Cross River Rail Project

Monthly Environmental Report

March 2022

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Executive Summary

This Monthly Environmental Report (MER) has been produced for Project Works undertaken on site for March 2022 for the Rail, Integration and Systems (RIS), and Tunnel, Stations and Development (TSD) packages. The report addresses the obligations outlined in the Coordinator-General's change report – *Coordinator-General's change report – no. 12 (January 2022)* and the individual contractor's Construction Environmental Management Plans (CEMPs), which have been developed generally in accordance with the Project's Outline Environmental Management Plan (OEMP). The Cross River Rail Delivery Authority (Delivery Authority), as the Proponent of the Cross River Rail Project, is required to submit a monthly report to the Coordinator-General to demonstrate compliance with the imposed conditions.

Section 1 of this report provides a background to the project and the Coordinator-General's conditions. Section 2 provides a review of the contractor's reports contained in **Appendix A** (RIS Monthly Report) and **Appendix B** (TSD Monthly Report).

The Environmental Monitor (EM) has reviewed and endorsed this MER. This endorsement follows ongoing and new document reviews, and surveillance across the relevant project worksites.

The CEMPs prepared by both Unity Alliance (RIS Contractor) and CBGU JV on behalf of Pulse (TSD Contractor) for their Relevant Project Works were endorsed by the EM and submitted to the Coordinator-General in accordance with Condition 4(a) and 4(b) respectively.

The table below presents a summary of compliance status against each condition with a short comment for each:

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
1.	**General conditions** – compliance with the Project Changes relevant to the contractor's scope	Yes	The CEMP and site management plans are in accordance with the Project Changes.
2.	**Outline Environmental Management Plan** – timely submission to the Coordinator-General including required sub-plans	Yes	OEMP dated June 2020 is effective for the reporting period.
3.	**Design** – achievement of the Environmental Design Requirements	NA	Ongoing progress with design packages.
4.	**Construction Environmental Management Plan** – all relating to Relevant Project Works.	Yes	RIS – CEMP Revision 13 covering full scope of RIS works is effective from 14 March 2022. TSD – CEMP Revision 8 covering full scope of TSD works is effective from 9 June 2021.
5.	**Compliance and Incident management** – Non-compliance events, notifications and reporting.	Yes	There were no non-compliance events (NCEs) in March 2022. Refer to Section 2.5 of this report.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
6.	**Reporting** – Monthly and Annual reporting.	Yes	This MER, including RIS and TSD Monthly Reports, has been submitted in accordance with the conditioned requirements. Refer to **Appendix A** and **Appendix B**.
7.	**Environmental Monitor (EM)** – engaged and functions resumed.	Yes	Ongoing weekly site inspections and document reviews continue to take place.
8.	**Community Relations Monitor (CRM)** – engaged and functions resumed	Yes	Ongoing.
9.	**Community Engagement Plan** – developed and endorsed by Environmental Monitor.	Yes	CEMPs endorsed with Community Engagement Plan.
10.	**Hours of work** – Project Works undertaken during approved hours.	Yes	Project Works have been undertaken in accordance with project requirements. This has been achieved through Standard working hours, Extended work hours and Managed Work.
11.	**Noise** – Project Works must aim to achieve internal noise goals for human health and well-being.	Yes	Noise monitoring met project noise requirements at Sensitive Places. RIS – Noise monitoring was undertaken to validate predictive noise modelling and confirmed that project requirements were met. Refer to **Appendix A** (Table 4 and Section 3.1.2). TSD – Noise monitoring was undertaken to validate predicted noise modelling and for stakeholder enquiries. Noise monitoring confirmed project requirements were met. Refer to **Appendix B** (Table 3 and Section 3.2).
	Vibration – Project Works must aim to achieve vibration goals for cosmetic damage, human comfort and sensitive building contents.	Yes	Vibration monitoring met project vibration requirements at Sensitive Places. RIS –Vibration monitoring was undertaken to validate predicted vibration modelling and confirm that project requirements were met. Refer to **Appendix A** (Table 5 and Section 3.1.4). TSD – Vibration monitoring was undertaken to validate predicted vibration modelling. The TSD contractor confirmed the monitoring results met project goals. Refer to **Appendix B** (Table 2 and Section 3.1).

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
12.	**Property damage** – relating to ground movement.	Yes	RIS – Vibration modelling has been undertaken for Relevant Project Works and Property Damage Sub-plans have been developed and implemented. Pre-condition surveys have been completed at heritage, commercial and residential buildings at RNA, Northern Corridor and Fairfield to Salisbury stations. TSD – Vibration modelling has been prepared and is ongoing. Where required, building condition survey reports are completed for heritage and residential buildings. No enquiries relating to property damage were received during January.
13.	**Air quality** – Works must aim to achieve air quality goals for human health and nuisance.	Yes	Air quality monitoring met Project air quality goals. RIS – Refer to **Appendix A** (Tables 7, 8 and 9 and Sections 3.2.1 and 3.2.2, plus Figures 1, 2 and 3). TSD – Refer to **Appendix B** (Tables 4 and 5 plus Sections 3.3.1 and 3.3.2).
14.	**Traffic and transport** – Works must minimise adverse impacts on road safety and traffic flow.	Yes	Traffic Management Plans are covered in the CEMPs. Sub-plans for all active worksites have been reviewed by the EM.
15.	**Water quality** – Works must not discharge groundwater from the construction site above the relevant environmental values and water quality objectives. Monitor and report on water quality in accordance with CEMP and Sub-plans.	Yes	Monitoring and reporting on groundwater and surface water quality was undertaken in accordance with RIS and TSD Water Quality Management Plans. RIS – No groundwater discharges occurred. Post-rainfall monitoring was triggered site wide following the February/March 2022 rainfall and flood event. Erosion and sediment control (ESC) inspections were undertaken in accordance with site specific ESC Plans. If damaged, ESC controls were reinstated as soon as practical post the flood event. Water Quality Monitoring was also triggered at RNA, Northern Corridor, and Clapham Yard to support dewatering activities following the February/March 2022 Flood event. These discharges ocurred into catchments with high flows to manage health and safety risks onsite, with controls in place to address relevant environmental requirements.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
			Refer to **Appendix A** (Table 10, 11 and 12 and Section 3.3) for results. TSD – Active discharge of groundwater occurred from Roma Street, Albert, Woolloongabba and Boggo Road worksites. At the time of reporting the Woolloongabba results had not been received from the laboratory and the results are to be included in next months report. Monitoring results of groundwater quality prior to discharge is consistent with the pre-construction water quality levels except for Albert Street and Roma Street which both recorded total nitrogen levels above baseline monitoring pre-construction data. Active discharge of surface water occurred at the Northern Portal, Woolloongabba and Southern Portal. Results met water quality discharge criteria. Urgent discharges as a result of the late-february flood event occurred at Roma Street and the Southern Portal. These discharges ocurred into catchments with high flows to manage health and safety risks onsite, with controls in place to meet relevant environmental requirements. Routine in stream monthly monitoring met project water quality requirements. Refer to **Appendix B** (Table 6) for ground water monitoring results. Refer to **Appendix B** (Tables 7 and 8) for surface water monitoring results.
16.	**Water resources** – Evaluate potential impact, plan works, implement controls and monitor inflow of groundwater associated with drawdown.	Yes	RIS – There is no sustained groundwater extraction involved in the RIS scope of works so predictive modelling of groundwater drawdown is not required. Collection of hydrological data to model potential inflow rates into excavations during construction has been undertaken. TSD – Inflow of groundwater into the worksites is being continously monitored to validate the predictive modelling.
17.	**Surface water** – Must be designed 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 and constructed to avoid afflux or cause the redirection of uncontrolled	Yes	Contractors continue to consider this condition in their site planning and design.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
	surface water flows, including stormwater flows, outside of worksites.		
18.	**Erosion and sediment control** – Provisions for erosion and sediment control must be 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.	Yes	Site specific ESC plans for all active work sites have been reviewed by the EM and implemented on site.
19.	**Acid sulfate soils** – managed as per the Queensland Acid Sulfate Soil Technical Manual.	Yes	Acid Sulfate Soil Management Plans have been prepared and implemented for all active worksites.
20.	**Landscape and open space** – general requirement to minimise impacts on landscapes and open space values and specific requirements around Victoria Park.	Yes	The construction of a temporary access road through Victoria Park was undertaken under a Heritage Exemption Certificate approved by the Department of Environment and Science (DES) on 24 June 2021. Consideration has been taken to minimise loss of trees and the area of park impacted during these temporary works.
21.	**Worksite rehabilitation** – worksites rehabilitated as soon as practicable upon completion of works or commissioning, and in consultation with Brisbane City Council.	NA	N/A

Non-Compliance Events

There were no NCEs raised in March 2022.

Definitions

Acronym	Definition
ARI	Average Recurrence Interval - The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration.
CEMP	Construction Environmental Management Plan
CGCR	Coordinator-General's Change Report
CRM	The Community Relations Monitor engaged in accordance with Imposed Condition 8
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
DES	Department of Environment and Science
EIS	Environmental Impact Statement
EM	The Environmental Monitor engaged in accordance with Imposed Condition 7
ESC	Erosion and sediment control
IECA	International Erosion Control Association
Imposed condition/s	A condition/s imposed by the Coordinator-General under section 54B of the SDPWO Act for the Project
MER	Monthly Environment Report
MRTS52	Transport and Main Roads Specifications MRTS52 Erosion and Sediment Control
NCE	Non-Compliance Event
OEMP	Outline Environmental Management Plan
Project	The Cross River Rail Project
Project Works	As defined in the Imposed Conditions
Proponent	The Cross River Rail Delivery Authority
RfPC	Request for Project Change
RIS	Rail, Integration and Systems
SDPWO Act	*State Development and Public Works Organisation Act 1971*
Sub-plan	Any sub-plan of the CEMP
The Delivery Authority	The Cross River Rail Delivery Authority
TSD	Tunnel, Stations and Development

1. Introduction

1.1. Background

The Cross River Rail Project (the Project) is a declared coordinated project under the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The CRR Environmental Impact Statement (EIS) was evaluated by the Coordinator-General who recommended the Project proceed, subject to Imposed Conditions and recommendations. Since the evaluation of the EIS, several Requests for Project Change (RfPC) submissions have been evaluated by the Coordinator-General. RfPC 12 was endorsed in January 2022 by the Coordinator-General.

The Coordinator-General has imposed conditions on the Project that apply throughout the design, construction, and commissioning phases. These are referred to as the Imposed Conditions. In addition, the Coordinator-General has approved the Project's OEMP which outlines the environmental management framework for the Project. The OEMP includes environmental outcomes and performance criteria which must be achieved for the Project.

Imposed Conditions 5 and 6 nominate the compliance and reporting requirements for the Project. This monthly report addresses these requirements.

1.2. Project Delivery

The Delivery Authority is responsible for planning and delivering the Project. The Project established environmental management plans and secured some of the secondary environmental approvals in addition to enabling works.

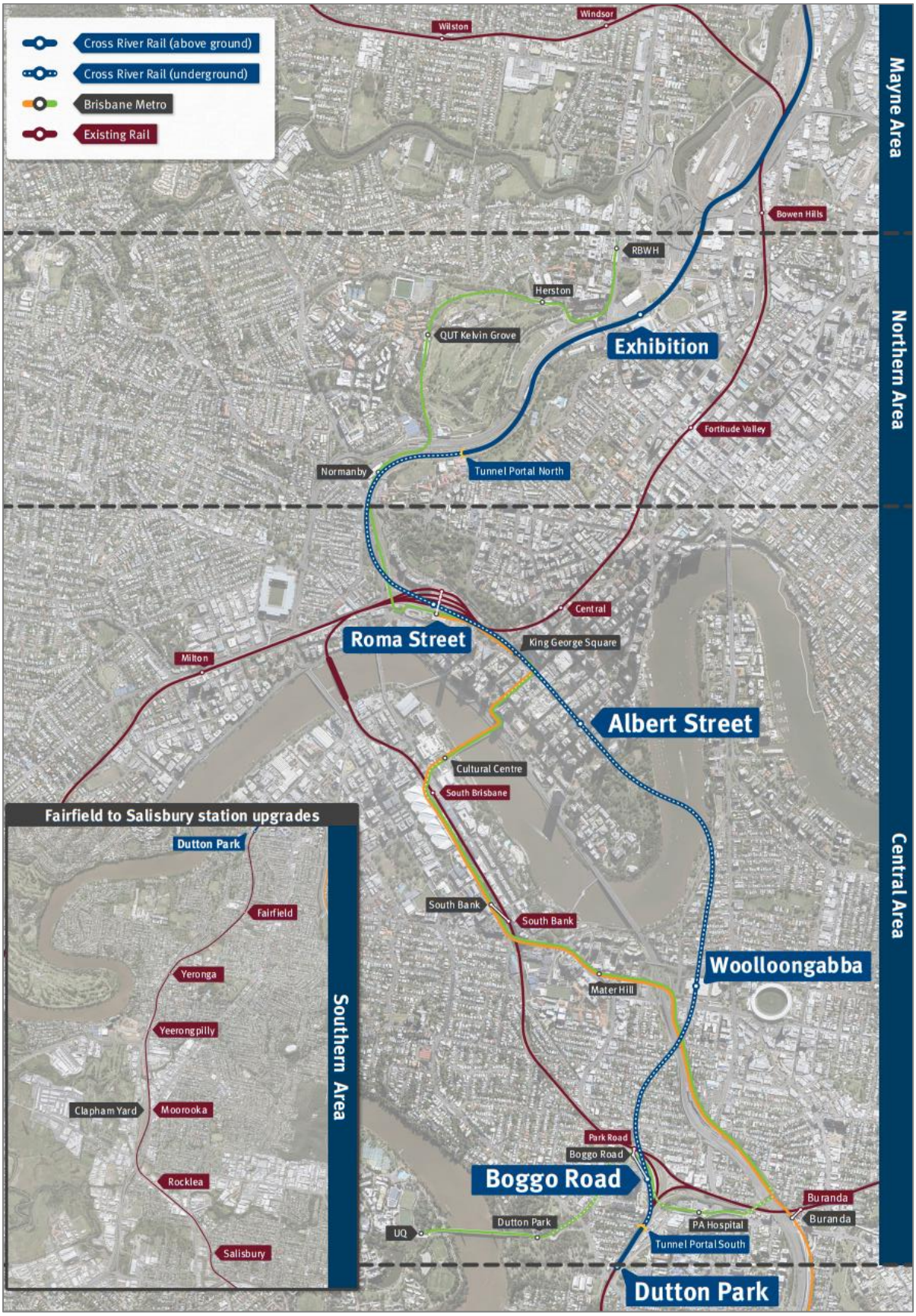
The two main delivery packages which require reporting under the Coordinator-General's imposed conditions are:

- Tunnel, Stations and Development (TSD) being delivered by CBGU JV; and
- Rail, Integration and Systems (RIS) being delivered by Unity Alliance.

The Project is geographically divided into four areas:

- Mayne Area;
- Northern Area;
- Central Area; and
- Southern Area.

These are shown in the figure over.


Cross River Rail (above ground)
Cross River Rail (underground)
Brisbane Metro
Existing Rail
Mayne Area
Northern Area
Central Area
Southern Area
Windsor
Wilston
Bowen Hills
RBWH
Herston
QUT Kelvin Grove
Exhibition
Fortitude Valley
Normanby
Tunnel Portal North
Central
Roma Street
King George Square
Milton
Albert Street
Cultural Centre
South Brisbane
South Bank
South Bank
Woolloongabba
Mater Hill
Park Road
Boggo Road
Boggo Road
Buranda
Buranda
PA Hospital
Tunnel Portal South
Dutton Park
UQ
Dutton Park
Fairfield to Salisbury station upgrades
Dutton Park
Fairfield
Yeronga
Yeerongpilly
Clapham Yard
Moorooka
Rocklea
Salisbury

1.3. Reporting Framework

This MER has been prepared to comply with Imposed Conditions 6 and 7 of the Coordinator-General Change Report (CGCR) and includes:

- monitoring data and associated interpretation of the results required by the imposed conditions and Construction Environmental Management Plan (CEMP);
- details of any NCE's, including incidents, corrective actions, and preventative actions; and
- details of any complaints, including description, responses, and corrective actions.

Reporting on environmental elements captured in each monthly environmental report, including the annual environmental report, will be reviewed, and endorsed by the EM.

1.4. Monthly Environment Report Endorsement

This MER has been endorsed by the EM and the endorsement provided to the Coordinator-General.

2. Compliance Review

This MER has been reviewed and endorsed by the EM as per Imposed Condition 7 of the CGCR.

2.1. Relevant Project Works

The following Project Works were undertaken in March 2022:

Area	Project Works
Mayne Area	**Mayne Yard North –** • Pier Protection Ferny Grove Flyover (RC14); • Breakfast Creek Bridge temporary jetty completed on southern bank; • February/March flood recovery works; and, • Easter SCAS works complete.
Northern Area	**RNA/ Northern Corridor –** • RC22/23 Bowen Bridge pier protection; • RC21 O'Connell pier protection;; • Drainage Stage 1 ongoing; • Victoria Park Feeder Station inground scope ongoing; • Retaining wall RW210 (western alignment) complete; and, • BR43 (EKKA Station Western viaduct) structural steel installed. **Northern Portal –** • TBM Extraction; • backfill on top of portal roof structure; • Three base slab pours and ongoing blinding in portal dive structure; and, • Ongoing excavation of dive structure.
Central Area	**Roma Street** – • Services building Level B3.5 steel works complete and B4 internal precast wall installation ongoing; • Station building wall formwork preparation ongoing; • Passenger adits RA7 and RA2 blasting and excavation/trimming ongoing; • Station cavern vent/sump excavation ongoing • Station cavern invert slab, kickers and waterproofing ongoing; and

Area	Project Works
	• Inner Northern Busway (INB) underpinning works 9 of 9 columns complete, jacking analysis and settlement monitoring ongoing
	Albert Street – • Lot 1 – station box excavation and ground retention continues, final blast complete; • Lot 2 – excavation and retention of bench and invert layers invert blinding and waterproofing commenced and micro-blasting for service adits back to Lot 1; and, • Lot 3 – excavation continuing (~75% complete), ongoing ground retention and blinding for sloping slab at RL -11.1 complete.
	Woolloongabba – • Station jump form system lift 14 poured; • Southern cavern back of house internal structure Stage 11 works ongoing; and, • Northern cavern headwall works and waterproofing ongoing, and 4 arch pour sections complete.
	Boggo Road – • Northern cavern waterproofing complete, and 10 of 10 permanent lining arch pours complete; • Northern cavern back of house B4 slab formwork commenced; • Wall 2 pours; and. • B6 and B7 concrete slab pours continuing.
	Southern Portal – • Detailed excavation and shotcrete within cut and cover trough ongoing; • Sewer and stormwater micro tunnelling temporarily on hold due to redesign works 97% of overall micro tunnelling completed; • Freight Flyover Underpinning structure final pour complete; and, • Piling complete and works commenced on piling layers in Zone E.
Southern Area	**Dutton Park** – • Easter SCAS works completed; • Track removal, formation rebuild and track reinstatement; and, • Preparatory tree clearing and noise wall removal for Easter SCAS completed. **Fairfield Station** – • Temporary closure commenced on 28 March 2022; • Easter SCAS works; • Temporary Comms Equipment Room (CER) relocation; and, • Removal and temporary relocation of platform heritage shelter. **Yeronga Station –** • Patrial reopening achieved on 28 March 2022; • Easter SCAS works; • Fairfield Road west pedestrian overpass foundation, overpass installation and footpath reinstatement ongoing; and, • Fit out, installation, cladding and finishing stairs to the Fairfield Rd overpass ongoing. **Clapham Yard** – • Easter SCAS work; • Retaining wall RW60 piling; • February / March flood recovery works; • Sheet piling for Moolabin Creek Bridge 93 ongoing; and, • Drainage and CSR scope ongoing.

2.2. Key Environmental Elements

2.2.1. Noise

The Coordinator-General's conditions establish a framework for managing the impacts of noise. The Imposed Conditions do not establish noise limits. Compliance with the Imposed Conditions noise requirements involves demonstrating the implementation of the endorsed CEMP and associated Noise and Vibration Management Plan. This establishes the management measures to be applied which aims to achieve the identified noise goals as far as reasonably practicable. The CEMP also includes requirements for the provision of the required community notifications of upcoming work, potential impacts, and how the project team can be contacted in relation to any potential impacts.

For Project Works where potential noise impacts are modelled to be above the noise goal but below the noise goal plus 20dBA, this work is authorised where the endorsed CEMP and associated Noise and Vibration Management Plan is being implemented, including communicating construction activities to potential and actual Directly Affected Persons (DAPs). For Project Works where potential noise impacts are predicted to be more than 20dBA above the relevant noise goal, specific engagement is required with DAPs for these works.

Where internal monitoring was not possible, contractors have undertaken external monitoring at nominated locations. To determine compliance with the project's noise requirements and to calibrate modelled predictions the project applies recommended façade attenuation corrections, which consider receiver property type.

In the Mayne Area, noise monitoring was undertaken to validate predictive modelling near a commercial receiver on Grafton Street during pile driving activities as part of the Breakfast Creek works in standard hours. Monitoring results confirmed noise levels met project noise goals. Monitoring results are detailed in **Appendix A** (Table 4).

