CROSSRIVERRAIL
Delivery Authority

Environmental Impact Statement

Request for Project Change 3

November 2018

Volume 1

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Executive Summary

The Cross River Rail (CRR) Project was declared a significant project (now a coordinated project) for which an Environmental Impact Statement (EIS) was required. The EIS relating to the CRR Project was approved by the Coordinator-General on 20 December 2012. The Project has previously submitted two Requests for Project Changes (RfPCs), to refine the design including reducing the tunnel component of the Project and to relocate the long-distance coach terminal. The CRR Project has approval to demolish the Brisbane Transit Centre (BTC) (West Tower) to enable the construction and shaft excavation of the CRR Roma Street Station. Due to issues with building severability, demolition of the entire BTC is required. This increase involves new property impacts and additional building demolition of BTC (East Tower) and Hotel Jen not previously assessed. This additional area will be utilised for the construction of the CRR Roma Street Station.

The Cross River Rail Delivery Authority (Delivery Authority) has commenced the acquisition process for these properties. In addition, temporary impacts will also occur as a result of the demolition of these buildings. Demolition worksite and access needs have resulted in the requirement to temporarily occupy the open space adjacent to Hotel Jen (part of Lot 60 located at the corner of Roma Street and Parkland Boulevard) during demolition and construction works.

Further technical assessments have been completed to assess the current site conditions and to determine key potential impacts resulting from the works proposed. Assessment aspects included flora and fauna, contaminated land, heritage, noise and vibration, air quality, transport, social amenity, visual amenity and landscape.

Removal of urban vegetation and landscaped vegetation is required in the relevant part of Lot 60 on SP207215 for demolition access and demolition worksite establishment, with eight trees required to be removed. This site will also be required for the full construction period to support the Roma Street Station construction works program. These trees have been identified in the arborists' vegetation assessment as having medium to high retention value.

As all the impacted properties are listed on the Environmental Management Register as having potential for contamination, soil excavation will be required for worksite establishment and further validation of soil contamination will be required prior to disturbance and removal from site.

Both State and Brisbane City Council listed heritage sites are near to the site, the nearest being the original Roma Street Station building and part of the worksite is within the Roma Street railyards a locally listed heritage site.

Vibrational assessment predicts compliance with the Project heritage building damage criteria of 2 mm/s PPV at all heritage sites during demolition works, except during ground remediation where Project goals may be exceeded at the Transcontinental Hotel and King George Chambers. The use of smaller equipment will be considered in detailed design to further aim to achieve these goals.

The proposed demolition will result in a moderate increase of noise impacts compared to the noise levels previously approved. Noise impacts to the Supreme Court and Magistrates Court are predicted for most activities, with impacts to surrounding residences also occurring for louder activities. Dust and air emissions are predicted to be managed within the current Project air quality objectives. The vibrational assessment shows vibratory compaction during site levelling and compaction may cause short-term exceedance to human comfort experienced at the Supreme Court, Former Bank of Queensland and Baby Clinic (former).

Landscape and visual amenity impacts include the removal of landscape trees and the temporary loss of open space and visual impacts during demolition. Improvements to visual amenity and sightlines will occur upon completion of the works.

Traffic network impacts from the demolition works are expected to be minor and will generate an average of two heavy vehicles per hour and a peak of four heavy vehicles per hour. Modifications to the grade of the adjacent open space park will be required to allow heavy vehicle access from the demolition site. The demolition of the pedestrian bridge will involve a short term temporary closure of Roma Street, which will be undertaken at night or on weekend to minimise impacts to peak traffic movement. Parkland Boulevard will remain open to cyclists and pedestrians during the demolition.

Extensive consultation with key affected stakeholders has been ongoing and a detailed community consultation program has been developed to manage the potential impacts and changes proposed as part of this RfPC.

1. Introduction

The Cross River Rail (CRR) Project was declared a significant project (now a coordinated project) for which an Environmental Impact Statement (EIS) was required. The EIS relating to the CRR Project was evaluated by the Coordinator-General (CG) in a report dated 20 December 2012. The Coordinator-General Evaluation Report (CGER) recommended that the Project could proceed, subject to conditions for the minimisation and management of the environmental impacts of the Project in its delivery and implementation.

A Request for Project Change (RfPC-1) was made on the 5 December 2016. RfPC-1 was evaluated by the CG in a Coordinator-General Change Report (CGCR) on 9 June 2017 resulting in a modified Project smaller in scale with reduced potential impacts and enhanced affordability. As part of RfPC-1, the demolition of the Brisbane Transit Centre (BTC) (West Tower) and coach ramps were required to construct the underground CRR Roma Street Station. As part of that application, it was identified that the Roma Street Coach Terminal would need to be relocated. On 28 June 2018, a further RfPC (RfPC-2) was submitted and approved by the CG in a CGCR issued on the 31 August 2018 which addressed the temporary solution for the relocation of the Roma Street Coach Terminal to a site previously approved as a construction laydown area (Platform 10).

It has been decided by the CRRDA, as a constructing authority, to resume the BTC (East Tower) and the Hotel Jen as additional land pursuant to section 13 of the *Acquisition of Land Act 1967.* The proposed changes to the Project scope and relevant land area are being captured as part of this third RfPC (RfPC-3).

1.1 Purpose

The purpose of this RfPC-3 is to request that the CG assesses a change to the Project in accordance with Part 4, Division 3A of the *State Development and Public Works Organisation Act 1971* Qld (SDPWO Act).

This report:

- Describes the proposed Project change;
- States reasons for the change;
- Includes relevant information about the proposed change and its effects on the Project, to allow the CG to make the evaluation, including:
  - the assessment of the environmental impact of the changes to the Project, and
  - proposed mitigation measures to inform the CG decision process for this RfPC application; and
- Updates current Project documentation, including Volume 2 Design Drawings, to ensure the latest Project corridor and nominated scope for the works is captured.

1.2 Proponent

The Cross River Rail Delivery Authority (the Delivery Authority) is the proponent for the Project. The Delivery Authority was established by the *Cross River Rail Delivery Authority Act 2016* Qld.

1.3 Process for Evaluation of Project Changes

The process by which the changes to the Project are to be addressed are established in Part 4, Division 3A of the SDPWO Act. The proposed demolition work triggers the requirement for the Proponent to request that the CG assess the following:

- changes to the Project impact area; and
- additional proposed demolition works.

The CG may require the Project Proponent to publicly notify the proposed change, and its effects on the Project, in a way decided by the CG.

In evaluating the proposed change to the Project, the CG must consider:

- nature of the proposed change and its effect on the Project;
- environmental impacts of the proposed change, if any;
- any properly made submissions on the application for Project Change; and
- any other material deemed relevant by the CG.

The CG will prepare a change report that makes the evaluation. The change report may state conditions or make recommendations, including amendments to the CRR Project Imposed Conditions or recommendations. This report is given to the proponent and must be publicly notified.

1.4 Scope of Project Change

This RfPC-3 relates to the Roma Street precinct and the scope of change is limited to the expansion of the CRR Roma Street major worksite area by one hectare resulting in the demolition of two buildings (BTC - East Tower and Hotel Jen), associated demolition worksites and use of this area to support the construction of the CRR Roma Street Station. The lots subject to the changed impacts are Lot 1 SP207220, Lot 35 SP207219 and Lot 60 SP207215 as shown in **Figure 1**.

In addition to demolition requirements, this additional area has been identified as being required for the five-year construction period of the CRR Roma Street Station. As such, as part of this RfPC-3 the Authority is seeking approval for part of Lot 60 to be included in the project footprint. It is expected that the site will be fully disturbed for construction laydown and staging purposes. Despite not being able to disclose specific activities at this time, details of the final construction activities to be undertaken in this area will be assessed as part of a future RfPC upon award of preferred tenderer.

No changes are proposed to other components of the Project as part of this RfPC-3.

To quantify the impacts of the proposed BTC demolition and CRR Roma Street Station worksite expansion, technical assessments, including flora and fauna, contaminated land, heritage, noise and vibration, air quality, transport, social amenity, visual amenity and landscape, have been completed and key potential impacts identified.

This RfPC-3 provides relevant information about the proposed change and its effects on the Project to allow the CG to make the evaluation. This RfPC-3:

- demonstrates that there has been thorough and ongoing consultation with key stakeholders as part of the design development phase;
- demonstrates that the potential impacts have been identified; and

- recommends mitigation measures that are proportionate and appropriate for managing the potential impacts identified to achieve compliance with the CRR Project conditions imposed and recommended by the CG.

Figure 1 Additional CRR Project Impact Area

2. CRR Project as Currently Evaluated

The CRR Project is the Project as currently evaluated through the following:

- 2011 EIS - the CRR Reference Project is provided in the EIS (Volume 1, Part A, Chapter 4) dated July 2011;
- RfPC-1 - CGCR - EIS approved on the 9 June 2017; and
- RfPC-2 - CGCR – EIS approved on the 31 August 2018.

2.1 Project Design

There is no change to the currently approved general arrangement or design of the CRR Project within the Roma Street precinct as part of this RfPC-3 application and a description of the currently approved design is not required.

2.2 Project Delivery

Current approved construction works at the Roma Street Precinct includes the following activities:

- Demolition of the BTC (West Tower);
- Construction worksites with laydown, parking, workshop and storage;
- Haulage and spoil removal;
- Site offices;
- Public Utility Plant (PUP) relocation; and
- Temporary coach terminal adjacent to Platform 10.

2.2.1 Property Impact

The current Roma Street Precinct approved property impact and construction work impact areas are shown in **Figure 2** and **Figure 3** respectively.

2.2.2 Demolition Work

The BTC (West Tower) building and coach ramps are approved to be demolished to accommodate the CRR Roma Street Station. Demolition is expected to generally take place within the confines of the worksite. Establishment of the worksite for demolition is likely to involve site hoardings at or near the back of footpaths allowing pedestrian and cyclist access to be maintained along frontage footpaths. Building scaffolding will also be erected around the outside of the building structures to ensure demolition works are contained within the worksite.

2.2.3 Construction Worksites

There are two approved worksites identified for the CRR Project within the Roma Street Precinct:

1. Major construction worksite - the CRR Roma Street Station construction worksite is approved to be located between the Inner Northern Busway and Roma Street covering the BTC (West Tower) site and coach ramps. This worksite is approved to be used for the construction of the CRR Roma Street Station and a large central cut-and-cover construction with mined caverns extending to the south-east and north-west along the changed alignment. Worksite access will be provided from Roma Street via a two-way point adjacent to the Inner Northern Busway entry (near Countess Street), as well as a left-in, left-out arrangement further east (opposite Makerston Street).
2. Roma Street Parklands satellite site – this worksite was to be established off Parkland Boulevard primarily for workforce car parking with access off College Road.

2.2.4 Traffic and Access

Haulage and Traffic Generation

Heavy vehicle demolition haulage numbers were not identified for either the original EIS or RfPC-1 as demolition was only for a relatively short period and the frequency of truck movements was not expected to exceed that of the excavation stage.

Parking

The CGCR for RfPC-1 approves 45 on-site parking spaces at the worksite at BTC (West Tower). The removal of ~600 car parking spaces at the BTC is also approved as part of RfPC-1. RfPC-2 approved the Parkland Boulveard shared zone to be utilised for pick-up/drop-off (adjacent to escalators and café).

Busway Operations

The inbound bus stop at Roma Street adjacent to the worksite is approved to be relocated in coordination with TransLink during the demolition phase. Establishment of the construction worksite may also result in temporary disruption to the Inner Northern Busway adjacent to Roma Street Station. This will be managed in consultation with TransLink and Brisbane City Council (BCC).

Pedestrian and Cycle Access

The CityCycle station in front of the BTC (West Tower) will be relocated in consultation with BCC. Access to the existing Roma Street rail station and Brisbane City busway would be maintained through alternative arrangements developed in consultation with Queensland Rail and BCC.

2.2.5 Future Use

The broader project and future precinct planning will support redevelopment of the BTC and surrounding site with the new station being designed in such a way as to support any future over station development. Final use of the site will be assessed as part of separate planning and approval processes and will be subject to State and local government planning policies and requirements in force at the time of application.

Figure 2 Approved property impact plan

Figure 3 Approved construction site plan

3. Changes to the CRR Project

3.1 Changes to the CRR Project Design

There is no change to the currently approved general arrangement of design of the CRR components within the Roma Street Precinct as part of this RfPC-3 application. The changes identified in this report are limited to additional areas required for demolition and construction use.

3.2 Changes to the CRR Project Delivery

The key proposed change is the increased demolition works to include the BTC (East Tower) and Hotel Jen. The area will also be used for construction laydown, additional worksites and other construction-related activities to support the construction of the underground CRR Roma Street Station for the full construction period.

The change to property impacts is the increase of impact area on Lot 1 on SP207220 to include the entire lot and a partial new impact area within Lot 60 on SP207215 and Lot 35 on SP207219 not previously impacted by the Project. The property impact area changes are shown in **Figure 4**.

The additional works involve the demolition of Hotel Jen and the BTC (East Tower), including the pedestrian bridge over Roma Street that links to the BTC. Buildings within Lot 1 on SP207220 are proposed to be demolished sequentially with Hotel Jen and BTC (East Tower) first, followed by the Podium and BTC (West Tower). The temporary utilisation of the open space park adjacent to Hotel Jen and Queensland Rail carpark is proposed for demolition access and demolition works laydown and following demolition to support the construction of the underground CRR Roma Street Station. The proposed changes are presented in **Figure 5**.

Figure 4 RfPC-3 changed property impact plan

Figure 5 RfPC-3 Changed construction site plan

To facilitate demolition of the BTC (East Tower) and Hotel Jen buildings, the Delivery Authority, as a constructing authority, proposes the resumption of the lots on which the Eastern Tower and Hotel Jen are located, pursuant to section 13 of the *Acquisition of Land Act 1967 (*ALA).

The demolition works **included** in the proposed scope for this application are outlined below.

Worksite establishment

- Clearing of site, including the removal of a mature fig tree and landscape plantings;
- Installation of scaffolding and protection structures around the exterior of the buildings;
- Removal of infrastructure i.e. seating, foot paths, fencing, rail buffer stop and garden edges;
- Earthworks Installation of stormwater controls;
- Works associated with public utility plant including disconnection, diversion and protection of assets;
- Construction of hard stand, fencing and hoarding;
- Installation of site office as a relocatable building located onsite;
- Installation of site hoardings at or near the back of footpaths allowing pedestrian and cyclist access to be maintained along frontage footpaths;
- Site set up including traffic, access and environmental controls; and
- Upgrading of at grade pedestrian crossing at Roma Street station entrance.

Soft strip out process

- Disconnection of services to buildings;
- Strip out of internal cladding, linings, fixed furniture, fittings and equipment to reduce the building to a structural shell;
- Separation of waste streams into like materials to increase the effectiveness of recycling and to reduce pressure on landfills;
- Uncover and remove unknown hazardous material which may be present beneath cladding and lining;
- Removal of any hazardous materials (fuel storage tanks); and
- Obtaining clearance certificates confirming hazmat removal (eliminate contamination).

Building demolition

- Removal of pedestrian bridge from George Street to the BTC;
- Demolition of building and crushing of materials:
    - removal of all structures and facilities above ground level
    - removal of columns, piers and internal wall structures
    - removal of all demolished materials and debris from the site
    - providing protection against falling from height along the top of the retained brickwork retaining wall
    - backfilling all redundant pits or voids with fill free of deleterious materials and compacting to a density consistent with that of the surrounding ground;
- Salvage of identified materials; and

- Removal of approximately 90,000 tonnes of waste material by heavy vehicle haulage for recycling or disposal.

