Cross River Rail Environmental Impact Statement

Request for Project Change 9

Changes to the Project and changes to the imposed conditions – Southern Portal Area

Volume 1

Date: ***November 2020***

Author: ***Cross River Rail Delivery Authority***

CROSSRIVERRAIL

Queensland Government

Executive Summary

The Cross River Rail (CRR) Project is a Coordinated Project for which an Environmental Impact Statement (EIS) is required under the *State Development and Public Works Organisation Act 1971*. The CRR EIS was evaluated by the Coordinator-General, who recommended the Project proceed, subject to Imposed Conditions and recommendations. Since the evaluation of the EIS, eight Requests for Project Change (RfPCs) have been evaluated by the Coordinator-General.

The Cross River Rail Delivery Authority (Delivery Authority) is applying to the Coordinator-General to evaluate a change to the CRR Project, and a change to the Imposed Conditions to reflect those changes for certain works in the Southern Portal Area.

Proposed Change to the CRR Project

It is proposed to change the construction methodology for a section of the Southern Portal Area from a partly mined, partly cut and cover construction, to cut and cover construction only. The Proposed Change will require an additional construction access via Peter Doherty Street, including a temporary intersection upgrade at the intersection of Peter Doherty Street and Annerley Road.

The requested Project change is confined to zones A - F shown in Figure 1 (Southern Portal Area) and the Project Works described in Table 1 (Southern Portal Area Works).

The changed construction methodology is in response to track and structural realignments within the rail corridor, to optimise the rail corridor during operations. The track and structural realignments are generally in accordance with the Project as already evaluated by the Coordinator-General.

The changed construction methodology is in response to track and portal structure realignments within the rail corridor which have been required resolve complex construction interfaces and optimise rail operational outcomes. The track and portal structure realignments are generally in accordance with the Project as already evaluated by the Coordinator-General.

Proposed Change to the Imposed Conditions

Consequential changes to Imposed Condition 1 (General Conditions) are requested to reflect the changes to the Evaluated Project as set out in this RfPC. The changes to Imposed Condition 1 are proposed to require that the Project be carried out generally in accordance with this RfPC, including the drawings provided at Volume 2, and to delete redundant references.

Reason for the Proposed Change

The reason for the Proposed Change is to optimise the track geometry and layout of infrastructure within the Southern Portal Area to resolve complex construction interfaces and optimise rail operational outcomes, which requires a consequential change to the construction methodology for part of the Southern Portal infrastructure. Cut and cover construction has been determined as the safest and most efficient construction methodology for the Southern Portal Area Works, particularly given the complex infrastructure interfaces in this part of the railway corridor.

Changes to Imposed Condition 1 are required to reflect the changes to the Evaluated Project as set out in this RfPC.

Effect of the Proposed Change

The effect of the Proposed Change is set out in detail in Chapter 3 of this RfPC and the technical reports at Volume 3. The Proposed Change will result in longer rail possessions at the Southern Portal Area, with changed noise, vibration, traffic and air quality impacts.

The CRR Project is delivered in accordance with the Environmental Management Framework that has been established by the Coordinator-General in the Imposed Conditions. That Environmental Management Framework (EMF) continues to be appropriate to manage the environmental effects of the CRR Project, including proposed minor changes and a detailed consultation and community engagement process.

Although the predicted impacts will be different, the Project must continue to meet the environmental outcomes and performance criteria in the outline environmental management plan (OEMP) that has been approved by the Coordinator-General.

Undertaking the Southern Portal Area Works will require periodic rail possessions and changes to rail services. Changes to rail services may include altered suburban stopping patterns or routes, and/or rail replacement services to link customers to and from impacted stations.

Travel disruption planning and management is coordinated well in advance of rail possessions with Translink, DTMR, QR and BCC. This process will be managed through an integrated, coordinated, multi-agency and multimodal response similar to the temporary bus diversion that was undertaken for Roma Street. This approach ensures all Cross River Rail disruptions are planned and managed in consideration of other projects, events and activities across South East Queensland with the aim of keeping the city's transport networks moving whilst major construction projects are underway. A strategic and coordinated approach to delivering public communications that is based on analytics will ensure the public is informed well in advance of network disruptions, to minimise inconvenience and maximise the ability to plan their journey.

The changed construction methodology from a part mined / part cut and cover solution to a full cut and cover method significantly increases the certainty of managing potential ground settlement in the rail corridor and addressing power, water and sewer utilities that will intersect with the Southern Portal structure.

The changes to rail track geometry provides operational benefits to the Project, with the increased track curvature resulting in reduced operational noise and maintenance requirements for both track and rollingstock as a result of less wear and tear.

It is requested that the Coordinator-General evaluate the Proposed Changes as set out in this RfPC, and amend Imposed Condition 1 in accordance with the requested amendments detailed in Chapter 4.

Table of Contents

1. Introduction

The Delivery Authority established by the *Cross River Rail Delivery Authority Act 2016* (Qld) is the proponent for the CRR Project. The CRR Project is a declared coordinated Project for which an Environmental Impact Statement (EIS) was required under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The EIS for the CRR Project (2011 EIS) is evaluated by the Coordinator-General, who recommended that the Project proceed, subject to the Imposed Conditions in the evaluation report dated 20 December 2012. Since the 2012 evaluation report, eight Requests for Project Change (RfPC) have been submitted and had changes evaluated by the Coordinator-General.

The Coordinator-General's Report on Project Change for RfPC4 was released on 26 June 2019. RfPC4 sought changes to the reference Project including the current approved configuration of the Southern Portal Area.

The authorised CRR Project is the Evaluated Project as described in Imposed Condition 1 of the Coordinator-General's Project-wide Imposed Conditions.

Since the Coordinator-General's Report on Project Change for RfPC4, further detailed planning has been undertaken on the Southern Portal Area. The planning considered the level of congestion within the rail corridor, including multiple commuter rail lines servicing the Gold Coast and Cleveland regions along with freight rail lines to the Port of Brisbane, the Boggo Road Busway that passes underneath the rail corridor and a grade separated rail freight flyover crossing above the rail corridor. These key features were then overlaid with the multiple intersections with utilities (high voltage power, stormwater and sewer) which will require upgrading and/or relocation through the various stages of the work. Given the complexity of this area, the Project faced a number of technical challenges, particularly with rail alignment, rail geometry and utility constraints. The design and construction methodology has now been further developed to resolve these various technical issues and as a result, the following Proposed Changes to the Evaluated Project for the Southern Portal Area Works are requested:

- Change to construction methodology from a partly mined, partly cut and cover construction, to cut and cover construction only, and associated access via Peter Doherty Street, including a temporary intersection upgrade at the intersection of Peter Doherty Street and Annerley Road. The change to construction methodology is in response to minor track and structural realignments to resolve complex construction interfaces and optimise operations (see Chapter 3);
- Consequential changes to Imposed Condition 1 (General Conditions) to require that the Project be carried out generally in accordance with this RfPC, including the drawings provided at Volume 2, and delete redundant references (see Chapter 4)

1.1 Purpose

The purpose of this RfPC is to request that the Coordinator-General assess the Proposed Changes to the Evaluated Project and to Imposed Condition 1, in accordance with Part 4, Division 3A of the SDPWO Act. This RfPC:

- describes the Proposed Changes and their effects on the Project;
- states reasons for the Proposed Changes;
- includes enough information about the proposed change and its effects on the Project to allow the Coordinator-General to make the evaluation; and
- provides replaced drawings to ensure the Proposed Changes are accurately captured in the Evaluated Project.

1.2 Consultation requirements

The Coordinator-General will determine whether the Delivery Authority will be required to publicly notify the Proposed Changes and their effects on the Evaluated Project. If public notification is required, public notices inviting submissions on the request will be published in accordance with the SDPWO Act.

The consultation period is determined by the Coordinator-General and stated on the public notification. If the request is publicly notified, any person, company or organisation may make a submission on the request. A 'properly made' submission:

- is made in writing to the Coordinator-General;
- is received on or before the deadline for submission;
- states the name and address of each submitter;
- is signed by each submitter; and
- states the grounds of the submissions and the facts and circumstances relied on in support if the grounds.

1.3 Structure of this Request for Project Change

This RfPC consists of the following volumes:

- **Volume 1 – Request for Project Change (this report) -** Volume 1 describes the Proposed Changes, the reasons for the Proposed Changes and the effects of the changes on the Project.
- **Volume 2 – Amended Drawings -** Volume 2 presents the changed Project drawings including general arrangement drawings, longitudinal and cross sections, property impact plans and station arrangement drawings. and
- **Volume 3 – Technical Reports -** Volume 3 provides technical information supporting the Request for Project Change.

1.4 Context of Proposed Changes included in this Request for Project Change

1.4.1 Physical extent of changes

The Southern Portal Area is shown as zones A, B, C, D, E and F on Figure 1.

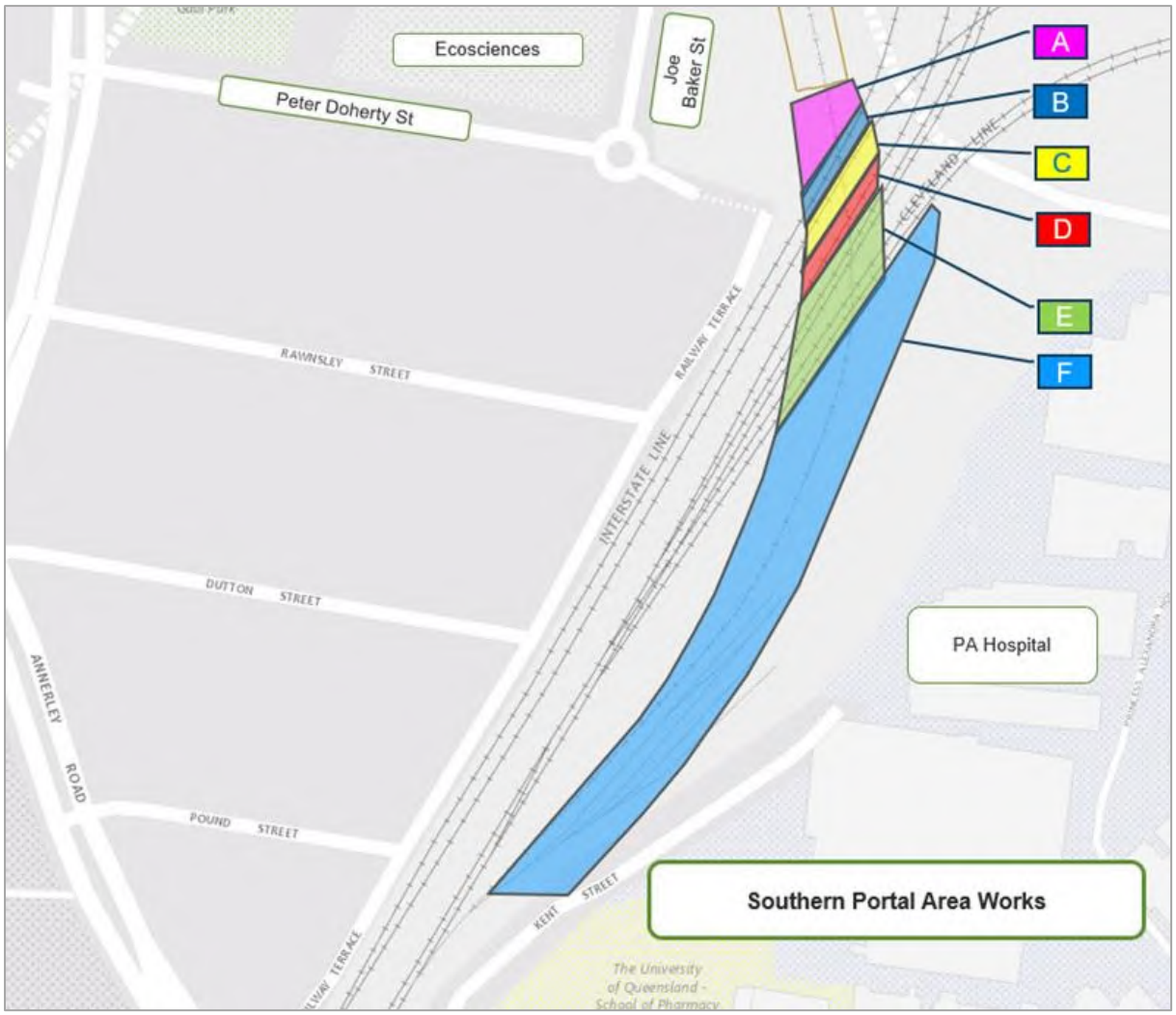


Figure 1: Map of the Southern Portal Area

The Southern Portal Area is where the Southern Portal of the tunnel for the CRR Project will be constructed. Surrounding the Southern Portal Area is:

- the Princess Alexandra (PA) Hospital to the east;
- the Leukaemia Foundation and Ecosciences to the west; and
- the existing Dutton Park Railway Station to the south.

The Southern Portal Area is a complex part of the rail corridor characterised by:

- multiple commuter rail lines servicing both the Gold Coast and Cleveland regions;
- freight rail lines to the Port of Brisbane, including a grade separated rail freight flyover above the rail corridor; and
- Boggo Road Busway passing underneath the rail corridor.

The entire Southern Portal Area is bounded and intersected by a range of utilities including high voltage power, essential communications, stormwater and sewage infrastructure.

The changes proposed in this RfPC are limited to Project delivery in the six zones that comprise the Southern Portal Area Works, as shown in Figure 1, with the Southern Portal Area Works described in Table 1: Southern Portal Area Works.

Zone	Description	Access via	Working Hours	Estimated Duration
A	Boggo South cut and cover	Peter Doherty Street	6.30am-6.30pm Mon-Sat	10 months
B	Dual gauge demolition and reconstruction	Peter Doherty Street	6.30am-6.30pm Mon-Sat	7 months
C	Freight flyover underpinning	Peter Doherty Street	6.30am-6.30pm Mon-Sat	7 months
D	Middle Road construction cut and cover with sheet piling	Peter Doherty Street	24 hours 7 days	10 days (Easter 2021) 40 days (Quarter 3/Quarter 4 2021)
E	Brownfield rail construction cut and cover	Kent Street	6.30am-10.00pm Mon - Sat	6 months (3 months of which would include works 6.30pm-10.00pm)
F	Greenfield rail construction - dive and cut and cover structure	Kent Street	6.30am-6.30pm Mon - Sat	12 months

Table 1: Southern Portal Area Works

1.4.2 Program of works

The estimated schedule for the Southern Portal Area Works is set out in Figure 2: Estimated schedule of works. The works in zone F are not a change from the Evaluated Project but are included for completeness.

Activities as listed will not take place 24 hours a day, 7 days a week for the entire duration, except where specified. Additionally, the works specified within a particular stage may overlap.

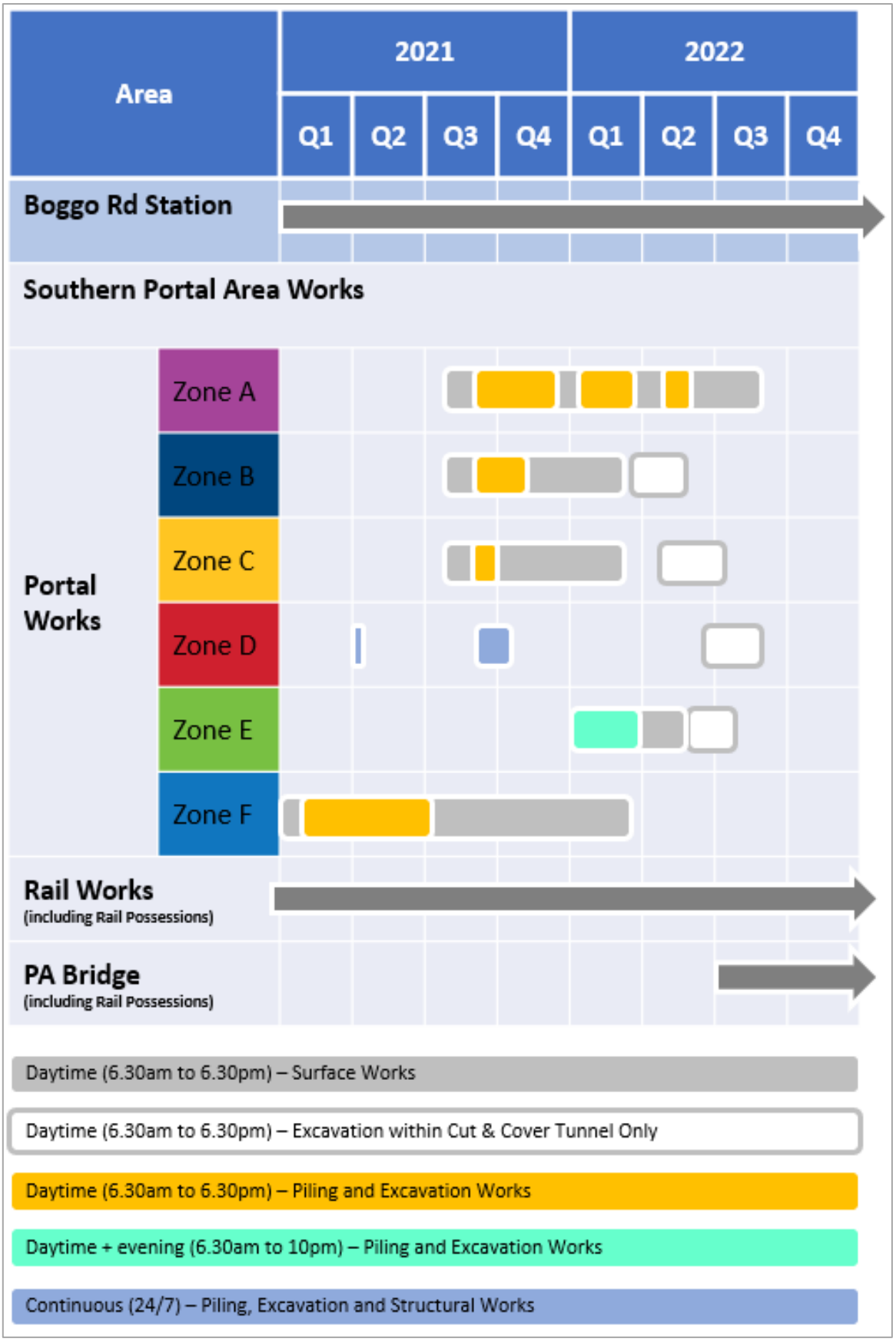


Figure 2: Estimated schedule of works

Works requiring a longer 24/7 rail possession are identified in Zone D. Zone D involves a 40 day closure of the 'middle road' track to undertake cut and cover construction activities. The estimated schedule and staging of works is provided below. The work stages as described will overlap.

- Excavation and piling (higher impact activity) 10 to 11 days
- Formwork, reinforcement and concrete works 21 to 22 days
- Track reinstatement 10 to 11 days

2. Overview of Evaluated Project

The CRR Project is a 10.2 km north-south rail line connecting Dutton Park to Bowen Hills with 5.9 km of tunnel under the Brisbane River and Central Business District (CBD). The CRR Project also includes new stations at Boggo Road, Woolloongabba, Albert Street, and Roma Street, with upgrades to the existing Exhibition Railway Station and stations from Fairfield to Salisbury.

Further information on the CRR Project and changes that have occurred since the CRR Project was originally evaluated in 2012 are detailed in:

- The Coordinator-General's evaluation report on the EIS dated 20 December 2012;
- The Coordinator-General's change report dated 9 June 2017;
- The Coordinator-General's change report dated 31 August 2018;
- The Coordinator-General's change report dated 13 March 2019;
- The Coordinator-General's change report dated 26 June 2019;
- The Coordinator General's change report dated 4 October 2019;
- The Coordinator-General's change report dated 8 May 2020;
- The Coordinator-General's change report dated 16 July 2020; and
- The Coordinator-General's change report dated 19 November 2020.

2.1 Environmental Management Framework

The Evaluated Project is managed by the Environmental Management Framework (EMF), which is required by the Coordinator-General's Imposed Conditions for the Project.

The EMF for the Project comprises a number of elements:

- The **Coordinator-General's Imposed Conditions** as set out in Appendix 1 - Project-wide Imposed Conditions - Cross River Rail Project (Imposed Conditions);
- The **Outline Environmental Management Plan (OEMP)** which is required by Imposed Condition 2 and approved by the Coordinator-General;
- The **Construction Environmental Management Plan (CEMP)** (including **sub-plans**) is required by Imposed Condition 4 for all Project Works, and must be endorsed by the Environmental Monitor; and
- **Specific CEMPs** for Project Works in Extended Work Hours.

The EMF is supported by:

- a compliance and reporting regime, as set out in Imposed Conditions 5 and 6;
- two specific entities required by the Imposed Conditions provide oversight for the implementation of the Imposed Conditions. Both these entities are required to be

independent, appropriately skilled and experienced and approved by the Coordinator-General. These entities are:

(i) the Environmental Monitor (Imposed Condition 7); and

(ii) the Community Relations Monitor (Imposed Condition 8).

Imposed Condition 2(a) requires an OEMP to be submitted to the Coordinator-General two months prior to the commencement of Project work and the OEMP to be approved by the Coordinator-General.

Imposed Condition 2(b) requires that the OEMP sets the environmental outcomes and performance criteria for the Project, together with possible mitigation measures, monitoring and reporting for each environmental element to achieve the environmental outcomes. The condition also requires specified sub-plans be included as part of the OEMP. These include for example:

- Construction Traffic Management Plan;
- Noise and Vibration Management Plan; and
- Air Quality Management Plan.

The Coordinator-General has approved the OEMP, consistent with Imposed Condition 2. The approved OEMP includes sub-plans that incorporate the environmental outcomes that must be met by the Project. The Approved OEMP is available on the CRR website: https://crossriverrail.qld.gov.au/planning-environment/environment-approvals/environmental-management/

Imposed Condition 4(a) requires that a CEMP must be developed by the Proponent and endorsed by the Environmental Monitor prior to the commencement of relevant Project work. That CEMP:

… must meet the requirements of Imposed Condition 4(c), including that it:

i. *Must incorporate the environmental outcomes and performance criteria of the Outline Environmental Management Plan;*

ii. *Must demonstrate that the Imposed Conditions (Construction) will be complied with during Relevant Project Work;*

iii. *Must incorporate mitigation measures to achieve the environmental outcomes where predictive studies indicate impacts beyond those provided for in the performance criteria;*

iv. *Must be implemented (Imposed Condition 4(d); and*

v. *Must be updated and endorsed by the environmental monitor for new or additional Relevant Project Work (Imposed Condition 4(g) and (g)(i).*

The Environmental Monitor must endorse the CEMP as consistent with the OEMP and complying with the Imposed Conditions (construction) (Condition 7(c)(viii). That endorsement cannot be given where the requirements are not met.

The endorsed CEMP contains the detailed mitigation measures that are implemented for relevant Project Works. There are already detailed CEMPs for the Project Works that are underway, including detailed sub-plans and site management plans. The CEMPs include detail of the construction works to be undertaken and program, mitigation measures, monitoring, auditing and reporting.

The existing CEMPs are available on the Delivery Authority's website at https://crossriverrail.qld.gov.au/planning-environment/environment-approvals/environmental-management/.

An overview of the Coordinator-General Imposed Conditions EMF is provided below in Figure 3: Coordinator-General Imposed Conditions Environmental Management Framework.

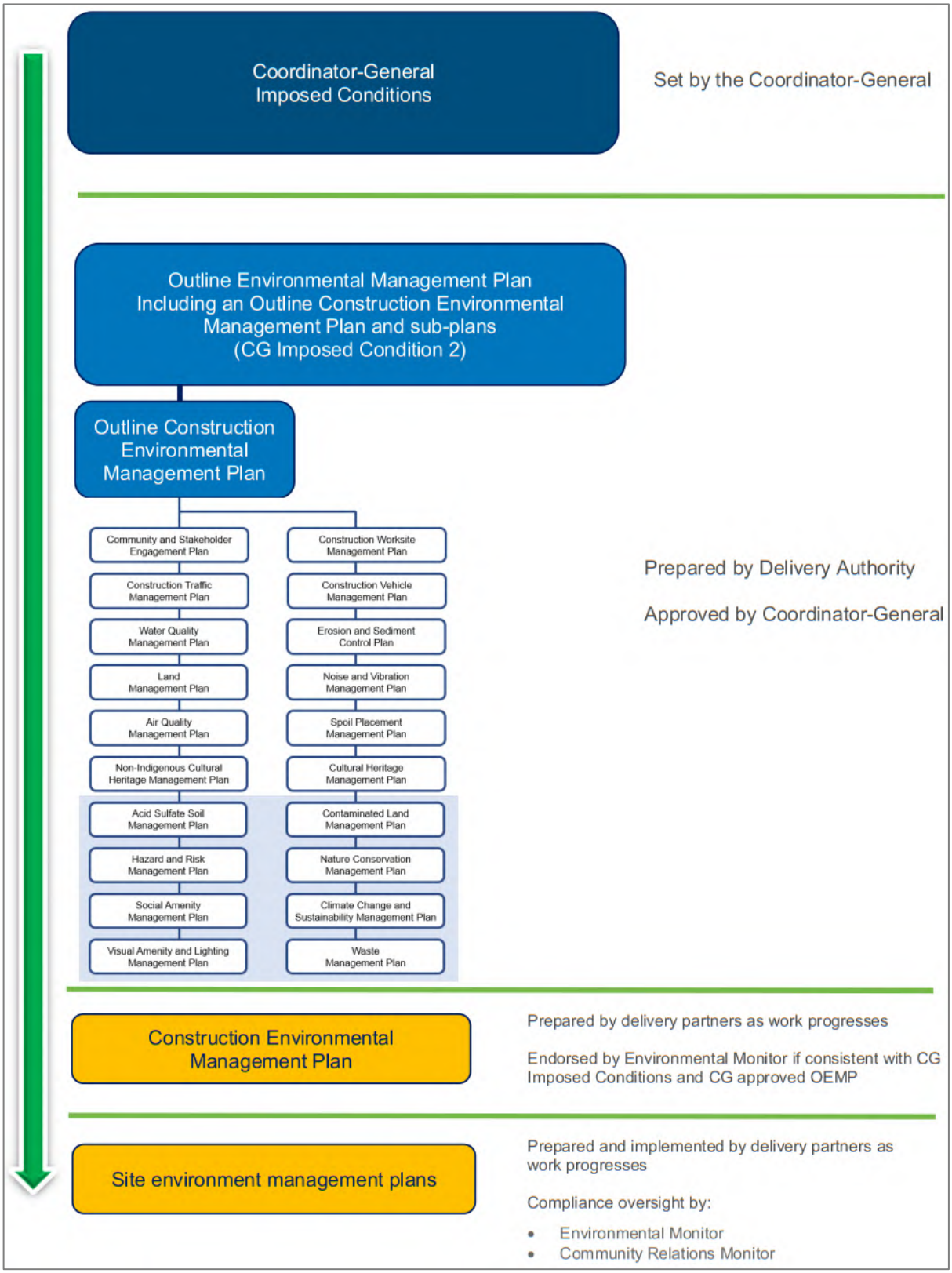


Figure 3: Coordinator-General Imposed Conditions Environmental Management Framework

2.2 Relationship to Environmental Management Framework

The Southern Portal Area Works will be undertaken subject to compliance with a specific CEMP that will be endorsed by the Environmental Monitor and must be consistent with the OEMP including by demonstrating how the environmental outcomes are achieved. In addition, Imposed Condition 11(c)(i), (ii) and (iii) requires specific mitigations for Directly Affected Persons impacted by works greater than 20dBA $_{(LA\ 10\ adj(15min))}$ above the relevant noise goal.

2.2.1 Directly Affected Persons Framework

The existing process for identifying and engaging with Directly Affected Persons is outlined below in Figure 4: Directly Affected Persons Framework.

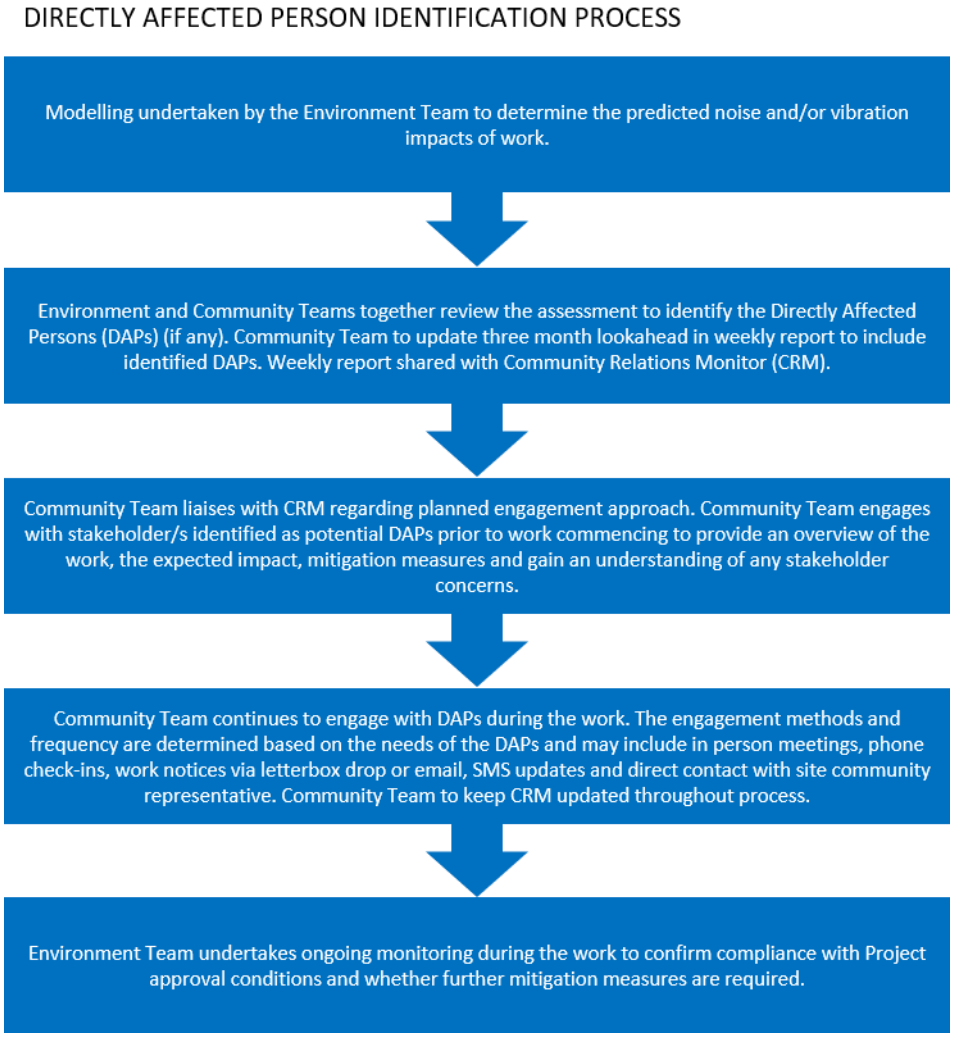


Figure 4: Directly Affected Persons Framework

The implementation of the Directly Affected Persons Framework does not require changes to the OEMP, CEMP or related sub-plans.

2.2.2 Amendment to drawings

The following drawings in Volume 2 are proposed to be amended:

CRRDA Drawing Number	Revision	Title	RfPC9 Changes	Drawing Changes
General Arrangement Drawings				
CRR-003-CD-GA-211	F	General Arrangement – Sheet 11	Yes	Updated with the design solution comprising changes to the Southern Portal alignment and configuration of freight and passenger lines in the Southern Portal Area.
CRR-003-CD-GA-212	E	General Arrangement – Sheet 12	Yes	Updated with the design solution comprising changes to the Southern Portal alignment and configuration of freight and passenger lines in the Southern Portal Area.
CRR-003-CD-GA-226	E	General Arrangement – Sheet 26	Yes	Updated with the design solution comprising changes to the Southern Portal alignment and configuration of freight and passenger lines in the Southern Portal Area.
CRR-003-CD-GA-231	C	General Arrangement – Sheet 31	Yes	Updated with the design solution comprising changes to the Southern Portal alignment and configuration of freight and passenger lines in the Southern Portal Area.
Property Impact Plans Drawings				
CRR-003-RP-GA-111	F	Property Impact Plans – Sheet 11	Yes	Changes to temporary requirement at Noble Street to allow for pedestrian access to Dutton Park Station (assessed during RfPC-4).
CRR-003-RP-GA-112	E	Property Impact Plans – Sheet 12	Yes	Changes to temporary land requirement at PAH to allow for heavy vehicle access leaving Southern Portal Area.
CRR-003-RP-GA-133	A	Property Impact Plans – Sheet 33	Yes	New drawing sheet added. Changes to temporary requirement at Peter Doherty Street and Annerley Road to allow for intersection changes as identified in the Traffic Impact Assessment.

Table 2: Amended drawings

3. Proposed Change to construction methodology - Southern Portal Area Works

3.1 Overview of Proposed Change

SDPWO Act requirement	Overview	
Proposed change	Change of construction methodology for the Southern Portal Area to a full cut and cover methodology.	
Reason/s	The cut and cover construction methodology has been adopted as it will result in: • reduced potential for ground settlement and overall construction risk • reduced impact on nearby infrastructure, including the busway, freight flyover and surface track and • appropriate management of the interfaces with utility infrastructure, including high voltage cabling	
Reference	**Effect**	**Mitigation**
Construction Noise (refer to Section 3.4.1)	As there is a change to construction methodology with a different construction duration, it is not possible to make a direct comparison with the Evaluated Project. There will be periods of increased works outside of standard hours with higher maximum noise levels compared to the Evaluated Project. However, the longer occupation of the rail corridor is expected to result in an overall decrease in the duration of higher intensity works.	The adjustment in the construction schedule allows greater flexibility for the existing mitigation measures under the EMF to be implemented. These measures include: • Noise and Vibration Management Plan • Imposed Condition 11 and • Community and Stakeholder Engagement Plan
Traffic Noise (refer to Section 3.4.2)	Increase in road traffic noise due to the Southern Portal may increase by around 3dBA along Peter Doherty Street.	The site specific Construction Traffic Management Plan (CTMP) sub-plan will include the permitted haulage routes between the adjacent arterial road networks and the sub-plan precinct.
Vibration (refer to Section 3.4.3)	Vibration levels remain below the vibration goals in Imposed Condition 11.	Mitigation measures will be consistent with the existing Noise and Vibration Management Plan.
Traffic (refer to Section 3.4.4)	Additional haulage is required via Peter Dohery Street, because of an additional 20 000 Bulk Cubic Meter (BCM) from zones A, B, C and D because of the changed construction methodology. An upgrade to the Peter Doherty Street/Annerley Road Intersection will be required to facilitate the additional haulage vehicles.	Managed through: • update to OEMP Haulage Management sub-plan (see Appendix 1); • development CTMP in consultation with Brisbane City Council (BCC) – to be endorsed prior to works proceeding.
Air Quality (refer to Section 3.4.5)	The predicted concentrations and deposition rates for all pollutants and averaging periods are below the applicable air quality objective at all assessment locations	Mitigation measures will be consistent with the existing Air Quality Management Plan.

Does the current EMF need to be revised to manage the Proposed Change?	No - 3.4.1.4 (Construction Noise) No - 3.4.2.4 (Traffic Noise) No - 0 (Vibration) Yes - 3.4.4.4 (Traffic) No - 3.4.5.4 (Air Quality)

Affected zones	A, B, C, D, E, F

3.2 Description of Proposed Change

The Southern Portal Area Works under the evaluated project comprised a trough dive structure, a cut and cover structure, and a mined section. These construction elements are shown at Figure 5.

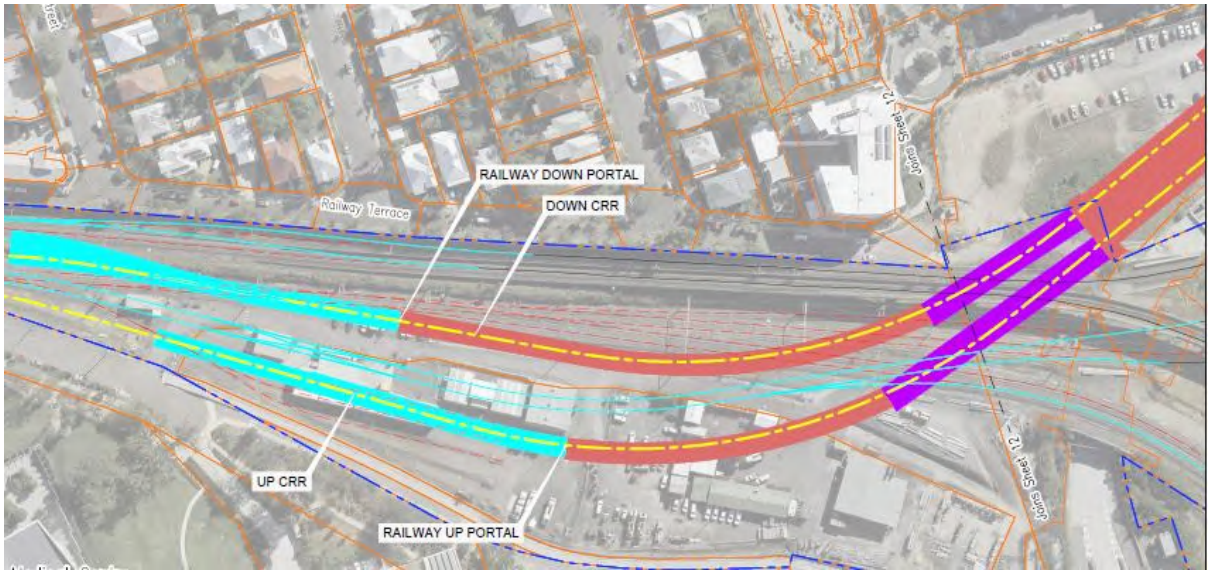


Figure 5: Evaluated Project- Southern Portal Area Works

The Proposed Change is that construction of part of the Southern Portal Area Works be changed from a partially mined, partial cut and cover methodology, to a full cut and cover methodology for that area of the Southern Portal Area Works that was previously mined. The Proposed Change is shown in Figure 6, with construction of the Proposed Change programmed to occur generally as set out in Figure 2: Estimated schedule of works.

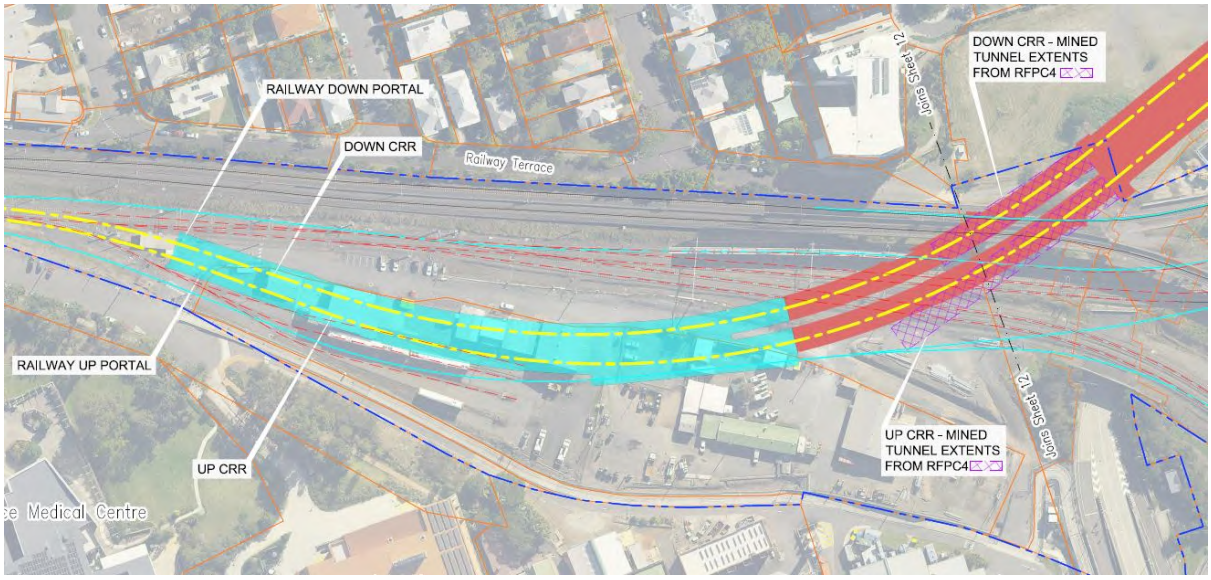


Figure 6: Proposed Change - Southern Portal Area Works

The Proposed Changes to the construction methodology are also outlined in Table 3:

	Original (RfPC-4)			Current (RfPC-9)			Difference		
	Tunnel MC01	**Tunnel MC02**	**Total (both tunnels)**	**Tunnel MC01**	**Tunnel MC02**	**Total (both tunnels)**	**Tunnel MC01**	**Tunnel MC02**	**Total (both tunnels)**
Mined	75m	110m	**185m**	-	-	**-**	-75m	-110m	**-185m**
Cut & cover (incl trough structure)	350m	275m	**625m**	380m	380m	**760m**	+30m	+105m	**+135m**
Total	**425m**	**385m**	**810m**	**380m**	**380m**	**760m**	**-45m**	**-5m**	**-50m**

Table 3: Proposed Changes to construction methodology

3.3 Reason for the Proposed Change

The reason for the Proposed Change is to optimise the track geometry and layout of infrastructure within the Southern Portal Area to resolve complex construction interfaces and optimise rail operational outcomes, which requires a consequential change to the construction methodology for part of the Southern Portal infrastructure.

Since the RfPC4 submission, further detailed planning has been undertaken on the Southern Portal Area. The planning considered the level of congestion within the rail corridor, which comprises multiple commuter rail lines servicing the Gold Coast and Cleveland regions along with freight rail lines to the Port of Brisbane, the Boggo Road Busway that passes underneath the rail corridor and a grade separated rail freight flyover crossing above the rail corridor.

These key features were then overlaid with the multiple intersections with utilities (high voltage power, stormwater and sewer) which need to be upgraded and/or relocated throughout the various stages of the work. Given the complexity of this area, the Project faced a number of technical challenges, particularly with rail alignment, rail geometry and utility constraints. The design has been further

developed to resolve these technical issues and provides for a construction methodology that also resolves ground stability construction risks within the rail corridor.

The changes to track geometry also provide operational benefits to the Project, with the increased track curvature resulting in reduced wheel squeal (and therefore reduced operational noise), as well as reduced maintenance requirements for both track and rollingstock as a result of less wear.

The changed construction methodology will result in:

- reduced potential for ground settlement within the operational rail corridor;
- reduced impact on nearby infrastructure, including the busway, freight flyover and surface track; and,
- appropriate management of the interfaces with utility infrastructure, including high voltage cabling, reducing construction risks.

3.4 Technical areas

3.4.1 Construction noise

3.4.1.1 Evaluated Project – Construction noise

Imposed Condition 11

Imposed Condition 11 Construction Noise and Vibration provides that:

a) Project Works must aim to achieve the Project noise goals for human health and wellbeing presented in Table 2 at a Sensitive Place.

Table 2 Imposed Conditions - Noise goals (internal) for Project Works

	Monday - Saturday 6.30am - 6.30pm	**Monday - Friday 6.30pm - 10.00pm (Gabba, CBD only)**	**Monday - Saturday 6.30pm - 6.30am Sundays, Public Holidays**	**For Blasting Monday - Saturday 7.30am - 4.30pm only**
Continuous ***($LA_{eq\ adj}$) (1hr)***	*AS 2107* *Maximum design level*	*40 dBA* *$LA_{eq\ adj\ (1hr)}$*	*35 dBA* *$LA_{eq\ adj\ (1hr)}$*	
Intermittent ***($LA_{10\ adj}$) (15min)***	*AS 2107* *Maximum design level + 10dBA*	*50 dBA* *$LA_{10,\ adj}$*	*42 dBA* *$LA_{10\ adj}$*	*130 dB Linear Peak*

Notes:

All goals are internal noise levels for human health and well-being outcomes.

Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in the relevant State guideline, such as the Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 (currently under review).

Adjustments (adj) will be applied as outlined in the Department of Environment and Science Noise Measurement Manual Version 4 August 2013.

b) During construction monitor and report on noise and vibration in accordance with the Noise and Vibration Management Plan, a sub-plan of the Construction Environmental Management Plan.

c) Project Works predicted to or monitored as generating noise levels more than 20dBA (LA 10 adj (15 min)) above the relevant goal in Table 2. are authorised to occur in a locality only:

i. *when advance notification and consultation has been undertaken with Directly Affected Persons or potentially Directly Affected Persons about the particular predicted impacts and the approach to mitigation of such impacts;*
ii. *where mitigation measures addressing the particular predicted or measured impacts have been developed on a 'case by case' basis in consultation with Directly Affected Persons;*
iii. *where the mitigation measures are incorporated in a mitigation register and implemented prior to undertaking the Project Works;*
iv. *between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day with the respite only applying where generating noise levels more than 20dBA LA10 adj (15 min) at a Sensitive Place that is occupied;*

d) *Condition 11 (c)(iv) does not apply to Extended Hours Works.*

Noise Sound (or noise) consists of minute fluctuations in atmospheric pressure capable of evoking the sense of hearing. The human ear responds to changes in sound pressure over a very wide range. The loudest sound pressure the human ear responds to is ten million times greater than the softest. The decibel (dB) scale reduces this ratio to a more manageable size using a logarithmic scale.

The symbol LA represents A-weighted sound pressure level. Noise level descriptors are as follows:

- LA_{max} – The maximum A-weighted noise level associated with a sampling period;
- LA_{1} – The A-weighted noise level exceeded for 1% of a given measurement period. This parameter is often used to represent the typical maximum noise level in a given period;
- LA_{10} – The A-weighted noise level exceeded 10% of a given measurement period and is utilised normally to characterise average maximum noise levels;
- LA_{eq} – The A-weighted average noise level is defined as the steady noise level that contains the same amount of acoustical energy as a given time-varying noise over the same measurement period; and
- LA_{90} – The A-weighted noise level exceeded 90% of a given measurement period and is representative of the average minimum background noise level (in the absence of the source under consideration), or simply the 'background' level.

Outline Environmental Management Plan – Noise and Vibration

Appendix Q of the OEMP outlines the requirements for the Noise and Vibration Management Plan (NVMP) and includes environmental outcomes and performance criteria. The OEMP includes the following environmental outcomes relevant to noise that are to be achieved for the Project:

- Construction activities are designed, planned and implemented to maintain human health and wellbeing, to the extent reasonable and practicable;
- Construction activities generally are designed, planned and implemented to maintain daily patterns of activity, and to minimise sleep disturbance at night; and
- Construction activities are managed to avoid vibration-related structural damage on all properties, to minimise vibration-related impacts on properties and sensitive plant and equipment.

Noise and Vibration Management Plan

The NVMP forms part of the CEMP. The NVMP describes how potential noise and vibration impacts during construction of the Project will be managed.

The objectives of the NVMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It also:

- nominates the Project's monitoring and reporting requirements in relation to noise and vibration;
- manages the impact on the local community in terms of noise and vibration from construction works; and
- provides for monitoring to measure the effectiveness of management and mitigation measures.

3.4.1.2 Effect of the Proposed Change – Construction noise

A Construction Noise Mitigation Report (Volume 3, Attachment A) has been prepared in accordance with the requirements in the OEMP, CEMP, NVMP and Imposed Condition 4(c)(ii), which require that predictive studies be undertaken of environmental impacts from construction activities '……which have regard to the scale, intensity, location and duration of construction works, and location of Directly Affected Persons'.

The Construction Noise Mitigation Design Report assessed the effects of construction noise and compared these effects to the Evaluated Project. It contains the following:

- outline of methodology including inputs and assumptions and noise goals (section 4.1 of the Construction Noise Mitigation Design Report found at Volume 3 of this RfPC);
- predicted construction noise levels (section 4.2 of the Construction Noise Mitigation Design Report found at Volume 3 of this RfPC); and
- recommended acoustic design measures (section 5 of the Construction Noise Mitigation Design Report found at Volume 3 of this RfPC).

Predicted construction noise levels

The noise assessment undertaken in the Construction Noise Mitigation Design Report:

- modelled the construction activities described within this RfPC; and
- has processed modelled noise predictions for the duration of the works at the nearest noise sensitive receivers.

The Construction Noise Mitigation Design Report assessed the predicted construction noise levels at 71 of the nearest sensitive receptors for:

- Daytime (6.30am to 6.30pm); and
- Evening and night works (6.30pm to 6.30am).

The results of this assessment are presented in Appendix C of the Construction Noise Design Report found at Volume 3, Attachment 1 of this RfPC.

Table 4 presents a summary of predicted construction noise levels at four selected noise sensitive receivers located close to the works zones; being:

- 41 Peter Doherty Street (Leukaemia Foundation);
- Rawnsley Street (residential);
- Railway Terrace (residential – BOG_1)); and
- Railway Terrace (residential – DUT_3).

The data has been extracted from Tables C6A to C6F in Appendix C of the Construction Noise Mitigation Design Report found at Volume 3, Attachment A of this RfPC.

The noise presented in Table 4 is a maximum (peak) predicted level within the respective stage. The maximum (peak) level of predicted noise is not expected to be generated for the entirety of the stage

and is based on a 'worst case' scenario whereby all equipment is running simultaneously. The mitigation of these noise levels and sources which aims to reduce the predicted noise levels through various noise mitigation and management strategies is further discussed in Section 3.4.1.3 of this RfPC.

For example:

- works in zone F are estimated to be scheduled for 11 months overall, during daytime only; and
- works in zone D include a 40 day period of rail possession including evening and night time surface works.

During this time:

- the maximum (peak) noise level as modelled will not be continuous during the work periods; and
- the maximum (peak) predicted noise is determined based on a 'worst case' scenario (for example, where all plant items are operating concurrently) which is a conservative assessment of construction impacts. Therefore, noise monitoring will be conducted during construction to validate the modelling and confirm actual noise levels.

The works are regulated by Queensland Rail (QR) rail possessions that are designed to minimise disruption to the rail network and allow for safe access to the rail corridor. The works can only be undertaken during the periods of approved rail possessions which will include evening and night works.

Table 4 shows where noise levels may be above the Construction Noise Goals. The Construction Noise Goals are based on Note 2 of Condition 11 where modelling has applied recommended facade corrections to determine an external noise goal. This means that where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in the relevant State guideline, such as the Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 have been applied.

The actual noise level is dependent on:

- the construction stage and the type of construction activities being undertaken;
- the period of work;
- the type of receiver; and
- proximity of the nearest receiver to the works.

Key points from Table 4: Range of predicted construction noise levels at 4 selected receivers for each construction stage are:

- construction noise levels may be above the Construction Noise Goals by up to 20dBA (Stage 2) during daytime and up to 18dBA (Stage 4 Roof) during Out of Hours Work at the Leukaemia Foundation;
- construction noise levels may be above the Construction Noise Goals by up to 24dBA (Stage 2) during daytime and up to 21dBA (Stage 4 Roof) during Out of Hours Work at Rawnsley Street;
- construction noise levels may be above the Construction Noise Goals by up to 27dBA (Stage 2) during daytime and up to 27dBA (Stage 4 Roof) during Out of Hours Work at one of the closest receivers (Railway Terrace (BOG_1)); and
- construction noise levels may be above the Construction Noise Goals by up to 21dBA (Stage 1) during daytime and up to 13 dBA (Stage 1, 2, 4 and 5) during Out of Hours Work at Railway Terrace (DUT_3).

NCA	Representative Location	Receiver Type	Construction Noise Goals (CNGs), dBA				Predicted Noise Level Range, dBA		Potential noise levels above Imposed noise goals, dBA	
			Day ($L_{eq\ 15min}$)	Day ($L_{10\ 15min}$)	OOH ($L_{eq\ 15min}$)	Night (L_{max})	Day ($L_{eq\ 15min}$)	OOH ($L_{eq\ 15min}$)	Day ($L_{eq\ 15min}$)	OOH ($L_{eq\ 15min}$)
STAGE 1: 11 Months (construction works within zone F)										
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	50 - 76	28 - 52	14	-
BOG_1	Rawnsley Street	Residential	47	57	42	49	57 - 70	39 - 51	23	9
BOG_1	Railway Terrace	Residential	47	57	42	49	57 - 72	53 - 65	25	23
DUT_3	Railway Terrace	Residential	47	57	42	49	53 - 68	34 - 48	21	6
STAGE 2: 3 Months (construction works within zones B, C, D & F)										
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	56 - 82	52 - 70	20	13
BOG_1	Rawnsley Street	Residential	47	57	42	49	54 - 71	47 - 60	24	18
BOG_1	Railway Terrace	Residential	47	57	42	49	53 - 74	46 - 64	27	22
DUT_3	Railway Terrace	Residential	47	57	42	49	50 - 66	41 - 55	19	13
STAGE 3: 12 Months (construction works within zones A, B & C)										
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	55 - 80	44 - 62	18	5
BOG_1	Rawnsley Street	Residential	47	57	42	49	51 - 68	40 - 53	21	11
BOG_1	Railway Terrace	Residential	47	57	42	49	51 - 72	40 - 55	25	13
DUT_1	Railway Terrace	Residential	47	57	42	49	46 - 60	35 - 49	13	7
STAGE 4 Roof: 3 Months (construction works within zones A, B, C, D & E)										

NCA	Representative Location	Receiver Type	Construction Noise Goals (CNGs), dBA				Predicted Noise Level Range, dBA		Potential noise levels above Imposed noise goals, dBA	
			Day ($L_{eq\ 15min}$)	Day ($L_{10\ 15min}$)	OOH ($L_{eq\ 15min}$)	Night (L_{max})	Day ($L_{eq\ 15min}$)	OOH ($L_{eq\ 15min}$)	Day ($L_{eq\ 15min}$)	OOH ($L_{eq\ 15min}$)
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	51 - 79	49 - 75	17	18
BOG_1	Rawnsley Street	Residential	47	57	42	49	50 - 65	47 - 63	18	21
BOG_1	Railway Terrace	Residential	47	57	42	49	50 - 72	46 - 69	25	27
DUT_3	Railway Terrace	Residential	47	57	42	49	43 - 57	41 - 55	10	13
STAGE 4 Excavation: 3 Months (construction works within zones A, B, C, D & E)										
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	55 - 81	52 - 74	19	17
BOG_1	Rawnsley Street	Residential	47	57	42	49	56 - 69	52 - 62	22	20
BOG_1	Railway Terrace	Residential	47	57	42	49	57 - 72	53 - 65	25	23
DUT_3	Railway Terrace	Residential	47	57	42	49	48 - 60	44 - 55	13	13
STAGE 5: 5 Months (construction works within zones A, B, C, D & E)										
BOG_1	41 Peter Doherty Street (Leukaemia Foundation)	Residential	62	72	57	59	38 - 65	34 - 55	3	-
BOG_1	Rawnsley Street	Residential	47	57	42	49	41 - 53	39 - 51	6	9
BOG_1	Railway Terrace	Residential	47	57	42	49	40 - 58	39 - 50	11	8
DUT_3	Railway Terrace	Residential	47	57	42	49	36 - 49	35 - 48	2	6

Table 4: Range of predicted construction noise levels at 4 selected receivers for each construction stage

3.4.1.3 Mitigation measures – Construction noise

Various noise mitigation and management strategies will be put into place to review the predicted noise levels. At some receiver locations, noise levels may be above the Construction Noise Goals and there are no physical mitigation measures that can be applied to achieve the Construction Noise Goals. The mitigation will be determined in consultation with the affected receivers, in accordance with Imposed Condition 9, and, if triggered, Imposed Condition 11(c).

Identified below are the key noise mitigation and management strategies to manage construction noise.

Noise mitigation and management

The following standard noise control measures will be considered through the CEMP:

Control type	Control measure	Typical use
At-Source Control Measures	Noise control kits	Plant that is brought to site for regular use should meet the sound power limits identified in Table C1 (refer to Appendix C). Where plant is above the Construction Noise Goals then the plant may require installation of 'noise control kits' to comply with the noise limits in Table C1. Such 'noise control kits' comprise: • high performance 'residential-grade' exhaust mufflers; • additional engine cowling / enclosure lined inside with sound absorbent industrial-grade foam; and • air intake and discharge silencers / louvres. The need to fit 'noise control kits' onto the identified plant, will be confirmed once each plant item is tested prior to its regular use on site.
	Limit equipment in use	Only the equipment necessary during each stage of the works will be used.
	Limit activity duration	Any equipment not in use for extended periods shall be switched off. For example, heavy vehicles should switch engines off when not in use.
	Use and siting of plant	Avoid/ limit simultaneous operation of noisy plant and equipment within discernible range of a sensitive receiver. Direct noise-emitting plant away from sensitive receivers where practicable. Locate fixed location plant items as far from sensitive receivers as practicable.
	Equipment selection	Use quieter and less noise/ vibration emitting construction methods where feasible and reasonable.
	Non-tonal reversing alarms	Alternative reverse alarms, such as 'quackers' will be installed on plant and equipment, where practicable.
	Site inductions & Toolbox Talks	All employees, contractors and subcontractors will receive a Project induction. The environmental component may be covered in toolboxes and should include: • location of nearest sensitive receivers • relevant Project-specific and standard noise and vibration mitigation measures; • permitted hours of work; • OOHW Procedure and Form and Location of construction employee parking areas.

Control type	Control measure	Typical use
Noise Management Measures	Community consultation	Inform community of construction activity and potential impacts.
	Behavioural practices	No swearing or unnecessary shouting or loud stereos/radios on site. No dropping of materials from height, throwing of metal items and slamming of doors.
	Noise monitoring	Noise monitoring should be carried out as detailed in Section 5.3.3 of the Construction Noise Mitigation Design Report.

Table 5: Site noise control measures

Plant and equipment

The performance requirements for specific items of plant and equipment (in particular, concrete pumps, scrubbers and gensets) are specified in Table C5 of Appendix C of the Construction Noise Mitigation Design Report found in Volume 3, Attachment A of this RfPC.

Some plant may require additional attenuation (e.g. residential grade muffler, acoustic attenuator or partial/full enclosure) to ensure specified noise level can be achieved on site. These include:

- non-tonal reversing beepers and warning alarms (or an equivalent mechanism) must be fitted to all mobile plant that will be used on site; and
- truck air brake silencers are to be installed correctly and fully operational for any heavy vehicles operating in the Evening (6pm to 10pm) and Night (10pm to 6.30am).