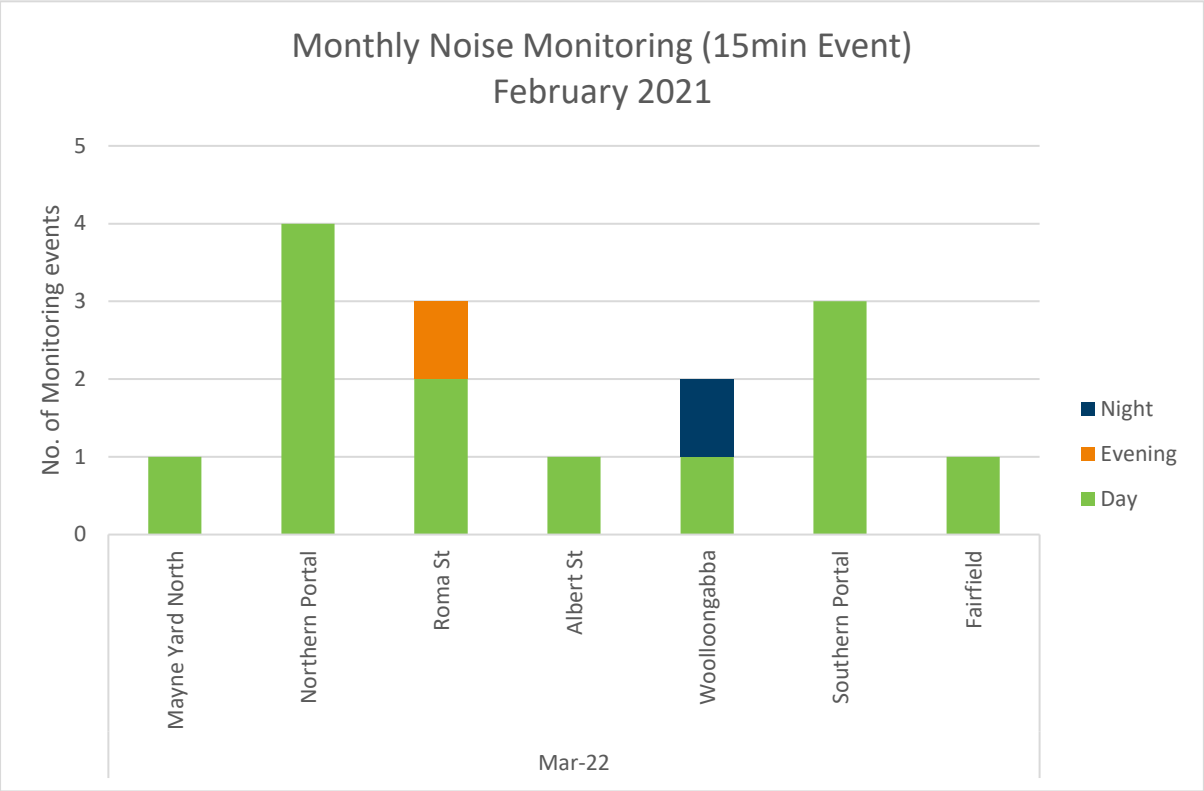
In the Northern Area, noise monitoring was undertaken to validate predictive modelling for TBM extraction works at the Northern Portal. Monitoring results for the Northern Area are detailed in **Appendix B** (Table 3). The TSD contractors reported that the project noise requirements have been met.

In the Central Area, noise monitoring was undertaken to validate predictive modelling at Sensitive Places close to the project worksites and in response to noise enquiries and complaints. The TSD contractors reported that the project noise requirements have been met during this reporting month. Monitoring results for the Central Area are detailed in **Appendix B** (Table 3).

In the Southern Area, noise monitoring was undertaken to validate predictive modelling at Sensitive Places.

North of Fairfield Station, during tree removal works in standard hours monitoring was completed to validate predictive modelling near a residence during vegetation wood chipping activities. Monitoring results confirmed noise levels exceeded project noise goals for standard hours, however, it is noted that monitoring wasn't able to be undertaken at the façade and had to be undertaken at the fence line of the property roughly 8m from the woodchipper. Additionally works were permissible as case-by-case consultation had been undertaken with the DAP prior to the works proceeding. Monitoring results are detailed in **Appendix A** (Table 4).

A summary of noise monitoring events for the month is provided in the chart below.



2.2.2. Vibration

Vibration monitoring in the Southern Area was not triggered.

In the Mayne Area, vibration monitoring took place near sensitive commercial receivers as pile driving activities were occurring along the Breakfast Creek southern bank. The reported results met the project goals and are detailed in **Appendix A** (Table 5).

In the Northern Area, vibration monitoring took place at the Northern Portal as TBM extraction works were occurring and at Petrie Terrace where cross passage blasting occurred. The reported results met the project goals. Vibration monitoring results for the Central Area are detailed in **Appendix B** (Table 2).

In the Central Area, vibration monitoring took place to validate predictive modelling for controlled blasting and construction works at Roma Street and Albert Street. Monitoring results met the project goals. Vibration monitoring results for the Central Area are detailed in **Appendix B** (Table 2).

2.2.3. Air Quality

2.2.3.1. Dust Deposition

Dust deposition monitoring was conducted at Mayne, Northern, Central and Southern Areas. Results met the project air quality goal[1] for all active worksites.

[1] CG air quality goal for dust deposition - 120µg/m^2 (over an averaging period of 30 days).

The Roma Street dust deposition sample was damaged during the major rainfall/flood event which resulted in no results reported for the month of March. The Roma Street dust deposition gauge has since been reinstated. No dust management issues were raised by the Environmental Monitor and the site layout and activities are currently of low risk at the Roma Street site. Monitoring results across the RIS sites are indicative only as all dust deposition gauges overtopped due to the significant rainfall event. Dust deposition results are detailed in **Appendix A** (Table 7) and **Appendix B** (Table 4).

A summary of dust deposition monitoring is provided in the table below.

Air Quality – Dust Deposition Monitoring			
Area	**Worksite**	**Monitoring Location**	**Comments**
Mayne Area	Mayne Yard	Mayne Yard	- Results met air quality goal - Results are indicative only
Northern Area	RNA / Exhibition	RNA Showgrounds	- Results met air quality goal - Results are indicative only
	Northern Portal	Northern Portal (near Brisbane Girls Grammar School)	- Results met air quality goal
Central Area	Albert Street	Mary Street	- Results met air quality goal
		Elizabeth Street	- Results met air quality goal
	Boggo Road	Quarry Street (north of the site)	- Results met air quality goal in January and February 2022
		Peter Doherty Street/Leukemia Foundation	- Results met air quality goal in January and February 2022
	Southern Portal	Dutton Park Station	- Results met air quality goal in January and February 2022
		PA Hospital - Central Energy Unit along Kent Street	- Results met air quality goal in January and February 2022
	Roma Street	Roma Street Station	- No results were able to be reported this month. Sample was damaged during the major rainfall/flood events experienced in late-February 2022.
	Woolloongabba	Russian Orthodox Cathedral	- Results met air quality goal
		Woolloongabba Busway	- Results met air quality goal
Southern Area	Clapham Yard	Clapham Yard	- Results met air quality goal - Results are indicative only

2.2.3.2. Particulate Matter and Total Suspended Particulates

Monitoring for particulate matter (PM_{10}) and total suspended particulates (TSP) was conducted at Mayne, Northern, Central and Southern Area worksites. Results met the project goals at all active worksites.

The Woolloongabba air quality unit experienced technical difficulties and stopped functioning between 1-9 and 17 March 2022. The review of a nearby DES air quality monitoring station (South Brisbane) demonstrated PM_{10} levels between 1-9 and 17 March were compliant with project air quality goals. The Boggo Road air quality unit also experienced technical difficulties and stopped function on 1, 5-8, 13, 17-22 and 26-31 March 2022. The review of a nearby DES air quality monitoring station

(Woolloongabba) demonstrated PM_{10} levels on the days when the Boggo Road air quality unit was down, were compliant with project air quality goals.

Particulates results are detailed in **Appendix A** (Figure 2 and Figure 3) and **Appendix B** (Table 5)

A summary of particulate monitoring is provided in the table below.

Air Quality – PM_{10} / TSP Monitoring			
Area	**Worksite**	**Monitoring Location**	**Comments**
Mayne Area	Mayne Yard	Mayne Yard North	- Results met air quality goals
Northern Area	RNA / Exhibition	RNA showgrounds	- Results met air quality goals
	Northern Portal	Brisbane Girls Grammar School	- Results met air quality goals
Central Area	Albert St	iStay River City and Capri (Corner of Mary Street and Albert Street)	- Results met air quality goals
	Boggo Rd / Southern Portal	North-east of Boggo Road worksite	- Results met air quality goals - Monitoring unit experienced a technical fault with no results on 1, 5-8, 13, 17-22 and 26-31 March
	Woolloongabba	Place Park, Woolloongabba	- Results met air quality goals. - Monitoring unit experienced a technical fault with no results between 1-9 and 17 March
Southern Area	Clapham Yard	Clapham Yard	- Results met air quality goals

2.2.4. Water Quality

Water quality monitoring and reporting was undertaken in accordance with the contractors CEMP and Water Quality Management Plans.

2.2.4.1. Surface Water

Post-rainfall monitoring was triggered at Mayne, Northern, Central and Southern Area worksites, and active surface water discharges occurred from the Northern Portal, Roma Street, Woolloongabba and Southern Portal worksites during dewatering activities.

At Mayne Yard post-rainfall monitoring was triggered in receiving waters at Breakfast Creek following rain events throughout March. Where visual assessments determined there was a difference in water quality when comparing upstream and downstream monitoring locations, in-situ water quality monitoring was undertaken. Downstream locations did not exhibit an increase of more than 10% turbidity therefore there was no exceedance of the water quality investigation criteria. See **Appendix A** (See Section 3.3 and Table 10, 11 and 12) for further details.

Water quality monitoring was also triggered at RNA, Northern Corridor and Clapham Yard following active dewatering due to the February/March 2022 rainfall and flood event. These urgent discharges occurred into catchments with high flows to manage health and safety risks onsite, with controls in place to meet relevant environmental requirements.

In the Northern Area at the Northern Portal worksite water quality monitoring was triggered on 39 occasions as water used for washing down the TBM components and stormwater run-off was treated and actively discharged to the stormwater network. Water quality met project water quality discharge criteria. See **Appendix B** (Table 7) for further details.

In the Central Area water quality monitoring was triggered as treated stormwater runoff was actively discharged to the stormwater network on 4 occasions from the Woolloongabba and Southern Portal worksites. Water quality met project water quality discharge criteria. See **Appendix B** (Table 7) for further details. On 2 March 2022, urgent discharge as a result of the February/March rainfall and flood event occurred at Roma Street and Southern Portal worksites. These urgent discharges occurred into catchments with high flows to manage health and safety risks onsite, with controls in place to meet relevant environmental requirements.

Post-rainfall monitoring in receiving waters of the TSD worksites was undertaken in late March, however, at the time of this report the sampling had not yet been received from the laboratory. These results will be included in the April Monthly Environmental Report.

In the Southern Area post rainfall monitoring was triggered at Clapham Yard in receiving waters of Moolabin and Rocky Water Holes Creeks following rain events throughout March. Where visual assessments determined there was a difference in water quality when comparing upstream and downstream monitoring locations, in-situ water quality monitoring was undertaken. On the three occasions in-situ water quality monitoring was undertaken, the downstream location did not exhibit an increase of more than 10% turbidity therefore there was no exceedance of the water quality investigation criteria. See **Appendix A** (See Section 3.3 and Table 10 and Table 11) for further details.

Water quality monitoring was also triggered at Clapham Yard to support urgent active dewatering where an immediate risk of failure of temporary works was identified and required remedial action following the February/March rainfall and flood event. These discharges occurred into catchments with high flows to manage health and safety, and aforementioned engineering risks onsite. Controls were in place to meet relevant environmental requirements.

Routine surface water quality monitoring was undertaken in the receiving waters of all TSD worksites in accordance with the Contractor's Water Quality Management Plan. The monitoring results reflect the condition of a broader catchment upstream from the worksites. See **Appendix B** (Table 9) for further details.

Surface water quality monitoring is summarised in the table below:

Surface Water Quality Monitoring					
Area	**Worksite**	**Discharge**	**Post-Rain Monitoring**	**Routine Monitoring**	**Comments**
Mayne Area	Mayne Yard North	Yes	Yes	No	- Post-rainfall monitoring was triggered. In-situ water quality monitoring was undertaken when passive discharge occurred. - ESC was implemented in accordance with site specific ESC Plan.
Northern Area	Northern Portal	Yes	Yes	Yes	- Active surface water discharge met water quality investigation criteria. - Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.

Surface Water Quality Monitoring					
Area	**Worksite**	**Discharge**	**Post-Rain Monitoring**	**Routine Monitoring**	**Comments**
	Northern Corridor	Yes	No	No	- Active dewatering discharges occurred into catchments with high flows to manage health and safety risks onsite - controls in place to meet environmental requirements.
	RNA/Exhibition	Yes	No	N/A	- Active dewatering discharges occurred into catchments with high flows to manage health and safety risks onsite - controls in place to meet environmental requirements.
Central Area	Albert Street	No	Yes	Yes	- Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.
	Boggo Road	No	Yes	Yes	- Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.
	Roma Street	Yes	Yes	Yes	- One urgent discharge occurred on 2 March 22 into catchments with high flows to manage health and safety risks onsite - controls in place to meet environmental requirements. - Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.
	Woolloongabba	Yes	Yes	Yes	- Active surface water discharge met water quality investigation criteria. - Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.

Surface Water Quality Monitoring					
Area	**Worksite**	**Discharge**	**Post-Rain Monitoring**	**Routine Monitoring**	**Comments**
	Southern Portal	Yes	Yes	Yes	- Active surface water discharge met water quality investigation criteria. - One urgent discharge occurred on 2 March 22 into catchments with high flows to manage health and safety risks onsite - controls in place to meet environmental requirements. - Post-rainfall monitoring undertaken in late March and will be captured in the April Report. - Routine in-stream monitoring undertaken in accordance with WQMP.
Southern Area	Clapham Yard	Yes	Yes	No	- Active dewatering discharges occurred into catchments with high flows to manage health and safety risks onsite - controls in place to meet environmental requirements. - Post-rainfall monitoring was triggered. In-situ water quality monitoring was undertaken when passive discharge occurred. - ESC was implemented in accordance with site specific ESC Plan.

2.2.4.2. Groundwater

There were no groundwater discharges at Mayne, Northern or Southern Area worksites.

Groundwater discharge occurred in the Central Area at Roma Street, Albert Street, Woolloongabba, and Boggo Road worksites. Groundwater discharge results exceeded relevant water quality objectives (WQO's)[2] for total nitrogen, ammonia nitrogen, oxidised nitrogen, organic nitrogen and dissolved oxygen. However, these results are consistent with the receiving environment baseline monitoring pre-construction data, except for Albert Street and Roma Street which both recorded nitrogen levels above the baseline monitoring pre-construction data. It is not uncommon for high levels of these water quality parameters to be identified in groundwater monitoring. Given the sites are located in highly urbanised inner-city settings, there are many influences on groundwater external to the project. The contractor

[2] The Brisbane River Estuary environmental values and water quality objectives (Basin no 143 – mid-estuary) in the Environmental Protection (Water) Policy 2009.

confirmed no changes have occurred onsite to the construction methodologies that would have affected the groundwater results.

Groundwater Quality Monitoring			
Area	**Worksite**	**Discharge**	**Comments**
Mayne Area	Mayne Yard North	No	- No groundwater discharges.
Northern Area	RNA/Exhibition	No	- No groundwater discharges.
	Northern Portal	No	- No groundwater discharges.
Central Area	Albert Street	Yes	- Discharge of groundwater did not meet Project WQO's but was generally consistent with pre-construction conditions except for nitrogen parameters. Given the sites are located in highly urbanised inner-city settings, non-project related infrastructure issues (i.e., sewer leaks) can influence the groundwater quality. The contractor confirmed no changes have occurred onsite to the construction methodologies that would have affected the groundwater results.
	Boggo Road / Southern Portal	Yes	- Groundwater discharge (dewatering). - Discharge of groundwater did not meet Project WQO's but was generally consistent with pre-construction conditions.
	Roma Street	Yes	- Groundwater discharge (dewatering). - Discharge of groundwater did not meet Project WQO's but was generally consistent with pre-construction conditions except for nitrogen parameters. Given the sites are located in highly urbanised inner-city settings, non-project related infrastructure issues (i.e., sewer leaks) can influence the groundwater quality. The contractor confirmed no changes have occurred onsite to the construction methodologies that would have affected the groundwater results.
	Woolloongabba	Yes	- Groundwater discharge (dewatering). - At the time of reporting, the results had not been received from the laboratory and will be included in the April report.
Southern Area	Clapham Yard	No	- No groundwater discharges.

2.2.5. Erosion and Sediment Control

Site specific Erosion and Sediment Control (ESC) Plans have been prepared, updated, and implemented at Mayne Yard, Northern Portal, RNA Showgrounds, Roma Street, Albert Street, Woolloongabba, Boggo Road, Southern Portal, Yeronga, Fairfield, and Clapham Yard worksites.

2.3. Complaints Management

A total of 24 complaints were received during the month of which 5 were non project related.

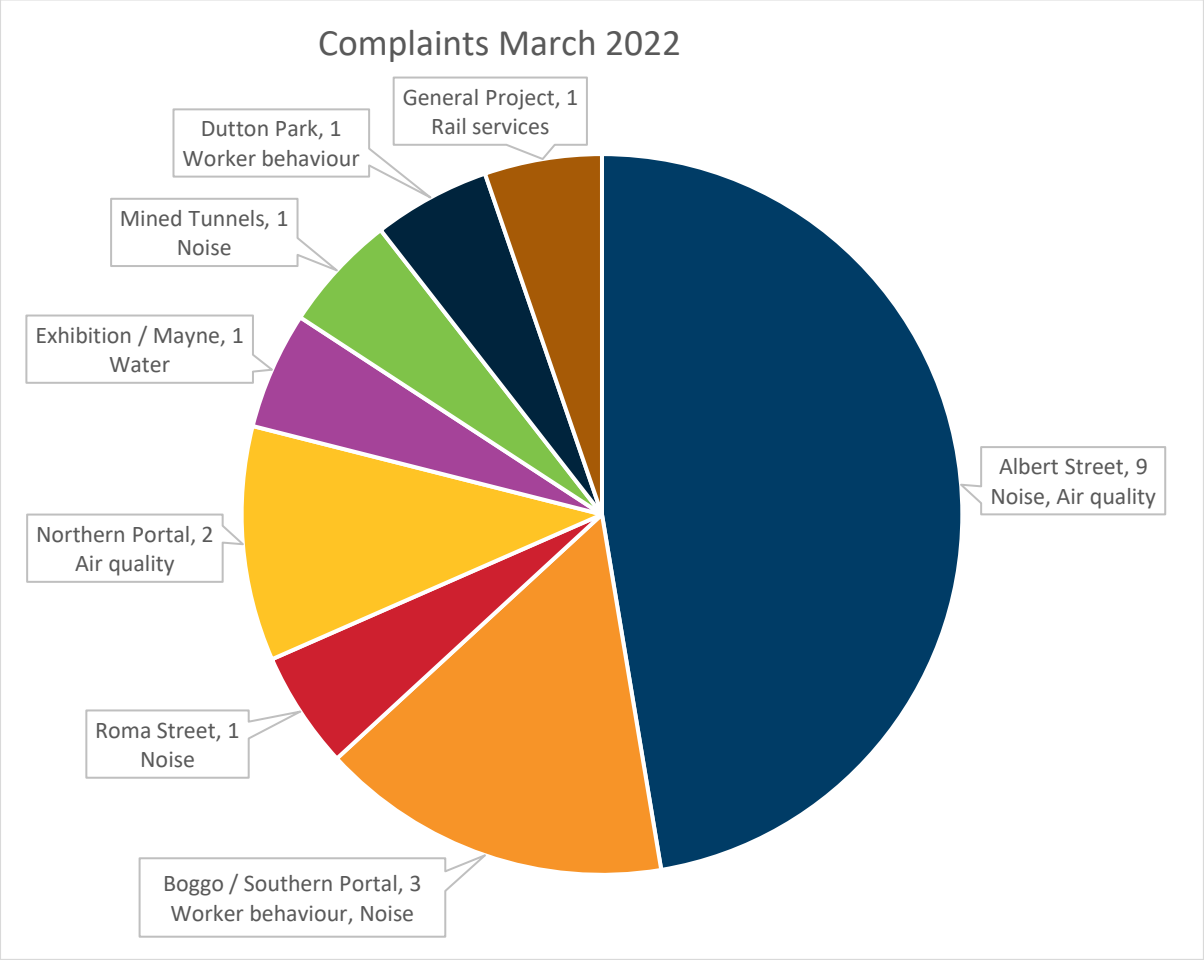
RIS works received 2 complaints this month related to Project Works at Mayne Yard and Dutton Park worksites. For further details refer to **Appendix A** (Table 3).

TSD activities received 16 complaints related to Project Works at Northern Portal, Roma Street, Albert Street, Southern Portal worksites and along the tunnel alignment. Of these, 8 complaints were related

to noise from works occurring from the Albert Street site, mostly during non-standard hours. For further details refer to **Appendix B** (Table 10).

One general complaint was received in relation to the extended closure of the Dual Gauge line which had been delayed due to recent weather events.

