise impacts for residences in Quarry Street will decrease compared to the evaluated project by approximately 5 dB(A) due to the increased distance to between these sensitive receptors and the nearest cut and cover section of the worksite. Construction noise levels at the Ecosciences Building, PA Hospital, TRI building and residential receptors to the south will remain consistent with the evaluated project.

With the underground station to be 2 m lower than previously proposed, the project change application predicts potential ground-borne noise and vibration impacts from Boggo Road station construction to be below the ground-borne noise goals at all sensitive receptors. The potential vibration impacts from the station construction are also predicted to be below the human comfort goals at all receptors. However, maximum vibration levels at the Ecosciences building are expected to be 0.13 mm/s, which exceeds the threshold value for vibration-sensitive equipment.

The Ecosciences building has a Transmission Electron Microscope (TEM) which has a sensitivity to floor vibration based on the manufacturers data ranging from 0.19 mm/s to 0.3 mm/s depending on the frequency of the vibration. The vibration predictions for the Ecosciences building indicate that the vibration levels exceeding this criterion for the TEM would occur between 0-21 per cent of the time depending on the location of the TEM within the building. That is for some areas in the building the vibration criterion curves are not exceeded, whereas for other locations they are exceeded up to 21 per cent of the construction works. To mitigate any potential impacts Imposed Condition 11 requires where predictive modelling indicates the manufacturers specified goals would not be achieved, mitigation measures will be agreed with Directly Affected Persons.

Pedestrian and cycle bridge construction

As shown in Table 5.9 the construction of the new pedestrian bridge is predicted to result in exceedances of up to 6 dB(A) during the day and 14 dB(A) at night for residential receptors and exceedances of up to 3 dB(A) and 11 dB(A) at night for the Leukemia Village.
The project change application did not predict any exceedances for the construction noise goals at the PA Hospital, Ecosciences building, or TRI building.

Table 5.9 Predicted noise impacts for sensitive receptors of Boggo Road station pedestrian and cycle bridge

Sensitive Receptor	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
ESA Leukemia Village	70 (day) 62 (night)	59-73	3 (day) 11 (night)
Railway Terrace Residential	57 (day) 49 (night)	55-63	6 (day) 14 (night)
Elliot Street Residential	57 (day) 49 (night)	42-54	- (day) 6 (night)

Busway modification works for construction site access and Annerley Road intersection modification

The project change application predicts the noise level ranges at sensitive receptors based on the location of the noise source and the distance from the sensitive receptor. Table 5.10 shows the predicted noise levels for the closer of the two worksites for the relevant works.

Table 5.10 Predicted exceedances for busway modification works at sensitive receptors in close proximity

Sensitive Receptor (Busway Works)	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Busway works			
Railway Terrace Residential	57 (day) 49 (night)	53-59	2 (day) 10 (night)
Elliot Street Residential	57 (day) 49 (night)	49-59	2 (day) 10 (night)
Annerley Road works			
Annerley Road Residential	57 (day) 49 (night)	69-73	16 (day) 24 (night)
Rawnsley Street Residential	57 (day) 49 (night)	66-72	15 (day) 23 (night)

The project change application predicts exceedances for the busway modification works construction of up to 2 dB(A) in the day and up to 10 dB(A) at night at the surrounding residential receptors on Railway Terrace and Elliot Street. Noise levels from the construction works of the intersection at Annerley Road and Peter Doherty Street are predicted to result in exceedances of up to 16 dB(A) during the day and 24 dB(A) at night at surrounding residential receptors on Annerley Road and Rawnsley Street.

The proponent indicates that there will be no exceedances of the noise goals during busway works at the ESA Leukaemia Village, Ecosciences building, PA Hospital and TRI Building. There would also be no exceedances of the noise goals for the Annerley Road works at the Boggo Road Gaol/Police Station and the ESA Leukaemia Village.

Woolloongabba station

Ground-borne noise impacts from tunnel construction

The proponent's assessment predicts exceedances of the 35 dB(A) night-time noise goals will be experienced for residential receptors located along the tunnel alignment within 30 m south-west of the Pacific Motorway. The 40 dB(A) goal for residential receptors in the day is also predicted to be exceeded in this location for residences within approximately 20 m of the tunnel alignment. The maximum noise level predicted was 50 dB(A) for receptors on Quarry Street, Woolloongabba. This is a reduced impact from the evaluated project which stated receptors located within a 100 m corridor of the TBM works were expected to experience exceedances of the noise goals. The

assessment predicts no ground-borne noise impacts for the Ecosciences Precinct at Boggo Road, TRI Building or PA Hospital both at Woolloongabba.

As the tunnel progresses south from Woolloongabba station to the Southern Portal the potential ground-borne noise and vibration impacts increase as the tunnel depth decreases. The proponent's assessment also predicts the construction ground-borne vibration levels will exceed the daytime human comfort vibration goals for sensitive receptors within approximately 30 m of the alignment and the night-time human comfort vibration goals within 25 m of the alignment between Longwood Street and Quarry Street, Woolloongabba. The maximum ground-borne vibration level predicted at residential receptors is predicted to be 1 mm/s at residences on Quarry Street, Woolloongabba, which is a slightly increased impact when compared to the evaluated project (0.5 mm/s).

The OEMP, which I require the proponent to update based on the proposed changes to the project, states low frequency noise mitigation measures that include a comprehensive notification and education programme to inform Directly Affected Persons where low frequency noise goals may be exceeded during tunnelling works. Notification will include tunnelling progress and temporary exposure periods during construction.

Station construction

As shown in Table 5.11 the proposed change to the station location at Woolloongabba will result in decreased construction noise levels at the worst-affected sensitive receptors such as the Kangaroo Point Holiday Apartments and the St Nicholas Russian Orthodox Cathedral when compared to the evaluated project. However, construction noise levels will increase for sensitive receptors located to the west as they are now closer to the construction site. Potential noise impacts from the proposed changes are similar to or lower than the predicted noise levels in the 2011 EIS. The minor increase in noise levels compared to the 2011 EIS of less than 1 dB(A) at the Gabba Central Apartments and at St Nicholas Russian Orthodox Cathedral is indiscernible and not considered significant.

Table 5.11 Change in noise level in sensitive receptors at Woolloongabba station Construction

Sensitive Receptor	2011 EIS Distance m	2017 Project Change Application Distance m	2019 Project Change Application Distance m	Change in Noise Level	
				2017 vs EIS dB(A)	2019 vs 2017 dB(A)
Gabba Central Apartments	200	110	190	+0.4	-4.7
St Nicholas Russian Orthodox Cathedral	100	60	95	+0.4	-4.0
Kangaroo Point Holiday Apartments	120	65	125	-0.4	-5.7

Leopard Street Residential	90	155	120	-2.5	+2.2
Trinity Lane Residential	170	270	190	-1.0	+3.1

With the construction methodology of the underground station remaining consistent with the evaluated project the proponents' assessment noted the inclusion of acoustic sheds will remain as a mitigation measure of noise and dust impacts at the site. Acoustic sheds will be used to cover the tunnel access shaft and spoil storage area.

Busway plaza bridge construction

The following noise levels ranges have been predicted at the closest sensitive receptors for the busway plaza bridge construction:

- Gabba Central Apartments 48-58 dB(A)
- St Nicholas Russian Orthodox Cathedral 46-59 dB(A)
- Kangaroo Point Holiday Apartments 46-57 dB(A)
- Leopard Street residential 45-57 dB(A)
- Trinity Lane residential 47-57 dB(A)

The proponent has subsequently advised that the construction of the busway bridge will result in no exceedances of the noise goals during the day and exceedances of up to 8 dB(A) at night at residential receptors, however this is based on worst-case meteorological conditions, with impacts likely to be less than predicted.
No exceedances at St Nicholas Russian Orthodox Cathedral are predicted.

I note that a submission raised concerns regarding groundborne noise and vibration at Kangaroo Point. I also note, that the tunnel alignment is moving 70 m closer to this sensitive receptor. The proponent's response to submissions included a review of the tunnel depth, proposed high attenuated track form and the predicted levels for groundborne noise and vibration for this location. Proposed management for noise and vibration will include baseline monitoring (in consultation with the property owner), condition survey reports completed pre and post construction and the management of the construction noise and vibration impacts through the project's CEMP. I require this approach to be undertaken.

Albert Street station

Demolition of 142 Albert Street

As shown in Table 5.12 the proponent's assessment predicts the demolition of 142 Albert Street will result in exceedances of 15 dB(A) in the day and 28 dB(A) at night at the closest residential receptors and exceedances of up to 27 dB(A) at commercial receptors.

Table 5.12 Predicted noise levels for closest sensitive receptors to demolition of 142 Albert Street

Sensitive Receptor (demolition works)	Noise goal dB(A)	Predicted noise level dB(A)	Exceedance dB(A)
Royal Albert Hotel (residential)	70 (day) 65 (evening) 57 (night)	80-85	15(day) 20 (evening) 28 (night)
138 Albert St (commercial)	75 (when in use)	88-102	27
160 Albert St (commercial)	75 (when in use)	88-102	27

To manage the potential impacts of the proposed demolition, mitigation measures such as the substitution of alternate demolition methods, consideration of materials handling measures and avoiding dropping materials from heights would be developed in accordance with the project's OEMP which I require the proponent to update based on the proposed changes to the project.

Northern cavern shaft site establishment

As shown in Table 5.13 the proponent's assessment predicts the site establishment works for the northern cavern would result in exceedances of the noise goals by up to 5 dB(A) in the day and 18 dB(A) at night at residential receptors and exceedances of up to 17 dB(A) for commercial receptors.

Table 5.13 Predicted noise levels for site establishment works of northern cavern at closest sensitive receptors on Albert Street

Sensitive Receptor (site establishment)	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Royal Albert Hotel (residential)	70 (day) 65 (evening) 57 (night)	70-75	5 (day) 10 (evening) 18 (night)
138 Albert St (commercial)	75 (when in use)	92	17
160 Albert St (commercial)	75 (when in use)	92	17

Northern cavern shaft site excavation

The proponent's noise assessment predicts that shaft excavation works will result in exceedances of noise goals of up to 3 dB(A) in the day and 16 dB(A) at night for residential receptors and exceedances of up to 15 dB(A) for commercial receptors for works conducted within a medium-performance acoustic shed. With the use of a high-performance acoustic shed the predicted noise levels would result in no exceedances

during the day and 4 dB(A) at night for residential receptors and exceedances of 3 dB(A) for commercial receptors, as shown in Table 5.14.

Table 5.14 Predicted noise levels for northern entrance shaft excavation works at closest sensitive receptors on Albert Street

Sensitive Receptor (excavation works)	Noise goal dB(A)	Shaft excavation with medium performance enclosure		Shaft excavation with high performance enclosure	
		Highest predicted noise level dB(A)	Exceedance dB(A)	Highest predicted noise level dB(A)	Exceedance dB(A)
Royal Albert Hotel (residential)	70 (day) 65 (evening) 57 (night)	73	3 (day) 8 (evening) 16 (night)	61	- (day) - (evening) 4 (night)
138 Albert St (Commercial)	75 (when in use)	90	15	78	3
160 Albert St (commercial)	75 (when in use)	90	15	78	3

Therefore, I have recommended that the proponent use the high-performance enclosure for shaft excavation works of the northern entrance at Albert Street as this will reduce the potential noise impacts on nearby sensitive receptors.

The proponent assessed ground-borne noise and vibration levels from the Albert Street station excavation works based on an excavator with hydraulic hammer.

The assessment predicted ground-borne noise levels would reach a maximum level of 49 dB(A) which will comply with daytime impact goals for both residential and commercial receptors but would exceed night-time goals for residential receptors. These noise levels are predicted to exceed the night-time residential goals for approximately 10 per cent of the duration of the construction works.

The assessment also predicted that ground-borne vibration levels from the station excavation on the northern cavern will reach a maximum vibration levels of 0.77 mm/s at nearby sensitive receptors which exceeds the goals for commercial and residential receptors. However, it should be noted that the vibration levels are only predicted to exceed the daytime residential and commercial vibration goals for approximately five per cent of the duration of construction works and the residential night time goals for 30 per cent of the duration of construction works.

I note that submissions raised concerns regarding potential constructing noise impacts to human health and potential noise impacts for business, patrons and residents in close proximity to the Albert Street construction works. Imposed Condition 11 outlines the goals for noise and vibration which must be met during construction of the project. This is managed through the project's OEMP that I require the proponent to update based on the proposed changes to the project with specific mitigation measures and controls to

ensure compliance with the noise goals in this condition being further detailed in the site-specific CEMP. Construction impacts will be monitored, worksites inspected and audited for compliance in accordance with the approved OEMP framework. In addition, the OEMP includes a community engagement plan that provides for Directly Affected Persons to be consulted prior to the commencement of project works and thereafter about project works, predicted impacts and mitigation measures.

I also note that submissions raised concerns relating to construction impacts and human health impacts due to construction noise and vibration in the vicinity of Dutton Park station. The conditions I have imposed on the project; in particular Condition 11 provide controls for construction noise and vibration impacts to achieve project noise goals for human health and well-being. During construction monitoring of noise and vibration will be completed in accordance with the Noise and Vibration Management Plan, a sub-plan of the CEMP, which is based on the OEMP that I require the proponent to update based on the proposed changes to the project.

Ground-borne noise impacts from tunnel construction

One exceedance of the human comfort ground-borne vibration goals was predicted for the office building at 123 Albert Street, Brisbane. However, as the vibration predictions are located for the lowest floor of the building and there will be losses associated with vibration propagation up the building, this predicted exceedance will not be significant for receptors above the lowest floors.

Roma Street station

Underground station - Eastern access shaft excavation

Construction of the eastern access shaft at Roma Street is located further to the east than previously assessed, resulting in new potential noise and vibration impacts at residential receptors on Roma Street, such as the Abbey Apartments, the Supreme Court and Magistrates Court.

The shaft excavation works would occur within an acoustic enclosure where typical noise reductions of diesel-powered items of plant are predicted to be 12 dB(A) for a medium - performance enclosure and 24 dB(A) for a high-performance enclosure. As shown in Table 5.15 the proponent's assessment predicted exceedances of the construction noise goals for site establishment works by up to 6 dB(A) at night for the Abbey Apartments and up to 3 dB(A) at the Supreme Court. No exceedances were predicted at the Magistrates Court.

Table 5.15 Predicted noise levels for site establishment works of the eastern access shaft at sensitive receptors

Sensitive Receptor (site establishment)	Noise goal dB(A)	Site establishment dB(A)	Exceedance dB(A)
Abbey Apartments (residential)	70 (day) 65 evening) 57 (night)	56-63	- (day) - (evening) 6 (night)

Sensitive Receptor (site establishment)	Noise goal dB(A)	Site establishment dB(A)	Exceedance dB(A)
Supreme Court	65-70	66-68	3

For the excavation works at the eastern access shaft the proponent's noise calculations predicted exceedances of the construction noise goals by up to 6 dB(A) at night at the Abbey Apartments and up to 4 dB(A) at the Supreme Court when using a medium-performance enclosure, as shown in Table 5.16. No exceedances were predicted for shaft excavation with a high-performance enclosure. There are also no exceedances of construction noise goals predicted at the Magistrates Court.

Table 5.16 Predicted noise levels for excavation works of the eastern access shaft at sensitive receptors

Sensitive Receptor (excavation works)	Noise goal dB(A)	Shaft excavation with medium performance enclosure		Shaft excavation with high performance enclosure	
		Predicted noise level dB(A)	Exceedance dB(A)	Predicted noise level dB(A)	Exceedance dB(A)
Abbey Apartments (residential)	70 (day) 65 (evening) 57 (night)	59-63	- - 6 (night)	49-52	- - -
Supreme Court	65-70	67-69	4	56-58	-

Relocation of the Inner Northern Busway

Noise emissions from the excavation of the INB cut and cover structure are expected to be consistent with noise that would be generated by the previously proposed cut and cover station construction works.

The proponent's assessment predicts the Abbey Apartments will experience noise levels up to 84 dB(A) with the noise mitigation of a 3 m hoarding. This would result in a 14 dB(A) exceedance of the construction noise goals during the day, 19 dB(A) during the evening and a 27 dB(A) at night. Noise levels at the Supreme Court are expected to be the consistent with those at Abbey Apartments which results in an exceedance of up to 19 dB(A) at the Supreme Court. The Magistrates Court is predicted to be 1-2 dB(A) lower due to the slightly increased separation distance to the worksite. Refer to Table 5.17.

Table 5.17 Predicted noise levels for closest sensitive receptors to relocation of Inner Northern Busway

Sensitive Receptor (construction INB)	Noise goal dB(A)	Predicted noise level dB(A)[4]	Exceedance dB(A)
Abbey Apartments (residential)	70 (day) 65 (evening) 57 (night)	84	14(day) 19 (evening) 27 (night)
Supreme Court	65-70	84	19
Magistrates Court	65-70	82-83	17-18

The proponent has advised that during detailed construction planning of the works detailed modelling is conducted with mitigation measures investigated. If an exceedance of 20 dB(A) is confirmed, consultation with the Directly Affected Persons will be undertaken and respite periods will be provided.

A reduction of approximately 12 dB(A) could be achieved using mitigation of a medium performance acoustic enclosure and a reduction of approximately 24 dB(A) using mitigation of a high-performance acoustic enclosure. For this reason, I have recommended the proponent consider the use of high-performance enclosure to undertake works for the excavation of the eastern access shaft and relocation of the INB works at Roma Street station which will reduce potential noise impacts on nearby sensitive receptors. I note that these exceedances may also be reduced with more detailed modelling with proposed mitigation measures to be undertaken during detailed construction planning.

Northern Portal

The proponent's assessment predicts that the changes to the project will result in an increase in operational noise levels of up to 5dB(A) at Brisbane Girls Grammar School (BGGS), with cumulative noise levels from all rail sources at the BGGS sports centre predicted to reach 92 dB/L_{Amax} and 64 dB$L_{Aeq,24hr,}$ which exceeds the project's operational noise goals.
This exceedance of the maximum noise level is due to the train movements on the proposed realigned exhibition track being 40 m closer to the BGGS sports centre. The predicted noise levels from the existing tracks with the same rail traffic volumes is 86 dB/L_{Amax} and 64 dB$L_{Aeq,24hr}$ which meets the project's operational noise goals.

To mitigate noise levels the project change application modelled the installation of a 6 m noise barrier located on the rail corridor and the results indicated only 1 dB(A) of noise attenuation for the BGGS Sports Centre due to the receiver being elevated above the rail corridor. The northern façade of the BGGS sports centre is the only building predicted to experience an exceedance of the project's noise goals. I expect that appropriate mitigation measures will be determined in consultation with BGGS.

[4] Noise levels predictions are presented for construction with a 3m hoarding.

Mayne Yard

With the exception of the demolition works, the project change application predicts that potential construction noise impacts for surface rail works to occur within the rail corridor at Mayne Yard will generally be consistent with the evaluated project.

During demolition works, the proponent's assessment predicted unmitigated noise levels at the closest residential receptors, located to the western side of Breakfast Creek would be in the range of 48-62 dB(A). This would result in exceedances of the noise goals in this location by up to 5 dB(A) in the day and 13 dB(A) at night for unmitigated demolition works.

Mayne North Stabling Yard

To undertake the proposed construction at Mayne Yard North stabling yard the demolition of facilities that were not previously assessed include the signal construction depot, rail construction depot, surveyor's depot, track maintenance depot and the shunter's facilities.

The project change application predicts unmitigated noise levels at the nearest residential receptors at the western side of Breakfast Creek to be in the range of 50-65 dB(A). This would result in exceedances of the noise goals by up to 8 dB(A) in the day and 16 dB(A) at night for unmitigated demolition works.

Breakfast Creek Bridge

Potential worst-case construction noise impacts resulting from the construction of the new Breakfast Creek bridge at the closest receptors on Grafton Street would result in exceedances of the construction noise goals by up to 10 dB(A) in the day and 18 dB(A) at night for unmitigated demolition works and up to 5 dB(A) in the day and 13 dB(A) at night for unmitigated dredging works. Refer to Table 5.18.

Table 5.18 Predicted noise levels for closest sensitive receptors to proposed Breakfast Creek Bridge

Work type	Sensitive Receptor	Noise goal dB(A)	Predicted unmitigated noise level dB(A)	Exceedance dB(A)
Piling	Grafton Street (residential)	57 (day) 49 (night)	56-67	10 (day) 18 (night)
Dredging	Grafton Street (residential)	57 (day) 49 (night)	54-62	5 (day) 13 (night)

To manage the potential impacts of the proposed bridge construction, site-specific mitigation measures would be developed in accordance with the project's OEMP that I require the proponent to update based on the proposed changes to the project. Potential mitigation measures for the backhoe dredging could include selecting quieter items of plant and using residential grade silencers. The proponent's assessment predicts that a noise reduction for the backhoe dredging of approximately 5 dB(A) would typically be achievable.

I note, a submission raised concerns regarding noise and vibration impacts on a BCC heritage listed property at Bowen Hills. The proponent's response indicated that discussions have occurred with the property owner regarding the completion of baseline environmental monitoring and a property condition survey prior to the commencement of works. Subject to the property owner's consent to accessing the property, this property will be included in the contractor's ongoing construction compliance monitoring to manage project impacts.

5.3.3 Mitigation measures

To reduce the potential noise and vibration impacts of the proposed changes to the project the most suitable mitigation measures to apply will depend on the detailed planning of each activity. For this reason, the proponent's application does not predict mitigated noise levels for each activity as the methodologies for demolition or construction is not yet developed to the detail required. I note the predicted noise levels for relocation of the INB at Roma Street were based on previous assessments which included a 3 m hoarding. I also note that more detailed modelling with proposed mitigation measures for all locations will be undertaken during detailed construction planning to appropriately determine the most suitable mitigation measures.

Imposed Condition 11 requires that the proponent provides advance notification and consultation with the Directly Affected Persons for exceedances greater than 20 dB(A) over the noise goals, and a requirement to conduct works only during the day time with respite periods included.

It is advised that the proponent will, during detailed construction planning of the works, undertake detailed modelling with further investigation of mitigation measures. If an exceedance of 20 dB(A) is confirmed consultation with Directly Affected Persons and respite periods will be required, as per Imposed Condition 11.