Attended noise monitoring

Attended noise monitoring can be undertaken to record noise levels resulting from construction works, subject to obtaining the property owner/occupier's consent to access the property (where required).

Residual impacts

At some receiver locations, noise levels may be above the Construction Noise Goals after all reasonable and feasible mitigation measures have been incorporated into the design. Where there are no further physical mitigation measures that can be applied to achieve the Construction Noise Goals, and if internal noise levels are still above the noise goals specified in the Imposed Conditions, then alternative mitigation and construction noise management may need to be considered, including:

- advance notification (e.g. letter box drops and telephone calls); and
- developing alternative mitigations in consultation with directly affected persons.

Further mitigation measures are detailed in the NVMP and may include changing operational procedures at evening/night to reduce noise impacts.

Complaints handling

All noise complaints received and responded to will be managed in accordance with procedures set out in the CEMP.

The CRR Community Team also operate a 24-hour construction complaints line (1800 010 875). Enquiries and/or complaints may also be received through the CRR Project email (info@crossriverrail.qld.gov.au).

3.4.1.4 Evaluation against current Environmental Management Framework

EMF Element	Change required (Y/N)	Description of Change
Imposed Condition 11	N	N/A
OEMP sub-plan – Noise and Vibration Management Plan	N	N/A
CEMP	N	N/A
CEMP sub-plan - Noise and Vibration	N	N/A

Table 6: Construction noise - evaluation against current EMF

3.4.2 Traffic noise

3.4.2.1 Evaluated Project – Traffic noise

The EIS at section 2.2.6 states:
Where the construction phase of CRR is adding heavy vehicles to the existing road network, it is appropriate to consider the incremental change in noise levels due to the changes in traffic volume. A change of up to 3 dBA in the level of a dynamic noise, such as passing vehicles is difficult for most people to detect, whilst a 3 dBA to 5 dBA change corresponds to a small but noticeable change in loudness.

Outline Environmental Management Plan – Noise and Vibration

Appendix Q of the OEMP outlines the requirements for the NVMP and includes the objects and the required outcomes. This includes the environmental outcomes in relation to noise and vibration that are to be achieved for the Project as outlined above at Section 3.4.1.1 of this RfPC.

CEMP sub-plan - Noise and Vibration

The NVMP forms part of the CEMP. The NVMP describes how the potential noise and vibration impacts during construction of the Project will be managed and minimised.

The objectives of this NVMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to noise and vibration;
- manage the impact on the local community in terms of noise and vibration from construction works; and
- monitor the effects of management and mitigation measures.

3.4.2.2 Effect of the Proposed Change – Traffic noise

A Construction Traffic Noise Assessment (Volume 3, Attachment B to this RfPC) has been prepared in accordance with the requirements in the OEMP, CEMP, NVMP and Imposed Condition 4(c)(ii), which require that predictive studies and assessment of impacts have regard to the scale, intensity, location and duration of construction works, and location of Directly Affected Persons.

The Construction Traffic Noise Assessment (Volume 3, Attachment B to this RfPC) contains the following:

- existing traffic volumes (Section 3);

- predicted construction traffic volumes (Section 4); and
- assessment of traffic noise (Section 5).

Predicted traffic noise levels

Predicted changes in traffic noise are based on a method developed by the United Kingdom Department of Transport entitled 'Calculation of Road Traffic Noise (1988)' known as the CoRTN (1988) method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board (ARRB) and as a result it is recognised and accepted by the Department of Transport and Main Roads (DTMR).

This is the same calculation methodology used by the EIS, which states:

[T]he effect of construction related heavy vehicle traffic on the noise emission from roadways has been assessed by calculating how the additional truck traffic would alter the $L_{A10(12hour)}$ level of noise emission from roadways using the CoRTN prediction algorithms. For the purpose of this analysis, the $L_{A10(12hour)}$ is the average L_{A10} traffic noise level between the hours of 6:30am and 6:30 pm.

The predicted increase in traffic noise on all assessed roads is detailed in Table 7 below.

Worksite	Road segment	Predicted increase noise level, dBA		
		$L_{A10\ (12hour)}$ (6.30am to 6.30pm) Day	$L_{A10\ (18hour)}$ (6am to 12midnight) Day and Evening	$L_{A10\ (1hour)}$ (12midnight to 6am) Night
Southern Portal	**Annerley Road**	+0.1	+0.1	+0.3
	Boggo Road	0	0	0
	Peter Doherty Street	+3	+2.8	+3.3
	Joe Baker Street	+0.2	+0.3	+0.3

Table 7: Predicted increase in traffic noise due to Southern Portal Area only

Table 7 shows that the predicted increase in road traffic noise levels due to the Southern Portal Area Works will be around 3dBA for the overall $L_{A10\ (12hour)}$, $L_{A10\ (18hour)}$ and $L_{A10\ (1hour)}$ noise parameters along Peter Doherty Street, when compared with existing June 2020/July 2020 traffic volumes.

The EIS states in section 2.2.6 Construction Road Traffic Noise, *a change of up to 3 dBA in the level of a dynamic noise, such as passing vehicles is difficult for most people to detect.* The predicted change in traffic noise is insignificant and will have minimal to no impact on Directly Affected Persons.

3.4.2.3 Mitigation measures – Traffic noise

The traffic noise effects will be managed in accordance with the current EMP.

This will include development of a site-specific CTMP sub-plan for the Southern Portal Area (CTMP Haulage Management sub-plan) to detail spoil haulage routes to and from the Southern Portal Area. This CTMP Haulage Management sub-plan will be prepared in consultation with the relevant road authority prior to works commencing.

The CTMP Haulage Management sub-plan will include the permitted haulage routes between the adjacent arterial road networks and the sub-plan precinct. Spoil haulage routes, to and from the sub-plan precinct will be documented within the CTMP Haulage Management sub-plan.

This will align with requirements already imposed under the OEMP which are to:

- ensure the Project's impacts on the community and stakeholders with respect to traffic and transport are minimised; and
- monitor the effects of management and mitigation measures. Under current conditions the CTMP (and sub-plans) must be periodically reviewed to address changes in the Project's construction programme and methodology, including modification to delivery schedules, delivery routes and spoil haulage route changes. Relevantly, this includes:
    - proposed access to worksites, with local or minor roads only used where unavoidable to access a Project worksite;
    - processes for advance notice to Directly Affected Persons and local communities within the vicinity of the spoil haulage routes and worksite accesses;
    - local traffic management measures developed in consultation with BCC for key intersections at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road; and
    - relevant specific traffic management measures developed in consultation with other key stakeholders, including QR, DTMR and BCC.

There is also a requirement for Project Works to 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 BCC, QR, DTMR (Metro/Translink) about changes in pedestrian and cycle paths required to facilitate Project Works.

As identified in Section 3.4.5 of the NVMP, increases in construction traffic noise on Peter Doherty Street will exceed 2dBA, and therefore the mitigation measures discussed in Section 3.2 of the NVMP will be applied to manage those impacts, including:

- initiating on-going and early consultations with potentially Directly Affected Persons to notify them of the proposed works and to determine suitable mitigation measures;
- maintaining plant and machinery in good working order, in accordance with the management system; and
- other best practice measures, such as limiting compression braking, which will also contribute to ensuring the noise impacts of Heavy Vehicle traffic on surrounding streets are minimised.

3.4.2.4 Evaluation against current Environmental Management Framework

EMF Element	Change required (Y/N)	Description of Change
Imposed Condition 11	N	N/A
OEMP sub-plan – Noise and Vibration Management Plan	N	N/A
CEMP	N	N/A
CEMP sub-plan - Noise and Vibration	N	N/A

Table 8: Traffic noise - evaluation against current EMF

3.4.3 Vibration

3.4.3.1 Evaluated Project – Vibration

Imposed Condition 11 – Noise and Vibration

The Coordinator General's Imposed Condition 11 – Construction Noise and Vibration states the following:

e) *Project Works must aim to achieve the construction vibration goals in Table 3.*

Table 3. The construction vibration goals

Receiver Type	Cosmetic Damage			Human Comfort (mm/s PPV)		Sensitive building contents (mms/PPV)
	Continuous Vibration	Transient Vibration	Blasting Vibration	Day	Night	
Residential	According to BS7385 reduced by 50%[4]	According to BS7385	50[1]	According to AS2670	0.5[2]	
Commercial	According to BS7385 reduced by 50%[4]	According to BS7385	50	According to AS2670	-	0.5[3]
Heritage Structures	2	-	10	-	-	-

Notes:

1. All residential receivers in the vicinity of the Project blasting sites are regarded as reinforced or framed structures (i.e. BS7385)

2. Residential sleep disturbance

3. Equipment specific vibration criteria are required for highly sensitive equipment (i.e. electron microscopes, MRI systems or similar), as part of future site-specific detailed investigations

4. If resonance is present, or if investigation to detect resonance were not able to be undertaken due to a lack of access

f) *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.*

g) *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 with the respite only applying where generating vibration levels more than those levels nominated in Table 3 (Human Comfort) at a Sensitive Place that is occupied; 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.*

Outline Environmental Management Plan

The OEMP details in Appendix Q the objectives of the NVMP, which include:

- nominate the Project's monitoring and reporting requirements in relation to noise and vibration;
- manage the impact on the local community in terms of noise and vibration from construction works; and
- monitor the effects of management and mitigation measures.

The environmental outcomes to be achieved in relation to noise and vibration for the Project are:

- construction activities are designed, planned and implemented to maintain human health and wellbeing, to the extent reasonable and practicable.
- construction activities generally are designed, planned and implemented to maintain daily patterns of activity, and to minimise sleep disturbance at night; and
- construction activities are managed to avoid vibration-related structural damage on all properties, to minimise vibration-related impacts on properties and sensitive plant and equipment.

The Performance Criteria specified in the OEMP specific to vibration are:

- Project Works must be designed, planned and implemented to achieve the vibration goals specified in Imposed Condition 11 to the extent reasonable and practicable.
- where predictive modelling, conducted prior to the commencement of works in a locality, indicates that the vibration goals are likely to be exceeded:
    - potentially Directly Affected Persons must be identified and consulted regarding the potential impacts and the mitigation measures proposed to address the impacts
    - effective mitigation measures must be developed in consultation with potentially Directly Affected Persons on a 'case by case' basis prior to commencement of the works
    - agreed mitigation measures are included in a mitigation register and implemented prior to undertaking relevant Project Works.
- any discussions with Directly Affected Persons must involve the community and stakeholder relations team; and
- for sensitive building contents, predictive modelling must take into account the manufacturer's specifications for tolerance to vibration and adopt such specifications as goals for construction to avoid or minimise impacts on the normal operation of such equipment.

Noise and Vibration Management Plan

The NVMP addresses impacts and associated mitigation and management measures for noise and vibration impacts arising from the remaining phases of construction. As stated above, it also:

- nominates the Project's monitoring and reporting requirements in relation to noise and vibration;
- manages the impact on the local community in terms of noise and vibration from construction works; and

- monitors the effects of management and mitigation measures.

In relation to the Southern Portal Area and the Boggo Road worksite, the NVMP notes a number of activities as having potentially the greatest noise impact on the surrounding receivers, including the impacts of heavy vehicle movements.

3.4.3.2 Effect of the Proposed Change – Vibration and ground-borne Noise

As part of the construction of the CRR Project, a NVMP has been developed. As part of the implementation of this NVMP, individual Construction Noise and Vibration Impact Assessments (CVRNIAs) are necessary for each worksite as part of the main works undertaken, as outlined in section 1.2 of NVMP.

A CVRNIA was undertaken to assess the impact of the proposed construction methodology change for the Southern Portal Area Works. This CVRNIA covers construction works for the hammering, boring, ground support, excavation activities for the Southern Portal Area Works. The full CVRNIA is included in Volume 3 of this RfPC.

Vibration and Ground-borne noise modelling has been completed for key locations and for the Southern Portal Area Works. The assessment is limited to those activities that could induce measurable levels of vibration and/or ground-borne noise. The assessments have been based on three dimensional models that account for equipment types and ground conditions. Please refer to Section 5 of the CVRNIA included in Volume 3 of this RfPC for full Vibration Impact Methodology and Modelling.

Variation from Evaluated Project

The Southern Portal Area Works differ from the Evaluated Project by:

- re-aligning the dive structures towards the east by approximately 30 metres; and
- extending the portal area further towards the north.

In broad terms, the Southern Portal Area Works are nearer to the PA Hospital support services buildings (eg. laundry, power plant, workshops) and in some sections further from the residential properties along Railway Terrace by up to 15 metres. The Leukaemia Foundation ESA Village on the western side of the railway corridor is closer to northern part of the works.

The planned construction methods involve:

- bored piles and vibratory sheeting for ground stabilisation; and
- varying size excavators with hydraulic hammers for excavating the competent rock material within the dive structure.

The changed construction methodology results in insignificant additional vibration over those levels identified for RfPC4 and remain compliant with Imposed Condition 11. Table 9 lists the modelled impacts at the three representative locations, including the PA TRI building, the Leukaemia Foundation ESA Village building and the EcoSciences building, and how these compare with the evaluated RfPC1 design. Comparison was made with the previously evaluated RfPC1 as it was the last time a similar cut and cover methodology was evaluated.

Both vibration and ground-borne noise levels predicted in this RfPC show an increase in levels compared to RfPC1 but are still below the nominated goals for the Project.

Location	Construction Method	Ground-borne noise and vibration goal		RfPC9** (Stage 2 Excavation)	
		Vibration PPV (mm/s)	*External ground-borne noise (dBA)* $LA_{eq\ 1hr}$	*Vibration PPV (mm/s)*	*External ground-borne noise (dBA)* $LA_{eq\ 15min}$
ESA Village	Excavation with rock-breaker	25	57	0.5	55
Railway Terrace	Excavation with rock-breaker	10	57	0.25	45
PA Hospital	Excavation with rock-breaker	25	57	<0.25	35
** RfPC9, Volume 3, CRR-VMP-Southern Portal, Stage 2 excavations (40T excavator with 3300kg hydraulic hammer)					

Table 9: Ground-borne noise and vibration comparison

The CVRNIA in Volume 3 confirms that an insignificant additional impact was modelled for the previous RfPC1 and RfPC4 alignments. The movement of the dive structure towards the east places the excavation closer to the TRI building than with the current alignment, however the difference in vibration and ground-borne noise between the current scenario and this modelled scenario is insignificant.

The Leukaemia Foundation building on the western side of the rail corridor is potentially affected by the re-alignment because of the extension of the works towards the north. As shown on Plate 16 of the CVRNIA included in Volume 3, the ground support works with the bored piles will be below both the vibration and ground-borne noise criteria because of the low energy of the equipment with respect to induced vibration. The scheduled 24-hour works will therefore remain below the vibration and ground-borne noise criteria.

Stages 2, 3 and 4 excavation works involve using hydraulic hammers for establishing the box structures of the revised alignment at the northern end of the Project and will induce slightly higher levels of vibration and ground-borne noise at the Leukaemia Foundation building than would have occurred with the previous alignment. As shown on Plates 5-14 of the CVRNIA included in Volume 3 of this RfPC, construction methodology during Stages 2 and 3 will be planned so that the works are demonstrated to be aiming to achieve the construction vibration goals provided in the Imposed Conditions.

Monitoring will be undertaken during construction to confirm actual vibration levels. The construction methodology may require further refinement pending the vibration levels detected during monitoring.

The EcoSciences building varies from the works according to the excavation stages with Stage 1 works not closer than approximately 170 metres and the remaining stages all further than 90 metres from the closest north-east corner of the building. The sensitive Transmission Electron Microscope equipment is an additional 70 metres from the north-east corner of the building. The separation distance is modelled to allow the vibration to reduce to values which will have no effect on the sensitive equipment serviceability.

3.4.3.3 Mitigation measures – Vibration

Management and control measures will be in accordance with the approved CEMP. These will be implemented where necessary to minimise the effect of any construction activities on the adjacent residential and commercial occupancies. The control measures will include the following:

- Management controls;
- Source controls (adjustments to the equipment generating the elevated levels of vibration); and
- Path controls (adjustments to the vibration path between the source and the receptor).

Management controls

The vibration and ground-borne noise mitigation management measures outlined in Table 10 will be implemented to reduce the disturbance to the nearby receptors during the Project.

Action Required	Applies	Details
Working hours	Vibration and ground-borne noise	Construction activities will only be undertaken during standard hours unless otherwise approved. To be included in Project Induction and Pre-Start Briefings, Toolbox Talks etc.
Scheduling of work	Vibration and ground-borne noise	Discussions with Directly Affected Persons regarding the modelling that has identified elevated level of vibration when compared with the guideline values. Discussions will be undertaken to determine the appropriate respite to minimise the impact.
Adjustment to equipment type	Vibration and ground-borne noise	Where elevated levels of vibration or ground-borne noise are predicted and cannot be mitigated through adjustments to the schedule, the use of alternative lower energy equipment types will be reviewed.
Relocation of equipment	Vibration and ground-borne noise	Should sensitive equipment be affected by the works and the level of vibration cannot be reduced, and rescheduling of equipment usage cannot be successfully implemented, the feasibility or temporary relocation of the equipment will be considered
Implement community consultation measures	Vibration and ground-borne noise	The following community consultation measures will be implemented: • periodic notification (monthly letterbox drops or equivalent; • website • Project infoline • email distribution list and • community-based forums (if required by approval conditions).
Site inductions and Training	Vibration and ground-borne noise	All employees, contractors and subcontractors will receive an environmental induction or training. The induction will at least include: • all relevant Project specific and standard vibration and regenerated noise mitigation measures. • relevant licence and approval conditions. • permissible hours of work. • any limitations on high vibration and/or regenerated noise generating activities. • location of nearest sensitive receptors. • equipment operating periods and/or preferred scheduling of activities and • environmental incident response processes.
Monitoring	Vibration	A monitoring program will be carried out for the duration of the works.

Action Required	Applies	Details
		The level of ground-borne noise as a function of the level of vibration will be established to confirm the relationship applied in the modelling. Remodelling undertaken where necessary. The level of vibration from the different excavating methods will be monitored at several locations to confirm the vibration attenuation relationship. Remodelling will be completed where necessary The vibration from the excavating equipment assessed during initial stages will be monitored to confirm the floor to floor attenuation

Table 10: Vibration and regenerated noise mitigation management procedures

Source controls

The range of source mitigation measures available to reduce the disturbance to the nearby receptors during the Southern Portal Area Works are outlined below in Table 11.

Action Required	Applies	Details
Equipment selection	Vibration and ground-borne noise	Equipment at the work sites will be selected and best suited to minimising impact via the level of vibration as well as appropriately sized to allow the task to be completed as quickly as possible.
Construction Method	Vibration and ground-borne noise	Less vibration emitting construction methods will be used where feasible and reasonable, such as bored pies preferred to driven piles; static rollers preferred to vibratory rollers. The vibration emitted from plant and equipment items are to be considered in equipment selection and scheduling decisions Plant that will be used will conform to the modelled types and sizes. Any variations in the equipment type and or size would be further assessed before being used
Plant assessment	Vibration and ground-borne noise	All plant utilised on site will be assessed to ensure it complies with supplier specifications and not affected by sub-standard maintenance
Simultaneous use of plant	Vibration and ground-borne noise	Simultaneous operation of vibration intensive plant within a small distance of each other will be avoided where the activity is close to sensitive receptors Where possible, the offset distance between plant generating vibration and adjacent sensitive receptor is to be maximised. Weekly inspections will be undertaken by the environmental teams to ensure plant are not emitting excess noise or vibration.
Start-up procedures	Vibration and ground-borne noise	All plant and equipment will be switched on away from sensitive spaces and brought slowly into position (where practicable and safe to do so), to minimise any elevated levels during start up, introducing the associated vibration and ground-borne noise gradually. As an example for piling, the drilling apparatus will be operated at a slow linear speed (vertically) to avoid any excessive force associated with collisions between the drilling apparatus and the ground.

Table 11: Potential measures that may be implemented to control vibration at the equipment source

Path controls

The vibration and noise mitigation path controls outlined in Table 12 could be implemented to reduce the disturbance to the nearby receptors during the Project. Adjustments to the vibration path as a control measure are only considered as a final measure after other mitigation options have been exhausted.

Action Required	Applies	Details
Introduction of open discontinuity between the source and the sensitive receptor	Vibration	Open discontinuities that are positioned close to the vibration source or the sensitive receptor can be used to attenuate the level of vibration and the associated level of regenerated noise. An example of a discontinuity is an open trench. The effectiveness of the trench is related to the depth versus the proximity of the works or the receptor. Where the works are undertaken at a distance more than twice the depth of the trench, the benefit is limited. The discontinuity must remain open and not filled with water.
Vibration isolation devices	Vibration	Passive vibration isolation systems can be used to reduce the level of vibration, including an adjustment of the dominant frequency bands of vibration. The systems can be simple rubber units where they absorb some of the vibration, mechanical springs which reduce the passage of certain frequencies. The transmissibility is dependent upon the vibration characteristics and the receptor. The method could be applied for isolation of specific equipment, but not appropriate for building wide reductions or personal amenity reduction.

Table 12: Potential measures that may be implemented to control vibration between the source and the receptor

Monitoring

Monitoring of the equipment to confirm the site vibration relationships is required to ensure appropriate selections have been made with respect to maintaining the integrity of the buildings and sensitive equipment so they are not affected by the construction works.

Verification of predicted results

During the initial stages of any works with a new equipment type, an attended site verification survey may be completed. The survey will involve vibration being simultaneously monitored at multiple locations to allow data to be recorded in a form that can be regressed to establish a site-specific vibration relationship between distance and vibration levels for each equipment type.

Monitoring of these levels at key locations will be required to confirm the accuracy of the modelling, and better inform subsequent modelling. Where required, it will also identify the requirement for any revised modelling predictions where there is enough discrepancy to warrant remodelling.

Unattended monitoring

The unattended vibration and ground-borne noise monitoring programme will be undertaken as described in the approved NVMP. The minimum monitoring requirements to be covered by the program for this site have been outlined in the NVMP.

Locations for monitoring equipment will be determined in consultation with potentially affected stakeholders.

In the event of an alarm notification of a management target exceedance from the monitoring system which is confirmed because of site activities an investigation will be undertaken to identify the reason for the non-compliance.

Attended monitoring

In addition to the verification survey, attended vibration surveys may be undertaken for the following:

- After the commencement of construction on site or a new item of plant arrives on site, vibration measurements may be undertaken near the most affected receptor to confirm the vibration levels and provide subjective comment. The aim of the monitoring will be to:
  - refine construction methods to minimise vibration and ground-borne noise;
  - differentiate between construction vibration sources and other sources (e.g. road, pedestrian, rail. traffic); and
  - confirm predicted vibration levels;
- In the event of a justified complaint, attended monitoring may be undertaken to confirm the location is not anomalous with respect to the predicted levels of vibration and/or ground-borne noise; and
- To assess internal levels within buildings.

Vibration monitoring will be carried out by a suitably qualified person. Monitoring information will be stored in the Project specific network.

3.4.3.4 Evaluation against current Environmental Management Framework

EMF Element	Change required (Y/N)	Description of Change
Imposed Condition 11	N	N/A
OEMP sub-plan – Noise and Vibration Management Plan	N	N/A
CEMP	N	N/A
CEMP sub-plan - Noise and Vibration	N	N/A

Table 13: Vibration - Evaluation against current EMF

3.4.4 Traffic

3.4.4.1 Evaluated Project – Traffic

Imposed Condition 14 – Traffic and Transport

Imposed Condition 14 sets out the conditions that must be satisfied to avoid or minimise adverse impacts on road safety, traffic flow, public transport, freight rail movements, pedestrian and cyclist safety and property access, among other things.

Relevantly Imposed Condition 14 provides that:

(e) *Heavy construction vehicles use only designated routes for spoil haulage and deliveries of major plant, equipment and materials, in accordance with the Construction Environmental Management Plan. The designated haulage routes for each worksite must follow major or arterial roads to the extent practicable and be developed in consultation with the Department of Transport and Main Roads and the Brisbane City Council in preparation of the Construction Environmental Management Plan.*

(f) *The Construction Traffic Management Plan must be supported by a road safety assessment for the spoil haulage route.*

(g) *Construction traffic must operate within the requirements of a construction traffic management sub-plan (Construction Traffic Management Plan) incorporated within the Construction Environmental Management Plan.*

Condition 14 further provides at (h) that Construction Traffic Management Plans must include:

iii. local traffic management measures developed in consultation with Brisbane City Council for key intersections:

…

(D) at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road;

…

iv. specific traffic management measures developed in consultation with other key stakeholders, including:

(A) the department administering the Economic Development Act 2012 with regards traffic management in the Queens Wharf Brisbane priority development area;

(B) Queensland Rail about maintaining access to railway stations; and

(C) the department administering the Transport Infrastructure Act 1994 and the Brisbane City Council about maintaining operations for bus services along streets affected by the Project Works.

Outline Environmental Management Plan – Traffic and Transport

Appendix H of the OEMP sets out the requirements for the CTMP, with Section 3.2 detailing the Environmental Outcomes that must be achieved. This includes:

- *Project construction traffic is managed to avoid or minimise and mitigate adverse impacts on road safety and traffic flow, public transport, pedestrian and cyclist safety, property access, freight rail movements and parking, existing road pavements and railway tracks.*

Section 3.3 sets out Performance Criteria which includes (among other things) the following criteria which must be achieved throughout construction of the Project:

- safe and efficient access is maintained for pedestrians, bicycles and for passengers to and from public transport facilities, including rail and busway stations and bus stops;
- practicable access is maintained to adjacent properties throughout the construction phase;
- haulage vehicles (i.e. spoil, construction equipment and materials haulage) only travel on designated haulage routes identified in the CTMP, unless agreed beforehand with the relevant road authority and the Environmental Monitor;
- information about the timing and scale of changes to traffic and transport conditions on passenger rail operations, the busway and road networks in the vicinity of Project Works is provided in advance to the local community, commuters and on request to other people interested in the Project Work; and
- pedestrian and cycle access to community facilities is not disrupted by Project Works, unless approved by the relevant road authority in consultation with the manager of the community facilities.

Construction Traffic Management Plan

The CTMP responds to the requirements set out in the OEMP. The CTMP sets out a range of strategies for minimising disruptions, ensuring safe traffic management and maintaining equivalent

functionality and capacity to existing public/private access egress at all times (unless otherwise approved in writing by the relevant owner/occupier). These strategies include:

Road network

- maintaining the traffic-carrying capacity and connectivity of affected roads and current levels of service, safety and travel time, as far as is practicable;
- minimising, where possible, the impact of construction traffic on local roads (e.g. Boggo Road, Joe Baker Street and Peter Doherty Street);
- early consultation with DTMR, BCC and Emergency Services about and incorporating feedback into the CTMP sub-plans as applicable;
- avoiding disruptions to the operation of the road network due to Project Works during peak periods, where possible, and managing such disruptions during off-peak periods;
- working collaboratively with BCC to assess where the implementation of local traffic management measures will reduce traffic impacts associated with construction vehicles at key intersections at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road; and
- avoiding major haulage tasks during scheduled major events at the Gabba Stadium, Lang Park, and for Riverfire and New Year's Eve.

Maintaining access for businesses, residents and community facilities

- staging the Project Works to maintain access for delivery vehicles to businesses at Boggo Road Urban Village and the Ecosciences Precinct;
- maintaining access for both the general public and emergency services vehicles to hospitals and medical centres at PA Hospital, Mater Hospital and the Royal Brisbane and Women's Hospital at all times;
- staging the Project Works to maintaining pedestrian access at all times through the Albert Street road closure including to commercial properties during trading hours;
- staging the Project Works to maintain equivalent level of access to public transport providers facilities;
- using real time monitoring and direct communication with Spoil Haulage vehicles to manage headways/arrivals at construction site access gates to ensure vehicles do not queue on adjacent roads; and
- where a reduction in the level of access to any of the above is predicted in the CTMP sub-plan CBGUJV, the Stakeholder and Community Relations team will undertake consultation;

The CTMP also describes strategies to be implemented in CTMP sub-plans to maintain the safe and efficient traffic flow on the transport network

Road, pedestrian and cyclist Infrastructure

- locating construction site accesses on higher order roads where practicable, to minimise the potential impact on local roads;
- designing construction site access points and site layouts to provide unimpeded turn movements from the public road network (and where not possible, identify appropriate operational controls) and with adequate storage capacity to ensure construction vehicles do not queue or stand on adjacent roads;

- staging of the Project Works to maintain acceptable footpath and cycle paths in areas adjacent to Project worksites and where changes are required to facilitate Project Works consult with BCC, QR, DTMR and Translink as applicable;
- designated haulage routes will utilise the arterial and major road network to the greatest extent possible with local or minor roads only used where it is unavoidable to access a Project worksite;
- real time management of spoil haulage vehicles to monitor vehicle speed and position to and between worksites and spoil disposal sites; and
- spoil haulage and materials and equipment delivery will be undertaken within the hours of work set out in the Conditions of Approval to avoid disruption to traffic flows during peak period.

Construction Vehicle Management Plan

The Construction Vehicle Management Plan (CVMP) also contemplates a range of traffic and other impacts from the use of heavy vehicles, including increased congestion and delays for existing road users due to increased construction traffic on local roads, impact to traffic and access requirements for other Brisbane Projects, and social amenity impacts (especially noise for nearby residents).

The mitigations discussed in the CVMP refer back to the CTMP sub-plans relating to Haulage Management, Precinct sub-plans detailing access and egress routes to avoid local roads, and real time monitoring of spoil haulage vehicles ensures compliance with routes, construction hours, load limits and speed limits.

The Project plant inspection procedures are also designed to ensure all vehicles are in good working order while travelling on public roads, and the precinct CTMP sub-plans detail access procedures to ensure queueing is avoided near site accesses, sensitive community facilities and residential neighbourhoods.

3.4.4.2 Effect of the Proposed Change – Traffic

A Traffic Impact Assessment (TIA) has been prepared in accordance with DTMR's Guide to Traffic Impact Assessment to assess the potential traffic and transport impacts arising from the Proposed Changes, as compared to the Evaluated Project.

The Traffic Impact Assessment is provided in Volume 3, Attachment D to this RfPC. As part of the TIA, different haulage route options were assessed. Based on the assessment undertaken in the TIA, an upgrade to the Peter Doherty Street/Annerley Road Intersection will be required to facilitate the additional haulage vehicles.

Figure 7: Proposed changes to worksite construction traffic routes

An assessment of this proposal is outlined in the sections following.

Annerley Road/Peter Doherty Street intersection

The current configuration of this intersection is a three-way signalised arrangement. The aerial and SIDRA Intersection 8.0 (SIDRA) assessed layout for the existing form are illustrated at Figure 8 below (also found in the Traffic Impact Assessment in Volume 3 of this RfPC). The upgrade to this intersection requires the addition of a right turn movement on Annerley Road southern approach. A dedicated right turn lane (for construction traffic only) is proposed at this intersection. This requires significant civil works to accommodate the additional lane, including demolition and reconstruction of the Annerley Road medians, relocation of signal infrastructure and kerb amendments. The intersection upgrade would be for temporary access during construction, and the intersection would be restored to its original configuration after the completion of works.

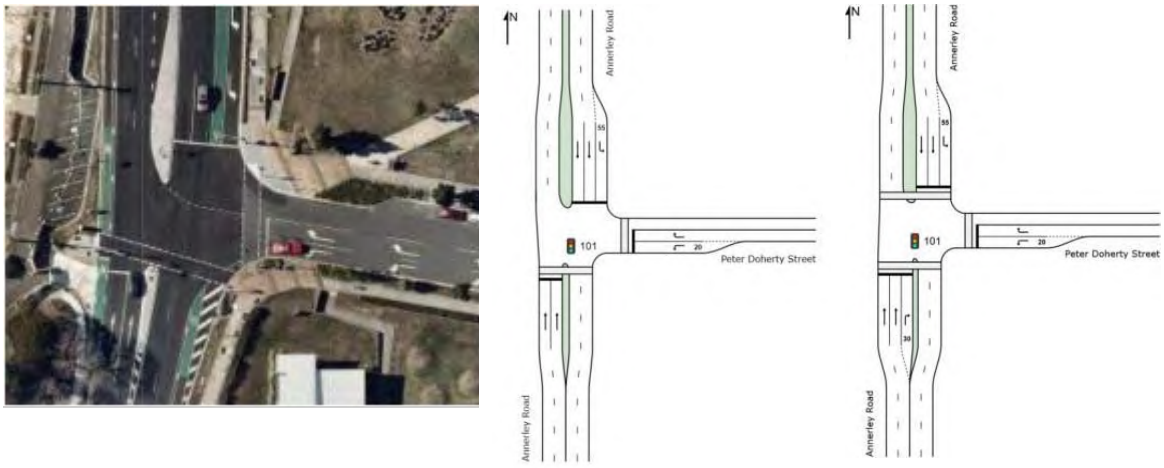


Figure 8: Layout - Annerley Road/Peter Doherty Street - existing and proposed

Traffic volumes

A background traffic survey was undertaken at the intersection of Peter Doherty Street and Annerley Road on Thursday 18 June 2020. The current volume of construction vehicles accessing the Boggo Road worksite is 28 vehicles per hour. To facilitate the Proposed Change to the construction methodology, an estimated additional 14 spoil haulage vehicles per hour in each direction is required.

The expected construction 24-hour traffic volumes have been calculated as part of the Construction Traffic Noise Assessment and are detailed in Table 14, below.

Road Segment	24-hour day period					
	Existing Total Vehicles	Existing Total Heavy Vehicles	Additional Vehicles		Proposed Total Vehicles	Proposed Total Heavy Vehicles
			All Vehicles	Heavy vehicles		
Annerley Road	16,790	425 (2.5%)	336	158	17,126	583 (3.4%)
Boggo Road	1,630	99 (6.1%)	0	0	1,630	99 (6.1%)
Peter Doherty Street	1,184	66 (5.6%)	336	158	1,520	224 (14.7%)
Joe Baker Street	1,630	99 (6.1%)	336	158	1,966	257 (13.1%)

Table 14: 24-hour traffic volumes

Intersection analysis

The study intersections are:

- Annerley Road / Boggo Road;
- Annerley Road / Peter Doherty Street; and
- Annerley Road / Cornwall Street / Noble Street / Railway Terrace.

The performance of the study intersections has been analysed using SIDRA. Table 15 below (also at Table 7.8 in the TIA at Volume 3, Attachment D of this RfPC) summarises the SIDRA results. The

associated adopted thresholds are detailed in Table 16 below (also at Table 7.7 in the TIA at Volume 3, Attachment D of this RfPC).

The TIA determined that the intersection upgrade option selected presents the safest outcome. There will be related impacts on the operations of the local intersections with an increase in DOS, delays, and queues across peak periods.

Intersection	Upgrade to Annerley Road/Peter Doherty Street with Dedicated Right Turn
Annerley Road / Boggo Road	Negligible impact
Annerley Road / Peter Doherty Street	Significant impact
Annerley Road / Rawnsley Street	Significant impact
Annerley Road / Cornwall Street / Noble Street / Railway Terrace	Moderate impact

Table 15: Summary of SIDRA results - upgrade to Annerley Road/Peter Doherty Street intersection

Parameter	Negligible Impact	Moderate Impact	Significant Impact
Degree of Saturation	<0.05 increase in DOS	<0.1 increase in DOS	>0.1 increase in DOS
Delay	<5 sec increase in delays	<10 sec increase in delays	>10 sec increase in delays
Queues	<19m increase in queues *(equivalent to one design vehicle)*	<38m increase in queues *(equivalent to two design vehicles)*	>38m increase or causes queue blockage *(equivalent to two design vehicles)*

Table 16: Adopted assessment thresholds

3.4.4.3 Mitigation measures – Traffic

All Proposed Changes to traffic movement, including the upgrade to Peter Doherty Street and Annerley Road, will be managed in accordance with the current Environmental Management Framework and overarching management measures in the CTMP.

This will include development of a site-specific CTMP sub-plan for the Southern Portal Area (CTMP Southern Portal Area sub-plan) to detail spoil haulage routes to and from the Southern Portal Area. This CTMP Southern Portal Area sub-plan will be prepared in consultation with the relevant road authority prior to works commencing.

The CTMP Southern Portal Area sub-plan will document the provisions to be made for pedestrians and cyclists to mitigate potential risks between construction vehicles and other road users. Risks to cyclists and pedestrians will be minimised through mitigation measures, including:

- stop line changes at the Annerley Road / Peter Doherty Street intersection;
- installation of cycle lane separator devices to protect cyclists on the bike lane;
- installation of cyclist facilities including a head start box at the left turn lane into Peter Doherty Street and bike transition ramps on Annerley Road; and
- warning signage for cyclists and drivers.

The CTMP Southern Portal Area sub-plan will include the permitted haulage routes between the adjacent arterial road networks and the sub-plan precinct. Spoil haulage routes, to and from the sub-plan precinct will be documented within the CTMP Haulage Management sub-plan.

The CTMP Southern Portal Area sub-plan will document the provisions to be made for pedestrians and cyclists to mitigate potential risks between construction vehicles and other road users on Peter Doherty Street and will be developed in consultation with the relevant Road Authority, the Dutton Park School, bicycle user groups and other Directly Affected Persons.

This would align with requirements already imposed under the OEMP which are to:

- ensure the Project's impacts on the community and stakeholders with respect to traffic and transport are minimised;
- monitor the effects of management and mitigation measures. Under current conditions the CTMP (and sub-plans) must be periodically reviewed to address changes in the Project's construction programme and methodology, including modification to delivery schedules, delivery routes and spoil haulage route changes. Relevantly, this includes:
    - proposed access to worksites, with local or minor roads only used where unavoidable to access a Project worksite;
    - processes for advance notice to Directly Affected Persons and local communities within the vicinity of the spoil haulage routes and worksite accesses;
    - local traffic management measures developed in consultation with BCC for key intersections at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road; and
    - relevant specific traffic management measures developed in consultation with other key stakeholders, including QR, DTMR and BCC.

There is also a requirement for Project Works to 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 BCC, QR, DTMR (Metro/Translink) about changes in pedestrian and cycle paths required to facilitate Project Works.

3.4.4.4 Evaluation against current Environmental Management Framework

Appendix H2 (BCC Haulage Restrictions) to the OEMP – Construction Traffic Management Plan has been updated to incorporate the changed heavy vehicle access for the Southern Portal Area Works. The amended Outline Environmental Management Plan is attached at Appendix 1.

EMF Element	Change required (Y/N)	Description of Change
Imposed Condition 14	N	N/A
OEMP sub-plans: **Construction Traffic Management Plan – Appendix H2 BCC Haulage Restrictions Site 1**	Y	Update map to show Peter Doherty Street bi-directional access Update restriction to remove 'no right turn into Peter Doherty Street from Annerley Road'
CEMP	N	N/A

EMF Element	Change required (Y/N)	Description of Change
CEMP sub-plan – Construction Traffic Management Plan	Y	Update to align with condition change above

Table 17: Traffic - Evaluation against current EMF

3.4.5 Air quality

3.4.5.1 Evaluated Project – Air quality

Imposed Condition 13 – Air quality

The Coordinator General's Imposed Condition 13 Air Quality provides that:

(a) Project Works must aim to achieve the goals in Table 4.

Table 4. Air quality criteria and goals

Criterion	*Air quality indicator*	*Goal*	*Averaging Period*
Human Health	*Total Suspended Particulates (TSP)*	*90 µg/m^3*	*1 year*
	Particulate matter (PM_{10})	*50 µg/m^3*	*24 hours*
		25 µg/m^3	*1 year*
Nuisance	*TSP*	*80 µg/m^3*	*24 hours*
	Deposited Dust	*120 mg/m^2/day*	*30 days*

Notes:
1. When monitored in accordance with the most recent version of AS3580.9.6 Determination of suspended particulate matter – PM_{10} high volume sampler with size-selective inlet – Gravimetric method. OR AS/NZS 3580.9.9: 2017 Methods for sampling and analysis of ambient air Determination of suspended particulate matter - PM_{10} low volume sampler - Gravimetric method.
2. When monitored in accordance with the most recent version of AS/NZS 3580.9.3:2003 Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler gravimetric method or (TSP) low volume sampler – Gravimetric method.
3. When monitored in accordance with the most recent version of AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposited matter – Gravimetric method

(b) During construction monitor and report on air quality in accordance with the Air Quality Management Plan, a sub-plan of the Construction Environmental Management Plan.

Outline Environmental Management Plan

Appendix E of the OEMP outlines the environmental measures and performance criteria to be achieved during the Project Works. This plan:

- nominates the Project's monitoring and reporting requirements in relation to air quality;
- manages the impact on the local community and sensitive receptors in terms of air quality from construction works; and
- monitors the effects of management and mitigation measures.

Air Quality Management Plan

The Air Quality Management Plan notes a number of activities as having potentially the greatest air impact on the surrounding receivers at the Southern Portal Area, including the impacts from spoil excavation and truck movements on internal haul roads.

3.4.5.2 Effect of the Proposed Change – Air quality

An Air Quality Impact Assessment (AQIA) was undertaken to review the Proposed Change to the construction methodology. The AQIA is included in the Air Quality Assessment included at Volume 3, Attachment E of this RfPC.

In accordance with the AQIA, dispersion modelling for this assessment uses the CALPUFF modelling system, which is an advanced meteorological and air quality modelling system commonly used for applications where non-steady state conditions may occur (i.e. complex terrain or coastal locations) or when calm wind conditions are important (i.e. for odour assessment).

The results of the AQIA are outlined below.

Incremental results – Southern Portal Area

Predicted incremental Total Suspended Particles (TSP), Particulate Matter to 10micrometres (PM_{10}) and dust deposition levels from the Project are presented in Table 18 below (and at Table 7.1 of the AQIA at Volume 3, Attachment E of this RfPC) for each of the assessment locations. It is noted that dust deposition rates were predicted by CALPUFF from TSP emissions. Assessment locations are shown at Figure 2.2 of the AQIA.

Assessment location ID	Predicted incremental concentration (µg/m^3) and deposition rate (mg/m^2/day)						
	TSP		PM_{10}		$PM_{2.5}$		Dust deposition
	24-hour maximum	Annual	24-hour maximum	Annual	24-hour maximum	Annual	Monthly maximum
Air quality objectives	**80**	**90**	**50**	**25**	**25**	**8**	**120**
S1	2.8	0.4	2.0	0.2	1.1	0.1	2.1
S2	20.3	3.5	7.8	1.3	3.8	0.6	22.1
S3	9.0	2.0	4.8	0.9	2.4	0.4	11.1
S4	1.2	0.3	0.9	0.2	0.5	0.1	1.4
S5	1.4	0.1	1.1	0.1	0.7	0.0	0.7
S6	8.1	1.7	4.4	0.8	2.3	0.4	10.0
S7	2.3	0.4	1.7	0.2	0.9	0.1	1.8
S8	1.8	0.3	1.5	0.2	0.8	0.1	1.5
S9	1.1	0.2	1.0	0.1	0.5	0.1	0.8
S10	0.7	0.1	0.6	0.1	0.3	0.0	0.5
Note: Air quality objectives are applicable to cumulative (increment + background). These are provided for comparison purposes only.							

Table 18: Incremental (Project only) concentration and deposition results

The predicted concentrations and deposition rates for all pollutants and averaging periods are below the applicable air quality objective at all assessment locations. The air quality objectives listed are applicable to cumulative concentrations and are shown for comparative purposes only.

Analysis of cumulative impact compliance is presented in Section 7.3 of the AQIA found in Volume 3 of this RfPC. Table 7.1 (reproduced above at Table 18 of this RfPC) shows that the maximum 24-hour PM_{10} concentration predicted as a result of the Southern Portal construction activities was 7.8 µg/m^3 at assessment location S2 which is located within 30m of the Project and is a workplace/commercial location. This result is well below the cumulative air quality objective of 50 µg/m^3. All other assessment locations are below 5 µg/m^3.

Contour plots, illustrating spatial variations in Project-related incremental TSP, PM_{10} concentrations and dust deposition rates are provided in Volume 3 of this RfPC.

Cumulative results – Southern Portal Area plus other sources and background

Cumulative impacts (i.e. Southern Portal Area plus other sources and background) at each assessment location have been assessed using the following methodology:

- For 24-hour average concentrations - each daily-varying predicted 24-hour average concentration for PM10 from the Project has been combined with the corresponding daily predicted concentrations from the Boggo Road Station and Dutton Park Station worksites. The adopted 2018 background concentration (70th percentile) was then added; and
- For annual average concentrations - the predicted annual average concentrations from the Project have been paired with the annual predictions from Boggo Road Station, Dutton Park Station and the corresponding background annual average concentration. Predicted cumulative TSP, PM10 and dust deposition levels from the Project are presented in Table 19 below for each of the assessment locations. The cumulative results show that the predicted concentrations and deposition rates for all pollutants and averaging periods are below the applicable air quality objectives at all assessment locations.

Table 19 below (also at Table 7.2 of the AQIA at Volume 3, Attachment E to this RfPC) shows that the maximum cumulative 24-hour PM_{10} concentration predicted was 26.8 µg/m^3 at assessment location S2. This result is well below the air quality objective of 50 µg/m^3. It is noted that the PM_{10} annual average measured background concentration was 17 µg/m^3. All other assessment locations are below 5 µg/m^3.

For the reasons stated above, it is not predicted the Project would result in adverse air quality impacts at the assessment locations assessed.

Assessment location ID	Predicted incremental concentration (µg/m^3) and deposition rate (mg/m^2/day)						
	TSP		PM_{10}		$PM_{2.5}$		Dust deposition
	24-hour maximum	Annual	24-hour maximum	Annual	24-hour maximum	Annual	Daily maximum
Air quality objectives	**80**	**90**	**50**	**25**	**25**	**8**	**120**
S1	52.2	44.8	22.3	18.1	10.6	7.7	67.4
S2	67.1	46.8	26.8	18.6	12.5	8.0	82.4
S3	55.3	45.8	23.3	18.5	10.7	7.9	73.5

Assessment location ID	Predicted incremental concentration (µg/m^3) and deposition rate (mg/m^2/day)						
	TSP		PM_{10}		$PM_{2.5}$		Dust deposition
	24-hour maximum	Annual	24-hour maximum	Annual	24-hour maximum	Annual	Daily maximum
S4	48.4	43.7	20.3	17.6	9.5	7.5	61.9
S5	49.0	43.6	20.7	17.5	9.6	7.4	61.6
S6	55.2	46.4	23.2	18.7	11.0	8.0	76.8
S7	49.0	43.7	20.7	17.6	9.5	7.5	62.1
S8	48.5	43.7	20.4	17.6	9.4	7.5	62.0
S9	48.0	43.6	20.0	17.5	9.2	7.4	61.3

Table 19: Cumulative (Project plus background) concentration and deposition results

The results of the dispersion modelling indicated that the predicted concentrations and deposition rates for incremental particulate matter (TSP, PM_{10} and dust deposition) were below the applicable air quality objectives at all assessment locations. The AQIA also showed that all assessment locations were predicted to be below the air quality objectives for all pollutants apart from dust deposition at S2 only. Cumulative impacts (Project, plus neighbouring construction sites, plus background) indicated that predicted concentrations and deposition rates for all pollutants and averaging periods are below the applicable air quality objectives at all assessment locations.

3.4.5.3 Mitigation measures – Air quality

The dust mitigation measures applied at the site are shown in the second column of Table 20 below. These measures feature in the Air Quality Management Plan (AQMP) which exists for the entire CRR Project (CBGU D&C JV 2020). The corresponding control factors applied in the emissions estimation and dispersion modelling is also shown. These factors have been accounted for in the emissions estimates shown in Table 6.1 of the AQIA at Volume 3 of this RfPC.

Construction Activity	Mitigation Measures	Control factor
Drilling	Water sprays	70%
Excavators/FELs	Water sprays and fencing	65%
Bulldozers on spoil	Water sprays and 3 sides and roof	85%
Loading trucks	Water sprays and fencing	65%
Wheel-generated dust (paved roads)	Paved roads and water sprays	50%
Rock breaker	Water sprays and fencing	65%
Piling Rig	Water sprays and fencing	65%
Wind erosion	Water sprays and chemical binding agent	90%
Site diesel combustion	-	-

Table 20: Mitigation measures and control factors applied in the assessment

There is a higher degree of mitigation proposed for the Southern Portal Area than what has been previously assumed in the AQIA. For example:

- bulldozers will now operate with a fence/shade cloth, water sprays and operations will generally be under a tunnel roof (CBGU JV has indicated that from January 2022, operations will be entirely under the cut and cover roof);
- water sprays will be used when loading trucks, on the rock breaker and on the piling rig; and
- a binding agent will be used on exposed areas (as well as water sprays).

The AQMP includes:

- details of mitigation measures;
- compliance management including training, incidents and emergencies (incorporating complaints management);
- details of air quality monitoring and auditing;
- reporting including greenhouse gas emissions and incident reporting; and
- documentation and communication protocols.

3.4.5.4 Evaluation against current Environmental Management Framework

EMF Element	Change required (Y/N)	Description of Change
Imposed Condition 13	N	N/A
OEMP sub-plan – Air Quality Management Plan	N	N/A
CEMP	N	N/A
CEMP sub-plan – Air Quality Management Plan	N	N/A

Table 21: Air Quality - evaluation against current EMF

4. Proposed Change to Imposed Condition 1 (General Conditions)

4.1 Overview of Proposed Change to Imposed Condition 1 (General Conditions)

SDPWO Act requirement	Overview
Proposed change	Changes to Condition 1 (General Conditions) to include references to the latest evaluated versions of Project documentation and to remove redundant references to previous drawings The Proposed Change is set out at 4.2 below.
Reason	To update the Evaluated Project to reflect this RfPC, being the proposed construction methodology and estimated schedule of works for the Southern Portal Area Works.
Effect	The Project will be required to be carried out generally in accordance with the updated description of Evaluated Project, including for the Southern Portal Area Works.
Mitigation	As set out in Chapter 3
EMF	Mitigation and management strategies as per the existing OEMP, OCEMP and CEMP, and sub-plans

Does the current EMF need to be revised to manage the Proposed Change?	No - 3.4.1.4 (Construction Noise) No - 3.4.2.4 (Traffic Noise) No - 0 (Vibration) Yes - 3.4.4.4 (Traffic) No - 3.4.5.4 (Air Quality)

Affected zones	A, B, C, D, E and F

4.2 Description of Proposed Change to Imposed Condition 1 (General Conditions)

The Proposed Change is to ensure that Condition 1 refers to the Project as updated by this RfPC, so that the Project will be required to be carried out generally in accordance with the updated description of the Evaluated Project, to include the Southern Portal Area Works.

The Proposed Change is to Imposed Condition 1(a) as follows:

Condition 1. General conditions

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

(i) the Cross River Rail Request for Project Change dated November 2020;

(ii) the drawings provided at Volume 2, Cross River Rail Request for Project Change dated November 2020;

(iii) the Cross River Rail Request for Project Change dated August 2020;

~~*(iv) the drawings provided at Volume 2, Cross River Rail Request for Project Change dated August 2020;*~~

(iv) the Cross River Rail Request for Project Change dated May 2020;

~~*(v) the drawings provided at Volume 2, Cross River Rail Request for Project Change dated May 2020;*~~

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

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

(vii) the Cross River Rail Request for Project Change dated April 2019.

4.3 Reasons for the Proposed Change to Imposed Condition 1 (General Conditions)

The reason for the Proposed Change is to ensure the Evaluated Project incorporates the changed construction methodology and the schedule of works for the Southern Portal Area Works.

4.4 Effect of the Proposed Change to Imposed Condition 1 (General Conditions)

The effects of the Proposed Change to Imposed Condition 1 for the Southern Portal Area Works and required mitigation measures are addressed in Chapter 3.

Undertaking the Southern Portal Area Works will require periodic rail possessions and changes to rail services. Changes to rail services may include altered suburban stopping patterns or routes, and/or rail replacement services to link customers to and from impacted stations.

Travel disruption planning and management is coordinated well in advance of rail possessions with Translink, DTMR, QR and BCC. This process will be managed through an integrated, coordinated, multi-agency and multimodal response similar to the temporary bus diversion that was undertaken for Roma Street.

This approach ensures all Cross River Rail disruptions are planned and managed in consideration of other projects, events and activities across South East Queensland with the aim of keeping the city's transport networks moving whilst major construction projects are underway.

A strategic and coordinated approach to delivering public communications that is based on analytics will ensure the public is informed well in advance of network disruptions, to minimise inconvenience and maximise the ability to plan their journey.

4.5 Relationship to Environmental Management Framework

In accordance with the requirements of Imposed Condition 10, the Southern Portal Area Works will be undertaken subject to compliance with a specific CEMP that will be endorsed by the Environmental Monitor and must be consistent with the OEMP, including by demonstrating how the environmental outcomes are achieved, including for extended work hours.

5. Conclusion

The Proposed Change to the Evaluated Project optimises the track geometry and layout of infrastructure within the Southern Portal Area railway corridor, which requires a consequential change to the construction methodology for the Southern Portal Area Works.

A cut and cover construction methodology has been determined as the safest and most efficient construction methodology for the Southern Portal Area Works, particularly given the complex infrastructure interfaces in this part of the railway corridor.

The Proposed Changes will result in an increase in the duration of rail possessions at the Southern Portal Area, with changed noise, vibration, traffic and air quality impacts as detailed in Chapter 3 of this RfPC and the technical reports at Volume 3.

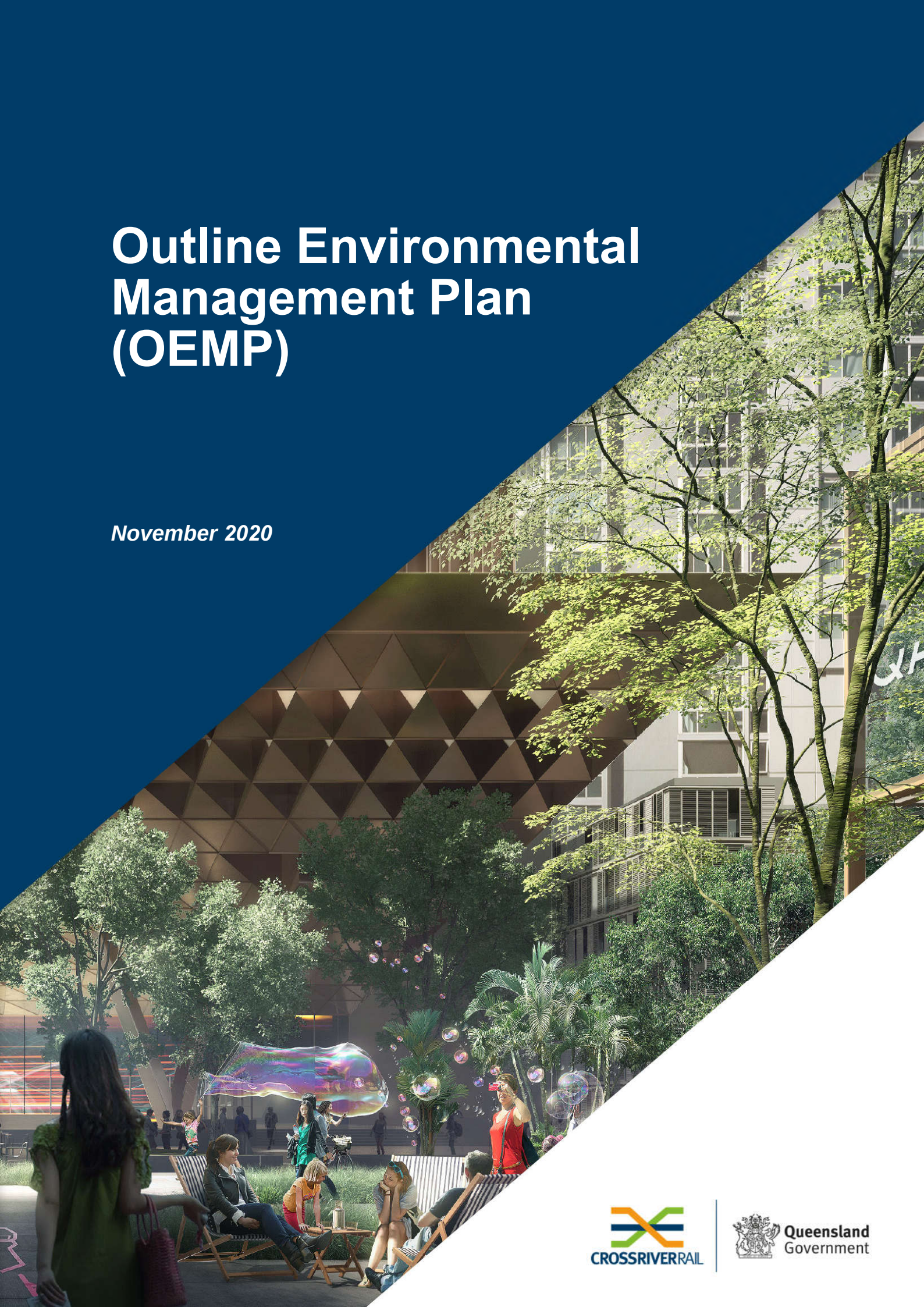
The Environmental Management Framework established by the Coordinator-General's Imposed Conditions continues to be appropriate to manage the environmental effects of the CRR Project and includes a detailed consultation and community engagement process. The Southern Portal Area is surrounded by a number of sensitive receptors and the Environmental Management Framework will be updated to specifically manage and mitigate the potential impacts of the Southern Portal Area Works on those sensitive receptors.

The Cross River Rail Delivery Authority, as the proponent for the CRR Project, requests that the Changed Project proceed, subject to the Imposed Conditions, including the changes to those Imposed Conditions set out in this RfPC.