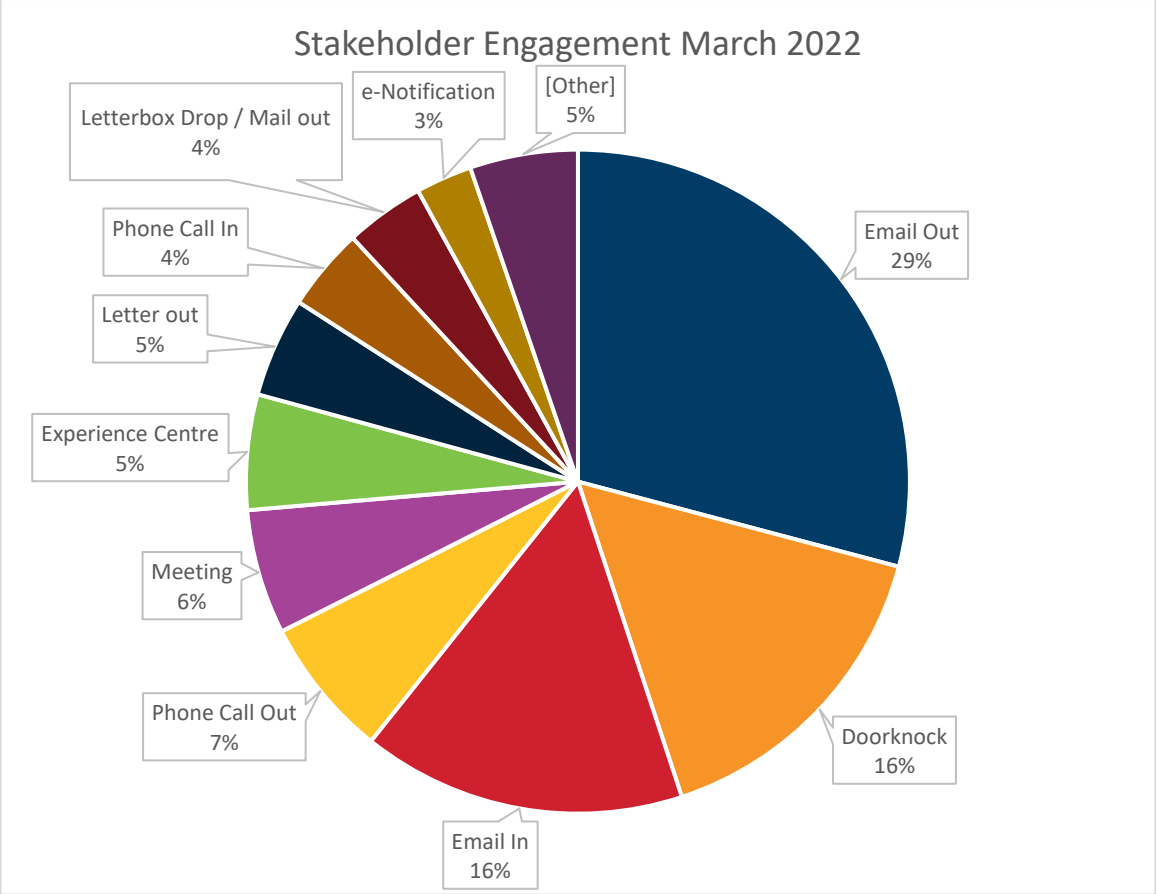
The Project Works complaints summary for the month is provided in the following chart.



Where attended noise monitoring was undertaken in response to a complaint, the contractor confirmed on all occasions that works undertaken at the time of the complaint adhered to project requirements. In some instances, previous attended noise monitoring data, representative of the relevant construction activities was used to confirm the works adhered to the project noise requirements.

To close out a complaint, the monitoring data is reviewed (where applicable) against compliance with the CEMP, site environmental management plans and permits, and checks that required community notification has taken place. Contractors have also confirmed that planned mitigation to reduce the impact was implemented. This is reviewed together to verify if project requirements have been met.

For scheduled out of hours works, community notification was provided, as well as regular project updates. Stakeholder engagement undertaken on the project during the month is summarised in the chart below.



2.4. New Upcoming Project Works

The key new planned Project Works for the coming months include:

Area	New planned works in the coming months
Mayne Area	**Mayne Yard North** – • Permanent piling for Breakfast Creek Bridge; • RSS and retaining walls for Tripod Bridge (BR11/13) and blade walls completion; • Sewer connection and chamber lift within Abbotsford Road; and, • Graffiti Removal Facility trackslab.
Northern Area	**RNA/ Northern Corridor** – • O'Connell Terrace pedestrian bridge (BR29) western abutment construction including rock anchors under bridge; • RNA Substation works; • Victoria Park Feeder Station early works and inground services; • Water main and sewer relocations under Bowen Bridge Rd; • OHLE foundation installation; and • Recommence Stage 1 drainage. **Northern Portal** – • Gantry crane removal and installation of remaining deck units in early May; and, • Rail deliveries in May.
Central Area	**Roma Street** – • Station cavern permanent lining in May; • Passenger adit waterproofing, steel fixing and concrete pouring;

Area	New planned works in the coming months
	• Station building base slab concrete pours; and, • Services building pre-cast panel installation and concrete pours. **Albert Street** – • Lot 1 – Excavation completion in May transitioning to station build phase; • Lot 2 – micro-blasting of services adits and completion of excavation and retention works in May; and, • Lot 3 – controlled blast in April. **Woolloongabba** – • Back of house lift 17 of 17 completion in May • Mezzanine component production at Coffs Harbour to Commence in April; and, • Northern cavern permanent lining completion. **Boggo Road** – • Station box sump concrete pour 2 of 2 in April; • Concrete wall pours ongoing; and, • Boggo Road Bridge early works to commence in May. **Southern Portal** – • Portal dive structure base slab installation to occur in April; • Slab-on-ground works to commence in April; • Shaft 1 diversion works; and, • Easter SCAS works including Freight Flyover Load transfer and the Dual Gauge track reinstatement and hand-back.
Southern Area	**Dutton Park** – • Installation of crossovers; • Cope Street property and associated infrastructure demolition; and, • Other preparatory works at Kent Street and Noble Street. **Yeronga Station** – • Screw pile installation on Platforms 1,2 and 3; • Platform 2 and 3 civil and FRP works; and, • Platform 3 precast retaining wall installation. **Fairfield Station** – • Commencement of structural foundations; and, • Inground services installation. **Clapham Yard** – • Complete retaining walls (RW620 and 635) FRP scope; • Continue drainage and earthworks; • Commence retaining wall RW650 in front of Aurizon Facility; and, • Commence piling for BR93 (Moolabin Creek) and BR94 (Chale Street)

2.5 Non-Compliance Events

No new NCEs have been raised this month. The summary of NCEs to date is shown in the table below.

Status	Date of event	Category	Area as on the Report	Conditions affected	Gate 1	Gate 2	Gate 3	Gate 4	Gate 5
⊞ **Open**									
⊟ **Closed**									
CRRDA-001-RIS-001	11/09/19	Noise	Yeronga Station	4, 10, 11	11/10/19	14/11/19	26/11/19	18/12/19	01/10/20
CRRDA-002-TSD-001	27/03/20	ESC	Woolloongabba	4, 15, 18	30/03/20	31/03/20	22/04/20	06/11/20	31/05/20
CRRDA-003-TSD-002	27/03/20	ESC	Boggo Rd	4, 15, 18	30/03/20	31/03/20	22/04/20	06/11/20	31/05/20
CRRDA-005-TSD-004	27/03/20	Reporting	Albert St, Boggo Rd, Roma St, Woolloongabba	4, 6, 11, 13	30/03/20	31/03/20	22/04/20	06/11/20	31/05/20
CRRDA-006-TSD-005	27/03/20	Air Quality	Albert St, Boggo Rd, Roma St, Woolloongabba	13	30/03/20	31/03/20	22/04/20	06/11/20	31/05/20
CRRDA-004-TSD-003	28/03/20	Traffic	Boggo Rd	4, 10, 14	30/03/20	31/03/20	22/04/20	06/11/20	31/05/20
⊟ **Withdrawn**									
CRRDA-007-RIS-002	04/01/20	Air Quality	Mayne Yard, Victoria Park, Yeronga, Fairfield	13	28/04/20	30/04/20	Withdrawn		
CRRDA-008-TSD-006	04/08/20	Working Hours	Roma Street	4,10	28/04/20	30/04/20	Withdrawn		

Gate 1 - EM notification to contractor. NCE confirmed
Gate 2 - 48 hour NCE notification submitted to CG
Gate 3 - 14 day report submitted
Gate 4 - 14 day report uploaded to CRR website
Gate 5 - Records of mitigation / preventative measures submitted to the CG — Complete

Throughout construction activities, events and incidents are routinely investigated to verify compliance with the Imposed Conditions and to verify that management and mitigation measures are implemented in accordance with CEMP and sub-plans.

Appendix A RIS Monthly Report

Monthly CGCR Report March 2022

Cross River Rail – Rail, Integration and Systems Alliance

Table of Contents

1 Progress Summary - Relevant Project Works

The following Project Works were undertaken during the reporting period:

Table 1: Summary of Project Works completed during the reporting period

Area	Project Works
Mayne Area	• **Mayne Yard North** February 2022 flood recovery works Graffiti Removal Facility – Cladding and roofing 90% completed with flood-damaged replacement panels already being manufactured Track pedestal structural steel completed and handed over to Track Team to install rail Crew Change Building - internal fit-out ongoing Yard Driver's footpaths and sanding pads nearing completion Yard Stabling Yard Fencing nearing completion Decanting scope nearing completion with sewer connection at Abbotsford Road planned for mid-April Pier Protection Ferny Grove Flyover (RC14) completed Tripod Bridge (BR11/13) – Blade walls FRP nearing completion RSS Wall RW125 and RW110 for BR11/13 have commenced Breakfast Ck Bridge (BR08) temporary jetty piling completed at Southern Side and ready for permanent piling CRR Lines – embankment construction including Stage 1 preload placement nearing completion Yard – All ballasted track and sleepers installed Yard – OHLE wire being installed Yard – Pneumatics installation has commenced
Northern Area	• **RNA / Northern Corridor** February 2022 flood recovery works RC22/23 Bowen Br pier protection completed as well as RC21 O'Connell Pier Protection Open Channels nearing completion EXT-SCAS #10 scope delivered as planned Electrical service relocation work on schedule for Energex handover in mid-Apr 2022 Victoria Park Feeder Station inground scope commenced BR43 (Ekka Station Western viaduct) Structural Steel Structure installed in EXT SCAS #10 RW210 Retaining wall (western alignment) completed
Southern Area	• **Yeronga Station** Platform 1 & 2 re-opened 28 March • **Fairfield Station** Station closure occurred on the morning of 28 March in parallel with Yeronga station re-opening Construction fencing installed Soft demolition commenced, in readiness for the upcoming Easter scope. • **Southern Portal / Dutton Park** Preparatory works and geotechnical investigations ongoing through March-22, hampered by SCAS cancellations (flooding and associated recovery works) OHLE foundation installation occurred when available through March-22, hampered by SCAS cancellations (flooding and associated recovery works). Preparatory tree clearing, noise wall removal undertaken to provide access for upcoming Easter SCAS scope • **Clapham Yard** February 2022 flood recovery works FRP of RW635 nearing completion 11kV relocation nearing completion Drainage and Earthworks scope ongoing

Acronyms:

CIP – Cast in Situ Piles

CSR – Combined Services Route
DL – Drainage Line
FRP – Form Reo Pour
HV – High Voltage
OHLE – Overhead Line Equipment
OTV – On Track Vehicle
PUP – Public Utility Plant
RNA - Royal National Agricultural and Industrial Association of Queensland
R&R – Remove and Replace
RSS – Reinforced Soil Slopes
RW – Retaining Wall
SCAS – Scheduled Corridor Access Schedule
UTX – Under Track Crossing

The following table summarises the upcoming Project Works:

Table 2: Summary of upcoming Project Works

Area	Project Works
Mayne Area	• **Mayne Yard North** Feb 22 SEQ flood event resulted in major impact to Yard, QR facilities, construction delays experienced, rework and recovery activities and mitigation attempts to re-supply international products, which had been damaged RSS walls RW110 / 120 / 125 for Tripod Bridge BR11/13 and blade walls completion Graffiti Removal Facility trackslab Crew Change Building completion, landscaping and carpark construction BR08 (Breakfast Ck Bridge) piling Sewer connection and sewer chamber lift within Abbotsford Road Yard – Signal Testing and Commissioning
Northern Area	• **RNA / Northern Corridor** BR29 (O'Connell Tce pedestrian bridge) western abutment construction RNA Substation works Sewer underbore at Landbridge S-200-06 to commence Victoria Park Feeder Station early works and inground services Watermain and sewer (QUU) relocation works under Bowen Bridge Road RW260 completion of backfill and edge protection Commence OHLE foundations through corridor BR43 Structural Steel bridge Precast infills CSR scope through RNA section and Western viaduct Re-commence Stage 1 drainage
Southern Area	• **Yeronga Station** Fairfield Rd West – Foundation, structural column, overpass installation, footpath reinstatement works Fairfield Overpass – Fit out, lift installation, cladding, finishing, stairs Station buildings – Fit out, painting, joinery, flooring Station entrances – Completion of FRP, landscaping and the like • **Fairfield Station** Easter SCAS scope includes major demolition, excavation, foundation prep, commencement of hydraulics installation, complete PL3 precast wall installation Following on from Easter SCAS the focus will be to continue with the inground services installation, commence structural foundations. • **Southern Portal / Dutton Park** Easter SCAS scope includes track removal, formation rebuild and track reinstatement across the Dual Gauge, UP suburban and DN suburban tracks to facilitate installation of four (4) crossovers at a later date Following on from Easter the focus on the scope will move to demolition of Cope St properties and associated infrastructure and other preparation works at Kent St and Noble St. • **Clapham Yard** Continue drainage and earthworks Complete Retaining Wall RW635 FRP and commence RW620 along Fairfield Road Complete temporary works creek crossing at Moolabin Creek Complete sheet piling (temporary works) for BR93 (Moolabin Ck) during Easter SCAS Complete Energex HV relocation in Easter SCAS Commence Drainage Underbore under Fairfield Rd Commence Retaining Wall RW650 in front of Aurizon facility Commence permanent Piling for BR93 (Moolabin Ck) and BR94 (Chale St)

2 Complaints

The below section summarises the complaints relating to the Project Works to be reported in accordance with condition 6(b)(iii) of the CGCR.

Table 3: Summary of Complaints

Date Received	Location	Issue	Activity source of the concern	Period	Unity Response	Status
03/03/22	Mayne Yard	Flooding	Earthworks	February	The stakeholder contacted the project team to advise their commercial properties (and neighbouring commercial properties) were being impacted by stormwater overland flows. They also noted that the issues had been ongoing for a series of months and had occurred prior to the SEQ February 2022 flood events. The stakeholder noted they believed the filling, piling and construction on the Mayne rail yard site had altered the natural water flow in this area. The project team reviewed the concerns and identified that a section of an existing unformed drainage channel between the suburban traffic line and the commercial properties required maintenance. This drainage channel is not part of the Cross River Rail Project works. The project team subsequently contacted Queensland Rail (QR) to inform them of the situation. QR is coordinating maintenance of the drainage line.	Closed
12/03/22	Dutton Park	Worker Behaviour	Traffic Management	March	The stakeholder contacted the project team to advise, based on their visual observations, that a traffic controller was driving at speed on Fenton Street. The Project Team passed on the feedback to the traffic control sub-contractor.	Closed

3 Environmental Monitoring Results

The below section summarises the monitoring results to be reported in accordance with condition 6(b)(i) of the CGCR.

3.1 Acoustics

Condition 11(b) of the CGCR requires that during construction, monitoring and reporting on noise and vibration in accordance with the Noise and Vibration Management Plan, a sub-plan of the Construction Environmental Management Plan (C-EMP) occurs.

3.1.1 Noise Monitoring

Attended noise monitoring was triggered based on the predictive noise assessments for the Relevant Project Works during the reporting period for:

- The installation of OHLE foundations in the southern Corridor between Dutton Park and Fairfield Stations. These works were however cancelled (the rail possessions were cancelled due the SEQ February flooding)
- The use of a woodchipper associated with the clearing of standing vegetation at Fenton Street, and
- The use of a pile driver on the northern bank of Breakfast Creek.

Complaint-based noise monitoring because of Project Works was not triggered during the reporting period.

3.1.2 Noise monitoring Results

Table 4: Summary of Noise Monitoring Data

Location	Receiver Type Details	Type of Monitoring	Work Hours	Noise Type	Purpose of Monitoring	Predictive model (dBA)	Performance Goal 1 (dBA) (Condition 11(a), Table 2, $LA_{10/eq}$ noise goals)	Performance Goal 2 (dBA) – (Condition 11(c), Table 2 LA_{10} noise goal + 20dBA))	Measured LA_{10} (dBA)	Measured LA_{eq} (dBA)	DAP engagement prior to works	Is performance Goal exceeded?	Comments For interpretation, please refer to 3.1.5.1
Fenton Street, Annerley	Residential	Attended - Outdoors	Standard Hours **Monitoring** Friday 11/03/22 13:00	Intermittent	Construction Monitoring at Sensitive Places - Model Verification	84	**Standard Hours** 65 (Outdoors) (45dBA (AS2107) + 10dBA + 10dBA façade reduction)[2]	**Standard Hours** 85 (Outdoors) (65 + 20dBA)[2]	86	86	Yes Case by Case	Yes Goal 1 & 2	Woodchipper noise model verification Monitoring carried out ~8m from woodchipper. Monitoring could not be undertaken at façade, so measurement was taken at fence line of property
Grafton Street Windsor	Commercial	Buffer Distance Test - Model Verification	Standard Hours **Monitoring** Thursday 17/03/22 12:30	Intermittent	Buffer Distance Test - Model Verification	75	**Standard Hours** 80 (Outdoors) (45dBA (AS2107) + 10dBA + 25dBA façade reduction)[2]	**Standard Hours** 100 (Outdoors) (85 + 20dBA)[2]	73	77	Yes Generic	No	Pile driving noise model verification Monitoring carried out near Grafton Street Entrance at the boundary with the commercial properties

- Note 2 of Imposed Condition 11 Table 2 states *Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 (PFNC) apply*.
- The monitoring was undertaken to validate the model therefore external noise measurements are appropriate to determine the impact of construction noise.

- Note (2) – Façade Attenuation
  - Note 2 of Imposed Condition 11 Table 2 states *Where internal noise levels are unable to be measured or monitored, the typical noise reductions presented in Guideline Planning for Noise Control, Ecoaccess, DEHP, January 2017 (PFNC) apply*.
  - The PFNC guideline can no longer be accessed. The Department of Environment and Science (DES) website still states this guideline is under review and is yet to release an alternative guideline
  - Former revisions of the PFNC table 7 stated the following regarding typical noise reductions through the building façade:
    - 5 dB – Window wide open
    - 10 dB – Partially closed
    - 20 dB – Single glazed, closed
    - 25 dB – Thermal double glazing, closed
  - The RfPC-4 Technical Report considered that all receptors had closed external single glazing for the assessment of construction noise impacts.
  - The Queensland Ombudsman assessed this assumption for the Airport Link Project and recommended that 10dB be adopted for major infrastructure projects in Queensland[1].
  - Additionally, several acoustic studies have shown that 10 dB is a suitable assumption for open windows. Most importantly this requirement only applies to temporary rail works within the project footprint and does not apply to long-term operational rail noise exposure.
  - Accordingly, it is considered appropriate to consider a 10 dB reduction on this basis. This assumption can be used for predictive modelling and for noise measurements, where indoor noise measurements are not practicable.

3.1.3 Vibration Monitoring

A pile driving rig was used at Breakfast Creek (southern bank) that triggered the need to undertake vibration monitoring to validate the predictive modelling.

Indeed, this same equipment will be used on the northern bank of Breakfast Creek and will therefore be located closer to the potentially affected receivers (commercial properties off Grafton Street).

To ascertain whether the proposed piling activities on the northern bank will require case by case consultation and agreed mitigation measures with the occupants or the incorporation of respite periods as per the requirements if Imposed Condition 11(g), the validation of the predictive model was necessary.

The vibration monitor was located approximately 15m away from the piling works which represents the separation distance between the commercial properties and the future piling works on the Northern Bank.

The results are presented in the below Table.

Complaint-based vibration monitoring was not triggered. No complaints related to vibration occurred during the reporting period.

Vibration monitoring to address property damage was not triggered by the predictive assessment.

3.1.4 Vibration Monitoring Results

Table 5 Summary of Vibration Data

Location	Date (Start and Finish)	Time of day	Closest DAP / Sensitive Place	Receiver Type (table 3 – Imposed Condition 11(e))	Purpose of Monitoring	Maximum predicted vibration Level (mm/s)	Maximum recorded vibration Level (mm/s)	Vibration goal for receiver (mm/s)	Exceedance of vibration limit?	Comments
Breakfast Creek Southern Bank	07/03/22 – 08/03/22	Surface Works Standard Hours	Commercial receiver Human Comfort	Commercial	Construction Monitoring at Sensitive Places – Model Verification	11mm/s at 15m offset	2.9mm/s at 15m offset	Transient Vibration 11(e) – 2mm/s (daytime human comfort – vibration goal) 11(g) – 10mm/s (daytime human comfort – vibration goal) - respite or case by case consultation trigger 11(e) – 50mm/s cosmetic damage	no	The monitoring validated that the predictive modelling is presenting a worst-case scenario.

3.1.5 Interpretation

3.1.5.1 Noise Monitoring[2]

3.1.5.1.1 Model Verification

The monitoring of the noise emissions for the woodchipper and the pile driver confirmed that the predictive noise models provide reasonable certainty of the noise emissions at or near the façade of Sensitive Places.

For the Fenton Street works, the measured LA_{10} readings exceeded the noise goal + 20dBA for works during Standard Work Hours.

The works were authorised to proceed under Imposed Condition 10 as they were carried out during Surface Works Standard Hours and case by case consultation had been undertaken with the residents prior to the works commencing.

For the Mayne Yard works, the measured LA_{10} readings did not exceed the relevant noise goal. DAP engagement had also occurred with the level of consultation as per the requirements of Imposed Condition 11 (c).

There were no noise complaints received associated with either of these Project Works.

The RIS scope of works continues to achieve the outcomes set out by the CGCR and OEMP.

3.1.5.1.2 Complaint's Response

There were nil Noise Complaints associated with extended hours work during the reporting periods.

The RIS scope of works therefore achieved the outcomes set out by the CGCR and OEMP.

3.1.5.2 Vibration Monitoring

3.1.5.2.1 Model Verification

The monitoring of the pile driving rig confirmed that it is unlikely the commercial properties occupants will experience vibration level requiring case by case consultation / respite periods.

There were no vibration complaints received associated with the Piling works. It is however noted the commercial properties were unoccupied at the time of monitoring as they had been affected by the SEQ February 2022 floods.