The project change application states an indicative reduction of 5-10 dB(A) from mitigation measures will be achieved. The OEMP that proponent is to update based on the proposed changes to the project includes a Noise and Vibration sub-plan which will be implemented at each construction worksite. It is expected that mitigation measures for each of the activities will be developed in accordance with the project's OEMP.

The project change application identified the following potential mitigation measures which could be included to address noise and vibration impacts from demolition activities:

- substitution of alternate (quieter) demolition methods
- the use of silencers on major items of equipment
- the use of barriers or hoarding where possible
- consideration of materials handling measures including the use of damped receptacles and avoiding the dropping of material from heights.

For mitigation of noise and vibration impacts from construction and piling activities the project change application proposed the following measures:

- selection of the quietest items of plant available

- substitution of alternate quieter construction methods such as use of CFA piling or hydraulically jacked piles
- use of silencers on major items of equipment
- conducting works behind barriers where possible.

5.3.4 Coordinator-General's conclusion: noise and vibration

I am satisfied that the proponent has appropriately assessed the potential noise and vibration impacts resulting from the proposed changes to the project.

The proposed changes will result in some changed construction noise and vibration impacts to nearby sensitive receptors due to changes in surface works, tunnelling works and works in the rail corridor that will be undertaken outside of standard construction hours to minimise interruptions to services.

I note the proposed changes will have increased construction noise impacts for works at Fairfield to Salisbury station upgrades, Clapham Yard, Mayne Yard and Breakfast Creek, with the inclusion of new construction worksites, therefore impacting on new sensitive receptors. There is also increased construction noise impacts and a change to the locations of the impacts at Albert Street and Roma Street stations due to the changed worksite locations and the construction methodology for integration of the INB at Roma Street.

With the addition of construction worksites with the station upgrades from Fairfield to Salisbury I have approved changes to Imposed Condition 10 in order to authorise construction hours of work to balance the amenity considerations against the need to deliver the project in a timely and efficient way.

I require the proponent to update the project's OEMP to include management measures for the upgrade works for Fairfield to Salisbury stations. Such measures are to include:

- prior to the commencement of works undertake predictive modelling to identify the potential for exceedances of the goals for health and wellbeing, and where exceedances are predicted apply mitigation measures, for example the installation of acoustic barriers around the site
- undertake early and ongoing consultation with residents, owners and occupiers at surrounding sensitive receptors to identify and avoid or minimise potential noise and vibration impacts.

Whilst the proponent's application predicted exceedances for the construction noise and human comfort vibration goals in some locations including 123 Albert Street and within 30 m of the tunnel alignment from Woolloongabba to the Southern Portal, I note this is less than the previously predicted 100 m buffer referred to in the evaluated project (project change application dated 10 February 2017).

I note the change application predicted exceedances of the construction noise goals for station cavern excavation works at Albert Street and Roma Street stations and the attenuation provided by a high performance acoustic enclosure to reduce noise levels by approximately 24 dB(A). I have therefore recommended that as part of detailed construction planning the proponent must consider the use of a high-performance

enclosure for noise attenuation for night time cavern excavation and construction works at Albert Street and Roma Street worksites.

Operational noise impacts for the tunnel component are predicted to comply with the operational ground-borne noise goals at all sensitive receptors with the use of a selection of high attenuation and very high attenuation trackforms.

I note that the project changes predict exceedances of the project's operational noise goals at Dutton Park station due to existing surface tracks and the requirement to remove an existing noise barrier on the eastern side of the rail corridor to align with QR safety standards. Whilst this is not solely he result of the CRR project, modifications to existing noise barriers have been suggested to mitigate, where possible, exceedances of the project's operational noise goals. I have also included a recommendation that where predictive modelling indicates exceedances of the noise goals for railway surface track airborne noise emissions, the proponent is to consult with QR and residents of Cope Street during detailed design and consider noise mitigation measures that balance achieving compliance with MD-15-317, operational rail requirements and amenity impacts for residents of Cope Street.

I also note, an operational exceedance of 5 dB(A) was predicted for the northern façade of the sport centre at BGGS. I expect that appropriate mitigation measures will be determined in consultation with BGGS.

I approve amendments to the project's Environmental Design Requirements for Noise and Vibration goals to ensure ground-borne noise goals applies only to underground works and ensure consistency with industry guidelines applied to the existing network.

With these amendments, I consider that the proposed changes to the project will continue to be managed in accordance with the project wide conditions and the mitigation measures as included in the OEMP that I require the proponent to update based on the proposed changes to the project. I expect that detailed site-specific mitigation measures will be developed in response to noise and vibration modelling as the demolition and construction methodologies for each worksite are refined. These site-specific mitigation measures should be included in the CEMPs for each worksite and be consistent with the OEMP.

I am satisfied that the Imposed Condition, including the approved amendments to the conditions for the project, are appropriate to manage the impacts resulting from the changes to the project.

5.4 Air quality

5.4.1 Introduction

Project changes including the scope of works, construction methodology and location of construction worksites would potentially result in changes to air quality impacts to existing or new sensitive receptors.

The proponent conducted a qualitative assessment of the potential air quality impacts associated with the proposed changes to the project to determine which changes would potentially result in material impacts. Further quantitative assessment (dispersion

modelling) was undertaken for the locations that material air quality impacts were considered likely, in particular major worksites or spoil handling locations. The proponent undertook updated dispersion modelling to assess the construction phase air quality impacts at the following worksites:

- Mayne Yard
- Woolloongabba station
- Roma Street station (including the works for the integration of the INB)
- Southern Portal and Boggo Road station (sites were assessed cumulatively as the worksites would be close together and works would occur at the same time).

Air quality impacts during construction and operation are predicted to be consistent with the evaluated project. For the worksites of Southern Portal and Boggo Road station, the proponent's assessment initially identified potential for increased air quality impacts due to a filter fabric enclosing the site to control dust emissions no longer being used in the changed project. In this case, the proponent reviewed the control measures and tested an additional mitigation scenario to adequately mitigate potential air quality impacts.

The key air quality issues raised in submissions are discussed in section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitters issues as part of my evaluation below.

5.4.2 Project-wide impacts and mitigation

Existing air quality and air quality goals

The background air quality, or ambient air of a locality establishes a baseline by which potential air quality impacts can be identified, compared and assessed. Background air quality information adopted in the evaluated project was established based on four monitoring stations located in Cannon Hill, the Brisbane CBD, South Brisbane and Rocklea.

The ambient air values for the changed project are presented in Table 5.19. The air quality indicators and air quality goals presented in the table were derived from the *Environmental Protection Policy (Air) 2008* and the goals set in the Imposed Conditions for the project. The proponent's assessment identified there were no additional pollutants requiring assessment due to changes in legislation or requirements.

Table 5.19 Background air quality concentrations and project air quality goals

Air quality Indicator	Averaging period	Units	Background concentration	Air quality goal	Criterion
Dust Deposition	30 days	mg/m^2/day	60	120	Nuisance
Total suspended particles (TSP)	24 hours	µg/m^3	26	80	Human Health
	annual	µg/m^3	24	90	
PM_{10}	24 hours	µg/m^3	17	50	
	annual	µg/m^3	14.5	25	

Air quality Indicator	Averaging period	Units	Background concentration	Air quality goal	Criterion
$PM_{2.5}$	24 hours	$\mu g/m^3$	8.3	25	
	annual	$\mu g/m^3$	6.5	8	

It should be noted that the air quality goals apply at areas off site where sensitive receptors are exposed for time periods comparable with the air quality goal averaging period.

Construction

To assess air quality impacts of the proposed changes to the project the proponent undertook a quantitative assessment focussed on fugitive dust emissions from the following construction activities that have the potential to emit dust and pollutants:

- drilling and blasting
- excavating spoil
- loading material on trucks
- rock breaking and piling
- wind erosion from disturbed places,
- wheel generated dust from machinery on unpaved surfaces.

The emission rates were calculated for each activity at the construction worksites to predict off-site concentrations using dispersion modelling. This would assist in predicting compliance with the project's air quality goals. It should be noted that the model predictions are conservative as they are based on peak activity levels occurring continuously for the entire year. All activities are unlikely to occur at the same time.

Fairfield to Salisbury stations

Whilst the proposed station upgrades for Fairfield to Salisbury stations are new works not previously assessed as part of the evaluated project, the change application noted proposed works at these stations will not have a significant impact on air quality. Any potential impacts will be temporary and minor in nature.

Although works are not expected to have a significant impact on air quality I note submissions were received raising concerns on the nuisance of dust and its management during construction. Air quality goals for dust deposition are addressed in Imposed Condition 13. In addition, the proponent is required to implement control measures and mitigations during construction to ensure compliance. Specific mitigation and controls measures will be detailed in the site-specific CEMP, consistent with the project OEMP that I require the proponent to update based on the proposed changes to the project. Monitoring and auditing of compliance will also be undertaken in accordance with the OEMP.

To manage any potential air quality impacts on sensitive receptors adjacent to these stations the mitigation measures as identified in the OEMP are to be implemented during construction. To ensure effectiveness of any mitigation measures implemented to manage potential air quality impacts I require that the Air Quality Management Plan

(AQMP), a sub-plan of the OEMP, be updated to include air quality monitoring for the worksites at Fairfield to Salisbury stations.

Clapham Yard

The proposed changes to the project at Clapham Yard are similar to those assessed in the project evaluated in 2012 when this site was part of the project area, however there is a significant reduction in the amount of fill that was previously proposed to be placed within the yard. The change application predicts that the proposed changes to the project at Clapham Yard will result in reduced air quality impacts when compared to the project evaluated in 2012 due to a reduction in imported fill, earthworks, and the number of trucks movements.

Therefore, the potential for air quality impacts at Clapham Yard are expected to be consistent with or less than that previously identified in the project evaluated in 2012 and the mitigation measures to manage the potential impacts will be in accordance with the OEMP that I require the proponent to update based on the proposed changes to the project.

Dutton Park station

The proposed changes to the project at Dutton Park station that have the potential to impact on air quality include the demolition of existing station buildings and construction of new buildings, ramps and associated infrastructure, including a covered pedestrian overpass.

This site is not considered a major worksite or location for spoil haulage therefore has a low potential for air quality impacts during construction, with any impacts being temporary and minor. I note submissions from residents of Cope Street raising concerns regarding dust impacts during construction. The Imposed Condition 13 provides the air quality goals for human health and nuisance. With sensitive receptors on Cope Street immediately adjacent to the railway corridor it is expected that potential dust deposition impacts for the construction works at Dutton Park will managed through mitigation measures outlined in the AQMP, under the project OEMP that I require the proponent to update based on the proposed changes to the project.

To ensure any mitigation measures implemented are effective in managing potential air quality impacts I require that the project's AQMP be updated based on the proposed changes to the project to include air quality monitoring for the worksite at Dutton Park station. The proponent's response to the submissions also indicates that the project will have a community contact number in the event that construction impacts including dust are a nuisance or felt to be above the project goals. All complaints are to be dealt with in accordance with the complaints management procedure outlined in the CSEP to ensure complaints received by the community and stakeholders are managed appropriately and consistently.

Southern Portal and Boggo Road

The proposed changes to the project at the Southern Portal and Boggo Road station that would impact air quality include:

- a change in construction methodology with increased mined cavern and reduced cut and cover which will reduce the potential air quality impacts
- the removal of filter fabric that was proposed to enclose the site to control dust emissions in the evaluated project.

Predictive air quality modelling undertaken by the proponent with the standard control measures of water spray to control dust and hoarding around the construction worksite resulted in exceedances of the project air quality goals with the exception of annual average TSP at nearby receptors. Some of these exceedances are significant with more than double the air quality project goals identified in the previously approved Cross River Rail project wide Imposed Conditions. Therefore, further modelling was undertaken by the proponent with the implementation of additional control measures including further watering and an increased percentage of sealed roads at the site. The results of the enhanced control measures showed the majority of exceedances were removed with the exception of the nuisance-based dust deposition goal (120 mg/m^2/day) which remains at one nearby receptor (PA Hospital), as shown in Table 5.20.

Table 5.20 Predicted concentrations at receptors in the proximity of Southern Portal and Boggo Road worksite

Receptor	Type	TSP		PM_{10}		$PM_{2.5}$		Dust Deposition
		24hr	annual	24hr	annual	24hr	annual	Daily max
Unit		µg/m^3						mg/m^2/day
S1	Commercial	35.4	26.6	21.0	15.7	9.1	6.7	80
S2	Hospital – support services	60.8	37.8	31.3	20.2	11.3	7.4	**140**
S3	Residential	57.0	33.1	32.8	18.5	10.0	7.1	112
S4	Residential	29.5	24.8	18.3	14.8	8.7	6.6	67
S5	School	30.3	25.0	18.6	15.0	8.7	6.6	66
S6	Residential	56.3	32.6	32.3	18.2	10.1	7.1	113
Air quality goal		**80**	**90**	**50**	**25**	**25**	**8**	**120**

This is a minor increase to the potential air quality impacts at the Southern Portal and Dutton Park station compared to the evaluated project which predicted no health or nuisance-based exceedances with the application of filter fabric enclosing the site to control dust emissions.

Air quality monitoring for location surrounding the Southern Portal and Boggo Road station were previously proposed for the evaluated project to monitor impacts at Princess Alexandra Hospital, Dutton Park State School, the Ecosciences Precinct and nearby residential receptors. These remain appropriate and must be implemented to ensure the dust mitigation measures outlined in the OEMP are effective. I require the proponent to update the OEMP to include the additional control factors required to specifically minimise the potential air quality impacts at the Southern Portal and Boggo Road station worksite.

Where monitoring indicates an exceedance, additional mitigation measures consistent with the AQMP; a subplan of the OEMP will be required.

Woolloongabba station

The major source of potential air quality impacts at Woolloongabba station are derived from the construction worksite. Whilst the proposed worksite remains in the same location as the evaluated project the assumptions relating to spoil generation, vehicle and machinery movements and blasting in the previous assessments undertaken for the project have changed. The proponent has therefore revised the assessment of potential air quality impacts from this site.

Air quality modelling of the proposed changes to the project was undertaken by the proponent and included conservative control measures such as water spray to control dust, hoarding and an acoustic shed proposed for tunnelling and spoil management. As shown Table 5.21 no exceedances of the relevant short-term (24 hr average) or long term (annual average) goals are predicted at any of the residential receptors surrounding the site with the exception of the 24-hour average TSP concentration predicted at a commercial receptor: 867 Main Street, Woolloongabba. However, it is noted that this receptor is the Landcentre building which has been demolished. Additionally, exceedances of the dust deposition criterion (120 mg/m2/day) are predicted at three receptors surrounding the site.

This revised assessment for the changed project predicts that air quality impacts will decrease compared to the evaluated project, that identified likely exceedances of the air quality goals. The reason for this decrease is that lower levels of peak spoil generation are, and associated vehicle movements even though the total volume of spoil is increased.

Table 5.21 Predicted concentrations at receptors in the proximity of Woolloongabba station worksite

Receptor	TSP		PM_{10}		$PM_{2.5}$		Dust Deposition
	24hr	annual	24hr	annual	24hr	annual	Daily max
Unit			$\mu g/m^3$				$mg/m^2/day$
W1	63.3	38.0	32.7	19.4	10.2	7.1	**160**
W2	53.9	33.2	27.0	17.9	9.4	6.9	113
W3	49.7	32.3	27.2	17.5	9.5	6.9	112
W4	61.5	37.3	32.9	19.3	10.1	7.1	**156**
W5	**89.0**	46.0	45.0	22.4	11.3	7.5	**223**
W6	55.8	29.5	27.3	16.5	9.7	6.7	128
W7	42.2	28.0	22.7	15.9	8.9	6.7	79
Air quality goal	**80**	**90**	**50**	**25**	**25**	**8**	**120**

The air quality monitoring locations and monitoring identified by the proponent in their OEMP which I require to be updated based on the proposed changes to the project must be implemented to mitigate any air quality impacts at Woolloongabba.

Albert Street station

Proposed changes to Albert Street station that have the potential to increase air quality impacts are the demolition of 142 Albert Street, the construction of the northern pedestrian access shaft and the changed construction methodology for the Albert Street station.

The closest residential receptors are the Royal Albert Apartments, located directly opposite 142 Albert Street. Other sensitive receptors include the staff and customers of the various surrounding commercial premises and other residential receptors nearby depending on wind direction.

The proposed construction methodology for the Albert Street station has changed from cut and cover to a mined cavern that will reduce the risk of air quality impacts due to less exposure of the ground disturbance. The majority of dust generating activities at Albert Street station are associated with the demolition of 142 Albert Street and with construction of the northern access shaft. Once the northern access shaft has been constructed, the proponent's assessment indicates that ongoing construction activities in the shaft are not expected to generate dust levels that would exceed the air quality goals at the surface. This is due to the purpose-built acoustic shed which is to be utilised for noise management for the mined cavern and tunnelling works. The acoustic shed will perform a secondary function of containing air pollutants.

I note submissions received raised concerns for human health and nuisance impacts for patrons and staff of commercial businesses and residences as a result of dust from construction works. As mentioned above, the air quality goals for construction are conditioned under the Imposed Condition 13. Specific mitigation and controls for managing dust from construction will be detailed in the site-specific CEMP, consistent with the OEMP that I require the proponent to update based on the proposed changes to the project. Monitoring and auditing of compliance will also be undertaken in accordance with the OEMP.

The Social Amenity Management sub-plan that forms part of the OEMP requires that the contractor avoid, or minimise and mitigate, impacts from construction activities on local businesses and the social environment. This includes advance notification to businesses and procedures for making complaints about project works.

The proponent's change application states that these activities would be managed through the implementation of the air quality management measures, in particular those related to dust mitigation in the AQMP, a sub plan of the Project's OEMP.

Roma Street station

Proposed changes to the project at Roma Street station include a changed alignment of the underground station and tunnel and the lowering of the INB. Dust generating activities that would potentially impact on air quality as a result of the proposed changes include:

- earthworks and spoil generation
- construction of the underground Roma Street station

- excavation and piling for the construction of the vent shaft, vertical transport box and construction shaft
- demolition and realignment of surface roads that service the INB.

Due to the proposed increase in the scale of surface works at Roma Street the proponent conducted dispersion modelling to determine the impacts in the surrounding area. The air quality modelling for Roma Street incorporated control measures such as mitigation from acoustic enclosures, water spray to control dust and the use of hoarding around the site.

The proponent's assessment predicted no exceedances of the air quality project goals at any sensitive receptors off-site. The activities that generate the most dust, such as removal of spoil from the mined cavern to construct the underground station, would occur in an acoustic shed which will assist in controlling dust levels at the surface.

It is expected that air quality mitigation measures as listed in the Project's OEMP that I require the proponent to update based on the proposed changes to the project will be implemented for these works.

The change application indicates that the proposed dust monitoring locations to the north of the existing Roma Street surface station and the Transcontinental Hotel to the south, remain appropriate. This monitoring will continue determine the effectiveness of the dust management measures outlined in the project's OEMP that I require the proponent to update based on the proposed changes to the project and to ensure the effectiveness of the acoustic shed in dust management.

It should also be noted that dispersion modelling was not conducted for the Roma Street site of the evaluated project due to a large acoustic shed located over the cut and cover shaft, therefore it is difficult to compare the changed environmental effect.

Northern Portal

Changes to the location of haul routes and the additional demolition of the Queensland Health (Biomedical Technology Services) building have the potential to impact local air quality through emissions from trucks and dust generation from demolition works.

The closest sensitive receptors to the Northern Portal site are commercial premises and the closest residential receptors are located approximately 100m to the south. Therefore, predictive modelling was not undertaken for the proposed change at this site as the demolition of the BTS building would be temporary, and dust generation would be managed through the implementation of air quality management measures in the OEMP that I require the proponent to update based on the proposed changes to the project.

Breakfast Creek Bridge

Predictive modelling was not undertaken for the proposed Breakfast Creek bridge as the proponent's change application anticipated that the bridge would be installed in pre-fabricated segments minimising the dust generating activities on site.

In addition to this, the closest sensitive receptors are approximately 100m from the proposed construction site. Therefore, the potential for air quality impacts from the construction of the bridge are low and will be managed through the implementation of air

quality management measures described in the Project's OEMP for the project that I require the proponent to update based on the proposed changes to the project.

Mayne Yard

The proposed changes at Mayne Yard will increase the area and duration of works when compared to the evaluated project, including potential impacts from the increase in spoil being removed from the site from 36,000 m^3 to 76,900 m^3. The proponent in their change application states that construction works for Mayne Yard will be staged so that works in Mayne Yard East and Mayne Yard North will not occur concurrently.

Sensitive receptors in close proximity to the proposed works at Mayne Yard include commercial properties on Burrow Street and residential properties and parks approximately 200m to the west in Windsor. The residential properties are buffered from Mayne Yard by existing industrial properties including concrete batching plants and vehicle repair stations.

Air quality modelling of the proposed changes at Mayne Yard was undertaken by the proponent and included conservative control measures such as water spray to control dust and the use of hoarding around the site. The assessment predicted an exceedance of 24 hour average TSP concentration (80 µg/m3 over 24 hrs) at one commercial receptor and dust deposition (120 mg/m2/day) at two commercial receptors (146 and 166 Abbotsford Road). Refer to Table 5.22 for the predicted concentrations at receptors in close proximity to Mayne Yard.

