

Cross River Rail Project

Monthly Environmental Report

December 2020



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Executive Summary

This Monthly Environmental Report (MER) has been produced for Project Works undertaken on site for December 2020 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 – design refinements and condition changes 2020 (July 2020)* 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 CBUG 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 against each condition:

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. OEMP has been updated as part of the RfPC9 submission and submitted to the Coordinator-General on 20 November 2020.
3.	Design – achievement of the Environmental Design Requirements	NA	RIS – Detailed flood modelling is in progress to ensure design will not cause property damage from flood impacts to third parties for events up to and including the 1 in 100 Annual Exceedance Probability flood event. Detailed operational noise modelling associated with railway surface track emissions and ground-borne emissions is in progress. Documents continue to be reviewed related to compliance with the environmental design standards.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
			TSD – ongoing progress with design packages relating to tunnel and station work.
4.	Construction Environmental Management Plan – all relating to Relevant Project Works.	Yes	RIS – CEMP Revision 8 has been updated to include Clapham Yard – Stage 1 as additional scope. Revision 8 has been reviewed and endorsed by the EM and provided to the OCG on 12 January 2021. TSD – CEMP Revision 7 for tunnelling and ongoing activities in the Central area was endorsed by the EM, submitted to the Coordinator-General in June and became effective on 5 July 2020.
5.	Compliance and Incident management – Non-compliance events, notifications and reporting.	Yes	There were no non-compliance events (NCEs) recorded in December 2020. Refer to Section 2.5 of this report.
6.	Reporting – Monthly and Annual reporting.	Yes	This MER including RIS and TSD Monthly Reports have been submitted in accordance with the conditioned requirements. RIS – Refer to Appendix A (RIS Monthly Report). TSD – Refer to Appendix B (TSD Monthly Report).
7.	Environmental Monitor (EM) – engaged and functions resumed.	Yes	Ongoing. Weekly site inspections 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.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
11.	Noise – Project Works must aim to achieve internal noise goals for human health and well-being.	Yes	Project Works met project noise requirements at Sensitive Places. RIS – Refer to Appendix A (Table 2 and Section 3.1.4) . TSD – Refer to Appendix B (Table 3) .
	Vibration – Project Works must aim to achieve vibration goals for cosmetic damage, human comfort and sensitive building contents.	Yes	RIS – Vibration monitoring as a result of the predictive vibration assessments and complaints was not triggered. TSD – Vibration monitoring continues across the sites and results are compliant with conditioned requirements. Refer to Appendix B (Table 2) .
12.	Property damage – relating to ground movement.	Yes	RIS – Predictive vibration modelling undertaken for relevant project works. Pre-condition surveys have been completed at heritage listed, commercial and residential buildings at RNA, Northern Corridor and Fairfield to Salisbury stations. Property Damage Sub-plans have been developed and implemented. TSD – Vibration modelling has been prepared and is ongoing and where required, building condition survey reports (for heritage and residential buildings), and Property Damage Sub-plans developed and implemented and predictive modelling undertaken for relevant works.
13.	Air quality – Works must aim to achieve air quality goals for human health and nuisance.	Yes	RIS – Project Works met air quality goals. Refer to Appendix A (Table 4, Section 3.2.4, and Figures 1, 2 and 3) . TSD – The Dust deposition monitoring gauge on the northern side of the Boggo Road work site did not achieve the air quality goals however the project work was compliant and did not contribute to this exceedance due to the following factors: prevailing wind conditions not from the site, no recorded exceedances of the daily TSP and PM ₁₀ air quality goals, no visible dust detected beyond the project boundaries during routine environmental inspections and no complaints received from adjacent sensitive receptors during the monitoring period. Further analysis of the laboratory results supports this. Refer to Appendix B (Table 4 and Table 5) .

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
14.	Traffic and transport – Works must minimise adverse impacts on road safety and traffic flow.	Yes	Traffic Management Plans covered in the CEMPs and 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 for the month. On 17 December a surface water discharge event occurred from the Northern Corridor to York's Hollow due to a high intensity rainfall event exceeding the design criterion for Type 2 Erosion and Sediment Control measures installed on site as per approved Erosion and Sediment Control Plan. An investigation of the event concluded that the event is not deemed a Non-Compliance Event with Imposed Conditions. Refer to Appendix A (Table 5 and Section 3.3.5.2) for more details. Refer to Appendix A (Table 6) for routine surface water monitoring results. TSD – Three groundwater discharges at Albert Street, Roma Street and Boggo Road did not meet the Water Quality Objectives, however recorded levels are consistent with pre-construction conditions. No external influences were introduced by the construction activities.
16.	Water resources – Evaluate potential impact, plan works, implement controls and monitor inflow of groundwater associated with drawdown.	Yes	RIS – There will be 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 continuously 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 surface water flows, including	Yes	Contractors continue to consider this condition in their site planning and design.

Imposed Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
	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 certified and 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 for all active worksites are in place.
20.	Landscape and open space – general requirement to minimise impacts on landscapes and open space values and specific requirements around Victoria Park.	Yes	Stormwater bund works and sewer relocation works in Victoria Park continued under the Site Environmental Plan and the Department of Environment and Science (DES) approved Heritage Exemption Certificates (202008-10615 EC and 202004-10189 EC).
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 NCE's raised in December 2020.

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	<i>State Development and Public Works Organisation Act 1971</i>
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, a number of Requests for Project Change (RfPC) submissions have been evaluated by the Coordinator-General. RfPC 8 is applicable for the works that took place in November 2020.

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.

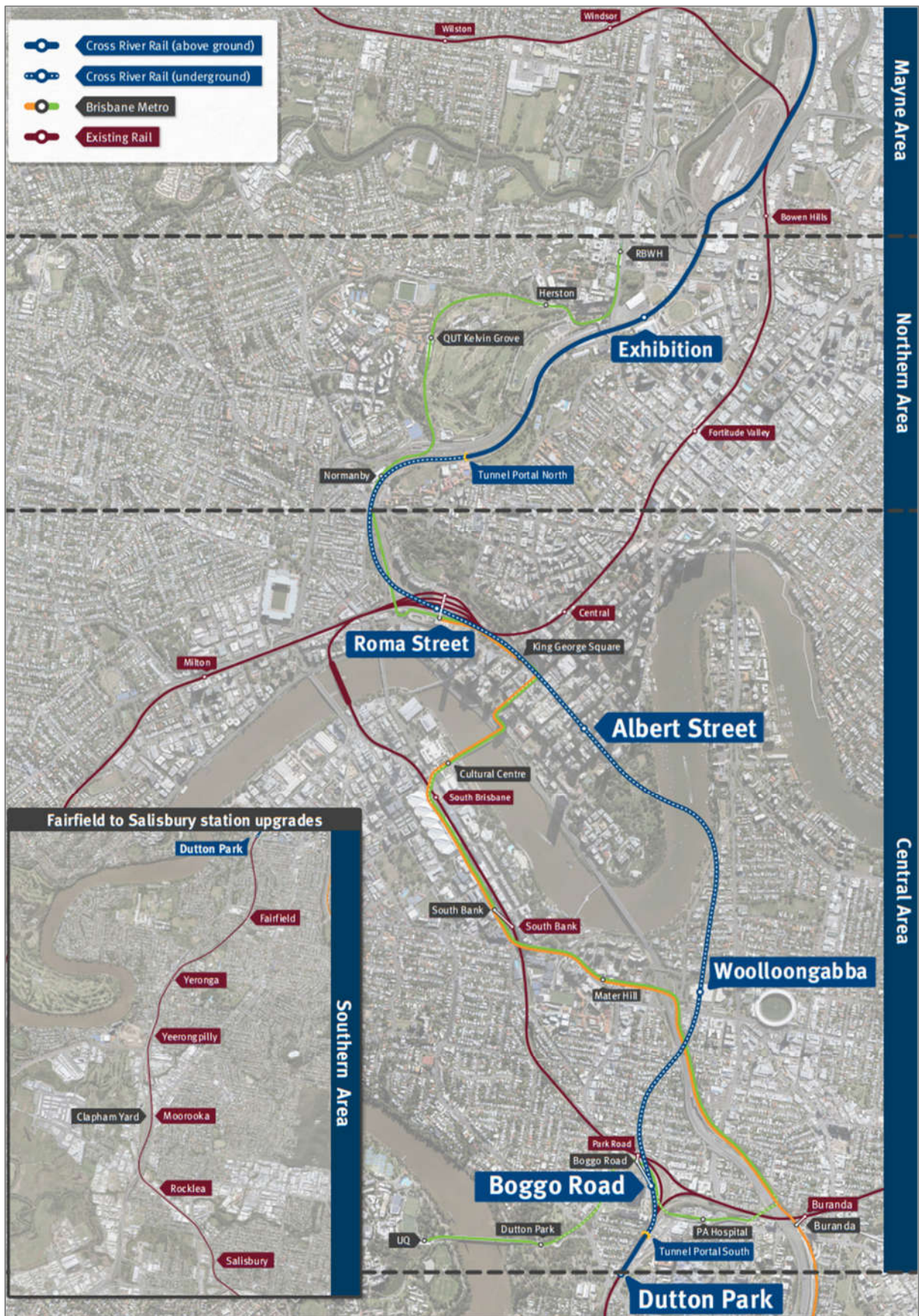
The two main delivery packages which require reporting under the Coordinator-General's imposed conditions are:

- 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.