The finishing works include:

- Levelling of the site and compaction of fill (ground remediation);
- Minor works required to provide a free draining, uniform site free of depressions and undulations;
- Design and construction of new storm water drainage for the site without exceeding current intake capacity of existing BCC stormwater assets; and
- Provision of suitable erosion and sediment control measures and environmental safeguards necessary to mitigate environmental effects to prevent build-up of sediment and other material in existing BCC stormwater assets.

Stockpile and waste management

The demolition of the buildings will require the management of the following stockpiles.

- Concrete;
- Brick;
- Steel;
- Non-ferrous metals;
- Construction and demolition waste;
- Potential asbestos or hazard containing materials; and
- Contaminated soils.

An excavator or a bobcat will commence processing the building material prior to the loading of trucks for disposal off-site. The stockpiling of material throughout the recycling process is required to ensure efficiency during site processing, loading out from site and processing at the recycling facility. Stockpiling demolition material into separate waste stockpiles maximises the recycling potential minimising material landfilled.

Water will be sprayed over the concrete and brick stockpile prior to and during (if required) the loading out process to mitigate dust. During the concrete processing stage where concrete is either hammered or pulverised to extract the steel reinforcement, water will be sprayed over the processing area and stockpiles. Material stockpiles will be kept to a manageable volume with progressive loading out. Water will be sourced from onsite reticulated supply where possible.

The trucks will transport the material from the point of generation (site) to the point of recycling or disposal. The recycling or disposal location would depend on the contractor and the type of recyclable material being removed. All removed materials will be destined to sites appropriately licensed to receive the materials. Waste tracking certificates and licenced waste transporters will be required for regulated waste. As the site is listed on the Environmental Management Register (EMR), a soil disposal permit will be required if contaminated soils are encountered and removed from site.

Any potential ‘Asbestos containing materials’ will be managed in accordance with Chapter 8 Asbestos of the *Work Health and Safety Regulations 2011* (as amended) and associated guidelines.

Site fencing

The works **included** in the proposed scope for this application are:

- installation of fence posts around the perimeter of the site;
- erection of hoarding; and
- installation of branded signage on fence panels.

Due to the nature of the permanent fencing design, ground penetration will be required to install the required support for the fence.

Site access

Construction vehicle access will be staged in accordance with the demolition works from Herschel Street and Roma Street into the existing BTC East Tower and Hotel Jen driveways. The one-way exit will be required for Stage 1 and will be via Lot 60 back onto Roma Street.

Public utility plant upgrades

Additional public utility plant (PUP) upgrades will be required to supply sufficient power to the Roma Street Coach Terminal. A contained Gen-Set for backup power and possible fuel storage may be required on Lot 35 on SP207219 in the location identified in **Figure 5**.

Traffic movement

The sweep path analysis indicates that the largest vehicle permitted would be the common 3 axle semi-trailer which can carry up to 24 tonnes. It is anticipated that at least 500 tonnes of material can be removed from the site each day, which can be completed with an average of 2 vehicles per hour (peak of 4 vehicles per hour) over the seven-month demolition period. A traffic management plan will be developed prior to commencement of the demolition works and traffic control will be in place throughout the works.

Heavy construction vehicles will only use designated routes for haulage in accordance with the Construction Environmental Management Plan (CEMP). The designated haulage route for the demolition works will follow major or arterial roads to the extent practicable and will be developed in consultation with the Department of Transport and Main Roads (TMR) and the BCC during preparation of the CEMP.

The general Roma Street Precinct experiences congestion during peak traffic hours of 7:30am to 9:00am and from 4:30pm to 6:30pm as a result of work commuter traffic. Demolition waste haulage with heavy vehicles will only occur during the current approved Project spoil haulage hours and will not add to the existing congestion.

Parking

Utilisation of surrounding commercially provided carparks will likely be required. Construction workers will be encouraged to avoid parking on the local streets, minimising the impact to visitors who typically make use of these parks.

Lighting

Lighting for site security during the demolition works will be installed within the worksite area.

Working Hours

Noise generating activities will be undertaken during the currently approved hours in accordance with Condition 10 of the Coordinator-General Change Report, August 2018.

3.3 Delivery Program

It is anticipated the demolition of Hotel Jen and BTC will commence in mid to late 2019 and extend over an 18-month period.

3.4 Change Justifications

Demolition of the BTC (West Tower) forms part of the currently-approved CRR Project. and the BTC is the principal building upon which the western and eastern towers and the Hotel Jen are located. Following further investigation of the building structural details and arrangement of the shared mechanical and electrical services, it has been assessed that it is not practical to demolish the BTC (West Tower) and leave the BTC (East Tower) and Hotel Jen remaining.

Significant refurbishment and strengthening works to the remaining BTC (East Tower) would be required to accommodate lateral load effects. Structural modifications including new downstand beams would also be required over the lower levels due to the loss of structural continuity. The existing car parking ramp for Hotel Jen and the BTC (East Tower) would be impacted by the demolition of the BTC (West Tower) rendering the car parking inaccessible without provision of a new access ramp.

Demolition of BTC (West Tower) has a material impact on the services between the BTC (West Tower) and the East Tower and Hotel Jen. The arrangement of shared services at the site is complex, including emergency systems, rendering the remaining buildings unable to be sustained for the intended purposes without significant refurbishment works undertaken. Multiple shared services between the buildings would have required capping and decommissioning or relocation within the remaining building envelope. There would have been major impacts on services including stormwater, sewerage, water, electricity and communications. Each of these services would have required additional design and reconnecting, impacting operations within the BTC (East Tower) and Hotel Jen. Changes to fire detection systems and fire suppression systems would also be required prior to any demolition occurring. Demolition works would affect the ability to maintain building operations including loading docks for deliveries and waste removal. The ability to maintain safe egress from the remaining East Tower including emergency evacuation during demolitions works would require additional building measures. Demolition of the BTC (West Tower) would have impacts on a number of businesses that are on ground level and level 2 (food court), and the car park if it were to remain. Having an operating hotel in the middle of a construction site would be undesirable from a business and guest perspective.

The site is a significantly constrained site. Demolition of the BTC (East Tower) and Hotel Jen, as well as temporary use of part of Lot 60 on SP207215 provides significant benefits to the Project in terms of additional temporary construction laydown area to offset the loss of the previously identified construction laydown areas.

The construction laydown areas that were nominated in RfPC-1 included the Platform 10 carpark, and the main Roma Street Parklands carpark, controlled by BCC. Consultation with BCC and local residents has identified the importance of maintaining the main Roma Street Parklands carpark to enable public access and enjoyment of the parklands, rather than close it to form part of the Project footprint. The

Platform 10 carpark has subsequently been approved as the site for construction of the Temporary Coach Terminal (refer RfPC- 2) and is therefore unavailable for use as construction laydown. There is also benefit in having the construction laydown yard immediately adjacent and on the same side of the railway corridor as the demolition, from a safety and reduced impacts (noise, dust, traffic) perspective.

4. Changed Impact Assessment

The impacts of the proposed change were assessed, with a summary of the results presented in **Table 2** below.

Table 2. Project environmental and social impact changes

Aspect	Impact	Details of Change
Land use and tenure	**Change**	- One hectare of additional land proposed to be impacted. - Loss of commercial and accommodation uses. - Temporary restricted access of public open space. - It is noted that the area of Lot 60 on SP207215 was previously approved as a worksite area under the 2011 EIS.
Contaminated land	**Change**	- Additional one hectare of land disturbed on the Environmental Management Register.
Climate change and sustainability	**No change**	- No change to level of impact.
Topography, geology, geomorphology and soils	**No change**	- No change to settlement risk. - No change to erosion risk with implemented management measures and proposed draft Outline EMP requirements. - No change to Acid Sulphate Soils (ASS) risk.
Transport	**Change**	- Increase of 2 to 4 per hour heavy vehicle haulage movements for duration of demolition works, however, this is insignificant to predicted peak construction. - Addition of demolition worksite access location from Herschel Street and Roma Street. - - Signals on Roma Street to be modified to relocate flow from the pedestrian bridge to be removed as part of the demolition works. Modifications will be coordinated with BCC before demolition works commence. - The on-road cycleway will not be impacted significantly.
Social amenity, visual amenity and lighting	**Change**	- Demolition worksite requires the removal of vegetation, removal of a mature fig tree, causing temporary visual clutter and loss of open space within the Park. - Demolition works cause visual clutter with hoardings and demolition works, loss of properties however upon completion there will be increased visual exposure and sightlines.
Nature conservation	**Change**	- Removal of significant urban vegetation is required in the park for worksite establishment. - No impact to Commonwealth or State EVNT species. - No impact on Queensland heritage listed species. - Removal of up to eight significant landscape trees with medium to high retention value.
Ground water resources	**No change**	- The demolition works will cease at ground level. - No change to management measures.

Aspect	Impact	Details of Change
Surface water resources	**No change**	- Onsite Erosion and Sediment Control Plan (ESCP) in place to manage rainfall runoff during construction. - No change to management measures.
Flood management	**No change**	- No change to flood risk or material fill or excavations required.
Air quality	**Change**	- Increased duration of demolition impacts for another 7-month period. - No predicted exceedance of air quality criteria. - No predicted increase in intensity or level of impact.
Noise and vibration	**Change**	- Noise impacts to the Supreme Court and Magistrates Court are predicted for most activities, with impacts to surrounding residences also occurring for louder activities. - Traffic volumes arising from the demolition activities would be compliant with noise limits. - Vibration impacts from RFPC-3 works will result in negligible vibration levels except during ground remediation (depending on the adopted methodology).
Waste management	**Change**	- Additional 90,000 tonnes in demolition waste generated. - Significant recycling of generated waste materials.
Indigenous heritage	**No change**	- No change.
Non-Indigenous cultural heritage	**Change**	- Increased duration of demolition work impacts to surrounding heritage buildings creating visual and social amenity impacts to State listed Roma Street Station site. - Increased temporary visual impacts on Emma Miller Park during demolition work period. - Deposition of dust from demolition activities, resulting in possible corrosion of fabric. - Potential vibrational impacts from vibratory compaction used during ground finishing.
Social environment	**Change**	- Temporary loss of access to open green space. - Temporary relocation of Roma Station access. - Relocation of commercial tenants and minor reduction in accommodation service capacity.
Economics	**Change**	- Improved redevelopment opportunities under master planning for the Roma Street Station precinct.
Hazard and risk	**No change**	- No asbestos found in the buildings to be demolished. - Other unknown hazardous materials potentially present. - Removal of known petroleum storages present onsite.
Cumulative impacts	**No change**	- Construction of the Roma Coach Terminal will be completed in July 2019 and will not overlap with the demolition works.

4.1 Land Use and Tenure

The key aspects addressed in this section include land use types, property requirements, land tenure, new and approved development and post-construction land use. The key impacts to land use and tenure for RfPC-3 is the additional 0.82ha (Lot 1 on SP207220) increase due to the proposed taking of additional land. While the demolition worksite and subsequent use as part of the CRR Roma Street Station construction worksite has changed, the type of land use impacts are generally consistent with the approved Project.

4.1.1 Overview

The area proposed is shown in **Figure 6.** The specific tenure details and addresses are outlined in **Table 3.**

Table 3. Land subject to the proposed change

Demolition Site	Address	Lot on Plan	Tenure Type	Owner
Standard Land Parcel				
BTC (East Tower) and Hotel Jen	159 Roma St, Brisbane City QLD 4000	1 on SP207220	Freehold	Landlease Funds Management Limited
Demolition access and worksite	15 Countess Street, Brisbane City QLD 4000	35 on SP207219	Freehold	Queensland Rail
Demolition access and worksite	300 Albert Street, Brisbane City, QLD, 4000	Part of 60 on SP207215	Freehold	The State of Queensland (represented by the Department of Housing and Public Works).

The Delivery Authority can negotiate to purchase land required for its functions or compulsorily acquire land under the *Cross River Rail Delivery Authority Act 2016* and the *Acquisition of Land Act 1967*.

There are a number of volumetric parcels and easements which also traverse the property impact area which are identified in **Table 4.**

Table 4. Easement and volumetric tenure

Easement Lot Parcels	Volumetric Lot Parcels
ASP212365	5SP207221
HHSP131543	5SP207221
BJJSP198173	27SP207221
LLSP100564	4SP207222
FFRP826191	3SP100562
PPSP100563	2SP100562
AMMSP136614	34SP100560

Easement Lot Parcels	Volumetric Lot Parcels
NNSP100565	25SP207220
KKSP100561	50SP100647
BRP905472	28SP207222
MMSP100558	37SP207218
TTSP100559	23SP207218
ATTSP136613	16SP207215
	24SP207219
	44SP152171
	44SP152171

Historic Use

The site has historically been used as a rail yard including goods handling and workshop/ maintenance areas. The site is considered to have been highly modified, with rail uses commencing in the 1870's and expanding through the early 1900's to include goods-stores and railyards. As part of the historical expansion of the site, significant excavation is reported to have occurred in the 1920's to form the approximate current levels at the site. It is understood that the site was utilised as a railway yard up until the mid-1990's. Further development of the site occurred in the 1985/86 with the construction of the BTC and, with the expansion of the Roma Street Parklands completed in the early 2000's (Epic Environmental 2018).

Figure 6 Land tenure

Current Use

Lot 1 on SP207220 is currently developed and occupied by a number of buildings as follows:

- The BTC, which currently operates as a transport interchange hub. The BTC complex includes two commercial office towers and two levels of retail. The BTC (West Tower) has 8 levels and a lettable area of 17,481 square metres and the BTC (East Tower) has 12-levels with a lettable area of 12, 140 square metres, see **Plate 1**.
- Hotel Jen currently operates as a 4-star hotel providing short term accommodation services with 191 rooms and associated facilities, see **Plate 2**. The hotel is owned and run by the Hotel Roma Pty Ltd, a corporate entity of the Shangri-La Group.

The relevant part of Lot 60 on SP207215 is currently green space. The portion of the lot proposed for demolition access and worksite contains landscaped gardens, a fig tree, pathways, retaining walls and seating, see **Plate 3**.

Lot 35 on SP207219 comprises the Roma Street rail yards and Queensland Rail facilities, including car parking areas. The small, required portion of this lot contains a car parking area and minor rail infrastructure including a rail buffer stop. Suitable arrangements are being put in place in consultation with Queensland Rail to compensate for the temporary use of this area.

Plate 1 – Brisbane Transit Centre (East Tower)

Plate 2 – Hotel Jen

Plate 3 – Adjacent park

Surrounding Uses

The site is surrounded by a mix of land uses typical of inner-city Brisbane including major public transport and road transport infrastructure. **Table 5** summarises key surrounding land uses.

Table 5. Surrounding land uses

	Adjacent Land Use	Adjacent Transport Network
North	Roma Street Railway and Station	Parkland Crescent and Parkland Boulevard
South	Supreme and Magistrates Courts, Commercial premises, Queensland Police building.	Roma Street
East	Emma Miller Place	Albert Street
West	Approved CRR demolition areas	Roma Street

4.1.2 Changes to Potential Impacts

Table 6 presents a summary of the changes for Roma Street Station precinct from construction land use impacts between the approved Project and the currently proposed RfPC-3 works.

