

Waterways and Water Quality Management Sub-Plan

Cross River Rail – Rail, Integration and Systems Alliance

Project number:	Q01080
Document number:	RIS-UNA-000-001-MPL-000279
Revision date:	12 October 2021
Revision number:	04

Document Approval

Rev	Date	Prepared By	Reviewed By	Approved By	Remarks
A	28/06/19	UNITY – Environment Manager	UNITY – Delivery Manager		IFR
B	18/09/19	UNITY – Environment Manager	UNITY – Delivery Manager		IFR
C	02/12/19	UNITY – Environment Manager	UNITY – Delivery Manager	UNITY – Environment Manager	IFU
00	24/01/20	UNITY – Environment Manager	UNITY – Delivery Manager	UNITY – Environment Manager	IFU
01	24/07/20	UNITY – Senior Environmental Advisor	UNITY – Environment Manager		IFR
02	07/09/20			UNITY – Environment Manager	IFU
03	26/08/21	UNITY – Senior Environmental Advisor	UNITY – Environment Manager		IFR
04	12/10/21			UNITY – Environment Manager	IFU
Signature:					

Plan Control

This Waterways and Water Quality Management Sub-Plan (the plan) has been developed for the Cross River Rail – Rail, Integration and Systems Project.

Approvals, Revisions and Amendments

Plan approval is in accordance with Section 4.1.2 of the Construction Environmental Management Plan (C-EMP).

Plan reviews and updates is in accordance with Section 7 and Section 8.1 of the C-EMP.

Revision Details

Revision	Remarks
A	Final C-EMP for Review and endorsement by the Environmental Monitor
B	Updated to address review comments from the Environmental Monitor dated 30 September 2019
C	Updated to address review comments from the Environmental Monitor dated 04 November 2019
00	Plan updated to include Hold Point process for unrestricted endorsement
01	6 monthly review and updated to incorporate changes linked to RfPC-7 and Updated O-EMP The update does not include new or additional Relevant Project Works
02	Issued for Use
03	Issued for review to the IEM 6 monthly review and update to incorporate <ul style="list-style-type: none"> changes linked to RfPC-11 addition of the Southern Area Scope of Works (Dutton Park and Buranda)
04	Issued for Use

1 Purpose of this Plan

This preliminary sub-plan has been prepared to comply with:

- Coordinator-General's Condition of Approval – Appendix 1 – Part C:
 - Condition 15
 - Condition 18
- Condition 16 (b)
- Final Outline – Environmental Management Plan (O-EMP) – Outline Water Quality Management Plan.

Component	Details
Environmental Outcome(s)	<ul style="list-style-type: none"> • 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. • Groundwater inflow to construction worksites, including tunnels, cross-passages, underground stations is minimised
Relevant Area	<p>Site wide</p> <p>Key areas:</p> <ul style="list-style-type: none"> • Mayne Yard and associated Enoggera/Breakfast Creek (mid-estuary – Brisbane River estuary) • Northern Area in the vicinity of Victoria Park and associated sensitive receptor of Barrambin (York's Hollow) (lowland freshwater – Brisbane River Estuary catchment waters) • Southern Area (Buranda section) and associated sensitive receptor of Norman Creek • Moorooka Station and Clapham Yard and associated sensitive receptor Moolabin Creek (lowland freshwater – Oxley Creek catchment waters) • Rocklea Station and associated sensitive receptor of Rocky Water Holes Creek (lowland freshwater – Oxley Creek catchment waters) • Salisbury Station and associated sensitive receptor of Stable Swamp Creek (lowland freshwater – Oxley Creek catchment waters).
Relevant Works / Activities	<ul style="list-style-type: none"> • Vegetation clearing • Bulk earthworks exposing subsoils • Trenching and excavations that have the potential to entrap surface water run off or intercept shallow groundwater • Spoil and fill material stockpiling • Site dewatering • Dust suppression • Storage and use of hazardous goods • Water take • Waste management.
Performance Criteria	<ul style="list-style-type: none"> • Groundwater: <ul style="list-style-type: none"> – Contamination of groundwater by construction materials is avoided by complying with the Waste, Contaminated Land and Acid Sulphate Soils Management Plans – Groundwater intrusion in surface excavations is managed in accordance with Imposed Condition 18 • Surface water: <ul style="list-style-type: none"> – Surface water runoff and dewatering activities from sediment basins and surface excavations associated with surface construction works is managed in accordance with the Guidelines for Best Practice Erosion and Sediment Control (International Erosion Control Association, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control.