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 Monthly Environment Report 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 December 2020:

Area	Project Works
Mayne Area	• Stormwater drainage works; • Temporary cable route diversions to facilitate Ferny Grove Flyover pier protection work; • Mayne Yard suburban line earthworks for new combined services route alignment; • Ground improvement piling for reinforced soil structure walls; • Stabling yard security fence installation; and • Main trunk outlet into Breakfast Creek.
Northern Area	• Line drilling and rock excavation to widen the rail corridor adjacent to O'Connell Terrace; • Soil nail installation adjacent to O'Connell Terrace; • Demountable toilet block relocations; • Public Utility Plant (PUP) relocations (sewer, water, electrical); • Combined services route installation; • Capping placement; • Sewer relocation in Victoria Park; • Concrete line drain installation; and • Boundary fence installation.
Central Area	• Roma Street – continued demolition of the Brisbane Transit Centre; lower adit blasting; cavern heading excavation continues with lead and lag headings now established; Services Building capping beam construction and upper-level piling works completed; and INB lift installation and commissioning and permanent INB structural steel stairs progressing with metal cladding and lighting. • Albert Street – station box excavation continues and installation of first row of props installed on Lot 1; tunnel and adit excavation and ground stabilisation works continue and alimak installation occurring on Lot 2; and piling pad complete and demolition nearing completion on Lot 3.

Area	Project Works
	- Woolloongabba – Northern cavern and decline ramp excavation complete; acoustic shed conveyor continues; ongoing haulage of excavated material; and TBM #1 segments arriving to site. - Boggo Road – excavation and retention work in the station box continues; installation of canopy tubes under busway and Park Road station continues; and telescopic excavators mobilised to continue spoil removal out of the station box as ramp is removed. - Southern Portal – establishment of temporary site facilities and the PA laydown; commenced excavation and piling pad utilising tunnel spoil from Roma Street; undertook OHLE foundations, signal relocations and cabling works during Christmas SCAS possession.
Southern Area	- Early works and detailed design is continuing at Cope Street, Dutton Park; - Yeronga site establishment ongoing; - Yeronga water main relocation ongoing; - Overhead line equipment (OHLE) works at Fairfield; and - Geotechnical, contaminated land and acid sulphate soil investigations at Clapham Yard.

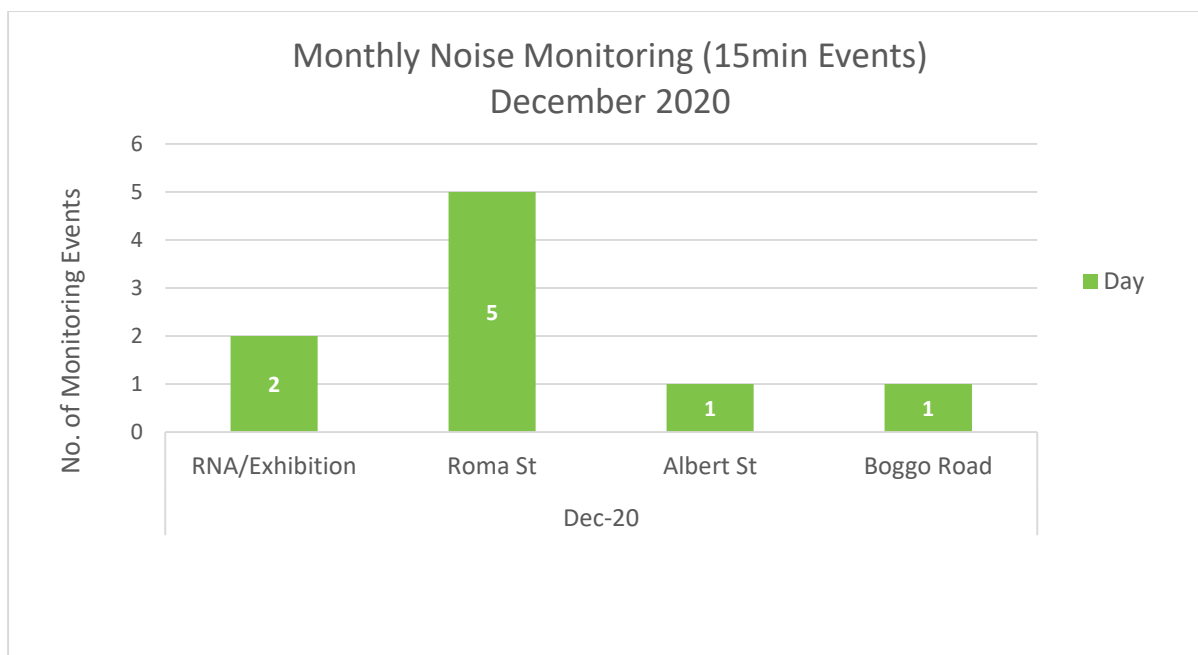
2.2. Key Environmental Elements

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 are being implemented. For project works where potential noise impacts are predicted to be more than 20dBA above the relevant noise goal, specific engagement is required with Directly Affected Persons (DAPs) for these works.

In the Northern Area, attended noise monitoring was undertaken to validate predictive modelling at sensitive places during micro-piling works at RNA/Exhibition during standard hours. Noise levels met project requirements. Noise monitoring in response to complaints was also undertaken during rock breaking activities in the RNA/Exhibition rail corridor. Measured noise levels complied with project requirements. Monitoring results are detailed in Table 2, **Appendix A**.

In the Central Area, noise monitoring was undertaken in response to complaints and to validate predictive modelling at sensitive places close to the project worksites. The monitoring results are detailed in **Appendix B** (Table 3). Where internal monitoring was not possible, contractors have undertaken external monitoring at nominated locations. The contractors used recommended façade attenuation corrections, considering receiver property type, to determine compliance with the project's noise requirements and to provide calibration of the completed modelled predictions. The TSD contractors reported that the project noise requirements have been met during this reporting month. The increased monitoring at Roma Street reflects the ongoing demolition works of the Brisbane Transit Centre, the services building capping beam construction and the station building piling pad preparation works.



2.2.2. Vibration

Vibration monitoring was not required to validate predictive modelling or in response to complaints in the Mayne, Northern and Southern Areas.

In the Central Area vibration monitoring took place to validate predictive modelling at Roma Street and Albert Street worksites and nearby receivers where major construction, demolition and controlled blasting activities were being undertaken. No complaints were received regarding vibration and the contractor reported all results were within the project's nominated goals for all receiver types. Vibration monitoring results 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 Yard, Northern Area and Central Area worksites from mid-November to mid-December.

Monitoring results for Mayne Yard and Northern Area met air quality goal.

In the Central Area, the dust deposition gauge at the northern end of the Boggo Road site recorded 175.0 mg/m²/day however was not a non-compliant event due to the following factors: the prevailing wind conditions during the reporting period were north-north-east (which indicates that the monitoring gauge was upwind from the worksite); no exceedances of the daily TSP and PM₁₀ air quality goal were recorded; no visible dust was detected beyond the project boundaries during routine environmental inspections; and the monitoring method (set out in the Australian Standards) has limitations, not allowing anyone to be quantitatively definitive about contributions to measured results. The project was applying the same dust control measures and the activities have not changed significantly. A summary of air quality monitoring undertaken is shown in the table below.

Air Quality – Dust Deposition Monitoring			
Area	Active Site*	Monitoring Location	Comments
Mayne Yard	Mayne Yard	Mayne Yard East	- Results met air quality goal.

Air Quality – Dust Deposition Monitoring			
Area	Active Site*	Monitoring Location	Comments
Northern Area	RNA / Exhibition	RNA Showgrounds	- Results met air quality goal.
	Northern Corridor	Northern Corridor (near Brisbane Girls Grammar School)	- Results met air quality goal.
Central Area	Albert Street	Mary Street	- Results met air quality goal.
	Boggo Road	Quarry Street (north of the site)	- Results did not meet air quality goal. See above supporting information on why this was not from the project works and see Appendix B – Section 3.3.1.
		Peter Doherty Street/Leukemia Foundation	- Results met air quality goal.
	Southern Portal	Dutton Park Station	- Results met air quality goal.
	Roma Street	Roma Street Station	- Results met air quality goal.
	Woolloongabba	Russian Orthodox Cathedral	- Results met air quality goal.
		Woolloongabba Busway	- Results met air quality goal.

* Southern Area (Dutton Park and Fairfield to Salisbury) had no active high-risk worksites.

2.2.3.2. Particulate Matter and Total Suspended Particulates

Monitoring for particulate matter (PM₁₀) and total suspended particulates (TSP) was conducted at Mayne Yard, Northern Area and Central Area worksites during the reporting period. All worksites met air quality goals. The Albert Street monitoring unit stopped functioning on the 13, 14 and 20 December due to a technical fault. The first fault occurred over the weekend and was rectified as soon as practicable. The nearby DES Air Quality Station (Brisbane CBD) demonstrated levels in the area were below the air quality goals for the reporting period.

