

Compliance Matrix

Table 1 Compliance Matrix

CRRDA REFERENCE	REQUIREMENT	ADDRESSED IN SECTION
Coordinator-General's change report – whole of project refinements 2019 Appendix 1 – Part C. – Condition 4 Construction Environmental Management Plan		
(a)	Prior to the commencement of Project Work, a Construction Environmental Management Plan for those works (Relevant Project Work) must be developed by the Proponent and endorsed by the Environmental Monitor as being consistent with the Outline EMP and these imposed conditions.	This Plan
(b)	The endorsed Construction Environmental Management Plan must be submitted to the Coordinator General at least 20 business days prior to the commencement of Relevant Project Works.	This Plan
(c)	The Construction Environmental Management Plan must:	
	(i) describe the Relevant Project Work	Section 1.3
	(ii) be based on predictive studies and assessments of construction impacts which have regard to the scale, intensity, location and duration of construction works, and location of Directly Affected Persons	Section 3
	(iii) be generally consistent with the Outline EMP and incorporate its environmental outcomes and performance criteria	This Plan
	(iv) incorporate and respond to the Imposed Conditions (Construction)	Section 3
	(v) demonstrate that the Imposed Conditions (Construction) will be complied with during Relevant Project Work	Section 3
	(vi) incorporate the community engagement plan, including the complaints management process, in accordance with Condition 9	Sections 3.3.1 and 8.4
	(vii) where predictive studies indicate impacts beyond those provided for in the performance criteria, incorporate mitigation measures to achieve the environmental outcomes	Section 3
	(viii) establish specific mitigation measures and processes for consultation with Directly Affected Persons for Project Works under Conditions 9(c), 11(c), and 11(e)	Sections 3.3.1 and 8.4
	(ix) contain a program and procedures for ongoing monitoring to identify the effectiveness of mitigation measures in achieving the Imposed Conditions (Construction) and the environmental outcomes in (iii)	Section 1.3 and Appendices A-T
	(x) include a process for regular review and if required updating of the Construction Environmental Management Plan, including a process to review and implement additional or different mitigation measures in response to monitoring results	Section 8.3

CRRDA REFERENCE	REQUIREMENT	ADDRESSED IN SECTION
	(xi) incorporate the EMP sub-plans required by the Imposed Conditions or as required by the approved Outline EMP.	Section 3.3 and Appendices A-T
(d)	The Construction Environmental Management Plan must be implemented for the duration of Relevant Project Work.	This Plan
(e)	Relevant Project Work is authorised if it is undertaken in accordance with the Construction Environmental Management Plan.	This Plan
(f)	The Construction Environmental Management Plan must be publicly available on the project website for the duration of the construction phase.	Section 7.5
(g)	The Construction Environmental Management Plan may be updated.	
	(i) updates to the Construction Environmental Management Plan that include new or additional Relevant Project Work must be endorsed by the Environmental Monitor as being consistent with condition 2 before Relevant Project Work may proceed.	Section 8.3
(h)	Updates to the Construction Environmental Management Plan that are limited to new or different mitigation measures for Managed Work may be endorsed by the Environmental Monitor.	Section 8.3

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Glossary of Terms

Term	Meaning
$\mu\text{g}/\text{m}^3$	Micrograms per Cubic Meter of Air
2012 CGER	Coordinator-General's evaluation report
AASS	Actual Acid Sulphate Soils
ACH Act	Aboriginal Cultural Heritage Act 2003
ARI	Average Recurrence Interval
ASS	Acid Sulphate Soils
BCC	Brisbane City Council
BTC	Brisbane Transit Centre
CaCO_3	Calcium carbonate (Aglime)
CBD	Central Business District
CBGU	Design & Construct Contractor comprising a joint venture with CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd
CEMP	Construction Environmental Management Plan
CG	Coordinator-General
CGCR	Coordinator-General change reports
CHMP	Cultural Heritage Management Plans
CLR	Contaminated Land Register
COEMP	Commissioning Environmental Management Plan
CPB CMS	CPB Contractors Management System
CRR	Cross River Rail
CSEP	Communications and Stakeholder Engagement Plan
DATSIP	Department of Aboriginal and Torres Strait Islander Partnerships
dBA	means decibels measured on the 'A' frequency weighting network
DEHP	Department of Environment and Heritage Protection (now DES)
Delivery Authority	Cross River Rail Delivery Authority
DES	Department of Environment and Science
Directly Affected Persons	means an entity being either the owner or occupant of premises for which predictive modelling or monitoring indicates the project impacts would be above the performance criteria in the Imposed Conditions
DTMR	Department of Transport and Main Roads
ECM	Environmental Constraints Map
EIS	Environmental Impacts Statement
EMP	Environmental Management Plan
EMR	Environmental Management Register

Term	Meaning
EMS	Environmental Management System
EP Act	Environmental Protection Act 1994 (Qld)
EPP (Water)	Environmental Protection (Water) Policy 2009 (Qld)
ESC	Erosion and Sediment Control
ESCP	Erosion and Sediment Control Sub-Plan
EWMS	Environmental Work Method Statements
GHG	Greenhouse Gas
INB	Inner Northern Busway
IECA	International Erosion Control Association
LA10 adj	means the A-weighted sound pressure level, adjusted for tonal character or impulsiveness, that is exceeded for 10% of a 1 hour period when measured using time-weighting 'F'
LAeq adj	means an A-weighted sound pressure level of a continuous steady sound, adjusted for tonal character, that within a 1 hour period has the same mean square sound pressure of a sound that varies with time
LCA	Licensed Construction Area
mg/m ² /day	Milligrams per Square Meter per Day
mm/s PPV	Millimetres per Second Peak Particle Velocity
NATA	National Association of Testing Authorities
NEPM	National Environmental Protection Measure
PA	Princess Alexandra
PAH	polycyclic aromatic hydrocarbons
PASS	Potential Acid Sulphate Soils
PFAS	per- and poly-fluoroalkyl substances
PM ₁₀	Particulate Matter of 10 Microns in diameter or smaller
Project	Cross River Rail Project
PSI	Preliminary Site Investigations
PSTR	Project Scope and Technical Requirements
QLD	Queensland
QR	Queensland Rail
RfPC	EIS Request for Project Change
RfPC-1	EIS Request for Project Change 1
RfPC-2	EIS Request for Project Change 2
RfPC-3	EIS Request for Project Change 3
RfPC-4	EIS Request for Project Change 4
RNA	Royal National Agriculture and Industrial Association

Term	Meaning
SDS	Safety Data Sheets
SPL	Sound Pressure Levels
SQP	Suitably Qualified Person
TMR	Transport and Main Roads
TRH	total recoverable hydrocarbons
TSP	Total Suspended Particulates
WRRMP	Waste and Resource Recovery Management Plan

1 Introduction

1.1 Background

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

The scope of works for this environmental management plan (EMP) are (in part) derived from the Coordinator General's Change Report for the Roma Street Demolition Works (March 2019), the project agreement and discussions that the Pulse Consortium has had with the Delivery Authority regarding proposed site establishment (interim activities) at the Roma Street, Albert Street, Woolloongabba and Boggo Road Precincts.

This Construction Environmental Management Plan (CEMP) for the Cross River Rail project will authorise site investigation works at the Station Precincts, including geotechnical drilling investigations, utilities excavations, contamination investigations, establishment of monitoring equipment and hazardous materials surveys. Furthermore, the CEMP will authorise site establishment works at the Station Precincts. This includes, but is not limited to the following:

- Installation of gantries, hoarding, fences, scaffolding
- Demolition of buildings and structures at Roma Street, Albert Street, the Southern Portal and Boggo Road
- Minor adjustments to intersections to facilitate truck movements
- Establishment of Site Access/Egress
- Earthworks to establish working platform, access roads, laydown areas, site levelling
- Piling using a piling rig to install approximately 1,800 piles ranging from 750 mm to 1050 mm diameter piles to a depth ranging from 4 m to 21 m
- Road closures
- Establishment of site buildings, sheds and amenities.

A number of technical assessments are to be undertaken to assess the key potential impact areas. A summary of the predicted and potential impacts and mitigation measures to manage these impacts are provided in each of the sub sections of Section 3 of this CEMP.

1.2 Project Summary

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

The CRR project includes;

- A new north-south passenger rail line, extending from Bowen Hills in the north over 18 kilometres (km) to Salisbury in the south
- Two 10-kilometre-long parallel tunnels, extending from Victoria Park at Spring Hill to Yeerongpilly via the Brisbane Central Business District (CBD), Woolloongabba and Dutton Park
- New underground railway stations at Roma Street, Albert Street, Woolloongabba, and Boggo Road

- New surface stations at the Royal National Agriculture and Industrial Association (RNA) Exhibition Showgrounds and Yeerongpilly.

The project also includes construction of four new high-capacity underground stations at Boggo Road, Woolloongabba, Albert Street, Roma Street and redevelopment of the existing over Dutton Park Station. Cross River Rail will integrate with proposed Brisbane Metro services.

The TSD Package will primarily deliver the underground section of the project. The scope of work will include:

- the tunnel from a southern portal near Dutton Park station, under the Brisbane River and the CBD, to a northern portal beyond Normanby
- four new underground stations at Boggo Road, Woolloongabba, Albert Street and Roma Street
- the tunnel portals and dive structures
- all associated mechanical, electrical and safety systems, including vertical transportation for passengers at underground stations
- tunnel track work, traction power systems and selection rail operation and control infrastructure.

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

- The first project change was the whole of project change application in June 2017, which included a reduction in the proposed total length of the project, reduction in the extent of underground tunnelling, changes to the portal locations and demolition of the Brisbane Transit Centre (BTC) amongst other minor changes. Through consultation, this project change identified issues with land, noise and vibration, traffic and transport, air quality and the social environment. The coordinator general approved the changes in June 2017.
- The second project change was the application to change the Temporary Roma Street Coach Terminal in August 2018. As part of the February 2017 project change application, the proponent identified that to facilitate the construction of the underground Cross River Rail Roma Street station, the existing BTC west tower at Roma Street (including the Roma Street long-distance coach terminal) would need to be demolished. In June 2018, the proponent lodged a project change application to facilitate the relocation of the coach terminal prior to the demolition of the BTC west tower. These changes included a change to the previously approved use of the carpark and drop-off area adjacent to Roma Street Station Platform 10, from a construction storage and laydown, to a temporary coach terminal, and amendments to the June Coordinator-General conditions for the project.
- The third project change is the Roma Street demolition works, in March 2019, which includes the demolition of the BTC east tower and Hotel Jen, including the removal of the pedestrian bridge over Roma Street linking the BTC to George Street, and the utilisation of the open space and carparking area adjacent to Hotel Jen for site access, construction laydown and general worksite requirements. The proposed changes to the project at Roma Street are required as the demolition of the BTC west tower and podium in isolation would result in significant structural integrity and continuity impacts to the BTC east tower and Hotel Jen. The demolition of the BTC west tower and podium in isolation would also

result in material impacts to emergency, stormwater, sewerage, water, electricity and communications services that are shared between the BTC west and east towers.

- The forth project change report lodged May 2019 and approved in June 2019, proposed refinements to the whole of the project area. Refinements include changes to the vertical and horizontal alignments of the tunnels and relocation of the stations, realignment of rail infrastructure through Mayne Yard including the construction of a new rail bridge across Breakfast Creek. Additional minor realignments of the underground Roma Street station and realignments at the Boggo Road station are have been approved as well as a new elevated surface pedestrian and cycle bridge from the Princess Alexandra (PA) Hospital to the Boggo Road Urban Village. Additionally, realignment of the Inner Northern Busway (INB) at Roma Street, including integration of the busway station with the underground Roma Street Cross River Rail station. Relocation of the proposed underground Albert Street (80 m north-west) and Woolloongabba stations (70 m west) is included, with changes to design and construction methodology of the tunnel and station caverns. A new Albert Street station entry at 142 Albert Street will require the acquisition of a new commercial property, a new stabling facility at Clapham Yard (Moorooka), which would lead to operational improvement for the rail network, and construction of a new rail bridge over Moolabin Creek. An upgrade to the existing Dutton Park station as well as upgrades to existing surface railway stations at Salisbury, Rocklea, Moorooka, Yeerongpilly, Yeronga and Fairfield.

1.3 Scope

The Construction Environmental Management Plan (CEMP) has been developed to provide a structured high-level approach to the management of environmental issues during the delivery of the Project. Being a live document, the intent is for additional references to scope be added through future revisions of the Document. But the overarching compliance with the OEMP and Coordinator General Conditions are founded in this Plan. Section 4 of this Plan outlines how the D&C Subcontractors management systems integrates with the CEMP to deliver the area and activity specific controls and requirements in parallel with any obligated sub plans

1.3.1 Site Investigation Works

The site investigation works are expected to take approximately 15 weeks and will be undertaken prior to and in conjunction with the site establishment works. These works will include:

- Geotechnical (drilling and excavation). Some 46 drill holes at varying depths of 15-45 m within the station precincts and surrounds (refer to Attachment 1Appendix F)
- Utilities (Excavations). Utility investigations across the TSD Licenced Construction Area (LCA), dependent on the specific requirements for positive identification of utilities to inform and confirm the design. Extent of excavation will generally comprise the following:
 - Localised pothole: 50 mm diameter hole up to 2 m depth
 - Slot trench: 300 mm width up to 2 m depth running perpendicular to roadway, generally full width of footpath verge
 - Excavation method: Non-destructive digging methods utilising hydro excavation equipment (vacuum excavation) with limited pressure to assure no damage to identified services (not exceeding 13,800 kPa / 2000 PSI)
 - Site specific utility locations will be available mid-September.

- Contamination investigations carried out in conjunction with the geotechnical drilling;
- Establishment of Monitoring Equipment
- Hazmat Surveys (Roma & Albert Streets demo destructive testing).

1.3.2 Site Establishment Works

The site establishment works (as defined by this plan) is scheduled to commence mid-2019 and continue until completion of piling works in 2020. Subsequent works, including piling (for example at the northern portal beyond 2020) will be managed within a subsequent revision of the CEMP.

1.3.2.1 Roma Street

- Utility Relocations including stormwater, sewage, telecommunications etc. across the TSD Licenced Construction Area (LCA)
- Protection of utilities within site area and access/egress points
- Provision of construction and site services
- Disconnection of services
- Demolition of:
 - BTC East Tower
 - Hotel Jen
 - Pedestrian overpass.
- Relocation of pedestrian walkways
- Temporary Platform to be constructed
- Construction of temporary water treatment plant and installation of electrical substation/ generators
- Removal of kerb side assets
- Clearing of street trees and vegetation adjacent to Parkland Boulevard to make way for pedestrian diversions, laydown areas and site vehicle access (refer to Attachment 1Appendix Q for site clearing plans).
- Site Establishment:
 - Installation of Gantries, Hoarding, Fences, Scaffolding
 - Minor adjustments to intersections to facilitate truck movements
 - Establishment of Site Access/Egress
- Piling (boring)
 - Pile type: 264 Soldier piles. Soldier piling, used for deep excavations, uses piles at regular intervals typically constructed by installing vertical piles which are supported by horizontal supports to spread the load, known as lagging walls.
 - 750 mm diameter with an average depth of 4 m
- Site Access:

- Establishment of Site Buildings, Fences, Sheds & Amenities.
 - On ground site facilities including Offices, Client Office (180m²), Cribs, Toilets, First Aid, Drug Testing, Gate Huts, Change Rooms, Wash Houses, Bath Houses and Stores (refer to Appendix Q).

Refer to Site Layout Plans in Appendix Q and Demolition Staging Plans in Appendix R.

1.3.2.2 Albert Street

- Utility Relocations including stormwater, sewage, telecommunications etc.
- Protection of utilities within site area and access/egress points
- Provision of construction and site services
- Disconnection of services to Lot 1 and Lot 2 (Lot 1 is East of Albert Street, south of Mary Street, Lot 2 is West of Albert Street, south of Mary Street)
- Demolition Lot 1 and Lot 2 (not at the North Entrance until December 2020)
- Relocation of pedestrians
- Construction of temporary water treatment plant and installation of electrical substation/ generators
- Removal of kerb side assets
- Clearing of street trees to make way for pedestrian diversions and site vehicle access (refer to Attachment 1 Appendix Q for site clearing plans).
- Site Establishment:
 - Installation of Gantries, Hoarding, Fences, Scaffolding
 - Minor adjustments to intersections to facilitate truck movements
 - Establishment of Site Access/Egress
 - Closure of Albert Street Mary to Charlotte Streets.
- Piling (boring)
 - Installation of 81 Hard secant piles, 80 soft secant piles, 106 Contiguous piles, and 155 RHS Reinforced Composite piles using Bauer BG28
 - 80 piles will be installed between December 2019 and January 2020, 81 between March and June 2020, and 261 between March and May 2020
 - 1050 mm diameter x 6 m long
- Site Access:
 - Establishment of Site Buildings, Sheds & Amenities.
 - Quadruple stacked on top of gantry site facilities including Offices, Client Office (180m²), Cribs, Toilets, First Aid, Drug Testing, Gate Huts, Change Room, Wash Houses, Bath Houses and Stores (refer to Appendix Q).

Refer to Site Layout Plans in Appendix Q and Demolition Staging Plans in Appendix R.

1.3.2.3 Woolloongabba

- Utility Relocations including stormwater, sewage, telecommunications etc.
- Provision of construction and site services
- Protection of utilities within site area and access/egress points
- Site Establishment:
 - Installation of Hoarding and Fences
 - Earthworks to establish working platform, access roads, laydown areas, site levelling
 - Establishment of Site Access/Egress.
- Site Access:
 - Establishment of Site Buildings, Sheds & Amenities.
 - Double stacked on ground site facilities including Offices, Client Office (180m²), Cribbs, Toilets, First Aid, Drug Testing, Gate Huts, Change Rooms, Wash Houses, Bath Houses and Stores (refer to Appendix Q).
- Piling (boring)
 - Installation of 175 Soldier piles using a Bauer BG28 with works being conducted from North to South 750 mm diameter x 5 m depth
- Signage

Refer to Site Layout Plans in Appendix Q and Demolition Staging Plans in Appendix R.

1.3.2.4 Boggo Road

- Utility Relocations including stormwater, sewage, telecommunications etc.
- Provision of construction and site services
- Demolition – Southern Portal and Boggo Roundabout
- Relocation of pedestrians, cycle paths & property access
- Clearing of street trees will occur in various locations due to road alignments, to make way for spoil handling sites, laydown areas, site offices and parking, for site vehicle access and to install the noise walls/hoardings during site establishment (refer to Appendix U for site clearing plans).
- Site Establishment
 - Installation of Hoarding, Noise walls, Fences
 - Earthworks for access roads, laydown areas, site levelling
 - Establishment of Site Access/Egress
 - for piling works, piling pads.
- Piling (Boring) - Boggo Road
 - Pile type: 30 Soldier piles, 132 hard secant piles and 131 soft secant piles

- Equipment: 3 x pile rigs, concrete trucks, concrete pumps, crawler cranes, excavator
 - Sequencing: 3 crew will work simultaneously
 - 1050 mm diameter x ranging from 15 – 21 m deep
- Piling (boring) - Southern Portal
 - 684 soldier piles
 - Equipment used will include 4 x pile rigs, concrete trucks, concrete pumps, crawler cranes, excavators
 - 4 crews will work simultaneously for Stage 1 works, 2 crews for Stage 2 works
 - 900 mm diameter with 11 m depth
- Site Access:
 - Establishment of Site Buildings, Sheds & Amenities.
 - Triple stacked on ground site facilities including Staff Offices, Client Offices (180m2), Cribbs, Toilets, First Aid, Drug Testing, Gate Huts, Change Rooms, Wash Houses, Bath Houses and Stores (refer to Appendix Q)
 - On ground site facilities including Offices, Cribbs, Toilets, First Aid and Drug Testing at the Southern Portal (refer to Appendix Q).

Refer to Staging Plans in Appendix R for details of demolition sequencing and locations, and refer to Appendix Q for concept site layout drawings demonstrating the temporary infrastructure requirements (site buildings, amenities etc) for site establishment works.

1.4 Purpose

The purpose of this CEMP is to confirm how CBGU will manage and control the site investigation and establishment works to ensure that all environmental risks and impacts are addressed. The implementation of this CEMP is the responsibility of the Environment and Sustainability Manager. This CEMP will be completed in line with the Imposed Conditions (Construction) outlined within the Coordinator General's report June 2019 (Refer to Compliance Matrix).

1.5 Objectives

The CEMP will seek to achieve the following objectives:

- To provide CBGU and its subcontractors with a framework that ensures site investigation and establishment activities are undertaken in a manner that complies with approval conditions and minimises impacts to the physical and biological environment
- To summarise predicted and potential environmental risks and prescribe mitigation measures to ensure impacts are avoided or minimised during the site investigation and establishment works
- To ensure that all CBGU employees and subcontractors involved in site investigation and establishment works are aware of their environmental responsibilities and are proactive in their approach to environmental management
- To comply with relevant legislation and guideline requirements relevant to environmental management
- Identify entities responsible for the achievement of the environmental outcomes.

2 Legislative Requirements

2.1 Coordinator-General Conditions

The works covered by this CEMP will be managed in accordance with the Coordinator Generals conditions. The imposed conditions relevant to various environmental elements are captured in each of the subsections.

An Outline Environmental Management Plan has been developed by the Delivery Authority, in line with the Coordinator-Generals change conditions (Change Report No. 4). The plan outlines the environmental risks that must be managed throughout the Project's commissioning phase. It includes the requirements of the imposed conditions (Commissioning), the Environmental Design Requirements, and the environmental outcomes and performance criteria for the Project's commissioning phase.

The most up-to-date version of the Coordinator-General's Change Report – whole of project refinements 2019 can be found on the Coordinator-General's website. Within this document, the various conditions are captured in the section identified in Table 2 below, details of the full conditions are located in Attachment 1Appendix E.

Table 2 Coordinator-General Conditions

Condition Number	Entity with Jurisdiction	Addressed
Condition 1: General Conditions	Coordinator-General	Section 2.1
Condition 2: Outline Environmental Management Plan	Coordinator-General	Has been developed and will be complied with through this plan.
Condition 3: Design	Chief Executive, TMR	Section 3.3
Condition 4: Construction Environmental Management Plan	Chief Executive, TMR	Sections 1.4 and 4.1.1
Condition 5: Compliance	Chief Executive, TMR	Section 7
Condition 6: Reporting	Chief Executive, TMR	Section 7.5
Condition 7: Environmental Monitor	Chief Executive, TMR	Section 4.2
Condition 8: Community Relations Monitor	Chief Executive, TMR	Section 3.3.1 and 8.4
Condition 9: Community Engagement Plan	Chief Executive, TMR	Sections 3.3.1 and 8.4
Condition 10: Hours of Work	Chief Executive, TMR	Section Appendix E
Condition 11: Noise and Vibration	Chief Executive, TMR	Section 3.3.5
Condition 12: Property Damage	Chief Executive, TMR	Section 3.3.5
Condition 13: Air Quality	Chief Executive, TMR	Section 3.3.6
Condition 14: Traffic and Transport	Chief Executive, TMR	Section 3.3.2
Condition 15: Water Quality	Chief Executive, TMR	Section 3.3.8
Condition 16: Water Resources	Chief Executive, TMR	Section 3.3.8
Condition 17: Surface Water	Chief Executive, TMR	Section 3.3.8
Condition 18: Erosion and Sediment Control	Chief Executive, TMR	Section 3.3.9
Condition 19: Acid Sulphate Soils	Chief Executive, TMR	Section 3.3.9
Condition 20: Landscape and Open Space	Chief Executive, TMR	Section 3.3.9
Condition 21: Worksite Rehabilitation	Chief Executive, TMR	Not applicable to site investigation and establishment works

Condition Number	Entity with Jurisdiction	Addressed
Condition 22: Environmental Design Requirements	Chief Executive, TMR	Not applicable to site investigation and establishment works
Condition 23: Commissioning	Chief Executive, TMR	Not applicable to site investigation and establishment works

The Project Scope and Technical Requirements (PSTR), Annexure C (Construction Requirements) and Annexure D (Management Requirements) will also impose requirements for the site establishment works, these include:

Table 3 Project Scope and Technical Requirements

Annexure C		Annexure D	
Section	Title	Section	Title
1.3	Methods of Work	2.0	Management Requirements
1.4	Hours of Work	5.0	Safety Requirements
1.6	Specific Stakeholder Requirements	6.0	Environment and Sustainability Requirements
5.0	Utility Infrastructure	7.0	Communications and Stakeholder Engagement Requirements
6.0	Environment	8.0	Transition and Acceptance Requirements
7.0	Site Management (including temporary site facilities, provision of motor vehicles, temporary hoarding, fencing and screening, site security and temporary lighting and fire precautions).		
10.0	Temporary Works		
12.0	Incident Management		

Further information on the conditions in these reports can be found in the *Tunnel, Stations and Development – Project Scope and Technical Requirements – Appendix 3 and 4* (Rev 6 issued 14 May 2019).

2.2 Commonwealth Legislation

Commonwealth legislation that is relevant to site establishment works and this CEMP includes:

- Aboriginal and Torres Strait Islander Heritage Protection Act 1984
- Environmental Protection and Biodiversity Conservation Act 1999

2.3 State Legislation

State legislation that is relevant to the Interim Site Establishment Works and this CEMP includes:

- Cross River Rail Delivery Authority Act 2016
- State Development and Public Works Organisation Act 1971

- Environmental Protection Act 1994
- Environmental Protection (Water) Policy 2009
- Environmental Protection (Noise) Policy 2008
- Environmental Protection (Air) Policy 2008
- Aboriginal Cultural Heritage Act 2003
- Building Act 1975
- Biosecurity Act 2014
- City of Brisbane Act 2010
- Economic Development Act 2012
- Electricity Act 1994
- Electrical Safety Act 2002
- Local Government Act 2009
- Nature Conservation Act 1992
- Planning Act 2016
- Plumbing and Drainage Act 2002
- Queensland Heritage Act 1992
- Rail Safety National Law Queensland Act 2017
- Survey and Mapping Infrastructure Act 2003
- Transport Infrastructure Act 1994
- Waste Reduction and Recycling Act 2011
- Water Act 2000
- Work Health and Safety Act 2011.

2.4 Approvals, Permits and Licences

CBGU will obtain licences, permits and approvals as required by law and maintain them as required throughout the delivery phase of the project. No condition of the Infrastructure Approval removes the obligation for CBGU to obtain, renew or comply with such necessary licences, permits or approvals.

Approvals expected to be required for the site investigation and establishment phases are identified in

Table 4 below.

Table 4 Environmental approvals, permits and licences relevant to the site investigation and establishment phases of the project

Approval / Permit / Licence	Regulatory Authority	Responsibility / Timeframe	Items approved
Work on Roadways and Footways	Brisbane City Council	Traffic Manager 10 BD	Crossover kerb and channel Excavate roadway or footway Connect to Council stormwater drainage Hoarding and gantry
Temporary lane or road closure	Brisbane City Council	Traffic Manager 20 BD	Lane closures around a building site Moving cranes or other equipment in or out of a building site Placing a barricade on the road
Natural Assets Local Laws 2003	Brisbane City Council	Environment and Sustainability Manager	Whole of project Offsets (vegetation)
Heritage Exemption Certificate	Department of Environment and Science	Environment and Sustainability Manager 36 BD	Working on and around heritage sites

Notes: Further approvals maybe required that are not listed in the table above.

2.5 Guidelines and Standards

All site establishment works must be undertaken in accordance with the specific guidelines nominated in the relevant sub-sections within this management plan. Guidelines and standards related to environmental management that must be met include, but are not limited to:

- Department of Transport and Main Roads (TMR) standards, including:
 - MRTS51 Environmental Management – TMR Specifications
- Queensland Rail standards, including:
 - Safety and Environment Management System.
- Brisbane City Council (BCC) environmental policies and guidelines, including:
 - Urban Stormwater Management Strategy
 - Stormwater Outlets in Parks and Waterways
 - Landscape Design for Water Conservation
 - Guidelines on Identifying and Applying Water Quality Objectives in Brisbane City.
- International Erosion Control Association Best Practice Erosion and Sediment Control Guidelines 2008 (IECA Guidelines).

3 Environmental Management Requirements

3.1 Environmental Management System

CBGU will utilise an Environmental Management System (EMS) that is based on the CPB EMS, which has been adapted to address project and joint venture requirements. This CEMP provides the system to manage and control the environmental aspects of the Project during construction. It also provides the overall framework for the system and procedures to ensure environmental impacts are minimised, and legislative and other requirements are fulfilled. The CEMP establishes the system for implementation, monitoring and continuous improvement to minimise impacts from the Project on the environment. The CBGU EMS:

- Is generally in accordance with the principles of AS/NZS ISO 14000 Environmental Management Standards Set
- Complies with the Environmental Documents

The EMS consists of the following key components:

- Governance documentation: The Coordinator General Conditions and Legislative requirements
- CEMP and sub-plans: This CEMP describes how CBGU will achieve the environmental outcomes on the project. Sub-plans identify requirements and processes applicable to specific impacts of the project's activities. (Refer to this CEMP and associated sub-plans.)
- Procedures and tools: Procedures and tools provide additional detail to support the CEMP and sub-plans or are used in the implementation of the CEMP
- Continuous improvement: Continual improvement is achieved through constant measures and evaluation (including monitoring, inspections), audit and review of the effectiveness of the CEMP and adjustment and improvement of the CEMP, project environmental outcomes and the EMS; and
- Performance targets: Objectives and targets have been developed as a means of assessing environmental performance during construction of the project.



Integration with other management plans: The CEMP is a functional plan in the integrated set of project management plans.

3.1.1 Environmental Aspects and Impacts

CBGU will use a risk management approach during all stages of the project to identify, assess, control and review environmental risks and harness opportunities. The environmental risk assessment undertaken during the development of the EIS has been used as a basis to further develop the project's environmental risks and opportunities. Environmental risks and opportunities are considered through:

- The risk assessment undertaken during the development of the environmental impact statement;
- The Principal Risk Assessment conducted at bid stage for major tangible risks;
- Safety -in-design workshops conducted throughout the project, which will include environmental considerations, where appropriate;
- Construction Area Plan (CAP) risk assessments;
- Work Pack risk assessments; and
- Project pre-start meetings.

The objectives of risk assessment are to:

- Identify activities/aspects, events or outcomes that have the potential to adversely affect the local environment and/or human health/property;
- Qualitatively evaluate and categorise each risk item;
- Assess whether risk issues can be managed by environmental protection measures; and
- Qualitatively evaluate residual risk with implementation of measures.

Risk assessments for the project consider *AS/NZS ISO 31000:2009: Risk management – Principles and guidelines*.

The Environment and Sustainability Manager (or delegate) is generally involved in, or has approval authorities, for most risk assessment types listed above to ensure environmental risks and opportunities are adequately raised and addressed. Issue-specific management plans also include a section that identifies key aspects and potential impacts relevant to that issue. Mitigation and management measures are then identified to minimise the risk associated with those aspects and potential impacts.

3.2 General Environmental Management

The following Imposed Condition must be achieved for the Project, in relation to the operation of the site investigation and establishment activities:

Condition 10. Hours of work

- (a) *Site investigation and establishment works are authorised to be undertaken within the hours of work set out in Table 5.*

Table 5. Construction Hours

Worksite / Precinct	Standard hours	Extended work hours	Managed Work	Spoil haulage and materials/ equipment delivery
Southern portal	Monday to Saturday, 6:30 am – 6:30 pm	For approved rail possession—80 hrs continuous work (Other extended work) 6:30pm - 10:00pm, Monday to Friday	24 hrs, 7 days	24 hrs, 7 days

Worksite / Precinct	Standard hours	Extended work hours	Managed Work	Spoil haulage and materials/ equipment delivery
Boggo Road Railway station	Monday to Saturday, 6:30 am – 6:30 pm	Monday to Friday, 6:30 pm – 10:00 pm	24 hrs, 7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday: 6.30am - 6.30pm
Woolloongabba Railway station	Monday to Saturday, 6:30 am – 6:30 pm	Monday to Friday, 6:30 pm – 10:00 pm	24 hrs, 7 days	24 hours, 7 days, except for: Monday to Friday: 7:00am - 9:00am 4:30pm - 6:30pm
Albert Street Railway station	Monday to Saturday, 6:30 am – 6:30 pm	Monday to Friday, 6:30 pm – 10:00 pm	24 hrs, 7 days	Monday to Friday: 6.30 am – 10.00 pm Saturday 6:30am - 6:30pm
Roma Street Railway station	Monday to Saturday, 6:30 am – 6:30 pm	Monday to Friday, 6:30 pm – 10:00 pm	24 hrs, 7 days	Monday to Friday 6.30am - 7.30am 9.00am - 4.30pm 6.30pm - 10:00pm Saturday 6.30am - 6.30pm
Northern portal	Monday to Saturday, 6:30 am – 6:30 pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday, 6:30 pm – 10:00 pm	24 hrs, 7 days	Monday to Friday: 6.30 am – 10.00 pm Saturday 6:30am - 6:30pm

(b) Project Works that are underground, or in a ventilated acoustic enclosure, may be undertaken at any time provided the environmental outcomes are achieved.

(c) Works carried out because of an emergency that:

(i) Is endangering the life or health of a person

(ii) Is endangering the structural safety of a building

(iii) Is endangering the operation or safety of community infrastructure that is not a building

(iv) Is required to prevent environmental harm, may be undertaken outside the hours set out in Table 5.

- (d) *The following work may be undertaken during Extended Work Hours as set out in Table 5, subject to compliance with a specific Construction Environmental Management Plan sub-plan in accordance with Condition 4:*
- (i) *Project Works within rail corridor land*
 - (ii) *Project Works within a road reserve or busway that cannot be undertaken reasonably nor practicably during standard hours due to potential disruptions to peak traffic flows or bus operations*
 - (iii) *Project Works involving the transport, assembly or decommissioning of oversized plant, equipment, components or structures*
 - (iv) *Delivery of "in time" materials such as concrete, hazardous materials, large components and machinery*
 - (v) *Project Works that require continuous construction support, such as continuous concrete pours, pipe-jacking or other forms of ground support necessary to avoid a failure or construction incident*
- (e) *Blasting must not occur on public holidays, and is only authorised to occur during the hours of 7:30am to 4:30pm Monday to Saturday, and not on Sundays or public holidays*
- (f) *Prior to blasting events, at least 48 hours' notice must be provided to persons who may be adversely affected.*

3.3 Environmental Management Sub-Plans

Section 3.3 details the sub plans to manage the environment risks as part of the site investigation and establishment works.

3.3.1 Community Engagement Plan

Stakeholder Engagement will be undertaken in accordance with the *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018.

The CRR Project will attract interest from a wide range of stakeholders across the corridor and SEQ throughout the D&C phases including early work, construction, commissioning and precinct development.

CBGU staff and subcontractors will be required to undertake an induction before starting work on the project. The induction will include a specially designed community relations segment that includes:

- Community sensitivities and relevant issues with visual aids
- Communication and consultation policies and procedures
- Expected standards of behaviour when dealing with the community and landholders – grievance management procedure
- Preventing complaints
- Reward and recognition programs to incentivise desirable behaviour.

3.3.2 Traffic Management

Traffic management will be undertaken in accordance with the *Construction Traffic Management Plan* CRRTSD-TM-MPL-CBGU-000012.

3.3.3 Aboriginal Cultural Heritage Management

3.3.3.1 Background

The Delivery Authority previously undertook an assessment of Indigenous cultural heritage within the Roma Street precinct as part of the February 2017 project change application. A search of the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) Aboriginal and cultural heritage database and register undertaken in September 2018 revealed that no new or additional known Indigenous Cultural Heritage sites or places have been recorded for project works (including the additional worksite area) since the last assessment.

The Delivery Authority's assessment noted that whilst this search is not definitive to the existence of Indigenous Cultural Heritage there would be no change to known impacts for Indigenous Cultural Heritage. Further the proponent noted that there is an increased potential for unknown finds within the additional disturbance area.

In accordance with the Aboriginal Cultural Heritage Act 2003, the Delivery Authority has advised that two Cultural Heritage Management Plans (CHMP) for the project have been prepared, one is approved, and one is still in draft (see Appendix B).

The Delivery Authority has also advised that mitigation measures for Indigenous Cultural Heritage will be provided for in the project's CHMP that will be executed prior to the commencement of works including being reviewed and approved by DATSIP. The site establishment works will be undertaken in accordance with the approved CHMP, with cultural heritage monitors being present throughout establishment activities.

Potential Impacts

The station precincts are in highly developed areas, thus limiting the potential for ground disturbance to uncover unidentified cultural items of significance.

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

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

Site investigation and establishment activities may identify or disturb culturally significant items, in which case, the CHMP and the Unexpected Heritage Finds Procedure should be referred to (included as Appendix A, and Appendix B). Mitigation measures to address potential impacts to indigenous cultural heritage items are listed in Section 3.3.3.2.

3.3.3.2 Mitigation Measures

- Works will be conducted in accordance with the approved CHMP. In the instance that there is a discovery of suspected new finds the following procedure should be referred to:

- a. If a material is discovered during the Project Activities that is or is reasonably likely to be a Find, the Sponsor Personnel on site will bring the discovery of the suspected Find to the attention of the Site Supervisor, who will restrict access to an area within a 3 m radius of the Find and erect such signage and/or take such other reasonable measures as are necessary to ensure that the Find will be avoided while the activities are undertaken
- b. The Sponsor will notify the Service Provider of any suspected Finds
- c. If the Cultural Heritage Office, having inspected the Find within the 2 Business Day period, forms the opinion that:
 - ii. The Find is not Cultural Heritage
 - A. The Cultural Heritage Officer will provide written advice to the Sponsor that the Find is not Cultural Heritage no later than 1 Business Day after the inspection
 - B. Any Project Activities that have ceased in the relevant area may resume
 - C. The process will be complete.
 - iii. The Find is Cultural Heritage, the Find will be managed under the Management Arrangements, following which Project Activities may resume.

For more detail, refer to the CHMP in Appendix B.

- All obligations relating to monitoring, finds processes and anything else described within the Terms of Reference must be followed during site establishment works, where ground disturbance occurs.
- Pre-clearance, post clearance forms and artefact find forms records to be retained to provide a traceable management approach to demonstrate the Project's Duty of Care within the ACH Act has been met.
- Monitoring and reporting on compliance with these requirements will be the responsibility of the CBGU, in line with the broader Environmental Management Framework established for the Project.
- Appropriate induction and awareness training will be implemented to ensure obligations and processes are well understood by all Project personnel.

3.3.4 Non-Indigenous Cultural Heritage Management Plan

3.3.4.1 Background

Heritage assessments have been undertaken to identify potential impacts to current values and recommend mitigation actions to inform detailed design. Heritage assessments have identified that Roma Street, Albert Street, Woolloongabba and Boggo Road precincts have areas of outstanding archaeological potential.

Baseline Conditions

The Archaeological Management Plan (June 2019) indicated that there are 9 zones of archaeological potential at Roma Street Station, 4 at Albert Street, 13 at Woolloongabba and 4 at Boggo Road. This assessment was undertaken to identify potential impacts to current values and recommend mitigation actions to inform detailed design.

The Delivery Authority has assessed the potential impacts of the proposed changes to the project on Indigenous and non-Indigenous cultural heritage values through database searches and targeted field assessments. Targeted preliminary field assessments of the Evaluated Project and Proposed Changes footprint were completed by a Heritage Consultant to identify any changes to impact on non-indigenous heritage values. A physical inspection of the four new railway station areas (Boggo Road, Woolloongabba, Albert Street

and Roma Street) was undertaken to verify values and understand current site conditions. The inspection included photography of each key feature within the assessment scope.

Key Heritage places identified as having potential for adverse impacts are listed below:

- Roma Street Precinct:
 - Transcontinental Hotel
 - Roma Street Railway Station
 - Roma Street Railyards
- Albert Street Precinct:
 - Charlotte St, Albert St, Alice St
 - Perry House/ Royal Albert Apartments/ Hotel 167 Albert Street
 - Mooney’s Building 130 Mary Street
 - Early Streets of Brisbane
 - Elizabeth street between George and Albert streets
 - Charlotte Street between George and Albert Streets
- Woolloongabba Precinct:
 - St Joseph’s Complex 44 Leopard Street
 - St Nicholas Russian Orthodox Cathedral 330 Vulture Street
 - The former Woolloongabba Post and Telegraph Office 765 Stanley Street
 - The Chalk Hotel 735 Stanley Street
- Boggo Road:
 - Boggo Road Gaol

The Department of Environment and Science (DES) is responsible for the management of heritage places that are identified as being of State significance by identifying and protecting them. Heritage places include buildings, structures, cemeteries, archaeological sites, gardens, urban precincts and natural and landscape features. The Brisbane City Central Business District Archaeological Plan endorsed by the Department of Environment and Science (DES), which provides direction with respect to potential archaeological significance for sites within the CBD. As Roma and Albert Street are identified as having outstanding archaeological potential in the Archaeological Assessment of Brisbane CBD, it is the responsibility of the proponent to notify DES if any items of potential archaeological significance are discovered during site establishment works.

Potential Impacts

Whilst the sites have undergone significant modification in the preceding 70 years or more, there remains the potential (low risk) for heritage artefacts to be encountered during excavation in natural ground below sub-grade.

The proposed changes to the project alignment are predicted to reduce the potential impacts of surface settlement on heritage values. The project change application describes that changes to the construction methodology (from box cut excavation to mined cavern construction) will reduce indirect construction activity

traffic and dust generation impacts on heritage values in the Central area. The Roma Street station building is identified to be at slight risk of settlement-induced damage. Proximity of the site establishment activities to the local heritage sites will determine the likelihood of impact.

Appendix E specifies continuous vibration goals for heritage structures and requires that vibration does not exceed 2 mm/s PPV. Appendix T (Vibration levels of proposed equipment) demonstrates that some equipment proposed for demolition, vegetation clearing and other ground disturbance will have vibration readings higher than 2 mm/s PPV if within 15 metres of a heritage structure. Therefore, lowest vibration emitting plant and equipment will be selected, as specified in Appendix T.

At the Roma Street precinct, all piling activities will occur greater than 5 metres from the Roma Street heritage station building, therefore vibration exceedances from piling equipment are not envisaged. Additionally, although excavation will occur, soldier piling (typically including retaining walls) will mitigate any potential settlement of surrounding surfaces due to the method of piling used. Site-specific mitigation measures are identified in Section 3.3.4.4.

Potential impacts possible to non-Indigenous cultural heritage include:

- Destruction/ uncovering an unexpected find of culturally important site/artefact
- Loss of evidence of past occupation of an area.

Impacts can be caused by demolition works, piling works, construction of temporary buildings and amenities, and an increase in vibration associated with works, earthworks, or excavation.

3.3.4.2 Environmental Outcomes

The following environmental outcomes in relation to non-indigenous cultural heritage are to be achieved for the Project:

- Site establishment activities are managed to maintain cultural heritage values of identified places of historical value, within and adjacent to the construction worksites.
- Site establishment 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.

3.3.4.3 Performance Criteria

- Site investigation and establishment activities do not adversely impact on places of historical heritage value directly, or indirectly through excessive dust deposition, vibration, or settlement
- A Heritage Management Plan is prepared and approved for all places of State or local historical heritage significance, if unable to achieve the construction vibration goals in Condition 11 Table 3 (Appendix E) for the proposed works, prior to these works commencing.
- Any archaeological places newly discovered and uncovered are appropriately managed
- If any archaeology is encountered during site establishment works, CBGU will stop work in accordance with the Environmental Protection (EP) Act, and the Queensland Heritage Act 1992. Any archaeological artefacts that are discovered require reporting to DES and are protected for a period of 20 days. DES will assess the discovery to determine if it is an important source of information about Queensland's history.

The procedure for identification of any archaeological items (if uncovered) will be based on relevant investigative tasks as outlined within the Archaeological Investigations Guideline (2013):

1. An archaeological consultant will be 'on call' during the geotechnical investigation, to review any archaeological items encountered
2. Reporting: All archaeological investigations must be properly documented. Reports can be deposited with the department. This process helps inform future work and ensures information about our history is retained for future generations
3. All archaeological investigations will contain contingency provisions in case results indicate the initial assessment is inaccurate.

3.3.4.4 Mitigation Measures

Site-specific mitigation measures outlined within the Coordinator-General's change report – whole of project refinements 2019 are as follows:

- Albert Street station: The proposed changes to construction methodology for Albert Street station and proposed demolition of 142 Albert Street are not anticipated to increase impact on adjacent heritage-listed places, when compared to the evaluated project. Settlement impacts at the identified heritage places are predicted to be below 5 mm, and surface vibration is not expected to exceed 0.5 mm/s, which is below the heritage threshold of 2 mm/s
- Roma Street station: The proposed underground Roma Street station realignment will result in an increase in maximum surface settlement from 20-25 mm to 0-50 mm at the heritage listed Roma Street station building. As the existing Roma Street station building is identified as having a 'Slight Risk' of damage, the proponent proposes to undertake settlement monitoring in accordance with the Outline Land Management Plan (a sub-plan of the OEMP). In order to avoid impacts to heritage buildings, Vibration levels must be below 2 mm/s PPV, therefore equipment exceeding this must be used greater than 15 metres from the heritage building (in accordance with Appendix T).
- Continuous vibrational monitoring undertaken during vibration generating activities at key heritage places where predicted to exceed the heritage building damage threshold
- Implementation of management measures to avoid the risk of construction activities damaging the existing fabric of the building or platform of the Roma Street Heritage Station
- State and locally listed heritage places are not to be used as access routes to geotechnical investigation zones or for the storage of any project related equipment or materials beyond essential requirements for worksites.

General recommendations for all heritage places are:

- Ensure that any impacts to the properties are avoided or minimised through site establishment location selection
- Archival (photographic) recording before any accepted impacts occur
- Where required, temporary fencing or other barricading during construction works to minimise risk of inadvertent impacts.

Specific measures for heritage sites near to the works and potentially subject to vibrational impacts:

- Site investigation and establishment works are to be managed to ensure the identified values of such places are maintained. Impacted places of historical cultural heritage value will be managed in accordance with the Heritage Management Procedure refer Appendix C
- Archaeological test pitting is not required to be conducted unless there is an unexpected archaeological find. Under the Archaeological Management Plan, a specific works procedure is to be implemented for unexpected archaeological finds (refer Appendix D)
- To protect places of historical heritage from excessive dust deposition, vibration and settlement, investigation works are to implement noise and air quality management measures. Management measures applicable to the site establishment activities will include hand-held attended monitoring at the start of our activity, on a monthly basis and in response to a complaint
- Routine daily site inspections are to include assessment of effectiveness of any exclusion fencing or signage protecting cultural heritage values if implemented.

3.3.5 Noise and Vibration Management Plan

3.3.5.1 Background

Construction noise and vibration was modelled in the Request for Project Change Report 1 (RfPC-1) and subsequently a further qualitative assessment of noise and operational impacts was completed as part of RfPC-2. Additional modelling was conducted for areas where the project alignment has changed significantly. This section provides a summary of the predicted impacts from which the mitigation measures were developed at sensitive receptors. These parameters are used as a baseline for all site establishment works, along with Coordinator-General imposed conditions outlined in Section 3.3.5.4. Refer to *EIS Change Report 2018: Section 4.3.3* for additional information.

Potential Impacts

Noise and vibration impacts will be generated as a result of site investigation and establishment activities including demolition, relocation of utilities and the associated traffic movements. There is potential for scheduling of certain works outside general working hours to minimise the impacts on the traffic networks and operation of adjacent transportation services. Therefore, the potential for some noise impacts at night on surrounding areas has the potential to disturb sleep and cause nuisance, these works will be managed via the *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018.

The site investigation works will be located within close proximity to sensitive receptors, including residential properties. Noise and vibration impacts will be generated by drill rigs and utility excavations. There is potential to schedule certain works outside general working hours to minimise the impacts on the traffic networks and operation of adjacent transportation services. Estimated noise and vibration levels at various setback distances from the investigative works have been identified in Table 6 and Attachment 1 Appendix S.

The full extent of demolition at Roma Street, Albert Street, and Boggo Road precincts is expected to commence in September 2019 and extend over a 3-month period. The piling works will commence in December 2019 through to December 2020.

