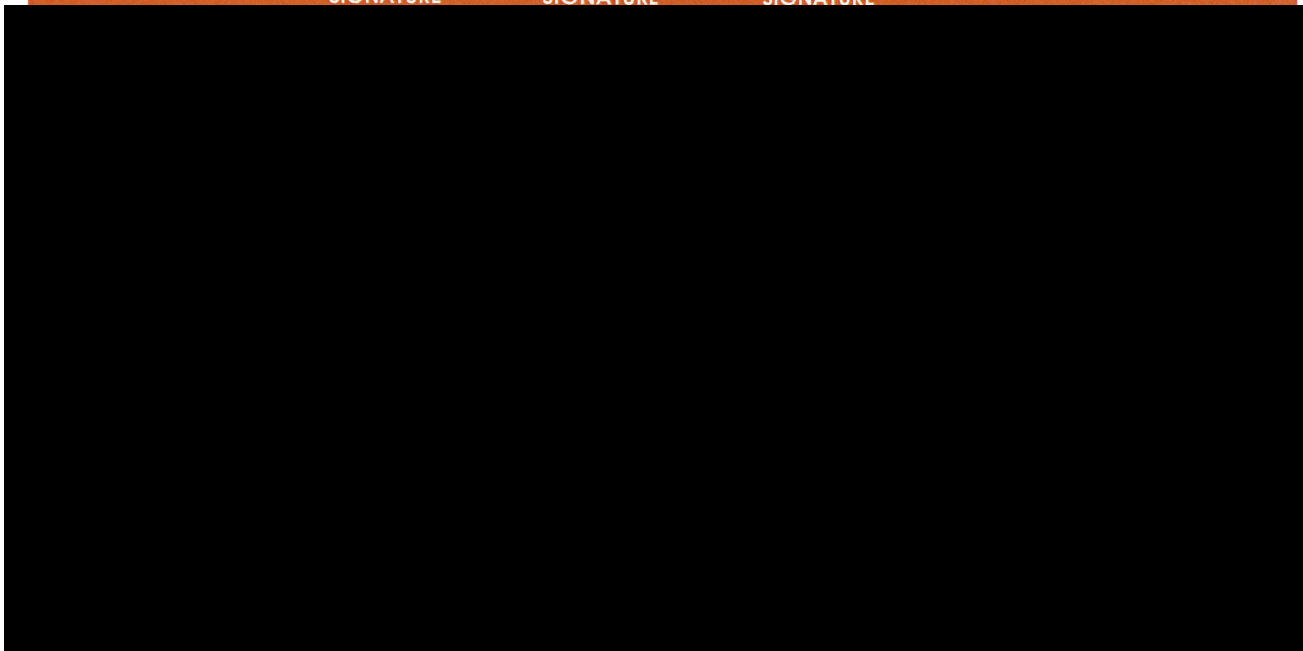


Water Quality Monitoring Plan

Cross River Rail Project – Tunnel, Stations and Development Package (TSD)

REV	DATE	PREPARED BY NAME & SIGNATURE	REVIEWED BY NAME & SIGNATURE	APPROVED BY NAME & SIGNATURE	REMARKS
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Document number: CRRTSD-EN-ENMP-CBGU-000020

Revision date: 14/09/2020

Revision: 4

Compliance Matrix

Table 1 Compliance matrix

CRRDA REFERENCE	REQUIREMENT	ADDRESSED IN SECTION
Coordinator-General's change report Appendix 1 – Part C. – Condition 15, 16, and 17		
Condition 15 Water Quality	A. Discharge of groundwater from Project Works must comply with: <ul style="list-style-type: none"> a. the Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid-estuary) in the Environmental Protection (Water and Biodiversity) Policy 2019. Note that surface water runoff and dewatering activities from sediment basins and surface exactions associated with surface construction works is managed in accordance with Imposed condition 18.	Section 5.2
	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	This Plan
Condition 15 Water Quality	C. Discharge of 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.	Section 5.2
	D. 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	This 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.	This Plan
	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.	This Plan
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	This Plan

CRRDA REFERENCE	REQUIREMENT	ADDRESSED IN SECTION
	must be submitted as part of the Construction Environmental Management Plan.	

Details of Revision Amendments

Document Control

The CBGU Project Director is responsible for ensuring that this Plan is reviewed and approved. The Project Environment & Sustainability Manager is responsible for updating this Plan to reflect changes to the Project, legal and other requirements, as required.