It is therefore recommended that when piling occurs on the northern bank, additional monitoring be carried out at the Grafton Street properties.

The RIS scope of works achieved the outcomes set out by the CGCR and OEMP.

3.1.5.2.2 Complaint's Response

There were nil vibration Complaints associated with vibration intensive works.

The RIS scope of works therefore achieved the outcomes set out by the CGCR and OEMP.

3.2 Air Quality

Imposed Condition 13(b) of the CGCR requires that during construction, monitoring, and reporting on air quality in accordance with the Air Quality Management Plan, a sub-plan of the C-EMP occurs.

[2] All free field measurements are undertaken in accordance with the latest revision of the Noise Measurement Manual from the Department of Environment and Science (DES) reference ESR/2016/2195

Visual monitoring was undertaken during routine environmental inspections. A total of 19 inspections were undertaken by the Environment Team across Mayne Yard, RNA Showgrounds, Yeronga Station, Clapham Yard, and the Northern Corridor.

UNITY has installed the following air quality monitoring devices, therefore data collected from these devices, when active, is reported on in the monthly report regardless of the Project Works occurring.

Table 6: Summary of Air Quality monitoring devices

Monitoring Device Installed by UNITY	Area	Name	Date Installed	Status for the Reporting Period
Dust Deposition Gauge	RNA Showgrounds	AQ-01	13 December 2019	Active
Dust Deposition Gauge	Mayne Yard (Eastern Air Shed)	AQ-04	13 February 2020	Active
Dust Deposition Gauge	Clapham Yard (Eastern Air Shed)	AQ-06	1 February 2021	Active
Dust Deposition Gauge	Yeronga Station	AQ-07	12 August 2021	Inactive DDG was decommissioned on 10 December 2021 following the completion of earthworks
TSP / PM_{10} Monitor	Mayne Yard (Eastern Air Shed)	Mayne Yard	23 April 2020	Active
TSP / PM_{10} Monitor	Clapham Yard (Eastern Air Shed)	Clapham Yard	9 August 2021	Active
TSP / PM_{10} Monitor	RNA (Western Air Shed)	RNA	25 August 2020	Active

3.2.1 Dust results

As passive dust deposition gauges (DDG) are analysed monthly, results span 12 February 2022 to 11 March 2022.

It is however noted that the results are either invalidated or indicative only as all DDG bottles overtopped due to rainfall. As per AS/NZS 3580.10.1, section 7.42, where a gauge has overflowed soluble matter cannot be determined, rendering the soluble matter results invalid.

Whilst the Australian Standard does not state that insoluble matter cannot be determined, as per the advice of the Project Certified Air Quality Professional (CAQP), when gauges overtop due to rainfall, there is a potential that some insoluble matter may have been lost.

On this basis and since the insoluble matter results are used to calculate the Deposited Dust results, when the DDGs overtop, the Deposited Dust results should be considered indicative only not relied upon to ascertain compliance

Table 7 Dust deposition gauge results for the reporting period

CGCR Goal ($mg/m^2/day$)	AQ-01 - RNA Showgrounds ($mg/m^2/day$)	AQ-04 Abbotsford Rd (E Mayne) ($mg/m^2/day$)	AQ-06– Clapham Yard ($mg/m^2/day$)
120	20*	37*	53*
Total Rainfall during Period (mm)	582	608	940

** Results are indicative only*

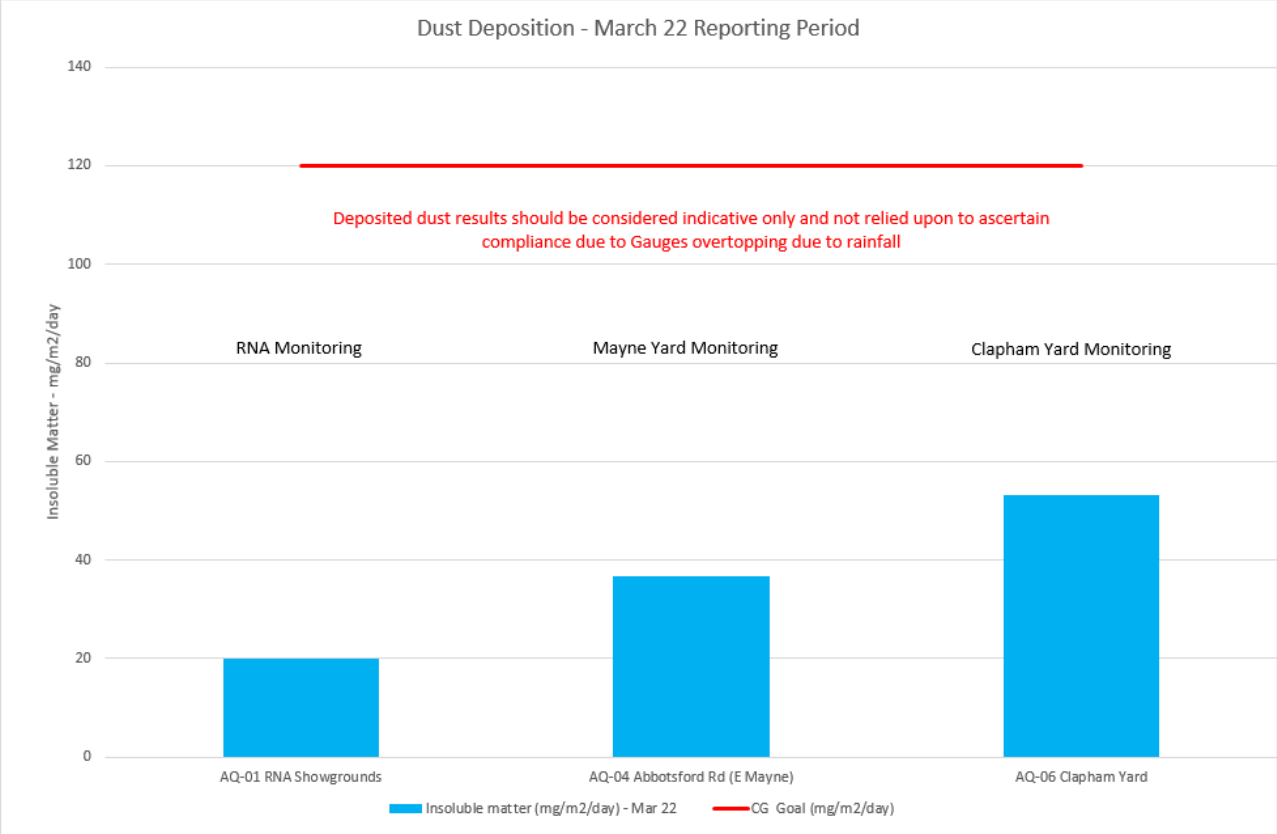


Figure 1 Air Quality Monitoring (Deposited Dust) Results

3.2.2 Particulates results

3.2.2.1 Air Quality Monitoring Stations

Unity had three (3) active air quality monitoring stations in place for the reporting period as detailed in Table 6.

3.2.2.2 Monitoring results – Reporting Period

External ambient air quality data was collected for total suspended particles (TSP), and particulate matter less than 10 µm (PM_{10}).

TSP is one of the indicators for which the Coordinator-General has imposed a goal of 80 µg/m^3 (over an averaging period of 24 hours) the project must aim to achieve under Imposed Condition 13(a).

PM_{10} is one of the indicators for which the Coordinator-General has imposed a goal of 50 µg/m^3 (over an averaging period of 24 hours) the project must aim to achieve under Imposed Condition 13(a).

These stations have been installed on-site as per AS/NZS 3850 1.1 following consultation with UNITY air quality professionals.

The results are represented in the below figures.

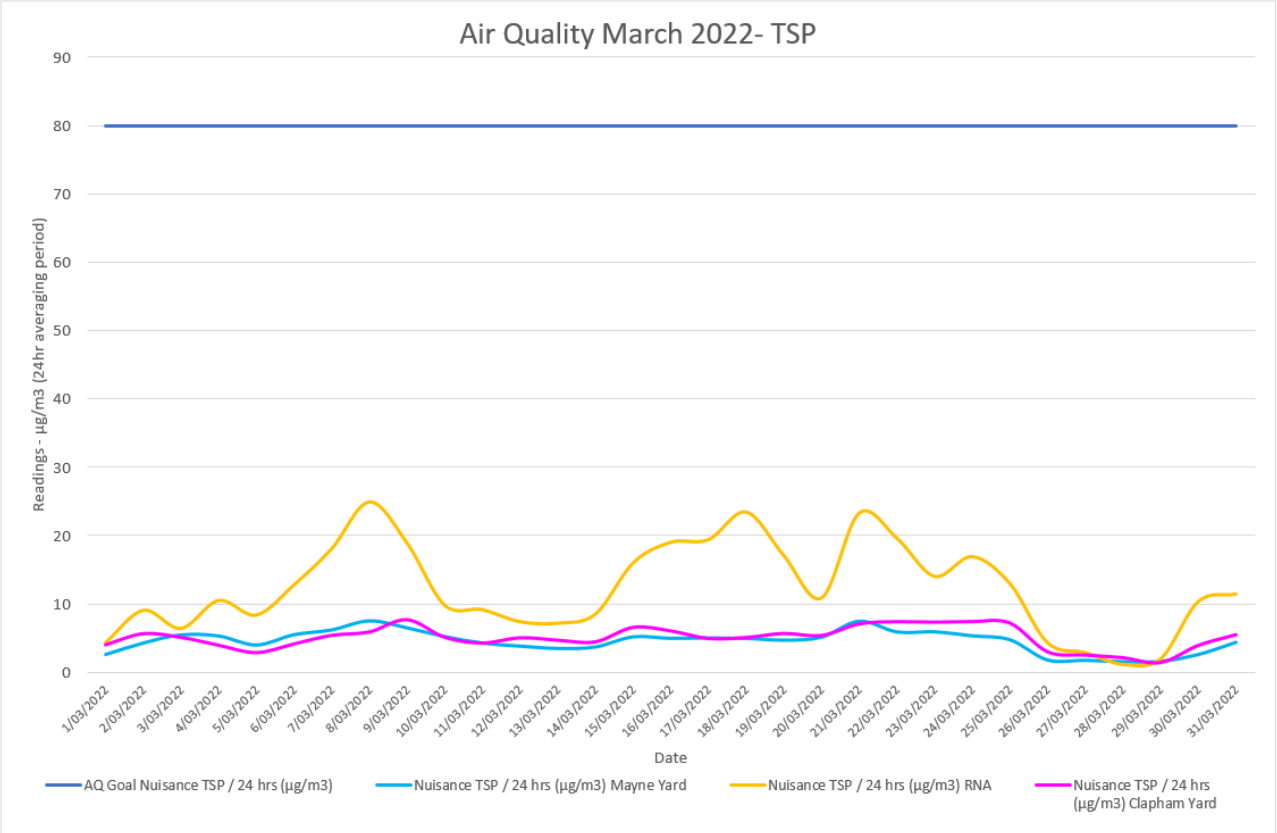


Figure 2 Air Quality Monitoring (TSP) Results

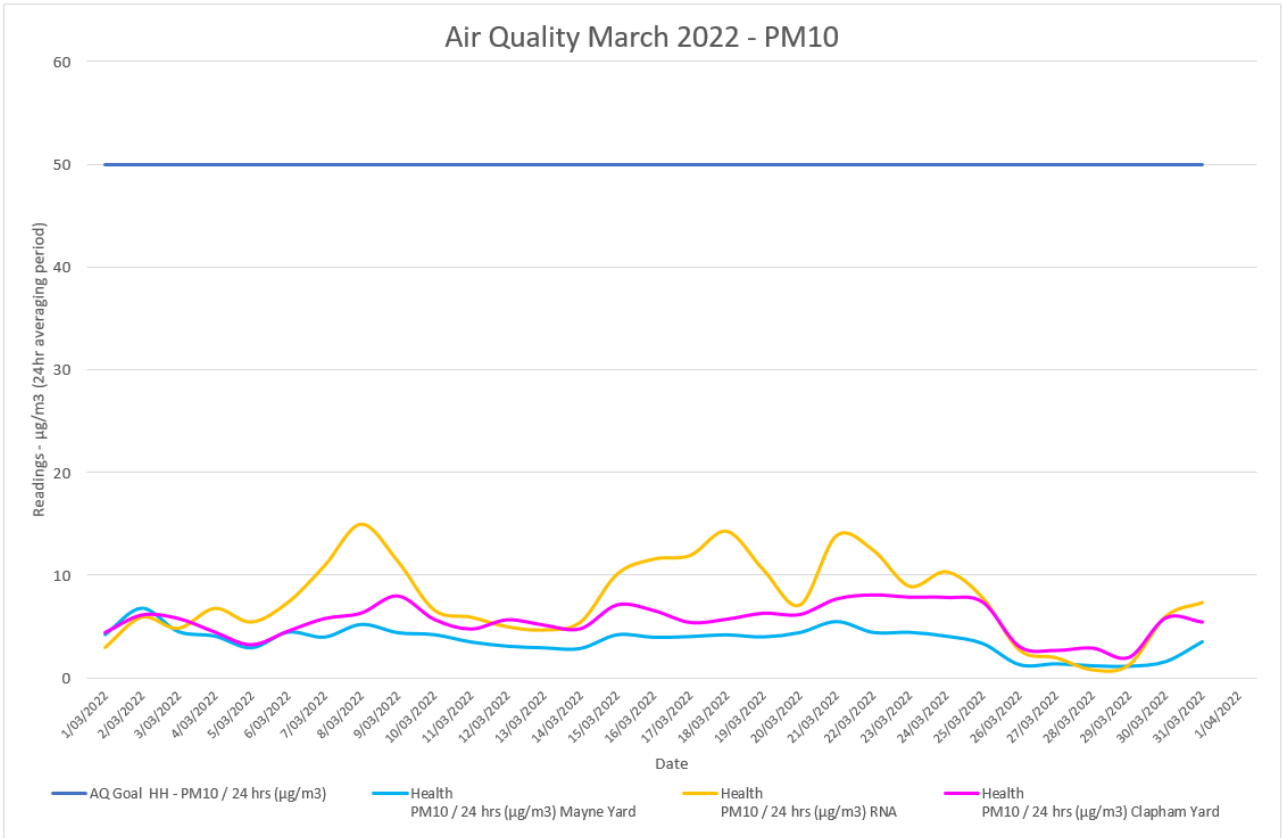


Figure 3 Air Quality Monitoring (PM_{10}) Results

3.2.2.3 Monitoring results – Annual averaging

Imposed Condition 13 (a) sets annual average air quality goals for TSP (Human health) and PM_{10} (Human health).

The below table summarises where TSP and PM_{10} monitoring have been carried out over the last 12 months.

The National Environment Protection (Ambient Air Quality) measure Technical paper No.5 provides guidance and procedures for uniform data recording and handling. (https://www.nepc.gov.au/system/files/resources/9947318f-af8c-0b24-d92804e4d3a4b25c/files/aaqprctp05datacollection200105final.pdf).

For air quality data to be officially reported, as per section 4.5 of Technical Paper No. 5, the minimum data capture would be 75% of the year or 274 days.

"It is essential that data loss is kept to an absolute minimum. For representative monitoring data and for credible compliance assessment it is desirable to have data capture rates higher than 95%. 75% data availability is specified as an absolute minimum requirement for data completeness".

In some instances, Relevant Project Works, which triggered TSP and PM_{10} monitoring was carried out for less than 274 days (e.g., at the Northern Corridor). In such instances the annual averages are still reported but are indicative only as data capture did not meet the 75% data capture requirements of *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 5 – Data Collection and Handling.*

Table 8: Summary of Air Quality monitoring devices over 12 months

Monitoring Device Installed by UNITY	Area	Date Installed	Date Decommissioned	Number of days data was captured over 365 days period	Data capture over an annual period	Annual performance reporting
TSP / PM_{10} Monitor	Northern Corridor (Eastern Air Shed)	23 April 2020	13 January 2021	260 over 365 days	71% over 365 days	*Indicative only* Data capture did not meet the minimum data capture requirements
TSP / PM_{10} Monitor	Mayne Yard (Eastern Air Shed)	23 April 2020	Not yet decommissioned	**Period 1** (to 23 April 2021) 358 over 365 days **Period 2** (Starting 24 April 2021) 341 over 342 days	**Period 1** 98% over 365 days **Period 2** 99% Over 342 days	**Applicable for Period 1** Data capture met minimum data capture requirements **Applicable for Period 2** Data capture has met minimum data capture requirements
TSP / PM_{10} Monitor	RNA (Western Air Shed)	11 June 2020	Not yet decommissioned	**Period 1** (to 11 June 2021) 314 over 365 days **Period 2** (starting 12 June 2021) 282 over 293 days	**Period 1** 86% over 365 days **Period 2** 96% Over 293 days	**Applicable for Period 1** Data capture met minimum data capture requirements **Applicable for Period 2** Data capture met minimum data capture requirements

Monitoring Device Installed by UNITY	Area	Date Installed	Date Decommissioned	Number of days data was captured over 365 days period	Data capture over an annual period	Annual performance reporting
TSP / PM_{10} Monitor	Clapham Yard (Eastern Air Shed)	1 February 2021	Not yet decommissioned	**Period 1** (to 31 January 2022) 326 (over 364 days) **Period 2** (starting 01 February 2022) 58 over 59 days	**Period 1** 90% over 364 days **Period 2** 98% Over 59 days	**Applicable for Period 1** Data capture met minimum data capture requirements **Not Applicable for Period 2** Data capture has not yet met the minimum data capture requirements

The below table summarises the applicable and indicative annual data results for TSP and PM_{10} against the performance goals imposed under Condition 13(a). Results in italic are indicative only.

Table 9 Annual Performance Results

Air Quality Indicator	Goal	Period	Northern Corridor	Mayne Yard	RNA	Clapham Yard
TSP	90 µg/m^3	Period 1	*8 µg/m^3*	11 µg/m^3	18 µg/m^3	8 µg/m^3
		Period 2	-	10 µg/m^3	16 µg/m^3	Not applicable
PM_{10}	25 µg/m^3	Period 1	*5 µg/m^3*	7 µg/m^3	11 µg/m^3	5 µg/m^3
		Period 2	-	7 µg/m^3	10 µg/m^3	Not applicable

3.2.3 Interpretation

During the reporting period:

- None of the particulate results exceeded their relevant goals for PM_{10} and TSP
- There was no evidence of dust being generated and leaving the site boundaries; and,
- There was no complaint received associated with air quality concerns during the reporting period.

The RIS scope of works has met the project outcomes set out by the CGCR and OEMP.

The air quality monitoring stations located at Mayne Yard and RNA are due for their yearly factory calibration in April 2022. This factory calibration which must be carried off-site at the manufacturer's facility located in New South Wales.

3.3 Water Quality

Condition 15(b) of the CGCR requires that during construction, monitoring, and reporting on water quality in accordance with the Water Quality Management Plan, a sub-plan of the C-EMP, occurs.

Condition 15(a) requires that discharges of groundwater from Project Works within the Breakfast Creek catchment must comply with the Brisbane River Estuary environmental values and water quality objectives (Basin no.143 – mid-estuary) in the *Environment Protection (Water) Policy 2009*.

Condition 15(a) requires that discharges of groundwater from Project Works within Moolabin Creek, Yeerongpilly – Oxley Creek catchment must comply with the Oxley Creek - Lowland freshwater environmental values and water quality objectives (Basin no.143 (part) – including all tributaries of the Creek) in the *Environment Protection (Water) Policy 2009*.

Water quality monitoring to demonstrate compliance with Condition 15(a) was not triggered during the reporting period. There were no groundwater discharges.

Water quality monitoring to demonstrate compliance with Condition 15(b) and Condition 18 was triggered during the reporting period for

- Site wide following
  - a 3-day continuous rainfall event between 25 and 27 February 2022.
    - Rainfall records from the Project and BoM's weather stations confirmed that this rain event exceeded the design criteria of the erosion and sediment controls measures.
      - Mayne Yard Area: 755 to 831 mm recorded over 72-hour period
      - Northern Area: 677 to 700 mm recorded over 72-hour period
      - Southern Area including Clapham Yard: 608 to 709 mm recorded over 72-hour period
    - The rainfall resulted in a regional flood event which affected all RIS worksites, either due to overland flooding, riverine flooding or a combination of both.
  - A 30-minutes storm event across Brisbane on Thursday 03 March 2022
    - Rainfall records from the Project and BoM's weather stations confirmed that this rain event exceeded the design criteria of the erosion and sediment controls measures.
      - Mayne Yard Area: 39 mm recorded over a 30-minute period with a peak intensity of 140mm/hr
      - Northern Area: 49 mm recorded over a 30-minute period with a peak intensity of 192mm/hr
      - Southern Area including Clapham Yard: 38 mm recorded over a 30-minute period with a peak intensity of 500mm/hr
    - This rainfall resulted in flash flooding across most RIS worksites.
  - Limited safe access was available between 28 February 2022 and 03 March 2022 to carry out monitoring due to ongoing flooded conditions of the Brisbane River, associated creeks and local roads.
  - Some visual monitoring of Breakfast Creek was carried out at SW2 on 28 February 2022 and 04 March 2022 which confirmed that releases had occurred from Mayne Yard and that Breakfast Creek was widely affected by the regional rain and associated flood events.
  - Once safe access was restored to Clapham Yard, visual monitoring of Rocky Water Holes Creek and Moolabin Creek was carried out on 28 February 2022 and 04 March 2022. This confirmed that releases had occurred from Clapham Yard and these creek systems were widely affected by the regional rain and associated flood events.
  - As severe thunderstorm warnings and flood alerts remained active and current until Sunday 06 March 2022, no site wide in-situ monitoring was carried out due to unstable weather conditions presenting an unacceptable risk the Unity Environmental Team personal safety.
- Mayne Yard
  - Friday 25 March
    - 30-min storm (15mm with peak intensity of 135 mm/hr)
    - Visual monitoring was carried out within 24 hours of the event
    - No Project Works discharges were identified
  - Monday 28 March
    - Series of showers during the day (total of 44mm of rain)

- In Situ Post rainfall monitoring was carried out within 24 hours of the event.
- No Project Works discharges were identified

- Clapham Yard
  - Friday 25 March
    - 1.5-hour storm (22mm with peak intensity of 45 mm/hr)
    - Visual monitoring Post rainfall monitoring was carried out within 24 hours of the event at Rocky Water Holes Creek and
    - In Situ Post rainfall monitoring was carried out within 24 hours of the event at Moolabin Creek and
    - Project Works discharges were identified
  - Monday 28 March
    - Series of showers during the day (total of 87mm of rain with peak intensity of 70mm/hr)
    - In Situ Post rainfall monitoring was carried out within 24 hours of the event.
    - Project Works discharges were identified

Water Quality Monitoring was also triggered at RNA, Northern Corridor and Clapham Yard to support active dewatering of impounded flood waters into high catchment flows where an immediate risk of failure of Temporary Works was identified and required remedial action.