Table 6. Land use changed impacts assessment summary (with mitigation)

Aspect	Approved Project	Change in Land Use Impacts
Property acquisition	Partial surface acquisition of Lot 1 on SP207220.	Increase from partial to a complete surface acquisition of Lot 1 on SP207220.
Land use	Relocation of the Roma Street Coach Terminal to Parkland Crescent. Major construction site over part of Lot 1 on SP207220 to construct the CRR Roma Street Station.	Temporary restriction of use of open space in park adjacent to Hotel Jen. Increased redevelopment opportunities under the master plan for the broader Roma Street precinct.
Impact area	The demolition of the BTC (West Tower) and the long-distance coach ramps.	Lot 1 on SP207220 to be resumed under section 13 of the ALA.. Additional demolition of Hotel Jen and BTC (East Tower) and loss of current commercial uses of these buildings.
Future land use	Following completion of construction, land that is not required for the rail infrastructure and operation may become available, where appropriate, for redevelopment, in accordance with the relevant planning framework; While redevelopment will be separate from the Project, investigations will be	The plan for post-construction land use from RfPC-3 remains consistent with approved CRR Project.

Aspect	Approved Project	Change in Land Use Impacts
	undertaken to integrate residual land with adjoining proposed rail stations; and Opportunities to integrate with other proposed developments and community facilities.	

4.1.3 Mitigation Measures

An assessment against relevant project mitigation measures which are consistent with the approved Project include the following:

- Work with land owners and interest holders, including Department of Housing and Public Works (DHPW), Brisbane City Council, City Parkland Services (CPS) and Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP) in terms of temporary access to the part of Lot 60 the subject of this RfPC.
- Ongoing consultation to be undertaken with key stakeholders in relation to future development;
- Access to adjoining properties and access for delivery vehicles to be maintained, where practicable. Where changes to access are required, alternative access arrangements to be identified in consultation with property owners and local businesses;
- Safe and efficient access to major land uses such as the Roma Street Parklands, particularly during major events;
- Implement appropriate environmental measures aimed at reducing potential construction impacts such as noise and vibration, dust, emissions and odours and construction traffic;
- Access for emergency services vehicles to be maintained for the duration of construction works;
- Undertake ongoing consultation with Queensland Rail regarding post construction use of Queensland Rail land required for the construction worksites; and
- Undertake ongoing consultation with relevant parties where disruption to land uses and facilities are required.

No additional mitigation measures are required to manage the changed impacts.

4.1.4 Compliance with CRR Project Requirements

An assessment of the changed Project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 7**. This has been undertaken to identify any need to request changed conditions.

Table 7. Compliance with land use and tenure conditions

Condition Reference	Requirement	Comments
Appendix 2, Part B Condition 3. Design (a)	The project must achieve the Environmental Design Requirements in Schedule 1.	See below.
Sch 1, Condition 8. (a)	Minimise the 'footprint' of the Project during both construction and operations to reduce impacts on existing land uses through design refinement.	This is an increase of approximately one-hectare to the footprint due to severance of the BTC principal building and the proposed resumption of additional land, including that part of Lot 60 required for demolition and construction.
Sch 1, Condition 8. (b)	The Project design seeks to optimise land use and transport integration with: (iv) Roma Street;	Removal of the entire BTC complex increases redevelopment and integration opportunities in the master planning for the Roma Street Station precinct.
Sch 1, Condition 8. (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 ….Roma Street redevelopment…..	The additional demolition allows significant redevelopment opportunities in the Roma Street Precinct. Ongoing consultation with QR occurs with regular meetings with the Delivery Authority Relationship Manager and involvement in Stakeholder Coordination Group with a collaborative approach at all times (liaison officer exchange).

No changes to the current conditions are required to accommodate the proposed Project Change.

4.2 Land

4.2.1 Overview

Soils, Topography and Geology

Roma Street Station area is within the Moggill Creek soil landscape with the dominant soil group being Gleyed podzolic soils with minor prairie and alluvial soils, these have a moderate risk for erosion.

Contaminated Land

All three subject lots underlying the site are listed on the Environmental Management Register (EMR) for having notifiable activities occur, these are activities with potential to cause land contamination. Details of the EMR information is outlined in **Table 8**.

Table 8. CMR and EMR register results

Property	EMR Site ID	Notifable Activity Details
Lot 1 on SP207220	83123	The BTC is currently listed on the EMR for 'petroleum product or oil storage'. A review of the BCC flammable and combustibles liquids license details indicate that Lot 1 on SP207220 holds a license for between 50,000 and 200,000 litres on-site in above ground storage.
Lot 60 on SP207215	85760	Notifiable activity 'railway yards' - The former Roma Street rail yards were historically located in the area now occupied by Emma Miller Place, open space adjacent to Hotel Jen and the Roma Street Parklands. The rail yard has been remediated during redevelopment. However, the property remains on the EMR.
Lot 35 on SP207219	83090	Included on the EMR for the Notifiable Activity of railway yards.

A contaminated land investigation for the Roma Street precinct was completed to provide a preliminary indication of the contamination status of the Roma Street Station site to facilitate construction/ redevelopment works required to be undertaken at the Site.

A Suitably Qualified Person conducted the investigation and prepared the Contaminated Land Investigation Document in accordance with the *Environmental Protection Act 1994* and Queensland Auditor Handbook for Contaminated Land. This investigation consisted of historic and desktop information.

The investigation found that a Site Management Plan for Lot 22 on RP903100 (portion of current Lot 60 SP207215) reported historical contamination including Polyaromatic Hydrocarbons (PAH) and metals associated with a discontinuous layer of ash/coke material. While total concentrations of PAHs exceed the EPA's environmental investigation thresholds and Exposure Setting "E" (Parkland) thresholds at some locations, prior research has confirmed that these compounds have a low leachability within the ash/coke material. Therefore, this type of impact has been referred to as "low level" impact with manageable risks. These areas were covered by a minimum 1.5 m thickness of clean fill (including topsoil) or by sealed surfaces, such as bitumen.

In addition, a historical area of 'oily ooze' in the southern portions of Lot 60 on SP207215 between the Celebration Lawn and Roma Street Station Platform 10 has been remediated and validated as part of redevelopment associated with the south-western portion of the Roma Street Parklands. The contaminated soil was treated and removed or retained onsite in a purpose build containment cell located beneath 'Fern Tree Gully Hill' in the central portion of Lot 60 on SP207215 (north of the lake and adjacent to the CRR Roma Street Satellite development area). Cover thicknesses in the containment cell area are reported to be between approximately 2 m and 8 m. The proposed impact area of this RfPC-3 is not with the area subject to the site management plan requirements, refer to **Figure 7.**

Two groundwater piezometers (CRR714 & CRR 716) were installed as part of geotechnical investigations (DTMR, March 2018)). Soil and groundwater sampling completed as part of the CRR EIS (DTMR 2018) reported elevated concentrations of Total Reportable Hydrocarbons (TRH) in soil sample CRR715 (1.3-1.75 m) and groundwater sample CRR716, with concentrations of PAH reported above the sensitive land use criteria in soil sample CRR715 (1.3-1.75 m).

Fill up to 2 m depth, was reported in the vicinity of the portal site, with previous bore holes (CRR714, CRR715 and CRR716) reporting fill materials to comprise silty clays, clayey gravels and sandy clays overlying residual soils and argillite rock. Groundwater has been observed at depths of 9.77 meters below ground level (mbgl) (CRR716) and 12.93 mbgl (CRR714) in October / November 2017.

Based on a site inspection and the findings of the historical review, potentially contaminating activities and contaminants of concern have been identified for each development area, as outlined in **Table 9.**

Table 9. Potential contaminates of concern based on proposed development areas

Potentially Contaminating Activity	Contaminates of Concern	Medium Affected	Likelihood of Contamination
Imported fill material during the construction of the Site	Heavy metals, TPH, PAH, OC/OP, ACM	Soil	Medium
Fuel storage and associated infrastructure	TRH, PAH, BTEX, Lead	Soil and Groundwater	Low - Medium

Notes: Heavy Metals includes Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, Nickel and Zinc
BTEX - Benzene, Toluene, Ethylbenzene and Xylenes
TRH - Total Recoverable Hydrocarbons
PAH - Polycyclic Aromatic Hydrocarbons
ACM - Asbestos containing material

Figure 7 Contaminated land

4.2.2 Changes to Potential Impacts

Table 10 presents a summary of the changes in land impacts between the approved Project and the proposed additional RfPC-3 works.

Table 10. Land impacts change assessment summary (with mitigation)

Aspect	Approved Project	Change in Land Impacts
Erosion and Sediment Control (ESC)	Sedimentation has the potential to result from construction activities such as vegetation clearing, demolition of existing infrastructure, earthworks associated with track work, road/footpath realignment, tunnel activities and haulage roads as well as spoil removal, haulage and placement.	One hectare of additional exposed disturbed area. No additional risk with current mitigation measures.
Contamination	Four properties identified on EMR inclusive of Lot 1 on SP207720 and Lot 60 on SP207215) in Roma Street precinct. Specific mitigation measures are to be developed and implemented prior to the commencement of site activities.	No additional properties on EMR impacted then already identified and approved, only extended area within these lots proposed to be impacted. Ground disturbance will be required within the part of Lot 60 on SP207215 to enable demolition traffic access through the site onto Roma Street.
Hazardous materials / asbestos	The presence of asbestos in buildings that are proposed to be demolished will be assessed prior to the construction tender being issued.	Asbestos risk assessment of all three buildings did not identify any asbestos material present. However, hazardous materials could be present behind sheeting which could not be accessed at time of assessment. This aspect is addressed in Section 4.6 Waste.

4.2.3 Mitigation Measures

Section 1.9 (Element 3) the Erosion and Sediment Control Plan (ESCP) will address mitigation measures which will be implemented during the works where relevant, these are sufficient to manage the risk of site sediment loss. Key management measures include:

- Develop a detailed Erosion and Sediment Control Plan (ESCP) for the demolition and worksite stages in accordance with the guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and TMR's Technical Standard MRTS52 Erosion and Sediment Control.
- The erosion and sediment control measures should address the following as a minimum:
  - avoid disturbing vulnerable surface and subsurface soils
  - early installation of drainage, erosion and sediment control measures
  - minimise worksite clearing and the extent and duration of soil exposure
  - identification of proposed spoil storage locations at worksites
  - divert clean waters around disturbed surfaces and spoil storage locations
  - on-site capture of surface drainage waters and sediment

  - use of sediment control devices such as sediment fences, check dams or other techniques to slow water flow and enable sediment to settle from the water prior to migrating offsite
  - monitoring the effectiveness of installed control measures
  - progressive stabilisation and revegetation of disturbed areas, using stored topsoil where practicable
  - early installation of measures to avoid loose spoil material or other soil spilling onto roadways (e.g. rumble grids, wheel-wash, covered loads) at all road access points from each construction worksite.
- Erosion and sediment control measures would be maintained in good working order, with any damaged or ineffective measures repaired or replaced following rainfall events or otherwise as required.
- As part of routine daily site inspections, conduct visual assessment of erosion and sediment control measures will be conducted to verify their condition and effectiveness and identify the need for maintenance. Any maintenance works required to rectify defects are to be undertaken as soon as practicable after detection.
- Review ESCPs at least monthly or when there is a change in work activities at the site and update as necessary to ensure the continued effectiveness of management measures.
- Immediately following a defined rainfall event, inspect and conduct necessary maintenance on all erosion and sediment control measures, including bunding and water treatment facilities, and inspect drainage discharge points from each worksite for evidence of sediment transport, if any.
- Regular auditing of the ESCPs are to be undertaken by suitably qualified and experienced personnel.

Section 1.9 (Element 4) of the draft OEMP provides management measures addressing investigation of potential contamination and disturbance, excavation, removal and disposal of contaminated soil. These measures will address the contamination risks of the area subject to this RfPC-3.

Specific management measures to be implemented include:

- Intrusive investigations will be required to confirm the contamination status of area proposed to be excavated within Lot 60 on SP207215.
- Soil must not be removed or moved around the site without adequate representative sampling undertaken by a qualified and experienced contaminated land consultant.
- Contaminated or unsuitable spoil material which cannot be used for spoil placement will be remediated or disposed of to landfill.
- No soil can be removed from the site without a disposal permit issued by the Administering Authority under the *Environmental Protection Act 1994*.
- Implement controls for material haulage, such as covering loads or wetting material to reduce airborne dust emissions.
- Maintain documentation of all contaminated material during transport operations (including the descriptions of processes, personnel and organisations involved in the removal, transportation and placement of contaminated material).
- All personnel involved in construction or excavation activities at the site are to be provided with all the relevant safety information and training relating to contamination before commencing site works.
- Develop and implement, prior to the commencement of construction, a Construction Occupational Health and Safety (OH&S) Plan, which outlines procedures for managing exposure of construction workers to potential contaminants in soil and water.

- Where asbestos is suspected in previously filled areas, analytical testing will be undertaken to confirm the presence or absence of asbestos prior to intrusive works.
- If asbestos is present, management measures for asbestos containing materials would be implemented in accordance with the Project's Asbestos Management Plan.

4.2.4 Compliance with CRR Project Requirements

An assessment of the changed Project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 11**. This has been undertaken to identify any need to request changed conditions.

Table 11. Compliance with land use and tenure conditions

Condition Reference	Requirement	Comments
Appendix 2, Part C, Condition 17 (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.	An ESCP will be developed for the construction worksite to meet these requirements.
Appendix 2, Part C, Condition 17 (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.	An ESCP will be implemented for the construction worksite to meet these requirements.
Appendix 2, Part C, Condition 18 (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.	This will be developed for the construction worksite to meet these requirements.

4.3 Nature Conservation

This section addresses potential impacts to nature conservation resulting from the proposed Project change and the additional area required for demolition access and temporary use to facilitate demolition works and construction of the new CRR Roma Street Station.

4.3.1 Overview

The area required within the parkland adjacent to Hotel Jen equates to approximately 0.18 hectares. The additional area is a landscaped parkland that has retained few ecological values.

Previous assessments for the CRR Project have been undertaken including those for the EIS (CRR Joint Venture 2011; ARUP in 2015) and recent targeted surveys specifically for this assessment by BAMM in August 2018. These nature conservation assessments included flora, fauna and habitat, and involved both desktop and field assessment. The desktop assessment comprised a review of available databases and published information, and included:

- The Commonwealth Protected Matters Search Tool using a 3 km buffer;
- The Queensland Wildlife Online database using a 3 km buffer;
- State mapping of essential habitat and Koala (*Phascolarctos cinereus*) habitat values within the study area;
- Atlas of Living Australia;
- Queensland Herbarium HERBRECS;
- Australian Virtual Herbarium databases;
- State mapping of regulated vegetation;
- BCC's Natural Assets Local Law database; and
- Brisbane's Heritage Register.

The field assessments utilise various methodologies pertaining to the assessment being performed to verify the values inferred from the desktop assessment. The methodologies comprised of:

- Flora assessment: Rapid field assessment methodology was utilized to quantify, and map areas identified by desktop analysis as having the potential to contain significant vegetation.
- Fauna and habitat assessment: Rapid field assessment methodology, utilised to quantify and map areas identified by desktop analysis as having the potential to provide habitat values for significant fauna species or breeding places.
- Weed audit: The Project area was traversed on foot to quantify and map the location of weeds within the Project area.
- Preliminary tree assessment: Trees within the project area with a diameter at breast height (DBH) greater than 15 cm were assessed to determine the health of the trees in the area.