Amendments

Any revisions or amendments must be approved by the CBGU Project Director before being distributed / implemented.

Distribution and Authorisation

The CBGU Project Director is responsible for the distribution of this Plan. The controlled master version of this document is available for distribution as appropriate and maintained on TeamBinder. All circulated hard copies of this document are deemed to be uncontrolled.

All personnel employed on the Project will perform their duties in accordance with the requirements of this Plan, supporting management plans, and related procedures.

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Referenced Documents

The following provides a list of referenced documents either as a sub-plan to this plan or referenced from.

Table 2 Referenced Documents

Document Number	Document Name	Location of Controlled Version
Referenced Project Plans include:		
CRRTSD-EN-MPL-CBGU-000019	Construction Environment Management Plan	TeamBinder
	Dewatering and Discharge Procedure	PMS
CRRTSD-CU-MPL-CBGU-000018	Communications and Stakeholder Engagement Management Plan	TeamBinder
CRRTSD-EN-ENMP-CBGU-000017	Water Quality Management Plan	TeamBinder
CRRTSD-CS-MPL-CBGU-000032	Construction Monitoring Management Plan	TeamBinder
	Spills Procedure	PMS

Note: this Management Plan may not contain the current version of the documents listed above. Refer to the 'location of controlled version' for the most current version.

Glossary of Terms

Table 3 Terms

Acronym	Definition
All Staff	Means all employees, Proponents and sub-contractors involved in the Project Works
CBGU	D&C Contractor comprising a joint venture with CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd
CEMP	The Project's Construction Environmental Management Plan
CG	Coordinator-General
CGCR	Coordinator-General's Change Report
CGER	Coordinator-General's Evaluation Report
CMS	CPB Management System
COEMP	The Project's Commissioning Environmental Management Plan
Contractor	The Contractors appointed to design, construct and commission the Project
Coordinator-General	The corporation sole preserved, continued and constituted under section 8 of the SDPWO Act
CRR	Cross River Rail
CRRDA	Cross River Rail Delivery Authority acting on behalf of the State
CRR TSD (the Project)	Cross River Rail - Tunnels, Stations and Development (TSD) Project
CSEP	Community and Stakeholder Engagement Plan
DES	Department of Environment and Science
EMP	Environmental Management Plan (refers to the OEMP, CEMP, COEMP including any Project sub-plans)
Environmental Monitor	The Environmental Monitor engaged in accordance with Imposed Condition 7
OEMP	Outline Environment Management Plan
Risk matrix	A table used in the evaluation of risk severity that has likelihood and consequence as its axes with numbers and ratings applicable to each likelihood/consequence combination. For use in risk evaluation and Safety in Design reviews.
Risk register	A database containing Project risks, assessments, treatments and responsibilities
RfPC	EIS Request for Project Change
Subcontractor	Any company, body or person who is contracted to CBGU for the purpose of supplying plant and/or services
TeamBinder	Proprietary software used as part of the Project wide Electronic Document Management System
the Project (or CRR TSD)	Cross River Rail - Tunnels, Stations and Development (TSD) Project

Acronym	Definition
WQMoP	Water Quality Monitoring Plan

1 Introduction

1.1 Background

The Design and Construction Joint Venture comprising of CPB Contractors Pty Ltd, BAM International Australia Pty Ltd, Ghella Pty Ltd and UGL Engineering Pty Ltd (CBGU D&C JV or CBGU) is responsible for delivering the Cross River Rail (CRR) Project (the Project) on behalf of the Cross River Rail Delivery Authority (the Delivery Authority).

This Water Quality Monitoring Plan should be read in conjunction with the Project's overarching Construction Environment Management Plan (CEMP).

- The CEMP provides specific details regarding the background of the Project, the scope of the Project and the staging and timing of key milestones associated with the construction of the Project.

1.2 Context

This Construction Water Quality Monitoring Plan (WQMoP) forms part of the Construction Environmental Management Plan (CEMP) developed for the construction of the Project. The WQMoP describes how CBGU will monitor water quality.

1.3 Objectives

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

- nominate the Project's monitoring and reporting requirements in relation to water quality
- manage the quality of waters released from construction worksites
- monitor the effects of water discharges from construction worksites on receiving waters
- monitor the effects of management and mitigation measures.