Table 5.22 Predicted concentrations at receptors in the proximity of Mayne Yard

Receptor	Type	TSP		PM_{10}		$PM_{2.5}$		Dust Deposition
		24hr	annual	24hr	annual	24hr	annual	Daily max
Unit		µg/m^3						mg/m^2/day
M1	Residential	38.9	26.9	21.7	15.6	8.9	6.7	70.7
M2	Commercial	43.4	28.6	23.4	16.3	9.2	6.8	81.5
M3	Commercial	54.3	32.9	26.2	17.6	9.7	6.9	100.4
M4	Commercial	77.8	44.9	32.9	21.5	10.7	7.4	**145.0**
M5	Commercial	**85.9**	43.3	34.5	20.6	11.0	7.3	**137.2**
M6	Residential	40.1	26.7	21.7	15.5	8.8	6.6	69.9
M7	Residential	38.9	26.4	21.3	15.4	8.8	6.6	69.9
M8	Residential	38.7	26.7	21.5	15.5	8.9	6.6	70.4
M9	Commercial	37.7	26.8	20.8	15.5	8.7	6.6	68.2
M10	Commercial	52.7	33.5	25.2	17.5	9.6	6.9	85.1
M11	Commercial	61.7	29.1	27.7	16.1	9.7	6.8	93.2
M12	Commercial	70.1	31.5	30.2	16.8	10.4	6.8	108.5
M13	Commercial	48.0	30.9	23.7	16.8	9.4	6.8	84.0
M14	Commercial	37.1	26.4	21.0	15.4	9.0	6.6	69.8
M15	Commercial	51.8	32.2	25.5	17.4	9.8	6.9	100.5

Receptor Type	TSP		PM_{10}		$PM_{2.5}$		Dust Deposition
	24hr	annual	24hr	annual	24hr	annual	Daily max
Unit	$\mu g/m^3$						$mg/m^2/day$
Air quality goal	**80**	**90**	**50**	**25**	**25**	**8**	**120**

This assessment is consistent with the evaluated project which found similar exceedances at nearby commercial receptors. It is expected that effective dust suppression methods as outlined in the Air Quality Management Plan (AQMP), a sub plan of the OEMP that I require the proponent to update based on the proposed changes to the project will be implemented to minimise the generation and spread of dust during construction. The change application suggested mitigation measures such as damping down, covering exposed areas and managing equipment and vehicle movement across the site will be implemented. Considering the assessment adopted a conservative approach and the commitment of the proponent to include site mitigation measures to manage dust, the exceedances at these receptors during construction is considered unlikely.

It should be noted the previous assessment for the evaluated project had identified the potential for disturbance of contaminated land as part of surface works in the rail corridor. If not managed disturbance of contaminated land would have local air quality and human health impacts. With the additional disturbance at Mayne Yard North, it is likely that the area of contaminated land being disturbed would be greater. The OEMP that I require the proponent to update based on the proposed changes to the project includes mitigation measures to manage the disturbance of contaminated land. For further information refer to Section 5.1 of this report.

5.4.3 Coordinator-General's conclusion: air quality

I am satisfied that the proponent has assessed the potential air quality impacts resulting from the proposed changes to the project. The proponent's assessment predicts that the potential air quality impacts would be similar to the evaluated project, as assessed and approved in the June 2017 CGCR.

I note, that where modelling showed exceedances of the health-based and nuisance-based air quality goals at nearby sensitive receptors at the Southern Portal and Boggo Road worksites, additional mitigation measures will be applied to ensure compliance. I require the OEMP to be updated to includes these additional control measures for South Portal and Boggo Road worksites.

Through the implementation of the mitigation measures outlined in the OEMP, that I require the proponent to update based on the changes to the project, the proponent expects the project changes will comply with the project's Air Quality goals (Appendix 1).

To ensure any mitigation measures implemented are effective in managing the air quality impacts I require that the Project's AQMP, a sub-plan of the OEMP be updated to include air quality monitoring for construction worksites not previously assessed as part of the project.

I am confident that air quality impacts will be managed in accordance with the Imposed Condition and the mitigation measures outlines in the approved and updated OEMP.

5.5 Social environment

5.5.1 Introduction

The social impacts of the changed project are generally consistent with the evaluated project. This chapter discusses stakeholder and community engagement that has informed the change application and impacts on a community organisation and a local park.

Overall, the changed project will reduce the number of properties impacted, with design changes enhancing network reliability and accessibility. The changed project will, once operational, enhance access to key social infrastructure and employment zones within and surrounding the CBD.

5.5.2 Community and stakeholder engagement

Public notification on the project change application was carried out between 20 May and 14 June 2019 with submissions made online or in writing to the Coordinator-General. Community and stakeholder engagement in support of the project change application was carried out by the proponent between 21 June 2018 and 30 May 2019 and included:

- face-to-face meetings with key stakeholders, including property owners, tenants, government departments and community groups
- letters to 124 property owners regarding potential volumetric acquisition
- seven staffed 'drop-in' engagement sessions at publicly accessible venues, attended by 180 people
- distribution of 1,487 flyers at 13 key locations across the project alignment
- distribution of over 36,500 newsletters
- static displays of project change application documents at six local libraries
- newspaper announcements in several different south-east Queensland publications
- social media announcements via Facebook, LinkedIn and Twitter.

I consider the engagement which the proponent has undertaken adequate to support the project change application. I am satisfied that consultation undertaken by the proponent was inclusive of all potentially interested or affected individuals and groups. However, I acknowledge concern expressed by 4 submitters regarding the clarity and comprehensiveness of the information presented during staffed 'drop in' engagement sessions. The submissions raised concerns that the information provided to stakeholders on the traffic and transport impacts at Roma Street and Parkland Boulevard was not sufficiently detailed and communicated at the 'drop in' engagement sessions.

I am satisfied that the information provided during public consultation in the project change application was sufficient to ensure stakeholders were given the opportunity to provide comment on the changed project prior to my evaluation.

An existing condition that I have imposed, requires the proponent to appoint an independent community relations monitor to assess the effectiveness of the proponent's community relations activities during the construction and commissioning of the project. I

consider this condition sufficient to ensure the project's ongoing consultation and engagement activities are effective and responsive to stakeholder concerns.

I am satisfied that my existing imposed conditions requiring the preparation and implementation of a Community and Stakeholder Engagement Plan (CSEP) will provide a practical framework for delivery of community and stakeholder engagement activities for the changed project. This includes early and ongoing consultation with directly affected stakeholders to prepare the detailed design, required changes to road conditions and the timing/nature of proposed works throughout construction. My existing imposed conditions require that feedback received through the implementation of the CSEP inform updates of the proponent's impact mitigation and management strategies.

5.5.3 Health and community well-being

Benefits

The potential benefits to health and community well-being of the changed project include:

- fewer volumetric acquisitions and reduced construction impacts on key social infrastructure (State Law complex and Brisbane City Hall) due to changes in the tunnel alignment
- reduced impact to pedestrians and station users during construction because of the increase in mined tunnel and stations (as opposed to cut-and-cover methods)
- improved access for commuters, including those with mobility restrictions, at Fairfield to Salisbury Stations
- improved co-location of transport options at Roma Street and Woolloongabba Stations, including with the proposed Brisbane Metro and Inner Northern Busway.

Impacts and mitigation

Impact evaluation of the following matters for the changed project relevant to health and community well-being are contained throughout this report and are not repeated in this chapter:

- property – in Land Use Section 5.1
- accessibility – in Traffic and Transport Section 5.2
- noise – in Noise and Vibration Section 5.3
- dust – in Air Quality Section 5.4
- station appearance – in Landscape and Visual Amenity Section 5.9.

The project change application identified the potential impacts from the temporary loss of parkland and greenspace at Emma Miller Place, and relocation of homelessness community service providers during construction of the project, if not appropriately managed.

To address potential impacts from the temporary construction works proposed at Emma Miller Place, the proponent has committed to notify people who are homeless and relevant service providers of future construction works that may impact the delivery of essential services at Emma Miller Place. I recommend the proponent work

collaboratively with stakeholders to assist community service providers in finding an alternative location to operate for the duration of construction and provide appropriate assistance to homeless persons who may be adversely affected by the changed project. Actions are to be prepared in collaboration with Queensland Council of Social Service, Department of Housing and Public Works, Department of Communities, Queensland Health, BCC and relevant not-for-profit organisations

The changed project includes permanent loss of recreational space in Outlook Park to provide for the proposed Boggo Road Station. I acknowledge BCC's submission raised concerns regarding the loss of recreational space in Outlook Park. I recommend (Recommendation 5) that the proponent undertake further consultation with BCC to jointly resolve the future of Outlook Park as part of the broader Boggo Road precinct planning process and to ensure the local community has adequate open space to support their recreational needs.

5.5.4 Coordinator-General's conclusion

I am satisfied that the proponent has undertaken community and stakeholder engagement to inform the project change application and I am satisfied that my existing imposed conditions requiring the proponent to prepare and implement a CSEP for my approval 2 months prior to construction will provide an iterative and practical framework for delivery of community and stakeholder engagement activities.

Within the framework of the CSEP, I have recommended further consultation be undertaken by the proponent with BCC to regarding Outlook Park.

To address the potential impact on the delivery of essential community services for homeless people at Emma Miller Place, I have recommended that the Proponent continue to work in cooperation with key stakeholders, including the Queensland Council of Social Service, Department of Housing and Public Works, Department of Communities, Queensland Health, Brisbane City Council and government funded Micah Projects to provide appropriate assistance to homeless persons who may be adversely affected by the Project Works. In particular. the proponent should use targeted communication at each construction site and engage relevant stakeholders early to ensure appropriate notice is provided to homeless people and service providers prior to construction commencing.

Overall, I consider the changed project will deliver significant social benefits in the form of improved access to key social infrastructure within and around the Brisbane CBD.

5.6 Cultural heritage

5.6.1 Introduction

The proponent has assessed the potential impacts of the proposed changes to the project on Indigenous and non-Indigenous cultural heritage values through database searches and targeted field assessments. The assessment identified an additional 40 non-Indigenous heritage places within and adjacent to (within 50 m) the proposed project alignment, including state and local heritage listed places. Of these, 10 will likely be

impacted by the project, five will potentially be impacted by the project, and 25 are not expected to be impacted by the project.

The changed project has the potential to impact on cultural heritage values through:

- disturbance, damage or destruction of Indigenous cultural heritage sites or places
- potential impact on the visual setting of a heritage place due to the introduction of an inconsistent (new) built form
- potential adverse impact on the physical fabric of a known heritage place, as a result of vibration and/or settlement caused by construction works.

The key cultural heritage issues raised in submissions are discussed in Section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitters issues as part of my evaluation below.

Indigenous cultural heritage

The project change application does not identify any significant changes to potential impacts on Indigenous cultural heritage values. I note that although the proposed change in project alignment will result in changed impacts to Victoria Park, the York's Hollow area, significant to Indigenous cultural heritage, will not be impacted.

In accordance with the *Aboriginal Cultural Heritage Act 2003*, the proponent is required to have a Cultural Heritage Management Plan (CHMP) for the project.

Mitigation measures for Indigenous cultural heritage will be provided in an approved CHMP. Construction works will be undertaken in accordance with an approved CHMP, which will include the presence of cultural heritage monitors throughout construction.

5.6.2 Site-specific impacts and mitigation

Alignment

The proposed changes to the project alignment are predicted to reduce the potential impacts of surface settlement on heritage values, with only two heritage listed sites identified as having a slight risk of settlement-induced damage (Roma Street station building and the Transcontinental Hotel), and six sites requiring settlement monitoring. This is a reduction in impact when compared to the evaluated project.

The project change application describes that changes to the construction methodology (from box cut excavation to mined cavern construction) will reduce indirect construction activity traffic and dust generation impacts on heritage values in the Central area.

Ground-borne vibration from tunnel boring machine excavation is predicted by the proponent to be under 0.5 mm/s along the mined tunnel sections, which is below the established heritage threshold of 2 mm/s, and generally lower than the evaluated project.

Traffic, dust and vibration impacts on heritage values will be managed through the OEMP and associated sub-plans that I require the proponent to update based on the proposed changes to the project.

Fairfield to Salisbury stations and Dutton park station

The project change application identifies nine QR listed heritage values within the railway corridor that will be directly impacted as part of the proposed project changes:

- Fairfield station
- Fairfield platform shelter
- Fairfield footbridge
- Yeronga footbridge
- Yeerongpilly station and trainmen's quarters
- Rocklea platform shelter
- Rocklea footbridge
- Salisbury station
- Salisbury footbridge.

The project change application describes that structural changes to these heritage values include removal of footbridges and stations, and construction of raised platforms, a new third platform at Fairfield station, new station building at all stations and new footbridges. The works are anticipated to result in minor impacts to existing station fabric.

The proponent has committed to addressing potential heritage impacts at these stations, platform shelters and footbridges during the detailed design phase in consultation with the QR Heritage Committee and suitably qualified heritage consultants.

An additional five state and/or local heritage listed places have been identified adjacent to the railway corridor between Dutton Park and Salisbury stations. The project change application does not predict any vibration or settlement impacts on these sites as a result of proposed station or track works.

I note that submissions raised concerns that heritage values at the stations would be impacted by the proposed changes, particularly at Fairfield station. The proponent indicates that the purpose of the upgrades is to improve accessibility and safety outcomes for the stations, and that design will be sympathetic to the cultural heritage landscape and streetscape values where appropriate. Further, the proponent notes that while the heritage platform shelter at Fairfield station will be temporarily removed during the raising of the platform, it will then be reinstated, in consultation with the QR Heritage Council.

Albert Street station

The proposed changes to construction methodology for Albert Street station and proposed demolition of 142 Albert Street are not anticipated to increase impact on adjacent heritage-listed places, when compared to the evaluated project. Settlement impacts at the identified heritage places are predicted to be below 5 mm, and surface vibration is not expected to exceed 0.5 mm/s, which is below the heritage threshold of 2 mm/s.

Roma Street station

The proposed underground Roma Street station realignment will result in an increase in maximum surface settlement from 20-25 mm to 0-50 mm at the heritage listed Roma Street station building. As the existing Roma Street station building is identified as having a 'Slight Risk' of damage, the proponent proposes to undertake settlement monitoring in accordance with the Outline Land Management Plan (a sub-plan of the OEMP), which I require the proponent to update based on the proposed changes to the project. Once the project is operational, the proposed design changes are expected to positively impact the Roma Street station building heritage values by opening the visual line of sight through the station plaza.

The proponent has committed to undertaking additional settlement modelling for the proposed Roma Street section of the INB relocation, and has indicated that, once additional settlement modelling has been completed, consultation will occur with directly affected persons in accordance with Imposed Condition 12 (property damage) and the Outline Land Management Plan, which I require the proponent to update based on the proposed changes to the project.

Exhibition station

Potential impacts on RNA showground heritage places associated with the proposed changes at the Exhibition station are largely consistent with the evaluated project, however three additional heritage listed properties have been identified in the area surrounding the Exhibition station construction footprint: Tufton House, Old Museum building, and Bowen Bridge and approach walls.

Tufton House and the Old Museum building, both state and local heritage listed, are immediately adjacent to the project footprint, but are not predicted to be directly impacted by the project.

The change report states that air quality impacts may occur during construction, however I am confident these would be temporary, and would be appropriately managed through the proponent's Air Quality Management Plan (a sub-plan of the OEMP), which I require the proponent to update based on the proposed changes to the project.

Vibration levels are expected to be below the heritage threshold of 2 mm/s at all heritage properties in the vicinity of the Exhibition station construction works. However, the proponent has committed to ensuring that any vibration-intensive works occurring within 10 m of a heritage building will be accompanied by pre-construction condition surveys and monitoring during construction. Additionally, in response to a submission regarding the potential impacts to Tufton House from project-related vibration, the proponent is in discussions with the property owner regarding monitoring during construction to manage any potential project impacts.

Northern portal and civil structures

The proposed changes to the construction access from Gregory Terrace will require demolition of the Department of Health BTS building, which forms part of the local heritage listed New Zealand Loan and Mercantile Agency Company Woolstore (former). The proponent has committed to undertaking a detailed heritage assessment and

archival recording prior to demolition of the building, in accordance with DES *Guideline: Archival recording of heritage places*.

The project change application predicts that changes to construction access will also result in a minor increase in impacts to heritage values of Victoria Park, which is listed on the Queensland Heritage Register, with removal of two low value trees and other minor vegetation, and a temporary increase in traffic volumes during the construction period. The proponent proposes to avoid damage to mature trees with temporary realignment of a bicycle path and construction site access. The proponent has also committed to minimising impacts through implementation of the OEMP, which I require them to update based on the proposed changes to the project, and consultation with the Queensland Heritage Council and the DES Heritage Unit. In accordance with the *Queensland Heritage Act 1992*, as affected by the *Cross River Rail Delivery Authority Act 2016*, the proponent will be required to obtain an Exemption Certificate for construction and permanent works at Victoria Park.

Mayne area

Two additional heritage places were identified in the Mayne area during cultural heritage assessment of the proposed project changes: the QR Heritage Register listed Breakfast Creek rail bridge (Warren Truss Bridge) and the BCC Heritage Register listed Windsor Park.

The Breakfast Creek rail bridge, located within the rail corridor, is no longer used, and will be demolished and replaced with a new bridge 50 m to the west. The proponent has committed to developing specific heritage mitigation measures in consultation with QR, including undertaking a detailed heritage assessment and archival recording of the bridge prior to demolition, as outlined in the OEMP that I require the proponent to update based on the proposed changes to the project.

Windsor Park, located to the west of the rail alignment between Breakfast Creek and the Albion overpass, is not anticipated to be directly impacted by the project. The change report states that dust deposition contour plots show construction impacts are not predicted to affect this heritage place.

5.6.3 Coordinator-General's conclusion: cultural heritage

I am satisfied that the proponent has adequately assessed the changed project's potential Indigenous and non-Indigenous cultural heritage impacts in accordance with the *Queensland Heritage Act 1992*.

While the project change report identifies an additional 40 heritage listed sites within and adjacent to the project alignment, the changed alignment will reduce the number of heritage listed properties directly affected by the project, which I consider a positive outcome.

I am confident the predicted settlement impacts can be appropriately managed through the OEMP and associated sub-plans, which I require the proponent to update based on the project changes. I note the proponent's commitment that consultation will occur with persons directly affected by settlement, in accordance with Imposed Condition 12

(property damage) and the Outline Land Management Plan, which I require the proponent to update based on the proposed changes to the project.

In consideration of concerns raised in submissions, I expect the proponent to fulfil their commitment to liaise with the QR Heritage Committee during the upgrade or removal of heritage listed sites.

I acknowledge that the proponent is required to have an approved CHMP for the project. I require that, in accordance with the approved CHMP, the potential impacts are managed and mitigated to ensure that all reasonable and practicable measures are taken to avoid harm to Indigenous cultural heritage. I note that although the proposed change in project alignment will result in changed impacts to Victoria Park, the York's Hollow area, significant to Indigenous cultural heritage, will not be impacted.

I am satisfied that with the implementation of mitigation measures consistent with those listed in this report and in the OEMP, updated based on the proposed changes to the project, along with legislative requirements under the *Queensland Heritage Act 1992*, the non-Indigenous and Indigenous cultural heritage impacts of the proposed changes to the project will be appropriately mitigated and managed.

The previously approved Cross River Rail project wide Imposed Conditions remain appropriate to manage the potential cultural heritage impacts of the changes to the project.

5.7 Hydrology

5.7.1 Introduction

The proponent assessed the potential changes to flooding and drainage impacts resulting from the proposed changes to the project.

The assessment included interrogation of existing hydrology models and reports with reference to the proposed changes and incorporated updated changes to legislation and guidelines. For some project locations hydrologic and hydraulic modelling were used to assess local flood risk and estimate flood levels to ensure design immunity.

The key hydrology issues raised in submissions are discussed in Section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitters issues as part of my evaluation.

Climate Change

Since the assessment of the evaluated project the Queensland Government released key documents which assist with the consideration and planning of climate change impacts:

- the Queensland Climate Adaptation Strategy 2017-2030 and the associated Sector Adaptation Plan for the Built Environment and Infrastructure recognises the impact of climate change on infrastructure and the need for adaptation planning to be incorporated in the design of infrastructure projects. This aligns with the project's Imposed Conditions and the Environmental Design Requirements that the project is

designed to be adaptable to conditions that may arise as a result of climate change which include accommodating a predicted 1 m sea level rise scenario in 2100

- the Brisbane River Catchment Flood Study (BRCFS) was released in 2017 and forms the basis for determination of flood levels in Brisbane including consideration of sea level rise and increase in rainfall intensity. This means the mapped extents and depths of floods in Brisbane are increased compared to previous studies. The flood levels and extents described in the proponent's assessment are based on the BRCFS existing flood surfaces. Where climate change flood levels and extents are indicated this is provided on the BRCFS scenario incorporating the 1 m sea level rise as per the project's Imposed Conditions.

5.7.2 Impacts and mitigation

Fairfield to Salisbury stations

Riverine Flood

The proposed changes to the project between Fairfield and Salisbury will not impact the flood immunity of these stations. All stations except Rocklea are located above the 1 in 100 AEP Brisbane River flood level, without climate change. Table 5.23 below lists the existing flood immunity for each of the stations.

Table 5.23 Existing flood immunity of Fairfield to Salisbury stations

Station	Flood Immunity (AEP) [5] (without climate change)	Flood Immunity (AEP) (with climate change)
Fairfield station	1 in 200	1 in 200
Yeronga station	1 in 200	1 in 200
Yeerongpilly station	above 1 in 100	above 1 in 100
Moorooka station	above 1 in 100	below 1 in 100
Rocklea station	between 1 in 100 to 1 in 50	below 1 in 100
Salisbury station	above 1 in 100	below 1 in 100

The construction worksites for the Fairfield to Salisbury stations except for Rocklea will be located outside of the 1 in 100 AEP flood event extent. In order to comply with the Imposed Condition all construction works at the stations will be designed and implemented to avoid inundation from stormwater due to a 2 yr (6hr) Annual Recurrence Interval (ARI) rainfall event and flood waters due to a 5 yr ARI rainfall event.

As can be seen in Table 5.23, the Moorooka, Rocklea and Salisbury stations have a flood immunity below 1 in 100 AEP flood event level with climate change. For these stations, the proponent has advised in their change application that the design will ensure that all critical rail system assets will have a flood immunity above 1 in 200 AEP flood event level, and that the proposed station and rail alignment's flood immunity would

[5] Annual Exceedance Probability – the probability of a flood occurring in any given year

not change. The potential impact of flooding will be further analysed during the detailed design phase to ensure the design does not result in unacceptable flood impacts.