A summary of particulates monitoring is shown below.

Air Quality – PM ₁₀ / TSP Monitoring			
Area	Active Site*	Monitoring Location	Comments
Mayne Area	Mayne Yard	Mayne Yard North - Eastern Air Shed (Burrows St, Bowen Hills)	- Results met air quality goals.
Northern Area	RNA / Exhibition	RNA - Western Air Shed (Lanham Street, Bowen Hills)	- Results met air quality goals.
	Northern Corridor	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. - Results met air quality goals (note that the monitoring unit had a technical fault between 13, 14 and 20 December).
	Boggo Rd / Southern Portal	North-east of Boggo Road worksite	- Results met air quality goals.
	Roma St	Roma Street Station	- Results met air quality goals.
	Woolloongabba	Place Park, Woolloongabba	- Results met air quality goals.

*Southern Area (Dutton Park and Fairfield to Salisbury) had no active high-risk worksites.

2.2.4. Water Quality

Monitoring and reporting on water quality was undertaken in accordance with the Project's Water Quality Management Plans.

2.2.4.1 Surface Water

There were no surface water discharges from Mayne Yard or Southern Area worksites during the reporting period.

In the Northern Area there was an uncontrolled discharge of sediment laden water on 17 December from the Northern Corridor to York's Hollow resulting in an exceedance of water quality discharge criteria for total suspended solids (TSS) over 50mg/L. The discharge event occurred due to a high intensity rainfall event exceeding the design criterion for Type 2 Erosion and Sediment Control measures installed on site as per approved Erosion and Sediment Control Plan. An investigation of the event concluded that the event is not deemed a Non-Compliance Event with Imposed Conditions. Refer to **Appendix A (Table 5 and Section 3.3.5.2)** for more details.

Active surface water discharge (dewatering by pumping) was undertaken in the Central Area at the Boggo Road and Woolloongabba worksites. Surface water discharge results were compliant with the relevant requirements detailed in Imposed Condition 18¹.

Surface water quality monitoring is summarised in the table below:

Surface Water Quality Monitoring				
Area	Site	Discharge	Post-Rain	Comments
Mayne Area	Mayne Yard North	Yes	Yes	- Passive surface water discharge. - Post-rainfall monitoring in Breakfast Creek met water quality discharge criteria.
Northern Area	Northern Corridor	Yes	Yes	- Passive surface water discharge. - Post-rainfall monitoring at York's Hollow did not meet water quality discharge criteria. An investigation of the event concluded that the event is not deemed a Non-Compliance Event with Imposed Conditions. Refer to Appendix A (Table 5 and Section 3.3.5.2) for more details.
Central Area	Albert Street	No	No	- No surface water discharges
	Boggo Road / Southern Portal	Yes	No	- Active surface water discharges. - Results met water quality discharge criteria.
	Roma Street	No	No	- No surface water discharges.
	Woolloongabba	Yes	No	- Active surface water discharges. - Results met water quality discharge criteria.
Southern Area	Dutton Park and Fairfield to Salisbury Stations	No	No	- No surface water discharges

¹ Guidelines for Best Practice Erosion and Sediment Control (IECA, 2008) and the Department of Transport and Main Roads' Technical Standard MRTS52 – Erosion and Sediment Control

2.2.4.1. Groundwater

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

Groundwater discharges occurred in the Central Area at Roma Street, Albert Street and Boggo Road worksites. All groundwater discharges exceeded the Water Quality Objectives (WQO's) for Total Nitrogen, Oxidised Nitrogen, Ammonia Nitrogen and Organic Nitrogen. Boggo Road also exceeded in Total Phosphorus, however they were all consistent with baseline monitoring pre-construction commencement and therefore an NCE was not required. Compliance assessment for short-term increases of pollutants does not necessarily cause significant impacts on the ecosystem and will require ongoing monitoring and assessment.

Groundwater Quality Monitoring			
Area	Site	Discharge	Comments
Mayne Area	Mayne Yard North	No	- No groundwater discharges.
Northern Area	Northern Corridor	No	- No groundwater discharges.
Central Area	Albert Street	Yes	- Groundwater discharge (dewatering) - Discharge of groundwater did not meet WQO's but was generally consistent with pre-construction conditions and no external influences were introduced by construction activity.
	Boggo Road / Southern Portal	Yes	- Groundwater discharge (dewatering) - Discharge of groundwater did not meet WQO's but was generally consistent with pre-construction conditions and no external influences were introduced by construction activity. (dewatering).
	Roma Street	Yes	- Groundwater discharge (dewatering) - Discharge of groundwater did not meet WQO's but was generally consistent with pre-construction conditions and no external influences were introduced by construction activity.
	Woolloongabba	No	- No groundwater discharges.
Southern Area	Fairfield to Salisbury Stations	No	- No groundwater discharges.

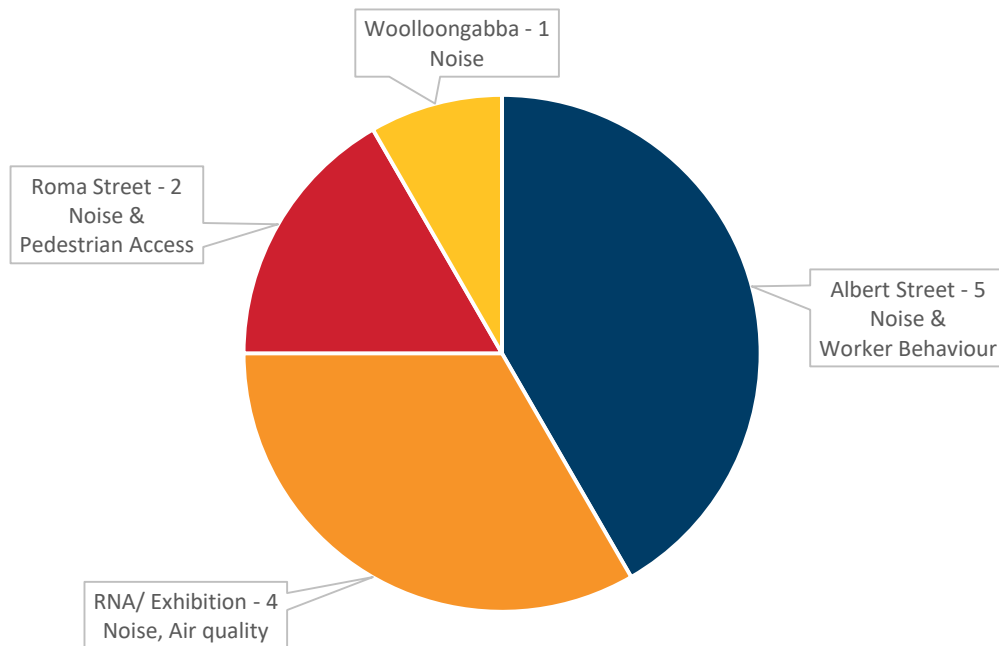
2.2.5. Erosion and Sediment Control

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

2.3. Complaints Management

The Project received 12 complaints during the month. There were four noise and air quality complaints related to RIS works at RNA/Exhibition worksites. Eight complaints were related to TSD works at the Woolloongabba, Roma Street and Albert Street worksites, and were in relation to noise, pedestrian and cyclist access, and worker behaviour (typically language/swearing). All complaints were responded to within the required timeframes. The outputs are summarised in the chart below.