Appendix 1: Updated Outline Environmental Management Plan (OEMP)

Outline Environmental Management Plan (OEMP)

November 2020



CROSSRIVERRAIL

Queensland Government

Table of Contents

1. Definitions

Table 1: Definitions

Acronym	Definition
All Staff	Means all employees, contractors and sub-contractors involved in the Project Works
BCC	Brisbane City Council
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CG	Coordinator-General
CGCR	Coordinator-General's Change Report – latest version is available on the Department of State Development, Tourism and Innovation website
CGER	Coordinator-General's Evaluation Report
COEMP	Commissioning Environmental Management Plan
Community and Stakeholder Engagement Team	Refers to the Delivery Authority's Community and Stakeholder Engagement Team
Contractor	The Contractors appointed to design, construct and commission the Project
Coordinator-General	The corporation sole preserved, continued and constituted under section 8 of the SDPWO Act
CPTED	Crime prevention through environmental design
CRR	Cross River Rail
CSEP	Community and Stakeholder Engagement Plan
DDA	*Disability Discrimination Act 1992*
Delivery Authority	The Cross River Rail Delivery Authority – proponent for the Project
DES	Department of Environment and Science
Directly Affected Persons	An entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the Project impacts would be above the performance criteria in the Imposed Conditions

Acronym	Definition
EDR	Environmental Design Requirements
EIS	Environmental Impact Statement
EMP	Environmental Management Plan (refers to the OEMP, CEMP, COEMP including any Project sub-plans)
EMS	Environmental Management System
Environmental Monitor	The Environmental Monitor engaged in accordance with Imposed Condition 7
EP Act	*Environment Protection Act 1994*
ESC	Erosion and sediment control
EWMS	Environmental work method statements or similar risk management system
ISCA	Infrastructure Sustainability Council of Australia
Imposed condition/s	A condition/s imposed by the Coordinator-General under section 54B of the SDPWO Act for the Project
MRTS51	MRTS51 Environmental Management – TMR Specification
NATA	National Association of Testing Authorities
OEMP	The Project's Outline Environmental Management Plan
Outline CEMP	The Project's Outline Construction Environmental Management Plan
Outline COEMP	The Project's Outline Commissioning Environmental Management Plan
Predictive Modelling	Means the use of appropriate analytical scenario testing, whether or not by numerical measurements, undertaken prior to the commencement of Project Works
PPE	Personal Protective Equipment
Project	The Cross River Rail Project
Project Works	As defined in the Imposed Conditions
Proponent	The Cross River Rail Delivery Authority
QA	Quality Assurance

Acronym	Definition
QR	Queensland Rail
Rail Infrastructure Manager	A person who has effective management and control of rail infrastructure or proposed rail infrastructure, whether or not the person – a) owns or will own the rail infrastructure; or b) has or will have a statutory or contractual right to use the rail infrastructure or to control, or provide, access to it.
Rail Transport Operator	A rail infrastructure manager or rolling stock operator, or a person or organisation which is both
RfPC	Request for Project Change
RIS	Rail Integration and Systems
RTO	Rail Transport Operator
SDPWO Act	*State Development and Public Works Organisation Act* 1971
SEMS	Queensland Rail's Safety and Environment Management System
Sub-plan	Any sub-plan to an EMP
The Delivery Authority	The Cross River Rail Delivery Authority
TMR	Queensland Department of Transport and Main Roads
TSD	Tunnels, Stations and Development

2. Introduction

2.1 Background

The Cross River Rail Delivery Authority (Delivery Authority) is responsible for facilitating the efficient delivery of the Cross River Rail Project (the Project).

The Cross River Rail Project (the Project) is a declared coordinated project for which an Environmental Impact Statement (EIS) is required under the *State Development and Public Works Organisation Act* 1971 (SDPWO Act). The CRR EIS was evaluated by the Coordinator-General who recommended the Project proceed, subject to Imposed Conditions and recommendations. Since the evaluation of the EIS, several Requests for Project Change (RfPCs) have been evaluated by the Coordinator-General, to allow for scope changes, amendments of Imposed Conditions, design modifications and refined constructability requirements. The CRR Project, as currently evaluated by the Coordinator-General, including the RfPCs, is referred to as the Evaluated Project.

As a result of submission of the latest Request for Project Change, the Coordinator-General has released a change report that included modified Imposed Conditions for the Project. These conditions are found in the latest version of the Coordinator-General's change report available on the Department of State Development, Tourism and Innovation website. Any Imposed Conditions referred to herein are from the aforementioned document.

2.2 Project Delivery

The Delivery Authority is responsible for planning and delivering the Project.

The Project is proposed to be delivered under two main packages:

- Tunnels, Station & Development (TSD) to be delivered by a Public Private Partnership (PPP); and
- Rail Integration Systems (RIS) to be delivered by an Alliance.

The Delivery Authority has appointed separate Contractors to deliver each of the TSD and RIS packages. The Contractors will be responsible for ensuring the Project's design, construction and commissioning meets all environmental requirements including the Imposed Conditions and Environmental Design Requirements. The Contractors will be responsible for the development and day-to-day implementation of the Construction Environmental Management Plan and associated sub-plans for their respective scope of works.

2.3 Project Phases

2.3.1 Design Phase

The design phase entails the preparation of detailed designs for the construction, commissioning and operation of the Project and may run progressively and in parallel with the construction phase.

2.3.2 Construction Phase

The construction phase is expected to last approximately five years. Construction may occur in stages.

2.3.3 Commissioning Phase

The commissioning phase will involve a programme of testing and verification, prior to operations. During this time, the elements of the Project will be tested individually, as coordinated systems and as an overall Project wide system. Testing will also work through the functionality, operation and integration with the existing systems and procedures of key stakeholders including Queensland Rail, the Department of Transport and Main Roads (TMR), bus and light rail operators, various state agencies and the Queensland Fire and Emergency Services.

As the Project will be a new part of an existing railway network, mechanical and electrical equipment, fire and life safety systems and rail operating systems will be integrated with the existing network and tested for functionality and safety.

Commissioning may occur progressively and may overlap with the construction phase and the operational phase. For instance, elements of some stations may be commissioned after the rest of the Project has become operational.

2.3.4 Operation Phase

The operation phase of the Project commences upon acceptance of the Project by the Queensland Government. The Project will be operated as part of the existing railway network, under the control of the Rail Infrastructure Manager.

3. Environmental Management Approach

This section describes the environmental management approach for the Project including the relevant environmental documentation, structure of management plans, the role of the Environmental Monitor, roles and responsibilities of the Contractor/s and other entities, and subcontractor management.

3.1 Imposed Conditions

The Imposed Conditions (including the Environmental Design Requirements) are conditions imposed by the Coordinator-General under section 54B of the SDPWO Act. These conditions must be complied with and prevail over any other environmental documentation to the extent of any inconsistency.

These conditions are nominated in **Appendix A** of this OEMP.

3.2 Outline Environmental Management Plan

This OEMP provides a framework for a comprehensive, integrated approach to environmental management throughout the design, construction and commissioning phases of the Project. The approach is aimed at facilitating the timely and efficient construction and commissioning of the Project while maintaining a reasonable environmental amenity in the locality and ensuring that unauthorised environmental harm resulting from the Project does not occur.

The OEMP is a requirement of Condition 2 of the Imposed Conditions. An OEMP was submitted to the Coordinator-General for approval six months prior to the commencement of Project Works and has been approved. This OEMP includes minor amendments to cater for new scopes of works as outlined in **Section 2.1** Background.

The OEMP complies with the requirements of Imposed Condition 2 by:

- including the environmental outcomes and performance criteria for each environmental element;
- including possible mitigation measures, monitoring and reporting for each environmental element to achieve the environmental outcomes;
- including an outline of:
    - the Construction Environmental Management Plan (CEMP); and
    - the Commissioning Environmental Management Plan (COEMP);
- being consistent with the Environmental Design Requirements (EDR) in Schedule 1 of the latest version of the Coordinator-General's change report; and
- including the sub-plans required by the Imposed Conditions.

3.3 Environmental Management Documentation

Environmental Management Plans have been developed by the Delivery Authority to outline the environmental management approach for the Project, as well as the key environmental risks that need to be managed throughout the various Project phases. The following plans have been developed:

- Outline Environmental Management Plan (OEMP) - *this plan*
- Outline Construction Environmental Management Plan (Outline CEMP)
- Outline Commissioning Environmental Management Plan (Outline COEMP)
- Outline sub-plans for various environmental elements

The relationship of the Environmental Management Plans described above is shown in **Figure 1** below.

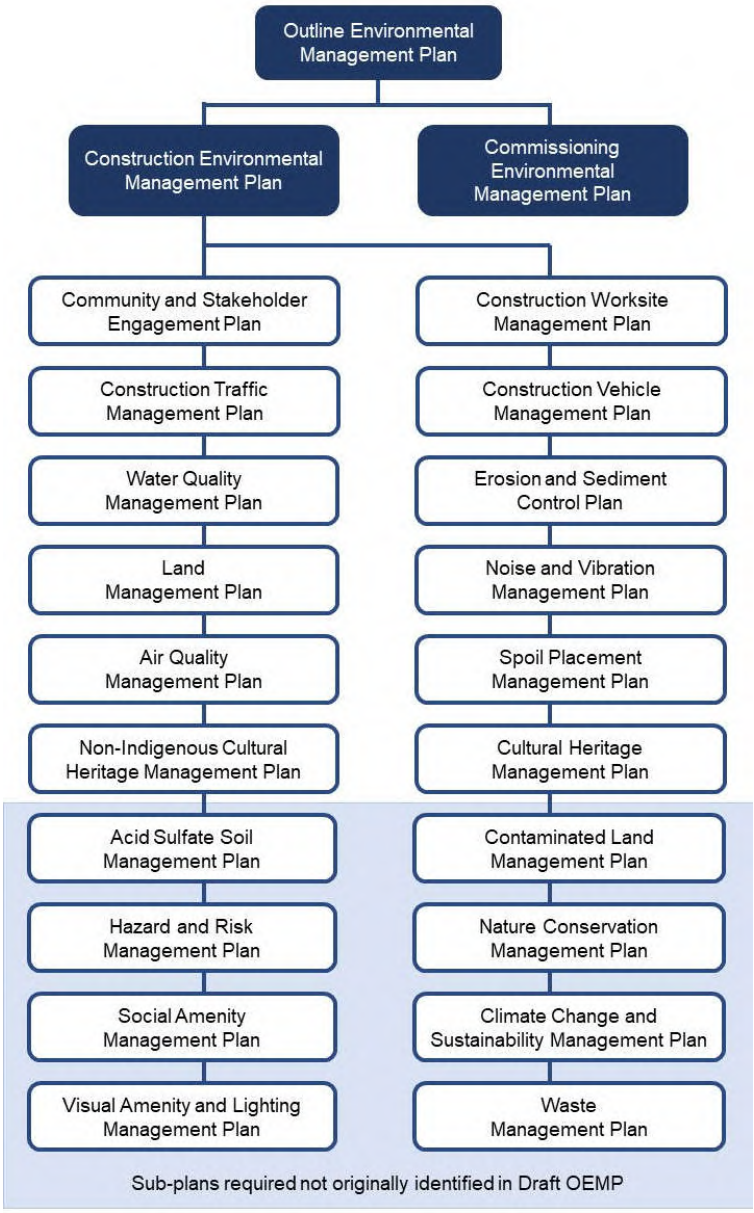


Figure 1: Environmental Management Plans

The Delivery Authority has nominated additional sub-plans as being required based on further Project information obtained since the original Draft OEMP was submitted. At a minimum, any mandatory requirements nominated within the plans shown above must be achieved.

The following plans are to be developed by the Contractor/s prior to Relevant Project Works commencing.

- Construction Environmental Management Plan (CEMP)
  - To be developed based on updated design and construction planning information
  - To be endorsed by the Environmental Monitor as consistent with the OEMP and Outline CEMP
- Commissioning Environmental Management Plan (COEMP)
  - To be developed based on updated design and construction planning information
  - To be endorsed by the Environmental Monitor as consistent with the OEMP and Outline COEMP
- Sub-plans for various environmental elements as demonstrated in **Figure 1** above.
  - To be developed based on updated design and construction planning information

- To be endorsed by the Environmental Monitor as consistent with the OEMP and relevant outline sub-plan

3.3.1 Construction Environmental Management Plan

At least 30 business days prior to the commencement of any relevant construction activities, the Contractor must provide the Delivery Authority with its detailed CEMP endorsed by the Environmental Monitor as consistent with this OEMP, the Outline CEMP and the Imposed Conditions. The Contractor must also provide a programme of construction activities and any relevant construction method statements. The construction method statements must be sufficient to inform a person about the nature, duration, scale and intensity of each construction activity. The Contractor's CEMP and construction method statements will be provided by the Delivery Authority to the Coordinator-General at least 20 business days prior to the commencement of the relevant construction activities.

The Outline CEMP is attached at **Appendix B**.

3.3.2 Commissioning Environmental Management Plan

The Contractor must provide the Delivery Authority with a detailed COEMP. The Contractor must also provide a programme of commissioning activities and any relevant construction method statements. The construction method statements must be sufficient to inform a person about the nature, duration, scale and intensity of each commissioning activity. The Contractor's COEMP must identify how the EDRs are to be achieved.

The Outline COEMP is attached at **Appendix C**.

3.3.3 Environmental Management Sub-plans

The sub-plans identified in **Figure 1** are required to be prepared by the Contractor prior to the commencement of relevant Project Works, in accordance with the Coordinator-General's Imposed Conditions. The Delivery Authority has provided outline environmental management sub-plans. The sub-plans will be updated and further refined by the Contractor to take into account detailed design and updated construction planning. These sub-plans must remain consistent with the OEMP and must be endorsed by the Environmental Monitor as such.

The outline sub-plans are attached at **Appendix D** through **Appendix W**.

3.3.4 Environmental Work Method Statements

Environmental work method statements (EWMS) or similar risk management systems are to be prepared to manage and control all high-risk activities that have the potential to impact on the environment or on heritage. EWMS will be prepared prior to the commencement of relevant construction activities on site and will incorporate relevant mitigation measures and controls from management plans. They will also identify key procedures to be used concurrently with the EWMS. EWMS are to be specifically designed to communicate requirements, actions, processes and controls to construction personnel using plans, diagrams and simple written instructions. EWMS for activities identified as having high environmental risk will contain management actions as identified in the relevant EMP.

Regular monitoring, inspections and auditing against compliance with the EWMS shall be undertaken to ensure that all controls are being followed and that any non-conformances are recorded with corrective actions implemented as soon as practicable.

An EWMS register will maintained by the Contractor and will be available upon request.

3.4 Approach

Consistent with the Imposed Conditions, the approach to environmental management for the Project is based on the following principles:

a) Environmental outcomes:
   i. for operations are achieved through the EDRs; and
   ii. for the construction phase may be achieved by meeting the performance criteria or by implementing appropriate mitigation measures or a combination of both, and, where required, closing out of corrective actions.

b) Satisfaction of the performance criteria achieves the environmental outcomes and:
   i. to the extent practicable, performance criteria must be measurable; and
   ii. where appropriate, performance criteria may be qualitative, or may be based on applicable goals and standards.

c) Mitigation measures must achieve the environmental outcomes. Mitigation measures are required where predictive modelling indicates that the performance criteria would not be achieved. Mitigation measures must:
   i. be developed to achieve the environmental outcomes. Mitigation measures may satisfy the performance criteria as a means of achieving the environmental outcomes;
   ii. be developed in consultation with Directly Affected Persons (and the Community and Stakeholder Engagement Team), where mitigation measures at the source will not achieve the environmental outcomes. Such measures must be entered in an environmental management register maintained by the Contractor and made accessible to the Environmental Monitor and the Delivery Authority; and
   iii. be monitored for implementation and achievement of the environmental outcomes.

   The mitigation measures entered in the environmental management register will remain confidential between the Delivery Authority, Contractor, the Directly Affected Persons and the Environmental Monitor. The Environmental Monitor will track the effectiveness of the mitigation measures and may recommend the application of measures in general terms found to be effective in similar circumstances.

d) Inspections, monitoring, auditing and reporting is undertaken to measure achievement of the environmental outcomes. The monitoring results will inform the need for corrective actions where the environmental outcomes are not achieved.

e) Corrective actions must be developed and implemented where inspections, monitoring or auditing indicates that the environmental outcomes have not been achieved.

f) An effective and responsive complaints system must be established and maintained during construction and commissioning, in accordance with that which is outlined in the CSEP.

g) Environmental reporting procedures must be established to demonstrate achievement or otherwise of the environmental outcomes. Reporting on environmental elements will be captured in the monthly and annual reports produced by the Contractors and endorsed by the Environmental Monitor.

3.5 Structure

The EMPs follow the format that has been outlined below. The structure of the environmental outcomes and performance criteria nominated for various environmental elements is outlined in **Table 2**.

Table 2: Components of EMPs and sub-plans

EMP component	Description	Effect
Environmental element	Aspect of Project implementation to be managed as it affects environmental values.	Must be addressed.
Environmental outcome(s)	Required outcomes of the Project for an environmental element.	Must be achieved.
Performance criteria	Measurable goals or indicators of the environmental outcome for an environmental element. The environmental outcomes are achieved when the performance criteria are met, which may be demonstrated by monitoring.	Must be achieved. If performance criteria cannot be achieved, this serves as a trigger for mitigation measures to be implemented.
Mitigation measures	Mitigation measures are either: • measures to satisfy the performance criteria (and in turn achieve the environmental outcomes); or • actions developed in consultation with Directly Affected Persons to achieve the environmental outcome for the element. The mitigation measures provided in the OEMP, Outline CEMP, Outline COEMP and any of its sub-plans are advisory only and may be revised through detailed design and construction planning. Additional or different mitigation measures may be applied to achieve the environmental outcome.	The mitigation measures to achieve the environmental outcomes must be developed in response to: • the predicted scale, intensity and duration of Project impacts; and • in consultation with Directly Affected Persons. The mitigation measures developed in consultation with Directly Affected Persons must be entered into the register of mitigation measures to be maintained by the Environmental Monitor before relevant Project Works can commence. Once registered, the mitigation measures become the measure for future monitoring and compliance.
Monitoring	Monitoring is to be undertaken to determine: • satisfaction of the performance criteria; or • implementation and effectiveness of mitigation measures. A monitoring programme for a particular environmental element must be designed and included in each individual sub-plan prior to the commencement of relevant project works.	Mandatory Monitoring must be conducted by suitably accredited and qualified personnel. Monitoring results will be reviewed by the Independent Environmental Monitor.
Reporting	Purpose and frequency of reporting to demonstrate achievement of the environmental outcomes and	Mandatory

EMP component	Description	Effect
	satisfaction of the performance criteria or mitigation measures.	
Corrective actions	Actions to be developed and implemented in response to an exceedance of the relevant performance criteria, or failure to implement a mitigation measure.	Mandatory

This structure is adopted in each of the Environmental Management sub-plans. These sub-plans form the basis of the detailed Environmental Management sub-plans that the Contractor is required to develop as part of the CEMP.

3.6 Environmental Monitor

The Delivery Authority has engaged an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Environmental Monitor for the duration of construction. The Environmental Monitor will endorse the Contractor's CEMP as being consistent with the OEMP and Imposed Conditions prior to commencement of relevant project works. The Contractor must ensure that the Environmental Monitor has reasonable site access and access to all information required to perform its function, including:

- approvals;
- the Contractor's CEMP;
- results of all monitoring required under the Imposed Conditions; and
- relevant information relating to complaints, including access to the complaints database.

The Environmental Monitor will review and endorse the Contractor's CEMP/s as well as monitor compliance with the Imposed Conditions, and the Delivery Authority's OEMP and CEMP (including sub-plans). The Environmental Monitor will also maintain the register of those mitigation measures agreed in consultation with Directly Affected Persons. Once registered, the mitigation measures then become the measure for future monitoring and compliance. The Environmental Monitor will also review the monthly and annual reports and monitoring results. The Environmental Monitor will provide advice to the Contractor and the Delivery Authority on the outcomes and adequacy of each of the aforementioned tasks.

3.7 Roles and Responsibilities

The structure, organisational roles, responsibilities and accountabilities in relation to environmental management throughout the construction and commissioning phases are outlined in **Table 3** below.

Table 3: Project roles and responsibilities – construction and commissioning

Project responsibilities
Coordinator-General
• Administers the *State Development and Public Works Organisation Act 1971*
Chief Executive, Department of Transport and Main Roads
• Entity with jurisdiction for a number of the Imposed Conditions
The Delivery Authority – design and construction
• Oversee the Contractor's detailed design process to achieve the environmental outcomes. The detailed design process may run progressively and in parallel with the construction programme, to ensure compliance with the Imposed Conditions and the EDRs. • Prepare the OEMP, the Outline CEMP and the Outline COEMP. These will form the basis of the Contractor's CEMP and COEMP. • Ensure there is adequate and accurate identification and reporting of any exceedances of quantitative performance criteria, failure to achieve qualitative performance criteria, and failure to implement mitigation measures during construction. • In consultation with the Contractor, ensure corrective actions arising from exceedances or failures are implemented as soon as possible. • Establish and maintain during design, construction and commissioning, a Project website for the purpose of informing people about Project activities. • Appoint an independent, suitably skilled and qualified entity as the Environmental Monitor for the Project. • Establish a community advisory group and appoint an independent, suitably skilled entity as the Community Relations Monitor for the Project.
Contractors – design and construction
• Manage the detailed design process to achieve the environmental outcomes. The detailed design process may run progressively and in parallel with the construction programme, to ensure compliance with the Imposed Conditions and the EDRs. • Prepare the CEMP to comply with the Imposed Conditions and be consistent with the OEMP. The CEMP must be endorsed by the Environmental Monitor as being consistent with the OEMP and the Imposed Conditions. The endorsed CEMP must be submitted to the Coordinator-General at least 20 business days prior to the commencement of Relevant Project Works. • Implement the CEMP for the duration of Relevant Project Works. • Maintain at the Project office and at each Project worksite: – a current copy of the endorsed CEMP containing a record of all revisions and updates, the completion of planned actions, monitoring records, and reports which are made available. – a schedule of all necessary approvals, including development approvals, environmental licenses, workplace health and safety and all other construction-related approvals necessary to undertake the works. • Establish an environmental management register of construction mitigation measures developed in consultation with Directly Affected Persons. • Ensure that construction mitigation measures are implemented in accordance with the CEMP.

Project responsibilities

- Undertake regular monitoring (as detailed in the CEMP) in relation to environmental performance criteria and mitigation measures to ensure the environmental outcomes are being achieved. Validated monitoring results must be reported each month in the monthly environmental reports for the duration of the construction and commissioning phases. This will inform the basis for the reporting of monitoring results on the Project website each month.
- Ensure there is adequate and accurate identification and reporting of any exceedances of performance criteria, failure to achieve performance criteria, and failure to implement mitigation measures during construction.
- Implement corrective actions arising from such exceedances or failures as soon as possible and in accordance with the CEMP. Non-compliances must be resolved, where relevant, in consultation with Directly Affected Persons. Corrective actions must be reported in the monthly environmental report.
- Establish and maintain open and effective communication, in consultation with the Delivery Authority, with people living or working near the Project worksites, people relying on the public transport or road transport network likely to be affected by Project construction traffic, and relevant stakeholders affected by the Project Works about:
  - the construction programme;
  - the intended scale, timing and duration, and nature of proposed work; and
  - proposed mitigation measures and monitoring of impacts, for the duration of the construction phase.
- Establish and maintain a process for receiving, recording and responding to validated complaints about construction issues in a timely way. This process shall be in accordance with the CSEP.
- Ensure the Project is carried out in accordance with relevant environmental legislation, policies and guidelines.
- Ensure all site personnel are inducted in and are aware of their environmental and cultural heritage responsibilities and obligations under relevant legislation and the requirements of the CEMP.
- Appoint competent personnel to implement and manage the application of the CEMP.

Queensland Rail – design and construction

- Statutory authority established under the *Queensland Rail Transit Authority Act 2013* (Qld) and reports to the Minister for Transport and Main Roads.
- Queensland Rail (QR) discharges its statutory functions through its wholly-owned subsidiary Queensland Rail Limited. Queensland Rail Limited is a Rail Transport Operator (RTO) under the Rail Safety National Law (RSNL) for the south-east Queensland passenger rail network.
- QR will act as the RTO in respect of any Project Activities carried out in Queensland Rail Limited's land during the design & construct phase, and Maintenance Phase and all of the Rail Integration Systems (RIS) Works carried out by the RIS alliance.
- Unless the context otherwise requires, QR, together with its subsidiary Queensland Rail Limited, are collectively referred to as "Queensland Rail" for the purposes of the EMP documents.

BCC – design and construction

- Liaise with the Delivery Authority about:
  - Project design issues affecting land use planning intentions;
  - traffic management and pedestrian management during the construction phase, particularly in relation to worksites;
  - impacts and changes to bus services operated by BCC; and
  - the relocation of public utilities.
- Carry out responsibilities in relation to delegated administration of permitting assessment and management of local law requirements, where applicable.
- Liaise with the Delivery Authority on relevant matters, such as urban design measures, local management plans and traffic management.

QUU – design and construction

Project responsibilities

- Liaise with the Delivery Authority about:
  - Project design issues affecting water and wastewater infrastructure; and
  - The relocation of public utilities (water and wastewater infrastructure).
- Liaise with the Delivery Authority on relevant matters.

Environmental Monitor – design and construction

- Review and endorse the Contractor's CEMP and sub-plans as being consistent with the OEMP and the Imposed Conditions.
- At all times have access to a current copy of the register of environmental approvals, authorities or permits necessary to implement the Project. The register must include an inventory of conditions placed upon all such approvals. This register will be accessible by the Environmental Monitor and updated and maintained by the Contractor.
- At all times have access to a current copy of the approved OEMP and the endorsed CEMP including any sub-plans as well as progressive updates as detailed design and construction advances.
- At all times have access to an environmental management register of construction mitigation measures developed in consultation between the Contractor, the Environmental Monitor and Directly Affected Persons.
- Provide input in developing reasonable and practicable mitigation measures for predicted or recorded exceedances of performance criteria.
- Monitor compliance with the Imposed Conditions, the CEMP and sub-plans.
- Have oversight of the implementation of the environmental monitoring requirements established in the CEMP. Review the results of the monitoring and verify these results if considered necessary.
- When requested by the Delivery Authority, attend scheduled meetings of community advisory groups as an independent, non-participatory observer.
- Complete any other tasks necessary to fulfil the requirements of Imposed Condition 7 – Environmental Monitor.

Community Relations Monitor – construction and commissioning

- Communicate with the Contractor and the Environmental Monitor about community consultation strategies.
- Participate in the Community Advisory Groups for the duration of construction at each locality likely to experience impacts during the construction of the Project.
- Disseminate Project information to the community and Directly Affected Persons, in accordance with the CSEP and as agreed with the Delivery Authority.
- Inform the Environmental Monitor as soon as practicable of community concerns about construction and commissioning.
- At all times have access to a current copy of the CEMP (including sub-plans), mitigation measures and complaints. This will be updated and maintained by the Contractor, who provides access to the Community Relations Monitor.
- To the extent reasonable and practicable, resolve community complaints not resolved by the complaints process where agreed with the Delivery Authority.
- Facilitate discussions between the Contractor and Directly Affected Persons about required mitigation measures. Attend all meetings, providing input on standard responses for similar issues.
- Participate in scheduled meetings to consider and provide feedback to the Contractor and the Delivery Authority via the Environmental Monitor, about construction matters referred to the community advisory group for comment, construction planning and construction activities, and views received from the wider community.
- Provide timely comments in an advisory role to the Environmental Monitor on the CEMP for the Project as it relates to the CSEP.
- Provide advice to the Environmental Monitor during the construction phase in relation to the community engagement plan.

Project responsibilities
• For the construction phase, review the environmental reports prepared by the Contractor and provide feedback to the Environmental Monitor in respect of complaints and community engagement.

3.8 Subcontractor Management

Though the Contractor may delegate environmental requirements and responsibilities to subcontractors, the Contractor will remain responsible for compliance with the approved and endorsed Environmental Management Plans and all relevant legislative requirements.

All subcontractors are required to attend a General Site Induction where the requirements and obligations of the OEMP, CEMP and relevant sub-plans are to be communicated at a site and delivery level.

4. Legislative Requirements

Construction of the Project must comply with the approved OEMP, CEMP and any sub-plans (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the Imposed Conditions. The Contractor's EMPs must include a procedure for reviewing and updating a register of legislation, guidelines and standards applicable to the Project at least every six months.

It is the Contractor's responsibility to ensure they comply with all relevant legislation, guidelines and standards.

4.1 Commonwealth Legislation

Commonwealth legislation that is likely to be relevant to the Project includes:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984;*
- *Disability Discrimination Act 1992;*
- *Environment Protection and Biodiversity Conservation Act 1999;*
- *Native Title Act 1993; and*
- *National Greenhouse and Energy Reporting Act 2007.*

4.2 State Legislation

State legislation that is likely to be relevant to the Project includes:

- *Cross River Rail Delivery Authority Act 2016;*
- *Environmental Protection Act 1994;*
- *Environmental Protection (Water and Wetland Biodiversity) Policy 2019;*
- *Environmental Protection (Noise) Policy 2019;*
- *Environmental Protection (Air) Policy 2019;*
- *Aboriginal Cultural Heritage Act 2003;*
- *Acquisition of Land Act 1967;*
- *Biosecurity Act 2014;*
- *Building Act 1975;*
- *City of Brisbane Act 2010;*
- *Coastal Protection and Management Act 1995;*
- *Economic Development Act 2012;*
- *Electricity Act 1994;*
- *Electrical Safety Act 2002;*
- *Explosives Act 1999;*
- *Fisheries Act 1994;*
- *Forestry Act 1959;*
- *Land Act 1994;*
- *Land Title Act 1994;*
- *Local Government Act 2009;*
- *Nature Conservation Act 1992;*
- *Planning Act 2016;*
- *Plumbing and Drainage Act 2018;*
- *Queensland Heritage Act 1992;*
- *Rail Safety National Law (Queensland) Act 2017;*
- *South East Queensland Water (Distribution and Retail Restructuring) Act 2009;*
- *State Development and Public Works Organisation Act 1971;*
- *Survey and Mapping Infrastructure Act 2003;*
- *Transport Infrastructure Act 1994;*
- *Transport Operations (Passenger Transport) Act 1994;*

- *Transport Operations (Road Use Management) Act 1995;*
- *Transport Planning and Coordination Act 1994;*
- *Transport Security (Counter Terrorism) Act 2008;*
- *Vegetation Management Act 1999;*
- *Waste Reduction and Recycling Act 2011;*
- *Water Act 2000;*
- *Water Supply (Safety and Reliability) Act 2008; and*
- *Work Health and Safety Act 2011.*

4.3 Guidelines and Standards

Guidelines and standards related to environmental management that must be met for the Project include, but are not limited to:

- TMR standards, including:
  - Technical Manual – Environmental Processes Manual (August 2013)
  - Technical specifications and standards
  - MRTS51 Environmental Management – TMR Specifications
  - MRTS52 Erosion and Sediment Control – TMR Specifications
  - MRTS16 Landscape and Revegetation Works – TMR Specifications

- Queensland Rail standards, including:
  - Safety and Environment Management System (SEMS)

- TMR (TransLink) standards, including:
  - TransLink Station Signage Manual
  - TransLink Public Transport Infrastructure Manual (2015)

- BCC environmental policies and guidelines, including:
  - Urban Stormwater Management Strategy
  - Erosion Treatments for Urban Creeks
  - Stormwater Outlets in Parks and Waterways
  - Landscape Design for Water Conservation
  - Guidelines on Identifying and Applying Water Quality Objectives in Brisbane City
  - S190 Landscaping - Reference Specifications for Civil Engineering Work

- International Erosion Control Association Best Practice Erosion and Sediment Control Guidelines 2008 (IECA Guidelines)

There are a number of guidelines and codes that must also be considered for the Project. These include, but are not limited to, the performance guidelines described in **Table 4** below which apply to monitoring and auditing of performance.

Table 4: Performance guidelines

Element	Performance guidelines
General	AS/NZS ISO 14001 Environmental management systems.
Hazard and risk	AS/NZS ISO 31000 Risk Management – Principles and Guidelines. AS/NZA 3833:2007 The Storage and Handling of Mixed Classes of Dangerous Goods, in Packages and Intermediate Bulk Containers. AS 1216 Class Labels for Dangerous Goods.

Element	Performance guidelines
	AS 1678 Emergency Procedure Guides – Transport. AS 1940 Storage and Handling of Flammable and Combustible Liquids. AS 3780 The Storage and Handling of Corrosive Substances. AS 2809 Road Tank Vehicles for Dangerous Goods. AS 2931 Selection of Use of Emergency Procedure Guides for Transport of Dangerous Goods. AS 2187.2 Explosives – Storage and Use – Use of Explosives. Australian Explosives Code for the Transport of Explosives by Road and Rail (AEC3).
Waste	Waste Reduction and Recycling Plan 2018-2021.
Water quality / drainage	Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000). Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018). Queensland Urban Drainage Manual 2017 (Institute of Public Works Engineering Australia).
Soils	National Environment Protection (Assessment of Site Contamination) Measure 1999. Queensland Acid Sulfate Soils Technical Manual. Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008). AS 4482.1 Guide to the investigation and sampling of sites with potentially contaminated soil – Non-volatile and semi-volatile compounds. PFAS National Environmental Management Plan (Version 2.0, January 2020)
Air	Air with AS 3580. 14-2011 Methods for sampling and analysis of ambient air. Part 14: Meteorological monitoring for ambient air quality monitoring applications.
Noise	Noise Measurement Manual (DEHP, 2013). AS 1055 Acoustics – Description and Management of Environmental Noise. AS 2436 Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Sites. AS 2107 Acoustics – Recommended design sound levels and reverberation times for building interiors. AS 2377 Acoustics – Methods for the Measurement of Railbound Vehicle Noise. AS 2702 Acoustics – Methods for Measurement of Road Traffic Noise.

Element	Performance guidelines
Vibration	AS 2670 Evaluation of human exposure to whole-body vibration.
Lighting	AS 4282 Control of the Obtrusive Effects of Outdoor Lighting.

It is the responsibility of the Contractor to ensure that the guidelines being used are the most up-to-date version. An update on these guidelines and standards should be sought from the relevant agency if required.

5. Training

5.1 Environmental Training

To assist with managing environmental risks associated with Project Works and fulfilling legislative duties and obligations, a training plan must be developed by the Contractor/s, identifying training requirements for each role within the Project. The Contractor will develop specific environmental and cultural heritage training required for each role and all relevant personnel as part of their detailed CEMP.

A training register must be maintained by the Contractor to record training attendance and currency of training for each staff, contractor and visitor.

5.2 Environmental Induction

All Contractors, staff, sub-contractors and visitors to construction worksites must attend general induction training that covers environmental management requirements, site-wide controls and site-specific / work-specific risks and mitigation measures. At a minimum, the induction should cover the below information:

- Relevant legislation;
- Environmental management plans and associated sub-plans;
- General Environmental Duty;
- Cultural Heritage & Cultural Heritage Duty of Care;
- Non-Indigenous Cultural Heritage;
- Duty to Notify;
- Key sensitive areas;
- Environmental No Go Areas;
- Water quality requirements;
- Air, noise and vibration requirements;
- Erosion and sediment control;
- Nature conservation;
- Contaminated land and hazardous substances;
- Spill management procedure;
- Waste removal;
- Incidents including definition, management and reporting requirements;
- Requirements of other agencies; and
- Staff code of conduct and behaviour.

The site induction should also include general duties under contractual requirements and measures established in the OEMP and the CEMP.

An induction register must be maintained by the Contractor to record induction attendance for all staff, Contractors, sub-contractors and visitors. This must be made available to the Delivery Authority upon request.

5.2.1 Toolbox Talks

Toolbox talks should be used as a method of raising awareness and educating personnel on issues related to all aspects of construction including environmental issues. Toolbox talks can be used to ensure environmental awareness continues throughout the Project.

6. Incidents and Emergencies

There are obligations under the *Environmental Protection Act 1994* (Qld) (EP Act) to notify the Chief Executive, Department of Environment and Science (DES) of incidents that cause or threaten unlawful 'material or serious environmental harm' as defined by the EP Act. Notification must be made to DES in accordance with the EP Act. There are also obligations to other regulatory agencies, TMR, QR and other stakeholders depending on the scale and type of incident.

The Imposed Conditions impose obligations to notify the Environmental Monitor and the Coordinator-General in writing of incidents in which a non-conformance has occurred in relation to the Imposed Conditions (including the CEMP or COEMP as relevant). The reporting timeframe for notification to the Coordinator-General and Environmental Monitor is 48 hours. The following section has been developed to allow for the timely management, classification and reporting of environmental incidents.

Incidents that may occur during the Project include a non-conformance with an Imposed Condition, a validated complaint from stakeholders of an environmental nature that is not authorised by Imposed Conditions, or an incident that causes or threatens unlawful material or serious environmental harm.

All Project and subcontractor personnel will report all environmental incidents and near misses to their supervisor and notify the Contractor's Environmental Team who is responsible for completing all reporting requirements. The Contractor will immediately notify the Delivery Authority. Reports will be issued to the Delivery Authority, who will then issue to the Coordinator-General, DES and any other regulatory agencies who require notification. The incident or near miss will be recorded using processes outlined in the CEMP.

6.1 Incident Types

Incidents include, but are not limited to:

- Any breach or potential breach of the legislation or an approval or permit condition.
- Unauthorised harm or desecration to Aboriginal objects or Aboriginal places.
- Unauthorised damage or interference to threatened species, endangered ecological communities or critical habitat.
- Unauthorised damage or destruction to any State or locally significant relic or Heritage item.
- Unauthorised clearing or clearing beyond the extent of the Project footprint.
- Unauthorised habitat damage.
- Unauthorised discharge from sediment basins or other containment devices.
- Inadequate installation and subsequent failure of temporary erosion and sediment controls (ESC).
- Potential contamination of waterways or land.
- Potential impact to level or contamination of groundwater.
- Accidental or unauthorised intentional starting of fire.
- Unauthorised dumping of waste.
- Spills of fuel, oil chemical or other hazardous material.

6.2 Incident Classification, Procedure and Reporting

In addition to the requirements under the Imposed Conditions, all Project, Contractor and subcontractor personnel will report all environmental incidents and near misses in accordance with processes agreed between the Contractor and the Delivery Authority prior to the commencement of Project Works.

6.3 Incident Prevention Management

Key effective incident prevention is undertaken by continual environmental inspections and monitoring for the duration of construction and commissioning. During construction the following preventative strategies will be implemented:

- Daily informal visual inspections of active work sites.
- Completion of the Project's Environmental Checklist which is to be developed as part of the Contractor's CEMP.
- Timely close out of corrective actions as identified in the Project's Environmental Checklist.
- Prompt maintenance and repairs identified by daily visual checks of corrective actions as identified in the Project's Environmental Checklist.
- Environmental training identified in the CEMP as being required.
- Environmental audits as identified in the CEMP.

Preventative or corrective actions will be identified in response to an environmental incident, during daily visual inspections or through the Project's Environmental Checklist.

6.4 Incident Investigation

Where an incident has occurred, an incident investigation must be undertaken by the Contractor, with the following elements to be included as a minimum:

- Identify the extent and cause of the incident.
- Identify the immediate corrective actions taken to prevent the impact from continuing including the personnel responsible for undertaking these actions.
- Identify corrective actions to remediate the impacted area including the personnel responsible for undertaking these actions.
- Undertake a root cause analysis.
- Assess risk of reoccurrence.
- Identify procedural deficiencies.
- Implement investigation recommendations from root cause analysis or procedure deficiencies.
- Report findings to the Delivery Authority.
- Where appropriate, provide any training that may assist staff and subcontractors in preventing reoccurrence of an event of a similar nature in future.

6.5 Complaint Management

All complaints are to be dealt with in accordance with the complaints management procedure outlined in the CSEP to ensure complaints received by the community and stakeholders are managed appropriately and consistently.

7. Inspections, Monitoring, Auditing and Reporting

7.1 Environmental Inspections

The Contractors will undertake environmental inspections to develop and evaluate the effectiveness of environmental controls.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance is observed, they will be recorded on the Project's Environmental Checklist. A register of all corrective actions including due date, closed out date, item description and responsible person will be recorded in such a way as to be able to be generated into a register when required.

The following inspections will be undertaken for the duration of the CRR Project:

Table 5: Project Environmental Inspection Requirements

Type of Inspection	Frequency	Form of Record
Informal inspection of active work sites	Daily	Daily diary
Formal inspection of active work sites	Weekly	Project Environmental Checklist
Rain Event (2-year 6-hour ARI)	Event	Project Water Quality Monitoring Form
Post rain for ESC Capacity (ensure > 75% capacity in ESC controls)	Event	Project Environmental Checklist
'Serious Environmental Harm', 'Material Environmental Harm' as defined by the *Environmental Protection Act* 1994 (Qld).	Incident	Incident Report
Non-conformance	Event	Non-conformance Report

7.2 Environmental Monitoring

Monitoring will be undertaken at various sensitive receptors to validate the impacts predicted for the Project and to measure the effectiveness of environmental controls. Environmental performance must be monitored by the Contractor for each environmental element throughout the Project. Monitoring must address performance in relation to the environmental outcomes and the performance criteria, and implementation of the mitigation measures needed to achieve the environmental outcomes. Monitoring will also assist in addressing potential community complaints.

The specific monitoring actions for each environmental element have been outlined in the relevant sub-plan and will be refined and finalised by the Contractor in the CEMP. The CEMP must, as a minimum, address monitoring requirements identified in the OEMP, the Outline CEMP and the Imposed Conditions.

During the construction phase, monitoring must include, as a minimum:

- collection, measurement and analysis of specified data at the locations and frequencies required by the EMPs according to recognised and accepted scientific methods by suitably qualified people;
- daily visual environmental site inspections at each worksite, including inspections of environmental control measures and environmental impacts of construction activities; and
- targeted monitoring of key parameters in response to an incident or failure to comply with the Imposed Conditions, the CEMP or one of the sub-plans.

All monitoring equipment is to be calibrated regularly and the results of the calibrations recorded. All monitoring and sampling undertaken is to be in accordance with applicable guidelines or Australian Standards. All analytical testing performed is to be undertaken in accordance with National Association of Testing Authorities (NATA) approved procedures or if this is unavailable, be performed to the most relevant standard. New technologies or materials may be used provided standards and outcomes are equal to or exceed current recognised standards.

The monitoring requirements for various environmental aspects include, but are not limited to, the below:

Table 6: Project Monitoring Requirements

Description	Frequency	EMP or sub-plan
Water Quality	Post-rain event	Water Quality Management Plan
Water Quality	Monthly	Water Quality Management Plan
Identification of Aboriginal Cultural Heritage locations	Pre-construction	Cultural Heritage Management Plan
Pre-clearance Ecological Surveys	Pre-construction	Nature Conservation Management Plan
Pre-clearance weed identification and removal	Pre-construction	Nature Conservation Management Plan
Dust Noise and Vibration	Pre-construction at sensitive receptors and ongoing monthly monitoring	Air Quality Management Plan Noise and Vibration Management Plan
Dust Noise and Vibration	Event in relation to complaint and/or at sensitive receptors and ongoing monitoring for the duration of the Project	Air Quality Management Plan Noise and Vibration Management Plan
Fauna injury and death register	Ongoing monthly monitoring for the duration of the Project	Nature Conservation Management Plan
Waste Register	Ongoing monthly monitoring for the duration of the Project	Waste Management Plan

Description	Frequency	EMP or sub-plan
Rainfall Register	Ongoing daily monitoring for the duration of the Project	Water Quality Management Plan

Any other monitoring nominated in the sub-plans must be undertaken by Contractor and reported on in accordance with reporting requirements outlined in the CEMP.

7.3 Environmental Auditing

Audits will be undertaken to assess the effectiveness of environmental controls, compliance with the Imposed Conditions, OEMP, Environmental Design Requirements and other relevant permits, approvals, and guidelines. The audits will include review of prior audits and the impacts of associated corrective actions. Audit requirements for Imposed Conditions, CEMP and associated Sub-plans will be managed through standalone audits, site inspections or surveillance inspections.

Findings and compliance results are to be reported to the Environmental Monitor and the Delivery Authority.

The auditing requirements for the Project include, at a minimum, the below:

Table 7: Project Auditing Requirements

Description	Frequency	Parties Involved	Reporting Requirements
AS/NZS ISO 14001 Audit	Annually	External	Environmental Monitor, Contractor
Imposed Conditions	Monthly	Internal	Environmental Monitor, Contractor
CEMP and Sub-plans	Monthly	Internal	Environmental Monitor, Contractor

External auditing will be undertaken by an independent environmental auditor in accordance with ISO19011:2003 – Guidelines for Quality and or Environmental Management Systems Auditing.

The Contractors and Environmental Monitor must maintain appropriate audit records, and these are to be reported on in the Monthly and Annual Reports.

7.4 Corrective Actions

Corrective actions must be undertaken where monitoring or validated complaints and/or incidents indicate the environmental outcomes are not achieved, either because the performance criteria have not been met, or mitigation measures have not been implemented. Where corrective actions become necessary, the works that do not achieve the environmental outcomes must cease until appropriate corrective actions have been implemented.

Corrective actions to achieve the environmental outcomes must be developed by the Contractor in consultation with the Delivery Authority and Directly Affected Persons where deemed necessary. These corrective actions shall address the underlying causes and not just the presenting results.

Corrective actions must be initiated by the Contractor as soon as practicable after it becomes evident, through monitoring, validated complaints or validated incidents, that the environmental outcomes for the relevant works are not being achieved.

The Contractor must maintain a register of corrective actions. The Contractor must also demonstrate that the corrective actions have been implemented and appropriately communicated within their organisation and supply chain to prevent reoccurrence.

7.5 Environmental Reporting

A mechanism for reporting on monitoring and compliance must be established in the CEMP.

Reporting will be undertaken to validate the impacts predicted for the Project and to comply with the Imposed Conditions. Reporting requirements for the Project are as follows:

Table 8: Project Reporting Requirements

Report and Scope
Monthly Environmental Design Report
During detailed design, a monthly Environmental Design Report must be submitted to the Environmental Monitor which verifies that the design completed in the reporting period is in accordance with the Environmental Design Requirements.
Monthly Environmental Report (Construction)
The Contractor must prepare a Monthly Environmental Report during the construction phase of the Project. The Monthly Environmental Report must include: • monitoring data required by the Imposed Conditions and CEMP undertaken for the period and, where required, an interpretation of the results; • a schedule of all validated monitoring results. Validated monitoring results must be produced for the preceding month's monitoring programme; • details of any non-compliance event, including a description of the incident, resulting effects, corrective actions, revised construction practices to prevent a recurrence, responsibility and timing; • reporting of complaints, including the number of complaints, description of issues, responses and corrective actions, maintaining appropriate confidentiality (in accordance with Imposed Condition 9(f)(vii)). A copy of the Monthly Environmental Report must be submitted to the Delivery Authority and the Environmental Monitor and be provided to the Coordinator-General and posted on the project website in accordance with the Imposed Conditions.
Construction Incidents and Non-Compliance Report
Interim report In addition to any statutory requirements, within 48 hours of an environmental incident or a non-compliance with the Imposed Conditions or the CEMP being detected, an interim report providing details of the incident or non-compliance and initial response, in accordance with Imposed Condition 5(a) and 5(b) is to be prepared by the Contractor and provided to the Environmental Monitor and the Coordinator-General. **Comprehensive report** Within 14 days following the notification of a non-compliance event, written advice detailing the following information must be provided to the Environmental Monitor and the Coordinator-General: • a description of the non-compliance event including details of the location, date and time of the non-compliance event; • the name and contact details of a designated contact person; • the circumstances in which the non-compliance event occurred;

Report and Scope

- details of any complaint in relation to the non-compliance event;
- the cause of the non-compliance event;
- a description of the environmental effects of the non-compliance event;
- the results of any sampling or monitoring performed in relation to the non-compliance event;
- actions taken to mitigate the environmental effects of the non-compliance event; and
- proposed actions to prevent a reoccurrence of the non-compliance event, including timing and responsibility for implementation.

The report must be provided as part of the next monthly environmental report.

Annual Environmental Report (Construction)

The Annual Environmental Report must be prepared by a suitably qualified person and submitted to the Coordinator-General and the Environmental Monitor no later than 31 July in any year during the construction phase. The report must address the previous 12 months activities.

The Annual Environmental Report must include:

- an evaluation of environmental management in relation to achievement of environmental outcomes, satisfaction of the performance criteria or where not satisfied, implementation of mitigation measures. The evaluation must extend to the effectiveness of mitigation measures for particular environmental elements and localities.
- an overview and evaluation of the implementation of the complaints handling and response process and procedure. The evaluation, in part, must refer to the number of complaints and the significance of the issues raised in complaints, together with closing out of the complaints to the satisfaction of the complainants.
- an overview and evaluation of the environmental record achieved during the reporting period. The environmental record must address, in part, the number and significance of environmental incidents and non-compliances with the Imposed Conditions and CEMP.
- an evaluation of the effectiveness of the community information and engagement system for the Project. The evaluation must include, in part, the system for advanced notice of construction works and the availability of relevant, comprehensive information about the programme of works and the nature, scale and intensity of work packages.
- A summary of key issues and significant reoccurring issues for community relations. The overview must include an analysis of each issue to identify any common cause, successful mitigation measures and opportunities to resolve and close out such issues.
- Identification of aspects for improvement in environmental management and community relations, and proposed actions to achieve such improvements.

8. Documentation

8.1 Environmental Records

The Contractor is responsible for maintaining all environmental management documents and records associated with conditions as outlined in the Project's environmental management documentation. Types of records will include, but are not limited to:

- Monitoring, inspection and compliance reports/records;
- Correspondence with Regulatory Agencies;
- Correspondence with the public and stakeholders;
- Induction and training records;
- Reports on environmental incidents, other environmental non-conformances, complaints and follow-up action; and
- Community engagement information.

All environmental management documents are subject to ongoing review and continual improvement.

8.2 Document Control

The Contractor will coordinate the preparation, review and distribution as appropriate, of the environmental documents.

A register must be retained on each worksite of all licenses, permits, approvals and any other agreements pertaining to the Project Works on that worksite.

Project documents, including the monthly and annual environmental reports and incident reports, are to be maintained and are to be made available for inspection on request by the Delivery Authority and by any government agency with relevant regulatory responsibilities. All monthly and annual environmental reports and incident reports must be kept for a minimum of at least five years after completion of construction of the Project or otherwise in accordance with applicable legislation or the regulator's requirements.

A procedure for managing revisions is to be established to ensure that all Project personnel have ready access to the latest revision of the relevant EMP at all times. The current version of the CEMP is to be available on the Project website at all times. A system must be established for registering all in-coming and out-going correspondence regarding environmental matters during the design, construction and commissioning phases of the Project. The document management system must also include:

- all environmental documents and plans, including all versions of the EMPs and related sub-plans, monitoring results, and environmental reports;
- all approvals, permits and licenses necessary to conduct the Project Works;
- technical investigations and studies;
- photographic and other visual records;
- complaints and responses; and
- general correspondence.

The Project has implemented a document control procedure to control the flow of documents within and between the Delivery Authority, Contractors, regulatory agencies, the Environmental Monitor and relevant stakeholders and subcontractors.

8.3 Review and Improvement

Internal reviews of the environmental documentation must take place as part of the continual improvement process. These reviews should include the Contractor's Environment Team and Environment Manager, the Delivery Authority and relevant Project team members.

The reviews should include:

- Identification of any changes in scope or design and whether or not these may trigger any additional approvals or permits;
- Review of the mitigation measures nominated for the Project and whether these are performing as expected;
- Review of the approvals register and identification of any amendments / additions required;
- Consideration of trends in monitoring, inspection and audit results;
- Consideration of changes in operational needs such as resourcing; and
- Consideration of feedback from management reviews.

An executive review of environmental documentation should be undertaken annually by the Contractor's Leadership Team and shall include:

- Assessment of the effectiveness of environmental management documentation;
- Management effectiveness;
- Potential improvements to environmental management documentation;
- Adequacy of current resources and future resources planning;
- Findings of audits and any actions that arise from audits;
- Environmental outcomes and whether these are being achieved;
- Compliance with legal requirements and any critical non-conformances;
- Organisational changes; and
- Effectiveness of environmental-related training.

8.4 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix A – Project wide Imposed Conditions

Refer to Imposed Conditions in the latest Coordinator-General's change report available on the Department of State Development, Tourism and Innovation website at www.dsdmip.qld.gov.au/crr.

CGCR Appendix 1 – Project-wide Imposed Conditions also includes –

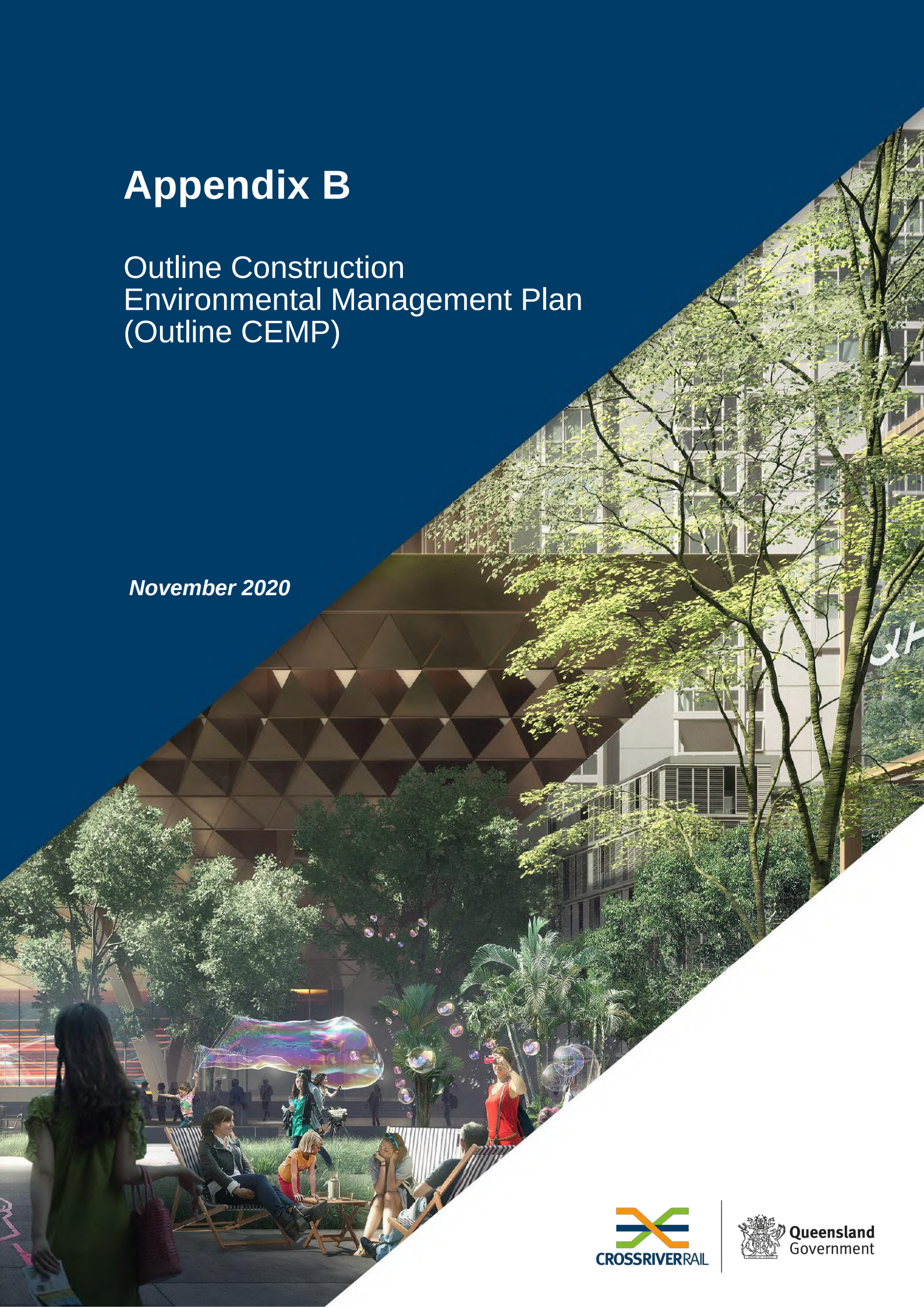
- Schedule 1 - Environmental Design Requirements;
- Schedule 2 - Nominated entities with jurisdiction for conditions; and
- Schedule 3 – Definitions.
-
- CGCR Appendix 2 – Coordinator-General's recommendations for the Cross River Rail project nominates 17 recommendations that need to be considered by the project.

In many instances, the use of the term 'proponent' in the Imposed Conditions is understood to mean the Contractor, not the Delivery Authority.

Appendix B

Outline Construction Environmental Management Plan (Outline CEMP)

November 2020



CROSSRIVERRAIL

Queensland Government

Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CEMP.

2. Introduction

2.1 Background

For background information on the Cross River Rail (CRR) Project (the Project), refer to **Section 2.1** of the OEMP.

2.2 Project Delivery

For information on Project delivery, refer to **Section 2.2** of the OEMP.

2.3 Project Phases

For information on the Project phases (including design, construction, commissioning and operations), refer to **Section 2.3** of the OEMP.

2.4 Environmental Management Approach

For information on the Project's environmental management approach, refer to **Section 3** of the OEMP.

For information on the Imposed Conditions, refer to **Section 3.1** of the OEMP.

For information on the environmental management documentation, including the various environmental management plans and relationships between various documents, refer to **Section 3.3** of the OEMP.

For information on the approach to environmental management adopted in the environmental management document, refer to **Section 3.4** of the OEMP. For information on the structure of the environmental management documentation, refer to **Section 3.5** of the OEMP.

For information on the role of the Environmental Monitor, refer to **Section 3.6** of the OEMP.

2.5 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

2.6 Subcontractor Management

Subcontractor management will be as per **Section 3.8** of the OEMP.

3. Legislative Requirements

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

4. Required Outcomes

4.1 Objectives

The objectives of this Outline CEMP are to:

- avoid, or minimise and manage environmental impacts of the Project during construction;
- achieve a reasonable level of environmental amenity for properties adjacent to the Project;
- allow the Project to be delivered in a timely and efficient manner; and
- provide for monitoring, reporting and corrective actions when required, in relation to environmental impacts arising from construction.

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CEMP.

4.2 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s as nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 1. General conditions
- Condition 4. Construction Environmental Management Plan
- Condition 5. Compliance
- Condition 6. Reporting
- Condition 7. Environmental Monitor
- Condition 8. Community Relations Monitor
- Condition 10. Hours of Work

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

4.3 Environmental Outcomes

The following environmental outcomes in relation to general construction are to be achieved for the Project:

- Construction activities, where practicable, avoid or minimise and manage impacts of the Project on the community.
- Construction activities minimise consumption of energy, potable water supplies and non-renewable resources.