Clapham Yard Stabling - Riverine Flood and Overland Flow

The Clapham Yard stabling area is affected by flooding from the Brisbane River and overland flow. In order to comply with the project's Imposed Conditions, construction works at this location will be designed and implemented to avoid inundation from stormwater due to a 2 year (6hr) Annual Recurrence Interval (ARI) rainfall event and flood waters due to a 5 year ARI rainfall event.

The proposed project change at Clapham Yard aims to achieve cut/fill balance to minimise filling in the floodplain, which would have effects on the flow of water. The change application states that the rail level at Clapham Yard would be no lower than the mainline rail level over Moolabin Creek, which is the lowest point. This change may result in the additional stabling infrastructure at Clapham Yard not complying with the QR stabling requirement of 1 in 100 AEP flood event immunity, however the proponent states this will be avoided by ensuring a correct cut fill balance so that the site isn't overfilled which would impact nearby sites. The proponent has committed to undertaking further modelling as part of the detailed design stage to confirm the cut/fill balance and flood immunity levels required for the stabling roads and rail system assets, and I require this to be undertaken. In its submission BCC also requested detailed flood modelling to be undertaken and provided to Council for review for cut and fill earthworks at Clapham Yard. I have recommended that the proponent should continue to undertake consultation with directly affected persons and key stakeholders for the duration of construction, to minimise and manage project impacts.

In addition, the proponent in their change application advised that all power and rail system assets would be designed at 1 in 200 AEP and all signalling assets and crew facility buildings at 1 in 100 AEP. Further detailed modelling would also be required to confirm no offsite afflux associated with the reprofiling of the yard and to consider mitigation to manage the risks associated with more frequent inundation on the yard than if the design were to achieve the 1 in 100 AEP flood event immunity. The project's Environmental Design Requirements require that the project design will not cause property damage from flood impacts to third parties for events up to and including the 1 in 100 AEP flood event.

The construction works for the proposed rail bridge design at Moolabin Creek include a temporary platform over the creek or a stone fill working platform within the creek, subject to further detailed design and approvals. The proponent's change application advises that, consistent with the 2011 EIS design the proposed construction work in this location has the potential to result in an increase in water level at adjacent commercial and industrial buildings in the order of 40mm for a 1 in 20 AEP flood event and 90mm for the 1 in 100 AEP flood event. The proponent must undertake detailed flood modelling and construction planning for the proposed Moolabin Creek bridge to confirm potential construction phase afflux impacts to upstream properties.

The proponent's change application advises that the rail infrastructure across Moolabin Creek bridge will be consistent with the existing conditions with an approximate flood

immunity of 1 in 50 AEP Brisbane River flood event and 1 in 100 immunity for the local Moolabin Creek flood event.

In its submission, BCC requested detailed flood modelling to be provided to Council for review for the new Moolabin Creek bridge. I require this to be undertaken and so have included a recommendation in this report that detailed hydraulic modelling is to be conducted as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek. BCC is to be consulted on hydraulic modelling which will inform construction methodology and bridge design. Hydraulic modelling should be provided to BCC for review and comment.

Southern Portal

Local Overland Flow

The proponent's assessment found that flooding and drainage impacts would generally be consistent with the evaluated project. The existing rail track is currently inundated in a 1 in 100 AEP flood event. The change application stated that to provide for the 1 in 100 AEP flood immunity for the track and portal it is proposed to divert the stormwater around the trough structure with retaining walls and intercept runoff via new underground stormwater pipes. Any potential afflux issues that may arise such as diversion of overland flow onto land outside the rail corridor will be further assessed by the proponent and mitigated through detailed design to achieve the project's Environmental Design Requirements.

Dutton Park station

Riverine Flood

The change application states that Dutton Park station would not be affected by a 1 in 10,000 AEP flood event and is not at risk of flooding from the Brisbane River.

Local Overland Flow

The proponent's assessment concluded that Dutton Park station is protected against the overland flow from external catchments for up to a 1 in 2000 AEP event. The maximum flood level is near the northern end of the station and modelling results found ponding would occur near the station, however would not exceed station floor levels.

Woolloongabba station

Riverine Flood

The location of the Woolloongabba station is susceptible to flooding in a 1 in 10,000 AEP flood event. The change application states that the change to the location and design of the station will result in the entrance being above the 1 in 10,000 AEP level plus sea level rise, which removes the need for deployable flood protection devices.

Local Overland Flow

The proponent has committed to undertaking a detailed design of the drainage system and will be required to mitigate any potential impacts, replicate the existing attenuation of

flood water on the site where possible and maintain the current discharge point in to the BCC stormwater network.

Albert Street station

The proposed Albert Street station is located within the 1 in 100 AEP flood event with ponding modelled to occur. Therefore the evaluated project design proposed three levels of flood protection to address different type of flood events.

Riverine Flood

The proposed changes to the Albert Street station will reduce the flood risk compared to the evaluated project with the street level entrance at the junction with Elizabeth Street being higher than the previous station entrance. The proposed station design level is above the 1 in 100 AEP riverine flood level and requires deployable flood protection against riverine flood for 1 in 10,000 AEP plus sea level rise.

Local Overland Flow

The Albert Street station will be constructed within an existing building footprint and therefore is unlikely to alter existing runoff rates. The station design places the northern entrance 300mm above the design flood levels and the south entrance at 4.55 m AHD, which provides for flood immunity of an overland flow event of 1 in 100 AEP plus climate change and sea level rise.

Drainage

The proponent reviewed the existing drainage system at the proposed Albert Street station and identified the drainage system between Charlotte Street and Mary Street is undersized and requires upgrading. The proponent in their change application indicates that slotted drains will be provided on Albert Street to accommodate the undergrounding of the overland flow.

Roma Street station

Riverine Flood

Hydrologic and hydraulic modelling to assess local flood risk predicted Roma Street station was susceptible to Brisbane River flooding in the 1 in 10,000 AEP flood event, where flood levels would be approximately 3.7m above the entry level of the proposed station. The change application proposed the additional flood mitigation of deployable flood protection devices (demountable barriers) at the underground station to protect against the 1 in 10,000 AEP flood event plus sea level rise. This in an improvement on the flood immunity of the previously evaluated project.

The design of the integration and lowering of the INB will comply with the drainage design criteria and the design flood immunity specified for the Brisbane Metro Project.

Local Overland Flood

The Roma Street station will be built within an existing building footprint, outside of the 1 in 100 AEP flood event and is unlikely to alter existing flow regimes. The station design floor level is 14.4 m AHD which provides flood immunity up to 1 in 1000 AEP flood event.

Drainage

The proponent in their change application indicates a review of the existing drainage system has been undertaken and it has the capacity to accommodate the drainage requirements arising from the proposed changes to the project at Roma Street.

Mayne Yard

Riverine Flood

The Breakfast Creek floodplain is heavily constrained with several existing structures crossing the waterway. Construction of the new Breakfast Creek bridge adjacent to Mayne Yard will require the construction of structures, both temporary (during construction of the bridge) and permanent within the waterway. Modifications to any existing structures crossing the creek, have the potential to increase peak flood levels and flood impacts both to upstream and downstream areas.

A 2017 hydraulic assessment for the proposed replacement of the existing Breakfast Creek Bridge found that flood modelling for an indicative construction (including the use of a temporary bridge) resulted in increases in peak flood levels from 50-100mm in private properties upstream of the temporary crossing, in floods ranging from a 1 in 5 AEP flood event to a 1 in 100 AEP flood event at Breakfast Creek. Therefore, depending on the construction methodology there is the possibility that the works could cause upstream flooding impacts. The proponent is therefore required to undertake further detailed bridge design including detailed flood modelling and construction planning to mitigate any potential property impacts.

Submissions raised concerns with the potential flooding impacts for upstream communities at Mayne Yard as a result of the proposed works and due to the works associated with the Breakfast Creek bridge. The existing project wide Imposed Conditions including the Environmental Design Requirements (Appendix 1) require the proponent to design the bridge to avoid afflux and not cause property damage from flood impacts to third parties for events up to and including the 1 in 100 AEP flood event. The proponent has identified that detailed flood modelling will be required to identify potential operational flood impacts and mitigation to avoid or minimise upstream afflux. This will be undertaken in consultation with stakeholders to inform subsequent State approvals under the *Planning Act 2016*. Further discussion is provided in Section 5.8 of this report.

I note that in its submission BCC requested to be consulted on all hydraulic modelling during the design and construction of the Breakfast Creek bridge, and I require this to occur. I have recommended that detailed hydraulic modelling be conducted as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek. BCC is to be consulted on hydraulic modelling which will inform the construction methodology and bridge design. Hydraulic modelling should be provided to BCC for review and comment.

Local Overland Flow & Drainage

The proponent's assessment notes that Mayne Yard is currently affected by local overland flow. Construction activities will be planned and implemented to prevent uncontrolled surface water flows outside of the worksite, which is a measure consistent

with the project's OEMP. Imposed Condition 17 requires that project works must be designed and implemented to avoid afflux or cause the redirection of uncontrolled surface water flows, including stormwater flows, outside of worksites.

The changed project proposed a new drainage system for Mayne Yard East and Mayne Yard North to capture and divert run-off from the Yard, access roads and carparks that would otherwise discharge into Breakfast Creek. The project change application states the existing gross pollutant traps in Mayne Yard will be retained and additional measures will be considered in the design to achieve the project's Environmental Design Requirement.

5.7.3 Coordinator-General's conclusion: hydrology

I am satisfied that the proponent has assessed the potential flooding and drainage impacts resulting from the changes to the project.

I note the proponent's assessment incorporated the Brisbane River Catchment Flood Study 2017 as the baseline data for predicting flood levels, therefore I am satisfied the assessment is based on current flood information.

The proponent highlighted the key project changes that are relevant to the flood impact assessment. These include:

- new bridge crossings at Moolabin Creek and Breakfast Creek
- reduced imported fill at Clapham Yard
- deployable flood protection at Roma Street station
- detailed design required to confirm deployable flood protection against riverine flood for 1 in 10,000 AEP flood event at Albert Street station.

I note the proponent's assessment predicts that the potential construction phase flood and drainage impacts are generally consistent with the evaluated project and will be managed through the mitigation measures outlined in the OEMP that I require the proponent to update based on the proposed changes to the project.

To reduce the potential impacts of the project, I have recommended that detailed hydraulic modelling be conducted as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek. BCC is to be consulted on the modelling results and their response is to be taken into account as the construction methodology and bridge design is finalised.

I note that the proposed changes to the project include achieving a cut/fill balance at Clapham Yard stabling area, which will reduce the impact on the Brisbane River floodplain capacity but may impact on achieving 1 in 100 AEP flood event immunity for the stabling yard which is required by QR. I recommend the proponent undertake further modelling in the detailed design phase in consultation with stakeholders including BCC and QR to confirm the required cut/fill balance and levels for Clapham Yard, as well as ensuring no off-site afflux impacts.

I expect that this detailed design and flood modelling in consultation with key stakeholders will further identify any potential flooding impacts for both construction and operation at Breakfast Creek, Moolabin Creek and Clapham Yard and inform any

additional mitigation measures required to ensure the project complies with the relevant Imposed Conditions.

5.8 Nature conservation

5.8.1 Introduction

As the changed project is within a highly urbanised area, the overall impact on flora and fauna is expected to be minimal, which is consistent with the evaluated project. The proponent has undertaken an assessment of potential nature conservation impacts resulting from the proposed project changes, including a desktop review and targeted field survey. The key project changes impacting on nature conservation include:

- construction of new rail bridges at Breakfast Creek and Moolabin Creek that will require the removal of approximately 2,000 m² of marine plants
- changed construction access that will require the removal of vegetation in Victoria Park
- additional works in the rail corridor at Yeronga, Yeerongpilly, Moorooka, Rocklea and Salisbury, which are within a declared Fire Ant Biosecurity Area.

The key nature conservation issues raised in submissions are discussed in Section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitter's issues as part of my evaluation below.

5.8.2 Project wide impacts and mitigation

The proponent has undertaken a desktop review and targeted field survey assessment for the changed project, which identified additional weed species compared to the evaluated project. Based on this assessment the proponent has established that the proposed changes to the project do not alter the pest and weed dispersion risk impacts. The proponent has committed, through the Outline Nature Conservation Management Plan (Outline NCMP) (a sub-plan of the OEMP), to the preparation of a pest and weed management plan to be implemented prior to the commencement of any project works, to ensure that construction activities do no cause the introduction or spread of pest species.

The proposed project changes include station upgrades at Yeronga, Yeerongpilly, Moorooka, Rocklea and Salisbury, which are identified as Fire Ant Biosecurity Zones (FABZ). FABZ are in place in areas of Queensland to restrict the movement of materials that could spread fire ants. The Outline NCMP, which I require the proponent to update based on the proposed changes to the project, outlines management measures for FABZ sites and will ensure all works within the FABZ areas comply with the requirement of the *Biosecurity Act 2014*. The proponent has committed, through the Outline NCMP, to the following

- prior to the commencement of any site works or construction, prepare and implement for each construction worksite or work area, a specific Approved Risk Management Plan for Red Imported Fire Ants

- material being moved within and across FABZ must be managed under a biosecurity instrument permit and in accordance with DAF's (Biosecurity Queensland) General Biosecurity Obligations
- all project sites receiving fire ant carriers must ensure that a Biosecurity Instrument Permit is provided by the supplier, or a Biosecurity Queensland certified inspection certificate is supplied for fire ant carriers.

I am satisfied that with the implementation of the OEMP, which I require the proponent to update based on the proposed changes to the project and compliance with the *Biosecurity Act 2014*, weed/pest species and biosecurity can be safely managed for the project.

5.8.3 Site specific impacts and mitigation

Fairfield to Salisbury stations

The proponent's project change application includes the construction of a new bridge over Moolabin Creek, which would impact on regulated vegetation along the banks of the creek. The project change application states that as the new bridge will be constructed between existing bridges, the impact on the nature conservation values of this vegetation will be minimial.

Upon finalisation of detailed bridge design, the proponent will be required to consider a range of accepted development requirements and obtain approvals for demolition and construction of bridge structures at Moolabin Creek, including:

- accepted development requirements for operational work that is the removal, destruction or damage of marine plants (Planning Regulation 2017)
- accepted development requirements for operational work that is constructing or raising waterway barrier works (Planning Regulation 2017)
- Operational Works (removal, destruction or damage of marine plant, constructing or raising waterway barrier works, prescribed tidal works) development permit (Planning Regulation 2017).

I am satisfied that in meeting these requirements, the impacts associated with demolition and construction of the proposed bridge, including impacts to regulated vegetation, will be appropriately managed.

Additionally, the proponent's Outline NCMP (a sub-plan of the OEMP), which I require the proponent to update based on the proposed changes to the project, outlines measures to help minimise potential impacts on flora, fauna and nature conservation, which are applicable to Moolabin Creek. These include minimising clearing/trimming of native vegetation, undertaking pre-construction fauna surveys, and implementing a pest and weed management plan.

Roma Street station and Inner Northern Busway

Vegetation clearing associated with proposed changes to the project at Roma Street include clearing of street plantings and gardens, and approximately one hectare of parkland at Emma Miller Place. This clearing is not anticipated to impact on regional ecosystems, remnant vegetation of significance or regulated vegetation, and no fauna

habitat features were identified in the area. Once construction works are completed, the proponent has committed to landscaping and rehabilitating Emma Miller Place to its former condition in consultation with BCC, which is consistent with the approved 2011 EIS. In response to submission concerns regarding the size of existing trees at Emma Miller Place, the proponent confirmed that appropriate offsets will be developed in consultation with BCC as part of a broader project agreement.

Victoria Park

The realignment of the access to the railway corridor and Northern Portal through Victoria Park will require the removal of two low value trees and other minor vegetation, resulting in disturbance of active and inactive fauna breeding sites. While this is an increase in potential impact when compared to the evaluated project, the proposed changes to the project reduces other impacts by avoiding impact to high value trees and an area mapped as of general ecological significance under the Brisbane City Council Plan 2014 that were previously approved for removal in the 2012 CGER.

The proponent has advised that any vegetation offset requirements resulting from clearing at Victoria Park will be developed in consultation with BCC as part of a broader project agreement. I require that project works and worksites in Victoria Park are designed and planned to avoid or minimise the loss of vegetation as required by the existing project-wide Imposed Condition 20.

Exhibition showgrounds

The proposed project change application includes design refinements at the Exhibition station that require the removal of two existing fig trees due to poor health and form. The proponent advises that while the trees provide potential fauna habitat (hollows), the trees will be replaced following the construction period, reducing the long-term impacts.

An increase in construction traffic movement within the exhibition grounds has the potential to cause additional disturbance to any fauna species choosing to nest within the site. However, proponent assessment of the site only identified one common ringtail possum. The proponent has committed in the OEMP (Outline NCMP), which I require the proponent to update based on the proposed changes to the project, to capturing and relocating fauna as required during construction works.

Mayne Yard

The proposed changes to the project at Mayne Yard include demolition of an existing rail bridge and construction of a new rail bridge over Breakfast Creek, which will see the north-bound track pass closer to remnant riparian vegetation of Breakfast Creek.

The project change application states that, while the new alignment will not encroach on mapped remnant vegetation areas, the narrow strips of vegetation along the banks of Breakfast Creek are consistent with RE 12.1.3 (‘least concern’) and contain estuarine mangroves and other marine plant species, such as marine couch and sedges. The proposal will require clearing of approximately 2,000 m² of marine plants at Breakfast Creek, resulting in new temporary and permanent impacts on marine plants as indicated below:

- temporary impacts are associated with construction, including within the footprint of the proposed temporary falsework bridge
- permanent impacts include the direct project footprint, as well as the requirement for ongoing maintenance of vegetation-free buffers to the new bridge structure in accordance with QR operational and safety standards.

Upon finalisation of detailed bridge design, the proponent will be required to consider a range of accepted development requirements and obtain appropriate approvals for demolition and construction of bridge structures, including geotechnical investigations and removal of quarry material in Breakfast Creek:

- accepted development requirements for operational work that is the removal, destruction or damage of marine plants (Planning Regulation 2017)
- accepted development requirements for operational work that is constructing or raising waterway barrier works (Planning Regulation 2017)
- excluded work (coastal) (Planning Regulation 2017)
- operational works (removal, destruction or damage of marine plant, constructing or raising waterway barrier works, prescribed tidal works) development permits (Planning Regulation 2017)
- quarry material allocation notice (*Coastal Management and Protection Act 1995*).

I am satisfied that in meeting these requirements, the impacts associated with demolition and construction of the proposed bridge, including impacts to marine plants, will be appropriately managed.

Riparian vegetation along Breakfast Creek adjacent to Mayne Yard has the potential to support black flying-fox (*Pteropus alecto*), protected under the *Nature Conservation Act 2014* (NC Act), and the area is mapped by DES as a flying-fox roost site (current and historical roosts).

Four fauna surveys undertaken between 2014 and 2017 show the roost site adjacent Mayne Yard has sporadic and declining use by the black flying-fox. The grey-headed flying-fox (listed as vulnerable under the EPBC Act) has been observed at the southern end of the roosting habitat, and the roost site has potential for seasonal use by the little red flying-fox (*Pteropus scapulatus*). The black, grey and little red flying-fox are all listed as significant fauna species under the Brisbane City Plan 2014 Biodiversity areas overlay code. There is potential for all three flying-fox species to be present during the construction phase of the development.

A submission on the project change application was concerned that limited discussion was provided regarding the project's direct impacts on flying-fox species, and measures to manage and mitigate impacts on flying-foxes.

The project change application confirms that in accordance with the Nature Conservation (Administration) Regulation 2017, the proponent will be required to obtain a flying-fox management permit for removal of vegetation within the DES mapped flying-fox roost site. The proponent has advised the extent of disturbance will be determined during detailed design. Additionally, the proponent has indicated that QR has an existing Environmental Management Plan specific to Mayne Rail Yard, which provides a number of measures to protect the black flying-fox.

The bush stone-curlew, listed as a significant fauna species under the Brisbane City Plan 2014 Biodiversity areas overlay code, was recorded in the study area during the BAAM 2017 field survey. In addition, a rainbow lorikeet (*Trichoglossus haematodus*) nest was located within a small tree hollow.

The proponent has advised that a fauna spotter-catcher working under a rehabilitation permit will be present during all preconstruction and construction works where fauna habitat will be disturbed or removed.

Mitigation and management measures

In addition to the management and mitigation measures identified above, the proponent has committed to reducing and managing the risk of impacts to nature conservation associated with the proposed project changes through the Outline NCMP, including:

- consultation with an arborist in relation to fig tree management at the RNA Showgrounds
- development of a suitable landscaping and rehabilitation plan for Emma Miller Place to ensure the area is returned to an agreed state (in consultation with BCC) following the temporary construction program
- undertaking a pre-construction fauna survey within and around worksites to identify any species for which a species management plan needs to be developed
- developing and implementing a rehabilitation plan, landscape plan, pest and weed management plan for each specific area
- obtaining necessary clearing permits and clearly marking ‘no-go’ areas
- capturing and relocating fauna (fauna spotter/catcher) as required during construction works
- employing a suitably qualified person for vegetation rehabilitation and on-going monitoring of fauna/flora and endangered, vulnerable and near threatened species
- management and mitigation of impacts on fauna through the implementation actions within the Outline NCMP, consistent with the project OEMP.

I expect the commitments to be implemented.

5.8.4 Coordinator-General’s conclusion: nature conservation

I am satisfied that the proponent has appropriately assessed the potential nature conservation impacts resulting from the proposed changes to the project.

I acknowledge there will be increased marine vegetation loss as a result of demolition and construction of bridges at Breakfast Creek and Moolabin Creek, with disturbance at Breakfast Creek potentially impacting on flying-fox habitat.

I am satisfied that potential impacts to marine vegetation and flying-fox habitat can be mitigated and managed through measures outlined in the OEMP (Outline NCMP), which I require the proponent to update based on the proposed changes to the project, along with additional development approvals required upon finalisation of detailed design for Breakfast Creek and Moolabin Creek bridges.

In response to submissions and requests for clarification, the proponent has committed to continue consulting and negotiating with BCC regarding proposed vegetation clearing and to finalise project-wide offset requirements. I expect the parties to finalise an agreement prior to any clearing works being undertaken.