Complaints Summary - December 2020

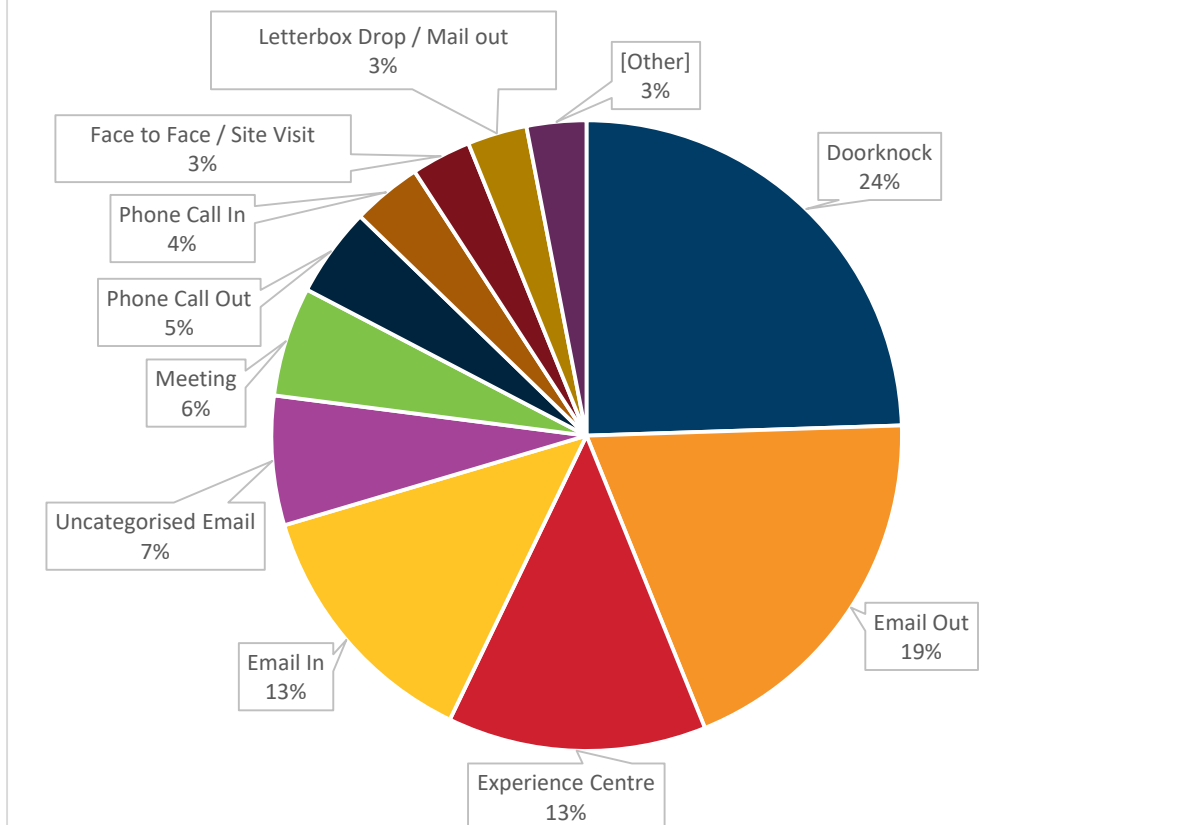


Where attended noise monitoring was undertaken in response to a complaint, the contractor confirmed on all occasions that works undertaken at the time of the complaint adhered to project requirements. In some instances, previous attended noise monitoring data representative of the concerned construction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

To close out a complaint the project reviews the monitoring data (where applicable), compliance with the CEMP, site environmental management plans and permits, and that required community notification has taken place and any actions taken to reduce/mitigate the impact – this will then demonstrate that project requirements have been met.

For scheduled out of hours works, community notification was provided, as well as regular project updates. The following chart summarises the types of engagement undertaken on the project in December 2020.

Engagement - 1 to 31 December 2020



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	• Ground improvement for Graffiti Wash Facility and Crew Change Building; • Ground improvement works for track sectioning cabin and slab; • Ground improvement piling for reinforced soil structures wall; • Signaling and commissioning works in Mayne Yard north; and • Ferny Grove flyover pier protection works.
Northern Area	• Piling for rail containment barriers; • Water main relocation; • Victoria Park shared user path diversion; • Northern Portal site establishment, piling, excavation and sewer works; and • RNA Platform 3 demolition.
Central Area	• Roma Street – enabling works for the Services Building and the new station building including piling and excavation, continued cavern excavation and controlled blasting; • Albert Street – excavation of station box to continue to mid-2021 on Lot 1, 24-hour tunnelling will continue within the acoustic enclosure on Lot 2 and piling to commence on Lot 3; • Woolloongabba – continue in January assembly to commence in station box, excavation of southern cavern area;

Area	New planned works in the coming months
	- Boggo Road – ongoing excavation with an increase in spoil removal from site; and ongoing northern canopy tubes installation; and - Southern Portal – site establishment and piling pad preparation works, utility relocation and Scheduled Corridor Access System (SCAS) works.
Southern Area	- Import fill from Mayne Yard to Clapham; - Clapham ground surface treatment - remove and replace; - Yeronga tree clearing; and - Yeronga retaining wall demolition.

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 – December 2020

**Cross River Rail – Rail, Integration and Systems
Alliance**

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1 Progress Summary

1.1 Summary of Project Works

The following *Project Works* continued in December 2020:

- Mayne Yard North
 - Stormwater drainage works
 - Temporary cable route diversions to facilitate Ferny Grove Flyover pier protection work
 - Mayne Yard Suburban Line Earthworks for new Combined Services Route alignment
 - Ground improvement piling for Reinforced Soil Structures (RSS) walls
 - Stabling yard security fence installation
 - Main Trunk outlet into Breakfast Creek
- Northern Corridor
 - Combined services route installation
 - Holding road installation
 - Capping placement
 - Public Utility Plant (PUP – Sewer) relocation in Victoria Park
 - Concrete lined drain installation
 - Boundary fence installation
- RNA Showgrounds
 - Line drilling and rock excavations to widen the Northern corridor adjacent O'Connell Terrace
 - Soil nail installation adjacent to O'Connell Terrace
 - Demountable toilet block relocations
 - Public Utility Plant (PUP) relocations (Sewer, Water, Electrical)
- Fairfield to Salisbury (F2S)
 - Yeronga site establishment
 - Yeronga water main relocation
- Clapham yard
 - Geotechnical and CLASS (Contaminated land and acid sulphate soil) investigations

The following *Project Works* started in December 2020:

- Mayne Yard North
 - Ground Improvement of Graffiti Wash Facility and Crew Change Building
 - Ground Improvement works for track sectioning cabin and slab
 - Preparation works for RC14 cast in place (CIP) piling of Ferny Grove Flyover pier protection
- Northern Corridor
 - Piling preparations for Bowen Bridge and ICB pier protection (RC22/RC23)
 - Defect close out ahead of handover to the Pulse Consortium
- RNA Showgrounds
 - Overhead line installations and wire transfers to facilitate the demolition of Western Platform
- F2S

- Fairfield Station OHLE foundation installation
- Clapham yard
 - No new works commenced in December 2020

The following *Project Works* are proposed in January 2021:

- Mayne Yard North
 - Commence continuous flight auger ground improvement piling for Reinforced Soil Structures wall RW110
 - RC14 CIP piling of Ferny Grove Flyover pier protection
- Northern Corridor
 - No new works are proposed in January 2021
- RNA
 - Western platform demolition
 - RW225 piling pad installation and associated service relocations.
- F2S
 - Yeronga tree Clearing
 - Yeronga Retaining Wall demolition
 - New Platform retaining wall FRP
- Clapham yard
 - No new works are proposed in January 2021

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 1: Summary of Complaints

Date	Location	Issue	Activity source of the concern	Period	Unity Response	Status
1/12/2020	Tufton Street - Residential	Noise / Air Quality	O'Connell Terrace rock breaking	Standard working hours	Noise Attended internal noise monitoring was offered by the Unity team but was declined by the stakeholder. Since attended monitoring had previously been undertaken at this location on eight (8) different occasions, as recently as 25 November 2020 no external monitoring was undertaken. The monitoring data collected to date confirmed compliance with the Project's noise goals (Imposed Condition 11a). Air Quality Continuous particulate monitoring undertaken within 50m of the stakeholder residence. The monitoring data confirmed compliance with the Project's air quality goals (Imposed condition 13a). The project team is continuing their regular engagement with this stakeholder ahead of planned works	Closed
8/12/2020	Tufton Street - Residential	Noise / Air Quality	O'Connell Terrace rock breaking	Standard working hours	Noise External Noise Monitoring undertaken at receiver in response to this complaint. . The external monitoring data confirmed compliance with the Project's noise goals (Imposed Condition 11a). Air Quality Continuous particulate monitoring undertaken within 50m of the stakeholder residence. The monitoring data confirmed compliance with the Project's air quality goals (Imposed condition 13a). The project team is continuing their regular engagement with this stakeholder ahead of planned works	Closed

Date	Location	Issue	Activity source of the concern	Period	Unity Response	Status
8/12/2020	Tufton Street - Residential	Noise	O'Connell Terrace rock breaking	Standard working hours	Noise External Noise Monitoring undertaken at receiver in response to this complaint. Internal monitoring was not offered due to safety concerns. The external monitoring data confirmed compliance with the Project's noise goals (Imposed Condition 11a). The project team is continuing their regular engagement with this stakeholder ahead of planned works	Closed
15/12/2020	Tufton Street - Residential	Noise / Air Quality	O'Connell Terrace rock breaking	Standard working hours	Noise Noise Monitoring was not undertaken. External Noise Monitoring had already been undertaken at receiver on 08/12/20 which is representative of the activity subject to the Complaint. The external monitoring data confirmed compliance with the Project's noise goals (Imposed Condition 11a). Air Quality Continuous particulate monitoring undertaken within 50m of the stakeholder residence. The monitoring data confirmed compliance with the Project's air quality goals (Imposed condition 13a). The project team is continuing their regular engagement with this stakeholder ahead of planned works	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 (CEMP) occurs.

3.1.1 Noise Monitoring

Attended noise monitoring was triggered based on the predictive noise assessments for

- Micro-piling works (O'Connell terrace Bridge – Standard hours)

In accordance with the CEMP, attended outdoors monitoring was undertaken to validate the predictive assessment.

Monitoring was undertaken in order to confirm that works could continue to proceed as planned.