Commonwealth Protected Flora and Fauna

The Protected Matters Search Tool identified 37 terrestrial vertebrate fauna species listed as threatened species under the *Environment Protection and Biodiversity Act 1999* (EPBC Act) 29 species listed as migratory species under the EPBC Act and 13 flora species that have the potential to occur within 3 km of the project area. This excluded those species that clearly do not have the potential to occur in the

area, for example albatross, marine turtles and whales. Field assessments identified no protected Endangered, Vulnerable or Near Threatened (EVNT) flora and fauna species occurring within the additional Project area.

State Protected Flora and Fauna

The Queensland Wildlife Online search identified the following within 3 km of the project area:

- Two terrestrial vertebrate fauna species (Powerful Owl, Tusked Frog) listed as vulnerable under the *Nature Conservation Act 1997* (NC Act);
- One terrestrial vertebrate fauna species (Koala) listed as vulnerable under the EPBC Act and NC Act;
- Four species listed as special least concern under the NC Act;
- Three species were listed as significant fauna species under the Brisbane City Plan 2014 Biodiversity areas overlay code; and
- 14 species were listed as significant flora species under the Brisbane City Plan 2014 Biodiversity area overlay code.

Field assessments performed by BAMM identified no State EVNT species present in the additional Project area.

Local Protected Vegetation

Vegetation in this area is mapped as Significant Regional Vegetation under the *Natural Assets Local Law 2013* (NALL), see **Figure 8**. To trim or remove this vegetation generally requires specific permits from Brisbane City Council. As the Project is subject to approval under State legislation, removal of vegetation will not require permitting under the BCC NALL. However, the Project will have regard to the significance of vegetation protected under the local law as it involves the removal of street trees and trees within public parks.

A search of Brisbane Heritage Register and current applications showed no protected heritage trees in the proposed demolition impact area for the CRR Roma Street Station major worksite.

Figure 8 Significant Landscaping Trees

The additional area and surrounding street frontages contain seven trees with a DBH greater than 15 cm identified as native and exotic trees, the location and species types are shown on **Figure 8**. An arborist assessment identified the trees as having a medium to high retention value.

Those trees determined to have a high retention value within the Roma Street precinct study area tended to be early mature to mature individuals with a medium to long useful life expectancy and little to no structural defects. Trees with a medium to low retention value tended to have medium landscape significance with a medium to short life expectancy (15 to 40 years).

Weed Species

The weed assessment identified no declared or other weed species within the site.

4.3.2 Changes to Potential Impacts

Table 12 presents a summary of the changes in construction nature conservation impacts between the approved Project and the proposed additional RfPC-3 works.

Table 12. Nature conservation change assessment summary (with mitigation)

Aspect	Approved Project	Change in Nature Conservation Impacts
Vegetation loss	As the changed project is within a highly urbanised area, the changed project's overall impact on flora and fauna is expected to be minimal. No vegetation removal from Emma Miller Place.	Additional vegetation removal not previously identified within the relevant part of Lot 60, including eight tree species and landscaped plants. No vegetation removal from Emma Miller Place is proposed.
Natural asset values	Not previously approved in proposed changed impact area.	Loss of vegetation mapped as Significant Urban Landscape value under the *Natural Asset Local Law 2013.*
Indirect impacts	Indirect effects include the potential for surface water run-off, dust, light, erosion risk and/or pollution/ contamination run-off to impact on areas of retained vegetation.	Remain the same as approved CRR Project.
Fauna	As the changed project is within a highly urbanised area, the changed project's overall impact on fauna is expected to be minimal.	Impacts to fauna will generally be the same, there is limited fauna habitat within the landscape gardens adjacent to Hotel Jen and BTC (East Tower).
Weeds and Pests	To ensure that construction activities do no cause the introduction or spread of pest species	No weed presence detected within the changed worksite area, therefore, no increased risk of weed spread impacts.

4.3.3 Mitigation Measures

The CRR Draft Outline EMP (Element 6) contains the following subplans which identify the mitigation measures proposed to prevent and manage impacts associated with nature conservation. These will be implemented during the works where relevant and are sufficient to manage risk of impact on nature conservation. These measures include:

- Minimise clearance or trimming of native vegetation to that necessary for construction to avoid unnecessary impacts, to reduce rehabilitation costs and minimise exposed surfaces that could lead to erosion and sediment issues.
- Where reasonable and practicable, locate construction site infrastructure, such as site offices, vehicle access and parking, material storage and cleaning areas for plant and equipment away from large trees and their drip zones.
- Ensure a qualified fauna spotter/ catcher is present prior to and during the removal of any habitat trees to capture and relocate any fauna that is disturbed. The fauna spotter/ catcher must be registered with DEHP and hold applicable licenses and permits.
- Ensure appropriate soil hygiene procedures are followed to prevent spread of pest plants and animals, and potential soil pathogens.

Key site-specific measures will include:

- The Delivery Authority will consult with BCC to outline the proposed clearing. General agreement will also be sought with BCC on the proposed offset requirements for any cleared Significant Landscape Trees. This agreement will be made prior to any clearing works being undertaken.

4.3.4 Compliance with CRR Project Requirements

An assessment of the changed project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 13**. This has been undertaken to identify any need to request changed conditions.

Table 13. Compliance with nature conservation conditions

Condition Reference	Requirement	Comments
Recommendation 2.	Greenspace planning - The proponent should liaise with BCC to offset the loss of public open space/pocket parks in accordance with Element 6 Nature Conservation of the Draft Outline EMP.	Refer to section 5.1.4 working groups meet fortnightly with BCC.

4.4 Air Quality

4.4.1 Overview

A qualitative technical assessment was undertaken to determine any potential material changes to the predicted air quality impacts detailed in the 2011 EIS, RfPC-1 and RfPC-2, from the increase of the construction site by one hectare and the additional demolition of two buildings. The assessment methodology and results are detailed in the technical assessment report provided in **Appendix A**.

Background air quality information detailed in the previously approved RfPC-1 and summarised in **Table 14** was established based on data from four monitoring stations (Cannon Hill, Brisbane CBD, South Brisbane, Rocklea). The data indicates that with the exception of annual $PM_{2.5}$, background concentrations are well below their respective air quality goals within the CRR Project Imposed Conditions.

Table 14. Background concentrations of air quality indicators against CRR Project goals

Air quality indicator	Averaging period	Units	Background concentration	Air quality goal	Criterion
TSP	Annual	µg/m^3	24	90	Human health
PM_{10}	24 hours	µg/m^3	17	50	
	Annual	µg/m^3	14.5	25	
$PM_{2.5}$	24 hours	µg/m^3	8.3	25	
	Annual	µg/m^3	6.5	8	
Dust deposition	30 days	mg/m^2/day	60	120	Nuisance
TSP	24 hours	µg/m^3	26	80	

There are sensitive community and open space receptors identified in Figure 15-3 of the 2011 EIS, these are located on the opposite side of Roma Street to the east of the site. The closest residential receptor to the site, is the Abbey Apartments approximately 60 m to the west and the Meriton Apartments approximately 110 m to the south. There is also a hotel and backpacker accommodation to the south of Roma Street.

Sensitive receptors are likely to include office workers in the area and transient receptors such as community members and train passengers entering/leaving the existing station complex.

Queen Elizabeth II Courts of Law (Supreme and District Courts) are located approximately 40 m across Roma Street and the Magistrates Court approximately 100 m southeast. There are also a number of heritage sites in the surrounding area which are identified in Section 4.7.

4.4.2 Changes to Potential Impacts

Demolition at the site has the potential to result in dust generation and exhaust emissions from construction traffic travelling to and from the site. Impacts are likely to be similar in nature to those identified in the 2011 EIS, RfPC-1 and RfPC-2 and can be effectively managed by the currently proposed dust management measures.

With regard to construction traffic, heavy vehicles will use only designated routes in accordance with the demolition plan and CEMP and would be limited to occur during current approved Project hours.

Demolition at the site, including the previously approved EIS and RFPC-1, would be carried out in advance of the main CRR Roma Street Station construction work.

The previously approved EIS and RfPC-1 provides mitigation measures that should be implemented during the construction period. It is anticipated that these would also be implemented during demolition at the site to manage dust generation.

There is unlikely to be any discernible cumulative impact to local air quality from demolition overlapping with the coach terminal construction approved as part of RfPC-2 as limited demolition, earthworks or construction of structures is required.

Table 15 presents a summary of the changes in construction air quality impacts between the approved Project and the proposed additional RfPC-3 works.

Table 15. Construction air quality change assessment summary (with mitigation)

Aspect	Approved Project	Change in Air Impacts
Dust	Construction phase impacts associated with Roma Street Station were not quantitatively assessed based on the fact that the works would occur in the shaft or purpose-built acoustic shed, hence there would be a low potential for adverse air quality impacts.	Increased duration of demolition impacts for another 7-month period. No predicted increase in intensity or level of impact.
Emissions and vehicle generated dust.	The EIS predicted that during peak construction, the Roma Street general site area would generate 10 heavy vehicles per hour or up to 130 vehicles per day (103 spoil and 27 deliveries). This results in 260 heavy vehicle movements per day (i.e. 130 movements to access the site and 130 movements to leave the site). Construction vehicle movements for RfPC-1 were anticipated to reduce from those predicted in the 2011 EIS with 6 heavy vehicles per hour and up to 66 heavy vehicles (39 spoil and 27 deliveries) per day. This would result in 132 heavy vehicle movements per day accessing and exiting the site.	A maximum of four heavy vehicle movements per hour is expected across the seven-month demolition period. This is a small amount of additional traffic compared to existing traffic flows on Roma Street. Likely to be similar to the amount of traffic required for the demolition of adjacent buildings already considered as part of the RfPC-1, however, an additional seven month duration of impact. Demolition traffic will use designated routes within the CEMP and demolition waste haulage limited to current approved project hours.

4.4.3 Mitigation Measures

The Draft CRR Outline EMP (Element 9) identifies the mitigation measures proposed to prevent and manage impacts associated with air quality during construction works. These are sufficient to manage risk of impact from dust and emissions generated from the works. Key measures to be implemented include:

- Monitor meteorological conditions, particularly wind speed and direction. When adverse meteorological conditions are experienced at worksites, such as dry windy conditions, take measures to avoid impacts of unreasonable dust or odour on adjacent properties. Such measures may include:
  - modification of construction methods
  - increase in dust suppression measures
  - when no other reasonable or practical measure is available, cessation of work until the meteorological conditions improve and the environmental outcome can be achieved.
- Ensure appropriate dust controls are used for demolition activities, including the use of water sprays and covering loads of material transported from the worksites.
- Other measures may be initiated where or when required to avoid nuisance, particularly in respect of buildings containing hazardous or potentially hazardous materials.
- Ensure trucks transporting construction spoil are covered to prevent wind-blown dust during transport and cleaned down prior to exit from the worksites and the spoil placement site to prevent spills of loose material to roadways.
- Installation of hoardings or barriers on worksite perimeters, where appropriate, to help mitigate dust impacts by acting as wind breaks.
- Sealing of access roads, as much as is practicable, within the worksites and ensuring sealed access roads into worksites are kept relatively dust free by regular sweeping and washing, wherever needed.

Key site-specific measures will include:

- Dust will be managed, by wetting the material down before it is moved and to also wet the material as it is being moved.
- Scaffold with zero wind penetration sheeting to be used to confine dust. Water points will be available on every floor and strategically positioned around the site external areas in HDPE pipe reticulation.
- Crushing of concrete will be undertaken under water sprays.
- All pavements and slabs will be swept periodically throughout the demolition process to eliminate tracking of sediment across the site an onto roads.
- Dust deposition monitoring will be implemented on the opposite side of Roma Street to the site, which would be representative of impacts at the Abbey apartments, other hotels and the Supreme Court.

4.4.4 Compliance with CRR Project Requirements

An assessment of the changed project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 16**. This has been undertaken to identify any need to request changed conditions.

Table 16. Compliance with air quality conditions

<table>
<tr><th>Condition Reference</th><th>Requirement</th><th>Comments</th></tr>
<tr><td>Appendix 2, Part C, Condition 13 (a).</td><td>Air quality Criteria and Goals
<table>
<tr><th>Criterion</th><th>Air quality indicator</th><th>Goal</th><th>Averaging period</th></tr>
<tr><td rowspan="3">Human Health</td><td>Total Suspended Particulates (TSP)</td><td>90 µg/m^3</td><td>1 year</td></tr>
<tr><td>Particulate matter ((PM_{10})[1]</td><td>50 µg/m^3</td><td>24 hours</td></tr>
<tr><td></td><td>25 µg/m^3</td><td>1 year</td></tr>
<tr><td rowspan="2">Nuisance</td><td>TSP[2]</td><td>80 µg/m^3</td><td>24 hours</td></tr>
<tr><td>Deposited dust[3]</td><td>120 mg/m^2/day</td><td>30 days</td></tr>
</table></td><td>The technical assessment in Appendix A shows that the CRR Project air quality goals would continue to be met based on existing levels in the area and the likely impacts associated with the demolition.

The use of the site for construction will be similar to that assessed in RfPC-1.</td></tr>
<tr><td>Appendix 2, Part C, Condition 13 (b).</td><td>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.</td><td>An Overarching Air Quality Management Plan has been developed and submitted to the CG for approval.</td></tr>
</table>

4.5 Noise and Vibration

This section discusses changes to the Project which will alter the potential noise and vibration impacts for the proposed RfPC-3 changed Project compared to the approved CRR Project. Key changes having potential to result in altered noise and vibration impacts through the following:

- Changes to the demolition area occupied by the major construction worksite resulting in potential changes to construction traffic movements and local traffic impacts;
- Increased building demolition works increasing early works traffic volumes from waste material haulage;
- Sequential demolition works program increasing the noise impact duration; and
- Cumulative noise impacts from temporary Roma Street Coach Terminal construction and operation.

4.5.1 Overview

A technical assessment was undertaken to predict the noise and vibrational impacts from the RfPC-3 proposed changes. The assessment methodology is detailed in the technical assessment report, provided in **Appendix B**.

Sensitive Receptors

The closest noise and vibration receivers to the proposed demolition works are (in increasing order of distance):

- Queen Elizabeth II Courts of Law (Supreme and District Courts), located approximately 40 m across Roma Street;
- Abbey Apartments located approximately 60 m to the west;

- Magistrates Court located approximately 100 m to the south-east;
- Meriton Apartments Herschel Street located approximately 110 m to the south;
- Residential and healthcare buildings (including Brisbane Private hospital) located on Wickham Terrace approximately 200 m to the north-east;
- Pullman King George Square hotel located approximately 220 m to the south-east; and
- Parklands Apartments located approximately 225 m to the north-west.

Construction Noise

Preliminary screening calculations based from EIS noise modelling results have been completed to predict the range of construction noise levels at the receivers. The calculations account for variation in the noise source position across the site, and (for receivers located more than ~100 m from the works) the effect of meteorological effects such as wind which can affect long-distance sound propagation.

Exceedances of the CG noise goals are predicted to only occur for receivers in the vicinity of Roma Street / George Street. An assessment against current internal noise goals under AS2107:2016 shows that noise goals will be exceeded:

- During most activities (site establishment and excavation, construction of hardstand, building demolition, stockpile management, ground remediation and finishing works) at Supreme Court by up to 15dB(A).
- During some activities (site establishment and excavation, building demolition and stockpile management) at Magistrates Court by up to 6dB(A).
- During external building façade demolition at Abbey and Meriton Apartments by 8 dB(A).