Further, the proponent notes that offsets for any significant residual impacts on Matters of State Environmental Significance will be provided as part of the state approvals to be obtained, including approvals relating to marine plants or other native vegetation disturbance permits.

5.9 Landscape and visual amenity

5.9.1 Introduction

The key impacts on landscape and visual amenity as a result of the proposed project changes include:

- temporary visual impacts at Roma Street station as a result of extended cut and cover works for the relocation and undergrounding of the Roma Street section of the INB
- changes to station entrances in Albert Street
- new pedestrian bridges at Woolloongabba station and Boggo Road station, to increase connectivity to surrounding land uses
- new rail bridges across Breakfast Creek and Moolabin Creek.

The key landscape and visual amenity issues raised in submissions are discussed in Section 3.3. I have considered each submission and how the information provided by the proponent has responded to submitters issues as part of my evaluation below.

5.9.2 Project wide impacts and mitigation

Lighting

Consistent with the evaluated project, lighting will be required throughout construction to facilitate night-time work activities and ensure the safety and security of workforce and property. The project change application states that the majority of project sites will require surface level lighting, with the use of acoustic sheds and screening measures (where applicable) to minimise glare to surrounding receptors. The change application predicts an increase in construction lighting requirements at Mayne Yard due to the increased extent of works, and at the Fairfield to Salisbury stations, which were not considered as part of the evaluated project.

To minimise light spill, the temporary lighting is proposed to be focused on project elements and points of interest. However, as identified in the evaluated project, sensitive receptors with limited access to visual barriers (such as high fences or vegetation) could also be susceptible to light glare from passing construction vehicles and demolition activity. The project change application states that the staged nature of the construction program means that impacts at each site would be limited to a short period of the whole of project works.

During operation, the proposed changes would result in an increase in frequency of trains operating along the network, when compared to the evaluated project, potentially increasing train movement lighting impact on surrounding receptors. The project change application states that operational lighting along the track alignment will be minimal and in accordance with current QR guidelines.

Three submissions on the project change application were concerned with potential impacts of light pollution from stations on nearby residences, and two submissions identified a concern regarding safety risks associated with poor lighting. The proponent notes that lighting will be designed to provide for commuter safety objectives while minimising light spill. Consistent with the evaluated project and the OEMP, the proponent has committed to the following measures to mitigate and manage potential lighting impacts associated with the proposed changes:

- program and schedule the construction phase of works to minimise night-time impacts of lighting, including from traffic movement, on residential properties
- where appropriate, use directionally-controlled, shielded lights that are mounted at a sufficient height to allow the light to be appropriately targeted to minimise light spill to surrounding properties, maintain safe driving conditions for motorists on adjacent roads and minimise impacts on local fauna
- project lighting to be designed in accordance with the relevant standard, such as *Australian Standard 4282:1997 Control of the obtrusive effects of outdoor lighting* and QR's guidelines, such as the *Lighting Standard for Railway stations*.

I am satisfied that the level of impacts from construction and operation lighting are generally consistent with the evaluated project and can be appropriately managed through the OEMP. I require the proponent to update the OEMP based on the proposed changes to the project, which requires all lighting impacts to be managed in accordance with relevant Australian Standards and QR's guidelines.

5.9.3 Site specific impacts

Residential areas and places of community importance, such as parks, recreational areas and heritage sites are sensitive to changes to the visual environment. During construction, short-term impacts on landscape character and visual amenity are expected at construction worksites, including:

- acoustic sheds
- security fencing
- site offices
- night lighting.

The proponent has undertaken a comparative visual assessment with the evaluated project, which identified associated impacts to the landscape and physical environment.

The proponent has committed, through the OEMP that I require to be updated based on the proposed changes to the project, to prepare a visual impact mitigation plan that will mitigate potential visual impacts during construction and include the use of noise barriers and hoardings. Impacts on the visual amenity and landscape for each area is detailed below.

Southern Portal

Southern corridor works were not previously included in the project scope, therefore visual impacts of the Southern Portal were not assessed as part of the evaluated project.

The site is considered to have a low-moderate visual sensitivity, with traffic and pedestrian views into the site, and mixed land use surrounding the site (residential, medical, commercial and industrial).

Construction activities, including the demolition of QR buildings and the use of temporary sheds, cranes and heavy machinery, are anticipated to have a low-moderate yet temporary impact on the visual amenity of the site.

As proposed works are contained within the existing rail corridor, and the new Southern Portal structure will be integrated/consistent with the existing land us. The operational visual impacts are predicted to be low.

Clapham Yard

New proposed works at Clapham Yard will result in an increased impact on visual amenity when compared to the evaluated project. However, due to the existing rail environment and low-moderate sensitivity of the surrounding receptors (largely industrial), the project change application predicts there would be a low-moderate visual impact during construction, and a low visual impact during operation.

Fairfield to Salisbury stations

The proposed station upgrades from Fairfield to Salisbury did not form part of the evaluated project and consequently construction will cause new impacts to visual amenity.

The project change application states that these stations are generally located in predominantly residential and multi-use commercial areas with moderate visual sensitivity. Construction works at each of the six stations will largely be undertaken within the rail corridor, however construction areas will also be required adjacent to the rail corridor at Yeronga, Moorooka and Salisbury stations. The visual impact at all stations during construction has been assessed as low-moderate, with periods of increased visual impacts during more obtrusive construction activity periods.

Once operational, the project change application predicts that proposed changes to the stations, including enhanced station and platform infrastructure, improved pedestrian access, updated architectural features, and reinstated vegetation are anticipated to provide low-moderate beneficial impacts to local viewpoints.

A number of submissions noted concerns that the proposed design of the new stations would be unsympathetic with the existing amenity values of the area, particularly at Fairfield station. In response, the proponent advised that in accordance with the imposed condition Environmental Design Requirements (6 and 9), design will be sympathetic to the cultural heritage landscape and streetscape values where appropriate, however the primary purpose of the station upgrades is to improve accessibility and safety outcomes for the stations. These improvements to safety and accessibility were also highlighted in submissions supporting the project. Further, the proponent notes that station design and accessibility will be consistent with the QR Station Design Manual and legislative

requirements under the *Disability Discrimination Act 1992* and the *Disability Standards for Accessible Public Transport 2002*.

Dutton Park station

Potential impacts to landscape amenity at Dutton Park station are predicted to increase during the construction phase (when compared to the evaluated project), due to the temporary change in land use in the area and an increase in the number of affected properties. The landscape impact has been assessed as low-moderate, as the surrounding landscape is predominantly residential and commercial properties, and existing screening around the station and Annerley Road limits sightlines into the rail corridor.

While the majority of construction works will occur within the rail corridor, which is below surrounding ground level and less visible from surrounding land uses, works associated with the pedestrian overpass would be visible from residential receivers and passing traffic, increasing potential impacts on visual amenity of the area when compared to the evaluated project.

A number of submissions on the project change application suggested that the proposed eastern platform extensions should occur northwards rather than southwards to limit impact on suburban amenity; and queried the final land use of acquired properties on Cope Street following project construction. The proponent responded that proposed changes to the eastern platform are in line with the evaluated project's western platform southern extension, and that the extension will be entirely within the rail corridor. Further, the proponent notes that the location of the extension will ensure the station remains operational during the construction period. The project change application states that following construction, the impacted lots will be redeveloped, however the proponent notes the final land use is still to be determined.

The project change application predicts that following construction, redevelopment of the impacted lots and improved accessibility and architectural features of the station would result in beneficial impacts to landscape and visual amenity for surrounding receptors.

Boggo Road station

The key changes to Boggo Road station impacting on visual amenity is the addition of a new pedestrian and cycle overpass and the extension and elevation of the existing noise barriers adjacent to the rail corridor, south of the proposed station.

As the proposed station is located in a highly urbanised mixed-use area with high visibility from surrounding sensitive receivers, temporary construction infrastructure (sheds and cranes) and activities are anticipated to have a greater visual impact than the evaluated project, with a moderate impact to visual amenity.

During operations, the proposed height extension of the noise barriers is anticipated to improve visual amenity. While the new pedestrian and cycle bridge will increase visual impact, it will significantly improve connectivity and access in the Boggo Road area.

Woolloongabba station

Construction and operational visual impacts for Woolloongabba station are anticipated to be consistent with the evaluated project. While the station is proposed to be relocated approximately 70 m west, the design of the station is similar, and it is located within a similar visual context.

Overall, the station development and proposed changes to pedestrian connectivity are expected to have a beneficial impact on visual amenity of the area.

Albert Street

The proposed changes to Albert Street include repositioning of the Albert Street station 80 m north-west, and construction of a new northern station entrance at 142 Albert Street, which requires demolition of the existing 142 Albert Street building. Major works are proposed at the site throughout the construction period, with sheds, cranes and air ventilation exhausts the most prominent visible construction elements. As construction will be relocated from within the street to behind site hoarding, the project change application identifies that there will be a reduced visual impact along Albert Street. However, due to the nature of high rise buildings within the Brisbane CBD, views of the construction worksites would occur from nearby high-rise residential and commercial buildings. Overall, due to the similar scale, location and nature of works proposed, I agree with the project change application's prediction that impacts to visual and landscape amenity during construction will be consistent with the evaluated project.

Operational impacts to visual and landscape amenity are also predicted to be similar to the evaluated project, however the consolidated entrances and removal of structures from Albert Street and adjacent footpaths are anticipated to complement BCC's Albert Street Vision.

Roma Street station and Inner Northern Busway

During construction, the proposed relocation of Roma Street station to below the existing heritage listed building is anticipated to result in a similar visual impact as the evaluated project, due to the length of time works will occur and the sensitivity of the surrounding receptors.

The lowering of the Roma Street end of the INB is predicted to increase temporary visual impacts during construction, due to road realignments, cut and cover tunnel works, construction worksites, and clearing of vegetation at Emma Miller Place.

The project change application predicts that the enhancement of the Roma Street station and improvement of public transport alignment is anticipated to improve the visual amenity of the area following completion of construction, by opening viewpoints to the heritage station building, and removing buses from the surface. Additionally, the proponent has committed to rehabilitating Emma Miller Place once construction is completed. I expect the proponent to implement this commitment.

Victoria Park

The proposed removal of vegetation at Victoria Park, along with demolition of the Department of Health BTS building and signalisation at Gregory Terrace will increase

impacts on visual amenity values at this location. As it is traversed daily by pedestrians, Victoria Park is considered to have moderate visual sensitivity, however the proponent considers impacts will be manageable with the implementation of mitigation measures as set out in the OEMP. I require the proponent to update the OEMP based on the proposed changes to the project and ensure that project works and worksites in Victoria Park are designed and planned to avoid or minimise the loss of vegetation as required by Imposed Condition 20.

Exhibition station

Proposed changes at the Exhibition station are anticipated to reduce negative impacts to visual amenity when compared to the evaluated project, both during construction and operation. The changed design, which no longer includes the proposed overpass, would reduce the scale of works, decreasing the length of time heavy machinery and construction activities are visible in the Exhibition area. Once operational, the proposed upgrades to Exhibition station are predicted to enhance visual amenity.

Mayne Yard

Proposed changes in the Mayne Yard are anticipated to result in an increased impact to visual amenity, both during construction and operation.

While the trough structure proposed in the evaluated project is no longer included in the project design, the scale of works has increased significantly with bridge demolition and construction, new stabling works, and construction of an elevated road. These project elements would also be more visible once operational.

The project change application concludes that due to the low-moderate sensitivity of viewpoints into Mayne Yard, the visual impacts are considered to be low-moderate, which is contextually consistent with the evaluated project.

I consider that visual impacts in the Mayne Yard area can be appropriately managed through the OEMP that I require the proponent to update based on the proposed changes to the project.

Management and mitigation measures

In accordance with the OEMP that I require the proponent to update based on the proposed changes to the project, the proponent proposes the following key measures to mitigate and manage impacts to visual amenity during construction and operation:

- preparing a Visual Impact Mitigation Plan prior to construction to mitigate potential visual impacts of noise barriers and hoardings, where appropriate
- designing and operating worksites to minimise the loss of public open space
- ensuring that the design and siting of construction worksites considers topography, vegetation, scale, character of construction and construction materials, proximity to surrounding sensitive land uses and the duration of its use
- providing noise barriers and hoardings around construction worksites to mitigate the views of construction works and where appropriate, these will incorporate landscaping and urban design measures to minimise the visual impact of the barriers and will be regularly maintained

- minimising external night-time construction activities and traffic movement within the worksites, where possible
- restore, rehabilitate, and where appropriate enhance open space and public areas disturbed or damaged by construction as soon as practicable following construction
- rehabilitation works to provide for:
  - where practicable, replacement of cleared mature trees with plantings of advanced individuals
  - regrading of the surface to facilitate surface runoff without erosion, and to create a landform suitable for use consistent with City Plan designations
  - reinstatement of paths, including the bicycle path in Victoria Park, street or park furniture, signage equipment and lighting
  - reinstatement of grassed areas and paved surfaces where practicable
  - introduction of interpretive signage relating to cultural heritage, historic heritage and way finding measures.

5.9.4 Coordinator-General's conclusion: landscape and visual amenity

I am satisfied that the proponent has appropriately assessed the potential impacts of the changed project on landscape and visual amenity, including lighting.

I acknowledge that during the construction period the increase in scope of works across the project will result in an overall increased temporary impact to lighting, landscape and visual amenity, particularly in the Mayne Yard and Southern area where overpasses would require the use of high/elevated machinery.

As with the evaluated project, I consider the changed project will result in an overall positive visual amenity and landscape outcome once operational. New and upgraded stations, with updated architectural features and improved access, will enhance public and civic spaces and increase security. I note concerns raised in submissions regarding the design of station upgrades and visual dominance of pedestrian overpasses, however I conclude the design will be sympathetic to the streetscape values.

I am satisfied that with the proponent's proposed mitigation measures listed in this report and those detailed in the OEMP (which I require the proponent to update based on the proposed changes to the project), the potential visual, landscape, amenity and lighting impacts of the proposed project changes will be mitigated and managed.

To supplement these measures, my Imposed Conditions (Appendix 1) require the proponent to ensure that project works are designed to minimise impacts on the landscape and visual amenity.

6. Evaluation of the proposed changes to the Imposed Conditions

As part of the project change application, the proponent is seeking amendments to the Imposed Conditions for the project.

The requested amendments are:

- an amendment to incorporate the latest request for project change documents including design drawings
- an amendment to ensure more timely submission of monthly reports
- an amendment to incorporate construction hours of work for the additional worksites at Dutton Park station and the Fairfield to Salisbury stations
- an amendment to ensure the road safety assessment identifies and considers the decided spoil haulage routes for the project and implement local traffic management measures for the Fairfield to Salisbury station and Clapham Yard works
- an amendment to provide greater clarification around noise and vibration environmental design requirements for the project once operational.

The requested amendments, including the proponent's justification for the requested amendment and my evaluation of their request is provided in Table 6.1.

Table 6.1 Proposed amendments to the Imposed Conditions

Section reference	Condition reference	Condition amendment/new condition	Reasons	Evaluation
Part A. Imposed Conditions (General)	Condition 1. General conditions (a)	Amend Condition 1(a) to: a) delete the following words in (i) "…including the amended Volume 3 Design Drawings publicly notified in April 2017" b) include a new (iv) "amendments to the Project identified in the Cross River Rail Request for Project Change dated April 2019".	It is requested that Condition 1 be amended to incorporate the Proposed Changes in this Request for Project Change, including by removing reference to the Volume 3 Design Drawings publicly notified in April 2017, as the Design Drawings have been superseded by this Request for Project Change.	I have amended Condition 1 (a) (i) to refer to "the Cross River Rail Request for Project Change dated April 2019" as it is the most current version of design drawings for the project.
Part C. Imposed Conditions (Construction)	Condition 6. Reporting	(c) The Monthly Report must be provided to the Coordinator-General and the Environmental Monitor and made available on the project website within ~~four~~ **six** weeks of the end of the month to which the report relates, and continue to be available on the	It is proposed to change the required submission period for the monthly report from 4 weeks to 6 weeks, to allow adequate time to collate, prepare and present the information and complete internal technical and quality reviews	The proposed amendment seeks to ensure that all required environmental monitoring data is captured within the relevant Monthly Report within a practical timeframe. I accept the proposed change to the condition.

Section reference	Condition reference	Condition amendment/new condition	Reasons	Evaluation
		project website until commissioning is complete.	and publication approvals required by the Delivery Authority's management procedures.	
	Condition 10. Hours of work	As per Appendix 1 – Table 1. Construction hours of Volume 1 of the April 2019 project change application.	With the addition of Project worksites, Condition 10 - Hours of Work needs to be amended in order to authorise construction hours that balance amenity considerations against the need to deliver the project in a timely and efficient way. A further amendment to Condition 10 - Hours of Work is required to clarify that the authorised construction hours for Dutton Park (track connections) is also intended to include the works necessary for the station upgrades. Therefore, the deletion of the words "(track connection)" with respect to Dutton Park Railway station is also requested.	The proposed amendments are consistent with the authorised hours of work for the Imposed Conditions and include restrictions for spoil haulage and materials/equipment delivery during peak traffic times at each worksite. The proposed amendments would also authorise the additional works at Dutton Park station. I accept the proposed changes to the conditions.
	Condition 14. Traffic and transport	(f) The ~~Outline Environmental Management Plan~~ **Construction Traffic Management Plan** must be supported by a road safety assessment for the spoil haulage route. (h) The Construction Traffic Management Plan must include:	It is requested to amend Imposed Condition14 to: • require that the road safety assessment for the spoil haulage route be delivered as part of the CEMP, rather than the OEMP, to allow haulage routes to be	The proposed amendments seek to ensure that the road safety assessment is conducted in a timely manner and includes the spoil haulage route/s in the assessment. The amendments also seek to ensure that local traffic management measures are

Section reference	Condition reference	Condition amendment/new condition	Reasons	Evaluation
		(iii) local traffic management measures developed in consultation with BCC for key intersections: … **(E) in the area of the F2S and Clapham Yard works;**	identified prior to the road safety assessment; and • require local traffic management measures for the areas impacted by new works.	implemented for the new worksites. I accept the proposed changes to the conditions.
Schedule 1 Environmental Design Requirements	3 – Noise and vibration	It is requested that the following changes be made to Environmental Design Requirement 3. 1. Add the following supporting text below the objectives identified in Environmental Design Requirement 3(a): The Single Event Maximum (SEM) Sound Level will be calculated as follows: • If the number of single events due to train passing is larger than 15 over a 24-hour period, use the arithmetic average of the maximum levels for the highest 15 events. • If the number of single events due to train passing is equal to or less than 15 over a 24-hour period, use the arithmetic average of the maximum levels for all the train events (e.g. if a total of 13 passes occur over a 24-hour period, use the arithmetic average of all 13 movements). Noise modelling or monitoring activities aimed at assessing performance against	It is requested that Environmental Design Requirement 3 be amended in order to: a) add supporting text below the criteria established in EDR 3(a) to clarify the measurement of railway surface track airborne noise emissions, consistent with the QR Single Event Maximum; b) amend Table 6 to clarify that the ground-borne noise criteria apply to in tunnel rail, and not to surface rail, consistent with the existing network.	The proposed amendments would provide further clarification for operational monitoring requirements and improve consistency with the existing operational rail management framework. I accept the proposed changes to the conditions.

Section reference	Condition reference	Condition amendment/new condition	Reasons	Evaluation
		the Planning Levels must be undertaken 1 metre from the most exposed façade of an affected building and 0.5 metres below the eave height. 2. Amend the heading to Table 6 so that the criteria apply to tunnels and underground stations, not to surface works, consistent with the balance of the network. The heading should read "Ground-borne noise design criteria (rail operations) - tunnels and underground stations).		

7. Conclusion

This report concludes my evaluation of the proposed project change pursuant to section 35I of the SDPWO Act.

I am satisfied that the requirements of the SDPWO Act have been met and that sufficient information has been provided to enable the evaluation of the project change and the amendment of conditions of approval.

I consider that the changes to the project would result in acceptable overall outcomes. Accordingly, I approve the changes to the Cross River Rail project as set out in the April 2019 project change application, subject to the conditions in Appendix 1. The Imposed Conditions (Appendix 1) aim to mitigate and manage the works associated with the changes to the project.

In accordance with section 35K of the SDPWO Act, the Coordinator-General's report on the EIS for the project, and the Coordinator-General's change report, both have effect for the project. However, if the reports conflict, this Coordinator-General's change report prevails to the extent of the inconsistency. The proponent must implement all conditions in this report.

Appendix 1, 2 and 3 of this report replaces Appendix 1, 2 and 3 of the March 2019 CGCR (Roma Street demolition works), therefore Appendix 1, 2 and 3 of the March 2019 CGCR no longer have effect.

In accordance with section 35 of SDPWO Act, this report will lapse on 31 December 2024.

A copy of this report will be issued to the proponent.

A copy of this report and all relevant EIS assessment documentation are available on the Department of State Development's website at **www.dsdmip.qld.gov.au/crr**

Appendix 1. Project wide Imposed Conditions – Cross River Rail project

Part A. Imposed Conditions (General)

Condition 1. General conditions

(a) The project must be carried out generally in accordance with:

(i) the Cross River Rail Request for Project Change dated April 2019;

(ii) the amended or new drawings provided at Appendix 2, Response to Submissions Report, June 2019, including:

(A) CRR-0003-AL-GA-100 – Drawing Index and Locality Plans - 1

(B) CRR-0003-AL-GA-201 – General Arrangement - 4

(C) CRR-0003-AL-GA-211 – General Arrangement - 11

(D) CRR-0003-CD-GA-110 – Construction Site Plans Moorooka Station

(E) CRR-0003-DUT-GA-101 – Dutton Park Station

(F) CRR-0003-RP-GA-111 – Property Impact Plans – 11

(G) CRR-0003-RP-GA-124 – Property Impact Plans – 24

(iii) amendments to the Project identified in the Cross River Rail Request for Project Change dated June 2018;

(iv) amendments to the Project identified in the Cross River Rail Request for Project Change dated November 2018.

(b) The proponent must notify the Coordinator-General and all nominated entities in Schedule 2 in writing of the commencement of Project Works and the commencement of the commissioning and operational phases of each 'construction site' at least 20 business days prior to the relevant commencement date.