Component	Details
	<ul style="list-style-type: none"> – Contaminants, chemicals, toxicants and litter from Project worksites are prevented from entering receiving surface waters, including stormwater drains, roadside gutters and waterways • ASS is avoided, or if intercepted, is managed to ensure no adverse impact on surface waters
Sustainability	Dis-1, Wat-1 and Wat-2.
Mitigation Measure	<ul style="list-style-type: none"> • Predictive groundwater modelling is used to identify potential inflow rates in work areas likely to intercept groundwater. Where modelling shows rates potentially exceeding 1L/sec, and taking into consideration drawdown risks associated with the duration / extent of works, suitable work alterations / methods will be implemented to reduce inflows. These may include: <ul style="list-style-type: none"> – Use of blinding – Use of sheet piling – Using driven or sleeved piling techniques – Prioritisation of precast structures as opposed to in-situ concrete pours. • Develop and implement requirements of the following site-specific plans developed prior to construction activities commencing: <ul style="list-style-type: none"> – Site-Specific Erosion and Sediment Control Plans – Supplementary ASS Management Plan (ASSMP) when triggered – Supplementary Contaminated Land Management Plan (CLMP) when triggered • The nomination of the surface water monitoring locations (and associated relevant analytical suite) is informed by SQPs in the fields of Contaminated Land, Acid Sulphate Soils and Ecology. • Prior to the Relevant Project Works the relevant supplementary plans are provided to the Environmental Monitor where relevant with sufficient notice to demonstrate compliance with Conditions 4c(ii) and 15. • The Relevant Project Works are not be authorised to commence until the supplementary plans have been completed where relevant • Contamination of groundwater by construction materials is avoided by complying with the Waste, Contaminated Land and Acid Sulphate Soils Management Plans • Prior to any discharge of surface or groundwater being authorised from the site, the UNITY Environment Team will monitor the water using appropriately calibrated water quality monitoring equipment and will authorise water releases from the site using the Permit to Dewater process • Only water that meets the Site Water Release Hierarchy below (as well as applicable requirements from the ASSMP or the Contaminated Land Management Plan) will be authorised for release. • Where an active site release is identified to no longer meet the permit to dewater conditions, the release is to be stopped and the relevant actions to be implemented to assess, and minimise impact (if any identified to have occurred) <p>Site Water Release Hierarchy</p> <ul style="list-style-type: none"> – Should there be no risk of successive rain events that pose risk of overwhelming/over-topping basins / sediment retention devices, all efforts will be made to achieve water quality parameters of the <i>EPP (Water and Wetland Biodiversity)</i> (refer Table 1 below); – Else, as a minimum offsite discharge will achieve the water quality parameters of the Queensland Water Quality Guidelines and MRTS51 (refer Table 2 below), – All passive release will occur through design and fit-for-purpose sediment devices designed in accordance with IECA 2008 as per the ESC Sub-Plan. • Where required, site specific ESCPs will be developed and implemented to ensure that surface waters immediately downstream of construction worksites are not adversely affected by Project works. • Regular water quality monitoring will be undertaken as outlined in the Construction Environmental Monitoring Program included in the C-EMP to ensure compliance with water quality requirements as per hierarchy provided above and to inform the ISCA rating.

Component	Details
	<ul style="list-style-type: none"> Details of the locations, frequency and scope of the monitoring (analytical suite) for surface and groundwaters will be included in the SEP. Key personnel, such as site supervisors, may also be authorised to test waters and authorise discharges, only after they have been appropriately trained in water testing procedures. UNITY's Environment Team will undertake dewatering training of key construction personnel. This training will include the following content (as a minimum): <ul style="list-style-type: none"> Legal obligations Description of key prescribed water contaminants and construction activities and/or latent conditions that may result in water impacts Description of the key sensitive receptors around the project Description of suitable dewatering techniques Waste will be managed in accordance with requirements of the Waste Management Sub-Plan, with particular focus on liquid wastes such as concrete washout waters. The location of sources of potential contaminants (such as hazardous substances storage areas, waste disposal areas, etc) are considered in relation to flow paths. Waste receptacles of appropriate size and servicing regime, along with segregation opportunities will be located suitably to minimise litter sources. Weekly inspections are used to verify performance or address issues.
Monitoring	<p>Monitoring is undertaken in accordance with the Construction Monitoring Program (attachment 4 of the C-EMP).</p> <p>Where additional monitoring is triggered based on the supplementary ASSMP, CLMP (or equivalent) the details of the monitoring will be included in the relevant Workpacks and SEPs</p>
Reporting	Reporting is undertaken in accordance with Section 8.2 of the C-EMP.
Corrective Action	Management of corrective actions will be undertaken as per Section 6 of the C-EMP.
Auditing	As per Section 7 of the C-EMP.