1.4 Legislative Framework

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

Specific legislation relevant to this WQMoP is detailed below.

1.4.1 Commonwealth Legislation

Commonwealth legislation that may be relevant to the Project and this WQMP includes:

- *Environment Protection and Biodiversity Conservation Act 1999.*

1.4.2 State Legislation

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

- *Cross River Rail Delivery Authority Act 2016*
- *Local Government Act 2009*
- *Environmental Protection Act 1994*
- *Coastal Protection and Management Act 1995*
- *Environmental Protection (Water and Biodiversity) Policy 2019*

1.4.3 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.

1.4.4 Guidelines and Standards

The following guidelines and standards may be relevant to the management of water quality for the Project:

- Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid- estuary) in the EPP (Water and Biodiversity)
- Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
- Queensland Water Quality Guidelines 2009 (DEHP, 2009)
- Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018)
- Australian guidelines for water quality sampling (AS/NZS 5667.11.1998) (Standards Australia)
- Heads of EPAs Australia and New Zealand (HEPA) (2018). PFAS National Environmental Management Plan (NEMP). January 2020
- National Environment Protection Council (NEPC) (2013). National Environment Protection (Assessment of Site Contamination) Amendment Measure (NEPM).

2 Required Outcomes

The following Imposed Conditions and environmental outcomes are to be achieved throughout construction of the Project. The environmental outcomes may be achieved by meeting the performance criteria in this WQMoP.

2.1 Coordinator-General Conditions

The Imposed Conditions relating to water quality and water resources for the Project can be found on the Coordinator-General's website (<http://www.dsdmip.qld.gov.au/coordinator-general/assessments-and-approvals/coordinated-projects/completed-projects/cross-river-rail-project.html>).

2.2 Environmental Outcomes

The following environmental outcomes in relation to water quality are to be achieved for the Project.

2.2.1 Groundwater

- Groundwater inflow to construction worksites, including tunnels, cross-passages, underground stations is minimised.
- Groundwater quality is maintained generally at pre-disturbance levels during and after construction.

2.2.2 Surface water

- Discharge of groundwater inflow from construction worksites does not adversely affect the environmental values of receiving water.
- Environmental values of surface water immediately downstream of construction worksites are not adversely affected by the Project, during and post-construction.
- Construction activities are managed to avoid the transportation of contaminants that might be released to waters.

3 Monitoring Program

3.1 Water Quality Monitoring

Water Quality is monitored so that:

- Water quality is in accordance with:
 - Brisbane River Estuary environmental values and water quality objectives (Basin no. 143 - mid- estuary) in the EPP (Water and Biodiversity)
 - Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)
 - Queensland Water Quality Guidelines 2009 (DEHP, 2009)
 - Monitoring and Sampling Manual: Environmental Protection (Water) Policy 2009 (DES, 2018)
- The water quality monitoring programme has been designed and implemented by a person with relevant qualifications, skills and experience
- Water quality monitoring must be undertaken at the designated outlet, or discharge point for each worksite.
- Water quality monitoring must occur daily, when required for discharge
- Water quality monitoring must also occur after a rainfall occurring in the months September – April and after rainfall in every other event (as per section 3.2.1). Water quality monitoring must also occur whenever there is a discharge to receiving waters of the stormwater system servicing a worksite
- Daily inspection must include visual monitoring of surface water discharges to the stormwater system and the receiving environment generally
- Response or campaign must be implemented when the daily visual site inspection detects a possible discharge of contaminated surface water or groundwater to the environment, or following a rainfall event or greater intensity than the design rainfall event
- Monitoring data must be validated as soon as practicable and be presented in a summary report for inclusion in the monthly report.

3.2 Surface Water Monitoring Program

3.2.1 Discharge Water Quality

Water quality monitoring for the parameters will be completed prior to the start of stormwater/water discharge events.

Discharge of 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.