However, no location is predicted to experience noise levels more than 20 dB above the relevant noise goals, and therefore specific consultation with Directly Affected Persons is not required according to the CG conditions.

Construction Traffic Noise

The change in road traffic noise level due to the CRR Project at Roma Street from construction traffic noise was predicted in the EIS to be L_{A10} (12hr) +0.3 using the following parameters:

- L_{A10} (18hour) for between 6am and 12pm; and
- L_{A10} (1hour) for the peak number of heavy vehicle movements during any hour between 12pm and 6am.

For RfPC-1, it was noted that the EIS traffic volumes were compliant with road traffic noise criteria, therefore the RfPC-3 would also comply with criteria given that construction traffic movement will be no greater, and in many cases lower, refer to **Table 17**.

Table 17. CRR Project traffic volumes

Construction Worksite	Peak Spoil Movement (Loads/day)			Peak Delivery Movement (Loads/day)			Peak Traffic Movements (Loads/Hour)		
	2011 EIS	RfPC-1	RfPC-3	2011 EIS	RfPC-1	RfPC-3	2011 EIS	RfPC-1	RfPC-3
Roma Street	103	39	24	27	27	n/a	10	6	4

The additional traffic predicted for these demolition works will be 24 loads a day with an average of two loads per hour and a peak of four loads per hour, as such it will be under that predicted for the EIS and within the road traffic noise criteria.

Construction Vibration

The Project vibration impacts have been predicted and assessed against the Project construction vibration criteria imposed within Appendix 2, Part C, Condition 11 (d) (Table 3).

Note that the criteria curves for both human comfort and building damage include different values at different frequencies. As a conservative approach, the lowest curve value at any frequency has been adopted as the target.

The applicable vibration goals (peak particle velocity) are as follows (most stringent value from curve):

- Human comfort
  - Residential 0.2 mm/s
  - Courtrooms 0.4 mm/s
- Threshold for consultation (all receivers) 10 mm/s
- Building damage
  - Heritage buildings 2 mm/s
  - Residential 15 mm/s
  - Courtrooms 50 mm/s

Preliminary screening calculations indicate the following ranges of construction vibration levels at receivers and heritage sites surrounding the site show that all activities are below the human threshold of perception of vibration, with the exception of vibratory compaction in ground remediation. Ground remediation works requiring dynamic compaction or vibratory compaction could result in ground vibration levels that may exceed human comfort criteria or heritage building damage criteria. However, it is important to note that the predicted maximum values are extremely conservative – a 5% chance of exceedance predicted for the largest vibratory compactor size. The selection of a smaller vibratory compactor would result in significantly lower vibration levels.

Impacts from construction debris are proportional to the potential energy of the debris (i.e. the mass of the object and the height from which it is dropped). This is difficult to predict in advance without a detailed demolition plan. Accordingly, for impact vibration, the maximum energy permissible without exceeding the vibration goals has been calculated, and planning of the construction sequence should control the size/height of any dropping of debris so that vibration impacts do not occur.

Maximum impact energy values for demolition works are as follows:

- Human comfort criteria 117.3 kJ (most sensitive receiver Supreme Court)
- Threshold of consultation 4.25 MJ
- Building damage 1.5 MJ (most sensitive receiver King George Chambers)

4.5.2 Changes to Potential Impacts

Compared to the demolition works approved as part of the EIS and RfPC-1, the proposed demolition works of Hotel Jen and the BTC (East Tower) are closer to most sensitive receivers, with the exception of Abbey Apartments and Parklands Apartments. Noise and vibration impacts from demolition are therefore likely to be greater at the majority of receivers but would be decreased compared to the EIS assessment for Abbey Apartments and for Parklands Apartments.

Table 18 presents a summary of the changes in construction noise and vibration impacts between the approved Project and the proposed additional RfPC-3 works.

Table 18. Construction noise and vibration change assessment summary (with mitigation)

Aspect	Approved Project Impacts	Change in Noise and Vibration Impacts
Construction noise	Air borne noise exceedances would be greatest during demolition and initial site excavation works. Without mitigation, the following properties would experience exceedances of daytime airborne construction noise goals: – BTC (East Tower) by up to 8dB(A) – Roma Street (Abbey Apartments) residential receptors by up to 7dB(A) – Queensland Police Headquarters and Watch House by up to 7dB(A) – St Alban Catholic Church by up to 7dB(A) – Supreme and District Courts by up to 5dB(A) – Wickham Terrace Residential by up to 3dB(A) The night-time construction noise goals would also be exceeded at these receptor locations if works were undertaken during these times.	It is relevant to compare the increase in noise levels for RfPC3 compared to the approved demolition works under the EIS and RfPC-1 (i.e. demolition of the BTC (West Tower) only). Due to the closer distance of the RfPC-3 works to some receivers, noise levels (assuming the same activity sound power) would change as follows (compared to RfPC-1 works): – Supreme Court +9.5 dB – Magistrates Court +4.7 dB – Abbey Apartments -1.6 dB – Meriton Apartments +1.6 dB – Parklands Apartments -4.7 dB – Pullman King George Square +3.3 dB – Wickham Terrace receivers +2.2 dB An increase of noise level of less than 3 dB would typically be considered negligible. Increases of up to 5 dB would be considered a minor increase, with increases of up to 10 dB being considered a moderate increase.
Construction traffic noise	Roma Street construction worksite predicted to have peak of six loads per hour during construction works, 39 peak spoil movements per day and 27 deliveries.	Traffic volumes will remain compliant with road traffic noise criteria. The cumulative construction traffic movements from RfPC-1 and RfPC-3 (assuming that movements occur simultaneously) is still lower than the

Aspect	Approved Project Impacts	Change in Noise and Vibration Impacts
	Traffic volumes were compliant with road traffic noise criteria.	approved construction movements from the 2011 EIS.
Construction vibration	Construction vibration modelling completed for the excavation works for the tunnel shaft as this is where most vibration impacts will occur.	All activities would generate vibrations below the human threshold of perception of vibration, except vibratory compaction during ground remediation. Vibratory compaction during ground remediation may cause short-term exceedance to human comfort levels at the: - Supreme Court - Former Bank of Queensland - Baby Clinic (former) This exceedance is not above 20 which triggers consultation with Directly Affected Persons. The minor exceedance triggers the implementation of mitigation measures. As well as exceedance to the heritage building damage goals at: - King George Chambers - Transcontinental Hotel The use of smaller equipment will be considered in detailed design to further aim to achieve these goals. These are conservative criteria and impacts to buildings would be unlikely with mitigation measures in place.

4.5.3 Mitigation Measures

The CRR Outline EMP (Element 10) contains a noise and vibration subplan which identifies the mitigation measures proposed to prevent and manage impacts associated with construction works. These will be implemented during the works where relevant, including consideration of the local meteorological conditions. This approach comprises predictive modelling, establishment of a construction noise monitoring program and adaptive management procedures. These are sufficient to manage the risk of impact from noise generated by these works. Relevant mitigation measures include:

Noise mitigation measures

- Initiate on-going and early consultation with potentially affected entities to notify them of the proposed works and to determine suitable mitigation measures; and implement the Construction EMP (noise and vibration) Sub-plan to achieve the outcomes agreed with the potentially affected entities.
- Generally, construction is to be planned and undertaken with the following measures:

- install acoustic screens as early as practicable in the programme around potential noise sources such as compressors, or place such noise sources in the demolition worksite so that effective acoustic screening is achieved, consistent with the environmental outcomes;
- use the quietest plant and equipment reasonably expected to be available to undertake each component of the work;
- regular maintenance of equipment to ensure that all plant and equipment remains in good working order and does not create noise nuisance incrementally;
- minimise the coincidence of noisy plant and equipment working simultaneously near sensitive receivers;
- fit residential class mufflers to mobile plant and equipment, such as but not limited to excavators, front end loader and other diesel-powered equipment, where engaged in works in or adjacent to residential areas;
- ensure careful placement within each worksite of fixed plant (e.g. compressors) to maximise shielding or separation from sensitive receivers; and
- minimise the use of warning devices (e.g. reversing alarms) on plant and equipment working adjacent to sensitive receivers within operational health and safety constraints.

Mitigation measures for demolition noise will be limited in scope due to the elevated nature of the source and/or receiver for many scenarios. This will limit the effectiveness of the use of construction hoardings and other measures as noise barriers during demolition, although for entirely ground-based activities such as site clearing and finishing works temporary barriers may be effective for some receivers.

Key site-specific noise mitigation measures will include:

- Preparation by the contractor of a Noise and Vibration Monitoring Management Plan signed off by a qualified acoustic consultant. The plan is to include the proposed demolition methodology and technical details of the plant and equipment that will be used to deliver the demolition to enable the development of necessary controls and management measures to mitigate noise and vibration and identify any areas in which the method of demolition needs to be altered.
- Demolition methodology will be to leave the perimeter “skin” of the buildings intact until the latter demolition stages to partially screen noise (and dust) emissions from the demolition plant.
- Scheduling the demolition sequence to be “inside out” wherever possible to allow the building façade to provide partial screening of demolition activities will assist in reducing the duration of the worst-case impacts from demolition, although demolition of the external façade will necessarily involve works being conducted in the open.
- Substitution of noisy demolition practices with quieter ones, for example, using saw-cutting in place of breaking.
- Glass panels to be removed as complete panes where possible avoid the requirement to break glass in removal of the façade.

Vibration mitigation measures

Key site-specific vibration mitigation measures will include:

- Measures to avoid the need to drop materials from heights:
  - collecting materials in skips on each floor and then craning the skips down to ground when full will be undertaken wherever possible
  - the use of chutes (which could be treated with vibration-damping resilient materials to reduce secondary noise generation from materials sliding down the chute)
  - bins and receptacles should be lined with resilient materials to reduce noise from materials being loaded.

- If vibratory compaction is required a detailed vibration impact assessment will be completed and/ or the property damage sub-plan procedure implemented for ground remediation works (levelling and site compaction), including:
  - advance communication with King George Chambers and the Transcontinental Hotel
  - procedures for building condition surveys both in advance of and following Project Works, including provision for consultation with property owners and occupants
  - monitoring to be undertaken for potential impacts to property
  - mitigation measures.

4.5.4 Compliance with CRR Project Requirements

An assessment of the changed Project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 19**. This has been undertaken to identify any need to request changed conditions or any areas where additional mitigation measures need to be identified to ensure compliance.

Table 19. Compliance with noise and vibration conditions

Condition Reference	Requirement	Comments
Appendix 2, Part C, Condition 11 (a).	Project Works must aim to achieve the project noise goals for human health and well-being presented in Table 2.	Noise management measures will be included in the demolition plan and CEMP to reduce noise impacts.
Appendix 2, Part C, Condition 11 (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	A noise monitoring program will be established as part of the CEMP. Baseline monitoring is currently being undertaken by the Delivery Authority.
Appendix 2, Part C, Condition 11 (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;	There is no predicted exceedance that would trigger this requirement from the proposed RfPC-3 works.

Condition Reference	Requirement	Comments
	(iv) between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day;	
Appendix 2, Part C, Condition 11 (d).	Project Works must aim to achieve the construction vibration goals in Table 3.	All activities would generate vibrations below the human threshold of perception of vibration, except vibratory compaction during ground remediation. Vibratory compaction during ground remediation may cause exceedance to the heritage building damage goals at: - King George Chambers - Transcontinental Hotel The use of smaller equipment will be considered in detailed design to further aim to achieve these goals.
Appendix 2, Part C, Condition 11 (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	No impacts predicted at buildings with sensitive building contents during assessment.
Appendix 2, Part C, Condition 11 (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	Ground compaction is generally considered to be continuous vibration as its duration is in an order of seconds. BS7385-2:1993 states that a continuous vibration depends on the frequency and damping of the structure, implying that a ground vibration is considered as continuous if it has sufficient number of cycles to build up structural responses. Continuous vibration has been predicted to occur above 2mm/s at five surrounding locations.

4.6 Waste

This technical section discusses elements of the Project that have resulted in changes to waste that will be generated including demolition and the waste management measures.

4.6.1 Overview

Waste Types and Volumes

Key wastes generated from the demolition works and their management strategies are outlined below:

- Non-recyclable materials will be transported and tipped at landfill;
- Ferrous and non-ferrous metals will be sent to recyclers;
- Brick and concrete to be sent to recyclers;
- Contaminated soils will be transported under soil disposal permits and disposed of at a licenced landfill facility;
- Hydrovac waste will be disposed of at a licenced landfill facility with the licence to accept liquid waste as a prescribed waste and waste tracking certificates will be retained; and
- Asbestos contaminated materials (if subsequently identified) will be disposed of at a licenced landfill facility using Waste Transfer Certificates required for regulated waste.

It is anticipated that approximately 90,000 tonnes of material will need to be removed from the site as per estimation of the waste volume conducted by Arup (2018). The *Waste Everyone's Responsibility Queensland Waste Avoidance and Resource Productivity Strategy* (2014 to 2024) sets a recovery rate of 80% for construction and demolition waste. Performance metrics which require recycling of at least 80% of demolition waste will be implemented in the demolition plan.

Hazardous Wastes

Asbestos risk assessments have been carried out on all the buildings proposed to be demolished as part of this change impact assessment.

In August 2001, PKK Environment and Infrastructure (now Parsons Brinkerhoff) was engaged to undertake an asbestos survey of the BTC's two commercial towers and the Holiday Inn (now Hotel Jen). The survey was conducted over three consecutive days and consisted of a visual inspection of all accessible areas of the premises and small representative samples of suspect materials collected and tested at a NATA laboratory. The reports found no asbestos present in any of the buildings.

In December 2013, an additional asbestos risk assessment undertaken by Green Cap on the BTC (East Tower) did not identify any asbestos. However, samples of pipework installation tested positive for synthetic mineral fibres (SMF), a general term used to describe a number of fibrous materials made from glass, rock, alumina and silica. SMF is considered hazardous and requires specific management.

Storage

Stockpiles of waste on site will be kept to a minimum to eliminate stockpile management and to minimise erosion and air borne dust from propagating. Contaminated stockpiles will be covered and have clear signage. The contractor will install environmental controls (e.g. silt fencing to contain contaminated water run-offs) as per the CEMP.

4.6.2 Changes to Potential Impacts

Table 20 presents a summary of the changes in construction waste impacts between the approved Project and the proposed RfPC-3 works.

Table 20. Construction waste change assessment summary (with mitigation)

Aspect	Approved Project	Change in Waste Impacts
Waste Volumes	Estimated quantities of construction and demolition waste generated during construction, such as concrete, steel, formwork, hazardous excavation, paints, chemicals, soils, lubricants, fire retardants, cabling, packaging, waste water, sludge and tyres vary from location to location, however the overall magnitude will be similar (and no greater) than CRR 2011 estimates.	Approximately an additional 90,000 t of waste generated, of which 72,000 t will be recycled and 18,000 t will go to landfill. Majority of material will be recycled with minimal impact to local landfills.
Storage	It is envisaged that there will be limited opportunity for material storage and reuse onsite and therefore, it is expected that a majority of waste material will be removed offsite for recovery or disposal.	No change.

4.6.3 Mitigation Measures

The Draft Outline EMP (Element 11 and 15) outlines waste and hazardous materials management measures and performance criteria.