4.4 Performance Criteria

The following performance criteria must be achieved throughout the construction of the Project.

Surface Works – Standard Hours

- Surface works must be conducted during standard hours and must achieve the environmental outcomes.
- Surface works may be conducted outside standard hours in the following circumstances:
  - emergency works to avoid the loss of life, damage to property, or to prevent environmental harm;
  - surface works are conducted as managed works or extended hours works.

Extended hours work

- Extended Work Hours, in accordance with Imposed Condition 10(d) may only be carried out under the following circumstances:
  - The works are in accordance with those deemed as able to be undertaken during extended work hours in accordance with the Imposed Conditions in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website;
  - Project Works within rail corridor land;
  - Project Works within a road reserve or busway that cannot be undertaken reasonably nor practically during standard hours due to potential disruptions to peak traffic flows or bus operations;
  - Project Works involving the transport, assembly or decommissioning of oversized plant, equipment, components or structures;
  - Delivery of "in-time" materials such as concrete, hazardous materials, large components and machinery;
  - Project Works that require continuous construction support, such as continuous concrete pours, pipe-jacking or other forms of ground support necessary to avoid a failure or construction incident.
  - A site-specific EMP sub-plan has been prepared to address the extended hours work, the predicted impacts and related mitigation measures, and a site management contact number through which complaints could be made. The site-specific EMP sub-plan must be developed by the Contractor and provide measures to achieve the environmental outcomes. It must be endorsed by the Environmental Monitor and submitted to the Coordinator-General, by the Delivery Authority, prior to the commencement of the works; and
  - Where environmental impacts are predicted to be above the project's nominated goals, advanced notification and/or consultation will be undertaken with Directly Affected Persons or potentially Directly Affected Persons about the particular predicted impacts and the approach to mitigation of such impacts and the monitoring programme and complaints procedure prior to the works being undertaken.
- In considering the notification, and imposing any requirements that may be appropriate, the Contractor must have regard for the:
  - matters raised in consultation with sensitive receivers about the potential impacts of the works;
  - management methods for achieving the environmental outcomes;
  - duration, scale and intensity of the works; and
  - advice of the Environmental Monitor and Community Relations Monitor.
- The works during extended hours must be monitored for compliance with the Coordinator-General conditions and the OEMP:
  - Where monitoring detects non-compliance with the requirements of the Coordinator-General's Imposed Conditions or an EMP, the extended hours work must cease immediately, once the worksite has been made safe and not recommence until a revised work method is demonstrated to achieve the environmental outcomes for nearby neighbours.

Managed Works

- Managed works are works where monitoring indicates the environmental outcomes are being achieved and are conducted generally in accordance with the program of works about which the community has been consulted.
- Managed works will only be undertaken in accordance with the Coordinator-General's Imposed Conditions in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website.

CEMP

- A CEMP must be prepared, or updated, at least 20 business days before the commencement of works at the relevant construction worksite. The CEMP must include a construction schedule

identifying the commencement and completion of each programmed suite of activities, sufficient to inform the Environmental Monitor, the Community Relations Monitor and the Coordinator-General of the nature and timing of the intended works.

- The CEMP must be endorsed by the Environmental Monitor as being consistent with the OEMP and the Coordinator-General's Imposed Conditions. The CEMP may be submitted separately and updated progressively for each construction worksite.

4.5 Mitigation Measures

- Mitigation measures to achieve environmental outcomes and performance criteria nominated in the OEMP and any relevant sub-plan (including the CEMP and COEMP), shall be implemented in accordance with the relevant sub-plan.
- Prior to the commencement of construction works, the Delivery Authority will establish and maintain a dedicated website that includes at least the following:
  - contact details for the Project, the Environmental Monitor and the Community Relations Monitor;
  - the monthly and annual environmental reports;
  - a summary of the overall construction programme, and summaries of the construction programmes for each worksite;
  - details for accessing the complaints system and how it operates; and
  - notifications about Project Works, including any extended hours work, traffic management and changes to public transport services.

5. Compliance Management

5.1 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.2 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.3 Inspections, Monitoring, Auditing and Reporting

5.3.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.3.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline CEMP are nominated below:

- collection, measurement and analysis of specified data at the locations and frequencies required by the EMPs according to recognised and accepted scientific methods by suitably qualified people;
- daily visual environmental site inspections at each worksite, including inspections of environmental control measures and environmental impacts of construction activities; and

- targeted monitoring of key parameters in response to an incident or failure to comply with the Imposed Conditions or an EMP.

5.3.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.3.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.3.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

5.4 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.5 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix C

Outline Commissioning Environmental Management Plan (Outline COEMP)

November 2020

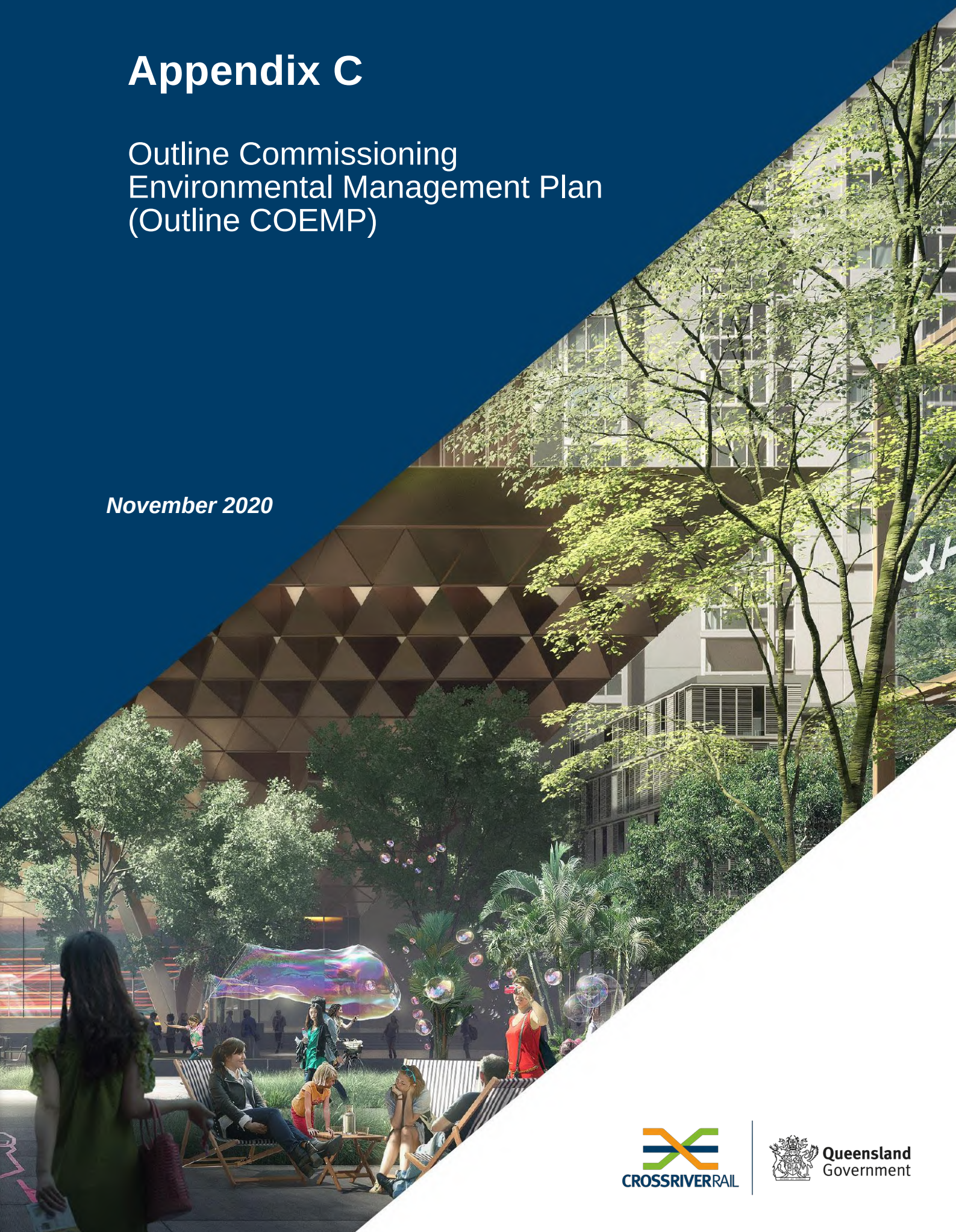


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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CEMP.

2. Introduction

2.1 Background

For background information on the Cross River Rail (CRR) Project (the Project), refer to **Section 2.1** of the OEMP.

2.2 Project Delivery

For information on Project delivery, refer to **Section 2.2** of the OEMP.

2.3 Project Phases

For information on the Project phases (including design, construction, commissioning and operations), refer to **Section 2.3** of the OEMP.

2.4 Environmental Management Approach

For information on the Project's environmental management approach, refer to **Section 3** of the OEMP.

For information on the Imposed Conditions, refer to **Section 3.1** of the OEMP.

For information on the environmental management documentation, including the various environmental management plans and relationships between various documents, refer to **Section 3.3** of the OEMP.

For information on the approach to environmental management adopted in the environmental management documentation, refer to **Section 3.4** of the OEMP. For information on the structure of the environmental management documentation, refer to **Section 3.5** of the OEMP.

For information on the role of the Environmental Monitor, refer to **Section 3.6** of the OEMP.

2.5 Subcontractor Management

Subcontractor management will be as per **Section 3.8** of the OEMP.

3. Legislative Requirements

Design, construction, commissioning and operation of the Project must comply with the legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

4. Required Outcomes

4.1 Objectives

This Outline COEMP is relevant to the Project's commissioning phase. It provides a framework for a comprehensive, timely, efficient and integrated approach to environmental management during commissioning of the Project, while maintaining a reasonable environmental amenity in the locality, and

ensuring that environmental harm resulting from the Project does not occur above the allowable limits. It also guides the process of confirming that the Environmental Design Requirements (EDRs) have been achieved.

The commissioning phase will involve a programme of testing and verification, prior to operations. During this time, the elements of the Project will be tested individually, as coordinated systems, and as an overall Project wide system. Testing will also work through the functionality, operation and integration with the existing systems and procedures of key stakeholders including the Rail Transport Operator, TMR and the Queensland Fire and Emergency Services.

The environmental outcomes of this Outline COEMP will be achieved largely through addressing:

- EDRs in the detailed design phase (nominated in Schedule 1 of the CGCR);
- Part D of the Imposed Conditions (nominated in the CGCR); and
- The environmental outcomes and performance criteria for each environmental element relevant to the Project's commissioning phase.

Mitigation measures to achieve the environmental outcomes and performance criteria that are identified in this plan are advisory only. They may be modified subject to detailed design and commissioning requirements. These will be further developed by the Contractor during the detailed design phase and the information will be provided in the detailed COEMPs developed by the Contractor.

Once satisfied that the Project has achieved the EDRs, the Contractors will notify the Delivery Authority of the outcomes of the verification process. The Delivery Authority will then notify the Coordinator-General of this outcome.

4.2 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 3. Design
- Condition 22. Environmental Design Requirements
- Condition 23. Commissioning

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

4.3 Environmental Design Requirements

The EDRs that must be achieved in the commissioning phase are nominated in Schedule 1 of the CGCR. These include:

- EDR 1. Traffic and Transport
- EDR 2. Air Quality
- EDR 3. Noise and Vibration
- EDR 4. Settlement
- EDR 5. Hydrology
- EDR 6. Cultural Heritage
- EDR 7. Climate Change and Sustainability
- EDR 8. Land Use and Tenure
- EDR 9. Visual Amenity and Lighting
- EDR 10. Social Environment
- EDR 11. Waste

4.4 Environmental Outcomes

The following environmental outcomes in relation to commissioning are to be achieved for the Project:

Transport

- Access for emergency services is provided.
- Safe and efficient access for pedestrians and cyclists is provided in the vicinity of Project stations.

Visual Amenity and Lighting

- Lighting, landscaping and urban design treatments, including noise barriers, are designed and maintained to contribute and integrate effectively with the surrounding urban and landscape environment, achieving a reasonable visual amenity and passenger safety.

Groundwater and surface water

- Groundwater quality surrounding the Project is generally comparable with pre-construction levels.
- Groundwater levels surrounding the Project are generally comparable with pre-construction levels.
- Discharge of groundwater from the Project does not adversely impact on the environmental values of receiving waters.
- Operation of the Project does not adversely impact on the environmental values of receiving surface waters.

Air Quality

- The Project ventilation system achieves the environmental design requirements.

Noise and Vibration

- The Project operations maintain an acceptable acoustic environment, including human comfort, normal daily life and urban amenity for people living and working adjacent to the Project infrastructure.

Waste

- Waste generation is avoided where possible and if unavoidable, minimised.
- Risks to human health or the environment associated with the transport, storage, handling or disposal of waste, including regulated wastes, are known and managed to minimise such risks.

Hazard and Risk

- Risks to people and the environment associated with potential hazards are known and understood, and managed to minimise risks to as low as reasonably practical.

Geology and Soils

- Erosion and sedimentation is controlled to achieve background levels.
- Settlement is within the nominated parameters established in the settlement analysis for the environmental design requirements.

Climate Change and Sustainability

- Energy demand and consumption by the Project is minimised.
- Use of potable water by the Project is minimised.

- Greenhouse gas emissions from the operation of the Project are minimised.

4.5 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

Transport

- The Project is commissioned in accordance with the Rail Transport Operator's and TMR procedures, and the *Transport Operations (Passenger Transport) Act 1994*.
- An emergency response and management plan is agreed by the Project operators and the emergency services authorities prior to the commencement of operations.
- Pedestrian and cyclist access during peak periods, major events and emergency incidents is provided in the vicinity of Project stations.
- Safety Management Systems are prepared by the Rail Transport Operator during commissioning.

Visual Amenity and Lighting

- Landscaping and urban design treatments proposed in detailed design are maintained to achieve specifications.
- Noise barriers are designed and installed in consultation with near neighbours to minimise adverse visual and amenity impacts.
- Lighting is maintained in accordance with the standards determined by the Rail Transport Operator and TMR policies and procedures and in accordance with the standards set out in the *Disability Discrimination Act 1992*.
- Landscaping and urban design treatments must achieve Crime Prevention through Environmental Design principles.

Groundwater and surface water

- Groundwater inflow to the Project tunnels is managed, treated as required, and disposed of so as not to cause environmental harm.
- Groundwater released to receiving waters complies with relevant Imposed Conditions nominated in the CGCR.
- Environmental values of surface waters are maintained.
- No release of sediment or other water-borne contaminants above the allowable limits to surface waters (stormwater drains, sewage network and waterways) occurs as a result of runoff or discharges/spills from operating procedures.

Air Quality

- Emissions from the Project do not cause an exceedance of the ambient air quality goals set out in Table 5 in Schedule 1 of the CGCR.

Noise and Vibration

- Where practicable, the Project achieves the noise criteria for railway airborne noise emissions:
- 65 dBA, evaluated as the 24 hour average equivalent continuous A-weighted sound pressure level; and
- 87 dBA, evaluated as a Single Event Maximum sound pressure level.

<u>Ground-borne noise and vibration goals</u>

- The Project operates generally within the goals for ground-borne noise and vibration outlined in Table 6 and Table 7, in Schedule 1 of the CGCR.

Surface mechanical plant and ventilation

- Surface mechanical plant and ventilation systems operate within the noise goals in Table 8 in Schedule 1 of the CGCR.

Waste

- Waste minimisation strategies are implemented in accordance with the Rail Transport Operator and TMR procedures.
- Waste is collected, transported, stored, handled and disposed in accordance with statutory requirements.

Hazard and Risk

- Potential hazards are identified and managed to mitigate risks to as low as reasonably practical for people and the environment.
- A hazard and risk management plan is developed for commissioning, and is implemented, reviewed and updated as required.

Geology and Soils

- The Water Quality Objectives are not worsened by the Project.
- There is no soil erosion attributed to the Project commissioning.
- Settlement is limited generally to 25mm or to 50mm in a worst-case event, measured at any location within 50m of the route centreline or the outer walls of an underground station or excavated structure (excluding designated worksites and surface properties owned by the Authority).

Climate Change and Sustainability

- Ventilation for underground stations achieves energy targets nominated in the design requirements while maintaining a steady flow of fresh air to all pedestrian and working areas.

4.6 Mitigation Measures

Transport

- Consult with Queensland Fire and Emergency Services about emergency access arrangements to work areas in preparing and implementing an emergency access management plan.
- Ensure emergency service access is maintained at all times to the tunnel systems and stations.
- Consult with TMR, the Rail Transport Operator, BCC, Bicycle Queensland and other key local stakeholders in developing and implementing measures to manage pedestrian and cyclist access to stations during peak periods, major events and emergency incidents.
- Commission closed circuit television (CCTV) surveillance of:
    - the proposed pedestrian and cycle pathway connecting the PA Hospital precinct with Boggo Road Urban Village, Boggo Road Busway Station and Park Road Railway Station; and
    - pedestrian and cycle paths approaching the Woolloongabba, Albert Street, Roma Street, and Exhibition Stations.
- Develop and implement a community education and awareness strategy about the commencement of Project operations and how operations may affect local movements during major events and emergencies.
- Develop and implement local traffic and parking management plans, in consultation with BCC. Such plans may include resident parking schemes for local streets in the vicinity of the Projects stations.

Visual Amenity and Lighting

- Where monitoring detects that the environmental outcome is not achieved, the design and installation of lighting, landscaping and noise barriers must be rectified accordingly.

Groundwater and surface water

Groundwater

- Contaminated groundwater entering the tunnel and underground stations must be captured, treated and discharged to an approved location.
- Spills and leaks of fuels or chemicals must be managed in accordance with Queensland Rail's SEMS and Project operating environmental procedures so as not to cause environmental harm.

Surface water

- Measures are implemented in accordance with the Queensland Rail's SEMS and Project operating environmental procedures for managing impacts on surface water quality.
- Measures must be developed and implemented to contain and prevent fire retardants and other chemicals entering a watercourse in the event of an emergency or incident arising from commissioning of the Project.
- Implement the rail operating environmental procedures in relation to the storage and handling of fuels and chemicals and the management of spills and leaks.
- Rainfall and rising water levels must be monitored. Flood preparation and emergency response procedures must be enacted

Air Quality

- Where commissioning tests identify a potential for recurring exceedances of any of the air quality goals as a consequence of emissions contributions from the station ventilation systems, such systems must be refined, modified and subject to enhanced operating procedures to achieve the goals and the environmental outcome.

Noise and Vibration

- Noise and vibration damping track fasteners must be installed if monitoring indicates an exceedance of the ground-borne noise and vibration goals. The specifications for the track fastening system must be determined from a combination of predictive modelling and site-specific monitoring data.

Waste

- Implement measures to manage waste generated by the Project in accordance with Rail Transport Operator and TMR procedures.

Hazard and Risk

- Implement the commissioning hazard and risk management plan.
- Application of the hierarchy of risk and hazard control.

Geology and Soils

- Erosion and sediment controls provided for the Project must be monitored in accordance with the Project's periodically and maintained by the Contractor throughout the commissioning period.
- In the event of settlement exceeding the performance criteria, prepare a new building condition survey report and recommendations for repairing building damage in the affected areas.

Climate Change and Sustainability

- Maintain energy consuming plant and equipment in accordance with specifications to ensure optimal performance.
- Maximise the use of greywater and stormwater or groundwater collected from the Project, including in the maintenance of landscaping and infrastructure cleaning where appropriate.

5. Compliance Management

5.1 Roles and Responsibilities

The structure, organisational roles and responsibilities and accountabilities in relation to environmental management throughout the construction and commissioning phases are outlined in **Table 1** below.

Table 1: Project roles and responsibilities – commissioning

Project responsibilities
Coordinator-General
• Administers the *State Development and Public Works Organisation Act 1971*
Chief Executive, Department of Transport and Main Roads
• Entity with jurisdiction for a number of the Imposed Conditions
The Delivery Authority – commissioning
• Oversee the Contractor's commissioning process to achieve the environmental design requirements. Prepare the OEMP, including the Outline CEMP and the Outline COEMP. These will form the basis of the Contractor's CEMP and COEMP. • Ensure there is adequate and accurate identification and reporting of any exceedances of quantitative performance criteria, failure to achieve qualitative performance criteria, and failure to implement mitigation measures during construction. • In consultation with the Contractor, ensure corrective actions arising from exceedances or failures are implemented as soon as possible. • Establish and maintain during design, construction and commissioning, a Project website for the purpose of informing people about Project activities. • Appoint an independent, suitably skilled and qualified entity as the Environmental Monitor for the Project. • Establish a community advisory group and appoint an independent, suitably skilled entity as the Community Relations Monitor for the Project.
Contractor – commissioning
• Prepare the COEMP consistent with the OEMP. The COEMP must be endorsed by the Environmental Monitor prior to the commencement of commissioning activities. • Monitor the environmental performance of the Project during the commissioning activities. Monitoring must address the COEMP and the EDRs. • Ensure required mitigation measures are implemented prior to the acceptance of the Project as being complete. • Establish and maintain open and effective communications, in consultation with the Delivery Authority, with people living or working near the Project, people relying on the public transport or road transport network likely to be affected by Project commissioning activities, and relevant stakeholders about: – the programme of commissioning activities; and – the likely impacts, intended scale, duration and nature of commissioning activities.

Project responsibilities
• Establish and maintain a process for receiving, recording and responding to verified complaints about commissioning issues. This process shall be in accordance with the CSEP. • Ensure the safe and efficient commissioning of the Project in accordance with legislation and regulations, and good environmental management practices. • Appoint competent personnel to implement and manage the application of the COEMP.
Queensland Rail – commissioning
• Statutory authority established under the *Queensland Rail Transit Authority Act 2013* (Qld) and reports to the Minister for Transport and Main Roads. • Queensland Rail (QR) discharges its statutory functions through its wholly-owned subsidiary Queensland Rail Limited. Queensland Rail Limited is a Rail Transport Operator (RTO) under the Rail Safety National Law (RSNL) for the south-east Queensland passenger rail network. • QR will act as the RTO in respect of any Project Activities carried out in Queensland Rail Limited's land during the design & construct phase, and Maintenance Phase and also all of the Rail Integration Systems (RIS) Works carried out by the RIS alliance. • Unless the context otherwise requires, QR, together with its subsidiary Queensland Rail Limited, are collectively referred to as "Queensland Rail" for the purposes of the EMP documents.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline COEMP are nominated below:

Transport

- In the commissioning period:
  - monitor pedestrian crowding on footpaths in the vicinity of Roma Street Station and Albert Street Station during the morning and evening weekday peak periods;
  - monitor pedestrian crowding on footpaths in the vicinity of Woolloongabba Station, Roma Street Station and Exhibition Station, during major events at the Gabba Stadium, Lang Park and the RNA Showgrounds;
  - monitor effective implementation of emergency management plans;
  - monitor effective management of pedestrian movement and crowding within the stations and on the platforms.

Visual Amenity and Lighting

- As required by the Rail Transport Operator and TMR procedures, and conditions of approval.

Groundwater and surface water

Groundwater

- Groundwater inflows to the tunnel and underground stations must be monitored to identify significant changes in quality or quantity.
- Regularly monitor the surrounding ground water aquifer with respect to drawdown and quality. Assess deviations from seasonal baseline groundwater levels and develop appropriate mitigation options.

Surface water

- Where an uncontrolled release of contaminants, chemicals or fuels occurs, monitor the surface water flows at collection points and at the approved point of discharge; and
- Otherwise monitor surface water discharges as required by the Rail Transport Operator's procedures.

Air Quality

- Monitor as required by the Rail Transport Operator's SEMS and Project operating environmental procedures.
- Air quality in the tunnels and underground stations must be managed to achieve operational health and safety requirements specified for the Project design.

Noise and Vibration

- Monitor for ground-borne noise and vibration at selected sensitive receivers during commissioning.
- Monitor in response to complaints received during commissioning.

Waste

- Monitor resource usage and waste generated in accordance with the Rail Transport Operator and TMR procedures.

Hazard and Risk

- As required by the Rail Transport Operator and TMR procedures.

Geology and Soils

- As required by the Rail Transport Operator and TMR procedures.

Climate Change and Sustainability

- As required by the Rail Transport Operator and TMR procedures.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to commissioning and operations are outlined below:

Transport

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Visual Amenity and Lighting

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Groundwater and surface water

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Any incident must be reported within 10 business days of determining water quality objectives have not been achieved.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Air Quality

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.
- Commissioning test report, and then periodically in accordance with the standard operating environmental procedures developed for the Project.

Noise and Vibration

- Noise and vibration monitoring data must be included in the monthly environmental reports prepared during the commissioning phase.
- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Waste

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Hazard and Risk

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Geology and Soils

- Any non-compliance event must be reported in accordance with the processes outlined in the OEMP.
- Reporting will be undertaken as required by the Rail Transport Operator and TMR procedures.

Climate Change and Sustainability

- As required by the Rail Transport Operator and TMR procedures.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix D

Acid Sulfate Soil Management Plan

November 2020

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this outline ASSMP. Additional definitions for the Outline ASSMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
AHD	Australian Height Datum
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soil Management Plan
EPP	Environmental Protection Policy
PASS	Potential Acid Sulfate Soils

2. Introduction

This Outline Acid Sulfate Soil Management Plan (Outline ASSMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objective of this Outline ASSMP is to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to Acid Sulfate Soil (ASS);
- manage the impact on the environment and public health as a result of ASS; and
- monitor the effects of management and mitigation measures.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline ASSMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 19. Acid Sulfate Soils

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to ASS are to be achieved for the Project:

- Construction activities avoid or minimise environmental and public health risks associated with disturbance of potential acid sulfate soils encountered during construction works.
- Construction activities do not impact on the environmental values of the Brisbane River and other waterways within the study corridor.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Runoff from ASS impacted worksites complies with the environmental objectives established in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water and Wetland Biodiversity)).
- ASS is avoided, or if intercepted, is managed to avoid adverse impact to environmental values, infrastructure, construction equipment, construction personnel or the public.

4. Impacts and Mitigation Measures

4.1 Impacts

There is a possibility of encountering ASS where surface works are proposed in a number of the isolated alluvial valleys along the extent of the Project alignment and there is potential for the disturbance of these sediments to result in impacts to the quality of both surface water and groundwater. The potential environmental impacts associated with disturbance of ASS include:

- Changes to water chemistry of receiving waterbodies;
- Sedimentation of waterways and accelerated erosion;
- Changes to the aquatic ecosystem through deoxidation of waterbodies;
- Oxidation of ASS and ASS affected sediments and generation of acid leachate;
- Contamination (both on and offsite) of surrounding soils and/or waters impacting local ecology;
- Delays in construction program and increased costs;
- Risk to human health through direct exposure;
- Impacts on concrete structures coming into contact with ASS;
- Direct impacts on soil organisms and vegetation; and
- Negative public relations associated with pollution and prosecution.

The following locations and/ or activities have been identified as high-risk due to the proximity to sensitive requires, and require management or mitigation during the course of the project:

- Bridge construction works across Breakfast Creek due to the proximity of Breakfast Creek;
- Albert Street Station due to the proximity of Brisbane River; and

- Mayne Yard and surface works within Mayne Yard due to the proximity of Breakfast Creek.

4.2 Mitigation Measures

The following mitigation measures may be implemented to achieve the environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- To inform detailed design and construction planning, undertake ASS investigations in accordance with the National acid sulfate soils sampling and identification methods manual June 2018 in areas below 5 metres AHD, where proposed excavation or soil disturbance is to occur. Where ASS investigations identify the likelihood of ASS being disturbed, prepare and implement an ASS Management Plan in accordance with Queensland Acid Sulfate Soils Technical Manual: Soil Management Guidelines (Ver4.0 DSITI 2014) and in consultation with DES if necessary.
- The ASS Management Plan will include corrective actions for incident management and remediation and requirements for validation and verification testing of soils and potentially affected waters prior to release from the construction worksite. Groundwater dewatering will be undertaken in accordance with the Guidance for the dewatering of acid sulfate soils in shallow groundwater environments (June 2018). These management strategies may include:
  - Neutralising the soils with alkaline material, such as lime;
  - Hydraulic separation via sluicing and/ or hydrocloning;
  - Strategic reburial below groundwater table;
  - Stormwater/ groundwater collection, control and treatment measures;
  - If treatment of potential acid sulfate soils (PASS)/ ASS, this will be undertaken at a suitable facility; and
  - Validation of treated material prior to disposal (on and/ or offsite).

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Induction and Training

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline ASS are nominated below:

- As part of routine daily site inspections, monitor for the presence of flocculation of iron in surface water drains, mortality of aquatic flora and/or fauna in adjacent waterways, visible corrosion of concrete structures.
- For construction works involving disturbance of ASS, conduct appropriate monitoring of receiving waters predicted to be influenced by drainage from a worksite or construction works involving ASS. Monitoring should be in accordance with Queensland Acid Sulfate Soil Technical Manual - Soil Management Guidelines v4.0 (DSITIA 2014), site EMP/ASSMP and requirements for any receiving waters.
- For construction works involving disturbance of ASS, conduct monthly groundwater and surface water monitoring in areas hydraulically connected to sites of ASS disturbance.
- All leachate and runoff from areas excavated below 5m AHD, ASS treatment pads and stockpile areas will be captured, contained, analysed and treated (if necessary) prior to offsite discharge in compliance with relevant works approvals and surface water discharge criteria adopted for the Project.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to ASS are outlined below:

- Results of ASS monitoring are to be reported in the monthly construction compliance report, along with details of any complaints or incidents relating to these issues.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix E

Air Quality Management Plan

November 2020

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline AQMP. Additional definitions for the Outline AQMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
AC	Air Conditioning
AQMP	Air Quality Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
GHG	Greenhouse gas
ISCA	Infrastructure Sustainability Council of Australia
LPG	Liquified petroleum gas
PA Hospital	Princess Alexandra Hospital
PM	Particulate Matter
RNA	Royal National Agricultural and Industrial Association of Queensland
TSP	Total Suspended Particulates

2. Introduction

This Outline Air Quality Management Plan (Outline AQMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline AQMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to air quality;
- manage the impact on the local community and sensitive receptors in terms of air quality from construction works; and
- monitor the effects of management and mitigation measures.

An air quality monitoring programme must be developed and implemented by the Contractors at each worksite so that Project-related impacts on local stakeholders and the environment can be avoided, or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

2.2.1 Additional Requirements

In addition to the legislative requirements specified in the OEMP, the following Australian Standards are applicable:

- AS2985 Workplace atmospheres - method for sampling and gravimetric determination of respirable dust;
- AS3640 Workplace atmospheres - method for sampling and gravimetric determination of inhalable dust;
- AS3580.1.1 Method for sampling and analysis of ambient air – Guide to siting air monitoring equipment;
- AS3580.9.3 Methods for sampling and analysis of ambient air - Part 9.3: Determination of suspended particulate matter - Total suspended particulate matter (TSP) - High volume sampler Gravimetric method;
- AS3580.9.6 Methods for sampling and analysis of ambient air - Method 9.6: Determination of suspended particulate matter - PM10 high volume sampler with size selective inlet - Gravimetric method;
- AS3580.9.14 Methods for the sampling and analysis of ambient air - Method 9.14: Determination of suspended particulate matter – PM2.5 high volume sampler with size selective inlet - gravimetric method;
- AS3580.9.9 Methods for sampling and analysis of ambient air - Method 9.9: Determination of suspended particulate matter - PM10 and TSP low volume sampler - Gravimetric method;
- AS3580.9.10 Methods for sampling and analysis of ambient air - Method 9.10: Determination of suspended particulate matter - PM2.5 low volume sampler - Gravimetric method;
- AS3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulate matter – Deposition matter – Gravimetric method; and
- AS3580.14 Meteorological Monitoring for Ambient Air Quality.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline AQMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 13. Air Quality

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to air quality are to be achieved for the Project:

- Nuisance from dust, odour and emissions arising from construction activities is minimised at nearby sensitive receivers.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Construction emissions are within the construction air quality objectives for total suspended particulates (TSP), particulate matter (PM) and deposited dust, as set out in Imposed Condition 13 in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website.
- Where construction emissions are predicted to exceed the construction air quality goals, mitigation measures are designed and implemented to mitigate the impacts for nearby sensitive receivers.

3.4 Requirements of Contractor Sub-Plan

3.4.1 General Requirements

1. The Contractor's AQMP must be updated and revised on the basis of:

    a) Detailed designs for Project infrastructure developed by the Contractor;
    b) Detailed construction planning;
    c) Meteorological data relevant to each worksite;
    d) Air quality data relevant to each worksite; and
    e) Predictive modelling for each planned construction scenario, considering seasonal variations in meteorological conditions and the programme of works.

2. Each worksite is to be equipped with:

    a) A calibrated weather station measuring wind direction and speed from which site-specific wind roses can be produced, rainfall, temperature and humidity;
    b) Calibrated air quality samplers suitable for monitoring TSP, PM_{10} and dust deposition;
    c) Calibrated air quality monitoring equipment suitable for campaign monitoring of dust deposition; and
    d) A person capable of and trained in the operation of the air quality sampling equipment and in the recording of sampling data.

3. Air quality monitoring sites will be determined by the Contractor and approved by the Delivery Authority and Environmental Monitor. Any change in monitoring location first must be endorsed by the Environmental Monitor who will then inform the Delivery Authority.

4. Air quality monitoring must be conducted at the designated monitoring sites at all times surface works are conducted. Data is to be provided in the monthly environmental report.

5. If predictive modelling or monitoring indicates likely exceedances of the performance criteria during construction, additional mitigation measures are to be implemented such that the Project's air quality goals in Imposed Condition 13 in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, are achieved. Such measures may include:

    a) Additional site management measures (e.g. additional watering and other forms of dust suppression, sealing traffic areas within worksites, stabilising exposed work areas);
    b) ceasing dust generating activities that are likely to exceed the goals during dry, windy conditions;
    c) providing work sheds or enclosures equipped with a fabric filter for the removal of airborne particulate matter over the principal dust sources (e.g. deep excavations, spoil handling facilities); and

d) re-evaluating the efficacy of the dust controls and supplementing them if required.

6. Haul roads used for tunnel spoil material within the Southern Portal, Boggo Road, Woolloongabba and Northern Portal construction worksites must be suitably stabilised for dust management. Traffic areas within all worksites must be suitably stabilised for dust management.

7. The Contractor's AQMP must be updated to include air quality monitoring for any construction worksites not previously assessed by the Delivery Authority.

3.4.2 Other Air Quality Requirements

1. Prior to the commencement of underground works, appropriate management measures must be in place to address the risk, if any, to the underground workforce of respiratory illness. Queensland Health must be consulted in framing the scope of the assessment and must be provided with a copy of the findings.

2. The Contractor must consult with sensitive receivers proximate to the worksites about the scale and duration of works with the potential to impact on air quality. In particular, the Contractor must consult with:

   a) Southern portal and Boggo Road: Queensland Heath and the PA Hospital administration, the Translational Research Institute of Australia, the Leukaemia Foundation at the ESA Village, and the CSIRO at the Ecosciences Precinct Boggo Road;
   b) Woolloongabba: nearby businesses in Vulture Street and Stanley Street;
   c) Albert Street: nearby businesses and managers of nearby residential buildings;
   d) Roma Street: nearby businesses and managers of nearby residential buildings;
   e) Northern Portal: the Brisbane Girls' Grammar School, the Brisbane Grammar School, St Joseph's College Gregory Terrace, and businesses in the Centenary Pool complex; and
   f) Exhibition: the RNA Society and managers of nearby residential buildings, and the Queensland Youth Orchestra as key tenant and lessee of the Old Brisbane Museum.

   All consultation is to be undertaken with the involvement of the Delivery Authority and the Community and Stakeholder Engagement Team.

3. Validated complaints about air quality and particularly dust deposition must be addressed as soon as practicable after the complaint has been made and in accordance with the complaints management procedure outlined in the CSEP. Should there be an absence of monitoring data to confirm or refute the complaint, a visual inspection must be undertaken and the findings reported to the Delivery Authority, the Environmental Monitor and the complainant. The Environmental Monitor may require a site-specific monitoring campaign to inform the development of additional mitigation measures.

4. Impacts and Mitigation Measures

4.1 Impacts

Dust and pollutant emissions during construction and operation of the Project have the potential to impact the ambient air environment and cause environmental nuisance at sensitive receptors across the Project. During the Project's construction period, the following sources have the potential to emit dust and pollutants and impact air quality:

- Worksite establishment and demolition activities;
- Tunnelling and associated excavation works (cut and cover operations);
- Shaft excavation;

- Spoil removal and replacement;
- Above ground road and bridge works;
- Construction of railway stations and other buildings;
- Wind erosion from disturbed locations;
- Wheel-generated dust from truck movements on unpaved surfaces; and
- Power source emissions from construction equipment, generators and other plant.

The following worksites have been identified as having the greatest potential for off-site air quality impacts due to fugitive dust emissions and will be subject to detailed assessment:

- Southern portal and Boggo Road Station;
- Woolloongabba Railway Station;
- Albert Street Railway Station;
- Roma Street Railway Station;
- Exhibition Railway Station;
- Northern portal;
- Mayne Rail Yard; and
- Fairfield to Salisbury Stations.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 Air quality - General

- Prepare and implement a detailed AQMP to achieve the environmental outcomes for the duration of construction activities.
- To the extent possible, use existing data to establish baseline air quality prior to construction at the Fairfield to Salisbury stations, Southern portal, Boggo Road, Woolloongabba, Albert Street, Roma Street, Northern portal, Exhibition Station and Mayne Yard worksites.
- Air quality monitoring must be undertaken to ensure that air quality goals in Imposed Condition 13 are achieved. In particular at the following sensitive receptors:
  - PA Hospital
  - Dutton Park State School
  - Ecosciences Precinct
- At construction sites and spoil placement sites, 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; and
  - when no other reasonable or practical measure is available, cessation of work until the meteorological conditions improve and the environmental outcomes can be achieved.
- If monitoring shows exceedances during construction, additional mitigation measures will be required, such as stopping dust generating activities during dry, windy conditions, undertaking additional audits of dust controls, increasing watering rates during dry periods, and undertaking targeted consultations with affected entities.
- Haul roads used for tunnel spoil material at the Southern Portal / Boggo Road, Woolloongabba and Northern Portal construction worksites must be suitably stabilised for dust management.
- Where predictive modelling or monitoring indicates exceedances of the air quality goals for human health at nearby sensitive receivers, measures such as work sheds or enclosures equipped with a fabric filter for the removal of airborne particulate matter may be required.

4.2.2 Dust

- Ensure appropriate dust controls are used for demolition and construction activities to ensure dust from Project works does not move beyond worksite boundaries. Mitigation measures may include:
  - managing dust-creating works according to meteorological conditions;
  - paving haul routes and heavily trafficked areas within worksites with resilient dust-free paving materials;
  - water sprays and covering loads of material transported from the worksites;
  - installing ventilated work sheds or enclosures over work areas; and
  - actively managing spoil handling and stockpiles if loose material is present and exposed to wind.
- Other measures may be initiated where or when required to avoid nuisance, particularly in respect of buildings containing hazardous or potentially hazardous materials.
- Manage the movement and handling, stockpiling and loading of construction spoil to avoid dust nuisance. In the event that dust generation will exceed the construction air quality goals in Imposed Condition 13, the handling and loading of construction spoil for transport to the spoil placement sites must be undertaken within enclosed and ventilated work areas.
- 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.
- Install truck wheel wash stations at locations in worksites. Where space constraints do not allow for the implementation of wheel wash stations, implement additional washing and sweeping of roads servicing worksite access and egress points to avoid the spillage of spoil.
- Install hoardings or barriers on worksite perimeters, where appropriate, to help mitigate dust impacts by acting as wind breaks.
- Seal access roads, as much as is practicable, within the worksites and ensure sealed access roads into worksites are kept relatively dust free by regular sweeping and washing, wherever needed.

4.2.3 Diesel Exhaust Emissions

- Manage the movement of construction vehicles to avoid queuing near residential receivers approaching the worksites or adjacent to other sensitive activities.
- Adopt procedures to avoid construction vehicles idling for excessive periods (e.g. more than five minutes) if required to queue to enter construction sites.
- Ensure marshalling sites and queuing for trucks and site vehicles are located away from residential areas and other sensitive receivers.
- Where feasible, collect and direct exhaust emissions from stationary plant away from sensitive receivers.
- As much as practicable, minimise the use and intensity of use of diesel engines.
- For stationary plant and equipment, ensure all diesel motors are fitted with emission control measures and that these are regularly maintained to manufacturers' specifications.

4.2.4 Odour

- During the first disturbance of potentially odorous soils, implement reasonable and practicable measures to avoid or mitigate and manage impacts of odours on adjacent properties. Such measures may include:
  - ensuring clean cover materials (e.g. clean fill) is on hand to immediately cover odorous spoil materials that are resulting in off-site impacts;
  - identifying and determining the potential for odour impacts at off-site sensitive receivers based on preliminary information on the scale and nature of any known contamination, the distance from the contamination area to sensitive receivers, and the prevailing meteorological conditions;

- conducting works with odorous soils when wind directions are unlikely to affect sensitive receivers; and
- covering odorous, excavated soil stockpiled on a construction site or a spoil placement site to reduce odour impacts.

4.2.5 Greenhouse Gases

- Maintain construction plant and equipment and haul trucks in good working order to maximise the fuel efficiency of equipment.
- Procure energy efficient construction equipment as much as practicable.
- Use appropriately sized equipment for construction activities.
- Minimise waste from construction by procuring pre-fabricated products.
- Use mains electricity where practicable to minimise the use of generators.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline AQMP are nominated below:

Dust and odour

- Monitor and log daily meteorological conditions, including wind speed and direction.
- Undertake visual inspections for dust generating activities on a daily basis (e.g. stockpiles, unstable material with potential for dust).
- Undertake ambient odour inspections for potential odour-generating activities (e.g. excavation of contaminated soils) on a daily basis.
- Undertake weekly monitoring of ambient air quality (TSP, PM_{10} and deposited dust) against the air quality goals for each of the construction worksites in operation. Monitoring must be conducted in the vicinity of construction worksites in areas representative of the receiving environment and sensitive receptors for the duration of surface works, and in response to complaints. Monitoring

locations must be down-wind of the worksites. Indicative air quality monitoring locations around the main construction worksites are provided in **Table 2** below.

Table 2: Indicative air quality monitoring locations

Worksite	Indicative Dust Monitoring Location
Fairfield to Salisbury Stations	Air quality monitoring must be undertaken at each of the worksites between Fairfield and Salisbury.
Southern Portal and Boggo Road Station	1. Dutton Park State School, south eastern corner of site (dust, TSP, PM_{10}) 2. Ecosciences Precinct, roof level at location indicative of AC intakes (dust, TSP, PM_{10}) 3. PA Hospital grounds, ground level (dust, TSP, PM_{10}) 4. PA Hospital, roof level at location indicative of AC intakes (dust, TSP, PM_{10}) 5. Joe Baker Street, near ESA Village (dust, TSP, PM_{10}) 6. Dutton Street, at selected residences (dust, TSP, PM_{10})
Woolloongabba Station	7. TMR/DES monitoring station at South Brisbane (dust, TSP, PM_{10}) 8. Reid Street, adjacent Chalk Hotel car park (dust, TSP, PM_{10})
Albert Street Station	9. Courtyard area, Level 3, The Sebel (dust, TSP, PM_{10}) 10. Albert Street, south-west corner with Mary Street (dust, TSP, PM_{10})
Roma Street Station	11. Adjacent to residential complex, Roma Street Parkland (dust, TSP, PM_{10})
Northern Portal	12. Victoria Park, adjacent to Brisbane Girls Grammar School (dust, TSP, PM_{10}) 13. Gregory Terrace, adjacent to Centenary Aquatic Centre (dust, TSP, PM_{10})

- All monitoring is to be performed by a suitably qualified person in accordance with the Queensland Air Quality Sampling Manual (1997), and in accordance with the relevant Australian Standards. All laboratory analyses are to be performed by a NATA-accredited laboratory.

Vehicle emissions

- Visually monitor construction vehicle movements on a regular basis to:
  - Prevent queuing in streets, other than designated haul routes identified in the CTMP; and
  - Prevent queuing vehicles idling for periods exceeding five minutes.

Greenhouse gases

- Record the following consumption data to enable GHG emissions to be accurately calculated and reported for the Project:
  - Diesel, petrol, LPG use by Project and contractor vehicles and machinery;
  - Electricity use;
  - Consumption of oils and greases; and
  - Number of units and size of any refrigeration units on site.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to air quality are outlined below:

- The monthly environmental report must include the results of the ambient air quality monitoring programme and results of odour and dust inspections. Energy consumption data will also be reported each month to enable GHG emissions to be accurately calculated and reported.
- Maintain records of the number of incidents or complaints received in relation to dust or odour impacts.
- Record actions taken to mitigate incidents or complaints.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix F

Climate Change and Sustainability Management Plan

November 2020

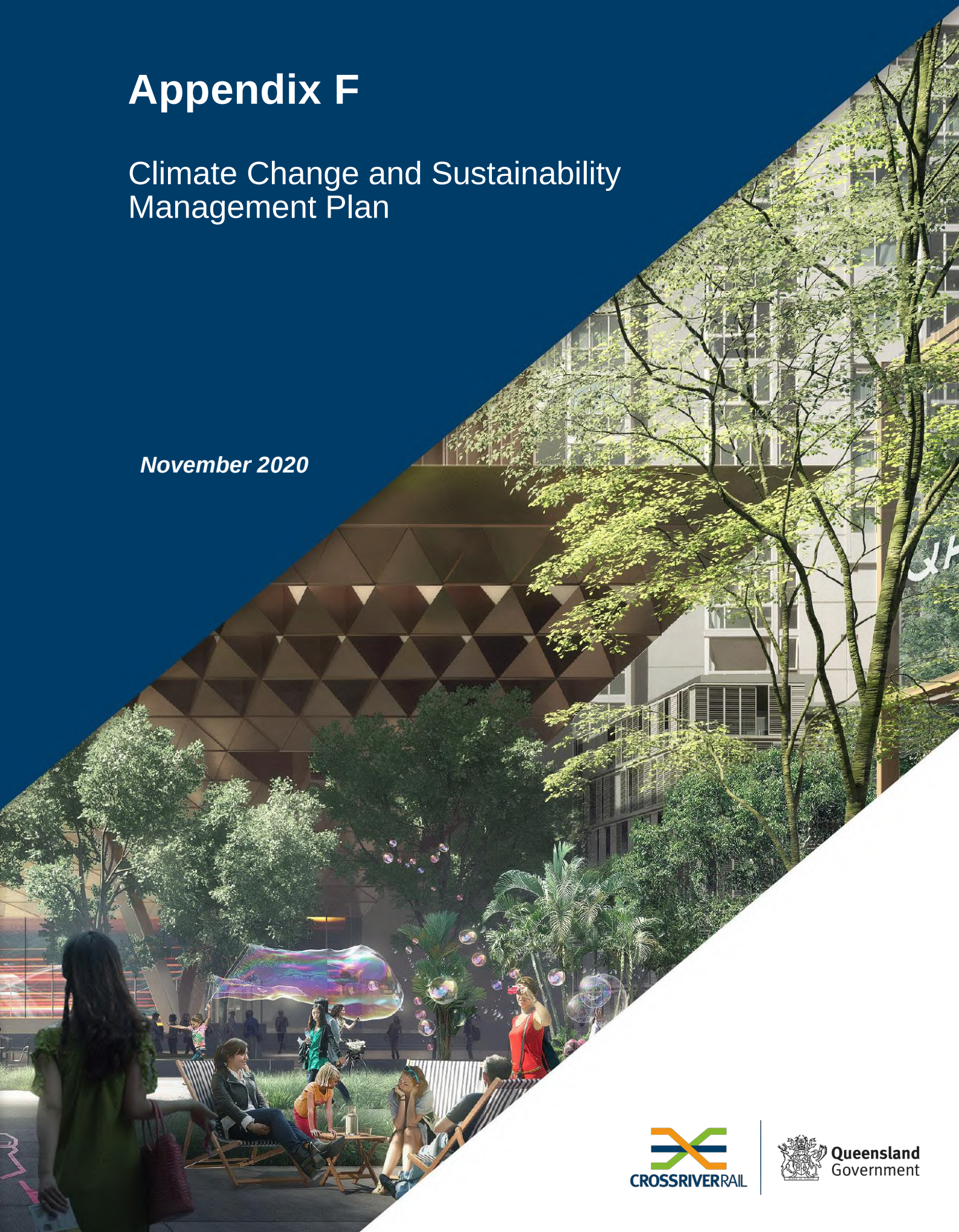

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CCSMP. Additional definitions for the Outline CCSMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
GHG	Greenhouse Gas
ISCA	Infrastructure Sustainability Council of Australia

2. Introduction

This Outline Climate Change and Sustainability Management Plan (Outline CCSMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline CCSMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to climate change and sustainability;
- manage the impact on the broader environment in terms of climate change and sustainability; and
- monitor the effects of management and mitigation measures outlined herein.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CCSMP.

3.1 Environmental Outcomes

The following environmental outcomes in relation to climate change and sustainability are to be achieved for the Project:

- Ensure through design that the Project is adaptable to conditions that may arise as a result of climate change.
- Ensure that the Project design minimises energy demand and lifecycle energy consumption.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

- The Project design accommodates the predicted 2100 sea level rise.
- The Project design achieves specific energy efficiency and resource efficiency measures.
- Material use is minimised and the reuse and recycle of materials is maximised.
- The use of potable water supply and energy in construction is minimised.

4. Impacts and Mitigation Measures

4.1 Impacts

Construction of the Project has the potential to contribute to climate change through emissions generated as part of the construction and operation of the Project. To ensure minimal contribution and to achieve best practice sustainability, the Project will implement various management measures as outlined below.

4.2 Management Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Design the Project infrastructure to achieve immunity for a predicted 1.0m sea level rise scenario in 2100.
- Investigate during the detailed design phase, the potential for additional energy efficiency measures to be incorporated into the design and construction of the Project.
- Identify opportunities to incorporate water efficiency and energy efficiency measures into the Project design.
- Identify and implement measures to maximise the use of grey water or capture, store and use stormwater or seepage groundwater for construction activities.
- Investigate opportunities to maximise the re-use of spoil on the Project or for other projects, subject to requirements of the Commonwealth Government with regards to the referral made pursuant to the *Environment Protection and Biodiversity Conservation Act 1999*.
- Implement measures to avoid and reduce, re-use and recycle materials used across construction activities.
- Develop a sustainable procurement strategy.
- Undertake a greenhouse gas (GHG) emissions inventory in line with the GHG protocol for all phases of the Project.
- Pursue an Infrastructure Sustainability Council of Australia (ISCA) Sustainability Rating.
- Develop and implement a local procurement policy for goods and services.
- Create a sustainability tool during detailed design to track initiatives and requirements.
- Management measures proposed to avoid and reduce, re-use and recycle material identified as part of this Outline CCSMP are to be consistent with measures to be included in the Outline Waste Management Plan (Outline WMP) to avoid and reduce, re-use and recycle material.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to this Outline CCSMP are outlined below:

- Monitor that management measures nominated above are incorporated into the detailed design and that measures are followed through to construction and operation.
- Regular monitoring (weekly) of the worksites for compliance with the Contractor's detailed Waste Management Plan developed during detailed design for the Project.
- Monitor energy consumption and potable water use monthly.
- Monitor the implementation of adopted sustainability requirements.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to climate change and sustainability are outlined below:

- Monthly sustainability reporting for all relevant aspects and monitoring results for compliance with the OEMP.
- Energy consumption and potable water use to be reported monthly.
- Maintain the sustainability tool for the Project, by auditing and reporting on the sustainability design requirements that have been incorporated into the final design.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix G

Community and Stakeholder Engagement Plan

November 2020

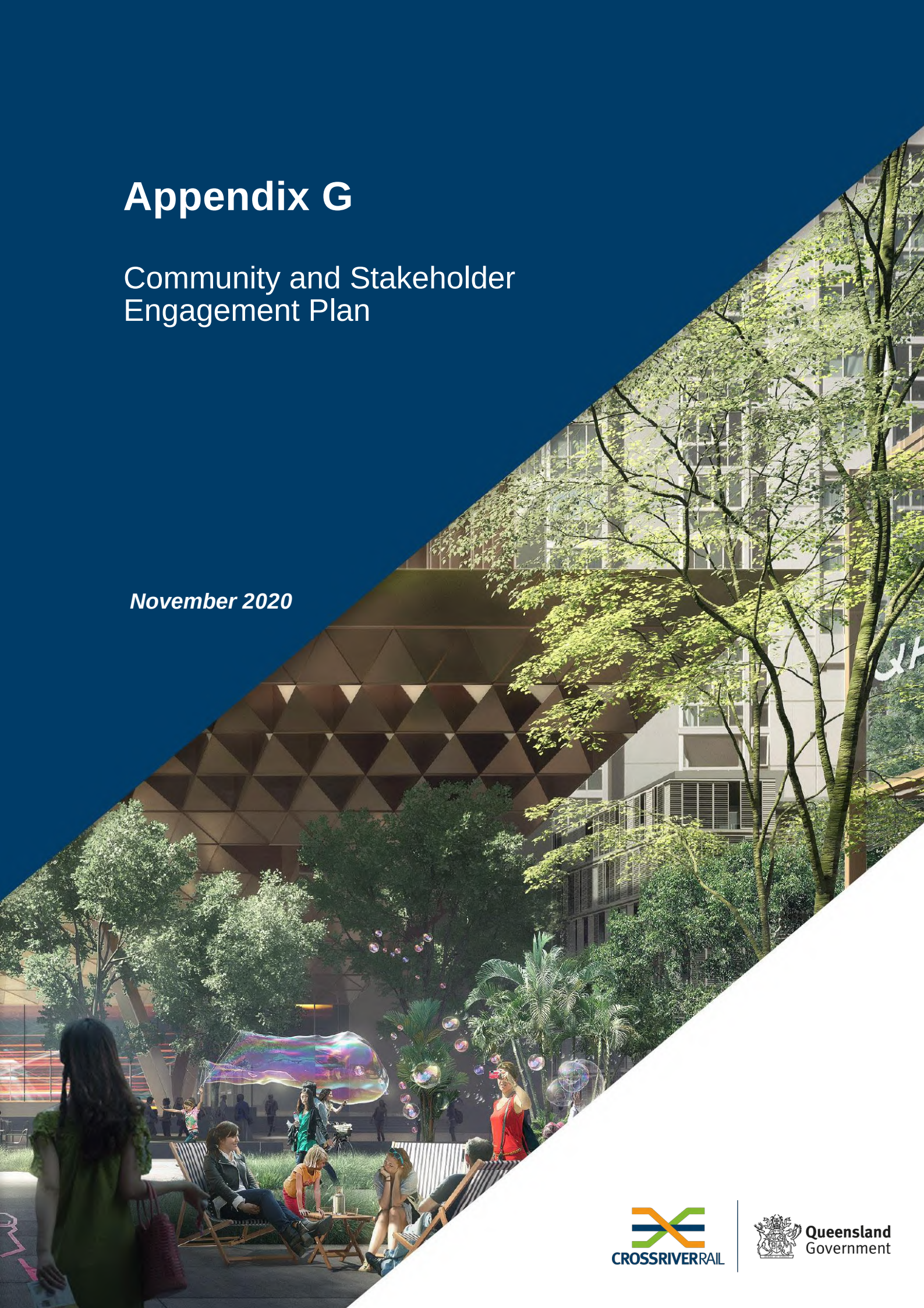

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CSEP. Additional definitions for the Outline CSEP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CAG	Community Advisory Group
CPTED	Crime Prevention through Environmental Design
CRM	Community Relations Monitor
CSEP	Community and Stakeholder Engagement Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Directly Affected Persons	An entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the Project impacts would be above the performance criteria in the Imposed Conditions
PA Hospital	Princess Alexandra Hospital
RNA	Royal National Agricultural and Industrial Association of Queensland
TRI	Translational Research Institute

2. Introduction

This Outline Community and Stakeholder Engagement Plan (Outline CSEP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The Contractor is to implement engagement procedures through which stakeholders and the community can obtain information, discuss and provide feedback on the Project, construction activities and environmental management measures.

Community and stakeholder engagement on the Project is to achieve the following outcomes:

- Local communities, residents and businesses likely to be directly affected by construction works for the Project are aware of the nature, timing and predicted effects of the works in advance of their commencement;
- Public transport and road users, including pedestrians and cyclists are aware of construction works and the predicted effects on road and rail network operations in advance of their commencement;

- Opportunities for ongoing consultation with local communities likely to be directly affected by construction works, as well as the wider community are provided throughout the construction phase;
- Communities have access to an effective and responsive communication and complaints process to address and respond to community issues;
- Consultation with the community and stakeholders is commenced well in advance of the commencement of construction works and, in some circumstances, commences with the design of mitigation measures during detailed design. Such consultation is to be conducted in sufficient detail to address specific construction impacts and mitigation requirements; and
- Consultation with affected entities about possible mitigation measures is conducted in confidence.
- Undertake early and on-going notification in accordance with the CSEP with business owners near to construction worksites or other construction works. In particular, this is to include, but not be limited to businesses near:
  - Kent Street (Southern portal);
  - Boggo Road, Peter Doherty Street, and Joe Baker Street, (Boggo Road Station);
  - Stanley Street, Vulture Street and Main Street, (Woolloongabba Station);
  - Margaret, Mary, Charlotte, Elizabeth and Albert Street, (Albert Street Station);
  - Roma Street and Brisbane Transit Centre, (Roma Street Station);
  - Gregory Terrace (Northern portal);
  - O'Connell Terrace, Exhibition Station (Exhibition Station);
  - Abbotsford Road, Mayne Yard; and
  - Fairfield to Salisbury Stations.
- Undertake on-going consultation with the RNA to ensure suitable access is maintained to the RNA Showgrounds for livestock and delivery vehicles during the Ekka and other major scheduled events at the RNA Showgrounds. General road access is also to be maintained to the RNA Showgrounds during the course of the Project works.
- Undertake early and on-going consultation with managers of community facilities above the tunnel alignment or near to construction worksites or other construction works. In particular, this is to include, but not be limited to:
  - PA Hospital and the Translational Research Institute (TRI);
  - Dutton Park State School at Dutton Park;
  - CSIRO and ESA Village – Leukaemia Foundation at Boggo Road Urban Village;
  - The Gabba Stadium at Woolloongabba;
  - Centenary Pool, Brisbane Grammar School, and Brisbane Girls Grammar School at Spring Hill;
  - Royal Brisbane and Women's Hospital; and
  - RNA Showgrounds, Bowen Hills.
- Undertake consultation with managers of the Gabba Stadium and other social infrastructure to ensure planning of major construction works or haulage activities considers the timing of and effects on major events.
- Maintain safe access for pedestrians and cyclists near to construction worksites and other construction works, which complies with the *Disability Discrimination Act 1992* and considers Crime Prevention through Environmental Design (CPTED) principles.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CSEP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved.