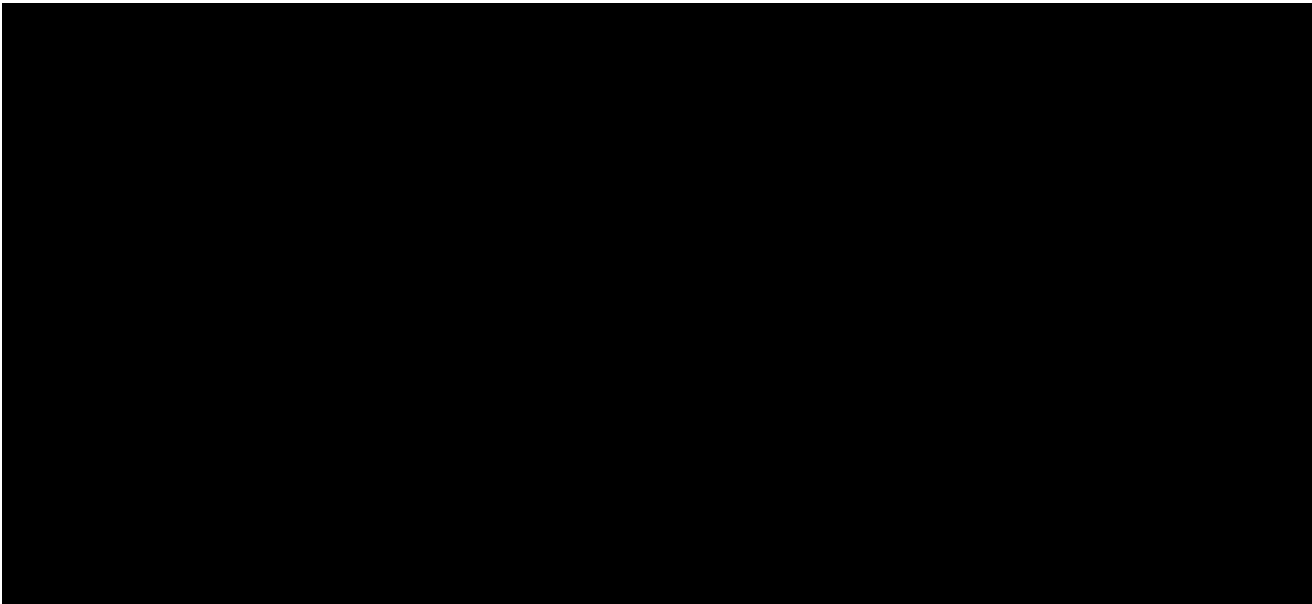
Surface water runoff and dewatering activities from sediment basins and surface exactions associated with surface construction works is managed in accordance with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control.

Event based sampling/monitoring must be undertaken within 24 hours following a rain event which exceeds 44mm in a 24 hour period (85th percentile IECA rainfall event for Brisbane), however for rain events which occur outside of standard hours sampling/monitoring will occur during the following shift.

3.2.2 Surface Water Quality

Surface water quality monitoring will occur monthly within approximately 50 metres upstream and downstream of each discharge point for each of the precincts, as per Table 4 and Figure 1 below.