Site specific management measures to be included in the demolition plans will include:

- A Project performance target of an 80% recovery rate will be required for demolition waste.
- The demolition contractor will be required to prepare a site-specific waste and recycling management plan which will be provided to the Delivery Authority prior to commencing works. The purpose of this plan is to:
  - describe the types of wastes which are likely to be encountered at the site
  - provide the tipping locations and quantities of the wastes
  - provide the method of waste tracking
  - provide the method of measuring the quantities of recycled waste
  - outline the procedures to be adopted during the waste-relocation.

Hazardous materials management measures include:

- Demolition works are to be undertaken in accordance with Safe Work Australia's Demolition Work Code of Practice (July 2012) or revised versions.
- Prior to demolition/refurbishment works undertake a destructive hazardous materials survey of the premises as per the requirements of AS2601:2001 The Demolition of Structures, Part 1.6.1.
- Upon receipt of a destructive hazardous materials audit identifying such materials the contractor will be required to:
  - develop a Removal Control Plan prior to commencing asbestos removal

  - produce hazardous materials removal SWMS for different types of materials removal once positively identified
  - engage an experienced and licenced hazardous materials removal contractor to remove before demolition commences
  - during any asbestos removal works background air monitoring will be performed by an independent Occupational Hygienist with daily results maintained on site
  - prior to the commencement of structural demolition, clearance certificates will be obtained from the Hygienist confirming hazmat removal has been completed for parts or whole of the structure as cleared by clearance reports.
- Implementation of the National Occupational Health and Safety Commission's *National Code of Practice for the Safe Use of Synthetic Mineral Fibres*. Compliance with this Code of Practice is a minimum requirement to ensure the health and safety of employees and reduce the risk of unsafe exposure to SMF.
- In the event that hazardous substances are encountered or suspected after demolition commencement, works will stop immediately, the area barricaded, and additional assessment undertaken.

4.6.4 Compliance with CRR Project Requirements

An assessment of the changed project's ability to meet compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 21**. This has been undertaken to identify any need to request changed conditions.

Table 21. Compliance with waste conditions

Condition Reference	Requirement	Comments
Appendix B, Schedule 1, Condition 11 (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.	The demolition contractor will be required to prepare a waste and recycling management plan prior to commencement.
Appendix B, Schedule 1, Condition 11 (a)	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.	A Project performance target of an 80% recovery rate will be required for construction and demolition waste.
Appendix B, Schedule 1, Condition 11 (a)	During detailed design, the feasibility of re-using material excavated from the Project is investigated.	Detailed design not yet commenced, these works are part of early works.

4.7 Cultural Heritage

This section discusses changes to impacts associated with the approved CRR Project in relation to Indigenous and non-Indigenous cultural heritage.

4.7.1 Overview

Non-Indigenous Cultural Heritage

There are a number of State and local heritage places within and around the additional worksite area, see **Figure 9**. The Delivery Authority, commissioned Niche Environment and Heritage consultants to undertake an assessment of heritage values at the Roma Street precinct to identify potential impacts to current values and recommend mitigation actions to inform detailed design. The assessment undertaken in September 2018 included a desktop review of existing studies and heritage register entries and a day of field survey. **Table 22** lists out the heritage places within 200 m of the proposed impact area.

Table 22. Heritage places

Place	Address	Register Listing	Distance from Impact Area
King George Chambers	154 - 158 Roma St Brisbane City 4000	BCC	39m
The McDonnell and East & Co Building	414 George Street	State	141m
Transcontinental Hotel	462-468 George Street	State	35m
Former Bank of Queensland	458-460 George Street	BCC	72m
Baby Clinic (former)	51 Herschel Street	BCC	105m
Roma Street Railway Station	15 Countess Street Brisbane	State	46m
Roma Street Railyards	15 Countess Street Brisbane	Local	0m

In addition to the State and local listed heritage sites, the following sites are also listed on the Queensland Rail Heritage Register:

- Roma Street Platform Shelter;
- Countess Street Rail Bridges; and
- Petrie Terrace Road Bridge.

Figure 9 Surrounding listed heritage places

The additional worksite footprint and demolition area is adjacent to the State Heritage listed Roma Street Railway Station and overlaps a portion of the BCC locally listed Roma Street Railyards.

Indigenous Cultural Heritage

A search of the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Aboriginal cultural heritage Database and Register was carried out for the additional property impact areas and the surrounding area in September 2018. While this is not definitive as to the existence of Indigenous cultural heritage in the study corridor, it is noted that the search revealed that no new Indigenous cultural heritage sites or places had, at the time, been recorded on the register in this area since CRR 2016 (RfPC-1).

A Cultural Heritage Management Plan (CHMP) is mandatory under Part 7 of the *Aboriginal Cultural Heritage Act* 2003 (ACH Act) whenever an EIS is required. A formal CHMP under Part 7 of the ACH Act establishes a statutory process for addressing cultural heritage with certainty. A CHMP is a State-approved agreement between the land user and the Aboriginal Party(ies) of the area about how project activities may be managed to avoid harm to Indigenous cultural heritage or to minimise harm where avoidance is not reasonably practicable. A CHMP is currently being negotiated between the cultural heritage parties for the area and the Delivery Authority. Once agreed, the CHMP will be issued to DATSIP for approval.

4.7.2 Changes to Potential Impacts

Table 23 presents a summary of the changes in cultural heritage impacts between the approved Project and the proposed additional RfPC-3 works.

Table 23. Construction cultural heritage change assessment summary (with mitigation)

Aspect	Approved project	Change in Cultural Heritage Impacts
Cultural heritage	Measures to be set out within agreed CHMP.	No change to impacts. Increased potential for unknown finds with the additional disturbance area. Monitors will be present for the works as agreed under the CHMP.
State Heritage values	A potential adverse impact on the physical fabric of a known heritage place as a result of dust settlement caused by the demolition works. The potential heritage impacts of the CRR 2011 Roma Street Station and RfPC-1 station are generally considered to be the same (low to nil) on the heritage places at this location given their distance from the respective stations.	Increased duration of demolition work noise with sequential demolition of buildings creating visual and social amenity impacts to State listed Roma Street Station site.
Local Heritage values	No impacts to local heritage site values from demolition and worksite establishment, some temporary visual impacts during demolition.	The large amount of open space required for construction and demolition work sites may disturb heritage places near the underground station. Demolition worksite will occur on part of a locally listed heritage place, being the Roma Street Railway Yards.

Aspect	Approved project	Change in Cultural Heritage Impacts
Noise and Vibration	Potential adverse impact on the physical fabric of a known heritage place, as a result of vibration and/or settlement caused by construction works.	Vibration impacts under heritage building damage goals for all activities, exception of vibrational compaction. During compaction two heritage sites have been identified as potentially slightly exceeding these goals, however damage is unlikely to occur.
Dust	Deposition of dust from construction activities, resulting in possible corrosion of fabric.	Deposition of dust from construction activities, resulting in possible corrosion of fabric.
Disturbance to unknown Items	Possible disturbance or destruction of subsurface archaeological deposits.	Possible disturbance or destruction of subsurface archaeological deposits where ground disturbance occurs within the demolition site and or at the adjacent pat Lot 60 area.

4.7.3 Mitigation Measures

The Draft Outline EMP (Element 13) outlines Indigenous cultural heritage management measures and performance criteria for construction waste. Mitigation measures for Indigenous cultural heritage will be provided for in the Project's CHMP/s which will be executed prior to the commencement of these works.

The Draft Outline EMP (Element 12) outlines non-Indigenous cultural heritage management measures and performance criteria for construction works. Key specific mitigation measures for the demolition works include:

- Heritage condition surveys prior to commencing demolition work of the State listed Roma Street Station.
- Continuous vibrational monitoring during vibration generating activities at sites predicted to exceed the heritage building damage threshold.
- Archival (photographic) recording before any accepted impacts occur.
- If assessment identifies the potential damage of a heritage listed place/item, suitable management measures must be put in place to meet the requirements of relevant heritage legislation prior to works commencing.
- All management measures must be developed and implemented to avoid the risk of construction activities damaging the existing fabric of the building or platform of the Roma Street Heritage Station.
- Where safe to do so, public access to State and City heritage registered places will be maintained throughout the entire project.
- Temporary fencing or other barricading will be erected prior to demolition works to minimise risk of inadvertent impacts.
- State and BCC heritage registered places must not be used as access routes to construction zones.
- No State or BCC heritage listed place is to be used for the storage of any project related equipment or materials beyond essential requirements for worksites as nominated on impact plan.

4.7.4 Compliance with CRR Project Requirements

The CG conditions relating to cultural heritage focuses around design aspects which are not applicable to these proposed early works. General management of heritage values will be captured in the CEMP required under Condition 4.

4.8 Traffic Impact

This section discusses changes to impacts associated with the approved CRR Project in relation to traffic volumes, transportation network including road, rail, bus, cycleway and pedestrian access.

4.8.1 Overview

A technical assessment was undertaken to determine the traffic effects of demolition works including:

- Review of traffic volumes added to Herschel Street and Roma Street as a result of the heavy vehicles required movement in comparison with the baseline traffic flows;
- Swept path assessment of haulage trucks along Roma Street; and
- Review of potential changes to access for pedestrians and cyclists using Roma Street.

The technical assessment is provided in **Appendix C** of this report.

Previous surveys organised by Arup (2018) show that Roma Street currently caters for over 30 heavy vehicles in a single direction during peak times. Demolition of the two additional buildings is expected to be completed within seven months. It is anticipated that approximately 90,000 tonnes of material will need to be removed from the site as per estimation of waste volume conducted by Arup (2018). Based on approximate 31 working weeks within seven months, on a 12 hours / 6 days operation week as per approved working hours, it is anticipated that at least 500 tonnes of material can be removed from the site each day, which can be completed with approximately two vehicles per hour (or four movements per hour). To allow for possible restrictions during peak periods and unforeseen delays in the program, a total of approximately four vehicles per hour is adopted as the worst-case scenario.

There are a number of City Cycle stations and bus stations along Roma Street, see **Figure 10**. In areas of high pedestrian and cycle activity such as Roma Street, articulated or dog trailer vehicles could present a hazard to road users, due to the swept paths and vehicles tracking across kerbs at intersections, as well as road users failing to observe the trailer component of the vehicle when crossing the road. Therefore, the largest vehicle permitted would be the standard three axle semi-trailer which can carry up to 24 tonnes.

Figure 10 Surrounding transport features

4.8.2 Changes to Potential Impacts

Table 24 presents a summary of the changes in construction traffic impacts between the approved Project and the proposed additional RfPC-3 works.

Table 24. Construction traffic impact change assessment summary (with mitigation)

Aspect	Approved Project	Change in Traffic Impacts
Traffic generation	The transport of demolition waste is expected to have minimal impact on existing traffic as demolition truck activity is unlikely to coincide with the main construction activities. 27 trucks per day peak delivery and six trucks per hour peak total from Roma Street construction.	Two vehicles per hour (24 per day) with the largest vehicle permitted being the common three axle semi-trailer which can carry up to 24 tonnes. Demolition works of the bridge will involve a temporary closure of Roma Street and the footpath along this section.
Worksite access	During construction there will be two access points to the worksite off Roma Street, one at either end of the worksite.	Modifications to the grade of the adjacent open space park will be required to enable safe vehicle movement from the demolition site onto Roma Street. This may require removal of up to 5,000 m^3 of spoil. Modifications to the kerb will be required to facilitate the additional access point on Lot 60. Additionally, appropriate pedestrian and traffic management controls will be implemented to manage this interface. Site access from Roma Street is demonstrated as feasible in sweep path analysis assessment (see **Appendix C**).
Parking	Approved the loss of 600 carparking spaces with the demolition of BTC (West Tower).	Demolition of the BTC (East Tower) and Hotel Jen will include the loss of approximately 190 car parking spaces. The existing BTC car park is principally used by tenants of the transit centre office buildings as well as some paid car parking for CBD commuters. With the demolition of the office buildings, there will be reduced car parking demand at Roma Street Station.
Bus network	The inbound bus stop at Roma Street adjacent to the worksite will need to be relocated in coordination with TransLink during the demolition phase. This may include moving the bus stop further east along Roma Street in front of the BTC East Tower for buses continuing along Roma Street. Services travelling via Herschel Street may temporarily be unable to stop at Roma Street. Establishment of the construction worksite may also result in temporary	Bus network operation through the Inner Northern Busway will not be affected by the demolition works as the BTC (West Tower) will still be operational during works. Some minor disruptions to services are possible during demolition if required to ensure safety to users.

Aspect	Approved Project	Change in Traffic Impacts
	disruption to the Inner Northern Busway adjacent to Roma Street Station.	
City Cycle	The CityCycle station in front of the BTC (West Tower) will need to be relocated in consultation with BCC.	It is anticipated that the CityCycle station in front of the BTC (East Tower) and Hotel Jen will need to be removed due to the potential reduction of the effective footpath width.
Cyclists	The worksite is not anticipated to impact cycle activity. The Roma Street Coach Terminal will create minor detours and delays to cyclist movements on Parkland Boulevard.	The worksite is not anticipated to impact cycle activity on Roma Street. Parkland Boulevard is expected to remain open to cyclists during the demolition.
Pedestrian movement	Some delays to pedestrian and cycle movements will be caused by vehicles crossing footpaths to access the worksite along Roma Street.	Pedestrian access routes will be retained, however, appropriate staging, traffic control and detours will be required. The existing bridge over the intersection of Roma Street and Herschel Street that caters for pedestrians in and out the BTC will need to be removed due to its structural connection. This will cause impact on Roma Street vehicular traffic during the demolition of the bridge to ensure demolition works do not occur over live traffic. The methodology and timeframe will be determined upon award of the preferred contractor.

4.8.3 Mitigation Measures

The Draft Outline EMP (Element 2) outlines transport management measures and performance criteria to manage impacts associated with additional traffic generation. Mitigation measures are consistent with the approved CRR Project. These include:

- Local communities and road users are to be notified of proposed changes to local traffic access arising from Project works. This includes, but is not limited to, the provision of clear signage identifying changed traffic conditions, and public advertisements (such as local and regional newspapers, Project website) describing the proposed changes, the duration of the changes, and possible alternative routes to avoid the impacts of the proposed changes.
- Project works in or near road corridors are to be screened with solid barriers to minimise distractions for motorists.
- Access to properties adjoining or near to Project works, is maintained. Where changes to property access are required, alternative access arrangements are to be identified in consultation with property owners and occupants and documented in traffic management plans.
- Access for delivery vehicles to local businesses near Project works is to be maintained. Where changes to access for delivery vehicles are required, alternative access arrangements are to be identified in consultation with local businesses.
- Prepare and implement Construction Traffic Management Plans (CTMP) for each worksite prior to the commencement of construction activities in consultation with TMR, BCC and Emergency Service Authorities.

- Construction haulage tasks are undertaken during the hours nominated in the construction hours.
- Prepare and implement a Construction Workforce Car Parking Plan for each construction worksite in consultation with TMR and BCC.
- To the extent reasonable and practicable, haulage activities are managed and coordinated with other major construction works near to construction activities so as to minimise the disruption to local traffic.
- In conjunction with TMR, BCC and emergency service providers, identify and implement measures to manage traffic flows and ensure safe traffic movement near construction works.
- Safe and functional access for pedestrians and cyclists is to be maintained near Project works, including for the elderly, children and people with mobility difficulties including vision and hearing impairments. This measure is to consider relevant CPTED principles.
- Where pedestrian and cycle access to community facilities is changed, local access strategies are to be developed in consultation with local communities, community facility managers and relevant stakeholder groups, including Vision Australia to provide safe and efficient pedestrian access. Safe, alternative access is to be provided for bikeways disturbed by construction works.