Potential noise and vibration impacts may be generated as a result of the following key activities:

- *Site establishment*: clearing of the site adjacent to Hotel Jen, earthworks, construction of a hardstand, fencing and hoarding

- *Internal demolition*: soft strip-out works within the buildings, conducted within the retained façade of the buildings
- *Building demolition*: works involving the removal of the building structures
- *Piling Construction*: works involving the staged installation of piles using excavators and piling rigs (boring)
- *Stockpile management*: works involving the collection of building debris and sorting into stockpiles via the use of a tracked excavator or bobcat and loading material onto haul trucks and haul truck movements
- *Ground remediation*: levelling of the site and compaction of fill
- *Finishing works*: potential construction of new drainage infrastructure.

Noise emissions have been predicted for each of these construction activities except the internal demolition stage, which will be conducted within the façade of the buildings and is therefore not expected to have significant external noise and vibration impacts.

Appendix S outlines the noise predictions for the equipment used for site establishment activities.

There is a low risk for vibration causing settlement-induced damage from modelling of site establishment, particularly surrounding heritage structures located at the Roma Street precinct, as identified in Section 3.3.4.1. The proximity of the site establishment activities to these heritage structures determines the likelihood of impact. Condition 11 Table 3 in Appendix E specifies continuous vibration goals for heritage structures and requires that vibration does not exceed 2 mm/s PPV. Equipment will be selected based on their vibration emissions, as specified in Appendix T, and demolition, piling and clearing works will remain greater than 15 metres from the heritage structures to avoid settlement damage.

The site establishment works will be located within close proximity to sensitive receptors, including residential properties. The site establishment works are expected to generate the most noise and vibration impacts (particularly from piling activities) and all latter stages of construction are expected to generate a considerably lower level of construction noise as much of the material will be pre-fabricated off site and effectively put together on site rather than constructed. The site establishment works will be scheduled during standard working hours, however there is potential for scheduling of certain works outside of general working hours to minimise the impacts on the traffic networks and operation of adjacent transportation services. Demolition and piling works would not be scheduled outside of standard hours due to noise and vibration impacts on surrounding areas having the potential to disturb sleep and cause nuisance if not managed. Truck movements are predicted to comply with the Project's noise and vibration goals at all worksites. Estimated noise and vibration levels at various setback distances from the investigative works are identified in Table 6 for site investigations, Attachment 1 Appendix S and Attachment 1 Appendix T for site establishment.

Table 6 Sounds Power and Pressure Level Setback Distances (site investigations)

Estimated Vibration and Noise levels	Petrol Powered Road Saw	Vacuum Excavation Truck	Plate compactor and small trench roller	3.5 t Excavator	3.5 t Excavator with small hammer
Sound Power Levels dBA	115	107	106	98	103

Estimated Vibration and Noise levels	Petrol Powered Road Saw	Vacuum Excavation Truck	Plate compactor and small trench roller	3.5 t Excavator	3.5 t Excavator with small hammer
Sound Pressure Levels (SPL) dBA @ 5 m	93	85	84	76	81
SPL @ 10 m	87	79	78	70	75
SPL @ 15 m	83	75	74	66	71
SPL @ 20 m	81	73	72	64	69
SPL @ 25 m	79	71	70	62	67
SPL @ 30 m	77	69	68	60	65
SPL @ 40 m	75	67	66	58	63
SPL @ 50 m	73	65	64	56	61
SPL @ 75 m	70	62	61	53	58
SPL @ 100 m	67	59	58	50	55

Noise management strategies and mitigation measures outlined in Section 3.3.5.5, are to be implemented during the geotechnical investigation works to ensure the environmental performance criteria noise goals outlined within Section 3.3.5.3 are achieved.

Proposed geotechnical borehole diameters are planned to be 100 mm. Post drilling and excavation the surface is envisaged to be either reinstated to the original surface level, or the installation of surface level pit. Proposed geotechnical borehole locations, additional information and station precinct maps are in Attachment 1 Appendix F.

Based on modelling data, the site establishment works without mitigation the following properties would experience *potential noise exceedances* at the following locations:

- Roma Street Precinct:
 - Daytime and night time airborne construction goal exceedances:
 - Roma Street (Abbey Apartments))
 - Queensland Police Headquarters and Watch House
 - St Alban Catholic Church
 - Supreme and District Courts
 - Wickham Terrace Residential by up to 3dB(A).

- Albert Street Precinct:
 - 70 Mary Street (Mantra on Mary)
 - 108 Albert Street (Oaks Festival Towers), and the associated ground floor commercial tenancies.
 - Previously identified receptors along Albert Street towards Elizabeth Street would also experience ground borne noise and vibration impacts.
- Woolloongabba Station:
 - Daytime and night time airborne construction goal exceedances:
 - Gabba Central Apartments
 - St Nicholas Russian Orthodox Cathedral
- Boggo Road and Southern Portal:
 - Daytime and night time airborne construction noise goals would be exceeded at:
 - Railway Terrace sensitive receptors
 - Sensitive receptors north of Park Road Railway Station (Merton Road to Elliot Street)
 - The Leukaemia Foundation ESA Village
 - The PA Hospital
 - Ground-borne noise goals would be exceeded at:
 - Sensitive receptors north of Park Road Railway Station between Merton Road and Elliot Street
 - The Leukaemia Foundation ESA Village.

Careful noise management strategies and mitigation measures outlined in Section 3.3.5.5 are to be implemented during the site establishment demolition, clearing, piling works to achieve the environmental performance criteria noise goals (Section 3.3.5.3). Attachment 1Appendix S and Attachment 1Appendix T detail the SPL and vibration levels of equipment to be used during the Site Investigation and Establishment works.

3.3.5.2 Environmental Outcomes

The following environmental outcomes in relation to noise and vibration are to be achieved for the site investigation and establishment works:

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

3.3.5.3 Performance Criteria

The following performance criteria must be achieved throughout the site investigation and establishment works:

- Project works are designed, planned and implemented to achieve the noise goals specified in Section 3.2.5.1 to the extent reasonable and practicable
- Site establishment works must be designed, planned and implemented to achieve the vibration goals specified in Section 3.2.5.1 to the extent reasonable and practicable
- Potentially Directly Affected Persons must be identified and consulted regarding the potential impacts and the mitigation measures proposed to address the impacts. These persons will be identified utilising existing information and additional predictive data in accordance with the Community Engagement Plan and Community and Stakeholder Engagement Plan
- Mitigation measures must be developed in consultation with potentially Directly Affected Persons on a 'case by case' basis
- Agreed mitigation measures must be included in a mitigation register and implemented prior to undertaking construction works where appropriate.

3.3.5.4 Coordinator-General Conditions

The following Imposed Conditions must be achieved for the Project, Condition 11 - Construction Noise and Vibration and Condition 12 - Property Damage, see Attachment 1 Appendix E for full details of these conditions.

3.3.5.5 Mitigation Measures

Noise

- Initiate on-going and early consultations with potentially Directly Affected Persons to notify them of the proposed works and to determine suitable mitigation measures and implement the CEMP to achieve the outcomes developed in consultation with the potentially Directly Affected Persons
- Operators of construction equipment to be made aware of the potential noise/ vibration problems and of techniques to minimise emission through a continuous process of operator education. This will include regularly training staff and subcontractors (i.e. via toolbox talks) through to using equipment in ways to minimise noise
- Enclose equipment that generates higher levels of noise, subject to confirmation of noise levels of drill rig
- Provide noise attenuation screens if required
- Maintain plant and machinery in good working order, in accordance with CPB CMS management system
- Demolition and piling works to occur within the period of 6.30 am to 6.30 pm Monday to Saturday (excluding public holidays). Works to occur outside of those hours will need prior assessment and approval
- Scheduling noisy work such that it will coincide with high levels of ambient noise, for example during peak hour traffic periods, so that construction noise is partially masked
- Substitution of noisy demolition practices with quieter ones, for example, using saw cutting in place of breaking

- Lowest noise/vibration emitting plant and equipment that can economically undertake the work should be selected, wherever possible
- Machines/ tools found to produce excessive noise/vibration compared to industry best practice should be removed from site or stood down until repairs or modification can be made; if repairs or modification are not possible then a suitable replacement should be found
- During piling works, work will only take place during dayshifts, with hoardings/noise walls to be in place prior to piling
- Vegetation clearing will occur during dayshifts only
- Removal of glass panels as complete panes, rather than breaking during removal
- Consultation with potentially affected entities to notify them of proposed works and determine suitable mitigation measures
- Plan construction to undertake the following measures:
 - Early installation of acoustic screens around potential noise sources
 - Using the quietest plant and equipment reasonably expected to undertake each component of work
 - Minimise the coincidence of noisy plant and equipment working simultaneously near sensitive receptors.
- Use of pre-fabricated materials for construction where possible
- Initiate on-going and early consultations with potentially Directly Affected Persons to notify them of the proposed works and to determine suitable mitigation measures and implement the CEMP to achieve the outcomes developed in consultation with the potentially Directly Affected Persons
- Enclose equipment that generates higher levels of noise
- Provide noise attenuation screens, hoarding or other portable noise barriers if required. Noise controls including hoardings/noise walls will be considered based on specialist advice and incorporated into the precinct designs. The effectiveness of these treatments will be demonstrated through noise monitoring required by this plan.
- Maintain plant and machinery in good working order and operate mobile plant and power tools in a quiet and efficient manner
- Switch plant and equipment off when not in use
- Locate generators and other 'fixed' sources as far as practical from adjacent receptors. Procure 'low noise' generators and other 'fixed' sources. Fit engine covers to all plant
- Fit effective residential class silencers to all engine exhausts
- Based on predictive modelling and drill equipment specifications, provide CBUGU Stakeholder and Communications Team with notification of scheduled high noise construction activities prior to allow for pre-notification to Directly Affected Persons in accordance with *Community Engagement Plan* CRRTSD-CU-MPL-CBUGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBUGU-000018.

- Undertake inspections to identify any sources of unnecessary or excessive noise for which there are no registered mitigation measures
- Undertake noise monitoring in accordance with the Monitoring Plan in Section 7.2. Monitoring will be undertaken at the start of demolition activities, on a monthly basis and in response to a complaint with hand held monitoring apparatus
- As per Condition 11 (f) CBGU will consult with Directed Affected Persons prior to works commencing (including consultation regarding predicted impacts and mitigation measures) in accordance with *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018.
- Project Works predicted to, or monitored as, generating noise levels more than 20dBA are authorised to occur only when advance notification and consultation has been undertaken with Directly Affected Persons and where mitigation measures have been developed on a 'case by case' basis and are incorporated in a mitigation register. These works can occur between the hours of 7:00am and 6:00pm Monday to Friday, with a respite period between 12:00 noon and 2:00pm each day
- Where noise monitoring indicates the noise goals relative to human health and wellbeing would be exceeded, inform and consult the Directly Affected Persons to develop mitigation measures. Any discussions with Directly Affected Persons must involve the community and stakeholder relations team.
- Where all reasonable and practicable measures are implemented and noise and vibration impacts are unavoidable and significant, respite measures may be used. The provision of respite periods involves scheduling work during periods when people are least affected to minimise exposure
- In accordance with the *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018, if necessary:
 - the environment team will set up a noise monitor to measure noise levels, determine if they are within operational requirements and inform the stakeholder if they are compliant.
 - if a neighbouring stakeholder is severely affected by noise above the performance criteria and therefore constitutes being a Directly Affected Person, the CRT team will work with the environment and construction teams to consider an individual noise treatment program, which may include changes to construction methodology/timing, architectural treatments or, as a last resort, temporary relocation.

Vibration

- Selection of equipment to minimise vibrational impacts, where possible.
- Vibration levels at locations with potentially vibration sensitive building contents have been modelled and found to be well below the vibration compliance guideline for damage of less than 3mm/s, of note the Princess Alexandra Hospital (Sensitive building contents) vibration levels during the site establishment works were modelled at 0 mm/s
- Where the works in a locality have potential to exceed the vibration goals nominated:
 - Surveys conducted as part of the EIS and Project Change Notices identify residential properties and other places especially sensitive to sleep disturbance (e.g. hospitals, nursing homes and child care centres)

- Demolition activities will have mitigation measures developed in consultation with Directly Affected Persons (this process is detailed below)
- When required surveys will be conducted in the locality to identify residential properties and other places especially sensitive to sleep disturbance (e.g. hospitals, nursing homes and child care centres)
- Where required 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
 - Implement practical and reasonable mitigation measures that would achieve the environmental outcomes or achieve alternative outcomes developed in consultation with Directly Affected Persons. These include:
 - Substitution of alternate demolition methods
 - Consideration of materials handling measures including the use of damped receptacles and avoiding the dropping of material from heights.
- Ensure ground vibration levels transmitted from operating items of plant in the vicinity of buildings do not exceed levels that are close to the lower level of human perception inside the premises or cause structural damage to the buildings and other structures, through:
 - Utilise existing baseline condition measurements already undertaken by CRRDA before commencement of the works.
 - Progressively monitoring during the works to confirm conformance with approval conditions.
- Where ground-borne vibration monitoring indicates either the vibration goals relative to human health and wellbeing would be exceeded, inform and consult, with the CRRDA Community and Stakeholder Engagement Team, the Directly Affected Persons to develop mitigation measures as per the *Property Damage Management Plan*, and *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or the *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018.

3.3.6 Air Quality Management Plan

3.3.6.1 Background

Albert Street is a fully developed urban environment within the Brisbane CBD. The Woolloongabba Precinct is a remediated and cleared site open to the surrounding urban environment on all sides. Roma Street and Boggo Road precincts are operational rail facilities. A qualitative assessment of the potential air quality impacts associated with the proposed changes to the project was completed to determine which changes would potentially result in material impacts. Further quantitative assessment (dispersion modelling) was undertaken for the locations that material air quality impacts were considered likely, in particular worksites/precincts.

Updated dispersion modelling was undertaken to assess the site investigation phase air quality impacts at the following worksites:

- Woolloongabba station
- Roma Street station (including the works for the integration of the Inner Northern Busway (INB))

- Southern Portal and Boggo Road station (sites were assessed cumulatively as the worksites would be close together and works would occur at the same time).

Fugitive dust emissions may result from the following site investigation and establishment activities:

- Drilling
- Demolition
- Excavating spoil
- Loading material on trucks
- Rock breaking and piling
- Wind erosion from disturbed areas
- Wheel generated dust from machinery on unpaved surfaces.

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

Construction air quality impacts for CRR Project were originally assessed in the *EIS in Volume 3, Technical Report 8 – Air Quality*. A further assessment of air quality impacts specifically for the site investigation works was completed. This assessment used a qualitative approach to determine any potential material changes to the predicted air quality impacts detailed in the 2011 EIS and RfPC-1. This section provides a summary of the baseline conditions and predicted impacts from these assessments from which the mitigation measures were developed. Refer to *EIS Change Report 2019: Section 8.3* for additional information.

Baseline Conditions

The key sensitive receptors potentially impacted by the works include local residents, transient local community members and public transport passengers. Each of these receptors are currently subject to existing air emissions.

Background air quality information shown in the previously approved RfPC's and summarised in Table 7 was established based on data from four monitoring stations (Cannon Hill, Brisbane CBD, South Brisbane, Rocklea). The data indicates that background concentrations are well below their respective air quality goals within the CRR Project Imposed Conditions. Since the CG approval for the coach terminal relocation (August 2018), baseline air quality monitoring has commenced at the Roma Street area.

Table 7 Baseline Air Quality and Goals

Air Quality Indicator	Averaging Period	Units	Goal	Background Concentration
Total Suspended Particulates (TSP)	1 year	µg/m ³	90	24
Particulate matter (PM ₁₀)	24 hours	µg/m ³	50	17
	1 year	µg/m ³	25	14.5
TSP	24 hours	µg/m ³	80	26

Air Quality Indicator	Averaging Period	Units	Goal	Background Concentration
Deposited Dust	30 days	mg/m ² /day	120	60

Potential Impacts

Close consultation with sites adjacent to the precincts will allow individual property mitigation measures to be tailored with consideration of actual dust measurements and particular circumstances at the time. Standard dust mitigation measures are likely to mitigate any potential dust impacts to surrounding sensitive receptors to acceptable levels.

The site investigation and establishment activities may increase potential for air quality impacts primarily due to dust generation from demolition works, removal of pavement and pavers, movement of equipment, vegetation clearing, earthworks, material haulage resulting in increased truck movements and wheel and wind generated dust from any exposed areas and vehicle emissions. Other impacts to air from construction result from vehicle and plant emissions. Any potential impacts will be temporary and minor in nature.

During the site investigation and establishment period, the following sources have the potential to emit dust and pollutants and impact air quality:

- Worksite establishment and demolition activities
- Spoil removal and replacement
- Construction of buildings and amenities
- Installation of piling
- Wind erosion from disturbed locations
- Wheel-generated dust from truck movements on unpaved surfaces
- Power source emissions from construction equipment, generators and other plant.

3.3.6.2 Environmental Outcomes

- Nuisance from dust, odour and emissions arising from site establishment activities is minimised at nearby sensitive receivers
- Nominate the 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 site establishment works
- Monitor the effects of management and mitigation measures.

3.3.6.3 Performance Criteria

The following performance criteria must be achieved throughout the site establishment works:

- Emissions are within the air quality goals as set out in the Coordinator- General's Imposed Condition 13: Air Quality
- Minimise complaints from dust generation
- Where emissions are predicted to exceed the air quality goals, mitigation measures are designed and implemented to mitigate the impacts for nearby sensitive receivers.

3.3.6.4 Coordinator-General Conditions

The following Imposed Condition must be achieved for the Project, Condition 13 - Air Quality see Attachment 1 Appendix E for full details of these requirements.

3.3.6.5 Mitigation Measures

The following 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.

- At investigation and establishment work sites, monitor meteorological conditions, particularly wind speed and direction. When adverse meteorological conditions are experienced (Weather warnings and wind speeds above 40 km/hr (considering the sheltered urban nature of the sites) to be reported to the Site Supervisor and Construction Teams) 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 methods
 - Increase in dust suppression measures.
- When no other reasonable or practical measure is available, cessation of work until the meteorological conditions improve and the environmental outcome can be achieved
- If monitoring shows exceedances during site investigation and establishment works, additional mitigation measures may be required, such as limiting dust generating activities during dry, windy conditions, increasing watering rates during dry periods, and undertaking targeted consultations with Directly Affected Persons.
- In accordance with the *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018, environment team members will set up a measuring device to monitor vibration for that area. The stakeholder will be informed if levels are within goals. Other potential solutions such as increased water truck patrols or house/vehicle washing to mitigate the dust will be investigated and implemented if feasible.

Dust

- Site specific dust mitigation methods have been tested to identify adequate mitigation of potential air quality impacts. The control methods and factors are identified in Table 8. The additional control measures will be added to the Project OEMP and implemented at these worksites.

Table 8 Control Methods for Site Specific Investigation and Establishment Activities

Precinct	Activity	Control Method	Control Factor
Southern Portal / Boggo Road	Drilling	Water spray	70%
Roma St and Albert St	Demolition	Water spray	50%
Woolloongabba and Roma Street Station	Drilling	Acoustic enclosure, water spray	91%

Precinct	Activity	Control Method	Control Factor
All Precincts	Vehicle Movements	Water spray	70%

- Ensure appropriate dust controls are used for any dust generating 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
 - Water sprays and covering loads of material transported from the worksites.
- Visually monitor vehicle movements on a regular basis to: prevent queuing in streets prevent queuing vehicles idling
- The site shall be visually monitored daily for excessive dust generation and corrective actions undertaken to minimise dust where possible
- Where appropriate undertake ambient odour inspections for potential odour-generating activities (e.g. excavation of contaminated soils) on a daily basis
- During piling works, hoardings will be installed as appropriate for dust control (acting as wind breaks), rock piling pads will be used, with appropriate onsite water control measures
- All complaints regarding dust are to be dealt with in accordance with the complaints management procedure as outlined in the *Community Engagement Plan* CRRTSD-CU-MPL-CBGU-000002 and/or *Communications and Stakeholder Engagement Management Plan* CRRTSD-CU-MPL-CBGU-000018. (Section 3.3.1).

Exhaust Emissions

- Manage the movement of vehicles to avoid queuing near residential receivers
- Adopt traffic management procedures in accordance with the *Construction Traffic Management Plan* (Section 3.3.2) to avoid vehicles idling for excessive periods if required to queue to enter the worksite
- Where feasible, collect and direct exhaust emissions from stationary plant away from sensitive receivers
- For stationary plant and equipment, ensure all diesel motors are fitted with emission control measures and that these are regularly maintained to manufacturers' specifications.

Greenhouse Gases

- Maintain equipment and vehicles in good working order to maximise the fuel efficiency of equipment
- Procure energy efficient equipment, when appropriate
- Use mains electricity where practicable to minimise the use of generators.

3.3.7 Visual Amenity and Lighting Management Plan

3.3.7.1 Background

Predicted Impacts

During the site establishment works of the Albert Street, Boggo Road, Roma Street and Woolloongabba Precincts the following sources have the potential to impact the visual amenity and lighting within and around the precinct footprint:

- Worksite establishment and demolition activities
- Spoil removal and replacement
- Relocation of utilities and protection of utilities within site area and access/egress points
- Construction / establishment of site buildings, sheds, fencing and amenities
- Lighting towers used to illuminate night works
- Vegetation clearing.

Excessive and offensive lighting, as well as unmanaged impacts on local residents and businesses due to construction of the Project have the potential to impact the visual amenity within and around the Project. Construction will be predominantly completed in the standard hours, thus reducing the volume and hours lighting will be required. The lighting can be managed and incorporated into the design to minimise any impacts.

Vegetation removal is required during site establishment activities therefore reducing landscape quality of the precincts. Vegetation clearing will occur due to new road alignments, inclusion of spoil handling area, site offices and parking, for site vehicle access and to install the noise walls/hoarding. Noise controls including noise walls/hoardings will be considered based on specialist advice and incorporated into the precinct designs. The effectiveness of these treatments will be demonstrated through noise monitoring required by this plan.

An increase in signage, demarcation and vehicles along the shared use zones will diminish the character of the precincts. During site establishment the visual amenity will be temporarily reduced, however the final precincts have been designed with urban design objectives and integrated into the surrounding urban environment. Integrated landscaping will improve the general site appearance.

3.3.7.2 Environmental Outcomes

The following environmental outcomes in relation to visual amenity and lighting are to be achieved for the site establishment works:

- Construction activities minimise and mitigate impacts on the visual and landscape environment
- Surface construction works do not extend beyond designated worksite boundaries.

3.3.7.3 Performance Criteria

- Impacts of construction works, including the 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
- The construction worksite is rehabilitated progressively, and as soon as practicable, following construction works
- Construction lighting is designed, constructed and operated to comply with the relevant standard such as AS4282-1997: Control of the obtrusive effects of outdoor lighting
- Avoid nuisance from construction lighting on sensitive receivers and onto nearby roads, pedestrians, cycle paths and parklands

- Surface construction works do not extend beyond designated worksite boundaries.

3.3.7.4 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.

Visual Amenity

- Integrate urban design objectives with the changes in the precinct
- Traffic management plan for the construction phase to include for safe pedestrian access
- Design roof and select materials which do not produce glare for the residences
- Careful integration of signage into the precinct and ensure suitable wayfinding
- Hoardings will be installed around site boundaries during piling works
- 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
- 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.

Lighting

- Where possible, external night time construction activities and traffic movement within the worksites will be minimised
- Program and schedule the construction phase of works to minimise night-time impacts of lighting, including from traffic movement, on residential properties
- The use of existing light poles or small mobile lights will be used during site establishment works, when nightworks are required
- To minimise light spill, the temporary lighting is proposed to be focused on project elements and points of interest
- Ensure all operational lights are located under a roof structure, as far as is practicable, to minimise spill up to the residences
- Project lighting to be designed in accordance with the relevant standard such as AS 4282-1997: Control of the obtrusive effects of outdoor lighting and the Rail Infrastructure Manager's requirements e.g. Queensland Rail's Lighting Standard for Railway Stations guidelines
- Construction phase works to minimise night-time impacts of lighting on residential properties where practicable. Place hoarding and visually impermeable barriers around worksites to minimise views of stockpiles and construction activities, particularly where worksites are visible to residential or recreational users

- Where appropriate, use directionally-controlled, shielded lights that are mounted at a sufficient height to minimise light spill to surrounding properties, maintain safe driving conditions for motorists on adjacent roads and minimise impacts on local fauna
- 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.

Landscape

- 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
- During worksite establishment and subsequent construction, maintain daily site inspections of protective measures for designated significant trees and vegetation, and temporary visual barriers and hoardings for damage or graffiti
- 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, street or park furniture, signage equipment and lighting
 - Reinstatement of grassed areas and paved surfaces where practicable
 - Introduction of interpretive signage relating to cultural heritage, historic heritage and way finding measures.

3.3.8 Water Management Plan

3.3.8.1 Background

Baseline groundwater, surface water and flood condition and impacts for CRR Project were originally assessed in the EIS April 2019 in Volume 3, Technical Report 7 - Hydrology. Subsequently, the Delivery Authority has commissioned baseline surface water quality and groundwater monitoring for the CRR Project. Baseline surface and ground water monitoring will be carried out over a 12-month period from August 2018 to August 2019.

Potential Impacts

It is unlikely that the proposed site investigation activities will have significant impacts on either groundwater or surface water environmental values. Results from proposed water monitoring holes (refer Attachment 1Appendix F and Table 9) will be analysed and reviewed by a suitably qualified person (SQP).

Site establishment activities will consist of the relocation of utilities and services, demolition of structures, piling and material haulage of waste generated. Piling activities have the potential to intercept groundwater at the following locations:

- Boggo Road:
 - Groundwater level expected at RL 22 metres
 - Piling depth of 15 – 21 metres
- Albert Street:
 - Groundwater level expected at RL 0.0 metres (natural ground level of RL 4.55 metres)
 - Piling depth of 11 – 13 metres
- Roma Street:
 - Groundwater level expected at RL 1.5 metres (natural ground level of RL 13 metres)
 - Piling depth of 4 metres
- Woolloongabba:
 - Groundwater level expected at RL 5.0 metres
 - Piling depth of 5 metres

If groundwater is intercepted during piling activities, the water, particularly any resulting from Boggo Road or Woolloongabba precincts, will undergo testing for contamination in accordance with Appendix G – Contamination Management Procedure. Depending on the quality of groundwater, the water may be captured on site in a bunded area, treated if required, and if appropriate, re-used for dust suppression purposes on site (in accordance with the Soil and Water Management Procedure – Appendix H). If surplus non-contaminated water requires discharge, this will be undertaken in accordance with the Dewatering and Discharge Procedure (Appendix I). This discharge procedure details the Brisbane River environmental values and water quality objectives for mid estuary and the processes and monitoring to be completed prior to discharge of waters to the stormwater system.

Disposal of groundwater and other waste water can include direct release to sewer. The *Water Supply (Safety and Reliability) Act* was amended in 2011 to provide for the release of trade waste and seepage water to sewer. This requires consultation and agreement with Queensland Urban Utilities (QUU) and key considerations are the quality and quantity of flows discharged. The QUU sewer network requires sufficient capacity and the level of contaminants needs to be assessed to not impact the downstream sewage treatment process.

Provision should be made for water storage and alternative disposal should maintenance be required on the downstream QUU infrastructure or outlet pipework and any of the monitoring/ sampling equipment. Water quality standards and flow rates should be agreed with QUU. It is assumed that discharge to the sewer network can occur at Woolloongabba precinct.

During site establishment works there is the potential for sources of pollutants to enter waterways from litter, spills, heavy metals, oils and hydrocarbon and chemicals/ hazardous substances and from surface run-off from tracks, demolition works, stations and paved surfaces. Intense and/or frequent rainfall may also have the potential to mobilise sediment from exposed soil areas which can lead to increased sedimentation of local waterways. Surface water quality will be regularly monitored and, if necessary, managed in accordance with

Attachment 1Appendix G. Results from proposed water monitoring bore-holes (refer Appendix F Table 11) will be analysed and reviewed by a suitably qualified person (SQP) in accordance with the: Contamination Management Procedure (Appendix G) and reported in the Monthly and Annual Reports as detailed in Section 7.5.

3.3.8.2 Environmental Outcomes

Surface water

- Construction activities are managed in accordance with the Dewatering and Discharge Procedure (refer to Appendix I) to avoid the transportation of contaminants that might be released to waters
- Environmental values of surface waters immediately downstream of the construction worksite are not adversely affected by the site establishment works during and post construction.

Groundwater

- Groundwater inflow to the construction worksite is minimised
- Groundwater quality surrounding the precinct is generally comparable with preconstruction levels
- Discharge of groundwater from the site establishment works does not adversely impact the environmental values of receiving waters.

Flood management

- The construction worksite is designed to provide for safe evacuation of worksites and to avoid disruption of evacuation routes for adjacent properties in the event of flooding.

3.3.8.3 Coordinator-General Conditions

The following Imposed Conditions must be achieved for the Project; Condition 15 - Water quality and Condition 16 - Water Resources, see Attachment 1Appendix E for further details.

3.3.8.4 Mitigation Measures

The discharge points for waters are nominated as ponded waters/basins and water treatment plants, these will be sampled as per Dewatering and Discharge Procedure (Appendix I), only waters that satisfy the discharge criteria will be discharged to the nearest stormwater drain.

Table 9 identifies the proposed groundwater monitoring wells that will be implemented at Albert Street and Woolloongabba precincts during site investigation works. Monitoring of these wells will continue throughout site establishment works

Table 9 Proposed Monitoring Wells

Location	ID	Depth (m BGL)	Purpose
Woolloongabba Precinct	Monitor 2	12	Groundwater monitoring at Woolloongabba station
	Monitor 3	12	
	Monitor 4	12	
	Monitor 5	12	

Location	ID	Depth (m BGL)	Purpose
Albert Street	Monitor 8	15	Groundwater monitoring at Albert Street Station
	Monitor 9	40	

- Develop and implement storage and handling procedures for fuels, chemicals and other hazardous materials, including procedures to prevent or contain spills
- Ensure that accidental spills are cleaned up and appropriately remediated to avoid contamination of groundwater seepage. This will be completed in accordance with Appendix G Contamination Management Procedure
- Spill kits and SDS registers to be maintained onsite in areas where chemical storage or handling occurs;
- Prior to commencement of works, develop and implement practices and procedures for waste handling, storage and disposal of slurry and potential contaminated material. Refer to Appendix G Contamination Management Procedure
- Surface drainage measures are implemented at construction worksites and work areas to effectively manage stormwater runoff
- Surplus dirty water collected on site will be re-used for dust suppression as per the Soil and Water Procedure (Appendix H)
- Groundwater is discharged in accordance with the Dewatering and Discharge Procedure (Appendix I)
- Stockpiles of excess material are to be located away from drainage areas and flood affected areas
- During routine daily site inspections and immediately following any rainfall event causing runoff from the worksite, a visual assessment is to be conducted of all drainage areas within and adjacent to the worksite to determine the presence of litter, sediment, chemical plumes or other toxicants
- Implement erosion and sediment controls (ESC) in accordance with the Manage Soil and Water Procedure (refer to Appendix H)
- Immediately following any rainfall event causing runoff from the worksites, a visual inspection of all erosion and sediment control measures and bunding is to be conducted to assess any damage or maintenance requirements and to review effectiveness
- Plant risk assessments to be completed for all machinery brought to site to ensure that the machine is functional, free of damage and / or contaminants.

3.3.9 Land Management Plan

3.3.9.1 Background

Baseline land conditions for the sites were originally assessed in the *EIS in Volume 2, Chapter 6 – Soils, Topography and Geomorphology and Chapter 7 – Land Contamination*. Roma, Albert, and Boggo Road precincts are considered low-medium risk for land contamination. However, standard land contamination procedures will be followed for all activities within these precincts and within the rail corridor as identified in Section 3.3.9.5. Further assessment was carried out in the *EIS in Volume 3, Technical Report 4 – Soils, Geology and Geomorphology*. This included the following:

- Desktop review of soil types along the new alignment to determine:
 - Soil erosivity
 - Determine the potential presence of Potential Acid Sulphate Soils (PASS) or Actual Acid Sulphate Soils (AASS).
- A review of previous contaminated land assessments completed for the Evaluated Project
- A review of the Environmental Management Register (EMR) and Contaminated Land Register (CLR) was undertaken for the proposed changed alignment which were outside of the PSI footprints
- Preliminary Site Investigations (PSI) completed for the Evaluated Project footprint and areas for the Proposed Changes.

Further preliminary contaminated land investigations have subsequently been conducted, specifically for the Roma Street area. This investigation provided a preliminary indication of the contamination status of the precinct to facilitate investigation/construction/redevelopment works required to be undertaken. A Suitably Qualified Person conducted the investigation and preparation of the Contaminated Land Investigation Document in accordance with the Environmental Protection Act 1994, Queensland Auditor Handbook for Contaminated Land. This investigation consisted of historic and desktop information. Contamination assessments will also be undertaken for the Roma Street, Albert Street, Boggo Road and Woolloongabba precincts as part of these site investigation works.

- Roma Street precinct is considered low-medium risk. Assumed contamination includes:
 - The BTC Towers are listed on the EMR for petroleum products and oil storage, potential for hydrocarbon contamination
 - The adjoining Roma Street Parklands (the former Roma Street rail yards) has been remediated and redeveloped but remains on the EMR, the parklands has a containment cell housing contaminated material approximately 200 m north of the proposed Roma Street Station.
- Albert Street precinct is considered low risk. Assumed contamination includes:
 - Properties within Albert Street adjacent to the Albert Street Station are listed on the EMR for petroleum products and soil storage
 - There is a possibility of intersecting with uncontrolled fill within the CBD
 - Demolition of buildings may uncover asbestos material
 - There is potential to intersect with Acid Sulfate Soil.
- Boggo Road precinct is considered low risk. Assumed contamination includes:
 - Arsenic residue in rail corridor from historical herbicide/pesticide spraying
 - The PA Hospital (adjoining rail corridor) listed on the EMR for petroleum products and oil storage
 - QR buildings and structures may contain asbestos
 - Potential for temporary increase in groundwater drawdown and potential increase in contamination of groundwater from worksites and surface water interaction. This risk was identified as low through the project EIS and the site investigation and establishment works are being conducted (in part) to enable further groundwater monitoring as recommended. The site investigation and establishment is not predicted to require dewatering.

Potential Impacts

Loss of sediment offsite into waterways may occur during excavation and stockpiling of soil materials. The site is drained through council stormwater and release of sediment laden waters could see impacts to the Brisbane River where the stormwater is discharged.

While the risk is generally low, ASS may be present in localised zones (ARUP, 2018). There is potential to intersect with ASS at the Albert Street precinct. At the other underground station locations, including Boggo Road, Woolloongabba and Roma Street, the potential for exposure of ASS from excavation is considered low. ASS disturbance could result from a number of construction-related activities including:

- Excavation of ASS material
- Sediment movement into waterways and overland flow paths
- Downward loading pressure on unconsolidated sediments from stockpiles, placement of fill material and the placement of structures such as footings, piers, piles and road and rail infrastructure construction
- Groundwater drawdown
- Changes for surface and subsurface flow regimes and pathways.

A desktop review was undertaken to identify additional potentially contaminated sites that may be directly or indirectly impacted by the Proposed Changes. Additional land parcels were identified within and adjacent to the changed alignment that were listed on the EMR as a result of registered notifiable activities. Notifiable activities are prescribed under the *Environmental Protection Regulation 2008* and are those that have been identified as being likely to cause land contamination. The 2011 EIS identifies 2,972 land parcels listed on the EMR. Of these, 506 are located in the study corridor. A summary of potential contamination at the precincts is identified in Table 10.

Table 10 Potential Land Contamination at Precincts

Area	Land Impacts
Roma Street Station	Limited environmental assessment conducted as part of the works presented in the CRR Geotechnical Investigation Report (DTMR, March 2018) reported elevated concentrations of PAH and total recoverable hydrocarbons (TRH) in soils along with elevated concentrations of TRH in groundwater. The notifiable activity for this site remains as petroleum products/oil storage and railway yards.
Albert Street Station	Additional sites nominated on Mary Street and Charlotte Street for minor road works and Elizabeth Street for construction of northern access to the new station. These land parcels are not listed on EMR.
Woolloongabba Station	Stage two contaminated land investigation completed for this site identified soils having elevated concentrations of heavy metals, total recoverable hydrocarbons, polycyclic aromatic hydrocarbons, per- and poly-fluoroalkyl substances (PFAS) and asbestos above the adopted NEPM assessment criteria for protection of human health and the environment. Groundwater is also locally impacted with heavy metals. Remediation of this site is underway with the intention to remove the site from the EMR.

Area	Land Impacts
	The notifiable activity for this site now includes railway yards, hazardous contaminant and petroleum products or oil storage.
Boggo Road	Additional land parcels on Peter Doherty Street, Joe Baker Street and Boggo Road (road reserve). These land parcels are not listed on the EMR.

3.3.9.2 Environmental Outcomes

- Site investigation and establishment works minimise soil erosion and sedimentation and avoid adverse impacts on the environmental values of receiving waters
- Site investigation and establishment works minimise the impacts of ground settlement from construction works
- Site investigation and establishment works avoid or minimise environmental and public health risks associated with disturbance of potential ASS encountered during construction works
- Site investigation and establishment works do not impact on the environmental values of the Brisbane River and other waterways.

3.3.9.3 Performance Criteria

- Site investigation and establishment works do not result in the mobilisation of soil or water contaminants, including sediment movement beyond the boundaries of the worksite. Soil erosion within the worksite is to be rectified as soon as practicable after a rainfall event to prevent the release of sediment offsite
- Runoff from the worksite complies with the environmental objectives established in the Environmental Protection (Water) Policy 2009 (EPP (Water))
- ASS is avoided, or if intercepted, is managed to avoid adverse impact to environmental values, infrastructure, equipment, personnel or the public.

3.3.9.4 Coordinator-General Conditions

The following Imposed Conditions must be achieved for the Project, Condition 18 - Erosion and sediment control and Condition 19 - Acid sulphate soils, refer to Attachment 1 Appendix E for full detail of these conditions.

3.3.9.5 Mitigation Measures

Erosion and Sediment

To inform detailed design and planning, undertake soil sampling at worksites as part of further geotechnical investigations, to identify and characterise vulnerable soils in areas of surface works. Characteristics of interest include confirmation of soil landscapes, soil depth, presence of fill and soil chemical properties

- Manage erosion and sediment 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
- CBGU to reduce the risk of erosion during site establishment works by:
 - Avoiding disturbance of vulnerable surface and subsurface soils

- Minimising worksite clearing and the extent and duration of soil exposure
- Identifying proposed spoil storage locations at establishment sites
- Diverting clean waters around disturbed surfaces and spoil storage locations
- Monitoring the effectiveness of installed control measures
- Progressive stabilisation and revegetation of disturbed areas, using stored topsoil where practicable.
- Any damaged erosion and sediment control measures will be repaired or replaced following rainfall events in line with the Erosion and Sediment Control Procedure identified in Appendix J
- Stockpiles located away from drainage areas and flood affected areas. Locate spoil placement sites away from creek banks and provide adequate bunding to prevent sediment run-off into waterways or stormwater drains or inundation in a 1 in 5-year flood event
- Erosion and sediment control measures must be maintained in good working order, with any damaged or ineffective measures repaired or replaced following rainfall events or otherwise as required.

Acid Sulphate Soils

- Characterisation of the ground in areas of potential disturbance is essential to quantify the quantity of sulphides and the neutralisation required in order to mitigate risk of AASS production. This will be done in accordance with the Acid Sulphate Soils Procedure in Appendix K
- Low level of treatment – Category L for disturbances of ASS requiring treatment with less than 0.1 tonnes of fine CaCO_3 , the management should ensure that:
 - Soils are treated with an amount of neutralising agent that will counter their existing plus potential acidity (up to the equivalent of 0.1 tonnes of fine CaCO_3 , e.g. 5 x 20-kilogram bags of fine aglime, available from hardware or agricultural supply stores)
 - Site run-on, runoff and infiltration is managed (any bunding must be made from non-ASS materials).
- Medium level of treatment – Category M for disturbances of ASS requiring treatment with 0.1 to 1 tonne of fine CaCO_3 the management should ensure that:
 - Soils are treated with an amount of neutralising agent that will counter their existing plus potential acidity (up to the equivalent of 1 tonne of fine CaCO_3)
 - The neutralising agent is thoroughly mixed with the soil
 - Site run-on, runoff and infiltration is managed (any bunding must be made from non-ASS materials).

Contaminated Land

- For sites where contamination is known or suspected to occur onsite (i.e. listed on the EMR) or is unexpectedly encountered during excavation/construction activities refer to the Contamination Management Procedure for mitigation measures in Appendix G
- Design to minimise and limit ground disturbance
- 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
 - Covering odorous, excavated soil stockpiled on a construction site or a spoil placement site to reduce odour impacts.
- Observations during any soil disturbance for the presence of fill or soil staining. If suspect material is encountered, sampling is to be undertaken to verify any contamination. Suspect material to be stored in sealed container or covered stockpile, flagged as a no go area
 - Any surplus soil or fill material required to be removed from site, must have verification soil testing completed prior to removal. Where soils are contaminated, obtain a soil disposal permit prior to removal off site
 - Implement measures to minimise the exposure of humans and the environment to potentially contaminated soils during excavation activities, in accordance with guidance from the SQP
 - Weed management and control practices are to be implemented throughout the site investigation precincts to minimise the risk of spread of weed species into, out of the project area and between construction sites. This will be in accordance with the Weed Management Procedure identified in Appendix L

3.3.10 Waste Management Plan

3.3.10.1 Background

The sites are located in Brisbane Metro area where there are numerous waste collection and recycling opportunities available for waste management. The CBGU *Construction Traffic Management Plan* CRRTSD-TM-MPL-CBGU-000012 identifies the application of shake down pits or other approved facilities at site entry points to minimise the transfer of waste and dust from the site to other roads. Requirement for the establishment of waste management and materials recycling arrangement, including minimisation of waste creation, recycling of used materials as far as possible and responsible disposal of waste (as per the Environmental Protection Act 1994) is also identified.

Potential Impacts

The site investigation works are expected to generate minimal waste products. The primary waste stream expected is slurry generated from drill works. Waste from utility excavations is expected to include overburden, this will be contained using hydro-excavation equipment. Contamination investigations will occur in conjunction with the geotechnical drilling. Potentially contaminated soil will be disposed offsite in accordance with a Disposal Permit.

The site establishment works are not expected to generate significant waste products and any associated impacts would generally occur through poor waste management actions. The primary waste stream expected is demolition waste, site establishment waste, and scraps or waste from contamination encountered. The primary impacts include:

- Dust generation from inappropriate handling and disposal of excavated material
- Soil and water contamination from material spills during handling and haulage

- Soil and water contamination from inappropriate handling of solid and liquid waste and material separated for recycling, re-use and recovery
- Soil and water contamination from inappropriate handling of waste materials from a site listed on the EMR.
- Increased prevalence of vermin, insects and pests
- Inefficient use of resources and inappropriate procurement of resources.

3.3.10.2 Environmental Outcomes

- Site investigation and establishment 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 establishment works are carried out to avoid breach of environmental legislation, cause potential environmental harm and or adverse impacts on communities
- Reuse and recycling of waste materials generated by site establishment activities is optimised.

3.3.10.3 Performance Criteria

- Site investigation and establishment activities are conducted in accordance with the following:
 - Waste management principles (avoid, reduce, reuse and recycle) and sustainable disposal strategies are implemented
 - Targets to recover and re-use waste, for all classes or categories of waste
 - Taking all reasonable and practicable steps to minimise the impacts of handling and disposal of waste at the worksites, and at the disposal sites.
- Hazardous waste is handled and disposed of in accordance with the approved disposal methods in the Waste Management Procedure (refer to Appendix M), the QLD Soil Management Guidelines, and Workplace Health and Safety Queensland
- Waste generated is managed in accordance with the requirements and recovery targets set out in the Queensland Governments Waste - Everyone's Responsibility Queensland Waste Avoidance and Resource Productivity Strategy (2014- 2024), refer to Appendix N
- Inert and non-hazardous demolition wastes will be recycled at a minimum of 90% as per the ISCA requirements for the project. This recycling will be managed through the demolition contractors (via contracts)
- Any regulated and contaminated waste to be disposed of in accordance with the Environmental Protection Act 1994.

3.3.10.4 Mitigation Measures

- Site management to ensure that there are adequate waste bins for the site area
- Waste materials to be separated on site and recycled wherever possible
- Allocate sufficient waste storage for the entire worksite
- Remove all waste and/or unnecessary equipment and facilities

- Inductions to cover site rubbish disposal. No rubbish to be left / dumped on site by CBGU staff and/or subcontractors
- Train CBGU staff and subcontractors to identify opportunities for reuse, where practicable
- Potential soil and water contamination from sites listed on the EMR will be disposed offsite in accordance with a Disposal Permit (see Appendix V for Environmental Constraints Mapping)
- Consider using materials and products that have a recycled content wherever cost/performance competitive, and where environmentally preferable to the non-recycled alternative
- Identify and implement strategies for the reuse of waste products generated during site establishment works. Where reasonable and practicable, provide for the re-use of excavated or salvaged materials in construction material including:
 - Segregated and labelled bins for different waste streams
 - Transfer kerb and pavement materials (concrete, asphalt) to crushing and recycling plants
 - Chip and mulch vegetation cleared for the Project and re-use mulched material for landscaping purposes when feasible
 - Collect empty oil and fuel drums and other containers for return to licensed recycling facilities by a licensed waste contractor.
- Waste unable to be re-used, recycled or recovered must be disposed of in appropriately licensed commercial landfill sites and sewage treatment systems
- 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
- Ensure that sufficient loading / unloading space is provided at the worksite to allow waste materials to be sorted for recycling and reuse
- Ensure the movement of hazardous materials and regulated wastes occurs at non-peak times to minimise the possibility of traffic conflicts and associated risks
- Transportation of hazardous wastes, regulated wastes and contaminated soils must be undertaken by a suitably licensed waste contractor and in accordance with relevant Australian standards, legislative requirements and guidelines
- Safety Data Sheets (SDS) are required to be kept at the storage location of all waste hazardous materials and dangerous goods
- Prepare and implement spill response measures in relation to waste hazardous materials and dangerous goods, refer to procedure in Appendix P
- Any waste materials suspected of containing asbestos will be disposed to an appropriately licensed landfill by a certified asbestos waste contractor, in accordance with the Asbestos Management Procedure (refer to Appendix O)
- Ensure provision of bins at worksite common areas, fitted with lids and serviced prior to being filled to capacity

- Routine daily site inspections are to 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.

3.3.11 Nature Conservation Management Plan

3.3.11.1 Background

The objectives of this Nature Conservation Management Plan (NCMP) 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 flora and fauna (Section 7) as part of the overall project reporting requirements
- Ensures controls and procedures are implemented during site investigation and establishment activities to avoid, minimise or manage potential adverse impacts to fauna and flora within and adjacent to the Project;
- Ensures appropriate measures are implemented to comply with all relevant legislation; and
- Monitors 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, see Appendix U for the Vegetation Clearing.

3.3.11.2 Environmental Outcomes

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

- Ecological, habitat and natural asset values of open space areas near Project Works are maintained
- No net loss of habitat occurs as a result of the design and construction of the Project
- Construction activities do not cause the introduction of spread or pest species; and
- General Biosecurity Obligations must be met pursuant to the *Biosecurity Act 2015*.

3.3.11.3 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 or 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 2015* 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 2015.