- Condition 8. Community Relations Monitor
- Condition 9. Community engagement plan

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Engagement Process and Procedures

Community and stakeholder engagement during construction is to include:

- Development and implementation of a CSEP and community engagement plans;
- Establishment and operation of Community Advisory Groups (CAG);
- Direct consultation with people whose property is predicted to be directly affected by construction activities, as well as with key stakeholders; and
- A complaints management procedure.

During the operation phase of the Project, community engagement, communications and complaints management are to be undertaken in accordance with the operator's customer feedback processes.

Community and Stakeholder Engagement Plan

A detailed CSEP is to be developed and implemented by the Contractor to ensure community and stakeholders are informed in a timely manner about construction activities. This plan is to be provided to the Environmental Monitor, the CRM, and the Coordinator-General prior to commencement of construction works.

Community and stakeholder engagement during the construction phase must include:

- Early establishment and maintenance of a comprehensive and accessible community information service including:
  - toll-free telephone service with 24 hours, seven days a week servicing;
  - project website and email service;
  - regular newsletters;
  - regular advertisements in local newspapers; and
  - scheduled information sessions or open days.
- Availability of information through the Project website generally and in response to specific enquiries about environmental performance;
- Early and on-going engagement with owners and occupants of premises adjacent or close to the proposed works about the scale, duration, location, potential effects and mitigation measures;
- Early notification to owners and occupants of sensitive receivers that are predicted to be affected by construction works in terms of their scale, duration, location and potential effects;
- Establishment of CAGs; and
- Where required, procedures to respond to complaints, issues or incidents and on-going communications with affected entities and a documented process for issues resolution.

Community Advisory Groups

CAGs are to be convened by the Delivery Authority prior to commencement of construction works. Such groups will meet regularly until completion of the commissioning phase and will have the purpose of providing timely, open advice and representation of community issues and concerns arising from the Project.

The CAGs would:

- Be kept informed and provide feedback to the Contractor and Delivery Authority about construction plans and programmes; and
- Provide community feedback to the Delivery Authority, the Contractor, the CRM and Environmental Monitor about concerns with the Project's construction.

The CRM or their delegate can facilitate and chair the CAG meetings if requested, and will provide administrative support for their conduct. The CRM may also coordinate the provision of technical advice from the Contractor's project team in response to written queries at a scheduled meeting.

The Environmental Monitor may attend CAG meetings as an independent observer.

The Contractor must keep the Delivery Authority informed of the views and issues raised in meetings of the CAG by providing endorsed copies of minutes and other meeting records as required. The Delivery Authority is responsible for keeping the Coordinator-General informed of the views and issues raised in meetings of the CAG.

For the commissioning phase of the Project, feedback must also be sought from the CAGs in relation to proposed commissioning activities and outcomes.

Direct landowner and stakeholder consultation

Early and on-going consultation must be undertaken throughout the detailed design and construction phase, with directly affected landowners and managers of community facilities in neighbourhoods adjacent to worksites and other construction works or above the main alignment. The purpose of such consultation is to provide updates on construction activities including advance notice of works which might be intrusive, identify likely impacts, and develop effective mitigation strategies.

Complaints and responses

The Contractor's CEMP/s must include a procedure for receiving, registering and responding to complaints. Complaints must be managed promptly and effectively. The complaints management system must include:

- A procedure for receiving complaints on a 24 hour, seven days a week basis, during the construction phase;
- A procedure for registering and responding to complaints;
- A mechanism for notifying the community of the complaints procedure and how it may be accessed;
- A process for registering and handling complaints received, including a database for tracking of complaints and actions taken in response. The database must include:
  - the time and date each complaint is received;
  - details of the complainant and the recorder of the complaint;
  - the specific activity causing the complaint including the place, time and date;
  - the entity responsible for addressing the complaint;
  - the action taken to address the complaint, if necessary;
  - feedback given to the complainant;
  - time and date on which the complaint was addressed and closed out;
  - immediate communication of the complaint to the nominated representative of the Contractor;

  - details on how the action taken by the Contractor was communicated to the complainant, the CRM and Environmental Monitor, the Delivery Authority and other relevant regulatory authorities; and
  - any subsequent remedial action required to avoid cause for future complaints if relevant.
- A procedure for escalating and resolving verified complaints consistent with the relevant legislation;
- Regular reporting, via the monthly environmental report, to the community of complaints and corrective actions maintaining appropriate confidentiality; and
- Monitoring and auditing of the complaint handling system.

Complaints during operation will be incorporated into the operator's customer feedback procedures.

4. Compliance Management

4.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

4.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

4.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

4.4 Inspections, Monitoring, Auditing and Reporting

4.4.1 Environmental Inspections

The Contractor will undertake environmental inspections to develop and evaluate the effectiveness of environmental controls if a complaint of an environmental nature has been raised.

If any maintenance and/or deficiencies in environmental controls or in the standard of environmental performance is observed, they will be recorded on the Project's Environmental Checklist. A register of all corrective actions including due date, closed out date, item description and responsible person will be recorded in such a way as to be able to be generated into a register when required. The complainant will be advised of the proposed mitigation and/or management measures.

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

4.4.2 Environmental Monitoring

In the event of a complaint of an environmental nature being raised, monitoring will be undertaken at various sensitive receptors to validate the impacts predicted for the Project and to measure the effectiveness of environmental controls and implementation of this Outline CSEP. The monitoring also helps in addressing any potential Community Complaints that may be made.

The complainant will be advised of additional or different mitigation and/or management measures that are adopted due to monitoring.

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

4.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

4.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

4.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

4.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

4.6 Communication

All Project-related communication must be undertaken in accordance with an approved CSEP and as per contractual requirements.

This includes:

- Communication with the Delivery Authority;
- Internal communications;
- External communications;
- Communication between TSD, RIS and ETCS packages;
- Government authority and agency communications;
- Stakeholder and community liaison;
- All communications with media; and
- All communications with unions.

If there is any doubt about how communication should occur in any instance, seek advice from the Delivery Authority's Stakeholder and Communications Team.

Appendix H

Construction Traffic Management Plan

November 2020

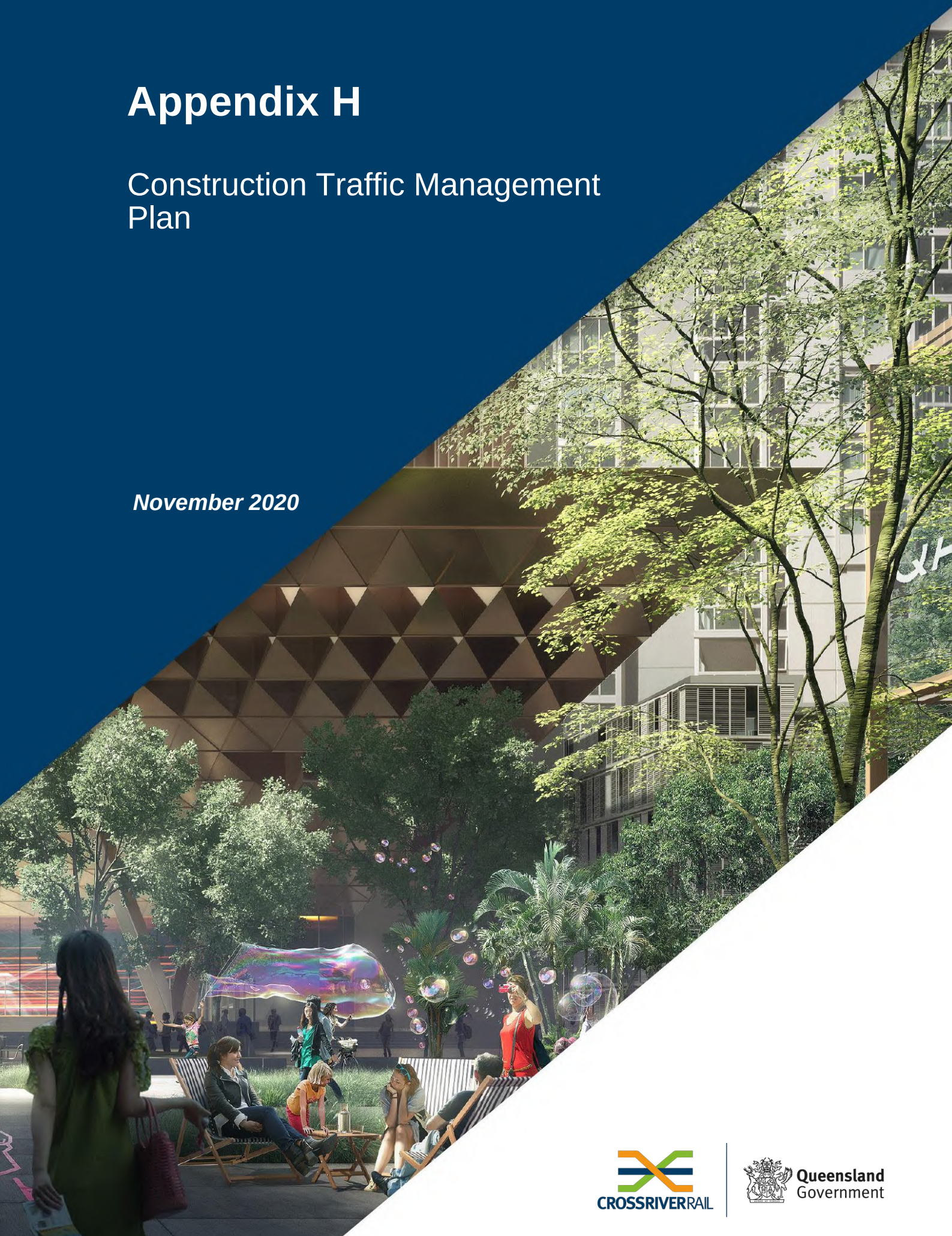

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Table of Contents

Appendix H2 – BCC Haulage Restrictions

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CTMP. Additional definitions for the Outline CTMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
BMTMC	Brisbane Metropolitan Traffic Management Centre
CPTED	Crime Prevention Through Environmental Design
CTMP	Construction Traffic Management Plan
REX	Riverside Expressway
RPEQ	Registered Professional Engineer Queensland
VMS	Variable Message Signs

2. Introduction

This Outline Construction Traffic Management Plan (Outline CTMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline CTMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on the community and stakeholders with respect to traffic and transport are minimised;
- nominate the Project's monitoring and reporting requirements in relation to this plan; and
- monitor the effects of management and mitigation measures outlined herein.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CTMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 14. Traffic and Transport

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to construction traffic management are to be achieved for the Project:

- Project construction traffic is managed to avoid or minimise and mitigate adverse impacts on road safety and traffic flow, public transport, pedestrian and cyclist safety, property access, freight rail movements and parking, existing road pavements and railway tracks.
- Workforce parking is provided and managed to avoid or minimise and mitigate adverse impacts on the local community and businesses.
- Traffic access for emergency services to construction worksites and adjoining properties is maintained throughout the construction phase.
- Access is maintained to properties throughout the construction phase or an acceptable alternative solution is agreed with the property owner prior to closure of any access.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Safe and efficient access is maintained for pedestrians, bicycles and for passengers to and from public transport facilities, including rail and busway stations and bus stops.
- Practicable access is maintained to adjacent properties throughout the construction phase.
- Disruptions to the operation of the road network and the public transport network due to Project Works must be avoided during peak periods, where possible, and managed during off-peak periods.
- Passenger rail services and schedules during peak weekday travel times are maintained, unless with prior agreement of the Rail Transport Operator and TMR.
- Passenger bus services and schedules during peak travel times are maintained, where possible.
- Key freight rail services and schedules are maintained, unless with prior agreement of the Rail Transport Operator.
- Haulage vehicles (i.e. spoil, construction equipment and materials haulage) only travel on designated haulage routes identified in the CTMP, unless agreed beforehand with the relevant road authority and the Environmental Monitor.
- All haulage routes are subject to a Road Safety Assessment – Spoil Haulage Routes.
- A Traffic Management Plan will be developed by the Contractor and communicated to all site personnel during site induction, outlining routes for commuting and parking at each worksite.
- Spoil haulage vehicles are managed in real time to and from worksites and spoil sites to avoid speeding, queuing in local streets, congested areas and traffic incidents, and to manage and avoid over-loading, spills and safety incidents. This includes the use of GPS tracking for major deliveries to minimise conflicts and prevent queuing on public roads.
- During construction, workforce car parking must be provided and managed to avoid workforce parking on local streets.
- Information about the timing and scale of changes to traffic and transport conditions on passenger rail operations, the busway and road networks in the vicinity of Project Works is

provided in advance to the local community, commuters and on request to other people interested in the Project Works.

- Pedestrian and cycle access to community facilities is not disrupted by Project Works, unless approved by the relevant road authority in consultation with the manager of the community facilities.

3.4 Requirements of Contractor Sub-Plan

3.4.1 General Construction Traffic Management

1. The Contractor must prepare and implement a CTMP for all transport infrastructure impacted by the Contractor prior to the commencement of construction activities in consultation with TMR, BCC and Emergency Service Authorities.

2. The CTMP and its sub-plans must be subject to periodic review to address changes in the Project's construction programme and changes in construction methodology, including modification to delivery schedules, delivery routes and spoil haulage route changes.

3. The CTMP and its sub-plan must be prepared by a suitably qualified Traffic Engineer.

4. The CTMP must address, but not be limited to, the following general measures:
   a) the matters listed in Imposed Condition 14;
   b) proposed designated truck routes to and from construction worksites for the haulage of spoil and relate to the spoil placement sites identified at the time;
   c) mitigation measures for the designated haulage route(s) that consider the outcomes of Road Safety Assessment Report – Spoil Haulage Routes undertaken as required by the Imposed Conditions;
   d) should alternative spoil placement sites be identified, suitable designated spoil haulage routes must be identified and must rely to the extent possible on the arterial and major road network of the area. A Road Safety Assessment Report – Spoil Haulage Route must be completed for any new or additional spoil haulage route identified;
   e) where special circumstances require the use of other truck routes, such as the delivery or removal of oversized plant, equipment or structures, construction traffic must be managed in accordance with specific traffic management sub-plans prepared in consultation with the Rail Transport Operator, TMR, BCC or other relevant local governments; and
   f) construction haulage tasks must be scheduled and managed to avoid disruption to traffic flows during peak traffic periods, where possible.

The CTMP must also include:

- the proposed access to worksites, with local or minor roads only used where unavoidable to access a Project worksite;
- a process for advance notice to Directly Affected Persons and local communities within the vicinity of the spoil haulage routes and worksite accesses;
- local traffic management measures developed in consultation with BCC for key intersections:
  - in Bowen Hills including Bowen Bridge Road, College Road, Gregory Terrace and O'Connell Terrace;
  - in the CBD including Albert Street, Charlotte Street, Elizabeth Street, Mary Street, Margaret Street, George Street and Roma Street;
  - at Woolloongabba including Leopard Street, Stanley Street, Vulture Street and Main Street;
  - at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road;
  - at Bowen Bridge Road where secondary access has been proposed via Energex; and
  - in the area of the Fairfield to Salisbury stations and Clapham Yard works
- Specific traffic management measures developed in consultation with other key stakeholders, including:

  - The department administering the *Economic Development Act 2012* with regards to traffic management in the Queens Wharf Brisbane priority development area;
  - Queensland Rail (QR) about maintaining access to railway stations; and
  - The department administering the *Transport Infrastructure Act 1994* and BCC about maintaining operations for bus services along streets affected by the Project Works.
- 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 BCC, QR, TMR (Metro/Translink) about changes in pedestrian and cycle paths required to facilitate Project Works.

3.4.2 Other Major Construction Projects

The measures to be implemented must take into account the construction traffic related to other major projects in the Project corridor, including:

- the redevelopment of the RNA Showgrounds;
- Queen's Wharf Brisbane;
- Brisbane Metro;
- development of the Woolloongabba priority development area;
- development of the Boggo Road Urban Village; and
- any future development and or redevelopment of land around the Project footprint.

Cumulative Construction Traffic Management

1. The CTMP must consider cumulative impacts of traffic at key intersections e.g. for the CBD along Alice Street, George Street and Roma Street.

2. Spoil haulage and materials and equipment delivery must be undertaken within the hours of work set out in Imposed Condition 10. In addition, where haulage routes traverse residential streets or travel past sensitive local facilities, such as schools, specific mitigation measures must be provided to mitigate any risks associated with these activities.

3. As far as practicable, major haulage tasks for worksites are avoided during the following scheduled major events:
   a) at the Gabba Stadium (crowds greater than 25,000) – for the Woolloongabba Station worksite;
   b) at Lang Park (crowds greater than 25,000) – for the Roma Street Station worksite;
   c) the Ekka and other events at the RNA Showgrounds (daily crowds greater than 25,000) - for the Exhibition Station worksite;
   d) Riverfire; and
   e) New Year's Eve - Albert Street Station and Roma Street Station worksites.

3.4.3 Maintaining Access

1. Project Works must not result in a loss of access for delivery vehicles to local businesses and community facilities. Where changes to access for delivery vehicles is required because of Project Works, alternative access arrangements are identified in consultation with local businesses and facilities. In particular, access for delivery vehicles must be maintained to:
   a) businesses at Boggo Road Urban Village and the Ecosciences Precinct off Annerley Road, Dutton Park;
   b) businesses and community facilities at Stanley Street and Vulture Street at Woolloongabba;
   c) hospitals and medical centres at the Princess Alexandra Hospital and the Royal Brisbane and Women's Hospital (RBWH);
   d) businesses at Roma Street, Charlotte Street, Mary Street and Albert Street in the Brisbane CBD;
   e) schools along Gregory Terrace;

f) businesses along O'Connell Terrace, Bowen Hills; and
g) any other residence, business, school or medical centre along the Fairfield to Salisbury Project alignment.

2. Access for emergency services vehicles must be maintained for the duration of construction works to:
   a) Princess Alexandra Hospital, via Cornwall Street and Kent Street;
   b) Mater Hospital, via Stanley Street; and
   c) RBWH via O'Connell Terrace.

3.4.4 Public and Active Transport

1. Early and on-going notification must be given to Rail Transport Operator, TMR, TransLink, BCC and local communities about the timing and duration of shutdowns for public transport, likely disruptions and alternative transport arrangements to be implemented during the period of disruption.

2. Temporary disruption to the Inner Northern Busway adjacent to Roma Street Station and the Eastern Busway adjacent to Boggo Road Station and adjacent to Woolloongabba Busway Station must be managed in consultation with TransLink and BCC. Appropriate cumulative impact assessments must be undertaken by the Contractor and management plans must be in place, in particular to deal with the impacts of temporary diversion of buses onto Roma Street.

3. Temporary alternative bus stops must be provided in consultation with TransLink where bus stops along Roma Street adjacent the Brisbane Transit Centre (West Tower) are disrupted.

4. Local communities are notified about changes to pedestrian and cycle access because of the Project Works. Public notification via local and regional newspapers, social media and the Project website must describe the proposed changes, the duration of the changes and possible alternative routes.

5. Cycle facilities likely to be affected by construction works, such as the CityCycle stations, must be relocated in consultation with BCC.

6. Safe and functional access for pedestrians and cyclists is to be maintained near Project Works.

7. Safe, alternative access must be provided for bikeways disturbed by construction works.

8. 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 stakeholders, including Vision Australia, to provide safe and efficient pedestrian access. Safe, alternative access is to be provided for bikeways disturbed by construction works.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential traffic and transport related impacts could include, but are not limited to, the following:

- Increased delays during commuter peak periods;
- Unintended interference with or damage to public utilities owed by other entities;
- Impact to public utility provider's programmes and other infrastructure and construction programmes;
- Impact to outdoor education programmes of surrounding schools and impact to the use and accessibility of pedestrian pathways;
- Impact to traffic and access requirements for other Brisbane projects;

- Unreasonable loads imposed on existing services and roads;
- Removal of park and public space;
- Impact to heritage places and heritage values as a result of increased traffic volumes;
- Public transport services; and
- Temporary road closures and traffic diversions.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Local communities, including residents, businesses, users of community facilities and public transport passengers, are to be notified about changes to access and transport arrangements near construction works.
- Public notification (local and regional newspapers, Project website and social media) describing the proposed changes, the duration of the changes and possible alternative routes to avoid the impacts of the proposed changes is required at least 10 business days prior to the commencement of relevant construction work.

4.2.1 Project Works on the Rail Network

- Project Works that require rail network shutdowns must be agreed with the Rail Transport Operator, prior to commencement of works within the rail corridor to minimise disruption to the rail network and should use existing planed shutdowns where possible.
- Early and on-going notification is provided to the Rail Transport Operator, the Delivery Authority, rail passengers, rail freight operators and local communities of the timing and duration of rail shutdowns, likely disruptions to rail services and alternative arrangements to be implemented.
- Bus replacement services are provided where passenger rail operations are interrupted, such as during rail network shutdown periods or temporary closures of stations.
- Disruption to rail passenger services is avoided to the extent reasonable and practicable during major events, at the ‘Gabba’ (Woolloongabba Station), the Ekka (Exhibition Station) and at Lang Park (Roma Street Station). Where disruptions are unavoidable, bus shuttle services are provided between appropriate stations to the major event venues, or to bypass the disrupted section in the network.
- To the extent reasonable and practicable, existing access to the rail corridor for maintenance and emergency service vehicles is maintained. Where necessary, alternative access arrangements are provided in consultation with Rail Infrastructure Manager and other rail operators.
- Pedestrian access for rail staff between Mayne Yard and Bowen Hills Station is to be maintained.
- Road access to and within Mayne Yard is maintained during Project Works.
- Construction Workforce Car Parking Plan should include measures for how travel by Public Transport would be encouraged.

4.2.2 Project Works on the Road Network

- Local communities and road users are 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, social media, 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 where practical to minimise distractions for motorists and to prevent flying debris, liquid splash and minimise noise impact.
- The Proponent must prepare and implement CTMPs for each worksite prior to the commencement of construction activities in consultation with TMR, BCC and Emergency Service Authorities. The CTMP must undergo periodic review to address changes in the Project’s construction programme. The CTMP is to address, but not be limited to, the following measures:

  - where special circumstances require the use of other truck routes, such as the delivery or removal of oversized plant, equipment or structures, construction traffic is managed in accordance with specific traffic management sub-plans prepared in consultation with TMR, BCC or other relevant local governments;
- Assess cumulative impacts of traffic at key intersections along Alice Street, George Street and Roma Street. Prepare and implement a CTMP to address identified impacts with input from relevant stakeholders.
- Prepare and implement a Construction Workforce Car Parking Plan for each construction worksite in consultation with TMR and BCC. The Construction Workforce Car Parking Plans are to be prepared and implemented prior to the commencement of construction works and updated as necessary to reflect the needs of the Project during peak construction workforce periods. As a minimum, the plans would:
  - outline parking and travel arrangements for the construction workforce;
  - identify measures to avoid worker car parking and access in local streets near construction worksites;
  - address safety, access and amenity for both workers and the local community;
  - describe any proposals to shuttle workers to or from other worksites;
  - identify any restricted areas or times where different worker procedures apply;
  - identify parking control arrangements in consultation with BCC;
  - address changing worksite demands during the construction programme;
  - promote the use of public transport; and
  - be provided to BCC prior to commencement of construction at a worksite.
- Prepare and implement a Construction Vehicle Management Plan, prior to the commencement of construction works, which provides measures to manage the construction truck fleet, including, but not limited to:
  - real-time monitoring of spoil haulage truck position, speed, route and performance in relation of traffic conditions and schedule requirements;
  - managing truck speed and position to avoid queuing near construction worksites, sensitive community facilities and residential neighbourhoods;
  - managing traffic signals on nominated spoil haulage routes in night-time hours to achieve optimum performance of the truck fleet and to minimise impacts on communities along the designated routes;
  - spoil vehicles to be clearly marked, including a visible Project contact phone number;
  - maintaining all haulage vehicles to Australian Design Rule 28/01 in relation to noise emissions, exhaust emissions, traffic safety and operational safety;
  - maintaining all haulage vehicles to Australian Design Rule 80 for emission control;
  - ensuring all vehicles leaving a construction worksite pass over or through devices that removes loose soil and other debris before entering a public road;
  - ensuring all vehicles and equipment are well maintained to minimise combustion generated emissions and manage PM2.5 levels; and
  - Driver Code of Conduct to be established that includes detail on approved haulage routes, safety, courtesy and amenity.

4.2.3 Haulage Management

- Haulage management requirements are to be included as part of the CTMP which will be developed in consultation with BCC prior to construction starting.

- The CTMP will include:
  - Reference to and compliance with the *Heavy Vehicle National Law Act* (Cth) 2012 and the associated regulations;
  - As far as practicable, major haulage tasks for worksites are avoided during the following scheduled major events:
    - at the Gabba Stadium (crowds greater than 25,000) – for the Woolloongabba Station worksite;
    - at Lang Park (crowds greater than 25,000) – for the Roma Street Station worksite;

        - the Ekka and other events at the RNA Showgrounds (daily crowds greater than 25,000), for the Exhibition Station worksite;
        - Riverfire; and
        - New Year's Eve – Albert Street Station and Roma Street Station worksites.
    - Haulage activities are managed and coordinated with other major construction works near to construction activities so as to minimise the disruption to local traffic;
    - The capacity of intersections with arterial roads along haulage routes is investigated and mitigation measures implemented, to minimise the impact of construction vehicles to maintain reasonable levels of service on all intersection operations;
    - Reference to and compliance with Coordinator-General's Change Report on haulage to Spoil Placement Sites, **Appendix H1**, and the BCC haulage restrictions, **Appendix H2**;
    - Compliance with the Imposed Conditions' nominated haulage hours relative to various locations along the Project;
    - Designated haulage route(s) including contingency haulage for all stages of the Works, both inside and outside of the CBD will be developed in consultation with BCC;
    - The Contractor must develop an updated and detailed road safety assessment for the spoil haulage routes;
    - Site specific haulage entry and exit points for each work site plus details of proposed material handling areas must be nominated;
    - An estimate of the quantity of excavated / demolition material to be removed and the approximate number of heavy vehicle movements per day, including destinations for loads and travel times;
    - In general, haulage vehicles should enter and leave the site by the shortest practical route to connect to the BCC and/or TMR arterial road network;
    - Proposed haulage management and supporting documentation must be prepared by a suitably qualified and experienced person holding current Traffic Management Design qualifications, with all drawings certified by a suitably qualified and experienced RPEQ;
    - Details of a suitable compliance strategy to control the weight of vehicles entering and leaving the site to the satisfaction of TMR and BCC must be provided as part of the Contractor's Haulage Management Plans;
    - An auditable process to manage, monitor and report on the compliance with the 42.5 tonne total GML (General Mass Limit) of vehicles unless otherwise permitted by TMR;
    - Monitoring arrangements, daily metric reporting and monthly reporting to manage load limit compliance;
    - Relevant actions and procedures identifying how loads will be appropriately secured, managed and loaded. Haulage vehicles are to be spaced 200 metres apart when departing the site onto the Riverside Expressway (REX) and the Captain Cook Bridge;
    - Contingency planning for non-standard operations and unpredicted impacts, including a safety management protocol (e.g. for loss of load or heavy vehicle breakdown on the REX);
    - A communication strategy (including a community engagement plan) for routes and corridors that are being utilised for the transportation of material(s), with provision for a complaint register, and the ability to identify relevant trucks or drivers in relation to a complaint received;
    - Where there are significant changes to the haulage process, submit a new or revised CTMP or sub-plan which is prepared by a suitably qualified and experienced person with current Traffic Management Design Qualifications, with all drawings certified by a suitably qualified and experienced RPEQ;
    - Undertake all haulage in accordance with the relevant CTMP, which must be current and available on site at all times; and
    - Submit on a monthly basis, or as requested, haulage monitoring results prepared by an experienced person and is to be in compliance with the relevant CTMP or sub-plan.

4.2.4 Road Traffic and Access

- 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;

- Notify local communities and road users in advance of and for the duration of proposed changes to local traffic access arising from Project works. This includes, but is not limited to:
    - directional signage and line marking to direct and guide drivers and pedestrians past work sites and on the surrounding network. This is to be supplemented by portable Variable Message Signs (VMS) where required to advise drivers of potential delays, traffic diversion, speed restrictions, alternate routes;
    - public notification of proposed traffic changes by newspaper, social media, Project website, and community liaison, describing the proposed changes, the duration of the changes, and possible alternative routes to avoid the impacts of the proposed changes; and
    - coordination with the Brisbane Metropolitan Transport Traffic Management Centre (BMTMC) in the event of incidents or undue congestion;
- Access to properties adjoining or near to Project works, is maintained. Where changes to property access are required, alternative access arrangements are to be agreed in consultation with property owners or occupants;
- Roma Street busway diversions must be considered and evaluated in terms of the impact to road traffic with an adequate level of service maintained; and
- Truck movements are to be managed to avoid impacts on local streets approved for use such as damage to road pavements, from heavy vehicle traffic.

4.2.5 Public and Active Transport

- Traffic management measures are to be implemented near to Project works to minimise disruption and delays to bus services.
- Construction works within the busway corridor to be coordinated with TMR and BCC.
- Bus replacement services are to be provided where passenger rail operations are interrupted, such as during rail network shutdown periods or temporary closures of stations.
- Where busway shutdowns are required during operational hours, TMR and BCC will be consulted in advance to enable alternate routes and stops to be established. Temporary disruption to Inner Northern Busway adjacent to Roma Street Station and the Eastern Busway adjacent to Boggo Road Station and adjacent to Woolloongabba Busway Station will be managed in consultation with TMR and BCC.
- Early and on-going notification is to be provided to TMR, BCC, busway passengers and local communities of the timing and duration of shutdowns, likely disruptions to services and alternative arrangements to be implemented.
- Provision of temporary alternative bus stops to be provided in coordination with TMR and BCC where bus stops along Roma Street adjacent the Brisbane Transit Centre are disrupted.
- Local communities are to be notified about changes to pedestrian and cycle access near construction works, and public advertisements (local and regional newspapers, Project website, social media) describing the proposed changes, the duration of the changes and possible alternative routes to avoid the impacts of the proposed changes.
- Cycle facilities likely to be disrupted during construction works, such as the CityCycle stations adjacent the Brisbane Transit Centre and on the corner or Albert Street and Mary Street, are temporarily or permanently relocated in consultation with BCC.
- 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 Crime Prevention Through Environmental Design (CPTED) principles.
- Safe, alternative access is to be provided for bikeways disturbed by construction works, including but not limited to, the bikeway near the Northern portal worksite in Victoria Park and the bikeway along Kent Street, and the PA Hospital bikeway.
- 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.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline CTMP are nominated below:

- Monitoring of construction traffic to ensure compliance with the Imposed Conditions;
- Weekly reviews with Brisbane Metropolitan Traffic Management Centre (BMTMC) to identify any congestion issues along Project haul routes and at major intersections;
- Weekly inspections of local streets surrounding worksites to identify any unauthorised worker parking and non-compliances with the Construction Workforce Car Parking Plan, which is to be developed by the Contractor prior to construction of construction worksites commencing; and
- Weekly inspections of pedestrian and cycle accesses surrounding worksites to identify any disturbances caused by construction activities. Any damaged or unsafe pedestrian or cycle accesses must be rectified immediately.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to traffic and transport are outlined below:

- Results of traffic monitoring are to be reported in the monthly environmental report, along with details of any incidents or complaints related to construction traffic, include any incidents involving construction traffic.

Any amendments to the CTMP, Construction Workforce Car Parking Plan or Construction Vehicle Management Plan as a result of environmental reporting outcomes are to be made in consultation with TMR and BCC.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix H1 – Spoil Placement Sites

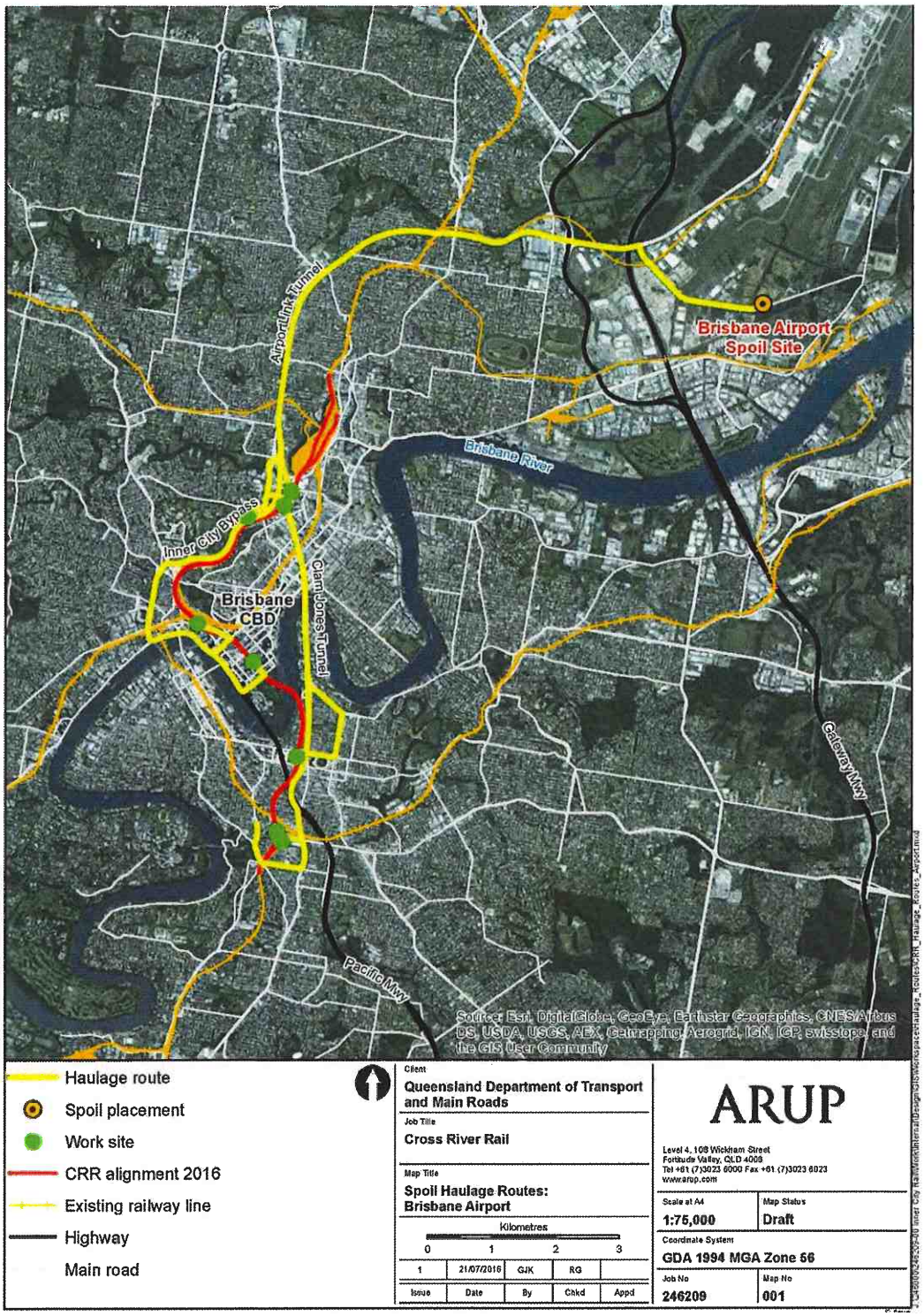


Figure 1: Spoil Haulage Route - Brisbane Airport

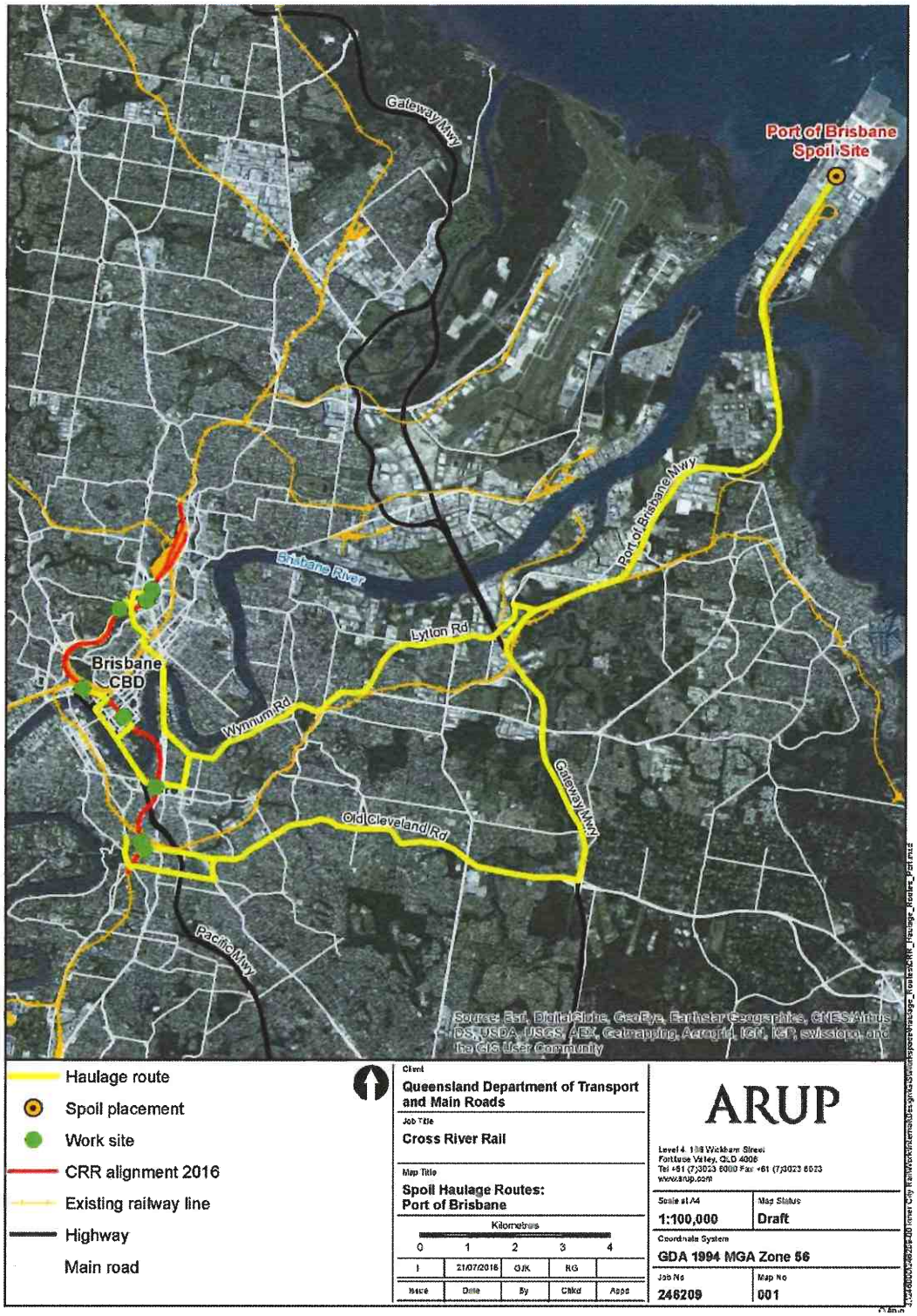


Figure 2: Spoil Haulage Route - Port of Brisbane

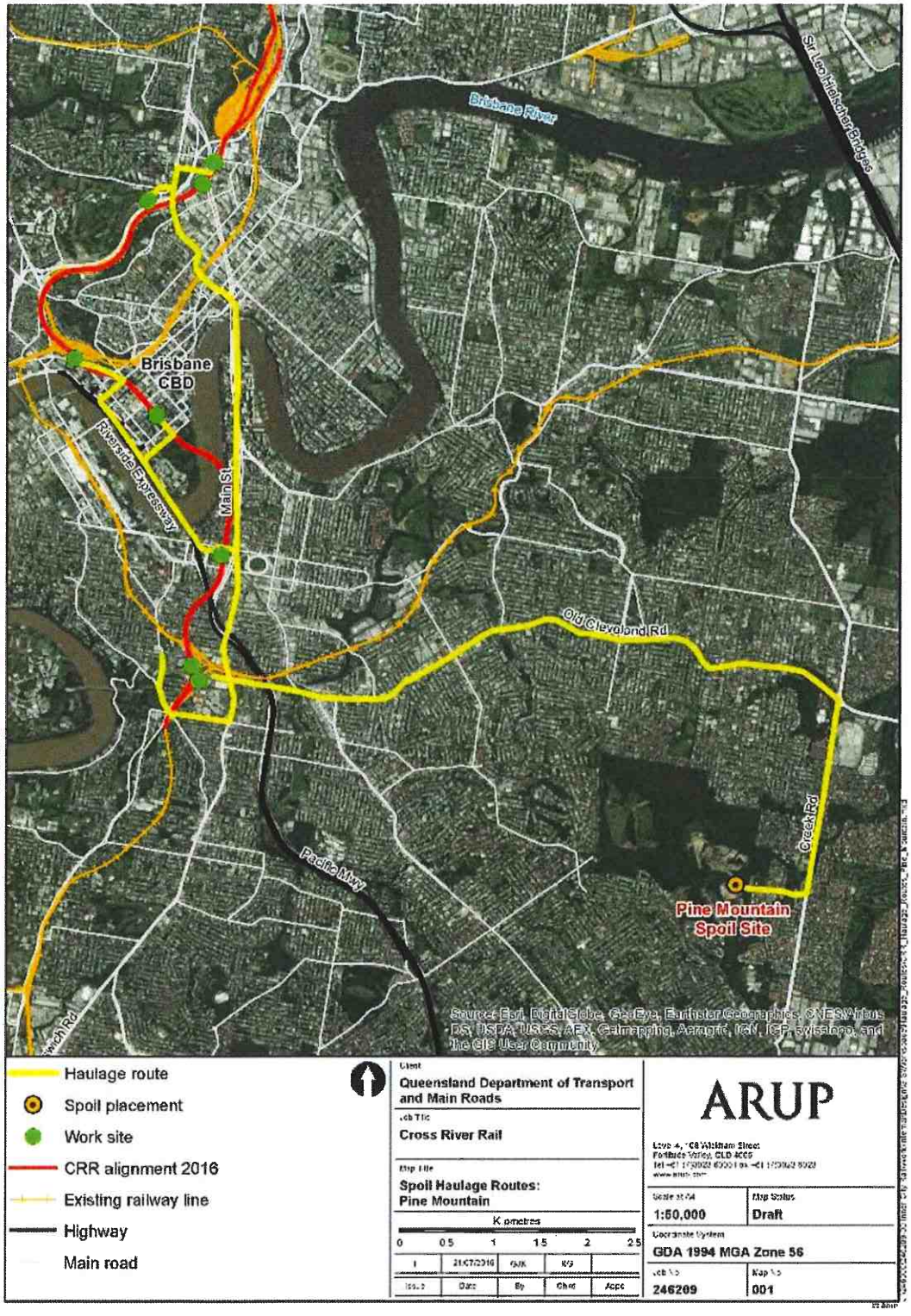


Figure 3: Spoil Haulage Route - Pine Mountain

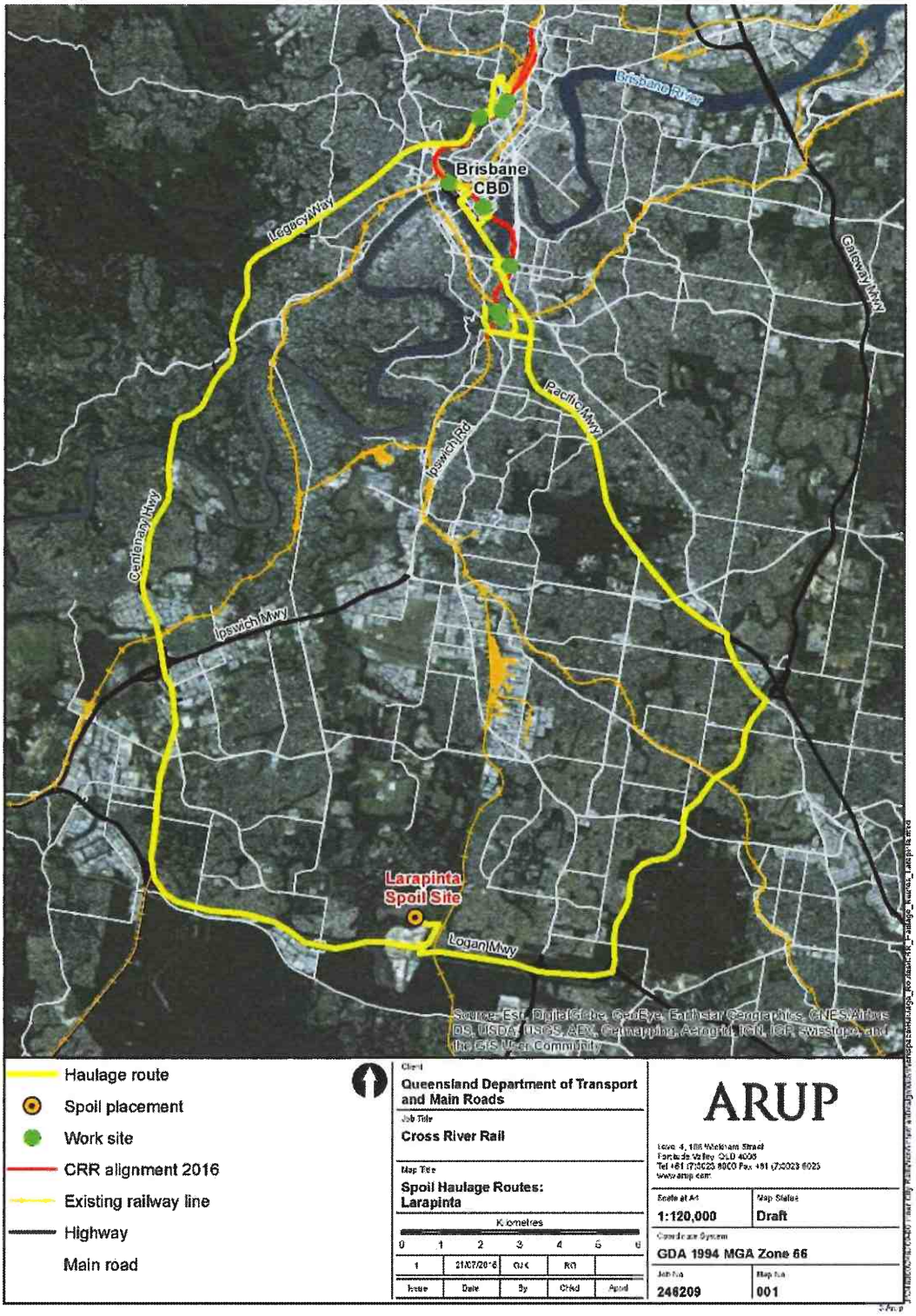


Figure 4: Spoil Haulage Route - Larapinta

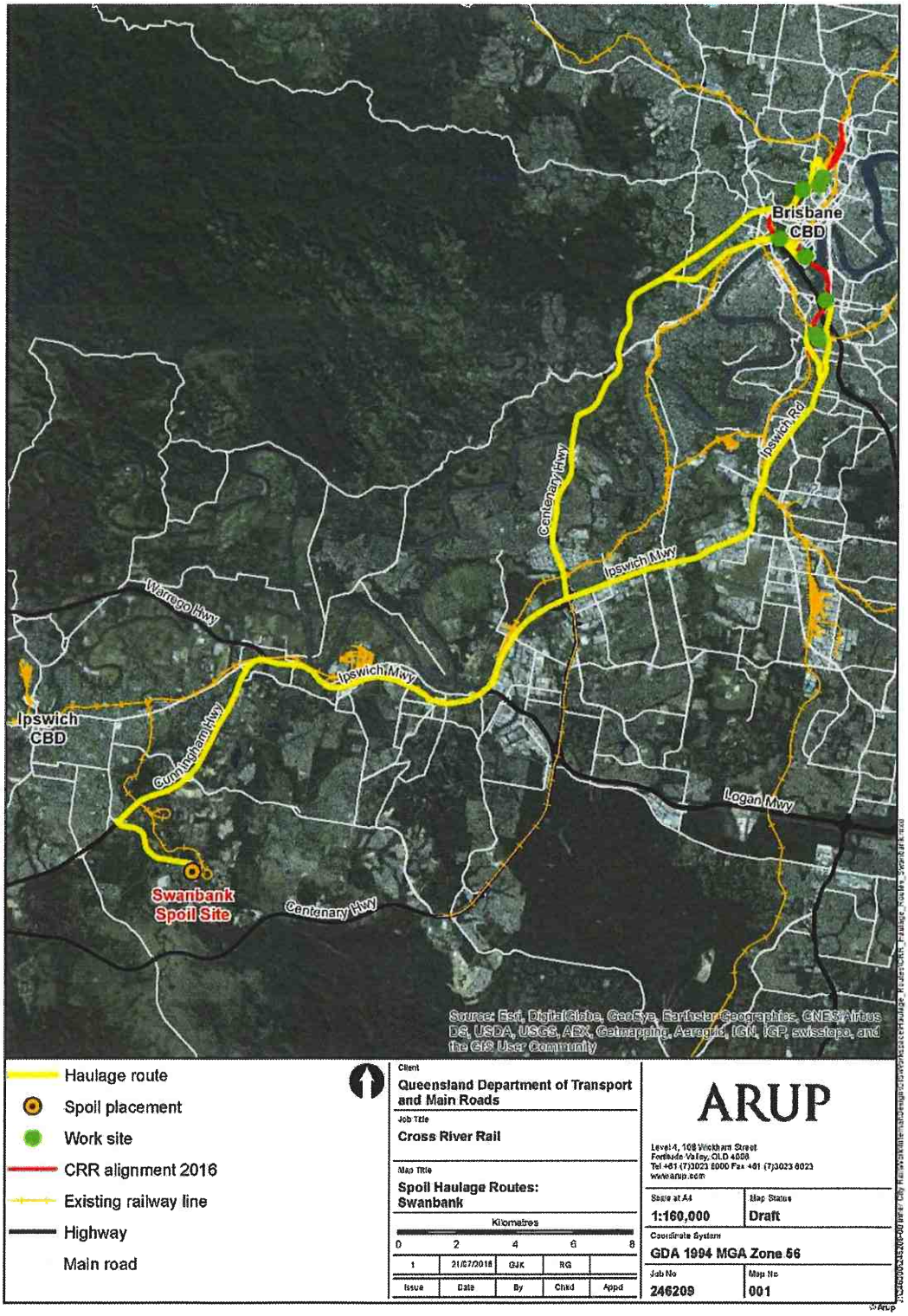
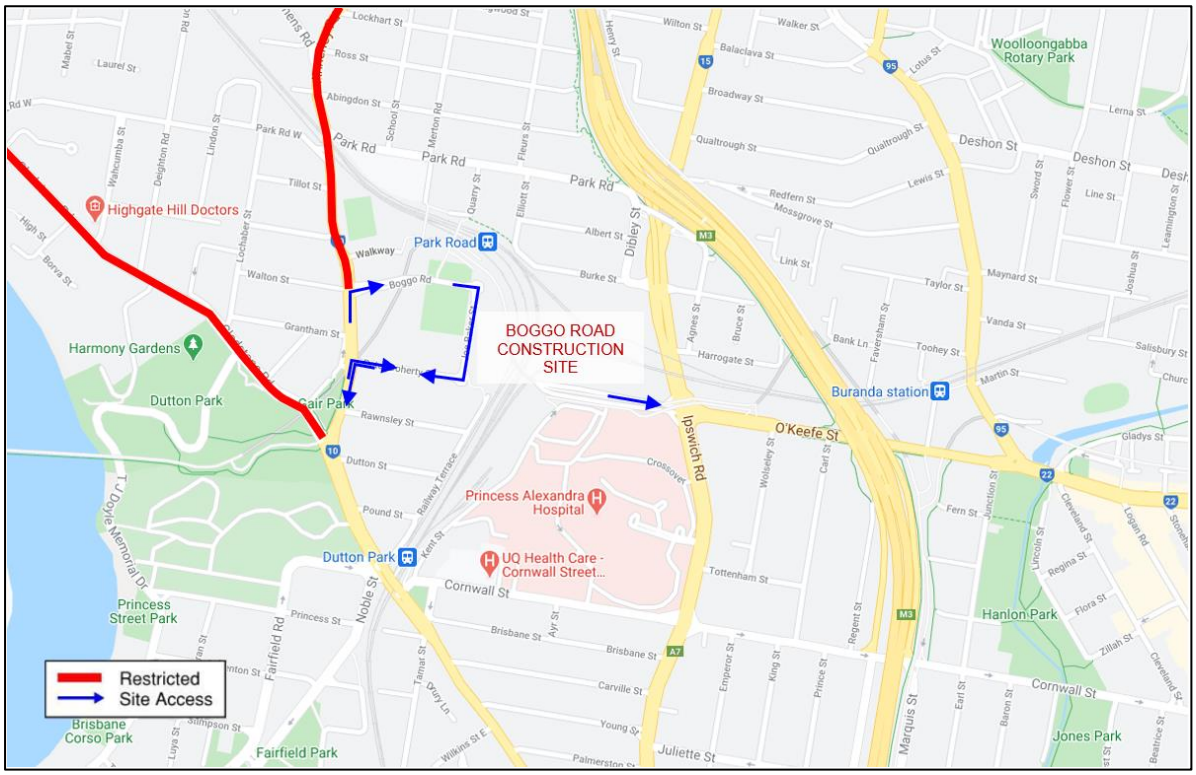


Figure 5: Spoil Haulage Route - Swanbank

Appendix H2 – BCC Haulage Restrictions

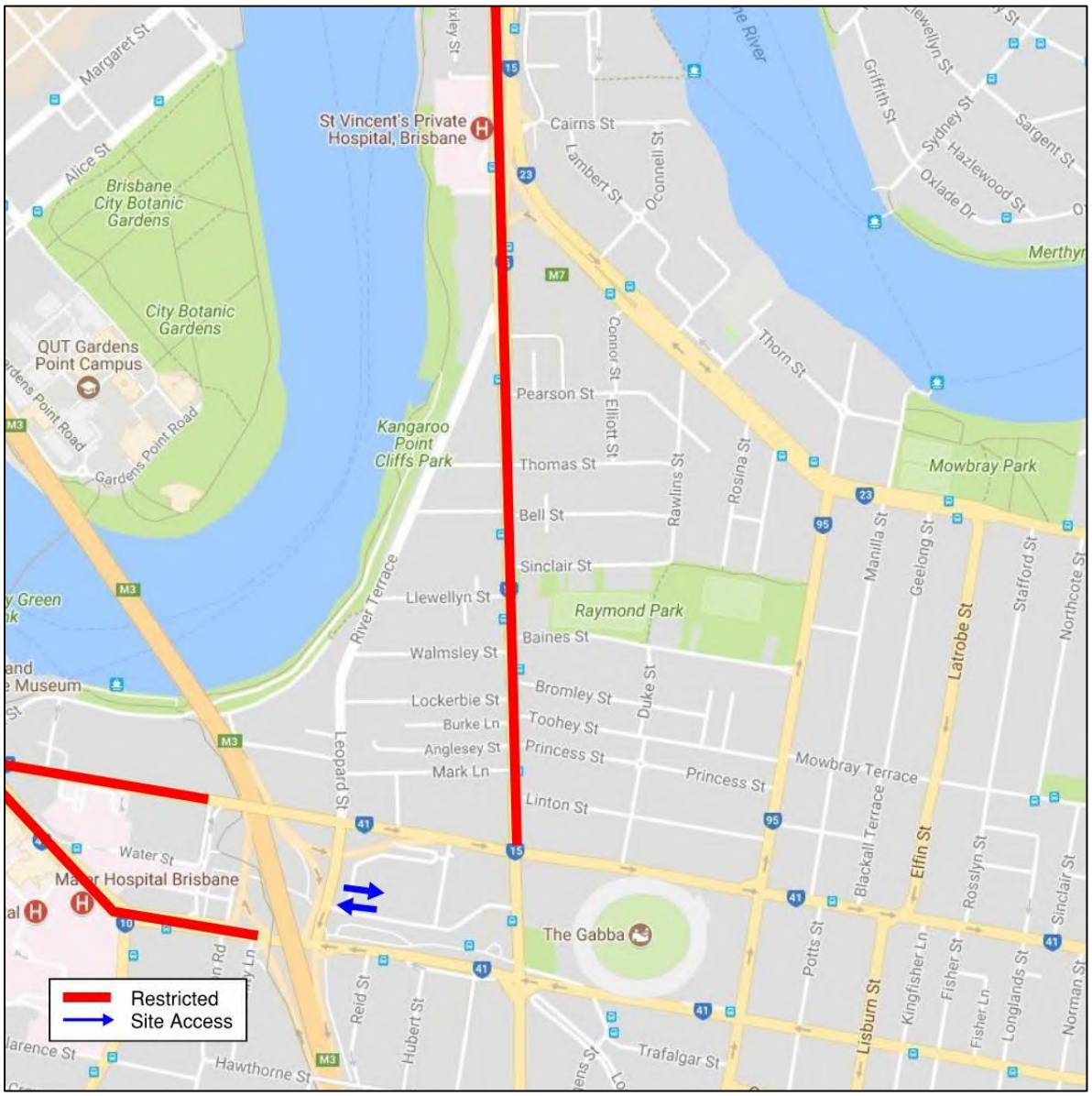
Site 1: Dutton Park and Boggo Road

Council comments
- No haulage vehicles along Annerley Road, north of Boggo Road - No haulage vehicles along the extent of Gladstone Road - No right turn onto Annerley Road from Boggo Road