2 Project Water Quality Objectives

Table 1: Water quality objectives – Brisbane River Estuary EV's & WQO's (Basin no. 143) SOURCE: EPP (Water and Wetland Biodiversity).

Water Area/Type	Management Intent	Water Quality Objectives
Mid Estuary	Aquatic ecosystem – moderately disturbed	Turbidity: <8 NTU Suspended Solids: <20 mg/L Chlorophyll a: <4 µg/L Total Nitrogen: <300 µg/L Oxidised N: <10 µg/L Ammonia N: <10 µg/L Organic N: <280 µg/L Total phosphorous: <25 µg/L Filterable reactive phosphorus (FRP): <6 µg/L Dissolved Oxygen: 85-105% saturation pH: 7.0 – 8.4 secchi depth: >1.0m
Lowland freshwater	Aquatic ecosystem – moderately disturbed	Turbidity: <25 NTU Suspended Solids: <6 mg/L Chlorophyll a: <5 µg/L Total Nitrogen: <500 µg/L Oxidised N: <60 µg/L Ammonia N: <20 µg/L Organic N: <420 µg/L Total phosphorous: <50 µg/L Filterable reactive phosphorus (FRP): <20 µg/L Dissolved Oxygen: 85-110% saturation pH: 6.5 – 8.0 secchi depth: n/a Conductivity: 600 µS/cm

Table 2: Summary of water quality parameters for management of stormwater quality and flow – construction phase of development¹

Parameter	Discharge ² Water Limits (impounded water)	Discharge Point Limits	Change (Upstream / Downstream)
Turbidity	Nil until Turbidity / TSS correlation achieve	Nil until Turbidity / TSS correlation achieve	Released waters from the approved discharge point(s) have turbidity (NTU) less than 10% above receiving waters turbidity—measured immediately upstream (within 50-100m) of the site.
Coarse sediment	No visual evidence of sediment accumulating at point of Discharge.	No visual evidence of sediment accumulating at point of Discharge.	-
Suspended Solids ⁴	Discharges shall be < 50 mg/L TSS or equivalent turbidity as determined by laboratory analysis by correlating turbidity with the suspended solids limit.	< 50 mg/L TSS or equivalent turbidity as determined by laboratory analysis by correlating turbidity with the suspended solids limit	5 mg/L or 10% increase (whichever is greatest) ⁵
pH	<ul style="list-style-type: none"> Stable pH reading; and General sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0 	<ul style="list-style-type: none"> Stable pH reading; and General sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0 	1.0 pH unit change
Hydrocarbons tannins, paint	No visible trace	No visible change from upstream	-
Waste	No Waste or litter	No Waste or litter	-
Nutrients (N and P)	Manage through sediment control.	Manage through sediment control.	-
Other toxicants	Manage through the CLMP and the ASSMP	Manage through the CLMP and the ASSMP	-
Turbidity	Nil until Turbidity / TSS correlation achieve	Nil until Turbidity / TSS correlation achieve	Released waters from the approved discharge point(s) have turbidity (NTU) less than 10% above receiving waters turbidity—measured immediately upstream (within 50-100m) of the site.
Coarse sediment	No visual evidence of sediment accumulating at point of Discharge.	No visual evidence of sediment accumulating at point of Discharge.	-

¹ Large and medium scale construction sites, defined as disturbance area greater than 1 ha (large) or 2500m² (medium density)

² Discharges are as stormwater flows moving into Waterways within the Site, Waterways adjacent to the Site and beyond the boundary of the Site where it could reasonably enter a Waterway such as in defined drainage lines (Discharges). Discharges criteria also applies to Discharges from sediment basin(s) and excavation prior to dewatering

³ Discharge criteria does not extend to overland flows.

⁴ Erosion and sediment controls must perform to insofar as their design rainfall event sizing is not exceeded

⁵ A site-specific relationship should be developed between turbidity and suspended solids, prior to the commencement of construction on large and medium scale construction sites. Background refers to receiving waters immediately upstream of site waters release points.