3.3.11.4 Mitigation Measures

- The following approvals and exemptions have been identified for the works:
 - The works are located outside of the high-risk trigger area for Protected Plants and the vegetation and flora assessment (Appendix U) identified a single endangered, vulnerable or near threatened (EVNT) species located within proximity to the works area. The EVNT species is a single Plunkett Mallee (*Eucalyptus curtisii*) which has been planted as part of site landscaping and will be retained for the works. As such a clearing a clearing permit and exempt clearing notification is not required.
 - Under the Planning Regulation 2017, the works are exempt for clearing native vegetation (Schedule 21, Part 1, section 1, Clause 14(b)).
 - The Coordinator General's Project Change report (June 2019) project approvals indicate that the works are exempt from Natural Assets Local Laws 2003 with offsets developed in consultation with Brisbane City Council. Consultation with Council has resulted in an agreed approach to offsets based on the site clearing plans (Appendix U).
 - Clearing several trees will occur within the Woolloongabba Priority Development Area. There is an overall exemption under Schedule 1 of the Woolloongabba Development Scheme being for the development of a utility installation. This exemption relates to all aspects of development. Disturbance to significant vegetation and habitat during construction will be minimised, 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.
- As part of the Project induction process, it will be communicated 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.
- Clearance or trimming of native vegetation to that necessary for construction to avoid unnecessary impacts will be minimised, to reduce rehabilitation costs and minimise exposed surfaces that could lead to erosion and sediment issues.
- Where reasonable and practicable, construction site infrastructure will be located, 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.
- Site management procedures will be implemented to avoid or minimise potential for harming native fauna and respond to incidents when fauna enter construction worksites.
- A qualified fauna spotter/catcher will be present prior to and during the removal of any habitat trees to capture and relocate any fauna that is disturbed. The fauna spotter/catcher will be registered with DES and hold applicable licences and permits.
- A suitably qualified and experienced person will undertake a pre-construction fauna survey within and around work sites to identify any fauna.
- Lighting associated with night works will where possible incorporate fittings to limit dispersion of light outside the target area and 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 will not extend up into the canopy of any surrounding trees.

4 Implementation

4.1 Environmental Management Documentation

4.1.1 Construction Environmental Management Plan

This CEMP outlines the environmental management practices and procedures that are to be followed during the construction of this project. It provides the overall framework for the system and procedures to ensure environmental impacts are minimised and legislative and other requirements are fulfilled. The implementation of this CEMP is supported by the remainder of the environmental management system.

The environmental management measures defined in this CEMP have been developed with consideration of the Coordinator General's Conditions. This CEMP is consistent with AS/NZS ISO 14001:2015 requirements.

4.1.2 Construction Environmental Management Subplans

A number of construction environmental management sub plans support the CEMP. This information has been prepared to identify requirements and processes applicable to specific impacts or aspects of the project's activities. The sub plans address the relevant OEMP and Coordinator General Conditions and are located in Section 3.3.

4.1.3 Construction Area Plan

Construction Area Plans (CAP) outline the planning process and construction methodology for the project areas to ensure effective and efficient execution of work, this is part of the overall Construction planning process as detailed in Figure 1 below. A key component of this process is to Undertake Construction Area Risk Review.

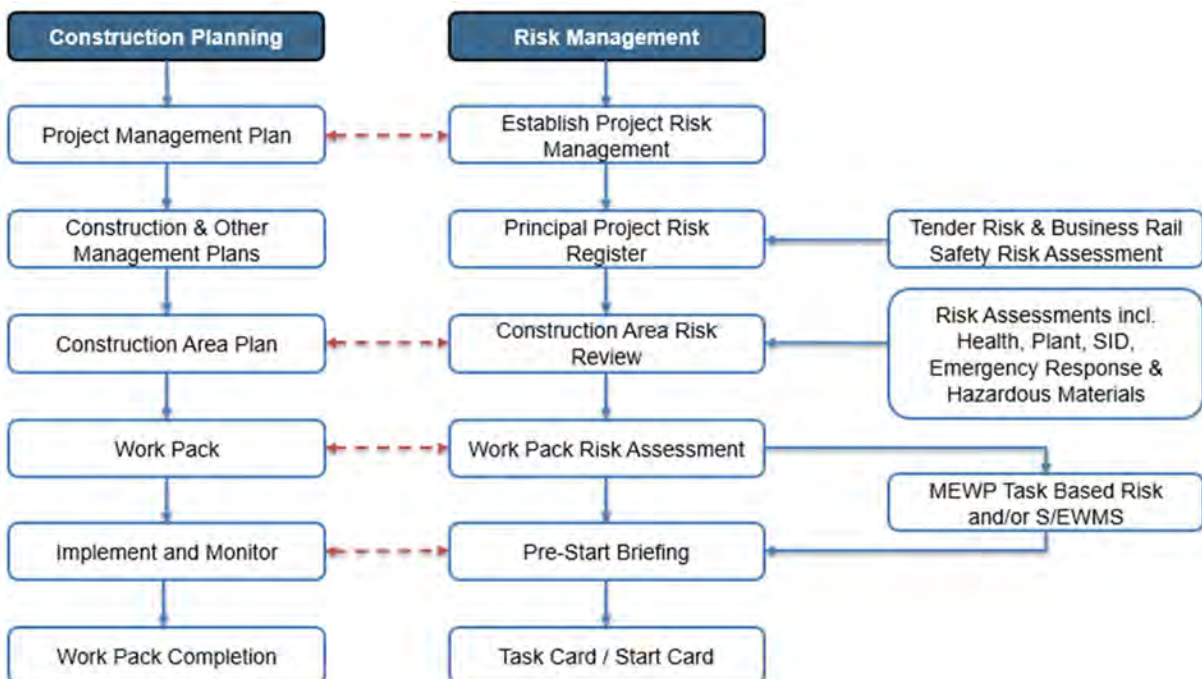


Figure 1 Construction Planning Process

4.1.4 Work Packs

Work Packs outline the work sequencing, requirements and approved documents for the Superintendent, Foreman, Supervisor and work crew to reference in order to undertake work effectively and efficiently.

WPs are collections of documents, consistent with the WBS that set out how and where work will be performed. Each WP may include a number of standard operating procedures, as well as details of unique or unusual methods particular to the work to be undertaken. WPs will be prepared, managed and issued by the construction team. Each WP will typically contain sufficient information to enable staff to construct the works, and to document that construction.

Each of these disciplines have their own WMSs, written to describe methodology, resources, plant and equipment, risks and other specific requirements. The Project Director and discipline managers will determine who is charged with allocating responsibility for developing these WMSs. Typically, WMSs will vary in size and content depending on the complexity of the work and the interfaces with other construction activities. Several WPs will be developed to support a WMS.

4.1.4.1 Environmental Constraints Maps

An Environmental Constraints Map (ECM) is a document prepared to assist in the planning and management of specific areas in Work Packs. Environmental and socially sensitive areas including vegetation, heritage, sensitive receivers, waterways, etc. may be included on an ECM.

A series of ECMs spanning the project area will supplement applicable construction environmental management plans. The ECM provides a simple but effective tool to identify key risk areas and to promote ongoing communication to construction personnel throughout the project, ECM's for the Site investigation and Establishment works are provided in Appendix V.

The ECMs will be document controlled separately to this CEMP or other applicable sub plans. Therefore, an update to the ECMs will not require this CEMP or sub plans to be updated.

4.1.4.2 Environmental Work Method Statements

Environmental Work Method Statements (EWMS) will be prepared for activities within or near environmentally sensitive areas and will include protection measures that minimise the risk of impacting the sensitive areas. The requirement for EWMS will be directed by the Environment and Sustainability Manager for those activities deemed to carry an inherent level of environmental risk (e.g. site establishment, demolition of heritage items).

As a minimum, EWMS will include:

- Description of the work activity, including any plant and equipment to be used;
- Outline of the sequence of tasks for the activity, including interfaces with other construction activities;
- Identification of any environmental and/or socially sensitive areas, sites or places;
- Identification of potential environmental risks/impacts due to the work activity;
- Mitigation measures to reduce the identified environmental risk, including assigned responsibilities to site management personnel; and
- Process for assessing the performance of the implemented mitigation measures.

The EWMS will be reviewed by the relevant Construction Manager and / or Project Engineer and then approved by the Environment and Sustainability Manager (or delegate). Relevant conditions of the EWMS will be incorporated into Works Packs as required.

4.2 Roles and Responsibilities

The organisational responsibilities and accountabilities in relation to environmental management throughout site establishment works are outlined in Table 11 below.

Table 11 Project Roles and Responsibilities

Project Responsibilities
Coordinator-General
<ul style="list-style-type: none"> Administers the State Development and Public Works Organisation Act 1971.
Chief Executive, Department of Transport and Main Roads
<ul style="list-style-type: none"> Entity with jurisdiction for a number of the Imposed Conditions
Cross River Rail Delivery Authority
<ul style="list-style-type: none"> Oversee CBGU'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, including the Outline CEMP and the Outline COEMP. These will form the basis of CBGU'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 CBGU, 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.
Independent Environmental Monitor
<ul style="list-style-type: none"> Monitor compliance with the imposed conditions during the construction of the project.

Project Responsibilities

- Monitor compliance with the Construction Environmental Management Plan and sub-plans.
- Maintain a register of mitigation measures agreed between the Proponent and Directly Affected Persons (Mitigation Register).
- Review the compliance reports required by Condition 5, and the monthly reports and annual reports required by Condition 6, and provide advice to the Coordinator-General and the Proponent on the contents and adequacy of those reports.
- Review the results of monitoring, which may be verified by the Environmental Monitor including by independent monitoring.
- Provide advice to the Proponent about compliance with the Imposed Conditions for construction, including by providing the results of independent monitoring where required.
- Provide advice to the Proponent about issues raised in complaints and the response to complaints, including advice from the Community Relations Monitor.
- Endorse the Construction Environmental Management Plan as consistent with the Outline EMP and complying with the Imposed Conditions (Construction).

CPB Bam Ghella UGL (CPBU)

- Responsible for all approvals, the Construction Environmental Management Plan, the monitoring required under this plan and all information relating to complaints, including access to the complaints database.
- Oversee the subcontractor's site establishment works to achieve the environmental outcomes.
- 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.
- Auditing of subcontractor works to ensure compliance.
- In consultation with the subcontractor, ensure corrective actions arising from exceedances or failures are implemented as soon as possible.
- Establish and maintain a process for receiving, recording and responding to in a timely way, validated complaints about environmental issues.
- Ensure subcontractors comply with this CEMP for site establishment works.
- Establish an environmental management register of mitigation measures developed in consultation with Directly Affected Persons.
- Undertake regular monitoring 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 site establishment works. 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 site establishment.

Project Responsibilities

- Implement corrective actions arising from such exceedances or failures as soon as possible and in accordance with the CEMP. Non-compliances must be resolved in consultation with Directly Affected Persons. Corrective actions must be reported in the monthly environmental report.
- Establish and maintain open and effective communications, 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 site establishment programme
 - The intended scale, timing and duration, and nature of proposed establishment works
 - Proposed mitigation measures and monitoring of impacts, for the duration of the establishment phase.
- 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.

Subcontractor

- Manage the site establishment works to achieve the environmental outcomes.
- Implement this detailed CEMP for the duration of the works.
- Maintain at the Project office and at each worksite:
 - Maintain 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.
- Ensure the Project is carried out in accordance with relevant environmental legislation, policies and guidelines.
- Ensure that mitigation measures are implemented in accordance with the CEMP.

4.3 Subcontractor Management

Though CBGU may delegate environmental requirements and responsibilities to subcontractors, we will remain responsible for the compliance with the endorsed CEMP.

All subcontractors are required to attend the General Site Induction where the requirements and obligations of the CEMP are to be communicated at a site and delivery level as per Section 5.

5 Training

5.1 Environmental Induction

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

- Relevant legislation
- Environmental management requirements
- 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
- Flora & fauna
- Contaminated land and hazardous substances
- Spill management procedure
- Waste removal
- Incidents including definition, management and reporting requirements
- Requirements of other agencies
- Staff code of conduct and behaviour.

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

An induction register is maintained by CBGU to record induction attendance for all staff, subcontractors and visitors.

5.2 Environmental Training

CBGU will develop specific environmental and cultural heritage training required for various roles and personnel as part of their CEMP. A training register is to be maintained by CBGU to record attendees at the training sessions.

5.2.1 Toolbox Talks

Toolbox talks are used as a method of raising awareness and educating personnel on issues related to all aspects of site establishment works including environmental issues. Toolbox talks are used to ensure environmental awareness continues throughout the site establishment works.

6 Incidents & Emergencies

6.1 Incident Notification

The immediate response to all incidents is to make the area safe and undertake measures to prevent further environmental harm. The Environment and Sustainability Manager and Project Director should be notified immediately in the event of an environmental incident.

Incidents that may occur during the Project include a non-conformance with an Imposed Condition including the CEMP or OEMP, 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 CBGU and subcontractor personnel will report all environmental incidents and near misses to their supervisor and notify CBGU's Environmental Team who, in consultation with the Delivery Authority will complete all reporting requirements for the CG, DES and any other regulatory agencies who require notification. The incident or near miss will be recorded using processes outlined in the CEMP, the minimum requirements for reporting incidents are in section 7.5.5.

6.1.1 Notification to DES and other Regulatory Agencies

The Project has 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 within 24 hours. The Project also has obligations to other Regulatory Agencies, DTMR, Queensland Rail (QR) and other stakeholders depending on the scale and type of incident.

6.1.2 Notification to CG, Delivery Authority and Environmental Monitor

The Imposed Conditions impose obligations to notify the Environmental Monitor and the CG 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 CG and Environmental Monitor is 48 hours. Section 7.5.5 has been developed to detail the minimum requirements for the timely management, classification and reporting of environmental incidents.

6.1.3 Internal Incident Notification

Internal Incident Notification shall occur in accordance with the CPB Contractors Environmental Management System. Where necessary, the Project Director or delegate will also notify the joint venture parent companies, CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd.

6.1.4 Coordinator-General Conditions

The following Coordinator-General condition must be achieved for the site establishment works, Condition 5 - Compliance see Attachment 1 Appendix E for full details.

6.2 Incident Types

Incidents include, but are not limited to:

- Any breach of the legislation or an approval or permit condition

- Unauthorised harm or desecration to Aboriginal objects or Aboriginal places
- Unauthorised damage or contrary 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 discharge from sediment basins or other containment devices
- Unauthorised clearing or clearing beyond the extent of the Project footprint
- Unauthorised habitat damage
- Inadequate installation and subsequent failure of temporary ESC
- Contamination of waterways or land
- 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.

6.3 Incident Classification and Procedure

In addition to the requirements under the CEMP, all CBGU and subcontractor personnel will report all environmental incidents and near misses in accordance with processes in section 7.5.5 and as agreed between CBGU and the Delivery Authority prior to the commencement of Project Works.

6.4 Incident Prevention Management

Key effective incident prevention is undertaken by continual environmental inspections and monitoring for the duration of commissioning. During site establishment works 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 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.

6.5 Incident Investigation

Where a significant incident has occurred, an incident investigation must be undertaken, 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.

6.6 Complaint Management

All complaints are to be dealt with in accordance with the complaints management procedure outlined in the *Community Engagement Plan (CEP)* and/or *Community and Stakeholder Engagement Plan (CSEP)* to ensure complaints received by the community and stakeholders are managed appropriately and consistently, as per the Complaints flow diagram below.

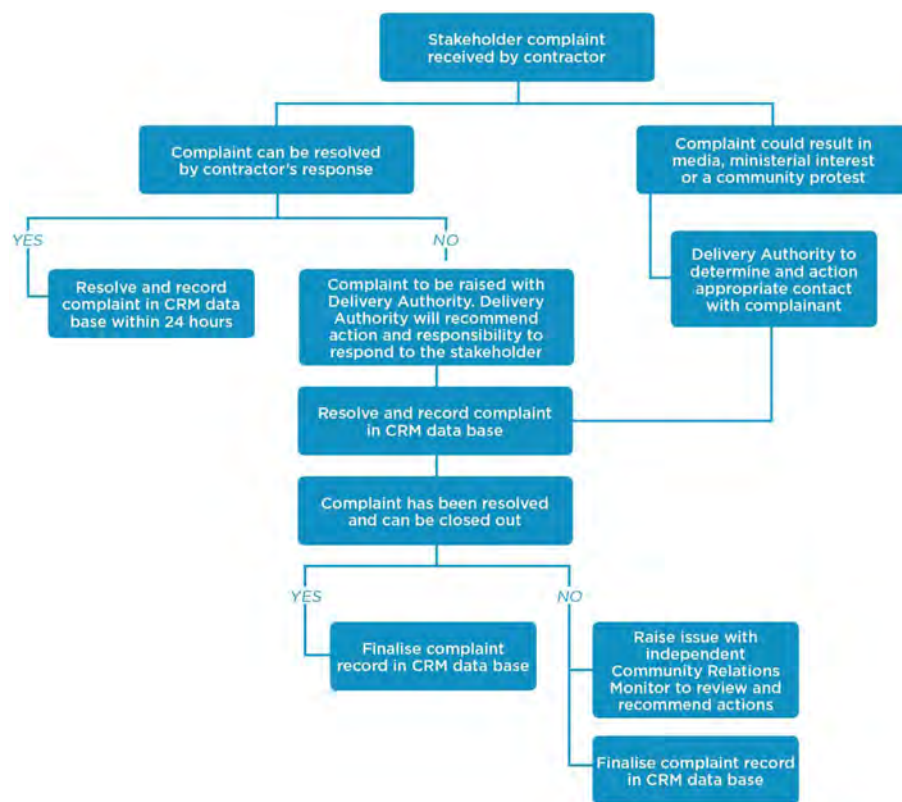


Figure 2 Complaints management process

7 Inspections, Monitoring, Auditing and Reporting

This section outlines the compliance processes that have been adopted by CBGU to ensure compliance with the Coordinator-General Conditions and any other legislative requirements.

7.1 Environmental Inspections

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

The following inspections will be undertaken for the duration of the site establishment works.

Table 12 Project Environmental Inspection Requirements

Type of Inspection	Frequency	Form of Record
Informal inspection of active work areas	Daily	Observation and notes
Formal inspection of active work areas	Weekly	Project Environmental Checklist
'Serious Environmental Harm', 'Material Environmental Harm', as defined by the <i>Environmental Protection Act 1994</i> (QLD)	Incident	Incident Report
Non-conformance	Event	Non-conformance Report

7.2 Environmental Monitoring

The Coordinator-General conditions requires that CRRDA must engage an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Environmental monitor for the duration of construction (as per Condition 7, Attachment 1 Appendix E). The responsibilities of the Environmental Monitor are outlined in Section 4.

7.2.1 Baseline Monitoring

The initial baseline assessment documented in the EIS is based on previous assessments, and the EIS phase desktop and selected field studies. The additional site investigations to be undertaken will provide additional information for use in determining project-specific performance criteria and an indication of the likelihood of achieving compliance with the existing environment conditions.

To obtain adequate baseline data, monitoring is being carried out for at least twelve (12) months (where practical) commencing in August 2018. In addition, this baseline monitoring will continue, where not impacted by the site establishment activities, and will be used to also monitor performance. Noise and Vibration monitoring identified within Section 3.4.5 will be undertaken at sensitive receptors if the piling rig or demolition activities exceed noise and vibration goals identified in Condition 11 (Attachment 1 Appendix E).

7.2.2 Performance Monitoring

Environmental performance must be monitored for each environmental element throughout the site establishment phase. Monitoring must address performance in relation to the environmental outcomes, performance criteria and Coordinator-General's Imposed Conditions, and implementation of the mitigation measures needed to achieve the environmental outcomes.

The specific monitoring actions for each environmental element at each of the Precincts (Roma St, Albert St, Woolloongabba and Boggo Rd) are outlined in Table 13 below.

Table 13 Performance Monitoring Requirements

Aspect	Monitoring Requirements
Noise	<p>During site establishment works and high noise generating activities undertake noise monitoring at key sensitive receptors to verify predicted noise levels and compare against Project noise goals (Attachment 1Appendix E).</p> <p>Monitoring will be conducted in the first 48 hours for any new work predicted to cause significant impact in order to validate noise predictions and in order to ensure effectiveness of mitigation measures. Beyond this time it will only be conducted as required.</p> <p>Undertake noise monitoring in response to complaints about construction noise.</p> <p>Noise monitoring shall be undertaken in accordance with the construction program and the methods referred to the Noise Management Manual (DEHP, Version 4, 2013).</p>
Vibration	<p>Baseline condition measurements before commencement of the works.</p> <p>Progressively monitoring during the works to confirm conformance with Project vibrational goals.</p> <p>Vibration monitoring will be carried out to test for both structural damage and human comfort where the predicted vibration levels (Attachment 1Appendix T) have the potential to exceed the Construction Vibration Goals (Appendix E), based on the proximity of the structure to the vibration source.</p> <p>Undertake continuous monitoring during high vibrational impact work which has potential to cause damage to buildings or surrounding infrastructure.</p> <p>Vibration monitoring shall be conducted in accordance with the requirements identified in section 5.2 vibration measurement of the <i>Transport Noise Management Code of Practice Volume 2 - Construction Noise and Vibration</i> (TMR, March 2016).</p>
Dust and Odour	<p>Monitor meteorological conditions particularly wind speed and direction.</p> <p>A dust deposition monitor will be installed adjacent to the Parklands residential complex at Roma Street Station during site establishment works.</p> <p>Undertake weekly monitoring of ambient air quality (Total Suspended Particulate (TSP), PM10 and deposited dust) against the air quality goals at all precincts.</p> <p>Monitoring must be conducted in response to complaints and monitoring locations must be down-wind of the worksites.</p> <p>Air quality monitoring conducted in response to a complaint will be conducted in accordance with Chapters 6 and 7 of the <i>DTMR Road Traffic Air Quality Management Manual</i>.</p>
Water	<p>Water quality criteria that must be met prior to any offsite discharge to the environment or onsite reuse.</p> <p>Field sampling is required prior to release, appropriately calibrated monitoring equipment shall be used to conduct this monitoring.</p> <p>Release points are noted as basins/ponds and water treatment plants, these will be sampled prior to discharge of waters.</p> <p>Water quality monitoring of the pollutants will be conducted using the identified sampling method and units of measurement and will be undertaken at the prescribed sample frequency in the Dewatering and Discharge Procedure (Appendix I).</p>

During the site investigation and establishment phases, monitoring must include, as a minimum:

- All monitoring is to be performed by a suitably qualified person in accordance with the QLD 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

- Collection, measurement and analysis of specified data at the locations and frequencies required by the CEMP according to recognised and accepted scientific methods by suitably qualified people
- Daily visual environmental site inspection at each work area, including inspections of environmental control measures and environmental impacts of site establishment activities
- Targeted monitoring of key parameters in response to an incident or failure to comply with the Imposed Conditions or the CEMP.
-

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.

7.3 Auditing

Auditing will be undertaken to verify compliance with the CEMP and Coordinator-General's Imposed Conditions. The audits will include review of any prior audits and the impacts of associated corrective actions. The auditing requirements for the Project include, at a minimum, the below:

- Auditing will be undertaken by a suitably qualified person in accordance with *ISO19011:2003 – Guidelines for Quality and or Environmental Management Systems Auditing*.
- Maintain appropriate audit records, and these are to be reported on in the Monthly Report to the Delivery Authority. The Monthly Report must be provided to the Coordinator-General and made available on the project website within four weeks of the end of the month to which the report relates and continue to be available on the project website for the duration of the establishment works.

7.4 Corrective Actions

Corrective actions must be undertaken where monitoring or validated complaints indicate the environmental outcomes or Imposed Conditions are not achieved in relation to particular works, 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 or meet the Imposed Conditions must cease until the corrective actions have been developed and implemented.

Corrective actions must be developed by CBGU in consultation with the Delivery Authority and Directly Affected Persons where deemed necessary. These corrective actions may be developed using a root cause analysis approach to ensure the underlying causes are addressed and not just the presenting causes.

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

CBGU must demonstrate that the corrective actions have been implemented and appropriately communicated within their organisation (and supply chain, if relevant) to prevent reoccurrence.

7.5 Reporting

7.5.1 Coordinator-General Conditions

The following Coordinator-General condition must be achieved for the site establishment works. Condition 6 - Reporting, see Attachment 1 Appendix E for full details

7.5.2 Monthly Report

To ensure compliance with Coordinator-General Condition 6 the proponent will prepare and submit a monthly report within 6 weeks from the end of the month to the Delivery Authority, for publication on their website, which includes the following information:

- Monitoring data required by the Imposed Conditions or CEMP undertaken for the period and, where required, an interpretation of the results
- Details of any Non-Compliance Event, including a description of the Non-Compliance Event, 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.
- An evaluation of compliance in relation to the CEMP
- A summary of any Non-Compliance Events during the reporting period
- A summary of any Non-Compliance Events during the previous reporting period, with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant).

7.5.3 Annual reporting

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

The Annual Report will include:

- a compliance evaluation table detailing the relevant imposed condition, whether compliance with the condition was achieved and how compliance was evaluated;
- an evaluation of compliance in relation to the CEMP and its sub-plans;
- a summary of any Non-Compliance Events during the reporting period;
- a summary of any Non-Compliance Events during the previous reporting period, with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant).

7.5.4 Greenhouse Gas Emissions Reporting

Record the following consumption data to enable Greenhouse Gas (GHG) emissions to be accurately calculated and reported for the Project:

- Diesel, petrol, LPG use by vehicles and machinery
- Electricity use
- Consumption of oils and greases
- Number of units and size of any refrigeration units on site.

7.5.5 Construction Incidents and Non-Compliance Reporting

Environmental incidents shall be notified verbally immediately and in writing within 48 hours of an incident occurring to the Development Authority. Notification will generally be undertaken by the Environment and Sustainability Manager or a member of the CBGU environment team. Additional notification of the incident to the relevant authorities, EM and parent companies will also be undertaken as required.

7.5.5.1 Interim report – Development Authority

In addition to any statutory requirements, within 48 hours of an environmental incident or a non-compliance with the CG's 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) will be prepared by CBGU and provided to the Environmental Monitor and the CG. This report will include the following information:

- A description of the Non-Compliance Event, detailing; the location; date; and time of the event
- Name and details of the designated contact person
- An outline of any actions taken or will be taken to respond to the Non-Compliance Event.

7.5.5.2 Comprehensive report – Development Authority

Within 14 days following the notification of a non-compliance event, written advice detailing the following information will be provided to the Environmental Monitor and the CG:

- A description of the non-compliance event including details of the location, date and time of the noncompliance event;
- The name and contact details of a designated contact person;
- The circumstances in which the non-compliance event occurred;
- 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 will be provided as part of the next monthly environmental report. These Non-Compliance Events will be made available on the project website for the duration of the construction phase of the project.

7.5.5.3 Internal Incident Report

Internal Incident Notification shall occur in accordance with the CPB Contractors Environmental Management System. Where necessary, the Project Director or delegate will also notify the joint venture parent companies, CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd.

7.5.5.4 Regulatory Incident Report

In consultation with the Delivery Authority, CBGU will complete all reporting requirements for the CG, DES and any other regulatory agencies who require notification.

8 Documentation & Communication

8.1 Environmental Records

CBGU is responsible for maintaining all environmental management documents and records associated with conditions as outlined in the CEMP. 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
- Community engagement information
- Records of the following waste and regulated waste tracking, as a minimum, are to be kept throughout the construction phase:
 - Resource use and waste generated from construction works
 - Waste recovered and re-used
 - Waste disposed to landfill
 - Waste transporter or waste contractor details (including company name, licensed operator name and license number).
- Document all contaminated material during transport operations (including the descriptions of processes, personnel and organisations involved in the removal, transportation and placement of contaminated material)
- Documented records of contaminated material movement and disposal
- Soil disposal permits will be maintained on register
- Archival recording will be carried out in accordance the Department of Environment and Science Protection's guideline on Archival Recording of Heritage Places.

8.2 Document Control

A register will be retained of all licenses, permits, approvals and any other agreements pertaining to the works.

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

A system (Teambinder) has been established for registering all in-coming and out-going correspondence regarding environmental matters during the design, construction and commissioning phases of the site investigation and establishment works. The document management system must also include:

- All environmental documents and plans, including all versions of the CEMP, monitoring results, and environmental reports
- All approvals, permits and licenses necessary to conduct the works
- Technical investigations and studies
- Photographic and other visual records
- Complaints and responses
- General correspondence.

8.3 Review and Improvement

CBGU will coordinate the preparation, review and distribution as appropriate, of the environmental documents, including on the project website. As per condition 4 (f) of the CGCR #4 the CEMP will be made available for the public on the project website for the duration of the construction phase. All environmental management documents are subject to ongoing review and continual improvement.

CBGU will implement a document control procedure to control the flow of documents within and between CBGU, Regulatory Agencies, the Delivery Authority and relevant stakeholders and subcontractors. This will include a process for regular review and if required updating of the CEMP, including a process to review and implement additional or different mitigation measures in response to monitoring results.

Updates to the CEMP that include new or additional Relevant Project Work will be endorsed by the Environmental Monitor as being consistent with condition 4 (g) (Appendix E) before Relevant Project Work proceeds.

8.3.1 Construction Environmental Management Plan Review

Revisions to this CEMP may be required during the project to reflect changing circumstances or identified deficiencies. Revisions may result from:

- Annual review
- Management Review
- Audit (either internal or by external parties)
- Complaints or non-conformance reports or
- Changes to the Company's standard system.

Revisions shall be reviewed and approved prior to issue. Updates to the CEMP are numbered consecutively and issued to holders of controlled copies.

8.4 Communication

All internal and external communication with all stakeholders including the public, Coordinator-General, government agencies and the Delivery Authority must be done in accordance with *the Community Engagement Plan* and/or *Community and Stakeholder Engagement Plan*.

Appendix A

Unexpected Heritage Finds Procedure

LegendResponsibilities

PM – Project Manager

SS – Site Supervisor

EM – Environment and Sustainability Manager

EA – Environmental Adviser

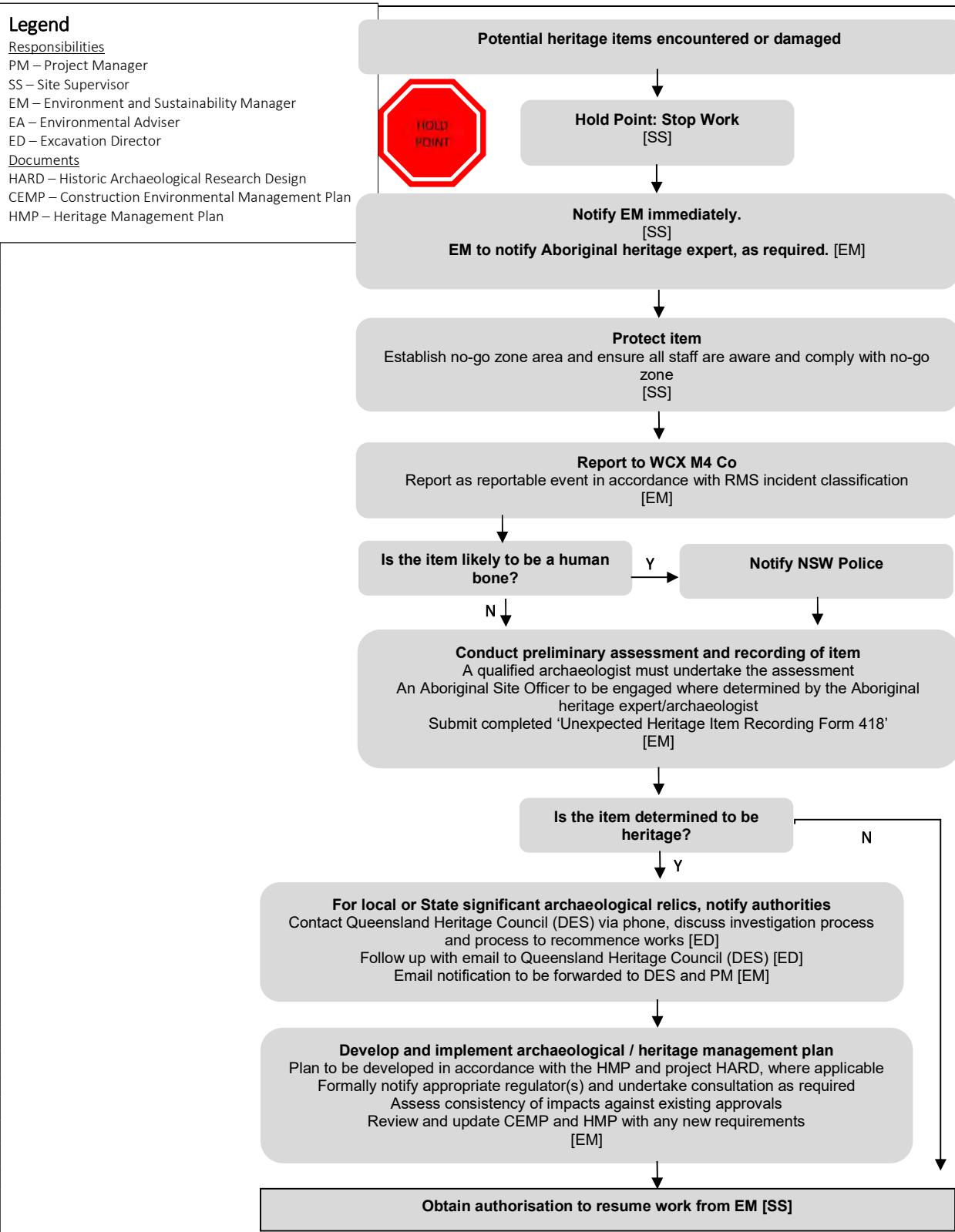
ED – Excavation Director

Documents

HARD – Historic Archaeological Research Design

CEMP – Construction Environmental Management Plan

HMP – Heritage Management Plan



Introduction

Objectives

To provide guidance for the on-site management of an unexpected actual or potential heritage item (Aboriginal or Non-Aboriginal). This procedure does not cover mitigation measures to protect known Aboriginal and non-Aboriginal heritage items that may be impacted by the project during construction – refer to the Cultural Heritage Management Plan (CHMP) (State of Queensland represented by Cross River Rail Delivery Authority) (Clayton Utz).

Training

All personnel to receive heritage training and inductions

Procedure

This procedure summarises the process to follow in the event of unexpected heritage finds. The steps in the flow chart must be followed in the event of the discovery of a potential heritage item during construction. No work is to recommence until the Environment and Sustainability Manager has authorised work to recommence.

Archaeological / heritage management plan

In the event that historical archaeological relics of State or local significance are exposed unexpectedly, the Queensland Heritage Council (Queensland Department of Environment and Science) must be notified in writing by a qualified historical archaeologist and a management plan must be prepared in consultation with the Queensland Heritage Council. This plan must outline all feasible and reasonable measures to be implemented to avoid and/or minimise harm to the item(s) and must be in accordance with the HMP. Work must not recommence without the approval of the Queensland Heritage Council. The Secretary, DES, must be notified in writing of the discovery and of the outcome of consultation with the Queensland Heritage Council. During this process, there should be reference to the site approved CHMP.

Aboriginal heritage management

In the event that items of Aboriginal heritage significance are discovered, an assessment of the significance of the item(s) and determination of appropriate mitigation measures, including when works can re-commence, should be undertaken by a suitably qualified and experienced archaeologist in consultation with the Aboriginal stakeholders. Assessment of the consistency of any Aboriginal heritage impacts against the approved impacts of the project must also be undertaken.

Appendix B

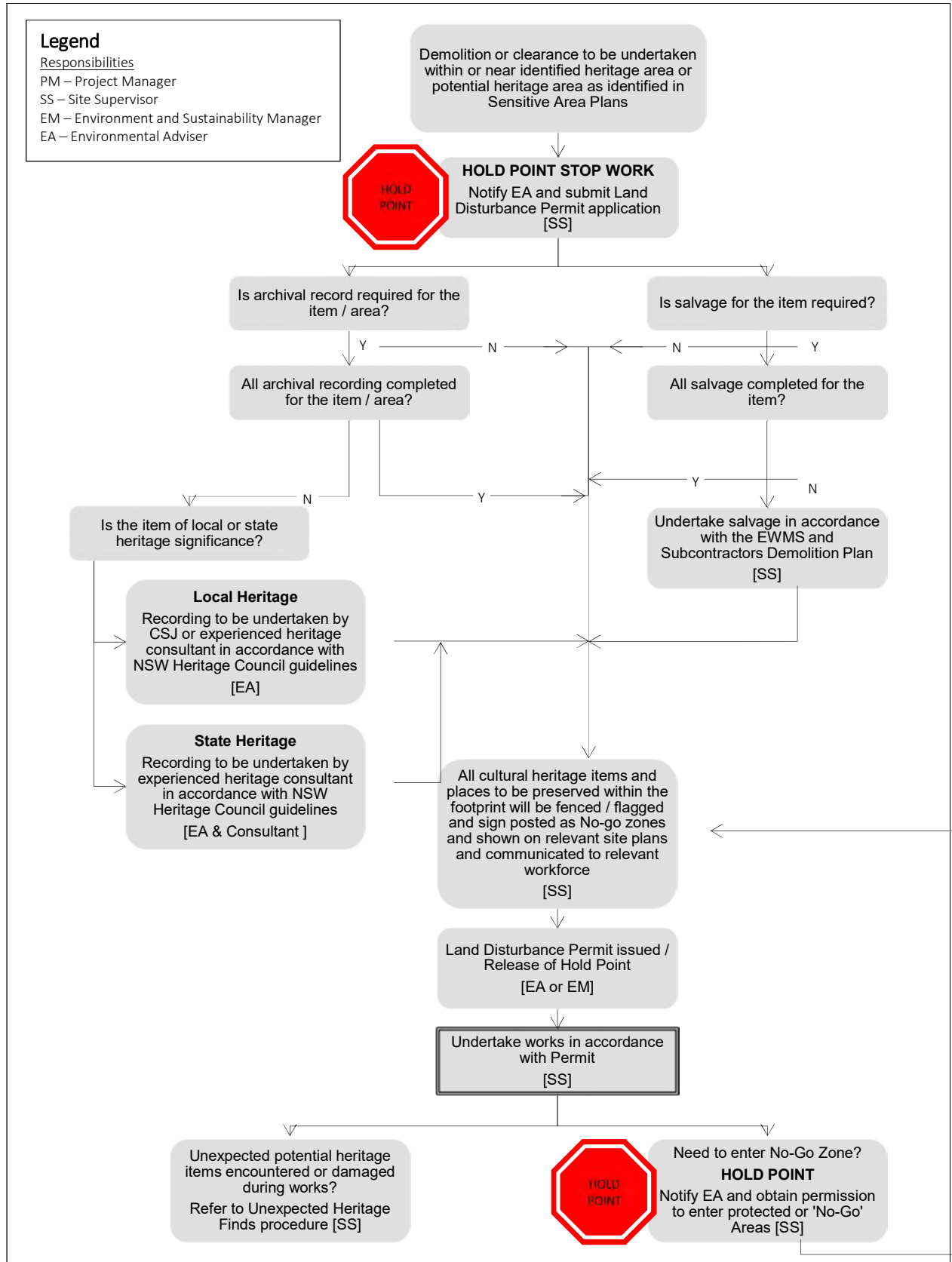
Cultural Heritage Management Plan

Please refer to CRRDA issued:

- 05.06.05 Cultural Heritage > 05.06.05.01 Draft CHMP for Aboriginal Party 1.pdf
- 05.06.05 Cultural Heritage > 05.06.05.02 Draft CHMP for Aboriginal Party 2.pdf

Appendix C

Heritage Management Procedure



Introduction

Objectives

This procedure provides guidance for the on-site management of Aboriginal and non-Aboriginal heritage. The objectives of this procedure are to implement measures to protect all known Aboriginal and non-Aboriginal heritage items that are not directly impacted by the project during construction. It does not cover the process to be followed in the event of an unexpected heritage find – refer to the Environmental Management Plan – Site Investigations, and Cultural Heritage Management Plan (CHMP) (State of Queensland represented by Cross River Rail Delivery Authority) (Clayton Utz).

Training

All personnel to receive heritage training and inductions

Procedure

This procedure is to be implemented for the management of known heritage areas and items during site investigation activities. In the event that an unexpected heritage item is encountered or damaged, the Unexpected Heritage Finds Procedure for Cross River rail and the Cultural Heritage Management Plan: Section 18 Discovery of suspected new Finds must be followed.

Internal notifications

The following occurrences must be reported to the Supervisor immediately:

- Discovery / disturbance of known or possible heritage items or places
- Entering or modifying a no-go zone
- Damage to no-go zone fencing or signage.

Archival recording

Any required archival recording is to be undertaken in accordance with the *Archival Recording of Heritage Places Guideline (DES 2013)* under section 173 of the Queensland Heritage Act 1992. Archival recording is an essential part of conservation practice for heritage places. It aims to identify and capture the unique qualities of a place, creating a permanent record to inform ongoing understanding of our cultural history, significant historical events and caring for heritage places. Minimum requirements for archival recording, as identified by the guidelines, are summarised in the table below. The guideline is relevant to all types of heritage places, items and objects, including landscapes, buildings, building interiors, monuments, structures and spaces, Archaeological Places and artefacts, related objects and material elements, as well as significant social or cultural aspects of a place. The guideline provides guidance for applicants and consultants.

Minimum requirements for archival recording

Responsibility	Activity
What the applicant should do	<ul style="list-style-type: none"> • Consult with the officer managing the approval conditions to define and determine an agreed scope of work required for archival recording. If the applicant has already appointed a consultant to undertake the work, the consultant should be included in these consultations. • After consultation, submit a written outline of the scope of work to the officer managing the approval conditions prior to undertaking recording.

Responsibility	Activity
	<ul style="list-style-type: none"> • Establish a written brief for the consultant undertaking the archival recording. The brief should outline terms and conditions for recording and include the scope of work. • Engage an appropriate consultant to undertake recording, if a consultant has not already been enlisted. The quality of an archival record relies on appointing appropriate consultants with the knowledge, skills and equipment required to undertake the record, thus ensuring outcomes are appropriate to the specific features of a place. Consultants may include heritage consultants, architects, photographers, engineers, archaeologists and historians. • Archival records involving significant archaeological evidence must be prepared by an archaeologist with appropriate experience in historical, industrial and/or maritime archaeology in Australia. • Provide a background briefing to the consultant so that they understand the history, operations and cultural significance of the place. • Provide the consultant with any existing available plans and documentary evidence, such as cultural management plans, conservation studies and heritage register entries. • If required, allow the consultant access to conduct a preliminary site visit prior to undertaking the recording. • Ensure the recording is collated according to requirements outlined in this guideline. • Lodge the completed archival recording as outlined in this guideline.
What the consultant should do	<ul style="list-style-type: none"> • Conduct and produce the recording according to specifications outlined in this guideline and in accordance with the agreed scope of work • Provide Measured drawings to provide an accurate record of buildings, structures, objects and places. They also depict the physical features that contribute to their cultural heritage significance. • Before undertaking a recording, gain a good understanding of the history, operations and cultural significance of the place. Preliminary research should include reviewing the Queensland Heritage Register entry and any other existing records, reports or documents, such as conservation management plans. • If possible, conduct a preliminary site inspection prior to commencing recording, preferably with someone familiar with the site's heritage significance. Become familiar with the site and any opportunities or constraints it holds for recording purposes. • Consult with the officer managing the approval about the scope of work required and provide a written scope of work document to the assessing authority prior to commencing recording. • Work with care and ensure appropriate expertise and equipment to undertake recording. Correct, accurate setup and skill in operating equipment is vital. Poor quality recordings or recordings that do not fulfil the scope of work will be rejected. • Undertake recording with minimal impact on a place. If there is a need to disturb the place in any way (such as moving furniture or storage items to create a clear view for photography), discuss and gain approval first from the site owner, applicant and the officer managing the approval. • Use professional judgement and skill when undertaking a recording. Notify the applicant and the officer managing the application if a change to the scope of work is required. This could include where conditions on site do not allow fulfilment of scope of works, or aspects of a place are revealed whilst recording that are significant to the history of the place but are not addressed in the scope of works. • Photographic recording requirements provide a visual record of a place at a moment in time; simultaneously capturing a variety of attributes of a place from small-scale details and materials to large-scale characteristics of building form and 3-dimensional spatial relationships. Consultants should provide images, key plans, an index sheet and a photographic report.

Responsibility	Activity
Approval and lodgement requirements	<ul style="list-style-type: none"> Collating documents for lodgement and approval is the final step in the archival recording process. Approval is needed to ensure requirements within this guideline have been met. This ensures that all archival records received have an appropriate level of content and are consistent in format. In accordance with the Burra Charter, records associated with a place should be placed in a permanent archive and made publicly available. On approval it is recommended that the record be lodged with the John Oxley Library within the State Library of Queensland. This ensures documents are appropriately managed and the public can access them.

Salvage

Items requiring salvage will be identified by the independent heritage consultant in accordance with the approved CHMP. A preliminary memo will be prepared to identify items and materials to be salvaged from heritage items prior to demolition.

In summary, the salvage process will include:

- The urban design and landscape architects will confirm types / amounts of materials to be salvaged for reuse within the fabric of the project.
 - The heritage consultant will identify elements and materials to be salvaged from heritage items, and also from contributory and potential heritage items.
 - The elements and materials identified by the urban design and landscape architects and the heritage consultant will be salvaged from the nominated houses, if feasible (it is noted that although efforts have been taken to identify items in good condition, there have been some instances where the condition of elements has proven too poor to successfully salvage). These elements and materials are collectively identified as 'salvaged elements'. The salvaged elements and materials will be photographed, tagged and catalogued according to origin and stored until reuse in a secure, weather-proofed location. Storage locations may include secured storage sites at the Cross River Rail Project precincts.
 - Where practicable, salvaged materials such as sandstone blocks and brickwork will be used in the fabric of the permanent works (e.g. as seatwalls, facing for retaining walls).
 - Local councils will be consulted regarding a process to allow residual elements and materials (salvaged elements and materials not incorporated into the fabric of the project), to be available to end users with a priority on property owners within the locality or heritage conservation area from where the items were salvaged.
 - Residual salvaged elements will be distributed to end users, as agreed upon above.
- Salvage activities in this context are separate and distinct from the salvage activities that may occur where significant items are identified as a result of archaeological investigations outlined in the Historical Archaeological Research Design (refer to the Cultural Heritage Management Plan).

Appendix D

Archaeological Management Plan

Please refer to CRRDA issued:

- 05.06.05 Cultural Heritage > 05.06.05.05 4303 Cross River Rail Project AMP Rev3_190607.pdf

Appendix E

Project Wide Imposed Conditions- Cross
River Rail Project

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

Part A. Imposed Conditions (General)

Condition 1. General conditions

- (a) The project must be carried out generally in accordance with:
 - (i) the Cross River Rail Request for Project Change dated April 2019;
 - (ii) the amended or new drawings provided at Appendix 2, Response to Submissions Report, June 2019, including:
 - (A) CRR-0003-AL-GA-100 – Drawing Index and Locality Plans - 1
 - (B) CRR-0003-AL-GA-201 – General Arrangement - 4
 - (C) CRR-0003-AL-GA-211 – General Arrangement - 11
 - (D) CRR-0003-CD-GA-110 – Construction Site Plans Moorooka Station
 - (E) CRR-0003-DUT-GA-101 – Dutton Park Station
 - (F) CRR-0003-RP-GA-111 – Property Impact Plans – 11
 - (G) CRR-0003-RP-GA-124 – Property Impact Plans – 24
 - (iii) amendments to the Project identified in the Cross River Rail Request for Project Change dated June 2018;
 - (iv) amendments to the Project identified in the Cross River Rail Request for Project Change dated November 2018.
- (b) The proponent must notify the Coordinator-General and all nominated entities in Schedule 2 in writing of the commencement of Project Works and the commencement of the commissioning and operational phases of each 'construction site' at least 20 business days prior to the relevant commencement date.
- (c) The temporary coach terminal works must be carried out in accordance with the conditions imposed at Appendix 3.

Condition 2. Outline Environmental Management Plan

- (a) Two months prior to the commencement of Project Work submit a final Outline Environmental Management Plan to the Coordinator-General for approval.
- (b) The Outline Environmental Management Plan must:
 - (i) Include the environment outcomes and performance criteria for each environmental element from the draft outline EMP except as amended by these conditions;
 - (ii) include possible mitigation measures, monitoring and reporting for each environmental element to achieve the environmental outcomes;
 - (iii) include an outline of:
 - (A) the Construction Environmental Management Plan
 - (B) the Commissioning Environmental Management Plan
 - (iv) be consistent with the Environmental Design Requirements in Schedule 1
 - (v) include the following sub-plans:
 - (A) Community and Stakeholder Engagement Plan
 - (B) Construction Worksite Management Plan

- (C) Construction Traffic Management Plan (CTMP)
- (D) Construction Vehicle Management Plan
- (E) Water Quality Monitoring Plan
- (F) Erosion and Sediment Control Plan
- (G) Spoil Placement Management Plan
- (H) Noise and Vibration Management Plan
- (I) Air Quality Management Plan
- (J) Settlement Management Plan
- (K) Non-Indigenous Cultural Heritage Management Plan
- (L) Indigenous Cultural Heritage Management Plan
- (vi) Be made available on the proponent's website once approved by the Coordinator-General and for the duration of the construction of the project and for a period of five years from commencement of operation.
- (c) Any further amendments to the Coordinator-General approved Outline Environmental Management Plan will be issued to the Coordinator-General 20 business days prior to the commencement of Relevant Project Works.