Site 2: Woolloongabba

Council comments
- No haulage vehicles along Main Street, north of Vulture Street - No haulage vehicles along the Story Bridge - No haulage vehicles along Vulture Street, west of Allen Street - No haulage vehicles on Stanley Street, west of the Pacific Motorway

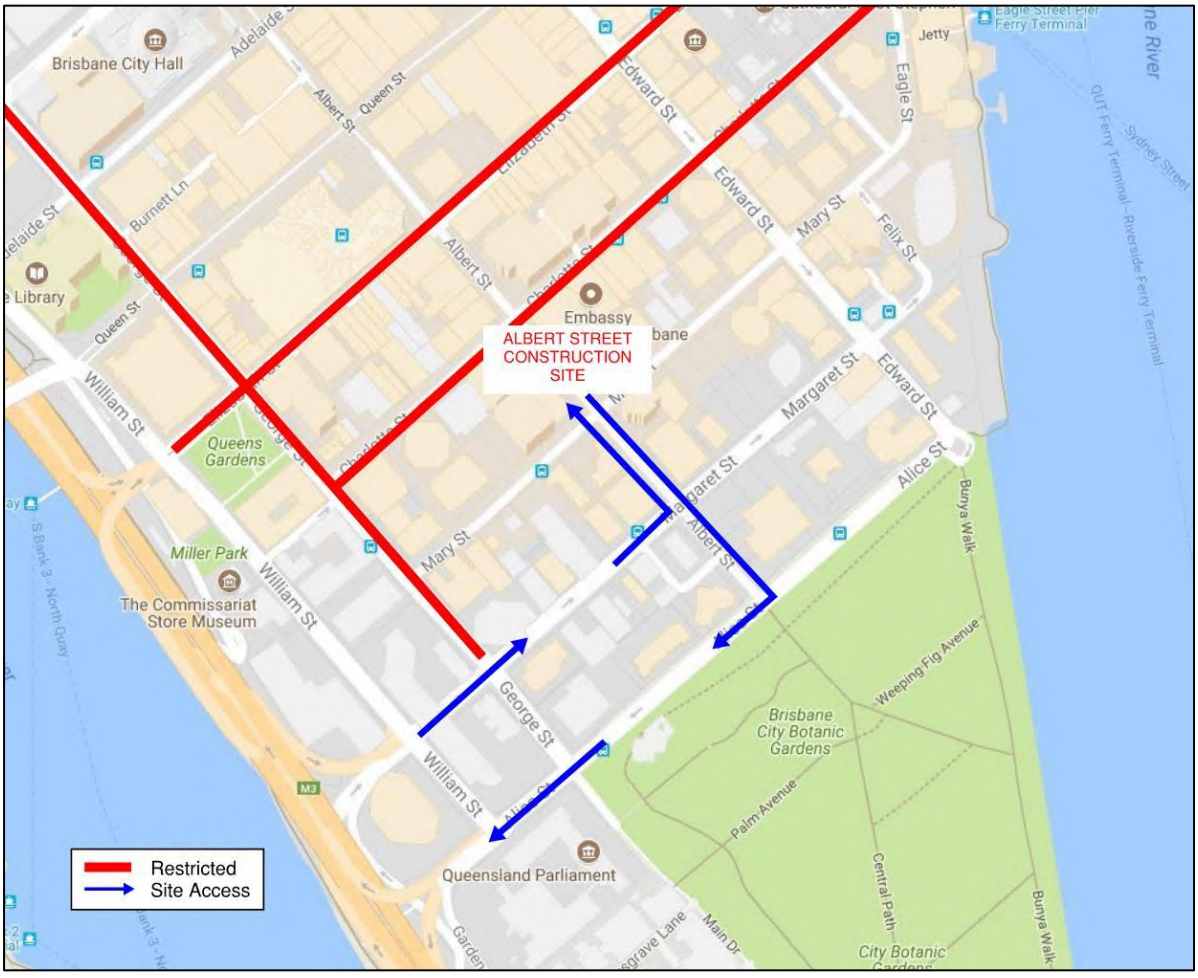


Site 3: Albert Street (Option 1)

Council comments
- No haulage vehicles on George Street, west of Mary Street - No haulage vehicles on Charlotte Street - No haulage vehicles along Elizabeth Street - Access from the Riverside Expressway via Margaret Street - Access onto the Riverside Expressway via Alice Street - Access to Alice Street from Mary Street via Edward Street

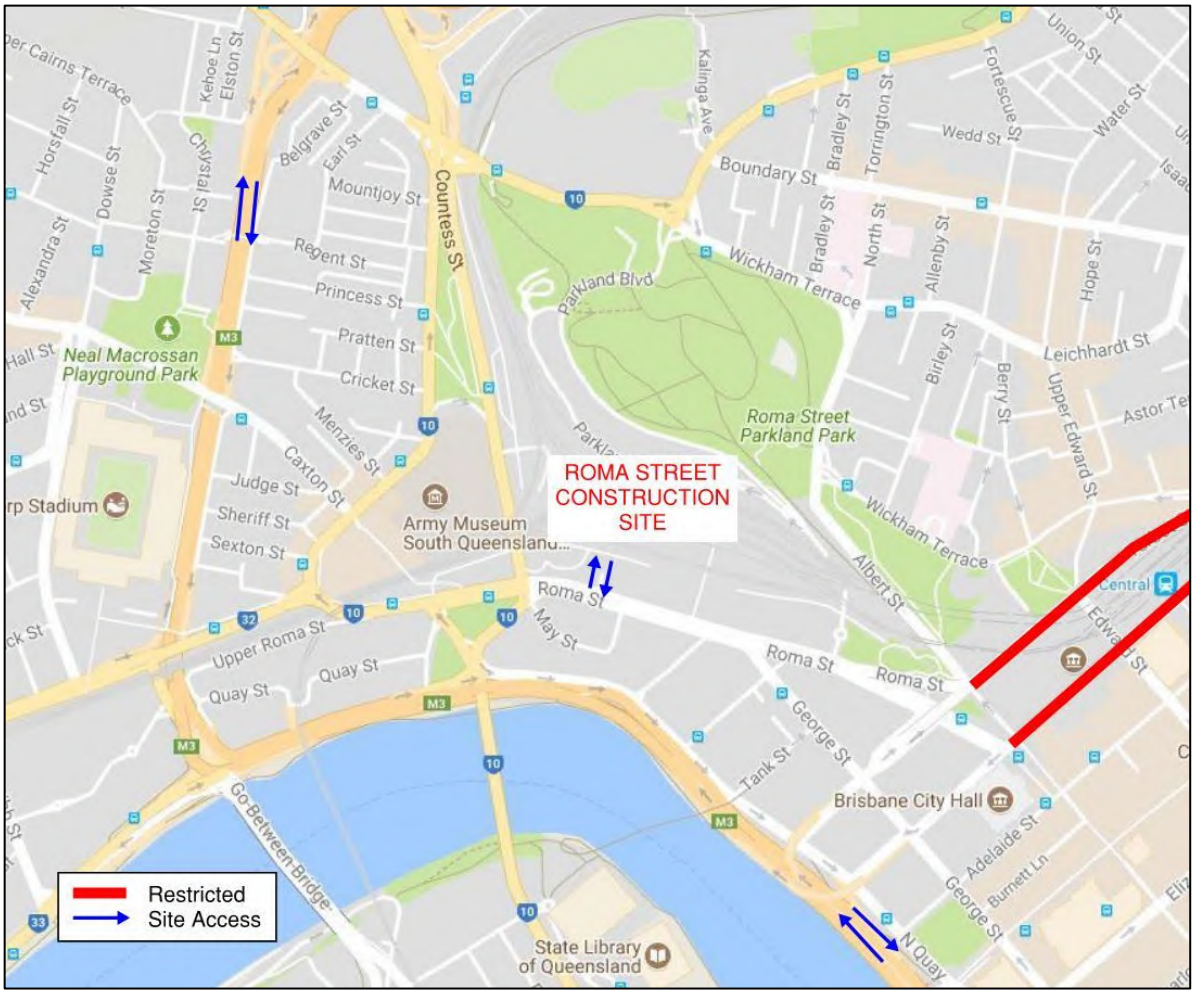
Site 3: Albert Street (Option 2)

Council comments
- No haulage vehicles on George Street, west of Margaret Street - No haulage vehicles on Charlotte Street - No haulage vehicles along Elizabeth Street - Access from the Riverside Expressway via Margaret Street - Access onto the Riverside Expressway via Alice Street - Access to Alice Street from Mary Street via Albert Street



Site 4: Roma Street

Council comments
- Access into site via existing signalised intersection - No haulage vehicles on Turbot Street, north of Albert Street - No haulage vehicles on Ann Street, north of Albert Street



Appendix I

Construction Vehicle Management Plan

November 2020

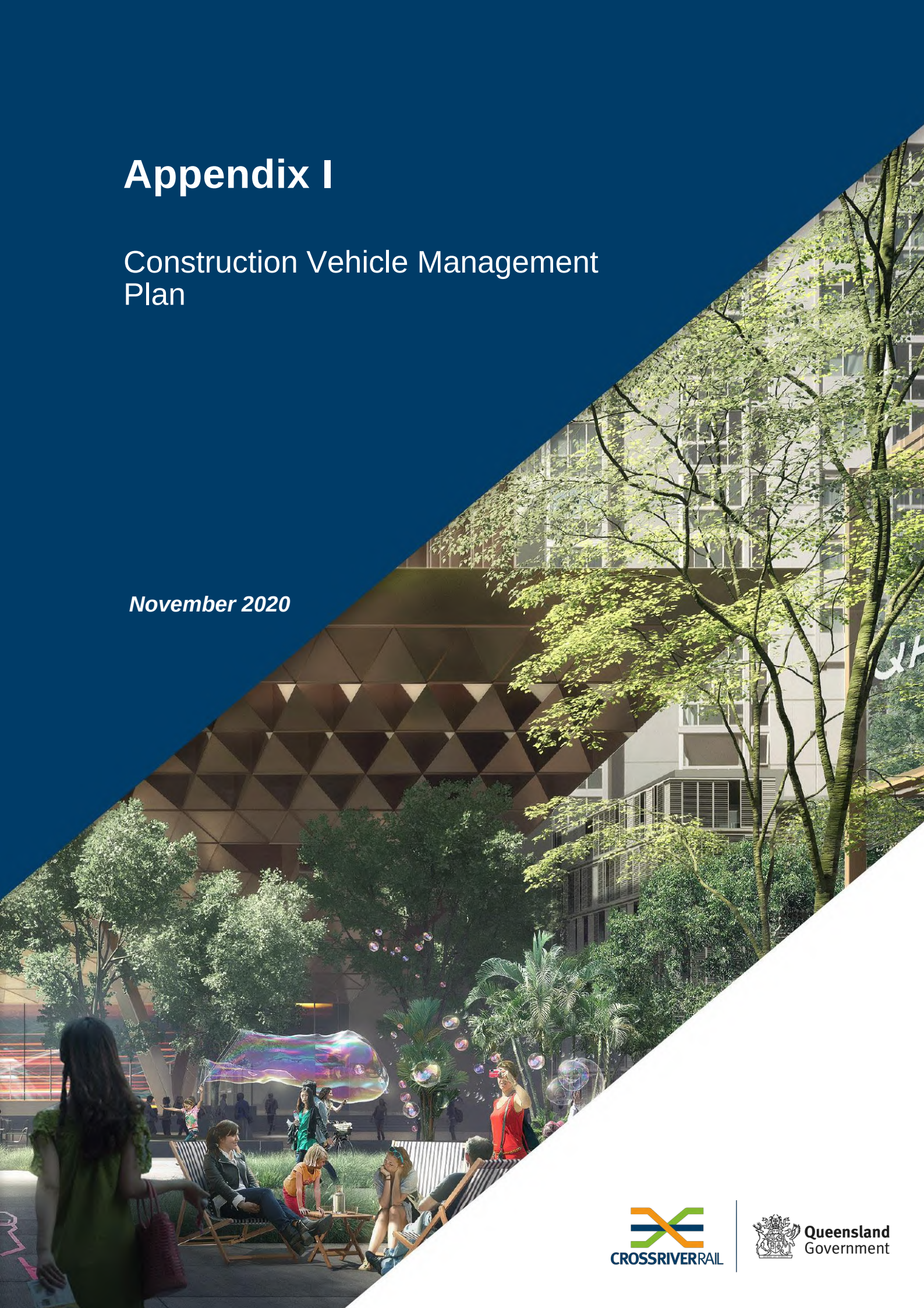


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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CVMP. Additional definitions for the Outline CVMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CVMP	Construction Vehicle Management Plan

2. Introduction

This Outline Construction Vehicle Management Plan (Outline CVMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline CVMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on the community and stakeholders with respect to vehicle traffic and transport are minimised;
- nominate the Project's monitoring and reporting requirements in relation to this plan;
- monitor the effects of management and mitigation measures outlined herein;
- manage the construction truck fleet and avoid or minimise impacts on the local road network, the environmental amenity of properties along construction haul routes and in the vicinity of construction worksites; and
- provide a mechanism for tracking vehicles to monitor and manage potential impacts.

The Outline CVMP applies to all Project construction vehicles over 4.5 tonnes gross vehicle mass.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CVMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved as it relates to construction vehicles.

- Condition 14. Traffic and Transport

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to vehicle management are to be achieved for the Project:

- Project construction traffic is managed to avoid or minimise and mitigate adverse impacts on road safety and traffic flow, public transport, pedestrian and cyclist safety, property access and parking, existing road pavements and railway tracks.
- Workforce parking is managed to avoid or minimise and mitigate adverse impacts on the local community and businesses.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Safe and efficient access is maintained for pedestrians, bicycles and for passengers to and from public transport facilities, including rail and busway stations and bus stops.
- Access to all properties is maintained during construction activities at all times, unless an acceptable solution is agreed with the property owner/occupant and documented.
- Disruptions to the operation of the road network and the public transport network due to Project Works must be avoided during peak periods, where possible, and managed during off-peak periods.
- Haulage vehicles (i.e. spoil, construction equipment and materials haulage) only travel on designated haulage routes identified in the Construction Traffic Management Plan (CTMP), unless agreed beforehand with the relevant road authority, the Delivery Authority and the Environmental Monitor.
- Spoil haulage vehicles are managed in real time to and from worksites and spoil sites to avoid speeding, queuing in local streets, congested areas and traffic incidents, and to manage and avoid over-loading, spills and safety incidents.
- Worker parking is provided for each construction worksite where space is available. Where parking is insufficient to meet worksite demands and no commercial (paid) parking is available, alternative means of worker transport is provided to avoid adverse impacts on communities near construction worksites. Where practicable, the access of workers' car parking is not via local streets.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential construction vehicle related impacts could include, but are not limited to, the following:

- Increased congestion and delays for existing road users due to increased construction traffic on local roads;
- Increased road accidents and incidents due to increased construction traffic on local roads;
- Impact to traffic and access requirements for other Brisbane projects; and
- Impact to social amenity, in particular noise, for residents surrounding haulage routes.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

Construction vehicles are managed so that:

1. The Contractor has direct communications with spoil haulage companies engaged on the Project;
2. real-time monitoring of each spoil haulage truck's position, speed, route and performance in relation to traffic conditions and schedule requirements;
3. speed and position for all heavy vehicles entering a construction worksite is managed to avoid queuing near construction worksites, sensitive community facilities and residential neighbourhoods;
4. traffic signals on nominated spoil haulage routes in night-time hours are managed to achieve optimum performance of the truck fleet and to minimise impacts on communities along the designated routes;
5. spoil haulage vehicles are clearly marked and have a visible contact phone number;
6. procedures for managing and responding to traffic incidents involving Project construction vehicles are developed and implemented, including notification to the Delivery Authority;
7. all haulage vehicles are maintained to Australian Design Rule 28/01 in relation to noise emissions, exhaust emissions, traffic safety and operational safety;
8. all haulage vehicles are maintained to Australian Design Rule 80 for emissions control;
9. all vehicles leaving a construction worksite pass over or through devices that remove soil and other debris before entering a public road, and all vehicles carrying spoil and other loose dusty material have covered loads;
10. regular maintenance of heavy vehicles and equipment is undertaken by accredited technicians in appropriately bunded and screened places; and
11. a driver code of conduct is developed by the Contractor and implemented that includes detail on approved haulage routes, safety, courtesy and amenity.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline CVMP are nominated below:

- Maintain weekly log books of Project vehicles and plant and construction machinery.
- Undertake weekly inspections of all components of vehicles in accordance with a log book agreed to with the Delivery Authority's safety team.
- Monitor consultation with and feedback from local business owners and residents surrounding the use of Project vehicles.
- Monitor community complaints system for number and types of complaints for each locality.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix J

Construction Worksite Management Plan

November 2020

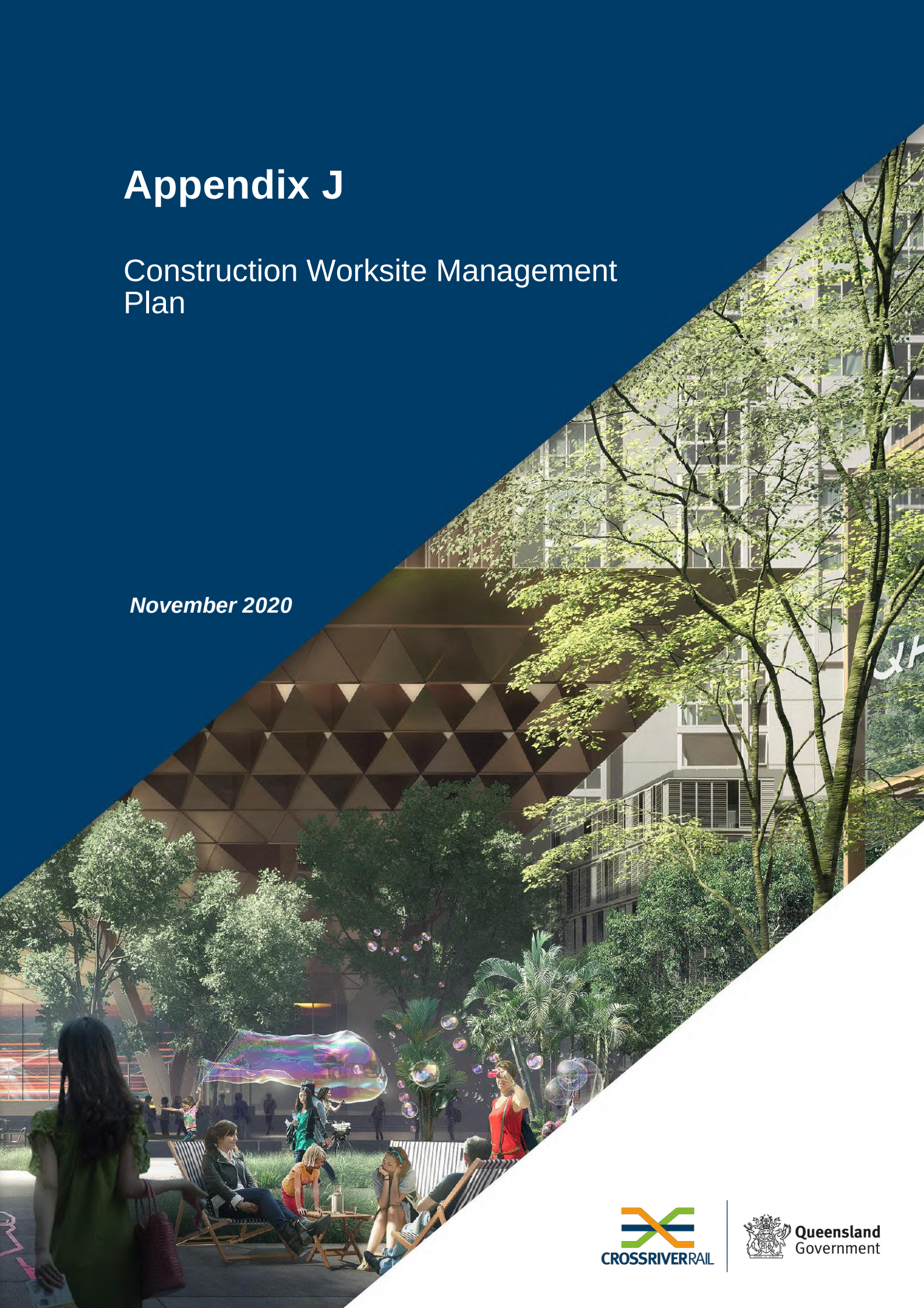

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CWMP. Additional definitions for the Outline CWMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CWMP	Construction Worksite Management Plan

2. Introduction

This Outline Construction Worksite Management Plan (Outline CWMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline CWMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on the community (including public utility providers and other construction projects in the surrounding areas) are minimised;
- nominate the Project's monitoring and reporting requirements in relation to this plan; and
- monitor the effects of management and mitigation measures outlined herein.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions, environmental outcomes and performance criteria must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CWMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 10. Hours of work
- Condition 21. Worksite rehabilitation

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to construction worksites are to be achieved for the Project:

- Construction worksites across the Project should be established and run in such a way as to not adversely affect the environmental values of the surrounding environment as much as is practicable;
- Environmental values of nearby sensitive receptors to the construction worksites are not adversely affected by the Project, during and post-construction; and
- Nuisance from dust, odour, emissions, noise and lighting arising from the construction worksites are minimised as much as is practicable.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Revegetation to be designed and constructed with consideration of TMR specification MRTS16 Landscape and Revegetation;
- Impacts of Project Works, including worksite and spoil handling facilities, on existing visual amenity are minimised through the design and siting of screens and barriers, plant and equipment, buildings and other structures, and lighting and telecommunications infrastructure;
- Construction worksites are planned, prepared and maintained in accordance with the CEMP;
- Construction worksites are rehabilitated as soon as practicable following completion of the works in accordance with rehabilitation plans;
- Construction of worksites can only be undertaken during construction hours as identified in Imposed Condition 10 nominated in the CGCR;
- Construction lighting is designed, constructed and operated to comply with the relevant standard such as AS4282-2019: Control of the obtrusive effects of outdoor lighting;
- Avoid nuisance from construction lighting on sensitive receivers and onto nearby roads, pedestrians and cycle paths, and parklands;
- Interactions between the construction workforce and local communities are positive and reflect the implementation of a workforce code of behaviour; and
- Safe access is maintained near to construction worksites and Project Works, including to social infrastructure and businesses.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential construction worksite management related impacts could include, but are not limited to, the following:

- Increased noise levels and lighting nuisance from worksites;
- Unintended interference with or damage to public utilities owed by other entities;
- Impact to outdoor education programmes of surrounding schools and impact to the use and accessibility of pedestrian pathways;
- Impact to traffic and access requirements for other Brisbane projects;
- Unreasonable loads imposed on existing services and roads; and
- Removal of park and public space.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Ensure that the design and siting of construction worksites considers topography, vegetation, scale, character of construction and construction materials, proximity to surrounding sensitive land uses and the duration of its use.
- Project Works are to be undertaken, and construction worksites constructed, such that the loss of vegetation is avoided or minimised as much as practicable in accordance with Imposed Condition 20 nominated in the CGCR .
- 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.
- Works are to be undertaken in accordance with the construction hours prescribed in Imposed Condition 10 nominated in the CGCR .
- Construction phase works are 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.
- Worksites are to be designed and constructed taking into account all other relevant sub-plans.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Communication

Communication strategies including internal communication, external and Government Authority consultation, and stakeholder and community liaison must be undertaken in accordance with the CEMP and the CSEP.

5.5 Inspections, Monitoring, Auditing and Reporting

5.5.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.5.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline CWMP are nominated below:

- Maintain weekly inspection checklist of all worksites and identify any environmental issues as well as mitigation measures to be implemented.
- Undertake weekly inspections of all worksites with the relevant supervisor to identify any environmental controls that require rectification.
- Monitor consultation with and feedback from local business owners and residents surrounding construction worksites (including construction vehicles and plant operating in the area and construction personnel).
- Monitor community complaints system for number and types of complaints for each locality.
- During worksite establishment and subsequent operation, maintain daily site inspections of protective measures for designated significant trees and vegetation, and of temporary visual barriers and hoardings for damage or graffiti.
- Weekly inspections of lighting during night works are to be conducted to ensure that construction lighting has been installed and operated in accordance with the relevant standard such as AS4282-1997.

5.5.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.5.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.5.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

5.6 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

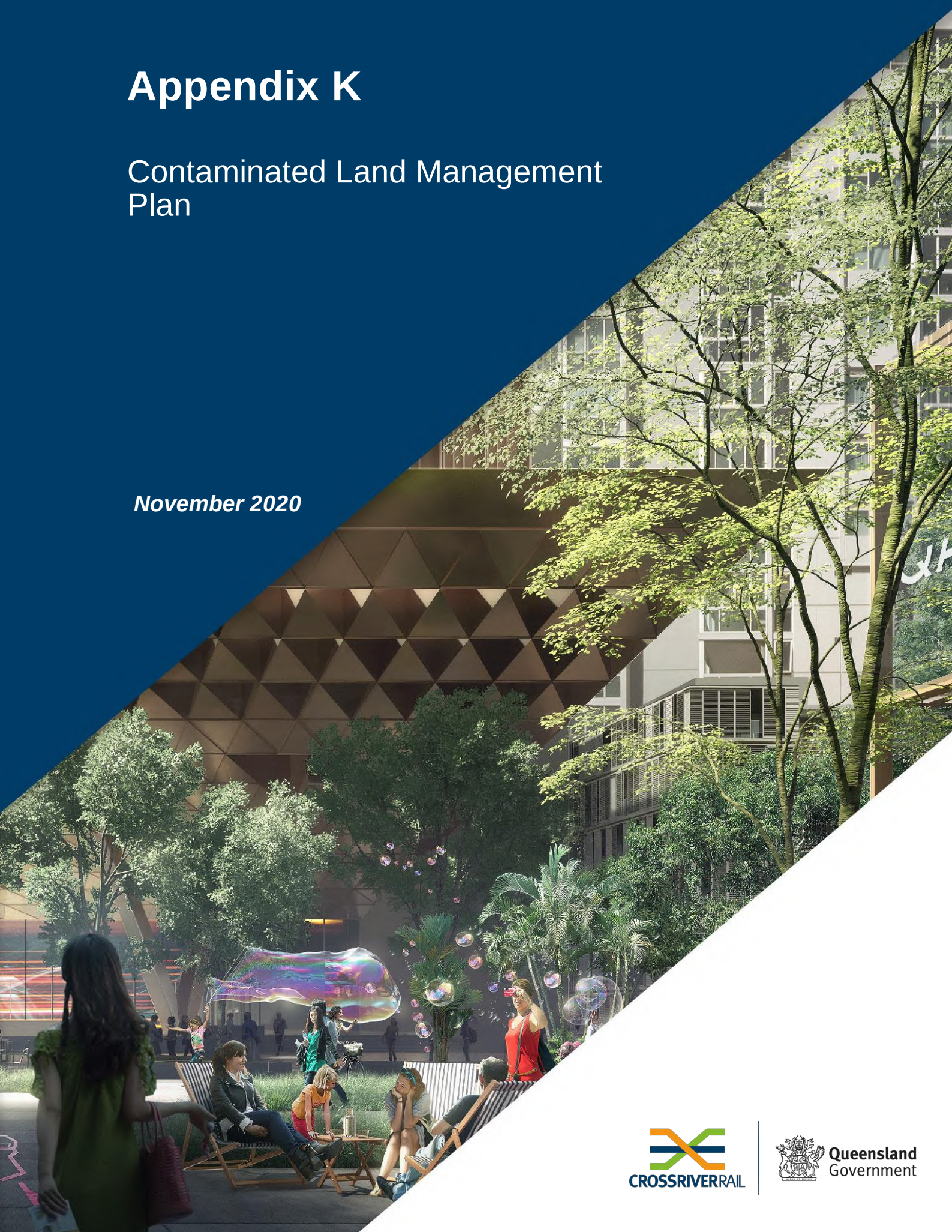
5.7 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix K

Contaminated Land Management Plan

November 2020



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Queensland Government

Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CLMP. Additional definitions for the Outline CLMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CLMP	Contaminated Land Management Plan
CLR	Contaminated Land Register
EMR	Environmental Management Register
EP Act	Environmental Protection Act
NEPM	National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013
RAP	Remediation Action Plan
SDS	Safety Data Sheets
SMP	Site Management Plan

2. Introduction

This Outline Contaminated Land Management Plan (Outline CLMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline CLMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to contaminated land;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to the surrounding environment due to contaminated land;
- manage the impact on the environment and public health as a result of contaminated soil, groundwater and soil gas; and
- monitor the effects of management and mitigation measures.

It is intended that a Detailed Site Investigation (Contaminated Land) be undertaken at some of the sites nominated on the Environmental Management Register (EMR) or Contaminated Land Register (CLR). From this a Remediation Action Plan (RAP) will be developed for sites that are going to be remediated, or a Site Management Plan (SMP) will be developed for sites that will not be remediated. This will ensure that Project-related impacts on local communities and the environment as a result of contamination can be avoided, or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CLMP.

3.1 Environmental Outcomes

The following environmental outcome in relation to contaminated land is to be achieved for the Project:

- Construction activities avoid, or minimise the environmental and public health risks from contaminated soil, groundwater or soil gas intercepted during Project Works.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Works are conducted in accordance with the National Environment Protection (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) (the NEPM) (National Environment Protection Council 2013) and the Queensland Auditor Handbook for Contaminated Land 2018;
- Works are conducted in accordance with the PFAS National Environmental Management Plan (Version 2.0, January 2020);
- Works are conducted in accordance with the requirements of the *Environmental Protection Act 1994* (EP Act) and subordinate legislation;
- Any Site Management Plan must be prepared by a Suitably Qualified Person (SQP), certified by a Contaminated Land Auditor and approved by the DES;
- Site investigations for contaminated sites inform detailed design and work planning, and are completed prior to the commencement of works;
- Site Management Plans, including any required Remediation Plans, are prepared in conjunction with detailed design. Project Works are conducted in accordance with the Site Management Plans. These plans shall be prepared by a SQP and accepted by Contaminated Land Auditor;
- Construction activities involving the disturbance of contaminated land do not cause contamination of previously uncontaminated sites or adjoining land;
- Handling of asbestos occurs in accordance with the EP Act and the Work Health and Safety Regulations 2011, and relevant Queensland Codes of Practice[1];
- The storage, handing and transport of hazardous materials does not cause contamination of land or waters, or if contamination does occur, remediation of the contaminated land or waters occurs in accordance with the relevant legislation, standards and procedures; and
- When undertaking investigations for potentially contaminated soil, works are to be conducted in accordance with Australian Standard 4482 – Guide to the investigation and sampling of sites with potentially contaminated soil.

[1] Workplace Health and Safety Queensland, 2011, How to Manage and Control Asbestos in the Workplace and How to Safety Remove Asbestos, Dept. of Justice and Attorney General, Brisbane.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential contaminated land related impacts could include, but are not limited to, the following:

- Contamination (both on and offsite) of surrounding soils and/or waters impacting local ecology;
- Delays in construction program and increased costs;
- Mobilisation of contaminated soil and/or water;
- Risk to human health through direct exposure;
- Direct impacts on soil organisms and vegetation;
- Complaints from the public relating to odours which could be released during ground disturbance or remediation;
- Negative public relations associated with pollution and prosecution; and
- Fines or penalties from incorrect disposal of contaminated material.

Potentially contaminated soil is likely to be encountered during construction of underground stations and precinct development. Fairfield to Salisbury stations have been identified as having potentially contaminated soil due to their location in the rail corridor.

At Mayne Yard, an estimated 76,900m^3 of material will be excavated for the construction of a trough structure (underpass). At Clapham Yard, railyards and three sites along Chale Street are listed on the Environmental Management Register (EMR), having the potential for disturbance of contaminated soils.

There is potential for an increase of contaminated soils being disturbed due to the excavation required to lower the Roma Street end of the Inner Northern Busway. The Energex substation located off Bowen Bridge road is on the EMR and may be affected by Project Works.

There is potential for a temporary increase in groundwater drawdown between Boggo Road Station and Woolloongabba Station due to tunnelling technique (mined) and depth of the alignment. Construction at this location may result in an increased potential for discharge of potentially contaminated groundwater from worksites to surface water and restrictions on the utilisation and disposal of contaminated groundwater arising from dewatering of the below ground works.

There is also potential for vapour or gas produced (soil gas) to be present where contamination or putrescible (decaying) material in soil and/or groundwater produces gas or is of a volatile nature. Soil gas has the potential to migrate into and accumulate in underground infrastructure (i.e. tunnels, stations and shafts).

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 Investigation of Potential Contamination

- Undertake a Stage 1 and Stage 2 (as required) Detailed Site Investigation to ascertain the risk posed from disturbance by the Project of potentially contaminated sites. Further detailed investigation would include:
  - consultation with the land owners, BCC and/ or DES. Should consultation not provide adequate information to define the potential risk, further site investigation would be required in accordance with the NEPM and the ‘Queensland Auditor Handbook for Contaminated Land (2018). These investigations are to be undertaken by a person suitably qualified in accordance with the EP Act.

  - additional site contaminated land investigations must be undertaken prior to and post construction to determine the level of contamination and required management measures.
- Integrate site-specific recommendations presented in the Stage 1 and Stage 2 Detailed Site Investigations with detailed design and construction requirements in Project documents including the CEMP and COEMP developed by the Contractor prior to Project Works commencing.
- Contaminated or spoil material unsuitable for spoil placement will be remediated or disposed of to landfill. Develop approaches to remediate contaminated or unsuitable material on site and minimise disposal to landfill.
- Prior to the commencement of construction, develop and implement a contaminated land management procedure for potentially contaminated sites, to include, but not be limited to:
  - identification of the likely forms of contamination (e.g. fuels, oils, paints, etc.);
  - procedures for the appropriate storage of hazardous materials in compliance with relevant standards;
  - measures to prevent land contamination during construction;
  - procedures for identifying, investigating and managing unforeseen contamination;
  - management measures for contaminated dust generated during earthworks, including monitoring at adjacent properties and nearby sensitive receivers;
  - spill response and remediation procedures;
  - identification of properties on the EMR or CLR in accordance with the EP Act;
  - measures for the management, remediation and disposal of contaminated soil from properties listed on the EMR or CLR;
  - where properties have an approved SMP, these should be updated accordingly;
  - post-construction management and/or monitoring requirements; and
  - disposal permits obtained from DES for the removal of contaminated soil in accordance with the EP Act, as required.
- Notify DES of any land parcels containing a hazardous contaminant, or for which a notifiable activity has previously been or is being undertaken that are not listed on the EMR or CLR or that have a history of notifiable activities that have not been previously notified to DES.
- 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.

4.2.2 Disturbance, Excavation, Removal and Disposal of Contaminated Soil

- Implement appropriate erosion and sediment controls and staging of site activities to minimise the extent of disturbed areas, and to minimise the potential run-off of contaminated soils.
- Implement measures to minimise and manage the exposure of people and the environment to potentially contaminated soils during excavation activities. Action is required to remediate or manage the land to prevent adverse environmental and human health impacts.
- 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).
- Keep documented records of contaminated material movement and disposal.
- Implement appropriate workplace health and safety procedures, including use of personal protective equipment (PPE) and hygiene controls, and documentation of inspections and workplace health and safety compliance throughout construction.
- Off-site disposal of contaminated material must be to a licensed landfill facility under a DES issued disposal permit.

4.2.3 Disturbance and Migration of Contaminated Groundwater

- Where appropriate groundwater information is not available to inform Stage 1 and Stage 2 Detailed Site Investigations of potentially contaminated sites, determine the need for targeted groundwater monitoring based on the anticipated source and nature of contamination for each site.
- Undertake targeted groundwater monitoring on selected sites to establish whether contamination is likely to be present in groundwater systems potentially impacted by the Project.
- Implement the ground water monitoring programme specified in the Water Quality Management Plan (WQMP), including triggers to identify mobilisation of contaminated groundwater both in-situ and at drawdown collection points.

4.2.4 Ground Gas Accumulation

- Identify, through Stage 1 and Stage 2 Detailed Site Investigations of potentially contaminated sites, areas where ground gas poses a potential risk to the Project.
- Where investigations identify potential risks from ground gas, gas monitoring systems and alarms would be fitted in underground infrastructure.
- During construction assess ambient gas concentrations, including oxygen, methane, carbon dioxide and carbon monoxide.
- Where ground gas accumulation in underground work areas and infrastructure is expected to occur, adopt appropriate engineering controls to minimise the inflow of ground gas.

4.2.5 Provisions for Asbestos

- Prior to the commencement of demolition works and construction, prepare and implement an Asbestos Management Plan. The Asbestos Management Plan is to be prepared in accordance with, but not limited to, the following legislation and guidelines:
  - *Environmental Protection Act 1994;*
  - *Work Health and Safety Act 2011* (WHS Act);
  - Work Health and Safety Regulations 2011;
  - Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC: 2018 (2005)]; and
  - Code of Practice for the Safe Removal of Asbestos [NOHSC: 2002(2005)].
- Prior to partial or full demolition of any buildings or structures, an asbestos audit is to be carried out by a licensed asbestos contractor. Management of asbestos containing demolition materials is to be undertaken in accordance with the Asbestos Management Plan.
- 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.
- Any investigation of asbestos contaminated soil must be undertaken by a suitably qualified person in accordance with the NEPM.

4.2.6 Provisions for Hazardous Substances and Construction Management

- Develop and maintain a hazardous materials register for each worksite as required by the Construction OH&S Plan and other regulations or guidelines, to include:
  - storage location;
  - storage requirements;
  - information on the proper use;
  - handling information; and
  - disposal procedures.

- Develop and maintain Safety Data Sheets (SDS) for all materials and chemicals included in the hazardous materials register and store hazardous materials in accordance with relevant SDS and relevant Australian Standards.
- Design chemical and fuel storage areas to comply with Australian Standards, including AS1940: Storage and Handling of Flammable and Combustible Liquids 2017 and AS3780: The Storage and Handling of Corrosive Substances 2008.
- Develop incident management plans prior to the commencement of construction and implement as required, which outline procedures for containing and cleaning-up accidental spillage of fuels and other hazardous materials.
- Spill response equipment commensurate of the type and quantity of hazardous substances being stored is provided at appropriate locations on site, in close proximity to storage and handling areas. Clean-up and remediation of spills and leaks as quickly as possible and in accordance with the incident management plans.
- Undertake refuelling and maintenance activities in appropriately located designated bunded areas to avoid the potential for soil and water contamination.
- Conduct induction and training for construction staff in relation to:
  - the management and remediation of contaminated land;
  - procedures for the handling, storage and disposal of hazardous materials;
  - incident response practices and procedures; and
  - environmental awareness to encourage good material handling practices, spill management and incident reporting.
- Site all hazardous liquid stores above ground on an impervious base within a bunded and secured area. The base and bund walls would be impermeable to the material(s) stored.
- Store smaller quantities of chemicals, fuels and oils in either self-bunded pallets, within a bunded area, or in a bunded container, while storing bulk quantities of diesel in self-bunded tanks or within an appropriately bunded area.
- Contain waste products such as oily water separator waste, sludges and residues within weatherproofed, sealed and bunded areas to prevent any leakages or spills potentially causing environmental harm to soils, surface water or groundwater.
- Locate spill kits in the vicinity of hazardous material storage areas and train site staff in their use.
- Secure fences and locking or manning access points to adequately protect worksites and storage areas from theft and/ or vandalism.
- Clearly mark the contents of tanks and display notices requiring that the valves and trigger guns be locked when not in use.
- Undertake regular inspections of tanks, bunds and storage areas to ensure the integrity of all facilities.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline CLMP are nominated below:

- Daily site inspections are to be undertaken and documented by the Contractor throughout the construction phase and are to include identification of any actual or potential contamination issues or risks. Any spills or other uncontrolled release of contaminants to the environment are to be addressed in accordance with the construction incidents and non-conformance reporting procedure described in the OEMP.
- Immediately following a defined rainfall event, inspect and conduct necessary maintenance on all bunded chemical and hazardous storage areas.
- Ensure that sign-off from a licensed asbestos contractor has been obtained and documented prior to any partial or full demolition of buildings and structures.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to contaminated land are outlined below:

- Results of monitoring for contamination or asbestos issues are to be reported in the monthly environmental report, along with details of any incidents or complaints relating to contamination or asbestos issues.
- Records of all disposal permits and contaminated soils removed during construction of the Project are to be maintained and included in the annual environmental report.
- Contaminated site investigation and validation reports are to be prepared in accordance with relevant legislation, standards and guidelines and included in the annual environmental report.
- In the event of a contamination incident, the incident is to be notified in accordance with the EP Act and the reporting procedure described in the OEMP.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix L

Cultural Heritage Management Plan

November 2020

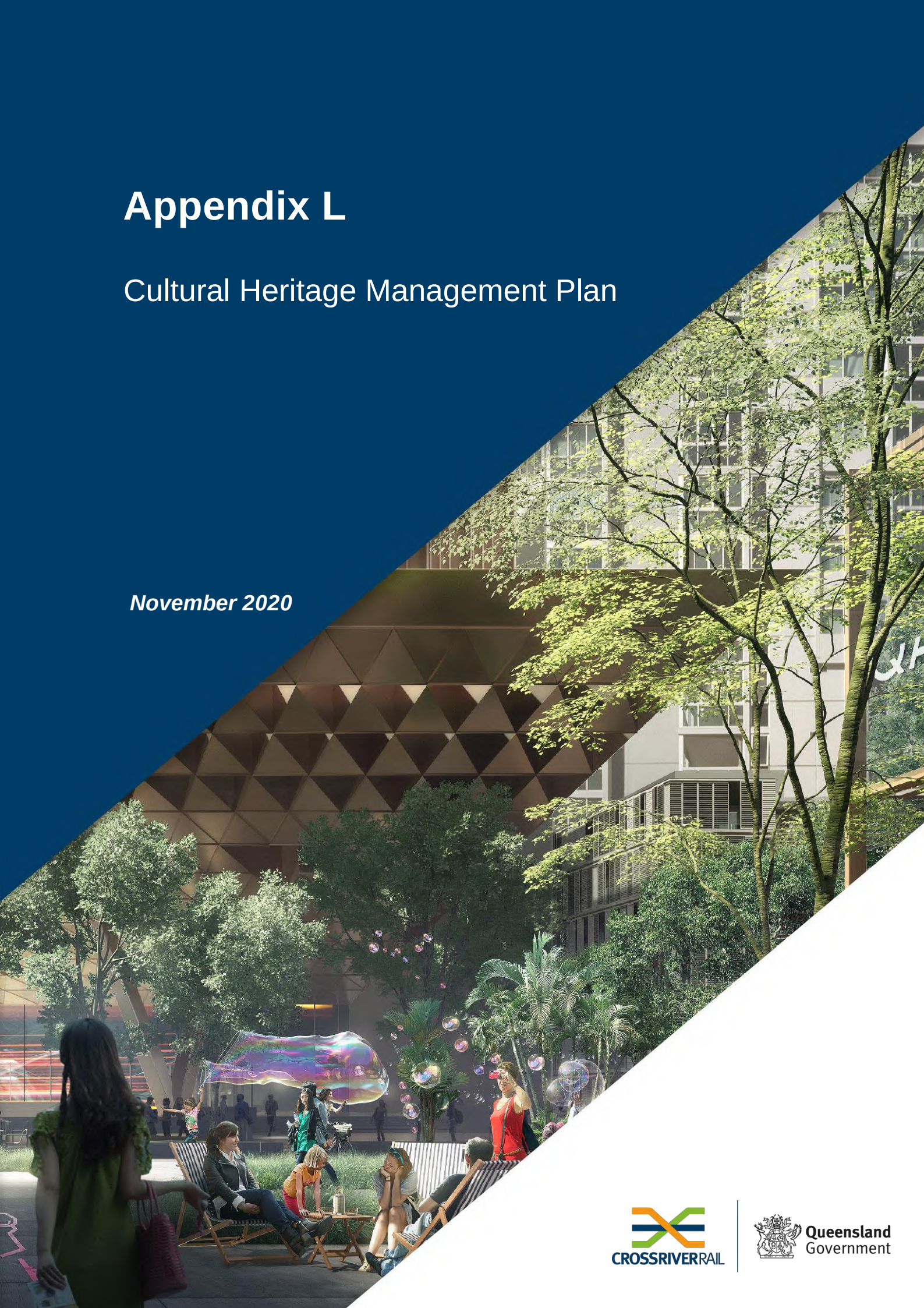

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline CHMP. Additional definitions for the Outline CHMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
ACHA	*Aboriginal Cultural Heritage Act 2003*
CHMP	Cultural Heritage Management Plan

2. Introduction

This Outline Cultural Heritage Management Plan (Outline CHMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objective of this Outline CHMP is to ensure that construction activities are managed to provide effective recognition, protection and conservation of Aboriginal cultural heritage that may be impacted by the construction of the Project.

The Contractors will take ownership of aspects of the Project's approved CHMPs in accordance with the relevant deed of novation.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

The Project must also comply with all relevant heritage legislation, including the *Aboriginal Cultural Heritage Act 2003* (ACHA), and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental and heritage outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline CHMP.

3.1 Environmental Outcomes

The following environmental and heritage outcomes in relation to Aboriginal cultural heritage are to be achieved for the Project:

- Construction activities are managed to maintain cultural heritage values of sites, places and values within and adjacent to construction worksites.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Aboriginal Cultural Heritage Management Plan(s) (CHMPs) are prepared and approved in accordance with the ACHA, prior to commencement of any ground disturbance works.
- Construction activities comply with the requirements of the approved CHMP(s) under the ACHA.
- All personnel involved in, or supervising construction works have completed the Project's cultural heritage induction.
- Construction impacts, such as excessive dust deposition, excessive vibration or excessive settlement, do not affect the values of places of Aboriginal cultural heritage.

4. Impacts and Mitigation Measures

4.1 Impacts

While the Project is being undertaken in an urban environment, and the potential for impacting Aboriginal cultural heritage is low, the Project respects that some items of Aboriginal cultural heritage may be encountered during Project works, as well as the potential for intangible Aboriginal cultural heritage values to be impacted. As such, the below measures have been proposed to mitigate these potential impacts.

4.2 Mitigation Measures

The management measures nominated in the approved Project CHMPs must be complied with.

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- All works are to be undertaken in accordance with the approved CHMPs under the ACHA in relation to the Project area.
- Cultural heritage awareness training should be included in the induction processes. This training will include alerting workers to any heritage places in the vicinity, and outlining appropriate mitigation procedures. The induction may include an aspect prepared by an Aboriginal party for the Project area.
- To protect places of Aboriginal cultural heritage from excessive dust deposition, vibration and settlement, construction works are to be undertaken in accordance with the Air Quality Management Plan, Noise and Vibration Management Plan, and Land Management Plan, respectively.
- Explore opportunities for acknowledgment of a locality's significance to Aboriginal people (e.g. establishment of signage or public art or through involvement of Aboriginal people in any ground-breaking ceremonies that might precede construction works). This could include:
    - Consideration of opportunities for Aboriginal people to be involved in the construction and development of the Project, including opportunities for traineeships and employment on the Project;
    - Consideration of the planting of native vegetation, including food plants, as part of the revegetation strategy for the Project;
    - Maintenance of gardens and lawns around the stations to sustain native vegetation; and
    - Consideration of the return of remnant land acquired for the Project to Aboriginal Parties.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP. Specific responsibilities for the implementation of the approved CHMPs are outlined within the CHMPs.

5.2 Training and Inductions

Environmental and heritage training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental and heritage inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

An incident could also include harm to intangible or tangible Aboriginal cultural heritage items of significance.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to Aboriginal cultural heritage are nominated below:

- Monitoring is to be undertaken in accordance with the approved CHMPs.
- Routine daily site inspections are to include assessment of any exclusion fencing or signage protecting cultural heritage values to determine effectiveness.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to cultural heritage are outlined below:

- Subject to the CHMP and confidentiality requirements, reporting of any cultural heritage finds and inspections of cultural heritage protection measures are to be included in the monthly

construction compliance report, along with any complaints or incidents relating to cultural heritage issues.
- Reporting to be completed as outlined in the approved CHMP.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP, approved CHMPs, and as outlined in the Project's contractual documentation.

Appendix M

Erosion and Sediment Control Plan

November 2020

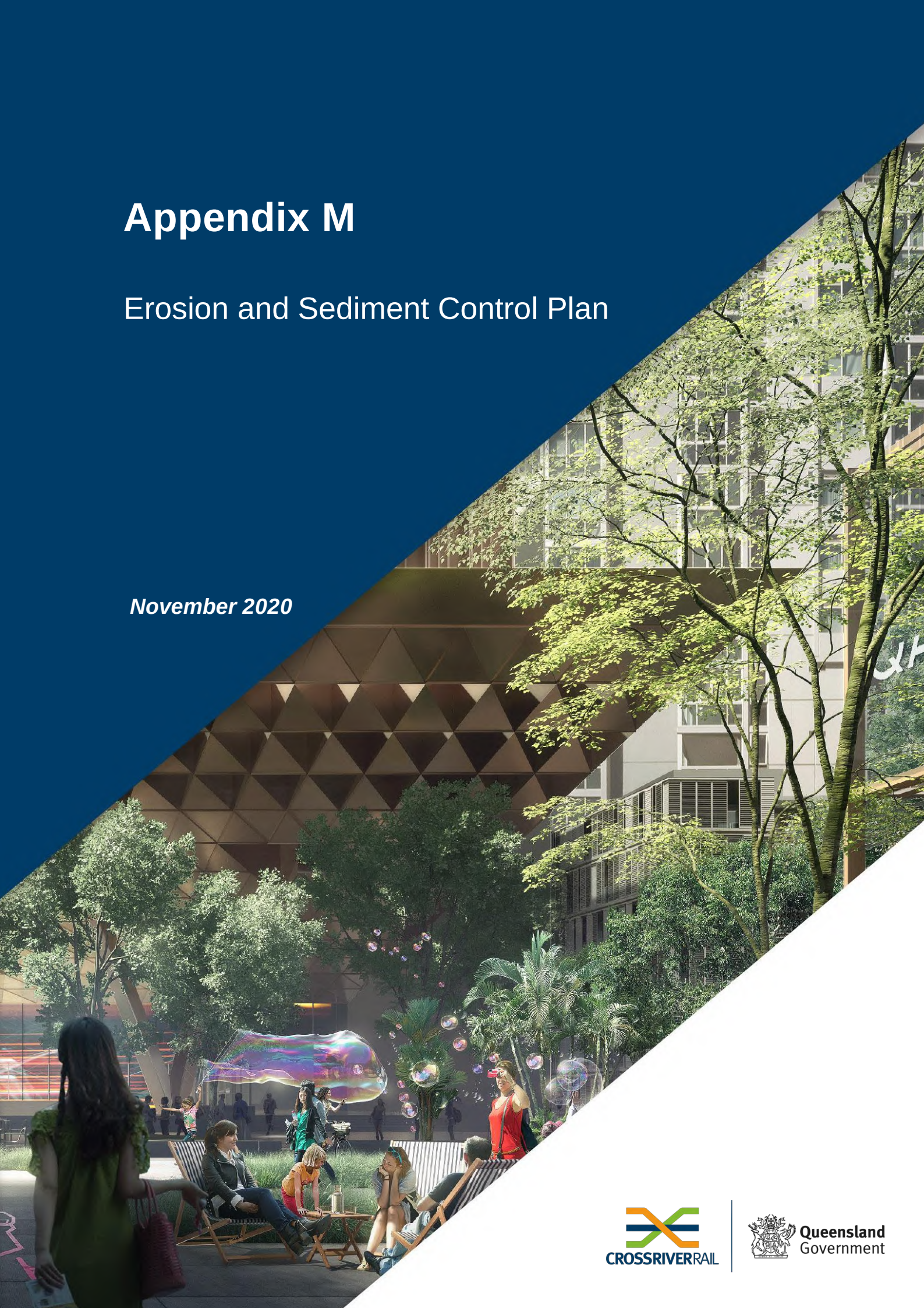

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline ESCP. Additional definitions for the Outline ESCP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Plan

2. Introduction

This Outline Erosion and Sediment Control Plan (Outline ESCP) forms part of the Outline Environmental Management Plan (Outline CEMP) for the Project.

2.1 Objectives

The objectives of this Outline ESCP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- describe the erosion and sediment control (ESC) approach that will be employed by the Project;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts resulting from erosion and the movement of sediment within and adjacent to the Project, including impacts to the downstream environment and waterways;
- nominate the Project's monitoring and reporting requirements in relation to ESC; and
- monitor the effects of management and mitigation measures.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline ESCP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 18. Erosion and Sediment Control

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to ESC are to be achieved for the Project:

- Construction activities minimise soil erosion and sedimentation and avoid adverse impacts on the environmental values of receiving waters.
- Construction activities do not impact on the environmental values of the Brisbane River and other waterways within the study corridor.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

- The Project does not result in soil erosion beyond the boundaries of worksites. Soil erosion within a worksite is rectified as soon as practicable after a rainfall event to prevent the release of sediment offsite.
- Soil erosion and sediment controls are implemented and maintained for each worksite 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.
- Runoff from worksites complies 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.

4. Impacts and Mitigation Measures

4.1 Impacts

The construction phase of the Project will require major earth works in the form of cut and fill as well as tunnelling, resulting in localised changes to landform contours and topography. Additionally, activities associated with construction of the Project have the potential to alter or impede overland surface flow and drainage patterns.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Develop a detailed ESCP for the Project 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 ESCP would form a sub-plan under the CEMP and would address:
  - water and wind erosion;
  - turbidity in freshwater, estuarine and marine environments;
  - transport of sediment leaving the site onto the road network;
  - soil mixing, inversion and compaction; and
  - worksite reinstatement.
- To inform detailed design and construction planning, undertake soil sampling at worksites as part of further geotechnical investigations, to identify and characterise vulnerable soils in areas of proposed surface works. Characteristics of interest include confirmation of soil landscapes, soil

depth, presence of fill and soil chemical properties. In particular, sampling is to be undertaken at, but not limited to, the following locations:
  - Southern portal construction worksites;
  - Boggo Road Station construction worksite;
  - Northern portal and associated construction worksite; and
  - Exhibition Station and Mayne Yard.
- ESC measures must address:
  - water and wind erosion;
  - turbidity in the nearby estuarine environments;
  - transport of sediment leaving the site onto the road network;
  - soil mixing, inversion and compaction; and
  - progressive worksite reinstatement.
- The ESC measures should include:
  - measures to control soil erosion within a worksite and a spoil placement site;
  - measures to divert surface water drainage around disturbed areas within a worksite and a spoil placement site;
  - measures to capture and treat surface drainage waters within a worksite and spoil placement sites to avoid the release of sediment to the environment;
  - measures to control and avoid the movement of sediment from a worksite by construction vehicles onto the road network;
  - monitoring the effectiveness of installed control measures; and
  - progressive stabilisation and revegetation of disturbed areas within worksites and spoil placement sites.
- ESC measures must be maintained in good working order, with any damaged or ineffective measures repaired or replaced following rainfall events or otherwise as required.
- Measures for the management of spoil should address:
  - installation of spoil enclosure sheds at worksites where activities associated with spoil management, handling and removal from site are to occur;
  - managing the stripping and stockpiling of surface spoil material from surface works areas with regard to potential contamination;
  - locating spoil placement sites away from creek banks and providing adequate ESC measures to prevent sediment runoff into waterways or stormwater drains; and
  - spoil being taken offsite must be placed at an approved and suitably managed spoil disposal location.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline ESCP are nominated below:

- As part of routine daily site inspections, conduct visual assessment of ESC measures to verify their condition and effectiveness and identify the need for maintenance, including material being tracked onto the road network. 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 a particular 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 ESC measures, including bunding and water treatment facilities, and inspect drainage discharge points from each worksite for evidence of sediment transport, if any.
- During the post-construction maintenance phase, conduct monthly visual inspections of surface soil stabilisation measures and undertaken rectification measures as required, to ensure successful establishment.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to ESC are outlined below:

- Results of soil erosion and sedimentation monitoring are to be reported in the monthly construction compliance report, along with details of any complaints or incidents relating to these issues.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix N

Hazard and Risk Management Plan

November 2020

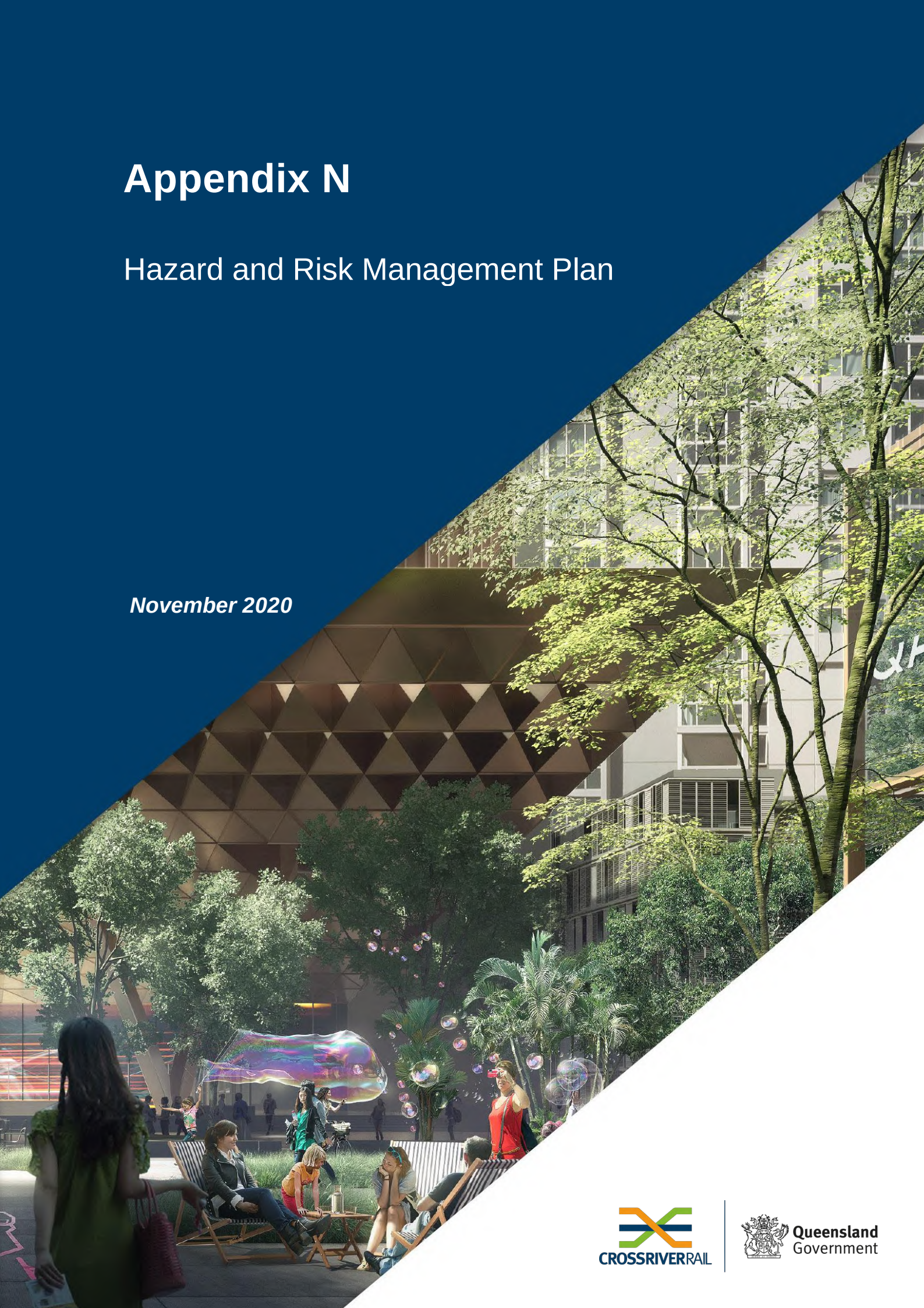

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline HRMP. Additional definitions for the Outline HRMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
HRMP	Hazard and Risk Management Plan

2. Introduction

This Outline Hazard and Risk Management Plan (Outline HRMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline HRMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- guide staff and subcontractors on hazardous materials management within the Project area and/or Project vicinity during construction;
- appropriately manage specific construction activities that have the potential to cause contamination as a result of hazardous material use;
- minimise risks to the environment, workers and to the public; and
- ensure that all hazardous materials stored onsite are handled in a responsible manner and in accordance with legislative requirements.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline HRMP.