(c) The temporary coach terminal works must be carried out in accordance with the conditions imposed at Appendix 3.

Condition 2. Outline Environmental Management Plan

(a) Two months prior to the commencement of Project Work submit a final Outline Environmental Management Plan to the Coordinator-General for approval.

(b) The Outline Environmental Management Plan must:

(i) Include the environment outcomes and performance criteria for each environmental element from the draft outline EMP except as amended by these conditions;

(ii) include possible mitigation measures, monitoring and reporting for each environmental element to achieve the environmental outcomes;

(iii) include an outline of:

(A) the Construction Environmental Management Plan

(B) the Commissioning Environmental Management Plan

(iv) be consistent with the Environmental Design Requirements in Schedule 1

(v) include the following sub-plans:

(A) Community and Stakeholder Engagement Plan

(B) Construction Worksite Management Plan

(C) Construction Traffic Management Plan (CTMP)

(D) Construction Vehicle Management Plan

(E) Water Quality Monitoring Plan

(F) Erosion and Sediment Control Plan

(G) Spoil Placement Management Plan

(H) Noise and Vibration Management Plan

(I) Air Quality Management Plan

(J) Settlement Management Plan

(K) Non-Indigenous Cultural Heritage Management Plan

(L) Indigenous Cultural Heritage Management Plan

(vi) Be made available on the proponent's website once approved by the Coordinator-General and for the duration of the construction of the project and for a period of five years from commencement of operation.

(c) Any further amendments to the Coordinator-General approved Outline Environmental Management Plan will be issued to the Coordinator-General 20 business days prior to the commencement of Relevant Project Works.

Part B. Imposed Conditions (Design)

Condition 3. Design

(a) The project must achieve the Environmental Design Requirements in Schedule 1.

Part C. Imposed Conditions (Construction)

Condition 4. Construction Environmental Management Plan

(a) Prior to the commencement of Project Work, a Construction Environmental Management Plan for those works (Relevant Project Work) must be developed by the Proponent and endorsed by the Environmental Monitor as being consistent with the Outline EMP and these imposed conditions.

(b) The endorsed Construction Environmental Management Plan must be submitted to the Coordinator General at least 20 business days prior to the commencement of Relevant Project Works.

(c) The Construction Environmental Management Plan must:

(i) describe the Relevant Project Work;

(ii) be based on predictive studies and assessments of construction impacts which have regard to the scale, intensity, location and duration of construction works, and location of Directly Affected Persons;

(iii) be generally consistent with the Outline EMP and incorporate its environmental outcomes and performance criteria;

(iv) incorporate and respond to the Imposed Conditions (Construction);

(v) demonstrate that the Imposed Conditions (Construction) will be complied with during Relevant Project Work;

(vi) incorporate the community engagement plan, including the complaints management process, in accordance with Condition 9;

(vii) where predictive studies indicate impacts beyond those provided for in the performance criteria, incorporate mitigation measures to achieve the environmental outcomes;

(viii) establish specific mitigation measures and processes for consultation with Directly Affected Persons for Project Works under Conditions 9(c), 11(c), and 11(e);

(ix) contain a program and procedures for ongoing monitoring to identify the effectiveness of mitigation measures in achieving the Imposed Conditions (Construction) and the environmental outcomes in (iii)

(x) include a process for regular review and if required updating of the Construction Environmental Management Plan, including a process to review and implement additional or different mitigation measures in response to monitoring results;

(xi) incorporate the EMP sub-plans required by the Imposed Conditions or as required by the approved Outline EMP.

(d) The Construction Environmental Management Plan must be implemented for the duration of Relevant Project Work.

(e) Relevant Project Work is authorised if it is undertaken in accordance with the Construction Environmental Management Plan.

(f) The Construction Environmental Management Plan must be publicly available on the project website for the duration of the construction phase.

(g) The Construction Environmental Management Plan may be updated.

(i) updates to the Construction Environmental Management Plan that include new or additional Relevant Project Work must be endorsed by the Environmental Monitor as being consistent with condition 2 before Relevant Project Work may proceed.

(h) Updates to the Construction Environmental Management Plan that are limited to new or different mitigation measures for Managed Work may be endorsed by the Environmental Monitor.

Condition 5. Compliance

(a) The proponent must notify the Environmental Monitor and the Coordinator-General in writing, within 48 hours after becoming aware of a Non-Compliance Event.

(b) The notification must include:

(i) a description of the Non-Compliance Event, including details of the location, date and time of the Non-Compliance Event;

(ii) the name and contact details of a designated contact person;

(iii) an outline of actions that have been or will be taken to respond to the Non-Compliance Event.

(c) Within 14 days following the notification of a Non-Compliance Event, written advice detailing the following information must be provided to the Environmental Monitor and the Coordinator-General:

(i) a description of the Non-Compliance Event, including details of the location, date and time of the Non-Compliance Event;

(ii) the name and contact details of a designated contact person;

(iii) the circumstances in which the Non-Compliance Event occurred;

(iv) details of any complaint in relation to the Non-Compliance Event;

(v) the cause of the Non-Compliance Event;

(vi) a description of the environmental effects of the Non-Compliance Event;

(vii) the results of any sampling or monitoring performed in relation to the Non-Compliance Event;

(viii) actions taken to mitigate the environmental effects of the Non-Compliance Event;

(ix) proposed actions to prevent a recurrence of the Non-Compliance Event, including timing and responsibility for implementation.

(d) The Non-Compliance Event report must be made available on the project website and remain available for the duration of the construction phase for the project.

Condition 6. Reporting

(a) The Proponent must prepare a Monthly Report that summarises compliance and monitoring results for the duration of construction works.

(b) The Monthly Report must include:

(i) monitoring data required by the imposed conditions or Construction Environmental Management Plan undertaken for the period and, where required, an interpretation of the results;

(ii) details of any Non-Compliance Event, including a description of the incident, resulting effects, corrective actions, revised construction practices to prevent a recurrence, responsibility and timing;

(iii) reporting of complaints, including the number of complaints, description of issues, responses and corrective actions.

(c) The Monthly Report must be provided to the Coordinator-General and the Environmental Monitor, and made available on the project website within six weeks of the end of the month to which the report relates, and continue to be available on the project website until commissioning is complete.

(d) The Proponent must provide annual reports to the Coordinator-General and the Environmental Monitor (Annual Report) no later than 31 July in any year during the construction phase about compliance with the imposed conditions.

(e) The Annual Report must include:

(i) a compliance evaluation table detailing the relevant imposed condition, whether compliance with the condition was achieved and how compliance was evaluated;

(ii) an evaluation of compliance in relation to the CEMP and its sub-plans;

(iii) a summary of any Non-Compliance Events during the reporting period;

(iv) a summary of any Non-Compliance Events during the previous reporting period, with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant).

Condition 7. Environmental Monitor

(a) The Proponent must engage an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Environmental Monitor for the duration of construction.

(b) The Proponent must ensure that the Environmental Monitor has reasonable site access and access to all information required to perform its function, including, without limitation:

(i) all approvals;

(ii) the Construction Environmental Management Plan;

(iii) results of all monitoring required under the Imposed Conditions (Construction) including through the Construction Environmental Management Plan;

(iv) all information relating to complaints, including access to the complaints database.

(c) The Environmental Monitor must:

(i) monitor compliance with the imposed conditions during the construction of the project;

(ii) monitor compliance with the Construction Environmental Management Plan and sub-plans;

(iii) maintain a register of mitigation measures agreed between the Proponent and Directly Affected Persons (Mitigation Register);

(iv) review the compliance reports required by Condition 5, and the monthly reports and annual reports required by Condition 6, and provide advice to the Coordinator-General and the Proponent on the contents and adequacy of those reports;

(v) review the results of monitoring, which may be verified by the Environmental Monitor including by independent monitoring;

(vi) provide advice to the Proponent about compliance with the Imposed Conditions for construction, including by providing the results of independent monitoring where required;

(vii) provide advice to the Proponent about issues raised in complaints and the response to complaints, including advice from the Community Relations Monitor;

(viii) endorse the Construction Environmental Management Plan as consistent with the Outline EMP and complying with the Imposed Conditions (Construction);

Condition 8. Community Relations Monitor

(a) The proponent must engage an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Community Relations Monitor for the duration of construction.

(b) The Community Relations Monitor must:

(i) review and provide advice to the Environmental Monitor on the community engagement plan required by Condition 9;

(ii) receive monthly reports from the proponent on complaints;

(iii) attend each meeting between the Proponent and a Directly Affected Person to consult on mitigation measures, including providing input on standard responses for similar impacts;

(iv) provide advice to the Environmental Monitor in relation to complaints, community engagement and consultation on mitigation measures;

(v) be available to members of the community in accordance with Condition 9(f)(vi).

Condition 9. Community engagement plan

(a) The Proponent must develop a community engagement plan as part of the Construction Environmental Management Plan consistent with the Outline EMP's Community and Stakeholder Engagement Plan.

(b) The community engagement plan must be given to the Community Relations Monitor for advice at least 10 business days prior to the Construction Environmental Management Plan being provided to the Environmental Monitor.

(c) The community engagement plan must provide for:

(i) Directly Affected Persons to be consulted prior to commencement of Project Works and ongoing thereafter about Project Works, predicted impacts and mitigation measures;

(ii) Directly Affected Persons to be consulted about possible mitigation measures;

(iii) local communities near Project Works to be informed about the nature of construction, including the timing, duration and predicted impacts of the works in advance of their commencement;

(iv) information to be provided to public transport, road users, pedestrians and cyclists about the predicted effects of Project Works on road, rail and pedestrian and cycle network operations, in advance of their commencement;

(v) specific community consultation plans for identified key stakeholders;

(vi) implementation of an Indigenous employment policy, providing for Indigenous training and employment opportunities;

(vii) a process for advance notification to local communities of Project Works, including the timing, duration, predicted impacts and mitigation measures, which is available on the project website and through other media.

(d) The community engagement plan must incorporate a complaints management system developed specifically for the Project, which is established prior to the commencement of Project Works.

(e) The complaints management system must deliver a prompt response to community concerns with relevant information, action where required, and reporting of incidents.

(f) As a minimum, the complaints management system must include the following elements:

(i) a procedure for receiving complaints on a 24 hour, seven days a week basis, during Project Works;

(ii) a mechanism for notifying the community of the complaints procedure and how it may be accessed;

(iii) a process for registering and handling complaints received, including a database for tracking of complaints and actions taken in response;

(iv) a procedure for verifying complaints through monitoring and detailed investigation, and escalating and resolving verified complaints;

(v) a procedure for complaints to be notified to the Community Relations Monitor, including information about the complaint and its resolution;

(vi) access by the community to the Community Relations Monitor; and

(vii) regular reporting via the monthly environmental report, to the community of complaints and corrective actions, maintaining appropriate confidentiality.

(g) All information regarding complaints, including the information collected in Condition 9(f)(iii) must be made available to the Community Relations Monitor.

Condition 10. Hours of work

(a) Surface works for the Project are authorised to be undertaken within the hours of work set out in Table 1.

Table 1. Construction hours

Worksite	Surface works—standard hours	Extended work hours	Managed Work	Spoil haulage and materials/ equipment delivery
Fairfield, Yeronga, Yeerongpilly, Rocklea and Salisbury stations	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm	7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm

Worksite	Surface works—standard hours	Extended work hours	Managed Work	Spoil haulage and materials/ equipment delivery
Moorooka/ Clapham Yard	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm	7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm
Southern portal	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) 6:30pm - 10:00pm, Monday to Friday	24 hrs, 7 days	24 hours, 7 days
Boggo Road Railway station	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm,	24 hrs, 7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm
Dutton Park Railway station	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work	n/a	24 hours, 7 days, except for: Monday to Friday: 7:00am - 9:00am 4:30pm - 6:30pm
Woolloongabba Railway station	Monday to Saturday, 6.30am-6.30pm	Monday to Friday 6:30pm- 10:00pm	24 hrs, 7 days	24 hours, 7 days, except for: Monday to Friday: 7:00am - 9:00am 4:30pm - 6:30pm
Albert Street Railway station	Monday to Saturday 6.30 am – 6.30 pm,	Monday to Friday 6.30 pm – 10.00 pm	24 hours, 7 days	Monday to Friday: 6.30 am – 10.00 pm Saturday 6:30am - 6:30pm
Roma Street Railway station	Monday to Saturday, 6.30am-6.30pm	Monday to Friday 6:30pm- 10:00pm	24 hrs, 7 days	Monday to Friday 6.30am - 7.30am 9.00am - 4.30pm 6.30pm - 10:00pm Saturday 6.30am - 6.30pm
Northern portal	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work	24 hrs, 7 days	Monday to Friday: 6.30 am – 10.00 pm

Worksite	Surface works—standard hours	Extended work hours	Managed Work	Spoil haulage and materials/ equipment delivery
		(Other extended work) Monday to Friday 6:30pm - 10:00pm,		Saturday 6:30am - 6:30pm
Exhibition Railway station	Monday to Saturday, 6.30am-6.30pm		24 hours, 7 days	Monday to Saturday: 6:30am - 6:30pm
Mayne Railway Yard	Monday to Saturday, 6.30am-6.30pm		24 hours, 7 days	24 hours, 7 days

(b) Project Works that are underground, or in a ventilated acoustic enclosure, may be undertaken at any time provided the environmental outcomes are achieved.

(c) Works carried out because of an emergency that:

(i) is endangering the life or health of a person; or

(ii) is endangering the structural safety of a building; or

(iii) is endangering the operation or safety of community infrastructure that is not a building; or

(iv) is required to prevent environmental harm, may be undertaken outside the hours set out in Table 1.

(d) The following work may be undertaken during Extended Work Hours as set out in Table 1. subject to compliance with a specific Construction Environmental Management Plan sub-plan in accordance with Condition 4:

(i) Project Works within rail corridor land;

(ii) Project Works within a road reserve or busway that cannot be undertaken reasonably nor practicably during standard hours due to potential disruptions to peak traffic flows or bus operations;

(iii) Project Works involving the transport, assembly or decommissioning of oversized plant, equipment, components or structures;

(iv) delivery of "in time" materials such as concrete, hazardous materials, large components and machinery;

(v) Project Works that require continuous construction support, such as continuous concrete pours, pipe-jacking or other forms of ground support necessary to avoid a failure or construction incident.

(e) Blasting must not occur on public holidays, and is only authorised to occur during the hours of 7:30am to 4:30pm Monday to Saturday, and not on Sundays or public holidays.

(f) Prior to blasting events, at least 48 hours' notice must be provided to persons who may be adversely affected.

Condition 11. Construction Noise and Vibration

(a) Project Works must aim to achieve the project noise goals for human health and well-being presented in Table 2.

Table 2. Noise goals (internal) for Project Works

	Monday – Saturday 6.30am – 6.30pm	Monday – Friday 6.30pm – 10.00pm (Gabba, CBD only)	Monday – Saturday 6.30pm – 6.30am Sundays, Public Holidays	For Blasting Monday – Saturday 7.30 am – 4:30 pm only
Continuous ($LA_{eq\ adj}$)(1hr)	AS 2107 Maximum design level	40 dBA $LA_{eq\ adj\ (1hr)}$	35 dBA $LA_{eq\ adj\ (1hr)}$	130 dB Linear Peak
Intermittent ($LA_{10\ adj}$)(15min)	AS 2107 Maximum design level + 10 dBA	50 dBA $LA_{10,\ adj}$	42 dBA $LA_{10\ adj}$	

Notes

1. All goals are internal noise levels for human health and well-being outcomes.
2. Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in the relevant State guideline, such as the Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 (currently under review).

(b) During construction monitor and report on noise and vibration in accordance with the Noise and Vibration Management Plan, a sub-plan of the Construction Environmental Management Plan.

(c) Project Works predicted to or monitored as generating noise levels more than 20dBA ($LA_{eq\ 10min,\ adj}$) above the relevant goal in Table 2. are authorised to occur in a locality only:

(i) when advance notification and consultation has been undertaken with Directly Affected Persons or potentially Directly Affected Persons about the particular predicted impacts and the approach to mitigation of such impacts;

(ii) where mitigation measures addressing the particular predicted or measured impacts have been developed on a 'case by case' basis in consultation with Directly Affected Persons;

(iii) where the mitigation measures are incorporated in a mitigation register and implemented prior to undertaking the Project Works;

(iv) between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day;

(d) Project Works must aim to achieve the construction vibration goals in Table 3.

Table 3. The construction vibration goals

Receiver type	Cosmetic Damage			Human comfort (mm/s PPV)		Sensitive building contents (mms/PPV)
	Continuous vibration (mm/s PPV)	Transient vibration (mm/s PPV)	Blasting vibration (mm/s PPV)	Day	Night	

Residential	According to BS7385 reduced by 50%[4]	According to BS7385	50[1]	According to AS2670	0.5[2]	
Commercial	According to BS7385 reduced by 50%[4]	According to BS7385	50	According to AS2670	-	0.5[3]
Heritage structures	2	-	10	-	-	

Notes:

1. All residential receivers in the vicinity of the Project blasting sites are regarded as reinforced or framed structures (i.e. BS7385)
2. Residential sleep disturbance
3. Equipment specific vibration criteria are required for highly sensitive equipment (i.e. electron microscopes, MRI systems or similar), as part of future site-specific detailed investigations
4. If resonance is present, or if investigation to detect resonance were not able to be undertaken due to a lack of access

(e) Where vibration protection criteria are available for sensitive building contents, predictive modelling must take into account the manufacturer's specifications for tolerance to vibration. To the extent reasonable and practicable, those specifications apply in lieu of the construction vibration goals in Table 3. Where predictive modelling indicates the specified criteria would not be achieved by the Project Works, such works may proceed only in accordance with specific mitigation measures agreed with the potentially Directly Affected Persons.

(f) Project Works predicted to or monitored as generating vibration levels more than 2mm/s for continuous vibration and 10mm/s for transient vibration may occur only:

(i) between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day; or

(ii) in accordance with the mitigation measures developed in consultation with and agreed by Directly Affected Persons that are incorporated in the Mitigation Register.

Condition 12. Property Damage

(a) Prior to the commencement of Project Works, predictive modelling must be undertaken of potential ground movement that may be caused by the Project Works. Such predictive modelling must ascertain the potential for damage due to ground movement being caused to property by Project Works.

(b) Where predictive modelling indicates the Project Works would lead to impacts above the vibration goals for cosmetic damage in Table 3. the proponent must prepare and submit a property damage sub-plan, prior to the commencement of such works, as part of the Construction Environmental Management Plan. The property damage sub-plan must set out the procedure for:

(i) advance communication with potentially Directly Affected Persons;

(ii) procedures for building condition surveys both in advance of and following Project Works, including provision for consultation with property owners and occupants;

(iii) monitoring to be undertaken for potential impacts to property; and

(iv) mitigation measures.

(c) Where a post-construction building condition survey identifies that property damage has occurred as a consequence of the Project Works, such damage must be repaired as soon as practicable by the Proponent at no cost to the property owners. Such repairs must be undertaken in consultation with the property owners and occupants and must return the premises at least to the condition existing prior to commencement of Project Works. The Proponent must agree the timing, method and extent of works required with the affected landowner and must gain permission to undertake such reparation works prior to their commencement.

Condition 13. Air quality

(a) Project Works must aim to achieve the goals in Table 4.

Table 4. Air quality criteria and goals

Criterion	Air quality indicator	Goal	Averaging period
Human Health	Total Suspended Particulates (TSP)	90 µg/m^3	1 year
	Particulate matter ((PM_{10})[1]	50 µg/m^3	24 hours
		25 µg/m^3	1 year
Nuisance	TSP[2]	80 µg/m^3	24 hours
	Deposited dust[3]	120 mg/m^2/day	30 days

(b) During construction monitor and report on air quality in accordance with the Air Quality Management Plan, a sub-plan of the Construction Environmental Management Plan.

Condition 14. Traffic and transport

(a) Project construction traffic must be managed to avoid or minimise adverse impacts on road safety and traffic flow, public transport, freight rail movements, pedestrian and cyclist safety, and property access.

(b) During construction workforce car parking must be provided and managed to avoid workforce parking on local streets.

(c) Access for emergency services to project worksites and adjoining properties must be maintained throughout the construction phase.

(d) Practicable access is maintained to adjacent properties throughout the construction phase.

(e) Heavy construction vehicles use only designated routes for spoil haulage and deliveries of major plant, equipment and materials, in accordance with the Construction Environmental Management Plan. The designated haulage routes for each worksite must follow major or arterial roads to the extent practicable and be developed in consultation with the Department of Transport and Main Roads and the Brisbane City Council in preparation of the Construction Environmental Management Plan.

(f) The Construction Traffic Management Plan must be supported by a road safety assessment for the spoil haulage route.

(g) Construction traffic must operate within the requirements of a construction traffic management sub-plan (Construction Traffic Management Plan) incorporated within the Construction Environmental Management Plan.

(h) The Construction Traffic Management Plan must include:

(i) the proposed access to worksites, with local or minor roads only used where unavoidable to access a project worksite;

(ii) a process for advance notice to Directly Affected Persons and local communities within the vicinity of the spoil haulage routes and worksite accesses;

(iii) local traffic management measures developed in consultation with Brisbane City Council for key intersections:

(A) in Bowen Hills including Bowen Bridge Road, College Road and O'Connell Terrace;

(B) in the CBD including Albert Street, Charlotte Street, Elizabeth Street and Roma Street;

(C) at Woolloongabba including Leopard Street, Stanley Street, Vulture Street and Main Street;

(D) at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road;

(E) in the area of the Fairfield to Salisbury stations and Clapham Yard works.

(iv) specific traffic management measures developed in consultation with other key stakeholders, including:

(A) the department administering the *Economic Development Act 2012* with regards traffic management in the Queens Wharf Brisbane priority development area;

(B) Queensland Rail about maintaining access to railway stations; and

(C) the department administering the *Transport Infrastructure Act 1994* and the Brisbane City Council about maintaining operations for bus services along streets affected by the Project Works.