3.3.1 Rainfall Records

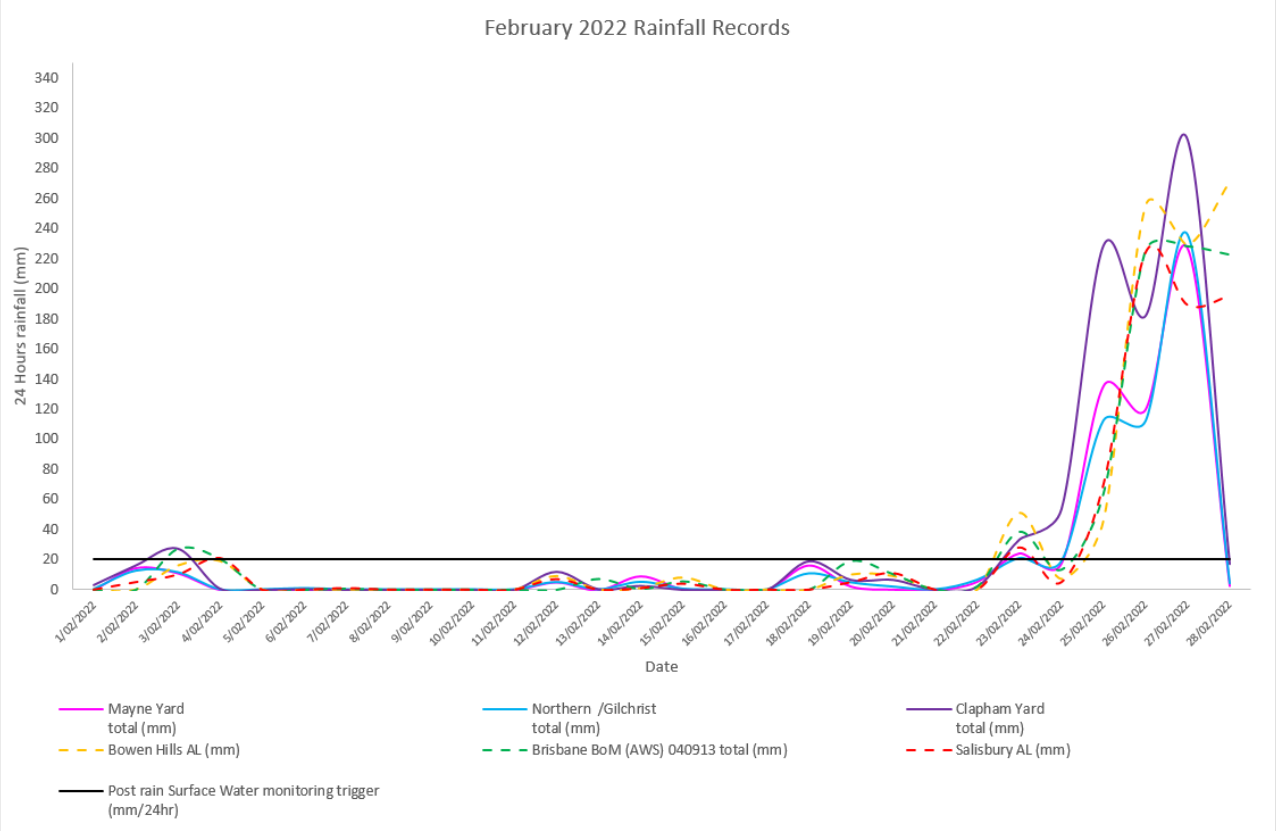


Figure 4 February 2022 Rainfall Records

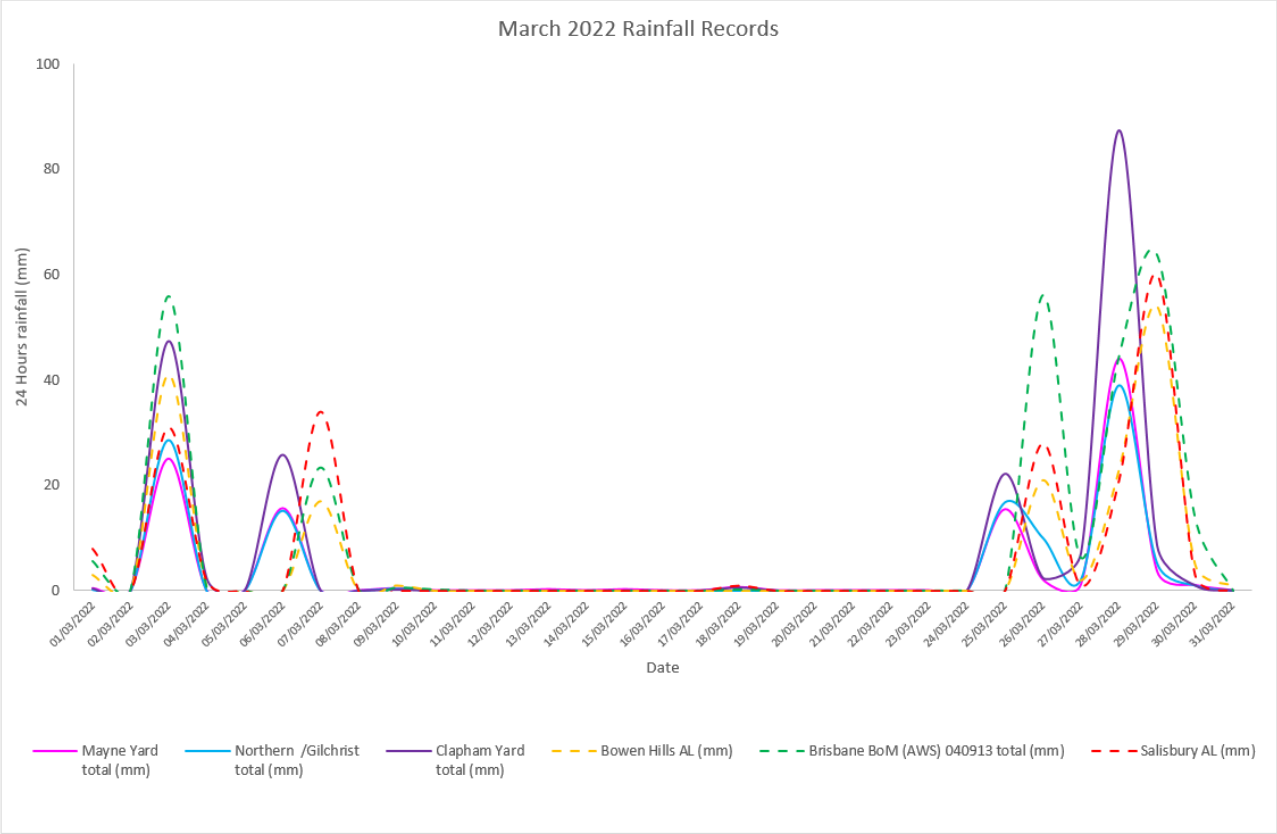


Figure 5: March 2022 Rainfall Records

3.3.2 Post Rainfall Monitoring Results

Post rainfall monitoring is triggered typically following any rainfall event exceeding 20 to 25 mm over 24 hours, however, storm events during the high-risk period of the year (November to March) of lesser amounts but of a higher intensity may cause run-off which would also trigger post-rain monitoring consistent with the C-EMP.

Post rainfall monitoring initially consists of visual monitoring to determine if in-situ water quality monitoring is necessary. If contaminants are observed (e.g., hydrocarbon sheen) or if there is a visible difference in water quality when comparing upstream and downstream monitoring points, water quality sampling will then be undertaken. The visual assessment will assess gross increases in turbidity, litter, hydrocarbons, or the movement of any coarse sediment into the waterway. The assessment will also note any potential offsite impacts that may be adversely affecting water quality within the construction area.

For the reporting period, post rainfall monitoring consisted of a mixture of visual monitoring and in-situ monitoring.

3.3.2.1 Qualitative Monitoring

3.3.2.1.1 Mayne Yard North

On 25 March visual monitoring of Breakfast Creek was carried out at SW02 immediately after the storm event. The visual monitoring identified that passive discharges not related to the Project Works had occurred from the Grafton Street Drainage system. Based on the knowledge of the active stormwater system along Grafton Street and McDonald Road it was confirmed that the source of the discharge was a nearby property used as a laydown by a third party not related to the Project.

No in-situ water quality monitoring was undertaken at the time. Further analysis is presented in Section 3.3.5

3.3.2.1.2 Clapham Yard

3.3.2.1.2.1 Moolabin Creek

In situ monitoring could not be carried out within 24 hours following the 25-28 February Flood Event and the 03 March 2022 Microburst. Local road closures and ongoing flood warnings prevented the Project Team from accessing the nominated routine monitoring locations. Therefore, the Project Team carried visual monitoring only using a combination of drones and on-foot inspections where safe to do so. The visual monitoring confirmed that passive discharges from the Project Works had occurred. Further analysis is presented in Section 3.3.5.

3.3.2.1.2.2 Rocky Water Holes Creek

In situ monitoring could not be carried out within 24 hours following the 25-28 February Flood Event and the 03 March 2022 Microburst. Therefore, the Project Team carried visual monitoring only using a combination of drones and on-foot inspections where safe to do so. The visual monitoring confirmed that passive discharges from the Project Works had occurred. Further analysis is presented in Section 3.3.5.

Visual monitoring immediately following the 25 March event confirmed that passive discharges from the Project Works had occurred through Type 2 controls along Fairfield Road, prior to entering gully pits reporting to Rocky Water Holes Creek. Visual monitoring of the creek confirmed that upstream water quality was highly turbid and the discrete discharges from the Project Works were not discernible. It was not safe to carry out in situ monitoring following the event. The Brisbane City Council had issued three flood alerts for the Creek following the rain event and conditions remained unstable along the creek.

3.3.2.2 Quantitative Monitoring

The post rainfall monitoring events identified that water quality was visually more turbid than ambient conditions throughout the systems at all monitoring locations.

In some instances, TSS results at the downstream monitoring locations were more than 10% greater than the upstream results.

In some instances, the TSS results difference between the upstream and downstream results were also greater than 5mg/L.

Table 10: Surface Water Discharge Monitoring Results

Date	Location	Waterway	Tide	Discharge Criteria[3]				TSS Delta
				Turbidity (NTU) Nil until Turbidity / TSS correlation achieved[4]	TSS (mg/L) <50	DO (%) Nil	pH (pH Unit) Stable pH reading; and General sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0	change of 5mg/L or 10% increase (whichever is the greatest)
29/03/22	Breakfast Creek	SW01 (upstream based on tide status)	High tide (outgoing)	In Field: 55 Lab: 43	36	88	7.4	No Downstream TSS results 11% lower than upstream TSS results
29/03/22	Breakfast Creek	SW02	High tide (outgoing)	In Field: 66 Lab: 58	29	86	7.5	

[3] Refer to the waterways and water quality management plan, a C-EMP sub-plan for details of derivation of the discharge criteria

[4] Correlations are typically run on the source water (i.e., basins) not the receiving system where there is a dilution component of potentially diffuse sources of sediments from non-Project related areas. Due to the very limited amount of discharges the RIS Scope of Works has experienced, there is no correlation available. Typically, a minimum of 20 data points is used to determine TSS / in field turbidity correlation for site waters.

Date	Location	Waterway	Tide	Discharge Criteria[3]				TSS Delta
				Turbidity (NTU) Nil until Turbidity / TSS correlation achieved[4]	TSS (mg/L) <50	DO (%) Nil	pH (pH Unit) Stable pH reading; and General sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0	change of 5mg/L or 10% increase (whichever is the greatest)
29/03/22	Breakfast Creek	SW03 (downstream based on tide status)	High tide (outgoing)	In Field: 63 Lab: 62	28	85	7.4	All TSS results below 50mg/L
26/03/22	Clapham Yard	Moolabin Creek (SW-05 - upstream)	N/A	Field: 40 Lab: N/A	N/A	72	7.4	N/A However downstream turbidity without external influence within 10% of upstream data
26/03/22	Clapham Yard	Moolabin Creek (SW-06 – downstream)	N/A	Field: 30 Lab: N/A	N/A	50	7.2	
29/03/22	Clapham Yard	Moolabin Creek (SW-05 - upstream)	N/A	In Field: 56 Lab: 39	14	87	7.2	No Downstream TSS results within 10% of upstream data
29/03/22	Clapham Yard	Moolabin Creek (SW-06 – downstream)	N/A	In Field: 44 Lab: 37.5	16	86	7.3	
29/03/22	Clapham Yard	Rocky Water Holes Creek (SW-07 - upstream)	N/A	Field: 74 Lab: 29	17	84	7.7	No Downstream TSS results 35% lower than upstream TSS results All TSS results below 50mg/L
29/03/22	Clapham Yard	Rocky Water Holes Creek (SW-08 – downstream)	N/A	Field: 67 Lab: 60	11	87	7.2	

3.3.3 Groundwater Discharge Monitoring Results

Groundwater discharge monitoring was not triggered during the reporting period.

3.3.4 Routine Surface Water Monitoring Results

During the reporting period, UNITY did not undertake routine surface water monthly monitoring. A review of the data sample has identified that over 12 months of continuous data collection has occurred with a total of over 18 monitoring events. The frequency of background monitoring has therefore been reduced to bi-annually, with the next sampling round to be undertaken during the dry season (April to September). This reduction of monitoring frequency is acceptable to continue informing the Dis-1 Credit for the ISC 'Excellent Rating' the Project is pursuing.

3.3.5 Post Rainfall Monitoring Results Interpretation

The post rainfall monitoring events identified that water quality was visually more turbid throughout the systems at all monitoring locations.

Where in-situ monitoring was carried out, in some instances, downstream water quality data exhibited changes of 5mg/L or 10% increase for TSS or 10% increase for turbidity.

This was typically when external influences were confirmed to be present.

Consistent with Table 2 of the Waterways and Water Quality Management subplan when TSS results downstream of the Project Works exhibit a change of 5mg/L or 10% increase (whichever is the greatest) further investigation is required to ascertain whether this change in water quality is related to released water from the Project Works.

Therefore, a detailed review of the data was required to ascertain whether

- the source of the increased turbidity could be reasonably accredited solely to the Project Works; and
- if so, had the Project implemented all reasonable and practicable measures to minimise environmental impacts.

The assessment included the review of the following factors:

- rainfall size (below or above the design criteria for the erosion and sediment control measures)
- existence of an ESC-P designed and regularly maintained by suitably qualified person consistent with the Guidelines for Best Practice Erosion and Sediment Control (IECA 2008) as per Imposed Condition 18
- status of the erosion and sediment controls measures, that is
  - ESC measures were installed and maintained as per the ESC-P or the relevant action plan from routine surveillance, and
  - If the rain event was below the design criteria, the ESC measures had not been damaged by the rain event.
- presence of external sources of sedimentation in the immediate vicinity of the Project Works, and
- evidence that, where site run-off had been generated by the rainfall, site run off had entered the surface water bodies without going through an ESC measure, and
- previous rainfall resulting in increased run-off potential, and
- flow conditions of the creek (e.g., were flood warnings issued).

The below table details the assessment for each individual monitoring event that identified or presumed impacts to water quality.

Table 11: Review of Relevant Factors – Surface Water Quality

Date	Location	Event size	Event above Design Criteria	ESC-P designed and regularly maintained by Suitably Qualified Person	ESC measures were installed and maintained to the appropriate standard	ESC measures damaged by the rain event	Evidence of site run off had entered the surface water bodies	Site run off had entered the surface water bodies without going through ESC measures	Presence of external sources of sedimentation	Previous rainfall resulting in increased run-off potential	Flood alert issued	Discernible downstream impact solely attributable to Project Works releases
25-28 Feb 22	Site Wide	Sizing complex as not purely dependent on Rainfall Based on rainfall depth alone >1%EAP	Yes	Yes	Yes	Yes	Yes Flood water from the nearby creeks at Mayne Yard and Clapham Yard had also entered site, with some waters remaining entrapped as flood waters receded	Likely based on the nature of the event	Yes Regional event	Yes	Yes	No
03 Mar 22	Site Wide	Sizing complex due to the severely saturated catchment conditions Based on rainfall depths alone event was as a minimum a 0.5 EY (or 2 year ARI)	Yes	Yes	Yes, where safe access to site had been restored and repairs of ESC measures had progressed Clapham Yard had remained inaccessible (due to road closures and flooded conditions)	Yes	Yes	No based on limited site inspections	Yes Brisbane wide event which resulted in additional flash flooding from saturated catchments	Yes	Yes, + BoM[5] Severe Thunderstorm Warning for DAMAGING WINDS and HEAVY RAINFALL	No
25 Mar 22	Mayne Yard	Rainfall Depth: between a 6EY[6] an 4EY Intensity: up to 0.2EY (5 Year ARI[7])	Yes	Yes	Yes	No	No	No	Yes Industrial and Commercial properties upstream with discrete discharge points.	No	No	No
25 Mar 22	Clapham Yard	Rainfall Depth: 6EY to 4EY Intensity: up to 3EY	Yes	Yes	Yes	No	Yes	Yes	Yes Industrial and Commercial properties upstream with discrete discharge points. Road drainage (including Fairfield Road) with discrete discharge points. Unconsolidated in stream sediment that is remobilised when flows are greater than low flows.	No	Yes	No
28 Mar 22	Mayne Yard	Rainfall Depth: 4EY to 3EY Intensity: <4EY	yes	Yes	Yes	No	No	No	As above	Yes	No BoM Severe Weather Warning for HEAVY RAINFALL	No
28 Mar 22	Clapham Yard	Rainfall Depth: 1EY to 0.5EY Intensity: 2EY to 1EY	Yes	Yes	yes	No	Yes	No	As above	Yes	Yes + BoM Severe Weather Warning for HEAVY RAINFALL	No

[5] BoM: Bureau of Meteorology
[6] Exceedances per year (EY): the number of times an event is likely to occur or be exceeded within any given year.
[7] average recurrence interval (ARI): The average or expected value of the periods between exceedances of a given rainfall total accumulated over a given duration

In summary, the water quality impacts identified as part of the post rainfall monitoring program implemented by Unity cannot be reasonably accredited solely to the Project Works.

Where impacts were discernible between upstream and downstream locations these were typically attributable to external sources of sediment or consistent with above design events or both.

ESC-Ps for the relevant areas were regularly reviewed and updated by a suitably qualified person in ESC management.

Project Works related discharges did not enter the receiving water bodies without passing through ESC measures.

Actions pertaining to the maintenance of the ESC measures prior to predicted rain events and following rainfall had been promptly addressed to a suitable degree of execution.

The ESC measures did not fail even at above design rain events.

Compliance with Imposed Conditions 15 and 18 was met.

3.3.6 Dewatering Monitoring – Flood response

South-East Queensland experienced a significant rainfall and region wide flooding which started late February 2022 and extended through early March 2022.

The rainfall resulted in a regional flood event which affected all RIS worksites, either due to overland flooding, riverine flooding or a combination of both.

Flood waters then remained trapped on site as creek and river levels receded.

Once site access was possible, it was identified that emergency dewatering was required at the RNA, Northern Corridor and Clapham Yard sites. Emergency dewatering requirements were limited to discrete areas of works showing signs of damage with the potential to result in localised failures due to extended inundation periods and / or undermining if not promptly rectified.

These areas were located immediately adjacent to the existing QR network or at the boundary with private properties. Therefore, dewatering was necessary to carry out rectification works to mitigate impact to third party property or infrastructure.

Controls and management measures implemented during this dewatering included intake and discharge points configured to help appropriately manage erosion and sediment control risks and reduce potential sediment discharge.

The following information was also taken into consideration to assess whether the proposed discharge was likely to cause medium to long term environmental impact (i.e. material or serious environmental):

- the volumes and duration of the proposed discharge,
- the proximity of the nearest receiving watercourse / waterway,
- The status of the flood mitigation water releases from Wivenhoe Dam and the resulting flow conditions of the receiving watercourse / waterways and associated broader catchments. Key data was as follows:
  - discharge rates recorded at Savage Crossings which reached a mean 2723 cubic metres per second (cumecs) as of 26 February as shown in Figure 6 (it is noted that online live records became unavailable from 27 February 2022 onwards).
  - SEQ Water Dam releases public announcement:
    - Thursday 03 March 2022: 3400 cumecs.
    - Sunday 08 March 2022: 500 cumecs
    - Monday 09 March 2022: Gated releases from Wivenhoe Dam ceased and Seqwater's Flood Operations Centre had stood down.