Part B. Imposed Conditions (Design)

Condition 3. Design

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

Part C. Imposed Conditions (Construction)

Condition 4. Construction Environmental Management Plan

- (a) Prior to the commencement of Project Work, a Construction Environmental Management Plan for those works (Relevant Project Work) must be developed by the Proponent and endorsed by the Environmental Monitor as being consistent with the Outline EMP and these imposed conditions.
- (b) The endorsed Construction Environmental Management Plan must be submitted to the Coordinator General at least 20 business days prior to the commencement of Relevant Project Works.
- (c) The Construction Environmental Management Plan must:
 - (i) describe the Relevant Project Work;
 - (ii) be based on predictive studies and assessments of construction impacts which have regard to the scale, intensity, location and duration of construction works, and location of Directly Affected Persons;
 - (iii) be generally consistent with the Outline EMP and incorporate its environmental outcomes and performance criteria;
 - (iv) incorporate and respond to the Imposed Conditions (Construction);
 - (v) demonstrate that the Imposed Conditions (Construction) will be complied with during Relevant Project Work;
 - (vi) incorporate the community engagement plan, including the complaints management process, in accordance with Condition 9;
 - (vii) where predictive studies indicate impacts beyond those provided for in the performance criteria, incorporate mitigation measures to achieve the environmental outcomes;

- (viii) establish specific mitigation measures and processes for consultation with Directly Affected Persons for Project Works under Conditions 9(c), 11(c), and 11(e);
- (ix) contain a program and procedures for ongoing monitoring to identify the effectiveness of mitigation measures in achieving the Imposed Conditions (Construction) and the environmental outcomes in (iii)
- (x) include a process for regular review and if required updating of the Construction Environmental Management Plan, including a process to review and implement additional or different mitigation measures in response to monitoring results;
- (xi) incorporate the EMP sub-plans required by the Imposed Conditions or as required by the approved Outline EMP.
- (d) The Construction Environmental Management Plan must be implemented for the duration of Relevant Project Work.
- (e) Relevant Project Work is authorised if it is undertaken in accordance with the Construction Environmental Management Plan.
- (f) The Construction Environmental Management Plan must be publicly available on the project website for the duration of the construction phase.
- (g) The Construction Environmental Management Plan may be updated.
 - (i) updates to the Construction Environmental Management Plan that include new or additional Relevant Project Work must be endorsed by the Environmental Monitor as being consistent with condition 2 before Relevant Project Work may proceed.
- (h) Updates to the Construction Environmental Management Plan that are limited to new or different mitigation measures for Managed Work may be endorsed by the Environmental Monitor.

Condition 5. Compliance

- (a) The proponent must notify the Environmental Monitor and the Coordinator-General in writing, within 48 hours after becoming aware of a Non-Compliance Event.
- (b) The notification must include:
 - (i) a description of the Non-Compliance Event, including details of the location, date and time of the Non-Compliance Event;
 - (ii) the name and contact details of a designated contact person;
 - (iii) an outline of actions that have been or will be taken to respond to the Non-Compliance Event.
- (c) Within 14 days following the notification of a Non-Compliance Event, written advice detailing the following information must be provided to the Environmental Monitor and the Coordinator-General:
 - (i) a description of the Non-Compliance Event, including details of the location, date and time of the Non-Compliance Event;
 - (ii) the name and contact details of a designated contact person;
 - (iii) the circumstances in which the Non-Compliance Event occurred;
 - (iv) details of any complaint in relation to the Non-Compliance Event;
 - (v) the cause of the Non-Compliance Event;
 - (vi) a description of the environmental effects of the Non-Compliance Event;
 - (vii) the results of any sampling or monitoring performed in relation to the Non-Compliance Event;
 - (viii) actions taken to mitigate the environmental effects of the Non-Compliance Event;

- (ix) proposed actions to prevent a recurrence of the Non-Compliance Event, including timing and responsibility for implementation.
- (d) The Non-Compliance Event report must be made available on the project website and remain available for the duration of the construction phase for the project.

Condition 6. Reporting

- (a) The Proponent must prepare a Monthly Report that summarises compliance and monitoring results for the duration of construction works.
- (b) The Monthly Report must include:
 - (i) monitoring data required by the imposed conditions or Construction Environmental Management Plan undertaken for the period and, where required, an interpretation of the results;
 - (ii) details of any Non-Compliance Event, including a description of the incident, resulting effects, corrective actions, revised construction practices to prevent a recurrence, responsibility and timing;
 - (iii) reporting of complaints, including the number of complaints, description of issues, responses and corrective actions.
- (c) The Monthly Report must be provided to the Coordinator-General and the Environmental Monitor, and made available on the project website within six weeks of the end of the month to which the report relates, and continue to be available on the project website until commissioning is complete.
- (d) The Proponent must provide annual reports to the Coordinator-General and the Environmental Monitor (Annual Report) no later than 31 July in any year during the construction phase about compliance with the imposed conditions.
- (e) The Annual Report must include:
 - (i) a compliance evaluation table detailing the relevant imposed condition, whether compliance with the condition was achieved and how compliance was evaluated;
 - (ii) an evaluation of compliance in relation to the CEMP and its sub-plans;
 - (iii) a summary of any Non-Compliance Events during the reporting period;
 - (iv) a summary of any Non-Compliance Events during the previous reporting period, with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant).

Condition 7. Environmental Monitor

- (a) The Proponent must engage an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Environmental Monitor for the duration of construction.
- (b) The Proponent must ensure that the Environmental Monitor has reasonable site access and access to all information required to perform its function, including, without limitation:
 - (i) all approvals;
 - (ii) the Construction Environmental Management Plan;
 - (iii) results of all monitoring required under the Imposed Conditions (Construction) including through the Construction Environmental Management Plan;
 - (iv) all information relating to complaints, including access to the complaints database.
- (c) The Environmental Monitor must:
 - (i) monitor compliance with the imposed conditions during the construction of the project;

- (ii) monitor compliance with the Construction Environmental Management Plan and sub-plans;
- (iii) maintain a register of mitigation measures agreed between the Proponent and Directly Affected Persons (Mitigation Register);
- (iv) review the compliance reports required by Condition 5, and the monthly reports and annual reports required by Condition 6, and provide advice to the Coordinator-General and the Proponent on the contents and adequacy of those reports;
- (v) review the results of monitoring, which may be verified by the Environmental Monitor including by independent monitoring;
- (vi) provide advice to the Proponent about compliance with the Imposed Conditions for construction, including by providing the results of independent monitoring where required;
- (vii) provide advice to the Proponent about issues raised in complaints and the response to complaints, including advice from the Community Relations Monitor;
- (viii) endorse the Construction Environmental Management Plan as consistent with the Outline EMP and complying with the Imposed Conditions (Construction);

Condition 8. Community Relations Monitor

- (a) The proponent must engage an independent, appropriately skilled and experienced entity, approved by the Coordinator-General, as the Community Relations Monitor for the duration of construction.
- (b) The Community Relations Monitor must:
 - (i) review and provide advice to the Environmental Monitor on the community engagement plan required by Condition 9;
 - (ii) receive monthly reports from the proponent on complaints;
 - (iii) attend each meeting between the Proponent and a Directly Affected Person to consult on mitigation measures, including providing input on standard responses for similar impacts;
 - (iv) provide advice to the Environmental Monitor in relation to complaints, community engagement and consultation on mitigation measures;
 - (v) be available to members of the community in accordance with Condition 9(f)(vi).

Condition 9. Community engagement plan

- (a) The Proponent must develop a community engagement plan as part of the Construction Environmental Management Plan consistent with the Outline EMP's Community and Stakeholder Engagement Plan.
- (b) The community engagement plan must be given to the Community Relations Monitor for advice at least 10 business days prior to the Construction Environmental Management Plan being provided to the Environmental Monitor.
- (c) The community engagement plan must provide for:
 - (i) Directly Affected Persons to be consulted prior to commencement of Project Works and ongoing thereafter about Project Works, predicted impacts and mitigation measures;
 - (ii) Directly Affected Persons to be consulted about possible mitigation measures;
 - (iii) local communities near Project Works to be informed about the nature of construction, including the timing, duration and predicted impacts of the works in advance of their commencement;

- (iv) information to be provided to public transport, road users, pedestrians and cyclists about the predicted effects of Project Works on road, rail and pedestrian and cycle network operations, in advance of their commencement;
 - (v) specific community consultation plans for identified key stakeholders;
 - (vi) implementation of an Indigenous employment policy, providing for Indigenous training and employment opportunities;
 - (vii) a process for advance notification to local communities of Project Works, including the timing, duration, predicted impacts and mitigation measures, which is available on the project website and through other media.
- (d) The community engagement plan must incorporate a complaints management system developed specifically for the Project, which is established prior to the commencement of Project Works.
- (e) The complaints management system must deliver a prompt response to community concerns with relevant information, action where required, and reporting of incidents.
- (f) As a minimum, the complaints management system must include the following elements:
- (i) a procedure for receiving complaints on a 24 hour, seven days a week basis, during Project Works;
 - (ii) a mechanism for notifying the community of the complaints procedure and how it may be accessed;
 - (iii) a process for registering and handling complaints received, including a database for tracking of complaints and actions taken in response;
 - (iv) a procedure for verifying complaints through monitoring and detailed investigation, and escalating and resolving verified complaints;
 - (v) a procedure for complaints to be notified to the Community Relations Monitor, including information about the complaint and its resolution;
 - (vi) access by the community to the Community Relations Monitor; and
 - (vii) regular reporting via the monthly environmental report, to the community of complaints and corrective actions, maintaining appropriate confidentiality.
- (g) All information regarding complaints, including the information collected in Condition 9(f)(iii) must be made available to the Community Relations Monitor.

Condition 10. Hours of work

- (a) Surface works for the Project are authorised to be undertaken within the hours of work set out in Table 1.

Table 1. Construction hours

Worksite	Surface works—standard hours	Extended work hours	Managed Work	Spoil haulage and materials/equipment delivery
Fairfield, Yeronga, Yeerongpilly, Rocklea and Salisbury stations	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm	7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm

Worksite	Surface works—standard hours	Extended work hours	Managed Work	Spoil haulage and materials/equipment delivery
Moorooka/ Clapham Yard	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm	7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm
Southern portal	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) 6:30pm - 10:00pm, Monday to Friday	24 hrs, 7 days	24 hours, 7 days
Boggo Road Railway station	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work (Other extended work) Monday to Friday 6:30pm - 10:00pm,	24 hrs, 7 days	Monday to Friday: 6.30am - 7.30am 9.00am - 2.30pm 4.30pm - 6.30pm Saturday 6.30am - 6.30pm
Dutton Park Railway station	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work	n/a	24 hours, 7 days, except for: Monday to Friday: 7:00am - 9:00am 4:30pm - 6:30pm
Woolloongabba Railway station	Monday to Saturday, 6.30am-6.30pm	Monday to Friday 6:30pm- 10:00pm	24 hrs, 7 days	24 hours, 7 days, except for: Monday to Friday: 7:00am - 9:00am 4:30pm - 6:30pm
Albert Street Railway station	Monday to Saturday 6.30 am – 6.30 pm,	Monday to Friday 6.30 pm – 10.00 pm	24 hours, 7 days	Monday to Friday: 6.30 am – 10.00 pm Saturday 6:30am - 6:30pm
Roma Street Railway station	Monday to Saturday, 6.30am-6.30pm	Monday to Friday 6:30pm- 10:00pm	24 hrs, 7 days	Monday to Friday 6.30am - 7.30am 9.00am - 4.30pm 6.30pm - 10:00pm Saturday 6.30am - 6.30pm
Northern portal	Monday to Saturday, 6.30am-6.30pm	For approved rail possession—80 hrs continuous work	24 hrs, 7 days	Monday to Friday: 6.30 am – 10.00 pm

Worksite	Surface works—standard hours	Extended work hours (Other extended work) Monday to Friday 6:30pm - 10:00pm,	Managed Work	Spoil haulage and materials/equipment delivery Saturday 6:30am - 6:30pm
Exhibition Railway station	Monday to Saturday, 6.30am-6.30pm		24 hours, 7 days	Monday to Saturday: 6:30am - 6:30pm
Mayne Railway Yard	Monday to Saturday, 6.30am-6.30pm		24 hours, 7 days	24 hours, 7 days

- (b) Project Works that are underground, or in a ventilated acoustic enclosure, may be undertaken at any time provided the environmental outcomes are achieved.
- (c) Works carried out because of an emergency that:
- (i) is endangering the life or health of a person; or
 - (ii) is endangering the structural safety of a building; or
 - (iii) is endangering the operation or safety of community infrastructure that is not a building; or
 - (iv) is required to prevent environmental harm, may be undertaken outside the hours set out in Table 1.
- (d) The following work may be undertaken during Extended Work Hours as set out in Table 1. subject to compliance with a specific Construction Environmental Management Plan sub-plan in accordance with Condition 4:
- (i) Project Works within rail corridor land;
 - (ii) Project Works within a road reserve or busway that cannot be undertaken reasonably nor practicably during standard hours due to potential disruptions to peak traffic flows or bus operations;
 - (iii) Project Works involving the transport, assembly or decommissioning of oversized plant, equipment, components or structures;
 - (iv) delivery of "in time" materials such as concrete, hazardous materials, large components and machinery;
 - (v) Project Works that require continuous construction support, such as continuous concrete pours, pipe-jacking or other forms of ground support necessary to avoid a failure or construction incident.
- (e) Blasting must not occur on public holidays, and is only authorised to occur during the hours of 7:30am to 4:30pm Monday to Saturday, and not on Sundays or public holidays.
- (f) Prior to blasting events, at least 48 hours' notice must be provided to persons who may be adversely affected.

Condition 11. Construction Noise and Vibration

- (a) Project Works must aim to achieve the project noise goals for human health and well-being presented in Table 2.

Table 2. Noise goals (internal) for Project Works

	Monday – Saturday 6.30am – 6.30pm	Monday – Friday 6.30pm – 10.00pm (Gabba, CBD only)	Monday – Saturday 6.30pm – 6.30am Sundays, Public Holidays	For Blasting Monday – Saturday 7.30 am – 4:30 pm only
Continuous (LA_{eq adj})(1hr)	AS 2107 Maximum design level	40 dBA LA _{eq adj} (1hr)	35 dBA LA _{eq adj} (1hr)	130 dB Linear Peak
Intermittent (LA_{10 adj})(15min)	AS 2107 Maximum design level + 10 dBA	50 dBA LA _{10, adj}	42 dBA LA _{10 adj}	

Notes

- 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).
- (b) During construction monitor and report on noise and vibration in accordance with the Noise and Vibration Management Plan, a sub-plan of the Construction Environmental Management Plan.
- (c) Project Works predicted to or monitored as generating noise levels more than 20dBA (LA_{eq 10min, adj}) above the relevant goal in Table 2. are authorised to occur in a locality only:
- 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;
 - 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;
 - where the mitigation measures are incorporated in a mitigation register and implemented prior to undertaking the Project Works;
 - between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day;
- (d) Project Works must aim to achieve the construction vibration goals in Table 3.

Table 3. The construction vibration goals

Receiver type	Cosmetic Damage			Human comfort (mm/s PPV)		Sensitive building contents (mms/PPV)
	Continuous vibration (mm/s PPV)	Transient vibration (mm/s PPV)	Blasting vibration (mm/s PPV)	Day	Night	

Residential	According to BS7385 reduced by 50% ⁴	According to BS7385	50 ¹	According to AS2670	0.5 ²	
Commercial	According to BS7385 reduced by 50% ⁴	According to BS7385	50	According to AS2670	-	0.5 ³
Heritage structures	2	-	10	-	-	

Notes:

1. All residential receivers in the vicinity of the Project blasting sites are regarded as reinforced or framed structures (i.e. BS7385)
 2. Residential sleep disturbance
 3. Equipment specific vibration criteria are required for highly sensitive equipment (i.e. electron microscopes, MRI systems or similar), as part of future site-specific detailed investigations
 4. If resonance is present, or if investigation to detect resonance were not able to be undertaken due to a lack of access
- (e) Where vibration protection criteria are available for sensitive building contents, predictive modelling must take into account the manufacturer's specifications for tolerance to vibration. To the extent reasonable and practicable, those specifications apply in lieu of the construction vibration goals in Table 3. Where predictive modelling indicates the specified criteria would not be achieved by the Project Works, such works may proceed only in accordance with specific mitigation measures agreed with the potentially Directly Affected Persons.
- (f) Project Works predicted to or monitored as generating vibration levels more than 2mm/s for continuous vibration and 10mm/s for transient vibration may occur only:
- (i) between the hours 7:00am to 6:00pm Monday to Friday, with a respite period between 12:00noon and 2:00pm each day; or
 - (ii) in accordance with the mitigation measures developed in consultation with and agreed by Directly Affected Persons that are incorporated in the Mitigation Register.

Condition 12. Property Damage

- (a) Prior to the commencement of Project Works, predictive modelling must be undertaken of potential ground movement that may be caused by the Project Works. Such predictive modelling must ascertain the potential for damage due to ground movement being caused to property by Project Works.
- (b) Where predictive modelling indicates the Project Works would lead to impacts above the vibration goals for cosmetic damage in Table 3. the proponent must prepare and submit a property damage sub-plan, prior to the commencement of such works, as part of the Construction Environmental Management Plan. The property damage sub-plan must set out the procedure for:
- (i) advance communication with potentially Directly Affected Persons;
 - (ii) procedures for building condition surveys both in advance of and following Project Works, including provision for consultation with property owners and occupants;
 - (iii) monitoring to be undertaken for potential impacts to property; and
 - (iv) mitigation measures.

- (c) Where a post-construction building condition survey identifies that property damage has occurred as a consequence of the Project Works, such damage must be repaired as soon as practicable by the Proponent at no cost to the property owners. Such repairs must be undertaken in consultation with the property owners and occupants and must return the premises at least to the condition existing prior to commencement of Project Works. The Proponent must agree the timing, method and extent of works required with the affected landowner and must gain permission to undertake such repairation works prior to their commencement.

Condition 13. Air quality

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

Table 4. Air quality criteria and goals

Criterion	Air quality indicator	Goal	Averaging period
Human Health	Total Suspended Particulates (TSP)	90 µg/m ³	1 year
	Particulate matter ((PM ₁₀) ¹	50 µg/m ³	24 hours
		25 µg/m ³	1 year
Nuisance	TSP ²	80 µg/m ³	24 hours
	Deposited dust ³	120 mg/m ² /day	30 days

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

Condition 14. Traffic and transport

- (a) Project construction traffic must be managed to avoid or minimise adverse impacts on road safety and traffic flow, public transport, freight rail movements, pedestrian and cyclist safety, and property access.
- (b) During construction workforce car parking must be provided and managed to avoid workforce parking on local streets.
- (c) Access for emergency services to project worksites and adjoining properties must be maintained throughout the construction phase.
- (d) Practicable access is maintained to adjacent properties throughout the construction phase.
- (e) Heavy construction vehicles use only designated routes for spoil haulage and deliveries of major plant, equipment and materials, in accordance with the Construction Environmental Management Plan. The designated haulage routes for each worksite must follow major or arterial roads to the extent practicable and be developed in consultation with the Department of Transport and Main Roads and the Brisbane City Council in preparation of the Construction Environmental Management Plan.
- (f) The Construction Traffic Management Plan must be supported by a road safety assessment for the spoil haulage route.
- (g) Construction traffic must operate within the requirements of a construction traffic management sub-plan (Construction Traffic Management Plan) incorporated within the Construction Environmental Management Plan.
- (h) The Construction Traffic Management Plan must include:
- the proposed access to worksites, with local or minor roads only used where unavoidable to access a project worksite;

- (ii) a process for advance notice to Directly Affected Persons and local communities within the vicinity of the spoil haulage routes and worksite accesses;
- (iii) local traffic management measures developed in consultation with Brisbane City Council for key intersections:
 - (A) in Bowen Hills including Bowen Bridge Road, College Road and O'Connell Terrace;
 - (B) in the CBD including Albert Street, Charlotte Street, Elizabeth Street and Roma Street;
 - (C) at Woolloongabba including Leopard Street, Stanley Street, Vulture Street and Main Street;
 - (D) at Dutton Park including Annerley Road, Peter Doherty Street, Joe Baker Street and Boggo Road, as well as Kent Street, Cornwall Street and Ipswich Road;
 - (E) in the area of the Fairfield to Salisbury stations and Clapham Yard works.
- (iv) specific traffic management measures developed in consultation with other key stakeholders, including:
 - (A) the department administering the *Economic Development Act 2012* with regards traffic management in the Queens Wharf Brisbane priority development area;
 - (B) Queensland Rail about maintaining access to railway stations; and
 - (C) the department administering the *Transport Infrastructure Act 1994* and the Brisbane City Council about maintaining operations for bus services along streets affected by the Project Works.
- (i) Project Works must be designed, planned and implemented to maintain acceptable footpath and cycle paths in areas adjacent to project worksites in terms of capacity, legibility and pavement condition. The proponent must consult with the Brisbane City Council and Queensland Rail about changes in pedestrian and cycle paths required to facilitate Project Works.

Condition 15. Water quality

- (a) Discharge of surface water and groundwater from Project Works must comply with the Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid-estuary) in the Environmental Protection (Water) Policy 2009.
- (b) During construction monitor and report on water quality in accordance with the Water Quality Management Plan, a sub-plan of the Construction Environmental Management Plan.

Condition 16. Water resources

- (a) Prior to the commencement of Project Works involving excavation, the Proponent must undertake predictive modelling of the potential for groundwater drawdown. The predictive modelling must be based on validated monitoring data and must address the likely extent of any drawdown over time, up to the time when such movement reaches equilibrium.
- (b) Project Works must be designed, planned and implemented to avoid where practicable and otherwise minimise the inflow of groundwater to the Project Works, including excavations, the underground stations and tunnels, having regard for the predictive modelling.
- (c) The Proponent must monitor the inflow of groundwater to the Project Works and compare monitoring data with the predictive modelling. If the rate of groundwater inflow rate

exceeds 1L/sec in any worksite, the proponent must revise work methods and devise and implement mitigation measures as soon as practicable.

Condition 17. Surface water

- (a) Project Works, and worksites, must be designed and implemented to avoid inundation from stormwater due to a 2 year (6hr) ARI rainfall event and flood waters due to a 5 year ARI rainfall event.
- (b) Project works must be designed and implemented to avoid afflux or cause the redirection of uncontrolled surface water flows, including stormwater flows, outside of worksites.

Condition 18. Erosion and sediment control

- (a) An erosion and sediment control sub-plan that is consistent with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control must be submitted as part of the Construction Environmental Management Plan.

Condition 19. Acid sulphate soils

- (a) Acid sulphate soils must be managed in accordance with the methods and requirements of the latest edition of the *Queensland Acid Sulphate Soil Technical Manual*.

Condition 20. Landscape and open space

- (a) Project Works are designed and implemented to minimise impacts on landscape and open space values.
- (b) Project works and worksites in Victoria Park must be designed, planned and implemented to avoid, or minimise the loss of trees and ornamental plantings, and must minimise the area of the park directly impacted during such works.
- (c) Worksites in Victoria Park must be enclosed with a visually solid screen and any night lighting including security lighting must be situated to minimise the spill of light beyond the worksite enclosures.
- (d) Existing pathways and recreational facilities in Victoria Park must be relocated within the park for the duration of the works, in consultation with the Brisbane City Council. Upon completion of the project works, such pathways and facilities must be re-established in locations in the park in consultation with the Brisbane City Council.

Condition 21. Worksite rehabilitation

- (a) Worksites for project infrastructure, such as the surface connections, stations and ancillary buildings must be rehabilitated as soon as practicable upon completion of the works.
- (b) All other worksites required to support commissioning activities must be rehabilitated as soon as practicable on completion of commissioning or sooner where possible.
- (c) Rehabilitation must address soil erosion and sedimentation, dust nuisance and landscape and visual impact.
- (d) Any planting, landscaping and streetscape works undertaken as part of rehabilitation must be undertaken in accordance with landscape and urban design plans prepared in consultation with the Brisbane City Council.

Part D. Imposed Conditions (Commissioning)

Condition 22. Environmental design requirements

- (a) The Proponent must conduct such testing and monitoring as is necessary to demonstrate that the Environmental Design Requirements in Schedule 1 have been satisfied.

- (b) At the completion of Commissioning, the Proponent must give written notice to the Coordinator-General that the Project has achieved the Environmental Design Requirements in Schedule 1.

Condition 23. Commissioning

- (a) Commissioning may be carried out in stages.
- (b) Testing for commissioning must be supported by advanced notice to local residents and businesses.
- (c) Testing for commissioning must not cause an exceedance of the goals in Table 2, Table 3, Table 4 or Condition 15.

Appendix F

Geotechnical Boreholes and Station
Precinct Maps

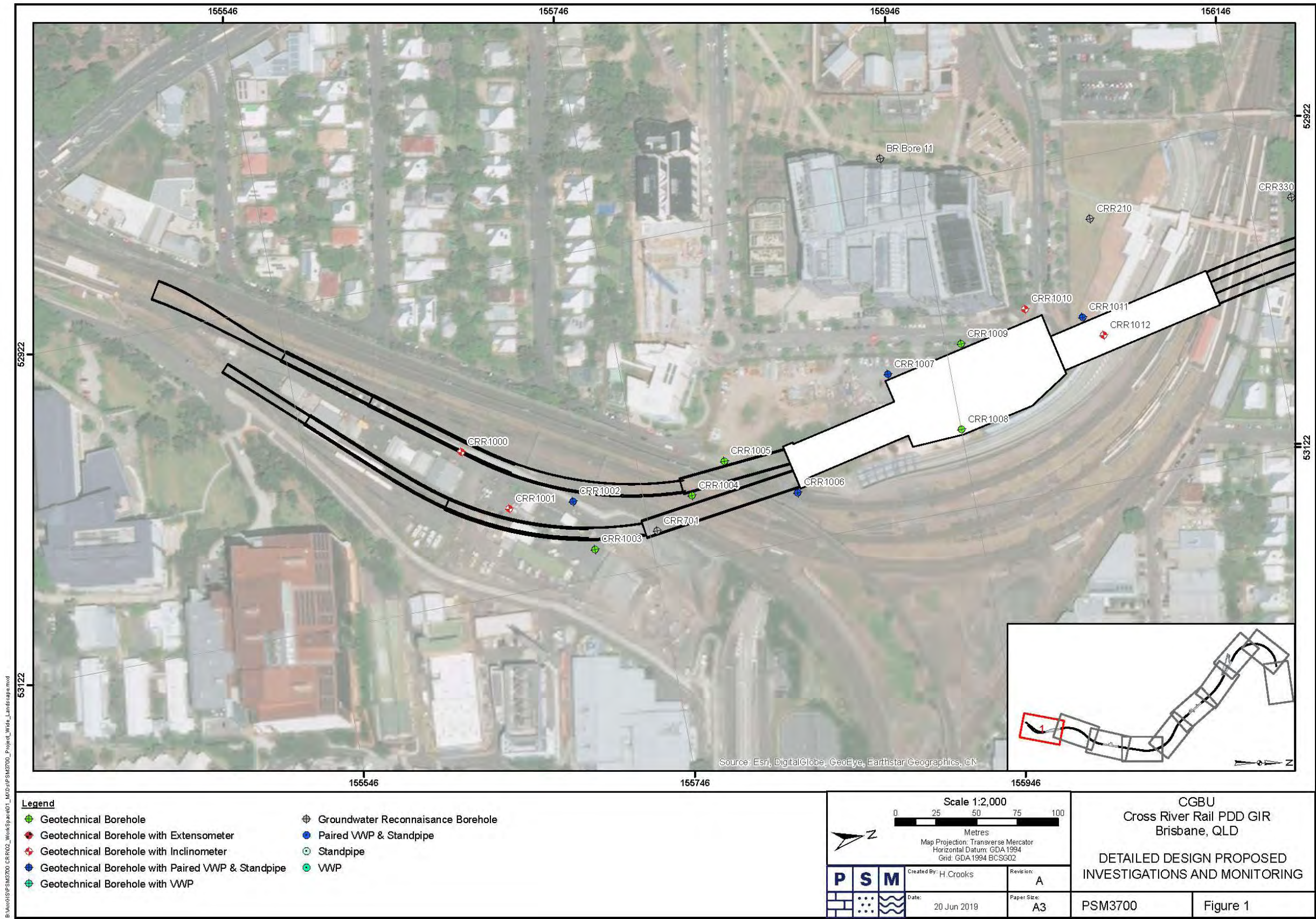
Borehole Location	Borehole ID	Priority	Location with respect to structure boundaries	Depth (m BGL)	Comment
Boggo Road	CRR1000	2	Within planned site infrastructure boundary	15	Borehole located on access road within investigation area.
	CRR1001	2	Within planned site infrastructure boundary	15	Located within a carpark – close proximity to buildings (noise and vibration exceedances dependent on fate of buildings).
	CRR 1002	2	Within planned site infrastructure boundary	18	Located on access track within investigation area.
	CRR1003	2	Within planned site infrastructure boundary	18	Located close to buildings within a carpark (noise and vibration exceedances dependent on fate of buildings).
	CRR1004	2	Outside of planned infrastructure boundary	20	Potential for Rail line/track closure due to location of borehole on rail tracks.
	CRR1005	2	Outside of planned infrastructure boundary	24	Within close proximity to rail line – located on cleared area.
	CRR1006	1	Outside of planned infrastructure boundary	28	Potential for Rail line/track closure due to location of borehole on rail tracks.
	CRR1007	1	Within planned site infrastructure boundary	32	Located on cleared area within site boundary.
	CRR1008	1	Within planned site infrastructure boundary	32	Within site boundary, close proximity to busway infrastructure
	CRR1009	1	Outside of planned infrastructure boundary	40	Joe Baker Street closure due to location of borehole.

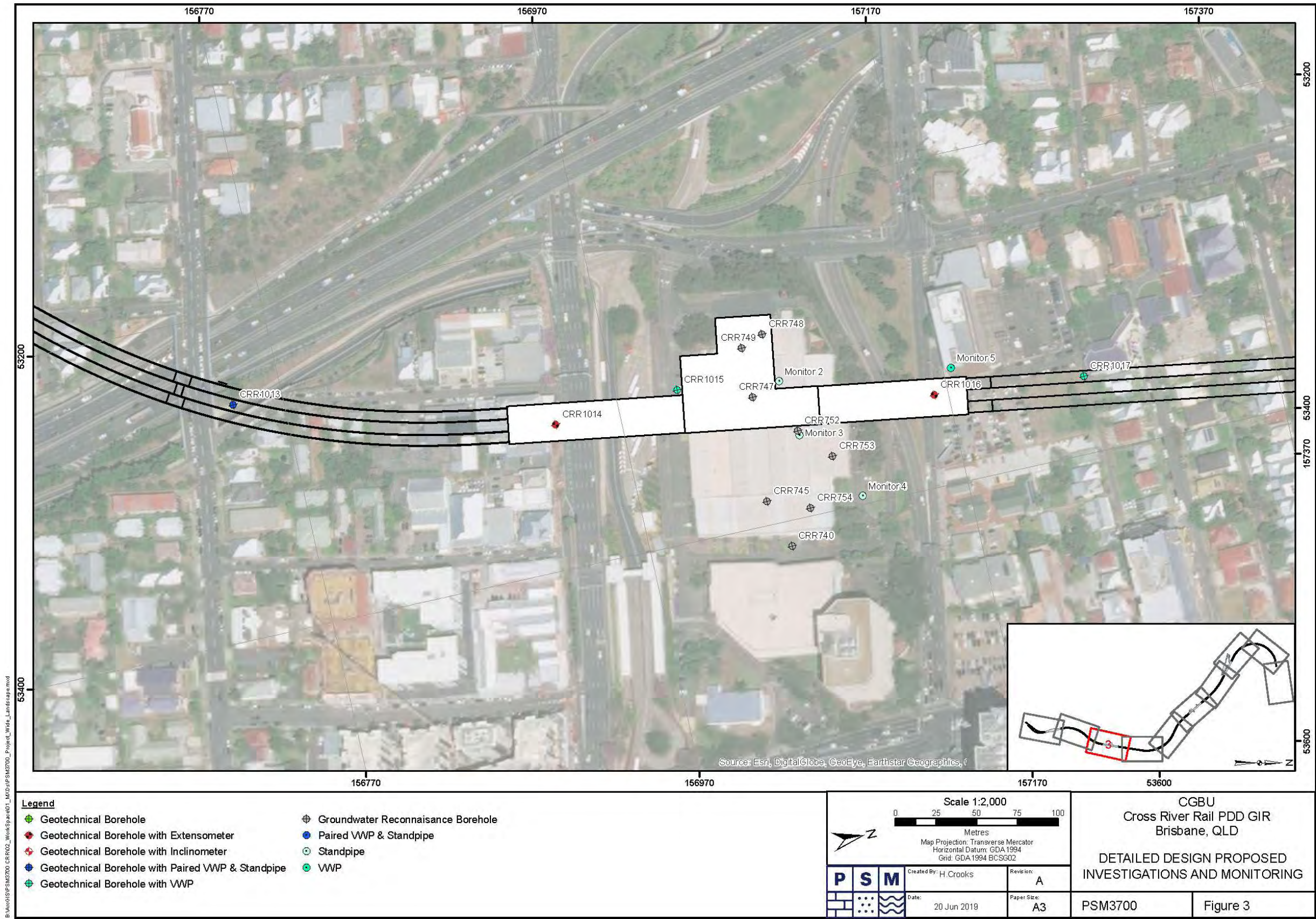
Borehole Location	Borehole ID	Priority	Location with respect to structure boundaries	Depth (m BGL)	Comment
	CRR1010	1	Outside of planned infrastructure boundary	30	Joe Baker Street closure due to location of borehole.
	CRR1011	2	Outside of planned infrastructure boundary	35	Located on cleared vacant land adjacent to busway infrastructure
	CRR1012	2	Within planned site infrastructure boundary	23	Located on Busway road infrastructure. Immediately before passenger boarding zone.
Woolloongabba Station	CRR1014	2	Within planned site infrastructure boundary	30	Located on the southern side of Stanley Street. Road/lane closure required for drill.
	CRR1015	1	Within planned site infrastructure boundary	34	Located on private access road adjacent to Goprint building.
	CRR1016	2	Within planned site infrastructure boundary	32	Located on the northern edge of footpath along Vulture Street, may require lane closure.
	CRR1017	2	Outside of precinct area	42.5	Located on cleared land close to neighbouring infrastructure. Potential for noise and vibration exceedances
Albert Street	CRR1023	2	Within planned site infrastructure boundary	40	Potential for lane closure on Albert street (near intersection with Mary Street) for drill
	CRR1024	1	Within planned site infrastructure boundary	48	Located along northern footpath on Mary Street, potential footpath and lane closure required.
	CRR1025	1	Outside of planned infrastructure boundary	43	Located along northern footpath on Mary Street, potential footpath and lane closure required.

Borehole Location	Borehole ID	Priority	Location with respect to structure boundaries	Depth (m BGL)	Comment
	CRR1026	1	Outside of planned infrastructure boundary	45	Located along northern footpath on Mary Street, potential footpath and lane closure required.
	CRR1027	1	Outside of planned infrastructure boundary	44	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1028	1	Within planned site infrastructure boundary	44	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1029	1	Within planned site infrastructure boundary	44	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1030	1	Outside of planned infrastructure boundary	44	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1031	1	Within planned site infrastructure boundary	44	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1032	2	Outside of planned infrastructure boundary	44	Located along southern footpath on corner of Charlotte and Albert Street, potential footpath and lane closure required.
	CRR1033	2	Outside of planned infrastructure boundary	40	Located along southern footpath on corner of Charlotte and Albert Street, potential footpath and lane closure required.
	CRR1034	1	Outside of planned infrastructure boundary	40	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1035	1	Outside of planned infrastructure boundary	40	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC

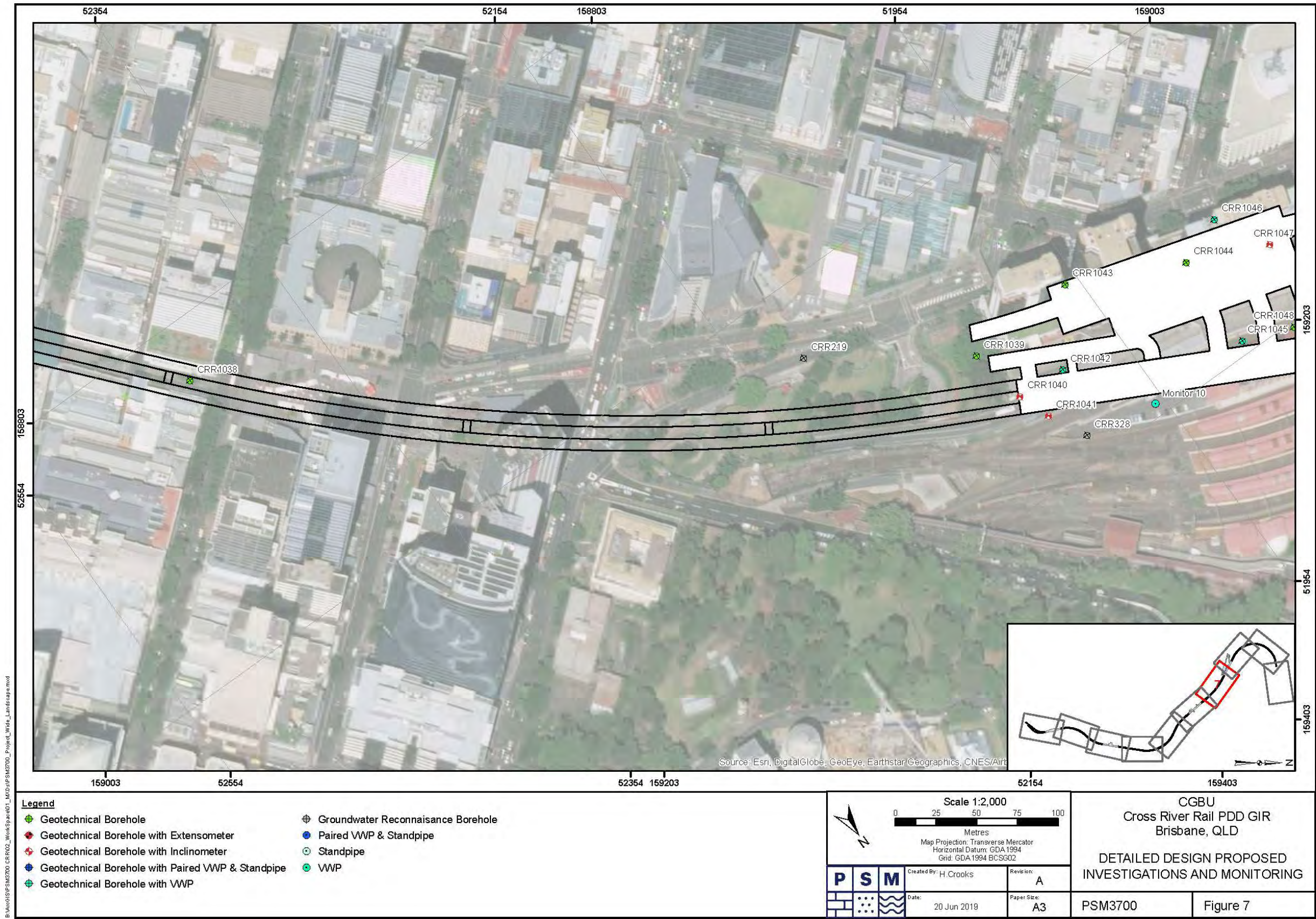
Borehole Location	Borehole ID	Priority	Location with respect to structure boundaries	Depth (m BGL)	Comment
	CRR1036	2	Within planned site infrastructure boundary	40	Located along southern footpath on corner of Elizabeth and Albert Street, potential footpath and lane closure required.
	CRR1037	2	Within planned site infrastructure boundary	42	Located along western footpath on Albert Street, potential footpath and lane closure required.
	CRR1038	2	Outside of precinct area	40	Located along Albert Street outside of precinct area, potential footpath and lane closure required.
Roma Street	CRR1039	1	Outside of planned infrastructure boundary	37	Located within the parkland. Potential vegetation clearing.
	CRR1040	2	Outside of planned infrastructure boundary	36	Located within the parkland.
	CRR1041	2	Outside of planned infrastructure boundary	35	Located between the Inner Northern Busway and rail stabilisation line.
	CRR1042	2	Outside of planned infrastructure boundary	38	Located on private parking and access area for Hotel Jen and Roma Street Station.
	CRR1043	2	Outside of planned infrastructure boundary	20	Located in front of the BTC East tower, potential footpath and lane closure required.
	CRR1044	1	Outside of planned infrastructure boundary	40	Located in front of the Roma Street Station, potential footpath and building access closure required.
	CRR1045	2	Outside of planned infrastructure boundary	38	Located on private parking and access area for Hotel Jen and Roma Street Station.

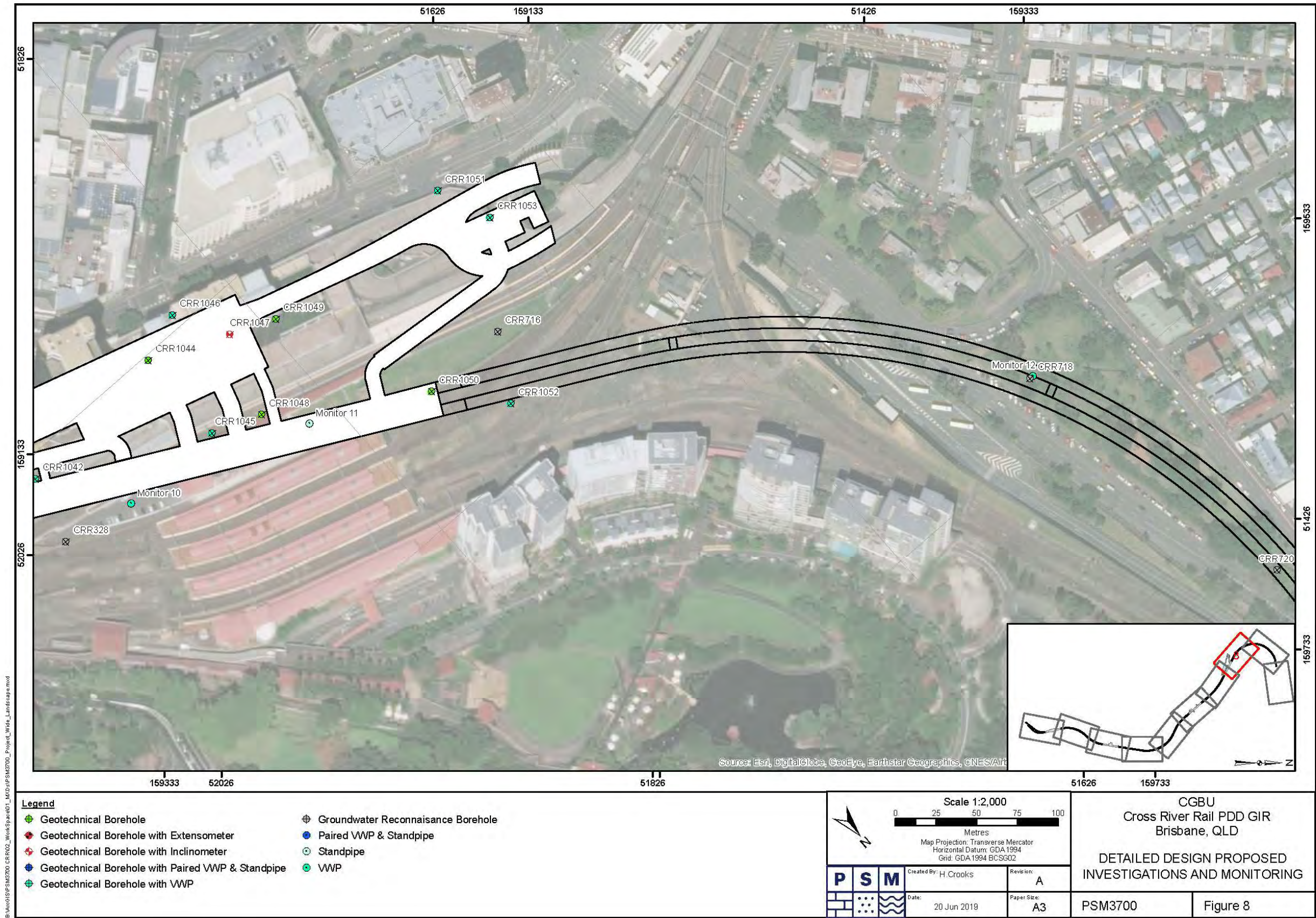
Borehole Location	Borehole ID	Priority	Location with respect to structure boundaries	Depth (m BGL)	Comment
	CRR1046	1	Outside of planned infrastructure boundary	35	Located near the eastern Roma Street Station exit. Potential footpath and lane closure required.
	CRR1047	1	Outside of planned infrastructure boundary	40	Located on the eastern side of the Roma Street Station, potential footpath and building access closure required.
	CRR1048	2	Outside of planned infrastructure boundary	40	Located on private parking/access area for Roma Station train stabilisation area.
	CRR1049	2	Outside of planned infrastructure boundary	20	Mobilisation of drilling equipment within existing infrastructure (TBC based on fate of building). Noise and vibration exceedances are TBC
	CRR1050	2	Within planned site infrastructure boundary	38	Located on cleared vacant land adjacent to rail line.
	CRR1051	1	Outside of planned infrastructure boundary	35	Located on the eastern side of the Roma Street Station, potential footpath and building access closure required.
	CRR1052	2	Outside of planned infrastructure boundary	42	Located on cleared land adjacent to rail lines.





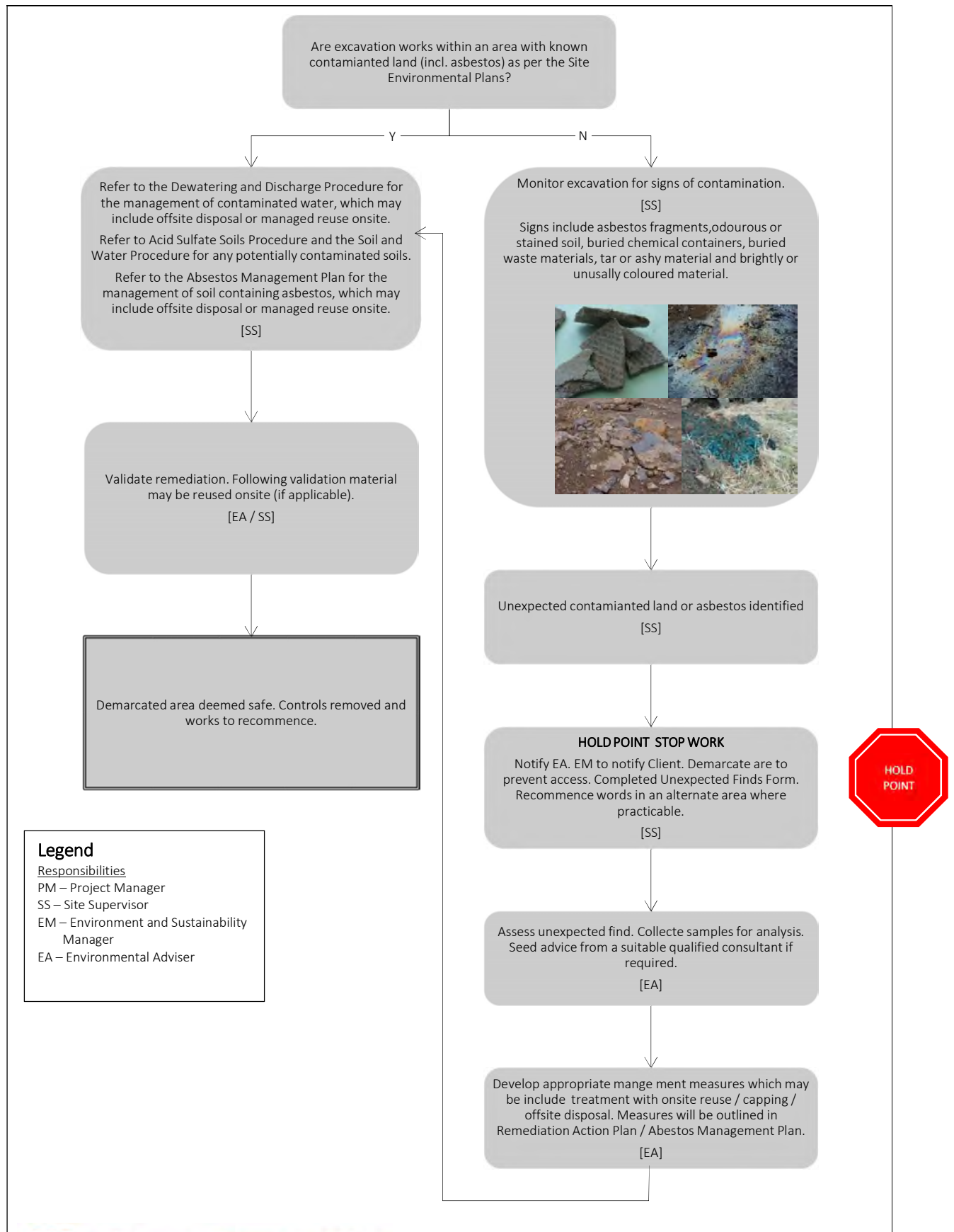






Appendix G

Contamination Management Procedure
(Including Unexpected Contamination
and Asbestos Finds)



Introduction

Objectives

The objective of this procedure is to detail the actions to be taken when potentially contaminated soil or materials (including asbestos) are known or suspected to occur onsite or are unexpectedly encountered during excavation/construction activities.