(i) Project Works must be designed, planned and implemented to maintain acceptable footpath and cycle paths in areas adjacent to project worksites in terms of capacity, legibility and pavement condition. The proponent must consult with the Brisbane City Council and Queensland Rail about changes in pedestrian and cycle paths required to facilitate Project Works.

Condition 15. Water quality

(a) Discharge of surface water and groundwater from Project Works must comply with the Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid-estuary) in the Environmental Protection (Water) Policy 2009.

(b) During construction monitor and report on water quality in accordance with the Water Quality Management Plan, a sub-plan of the Construction Environmental Management Plan.

Condition 16. Water resources

(a) Prior to the commencement of Project Works involving excavation, the Proponent must undertake predictive modelling of the potential for groundwater drawdown. The predictive modelling must be based on validated monitoring data and must address the likely extent of any drawdown over time, up to the time when such movement reaches equilibrium.

(b) Project Works must be designed, planned and implemented to avoid where practicable and otherwise minimise the inflow of groundwater to the Project Works, including excavations, the underground stations and tunnels, having regard for the predictive modelling.

(c) The Proponent must monitor the inflow of groundwater to the Project Works and compare monitoring data with the predictive modelling. If the rate of groundwater inflow rate

exceeds 1L/sec in any worksite, the proponent must revise work methods and devise and implement mitigation measures as soon as practicable.

Condition 17. Surface water

(a) Project Works, and worksites, must be designed and implemented to avoid inundation from stormwater due to a 2 year (6hr) ARI rainfall event and flood waters due to a 5 year ARI rainfall event.

(b) Project works must be designed and implemented to avoid afflux or cause the redirection of uncontrolled surface water flows, including stormwater flows, outside of worksites.

Condition 18. Erosion and sediment control

(a) An erosion and sediment control sub-plan that is consistent with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control must be submitted as part of the Construction Environmental Management Plan.

Condition 19. Acid sulphate soils

(a) Acid sulphate soils must be managed in accordance with the methods and requirements of the latest edition of the *Queensland Acid Sulphate Soil Technical Manual*.

Condition 20. Landscape and open space

(a) Project Works are designed and implemented to minimise impacts on landscape and open space values.

(b) Project works and worksites in Victoria Park must be designed, planned and implemented to avoid, or minimise the loss of trees and ornamental plantings, and must minimise the area of the park directly impacted during such works.

(c) Worksites in Victoria Park must be enclosed with a visually solid screen and any night lighting including security lighting must be situated to minimise the spill of light beyond the worksite enclosures.

(d) Existing pathways and recreational facilities in Victoria Park must be relocated within the park for the duration of the works, in consultation with the Brisbane City Council. Upon completion of the project works, such pathways and facilities must be re-established in locations in the park in consultation with the Brisbane City Council.

Condition 21. Worksite rehabilitation

(a) Worksites for project infrastructure, such as the surface connections, stations and ancillary buildings must be rehabilitated as soon as practicable upon completion of the works.

(b) All other worksites required to support commissioning activities must be rehabilitated as soon as practicable on completion of commissioning or sooner where possible.

(c) Rehabilitation must address soil erosion and sedimentation, dust nuisance and landscape and visual impact.

(d) Any planting, landscaping and streetscape works undertaken as part of rehabilitation must be undertaken in accordance with landscape and urban design plans prepared in consultation with the Brisbane City Council.

Part D. Imposed Conditions (Commissioning)

Condition 22. Environmental design requirements

(a) The Proponent must conduct such testing and monitoring as is necessary to demonstrate that the Environmental Design Requirements in Schedule 1 have been satisfied.

(b) At the completion of Commissioning, the Proponent must give written notice to the Coordinator-General that the Project has achieved the Environmental Design Requirements in Schedule 1.

Condition 23. Commissioning

(a) Commissioning may be carried out in stages.

(b) Testing for commissioning must be supported by advanced notice to local residents and businesses.

(c) Testing for commissioning must not cause an exceedance of the goals in Table 2, Table 3, Table 4 or Condition 15.

Schedule 1. Environmental Design Requirements

1. Traffic and transport

(a) Emergency access and evacuation for each station and the tunnel is designed in consultation with the Emergency Service Authorities.

(b) Station plazas and forecourts are of a sufficient size and dimension to avoid peak pedestrian flows spilling onto adjacent carriageways. Where the overflow of pedestrians onto carriageways cannot be avoided, local traffic management measures addressing such circumstances must be designed and implemented prior to the commencement of Project operations.

(c) Pedestrian and cycle pathways in the vicinity of stations are designed in accordance with Rail Infrastructure Manager's and TMR's requirements.

(d) The design of driveways and roadworks for the Project avoid conflicts between construction traffic and cyclists and pedestrians.

(e) New footpaths, pedestrian walkways and pedestrian road crossings in the vicinity of stations are designed, in consultation with BCC and emergency services authorities, to allow safe and efficient pedestrian movement during peak periods and, where applicable, major events at the Brisbane Cricket Ground (Woolloongabba station), Lang Park (Roma Street station) and the RNA Showgrounds (Exhibition station).

(f) The Project design provides for pedestrian connectivity between the PA Hospital, Boggo Road Busway station and Park Road Railway station, and incorporates appropriate crime prevention through environmental design (CPTED) principles and Disability Discrimination Act 1992 (DDA) compliant vertical transport facilities.

2. Air Quality

(a) Ventilation outlets from underground stations are designed and sited so as not to cause an increase in air temperature of more than one degree Celsius, measured as an hourly average, or concentrations of ambient air contaminants that exceed air quality objectives.

(b) The Project is designed so that it does not cause the air quality objectives specified in Table 5 to be exceeded.

(c) The ventilation outlets are designed to avoid discharging directly into an air intake for any other ventilation or air conditioning system that is in place at the time of detailed design and construction of the relevant ventilation outlet.

Table 5. Ambient air quality outcomes

Pollutant	Air Quality Objective	Average Period
Total Suspended Particulates (TSP)	90 µg/m^3	Annual
Particulates as PM10 (<10 µm)	50 µg/m^3	24 hours
	25 µg/m^3	Annual

3. Noise and Vibration

(a) Where practicable, the Project is designed to achieve the following noise criteria for railway surface track airborne noise emissions:

(i) 65 dBA, evaluated as the 24 hour average equivalent continuous A-weighted sound pressure level;

(ii) 87 dBA, evaluated as a Single Event Maximum sound pressure level.

Note: The Single Event Maximum (SEM) Sound Level will be calculated as follows:

- If the number of single events due to train passing is larger than 15 over a 24-hour period, use the arithmetic average of the maximum levels for the highest 15 events.
- If the number of single events due to train passing is equal to or less than 15 over a 24-hour period, use the arithmetic average of the maximum levels for all the train events (e.g. if a total of 13 passes occur over a 24-hour period, use the arithmetic average of all 13 movements).
- Noise modelling or monitoring activities aimed at assessing performance against the Planning Levels must be undertaken 1 metre from the most exposed façade of an affected building an 0.5 metres below the eave height.

(b) Where practicable, the Project is designed to achieve the goals for ground-borne noise provided in Table 6 and for vibration provided in Table 7.

(c) Ventilation systems, mechanical plant, and electricity feeder stations at or near stations are designed and sited to operate within the noise goals outlined in Table 8.

Table 6. Ground-borne noise design criteria (rail operations) – tunnels and underground station

Receiver	Time of day	Internal noise design criteria (dBA)
Residential	07:00-22:00	40dBA
	22:00-07:00	35dBA
Schools, educational institutions, places of worship.	When in use	40dBA to 45dBA
Retail areas	When in use	50dBA to 55dBA
General office areas	When in use	45dBA
Private offices and conference rooms	When in use	40dBA
Theatres	When in use	35dBA

Table 7. Ground-borne vibration design criteria (rail operations)

Receiver type	Period	Vibration goal (vibration velocity)
Residential	Day/ night	106dBV (0.2 mm/s)
Commercial and community facilities (including schools and places of worship)	When in use	112dBV (0.4 mm/s)
Industrial	When in use	118dBV (0.8 mm/s)
Sensitive equipment within medical or research facilities	When in use	82dBV (0.013 mm/s)

Table 8. Mechanical plant noise goals (operations)

Receiver	Time of day	Background (b/g) noise creep dBA LA_{90} (1 hour)	Acoustic quality objectives dBA LA_{eq} (1 hour)
Residential (for outdoors)	07:00 - 22:00	b/g + 0	-
	22:00 - 07:00	b/g + 0	50
Residential (for outdoors)	07:00 - 22:00	-	35

Receiver	Time of day	Background (b/g) noise creep dBA LA_{90} (1 hour)	Acoustic quality objectives dBA LA_{eq} (1 hour)
	22:00 - 07:00	-	30
Library and educational institution (for indoors)	When in use	-	35
Commercial and retail activity (for indoors)	When in use	-	45

4. Settlement

(a) Detailed design of the alignment and underground stations will be informed by a detailed ground settlement analysis, based on hydrogeological and geological modelling

(b) The settlement analysis will indicate the predicted horizontal and vertical extent of ground settlement for the Project Works and the time period over which such ground settlement would occur.

5. Hydrology

(a) A hydrogeological model will be developed during detailed design and before construction of relevant sections to determine ground conditions along the tunnel section.

(b) Further borehole investigations, groundwater monitoring and permeability testing at the station locations and along the tunnel alignment to identify and characterise any major transmissive features and better constrain the local hydrogeological model for detailed design.

(c) Review available bore construction records and target aquifers to determine the suitability of monitoring bores installed during the geotechnical investigations for ongoing groundwater monitoring for construction and commissioning. Following this review, additional bores may be proposed to address gaps identified in the groundwater monitoring network.

(d) Identify through surveys and consultation, water bores in the area potentially affected by groundwater drawdown and implement measures to mitigate potential effects on identified bores.

(e) In the event a new 'groundwater feature' (e.g. areas of high groundwater flow/ yield) is identified along the Project alignment, further detailed groundwater monitoring would be undertaken to characterise the feature and identify potential impacts to the environment. Additional management measures would be developed, where required.

(f) Develop and implement design measures and construction methods to minimise groundwater inflows in to the construction area.

(g) The Project design provides for the capture of groundwater seepage, should it enter the underground structures, and the subsequent treatment of such groundwater prior to its release to an approved discharge point.

(h) Where the project design anticipates groundwater entering underground structures, the design provides:

  (i) measures to minimise settlement due to project-induced drawdown;

  (ii) measures to ensure structural integrity and Project operational safety; and

  (iii) measures to minimise the risk of exposing acid sulphate soils to air or the chance for oxidation.

(i) The Project design achieves the water quality objectives stated for the Brisbane River Estuary environmental values and water quality objectives (Basin No. 143 mid-estuary)

referred to in the Environmental Protection (Water) Policy 2009 for any water, including groundwater, released from Project infrastructure to surface waters.

(j) The Project design is based on current flooding information to achieve flood immunity to the tunnel infrastructure and underground stations in a 1 in 10,000 year annual exceedance probability (AEP) regional flood event, and a 1 in 100 AEP overland flow event.

(k) The Project design will not cause property damage from flood impacts to third parties for events up to and including the 1 in 100 AEP flood event.

(l) Project Works in Mayne Rail Yard must be designed on the basis of detailed flood modelling.

6. Cultural Heritage

(a) The Project design reflects and minimises the impact on the cultural and historical significance of places where surface works occur, and where reasonable and practicable, avoids or minimises the direct impact on heritage values of such places.

(b) The Project design acknowledges a locality's historical significance or cultural significance to Aboriginal people through input to:

  (i) place naming;

  (ii) interpretative signage and other landmarks; and

  (iii) the themes for public art.

(c) In developing the Project design, the Proponent would provide opportunities for architectural design sympathetic to the cultural heritage landscape and streetscape.

7. Climate change and sustainability

(a) Project ventilation systems are designed to minimise energy consumption while achieving acceptable passenger comfort and air quality outcomes in both the ambient environment and the Project stations and tunnel system.

(b) The Project is designed to be adaptable to conditions that may arise as a result of climate change, including accommodating the predicted 1.0 m sea level rise scenario in 2100 (upper range).

(c) Sustainability initiatives, particularly in relation to energy consumptions and savings throughout the Project lifecycle are incorporated in detailed design and tracked via a Sustainability Tool (e.g. ISCA's rating tool) through to Project implementation.

(d) In design and construction, devise and implement a process for optimising energy efficiency in construction planning and delivery (e.g. component sourcing and transportation, spoil and materials handling – no double handling, programing to avoid re-work or redundant work).

(e) In operations, energy efficient design that meets the performance criteria of all Project plant and equipment would be included in the design specification.

8. Land use and tenure

(a) Minimise the 'footprint' of the Project during both construction and operations to reduce impacts on existing land uses through design refinement.

(b) The Project design seeks to optimise land use and transport integration with:

  (i) PA Hospital, Boggo Road Busway station, Park Road Railway station and Boggo Road Urban Village;

  (ii) Woolloongabba Priority Development Area (PDA);

(iii) Albert Street;

(iv) Roma Street; and

(v) Bowen Hills PDA.

(c) The Project is to be designed in consultation with:

(i) Rail Infrastructure Manager in relation to use of Railway land required for project worksites; and

(ii) Proponents for urban development projects at Boggo Road Urban Village, Woolloongabba PDA, Albert Street and Roma Street redevelopment and Royal National Agricultural and Industrial Association of Queensland (RNA) redevelopment.

(d) The Project design minimises the loss of public open space in Victoria Park during construction.

9. Visual amenity and lighting

(a) The Project design seeks to minimise the visual impact of the above-ground infrastructure with regards to its scale, height and bulk. Specific urban design and visual impact studies are required to inform detailed design for:

(i) the station ventilation outlets and intake structures;

(ii) the above-ground electricity feeder stations;

(iii) the portals and transition structures; and

(iv) noise barriers and other impact mitigation devices or structures.

(b) Where required, noise barriers are designed to reduce the visual impacts to surrounding properties and roadways by:

(i) incorporating urban design treatments and landscape elements such as massed plantings;

(ii) using clear or transparent materials to maintain existing expansive views beyond the rail corridor, subject to security and maintenance considerations being evaluated; and

(iii) avoiding the use of highly reflective materials and materials that support graffiti.

(c) Landscaping, urban design and public art treatments sympathetic to heritage landscape and streetscape values are incorporated into the design of Project Works at stations and thoroughfares accessing stations.

10. Social environment

(a) The design of stations and public spaces developed as part of the Project stations incorporate CPTED principles to maximise commuter safety.

11. Waste

(a) The Project is designed to minimise waste generation and maximise the reuse and recycling of waste materials generated by the Project during its construction and operation.

(b) Opportunities are investigated during the detailed design phase for the use of recycled materials, including for Project infrastructure produced from concrete, road base, asphalt and other construction materials.

(c) During detailed design, the feasibility of re-using material excavated from the Project is investigated.

Schedule 2. Nominated entities with jurisdiction for conditions

Table A1 lists the organisations/agencies responsible for each of the Coordinator-General's Imposed Conditions (Appendix 1).

Table A1. Entities with jurisdiction for Coordinator-General Imposed Conditions

Part	Approval	Condition no.	Entity with jurisdiction
A	General conditions	1	Coordinator-General
A	Outline Environmental Management Plan	2	Coordinator-General
B	Design	3	Chief Executive, TMR
C	Construction Environmental Management Plan	4	Chief Executive, TMR
C	Compliance	5	Chief Executive, TMR
C	Reporting	6	Chief Executive, TMR
C	Environmental Monitor	7	Coordinator-General
C	Community Relations Monitor	8	Coordinator-General
C	Community engagement plan	9	Chief Executive, TMR
C	Hours of work	10	Chief Executive, TMR
C	Construction Noise and Vibration	11	Chief Executive, TMR
C	Property Damage	12	Chief Executive, TMR
C	Air Quality	13	Chief Executive, TMR
C	Traffic and Transport	14	Chief Executive, TMR
C	Water quality	15	Chief Executive, TMR
C	Water resources	16	Chief Executive, TMR
C	Surface water	17	Chief Executive, TMR
C	Erosion and sediment control	18	Chief Executive, TMR
C	Acid sulphate soils	19	Chief Executive, TMR
C	Landscape and open space	20	Chief Executive, TMR
C	Worksite rehabilitation	21	Chief Executive, TMR
D	Environmental design requirements	22	Chief Executive, TMR
D	Commissioning	23	Chief Executive, TMR

Schedule 3. Definitions

Directly Affected Persons means an entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the project impacts would be above the performance criteria in the Imposed Conditions.

Construction Environmental Management Plan means the Construction Environmental Management Plan referred to in Condition 4.

Outline EMP means the Outline EMP approved by the Coordinator-General in Condition 2.

Managed Work means Project Work for which either the predicted or monitored impacts meet the performance criteria at a Sensitive Place.

Non-Compliance Event means Project Works that do not comply with the Imposed Conditions

Predictive Modelling means the use of appropriate analytical scenario testing, whether or not by numerical measurements, undertaken prior to the commencement of Project Works.

Project Work means any works, including early works, demolition works or site preparation works, for construction of the project. Project Work does not include:

- any works associated with the demolition of buildings and structures on State owned land;
- works involving the relocation or replacement of public utilities when undertaken by a public utility authority or provider;
- the placement and management of spoil at spoil placement locations
- works associated with the temporary Roma Street Coach Terminal.

Sensitive Place means:

- a dwelling (including residential allotment, mobile home or caravan park, residential marina or other residential premises, motel, hotel or hostel)
- a library, childcare centre, kindergarten, school, university or other educational institution
- a medical centre, surgery or hospital
- a protected area
- a public park or garden that is open to the public (whether or not on payment of money) for use other than for sport or organised entertainment
- a work place used as an office or for business or commercial purposes, which is not part of the project activity(ies) and does not include employees accommodation or public roads.

Appendix 2. Coordinator-General's recommendations for the Cross River Rail project

This appendix includes the Coordinator-General's recommendations for the Cross River Rail project.

Recommendation 1. Ecosciences building planning

The proponent should continue to undertake consultation with the key stakeholders to minimise constraints on the planned development of the stage 2 of the Ecosciences Precinct.

Recommendation 2. Greenspace planning

The proponent should liaise with Brisbane City Council to offset the loss of public open space/pocket parks in accordance with Element 6 Nature Conservation of the OEMP.

Recommendation 3. Silicosis

The proponent should consider the findings from the Coal Workers' Pneumoconiosis Select Committee final report, Black Lung White Lies – Inquiry into the re-identification of Coal Workers' Pneumoconiosis in Queensland. Implement relevant recommendations regarding the potential impacts from silica to underground workers involved in tunnelling construction (silicosis) and include in:

(a) The Hazard and Risk sub-plan and/or

(b) The Air Quality sub-plan

Recommendation 4. Mined tunnelling

Mined tunnelling should be implemented in accordance with the *Work Health and Safety Act – Tunnelling Code of Practice 2011* and the Excavation Work Code of Practice 2017.

Recommendation 5. Myer Centre carpark

The proponent should undertake an assessment taking into consideration the potential impacts on surface pedestrian, traffic and public transport networks of the proposed changes to exit arrangements for the Myer Centre carpark in consultation with Brisbane City Council and Myer Centre management.

Recommendation 6. Freight

The proponent should engage and consult with key stakeholders such as the Western Freight Users Group and the Rail Infrastructure Manager regarding the possession of the rail corridor to reduce potential impacts on rail freight movements during construction in accordance with Element 2 of the OEMP.

Recommendation 7. Pavement impacts

In consultation with Brisbane City Council, the proponent should develop mitigation measures to address any assessed pavement damage on local roads from project spoil haulage.

Recommendation 8. Noise and Vibration

The proponent should consult with relevant advisory agencies in the development of mitigation measures for predicted and monitored noise and vibration impacts above the goals for the CEMP.

Recommendation 9. Dust impacts - Southern Portal / Boggo Road Railway station worksites

The proponent should conduct predictive air quality modelling for early construction earthworks prior to the commencement of Project Works. Should exceedance of the goals in Table 4 of the Imposed Conditions be predicted, I recommend that consultation be undertaken with relevant entities including representatives of the PA Hospital, Leukaemia Foundation ESA Village, Ecosciences Precinct and the TRI building in the development of mitigation measures.

The proponent should establish real-time monitoring, with monitoring stations positioned at appropriate locations around the proposed worksites. Should exceedances of the goals in Table 4 be monitored or occur during construction, that are attributable to the project, the proponent should revise their adaptive management approach where necessary.

Recommendation 10. Boggo Road Pedestrian Connection

It is recommended that the Proponent refine the "Boggo Road Pedestrian Bridge Concept" (as shown in the Response to Submission Report dated June 2019) in consultation with the Department of Transport and Main Roads, Brisbane City Council, Ecosciences and the Princess Alexandra Hospital to maintain consistency with the Environmental Design Requirements for Traffic and Transport.

Recommendation 11. Traffic Management

In developing the Construction Traffic Management Plans required by Imposed Condition 14, it is recommended that the Proponent:

- continue to participate in the Traffic Management Liaison Group, together with Brisbane City Council, Translink and DTMR;
- undertake detailed analysis and modelling of the proposed temporary closure and diversion of the Inner Northern Busway at Roma Street;
- provide the outcomes of that analysis to Brisbane City Council and Translink to inform future public transport timetable management to accommodate the temporary diversion;
- consider the concurrent construction of other projects in the central business district in determining the appropriate spoil haulage hours in the central business district through the Construction Traffic Management Plan;
- consider the appropriate spoil haulage and materials equipment delivery hours at worksites in the vicinity of schools, taking into consideration student drop-off and pick-up hours between 7-9am and 2-4pm on school days.

Recommendation 12. Parkland Boulevard

It is recommended that the Proponent investigate the feasibility of upgrading access between the Roma Street Parklands and Parkland Boulevard Apartments and the external road network, with particular emphasis given to considering whether

amendments to the College Road/Wickham Terrace/Gregory Terrace/Parkland Boulevard intersection could accommodate an alternative egress point for Roma Street Parklands residents.

Recommendation 13. Flood studies

It is recommended that detailed hydraulic modelling be conducted as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek. Brisbane City Council should be consulted on hydraulic modelling which will inform construction methodology and bridge design. Hydraulic modelling should be provided to Brisbane City Council for review and comment.