Table 4 Surface Water Quality Approximate Discharge Locations



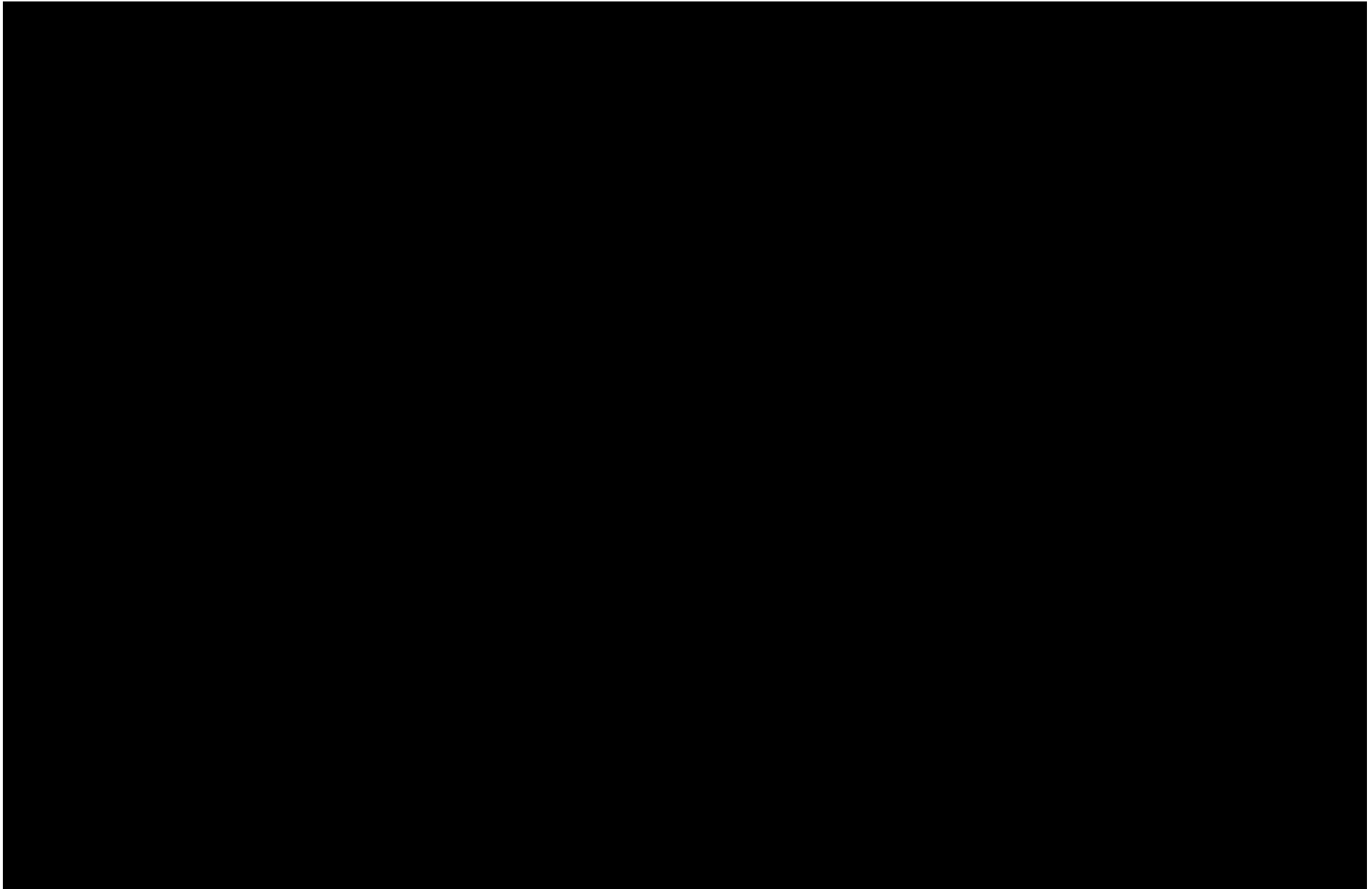


Figure 1 Surface water quality – Discharge locations

3.3 Groundwater Monitoring Program

3.3.1 Groundwater Quality

Groundwater quality monitoring will be conducted on a quarterly basis (every three months) as per OEMP requirements, for the parameters identified in Table 6. The monitoring locations will be detailed as part of the Sampling, Analysis and Quality Plan which is part of contaminated land management processes.

3.3.2 Groundwater Level (GW Pressure)

The groundwater level monitoring program will be completed using vibrating wire piezometers, and downloaded on a monthly basis, this monitoring program is detailed in Section 4.7 of the Construction Monitoring Management Plan (CMMP).

4 Compliance Management

4.1 Roles and Responsibilities

The organisational responsibilities and accountabilities in relation to environmental management throughout Project construction works are outlined in the overarching CEMP.

4.2 Induction and Training

4.2.1 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. Further details regarding environmental induction requirements have been outlined in the overarching CEMP.

4.2.2 Environmental Training

Details regarding environmental training requirements have been outlined in the overarching CEMP.

4.3 Communication

Communication strategies including internal communication, external and Government Authority consultation, and stakeholder and community liaison must be undertaken in accordance with the CEMP and the CSEP.

4.4 Incidents and Emergencies

4.4.1 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, Shared Services Director and Project Director should be notified immediately in the event of a significant environmental incident.

Further details regarding Incident Notification, have been outlined in the overarching CEMP, and Emergency Response and Incident Management Plan.

4.4.2 Incident Types

For the purpose of this WQMP, incidents include, but are not limited to:

- Any breach of the legislation or an approval or permit condition
- Contamination of waterways or land
- Impact to level or contamination of groundwater
- Exceedance of relevant WQO

4.4.3 Incident Prevention Management

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

- Daily informal visual inspections of active work sites as per OEMP requirements in table 5 section 7.1
- Completion of the Project's Environmental Checklist
- 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.

4.4.4 Incident Investigation

The Incident Investigation process has been specified in the overarching CEMP.