Training

- All personnel are to undertake Project inductions identifying their environmental and compliance obligations.
- Obligations and responsibilities relevant to contamination management will also be included in daily pre-start or activity-specific pre-start briefings, toolbox talks or targeted environmental training as appropriate.

Contaminated land procedure

Known contaminated material and asbestos

- Known contaminated soils or groundwater on the site likely to cause risk to health, safety or the environment must be identified, signposted and segregated from site activities by the erection of physical barriers.
- A Remediation Action Plan (RAP) should be developed for the management of identified contamination. The RAP may include some of the following mitigation measures:
 - Observe soil/fill during excavations to check for extent of contamination
 - Limit or eliminate excavation requirements.
 - Separation of known contaminated material (if any) from natural material, to reduce the treatment requirements and disposal volumes.
 - Delineation of contaminated material.
 - Spoil re-use within the project where possible.
 - Odour, dust, air quality and stormwater runoff management, including monitoring.
 - Development and implementation of occupational hygiene measures to manage ingestion risk where required.
 - Identification and implementation of appropriate PPE to manage health and safety risks if required.
 - Implement appropriate erosion and sediment controls (e.g. sumps, basins, baffles, bunds or ground cover).
- Refer to the Asbestos Management Procedure for the measures to manage and dispose of asbestos.
- The table below provides a summary of potential contamination associated with historic land uses.

Contamination source	Potential Contaminant
Landfills	Nutrients, hydrocarbons, metals, organic acids, asbestos in waste materials, groundwater and gas
Railway facilities	Hydrocarbons, solvents, phenolics, metals, asbestos in soils, groundwater and vapour
Industrial sites	Hydrocarbons, solvents, phenolics, pesticides, nutrients, metals, asbestos in soil, groundwater and vapour
Substations	Polychlorinated biphenyls, asbestos, polyaromatic hydrocarbons, heavy metals in soil
Sediments within waterways (ie estuaries of Parramatta River and Canada Bay)	Hydrocarbons, pesticides, metals in sediments
Reclaimed land	Metals, nutrients, hydrocarbon, asbestos in fill material and sediments.
Point sources of contamination (eg service stations, workshops, garages)	Hydrocarbons, solvents, metals in soil, groundwater and vapour.
Contamination associated with road usage	Hydrocarbons, heavy metals, asbestos, polycyclic aromatic hydrocarbons in soil and groundwater.

Appendix H

Soil and Water Procedure

Manage Soil and Water

Purpose

This procedure describes how to manage water onsite and prevent erosion and water pollution. When particles of soil are eroded and picked up by water as sediment this produces turbid (dirty) water which cannot enter stormwater or waterways.

Procedure

1 Establish Site Controls

Accountability: Construction Manager

- Ensure all erosion and sediment controls have been designed, developed and implemented as per the Site Erosion and Sediment Control Plan and in consultation with the Project Environmental Representative.

2 Include Controls in Work Pack(s)

Accountability: Senior Project Engineer

- Ensure all risks associated with soil and water are considered as part of the development of site work plans
- Ensure Work Packs include relevant environmental control information including a Site Environment Plan where required.

3 Undertake Work

Accountability: Supervisor

- Ensure clean water diversions are installed prior to the commencement of work.
- Ensure erosion and sediment controls are:
 - Installed prior to or immediately upon any disturbance to vegetation or soil
 - Adequately maintained and remain in place until revegetation, stabilisation or hardscaping has occurred.
- Keep cleared areas to a minimum and progressively rehabilitate/revegetate as they become available.
- Stockpile material away from water flow paths.
- Reuse sediment laden water (dirty water) that has been captured onsite where possible e.g. for dust control.
- Ensure water discharged from site is in strict accordance with the project's dewatering requirements.
- Obtain permit required to transfer/discharge water if applicable

Accountability: Worker

- Notify the Supervisor or Project Environmental Representative immediately if you observe:

- Unauthorised discharge of water offsite
- Turbid water in or near waterways or drains
- Ineffective or damaged sediment and erosion controls.

4 Monitor Water Quality

Accountability: Environment Representative

- Undertake monitoring to assess compliance in accordance with project requirements
- Track and record all water used or reused on the project.

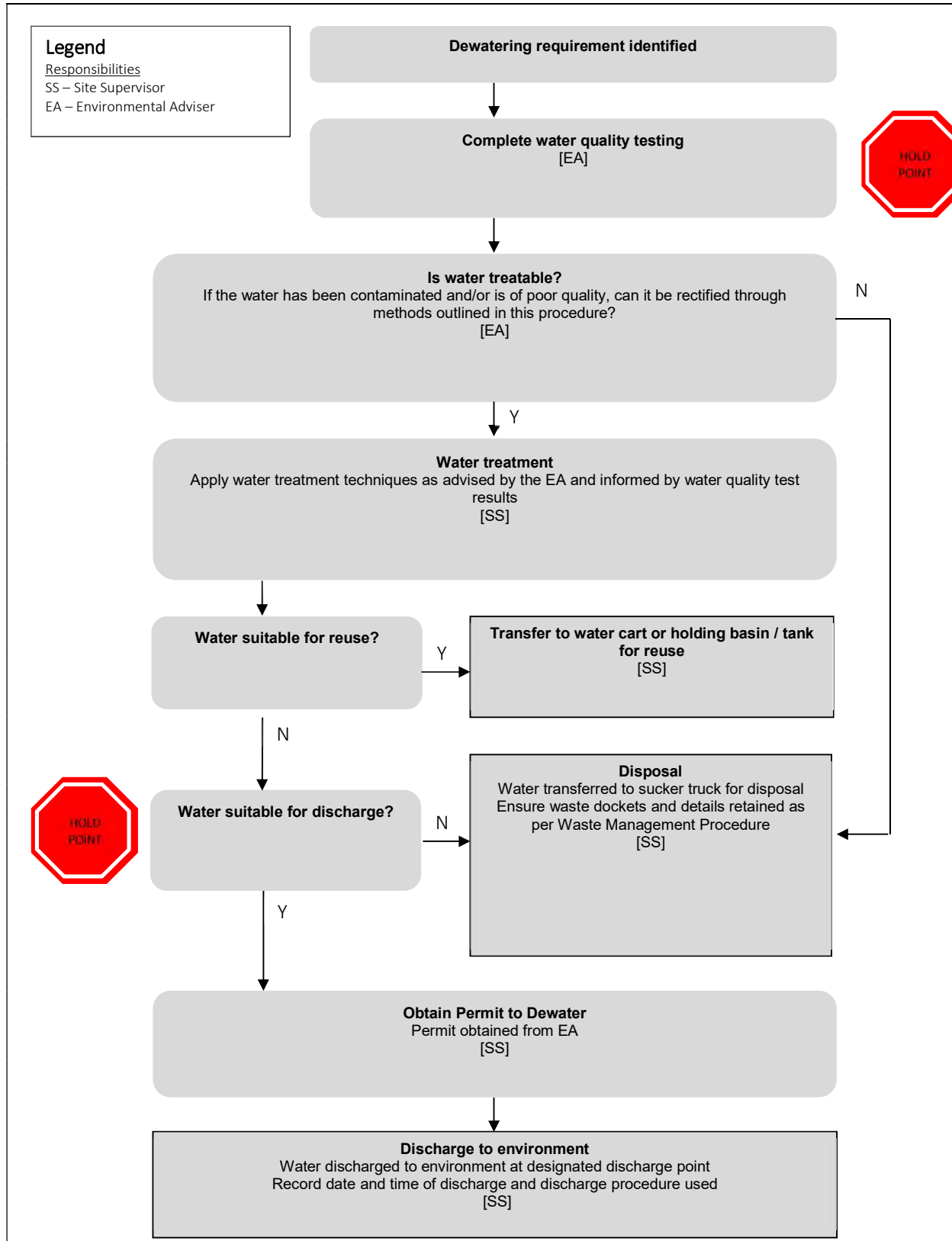
5 Perform Task Observations

Accountability: Line Manager, Manager Environment and Sustainability or Subcontractor Supervisor

- Conduct task observations as per project schedule to ensure ongoing effectiveness of environmental control measures.

Appendix I

Dewatering and Discharge Procedure



Introduction

Objectives

To correctly test and treat site water to ensure potential impacts from dewatering are minimised during construction and comply with the Environmental Authority (EA) that applies to the site investigation activities.

Training

All personnel are to undertake project inductions identifying their environmental and compliance. Obligations and responsibilities relevant to dewatering procedures will be included in project induction, daily pre-start or activity-specific pre-start briefings, toolbox talks or targeted environmental training as appropriate.

Dewatering and discharge procedure

Discharge locations

The discharge points are ponded waters/basins, these will be sampled as per this procedure. The station precincts are classified as middle estuary. The relevant water quality objectives to protect aquatic ecosystem environmental value is listed in the table below.

Water quality criteria

Water quality criteria that must be met prior to any offsite discharge point to the environment or onsite reuse are provided in the table below. Where field sampling is required, appropriately calibrated monitoring equipment as nominated below shall be used.

Water quality criteria for discharge to environment from discharge locations or for onsite reuse

Parameter	Project Limits	Method of assessment	Frequency	Quality Control
Offsite discharge				
pH	7.0 – 8.4**	probe	(a) less than 24 hours prior to a controlled discharge and daily for any continued controlled discharge; and (b) when rainfall causes a discharge from a basin which has not been emptied within 5 days of the cessation of a rainfall event.	1 in 20 lab tested
Total suspended solids	<20 mg/L**	Laboratory analysis of grab sample		N/A
Turbidity*	<8 NTU	Water quality meter		1 in 20 lab tested
Chlorophyll a	<4 µg/L **	To be undertaken in accordance with the Monitoring and Sampling Manual <i>Environmental Protection (Water) Policy 2009</i> .		To be undertaken in accordance with the Monitoring and Sampling Manual <i>Environmental Protection (Water) Policy 2009</i> .
Total nitrogen	<300 µg/L **			
Oxidised N	<10 µg/L **			
Ammonia N	<10 µg/L **			
Organic N	<280 µg/L **			
Total phosphorus	<25 µg/L **			
Filterable reactive phosphorus (FRP)	<6 µg/L **			

Parameter	Project Limits	Method of assessment	Frequency	Quality Control
Dissolved oxygen	20 th -80 th percentile) 85-105% saturation **			
Secchi depth	>1.0 m **			
Oil and grease	None visible**	Visual inspection		N/A
Colour	No visible discoloration	Visual inspection		N/A
Onsite reuse				
Oil and grease	None visible	Visual inspection		N/A
pH	6.5-8.5	pH meter		1 in 20 lab tested

* A statistical correlation must be developed that identifies the relationship between NTU and TSS to determine the NTU equivalent of 50 mg/L TSS before NTU is used as a criteria. The statistical correlation assessment and methodology will be made available at the request of the EPA.

** Established by The Environmental Protection (Water) Policy 2009 - Brisbane River environmental values and water quality objectives – Basin No. 143 (part) including all tributaries of the Brisbane River (July 2010).

Monitoring

Water quality monitoring of the pollutants nominated in the table above using the identified sampling method and units of measure will be undertaken at the prescribed sample frequency.

Unless otherwise approved, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area, must be undertaken in accordance with the Monitoring and Sampling Manual.

Discharge Procedure

All discharges are to be in accordance with the conditions described in the Permit to Dewater.

In order to prevent the discharge of sediment laden waters, the following measures must be adhered to:

- Use suitable dewatering inlet protection devices (i.e. float and housing or extraction tube) to prevent the extraction of settled sediments within the basin.
- Dewatering inlet devices must be placed at a sufficient distance from basin inlets and above the sediment storage zone.

Examples of suitable dewatering inlet devices are show in Attachment 1.

Basin signage must be updated when conditions change to reflect the following scenarios:

1. Red - do not discharge, basin unable to receive water
2. Red – do not discharge, basin able to receive water
3. Green – basin ok to discharge, basin unable to receive water

Indicative basin signage is shown in Attachment 2.

Reuse options

All onsite reuse options are to be explored before any offsite discharges are permitted. Reuse of onsite water may be required for the following construction activities (but not limited to):

- Dust control
- Compaction
- Wash down
- Vegetation establishment / rehabilitation.

Water treatment

Where water can be made suitable for discharge, water treatment should occur within 24 hours following each storm event and the basin should be drained once suspended solids levels are less than 50 milligrams per litre.

Where the water cannot be made suitable (e.g. due to contamination) refer to Construction Worksite Management Plan for disposal guidelines.

Neutralising water by adjusting pH levels

- If the water is above pH 8.4, hydrochloric acid (32% muriatic) or suitable alternative is used to lower the pH; and
- If the water is below pH 7.0 a base such as Calcium Hydroxide (Lime) or suitable alternative is used to raise the pH.

Determine quantity of lime or acid required by taking a 10 litre test sample of basin water and adding a known amount of lime or acid (initially 0.004%) and re-test. Vary the amount of lime/acid until within adopted limits. Once the required percentage is determined, calculate required volume of acid/lime for the basin by multiplying volume of water in basin by the determined percentage. Ensure thorough mixing after addition of acid/lime.

Turbid Water

If the TSS is greater than 20mg/L then the sediment must be settled out if water is to be released to a licensed discharge point. Treating the water with flocculent (e.g. gypsum) will make the sediment settle. Contact the environment team for advice. Application rates should be based on industry guidelines and / or manufactures specifications; typical dosing rates of 30kg of gypsum per 100m³ of water.

NOTE: an even application over the captured water is essential for effective flocculation (e.g. use a spray or similar device to circulate the water and wait for the sediment to settle out). Typical timeframe for treatment to take effect is 8-12 hours. Environmental Advisor to test water to ensure water quality criteria cited in the table above has been met prior to pumping.

Oil and grease

- Examine the surface of the water for visual evidence (e.g. sheen or discolouration); and
- If oil or grease contamination is present, spread absorbent material over the surface (or similar surfactant).

Erosion and sedimentation control

Erosion and sedimentation controls must be maintained at all sites at all times as per the Site Environmental Plans (SEPs). Sedimentation basins must be maintained and sediment should be regularly removed to ensure inlets to dewatering systems are above sediment levels.

Attachments

Attachment 1 Dewatering inlet protection

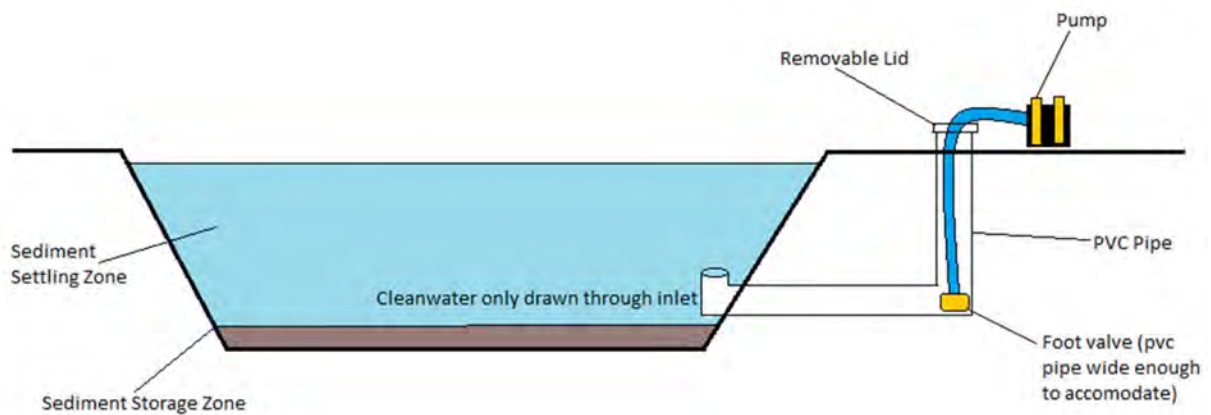


Figure 3 Typical detail – basin dewatering inlet structure



Figure 4 Ensure inlet is positioned above settled solids to stop sediment being sucked into the pipe



Figure 5 Floating inlet alternative to keep inlet above settled sediment

Attachment 2 Sediment Basin Signage

BASIN NUMBER _____	
DISCHARGE STATUS: RED = Do not discharge GREEN = Basin has been tested and approved. Discharge on listed date / time only.	DO NOT DISCHARGE BASIN
DO NOT DISCHARGE WATER FROM THIS POINT UNLESS IT HAS BEEN TESTED AND APPROVED BY THE ENVIRONMENTAL TEAM.	
Environmental Team: _____	

DISCHARGE

APPROVED

Date / Time _____

Approved By _____

Appendix J

Erosion and Sediment Control Procedure

Purpose

To manage the environmental impacts associated with the exposure of soils and the use of fill material generally related to erosion and sediment control, stockpile management and acid sulphate soils.

Performance Objective(s)

- Erosion and Sediment Control is in accordance with the Soil Erosion and Sediment Control Engineering Guidelines for Queensland Construction Sites, and Best Practice Erosion and Sediment Control Guidelines (IECA, 2008).
 - Area of disturbance is no greater than the area necessary for construction works to occur.
 - Minimise erosion of soils during construction works.
 - Minimise loss of sediment from site during construction works.
ESC measures shall be designed to achieve discharges from the construction site during any rainfall event consistent with the criteria identified within the Dewatering and Discharge Procedure.
 - Topsoil is stored for use in rehabilitation works.
 - Specific management of 5 yr ARI flood waters at the Albert St precinct (has been identified as impacted), see below for flood mapping.
- Stockpiles will be located above 4.6 m (AHD), if they are unable to be located at this level during works a flood notice will be made to the precinct and the stockpiles will be moved, to a location that meets this requirement

	#	Activities	Timeframe
Actions	Erosion and sediment control		
	1.1.1	Design erosion and sediment control (ESC) plans are developed by accredited RPEQ or CPESC	Prior to construction commencing
	1.1.2	ESC plans are revised and adjusted regularly and in line with changes in site conditions and works. Original ESC plans and each revision are kept on site. A photographic record of each ESC plan revision is to be taken and stored on file prior to updating where a whiteboard is used for the project ESC plan	Regularly during construction
	1.1.3	All control measures are implemented as per the most recent ESC plan	At all times
	1.1.4	Install construction fencing to delineate construction zone and prevent ground disturbance in areas outside the footprint of works. ESC plans to highlight areas of disturbance	Prior to construction commencing and during
	1.1.5	ESC plans to be updated as works progress	Regularly during construction
	1.1.6	Establish a single stabilised entry/exit point. This is to be shown on the ESC plans	At construction commencing

	#	Activities	Timeframe
	1.1.7	Clean stormwater must be diverted around or through the site without increasing the concentration of total suspended solids or other contaminants in the flow and without causing erosion (on-site or off-site)	At all times during construction
	1.1.8	Undertake drainage control measures including: Bypass 'clean' up-slope water around any soil disturbances Transport stormwater through the work site in a non-erosive manner Minimise hydraulic damage to the adopted erosion and sediment control measures during storm events	At all times during construction
	1.1.9	Undertake erosion control measures including: Limit the area of exposure Progressive stabilisation of disturbed areas. Protect disturbed areas remaining open without activity	At all times during construction
	1.1.10	Where practical, undertake sediment control measures including: Sediment basins Sediment fences Check dams	At all times during construction
	1.1.11	If heavy rain/storms forecast stabilise/ protect exposed areas and stockpiles	Prior to heavy rain/storm events
	1.1.12	Stockpile topsoil for future use in landscaping of site	When stripping topsoil
	1.1.13	Stockpiles of soil shall be controlled by sediment fences on the down slope side or covered completely	At all times
	1.1.14	Water from the external catchment will be diverted around/through the site via control measures and not allowed to enter disturbed areas of the site. Refer to ESC plan	At all times
	1.1.15	Stormwater runoff within the site shall be directed to catch pits and sumps identified in the ESC plans and treated	At all times
	1.1.16	Disturbed areas should be progressively stabilised as quickly as possible and, as a minimum, at the completion of each stage of works	Immediately
	1.1.17	Stabilise disturbed areas to ensure that erosion does not occur in disturbed areas within 20 days of inactivity, even though works might continue later	Immediately
	1.1.18	Works shall be completed as soon as practical to reduce time of exposed soils	As soon as practical
	1.1.19	Excavating and placing fill must be undertaken in a way that does not interfere with the flow of water to the downstream environment	At all times

	#	Activities	Timeframe
	1.1.20	Stripped topsoil must be stockpiled in stabilised heaps not exceeding 2.5m high for future use in rehabilitation of site	At all times
	1.1.21	All exposed ground not currently being worked or at finished level must be stabilised	At all times
	1.1.22	Where it is not feasible to effectively stabilise cleared areas of exposed soil, such as areas being actively worked, the following must be installed: Contingency measures such as A14/hessian, sandbags, hydromulch or soil binders must be implemented, prior to rain to minimise erosion Surface stormwater flows must be managed to avoid erosion of stockpiles, batters or embankments Sheet flows of stormwater must be managed to minimise sheet and rill erosion All concentrated stormwater flows including drainage lines, diversion drains, channels and batter chutes must be managed onto, through, and at release points from the site in all rain events up to and including the average recurrence interval (ARI) event of 1 in 2-year ARI without causing water contamination, sheet, rill or gully erosion, sedimentation, or damage to structures or property All flood waters with an ARI of 5 years will be managed on the Albert St site, as the site investigation and establishment works are short in duration this event will be managed in a similar manner to the 2 year ARI. As part of the pre-flood preparation (based on severe weather warnings) soils and hazardous substances will be managed to minimise discharge potential. During dewatering (eg trenches), pH must be within the range as specified within the Dewatering and Discharge Procedure.	At all times when required
	1.1.23	Following completion of works, the site shall be rehabilitated to stabilise any disturbed soils	At completion of works
Monitoring	1.1.24	Undertake daily checks on weather forecasts and warnings, record details and announce at pre-start	Daily
	1.1.25	Undertake daily checks of ESC measures to ensure they are cleaned out and maintained in working order	Daily
	1.1.26	Weekly inspections will be carried out to check: Works are only occurring within designated areas and no-go fencing or barriers are in place Stabilisation is occurring on a progressive basis For litter and debris For discharges from sediment basins/sediment traps	Weekly
	1.1.27	Prior to water release.	Prior to release

	#	Activities	Timeframe
		Any retained water on the project site to be tested for the following properties prior to release: Dissolved oxygen pH Turbidity Conductivity	
Reporting	1.1.28	CBGU to maintain a log of inspections, maintenance actions	Immediately following inspection / maintenance actions
	1.1.29	Records are to be logged and kept for verification of compliance on an as needs basis	As needed
	1.1.30	Records of any water quality testing to be retained for compliance	Immediately following testing
	1.1.31	Reports of any water treatment and testing results	Immediately following treatment and testing
Incident	1.1.32	In the event that ESCs are not effectively protecting the waterway/ downstream environment, any of the following corrective actions are implemented to rectify the situation	Immediate
Corrective Actions	1.1.33	Undertake a survey of ESC measures and determine effectiveness of current controls	Immediate
	1.1.34	Reassess the risks of the works areas and determine if further controls will remedy any problems	Immediate
	1.1.35	Seek the assistance of an appropriately qualified professional for advice on erosion sediment control devices	Immediate
	1.1.36	Raise Non-Conformance Report and conduct investigation into why there was failure to implement action and amendment to ESC implementations as requested by Environmental Auditor	Immediate



Brisbane City Council FloodWise Property Report

Report Reference

1566355457293

21/08/2019 12:44:17

Dedicated to a better Brisbane

THIS REPORT IS FOR BUILDING AND DEVELOPMENT PURPOSES ONLY

The FloodWise Property Report provides property or lot-based flood information for building and development requirements. This report provides information on estimated flood levels, habitable floor level requirements and more technical information on the four sources of flooding: river, creek / waterway, storm tide and overland flow. Refer to the Useful Definitions section for a glossary of terms.

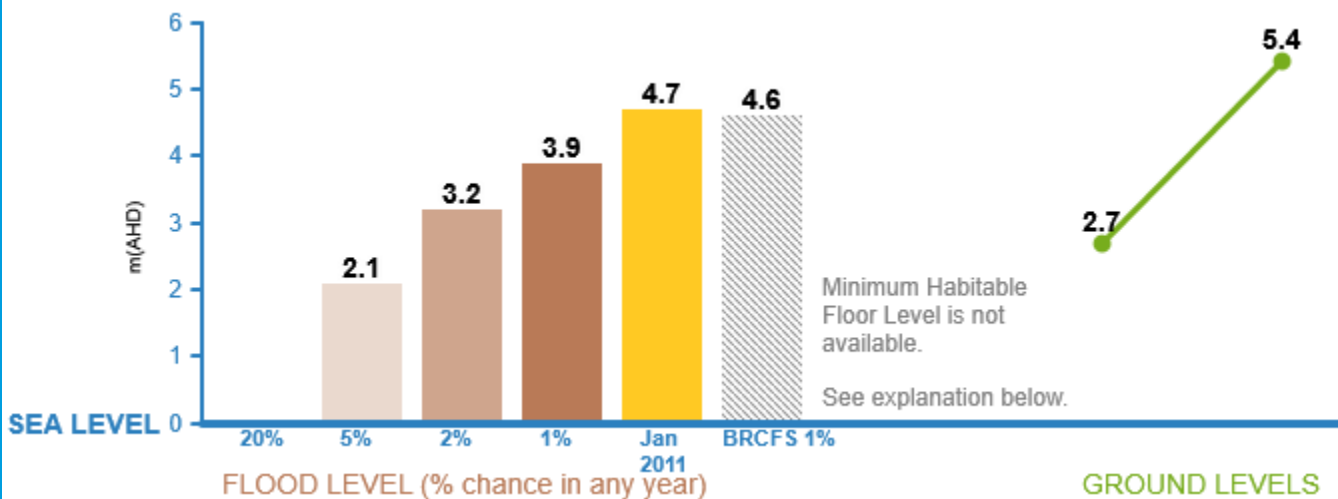
To find out more about how the contents of this report may affect building or development on this property, please visit www.brisbane.qld.gov.au/planning-building. For more general information about understanding your flood risk and how to prepare your property, family or business for potential flooding visit www.brisbane.qld.gov.au/beprepared

THIS IS A REPORT FOR:

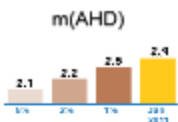
Rateable Address: 96 ALBERT ST, BRISBANE CITY QLD 4000

Lot Details: L.1 RP.171563

FLOOD LEVEL INFORMATION



EXPLANATION



m(AHD) - Metres Australia Height Datum. The level of 0.0m AHD is approximately mean sea level.

Flood Levels - The Flood level bar chart above shows the possible flooding level and percentage chance of that level being reached or exceeded in any year. If an orange bar shows, it is the calculated January 2011 flood level at this address or lot. If a hatched bar shows, it is the 1% AEP flood level from the 2017 Brisbane River Catchment Flood Study (BRCFS). Refer to 'Useful Definitions' for further information.

Minimum Habitable Floor Level - Applies to residential development only. Please refer to Council's planning scheme to learn how this may affect you. If a property is in an overland flow path, or a large allotment, a minimum habitable floor level cannot be provided. Refer flood and planning development flags below.

Ground Levels - The green line above shows this property's approximate lowest and highest ground levels based on latest available information (2014 airborne laser survey) to Council. If you are building, please confirm with a surveyor.

For further information and definitions please refer to the Useful Definitions page

FLOOD AND PLANNING DEVELOPMENT FLAGS

DEVELOPMENT FLAG(S)

This property may also be affected by one or more flood or property development overlays or flags. These include: LARGE ALLOTMENT

Please review the technical summary over page and refer to Council's planning scheme for further information.



Brisbane City Council FloodWise Property Report

Report Reference

1566355457293

21/08/2019 12:44:17

Dedicated to a better Brisbane

TECHNICAL SUMMARY

This section of the FloodWise Property Report contains more detailed flood information for this property so surveyors, builders, certifiers, architects and engineers can plan and build in accordance with Council's planning scheme. For more information about building and development in Brisbane please visit www.brisbane.qld.gov.au/planning-building or talk to a Development Assessment Planning Information Officer via Council's Contact Centre on (07) 3403 8888.

THIS IS A REPORT FOR:

Rateable Address: 96 ALBERT ST, BRISBANE CITY QLD 4000

Lot Details: L.1 RP.171563

PROPERTY INFORMATION (Summary)

The following table provides a summary of flood information for this property. More detailed flood level information is provided in the following sections of this report.

PROPERTY SUMMARY	LEVEL (mAHD)
Minimum Ground Level	2.7
Maximum Ground Level	5.4
Min Habitable Floor Level	Contact Council
Residential Flood Level (RFL)	4.7
Residential Flood Level Source	RIVER
Source of Highest Flooding	RIVER
Flooding may also occur from	RIVER

ESTIMATED PEAK FLOODING LEVELS

The table below displays the peak estimated flood levels by probability for this property. Estimated flood level data should be used in conjunction with applicable planning scheme requirements - Refer to Flood Planning Development Information.

Note that the overland flow flooding level maybe higher than the levels below from other sources.

DESCRIPTION	LEVEL (mAHD)	SOURCE
20% AEP	N/A*	
5% AEP	2.1	RIVER
2% AEP	3.2	RIVER
1% AEP	N/A*	RIVER
January 2011	4.7	RIVER
DFL	3.9	RIVER
RFL	4.7	RIVER
2017 BRCFS 1% AEP**	4.6	RIVER

* Council does not hold flood levels for this probability event, or it is not applicable for your property. If the source for the 1% AEP is River, refer to the DFL. Otherwise, refer to the BRCFS 1% AEP for information purposes only.

** This is the 1% AEP flood level from the 2017 Brisbane River Catchment Flood Study (BRCFS). The new flood study data is yet to be adopted for application in planning schemes and is for information purposes only.



Brisbane City Council FloodWise Property Report

Report Reference

1566355457293

21/08/2019 12:44:17

Dedicated to a better Brisbane

Useful Definitions

Australian Height Datum (AHD) - The reference level for defining ground levels in Australia. The level of 0.0m AHD is approximately mean sea level.

Annual Exceedance Probability (AEP) - The probability of a flood event of a given size occurring in any one year, usually expressed as a percentage annual chance.

Defined Flood Level (DFL) - The DFL for Brisbane River flooding is a level of 3.7m AHD at the Brisbane City Gauge based on a flow of 6,800 m³/s.

Maximum and Minimum Ground Level - Highest and lowest ground levels on the property based on available ground level information. A Registered Surveyor can confirm exact ground levels.

Minimum Habitable Floor Level - The minimum level in metres AHD at which habitable areas of development (generally including bedrooms, living rooms, kitchen, study, family and rumpus rooms) must be constructed.

Council's Planning Scheme - The City Plan (planning scheme) has been prepared in accordance with the Sustainable Planning Act as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Council's intention for future development in the planning scheme area, over the next 20 years.

Residential Flood Level (RFL) - Residential flood level (RFL) for Brisbane River flooding equates to the flood level applicable to the extent of January 2011 floods as depicted by mapping on the Queensland Reconstruction Authority website or the Council's defined flood level (DFL) for the Brisbane River, whichever is higher.

Rateable Address - A Lot or Property may have more than one street address. The address shown on this report is the address used by Council for the Lot or property selected.

Property - A property will contain 1 or more lots. The *Multiple Lot Warning* is shown if you have selected a property that contains multiple lots.

2017 Brisbane River Catchment Flood Study (BRCFS) - The BRCFS is a project led by the Queensland Government. The flood study was released in 2017. The 1% AEP flood levels from the flood study is yet to be adopted for application in planning schemes and is for information only. Other % AEPs will be updated with new information from the flood study as part of any relevant changes to City Plan 2014 as soon as is practicable.

Brisbane City Council's Online Flood Tools

Council provides a number of online flood tools:

- to guide planning and development
- to help residents and businesses understand their flood risk and prepare for flooding.

Planning and Development Online Flood Tools

Council's online flood tools for planning and development purposes include:

- FloodWise Property Report
- Flood Overlay Code

For more information on Council's planning scheme and online flood tools for planning and development:

- phone 07 3403 8888 to talk to a Development Assessment Customer Liaison Officer
- visit www.brisbane.qld.gov.au/planning-building
- visit a Regional Business Centre.

Helping residents and businesses be prepared for flooding

Council has a range of free tools and information to help residents and businesses understand potential flood risks and how to be prepared. This includes:

- Flood Awareness Map
- Flooding in Brisbane – A Guide for Residents
- Flooding in Brisbane – A Guide for Businesses
- Early Warning Alert Service. Visit www.brisbane.qld.gov.au/earlywarning to register for email, home phone or SMS severe weather alert updates.

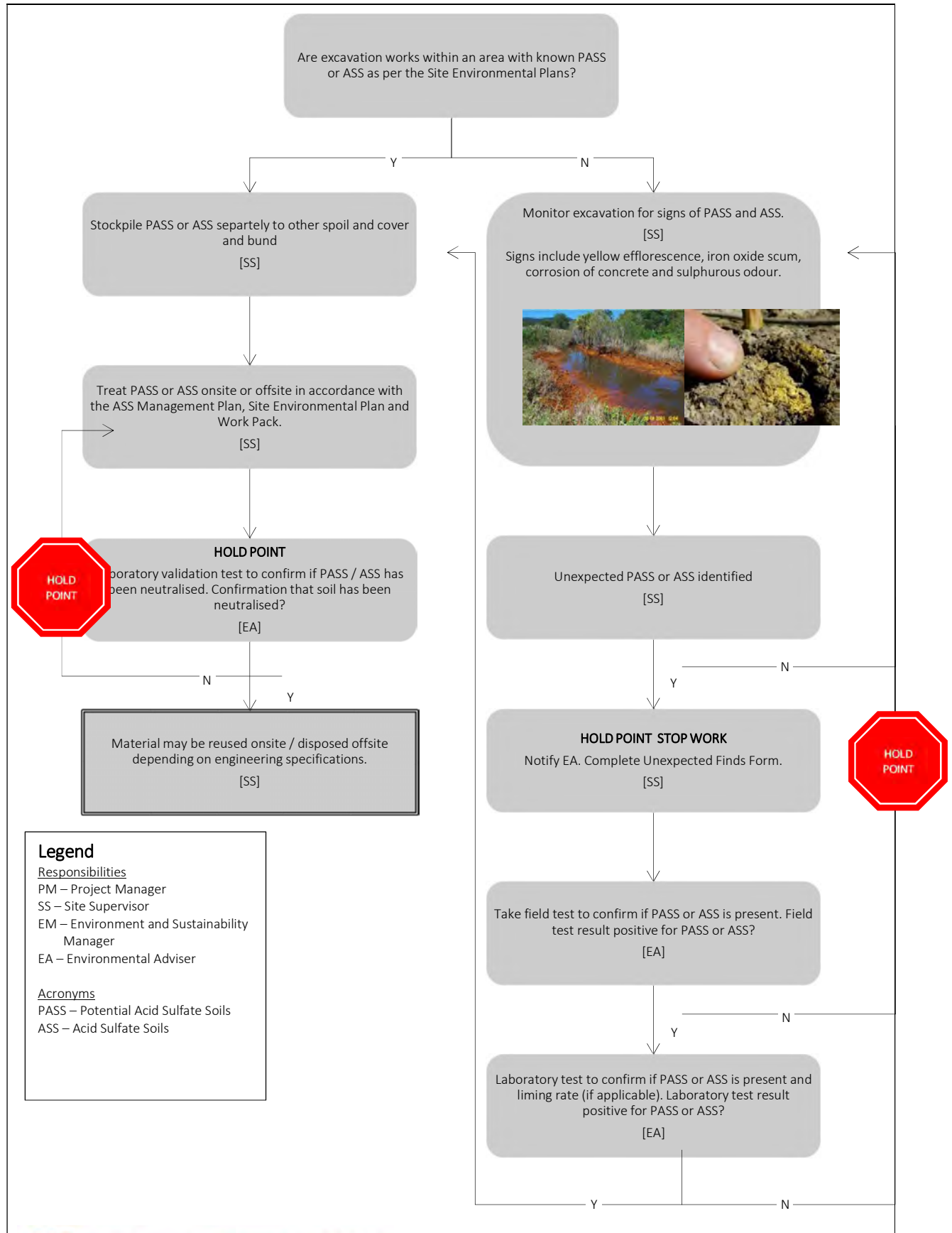
Note: The Flood Awareness Map shows four levels of flood likelihood from high likelihood (flooding is very likely to occur) through to very low likelihood (very rare and extreme flood events).

For more information on Council's online flood tools for residents and business:

- Visit www.brisbane.qld.gov.au/beprepared
- Phone (07) 3403 8888.

Appendix K

Acid Sulphate Soils Procedure



Introduction

Objectives

The objective of this procedure is to describe the management, testing, storage, treatment and disposal protocols of any confirmed or suspected Acid Sulphate Soils (ASS) unearthed during excavation and tunnelling works. This procedure applies to both those areas with known Potential or Actual ASS (PASS and AASS) and for unexpected finds of PASS and AASS.

Training

- All personnel are to undertake Project inductions identifying their environmental and compliance obligations.
- Obligations and responsibilities relevant to ASS will also be included in pre-start briefings, toolbox talks or targeted environmental training as appropriate.

Acid sulphate soils procedure

Excavation of acid sulphate soils

- During excavation minimise the volume of PASS/AASS removed and ensure it is separated from non-ASS material.
- Stockpile PASS and ASS prior to treatment within a bunded area which either has impervious base or on a layer of lime. Untreated stockpiles are to be covered if undisturbed for longer than two weeks.
- Stockpile areas are to be situated at least 20m away from watercourses. If this is not practicable, a sealed container should be used to prevent run off and further contamination of the area.
- Alternatively a sealed skip can be used to store ASS.

Treatment of acid sulphate soils

- Treatment areas are to be bunded, with a leachate collection system and located away from sensitive receivers and environments, including at least 20m away from watercourses or where practicable.
- The base of an excavation containing PASS or AASS will be dosed with lime to prevent oxidation.

PASS and ASS Treatment Method

- A third of the total aglime required for the excavated material (determined from lab testing) will be placed as a bed over the proposed treatment location.
- ASS or PASS material is to be placed on top of the lime in a layer no greater than 300mm and allowed to dry sufficiently.
- When the material is dry (expected 1-2 days in dry weather), another third of the total lime shall be added to the top and sides of the stockpile and thoroughly mixed, using either small or large mechanical equipment such as a disc plough or rotary hoe attached to a tractor or other suitable equipment.
- The partially treated stockpile shall then be allowed to dry further if required.

- The remaining third of lime shall be added to the top and sides of the stockpile.
- Thoroughly mix the stockpile using a rotary hoe (either on a tractor or as an excavator attachment). Where an excavator is to be used increase the safety factor to 2-2.5 dependent on the difficulty of mixing lime into the material.
- Chromium Reducible Sulphur validation testing is required to confirm ASS neutralisation status.
- The treated soil is then considered to be neutral and can be reused as spoil or general fill material. The final location of the neutral soil shall then be tracked and recorded in site Register.

Immediate reuse

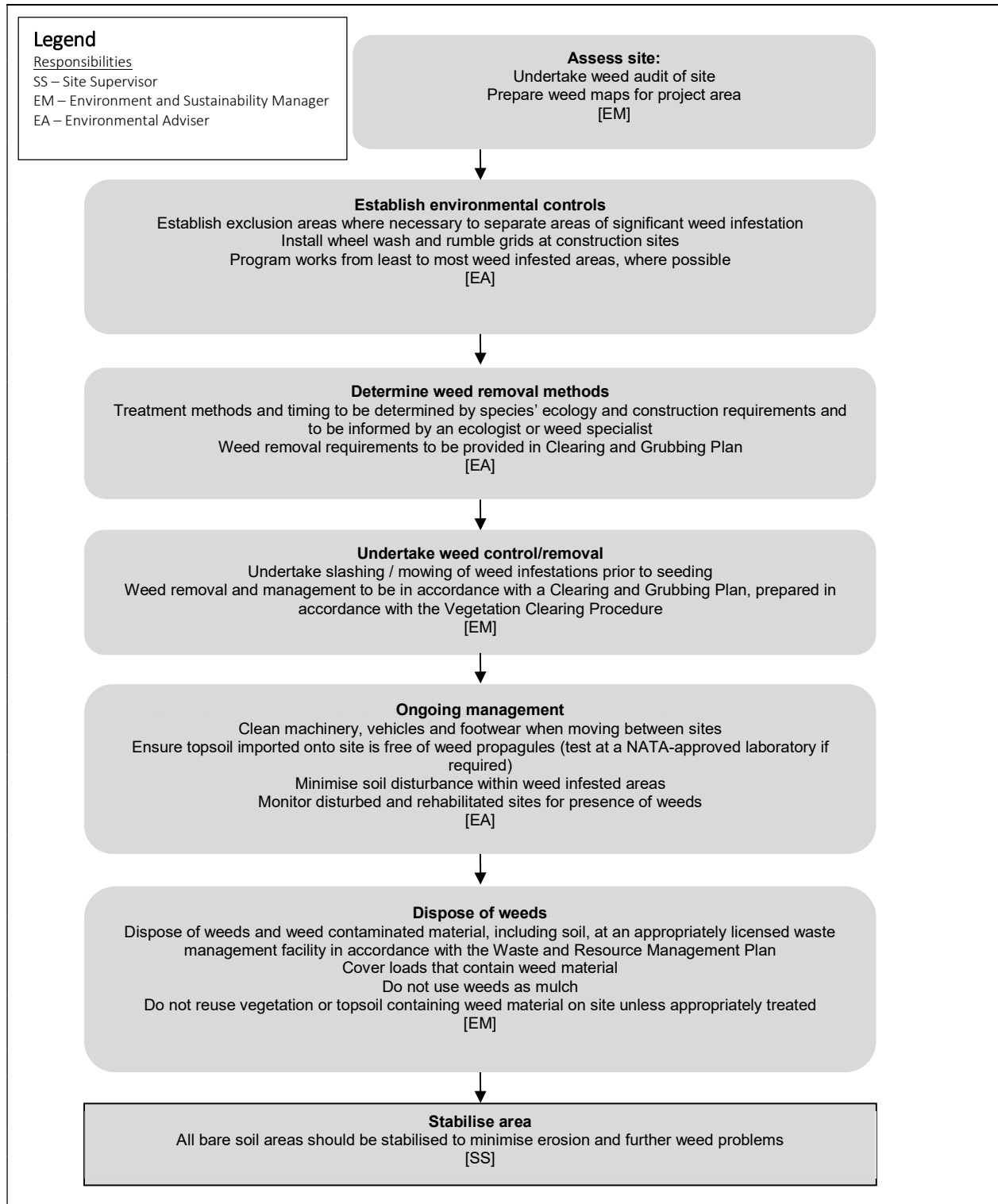
- Where PASS or is immediately reused (i.e. within the same day) there is a reduced likelihood that PASS will be exposed long enough to oxidise and become ASS.
- Immediate reuse may be appropriate if PASS are of low to moderate strength. Lime should be added over the top of the soil before it is disturbed, with the excavation process then providing immediate mixing and treatment.

Water within ASS excavation or stockpile area

- Where water has collected with an ASS excavation or the ASS stockpile area the Dewatering and Discharge procedure will be implemented. This includes a HOLD POINT to test the water and treat the water (as required) prior to discharge. Refer to Dewatering and Discharge Procedure.

Appendix L

Weed Management Procedure



Introduction

Objectives

To detail weed management and control practices to be implemented throughout construction to minimise the risk of spread of weed species into, out of the project area and between construction sites.

Training

All personnel to receive Environmental Induction and toolbox talks.

Weed management procedure

Weed control

Weed control is to be undertaken in accordance with this procedure and to consider Brisbane City Council requirements, where feasible.

Timing

- Where possible, weed removal should be undertaken prior to development of seed (early spring is generally the best time for most weed treatment and removal)
- If weeds have produced seed, seeds should be contained and removed prior to or during weed removal where feasible.
- All works are to be undertaken from least to worst weed affected areas where feasible.

Weed control techniques

- A guide to weed removal techniques for each weed species will be developed by a weed specialist once detailed weed mapping has been undertaken.
- Weed control techniques to be applied in each case will depend on the species, time of year and extent of infestation. Hand removal and other minimal impact techniques should be the first preference where practical.
- In presence of weed infestation, all plant, vehicles and footwear are washed down in an allocated wash-down area prior to departing site for the duration of construction to avoid the spread of weeds.
- Application of herbicides and/or pesticides should be undertaken by suitably trained and certified personnel in accordance with WorkCover requirements.

Ongoing management

Disturbed and/or rehabilitated sites are to be monitored for new weeds and weed infestations during the environmental inspections and any observations recorded.

Weed disposal

Where weeds cannot be effectively destroyed prior to topsoil stripping, contaminated topsoil will be isolated and either sterilised, encapsulated by deep burying, or disposed of at an approved off-site facility. Weeds are to be segregated and bagged (where possible) when disposing off site. Transport must be covered to further reduce the potential for spread of weed propagules. For any noxious weeds identified during site works, refer

to the Noxious Weeds (Weed Control) Order 2014 for the legal requirements for each species declared in within each Local Government Area (LGA). The control requirements for noxious weeds is outlined below.

Noxious weed classifications

Control class	Example control requirements
Class 1	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also "notifiable" and a range of restrictions on their sale and movement exist.
Class 2	The plant must be eradicated from the land and the land must be kept free of the plant. The weeds are also "notifiable" and a range of restrictions on their sale and movement exist.
Class 3	The plant must be fully and continuously suppressed and destroyed.*
Class 4	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread*
Class 5	There are no requirements to control existing plants of Class 5 weeds. However, the weeds are "notifiable" and a range of restrictions on their sale and movement exists.

* In some cases the following wording has also been inserted "the plant may not be sold, propagated or knowingly distributed"

Appendix M

Waste Management Procedure

Manage Waste

Purpose

To provide guidance on management procedures for potential waste generation associated with the site investigation activities, as well as a framework for ongoing waste management.

Waste

Section 13 (1) of the EP Act defines ‘waste’ as anything, other than a resource approved under the Waste Reduction Act, that is:

- a “left over, or an unwanted by-product, from an industrial, commercial, domestic or other activity; or
- b surplus to the industrial, commercial, domestic, or other activity generating the waste.”

General waste, limited regulated waste and regulated waste is further defined under the Environmental Protection Regulation. Schedule 7 prescribes what materials constitute regulated waste and waste that is not regulated waste. Certain waste management activities, including the disposal and transport of waste, are considered to be ERAs and require approval under the EP Act. The Environmental Protection Regulation also contains particular requirements for the handling of specific waste streams. The Queensland Waste Avoidance and Resource Productivity Strategy (2014–2024) provides a strategic view of resource recovery and sets targets for commercial, industrial and construction reuse within Queensland.