Recommendation 14. Consultation with key stakeholders

It is recommended that the Proponent should continue to undertake consultation with directly affected persons and key stakeholders for the duration of construction, to minimise and manage Project impacts.

Recommendation 15. Noise mitigation at Dutton Park

Consistent with achieving the Environmental Design Requirements for Noise and Vibration, it is recommended that where predictive modelling indicates exceedances of the noise criteria for railway surface track airborne noise emissions, the Proponent consult with Queensland Rail and residents of Cope Street during detailed design and consider noise mitigation measures that balance achieving compliance with MD-15-317, operational rail requirements and amenity impacts for residents of Cope Street.

Recommendation 16. Noise mitigation at Albert Street and Roma Street

To assist with meeting the project's construction noise criteria for night time cavern excavation and construction works, it is recommended that the Proponent consider (as part of the detailed construction planning) the use of a high performance enclosure for noise attenuation generally in the location of the "purpose built acoustic enclosure" shown on Drawing CRR-0003-CD-GA-150 and Drawing CRR-0003-CD-GA-155.

Recommendation 17. Managing impacts on homeless persons and associated community service providers

It is recommended that the Proponent continue to work in cooperation with key stakeholders, including the Queensland Council of Social Service, Department of Housing and Public Works, Department of Communities, Queensland Health, Brisbane City Council and government funded Micah Projects to provide appropriate assistance to homeless persons who may be adversely affected by the Project Works. In particular. the proponent should use targeted communication at each construction site and engage relevant stakeholders early to ensure appropriate notice is provided to homeless people and service providers prior to construction commencing.

Appendix 3. Imposed conditions – Temporary Roma Street Coach Terminal Works

This appendix includes conditions imposed by the Coordinator-General under section 54B of the SDPWO Act.

All of the conditions imposed in this Appendix take effect from the date of this Coordinator-General's change report.

These conditions do not relieve the proponent of the obligation to obtain all approvals and licenses from all relevant authorities required under any other Act.

In accordance with section 54B(3) of the SDPWO Act, I have nominated entities to have jurisdiction for the imposed conditions for the project in Schedule 1.

Pursuant to section 54D of the SDPWO Act, these conditions apply to anyone who undertakes the project, such as the proponent and an agent, contractor, subcontractor or licensee of the Proponent.

Defined terms that are part of the imposed conditions are contained in Schedule 2.

Part A Imposed Conditions (General)

Condition 1. General conditions

(a) The temporary coach terminal works must be carried out generally in accordance with the Cross River Rail Request for Project Change dated June 2018.

(b) The proponent must notify the Coordinator-General in writing of the commencement of construction of the temporary coach terminal and the commencement of the operational phase at least 20 business days prior to the relevant commencement date.

(c) The temporary coach terminal works must be carried out in accordance with the Imposed Conditions (temporary coach terminal works) in Appendix 3.

Part B Imposed Conditions (Temporary Coach Terminal Works)

Condition 2. Construction Environmental Management Plan

(a) A Construction Environmental Management Plan must be submitted to the Coordinator-General for approval at least 20 business days prior to the commencement of construction of the temporary coach terminal.

(b) The Construction Environmental Management Plan (temporary coach terminal works) must:

  (i) describe the temporary coach terminal works;

  (ii) be based on predictive studies and assessments of construction impacts which have regard to the scale, intensity, location and duration of construction works, and impact to Directly Affected Persons;

  (iii) incorporate and respond to the Imposed Conditions (temporary coach terminal works);

  (iv) demonstrate how the Imposed Conditions (temporary coach terminal works) will be complied with during the construction of the temporary coach terminal;

  (v) incorporate the stakeholder engagement plan, including the complaints management process, in accordance with Condition 5 in this Part B;

(vi) where predictive studies indicate impacts beyond those provided for in the performance criteria, incorporate mitigation measures to achieve the environmental outcomes;

(vii) establish specific mitigation measures and processes for consultation with Directly Affected Persons for temporary coach terminal works under Conditions 5(c), 7(c), and 7(f) in this Part B;

(viii) contain a program and procedures for ongoing monitoring to identify the effectiveness of mitigation measures in achieving the Imposed Conditions (temporary coach terminal works);

(ix) include a process for regular review and if required updating of the Construction Environmental Management Plan, including a process to review and implement additional or different mitigation measures in response to monitoring results;

(c) The Construction Environmental Management Plan (temporary coach terminal works) must be implemented for the duration of construction of the temporary coach terminal.

(d) Temporary coach terminal work is authorised if it is undertaken in accordance with the approved Construction Environmental Management Plan (temporary coach terminal works).

(e) The Construction Environmental Management Plan (temporary coach terminal works) must be available on the Cross River Rail website for the duration of construction of the temporary coach terminal.

(f) The Construction Environmental Management Plan (coach terminal works) may be developed in stages and/or updated. Any major update or additional stage will be submitted to the Coordinator-General 10 business days prior to issuing for use.

Condition 3. Compliance

(a) The proponent must notify the Coordinator-General in writing, within 48 hours after becoming aware of a non-compliance incident (incident) with the Imposed Conditions (temporary coach terminal works)

(b) The notification must include:

(i) a description of the incident, including details of the location, date and time of the Incident;

(ii) the name and contact details of a designated contact person;

(iii) an outline of actions that have been or will be taken to respond to the incident.

(c) Within 14 days following the notification of an Incident, written advice detailing the following information must be provided to the Coordinator-General:

(i) a description of the incident, including details of the location, date and time of the Incident;

(ii) the name and contact details of a designated contact person;

(iii) the circumstances in which the Incident occurred;

(iv) details of any complaint in relation to the incident;

(v) the cause of the incident;

(vi) a description of the environmental effects of the incident;

(vii) the results of any sampling or monitoring performed in relation to the Incident;

(viii) actions taken to mitigate the environmental effects of the incident;

(ix) proposed actions to prevent a recurrence of the Incident, including timing and responsibility for implementation.

(d) The incident report must be made available on the project website and remain available for the duration of the construction phase of the temporary coach terminal.

Condition 4. Reporting

(a) The proponent must prepare a monthly report that summarises compliance and monitoring results for the duration of the temporary coach terminal works.

(b) The Monthly Report must include:

(i) monitoring data required by the Imposed Conditions (temporary coach terminal works) or Construction Environmental Management Plan (temporary coach terminal works) undertaken for the period and, where required, an interpretation of the results;

(ii) details of any incident, including a description of the incident, resulting effects, corrective actions, revised construction practices to prevent a recurrence, responsibility and timing;

(iii) reporting of complaints, including the number of complaints, description of issues, responses and corrective actions.

(iv) an evaluation of compliance in relation to the Construction Environmental Management Plan (temporary coach terminal works);

(v) a summary of any Incidents during the reporting period;

(vi) a summary of any Incidents during the previous reporting period, with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant).

(c) The Monthly Report must be provided to the Coordinator-General and made available on the project website within four weeks of the end of the month to which the report relates and continue to be available on the project website for the duration of the construction phase of the temporary coach terminal.

Condition 5. Stakeholder engagement plan

(a) The proponent must develop a stakeholder engagement plan as part of the Construction Environmental Management Plan (temporary coach terminal works).

(b) The stakeholder engagement plan must provide for:

(i) Directly Affected Persons to be consulted prior to commencement of temporary coach terminal works and for the duration of the temporary coach terminal works;

(ii) Directly Affected Persons to be consulted about predicted impacts and possible mitigation measures;

(iii) local communities near temporary coach terminal works to be informed about the nature of construction, including the timing, duration and predicted impacts of the temporary coach terminal works in advance of their commencement;

(iv) information to be provided to public transport, road users, pedestrians and cyclists about the predicted effects of temporary coach terminal works on road, rail and pedestrian and cycle network operations, in advance of their commencement;

(v) specific community consultation plans for identified key stakeholders;

(vi) a process for advance notification to local communities of temporary coach terminal works, including the timing, duration, predicted impacts and mitigation measures, which is available on the project website and through other media.

(c) The stakeholder engagement plan must incorporate a complaints management system developed specifically for the temporary coach terminal works, which is established prior to the commencement of temporary coach terminal works.

(d) The complaints management system must deliver a prompt response to community concerns with relevant information, action where required, and reporting of incidents.

(e) As a minimum, the complaints management system must include the following elements:

(i) a procedure for receiving complaints on a 24 hour, seven days a week basis, during temporary coach terminal works;

(ii) a mechanism for notifying the community of the complaints procedure and how it may be accessed;

(iii) a process for registering and handling complaints received, including a database for tracking of complaints and actions taken in response;

(iv) a procedure for verifying complaints through monitoring and detailed investigation, and escalating and resolving verified complaints;

(v) regular reporting via the monthly environmental report, to the community of complaints and corrective actions, maintaining appropriate confidentiality.

(f) All information regarding complaints must be made available to the Coordinator-General on request.

Condition 6. Hours of work

(a) Construction works for the temporary coach terminal are authorised to be undertaken within the hours of work set out in Table 1.

Table 1 Construction hours

Standard hours	Extended work hours
Monday to Saturday, 6.30am - 6.30pm	Monday to Friday, 6:30pm - 10:00pm

(b) Works carried out because of an emergency that:

(i) is endangering the life or health of a person; or

(ii) is endangering the structural safety of a building; or

(iii) is endangering the operation or safety of community infrastructure that is not a building; or

(iv) is required to prevent environmental harm, may be undertaken outside the hours set out in Table 1.

(c) The following work may be undertaken during Extended Work Hours as set out in Table 1, subject to compliance with specific measures for Extended Work Hours in the Construction Environmental Management Plan (temporary coach terminal works):

(i) Paving, line marking, structural installation;

(ii) Temporary coach terminal works within a road reserve or busway that cannot be undertaken reasonably nor practicably during standard hours due to potential disruptions to peak traffic flows or bus operations;

(iii) Temporary coach terminal works involving the transport, assembly or decommissioning of oversized plant, equipment, components or structures;

(iv) delivery of "in time" materials such as concrete, hazardous materials, large components and machinery;

(v) Temporary coach terminal works that require continuous construction support, such as continuous concrete pours, or other forms of ground support necessary to avoid a failure or construction incident.

Condition 7. Construction noise and vibration

(a) Temporary coach terminal works must aim to achieve the project noise goals for human health and well-being presented in Table 2.

Table 2. Noise goals (internal) for temporary coach terminal works

	Monday – Saturday 6.30am – 6.30pm	Monday – Friday 6.30pm – 10.00pm
Continuous (LAeq adj)(1hr)	AS 2107 Maximum design level	40 dBA LAeq adj (1hr)
Intermittent (LA10 adj)(15min)	AS 2107 Maximum design level + 10 dBA	50 dBA LA10, adj

Notes

1. All goals are internal noise levels for human health and well-being outcomes.

2. Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in the relevant State guideline, such as the Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 (currently under review).

(b) During construction of temporary coach terminal works monitor and report on noise and vibration in accordance with the Construction Environmental Management Plan (temporary coach terminal works).

(c) Temporary coach terminal works predicted to or monitored as generating noise levels more than 20dBA (LA eq 10min, adj) above the relevant goal in Table 2 may occur only in accordance with the mitigation measures developed in consultation with and agreed by Directly Affected Persons that are incorporated in the Mitigation Register.

(d) Temporary coach terminal works must aim to achieve the construction vibration goals in Table 3.

Table 3. Vibration goals (internal) for Temporary Coach Terminal Works

Receiver type	Cosmetic Damage		Human comfort (mm/s PPV)		Sensitive building contents (mms/PPV)
	Continuous vibration (mm/s PPV)	Transient vibration (mm/s PPV)	Day	Night	
Residential	According to BS7385 reduced by 50%[1]	According to BS7385	According to AS2670	0.5[2]	
Commercial	According to BS7385 reduced by 50%[1]	According to BS7385	According to AS2670		0.5[3]
Heritage Structures	2				

Notes:

1. If resonance is present, or if investigation to detect resonance were not able to be undertaken due to a lack of access

2. Residential sleep disturbance

3. Equipment specific vibration criteria are required for highly sensitive equipment (i.e. electron microscopes, MRI systems or similar), as part of future site-specific detailed investigations

(e) Where vibration protection criteria are available for sensitive building contents, predictive modelling must take into account the manufacturer's specifications for tolerance to vibration. To the extent reasonable and practicable, those specifications apply in lieu of the construction vibration goals in Table 3. Where predictive modelling indicates the specified

criteria would not be achieved by the temporary coach terminal works, such works may proceed only in accordance with specific mitigation measures agreed with the potentially Directly Affected Persons.

(f) Temporary coach terminal works predicted to or monitored as generating vibration levels more than 2mm/s for continuous vibration and 10mm/s for transient vibration may occur only in accordance with the mitigation measures developed in consultation with and agreed by Directly Affected Persons that are incorporated in the Mitigation Register.

(g) The temporary coach terminal must incorporate dynamic signage and ensure equitable access is provided for visually impaired persons in accordance with relevant Australian Standards and design principles.

Condition 8. Air quality

(a) Construction of the temporary coach terminal works must aim to achieve the goals in Table 4.

Table 4. Air quality goals

Criterion	Air quality indicator	Goal	Averaging Period
Human health	Total Suspended Particulates (TSP)	90 µg/m^3	1 year
	Particulate matter (PM_{10})	50 µg/m^3	24 hours
		25 µg/m^3	1 year
Nuisance	TSP	80 µg/m^3	24 hours
	Deposited dust	120 mg/m^2/day	30 days

(b) During construction monitor and report on air quality in accordance with the Construction Environmental Management Plan (temporary coach terminal works).

Condition 9. Traffic and transport

(a) Construction traffic associated with the temporary coach terminal works must be managed to avoid or minimise adverse impacts on road safety and traffic flow, public transport, freight rail movements, pedestrian and cyclist safety, and property access.

(b) During temporary coach terminal works, workforce car parking will be provided within the worksite where possible, and parking on local streets is to be avoided.

(c) Access for emergency services to temporary coach terminal worksites and adjoining properties must be maintained throughout the construction phase.

(d) Practicable access is maintained to adjacent properties throughout temporary coach terminal works.

(e) Heavy construction vehicles use only designated routes for spoil haulage and deliveries of major plant, equipment and materials, in accordance with the Construction Environmental Management Plan. The designated haulage routes for each worksite must follow major or arterial roads to the extent practicable.

(f) Construction traffic must operate within the requirements of the Construction Environmental Management Plan (temporary coach terminal works).

(g) Prepare a Construction Traffic Management Plan (temporary coach terminal works) that includes:

(i) the proposed access to worksites, with local or minor roads only used where unavoidable to access a temporary coach terminal worksite;

(ii) a process for advance notice to Directly Affected Persons and local communities within the vicinity of the haulage routes and worksite accesses;

(iii) local traffic management measures developed in consultation with Brisbane City Council for key intersections including the reconfiguration of the intersection between Parkland Boulevard and Parkland Crescent to provide better sight distances and improved safety for road users;

(iv) specific traffic management measures developed in consultation with other key stakeholders, including:

(A) Queensland Rail about maintaining access to railway stations; and

(B) the department administering the *Transport Infrastructure Act 1994* and the Brisbane City Council about maintaining operations for bus services along streets affected by the temporary coach terminal works.

(h) Temporary coach terminal works must be designed, planned and implemented to maintain acceptable footpath and cycle paths in areas adjacent to temporary coach terminal worksites in terms of capacity, legibility and pavement condition. The proponent must consult with the Brisbane City Council and Queensland Rail about changes in pedestrian and cycle paths required to facilitate temporary coach terminal works.

Condition 10. Water quality

(a) Discharge of surface water and groundwater from the construction of the temporary coach terminal works must comply with the Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid-estuary) in the Environmental Protection (Water) Policy 2009.

(b) During construction monitor and report on water quality in accordance with the Construction Environmental Management Plan (temporary coach terminal works).

Condition 11. Surface water

(a) Temporary coach terminal works, and worksites, must be designed and implemented to avoid inundation from stormwater due to a 2-year (6hr) ARI rainfall event and flood waters due to a 5-year ARI rainfall event.

(b) Temporary coach terminal works must be designed and implemented to avoid afflux or cause the redirection of uncontrolled surface water flows, including stormwater flows, outside of worksites.

Condition 12. Erosion and sediment control

(a) An erosion and sediment control sub-plan that is consistent with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS51 – Environmental Management must be submitted as part of the Construction Environmental Management Plan (temporary coach terminal works).

Condition 13. Cultural heritage

(a) Temporary coach terminal works that involve excavation, construction or other activities that may cause harm to Aboriginal cultural heritage must not take place without the development and approval of a cultural heritage management plan for the Project in accordance with the *Aboriginal Cultural Heritage Act 2003*.

(b) Temporary coach terminal works that do not have the potential to harm Aboriginal cultural heritage may be carried out without the development and approval of a cultural heritage management plan for the Project, however must be carried out in accordance with the cultural heritage duty of care prescribed under section 23(1) of the *Aboriginal Cultural Heritage Act 2003*.

(c) Temporary coach terminal works that do not constitute Project Works may be carried out for the Project without the development and approval of a cultural heritage management plan for the Project, however must be carried out in accordance with the cultural heritage duty of care prescribed by section 23(1) of the *Aboriginal Cultural Heritage Act 2003*.

Schedule 1. Nominated entities with jurisdiction for conditions

Table A1 lists the organisations/agencies responsible for each of the Coordinator-General's Imposed Conditions (Appendix 3).

Table A2. Entities with jurisdiction for Coordinator-General Imposed Conditions

Part	Approval	Condition no.	Entity with jurisdiction
A	General conditions	1	Coordinator-General
B	Construction Environmental Management Plan	2	Coordinator-General
B	Compliance	3	Chief Executive, TMR
B	Reporting	4	Chief Executive, TMR
B	Stakeholder engagement plan	5	Coordinator-General
B	Hours of work	6	Chief Executive, TMR
B	Construction noise and vibration	7	Chief Executive, TMR
B	Air quality	8	Chief Executive, TMR
B	Traffic and transport	9	Chief Executive, TMR
B	Water quality	10	Chief Executive, TMR
B	Surface water	11	Chief Executive, TMR
B	Erosion and sediment control	12	Chief Executive, TMR
B	Cultural heritage	13	Chief Executive, TMR

Schedule 2. Definitions

Definitions

Temporary Coach Terminal Works means all works associated with the design, construction and commissioning of the temporary coach terminal.

Directly Affected Persons means an entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the temporary coach terminal works impacts would be above the performance criteria in the conditions imposed for the temporary coach terminal works.

Acronyms and abbreviations

Acronym	Definition
AEP	annual exceedance probability
AHD	Australian Height Datum
AQMP	Air Quality Management Plan
ARI	Annual Recurrence Interval
AS	Australian Standard
ASS	acid sulphate soils
BCC	Brisbane City Council
BCM	bank cubic metres
BGGS	Brisbane Girls Grammar School
BRCFS	Brisbane River Catchment Flood Study
BTC	Brisbane Transit Centre
BTS	Biomedical Technology Services
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CGCR	Coordinator-General's change report
CGER	Coordinator-General's evaluation report
CHMP	Cultural Heritage Management Plan
CPTED	Crime Prevention Through Environmental Design
CRRDA	Cross River Rail Delivery Authority
CRRDA Act	*Cross River Rail Delivery Authority Act 2016*
CSEP	Community and Stakeholder Engagement Plan
CTMP	Construction Traffic Management Plan
DAF	Department of Agriculture and Fisheries
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
DES	Department of Environment and Science
DTMR	Department of Transport and Main Roads
dB(A)	adjusted decibels
EIS	environmental impact statement
EMR	Environmental Management Register
ESCP	Erosion and Sediment Control Plan
EPBC Act	*Environment Protection and Biodiversity Act 1999*
ETCS	European Train Control System
EVNT	Endangered, Vulnerable or Near Threatened
FABZ	Fire Ant Biosecurity Zones
HA	high attenuation
INB	Inner Northern Busway
km	kilometres
km/hr	kilometres per hour

Acronym	Definition
$L_{Aeq,24hr}$	Time average A-weighted sound level having the same total energy as the time varying sound being measured between the 12 hours between 6:00 am to 6:00 pm.
L_{Amax}	The maximum A-weighted noise level
LOS	level of service
m	metres
m^2	square metre
m^3	cubic metre
mg	milligram
mm	millimetre
mm/s	millimetre per second
NALL	*Natural Assets Local Law 2013*
NC Act	*Nature Conservation Act 1997*
NCMP	Nature Conservation Management Plan
OEMP	Outline Environmental Management Plan
PA	Princess Alexandra
PDA	Priority Development Area
$PM_{2.5}$	particulate matter 2.5 micrometre or less in diameter
PM_{10}	particulate matter 10 micrometres or less in diameter
QR	Queensland Rail
RE	Regional Ecosystem
SDPWO Act	*State Development and Public Works Organisation Act 1971*
TEM	Transmission Electron Microscope
TSP	total suspended particles
VHA	very high attenuation
$\mu g/m^3$	micrograms per cubic meter

Glossary

Term	Definition
2011 EIS	The EIS publicly notified from 30 August 2011 to 21 October 2011.
2012 CGER	The CGER dated 20 December 2012.
August 2018 CGCR	The CGCR dated 30 August 2018.
coordinated project	A project declared as a 'coordinated project' under section 26 of the SDPWO Act. Formerly referred to as 'significant project'.
Coordinator-General	The corporation sole constituted under section 8A of the SDPWO Act and preserved continued and constituted under section 8 of the SDPWOA Act.
February 2017 project change application	The project change application dated 10 February 2017.
imposed condition	A condition imposed by the Queensland Coordinator-General under section 54B of the SDPWO Act. The Coordinator-General may nominate an entity that is to have jurisdiction for that condition
June 2017 CGCR	The CGCR dated 9 June 2017.
June 2018 project change application	The project change application dated 28 June 2018.
November 2018 project change application	The project change application dated 19 November 2018.
significant project	A project declared (prior to December 2012) as a 'significant project' under section 26 of the SDPWO Act. Projects declared after 21 December 2012 are referred to as 'coordinated projects'.
the project	The project described in the Coordinator-General's Evaluation Report dated 20 December 2012.

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Queensland
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