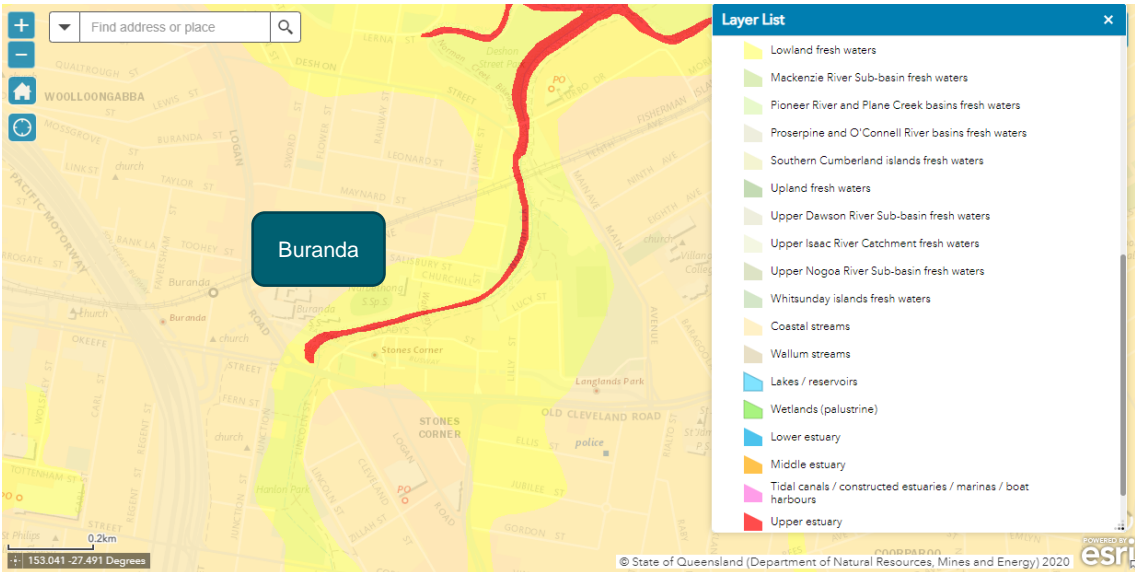
3 Catchment Mapping

The below mapping has been sourced from the DES Website - interactive map of EPP (Water and Wetland Biodiversity) scheduled data - surface water which can be access at the following link:

<https://apps.des.qld.gov.au/protection-policy-water/>

Table 2: Catchment Mapping

Area and EPP details	Waterway / Watercourse	Map
<ul style="list-style-type: none"> Mayne Yard – Enogerra Creek <ul style="list-style-type: none"> Schedule document name: Brisbane River Estuary Schedule map identifier: WQ1431 Subcatchment name: Lower Brisbane River Management intent type: Moderately Disturbed Water type: middle estuary 	<p>DAF: Grey Waterway (tidal)</p> <p>DoR: Not a Watercourse (as defined by Water Act 2000)</p>	
<ul style="list-style-type: none"> Barrambin (York's Hollow) – Northern Area <ul style="list-style-type: none"> Schedule document name: Brisbane River Estuary Schedule map identifier: WQ1431 Subcatchment name: Lower Brisbane River Management intent type: Moderately Disturbed Water type: lowland streams 	<p>DAF: Not a mapped Waterway</p> <p>DoR: Not a Watercourse</p>	

Area and EPP details	Waterway / Watercourse	Map
<ul style="list-style-type: none"> Southern Area <ul style="list-style-type: none"> Schedule document name: Brisbane River Estuary Schedule map identifier: WQ1431 Subcatchment name: Lower Brisbane River Management intent type: Moderately Disturbed Water type: estuarine (upper estuary) 	<p>DAF: Red Waterway (freshwater)</p> <p>DoR: Not a Watercourse (as defined by Water Act 2000)</p>	 <p>The map displays the Buranda area in Queensland, Australia. A red line highlights the Red Waterway, which flows through the area. The map includes a search bar at the top left, a layer list on the right, and a scale bar at the bottom left. The layer list includes various water types such as Lowland fresh waters, Upland fresh waters, and Estuaries. The map is credited to the State of Queensland (Department of Natural Resources, Mines and Energy) 2020 and Esri.</p>

Area and EPP details	Waterway / Watercourse	Map
<ul style="list-style-type: none"> Moorooka Station and Clapham Yard and associated sensitive receptor Moolabin Creek Rocklea Station and associated sensitive receptor of Rocky Water Holes Creek Salisbury Station and associated sensitive receptor of Stable Swamp Creek <ul style="list-style-type: none"> Schedule document name: Oxley Creek Schedule map identifier: WQ1434 Subcatchment name: Lower Oxley Creek Management intent type: MD Water type: lowland streams 	<p>Moolabin Creek and Rocky Water Holes Creek</p> <p>DAF: Green Waterways (freshwater)</p> <p>DoR: Watercourses (as defined by Water Act 2000)</p> <p>Stable Swamp Creek</p> <p>DAF: Green Waterway (freshwater)</p> <p>DoR: Not a Watercourse (as defined by Water Act 2000)</p>	