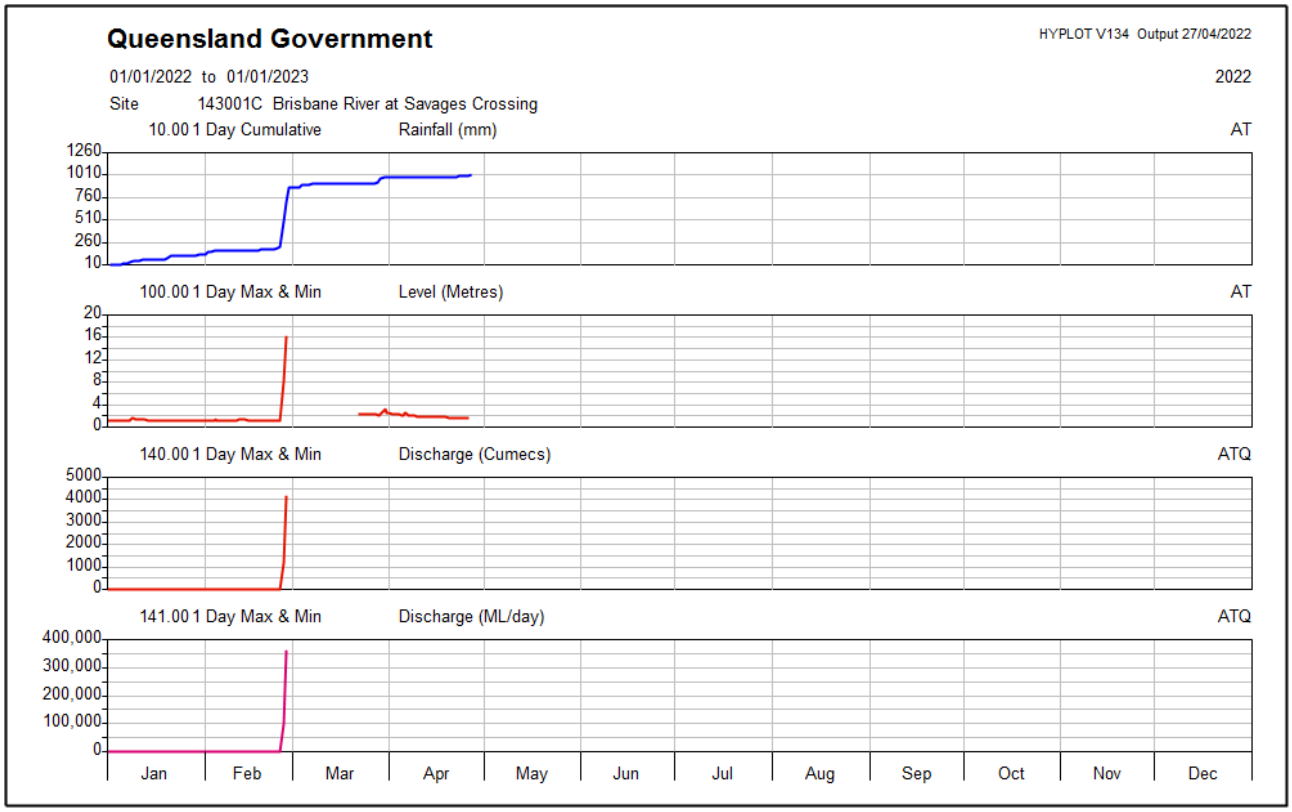


Figure 6: Water Monitoring Information Portal - Brisbane River at Savage Crossing

A summary of discharges from site is presented in Table 12.

All discharges were completed prior to the gated releases from Wivenhoe Dam ceasing.

Table 12: Dewatering – Flood Response

Start Date	Finish Date	Duration of dewatering	Project Site	Approximate volume discharged	Discharge Rate (cumecs)	Structure dewatered
01 March 2022	04 March 2022	36 hours (8-10 hours a day for 4 days)	RNA	Maximum 1,000m^3	0.008	Partially completed RSS Wall along the existing Suburban Rail Track
04 March 2022	04 March 2022	1 hour	Northern Corridor	30,000 L	0.008	Retaining wall immediately adjacent the existing Suburban Rail Track
07 Mar 2022	07 Mar 2022	Maximum 3 hours	Clapham Yard	100,000L	0.009	Retaining wall immediately upslope of George Weston Foods Mill
07 Mar 2022	07 Mar 2022	Maximum 12 hours	Clapham Yard	960,000L	0.002	Drainage Line 610 shored 3-4m deep pits excavation

When reviewing each discharge water parameters in relations to the receiving water parameters, the sediment load contribution to the receiving water systems can be deemed negligible in nature extent or context.

It is therefore highly unlikely that environmental harm has occurred from these short-term discrete releases.

The Project Works overall achieved a balance between meeting environmental outcomes whilst managing the health and safety imperatives.

4 Compliance Review

4.1 Non-Compliance Events

The below section summarises the events to be reported in accordance with Condition 5 and Condition 6(b)(ii) of the CGCR. A non-compliance event (NCE) is defined as Project Works that do not comply with the Imposed Conditions.

4.1.1 Non - Compliance Events Summary

Table 13 Summary of Non-Compliance Events

Event Title	Location, Date, and time of event	Date the Event was Formally Notified to CG/IEM	Conditions Affected	Date the Event Report Formally Sent to CG/IEM	Status of Event
None for this reporting period					

4.2 C-EMP Compliance

The below table summarises compliance status with the C-EMP and monitoring requirements of relevant sub-plans for the reporting period.

Table 14 C-EMP and relevant Subplans monitoring requirements – Compliance Status for the reporting period

Aspect	Monitoring requirement	Activities risk profile	Monitoring undertaken	Compliance status with C-EMP / Subplan	Effect of the non-compliance
Air Quality	Visual monitoring program + Additional particulate monitoring as required based on the outcomes of the predictive assessment/risk profile	Moderate to High	Yes – visual monitoring is undertaken as part of routine inspections. Monitoring for TSP, PM_{10}, and deposited dust was also undertaken	Compliant	Not Applicable
Air Quality	Complaint's response	Moderate to High	Not triggered no complaints	Compliant	Not Applicable
Noise	Buffer distance tests based on the outcomes of the predictive assessment based / risk profile of activities	Moderate to High	No	Compliant	Not Applicable
Noise	Plant noise audits for noisy plant to validate models input as required	Moderate to High	No	N/A	Not Applicable
Noise	Complaint's response	Moderate to High	Not triggered no complaints	Compliant	Not Applicable
Vibration	Construction Monitoring at Sensitive Places / DAPs - Model verification based on the outcomes of the predictive assessment based / risk profile of activities	Moderate to High	No	Compliant	Not Applicable
Vibration	Complaint's response	Moderate to High	Not triggered no complaints	Compliant	Not Applicable
Water Quality	Bi-Annual monitoring	N/A	Wet season monitoring completed in January 2022	Compliant	Not Applicable
Water Quality	Post Rainfall	Moderate to High	Triggered	Compliant	Not Applicable

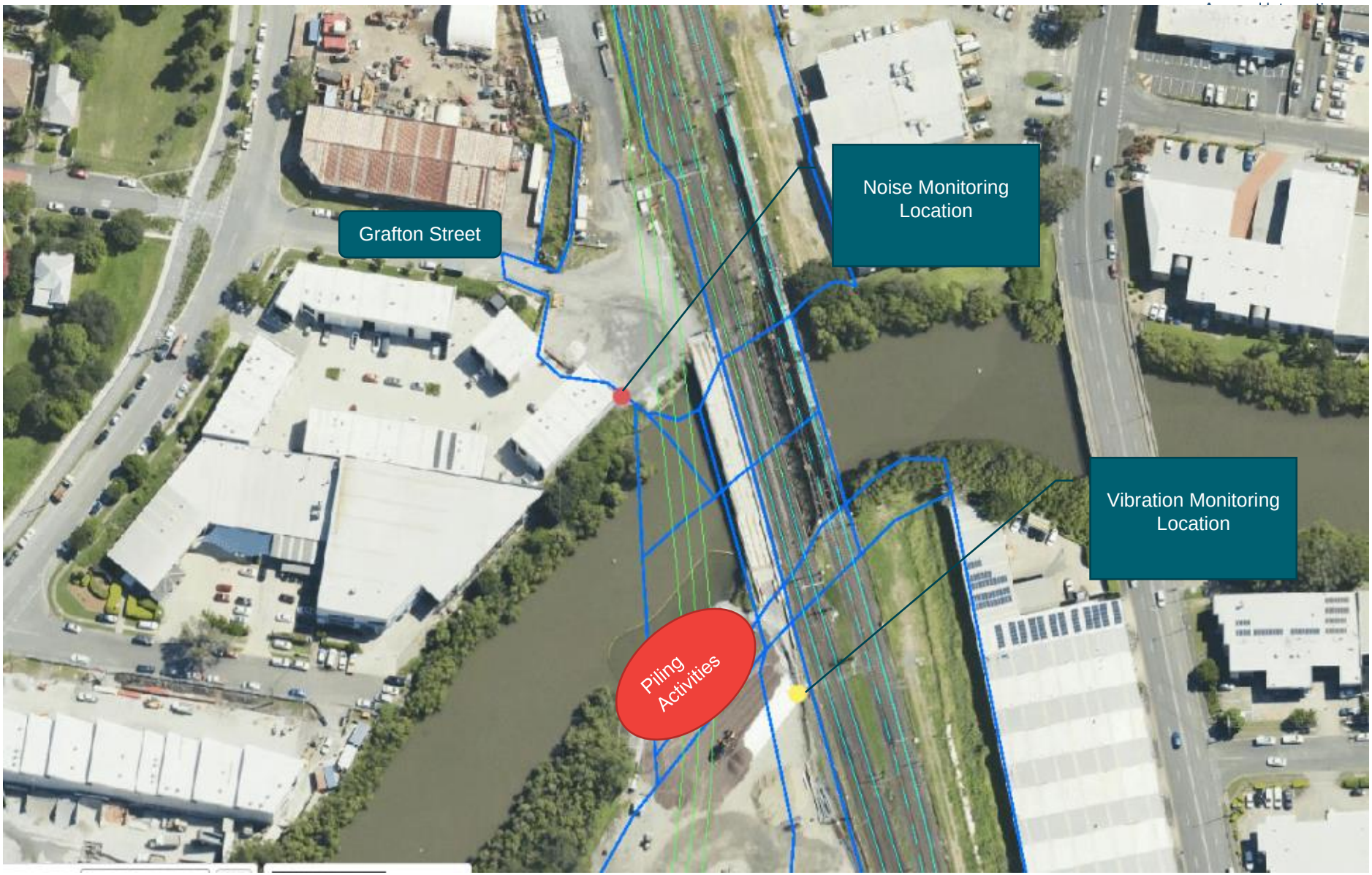
Aspect	Monitoring requirement	Activities risk profile	Monitoring undertaken	Compliance status with C-EMP / Subplan	Effect of the non-compliance
Water Quality	Dewatering	Moderate to High	Refer section Dewatering Monitoring – Flood response	N/A	Not Applicable

Attachment 1 CGCR Non-Compliance Event Report (if required)

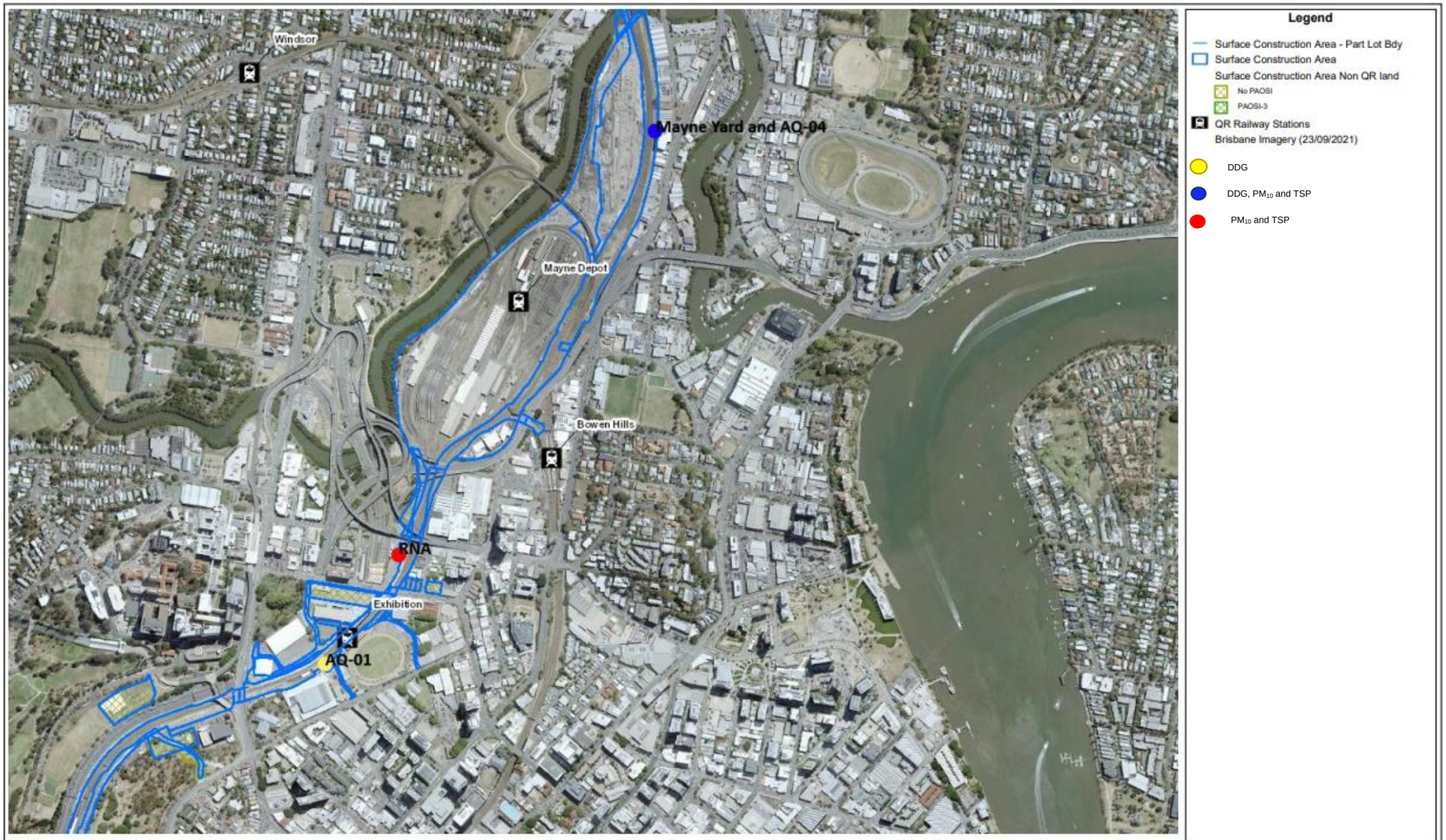
None for this reporting period.

Attachment 2 Monitoring Locations – Noise and Vibration


Fenton Street
Wood Chipping Activities
Noise Monitoring Location


Grafton Street
Noise Monitoring Location
Vibration Monitoring Location
Piling Activities

Attachment 3 Monitoring Locations – Air Quality



A FOR INFORMATION

Issue	Description	Date	Approved

Scale 1: 10,000

508 0 254.0 508 Meters

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Coordinate System	GDA MGA94-56	Designed	
Height Datum	AHD	Date Printed	9-Feb-2022

Assured Integration
for a New Era

Cross River Rail - RIS Alliance

Air Quality Monitoring

Legend

- Surface Construction Area - Part Lot Bdy
- Surface Construction Area
- Surface Construction Area Non QR land
  - No PAOSI
  - PAOSI-3
- QR Railway Stations
- Brisbane Imagery (23/09/2021)
- DDG
- DDG, PM10 and TSP
- PM10 and TSP

Issue	Description	Date	Approved
A	FOR INFORMATION		

Scale 1: 6,865

349 0 174.4 349 Meters

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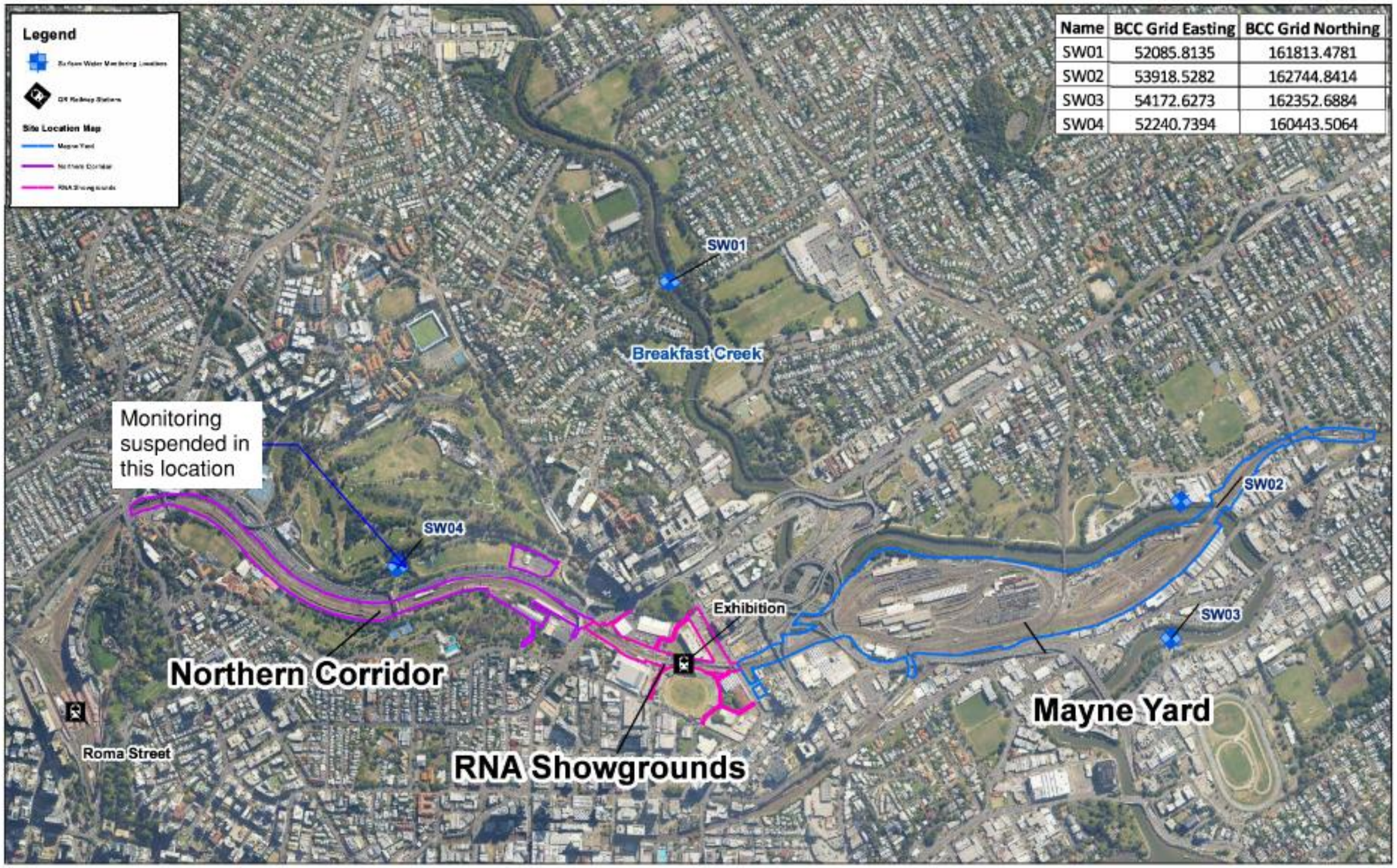
Height Datum	AHD	Date Printed	9-Feb-2022

Assured Integration for a New Era

Cross River Rail - RIS Alliance

Air Quality Monitoring

Attachment 4 Monitoring Locations – Surface Water


Legend
Surface Water Monitoring Locations
QR Railway Stations
Site Location Map
Mayne Yard
Northern Corridor
RNA Showgrounds
Name | BCC Grid Easting | BCC Grid Northing
SW01 | 52085.8135 | 161813.4781
SW02 | 53918.5282 | 162744.8414
SW03 | 54172.6273 | 162352.6884
SW04 | 52240.7394 | 160443.5064
SW01
Breakfast Creek
Monitoring suspended in this location
SW04
SW02
Exhibition
SW03
Northern Corridor
Mayne Yard
Roma Street
RNA Showgrounds
0 100 200 400 600 m
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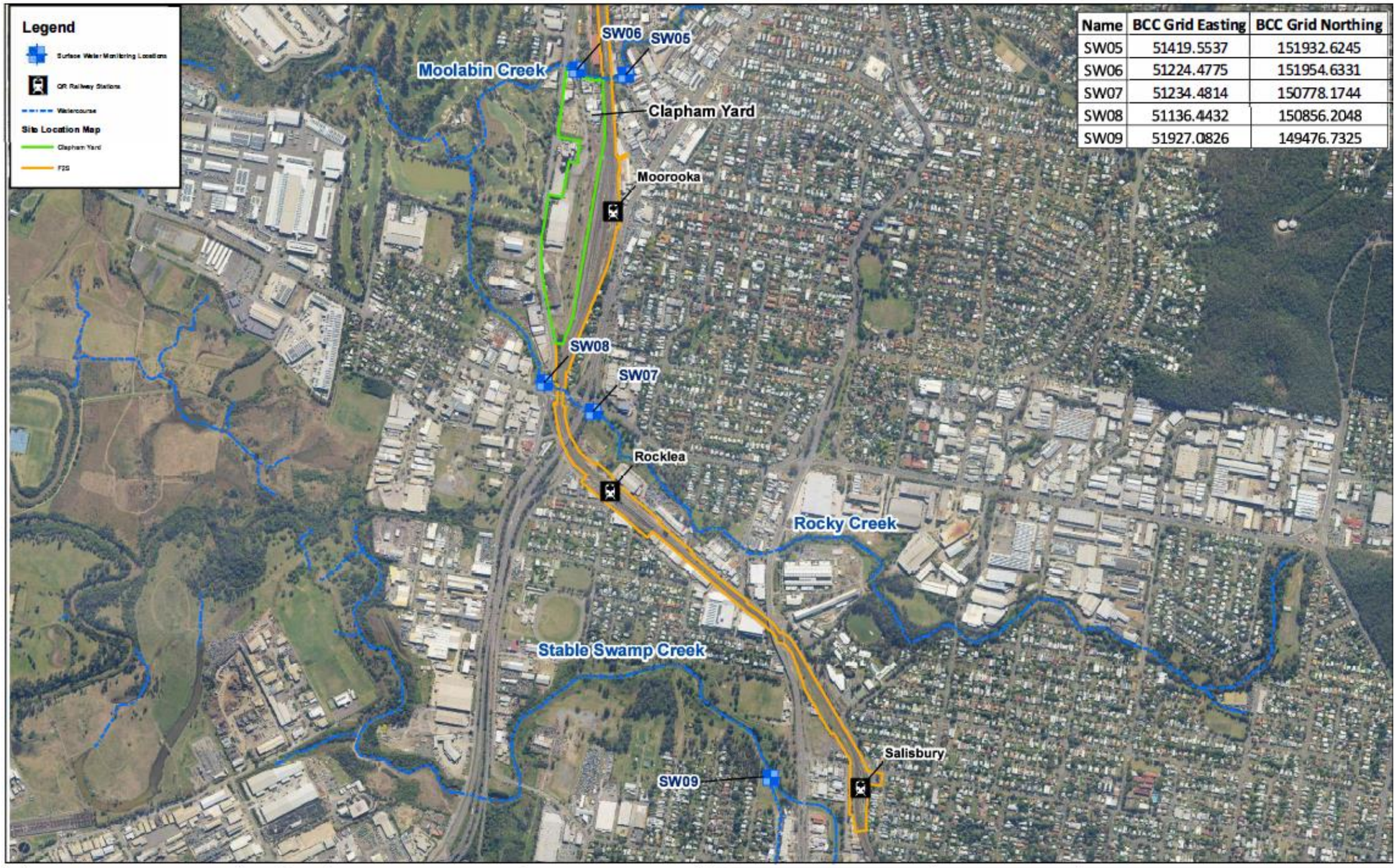
Status
Issued for Information
Original Size A3
Drawn GIS
Coordinate System GDA 1994 BCSC07
Designed UNITY
Height Datum AHD
Date Printed 2/13/2020
Filename: Surface_Water_Northern_Area_Map.mxd
1 Overview Map 17/03/2019 UNITY
Rev Description Date Approved
Project Wide Surface Water Investigation
Figure 1 - Surface Water Monitoring Locations
Project Number
Discipline ENV
Document PL
Document Number 002
Rev 1