4.4.5 Complaint Management

All complaints are to be dealt with in accordance with the complaints management procedure outlined in the CEMP.

Validated complaints about water quality must be addressed as soon as practicable after the complaint has been made and in accordance with the complaints management procedure outlined in the CSEP. Should there be an absence of monitoring data to confirm or refute the complaint, a visual inspection may be undertaken and the findings reported to both the Environmental Monitor and the complainant.

5 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. The section below details specific requirements relating to Inspections, monitoring, auditing requirements have not been outlined in the overarching CEM.

5.1 Environmental Monitoring

5.1.1 Baseline Monitoring

5.1.1.1 Surface Water

A baseline surface water monitoring was carried out over a 12-month period commencing in September 2018 and the final round of sampling will be completed in August 2019. The baseline surface water quality monitoring occurred at two (2) surface water locations that are applicable to the TSD Package (SW1 and SW2). Sampling location SW3 is further downstream however results will be included within this report when the data becomes available. The intent on the baseline surface water monitoring was to derive groundwater quality compliance limits in accordance with the Queensland Water Quality Guidelines (2009).

The baseline data will be included within this report when the data becomes available.

5.1.1.1 Groundwater

A baseline groundwater monitoring was carried out over a 12-month period commencing in September 2018 and the final round of sampling will be completed in August 2019. The baseline groundwater quality monitoring applicable to the TSD package occurred at eight (8) existing groundwater monitoring well locations that were previously installed across the footprint of the proposed Cross River Rail Corridor (MW1 to MW8). The intent on the baseline groundwater monitoring was to derive groundwater quality compliance limits in accordance with the Queensland Water Quality Guidelines (2009).

Appendix A provides the median of the test site \leq 80th percentile of the baseline data.

5.1.2 Auditing

Audits will be undertaken to assess the effectiveness of environmental controls, compliance with the CEMP, compliance with Environmental Design Requirements, and other relevant permits, approvals, and guidelines. There will be a monthly internal audit undertaken by CBGU as per the CEMP, who is to report findings to the Environmental Monitor and the Authority. This includes reporting on compliance with the CEMP and the Imposed Conditions.

Audits will be undertaken in accordance with the overarching CEMP.

5.1.3 Corrective Action

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 specific works that do not achieve the environmental outcomes or meet the Imposed Conditions must cease until the corrective actions have been developed and implemented.

The process for developing and implementing Correction Actions has been specified within the overarching CEMP.

5.2 Reporting

5.2.1 Monthly Reporting

To ensure compliance with Coordinator-General Condition 6, CBGU will prepare and submit a monthly report, details of which have been identified in the CEMP.

A report containing the below requirements from the Outline Water Quality Management Plan will also be prepared as and when required:

- Results of inspections, including reporting of hydrology management issues, must be included in the monthly environmental report, along with details of any incidents or complaints relating to hydrology issues.
- Results of groundwater quality and drawdown monitoring as part of the water quality monitoring
- Report after a design rainfall event exceeding a two-year average recurrence interval.
- In the event of flooding impacting construction worksites, the monthly construction compliance report is to include reporting on damage to construction works, plant and equipment, loss of materials and contaminants and the extent of rehabilitation and recovery works and actions for the affected works.

5.2.2 Incidents and Non-Compliance Event Reporting

Environmental incidents meeting the criteria of an NCE shall be notified verbally as soon as practical and in writing within 48 hours of becoming aware of an incident occurring. Notification will generally be undertaken by the Environment and Sustainability Manager or delegate. Additional notification of the incident to the relevant authorities, EM and parent companies will also be undertaken as required.

Further details regarding reporting, including provision of interim and detail reports have been provided in the overarching CEMP.

5.3 Documentation and Communication

Records in relation to water quality must be maintained in accordance with these requirements.

5.3.1 Document Control

Document control requirements have been specifically addressed within the overarching CEMP.

5.3.2 Review

In accordance with the General Requirements of the CEMP this construction WQMP must also be updated and revised on the basis of, changes to proposed spoil placement locations.

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

Revisions to this WQMP may also be required during the Project to reflect changing circumstances or identified deficiencies. Revisions may result from:

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

5.3.3 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 requirements of the CEMP.

Appendix A

Baseline Groundwater Monitoring

Table 6: Site-Specific Groundwater Compliance Limits (80% Percentile of Baseline)