Waste Management

The waste management procedure for Cross River Rail will follow the waste management hierarchy shown in Figure 1. While these principles lead towards best practice in waste management, it is recognised that they are not always achievable and/or practicable due to the nature of the waste product, availability of capable receiving facilities, health and safety implications and associated costs that may be involved.

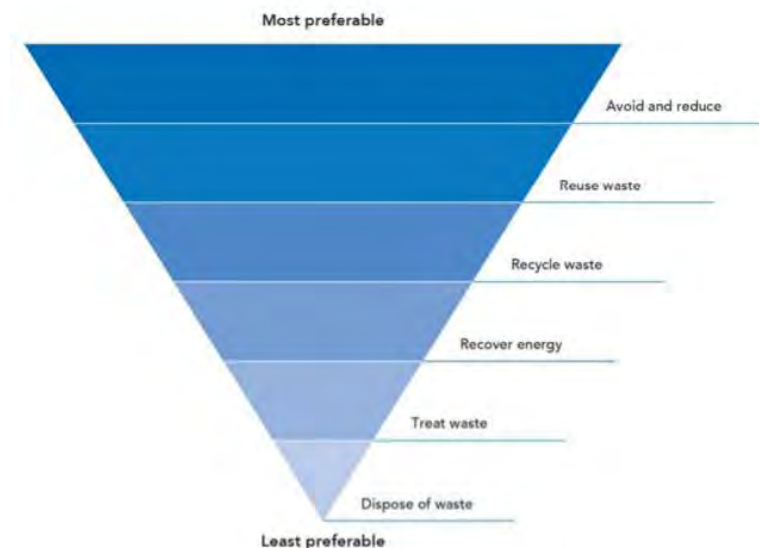


Figure 6 Waste and Resource Management Hierarchy

Avoid or reduce

Opportunities for avoiding and reducing (where avoidance is not possible) waste generation onsite should be identified.

Reuse

Reuse strategies (e.g. the identification of waste materials that would otherwise be destined for landfill disposal) should be identified.

Potential strategies include:

- Develop demolition procedures which facilitate recovery of materials for reuse, segregate different types of materials for recycling in preference to demolish and dispose
- Provide salvaging subcontractors with the opportunity to salvage (remove) building materials prior to demolition so that items can retain their value and be reused
- Stockpile clean topsoil that is free of weeds for reuse where practicable
- Reuse excavated soils wherever practicable to do so
- Reuse waste concrete wherever practicable in the design
- Chip and mulch vegetation cleared during construction and reuse mulched material for landscaping purposes.

Recycle

Recycling opportunities will be identified through the detailed design and development of the Waste and Resource Recovery Management Plan (WRRMP). This will consider the Guidelines to the Recycling Policy. Strategies for reuse of materials and recycling during the demolition and construction activities may include:

- Educate and train workforce (e.g. implementation of easily recognisable signage of recycling streams)
- Provide recycling facilities for general rubbish (e.g. glass, plastic, waste paper and metals)
- Collection of kerb and pavement materials and transport to crushing and recycling plants
- Segregate demolition materials by type to facilitate recycling and resource recovery efforts where reuse onsite is not practicable collect demolition materials for transportation to a nominated resource recovery and recycling depot.

Waste and Resource Recovery Management Plan

A WRRMP will be developed that outlines and describes waste management measures to be implemented during various phases of the Project's delivery (i.e. demolition, construction and operation). The WRRMP will outline:

- Waste stream assessment per project stage – prior to commencement of waste producing activities, specific waste management strategies will be developed for each waste stream including:
 - Developing and implementing systems to identify, quantify and monitor waste generation

- Identifying opportunities for resource recovery including the proposed destination for recovered materials
- Management of waste storage areas to prevent pollution of unused product and off cuts
- Training and awareness of waste management procedures for segregation of recyclable materials, storage of waste and identification opportunities to avoid waste generation and reuse material during construction
- Supply chain management actions to minimise generation of solid waste and encourage recycling
- Roles and responsibilities relating to waste management and resource recovery for each stage of site investigations, monitoring, auditing and reporting requirements procedure for review and update of the WRRMP.

The WRRMP will outline the mechanism for implementing the strategies required site investigation activities and the resulting waste stream management.

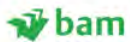
Appendix N

QLD Waste Avoidance and Resource
Productivity Strategy (2014 – 2024)



Waste—Everyone's responsibility

Queensland Waste Avoidance and Resource Productivity Strategy (2014–2024)



CBGU D&C JV

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Introduction

The *Queensland Waste Avoidance and Resource Productivity Strategy (2014–2024)* outlines the many opportunities and challenges ahead for Queensland as we work to improve our collective waste avoidance and recovery performance.

Queensland industry took the lead on developing the draft strategy and has fostered a strong focus on shared responsibility for improving waste and resource recovery performance.

This strategy provides a high-level direction for waste management and resource recovery in Queensland over the next 10 years—broadly focusing on waste from all sectors, including household, agricultural, mining, commercial and industrial waste, and solid and liquid hazardous (or regulated) waste. This 10-year strategy complements and supports *The Queensland Plan*.

The vision for this strategy is for Queensland to become a national leader in avoiding unnecessary consumption and waste generation—adopting innovative resource recovery approaches, and managing all products and materials as valuable and finite resources.

To achieve this vision the strategy sets a framework (Figure 1) of guiding principles and objectives, and priority areas which underpin the development of action plans. The strategy is also informed by the waste and resource management hierarchy (Figure 4), which sets out an order of preference for options for managing waste—from avoiding, to reusing, recovering, treating and disposing of waste. Taken together, the principles and hierarchy help shape the objectives and priorities, and in turn inform the development of action plans for implementing the strategy.

The strategy sets targets for improving resource recovery and recycling rates and reducing landfill disposal over the next 10 years. These targets take account of the different circumstances and opportunities in metropolitan, regional and remote parts of Queensland.

The strategy also identifies the highest priority wastes for action—wastes that are of national concern or that are of particular concern to Queensland.

The strategy will be implemented through a series of action plans that are intended to be developed at a government or sectoral level and will complement the objectives and priorities of the strategy. Specific or sectoral targets within the plans will help contribute towards achieving the strategy's targets. Action plans under the strategy will address improved management of any relevant priority wastes, as well as key waste generated or handled by the sector that have potential for improvement.

Implementation of the strategy will be reported on every three years, as required under the *Waste Reduction and Recycling Act 2011*. The Queensland Government Action Plan will also be reviewed every three years, in line with the strategy review, to ensure Queensland is achieving the vision and objectives of the strategy.

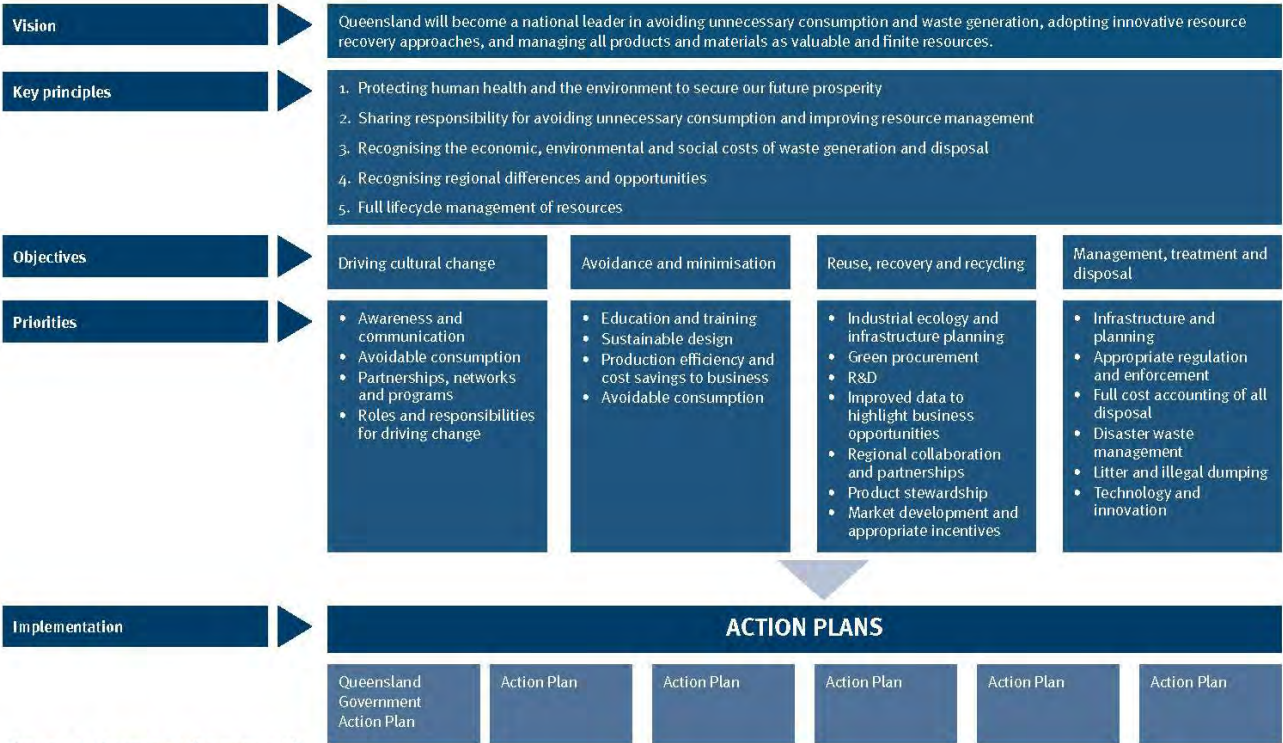


Figure 1: Strategy framework

Why do we need a waste strategy?

Changing patterns of consumption, economic changes, and projected population growth over the next decade mean that across Queensland, business industry and regional areas are facing many challenges. We need to re-think our approach to managing waste and resource recovery.

On current trends in population growth, waste generation and disposal from everyday business and domestic activities is expected to increase to more than 11 million tonnes by 2026. In addition, wastes from heavy industrial activities can also be expected to grow over the next decade as population and our demand for resources increases, and as industries expand to meet this growing demand.

Queensland has a population of 4.7 million—3 million live in the south-east corner which covers only 1.3% of the state

Queensland's large size, combined with a significant proportion of the population being located in decentralised coastal communities or vast areas of low-population regional areas inland, presents logistical challenges for managing waste. Small to medium sized businesses often lack the resources and expertise in the waste industry to find the most beneficial waste solutions, and economies of scale and distance create significant challenges to improving practices. A Chamber of Commerce and Industry Queensland survey in 2010 highlighted how difficult it can be for businesses to determine the volume, nature and cost of the waste they create. The resource recovery industry is expanding and material recovery is increasing each year; however investment in the industry remains a challenge due to the difficulty in locating and gaining approval for infrastructure, and the acceptance of recycled materials in the market place.

This strategy provides a roadmap on how Queensland can best deal with waste. The Queensland Government is implementing the strategy to position Queensland as a leader in sustainable waste management and resource recovery, and to realise the vision of *The Queensland Plan* by protecting the environment while encouraging greater opportunities for the economy.

4

In 2012-13 Queensland sent more than half of the waste produced from everyday business and household activities to landfill

In 2012-13 Queensland produced almost **8.5 million tonnes** of general waste from everyday household, business and construction activities.

55% of general waste was sent to landfill

14.9 million tonnes of hazardous wastes—not all of which can be recycled—was generated by heavy industrial activity including:

- ▶ Ash from power generation
- ▶ Asbestos
- ▶ Food processing waste
- ▶ Industrial process waste such as galvanizing liquid

45% of general waste was recovered, from the following streams:

- ▶ 61% construction
- ▶ 33% household
- ▶ 42% business

Figure 2: Management of waste in Queensland 2012-13

The true cost of waste generation and disposal includes a variety of environmental and economic costs to business and the community. Queensland has historically followed a linear pattern of waste management—manufacturing of raw materials into products, followed by consumption and disposal. This is now shifting to look at wastes as resources, cycling through the economy in different forms to extract their full potential. Landfills will remain a necessary part of waste management practices; however, the way that resources are managed will shift so that the resource value of wastes is more readily recognised and realised.

The total impact of waste is complex and is closely connected to the consumption of other resources, such as water and energy that goes into the goods we use. This means that there are multiple benefits and efficiencies from 'closing the loop' and better valuing the resource potential and embodied energy in waste items. Closing the loop recognises everything as a resource and this waste strategy recognises the importance of keeping waste in the economy for as long as possible (Figure 3).

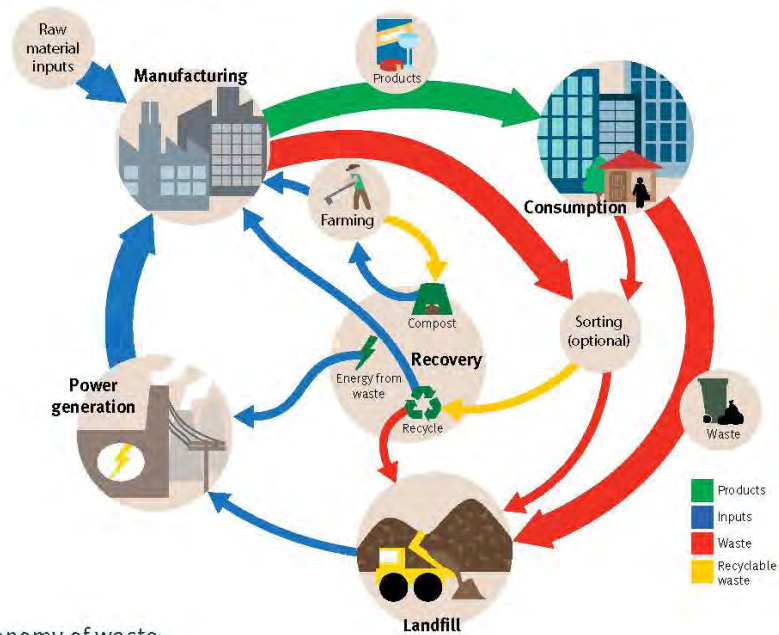


Figure 3: The cycle/economy of waste

Queensland snapshot



Setting the direction

We all produce waste, and we all make decisions about how waste is managed. This strategy shows how Queensland can improve its waste and resource management performance through targeted and collaborative action delivered through partnerships and shared responsibility.

This strategy is a call to action for the government, community and the waste industry and will be an effective tool to implement change. The 10-year strategy covers waste from all sectors—household, agricultural and industrial, solid and liquid, and hazardous or regulated waste.

Queensland industry took the lead in developing the new strategy and has fostered a strong focus on shared responsibility for improving waste and resource recovery performance. A steering committee set up to produce the draft strategy consisted of representatives from the waste and resource recovery industry, agriculture, resources, construction and tourism sectors, local and state governments, academia and environmental bodies.

The strategy vision is underpinned by a set of principles which guide the approach to goal-setting and decision-making. Four objectives have been set to implement the strategy's vision and principles, underpinned by priority areas for action (refer to page 7).

The waste and resource management hierarchy (Figure 4) sets the order of preference for managing waste in order to inform decision-makers. The hierarchy shapes the vision, principles, objectives and priorities in the strategy, and provides a basis for development of action plans.

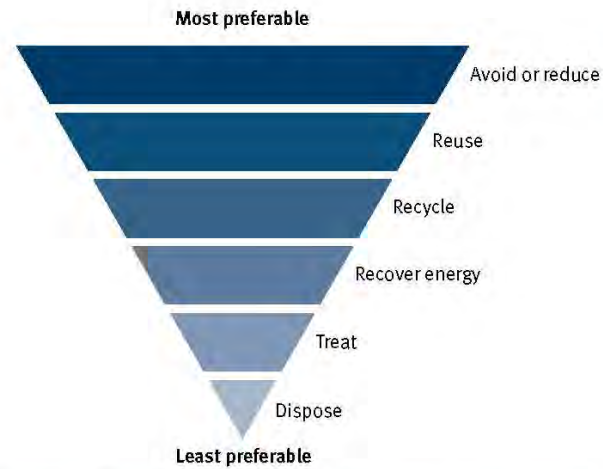


Figure 4: The waste and resource management hierarchy

Principles

Principle 1:

Protecting human health and the environment to secure our future prosperity

Good management of resources is a benefit to our society, economy and environment.

Principle 2:

Sharing responsibility for avoiding unnecessary consumption and improving resource management

Shared responsibility and commitment from those involved in selling, buying, using and disposing of products and material streams. This principle requires all parties to account for the environmental costs and impacts associated with goods and materials throughout their lifecycles. This principle aligns with Queensland's Waste Reduction and Recycling Act 2011 which states those who generate waste should retain responsibility for its management.

Principle 3:

Recognising the economic, environmental and social costs of waste generation and disposal

The true cost of waste must take into account the negative economic, environmental and social costs to government, business and the community. Costs include the impact of waste on the environment and human health, declining landfill space close to major population centres, the rising costs of virgin materials and the loss of valuable resources, increasing transport costs, and the large number of landfills that will require remediation at great cost to the community and governments.

Principle 4:

Recognising regional differences and opportunities

Queensland's geographic, demographic, socioeconomic, and environmental and health differences all require consideration. This principle recognises that a 'one size fits all' approach is impractical, given the divergence of circumstances around the state, and that local solutions are best fit.

Strategic regional collaboration can effectively maximise the benefits from shared services, infrastructure and expertise to deliver viable, accessible and sustainable local resource recovery solutions. This principle also recognises that local solutions create local jobs and minimise the impact of transport of waste and resources.

Principle 5:

Full lifecycle management of resources

We reach our goal when we draw the most sustainable benefit from the wastes that are generated and keep the material circulating in the economy for as long as possible. This principle aims to preserve the on-going value of material streams by ensuring the waste by-products from one process are channelled into another.

Objectives

1. Driving cultural change

All stakeholders recognise their role in meeting the vision of the waste strategy, and are informed and empowered to participate in achieving its goals and objectives

2. Avoidance and minimisation

Queensland will realise all opportunities (environmental, economic and social) from maximising sustainable consumption and production

3. Reuse, recovery and recycling

Queensland will optimise economic benefits from reuse, recovery and recycling

4. Management, treatment and disposal

Queensland will reduce the impact of waste on human health and the environment through improved waste practices

Aligning with *The Queensland Plan*

More than 80,000 Queenslanders contributed their ideas to *The Queensland Plan*, which has established a shared, long-term vision for Queensland over the next 30 years. The waste strategy has been developed to align with and contribute to the goals and objectives set in *The Queensland Plan* (Figure 5).

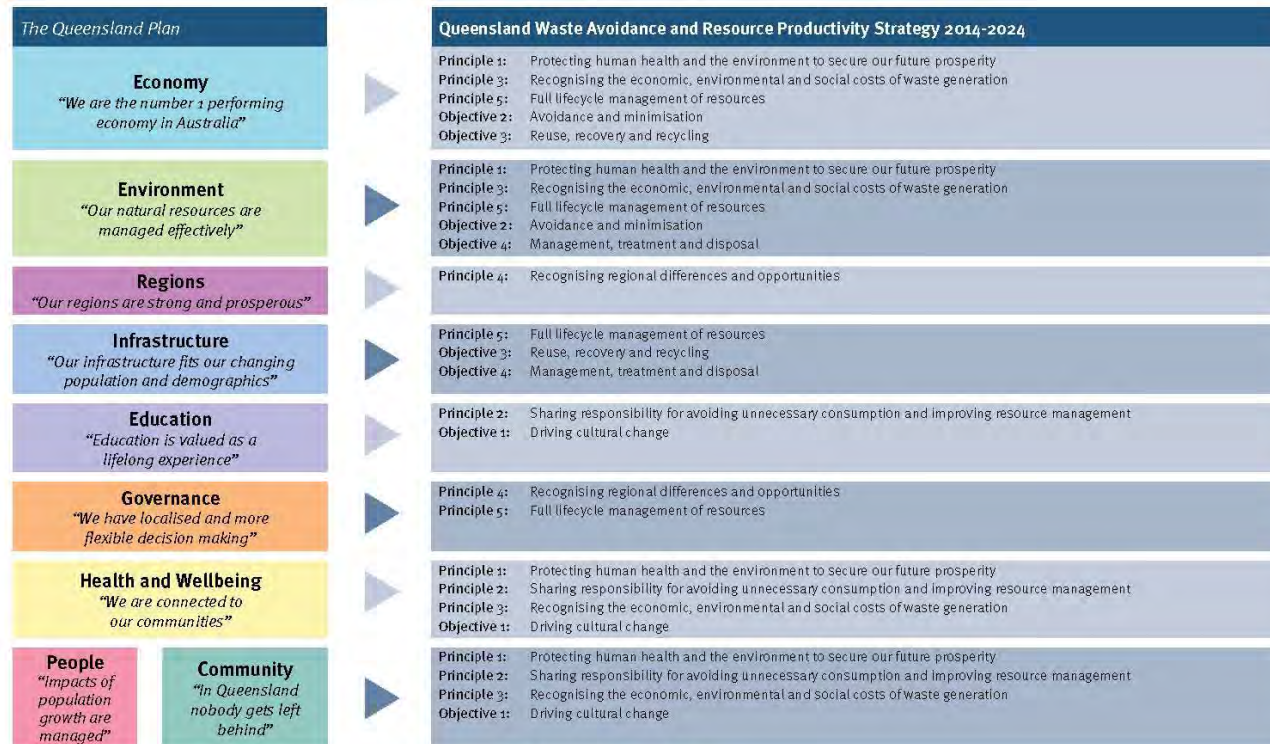


Figure 5: How the waste strategy aligns with *The Queensland Plan*

Targets

The Queensland Government understands that each part of the state has different needs and constraints, and access to different waste management technologies and services.

The strategy targets (Table 1) address the need identified in *The Queensland Plan* to reduce the impact of waste on the environment. At the same time, the targets take into account the different circumstances and opportunities in metropolitan and non-metropolitan parts of the state.

The south-east corner of the state is home to 70% of Queenslanders

1. Metropolitan
Covers local government areas within South East Queensland.
2. Regional centres
Darling Downs-Maranoa, Wide Bay, Fitzroy, Mackay, Townsville and Cairns regions. These are regions with significant urban centres with populations over 30,000.
3. Remote areas
Areas with small populations without large urban centres.



Figure 6: Differentiated target areas for domestic waste

Table 1: Strategy targets

Waste stream	Measure	2012-13 recovery baseline	2024 target
All general waste	Reduction in per capita generation	1.9 tonnes general waste per person per year	Reduce (by 5%) to 1.8 tonnes per person per year
Municipal solid waste (domestic)	Improved recycling rate	33% state <ul style="list-style-type: none"> • 37% metropolitan • 30% regional centre 	50% state <ul style="list-style-type: none"> • 55% metropolitan • 45% regional centre • Improve practices as much as practicable for remote areas
Commercial and industrial waste	Improved recycling rate	42% state	55% state
Construction and demolition waste	Improved recycling rate	61% state	80% state
Landfill diversion target	Reduction in the amount of waste going to landfill	4,675,000 tonnes to landfill	Reduce by 15% over life of strategy
Problem or priority wastes	Improved management of each waste	Individual baselines to be developed	Individual measures to be developed



Improved recycling rates through recovery and reuse of waste materials

Waste generation

The strategy sets a target for all Queenslanders to reduce the overall generation of waste. It is an ambitious target to reduce the amount of waste generated per capita by 5% across 10 years.

One of the strategy's objectives is to avoid and minimise waste and there are recognised measures that can reduce waste generation, such as cutting excess packaging, reducing food waste and organic waste, and increasing production efficiencies in manufacturing or construction.

Municipal solid (household) waste

The disposal and recovery of municipal solid waste can be tracked by area allowing for differentiated targets to be set across geographical zones, reflecting the differences in waste management across the state. Differentiated targets allow areas of the state to manage their wastes according to the available infrastructure, location and costs to undertake waste treatment and management.

The strategy proposes a 55% recycling rate in metropolitan areas, 45% recycling rate in regional areas, and a 50% recycling rate across Queensland. Remote areas are to improve their recycling rates as much as practicable, taking into account distance to waste management and treatment facilities. Within these targets there will also be a variation of what can realistically be achieved, depending on factors such as population and distance from transport corridors.

Commercial waste

Statewide targets apply to the general commercial and industrial, and construction and demolition waste streams. No regional targets are set for these wastes at this stage.

The Queensland Government proposes to look into available infrastructure, technology and recovery activities across the state to assist with the achievement of the commercial waste targets.

A future area of work under the strategy will be to gather baseline data and set statewide or regional targets for priority materials within these waste streams. In some cases, targets under national recovery schemes will already apply—for example, for used consumer packaging or for e-waste disposal.

The strategy proposes to increase the recycling rate of commercial and industrial waste to 55% across the state. Construction and demolition waste is proposed to increase to 80% across the state.

Landfill diversion

The landfill diversion target aims to reduce the amount of waste being disposed of into landfill by 15% over the next 10 years, promoting the reuse and recovery of wastes rather than directly disposing. The landfill diversion target will be reviewed every three years, to determine if a target of 5% every three years is being met.

Problem or priority wastes

Baselines and targets may be developed for individual priority wastes within the heavy industrial or the general waste stream. It is problematic to apply one target to the heavy industrial waste stream, which is made up of widely disparate types of hazardous waste,

not all of which can be recycled. National targets already apply to wastes such as scrap tyres, televisions and computers. These items are considered to have a greater resource value for their component parts and schemes are in place to redirect these wastes out of landfill.

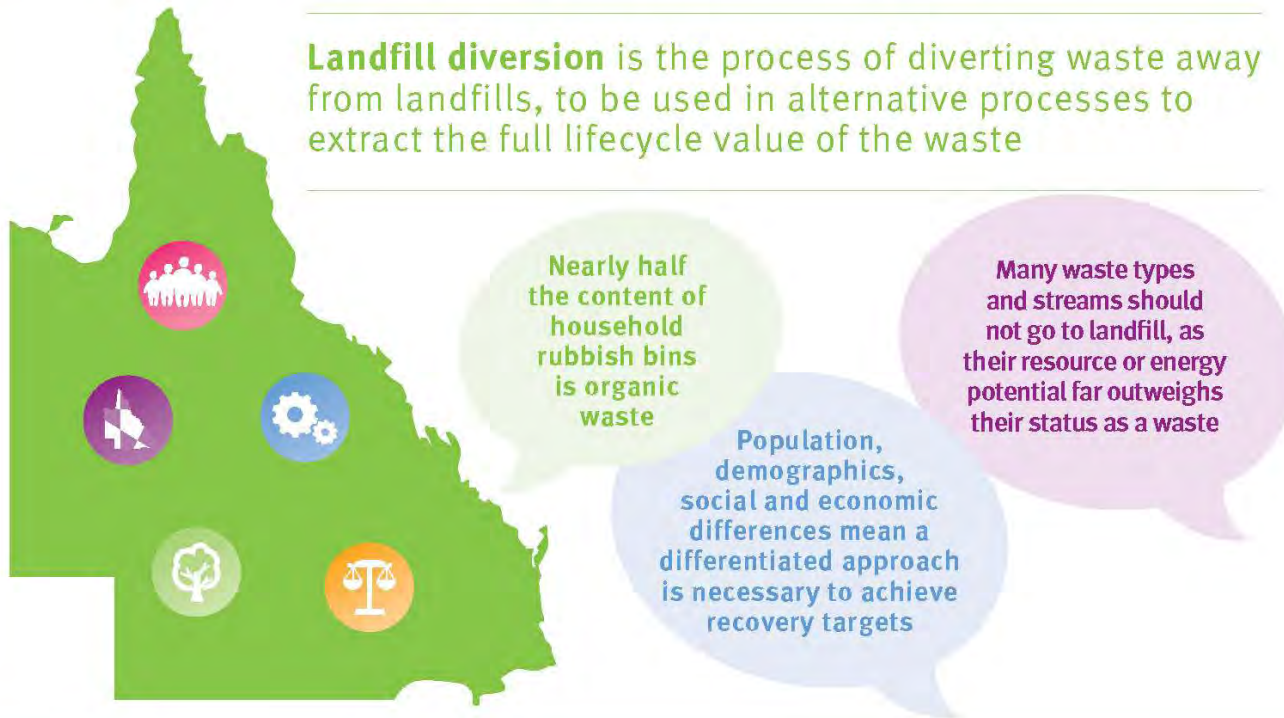
The regulated waste framework is currently under review, with changes proposed to streamline the ways regulated waste is managed in Queensland, to provide more certainty about what wastes are regulated. Changes to the framework will enable businesses and industry to better manage their regulated wastes, and provide additional information for baseline data to set targets and to better manage and where possible, reuse hazardous wastes to avoid disposal.



Opportunities

Queensland's size and decentralised population means that the cost of managing and recovering waste in South East Queensland is very different from Far North Queensland. By closing the loop and using resources more efficiently, we can reduce our environmental footprint and benefit from job creation and increased economic activity in the resource recovery industry, boosting productivity and fostering new and diversified industries across Queensland. A collaborative effort is required to achieve our targets—to identify the highest priority areas and wastes, implementing clever and profitable waste avoidance, minimisation and recovery systems.

Landfill diversion is the process of diverting waste away from landfills, to be used in alternative processes to extract the full lifecycle value of the waste



14



Organic waste

- Creating awareness amongst communities and businesses to inform better purchasing decisions and alternatives to disposal of organic waste.
- Recovering materials to feed into compost or alternative waste technologies to recover materials and energy from waste.



Partnerships

- Identifying inefficiencies and opportunities, and building collaborative partnerships between industries or government, could deliver substantial savings to Queensland businesses.
- By treating waste as a valuable resource, materials and resources will continue to circulate within the economy, generating jobs and further profit.
- Increase efficiencies through government/industry and industry/industry partnerships designed to cut waste (e.g. ecoBiz).



Regulatory initiatives

- Streamlining regulation to provide industry with certainty, stimulating research, innovation and investment in Queensland.
- Removing barriers to the development of new technologies, particularly for alternative waste technologies, and providing policy direction will encourage investment, market certainty and development.



Regional development

- Improving regional access to waste technologies through appropriate planning and industry placement.
- Encouraging local reuse and markets for re-usable products to increase waste opportunities in regional areas.
- Creating certainty for industry development through infrastructure mapping and use of regulatory tools and reforms.



New technologies

- Developing an alternative waste technologies policy—facilitating the increased development of energy-from-waste reflects the changing landscape of waste treatment and technology in Queensland.
- Providing additional research and development activities to grow productivity, reduce waste and add value to the four pillar sectors through Queensland's Science and Innovation Action Plan framework.

National action on waste management

With the increasing number of new products on the market and the increased volume of products being disposed of, there is a growing interest in the end-of-life product management. In 2011, the Australian Government introduced the *Product Stewardship Act 2011* in order to provide a framework to allow the product stewards to take responsibility for the appropriate management of the products they place on the market.

The momentum behind national initiatives will see major progress in key areas within the time horizon of the Queensland Government's waste strategy. This allows Queensland to concentrate on initiatives that extend and complement the national work, and focus on local priorities through adoption of a range of tools that are available to us.

It is likely the next 10 years could see an array of national product stewardship schemes covering a broader range of electrical and electronic waste beyond the current television and computer scheme, and consumables (such as used paint and handheld batteries). This will be in addition to the existing national schemes for used oil, tyres, televisions and computers, packaging and other waste.

Queensland's priority wastes

Under Queensland's *Waste Reduction and Recycling Act 2011*, priority wastes are those with high disposal impacts (such as toxicity or greenhouse gas emissions), social impacts (such as community concern or amenity), or whose recovery would present resource savings or business opportunities. The Act enables the Queensland Government to work with industry and the community in identifying priority wastes in the state, and determine—through a process of consultation—the most appropriate management options for each priority.

Potential solutions could include a state-based product stewardship scheme or landfill ban, to improve the management of particular priority wastes. However, under Queensland law, such schemes can only be considered where justified as the best option through a rigorous process of analysis and public consultation, and in the absence of national action.

Other measures that may be a best fit for a problem waste include education and awareness-raising, partnerships to deliver research or market development programs, or redefining a particular waste as a resource for a beneficial reuse.

A number of waste streams have been identified as priorities for Queensland (Table 2).

Table 2: Queensland's priority wastes

Priority waste stream	Priority material
Plastic waste	Agricultural plastics Packaging waste Plastic bottles, bags and other consumer plastics
Organic waste	Households: <ul style="list-style-type: none"> • green waste • food waste Commercial premises: <ul style="list-style-type: none"> • hospitality • food processing
High volume wastes with an existing resource value	Concrete Treated timber Plasterboard
Regional impact waste	Mining and industry development Mattresses Orphan agricultural and veterinary chemicals
Complementary national product stewardship measures	Fluorescent lights Used tyres Used oil

Action plans developed under the strategy will need to address methods for improving the management of Queensland's priority wastes, over the 10-year life of the strategy.

How will we get there?

Action plans

The high-level direction and outcomes set in the strategy will be realised through the development of action plans—detailing how the objectives, priorities and the overall vision will be achieved.

Each action plan will adopt the strategy headline target applicable to the sector, and will be supported by customised actions. The action plans will be tailored to meet the specific needs of the sector or waste stream and may include detail around key wastes for that sector—including:

- targets and measures for items such as office paper within commercial or business waste, trickle tape within agricultural waste, or organics within municipal or commercial waste
- regional targets, such as concrete within the construction and demolition waste stream, for materials that are managed locally
- business and industry targets, such as upstream resource productivity measures to cut the generation of waste.

Action plans will adopt specific sector, region and business targets—as well as develop KPIs to measure progress

Roles and responsibilities

Action plans can be developed by government, industry sectors, or peak bodies to give effect to the strategy.

The Queensland Government Action Plan will be released in 2015. This plan will detail the state government's short to medium term waste reduction actions and priorities and flag the development of actions for the longer term.

The government will also provide support and facilitation for the development of industry and sector action plans, and both parties will champion the commitment publicly. These action plans will:

- form an agreement between the sector/organisation and the Queensland Government on what will be done to contribute towards achieving the strategy's objectives and targets
- outline the roles and responsibilities of the Queensland Government and the sector/organisation
- detail how a sector/organisation will measure and publically report against its commitments.

The Queensland Government will encourage the voluntary development of industry action plans. The government will provide guidance materials and assistance towards action plan development, and promote and facilitate cross collaboration between mutually beneficial industries.

Under the *Waste Reduction and Recycling Act 2011* the Queensland Government has the ability to identify specific industries or bodies as regulatory planning entities, requiring them to develop and implement waste management plans. A key performance measure for the government will be to review the effectiveness of the voluntary action plans over the first 12 months, and to consider if more targeted measures, including regulation, will be required to deliver on this strategy.

How will progress be measured?

Success of this strategy will be measured in a number of different ways—including reviews, reporting and evaluations measures.

Targets and measures

The strategy sets out the high level targets, whether statewide or regional, to address environmental improvements or economic development opportunities.

Action plans developed under the strategy will contain measures and targets for specific sectors/organisations and types of waste—outlining the actions to be taken and how they contribute towards achieving the strategy's targets.

Overall state targets will determine how effective the strategy has been in improving recycling rates and waste management in Queensland.

Evaluation of action plan development and implementation

Within a year of this strategy's release, the Queensland Government will assess how many industries and sectors have developed action plans, to review the effectiveness of the voluntary approach to implementation.

It is envisaged that individual plans will set priorities and targets for relevant waste streams and materials. An assessment of these targets and how well they are being achieved will assist the Queensland Government to determine if the objectives and targets of this strategy are being met.

Statutory review

Chapter 2 of the *Waste Reduction and Recycling Act 2011* requires the strategy to be regularly reviewed through public consultation. The first review occurs within two years of strategy commencement, and subsequently at three-year intervals, or earlier where the Minister considers the strategy is under-performing.

The review includes monitoring what has been achieved in relation to the strategy's objectives and targets. This review will be used to gauge the performance of the strategy and to highlight areas of success or where amendment is necessary in order to meet the objectives.

Reporting data

To successfully plan and manage waste reduction in Queensland, good data is required—to shape the best waste strategy and policies and to provide certainty to investors.

Accurate data provides a strong foundation for business and policy decisions about waste management. Improved data would also help local governments and the waste industry to identify material flows and commercial opportunities to treat and recover waste. In terms of the strategy, data is crucial for identifying realistic targets, and the starting point against which improvements are benchmarked.

The regular reviews of the strategy will show how well the state is achieving the targets set in the strategy.

Under the *Waste Reduction and Recycling Act 2011* the Queensland Government is also required to publish annual figures on the amounts of waste being disposed and recovered in Queensland. The report also includes information about key aspects of waste management, such as the status of local and state government strategic waste planning, and amounts of litter and illegal dumping, which is managed under the Litter and Illegal Dumping Action Plan.

Mandatory waste and resource recovery reporting was introduced in 2011. Building on this, the new Queensland Waste Data System broadens the capture of information and improves reporting on waste disposal and recovery trends. The data system also:

- supports and strengthens online engagement with regional clients
- expands online collection to include a greater variety of stakeholders
- provides the baselines from which to build capability and performance standards.

References

The State of Waste and Recycling in Queensland 2013, Department of Environment and Heritage Protection

What a waste: An analysis of household expenditure on food (November 2009)
The Australia Institute

Blueprint for Waste Avoidance, Recovery and Management in Queensland (2010)
Chamber of Commerce and Industry Queensland

Waste Account, Australia, Experimental Estimates 2013 – Main Findings, Australian Bureau of Statistics

A study into commercial and industrial (C&I) waste and recycling in Australia by industry division (2013) Department of Sustainability, Environment, Water, Population and Communities

National television and computer recycling scheme: recycling targets,
www.environment.gov.au

2013 Rubbish Report – Queensland, Clean up Australia,
www.cleanup.org.au/PDF/au/2013-queensland.pdf

WRIQ Action Plans 2014 – Providing a pathway for protecting human health and the Queensland Environment, Waste Recycling Industry Association (QLD) www.wriq.com.au





#30681

Appendix O

Asbestos Management Procedure

Manage Asbestos

Purpose

This Procedure defines the way in which materials suspected of containing asbestos will be sampled during surveys. The procedure also defines the way surveying will be carried out within the organisation. All subsequent analysis will be performed in accordance with the scope of the schedules of accreditation of the laboratory.

This procedure also defines the method for carrying out the recognised approaches to undertaking asbestos surveys to be performed in accordance with the company's NATA accreditation to the standard **AS/NZS ISO/IEC 17020:2000 General criteria for the operation of various types of bodies performing inspection**.

The methods described herein are designed to meet the requirements of *Work Health and Safety Regulations (2011)* and include current operational practices. Additionally, the correct application of these procedures will ensure that the general Occupational Health and Safety (OHS) risks associated with such activities are reduced as far as practicable.

This procedure and other surveying related documents are available to all consultants.

All surveyors performing work in accordance with this procedure must be trained:

- In accordance with the procedure as detailed within the QMS System.
- In line with internal training schedule.

Asbestos

Asbestos: A generic term for a number of fibrous silicate minerals of which there is two major groups:

- Serpentine (chrysotile - commonly known as white asbestos) which was in some applications used up to late 1990's, however the use of it as a building material ceased in the 1980s.
- Amphibole group (amosite (brown asbestos), crocidolite (blue asbestos) as well as tremolite, actinolite and anthophyllite which were used up to the early 1980s).

Asbestos has been shown to cause a number of serious diseases. These include cancers, such as mesothelioma and lung cancer, and other non-malignant lung diseases such as asbestosis, pleural plaques and pleural thickening. Every year in Australia, hundreds die from asbestos-related disease. This material was in common use before the dangers to health were widely known. It cannot be used in any new products in Australia.

Asbestos has been used in roofing, asbestos cement sheets and pipes, clutch and brake linings, insulation, building materials, boilers, electrical fittings, gaskets, floor tiles, plastics, textiles and other products.

Asbestos Analysis

There will be a time when a suspect material needs to be positively identified as either containing asbestos or not containing asbestos.

Proper analysis of asbestos can only be done with highly specialized equipment. Depending on the type of sample to be analysed, these methods include:

- Polarised Light Microscopy (PLM)
- Phase Contrast Microscopy (PCM)
- Transmission Electron Microscope (TEM)
- Scanning Electron Microscope (SEM)
- Energy Dispersive X-ray Spectrometer microanalysis (EDS).

General Work Instructions

Surveying and sampling for asbestos can expose the consultant to hazardous fibres and therefore control measures including personal protective equipment (PPE) must be used.

A risk assessment should be carried out before commencing work on site, which includes any safety aspects and recording any safety protocol to be observed on site.

The Site OHS Officer is required to give the consultant an induction when the place of work is a construction site and should be made aware of hazards on the site.

Consider hazards such as electrical hazards, working at heights, excessive dust or other materials. Be familiar with the evacuation plan of the site.

Consider the magnitude of fibre release from the material, given a standard disturbance. This may be evaluated as high, medium, low or very low.

If the work is to be carried out at a height, appropriate precautions must be taken to prevent the risk of persons falling.

Room occupants will be directed to vacate whilst sampling is taken place.

Do not use power tools of any kind on suspected asbestos-containing material.

General Sampling Procedure

- Dampen down the area with the water spray bottle.
- Collect a thumb nailed size sample (preferably from a corner to both minimise destructive sampling and to provide ease of collection). For fibre cement sheeting, take the sample from a corner edge or along an existing hole or crack using pliers. Note: the sample size should be 50 to 100 grams or about 5 cm², except for floor tiles that require a sample of up to 100 cm² or as large as possible without creating excessive damage. Take only a small sample for friable asbestos (eg a teaspoonful).
- Double bag the sample and label bag job and sample number. Record the information such as sample colour, size, condition and location in the notes.
- If access to the bonded asbestos is unsafe or not possible, such as in parts of ceiling cavities or eaves do not attempt to reach it. Note down that it was inaccessible or unsafe to sample in the survey notes.
- Clean sampling tools with a wet wipe after each sample collection to avoid cross contamination.

- Leave the sample area clean with no evidence of debris from the sampling operation and seal sampling points to prevent the release of fibres. A variety of methods can be used to reseal the sampling point (e.g. tapes, fillers, PVA sealant).
- Bag, label and dispose of any contaminated material in an asbestos waste bag. The bag should then be twisted tightly, folded over and the neck secured in the folded position with adhesive tape.

Recording of Data and Reporting

All consultants and surveyors are expected to record all suspect ACM's on approved site data collection worksheets.

All materials that have been identified by the surveyor as not containing asbestos, but may be mistaken for asbestos by a lay person, must be recorded by the surveyor, either as a distinct sample or in appropriate comments box on the survey paperwork. An appropriate box would be a recording area that is unique to that sample and not a common comments area. Where such a material is likely to be commonly mistaken, then this material should be included in the final report.

All areas inspected and not inspected must be recorded on survey worksheets. It is the surveyor's responsibility to decide the importance of the information, with regard to the building, and how it is reported. Example areas are:

- Modern vinyl flooring
- Bricked up fireplaces
- Non-access beneath carpets
- Man Made Mineral Fibre ceiling tiles
- Electric heaters
- Rubber stair nosing.

Appendix P

Spill Containment Code of Practice 2015

Work Health and Safety (Managing Risks of Hazardous Chemicals in the Workplace) Code of Practice 2015

Regulation 357: Containing Spills

A person conducting a business or undertaking at the workplace must ensure, so far as is reasonably practicable that where there is a risk of a spill or leak of a hazardous chemical in a solid or liquid form, provision is made in each part of the workplace where a hazardous chemical is used, handled, stored or generated for a spill containment system that contains within the workplace any spill or leak of a hazardous chemical and any resulting effluent.

When a spill, leak or accidental release of hazardous chemicals occurs, appropriate actions must be taken to contain the hazardous chemicals within the workplace.

The spill containment system must describe how to contain, cleanup and dispose of the spill or leak and any resulting effluent. The system must not create a hazard by bringing together different hazardous chemicals that are not compatible or that would react together to cause a fire, explosion, harmful reaction or evolution of flammable, toxic or corrosive vapour.

Leaving containers open when not in use is one of the main causes of spills and can also lead to generating hazardous atmospheres and fire risks. Procedures, training and supervision should ensure containers are sealed when not in use.

Any spill containment system should be large enough to ensure that all spills can be held safely until cleaned up. Factors you should consider when designing a spill containment system include:

- the nature of the hazardous chemicals (whether liquid or solid)
- the quantity of the hazardous chemicals
- the size of the largest container or reasonably foreseeable largest spill
- the potential impact if the hazardous chemicals escape to the environment
- whether it is necessary to provide for the management of firewater at an incident
- a separate spill containment is provided for incompatible goods
- the materials used to construct the containment system, as well as any materials used for absorption, are compatible with the hazardous chemicals
- other materials in the vicinity that will prevent contamination of groundwater or soil
- the system's integrity will be maintained in any reasonably foreseeable incident.

For large quantities of hazardous chemicals, bunding may be required. Bunding should be designed and constructed in accordance with the relevant Australian Standard specific to the type of hazardous chemical, for example AS 1940: *The storage and handling of flammable and combustible liquids*, and in consultation with the emergency services authority.

Transfer of hazardous chemicals

Transferring hazardous chemicals generally presents a far greater risk than for static storage. During the transfer process, the chemicals will frequently be unconfined at some stage of the transfer process that may

include pouring or pumping from one container to another. Common methods for eliminating or reducing risks during transfer operations include:

- avoiding spillage or overflow, including overflow protection on equipment and receiving vessels
- providing emergency shut-offs to limit the amount of hazardous chemicals released during a loss of containment
- providing a spill containment system
- reducing static electricity and vapour generation. This is particularly important for fire risk hazardous chemicals such as flammable liquids
- ensuring transfer fittings are compatible
- avoiding sources of ignition
- installing flow and pressure regulators on pipe work or pumps
- installing interlocking of valves and switches
- implementing systems for detecting losses from pipe work and fittings, such as static pressure loss detectors, measurement to determine losses in transfer or external sensors.

Plumbed eye wash stations and safety showers should be installed in areas where workers may be exposed in the event of a spill during transfer operations.

Controlling risks from compressed gases

Key considerations for safe storage and handling of gas cylinders include:

- maintaining and regularly checking cylinders, regulators, hoses and pipes to cylinders to ensure that there are no leaks or dents
- storing cylinders in an upright position to ensure the safety device functions correctly
- securing cylinders to prevent dislodgement
- transport cylinders with appropriate equipment such as trolleys or gas cages
- keep the cylinder valve closed when the cylinder is not being used
- keep all sources of heat and ignition away from gas cylinders, even if the cylinders do not contain flammable material
- store cylinders outdoors or in very well ventilated areas.

Gas cylinders should be fitted with a bursting disc safety device and liquid petroleum gas cylinders should have an operational spring-loaded pressure relief valve.

If a small leak occurs, the cylinder valve should be closed if it is safe to do so. Appropriate personal protective equipment should be put on before attempting to locate the leak point. For toxic gases, self contained breathing apparatus may be required for emergency use. The area should be well ventilated and air conditioning systems should be turned off to avoid spreading gas. However, if a large amount of gas escapes, the area should be evacuated. If it is safe to do so, before evacuating, ventilate the area and remove or isolate ignition sources. Contact the gas supplier for advice, or in an emergency, contact the emergency services authority.

Potential risks associated with the transport and storage of small gas cylinders (e.g. acetylene and LPG) in vehicles must be also managed appropriately.

A range of Australian Standards provide further information relating to controlling risks from compressed and liquefied gases, such as AS/NZS 1596: The storage and handling of LP Gas, and AS 4332: The storage and handling of gases in cylinders.