Legend
Surface Water Monitoring Locations
QR Railway Stations
Watercourse
Site Location Map
Clapham Yard
FZS
Moolabin Creek
SW06
SW05
Clapham Yard
Moorooka
SW08
SW07
Rocklea
Rocky Creek
Stable Swamp Creek
SW09
Salisbury
Name | BCC Grid Easting | BCC Grid Northing
SW05 | 51419.5537 | 151932.6245
SW06 | 51224.4775 | 151954.6331
SW07 | 51234.4814 | 150778.1744
SW08 | 51136.4432 | 150856.2048
SW09 | 51927.0826 | 149476.7325
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Rev | Description | Date | Approved
Status
Issued for Information
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Coordinate System | GDA 1994 BCSG02 | Designed | Unity
Height Datum | AHD | Date Printed | 2/13/2020
Filename: | Surface_Water_Southern_Area_Map.mxd
N
Project Wide Surface Water Investigation
Figure 2 - Surface Water Monitoring Locations
Project Number | Discipline | Document | Document Number | Rev
ENV | PL | 002 | 1

Appendix B TSD Monthly Report

COORDINATOR-GENERAL'S MONTHLY REPORT: March 2022

Prepared in accordance with Coordinator-General Imposed Condition 6 - Reporting.

1. Monthly Monitoring Summary

It is CBGU Joint Venture's intent to aim for the Goals and Objectives relevant to vibration, noise, air quality and water monitoring within the practical extent of delivering the Project.

Vibration monitoring was conducted on five (5) occasions, and noise monitoring was conducted on eleven (11) occasions during March 2022. Each vibration and noise monitoring event confirmed works adhered to project requirements.

Ambient air quality monitoring was conducted at Roma Street, Albert Street, Woolloongabba, Boggo Road, Southern Portal and Northern Portal precinct sites during March 2022. Air quality monitoring confirmed works adhered to project requirements.

Water quality monitoring was conducted before the release of water from the site on thirty-nine (39) occasions. Each monitoring event confirmed project requirements were adhered to. Two (2) rounds of surface water quality monitoring was conducted; the monitoring events confirmed no impacts were generated by the Project.

2. CG Monthly Report – Compliance Assessment Against Imposed Conditions

Whilst not a requirement of Imposed Condition 6, CBGU offers the below Compliance Status Table as a good-will gesture to demonstrate the Project's ongoing environmental performance.

Table 1: Compliance Status – CG Imposed Conditions

CG Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
1.	**General conditions** – compliance with the Project Changes relevant to the Contractor's scope.	Yes	CBGU project works have been conducted in compliance with the Imposed Conditions.
2.	**Outline Environmental Management Plan** – timely submission to the Coordinator-General, including required sub plans.	N/A	The OEMP is not an obligation of the CBGU Joint Venture.
3.	**Design** – the achievement of the Environmental Design Requirements.	Yes	Design and implementation proceeded in accordance with the Environmental Design Requirements.
4.	**Construction Environmental Management Plan** – all relating to Relevant Project Works.	Yes	All CBGU works were conducted in accordance with the Construction Environmental Management Plan (CEMP) (Rev 8).
5.	**Compliance and Incident management** – Non-compliance events, notifications, and reporting.	Yes	Nil non-compliances occurred during the monitoring period (refer to Section 4).
6.	**Reporting** – Monthly and Annual reporting.	Yes	All reporting requirements are completed in accordance with Imposed Condition 6.
7.	**Environmental Monitor** – engaged and functions resumed.	Yes	An Environmental Monitor (EM) is appointed to the Project, and CBGU is committed to working collaboratively to aid the EM's functions under Imposed Condition 7.
8.	**Community Relations Monitor** – engaged and functions resumed.	Yes	A Community Relations Monitor (CRM) is appointed to the Project, and CBGU is committed to working collaboratively to aid the CRM's functions under Imposed Condition 8.
9.	**Community engagement plan** – developed and endorsed by Environmental Monitor.	Yes	A Community Engagement Plan (CEP) has been developed and implemented in accordance with Imposed Condition 9. The CEMP has been endorsed with the CEP.
10.	**Hours of work** – works undertaken during approved hours.	Yes	CBGU project works have been conducted in accordance with the approved hours of work.

CG Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
11.	**Noise** – Work must aim to achieve internal noise goals for human health and well-being.	Yes	CBGU project work has aimed to achieve internal noise goals for human health and well-being. Where internal noise levels have been unable to be measured, suitable noise reductions have been applied in accordance with Imposed Condition 11. Noise monitoring data is provided within Section 3.2.
	Vibration – Works must aim to achieve vibration goals for cosmetic damage, human comfort and sensitive building contents.	Yes	CBGU project work has aimed to achieve vibration goals for cosmetic damage, human comfort and sensitive buildings. Vibration monitoring data is provided within Section 3.1.
12.	**Property damage** relating to ground movement	Yes	The management of potential impacts relating to property damage has been completed in accordance with Imposed Condition 12.
13.	**Air quality** – Works must aim to achieve air quality goals for human health and nuisance.	Yes	CBGU project works have aimed to achieve air quality goals. Air quality monitoring data is provided within Section 3.3.
14.	**Traffic and transport** – Works must minimise adverse impacts on road safety and traffic flow.	Yes	CBGU project works have been conducted in a manner that has minimised adverse impacts on road safety and traffic flow.
15.	**Water quality** – Works must not discharge surface water and groundwater from the construction site above the relevant environmental values and water quality objectives.	Yes	CBGU has prepared and manages processes to ensure water quality is managed in accordance with Imposed Condition 15.
16.	**Water resources** – evaluate potential impact, plan works, implement controls and monitor the inflow of groundwater associated with drawdown.	Yes	CBGU project works are managed in accordance with Imposed Condition 16.
17.	**Surface water** – Must be designed 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 and constructed to avoid afflux or cause the redirection of uncontrolled surface water flows, including stormwater flows, outside of worksites.	Yes	Design of the CBGU project works considers the requirements of Imposed Condition 17.
18.	**Erosion and sediment control** – Provisions for erosion and sediment control must be 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.	Yes	CBGU has prepared and manages processes to ensure erosion & sediment control is managed in accordance with Imposed Condition 18.
19.	**Acid Sulfate Soils** managed as per the *Queensland Acid Sulfate Soil Technical Manual.*	Yes	CBGU has prepared and manages processes to ensure acid sulphate soils are managed in accordance with Imposed Condition 19.

CG Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
20.	**Landscape and open space** – general requirement to minimise impacts on landscapes and open space values and specific requirements around Victoria park	Yes	CBGU project works are designed and implemented in accordance with Condition 20.
21.	**Worksite rehabilitation** – worksites rehabilitated as soon as practicable upon completion of works or commissioning, and in consultation with Brisbane City Council.	Yes	CBGU project works are designed and implemented in accordance with Condition 21.
22.	**Flood Water –** Temporary emission to allows the release of Flood Waters to high flow receiving waters.	Yes	CBGU project works have been conducted in accordance with the provisions available to manage flood waters.

3. Environmental Monitoring Results

Monitoring data is provided below in accordance with Imposed Condition 6(b)(i).

3.1 Vibration

Vibration requirements (levels) are defined as goals within Imposed Condition 11. The goals are to be aimed for.

The Coordinator-General Change Report acknowledges instances that exist that these goals may not be achieved.

Five (5) vibration monitoring sessions were conducted during March 2022. All vibration monitoring adhered to project requirements and is detailed in the table below.

Table 2: Vibration Monitoring Data

No.	Start Date	Time (AM/PM)	Finish Date	Location	Average Vibration level (mm/s)	Max Vibration Level (mm/s)	Vibration Goal (mm/s)	Receiver / Goal Type	Adhered to Project Requirements (Yes / No)
1.	02/03/2022	3:58:00 PM	2/03/2022	Mary Street (Albert Street Precinct)	-	0.85	10	Heritage Structure (Controlled Blast)	Yes
2.	11/03/2022	12:56:00 PM	11/03/2022	Roma Street (Roma Street Precinct)	-	2.40	10	Heritage Structure (Controlled Blast)	Yes
3.	15/03/2022	11:18:00 AM	21/03/2022	Roma Street (Roma Street Precinct)	0.12	0.79	50	Structure	Yes
4.	19/03/2022	10:00:00 AM	19/03/2022	Roma Street (Roma Street Precinct)	-	2.65	10	Heritage Structure (Controlled Blast)	Yes
5.	26/03/2022	7:30:00 AM	26/03/2022	Roma Street (Roma Street Precinct)	-	2.60	10	Heritage Structure (Controlled Blast)	Yes

3.2 Noise

Noise requirements (levels) are defined as goals within Imposed Condition 11. The goals are to be aimed for.

The Coordinator-General Change Reports acknowledge instances exist that these goals may not be achieved.

Noise monitoring was conducted on eleven (11) occasions during March 2022. All noise monitoring data adhered to project requirements and is provided in the table below.

Table 3: Noise Monitoring Data

No.	Date	Time (AM / PM)	Location (Street Name) (Construction Precinct)	Purpose of Monitoring	Internal or External [3] Monitoring	Activity	Dominant Noise Source	Noise Goal LA10[1]	Noise level LA10	Noise Goal LAeq[2]	Noise level LAeq	Adhered to Project Requirements (Yes / No)
1.	2/03/2022	3:58:00 PM	Albert Street (Albert Street Precinct)	Construction Monitoring at Sensitive Places	External	Controlled Blast	Construction	-	-	130[3]	122.3[3]	Yes
2.	8/03/2022	11:36:00 AM	Gregory Terrace (Northern Portal)	Construction Monitoring at Sensitive Places	External	TBM Extraction	Construction	62	73.8	52	69.6	Yes
3.	8/03/2022	11:57:00 AM	Gregory Terrace (Northern Portal)	Construction Monitoring at Sensitive Places	External	TBM Extraction	Construction	62	69.1	52	66.6	Yes
4.	8/03/2022	8:08:00 PM	Roma Street (Roma Street Precinct)	Model Verification	Internal	Construction and Tunnelling	Construction	50	50.2	40	48.9	Yes
5.	11/03/2022	12:56:00 PM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	External	Controlled Blast	Construction	-	-	130[3]	128.4[3]	Yes

No.	Date	Time (AM / PM)	Location (Street Name) (Construction Precinct)	Purpose of Monitoring	Internal or External [3] Monitoring	Activity	Dominant Noise Source	Noise Goal LA10[1]	Noise level LA10	Noise Goal LAeq[2]	Noise level LAeq	Adhered to Project Requirements (Yes / No)
6.	17/03/2022	1:00:00 AM	Reid Street (Woolloongabba Precinct)	Model Verification	External	Station Build	Road Traffic	49	50.8	42	49.7	Yes
7.	19/03/2022	10:00:00 AM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	External	Controlled Blast	Construction	-	-	130[3]	130[3]	Yes
8.	23/03/2022	9:25:00 AM	Gregory Terrace (Northern Portal)	Construction Monitoring at Sensitive Places	External	Construction and TBM Extraction	Construction	62	75.2	52	73.1	Yes
9.	23/03/2022	9:46:00 AM	Gregory Terrace (Northern Portal)	Construction Monitoring at Sensitive Places	External	Construction and TBM Extraction	Construction	62	66.9	52	64.8	Yes
10.	24/03/2022	11:25:00 AM	Rawnsley Street (Southern Area)	Construction Monitoring at Sensitive Places	External	Piling	Construction	57	65.4	47	65.2	Yes
11.	26/03/2022	7:30:00 AM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	External	Controlled Blast	Construction	-	-	130[3]	129.3[3]	Yes

- *[1] Intermittent noise goal (LA10)*
- *[2] Continuous noise goal (LAeq)*
- *[3] Blasting is measured in dB Linear Peak.*
- *Note: In accordance with Imposed Condition 11, where internal noise levels were unable to be measured, external noise goals were developed by an acoustic specialist using the following standards: ISO 140-5:1998 Acoustics – Measurement of Sound Insulation in Buildings and of Building Elements, Part 5: Field measurements of airborne sound insulation of façade elements and facades and ISO 354:1985 Acoustics – Measurement of sound absorption in a reverberation room.*

3.3 Air Quality

3.3.1 Deposited Dust Results

Air quality requirements (levels) are defined as goals within Imposed Condition 13. The goals are to be aimed for. The Coordinator-General Change Report acknowledges instances that exist that these goals may not be achieved. Dust deposition monitoring was performed during March 2022. The dust deposition gauges result for the reporting period are detailed below, and all monitoring data adhered to project requirements.

- *Table 4.2: March Air Quality Monitoring – Deposited Dust Data*

Location	Project Wide Air Quality Goals[1]			Monitoring results (mg/m2/day)	Comments
	Criterion	Air Quality Indicator	Goal (mg/m2/day)		
Northern Portal	Nuisance	Deposited dust	120	58.06	*Air quality monitoring was performed during the reporting period. All results adhered to project requirements.*
Roma Street Precinct				-[1]	
Albert Street Precinct (North)				46.43	
Albert Street Precinct (South)				42.86	
Woolloongabba Precinct (North)				25.93	
Woolloongabba Precinct (South)				33.33	
Boggo Road Precinct (North)				21.43	
Boggo Road Precinct (South)				85.71	
Southern Portal (South)				14.29	
Southern Portal (East)				46.43	

- *[1] The Roma Street Sample was damaged during the major rainfall/flood events experienced in March 2022. As such, no results are able to be reported this month. The Roma Street dust deposition gauge has since been reinstated.*

3.3.2 Particulates and Ambient Air Quality Results

Total Suspended Particules (TSP) and particulate matter less than 10µm (PM10) monitoring was conducted during March 2022.

TSP and PM10 are monitored using portable air quality units and nearby Government air quality stations. Targeted monitoring of potential dust-generating activities is conducted by the mobile air quality units and was completed at Albert Street, Woolloongabba, Boggo Road and Northern Portal Precincts during March 2022. Three (3) Government air quality stations near the Construction Precincts are also utilised.

Table 5: Targeted Air Quality Monitoring – Total Suspended Particles and PM10 Data

Date	TSP Project Goal[1]	PM10 Project Goal	Woolloongabba		Albert		Boggo Road[2]		Northern Portal	
			TSP	PM 10	TSP	PM 10	TSP	PM 10	TSP	PM 10
	(µg/m3/24 hr)									
01-Mar-22	80	50	-	-	13.66	13.55	-	-	4.98	4.93
02-Mar-22	80	50	-	-	18.32	18.17	7.32	7.30	8.15	8.10
03-Mar-22	80	50	-	-	11.77	11.70	4.84	4.84	7.92	7.89
04-Mar-22	80	50	-	-	19.57	19.46	7.30	7.30	9.81	9.77
05-Mar-22	80	50	-	-	15.62	15.52	-	-	7.25	7.21
06-Mar-22	80	50	-	-	14.13	14.06	-	-	11.72	11.66
07-Mar-22	80	50	-	-	16.87	16.64	-	-	8.87	8.71
08-Mar-22	80	50	-	-	24.66	24.46	-	-	11.63	11.52
09-Mar-22	80	50	-	-	22.16	21.99	7.09	7.08	13.06	12.97
10-Mar-22	80	50	3.89	3.89	18.51	18.38	6.63	6.62	7.24	7.20
11-Mar-22	80	50	3.88	3.88	13.90	13.82	6.83	6.83	5.65	5.62
12-Mar-22	80	50	3.59	3.59	17.49	17.35	2.47	2.47	5.08	5.04
13-Mar-22	80	50	3.41	3.41	12.81	12.75	-	-	5.99	5.95
14-Mar-22	80	50	3.75	3.75	13.51	13.39	5.83	5.83	8.06	8.02
15-Mar-22	80	50	5.04	5.04	15.92	15.80	5.02	5.00	8.18	8.13
16-Mar-22	80	50	5.68	5.68	18.18	18.07	6.29	6.28	9.17	9.13
17-Mar-22	80	50	-	-	18.69	18.54	-	-	9.52	9.47
18-Mar-22	80	50	4.14	4.14	19.21	19.08	-	-	7.95	7.91

Date	TSP Project Goal[1]	PM10 Project Goal	Woolloongabba		Albert		Boggo Road[2]		Northern Portal	
			TSP	PM 10	TSP	PM 10	TSP	PM 10	TSP	PM 10
	(µg/m3/24 hr)									
19-Mar-22	80	50	6.84	6.84	17.05	16.94	-	-	7.78	7.73
20-Mar-22	80	50	5.57	5.57	12.73	12.67	-	-	7.56	7.54
21-Mar-22	80	50	6.47	6.47	19.19	19.03	-	-	9.72	9.65
22-Mar-22	80	50	7.01	7.01	16.79	16.64	-	-	10.35	10.28
23-Mar-22	80	50	9.12	9.12	22.10	21.91	13.00	12.90	14.17	14.08
24-Mar-22	80	50	10.42	10.42	16.95	16.83	10.74	10.73	14.45	14.35
25-Mar-22	80	50	12.37	12.37	25.69	25.40	10.50	10.48	11.86	11.81
26-Mar-22	80	50	4.05	4.04	18.53	18.21	-	-	6.65	6.60
27-Mar-22	80	50	2.55	2.55	9.83	9.70	-	-	4.21	4.19
28-Mar-22	80	50	2.39	2.38	15.46	15.28	-	-	5.24	5.22
29-Mar-22	80	50	2.46	2.46	32.61	32.14	-	-	3.56	3.54
30-Mar-22	80	50	2.62	2.62	33.79	33.24	-	-	2.97	2.86
31-Mar-22	80	50	2.73	2.72	35.02	34.51	-	-	4.16	4.05

- [1] Project works must aim to achieve construction air quality goals. The Coordinator-General Change Report – Whole of Project Refinements 2019 acknowledges instances exist that these goals may not be achieved.
- [2] The Woolloongabba air quality unit experienced technical difficulties between the 1st-9th and 17th March 2022. As soon as practicable the mobile air quality unit was reinstated. A nearby (Southern Brisbane) DES Air Quality Stations demonstrated compliant air quality during this outage period, these results are provided below. Low levels were also consistently monitored throughout the month when the unit was operating.
- [3] The Boggo Road air quality unit experienced technical difficulties on the 1st , 5th-8th, 13th , 17th-22nd & 26th & 31st March 2022. As soon as practicable the unit was inspected, and the problem was resolved. A nearby (Woolloongabba) DES Air Quality Stations demonstrated compliant air quality during this outage period, these results are provided below. Low levels were also consistently monitored throughout the month when the unit was operating. The monitoring unit is being reviewed to reduce the likelihood of future intermittent lapses.

CBGU also utilises three (3) Government air quality monitoring stations to monitor PM10 near the project sites. The results during this reporting period were as follows:

- Brisbane CBD: PM10 daily Maximum average: **23.1µg/m3/24 hr** (https://apps.des.qld.gov.au/air-quality/chart/?station=cbd&parameter=18&date=1/03/2022&timeframe=month)
- South Brisbane: PM10 daily Maximum average: **25.9 µg/m3/24 hr** (https://apps.des.qld.gov.au/air-quality/chart/?station=sbr&parameter=18&date=1/03/2022&timeframe=month)
- Woolloongabba: PM10 daily Maximum average: **25.0 µg/m3/24 hr** (https://apps.des.qld.gov.au/air-quality/chart/?station=woo&parameter=18&date=1/03/2022&timeframe=month)

The graphical representation of the Government air quality data is presented in the below charts (refer to Figure 1-3).