Additional specific mitigation measures which are required due to the proposed RfPC-3 additional works include:

- Heavy vehicle haulage will operate outside peak times to reduce any impact on the network and increase safety to road users.
- Minor disruptions to inbound bus operations will be coordinated with Translink during demolition works to ensure safety of users.
- The CityCycle stations adjacent the BTC are temporarily or permanently relocated in coordination with BCC.
- The operation of the site access will be controlled by a Construction Traffic Management Plan to ensure safety of riders during heavy vehicles movements in and out of the site.
- Signals on Roma Street to be modified to relocate flow from the pedestrian bridge expected to be closed as a result of the demolition works. Modifications will be modelled and coordinated with BCC before demolition works commence.

4.8.4 Compliance with CRR Project Requirements

An assessment of the changed Project's ability to achieve compliance with the current CG's imposed and recommended conditions for the Project has been assessed in **Table 25**. This has been undertaken to identify any need to request changed conditions or any areas where additional mitigation measures need to be implemented to ensure compliance.

Table 25. Compliance with traffic and transport conditions

Condition Reference	Requirement	Comments
Appendix B, Condition 14 (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.	Traffic impact assessments completed, including swept path analysis to ensure appropriate management of traffic impacts. The operation of the site access will be controlled by a Traffic Management Plan.

Condition Reference	Requirement	Comments
Appendix B, Condition 14 (b)	During construction workforce car parking must be provided and managed to avoid workforce parking on local streets	Utilisation of surrounding commercially provided carparks will likely be required. Construction workers will be encouraged to avoid parking on the local streets, minimising the impact to visitors who typically make use of these parks. Workforce parking will be provided at the worksite post demolition works.
Appendix B, Condition 14 (c)	Access for emergency services to project worksites and adjoining properties must be maintained throughout the construction phase.	Access to be maintained.
Appendix B, Condition 14 (d)	Practicable access is maintained to adjacent properties throughout the construction phase.	Access to be maintained to Roma Street Station and along Parkland Boulevard.
Appendix B, Condition 14 (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 DTMR and the BCC in preparation of the Construction Environmental Management Plan.	Heavy construction vehicles will follow this requirement and be restricted from peak hour congestion times.
Appendix B, Condition 14 (g)	Construction traffic must operate within the requirements of a Construction Traffic Management Plan incorporated within the CEMP.	Construction Traffic Management Plan will be developed.
Appendix B, Condition 14 (h)	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 BCC and QR about changes in pedestrian and cycle paths required to facilitate Project Works.	Pedestrian modelling completed to inform modification of signals on Roma Street to relocate flow from the pedestrian bridge (see **Appendix C**). Ongoing working groups have been established with QR and BCC to discuss these matters.

4.9 Social and Visual Amenity, Landscape and Lighting

The key aspects discussed in this section relate to the changes to social and visual amenity, landscape and lighting. Visual amenity relates to the anticipated change to representative viewpoints that are expected to occur during construction and operation.

4.9.1 Overview

The extended demolition worksite is adjacent to Emma Miller Place which provides localised green space. The green space borders the Inner Northern Busway and railway corridor and forms part of a pedestrian link connecting Roma Street Station to Queen Street Mall. The space comprises terraced grass areas and established trees and palms that impart a subtropical character. The parks provide a pleasant shady character, although they are not as well used as may be expected. This may be due to its location adjacent to the busy Roma Street. Along Roma Street the area is highly urbanised with high rise buildings dominating the landscape and amenity.

A site survey to record and confirm the landscape and visual baseline conditions for the additional property impact area was completed. Representative viewpoint locations have been assessed with reference to previous studies to assist with analysing potential changes. The visual assessment is accompanied by photographs to illustrate how RfPC-3 may change the landscape. A review of lighting has been undertaken and the effect of project changes on the landscape has been assessed for the elements that contribute to the character of each precinct. The technical assessment has been provided in **Appendix D.**

4.9.2 Changes to Potential Impacts

Six representative viewpoints have been identified to illustrate the potential visual change and impact that may arise as a result of the RfPC 3 demolition works. These representative viewpoints include:

1. Roma Street Parkland - carriage shed
2. Roma Street Parkland – carriage deck
3. Wickham Park – Albert Street edge
4. Emma Miller Place
5. Makerston Street
6. Herschel Street

Roma Street Parkland – carriage shed

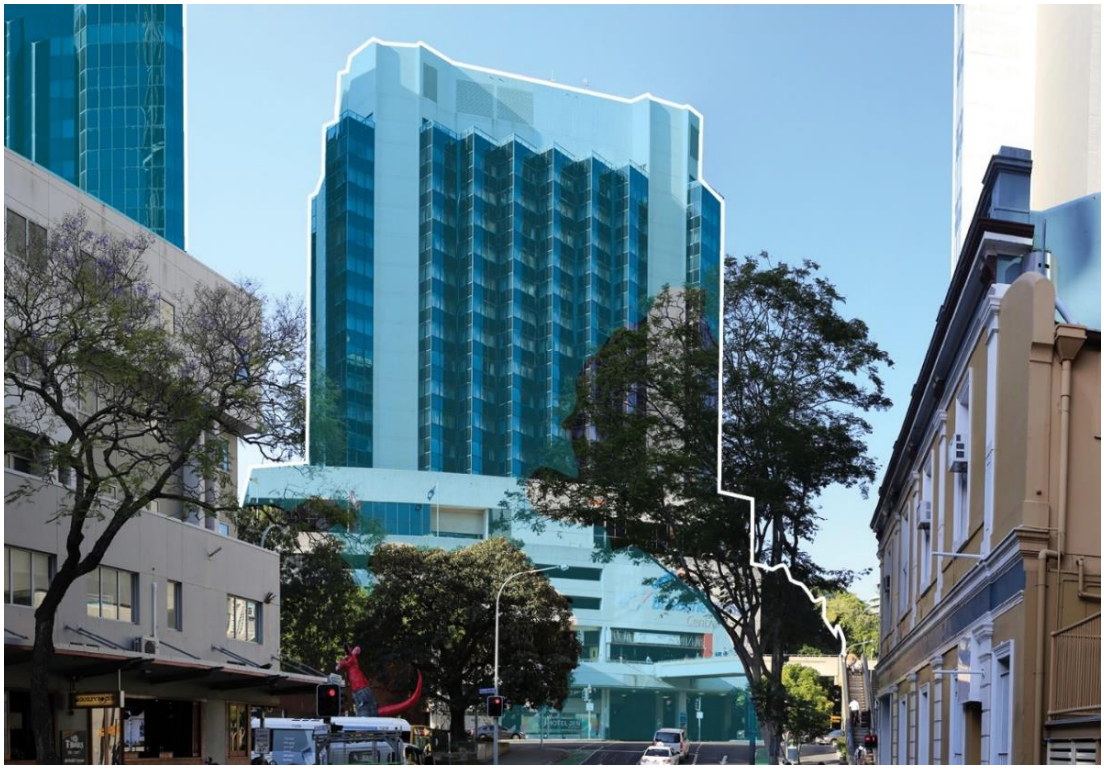
Roma Street Parkland – carriage desk

Wickham Park – Albert Street edge

Emma Miller Place

Makerston Street

Herschel Street



Key changes relate to an increase in potential adverse impacts at Roma Street Station during the demolition works. The main impacts on visual and landscape values from demolition and associated worksite are:

- Demolition and construction worksite - removal of vegetation, removal of fig tree, temporary visual clutter and loss of open space within the relevant portion of Lot 60; and
- Demolition works – visual clutter with hoardings and demolition works and loss of properties, however, upon completion there will be increased visual exposure and sightlines.

Table 26 presents a summary of the changes in visual impacts between the approved Project and the proposed additional RfPC-3 works.

Table 26. Construction visual impact change assessment summary (with mitigation)

Aspect	Approved Project	Change in Visual Impacts
Social amenity	Changes in local amenity and liveability for communities near to construction works due to increased construction noise, changed access, traffic diversions and construction traffic issues including parking. No direct use impacts are anticipated at Emma Miller Place in RfPC-1, however, use of the park and Emma Miller Place approved under original 2011 EIS.	Permanent removal of the commercial tenancies and hotel accommodation. The nature of any future development at the site may provide an opportunity for provision of commercial or hotel accommodation, subject to separate planning and approval processes. Permanent loss of the pedestrian link over Roma Street, requiring pedestrian traffic to be accommodated on Roma Street. Increase of 0.18 ha of open space temporarily lost with use of portion of Lot 60 for demolition access and to support construction of the future CRR Roma Street Station. Increased positive social amenity with possible redevelopment and renewal opportunities.
Visual amenity	Construction works at Roma Street would be highly visible from the adjacent buildings and the surrounding road network. No visual impact to Emma Miller Place. Impact will be a temporary benefit to the area, opening up sightlines along George Street to St Brigid's Church, Red Hill. This may only be a temporary benefit due to any redevelopment that may occur on the site under the BCC planning scheme.	Overall, the impact on visual amenity in the area of the Roma Street Station construction works will incrementally increase due to additional demolition phase of works. Demolition works will be now visible from Emma Miller Place. Increased positive impact as greater sightlines opened up. Improved views of the heritage listed Roma Street station building and its interface with the surrounding precinct.
Landscape	Increased impacts on visual amenity at Roma Street Railway Station during the demolition phase, due to the demolition of the BTC (West Tower). Construction works will be visible from the adjacent buildings and the surrounding road network and result in an increase in potential visual impacts at this location compared to CRR 2011, which did not propose any works here.	An incremental expansion of the previously approved demolition works, removing the urban scale and form that exists to the north of Roma Street. The fig trees adjacent to BTC (East Tower) and Hotel Jen and the trees that bound the eastern side of Hotel Jen will be removed. Landscape amenity provided by the park area that is the relevant portion of Lot 60 will be

Aspect	Approved Project	Change in Visual Impacts
		temporary lost as a result of the demolition and construction worksite. Local visual impacts to Emma Miller Place from views to the demolition and construction worksite and Hotel Jen demolition works.
Lighting	Lighting generated at external locations within the construction worksites has the potential to be visible from nearby sensitive receptors. Although lighting would be focussed over the particular points of interest, some light trespass was determined as likely.	Similar lighting requirements as that required for the demolition of BTC (West Tower), however, impacts extended in duration during additional demolition works.

4.9.3 Mitigation Measures

The current mitigation measures proposed within the Draft Outline EMP (Element 5) are sufficient to mitigate the impacts of the additional demolition works and relevant requirements will be included in the CEMP. These include:

- Where possible, adopt pruning and selective trimming of mature trees in preference to their removal.
- A suitably qualified arborist should be consulted regarding the management of mature vegetation to be retained.
- Where possible, fence and protect trees of particular significance that fall within construction worksites and laydown areas.
- Provide noise barriers and hoardings around construction worksites to mitigate the views of construction works. Where appropriate, these are to incorporate landscaping and urban design measures to minimise the visual impact of the barriers and are to be regularly maintained.
- Where possible, external night time construction activities and traffic movement within the worksites will be minimised.
- Project lighting to be designed in accordance with the relevant standard such as AS 4282-1997: Control of the obtrusive effects of outdoor lighting and the Rail Infrastructure Manager's requirements e.g. Queensland Rail's Lighting Standard for Railway Stations guidelines.
- Construction phase works to minimise night-time impacts of lighting on residential properties where practicable. Place hoarding and visually impermeable barriers around worksites to minimise views of stockpiles and construction activities, particularly where worksites are visible to residential or recreational users.
- 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.

Specific mitigation measures which are consistent with approved Project include the following:

- Hoarding during demolition to minimise the visual impacts during the works.

- Traffic management plan implemented for the demolition works to manage temporary changes in access that may arise during demolition.
- Use of all practical and feasible noise mitigation measures in the planning of the demolition activities, including scheduling the demolition sequence to be “inside out” wherever possible to allow the building façade to provide partial noise screening of demolition activities.
- Engagement with stakeholders.

4.9.4 Compliance with CRR Project Requirements

An assessment of the changed Project’s ability to meet compliance with the current CG’s imposed and recommended conditions for the Project has been assessed in **Table 27**. This has been undertaken to identify any need to request changed conditions or any areas where additional mitigation measures need to be implemented to ensure compliance.

Table 27. Compliance with cultural heritage conditions

Condition Reference	Requirement	Comments
Appendix B, Condition 20 (a)	Project Works are designed and implemented to minimise impacts on landscape and open space values.	This element will be demonstrated within detailed design of the CRR Roma Street Station and master planning for the precinct redevelopment.

5. Public and Stakeholder Consultation

5.1 Stakeholders

The consultation strategy involves targeted consultation with the key stakeholders identified in **Table 28**.

Table 28. Key stakeholders

RfPC-3 Stakeholders	
Government	• Brisbane City Council (lessee/licensee) • Building Queensland (interested) • City Parkland Services (sublessee/sublicensee) • Environment and Science (interest in open space) • Fire and Emergency Services (proximity to site) • Defence (Victoria Barracks) (proximity to site) • Housing and Public Works (land owner) • Justice and Attorney-General (proximity to site) • Office of Coordinator-General (interested) • Police (proximity to site) • Premier and Cabinet (interested) • Queensland Rail (to confirm) • Queensland Treasury (interested) • South East Queensland Council of Mayors (interested) • Stadiums Queensland (proximity to site and future station to stadium connections) • Department of State Development, Manufacturing, Infrastructure and Planning (interested – State manager and party to Roma Street Parklands Management Agreement) • Trade Investment Queensland (interested) • Translink (proximity to site) • Transport and Main Roads (asset owner)
Brisbane Coach Terminal and Hotel Jen	• Owners • Building managers • Tenants • External users and tours including Conxion, Sunstate Charters, Gray Line Business Day Tours, Queensland Day Tours, Brisbane 4WD Day Tours
Coach terminal operators	• Australian Sunset Safaris • Bus Queensland • Crisp Coaches • Cross Country Tours • Countrylink Coaches • Greyhound Australia • JPT Tour Group

RfPC-3 Stakeholders	
	• Murrays Coaches • Premier Motor Service • Queensland Bus Industry Council • Sunlover Holidays
Special interest	• Public Utility Providers including Telstra, Optus, Energex, Ergon, Urban Utilities, NBN Co • Transport and Main Roads (regulator of SISTOs) • Bicycle Queensland and associated bicycle user groups • Lot 60 open space – Hotel Jen, Returned Services League (RSL), interest group who relocated memorial plaque, Queensland Conservation Council, Landcare Queensland • Emergency services – police, fire and rescue and ambulance
Businesses within proximity (primarily Roma Street, Upper Roma Street, Parkland Boulevard and Crescent, College Road, Wickham Terrace)	• Cafes and restaurants • Accommodation providers • Corporate and commercial premises • Carparks • Barracks Shopping Centre
Community and services within proximity (primarily Roma Street, Upper Roma Street, Parkland Boulevard and Crescent, College Road, Wickham Terrace)	• Education facilities – Brisbane Grammar School, Brisbane Girls' Grammar School • Apartments and residents including Parkland Apartments (beneficial easement interests), Mayfair Residents, Craigston and 309 Wickham Street • Health services – Brisbane Private Hospital, St Andrew's War Memorial Hospital, Watkins Medical Centre, Alexandra House • Community and social services – The Liberal Catholic Church of St Alban, Brisbane Theosophical Society, Diamantina House and Roma House, Winter Warmth, Brothers in Need, Rosie's Branch
Other	• Public transport users • Cyclists • Pedestrians • Motorists • Commuters

The Delivery Authority has undertaken early engagement with key stakeholders including:

- Government
  - Brisbane City Council
  - City Parklands
  - Environment and Science
  - Housing and Public Works
  - Queensland Rail
  - Transport and Main Roads, incorporating Translink
- Brisbane Coach Terminal and Hotel Jen

  - Owners
  - Building managers
  - Tenants
- Coach operators
- Special interest groups
  - Bicycle Queensland and associated bicycle user groups
- Businesses within proximity
  - Cafes and restaurants
  - Accommodation providers
  - Corporate and commercial premises
- Community and services within proximity

The outcomes of this consultation are detailed in **Section 5.1.3**.