Attended noise monitoring was undertaken based on the complaints presented in Section 2 for:

- Tufton Street during rock breaking activities (8 December 2020)

3.1.2 Noise monitoring Results

The below table summarises the noise monitoring results for reporting period.

Table 2 Summary of Noise Monitoring Data

Location and Receiver Type Details	Type of Monitoring	Working Hours	Noise Type	Purpose of Monitoring	Predictive model LA ₁₀ (dBA)	Performance Goal (dBA) (Condition 11(a), Table 2, LA ₁₀ noise goals)	Performance Goal (dBA) – (Condition 11(c), Table 2 LA ₁₀ noise goal + 20dBA)	Measured LA ₁₀ (dBA)	Measured LA _{eq} (dBA)	Is performance Goal exceeded?	Comments
Tufton Street, Bowen Hills Residential	Attended – Outdoors ¹	Standard Hours Saturday 05/12/20 12:18	Intermittent	Construction Monitoring at Sensitive Places - Model Verification	80-85	65 (Outdoors) (45dBA AS 2107 Maximum Design Level + 10dBA + 10dBA façade reduction) ²	85 (Outdoors) (65+ 20dBA)	70	65	No exceedance	Micro-piling Works For interpretation, please refer to section 3.1.4.1.1
Tufton Street, Bowen Hills Residential	Attended – Outdoors ¹	Standard Hours Tuesday 08/12/20 13:17	Intermittent	Complaint Response	80-85	65 (Outdoors) (45dBA AS 2107 Maximum Design Level + 10dBA + 10dBA façade reduction) ²	85 (Outdoors) (65+ 20dBA)	79	76	No exceedance	Rock Breaking Works For interpretation, please refer to section 3.1.4.1.2

- Note (1) - Monitoring Method
 - 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, in particular 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 Queensland¹.
 - Additionally, a number of 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.

¹ https://www.ombudsman.qld.gov.au/ArticleDocuments/218/Airport_Link_Ombudsman_Statement.pdf.aspx, pages 208-210, Section 9.8.6

3.1.3 Vibration Monitoring

Vibration monitoring was not triggered during the reporting period based on the predictive vibration assessments for all activities.

Vibration monitoring because of complaints was not triggered. No complaints related to vibration occurred during the reporting period.

3.1.4 Interpretation

3.1.4.1 Noise Monitoring²

3.1.4.1.1 Micropiling Works – O’Connell Terrace

Monitoring of Micropiling works at O’Connell Terrace was undertaken externally at the nearest DAP (Tufton Street, Bowen Hills, multi-level unit building), approximately 5m from the façade of the building. Monitoring was undertaken during standard construction hours. The measured LA₁₀ readings were compliant with the Imposed Conditions for works during standard working hours. No additional monitoring was triggered for this activity.

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

3.1.4.1.2 Rock Breaking Works – O’Connell Terrace

Monitoring of Rock Breaking works at O’Connell Terrace was undertaken externally at the nearest DAP (Tufton Street, Bowen Hills, multi-level unit building), approximately 5m from the façade of the building. Monitoring was undertaken during standard construction hours in response to complaints made by residents. The measured LA₁₀ readings were compliant with the Imposed Conditions for works during standard working hours. No additional monitoring was triggered for this activity.

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

3.1.4.2 Vibration Monitoring

Not triggered during this reporting period.

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 CEMP occurs.

Visual monitoring was undertaken during routine environmental inspections. A total of nine (9) inspections were undertaken by the environment team across Mayne Yard, RNA Showgrounds 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 3 Summary of Air Quality devices

Monitoring Device Installed by UNITY	Area	Name	Date Installed	Status for the Month of December
Dust Deposition Gauge	RNA Showgrounds	AQ-01	13 December 2019	Active
Dust Deposition Gauge	Northern Corridor (near BGGs)	AQ-02	13 December 2019	Active
Dust Deposition Gauge	Northern Corridor (near Centenary Pool)	AQ-03	13 January 2020	Decommissioned as per the recommendation of the Certified Air Quality Professional (CAQP)
Dust Deposition Gauge	Mayne Yard (Eastern Air Shed)	AQ-04	13 February 2020	Active

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

Monitoring Device Installed by UNITY	Area	Name	Date Installed	Status for the Month of December
TSP / PM ₁₀ Monitor	Mayne Yard (Eastern Air Shed)	UNI324	23 April 2020	Active
TSP / PM ₁₀ Monitor	Northern Corridor (Eastern Air Shed)	UNI327	23 April 2020	Active
TSP / PM ₁₀ Monitor	RNA (Western Air Shed)	UNI319	25 August 2020	Active

3.2.1 Dust results

Since passive dust deposition gauges are analysed on a monthly basis, results span from 13 November to 14 December 2020.

The dust deposition gauges result for the reporting period are detailed below and complied with Imposed Condition 13(b) of the CGCR.

Table 4 Dust deposition gauge results for period 13 November 2020 to 14 December 2020.

CGCR Goal (mg/m ² /day)	AQ-01 Results - RNA Showgrounds (mg/m ² /day)	AQ-02 Results - BGGs (mg/m ² /day)	AQ-04 Abbotsford Rd (E Mayne) (mg/m ² /day)
120	53	90	73
Total Rainfall during Period	91.4mm	91.4mm	91.4mm

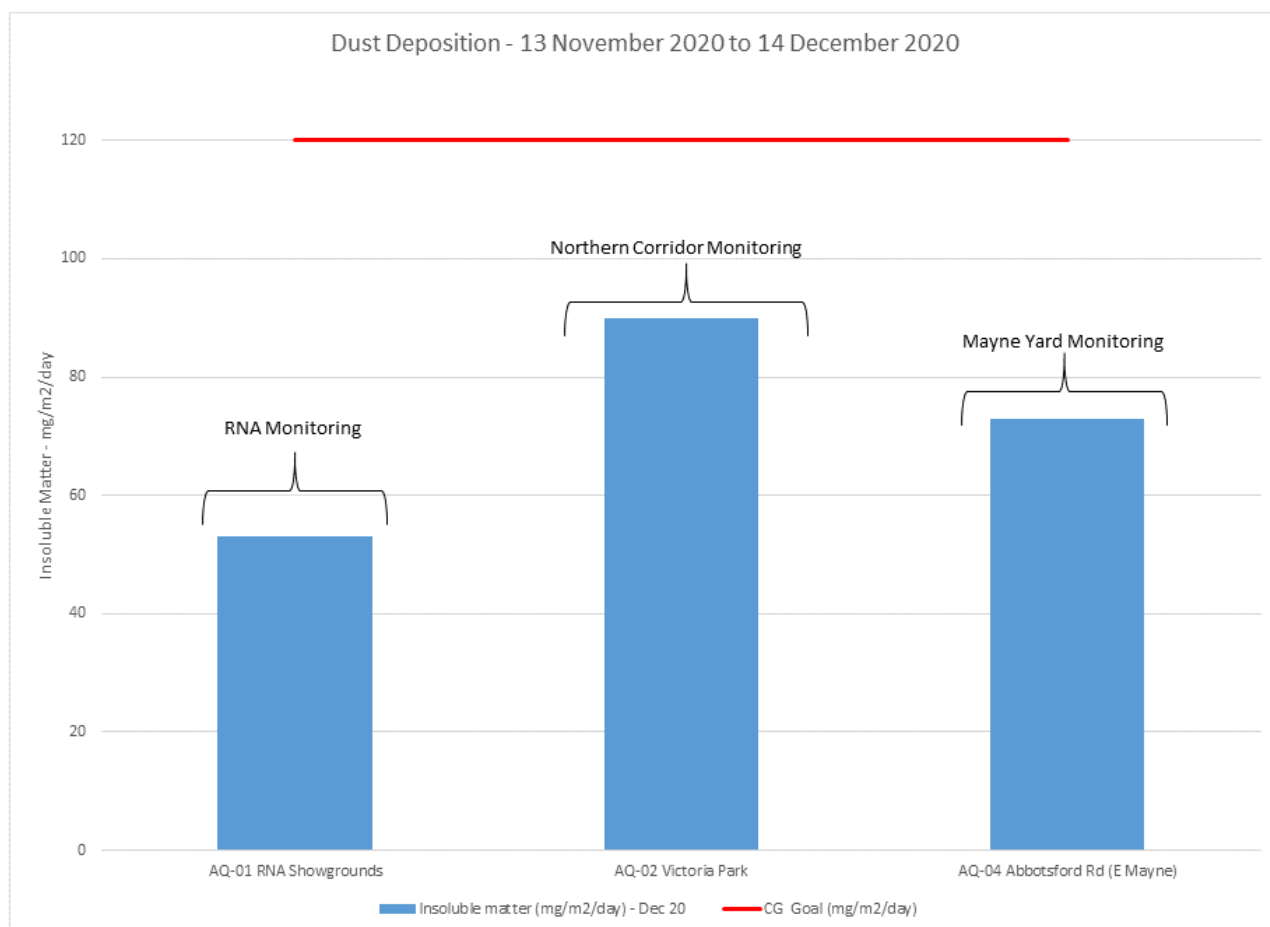


Figure 1: Air Quality Monitoring (Deposited Dust) 13 November – 14 December 2020 Results

3.2.2 Particulates results

3.2.2.1 UNITY Air Quality Monitoring Stations

Unity had three operational air quality monitoring stations set up for the reporting period.