3.1 Environmental Outcomes

The following environmental outcome in relation to hazard and risk is to be achieved for the Project:

- Construction activities are managed to mitigate the risks associated with inundation, construction failures or incidents, tunnel collapse, fire and life safety, hazardous chemicals, and traffic hazards.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

- A safe working environment is maintained for the construction workforce, near neighbours and passers-by, including pedestrians, cyclists and motorists.
- A Project hazard and risk register is implemented and maintained as a current and accurate central record of Project hazards and risk reduction/mitigation strategies for the full duration of the construction phase.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential hazard and risk related impacts could include, but are not limited to, the following:

- Inundation of construction worksites;
- Construction failures or incidents;
- Tunnel collapse;
- Fire and life safety;
- Impacts and risks related to hazardous chemicals; and
- Traffic incidents and hazards.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 General requirements

- Develop and implement a detailed Risk Management Plan that considers the potential risks associated with construction including, but not limited to:
    - risk minimisation and incident management;
    - inundation of surface works;
    - flood inundation of the underground works;
    - tunnel collapse;
    - fire and life safety;
    - hazardous chemicals and dangerous goods; and
    - traffic hazards associated with construction traffic.
- The management plan must be prepared taking into consideration requirements of the Emergency Service Authorities and should consider the requirements of the Industrial Hazard and Risk Assessment Planning Scheme Policy of BCC's City Plan 2014.
- Implement, review and maintain a hazard and risk register as the current and central record of Project hazards and risk reduction/mitigation strategies that will be adopted throughout construction.
- Implement risk mitigation strategies for the hazards identified for each Project aspect in the hazard and risk register.
- Establish procedures for communication with the Rail Transport Operator about construction activities in or near to the rail corridor and potential hazards and risks.
- Establish procedures for communication with TMR, BCC and TransLink about potential hazards and risks associated with construction activities in or near to state and local roads, and busways.
- Prior to the commencement of construction, prepare emergency response and incident management procedures, and implement in the event of accidents and emergencies. These are to be prepared in consultation with Emergency Service Authorities and include as a minimum:

  - responsibilities in the event of an incident;
  - traffic management and control systems;
  - evacuation routes in the event of an incident;
  - education and training programme for the construction workforce on the procedures; and
  - procedures for conducting simulated emergency response exercise. This is to be conducted at least once within 12 months of the commencement of construction works.
- Ensure that access for emergency services vehicles to construction worksites and other work areas is provided and maintained at all times.
- Establish a communication process with Emergency Service Authorities in relation to temporary road closures and disruptions and relocation of water mains that would affect hydrants near construction works.
- Provide fire and life safety measures, including ventilation, smoke extraction and firefighting systems for enclosed spaces and enclosed work areas such as underground works areas, acoustic enclosures and sheds, for the duration of construction.
- Develop a construction methodology that complies with the Rail Transport Operator's standards for track isolation and protection of rail infrastructure.
- Develop and implement an inspection and maintenance schedule for plant and equipment used at construction worksites.
- Ensure that the storage of flammable and combustible liquids complies with AS 1940, any other relevant standards, and the *Workplace Health and Safety Act 2011*.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline HRMP are nominated below:

- Routine worksite safety inspections and hazard and risk assessments are to be carried out each month during construction.

- Within 12 months of the commencement of construction works, a simulated emergency response exercise is to be conducted in conjunction with the above-mentioned Emergency Services, on at least one occasion.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to hazard and risk are outlined below:

- Ensure any incident is reported immediately on completion of the incident investigation and the Project hazard and risk register is updated as required.
- At least two months prior to the commencement of construction work at any construction site, a hazard and risk sub-plan of the CEMP is to be submitted to relevant Emergency Services for consultation on elements related to emergency services access to project worksites and associated procedures, including, but not limited to:
    - worksite accessibility for emergency services vehicles to the road network and construction sites;
    - maintenance of essential urban services (water, power);
    - transport and the use and storage of hazardous chemicals and dangerous goods at worksites; and
    - communication procedures during incidents.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix O

Land Management Plan

November 2020

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline LMP. Additional definitions for the Outline LMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
AMP	Archaeological Management Plan
LMP	Land Management Plan

2. Introduction

This Outline Land Management Plan (Outline LMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project. The Outline LMP has been developed to cover geology and settlement.

2.1 Objectives

The objectives of this Outline LMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on land and land health are minimised;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to geology and soil within and adjacent to the Project;
- ensure controls and procedures are implemented to manage settlement as a result of construction of the Project and spoil generated from the Project;
- nominate the Project's monitoring and reporting requirements in relation to this plan; and
- monitor the effects of management and mitigation measures.

It is intended that a monitoring programme be developed and implemented across the Project so that Project-related impacts on geology, and settlement in terms of the environment can be avoided, or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline LMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 12. Property Damage

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to land (including geology, soil, settlement and spoil) are to be achieved for the Project:

Geology and Soils

- Construction activities minimise soil erosion and sedimentation and avoid adverse impacts on the environmental values of receiving waters.
- Construction activities minimise the impacts of ground settlement from tunnelling or other construction works.
- Construction activities avoid or minimise environmental and public health risks associated with disturbance of potential acid sulfate soils (ASS) encountered during construction works.
- Construction activities do not impact on the environmental values of the Brisbane River and other waterways within the study corridor.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

- The Project does not result in soil erosion beyond the boundaries of worksites. Soil erosion within a worksite is rectified as soon as practicable after a rainfall event to prevent the release of sediment offsite.
- Soil erosion and sediment controls are implemented and maintained for each worksite 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 to manage runoff and dewatering activities.
- Groundwater released from worksites complies with the environmental objectives established in the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water and Wetland Biodiversity).
- Ground settlement consequential to Project Works does not impact on the structural integrity of buildings or infrastructure and generally does not exceed 1:500 differential settlement.
- ASS is avoided, or if intercepted, is managed to avoid adverse impact to environmental values, infrastructure, construction equipment, construction personnel or the public.

4. Impacts and Mitigation Measures

4.1 Impacts

Potential land related impacts could include, but are not limited to, the following:

Geology and Geomorphology

The potential impacts to geology and geomorphology values as a result of the Project are likely to be associated with adverse impacts to geological stability resulting in settlement impacts as a result of

tunnelling activities. There is also potential to impact on surface and groundwater systems as a result of drawdown if tunnelling activities intercept significant water-bearing geological discontinuities that cause groundwater inflows to the tunnel.

Settlement

Settlement in tunnelling projects may arise due to the following effects:

- Excavation and tunnelling induced settlement
- Groundwater drawdown induced settlement
- Local ground relaxation effects around structures at tunnel declines

There is potential for the Project to intercept the groundwater table, particularly during tunnelling activities. Potential risks associated with intercepting the groundwater table include:

- Groundwater inflow to tunnels
- Unanticipated settlement
- Disturbance of subsurface contamination associated with contaminated sites within the study corridor or the surrounding area where hydraulic connectivity exists

Settlement resulting from tunnel excavation/construction activities may arise due to:

- Elastic ground settlements caused by the excavation of the tunnel
- Consolidation settlement caused by dewatering of porous rock formations or compressible soil layers that are hydraulically connected to groundwater draw down into the tunnel excavations.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 Geology

- Undertake further geotechnical investigations to inform construction planning for the Project.

4.2.2 Settlement

- Undertake further detailed geotechnical and groundwater investigations along the tunnel alignment and at underground stations to inform detailed design and construction planning about potential settlement risk.
- Identify the potential for settlement impacts, including, but not limited to:
  - excavation induced settlement;
  - groundwater drawdown induced settlement;
  - ground treatment-related heave; and
  - local ground relaxation settlement.
- Undertake predictive modelling using a suitable methodology to identify the potential for ground settlement, the settlement trough footprint, within which predicted settlement would lead to property or asset damage, including structural, cosmetic and performance damage to buildings, utilities and other structures.
- Additional settlement analysis is to be done at all properties that are at slight risk of settlement impact or settlement damage with the management measures identified in here, and any additional measures identified, to be implemented. This includes settlement monitoring being undertaken at the Roma Street station building, which has been identified as having a ‘slight risk’ of damage.

- Where the predictive modelling indicates damage is likely as a consequence of the Project works, consult with potentially affected owners to undertake a dilapidation survey of buildings, structures, utilities and significant landscaping works and heritage landscape features. Asset condition surveys would be undertaken to identify and document pre- and post-construction conditions. Asset condition surveys of heritage buildings are to be undertaken by a person suitably qualified in condition assessments of heritage buildings.
- Prior to the commencement of construction, establish baseline conditions, including levels, at premises indicated by predictive modelling to be susceptible to settlement as a consequence of such construction.
- Where predictive modelling indicates settlement may be likely, detailed design and construction planning is to incorporate measures to limit settlement.
- In the event of settlement, monitor building and asset conditions. Where necessary the Contractor must repair damage caused by Project works at no cost to the asset owner.

4.2.3 Fossil and archaeological material

- If significant fossil and archaeological material or finds are encountered during excavation, a suitably qualified specialist must be consulted to determine management or preservation measures as required. For archaeological material, the find will also need to be managed in accordance with the DES endorsed Archaeological Management Plan (AMP).

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline LMP are nominated below:

Settlement

- Monitor the effects of settlement.

- If any subsequent ground settlement is alleged to be caused by the Project, an independent consultant may be engaged to prepare a new building conditions survey report, investigate the cause of any damage and make recommendations for repairing building damage established.
- New condition surveys of heritage buildings are to be undertaken by a person suitably qualified in condition assessments of heritage buildings.
- Monitoring of settlement must be conducted from the commencement of sub-surface construction works and dewatering.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to land are outlined below:

- Results of settlement monitoring must be reported quarterly within the monthly environmental report for the duration of construction and during the post-construction maintenance phase.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication strategies including internal communication, external and Government Authority consultation, and stakeholder and community liaison must be undertaken in accordance with the CEMP and the CSEP.

Appendix P

Nature Conservation Management Plan

November 2020

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline NCMP. Additional definitions for the Outline NCMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
Biosecurity Instrument Permit	A permit issued by DAF authorising a person to perform an activity, or not to perform an activity, other than in compliance with a biosecurity instrument, which is a movement control order or biosecurity zone regulatory provision
DAF	Department of Agriculture and Fisheries
FABZ	Fire Ant Biosecurity Zones
GBO	General Biosecurity Obligations
MSES	Matters of State Environmental Significance
NCMP	Nature Conservation Management Plan
RNA	The Royal National Agricultural and Industrial Association Queensland

2. Introduction

This Outline Nature Conservation Management Plan (Outline NCMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline NCMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to flora and fauna;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to fauna and flora within and adjacent to the Project;
- ensure appropriate measures are implemented to comply with all relevant legislation; and
- monitor the effects of management and mitigation measures.

It is intended that a flora and fauna monitoring programme be developed and implemented at each worksite so that the Project-related impacts on local stakeholder and the environment can be avoided, or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any

changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline NCMP.

3.1 Environmental Outcomes

Throughout construction, the following environmental outcomes must be achieved:

- Ecological, habitat and natural asset values of open space areas near Project Works are maintained;
- No net loss of MSES habitat, as defined in the *Environmental Offsets Regulation 2014*, occurs as a result of the design and construction of the Project;
- Construction activities do not cause the introduction or spread of pest species; and
- General Biosecurity Obligations (GBO) must be met pursuant to the *Biosecurity Act 2014.*

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Habitat for significant vegetation removed during construction is restored and rehabilitated to the extent reasonable and practicable, consistent with a rehabilitation plan developed in consultation with BCC;
- Clearing permits and other relevant permits or approvals for vegetation clearing are obtained from DES as required, and clearing is undertaken in accordance with the conditions of these permits or approvals;
- Pest species declared under the *Biosecurity Act 2014* are not spread or introduced during construction;
- Rehabilitation and landscape plans incorporate species appropriate for the surrounding landscape and infrastructure, and, where practicable, uses endemic plants;
- Species management plans should be developed where required and vegetation clearing and construction is undertaken in accordance with the conditions of approved plans and permits; and
- Contractor to meet requirements and obligations under the *Biosecurity Act 2014.*

4. Impacts and Mitigation Measures

4.1 Impacts

The Project has the potential to impact on flora and fauna within the alignment, due to tunnelling activities, and the construction of railway, bridges and other ancillary works.

During the Project's construction period, the following sources have the potential to harm flora and / or fauna if not managed correctly:

- Worksite establishment and demolition activities;
- Tunnelling and associated excavation works (cut and cover operations);
- Shaft excavation;
- Spoil removal and replacement;
- Above ground road and bridge works; and
- Construction of railway stations and other buildings.

In addition, station upgrades at Yeronga, Yeerongpilly, Moorooka, Rocklea and Salisbury are identified Fire Ant Biosecurity Zones (FABZ) and must be managed accordingly to prevent the spread of fire ants.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 Construction

- As part of the Project induction process, communicate to construction staff that all native flora and fauna is protected and must not be intentionally harmed and must not be handled except with a relevant permit.
- Minimise disturbance to significant vegetation and habitat during construction, by clearly marking and mapping vegetation to be retained and marking boundaries of work areas. In particular, disturbance to and the loss of significant mature trees, including figs, must be minimised.
- 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 clearing areas for plant and equipment away from large trees and their drip zones.
- Undertake a pre-construction fauna survey within and around worksites to identify any species for which a species management plan needs to be developed.
- Implement site management procedures to avoid or minimise potential for harming native fauna and respond to incidents when fauna enter construction worksites.
- 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 DES and hold applicable licences and permits.
- Ensure a suitably qualified and experienced person undertakes a pre-construction fauna survey within and around work sites to identify any fauna species for which a species fauna management plan needs to be developed.
- Lighting associated with night works should incorporate fittings to limit dispersion of light outside the target area. Avoid the use of mercury lamps to limit insect associated problems such as encouraging fauna to enter close to construction activities and traffic areas. Where safety considerations allow, lighting should not extend up into the canopy of any surrounding trees.
- Ensure appropriate soil hygiene procedures are followed to prevent the spread of pest plants and animals, and potential soil pathogens.
- Prepare and implement a Pest and Weed Management Plan, which includes measures consistent with the Rail Transport Operator's procedures. This must be prepared prior to the commencement of Relevant Project Work.
- Prepare and implement landscape and rehabilitation plans. This is to include investigation of opportunities for improvements to habitat as a result of the Project Works.
- Consult with an arborist in relation to fig tree management at the RNA Showgrounds.
- Wherever practicable, reinstate new landscaping and compensatory trees for those removed due to construction of the Project consistent with BCC requirements.
- Minimise the clearing / trimming of vegetation, undertake pre-construction fauna surveys and implement a pest and weed management plan prior to any works taking place at Moolabin Creek or Breakfast Creek.
- Ensure any development approvals required for works undertaken at Breakfast Creek and Moolabin Creek are obtained.
- Works across the Project footprint, including at Victoria Park, are to be designed and planned to avoid or minimise the loss of vegetation as required by Imposed Condition 20 in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website.

4.2.2 Red Imported Fire Ants

- Works undertaken at Yeronga, Yeerongpilly, Moorooka, Rocklea and Salisbury station comply with all of the requirements of the *Biosecurity Act 2014*.
- All Project sites receiving fire ant carriers must ensure that a Biosecurity Instrument Permit is provided by the supplier, or a Biosecurity Queensland certified inspection certificate is suppled for fire ant carriers.
- Prior to the commencement of any site works or construction, prepare and implement for each construction worksite or work area, a specific Approved Risk Management Plan for red imported fire ants.
- If material is to be imported from a FABZ, comply with the Department of Agriculture and Fisheries (DAF) (Biosecurity Queensland) requirements for all construction worksites and spoil placement locations, in relation to the management requirements for the movement of restricted materials.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Induction

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline NCMP are nominated below:

- Prior to construction commencing, undertake a pre-clearance ecological survey to identify any fauna in the construction area and relocate appropriately. This must be undertaken by qualified ecologists and accredited fauna spotter-catchers.
- Prior to construction commencing, undertake a pre-clearance weed survey, identifying weed species and removing them prior to construction works being undertaken. This must be done by a relevant qualified person and appropriate measures must be put in place to ensure that weed seed is not spread via persons, vehicles or equipment.
- Undertake regular inspections of work areas to ensure that vegetation marked for retention is not damaged or removed or vegetation outside of worksites or work areas has not been removed or damaged.

- Monitor significant trees identified as being at potential risk from the Project during post construction in accordance with relevant project approvals, exemption certificates and site access agreements.
- Regularly inspect construction worksites and other work areas, as appropriate, to assess compliance with mitigation measures identified to minimise impacts on flora and fauna.
- Inspect and monitor construction worksites and the spoil placement sites for the presence of fire ants as identified in the Risk Management Plan for Red Imported Fire Ants.
- Prior to the completion of construction works, monitor rehabilitation activities to ensure compliance with the Rehabilitation Plan.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix Q

Noise and Vibration Management Plan

November 2020

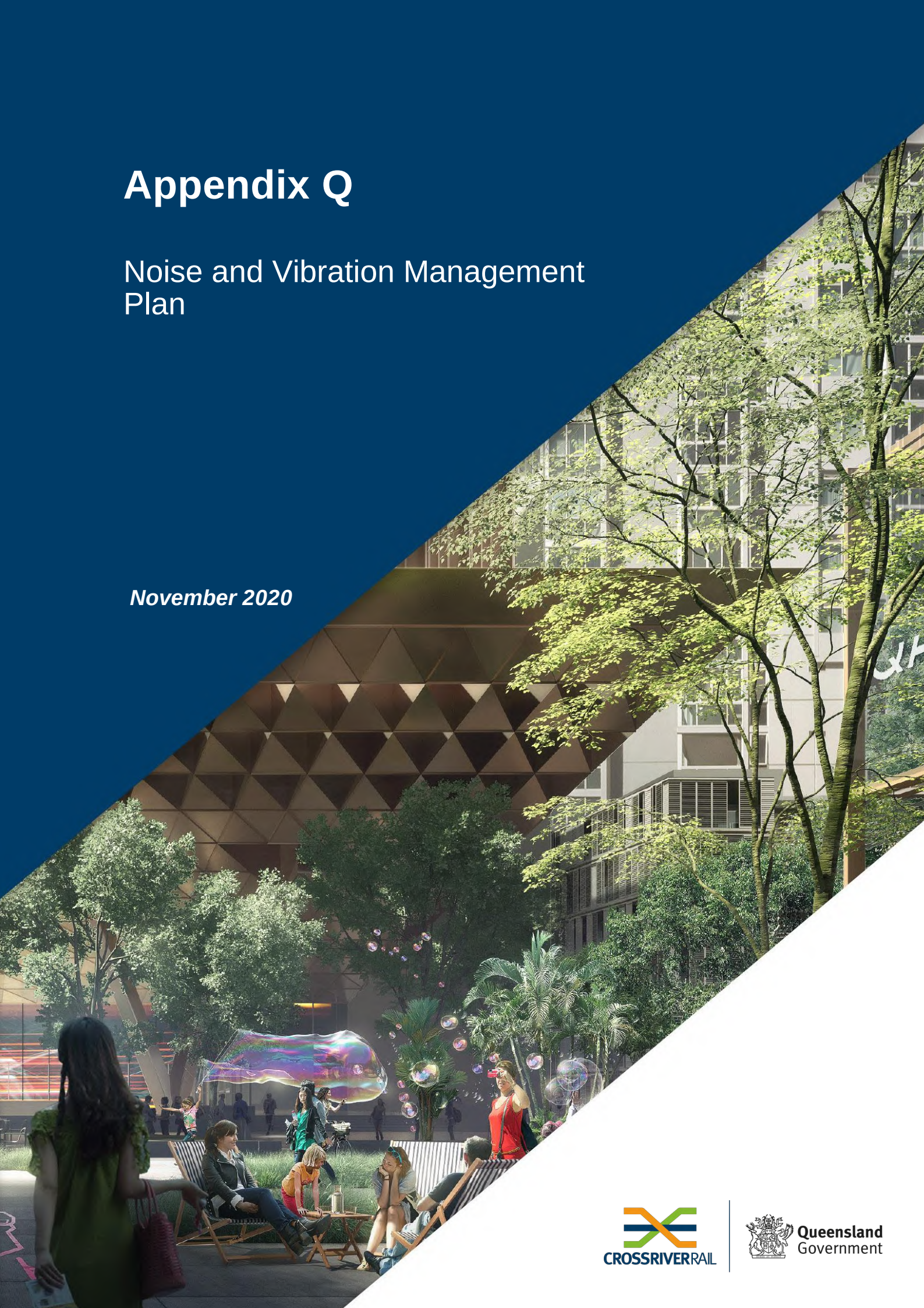

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline NVMP. Additional definitions for the Outline NVMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
NVMP	Noise and Vibration Management Plan
PA Hospital	Princess Alexandra Hospital
RNA	The Royal National Agricultural and Industrial Association of Queensland
TEM	Transmission Electron Microscopes
TBM	Tunnel Boring Machine

2. Introduction

This Outline Noise and Vibration Management Plan (Outline NVMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline NVMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to noise and vibration;
- manage the impact on the local community in terms of noise and vibration from construction works; and
- monitor the effects of management and mitigation measures.

It is intended that a noise and vibration monitoring programme be developed and implemented at each worksite so that Project-related impacts on local communities can be avoided, or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline NVMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 11. Construction Noise and Vibration

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to noise and vibration are to be achieved for the Project:

- Construction activities are designed, planned and implemented to maintain human health and wellbeing, to the extent reasonable and practicable.
- Construction activities generally are designed, planned and implemented to maintain daily patterns of activity, and to minimise sleep disturbance at night.
- Construction activities are managed to avoid vibration-related structural damage on all properties, to minimise vibration-related impacts on properties and sensitive plant and equipment.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

Air-borne Noise

- Project Works are designed, planned and implemented to achieve the noise goals specified in Imposed Condition 11 to the extent reasonable and practicable.
- Where predictive modelling conducted prior to the commencement of works in a locality, indicates that the noise goals are likely to be exceeded:
  - potentially Directly Affected Persons must be identified and consulted regarding the potential impacts and the mitigation measures proposed to address the impacts;
  - mitigation measures must be developed in consultation with potentially Directly Affected Persons on a ‘case by case’ basis prior to commencement of the works; and
  - agreed mitigation measures must be included in a mitigation register and implemented prior to undertaking Project Works.
- Project Works occurring underground or within an effective acoustic enclosure, and achieving the goals for human health and wellbeing set out in Imposed Condition 11, may progress continuously while monitoring indicates noise levels remain below the goals.

Vibration

- Project Works must be designed, planned and implemented to achieve the vibration goals specified in Imposed Condition 11 to the extent reasonable and practicable.
- Where predictive modelling, conducted prior to the commencement of works in a locality, indicates that the vibration goals are likely to be exceeded:

  - potentially Directly Affected Persons must be identified and consulted regarding the potential impacts and the mitigation measures proposed to address the impacts;
  - effective mitigation measures must be developed in consultation with potentially Directly Affected Persons on a 'case by case' basis prior to commencement of the works; and
  - agreed mitigation measures are included in a mitigation register and implemented prior to undertaking Relevant Project Works.
  - Any discussions with Directly Affected Persons must involve the community and stakeholder relations team.
- For sensitive building contents, predictive modelling must take into account the manufacturer's specifications for tolerance to vibration and adopt such specifications as goals for construction to avoid or minimise impacts on the normal operation of such equipment.

4. Impacts and Mitigation Measures

4.1 Impacts

Construction of the Project has the potential to result in impacts related to noise and vibration throughout the construction phase. There will likely be an increase in noise along the Project alignment due to increased machinery, tunnel boring activities and Project staff. Vibration from construction of the Project has the potential to impact nearby sensitive receptors and cause damage to adjacent buildings if mitigation measures are not implemented.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 General – Noise

- Prior to the commencement of Project Works in a locality, predictive modelling must be undertaken to identify the likely acoustic impacts.
- Where predictive modelling indicates either the noise or vibration goals would be exceeded, inform the Environmental Monitor and consult Directly Affected Persons to develop mitigation measures prior to the commencement of such work.
- Where the works in a locality are predicted to exceed the goals in Imposed Condition 11:
  - initiate on-going and early consultation with potentially Directly Affected Persons and relevant agencies to notify them of the proposed works and to determine suitable mitigation measures; and implement the detailed CEMP and NVMP to achieve the outcomes developed in consultation with the potentially Directly Affected Persons.

4.2.2 General – Vibration

- Prior to the commencement of construction in a locality, predictive modelling of construction vibration likely from both surface and underground Project Works must be undertaken. The predictive modelling is to identify the likely impacts from ground-borne vibration and consequential ground-borne noise.
- Where the works in a locality are predicted to exceed the vibration goals nominated in the NVMP:
  - conduct surveys in the locality to identify residential properties and other places especially sensitive to sleep disturbance (e.g. hospitals, nursing homes and child care centres);
  - conduct surveys in the locality to identify and determine the specifications for building equipment known to be sensitive to vibration, such as computers, microscopes, surgical equipment;
  - conduct pre- and post-construction building condition surveys where potential cosmetic (superficial) building damage is likely to occur as a consequence of Project Works; and
  - implement practical and reasonable mitigation measures that would achieve the environmental outcomes.

- Mitigation measures for construction vibration at sensitive receivers may include one or more of the following, as well as other practical and reasonable mitigation measures where appropriate:
  - changes in construction methods or programming, to avoid periods in which the predicted exceedance would impact on the most people, or during the operational hours of sensitive building equipment;
  - property treatments for properties predicted to be directly affected by exceedances of the goals. Such treatments must be agreed with the Directly Affected Persons prior to the commencement of the works; and
  - temporary relocation to alternative accommodation for Directly Affected Persons if no other viable solution is available to mitigate the predicted or actual impacts of construction.

4.2.3 Mechanical tunnel construction

1. Prior to commencement and then progressively, undertake predictive modelling, supplemented by monitoring data to refine the model to identify potential exceedances of the goals for construction noise and vibration. This should consider potential impacts to heritage buildings.

2. Where such predictive modelling indicates the goals would be exceeded, undertake advance consultation with Directly Affected Persons, to develop mitigation measures and to inform them of the construction programme and the likely duration of the predicted exceedance.

3. Generally, undertake advance consultation in localities, ahead of tunnelling activities. Consultation is to include information on the rate of progress, the potential effects and the monitoring programme which may require involvement from residents located above the main tunnel alignments.

4. In localities where predictive modelling indicates a risk of exceedances of the goals for construction vibration, conduct building condition surveys before and following completion of tunnel construction. Building condition surveys are to be conducted by agreement with potentially affected landowners.

5. Conduct monitoring of ground-borne noise and vibration along the main tunnel alignments and in proximity to the underground stations to inform and refine predictive modelling and the development of mitigation measures, and to provide feedback to the community and regulatory agencies on performance in relation to the goals for construction noise and vibration.

4.2.4 Low frequency construction noise

1. Implement a comprehensive notification and education programme to inform the community in localities where low frequency noise goals would likely be exceeded during tunnelling works. The notification is to include tunnelling progress and temporary exposure periods that can be expected during construction.

2. Provide local communities with tunnelling progress and subsequent likely (temporary) exposure periods.

3. Restrict heavy goods vehicle movements to operating only on designated haulage routs for construction materials and spoil.

4.2.5 Blasting

1. Where drilling and blasting is proposed, mitigation measures should consider:

   a) utilising the latest available blasting technology;
   b) pre-blasting condition surveys of adjacent buildings; and

c) early consultation with local communities and pre-warnings of the timing of the blast activities.

2. Limit blasting to between 7.30am and 4.30pm Monday to Saturday (not on Sundays and public holidays), desirably to regular scheduled times in localities where repeated blasting is required by construction or ground conditions.

4.2.6 General requirements

1. Generally, construction is planned and undertaken in accordance with the following measures:

   a) consult in advance with Directly Affected Persons about the programme of works, including notice of activities indicated by predictive modelling likely to exceed noise or vibration goals;
   b) install acoustic screens as early as practicable in the programme around fixed-point noise sources such as compressors and tunnel ventilation plant, or place such noise sources in the worksite so that the environmental outcomes are achieved;
   c) prior to the commencement of Project Works predicted to exceed the noise goals, install acoustic barriers around the worksite to achieve the environmental outcomes for nearby sensitive receivers;
   d) other than for extended work, night-time works predicted to exceed the noise goals may be conducted only underground or within an acoustic shed and then only when noise levels at sensitive receivers are within the noise goals, unless alternative mitigation measures are developed in consultation with and agreed with the Directly Affected Persons;
   e) use the quietest plant and equipment reasonably expected to be available to undertake each component of the work;
   f) undertake regular maintenance of equipment to ensure that all plant and equipment remains in good working order and noise emissions from the equipment do not increase;
   g) minimise the occurrence of noisy plant and equipment working simultaneously near sensitive receivers;
   h) fit residential-class mufflers to mobile plant and equipment, such as but not limited to excavators, front end loaders and other diesel-powered equipment, where engaged in works in or adjacent to residential areas;
   i) Conduct building condition surveys for heritage-listed places prior to commencement of works predicted to exceed the vibration goals for heritage places;
   j) ensure careful placement within each worksite of fixed plant (e.g. compressors) to maximise shielding or separation from sensitive receivers; and
   k) minimise the use of warning devices (e.g. reversing alarms) on plant and equipment working adjacent to sensitive receivers to within operational health and safety constraints. Where feasible, substitute audible warning devices with devices with reduced subjective noise output (e.g. non-tonal warning devices in place of tonal devices).

2. The following monitoring and modelling activities are to be undertaken to inform the noise and vibration mitigation measures:

   a) undertake background noise monitoring that informs predictive modelling undertaken near construction sites adjacent to sensitive receivers;
   b) a requirement for predictive modelling on which to base mitigation measures for noise and vibration from construction works. Predictive noise modelling must be based on a validated environmental noise model (e.g. CONCAWE, ISO 9613 or similar). Predictive vibration modelling must justify the use of the vibration model selected, including verification against site conditions, if required. Noise and vibration modelling must address the proposed construction methods in relation to the ground conditions in the work area, and identify nearby sensitive receivers;

c) proposed specific monitoring points for the predicted and likely construction noise and vibration from the proposed works;
d) criteria for monitoring compliance with the Coordinator-General's Imposed Conditions and the mitigation measures relating to the proposed works; and
e) a plan for on-going vibration and regenerated noise monitoring throughout the construction phase.

4.2.7 Fairfield to Salisbury and other surface works

1. Prior to the commencement of works, including any demolition and site preparation works, undertake predictive modelling to identify the potential for exceedances of the goals for health and wellbeing. Where exceedances are predicted, install acoustic barriers around the worksite prior to the commencement of works.

2. Undertake early and on-going consultation with residents and owners and occupants of businesses around the Fairfield to Salisbury works, including all station upgrades, to identify and avoid or minimise potential noise and vibration impacts.

3. Where Project Work outside of standard hours is required to minimise disruption to the operation and function of essential transport infrastructure, or where Project Works do not meet the required noise and vibration goals, consultation with Directly Affected Persons is to be undertaken in advance to develop mitigation measures for predicted and actual noise and vibration impacts.

4.2.8 Southern Portal, Boggo Road and Dutton Park Station works

1. Consult in advance with Directly Affected Persons and near neighbours about the station and portal works and the surface works in the designated rail corridor between Dutton Park Station and Park Road Station. Consultation must identify the activities likely to approach or exceed the noise and vibration goals for the Project.

2. Where noise and vibration predictive modelling indicates exceedances of the noise criteria for railway surface track airborne noise emissions, consult with Queensland Rail and residents of Cope Street during detailed design and consider noise mitigation measures that balance achieving compliance with MD-15-317, operational rail requirements and amenity impacts for residents of Cope Street and other nearby residents as required.

3. Consult with the PA Hospital, ESA Village (Leukaemia Foundation) and the Ecosciences facility to minimise the effects of construction on people and sensitive equipment (e.g. Transmission Electron Microscopes (TEM)). Confirm the technical specifications of the Ecosciences TEM vibration isolation system prior to commencement of vibration intensive Project Works.

4. Prior to the commencement of Project Works undertake predictive modelling to identify work likely to exceed the noise goals, and those properties likely to be impacted by such exceedances. If predictive modelling indicates that the construction noise goals would likely be exceeded during the Project Works, then:

    a) consult with Directly Affected Persons, local communities, particularly those south of Peter Doherty Street, west of Railway Terrace and the Quarry Street area north of the rail corridor about measures to mitigate night-time works in the rail corridor;
    b) erect noise barriers around the station shaft and portal works, while having regard for the operational requirements of the rail corridor. Such noise barriers must also be capable of modification for dust control as necessary;
    c) all handling of construction spoil, including loading construction spoil vehicles, must occur within acoustic enclosures;

d) erect a noise barrier along the north-west side of the on-site spoil route adjacent to the rail track if night-time spoil removal is required;
e) implement all other practical and reasonable mitigation measures to reduce noise impacts from the Project Works; and
f) undertake monitoring of construction noise at residential and commercial premises predicted to be affected by the works (eg immediately to the west of Railway Terrace and Joe Baker Street, and premises to the north of Park Road Station). Where monitoring detects exceedances of the goals for human health and wellbeing, develop and implement mitigation measures in consultation with the Directly Affected Persons as soon as practicable after monitoring.

4.2.9 Clapham Yard

1. Prior to the commencement of works, including any demolition and site preparation works, undertake predictive modelling to identify the potential for exceedances of the goals for health and wellbeing. Where exceedances are predicted, install acoustic barriers around the worksite prior to the commencement of works.

2. Undertake early and on-going consultation with nearby sensitive receivers around the Clapham Yard works, to identify and avoid or minimise potential noise and vibration impacts.

3. Where Project Work outside of standard hours is required to minimise disruption to the operation and function of essential transport infrastructure, or where Project Works do not meet the required noise and vibration goals, consultation with Directly Affected Persons is to be undertaken in advance to develop mitigation measures for predicted and actual noise and vibration impacts.

4.2.10 Woolloongabba Worksite

1. Consult in advance with Directly Affected Persons and near neighbours about the station works at Woolloongabba and the tunnel corridor between Park Road Station and the Woolloongabba Worksite and between Woolloongabba Worksite and the Brisbane River. Consultation must address the programme of works, including advanced notice of activities likely to approach or exceed the noise and vibration goals.

2. Prior to the commencement of Project Works undertake predictive modelling to identify work likely to exceed the noise goals, and properties likely to be impacted by such exceedances. If predictive modelling indicates likely exceedances of the noise goals for human health and wellbeing design and implement mitigation measures to achieve the environmental outcomes. Mitigation measures at the Woolloongabba worksite may include:

    a) install acoustic enclosures, barriers or sheds to protect local communities including those on Vulture Street, Main Street and Stanley Street.
    b) an acoustic shed over the long-term construction shaft to mitigate the effects of spoil handling, materials deliveries and night works;
    c) the shed is to be ventilated and equipped with an air filtration system and acoustic-screened doors at the entry and exit points for spoil haulage vehicles;
    d) night time works likely to exceed the noise goals must be conducted within the acoustic enclosure or shed; and
    e) implement all other practical and reasonable mitigation measures to reduce noise impacts from the Project Works.

3. Undertake monitoring of construction noise at nearby properties predicted to be affected. Subject to the findings of the facade noise measurements, mitigation measures may be required including temporary (or permanent) upgrades to the facade (e.g. double glazing, acoustic seals around doors etc.) in tandem with respite periods during services.

4. The acoustic shed being constructed as early in the programme as practicable.

4.2.11 Albert Street Station and associated underground works

1. Consult in advance with Directly Affected Persons and near neighbours about the station works at Albert Street and the tunnel corridor between the Brisbane River, Albert Street and Roma Street. Consultation must address the programme of works, including advanced notice of activities likely to exceed the noise and vibration goals.

2. Prior to the commencement of Project Works undertake predictive modelling to identify work likely to exceed the noise goals, and properties likely to be impacted by such exceedances.

3. Undertake monitoring of ground-borne vibration and noise at several places representative of the sensitive receivers along Albert Street, including at least residential premises and commercial premises containing sensitive office equipment.

4. If predictive modelling indicates likely exceedances of the noise or vibrations goals for human health and well-being, design and implement mitigation measures to achieve the environmental outcomes. Mitigation measures may include:

    a) installation of acoustic barriers or enclosures around the worksite to protect nearby sensitive receivers, and an acoustic shed over the long-term construction shaft off Albert Street to mitigate the effects of spoil handling, materials deliveries and general works. The acoustic shed is to be ventilated and equipped with an air filtration system;
    b) during the detailed design phase, develop specific mitigation measures to include in the CEMP to address potential exceedances, particularly noise and vibration, resulting from demolition works;
    c) rock breaking be restricted to 7.00am to 6.00pm unless and until monitoring results indicate compliance with the noise goals or mitigation measures developed in consultation with Directly Affected Persons have been implemented;
    d) ground-borne noise and vibration measurement trials be carried out for rock-breaking during the detailed design stage of the Project to accurately determine the extent of the impact and to allow sufficient time to develop an appropriate management strategy;
    e) investigate alternative construction techniques with the aim of avoiding or minimising potential ground-borne noise impacts. For example, drill and blast could be more efficient than use of heavy rock breakers to impede vibration propagation; and
    f) implement all other practical and reasonable mitigation measures to reduce noise impacts from the Project Works.

5. Undertake monitoring of construction noise and vibration at places representative of the sensitive receivers along Albert Street, Mary Street and Charlotte Street, including at each residential premises, places of historic or heritage significance, and commercial premises containing sensitive office equipment.

6. Construct acoustic sheds as early in the programme as practicable, and conduct rock breaking ground-borne noise and vibration trials during detailed design to accurately determine extent of the predicted impact. These sheds must be built to the required standard, i.e. ‘high performance, to ensure the required noise attenuation levels are achieved.’

7. Where demolition is occurring, seek to substitute traditional methods with alternative methods that reduce noise and vibration impacts, consider materials handling measures that can also minimise noise and vibration impacts, and avoid dropping materials from height.

8. Additional mitigation measures must be developed in detail in the Contractor’s CEMP to appropriately manage and mitigate the Northern cavern shaft excavation and ensure that compliance with the noise and vibration goals of Imposed Condition 11 are achieved.

4.2.12 Roma Street Worksite and associated underground works

1. Consult in advance with Directly Affected Persons and near neighbours about the station works and the tunnel corridor, the programme of works and advance notice of activities likely to approach or exceed the noise or vibration goals.

2. Consult with Directly Affected Persons prior to monitoring of noise and vibration at places representative of the sensitive receivers adjacent to Roma Street Station, including at least the Hotel Jen, the Abbey Apartments, Roma Street commercial (Transcontinental Hotel) and Queensland Police Headquarters.

3. If predictive modelling indicates likely exceedances of the noise or vibration goals for human health and wellbeing, design and implement mitigation measures to achieve the environmental outcomes. Mitigation measures may include:

    a) installation of a ventilated acoustic shed over the station shaft and spoil loading facilities in the Roma Street worksite;
    b) permitting night-time works likely to exceed the noise goals to be conducted only underground or within the acoustic shed except during extended hours, and only if the environmental outcomes would be achieved;
    c) restricting rock breaking to 7.00am to 6.00pm until monitoring results indicate compliance with the ground-borne noise goals or mitigation measures developed in consultation with Directly Affected Persons have been implemented;
    d) ground-borne noise and vibration measurement trials are carried out for rock- breaking during the detailed design stage of the Project to accurately determine the extent of the impact and to allow sufficient time to develop an appropriate management strategy;
    e) investigate alternative construction methods for works predicted to exceed the noise and vibration goals along the boundaries of the station shaft shared with adjacent buildings; and
    f) Implement all other practical and reasonable mitigation measures to reduce noise impacts from the Project Works.

4. Construct acoustic sheds as early in the programme as practicable, and prior to other construction works commencing unrelated to construction of the acoustic shed, and construct to a high performance standard, which ensures the required attenuation levels are achieved, considering specifics of sensitive receptors in the area.

4.2.13 Northern Portal

1. Consult in advance with Directly Affected Persons and near neighbours about the programme of construction works, including early works and site preparation works. Consult with residents of Gregory Terrace, businesses at the Centenary Aquatic Centre, and the administrations for each of Brisbane Girls' Grammar School, St Joseph's College Gregory Terrace and Brisbane Grammar School.

2. Prior to the commencement of Project Works undertake predictive modelling to identify work likely to exceed the noise goals, and properties likely to be impacted by such exceedances.

3. Where predictive modelling indicates potential exceedances of the noise and vibration goals for human health and wellbeing or human comfort for educational facilities, the Proponent must develop and implement mitigation measures in consultation with the Directly Affected Persons prior to the commencement of works. Mitigation measures may include:

    a) acoustic barriers or enclosures to screen works required for the tunnel boring machine (TBM) retrieval, and transition structures;
    b) acoustic barriers or enclosures to screen the loading and transport of spoil material from the worksite; and

c) implement all other practical and reasonable mitigation measures to reduce noise impacts from the Project Works.

5. Where monitoring detects exceedances of the goals for human health and wellbeing or human comfort, develop and implement mitigation measures in consultation with the Directly Affected Persons as soon as practicable after monitoring.

4.2.14 Exhibition Station

1. Prior to the commencement of works, including demolition and site preparation works, undertake predictive modelling to identify the potential for exceedances of the goals for health and wellbeing. Where exceedances are predicted, install acoustic barriers around the worksite prior to the commencement of works.

2. Undertake early and on-going consultation with residents and owners and occupants of businesses north of O'Connell Terrace (e.g. Tufton Street) and the RNA to identify and avoid or minimise potential noise and vibration impacts.

3. Prior to commencement of Project Works, pre-condition surveys must be undertaken for heritage buildings within the RNA showgrounds and the Old Museum. Ongoing monitoring must be undertaken during construction at sensitive receivers at the RNA showgrounds and the Old Museum including at heritage buildings and structures.

4.2.15 Breakfast Creek and Mayne Yard

1. To manage the potential impacts of the proposed demolition of the existing truss bridge and consutrction of the new Breakfast Creek Bridge, in addition to the general noise and vibration mitigation measures, solutions for backhoe dredging must be investigated to minimise noise and vibration impacts. For instance, selection of quieter items of plant and using residential grade silencers may result in a noise reduction of approximately 5 dB(A) for backhoe dredging.
2. Appropriate mitigation measures must be installed in Mayne East and Mayne North to ensure that the Project's noise and vibration goals are achieved in accordance with Imposed Condition 11.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline NVMP are nominated below:

- During the construction phase, implement and maintain a comprehensive programme of noise and vibration monitoring for each worksite, based on proximity to residences or other sensitive receivers. Monitoring must be conducted in locations where predictive modelling indicates exceedances of either the noise or vibration goals are likely to occur, or where verified noise and/or vibration complaints have occurred.
- Undertake daily inspections of the Project Works to confirm implementation of mitigation measures included in the mitigation register.
- Undertake daily inspections at each worksite to check acoustic enclosures and barriers for damage that could limit effectiveness, and to identify any sources of unnecessary or excessive noise for which there are no registered mitigation measures.
- Undertake site-specific monitoring in response to complaints about construction noise or vibration.
- Prior to the commencement of works, and with the owners' consent, undertake pre- condition surveys for buildings on heritage registers and other structures predicted to be at risk of cosmetic or other building damage.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to noise and vibration are outlined below:

- The results of noise and vibration monitoring must be reported in the monthly environment report, along with details of any incidents or complaints relating to noise and vibration management.
- Where monitoring detects exceedances of the noise or vibration goals or failure to implement mitigation measures, the Environmental Monitor must be notified as soon as practicable.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix R

Non-Indigenous Cultural Heritage Management Plan

November 2020

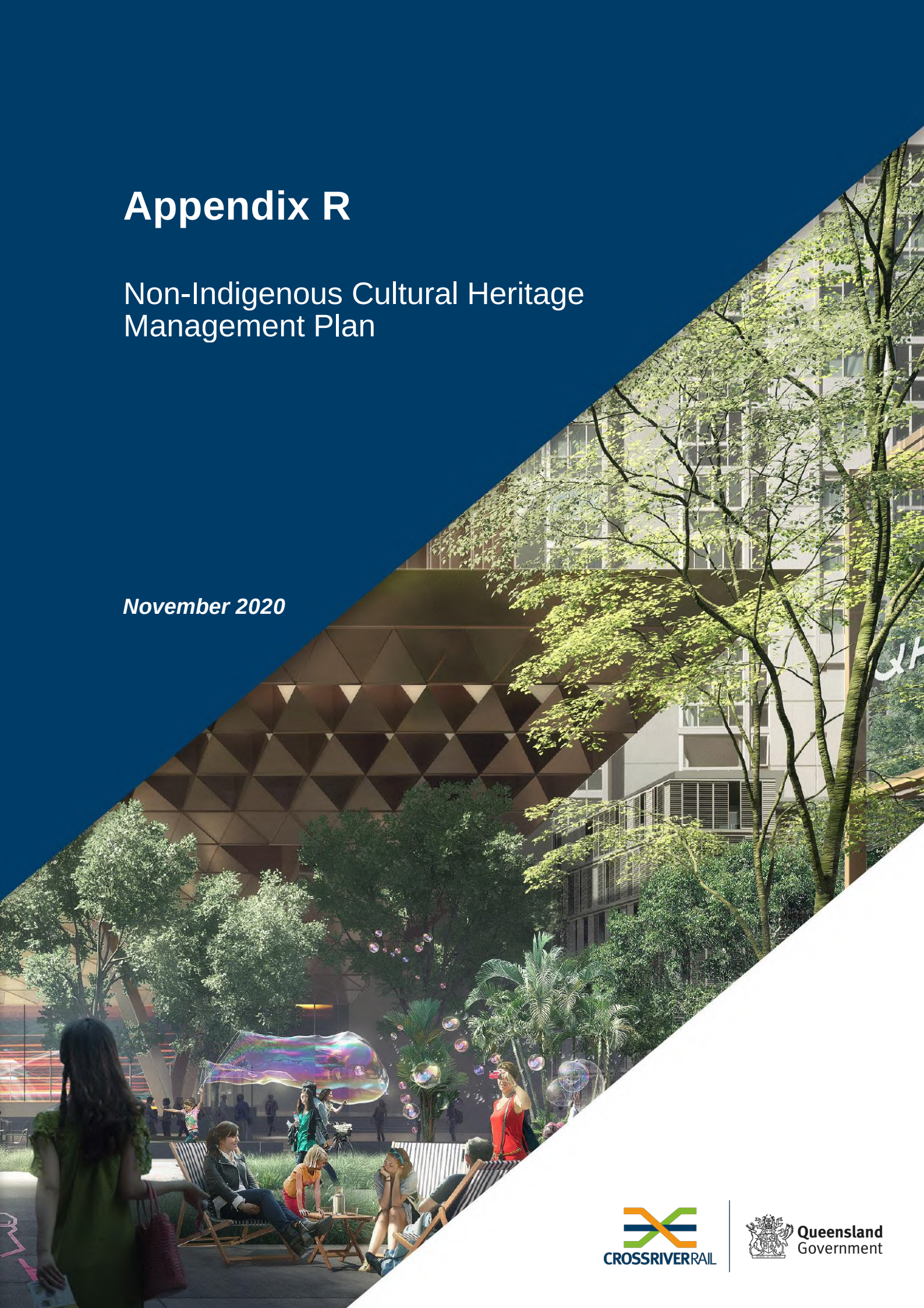

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline NICHMP. Additional definitions for the Outline NICHMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
NICHMP	Non-Indigenous Cultural Heritage Management Plan
RNA	Royal National Agricultural and Industrial Association of Queensland

2. Introduction

This Outline Non-Indigenous Cultural Heritage Management Plan (Outline NICHMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objective of this Outline NICHMP is to ensure that construction activities are managed to maintain non-indigenous heritage values of sites, places and values within and adjacent to construction worksites.

The Outline NICHMP has been developed to achieve the environmental and heritage outcomes for places of National, State and local heritage significance. Management measures and monitoring requirements are to be implemented to achieve the environmental outcomes and performance criteria nominated in this plan. This plan seeks delivery of heritage performance through the following objectives:

- Apply opportunities to preserve, restore and enhance heritage values at the stations and surrounding development interfaces with the Project;
- The Project design, construction and operation minimises the impact on historical significant buildings and artefacts and where reasonable and practicable, avoids or minimises the direct impact on heritage values of such places;
- Minimise the impact of noise and vibration and other activities during the construction phase which could cause damage to heritage values within and surrounding the Project;
- To verify predicted impacts to heritage values by ongoing monitoring during construction and operation to identify deflections from the predictions to enable early modification of construction methods to avoid unintended impacts; and
- Project delivered with minimal need to undertake ratification and repair works from Project caused heritage impacts and opportunities to restore and enhance existing heritage sites are embraced.

The Contractor will further develop this Outline NICHMP to identify all places for which a heritage management plan is required, prior to the commencement of relevant Project Works.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental and heritage outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline NICHMP.

3.1 Environmental Outcomes

The following environmental outcomes in relation to non-indigenous heritage are to be achieved for the Project:

- Construction activities are managed to maintain cultural heritage values of identified places of historical value, within and adjacent to the construction worksites and along both the surface rail and tunnel alignments.
- Construction activities are managed to maintain scientific values of any archaeological places uncovered during Project works.
- New infrastructure is sympathetic in design to the aesthetic significance of cultural heritage places in the vicinity.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Construction activities do not adversely impact on places of historical heritage value directly, or indirectly though excessive dust deposition, excessive vibration, or excessive settlement.
- A Heritage Management Plan is prepared and endorsed for all places of state or local historical heritage significance likely to be impacted by works prior to these works commencing. An overarching management plan is prepared in respect of places of local heritage value.
- Any archaeological places newly discovered and uncovered are appropriately managed.
- All personnel involved in, or supervising construction works have completed either the TMR Cultural Heritage Induction or another cultural heritage induction course.

4. Impacts and Mitigation Measures

4.1 Impacts

The delivery of CRR may have direct impacts on State listed heritage sites and local Heritage Places, including a number of structures, buildings and trees listed as being of heritage significance. There is a potential risk of direct impact through unintentional disturbance of potentially significant archaeological artefacts and features by all earthworks.

Delivery of the Project may also have indirect impacts to heritage values, caused through the generation of vibration and ground settlement which create building and or structural damage, or through dust, noise or visual impacts created from the surrounding land use.

Settlement in tunnelling projects may arise due to the following: excavation induced settlement, groundwater drawdown induced settlement and local ground relaxation effects around structures at tunnel declines. Excavation-induced ground movements could occur during the construction phase, but drawdown induced settlement could commence in the construction phase and continue into the operational phase for a number of years.

Construction may impact on the visual setting of known heritage places due to the introduction of unsympathetic built form in their proximity on completion. In particular, the areas around Roma Street

Station and Boggo Road Gaol will have visual impacts during construction and permanent visual impacts related to the location of the station entrances. The Breakfast Creek rail bridge (Warren Truss Bridge) will be demolished and replaced with a bridge to the west. Heritage values in Victoria Park will also be impacted due to construction access, including the former New Zealand Loan and Mercantile Agency Company Woolstore and QR heritage shed.

Additional construction impacts will occur along the QR corridor between Fairfield to Salisbury rail stations. This will result from track works within the rail corridor as well as replacing and upgrading structures at each of the rail stations. Any impacts on potential non-indigenous heritage items must be dealt with in accordance with the below mitigation measures and any approved Archaeology Management Plan or Heritage Management Plan.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental and heritage outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Any vibration-intensive works occurring within a nominated distance (zone of influence) of a heritage building (including RNA and the Old Museum) shall be accompanied by pre-construction condition surveys and be monitored during construction. The nominated zone of influence will be dependent on location and types of work to be undertaken.
- Avoid damage to mature trees in Victoria Park by temporarily realigning the bicycle path.
- Develop specific heritage mitigation measures in consultation with QR in relation to the Breakfast Creek bridge and each of the stations from Fairfield to Salisbury, including undertaking a detailed heritage assessment and archival recording of the bridge and building structures prior to demolition.
- Where predictive modelling indicates ground-borne vibration or settlement would present a risk, conduct building condition surveys of each building of Commonwealth or State heritage significance prior to and upon completion of the works. Building condition surveys would be undertaken to identify and document pre- and post-construction conditions. Necessary building condition surveys are to be undertaken by a person suitably qualified in condition assessments of heritage buildings.
- Consistent with any conditions imposed, prepare a Heritage Management Plan for places of historical cultural heritage value likely to be impacted by construction works to guide and manage construction and to ensure the identified values of such places are maintained.
- Heritage Management Plans are to be completed prior to construction activities commencing.
- Preparation of the Heritage Management Plans is to be informed by the condition survey report and by predictive modelling of criteria relevant to each place (e.g. vibration, settlement) and is to include mitigation measures to achieve the environmental outcomes in relation to heritage values for each place.
- Preparation of an archaeological management plan for mitigation, conservation and protection of archaeological sites prior to and during construction.
- Cultural heritage awareness training to be included in employee induction processes, to ensure workers are aware of heritage places in the vicinity of proposed works and proposed management procedures.
- Where harm to historical heritage values cannot be reasonably or practically avoided, undertake archival recording of cultural heritage values with the advice of an appropriately qualified heritage consultant.
- Where harm to historical heritage values cannot be reasonably avoided, adaptive re-use options must be explored where this is practical.
- Archaeological test pitting is to be conducted in places of high to outstanding archaeological potential prior to construction activities involving surface ground disturbance commencing, including parts of Albert Street and Charlotte Street. The results of these test pits will inform management responses. A specific works procedure is to be implemented for unexpected archaeological finds.