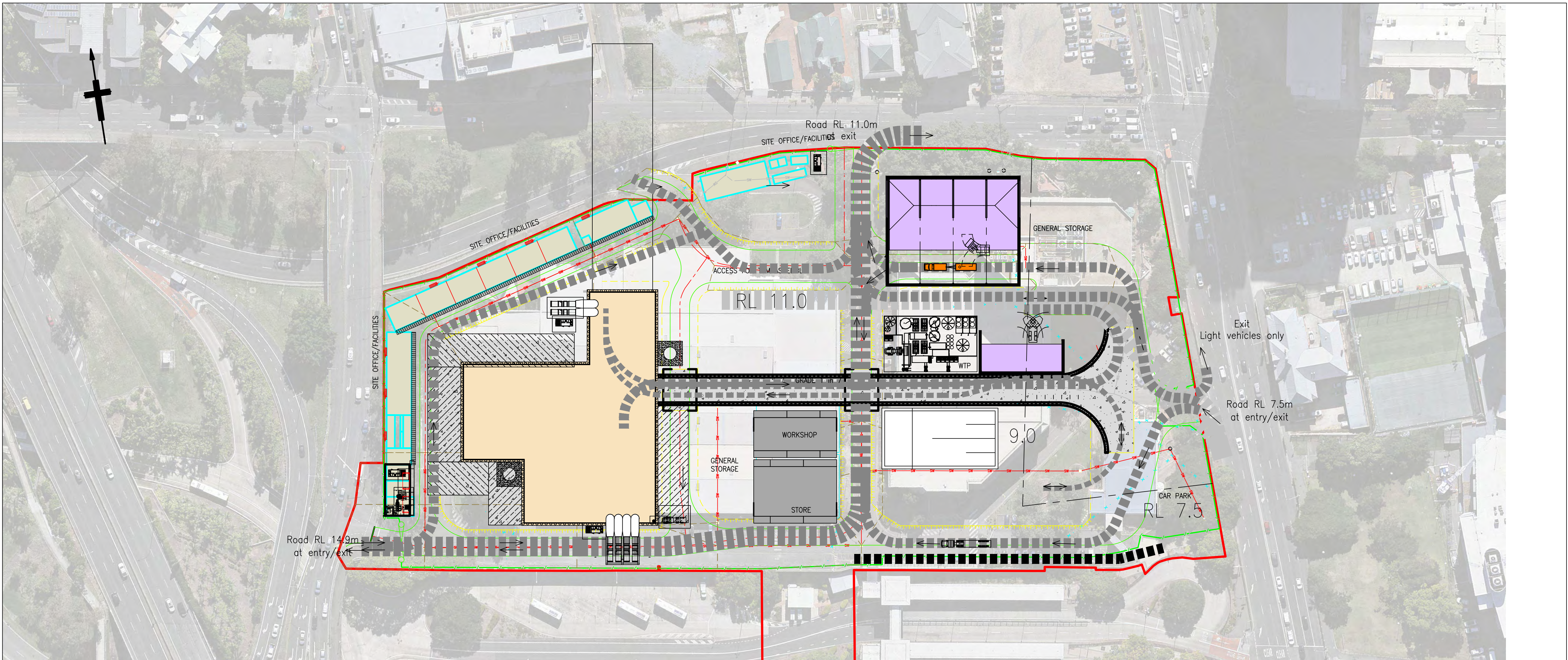
Asphyxiation hazards

Key considerations in minimising the risk of asphyxiation include:

- avoiding work being carried out in oxygen-depleted (under 19 per cent) atmospheres for example this could be done by testing the workplace atmosphere using an approved and intrinsically-safe gas monitor
- keeping the work area well-ventilated, particularly in low-lying areas and roof spaces where gases can accumulate— this could be done by ensuring windows are open where necessary and ventilation and extraction systems are on and are fully functional
- purging
- using an air-supplied respirator, particularly in confined spaces
- checking cylinders, cylinder fittings, hoses and connections to ensure that they are not damaged or in poor condition – this might include checking fittings and hoses for signs of corrosion or degradation or spraying them with a small amount of detergent solution or leak-detection spray and looking for bubble formations which may indicate the presence of a gas leak.

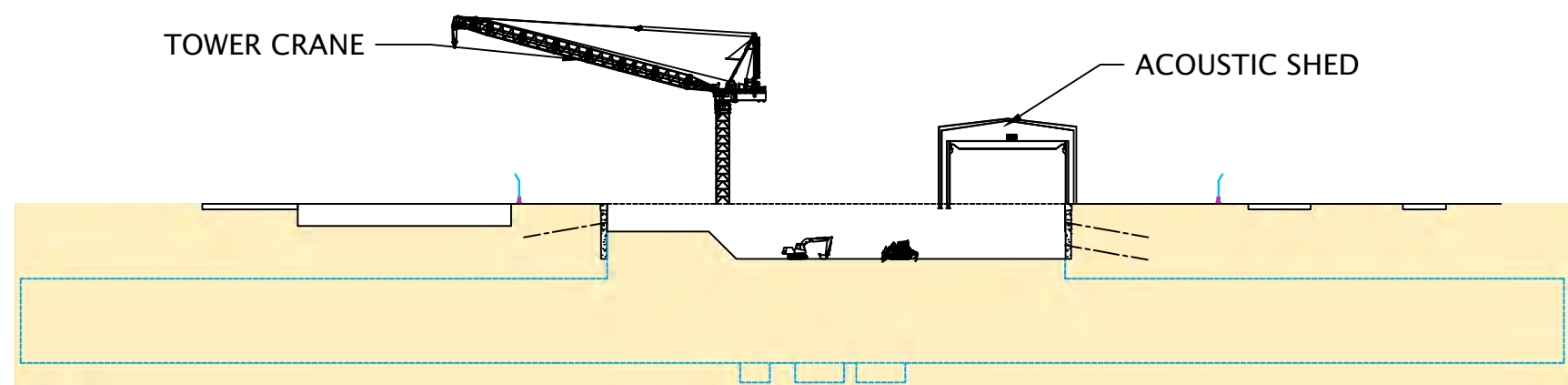
Appendix Q

Site Layout Concept Plans

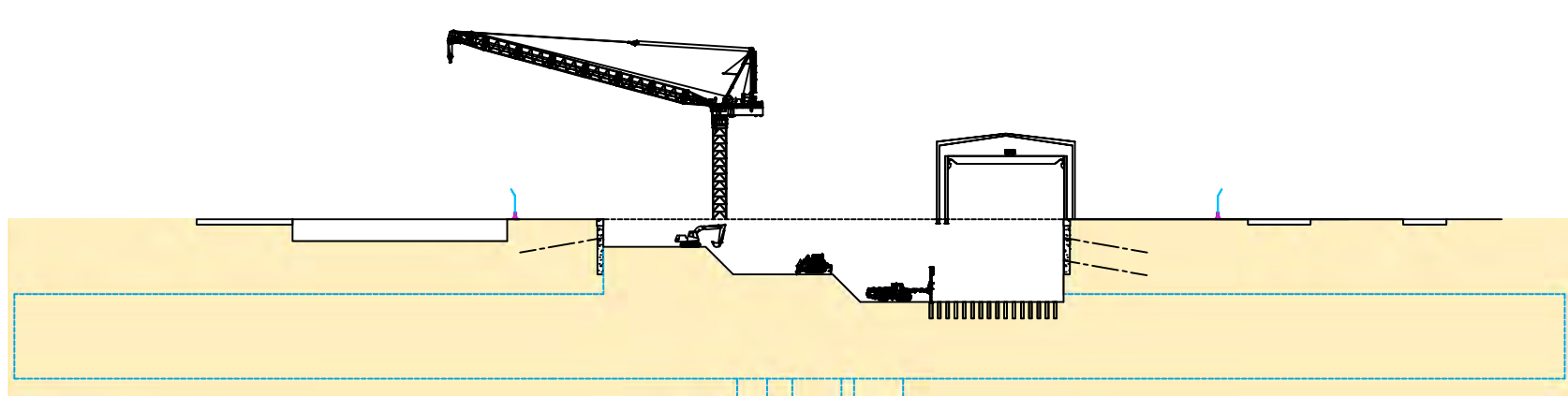


BOX AND CAVERN EXCAVATION

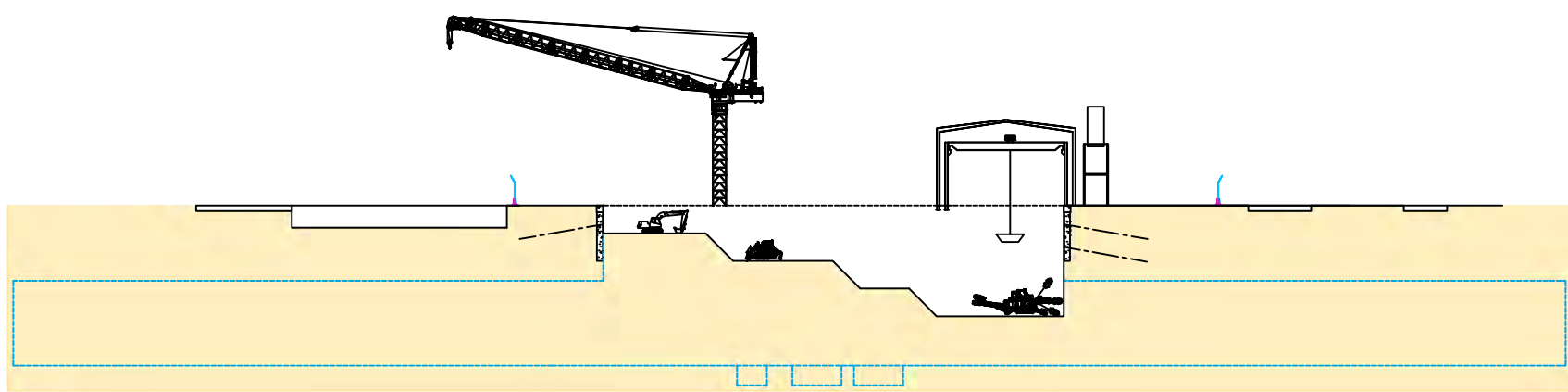
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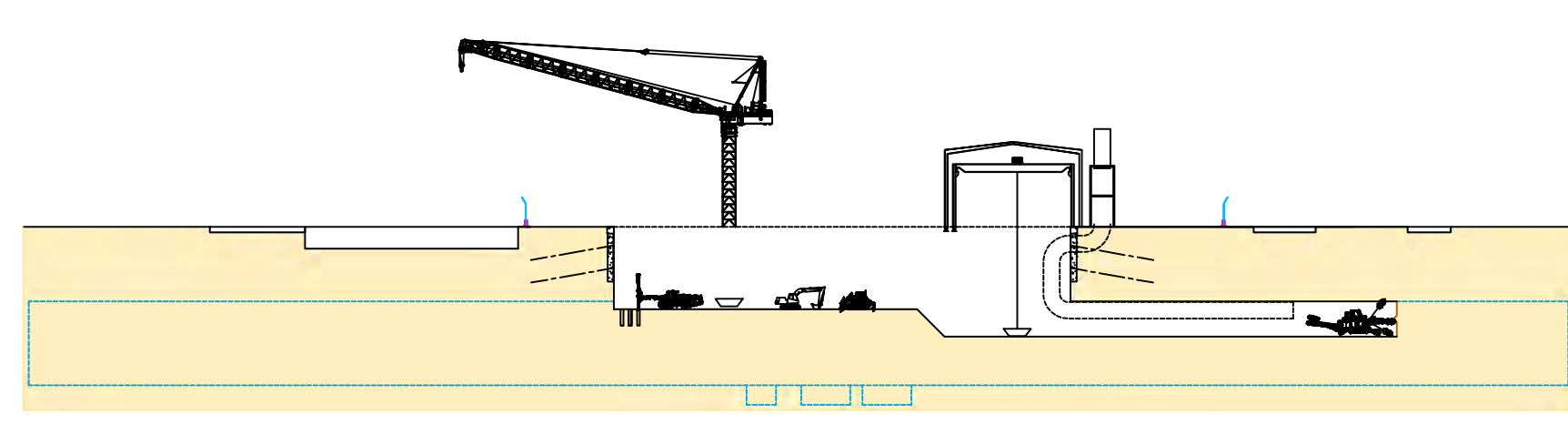
2.EXCAVATION STAGE 3 & 4 - DRILL & BLAST



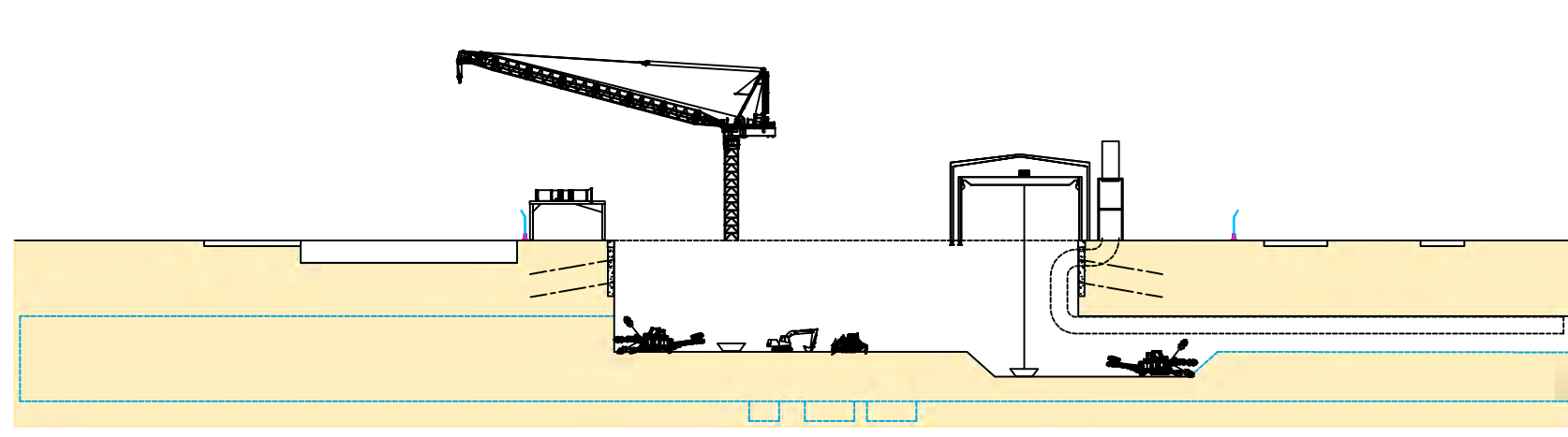
3.EXCAVATION STAGE 5 - MOBILISE ROAD HEADER



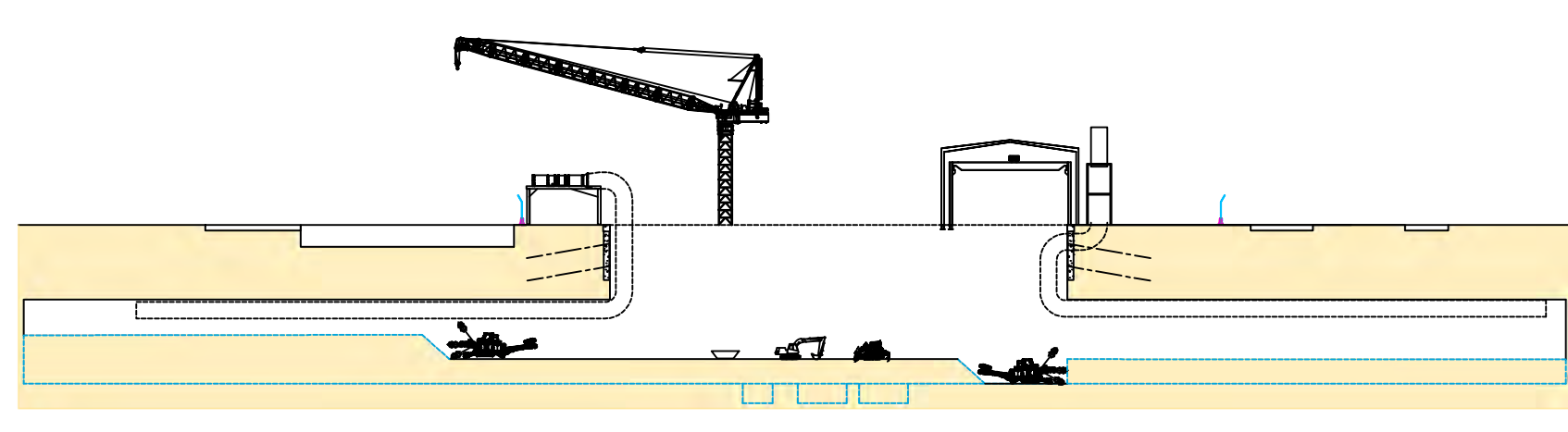
4. EXCAVATION STAGE 6 - BOX/CAVERN EXCAVATION



5.EXCAVATION STAGE 7 - MOBILISE ROAD HEADER 2



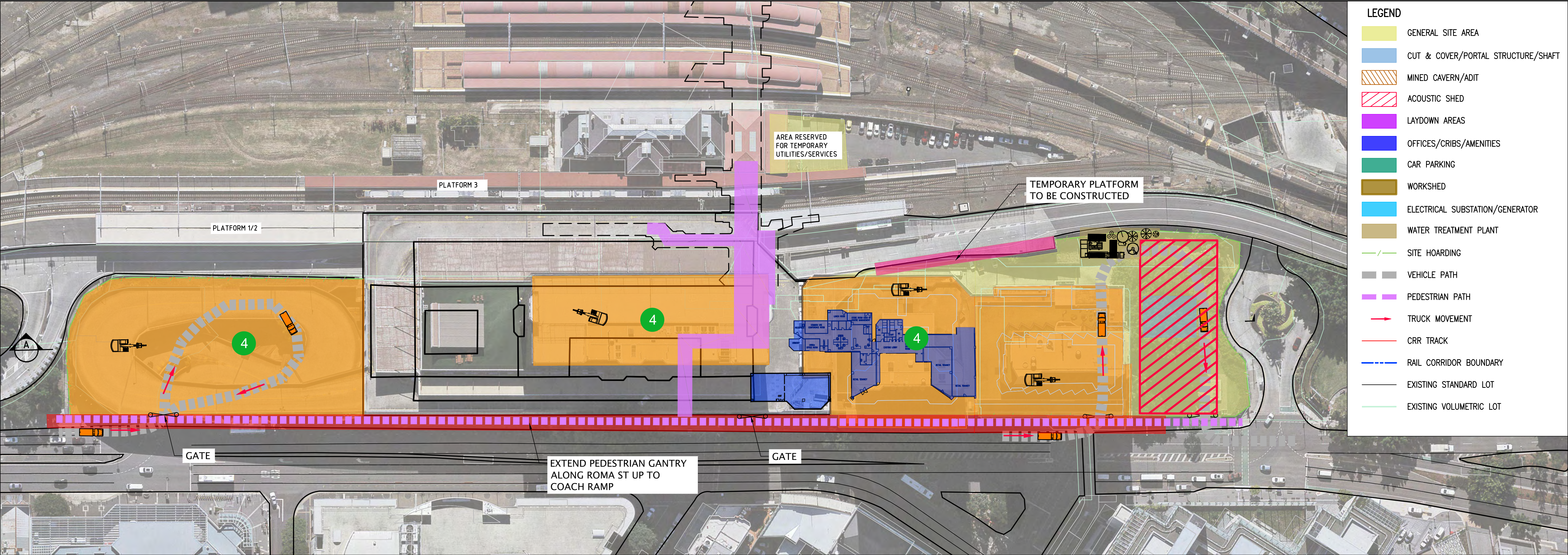
6.EXCAVATION STAGE 8 - N/S CAVERN EXCAVATION



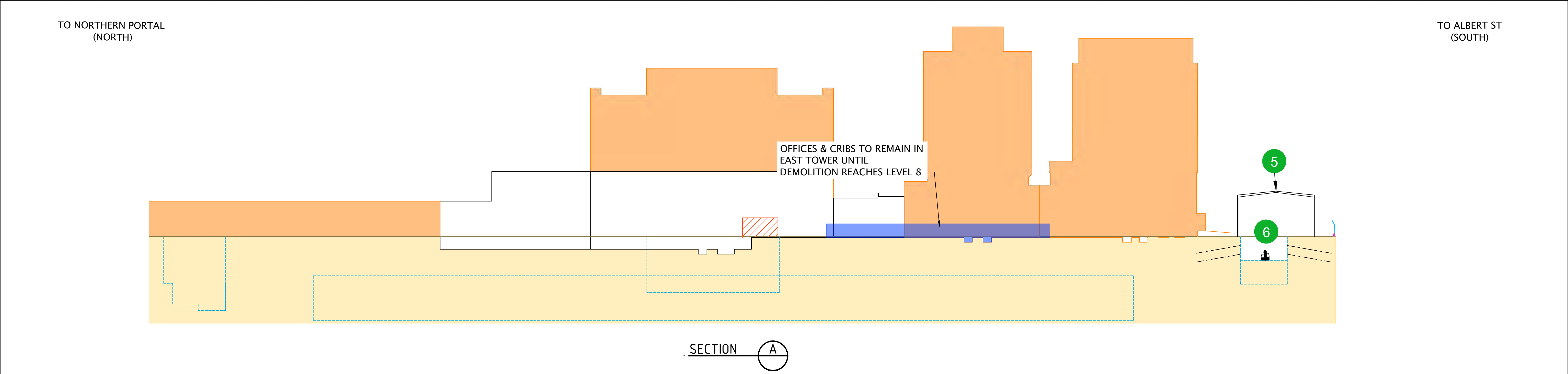
STAGE 2

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JOB No		ALTERATIONS					<div><div></div><div></div><div>CBGU D&C JV</div></div>		DESIGNED	S.B	11.07.19	CROSS RIVER RAIL DELIVERY AUTHORITY			Network - Civil Engineering		DRAWING NUMBER		ISSUE
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						DESIGN APPROVAL / CERTIFICATION													
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						PROFESSIONAL QUALIFICATION _ _ _ _ _													



- LEGEND
- GENERAL SITE AREA
 - CUT & COVER/PORTAL STRUCTURE/SHAFT
 - MINED CAVERN/ADIT
 - ACOUSTIC SHED
 - LAYDOWN AREAS
 - OFFICES/CRIBS/AMENITIES
 - CAR PARKING
 - WORKSHED
 - ELECTRICAL SUBSTATION/GENERATOR
 - WATER TREATMENT PLANT
 - SITE HOARDING
 - VEHICLE PATH
 - PEDESTRIAN PATH
 - TRUCK MOVEMENT
 - CRR TRACK
 - RAIL CORRIDOR BOUNDARY
 - EXISTING STANDARD LOT
 - EXISTING VOLUMETRIC LOT







4 DEMOLITION - EAST TOWER, WEST TOWER AND COACH RAMP

5 ERECT ACOUSTIC SHED IN GALLIPOLI PARK

6 EXCAVATE GALLIPOLI PARK SHAFT

JOB No	ALTERATIONS	NAME	RE	DATE
A	FOR CONSTRUCTION MANAGEMENT PLAN			24.06.19

SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING



CBGU D&C JV

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DRG CHK	T.D	24.06.19
DESIGN APPROVAL / CERTIFICATION		
A.L		24.06.19
PROFESSIONAL QUALIFICATION		DATE

CROSS RIVER RAIL DELIVERY AUTHORITY

Network - Civil Engineering

ROMA STREET STATION

CROSS RIVER RAIL - TSD

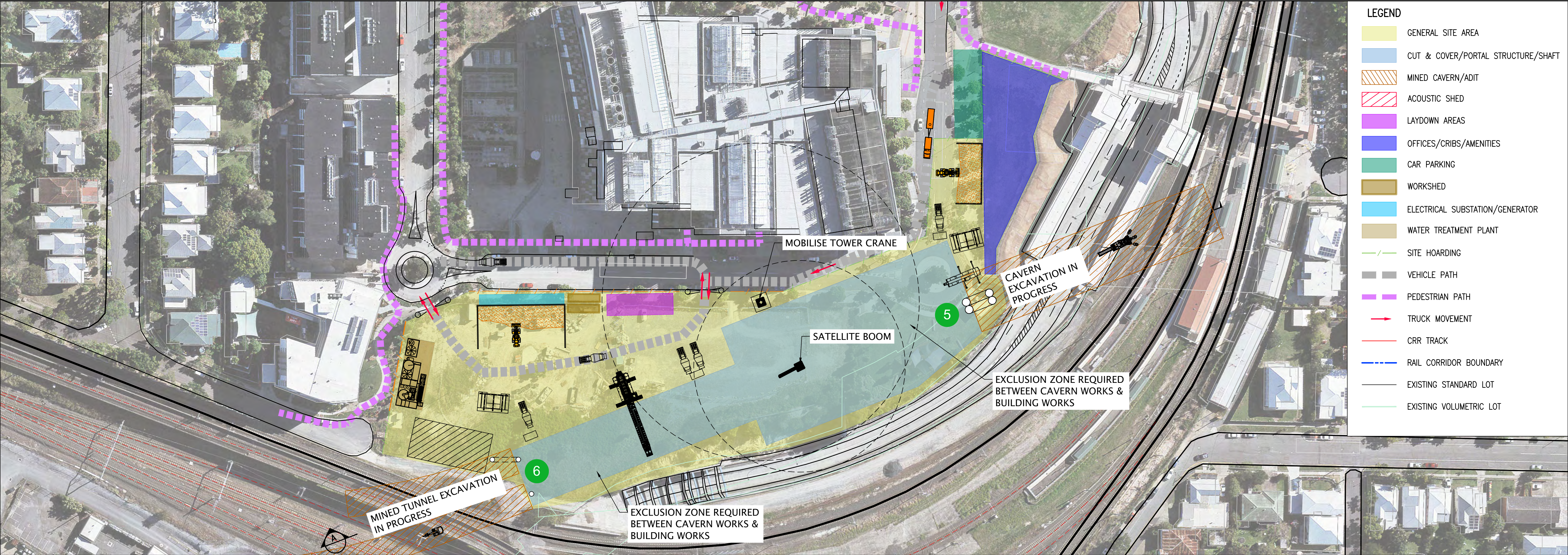
CONSTRUCTION STAGING CONCEPT

STAGE 2

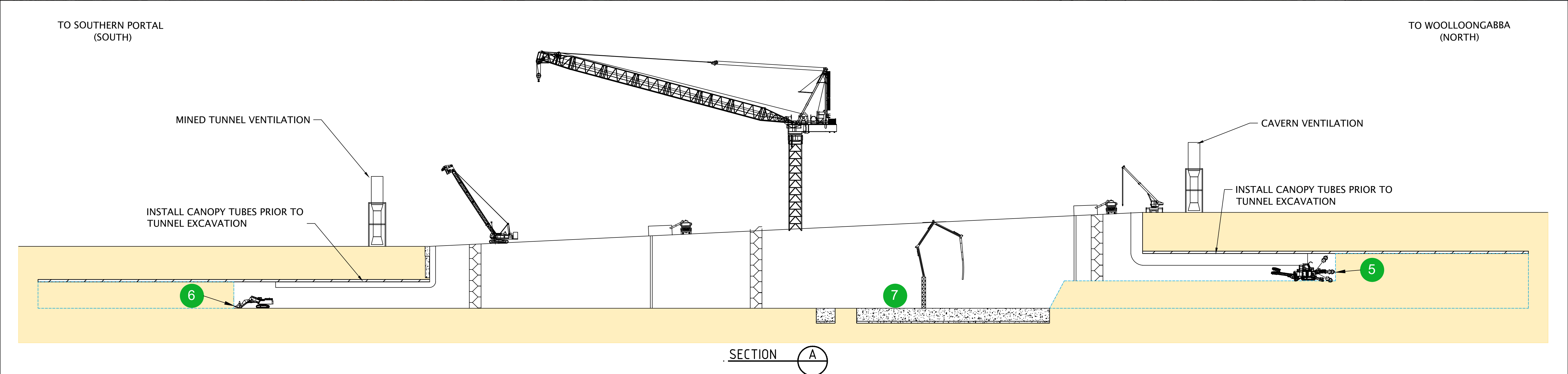
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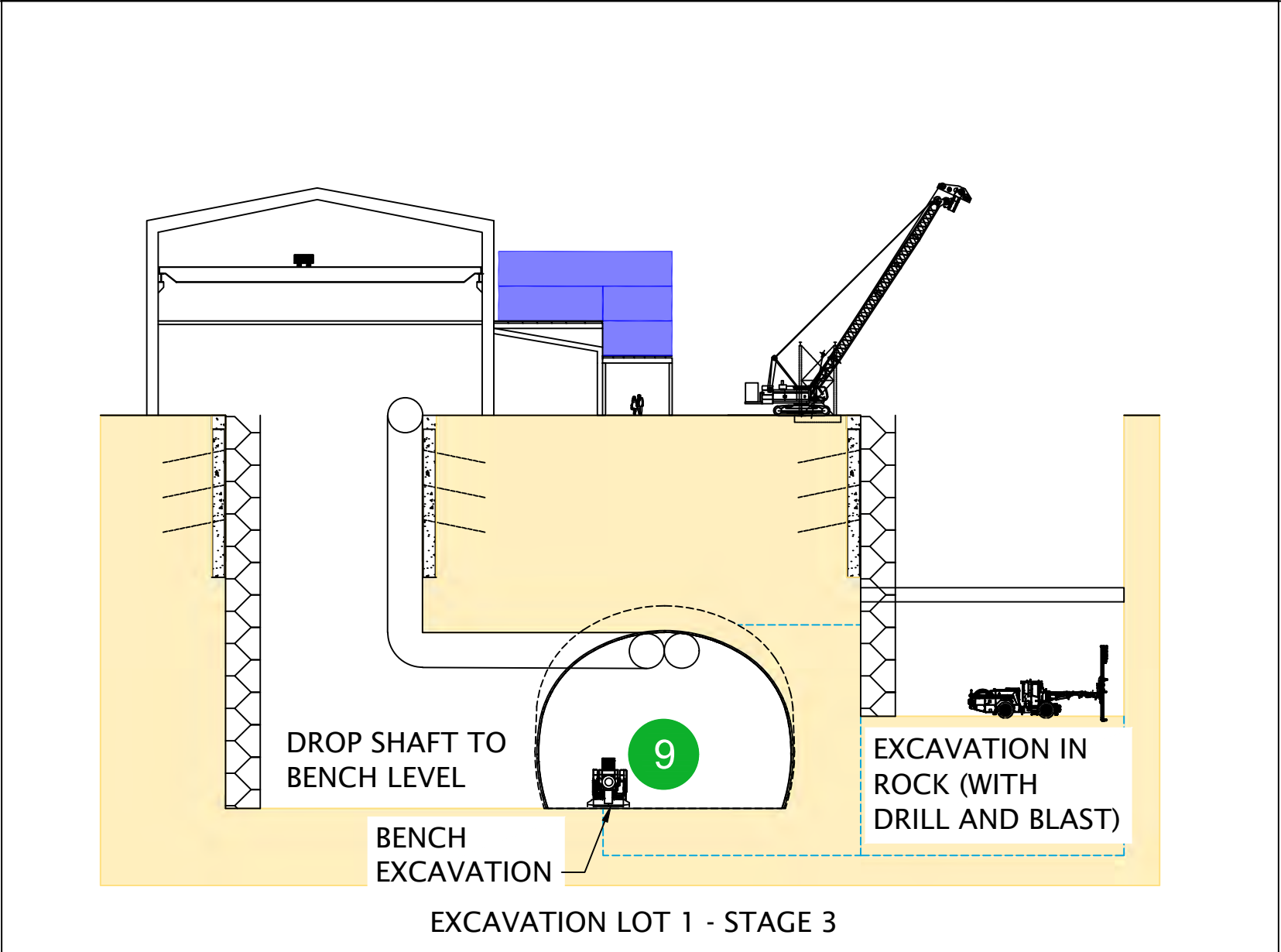
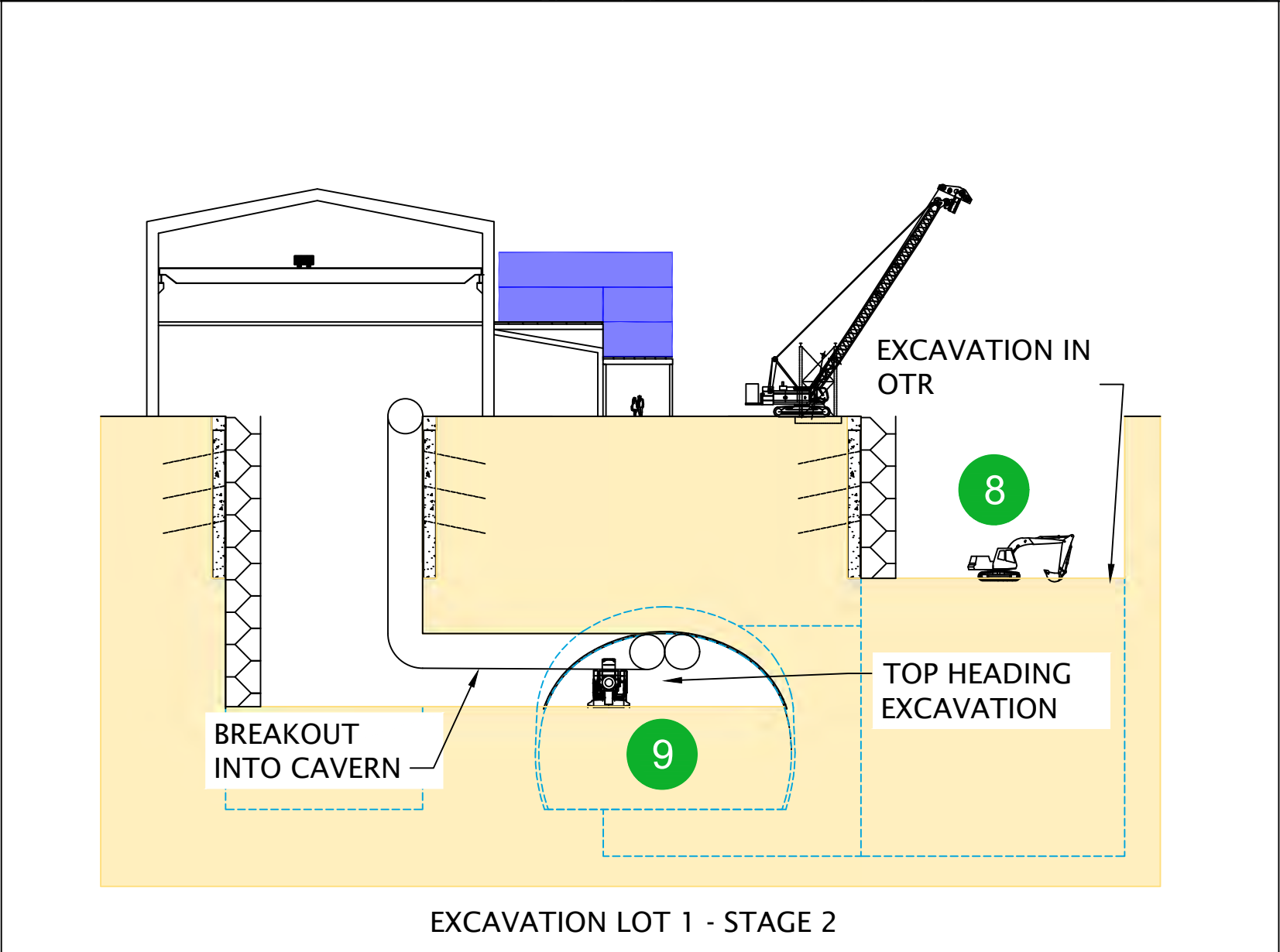
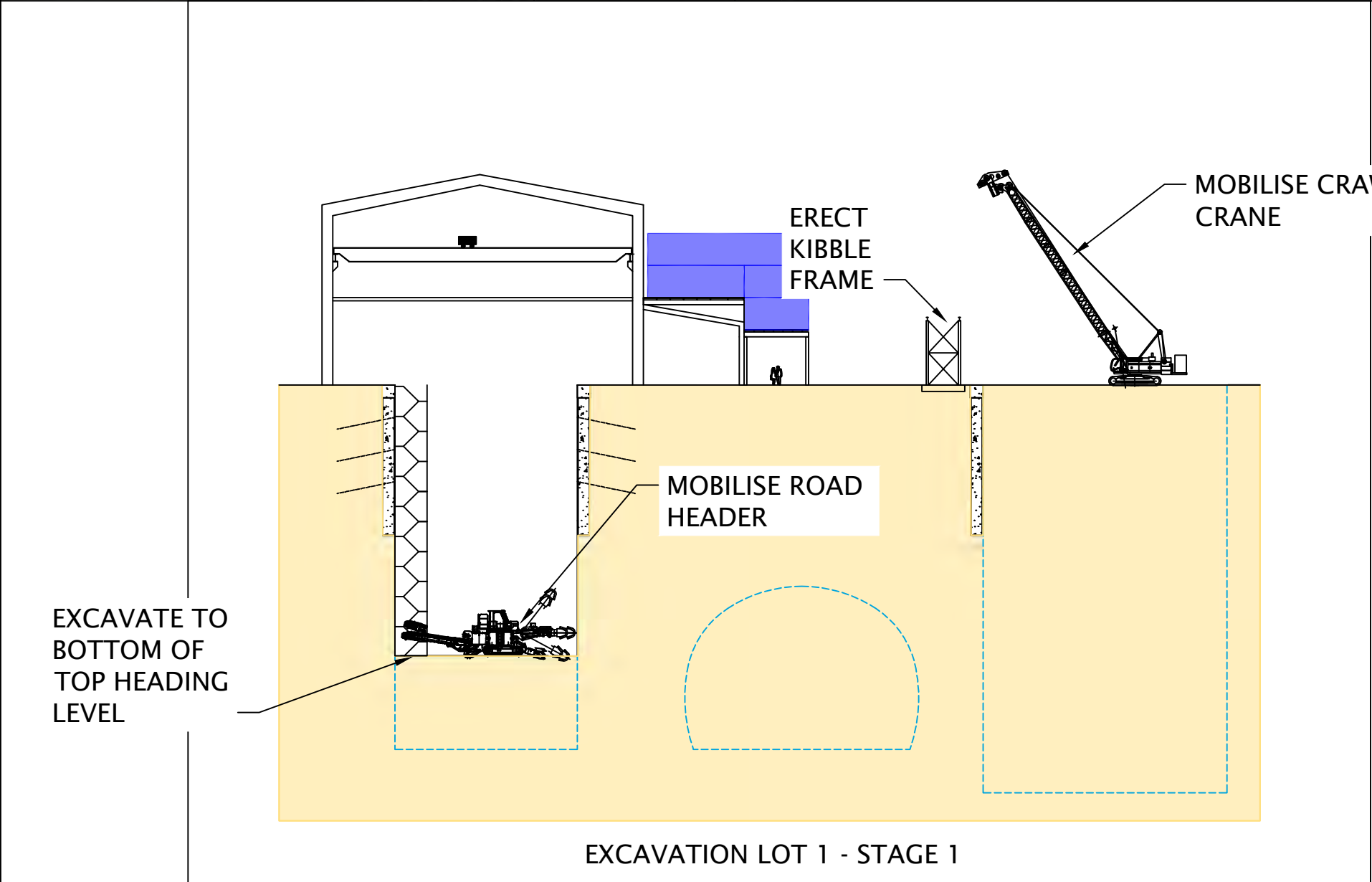
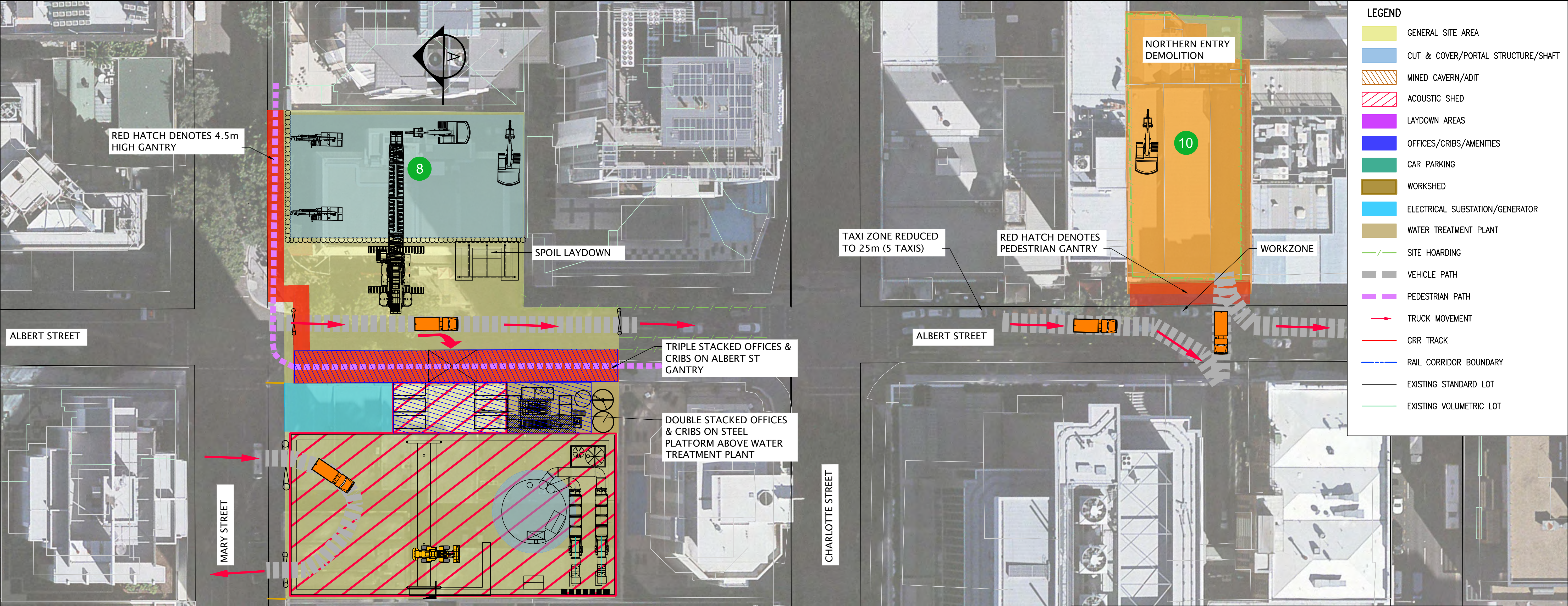


- LEGEND
- GENERAL SITE AREA
 - CUT & COVER/PORTAL STRUCTURE/SHAFT
 - MINED CAVERN/ADIT
 - ACOUSTIC SHED
 - LAYDOWN AREAS
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 - TRUCK MOVEMENT
 - CRR TRACK
 - RAIL CORRIDOR BOUNDARY
 - EXISTING STANDARD LOT
 - EXISTING VOLUMETRIC LOT



- 5 CAVERN EXCAVATION (WITH ROAD HEADER)
6 MINED TUNNEL EXCAVATION (WITH TUNNEL EXCAVATOR)
7 STATION BUILDING WORKS

JOB No		ALTERATIONS				<div><div> CPB CONTRACTORS</div><div> bam</div></div> <div><div> Ghella</div><div> UGL</div></div> <div>CBGU D&C JV</div>				DESIGNED	R.E	24.06.19	CROSS RIVER RAIL DELIVERY AUTHORITY				Network - Civil Engineering				DRAWING NUMBER				ISSUE																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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ALL SECTIONS TAKEN THROUGH SECTION A

- 8 EXCAVATE LOT 1 SHAFT
- 9 CAVERN MINING
- 10 NORTHERN ENTRY DEMOLITION

JOB No	ALTERATIONS
A	FOR CONSTRUCTION MANAGEMENT PLAN
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING	



DESIGNED	R.E	24.06.19
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DRG CHK	C.M	24.06.19
DESIGN APPROVAL / CERTIFICATION		
A.L		24.06.19
PROFESSIONAL QUALIFICATION		DATE

CROSS RIVER RAIL DELIVERY AUTHORITY

Network - Civil Engineering
ALBERT STREET STATION
CROSS RIVER RAIL - TSD
CONSTRUCTION STAGING CONCEPT
STAGE 4

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DRAWING NUMBER	ISSUE
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CONSULTANT DWG No.	CRRTSD-270-0000-DRG-CBGU-7500-000004

Appendix R

Demolition Staging Plans

QR PLATFORMS

PLATFORM 2

NO PASSENGERS:	1st MAY 20 ONWARDS
NO TRAINS:	1st MAY 20 ONWARDS
OVERHEAD WIRES REMOVED:	1st MAY 20 TO 31st JUL

PLATFORM 3

NO PASSENGERS:	1st MAY 20 TO 31 JUL 20
NO TRAINS:	1st MAY 20 TO 31 JUL 20
OVERHEAD WIRES REMOVED:	1st MAY 20 TO 31 JUL 20

LOCATION	ACCESS	HANDBACK
HOTEL JEN PHASE 1	2nd OCT 2019	N/A
HOTEL JEN PHASE 2	6th JAN 2020	21st MAR 2020
EAST TOWER	6th JAN 2020	N/A
WEST TOWER	6th JAN 2020	N/A
TRANSIT CENTRE	14th APR 2020	1st SEP 2020
COACH DECK	1ST JUN 2020	30th JUN 2020
COACH RAMP	6th JAN 2020	3rd APR 2020

HATCHED AREA OF
COACH RAMP HAND BACK
1st SEP 2020

HATCHED AREA OF
HOTEL JEN HAND BACK
1st SEP 2020

INTERFACE BETWEEN WEST TOWER
AND TRANSIT CENTRE - LEVEL 6

INTERFACE BETWEEN EAST TOWER
AND TRANSIT CENTRE - LEVEL 8

INTERFACE BETWEEN PHASE 1 AND PHASE 2
HOTEL JEN - LEVEL 9

CONCEPT ONLY. NOT AUTHORISED FOR CONSTRUCTION

JOB No	ALTERATIONS			
	ISSUE	DESCRIPTION	NAME	RECDATE
	A0	FOR INTERNAL USE	RE	03.06.19
	A1	FOR INTERNAL USE	RE	18.06.19
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING				



DESIGNED	R.E	18.06.19
DES CHK	T.D	18.06.19
DRAWN	R.E	18.06.19
DRG CHK	T.D	18.06.19
DESIGN APPROVAL / CERTIFICATION		
A.L		18.06.19
PROFESSIONAL QUALIFICATION		DATE

CROSS RIVER RAIL
DELIVERY AUTHORITY

Network - Civil Engineering

ROMA STREET STATION
CROSS RIVER RAIL - TSD
DEMOLITION - ACCESS/HANDBACK SCHEDULE

DRAWING NUMBER

ISSUE

A1

CONSULTANT
DWG No.