3.2.2.2 Monitoring results

External ambient air quality data was collected for total suspended particles (TSP), and particulate matter less than 10 µm (PM₁₀).

TSP is one of the indicators for which the Coordinator-General has imposed a goal of 80 µg/m³ (over an averaging period of 24 hours) the project must aim to achieve under Imposed Condition 13(a).

PM₁₀ is one of the indicators for which the Coordinator-General has imposed a goal of 50 µg/m³ (over an averaging period of 24 hours) the project must aim to achieve under Imposed Condition 13(a).

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

The results are represented in the below figures.

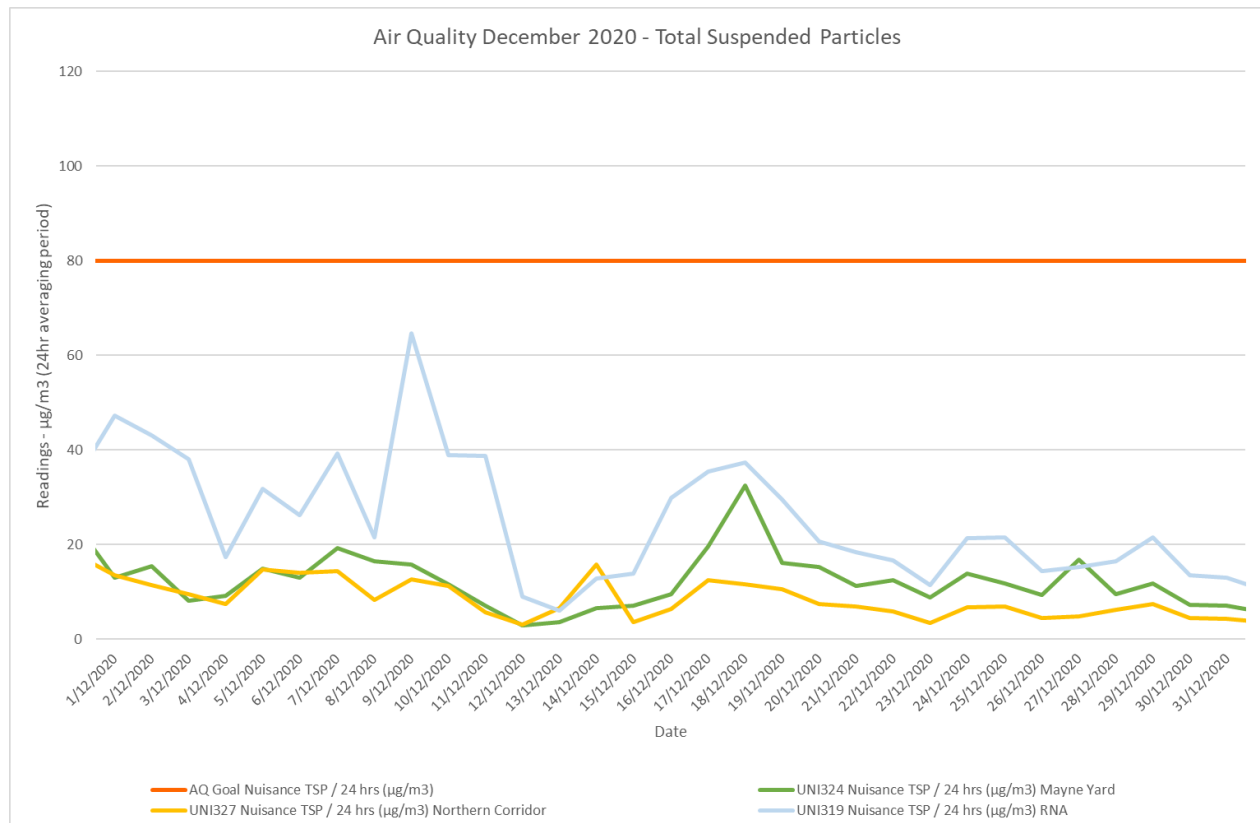


Figure 2: Air Quality Monitoring (TSP) - December 2020 Results

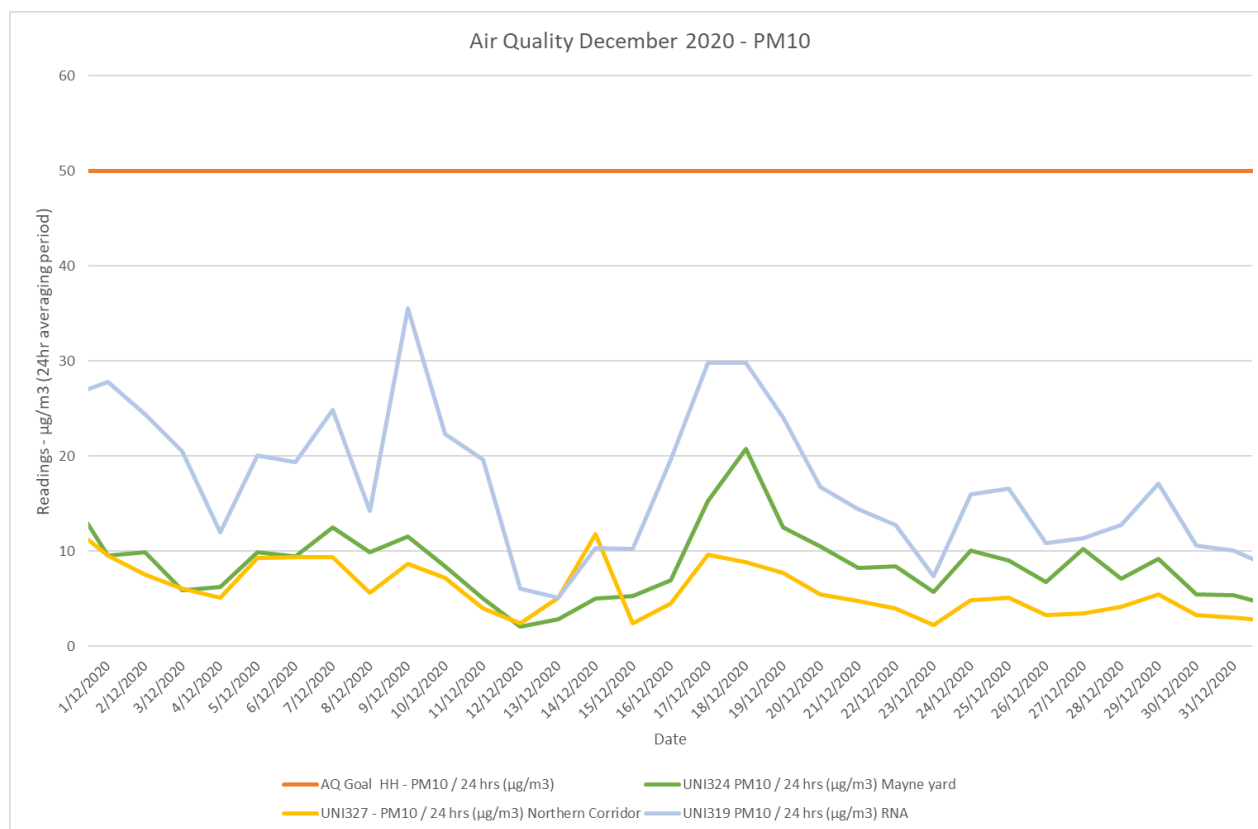


Figure 3: Air Quality Monitoring (PM₁₀) - December 2020 Results

3.2.3 Interpretation

Particulate monitoring results did not exceed the relevant air quality goals specified by Imposed Condition 13.

The CEMP and the AQMP recognise that particulate matter monitoring can be a lag indicator. Therefore, the monitoring regime detailed in the CEMP consists of a combination of surveillance regimes through inspections at the time the works are occurring and particulate matter monitoring to validate the surveillance regime findings and potential complaints.

Site inspections at Mayne Yard, RNA Showgrounds and the Northern Corridor by the environment team confirmed that:

- There was no visible dust leaving the site boundaries;
- Waters carts were on site and used for dust suppression / fill conditioning;
- During rock breaking activities at RNA, continuous dust suppression with hoses has been undertaken; and
- Stabilised egress was in place and in functioning order at each access point.

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

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 CEMP, 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:

- There were passive discharges through type 2 and 3 ESC devices during December associated with rain events:
 - 13-14 December 2020. A rain event occurred which generated run-off from the active worksites of Mayne Yard and Northern Corridor triggered a post-rain monitoring event at these locations.
 - 17 December 2020. A rain event occurred which generated run-off from the active worksite of Northern Corridor triggered a post-rain monitoring event at this location.

There were no active surface water discharges during December (e.g. dewatering through pumping, sediment basin release).

In-situ physico-chemical parameters results for all monitoring undertaken during the reporting period are presented below.