5.1.1 Stakeholder Matrix

Table 29. Stakeholder engagement approach

Stakeholder	Likely Concerns	Communication Approach
Government (proximity to site and interested)	• Future construction/demolition impacts for operations • Concerns from staff/ patrons/ interested parties about the proposed demolition and/or project • Integration with other planned development/services in the area	• Briefing • Phone calls/emails • Briefing pack (fact sheet, maps, videos/fly-throughs) • Individual meetings where requested
Brisbane Transit Centre and Hotel Jen	• Process to relocate and/or extinguish the business • Livelihood beyond the relocation or extinguishment of the business • Vacant possession timeframe • Understanding the Acquisition of Land Act process • Reaching a timely settlement with the Delivery Authority	• Ongoing, regular meetings • Phone calls/emails • Provide support services (e.g. Tenant Representative) as required • Static and interactive information sessions
Coach operators	• Relocation of coach terminal • Access changes • Reduction in capacity • Timetable rearrangements • Service impacts • Passenger wayfinding and communication • New temporary terminal location	• Ongoing meetings with individuals and groups • Phone calls/emails
Special interest – bicycle user groups, other cycling groups	• Future construction/demolition impacts • Safety and accessibility	• Briefing • Phone calls/emails • Briefing pack (fact sheet, maps, videos/fly-throughs) • Individual meetings where requested
Special interest – part of Lot 60 open space	• Removal of vegetation, greenspace and fig tree for a temporary requirement • Potential for contaminated soils • Previous heritage and historical value	After engagement with DHPW as site owner: • Phone calls/emails • Briefing pack (fact sheet, maps, videos/fly-throughs)

Stakeholder	Likely Concerns	Communication Approach
	• Personal involvement in establishing the site and/or relocating the memorial	• Individual meetings where requested (meeting will be sought with RSL to discuss historical connection to the site and possible legacy project offsets)
Businesses, community and services within proximity	• Future construction/demolition impacts • Potential service interruptions and relocations • Loss of greenspace/trees • Access and safety during demolition	• Letter • Email (link to fact sheet, maps, videos/fly-throughs) • Static and interactive information sessions • Presentations • Advertisement • Website
Other – broader community, public transport users, cyclists, pedestrians, motorists and commuters	• Future construction/demolition impacts • Potential service interruptions and relocations • Access and safety during demolition	• Static and interactive information sessions • Advertisement • Website

5.1.2 Consultation Program

The below implementation plan demonstrates the Delivery Authority's proposed engagement.

Table 30. Implementation plan

Activity		Content	Stakeholders
PRE-RELEASE CONSULTATION: TWO WEEKS PRIOR TO PUBLIC RELEASE OF THE REQUEST FOR PROJECT CHANGE			
Elected representative letter and briefings	Personalised letters/briefing notes to offer briefings to elected representatives on: - Imminent release of the Request for Project Change - Change Report process and opportunity for comments / submissions Establish project contacts so constituents can be directed to the Delivery Authority team.	- Advise of release of the Request for Project Change. - Book in a one-to-one briefing prior to the consultation period. - Provide a briefing pack for display in Electorate Office	• **Federal** - Member for Brisbane • **State** - Premier - Deputy Premier - Member for Brisbane Central • **Local** - Councillor for Central Ward
Courtesy phone calls	Contact key stakeholders to confirm imminent release of the Request for Project Change.	- Advise of release of the Request for Project Change. - Book in a one-to-one briefing during the consultation period. - Provide a briefing pack just prior to public consultation starting.	• **Government agencies (proximity to site)** - Housing and Public Works - Department of State Development, Manufacturing,

Activity		Content	Stakeholders
			Infrastructure and Planning - Brisbane City Council - City Parklands - Economic Development Queensland - Defence (Victoria Barracks) - Justice and Attorney General - Queensland Rail - Police - Translink - Transport and Main Roads
		- Advise of release of the Request for Project Change. - Offer one-to-one briefing during the consultation period if required. - Provide a briefing pack just prior to public consultation starting.	• **Government agencies (interested)** - Building Queensland - Environment and Science - Office of Coordinator-General - Premier and Cabinet - Queensland Treasury - South East Queensland Council of Mayors - Stadiums Queensland - State Development - Trade Investment Queensland • **Emergency services** • **Public Utility Providers** • **Special Interest groups** • **Brisbane Transit Centre and Hotel Jen** - Tenants - Owners

Activity		Content	Stakeholders
WEEK ONE			
Letter	Contact key stakeholders within proximity to the site to confirm the Request for Project Change public consultation period.	- Advise of RfPC release, consultation process and option to submit response - Advise how to speak with the team - Advise how to find out further information	• **Businesses, community and services within proximity**
General advertising	Advertise the Request for Project Change is available for public comment. Advertise timing of public displays and information session.	- Courier-Mail - Quest local newspaper	• **Broader community, public transport users, cyclists, pedestrians, motorists and commuters**

Activity		Content	Stakeholders
Website	Project website to be updated with current information.	- Fact sheet - Link to Request for Project Change on OCG website.	• **All**
Email	Advertise the Request for Project Change is available for public comment. Advertise timing of public displays and information session.	- Fact sheet - Link to Request to Project Change on OCG website.	• **Cross River Rail subscribers in proximity**
Meetings (as requested)	Provide information about the project and the Request for Project Change. Respond to stakeholder-specific questions and concerns.	- Project overview - Request for Project Change overview - Fact sheet - Videos/Virtual reality (VR) experiences	• **All**
Presentations (as requested)	Provide information about the project and the Request for Project Change.	- Project overview - Request for Project Change overview - Fact sheet - Videos/Virtual reality (VR) experiences	• **Interested associations, body corporates, companies etc**
Static displays	Provide information about the Request for Project Change for public review and comment. Proposed locations: - Brisbane Transit Centre - Brisbane Square Library - Roma Street Parkland Visitor Information Centre	- Fact sheet - Request for Project Change Report - Maps/images - Feedback information - Posters	• **All**

Activity		Content	Stakeholders
WEEK TWO – WEEK FOUR			
Meetings (as requested)	Provide information about the project and the Request for Project Change. Respond to stakeholder-specific questions and concerns.	- Project overview - Request for Project Change overview - Fact sheet - Videos/Virtual reality (VR) experiences	• **All**
Presentations (as requested)	Provide information about the project and the Request for Project Change.	- Project overview - Request for Project Change overview - Fact sheet - Videos/Virtual reality (VR) experiences	• **Interested associations, body corporates, companies etc**
Static displays	Provide information about the Request for Project Change for public review and comment. Proposed locations: - Brisbane Transit Centre	- Fact sheet - Request for Project Change Report - Maps/images - Feedback information - Posters	• **All**

Activity		Content	Stakeholders
	- Brisbane Square Library - Roma Street Parkland Visitor Information Centre		
Interactive display – Roma Street Parkland (week 2); Brisbane Transit Centre (week 3)	Provide information about the Request for Project Change for public review and comment. Staffed display to respond to enquiries and provide further information.	- Fact sheet - Request for Project Change Report - Maps/images - Feedback information - Videos/Virtual Reality (VR) experiences	• **All**

Activity		Content	Stakeholders
POST CONSULTATION			
Close-out stakeholder enquiries	Follow-up and close out any outstanding enquiries from consultation period.	Provide information as per enquiry or questions. Follow-up meeting if needed.	As needed
Collate feedback for OCG	Assist CG with collation of all feedback received during consultation.	Provide Consultation Manager Report and meeting minutes regarding the Request for Project Change to the CG.	CG

5.1.3 Key Stakeholder Consultation Outcomes

Consultation with the key stakeholders is a stated requirement outlined within the CGCR. **Table 31** below outlines the consultation already undertaken and key outcomes from consultation meetings with key stakeholders.

Table 31. Summary of consultation with key stakeholders

Stakeholder	Consultation and Outcomes
Government agencies	
Brisbane City Council	The Delivery Authority and Council have five working groups that meet fortnightly to progress discussions about a range of matters including property access, leases and land discussions, public transport services and potential relocation of services, timing and conditions of work. In addition, Council and Parklands Management have worked closely with the Delivery Authority to design the current solution for the temporary coach terminal, which will be relocated prior to the demolition of the Brisbane Transit Centre. The Delivery Authority will continue to work collaboratively with Council during project planning and delivery.
City Parklands	Consultation has been ongoing since March 2018 about land requirements for construction purposes, and discussions about alternative solutions to meet Council's and the Delivery Authority's operational needs. The Delivery Authority will continue to work collaboratively with City Parklands, through BCC during project planning and delivery.
Environment and Science	The Delivery Authority initiated consultation about the temporary use of open space adjacent to Hotel Jen with the Department of Environment and Science in September 2018 and will continue engagement during the planning of and removal of the vegetation associated with the demolition works.

Stakeholder	Consultation and Outcomes
Housing and Public Works	Consultation has been ongoing since January 2018 regarding the land access process for numerous sites around the Roma Street precinct, including initial discussions around part of Lot 60 requirements. The Delivery Authority will continue to work with Housing and Public Works. Legal and Property, to obtain the necessary land owner consents for temporary access to the relevant portion of Lot 60.
Queensland Rail (QR)	Consultation about the requirement for the BTC has been going since May 2018, with in-person briefings provided prior to the issue of the Notice of Intention to Resume (NIR) for numerous QR interests at Roma Street. The Delivery Authority and QR Roma Street have regular working group meetings.
Department of Transport and Main Roads (incorporating Translink)	Consultation has been ongoing since April 2018 regarding the Delivery Authority's requirements for the Roma Street precinct and particularly potential impacts to the busway asset. The Delivery Authority and Transport and Main Roads have regular working group meetings. The Delivery Authority will continue to work collaboratively with Transport and Main Roads during project planning and delivery.
Brisbane Transit Centre, Hotel Jen and coach operators	
Owners	The Delivery Authority started early engagement in May 2018 and a formal Notice of Intention to Resume were issued on 31 May 2018. The Delivery Authority is working with all parties towards an agreement by the vacant possession date of March 2019.
Building managers	
Tenants	
Coach operators	On 1 June 2018, the Delivery Authority hosted a forum with all operators currently utilising the coach facilities within the BTC. During this forum, operators were briefed on the requirement for relocation from the BTC (due to demolition), traffic counts and timetable analysis undertaken, operational models, and the concept design. The Delivery Authority continues to meet regularly with the Queensland Bus Industry Council about the temporary coach terminal operations.
Special interest	
Bicycle Queensland	The stakeholder believes that any potential conflicts can be managed in consultation with Bicycle Queensland, and highlighted the importance of good communication and behaviour of contractors.
Businesses within proximity	
Cafes and restaurants; accommodation providers; corporate and commercial premises	The Delivery Authority door knocked businesses within proximity of the BTC to advise of upcoming information sessions about the temporary coach terminal. This included providing a written update about the planned demolition of the BTC. In addition to the doorknock, the written update was dropped to more than 780 commercial properties. In general, businesses were most interested in the Roma Street precinct of the future, and potential construction impacts.
Community and services within proximity	
Education facilities	The Delivery Authority has met with nearby schools to provide a project briefing, discuss potential land and access requirements, outline the planned demolition of the BTC and discuss the relocation of the temporary coach terminal. The Delivery Authority has offered to provide safety education information to school students, and has committed to keep the schools informed of the project's progress.
Parkland Apartments	There has been extensive consultation with the Parkland Apartment about the planned demolition of the Brisbane Transit Centre, however the primary concern for

Stakeholder	Consultation and Outcomes
	the residents is the relocation of the temporary coach terminal to Parkland Crescent, adjacent Platform 10 at Roma Street station. Residents are concerned about construction and operational impacts – particularly safety, traffic and noise. The Delivery Authority continues to meet regularly with Parkland Apartment body corporate representatives, and hosted information sessions during June and September 2018.

5.1.4 Public Consultation

Previous public consultation undertaken during the 2017 RfPC-1 process (noting there was no requirement for the Brisbane Transit Centre in the previously approved 2011 EIS) resulted in a number of submissions. The issues relevant to the BTC and how these issues are being managed are summarised in **Table 32** below.

Table 32. Summary of key relevant social concerns and proposed management

Key Issues	Management measures/Proponent response
Impact to future development plans for the BTC site, including urban renewal	The proposed design of the station at Roma Street would provide for future redevelopment adjacent to the station and could provide for development above the station. The Roma Street station and the BTC have been identified as a strategic development site within the Brisbane City Centre Master Plan. The Project would support development within this zone through improved access to high frequency public transport. Consistent with the City Centre Master Plan, the Project would also support the revitalisation of the Roma Street station and the Brisbane Transit Centre precinct and support the creation of a western gateway to the Brisbane CBD.
Business and job losses as a result of their displacement from the BTC.	The Delivery Authority has implemented early engagement with businesses located in the BTC, and is continuing to engage with affected businesses. The Delivery Authority's preference is to relocate businesses where possible, and has introduced all tenants to a Relationship Manager and engaged a Tenancy Representative to assist.
Cost of acquiring land and businesses at BTC.	The key outcomes and assumptions for the cost-benefit analysis are included in Section 4.5.1 of Volume 1 of the Request for Project Change. The cost benefit analysis has been prepared in accordance with Queensland Treasury and Infrastructure Australia guidelines and provides direction for the Project Business Case. Estimates of the cost of property and land acquisition, including land required for the new underground station at Roma Street, are factored into the Project cost.
Development of the BTC site provides an opportunity to re-establish a visual connection between Roma Street and the heritage station building.	The potential for re-establishing a visual connection between Roma Street and the station building is noted and would be considered during detailed design to the extent practicable within the scope of the Changed Project.

Key Issues	Management measures/Proponent response
Loss of mature fig trees outside the current entrance to Roma Street station.	Should trees require removal the project would replace the tree with an offset program (species and number) as agreed by BCC.
Cycle connectivity in the Roma Street station precinct.	The Project proposes a concept to reconfigure streets and pedestrian facilities outside Roma Street station to improve pedestrian flows associated with the station. Cyclist connectivity would be considered in further refining this concept in consultation with BCC and with input from bicycle stakeholder groups. During the construction phase, connectivity for all forms of active transport will be addressed through the Construction Traffic Management Plan.
Loss of approximately 750 car parking spaces.	Alternative commercial car parking is available locally and alternative car parking exists through other commercial carparks located throughout the Brisbane CBD.

References

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APPENDIX A – Air Quality Technical Assessment

APPENDIX B – Noise and Vibration Technical Assessment

APPENDIX C – Traffic Assessment Report

APPENDIX D – Social and Visual Amenity, Landscape and Lighting Technical Assessment