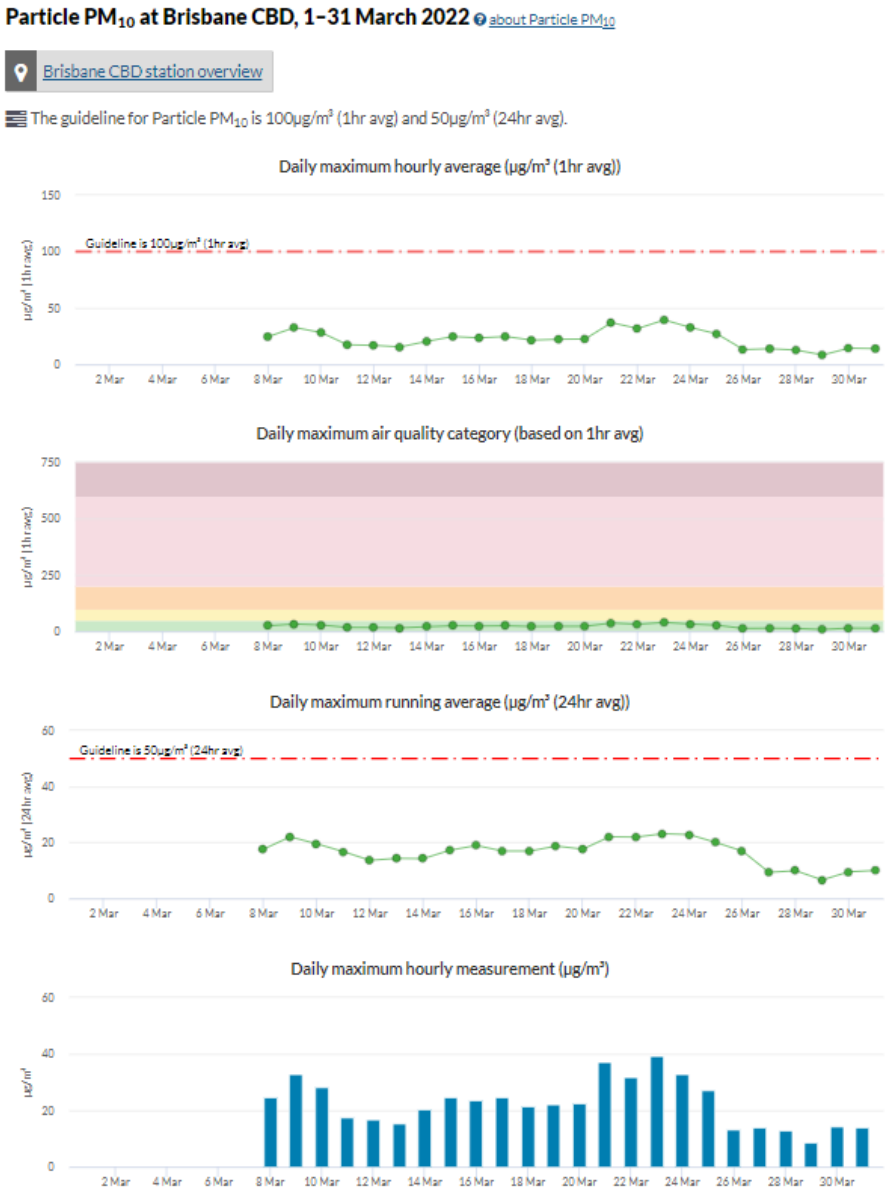

Figure 1: Brisbane CBD – DES Station - PM10 graph for March 2022 (reproduction from the DES website).

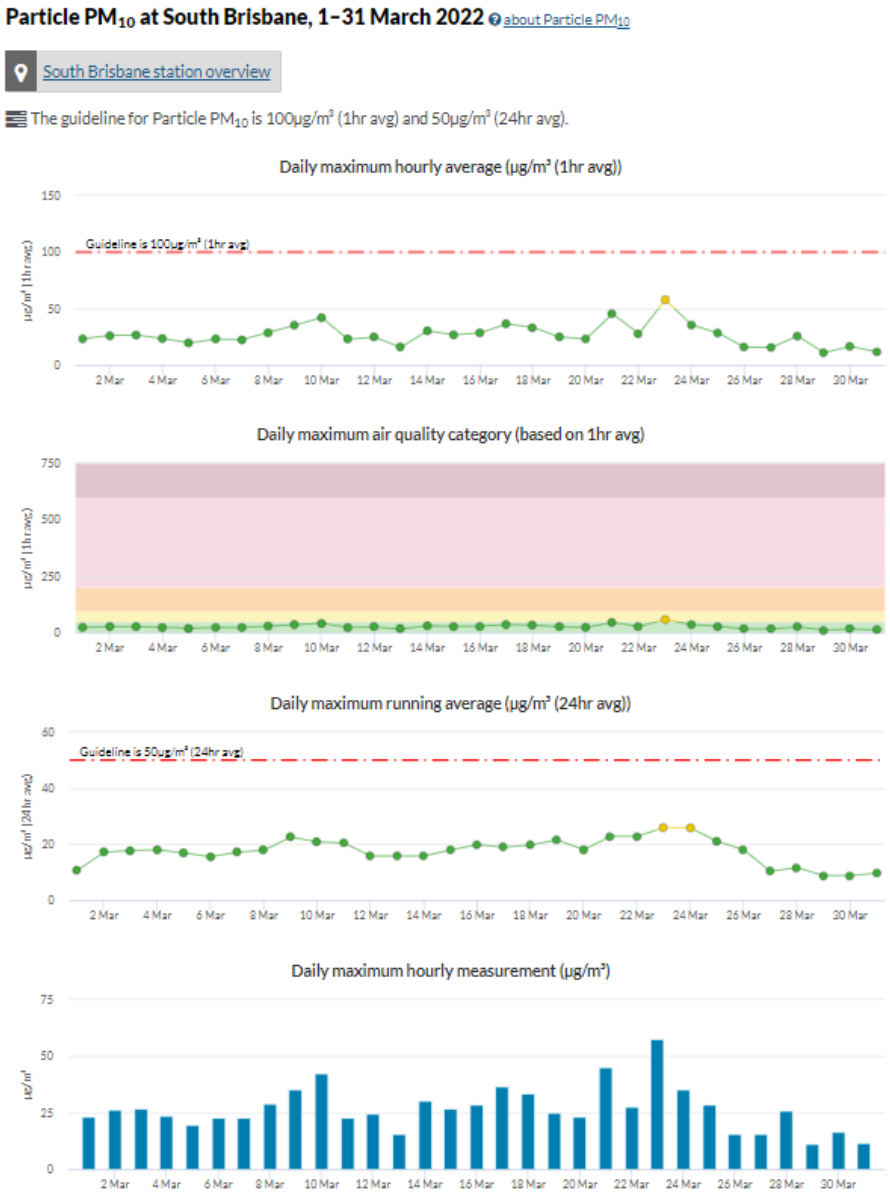

Figure 2: South Brisbane – DES Station - PM10 graph for March 2022 (reproduction from the DES website).

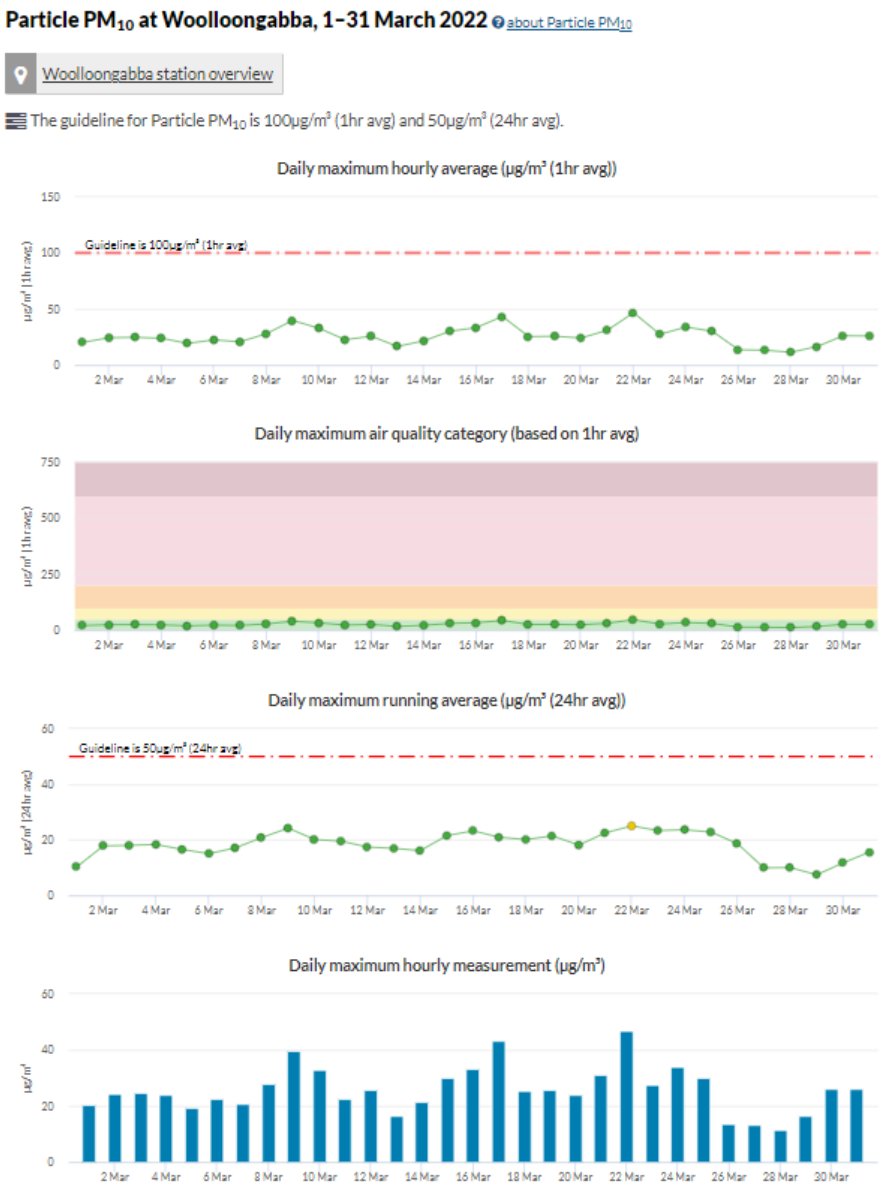

Figure 3: Woolloongabba – DES Station - PM10 graph for March 2022 (reproduction from the DES website).

3.4 Water Quality – Discharge

CBGU undertook four (4) water quality monitoring events prior to the release (groundwater and surface water) from the site.

3.4.1 Groundwater Discharge

Water quality monitoring data is provided in the table below.

Table 6: Groundwater Discharge – Water Quality Monitoring Data

Location	Date	Testing of Water Quality Objectives [1]											Adhered to Project Requirements (Yes / No)
		pH	Suspended solids (mg/L)	Turbidity (NTU)	Ammonia N (µg/L) [3]	Oxidised N (µg/L) [3]	Organic N (µg/L) [3]	Total nitrogen (µg/L) [4]	Total phosphorus (µg/L)	Filterable Reactive phosphorus (FRP) (µg/L)	Chlorophyll a (µg/L)	Dissolved oxygen (%) [2]	
Albert Street	18/03/2022	7.4	<5	1.2	17,600	23,400	3,200	44,200	<10	<10	<1	91.98	Yes
Roma Street	17/03/2022	7.93	<5	0.7	940	10,200	600	1,500	20	<10	<1	71.41	Yes
Boggo Road	16/03/2022	7.90	<5	2.30	100	<10	1,100	1,100	50	<10	7	113.77	Yes
Woolloongabba	15/03/2022	Note: At the time of reporting, Woolloongabba WTP results had not been received from the laboratory. Results to be included in next month's report.											

- [1] The Project's discharge procedure is designed to minimise environmental impact and aim to achieve the water quality objectives. Water quality objectives are defined as goals within the Brisbane River estuary environmental values and water quality objectives document.
- [2] All results adhere to project requirements in that site practices are designed to aim to achieve the water quality objectives. The dissolved oxygen samples were acquired prior to discharge from the site. Pumping of the water will have inadvertently aerated the water, thus influencing the dissolved oxygen level.
- [3] All results adhere to project requirements in that site practices aim to achieve the water quality objectives. These samples identified results generally consistent with pre-construction conditions, and no external influences were introduced by construction activity.
- [4] Total nitrogen levels adhered to project requirements in that site practices are designed to aim to achieve the water quality objectives. The results are mostly below that of the receiving environment. They are also considered abnormal compared to results from previous months, and are influenced by external factors (e.g., high rainfall events, overloaded sewage treatment plants,) rather than related to construction activities.
- Note: Testing of EPP (Water) Quality Objectives are analysed at a NATA accredited laboratory each month (results provided above). Field testing (turbidity, pH) is done regularly during ongoing discharge.

3.4.2 Ponded/Surface Water Discharge

Discharged ponded/Surface water quality monitoring data is provided in the table below.

Table 7: Surface Water Discharge - Water Quality Monitoring Data

No.	Location	Date	Testing of Water Quality Objectives [1]		Adhered to Project Requirements (Yes / No)
			pH	Turbidity (NTU)	
1.	Northern Portal	1/03/2022	7.97	35.70	Yes
2.	Northern Portal	1/03/2022	8.26	29.90	Yes
3.	Roma Street	02/3/2022	-[2]	-[2]	Yes
4.	Southern Portal	02/03/2022	-[2]	-[2]	Yes
5.	Northern Portal	2/03/2022	7.83	38.00	Yes
6.	Woolloongabba	2/03/2022	7.85	9.41	Yes
7.	Northern Portal	3/03/2022	7.82	34.10	Yes
8.	Northern Portal	3/03/2022	8.22	40.70	Yes
9.	Northern Portal	4/03/2022	8.12	32.20	Yes
10.	Northern Portal	5/03/2022	8.19	13.88	Yes
11.	Northern Portal	7/03/2022	8.38	39.80	Yes
12.	Southern Portal	7/03/2022	8.01	25.00	Yes
13.	Northern Portal	7/03/2022	8.16	25.10	Yes
14.	Northern Portal	8/03/2022	8.02	30.20	Yes
15.	Northern Portal	8/03/2022	8.03	7.86	Yes

16.	Northern Portal	9/03/2022	7.98	14.33	Yes
17.	Southern Portal	10/03/2022	8.12	40.50	Yes
18.	Northern Portal	10/03/2022	8.27	0.00	Yes
19.	Southern Portal	11/03/2022	8.07	32.20	Yes
20.	Northern Portal	11/03/2022	8.31	22.00	Yes
21.	Northern Portal	12/03/2022	8.22	15.68	Yes
22.	Northern Portal	14/03/2022	8.39	6.86	Yes
23.	Northern Portal	15/03/2022	8.31	36.10	Yes
24.	Northern Portal	16/03/2022	8.37	40.20	Yes
25.	Northern Portal	17/03/2022	8.31	4.58	Yes
26.	Northern Portal	18/03/2022	8.40	11.82	Yes
27.	Northern Portal	19/03/2022	8.32	16.82	Yes
28.	Northern Portal	21/03/2022	8.42	19.84	Yes
29.	Northern Portal	22/03/2022	8.26	7.63	Yes
30.	Northern Portal	23/03/2022	8.26	3.95	Yes
31.	Northern Portal	24/03/2022	8.31	1.88	Yes
32.	Northern Portal	25/03/2022	8.26	1.96	Yes
33.	Northern Portal	26/03/2022	8.42	23.80	Yes
34.	Northern Portal	28/03/2022	8.40	35.20	Yes
35.	Northern Portal	29/03/2022	8.34	28.70	Yes

36.	Northern Portal	29/03/2022	8.28	31.40	Yes
37.	Northern Portal	30/03/2022	8.21	28.60	Yes
38.	Northern Portal	30/03/2022	8.41	22.40	Yes
39.	Northern Portal	31/03/2022	8.17	38.60	Yes

- [1] The Project's discharge procedure is designed to minimise environmental impact and aim to achieve the water quality objectives. All discharges were compliant with *Guidelines for Best Practice Erosion and Sediment Control (IECA, 2008) and* the *Department of Transport and Main Roads' Technical Standard MRTS 52 – Erosion and Sediment Control.*
- [2] At the time of discharge (2 March 2022) Imposed Condition 22A had not yet been issued, however these two (only) discharges occurred consistent with advice (dated 3 March 2022) that supported releases into high catchment flows to manage safety and health risks. *Where possible, treatment of site/flood water occurred with flocculant prior to discharge and waters passed through controls (including high efficiency sediment basins) before exiting site. Throughout the month,* CBGU took all reasonable and practicable measures to treat and discharge water in accordance with *Guidelines for Best Practice Erosion and Sediment Control (IECA, 2008) and* the *Department of Transport and Main Roads' Technical Standard MRTS 52 – Erosion and Sediment Control, and achieved a 94-percentile total suspended solids concentration not exceeding 50mg/L (IECA allows for a 90 percentile).*

3.5 Water Quality – Surface Water

During March 2022, CBGU JV undertook two (2) rounds of surface water sampling at five (5) site locations (upstream and downstream). The first round of sampling extended over 11 & 17 March 2022. The second round of samples (post-rain sampling) then occurred on 30 & 31 March 2022. At the time of preparation of this report, the second round of sampling had not yet been received from the laboratory. These results will be reported in next month's report.

Results from the below monitoring locations reflect the condition of the broader catchment (not just the influence of the Project). Water quality generally appears good, and water discharge from the Project would not have had an impact on the catchment considering the results also provided within section 3.4 above.

Table 8: Offsite Upstream & Downstream Water Quality Data

Location	Upstream / Downstream	Date	Purpose of Monitoring	Turbidity (NTU)	EC (µS/cm)	Dissolved oxygen (%)	pH
Albert Street	Upstream	11/03/2022	Monthly	55.5	3010	75.04	6.89
Albert Street	Downstream	11/03/2022	Monthly	54.6	3150	76.25	6.9
Gabba	Upstream	11/03/2022	Monthly	53	1750	77.46	6.96
Gabba	Downstream	11/03/2022	Monthly	51.6	1930	81.09	7.06
Boggo Road [1]	Downstream	11/03/2022	Monthly	7.81	1360	36.31	7.06
Roma Street	Upstream	17/03/2022	Monthly	48.2	9080	64.15	7.43
Roma Street	Downstream	17/03/2022	Monthly	50.6	10000	65.36	7.38
Northern Portal	Upstream	17/03/2022	Monthly	1.97	1000	154.92	8.26
Northern Portal	Downstream	17/03/2022	Monthly	3.92	876	128.29	8.05

- [1] Monitoring at the Boggo Rd site occurs at a pipe outlet at the beginning of the surface catchment. There is no upstream/downstream monitoring point as such. The pipe outlet receives water released from the site, as well as a broader stormwater catchment.

4 Non-Compliances

Details of non-compliances are provided in accordance with Imposed Condition 6(b)(ii).

A Non-Compliance Event is defined as project works that do not comply with the Imposed Conditions. Nil non-compliances occurred during the monitoring period.

Table 9: Non-Compliance Events this Month

Event Title	Location, Date, and time of the event	Date the Event was Formally Notified to CG/IEM	Conditions Affected	Date the Event Report Formally Sent to CG/IEM	Status of Event
Nil					

5 Complaints

Reporting of complaints is provided below in accordance with Imposed Condition 6(b)(iii).

During March 2022, sixteen (16) complaints relating to the Project were received, as detailed in Table 10 below.

Table 10: Summary of Complaints

No.	Date	Location	Description of Issue	Responses	Status of Event
1.	1 Mar 22	Ross St (Tunnel Alignment)	Noise / Vibration	A stakeholder contacted the Project regarding noise and vibration emanating from the tunnel alignment. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise and vibration requirements, and the works undertaken were consistent with the community notification.	Closed
2.	2 Mar 22	Railway Tce (Southern Area)	Noise	A stakeholder contacted the Project regarding noise generated from the Southern Area. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
3.	4 Mar 22	(Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance.	Closed

No.	Date	Location	Description of Issue	Responses	Status of Event
				CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	
4.	5 Mar 22	Mary St (Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
5.	7 Mar 22	Gregory Tce (Northern Portal)	Air Quality	A stakeholder contacted the Project regarding air quality at the Northern Portal. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project air quality requirements, and the works undertaken were consistent with the community notification. CBGU also implemented additional measures to abate the stakeholders' concerns.	Closed
6.	7 Mar 22	Gregory Tce (Northern Portal)	Air Quality	A stakeholder contacted the Project regarding air quality at the Northern Portal. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project air quality requirements, and the works undertaken were consistent with the community notification. CBGU also implemented additional measures to abate the stakeholders' concerns.	Closed
7.	9 Mar 22	(Roma St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Roma St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
8.	13 Mar 22	Albert St (Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
9.	15 Mar 22	Boggo Rd (Boggo Rd Precinct)	Vehicle Movements	A stakeholder contacted the Project regarding vehicle movements at Boggo Rd. CBGU investigated and informed the workforce, via toolbox talk, about the use of vehicles.	Closed
10.	15 Mar 22	Albert St (Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed

No.	Date	Location	Description of Issue	Responses	Status of Event
11.	15 Mar 22	Mary St (Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
12.	17 Mar 22	Albert St (Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
13.	23 Mar 22	(Albert St Precinct)	Air Quality	A stakeholder contacted the Project regarding air quality at the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
14.	25 Mar 22	Boggo Rd (Boggo Rd Precinct)	Vehicle Movements	A stakeholder contacted the Project regarding vehicle movements at Boggo Rd.CBGU investigated and informed the workforce, via toolbox talk, about vehicle expectations.	Closed
15.	30 Mar 22	(Albert St Precinct)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed
16.	30 Mar 22	Albert St (Albert St)	Noise	A stakeholder contacted the Project regarding noise generated from the Albert St Precinct. CBGU provided the stakeholder with an overview of the works occurring and their duration. CBGU also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. CBGU reviewed the circumstances and monitoring confirmed works adhered to project noise requirements, and the works undertaken were consistent with the community notification.	Closed