3.3.1 Rainfall Records

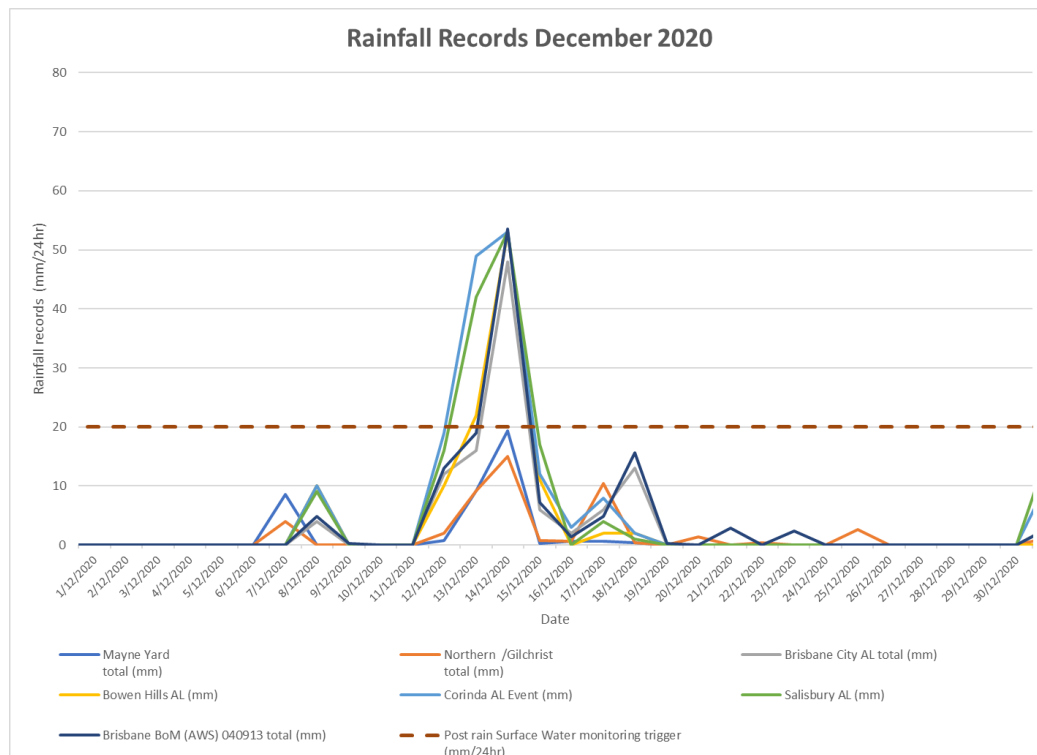


Figure 4: Rainfall – December 2020 Results

3.3.2 Surface Water Discharge Monitoring / 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 higher intensity may cause run-off which would also trigger post rain monitoring consistent with the C-EMP.

Post rainfall monitoring was triggered during the reporting period at the active worksites, Northern Corridor and Mayne Yard.

The result of monitoring at the relevant waterways are presented in the below. When results are in red, they exceed / do not meet the Project discharge criteria for compliance with Imposed Conditions 15 and 18.

Table 5: Surface Water Discharge Monitoring Results

Date	Location	Waterway	Tide	Turbidity (NTU)	TSS (mg/L)	DO (%)	pH (pH Unit)
Discharge Criteria ³				Nil until Turbidity / TSS correlation achieved ⁴	50	Nil	Stable pH reading; and General sites: 6.5 – 8.5, or Wallum/Acidic Ecosystems: 5.0 – 7.0
13/12/20	SW 1 – Upstream of Mayne Yard	Breakfast Creek	Falling brackish to marine conditions	In field: 10 Lab:10	7	70	7.0
13/12/20	SW 2 – Adjacent to Mayne Yard	Breakfast Creek	Falling brackish to marine conditions	In field: 24 Lab: 16	30	84	7.6
13/12/20	SW 3 – Downstream of Mayne Yard	Breakfast Creek	Falling brackish to marine conditions	In field: 19 Lab: 16	13	86	7.7
13/12/20	SW 4 – Downstream of Northern Corridor	Barrambin / York's Hollow	Not applicable – non tidal environment	In Field: 85 Lab: 67.5	39	66	7.0
14/12/20	SW 4 – Downstream of Northern Corridor (monitoring undertaken as part of ongoing monitoring of 13 December post rain event)	Barrambin / York's Hollow	Not applicable – non tidal environment	In Field: 18 Lab: 15	9	85	7.7
17/12/20	SW 4 – Downstream of Northern Corridor	Barrambin / York's Hollow	Not applicable – non tidal environment	In Field: 198.5 Lab: 131	128 (refer section 3.3.5 for more details)	89	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 discharged the RIS Scope of Works has experienced, there is no correlation available for Mayne Yard, and only a minimal data set (7 data points) for York's Hollow. Typically, a minimum of 20 data points is used to determine TSS / in field turbidity correlation for site waters. The data set for York's Hollow has been reviewed and a preliminary correlation of TSS = 0.5 x Field Turbidity has been established.

Date	Location	Waterway	Tide	Turbidity (NTU)	TSS (mg/L)	DO (%)	pH (pH Unit)
18/12/20	SW 4 – Downstream of Northern Corridor (monitoring undertaken as part of ongoing monitoring of 17 December post rain event)	Barrambin / York's Hollow	Not applicable – non tidal environment	In Field: 47 Lab: 26	24	59	7.1

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 undertook one (1) round of routine surface water monthly monitoring. This monitoring is being undertaken as it may inform the Dis-1 Credit for the ISCA 'Excellent Rating' the Project is pursuing. The results are presented in Table 6.

Table 6: Routine Surface Water Monitoring Results

Date	Location	Waterway	Tide	Turbidity (NTU)	TSS (mg/L)	DO (%)	pH (pH Unit)
10/12/20	SW 1 – Upstream of Mayne Yard	Breakfast Creek	Rising Brackish to marine conditions	In field: 10 Lab: 10	7	70	7.0
10/12/20	SW 2 – Adjacent to Mayne Yard	Breakfast Creek	Rising Brackish to marine conditions	In field: 24 Lab: 16	30	84	7.6
10/12/20	SW 3 – Downstream of Mayne Yard	Breakfast Creek	Rising Brackish to marine conditions	In field: 19 Lab: 16	13	86	7.7
10/12/20	SW 4 – Downstream of Northern Corridor	Barrambin / York's Hollow	Not applicable – non tidal environment	In field: 8 Lab: 7	10	94	7.7
10/12/20	SW 5 – Upstream rail corridor	Moolabin Creek	Not applicable – non tidal environment	In field: 7 Lab: 15	9	56	7.3
10/12/20	SW 6 – Downstream rail corridor	Moolabin Creek	Not applicable – non tidal environment	In field: 8 Lab: 5	6	42	7.4
10/12/20	SW 7 – Upstream Rail corridor	Rocky Water Holes Creek	Not applicable – non tidal environment	In field: 21 Lab: 21	40	45	7.4
10/12/20	SW 8 – Downstream Rail corridor	Rocky Water Holes Creek	Not applicable – non tidal environment	In field: 4 Lab: 5	48	48	7.5
10/12/20	SW 9 – Downstream Rail corridor	Stable Swamp Creek	Not applicable – non tidal environment	In field: 6 Lab: 4	7	84	7.7

3.3.5 Interpretation

3.3.5.1 13-14 December 2020 Post Rainfall Monitoring

Post rainfall monitoring undertaken following the 13-14 December 2020 storm events confirmed that despite run-off having been generated from the active worksites of Mayne Yard and the Northern Corridor, off-site discharges met the discharge criteria at the relevant receiving waters.

Therefore, compliance with Imposed Conditions 15 and 18 was met.

3.3.5.2 17 December 2020 Post Rainfall Monitoring

Post rainfall monitoring undertaken following the 17 December 2020 storm event at Barrambin identified that a sediment laden discharge had occurred. Laboratory samples collected within an hour from the storm event confirmed an exceedance of the discharge criterion for TSS had occurred.