- The Contractor shall undertake a detailed heritage assessment and archival recording prior to demolition of the New Zealand Loan and Mercantile Agency Company Woolstore and QR heritage shed.
- Archival recording should be carried out in accordance the DES' guideline on Archival Recording of Heritage Places.
- To protect places of historical heritage value from excessive dust deposition, vibration and settlement, construction works are to be undertaken in accordance with the Air Quality Management Plan, Noise and Vibration Management Plan, and Land Management Plan.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline NICHMP are nominated below:

- Monitoring is to be conducted for historical heritage places identified in a Heritage Management Plan as being at risk of damage during construction, in accordance with the approved management plan.
- Based on the results of test pitting, archaeological monitoring may be employed where necessary during ground disturbance works in places of high to outstanding archaeological potential (alternatively, the test pits may indicate that open area archaeological excavation is the appropriate management response).
- Routine daily site inspections are to include assessment of effectiveness of any exclusion fencing or signage protecting cultural heritage values.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to non-indigenous cultural heritage are outlined below:

- Archaeological finds are to be immediately reported to the relevant worksite supervisor, who is to inform the Project's cultural heritage coordinator. Finds of potential state significance are to be reported to DES by the Project's cultural heritage coordinator.
- Reporting of any cultural heritage finds and inspections of cultural heritage protection measures are to be included in the monthly construction compliance report, along with any complaints or incidents relating to cultural heritage issues.
- On completion of construction works, a report on historical heritage places is to be prepared in accordance with the approved Heritage Management Plan.
- On completion of construction works, a report is to be prepared on any archaeological places or objects exposed or recovered.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix S

Social Amenity Management Plan

November 2020

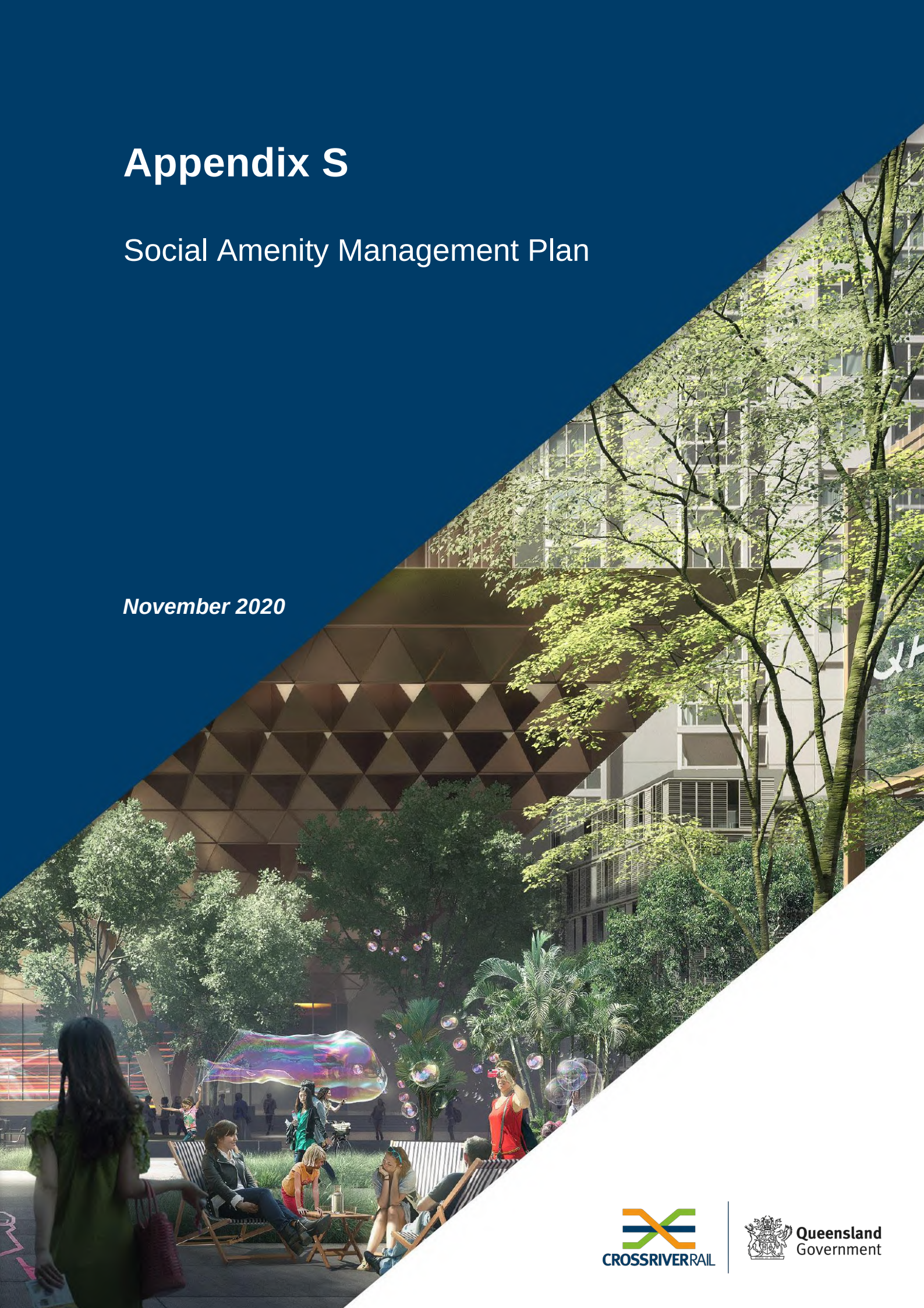

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline SAMP. Additional definitions for the Outline SAMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CPTED	Crime Prevention through Environmental Design
CSIRO	Commonwealth Scientific and Industrial Research Organisation
RNA	Royal National Agricultural and Industrial Association of Queensland

2. Introduction

This Outline Social Amenity Management Plan (Outline SAMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline SAMP is to describe construction impacts on the local community in terms of social amenity and the mitigation and management measures that will be put in place to minimise these impacts. This Outline SAMP will also:

- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to social amenity within and adjacent to the Project; and
- monitor the effects of management and mitigation measures proposed herein.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline SAMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR - latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved.

- Condition 20. Landscape and open space

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcome in relation to social amenity is to be achieved for the Project:

- Avoid, or minimise and mitigate impacts from construction activities on local businesses and the social environment.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Impacts on local amenity and community life are avoided or minimised and managed;
- Impacts on the use and functioning of social infrastructure and local businesses near the Project are avoided or minimised, mitigated or managed;
- Safe access is maintained near to construction worksites and Project Works, including to social infrastructure and businesses;
- Interactions between the construction workforce and local communities are positive and reflect the implementation of a workforce code of behaviour; and
- Communities and local businesses likely to be directly affected by Project Works are aware of the works in advance of their commencement and are aware of the procedures for making complaints about Project Works.

4. Impacts and Mitigation Measures

4.1 Impacts

Construction of the Project has the potential to impact the social amenity (including social amenity for residents and local businesses) within and around the Project. During the Project's construction period, the following sources have the potential to impact the social amenity within and around the Project footprint:

- Worksite establishment and demolition activities;
- Tunnelling and associated excavation works (cut and cover operations);
- Shaft excavation;
- Spoil removal and replacement;
- Above ground road and bridge works;
- Lowering of the Inner Northern Busway;
- Construction of railway stations and other buildings;
- Acquisition of properties for the Project;
- Lighting towers used to illuminate night works; and
- Construction workers interacting with the general public.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- Maintain safe and efficient pedestrian and vehicle access, including delivery vehicle access, to businesses near to the construction worksites and other construction works, including providing alterative access, where required.

- Undertake predictive modelling to understand fully the effects of the lowering of the Inner Northern Busway on Roma Street and surrounding networks, both at a Project level and at a cumulative level when considered with regard to other inner-city projects taking place.
- Undertake early and on-going notification in accordance with the Community and Stakeholder Engagement Plan (CSEP) with residents near to construction worksites or other construction works;
- Consultation will be undertaken with Directly Affected Persons and key stakeholders for the duration of construction, to minimise and manage Project impacts.
- Undertake early and on-going notification in accordance with the CSEP with business owners near to construction worksites or other construction works. In particular, this is to include, but not be limited to businesses near:
  - Kent Street (Southern portal);
  - Boggo Road, Peter Doherty Street, and Joe Baker Street, (Boggo Road Station);
  - Stanley Street, Vulture Street and Main Street, (Woolloongabba Station);
  - Margaret, Mary, Charlotte, Elizabeth and Albert Street, (Albert Street Station);
  - Roma Street and Brisbane Transit Centre, (Roma Street Station);
  - Gregory Terrace (Northern portal);
  - O'Connell Terrace, Exhibition Station (Exhibition Station); and
  - Abbotsford Road, Mayne Yard.
- Undertake on-going consultation with the RNA to ensure suitable access is maintained to the RNA Showgrounds for livestock and delivery vehicles during the Ekka and other major scheduled events at the RNA Showgrounds. General road access is also to be maintained to the RNA Showgrounds during the course of the Project works.
- Develop and implement a Charter for Local Content for the Project in accordance with the Queensland Government Local Industry Policy.
- Develop and distribute information packages to affected businesses providing information on available assistance services.
- Undertake early and on-going consultation with managers of community facilities above the tunnel alignment or near to construction worksites or other construction works. In particular, this is to include, but not be limited to:
  - Princess Alexandra Hospital and the Translational Research Institute;
  - Dutton Park State School at Dutton Park;
  - CSIRO and ESA Village – Leukaemia Foundation at Boggo Road Urban Village;
  - The Gabba Stadium at Woolloongabba;
  - Centenary Pool, Brisbane Grammar School, and Brisbane Girls Grammar School at Spring Hill;
  - Royal Brisbane and Women's Hospital; and
  - RNA Showgrounds, Bowen Hills.
- Undertake consultation with managers of the Gabba Stadium to ensure planning of major construction works or haulage activities considers the timing of and effects on major events.
- Maintain safe access for pedestrians and cyclists near to construction worksites and other construction works, which complies with the *Disability Discrimination Act 1992* and considers Crime Prevention through Environmental Design (CPTED) principles.
- Reinstate open space areas disturbed by construction activities (i.e. Victoria Park – temporary diverted bicycle path) progressively and as soon as practicable following construction.
- Involve the Traditional Owners, local communities and other relevant stakeholders, in rehabilitation of open space areas affected by construction activities. This may include:
  - Consideration of opportunities for Aboriginal people to be involved in the construction and development of the Project, including opportunities for traineeships and employment on the Project;
  - Consideration of the planting of native vegetation, including food plants, as part of the revegetation strategy for the Project; and
  - Maintenance of gardens and lawns around the stations to sustain native vegetation.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline SAMP are nominated below:

- Monitor consultation with and feedback from local business owners.
- Monitor community complaints system for number and types of complaints.
- Monitor employment records for employment diversity.
- Monitor procurement spend reports for Project spending on goods and services with local and regional providers.
- Monitor environmental monitoring reports for results on dust, noise and air quality changes to evaluate potential impacts on amenity.
- Project safety reporting to monitor safety incidents and near misses that may impact on workforce health and wellbeing as well as the general community.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to social amenity are outlined below:

- Complaints received from local businesses during construction are to be reported in the monthly construction compliance report along with details of the response provided.

- Complaints and feedback received from the community via the community complaints system or the community contact points during construction are to be reported in a monthly community feedback report, along with details of the response provided.
- Include records of consultation activities and outcomes in monthly reporting.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix T

Spoil Placement Management Plan

November 2020

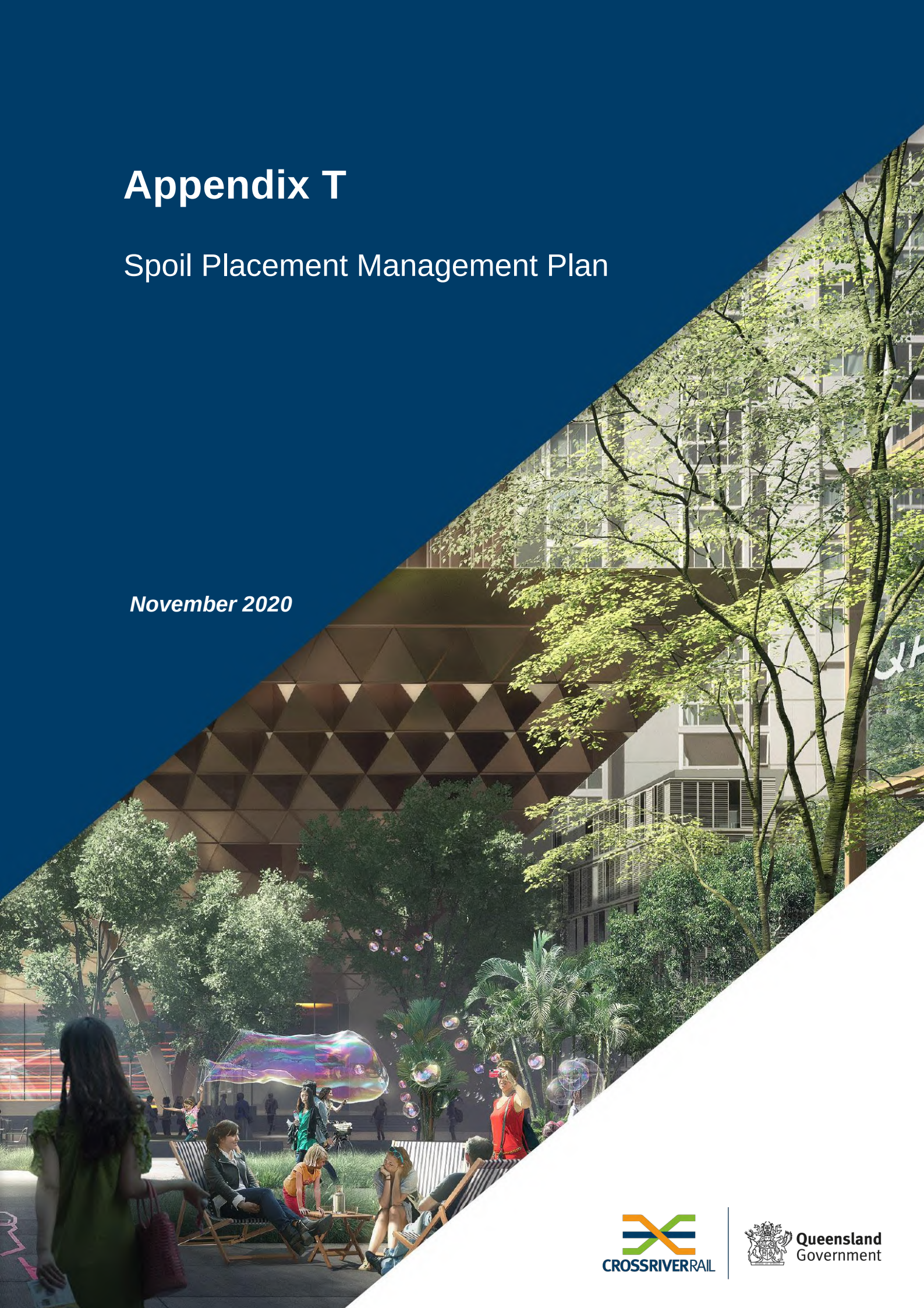

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline SPMP. Additional definitions for the Outline SPMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
SPMP	Spoil Placement Management Plan

2. Introduction

This Outline Spoil Placement Management Plan (Outline SPMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline SPMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on land and land health are minimised;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage potential adverse impacts to the environment as a result of spoil placement;
- ensure controls and procedures are implemented to manage spoil generated from the Project;
- nominate the Project's monitoring and reporting requirements in relation to this plan; and
- monitor the effects of management and mitigation measures.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Condition and environmental outcomes must be achieved throughout construction of the Project.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 14. Traffic and Transport

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

Spoil placement must address the following requirements:

1. Spoil placement sites:

    a) Spoil must be disposed of to a designated spoil placement site.
    b) Designated spoil placement sites must be appropriately licenced to accept spoil from Project Works.

2. Spoil haulage routes:

    a) All spoil must be transported from the originating worksite to the designated spoil placement site via a designated spoil haulage route.
    b) Designated spoil haulage routes must be inspected regularly while spoil is transported for spilled spoil.

3. Spoil placement site access:

    a) Access to a designated spoil placement site must be via a constructed and sealed road.
    b) The exit point must be fitted with a device suitable for the removal of loose soil from spoil trucks and their wheels, to avoid spillage on the access road and haulage route.

Construction spoil includes any soil or rock removed from a Project worksite or work area as a consequence of undertaking Project Works. Construction spoil does not include any material, such as liquid or solid waste material, contaminated soil or water, or hazardous or toxic material, that is subject to approvals or permitting requirements for its handling or removal.

Consider the appropriate spoil haulage and materials equipment delivery hours at worksites in the vicinity of schools, taking into consideration student drop-off and pick-up hours between 7-9am and 2-4pm on school days.

4. Compliance Management

4.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

4.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

4.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

4.4 Inspections, Monitoring, Auditing and Reporting

4.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

4.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP. Monitoring will also be undertaken at various sensitive receptors including each spoil disposal site to measure the effectiveness of environmental controls and implementation of this Outline SPMP.

4.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

4.4.4 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

4.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

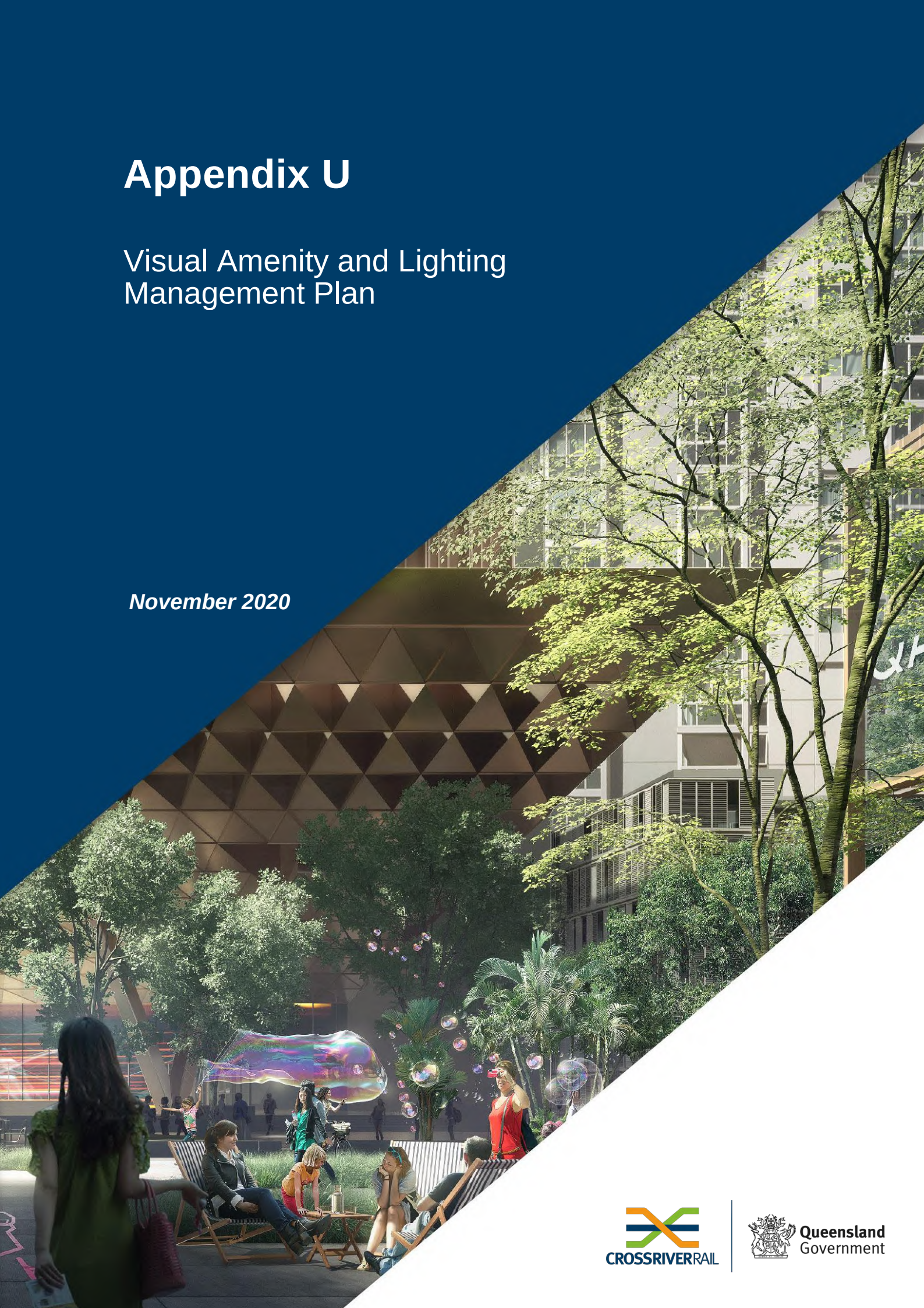
4.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix U

Visual Amenity and Lighting Management Plan

November 2020



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Queensland Government

Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline VLMP. Additional definitions for the Outline VLMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
VLMP	Visual Amenity and Lighting Management Plan

2. Introduction

This Outline Visual Amenity and Lighting Management Plan (Outline VLMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline VLMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- nominate the Project's monitoring and reporting requirements in relation to visual amenity and lighting;
- ensure controls and procedures are implemented during construction activities to avoid, minimise or manage adverse impacts to visual amenity and lighting from the Project; and
- monitor the effects of management and mitigation measures.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline VLMP.

3.1 Environmental Outcomes

The following environmental outcomes in relation to visual amenity and lighting are to be achieved for the Project:

- Construction activities minimise and mitigate impacts on the visual and landscape environment; and
- Construction activities avoid light nuisance for sensitive receivers and maintain safe driving conditions for motorists near to Project Works.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project.

- Revegetation to be designed and constructed with consideration of TMR specification MRTS16 Landscape and Revegetation;
- Impacts of Project Works, including worksite and spoil handling facilities, on existing visual amenity are minimised through the design and siting of screens and barriers, plant and equipment, buildings and other structures, and lighting and telecommunications infrastructure;
- Construction worksites are rehabilitated progressively, and as soon as practicable, following Project Works;
- Construction lighting is designed, constructed and operated to comply with the relevant standard such as AS4282-2019: Control of the obtrusive effects of outdoor lighting;
- Avoid nuisance from construction lighting on sensitive receivers and onto nearby roads, pedestrians and cycle paths, and parklands; and
- Surface Project Works do not extend beyond designated worksite boundaries.

4. Impacts and Mitigation Measures

4.1 Impacts

Excessive and offensive lighting, changes to the existing visual landscape, as well as unmanaged impacts on local businesses due to construction of the Project have the potential to impact the visual amenity within and around the Project.

The following sources have the potential to impact the visual amenity and lighting within and around the Project footprint:

- Worksite establishment and demolition activities;
- Tunnelling and associated excavation works (cut and cover operations);
- Shaft excavation;
- Spoil removal and replacement;
- Above ground road and bridge works;
- Above ground rail and rail network construction works;
- Construction of railway stations; associated infrastructure and other buildings;
- Construction of pedestrian connections;
- Lighting towers used to illuminate night works; and
- Tree and vegetation removal to accommodate Project works.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

- A visual impact mitigation plan shall be prepared prior to construction to mitigate potential visual impacts of noise barriers and hoardings, where appropriate.
- Ensure that the design and siting of construction worksites considers topography, vegetation, scale, character of construction and construction materials, proximity to surrounding sensitive land uses and the duration of its use.
- Ensure that worksites are operated to minimise the loss of public open space.
- Where possible, adopt pruning and selective trimming of mature trees in preference to their removal.
- Where possible, fence and protect trees of particular significance that fall within construction worksites and laydown areas.
- A suitably qualified arborist should be consulted regarding the management of mature vegetation to be retained.

- 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.
- Where possible, design noise barriers to:
  - incorporate high quality materials, urban design treatments and landscape elements such as low, massed plantings;
  - use, where appropriate, clear or transparent materials to maintain existing expansive views beyond the rail corridor; and
  - avoid the use of highly reflective materials and materials that support graffiti.
- Project lighting to be designed in accordance with the relevant standard such as AS 4282-2019: 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 minimise light spill to surrounding properties, maintain safe driving conditions for motorists on adjacent roads and minimise impacts on local fauna.
- Restore, rehabilitate, and where appropriate enhance open space and public areas disturbed or damaged by construction as soon as practicable following construction.
- Rehabilitation works provide for:
  - where practicable, replacement of cleared mature trees with plantings of advanced individuals;
  - regrading of the surface to facilitate surface runoff without erosion, and to create a landform suitable for use consistent with City Plan designations;
  - reinstatement of paths, including the bicycle path in Victoria Park, street or park furniture, signage equipment and lighting;
  - reinstatement of grassed areas and paved surfaces where practicable; and
  - introduction of interpretive signage relating to cultural heritage, historic heritage and way finding measures.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline VLMP are nominated below:

- During worksite establishment and subsequent operation, maintain daily site inspections of protective measures for designated significant trees and vegetation, and of temporary visual barriers and hoardings for damage or graffiti.
- Weekly inspections of lighting during night works are to be conducted to ensure that construction lighting has been installed and operated in accordance with the relevant standard such as AS4282-1997.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to traffic and transport are outlined below:

- Reporting of visual amenity and lighting monitoring, and any complaints relating to visual amenity or lighting are to be included in the monthly construction compliance report, along with details of any incidents or complaints relating to visual amenity or lighting.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix V

Waste Management Plan

November 2020

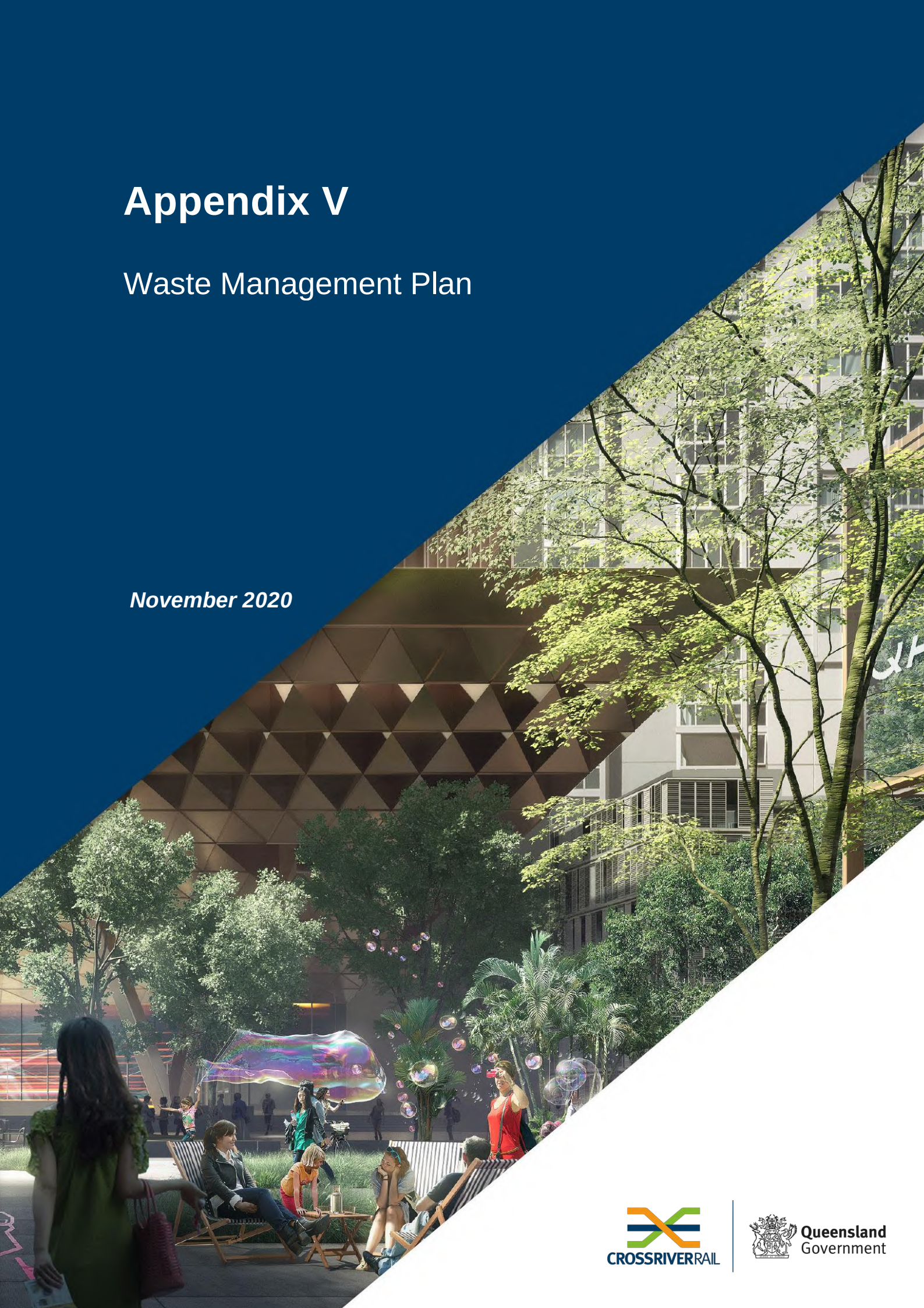

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline WMP. Additional definitions for the Outline WMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
CCSMP	Climate Change and Sustainability Management Plan
Dangerous Goods	Dangerous Goods is the name given to the group of chemicals and articles classified as dangerous for transport by road, rail, air or sea. The Dangerous Goods classification systems focus on goods with predominately acute hazards to safety, the environment or the road and rail transport vehicle
SDS	Safety Data Sheets
QUU	Queensland Urban Utilities
WMP	Waste Management Plan

2. Introduction

This Outline Waste Management Plan (Outline WMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline WMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. It will also:

- ensure that the Project's impacts on waste management are minimised;
- nominate the Project's monitoring and reporting requirements in relation to waste; and
- monitor the effects of management and mitigation measures.

It is intended that a waste programme be developed and implemented at each worksite to support the management of waste impacts as a result of construction of the Project.

Design and construction of the Project should adopt a waste management hierarchy of:

1. Avoid and reduce;
2. Re-use;
3. Recycle;
4. Recover energy; and
5. Treat and dispose of waste.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any

changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline WMP.

3.1 Environmental Outcomes

The following environmental outcomes in relation to waste are to be achieved for the Project:

- Construction activities, including demolition, are designed planned and implemented to minimise the generation of waste materials.
- Storage, handling, transportation and disposal of waste materials generated during construction are carried out to avoid environmental harm and adverse impacts on communities.
- Reuse and recycling of construction waste materials generated by Project construction activities is optimised.

3.2 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

- Construction activities are conducted in accordance with an approved Project Waste Management Plan (WMP) which will be developed by the Contractor. This WMP will include:
  - waste management principles (avoid, reduce, reuse and recycle) and sustainable disposal strategies are implemented;
  - targets to recover and re-use construction waste, including demolition waste for all classes or categories of waste; and
  - all reasonable and practicable steps are taken to minimise the impacts of handling and disposal of construction waste at the worksites, and at the disposal sites.
- Hazardous waste is handled and disposed of in accordance with specific management plans as nominated/required by Workplace Health and Safety Queensland.
- Waste generated by the Project is managed in accordance with the requirements and recovery targets set out in the Queensland Government *Waste Management and Resource Recovery Strategy (2019)*.

4. Impacts and Management Measures

4.1 Impacts

Key activities that will generate or contribute to waste material throughout construction of the Project include:

- Spoil material from tunnel and dive excavation
- Demolition and construction waste associated with the construction of tunnels and stations
- General solid waste generated by site staff, visitors and other personnel
- Liquid waste from the treatment of groundwater and wash-down activities

Potential waste related impacts could include the following:

- Soil contamination
- Water contamination
- Harm to flora, fauna and the surrounding environment

- Harm to human health
- Dust resulting from the inappropriate storage, handing and disposal or excavated material
- Soil and water including surface water and groundwater, contamination from inappropriate storage, handling and disposal of solid and liquid waste and materials separated for recycling, reuse or recovery
- An increase in the incidence of vermin, insects and pests resulting from the inappropriate storage and handling of putrescible waste
- An impact on social amenity during construction as a result of poor housekeeping in construction areas
- The inefficient use of resources

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures can be applied to achieve the environmental outcomes and performance criteria.

4.2.1 General requirements

- Prior to construction commencing, a WMP is to be prepared by the Contractor in accordance with the waste management hierarchy (avoidance, reduction, reuse, recycling, energy recovery and disposal), and must include the following:
  - waste management procedures for all phases of construction and waste material types, including demolition, and the handling and disposal of asbestos materials.
  - targets to recover and re-use construction waste, including demolition waste for all classes or categories of waste.
  - reasonable and practicable steps required to minimise the impacts of handling and disposal of construction waste at the worksites, and at waste disposal sites.
  - incident management procedures for responding to incidents that have the potential to cause environmental harm, including:
    - corrective or remedial actions as required to render the area safe and avoid or minimise environmental harm.
    - procedures for immediately reporting to relevant authorities and parties any incident where harmful waste material is released to the environment.
    - pre-qualification requirements for contractors providing services in waste and recyclables receiving facilities.
  - relevant training and awareness strategies for Project personnel on waste management procedures and principles, including recycling opportunities;
  - arrangements for decommissioning construction worksites post-construction; and
  - Management measures proposed to avoid and reduce, re-use and recycle material identified as part of this Outline WMP will be consistent with measures to be included in the Outline Climate Change and Sustainability Management Plan (Outline CCSMP) to avoid and reduce, re-use and recycle material.

4.2.2 Avoid and reduce

- Identify and implement measures for avoiding waste generation and, if avoidance is not reasonable or practicable, reducing on-site waste generation.
- Implement systems to identify, quantify and monitor waste generation.
- Implementation of Project office sustainability measures through the selection of energy and resource efficient goods and equipment (e.g. low wattage fluorescent lighting, inverter air conditioning, insulation panelling to reduce energy consumption, waterless urinals, foot pedal or automatic shutoff hand waste basins and rainwater harvesting to reduce water consumption).
- Where reasonable and practicable, order goods in bulk to minimise packaging waste, and where practicable, return packaging materials to the supplier.

- Develop and implement arrangements with suppliers to return unused construction materials to the supplier.
- Encourage Project workers to avoid or reduce waste through inductions and toolbox talks.

4.2.3 Reuse

- Train staff to identify opportunities for reuse, where practicable.
- Identify and implement strategies for the reuse of waste products generated during construction.
- Where reasonable and practicable, chip and mulch vegetation cleared for the Project and re-use mulched material for landscaping purposes.
- Provide salvaging contractors with the opportunity to salvage (remove) building materials prior to demolition so that items can retain their value and be reused.
- Identify opportunities in the open market for reuse of materials that are not able to be reused on the Project.
- Where reasonable and practicable, provide for the re-use of:
  - excavated material as fill at approved fill sites;
  - concrete formwork throughout the Project;
  - reinforced steel structures in the Project; and
  - structures, including culverts, cabling, poles and similar infrastructure.

4.2.4 Recycle

- Develop and implement Project specific recycling strategies.
- Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative.
- Where reasonable and practicable, transfer kerb and pavement materials (concrete, asphalt) to crushing and recycling plants.
- Provide separate recycling bins, skips and storage areas for recyclable materials at all construction worksites for construction-specific waste materials and general refuse.
- Investigate the availability of treated wastewater, stormwater runoff or groundwater inflow for site activities, such as dust mitigation, wash-down uses or watering landscape works.
- Where reasonable and practicable, segregate metals for recycling.
- Collect empty oil and fuel drums and other containers for return to licensed recycling facilities. This is to be done by a licensed contractor.
- Ensure that sufficient loading / unloading space at construction worksites to allow waste materials to be sorted for recycling and reuse.

4.2.5 Recover

- Strategies for the recovery of waste during construction must consider:
  - recovery of fixtures, such as lights and other electrical fittings, doors, wash basins, toilets, windows and sheds, through sales and / or charity organisations.
  - recovery of rail infrastructure for later use such as ballast, rail tracks, concrete sleepers, gantries, signals and fencing.
  - demolition of buildings in a manner that enables recovery of materials.
  - engaging a salvage specialist to identify opportunities for resource recovery.
- If recovered items and materials are to be sold this should occur in line with due processes for disposing of such items and materials in a commercial market.

4.2.6 Treatment

- The treatment of solid waste must not be undertaken on site during construction. All commercial forms of treatment must be undertaken at approved, offsite facilities.
- Groundwater must be treated through purpose built management systems with subsequent water used during construction. Excess water will be captured by a drainage system at each of the

stations and portals, and either transferred to a local treatment plant, treated and discharged to an approved point or discharged straight to sewer dependent upon Queensland Urban Utilities (QUU) approval.

4.2.7 Waste transport

- Ensure the movement of hazardous materials and regulated wastes occur in accordance with the relevant permits and approvals to minimise associated risks.
- Transportation of hazardous wastes, regulated wastes and contaminated soils must be undertaken by a suitably licensed waste contractor.
- Ensure that waste transport contractors have the necessary qualifications and permits prior to undertaking waste transportation activities for the Project.
- Conduct waste tracking in accordance with legislative requirements.

4.2.8 Disposal

- Waste unable to be reused, recycled or recovered must be disposed of in appropriately licensed commercial landfill sites and sewage treatment systems.

4.2.9 Hazardous materials or dangerous goods

- Prepare and implement a Hazardous Goods Management Plan, as a sub-plan to the CEMP, in consultation with Workplace Health and Safety Queensland.
- Undertake the storage and transport of any hazardous materials or dangerous goods in accordance with relevant Australian standards, legislative requirements and guidelines.
- Hazardous materials and potential sources of hazardous wastes must be documented, and a register of hazardous and regulated waste updated and maintained as required. The register is required to be updated for each new hazardous material introduced on site.
- Safety Data Sheets (SDS) must be required to be kept at the storage location of all hazardous materials and dangerous goods.
- Provision for the storage of Dangerous Goods (including fuel and hazardous waste), according to the Dangerous Goods Codes, at each construction worksite.
- Undertake refuelling and maintenance activities within designated bunded areas to minimise the potential for soil and water contamination from these activities. Where refuelling within bunded area is not possible, additional mitigation measures to prevent contamination from spill must be implemented following activity-specific risk assessment.
- Prepare and implement, if required, spill response measures in relation to hazardous materials and dangerous goods.
- Comply with the Energy Networks Association Industry Guideline in the removal and disposal of sulphur hexafluoride (SF6) filled electrical equipment.

4.2.10 Contaminated soil

- Manage and dispose of contaminated soil to an approved disposal site in accordance with the requirements of the *Environmental Protection Act 1994.*

4.2.11 Asbestos

- All waste materials suspected of containing asbestos must be disposed of to an appropriately licensed landfill by a certified asbestos waste contractor.

4.2.12 Groundwater

- Post-treatment, groundwater must be captured by a drainage system at each of the underground stations and portals, and either transferred to a local treatment plant, treated and discharged to an approved point or discharged straight to sewer upon QUU approval.

4.2.13 On-site waste storage

- Maintain accessible and stable areas at construction worksites for the storage of waste materials.
- Ensure provision of bins at worksite common areas, fitted with lids and serviced to avoid overflowing and spills.

4.2.14 Demolition works

- Where reasonable and practicable, implement demolition procedures that facilitate recovery of materials for re-use and segregation of different types of materials for recycling.
- The Project must comply with the requirements of the Energy Networks Association Industry Guideline in the removal and disposal of sulphur hexafluoride (SF6) filled electrical equipment.
- Collect appropriate demolition materials and where possible, re-use on site, or transport to a recycling depot or facility.
- Where reasonable and practicable, provide salvaging contractors the opportunity to salvage building materials prior to demolition so that applicable items can be re-used.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Monitoring requirements specific to the Outline WMP are nominated below:

- Routine daily site inspections must include monitoring capacity of waste storage facilities and arranging collections as required, monitoring for the presence of vermin or odours in association with waste storage or handling and monitoring for the presence of litter and general worksite tidiness.
- Monitor for the presence of vermin, insects and pest levels and implement appropriate control measures, as required.
- Records of the following waste management information, as a minimum, must be kept throughout the construction phase:
  - resource use and waste generated from demolition and Project Works;
  - waste recovered and re-used;
  - waste disposed to landfill; and
  - waste transporter or contractor details (including company name, licensed operator name and license number).

Monitoring for waste management should also be undertaken in accordance with the Contaminated Land Management Plan and Water Quality Management Plan as appropriate.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to traffic and transport are outlined below:

- Reporting on results of waste management inspections must be included in the monthly environmental report, along with any complaints or incidents relating to waste storage and handling issues.
- Quarterly reporting is to be provided in relation to performance against targets established in the WMP for resource use and waste recovery.
- Within 24 hours of becoming aware of circumstances where waste material is released to the environment which may cause environmental harm, the incident must be reported to DES. Corrective or remedial action as required to render the area safe and to avoid environmental harm must be taken as soon as reasonable practicable.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.

Appendix W

Water Quality Management Plan

November 2020

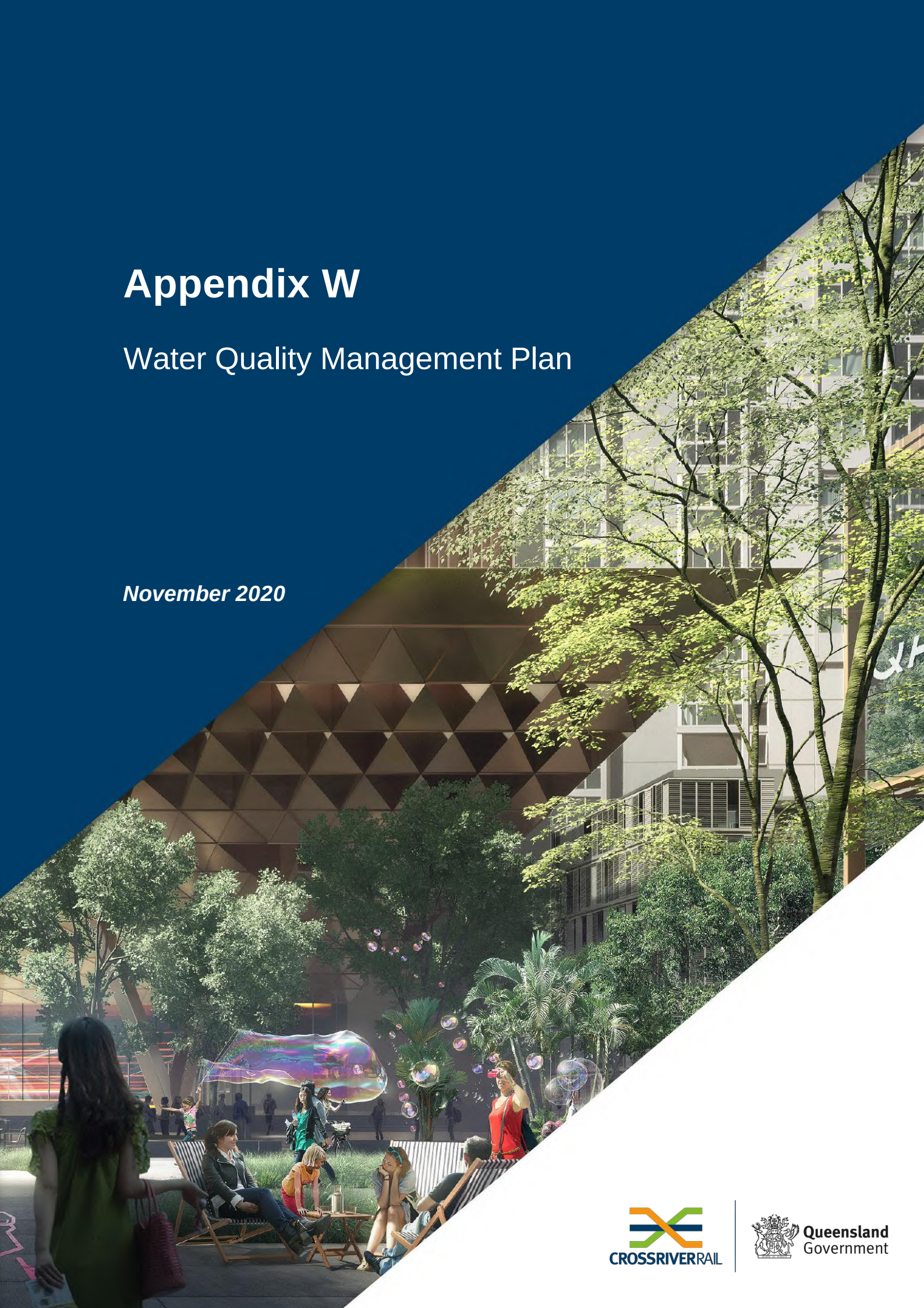

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Table of Contents

1. Definitions

The definitions in **Section 1** of the OEMP apply to this Outline WQMP. Additional definitions for the Outline WQMP are provided in **Table 1**: Definitions.

Table 1: Definitions

Acronym	Definition
AEP	Annual Exceedance Probability
ARI	Annual Recurrence Interval
ASS	Acid Sulfate Soils
EPP	Environmental Protection Policy
WSUD	Water Sensitive Urban Design

2. Introduction

This Outline Water Quality Management Plan (Outline WQMP) forms part of the Outline Environmental Management Plan (OEMP) for the Project.

2.1 Objectives

The objectives of this Outline WQMP are to achieve the environmental outcomes stated in the OEMP and the CEMP through the implementation of site-specific mitigation measures. This Outline WQMP will also:

- nominate the Project's monitoring and reporting requirements in relation to water quality;
- manage the quality of waters released from construction worksites;
- monitor the effects of water discharges from construction worksites on receiving waters; and
- monitor the effects of management and mitigation measures.

It is intended that a water quality monitoring programme be developed and implemented at each worksite so that Project-related impacts on receiving waters in the Brisbane River (mid-estuary) sub-catchments and Oxley Creek, including all tributaries of the creek, can be avoided or minimised and managed.

2.2 Legislative Framework

Design, construction, commissioning and operation of the Project must comply with the environmental legislation, guidelines and standards specified in the **Section 4** of the OEMP (as updated to reflect any changes current at commencement of each Project phase) and any additional requirements specified in the conditions of approval.

3. Required Outcomes

The following Imposed Conditions and environmental outcomes must be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this Outline WQMP.

3.1 Coordinator-General Conditions

Throughout construction, the following Imposed Condition/s, nominated in the CGCR – latest version is available on the Department of State Development, Tourism and Innovation website, must be achieved:

- Condition 15. Water quality
- Condition 16. Water resources
- Condition 17. Surface water

It is the responsibility of the Contractor to ensure that all Imposed Conditions are complied with, including those not nominated above.

3.2 Environmental Outcomes

The following environmental outcomes in relation to water quality are to be achieved for the Project:

Groundwater

- Groundwater inflow to construction worksites, including tunnels, cross-passages, underground stations is minimised.
- Groundwater quality is maintained generally at pre-disturbance levels during and after construction.

Surface water

- Discharge of groundwater inflow from construction worksites does not adversely affect the environmental values of receiving water.
- Environmental values of surface water immediately downstream of construction worksites are not adversely affected by the Project, during and post-construction.
- Construction activities are managed to avoid the transportation of contaminants that might be released to waters.

Flood Management – Construction

- Construction activities do not significantly alter existing flood patterns and do not increase existing flood levels on private property.
- Construction worksites are designed to provide for safe evacuation of worksites and to avoid disruption of evacuation routes for adjacent properties in the event of flooding.

3.3 Performance Criteria

The following performance criteria must be achieved throughout construction of the Project:

Groundwater

- Contamination of groundwater by construction materials is avoided.

- Groundwater released from construction worksites to receiving water complies with the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (EPP (Water and Wetland Biodiversity)) .

Surface water

- Surface water runoff and dewatering activities from sediment basins and surface excavations associated with surface construction works is managed in accordance with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control.
- Stormwater drainage is intercepted and diverted around exposed works within worksites.
- Contaminants, chemicals, toxicants and litter from Project worksites are prevented from entering receiving surface waters, including stormwater drains, roadside gutters and waterways.
- ASS is avoided, or if intercepted, is managed in accordance with the Acid Sulfate Soil Management Plan to ensure no adverse impact on surface waters.

Flood Management – Construction

- Construction activities and worksites do not cause or contribute to afflux for a 1 in 5-year AEP flood event or greater on the floodplain of any waterways or in overland flow paths.
- Construction activities, including any temporary works and spoil placement, do not cause flood water to be re-directed over other private property.
- For underground tunnels and stations, construction worksites and spoil placement sites within the project footprint are protected from inundation by stormwater from a 2 year (6hr) ARI rainfall event and flood waters, including overland flows, from a 5 year ARI rainfall event.
- For surface and in stream works, potential impacts on construction worksites associated with inundation by tributary or creek flooding (from stormwater during a 2 year ARI rainfall event and flood waters during a 5 year ARI rainfall event) will be managed through development and implementation of a Flood Management Plan.
- For underground tunnels and stations, bulk storage facilities for hazardous substances used in construction are protected from inundation by flood waters from a 1 in 50 AEP flood event.

4. Impacts and Mitigation Measures

4.1 Impacts

The Project has the potential to impact the surrounding surface and groundwater and to harm receiving water environments if not managed appropriately. Surface waters have the potential to enter tributaries and creek systems which flow into the Brisbane River and subsequently enter Moreton Bay, which contains marine protected zones and the internationally-recognised Ramsar Wetlands. Similarly, delivery of a new bridge across Breakfast Creek may also pose risks to surface water quality in and downstream of Breakfast Creek. Risks to the Brisbane River from the Project are anticipated to be primarily from surface and sediment runoff. The following management measures have been proposed to address these potential impacts.

4.2 Mitigation Measures

The following advisory mitigation measures may be implemented to achieve the nominated environmental outcomes and performance criteria. Additional or different mitigation measures may be applied to achieve the environmental outcomes and performance criteria.

4.2.1 Groundwater

- Prior to the commencement of construction:

- Prepare and implement specific management plans for Project Works that are predicted to disturb groundwater. These include measures to address the potential for, and prevent environmental impact from, groundwater drawdown;
- Develop and implement storage and handling procedures for fuels, chemicals and other hazardous materials, to avoid the release of contaminants to groundwater, including procedures to prevent or contain spills, and to ensure that accidental spills are cleaned-up and appropriately remediated to avoid contamination of groundwater seepage; and
- Develop and implement practices and procedures for waste handing, storage and disposal, and spillages to avoid contamination of groundwater.

4.2.2 Surface water

- Prior to the commencement of construction:
  - Develop and implement storage and handling procedures for chemicals and other hazardous materials to avoid the release of contaminants to waterways, stormwater drains or roadside gutters, including procedures for managing uncontrolled releases to waters.
  - Incorporate into the final design, where possible, water sensitive urban design (WSUD) measures (e.g. swales, bio-retention systems, vegetation buffers).
  - Implement surface drainage measures for the collection, treatment, diversion and assessment of wastewater generated from construction activities via an authorised system, including the provision of temporary water treatment facilities at the southern portal, Boggo Road, Woolloongabba, Albert Street, Roma Street and northern portal sites.
- Stockpiles must be located away from and above drainage areas and flood affected areas.
- Where an uncontrolled release of contaminants occurs:
  - Corrective actions and mitigation measures, including ceasing the release where practicable, are to be implemented immediately;
  - Undertake notifications required by law; and
  - Investigate and implement such additional mitigation measures as required to address the release.
- During construction, surface water run-off will be captured by a drainage system at each worksite, and transferred to a local treatment plant or sediment basin where required for treatment and discharged to an approved point.
- Where the station upgrades from Fairfield through to Salisbury cannot achieve a 1 in 200 AEP flood immunity due to the existing track levels, detailed design must ensure that all critical rail system assets will have flood immunity above the 1 in 200 AEP and that the station and rail alignments flood immunity would not be less than the existing case.

4.2.3 Flood management – Construction

- For construction worksites potentially affected by flooding, provide adequate protection (e.g. bunding or level differences) from local flooding for a 1 in 20-year AEP flood event.
- Construction flood protection measures are designed and implemented so as not to impact on third parties for a 1 in 5-year AEP flood event or greater.
- For underground tunnels and stations, bulk storage facilities containing hazardous substances are designed and sited to protect against flooding from a 1 in 50-year AEP flood event.
- Site access to all worksites is designed and constructed for all-weather access for construction vehicles and equipment.
- Construction activities, including any temporary works and spoil placement is designed to prevent flood waters being re-directed over other private property.
- Develop and implement safety measures for the Project Works, including emergency measures to prevent flooding in tunnels during construction, and measures to prevent plant and equipment being inundated or submerged with flood waters.
- Should there be any unavoidable changes to evacuation routes on adjoining properties, alternative routes are to be established in consultation with property owners or occupants.

- For underground tunnels and stations, deployable flood protection barriers shall be implemented to protect against the 1 in 10,000 AEP flood event plus sea level rise.
- Construction works at Clapham Yard are designed and implemented to avoid inundation from stormwater due to a 2-year, 6hr ARI rainfall event in accordance with the Imposed Conditions 17 of the CGCR.
- Construction work at Moolabin Creek are undertaken and scheduled to minimise any impacts, including by implementing appropriate mitigation measures.
- Detailed hydraulic modelling will be conducted as part of the final detailed design for the bridge structures in Breakfast Creek and Moolabin Creek. Brisbane City Council (BCC) is to be consulted on hydraulic modelling which will inform construction methodology and bridge design. Hydraulic modelling is to be provided to BCC for review and comment.
- Undertake flood modelling in the detailed design phase in consultation with stakeholders including BCC and QR to confirm the required cut/fill balance levels for Clapham Yard, as well as ensuring no off-site afflux impacts.

4.2.4 Water Quality Monitoring

Water quality is monitored so that:

1. Water quality monitoring is in accordance with:

    a) EPP (Water) - Brisbane River Estuary environmental values and water quality objectives (Basin No. 143, Mid-estuary) referred to in the EPP (Water and Wetland Biodiversity);
    b) EPP (Water) - Oxley Creek environmental values and water quality objectives (Basin No. 143, Lowland freshwater) referred to in the EPP (Water and Wetland Biodiversity);
    c) Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000); and
    d) Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018).

2. The water quality monitoring programme is to be designed and implemented by a person with relevant qualifications, skills and experience;

3. The water quality monitoring programme must be submitted to the Environmental Monitor for endorsement prior to implementation and prior to the commencement of Project Works to which it relates;

4. Water quality monitoring must be undertaken at the designated outlet, or discharge point for each worksite. Where there is more than one outlet or discharge point, each point must be monitored for water quality;

5. Water quality monitoring must occur daily and after rainfall occurring in the months September – April and after rainfall in every other event. Water quality monitoring must also occur whenever there is a discharge to receiving waters or the stormwater system servicing a worksite;

6. Daily site inspections must include visual monitoring of surface water discharges to the stormwater system and the receiving environment generally;

7. Response or campaign monitoring must be implemented when the daily visual site inspection detects a possible discharge of contaminated surface water or groundwater to

the environment, or following a rainfall event of greater intensity than the design rainfall event[1]; and

8. Monitoring data must be validated as soon as practicable and be presented in a summary report for inclusion in the monthly environmental report.

5. Compliance Management

5.1 Roles and Responsibilities

The Contractor's organisational structure and overall roles and responsibilities are to be in accordance with those outlined in **Section 3.7** of the OEMP. Specific responsibilities for the implementation of the environmental controls are to be detailed in the Contractor's CEMP.

5.2 Training and Inductions

Environmental training is to be completed in accordance with **Section 5.1** of the OEMP.

Environmental inductions are to be completed in accordance with **Section 5.2** of the OEMP.

5.3 Incidents and Emergencies

Environmental incidents and emergencies are to be managed in accordance with **Section 6** of the OEMP.

5.4 Inspections, Monitoring, Auditing and Reporting

5.4.1 Environmental Inspections

Environmental inspections will be undertaken in accordance with **Section 7.1** of the OEMP.

5.4.2 Environmental Monitoring

Environmental monitoring will be undertaken in accordance with **Section 7.2** of the OEMP.

Baseline water quality monitoring has previously been undertaken external to the project to inform Brisbane River Estuary environmental values and water quality objectives (Basin no. 143, Mid-estuary) in the EPP (Water and Wetland Biodiversity). These values are to be used as the baseline criteria for monitoring in accordance with requirements set out in this plan. These criteria are also those against which the Contractor will measure the effectiveness of the Project's environmental controls and implementation of this WQMP.

Monitoring will be undertaken at various sensitive receptors to validate the impacts predicted for the Project to measure the effectiveness of environmental controls and implementation of this WQMP.

Monitoring requirements specific to the Outline WQMP are nominated below:

Groundwater

- Prior to the commencement of construction, a groundwater monitoring programme that includes predictive modelling must be established in consideration of background water level and water quality measurements, where available, and the following guidelines:

[1] The surface water drainage system must be designed to accommodate a rainfall event with a 2-year return interval (6hr duration), or such other event defined by a detailed drainage study for each worksite and endorsed by the Environmental Monitor.

  - Brisbane River Estuary environmental values and water quality objectives (Basin no. 143, Mid-estuary) in the EPP (Water and Wetland Biodiversity);
  - Oxley Creek environmental values and water quality objectives (Basin No. 143, Lowland freshwater) in the EPP (Water and Wetland Biodiversity);
  - Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000); and
  - Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018).
- The groundwater monitoring programme must include a means of determining:
  - water level drawdown as a result of the Project Works;
  - quality of groundwater being intercepted;
  - site specific parameters which would indicate a need for further groundwater management (including treatment); and
  - volume of groundwater to be released.
- Groundwater monitoring would be undertaken with the frequency determined based on predicted drawdown (minimum quarterly) during construction near each worksite, underground works and excavations and assess deviations from seasonal baseline groundwater levels and quality, and identify/formulate appropriate mitigation options.
- Daily site inspections must include visual monitoring of groundwater inflows to the tunnels, underground stations and excavations, to identify any potential for inundation of critical work areas or contaminant storage areas, or any increase of inflow rates with potential to exceed the capacity of groundwater containment and treatment measures.
- Regularly monitor and maintain machinery and equipment to minimise the potential for contaminants to interact with groundwater.

Surface water

- Prior to the commencement of construction, a surface water monitoring programme must be established in accordance with the following guidelines:
  - Brisbane River Estuary environmental values and water quality objectives (Basin no. 143, Mid-estuary) in the EPP (Water and Wetland Biodiversity);
  - Oxley Creek environmental values and water quality objectives (Basin No. 143, Lowland freshwater) in the EPP (Water and Wetland Biodiversity);
  - Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000); and
  - Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018).
- The surface water monitoring programme must be implemented prior to and during construction.
- During daily site inspections and immediately following any rainfall event causing runoff from the worksite, a visual inspection must be conducted of all waterways within and adjacent to worksites to determine the presence of litter, sediment, chemical plumes or other toxicants.
- Immediately following a rainfall event causing runoff from the worksites, a visual inspection of all erosion and sediment control measures, bunding and water treatment facilities must be conducted to assess any damage or maintenance requirements and to review effectiveness.
- Monitoring data must be reviewed annually to evaluate effectiveness of mitigation measures and to determine whether on-going monitoring is required.

Flood management – Construction

- Monitoring of the condition and performance of stormwater drainage systems must be conducted as part of routine inspections to identify any issues potentially impacting on the effectiveness of these systems in providing the required level of flood protection.
- Emergency procedures must be developed for each worksite to facilitate the safe and efficient evacuation in the event of flooding and must contain a procedure for monitoring actual and potential flood events during construction and a procedure for warning all construction site staff if flooding is considered likely.

5.4.3 Environmental Auditing

Environmental auditing will be undertaken in accordance with **Section 7.3** of the OEMP.

5.4.4 Corrective Actions

Corrective actions are to be undertaken in accordance with **Section 7.4** of the OEMP.

5.4.5 Environmental Reporting

Environmental reporting is to be undertaken in accordance with **Section 7.5** of the OEMP.

Reporting requirements specific to water quality are outlined below:

- Results of inspections, including reporting of hydrology management issues, must be included in the monthly environmental report, along with details of any incidents or complaints relating to hydrology issues.
- Results of groundwater quality and drawdown monitoring as part of the water quality monitoring programme must be reported quarterly through the next monthly environmental report.
- Report after a design rainfall event exceeding a two-year average recurrence interval.
- In the event of flooding impacting construction worksites, the monthly construction compliance report is to include reporting on damage to construction works, plant and equipment, loss of materials and contaminants and the extent of rehabilitation and recovery works and actions for the affected works.

5.5 Document Control

Documentation, record keeping and document control will occur in accordance with **Section 8** of the OEMP.

5.6 Communication

Communication must be undertaken in accordance with the CSEP and as outlined in the Project's contractual documentation.