Appendix S

Sound Power levels for Equipment

Sound Power Levels for Equipment

Aspect	Plant/Equipment	Net Power (kW)	Operating Weight (kg)	Day (7am – 6pm)	Sound Power Level L_{Aeq}	Notes
Demolition of existing structures	Excavator with bucket	120	45 tonne	4	103	Typically 45T, but possibly up to 90T for large commercial areas. There may be up to 4 properties under demolition concurrently
	Excavator with rock hammer		45 tonne	4	122	
	Excavator with shears / crusher		45 tonne	2	120	Typically 45 T but possibly up to 90T for large commercial
	Longreach excavator and attachments		45 tonne	1	122	Long reach for multi-storey demolitions
	Truck and Dog / Semi Trailer	120		8 p.h.	108	
	Mobile screening equipment			1	120	Crushing and screening of demolition rubble
	Mobile crushing equipment			1	120	
Vegetation Clearing	Excavator with bucket	120	35 tonne	2	103	Surface 1-2 weeks
	Chainsaw			1	116	Surface 1-2 weeks
	Tub grinder/mulcher			1	120	Surface 1-2 weeks
	Small truck		<20 tonne	4 p.h.	107	Surface 1-2 weeks
Installation of enviro controls	Excavator with bucket	120	35 tonne	2	103	Surface 1-2 weeks
	Franna Crane	205	20 tonne	1	99	Surface 1-2 weeks
	Small truck		<20 tonne	4 p.h.	107	Surface 1-2 weeks
Establishment of construction facilities	Excavator with bucket	120	35 tonne	2	103	Surface 1-2 weeks
	Franna Crane	205	20 tonne	1	99	Surface 1-2 weeks
	Mobile Crane		50 tonne	1	103	Surface 1-2 weeks
	Concrete Aquitor			4 p.h.	108	Surface 1-2 weeks
	Concrete Pump/Boom Pump			1	99	Surface 1-2 weeks
	Grader			1	113	Surface 1-2 weeks
	Roller/ Compactor			1	109	Surface 1-2 weeks
	Plate Compactor			1	106	Surface 1-2 weeks
	Water cart		15kL	4 p.h.	104	Surface 1-2 weeks
	Semi trailer			4 p.h.	108	Surface 1-2 weeks

Aspect	Plant/Equipment	Net Power (kW)	Operating Weight (kg)	Day (7am – 6pm)	Sound Power Level L_{Aeq}	Notes
	Small truck		<20 tonne	4 p.h.	107	Surface 1-2 weeks
Road and intersection modifications and installation of traffic controls	Truck and Dog / Semi Trailer	205	20 tonne	1	99	
	Scissor Lift			1	95	
	Franna Crane	205	20 tonne	1	99	
	Skidsteer (Bobcat) with bucket and profiler			1	99	General, profiling minor AC
	Excavator with bucket and rockhammer		15 tonne	1	118	Remove medians, kerb lines etc
	Asphalt Paver			1	112	Road works - as per tie-in works
	Roller / Compactor			1	109	
	Road Saw			1	119	
	Line marking truck			1	108	
Utility Adjustments	Road saw			1	119	
	Excavator with bucket with hammer		up to 20 tonne	1	118	
	Plate Compactor			1	106	
	Small Truck		<20 tonne	4 p.h.	107	
	Skidsteer (Bobcat) with bucket and profiler			1	99	
	Roller / Compactor			1	109	
General worksite and car parking	Light vehicle	80		20 p.h.	89	Surface; Compound and car park will operate for the entire duration of construction works. Bust on shift changes only. Night movement entry via Levey St
	Water treatment plant pumps	10		2	78	
Workshops, Deliveries, Maintenance, Storage	Road truck (deliveries to site)			4 p.h.	108	Surface
	Compressor	110	2660	2	78	Surface
	Workshop Hand Tools			1	107	Surface; Partial enclosure (3 sided with roof) over workshop, Limited use OOHW

Aspect	Plant/Equipment	Net Power (kW)	Operating Weight (kg)	Day (7am – 6pm)	Sound Power Level L_{Aeq}	Notes
	Franna Crane	205	20 tonne	1	99	Surface: Limited use EVE: Not used at NGT
	Telehandler			1	99	106
	Diesel Generator			1	94	
	Washdown Bay / High pressure gurney			1	97	
	Water cart		15kL	4 p.h.	104	Surface
Piling	Piling Rig (bored piles)			4	111	
	Crawler Crane		35-50 tonne	1	98	Piling support crane
	Concrete Pump/Boom Pump	130		1	99	
	Excavator with bucket	150	35 tonne	1	103	
	Concrete Aoi	120		5 p.h.	108	
	Concrete Saw			1	119	Pile cut-off and breakdown
	Compressor			4	70	
	Jackhammers			4	121	Pile cut-off and breakdown

Noise sound power levels – L_{Aeq}

Precinct	Aspect	Plant	Number of plant			Sound Power Level L_{Aeq}
			6:30am – 6:30pm	6:30pm – 10pm	10pm – 6:30am	
Roma Street	Piling and excavation	Piling Rig	1	-	-	114
		Concrete Pump	2	-	-	99
		Excavator with bucket	1	-	-	104
		Concrete Agitator	5 p.hr	-	-	108
	Demolition and establishment	Excavator with rockhammer	3	-	-	119 + 5 penalty
		Excavator with bucket	1	-	-	103
		Excavator with breakers	2	-	-	103

Precinct	Aspect	Plant	Number of plant			Sound Power Level L _{Aeq}
			6:30am – 6:30pm	6:30pm – 10pm	10pm – 6:30am	
		Excavator with bucket	2	-	-	101
		Skidsteer	4	-	-	107
		Concrete Saw	2	-	-	121
		Mobile Crane	1	-	-	106
		Small Truck	4 p. hr	-	-	107
		Tower Cranes	1	-	-	102
		EWPs	2	-	-	97
		Truck & Dog	4 p. hr	-	-	108
		Small tools	2	-	-	107
Woolloongabba	Piling	Piling Rig	3	-	-	112
		Mobile cranes	3	-	-	99
		Concrete Pump	2	-	-	99
		Excavator with bucket	1	-	-	103
		Concrete Saw	1	-	-	124
		Rockhammer on 13t excavator	1	-	-	113 + 5 penalty
		Concrete Agitator	5 p. hr	5 p. hr	-	108
	Piling Pad Construction	Truck and dog	4 p. hr	-	-	108
		Grader or D6	1	-	-	106
		Vibrating roller	-	1	-	108
	Site Establishment (Steel works)	Semitrailer	3 per day	-	-	107
		Franna	1	-	-	98
		Mobile Crane	1	-	-	95
		Air Compressor	1	-	-	109

Precinct	Aspect	Plant	Number of plant			Sound Power Level L _{Aeq}
			6:30am – 6:30pm	6:30pm – 10pm	10pm – 6:30am	
		Rattle guns and small tools	1			107
	Establishment of construction facilities	Excavator with bucket	3			104
		EWPs	2			97
		Mobile Crane	1			106
		Small truck	4 p.hr			107
		Truck and Dog	4 p.hr			108
Boggo Rd	Installation of Environmental Controls	Excavator with bucket	2	-	-	103
		Franna Crane	1	-	-	99
		Small Truck	2 p. hr	-	-	107
	Demolition	Excavator with bucket	2	-	-	103
		Truck and Dog	2 p. hr	-	-	108
	Vegetation Clearing	Excavator with bucket	2	-	-	103
		Truck and Dog	2 p. hr	-	-	108
	Establishment of Construction facilities	Excavator with bucket	2	-	-	103
		Franna Crane	1	-	-	99
		Small Truck	2 p. hr	-	-	107
	Piling	Piling Rig	2	-	-	112
		Franna Crane	1	-	-	99
		Concrete Agitator	3 p. hr	-	-	108
		Concrete Pump	1	-	-	99
		Excavator with bucket	1	-	-	103

Precinct	Aspect	Plant	Number of plant			Sound Power Level L _{Aeq}
			6:30am – 6:30pm	6:30pm – 10pm	10pm – 6:30am	
		Concrete Saw	1	-	-	124
		Rockhammer on 13t excavator	1	-	-	119 + 5 penalty
Albert St stage 1	Site Establishment	Excavator with bucket	2	-	-	103
		Franna Crane	1	-	-	99
		EWPs	2			97
		Small truck	4 p.hr			107
	Demolition Lots 1 and 2	Excavator with bucket	2	-	-	103
		Excavator with rockhammer	2	-	-	121
		Truck and Dog	2 p. hr	-	-	108
Albert St stage 2	Demolition lot 1	Excavator with bucket	1	-	-	103
		Excavator with rockhammer	1	-	-	121
		Truck and Dog	2 p. hr	-	-	108
	Piling lot 2	Piling Rig	1	-	-	113
		Excavator with bucket	1	-	-	103
		Franna Crane	1	-	-	99
		Concrete Agitator	5 p. hr	5 p. hr	-	108
		Concrete Pump	1	-	-	99
	Laydown area	Franna Crane	1	-	-	99
		Road track	4 p. hr	-	-	108
Albert St stage 3	Laydown area	Franna Crane	1	-	-	99
		Road track	4 p. hr	-	-	108

Precinct	Aspect	Plant	Number of plant			Sound Power Level L_{Aeq}
			6:30am – 6:30pm	6:30pm – 10pm	10pm – 6:30am	
		Water treatment plant plus pumps	2	2	2	78
	Piling Lot 1	Piling Rig	1	-	-	113
		Excavator with bucket	1	-	-	103
		Franna Crane	1	-	-	99
		Concrete Agitator	5 p. hr	-	-	108
		Concrete Pump	1	-	-	99

Appendix T

Vibration levels

Plant Noise Source	Typical PPV Vibration (mm/s) at distance from plant							
	5m	10m	15m	20m	30m	40m	50m	100m
Bobcat (Mustang 2054)	<1	-	-	-	-	-	-	-
Compactor (852G)	5.3	2.0	2.2	1.4	<1	-	-	-
Dozer (D810) (with ripper)	<2	-	-	-	-	-	-	-
Drilling machine – Pneumatic (Atlas Copco (ROC 812HC 20T)	3.2	1	-	-	<0.1	-	<0.1	-
Drilling Rig – Air Trac Rotary (Ingersoll/Rand CM350)	4.4	1.4	-	-	0.6	-	<0.1	-
Drilling Rig – Tracked (Samsung SE 240 LC3 18T)	<2	-	-	-	-	-	-	-
Excavator ≤30T (travelling)	8.0	3.4	1.6	-	-	-	-	-
Excavator ≤30T (digging)	5.8	4.0	0.0	-	-	-	-	-
Excavator & Rock Hammer 20t	4.5	1.3	-	0.4	0.2	0.15	0.02	-
Excavator & Rock Hammer 27t	10.5	2.5	-	-	-	-	-	-
Excavator & Rock Hammer 50 t [^]	20	5	-	3	1	<1	-	-
Grader (20 tonne)	2.0	-	0.2	-	-	-	-	-
Jack hammers	2.0	1.0	0.2	0.1	0.0	0.1	-	-
Piling Rig – Bored (Soilmec 60T) *	2.4	0.2	0.2	-	-	-	-	-
Rocksaw (Komatsu AVANCE PC300)	1.5	-	-	-	-	-	-	-
Truck traffic (over normal (smooth) road surfaces)	1	0.2	-	0.05	-	0.02	-	-
Truck traffic (over irregular surfaces)	-	2.0	-	0.1	-	-	-	-
Vibratory Roller ≤ 3T (Smooth Drum)#	8.7	5.4	-	-	-	-	-	-
Vibratory Roller ≤ 8T (Pad Footed)#	9-12	3.1	-	-	-	-	-	-
Vibratory Roller ≤ 17T (Smooth Drum)	24.5	8.9	4.2	-	-	-	-	-

Notes: Source – Renzo Tonin & Associates database

* data based on sand/clay soil conditions

Monitor mounted on plate in sands

[^] Vibration data not available. Vibration levels approximated. Vibration monitoring recommended when plant on site.

Appendix U

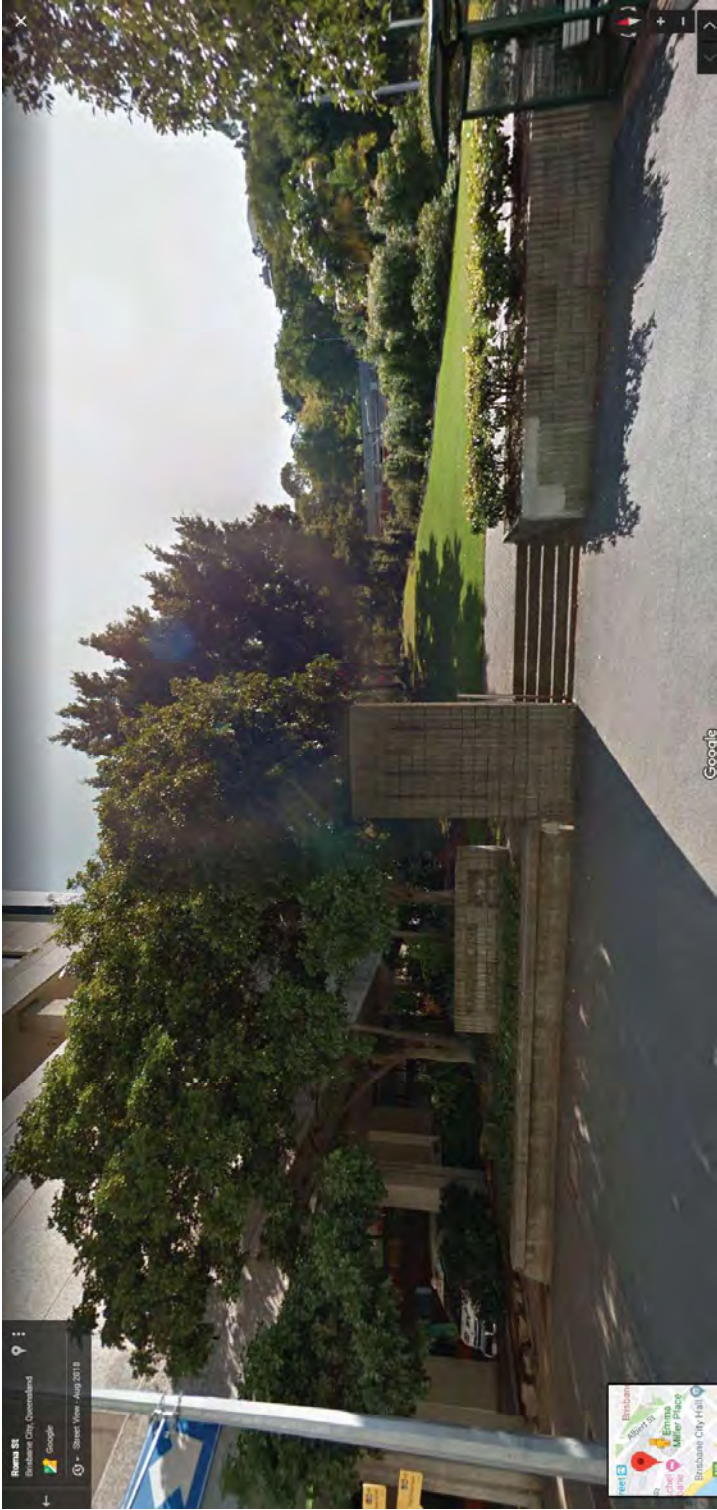
Site Clearing Plans

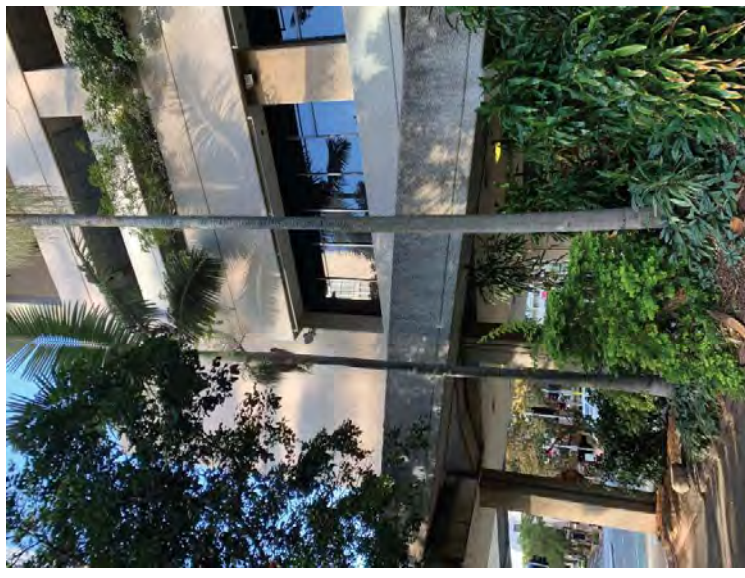
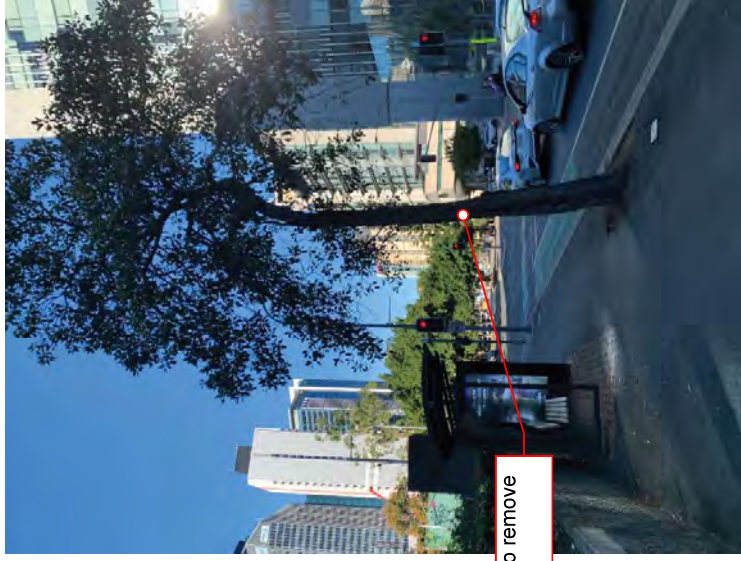
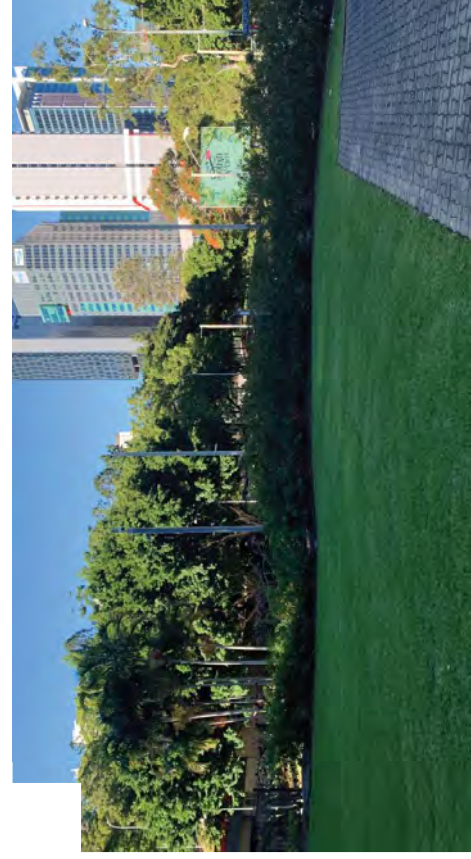
Woolloongabba Vegetation Clearing



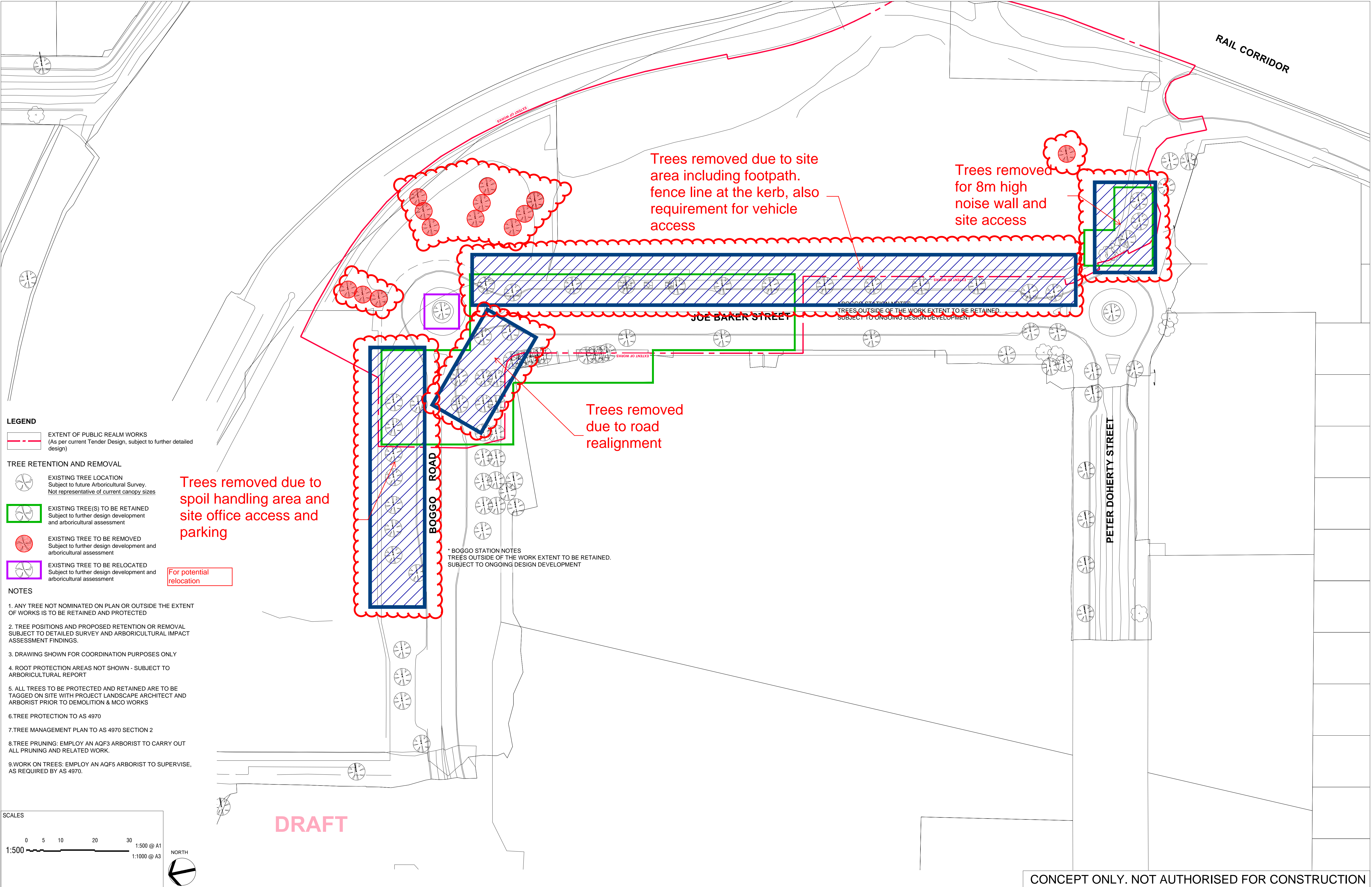
ROMA ST - SITE CLEARING PLAN







Footpath tree - option to remove under traffic control



LEGEND

EXTENT OF PUBLIC REALM WORKS
(As per current Tender Design, subject to further detailed design)

TREE RETENTION AND REMOVAL

EXISTING TREE LOCATION
Subject to future Arboricultural Survey.
Not representative of current canopy sizes

EXISTING TREE(S) TO BE RETAINED
Subject to further design development and arboricultural assessment

EXISTING TREE TO BE REMOVED
Subject to further design development and arboricultural assessment

EXISTING TREE TO BE RELOCATED
Subject to further design development and arboricultural assessment

NOTES

1. ANY TREE NOT NOMINATED ON PLAN OR OUTSIDE THE EXTENT OF WORKS IS TO BE RETAINED AND PROTECTED

2. TREE POSITIONS AND PROPOSED RETENTION OR REMOVAL SUBJECT TO DETAILED SURVEY AND ARBORICULTURAL IMPACT ASSESSMENT FINDINGS.

3. DRAWING SHOWN FOR COORDINATION PURPOSES ONLY

4. ROOT PROTECTION AREAS NOT SHOWN - SUBJECT TO ARBORICULTURAL REPORT

5. ALL TREES TO BE PROTECTED AND RETAINED ARE TO BE TAGGED ON SITE WITH PROJECT LANDSCAPE ARCHITECT AND ARBORIST PRIOR TO DEMOLITION & MCO WORKS

6. TREE PROTECTION TO AS 4970

7. TREE MANAGEMENT PLAN TO AS 4970 SECTION 2

8. TREE PRUNING: EMPLOY AN AQF3 ARBORIST TO CARRY OUT ALL PRUNING AND RELATED WORK.

9. WORK ON TREES: EMPLOY AN AQF5 ARBORIST TO SUPERVISE, AS REQUIRED BY AS 4970.

SCALES

0 5 10 20 30
1:500 @ A1
1:1000 @ A3



JOB No	REVISIONS					
	ISSUE	DESCRIPTION	NAME	REQ	DATE	
013216	A	FOR INFORMATION	WS	DK	11.06.19	
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING						



DESIGNED	WS	
DES CHK	DK	
DRAWN	WS	
DRG CHK	DK	
DESIGN APPROVAL / CERTIFICATION		
Approver		DATE
PROFESSIONAL QUALIFICATION		

**CROSS RIVER RAIL
DELIVERY AUTHORITY**


URBAN DESIGN AND PUBLIC REALM
BOGGO ROAD STATION AND PRECINCT
CROSS RIVER RAIL - TSD

TREE RETENTION & REMOVAL PLAN

DRAWING NUMBER		ISSUE
R1.4.7_PULS_TUN_BoggoRd_UPR-Gen_DRG_053580		A
CONSULTANT DWG No. CRR-TSD-HSL-DRG-TUN-300-910-10-053580		

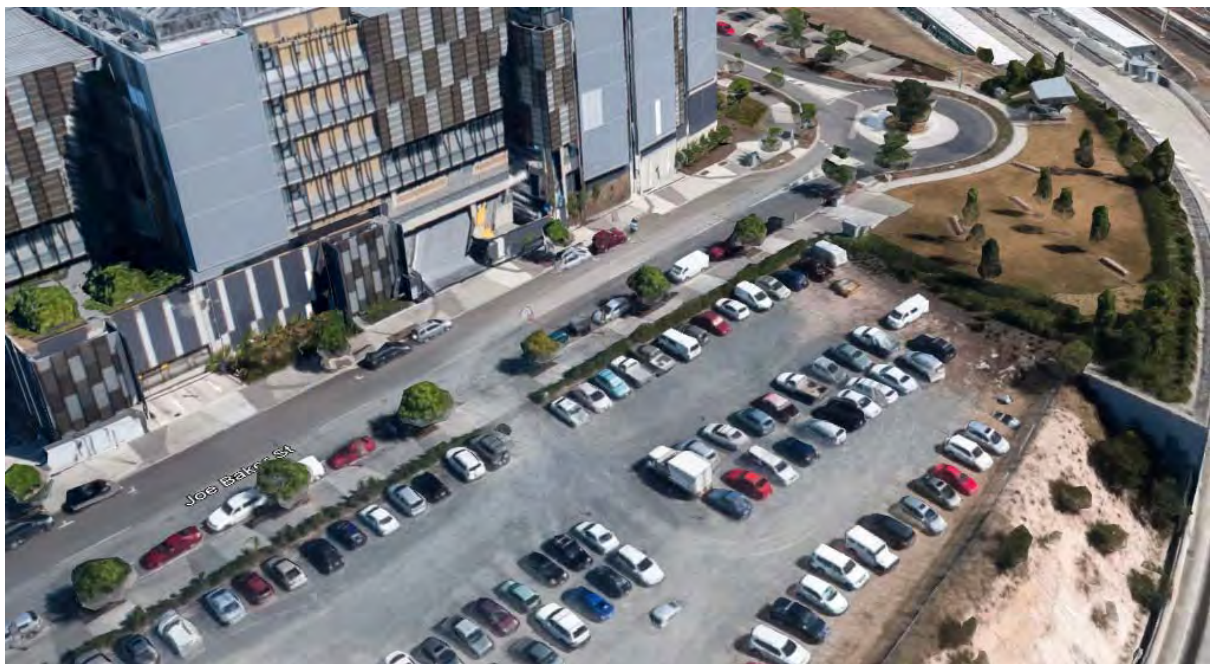
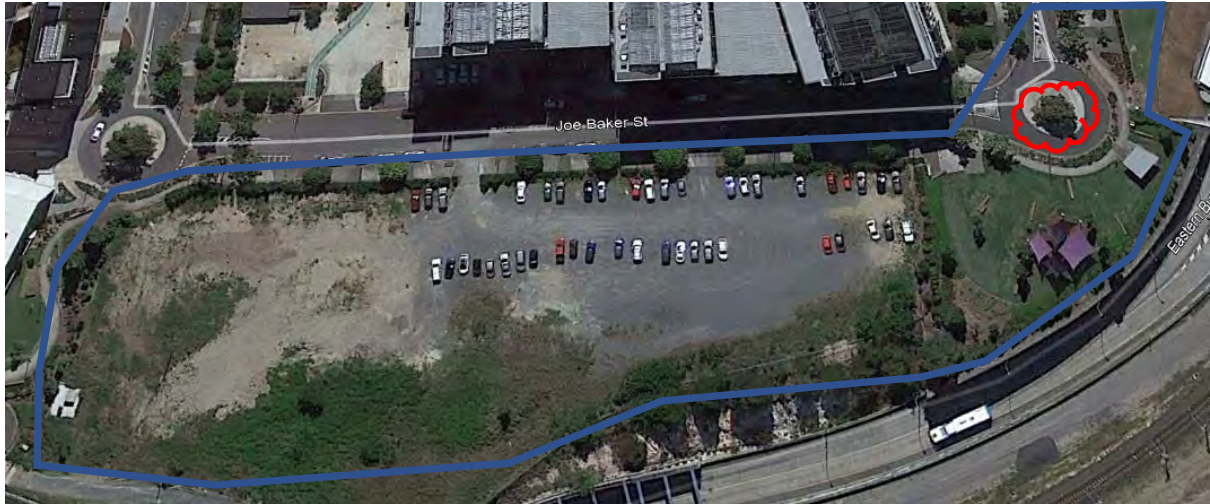
CONCEPT ONLY. NOT AUTHORISED FOR CONSTRUCTION

Boggo Road Station Site.

Site Boundary. 

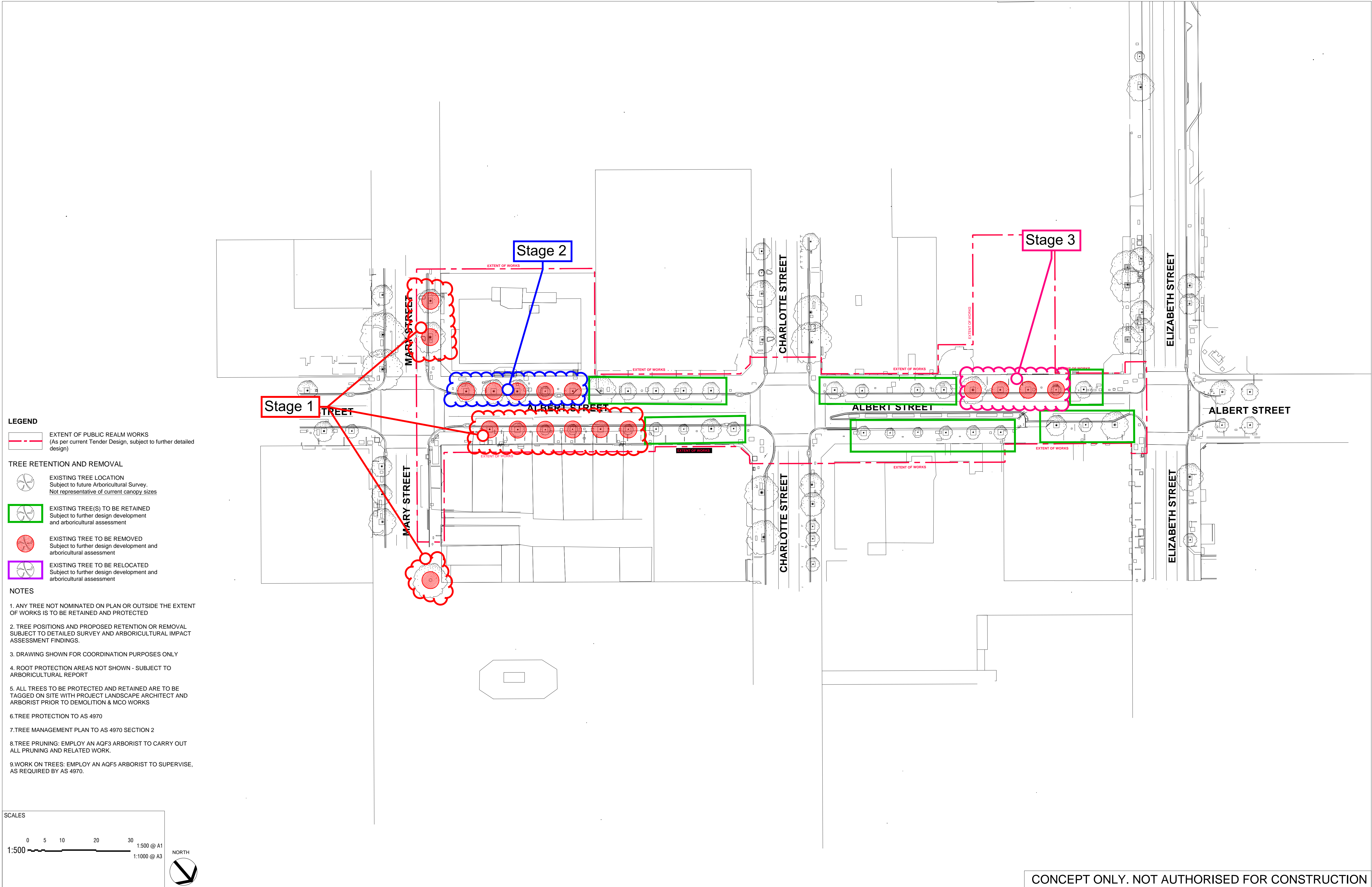
Tree to be relocated 

All other trees and vegetation to be removed









JOB No		REVISIONS				
013216	ISSUE	DESCRIPTION	NAME	REPO	DATE	
	A	FOR INFORMATION	WS	DK	11.06.19	
	B	FOR INFORMATION	WS	DK	13.06.19	
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING						



DESIGNED	WS	
DES CHK	DK	
DRAWN	WS	
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DESIGN APPROVAL / CERTIFICATION		
Approver		DATE
PROFESSIONAL QUALIFICATION		

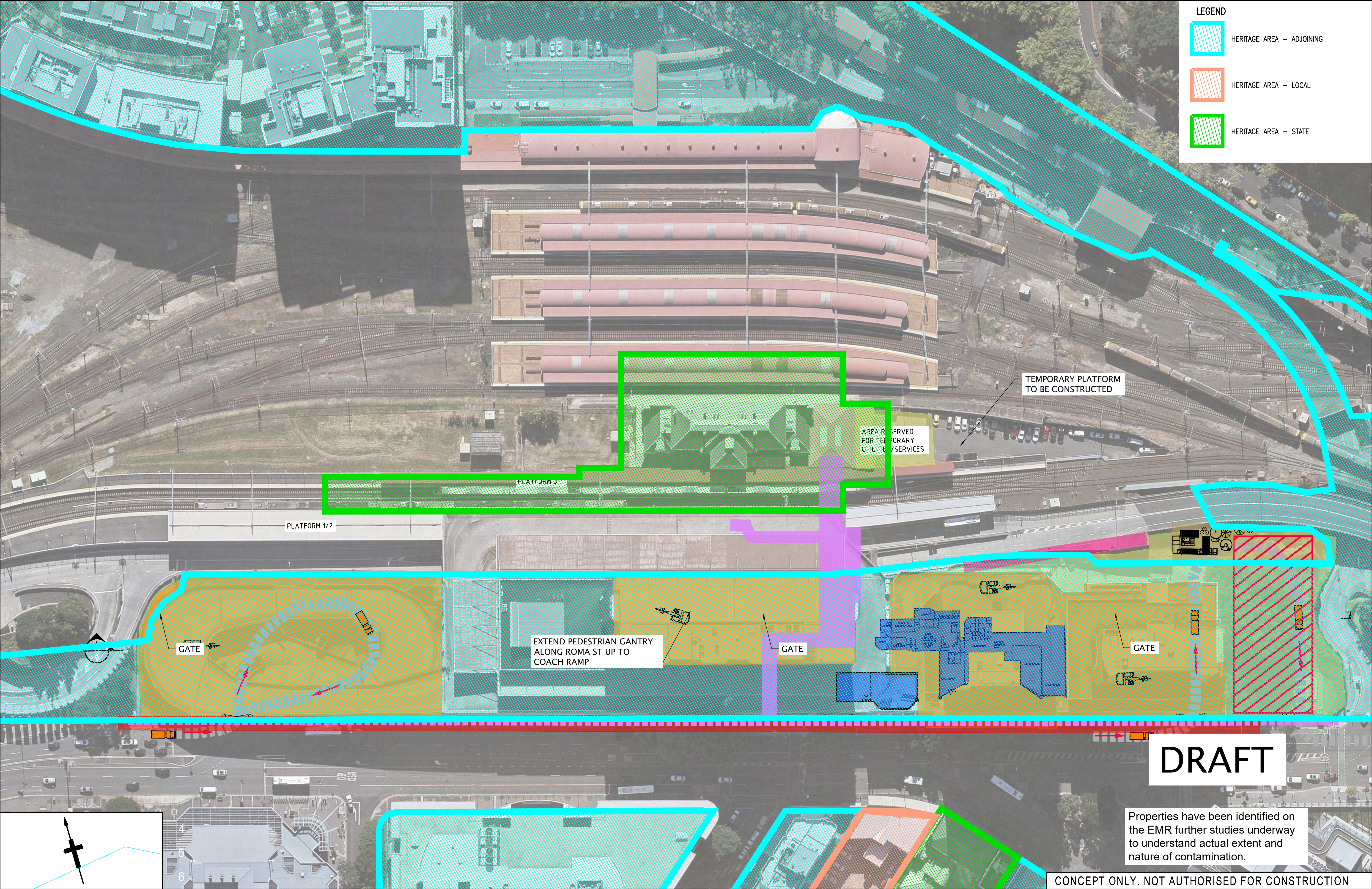
CROSS RIVER RAIL
DELIVERY AUTHORITY

URBAN DESIGN AND PUBLIC REALM
ALBERT STREET STATION AND PRECINCT
CROSS RIVER RAIL - TSD
TREE RETENTION & REMOVAL PLAN

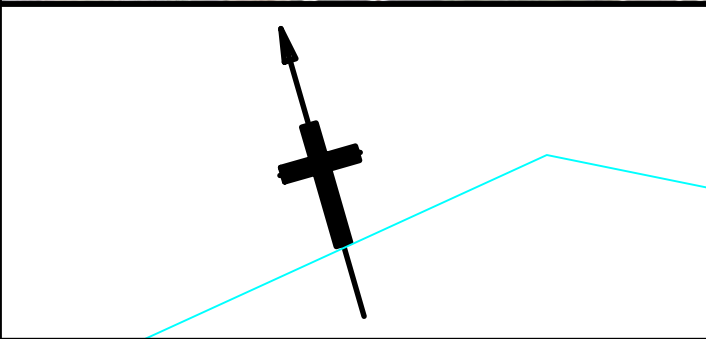
CONCEPT ONLY. NOT AUTHORISED FOR CONSTRUCTION		DRAWING NUMBER		ISSUE
R1.4.7_PULS_TUN_AlbertSt_UPR-Gen_DRG_		055580		B
CONSULTANT DWG No.		CRR-TSD-HSL-DRG-TUN-500-910-10-055580		

Appendix V

Environmental Constraints Maps



- LEGEND
- HERITAGE AREA - ADJOINING
 - HERITAGE AREA - LOCAL
 - HERITAGE AREA - STATE



JOB No	ALTERATIONS			
A	ISSUE DESCRIPTION	NAME	RPE	DATE
	FOR CEMP	RE		16.08.19
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING				



DESIGNED	R.E	16.08.19
DES CHK	R.F	16.08.19
DRAWN	R.E	16.08.19
DRG CHK	R.F	16.08.19
DESIGN APPROVAL / CERTIFICATION		
A.L		16.08.19
PROFESSIONAL QUALIFICATION		DATE

CROSS RIVER RAIL
DELIVERY AUTHORITY

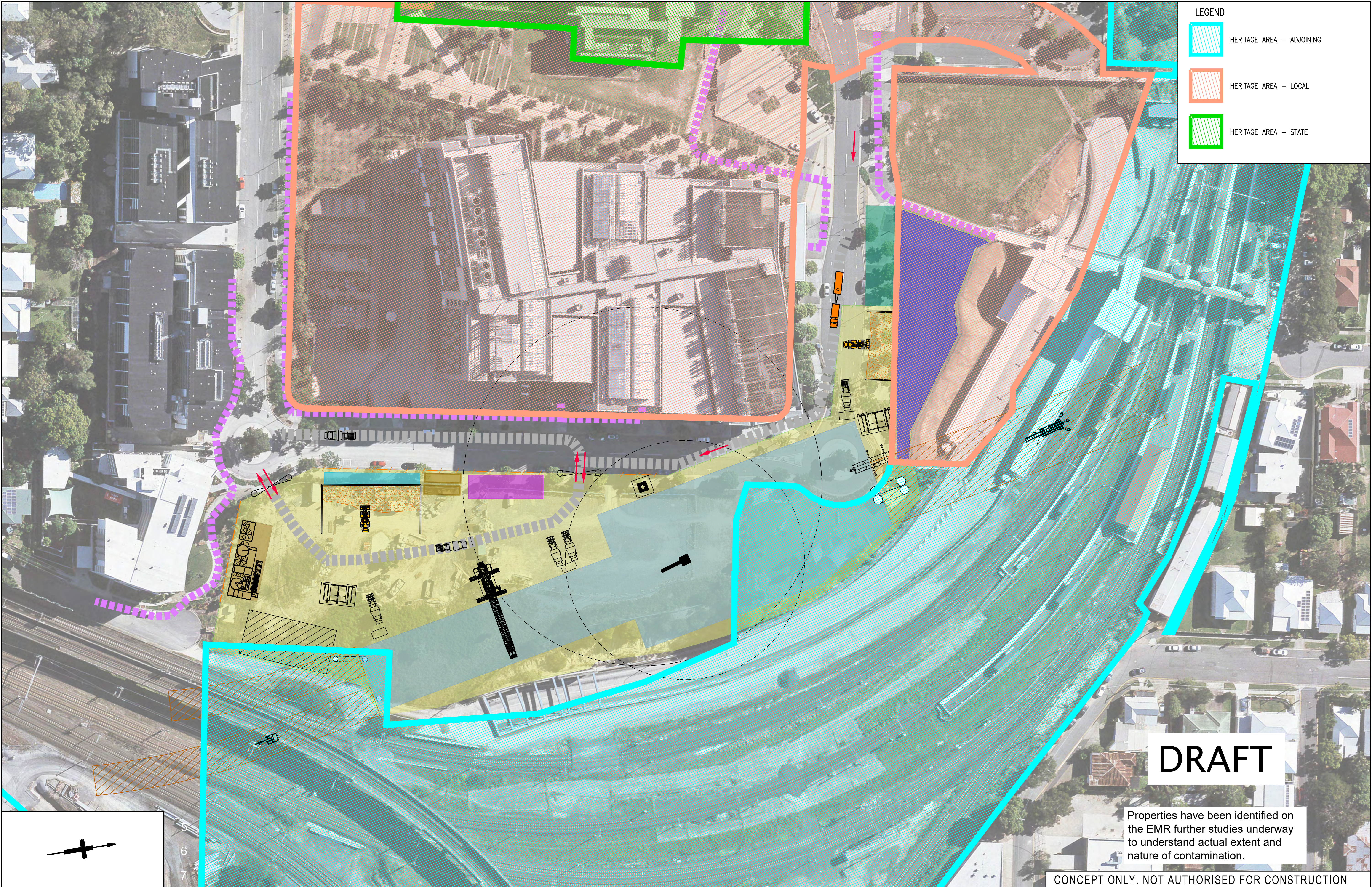
Network - Civil Engineering
ROMA STREET STATION
CROSS RIVER RAIL - TSD
CONSTRUCTION STAGING CONCEPT
HERITAGE & CONTAMINATION

DRAFT

Properties have been identified on the EMR further studies underway to understand actual extent and nature of contamination.

CONCEPT ONLY. NOT AUTHORISED FOR CONSTRUCTION

DRAWING NUMBER		ISSUE
		A
CONSULTANT DWG No.	CRRTSD-250-0000-DRG-CBGU-7600-000001	



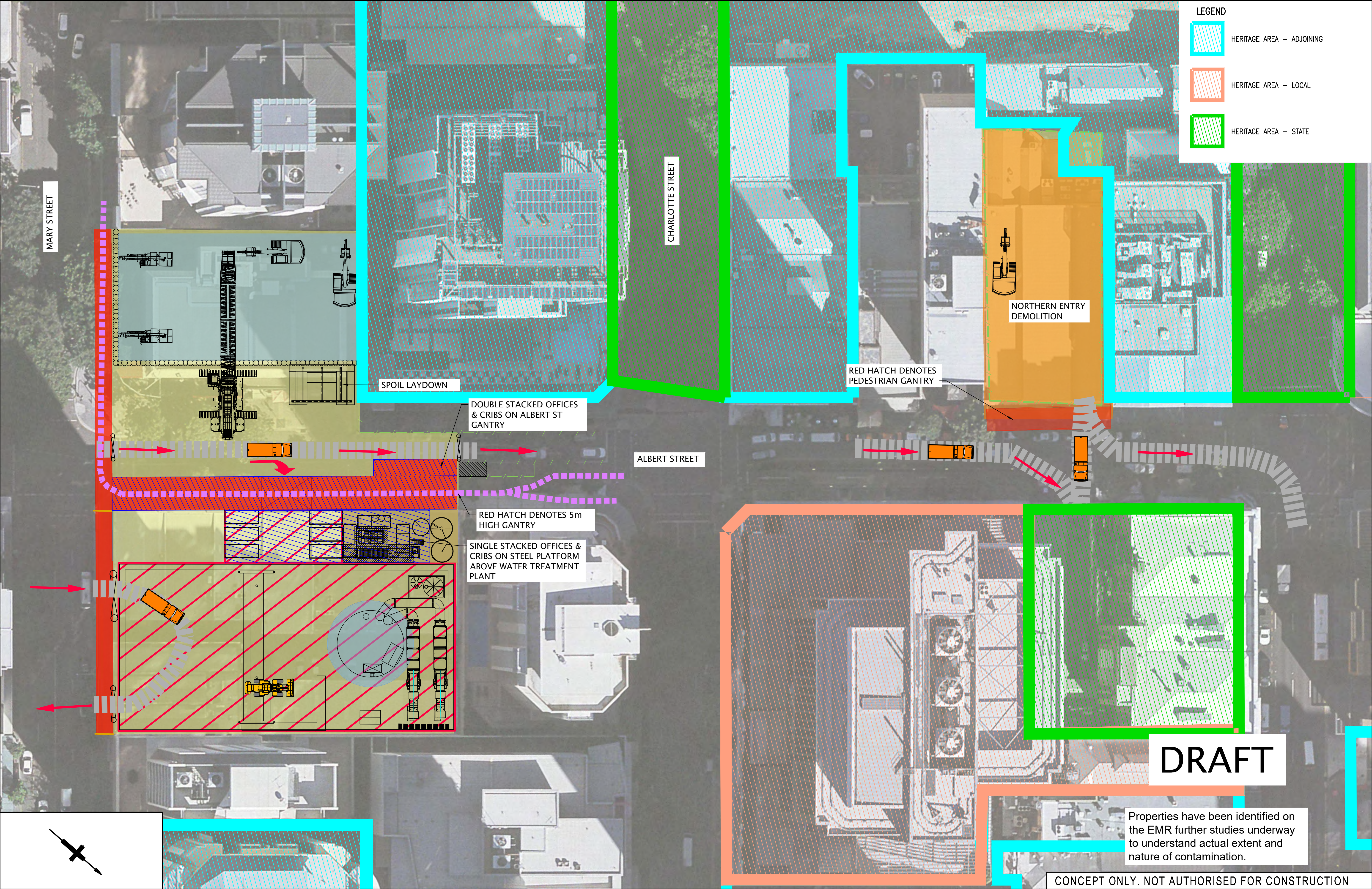
- LEGEND
- HERITAGE AREA – ADJOINING
 - HERITAGE AREA – LOCAL
 - HERITAGE AREA – STATE

DRAFT

Properties have been identified on the EMR further studies underway to understand actual extent and nature of contamination.

CONCEPT ONLY. NOT AUTHORISED FOR CONSTRUCTION

JOB No		ALTERATIONS					<div><div></div><div></div><div>CBGU D&C JV</div></div>		DESIGNED	R.E	16.08.19	CROSS RIVER RAIL DELIVERY AUTHORITY			Network - Civil Engineering		DRAWING NUMBER		ISSUE
	ISSUE	DESCRIPTION	NAME	RE	DATE	BOGGO ROAD STATION			CROSS RIVER RAIL - TSD						A				
	A	FOR CEMP			16.08.19	CONSTRUCTION STAGING CONCEPT													
						HERITAGE & CONTAMINATION													
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING									DRG CHK	R.F	16.08.19				CONSULTANT DWG No.		CRRSTD-420-0000-DRG-CBGU-7600-000001		
							DESIGN APPROVAL / CERTIFICATION A.L. 16.08.19 PROFESSIONAL QUALIFICATION DATE												



JOB No		ALTERATIONS				 		DESIGNED			R.E	16.08.19	CROSS RIVER RAIL DELIVERY AUTHORITY				Network - Civil Engineering		DRAWING NUMBER		ISSUE	
SCALES SHOWN ARE FOR AN A1 SIZE ORIGINAL DRAWING	ISSUE	DESCRIPTION			NAME	RE	DATE	DES CHK	R.F	16.08.19	DRWN	R.E					16.08.19	ALBERT STREET STATION CROSS RIVER RAIL - TSD CONSTRUCTION STAGING HERITAGE & CONTAMINATION				A
	A	FOR CEMP				R.E	16.08.19	DRG CHK	R.F	16.08.19												
							DESIGN APPROVAL / CERTIFICATION															
						 		A.L			16.08.19								CONSULTANT DWG No.	CRRSTD-270-0000-DRG-CBGU-7600-000001		