3.3.5.2.1 Information Review

The following information was therefore reviewed to ascertain whether the discharge met the requirements under Imposed Condition 4d, 15 and 18:

- Works being undertaken at the time were permanent drainage works were being completed to prepare for the Christmas shutdown period from 19 December 2020 (first day of shutdown) to 03 January 2021 (last day of shutdown)
 - The long-range weather forecast predicted wet weather to occur for 10 days of the scheduled 16 days shutdown period, inclusive of a five (5) day window of widespread rain (severe weather).
 - With such a forecast there was an increased risk of off-site releases.
 - The predicted weather forecast for 17 and 18 December offered a favourable weather window to execute the works to provide a longer term environmental benefit.
- Rainfall
 - The Northern Corridor however experienced a 15-30 minute storm event on 17 December 2020 at approximately 9.30 am. Review of the on-site weather stations confirmed the storm event was of a peak intensity ranging from 53 to 74mm/hr. This equates to a rain event in excess of a 3EY.
 - Rainfall depths ranging from 9.6 to 12mm were recorded as a result of the storm from various nearby weather stations (inclusive of two BoM weather stations⁵).
 - The storm event exceeded the design criterion for Type 2 ESC measures (0.5 x the 1 in 1 year critical storm or 4 EY) for a 15min design storm. The Design Criterion Rainfall Intensity for a 15 min storm is 44.9 mm/hr or approximately 9.8mm.
- Erosion and Sediment Control Plans (ESC-Ps)
 - Suitability
 - the Overarching ESC-P prepared in accordance with Imposed Condition 18 notes that the *“most effective control measure in the event of severe weather is to secure and stabilise as much exposed area as possible. This can also be achieved by scheduling high risk activities (such as stripping, or drainage work) to low risk periods of time (with limited rain forecast). Prior to forecasted severe weather (or any rainfall) all efforts should be made to secure the work area by temporary or permanent means”*.
 - The site specific ESC-P for the Northern Corridor prepared and regularly updated by a Certified Practitioner in Erosion and Sediment Control exists. The latest revision of the plan was dated 11 December 2020
 - Implementation
 - Controls were implemented in accordance with the approved ESC-Ps, this includes attempting to complete critical drainage works within a forecast period of rainfall in preparation for more severe weather during shutdown
- Monitoring and adaptative management
 - Consistent with the C-EMP, UNITY’s environmental personnel attended site within 1 hour of the rain event to assess:
 - the on-site impacts

⁵ BoM weather stations rainfall records are reviewed in conjunction with the site weather station rainfall records. Indeed, BoM weather station records are subject to data quality control and provide a reliable records of rainfall depth to help calibrate user based weather stations

- the off-site impact of the storm and collect water quality samples (in situ and for laboratory analysis) at Barrambin.
- In parallel the Construction team:
 - stopped works
 - deployed emergency ESC measures as per the site specific ESCP for unavoidable wet weather works response
- Further site inspections were undertaken the following morning to further assess whether any additional measures required to be completed within the Northern Corridor prior to works finishing on 23 December 2020.
- Further water quality monitoring was also undertaken the following morning. The visual monitoring confirmed that offsite discharge had stopped and that the water quality had visibly improved in 24 hours and was within background parameters (refer Table 5).

3.3.5.2.2 Conclusion

The rainfall event exceeded the design standard for the sediment controls (0.5 x the 1 in 1 year critical storm or 4 EY) therefore the Project discharge criteria can be exceeded pending all reasonable and practicable measures were implemented.

The erosion and sediment controls within the Project boundary were either installed in accordance with the ESC-P requirements or interim and compensatory measures were installed as per the ESC-P as a response to the rain and works were stopped.

Whilst within one hour of the discharge the total suspended (TSS) solids results exceeded 50mg/L, within 24 hours of the discharge having occurred the TSS results were less than 50mg/L.

No litter or hydrocarbons were visible at the discharge point. No coarse sediment deposits were visible at the discharge points. pH readings were consistent with background conditions.

On this basis

- The decision to proceed with the works was based on a risk assessment to achieve a higher level of protection on site prior to an extended period of shutdown
- All materials to enable a prompt response to actual wet weather (as per the SS-ESCP) were at hand and deployed readily as a response to rain
- The increased turbidity monitored at Barrambin was short-lived (less than 24 hours), with no requirement for remedial activities at the discharge points.
- All materials and personnel were available and in place to mitigate the extent of the release at source as a response to rain

The event is therefore not deemed a Non-Compliance Event with Imposed Conditions 4d, 15 and 18.

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 7 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 CEMP Compliance

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

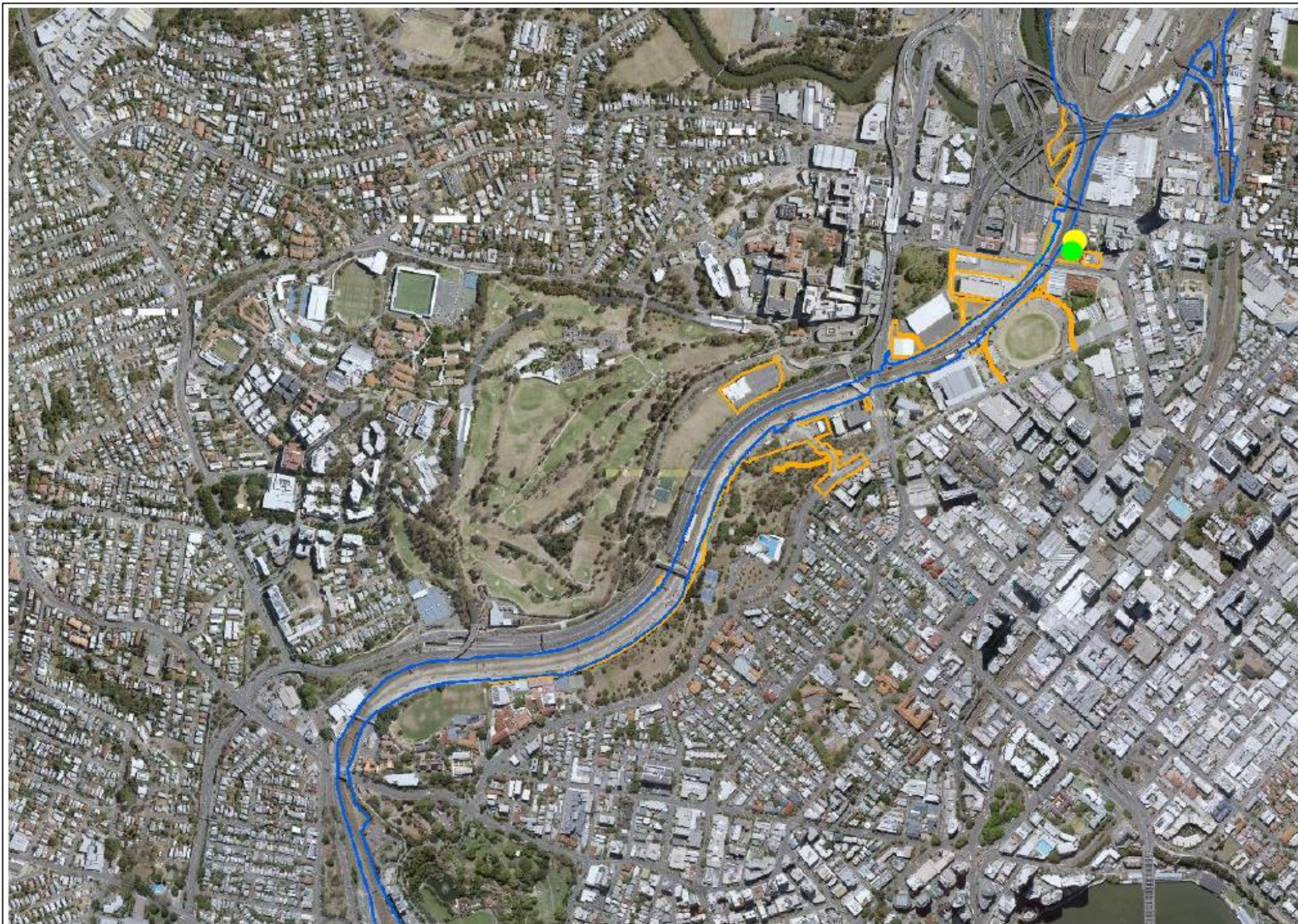
Table 8 CEMP and relevant Subplans monitoring requirements – Compliance Status for the reporting period

Aspect	Monitoring requirement	Activities risk profile	Monitoring undertaken	Compliance status with CEMP / 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 undertaken as part of routine inspections Monitoring for TSP, PM10 and deposited dust also undertaken	Compliant	Not Applicable
Air Quality	Complaints response	Moderate to High	Yes	Compliant	Not Applicable
Noise	Buffer distance tests based on the outcomes of the predictive assessment based / risk profile of activities	Moderate to High	Yes	Compliant	Not Applicable
Noise	Plant noise audits for noisy plant to validate models input as required	Moderate to High	No	Compliant	Not Applicable
Noise	Complaints response	Moderate to High	Yes	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	Complaints response	Moderate to High	Not triggered – no complaints	Compliant	Not Applicable
Water Quality	Monthly monitoring	N/A	Yes	Compliant	Not Applicable
Water Quality	Post Rainfall	Moderate to High	Yes	Compliant	Not Applicable
Water Quality	Dewatering	Moderate to High	Not triggered – no dewatering to receiving water systems	Compliant	Not Applicable

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

None for this reporting period.

Attachment 2 Monitoring Locations – Noise



- Legend**
- Project Boundary RFPC8 - Permanent
 - Project Boundary RFPC8 - Temporary Construction
 - Project Boundary RFPC8 - Volumetric
 - Complaint Response
 - Construction Monitoring at Sensitive places

A FOR INFORMATION			
Issue	Description	Date	Approved
	Noise Map 2		
Scale 1: 10,000			
© EIC Activities GIS			

This map is a user generated static output from EIC Activities Web GIS Viewer and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

GIS OUTPUT NOT USED FOR CONSTRUCTION			
Original Size	A3	Drawn	
Coordinate System	MGA94-56	Designed	
Height Datum	AHD	Date Printed	10-Dec-2020



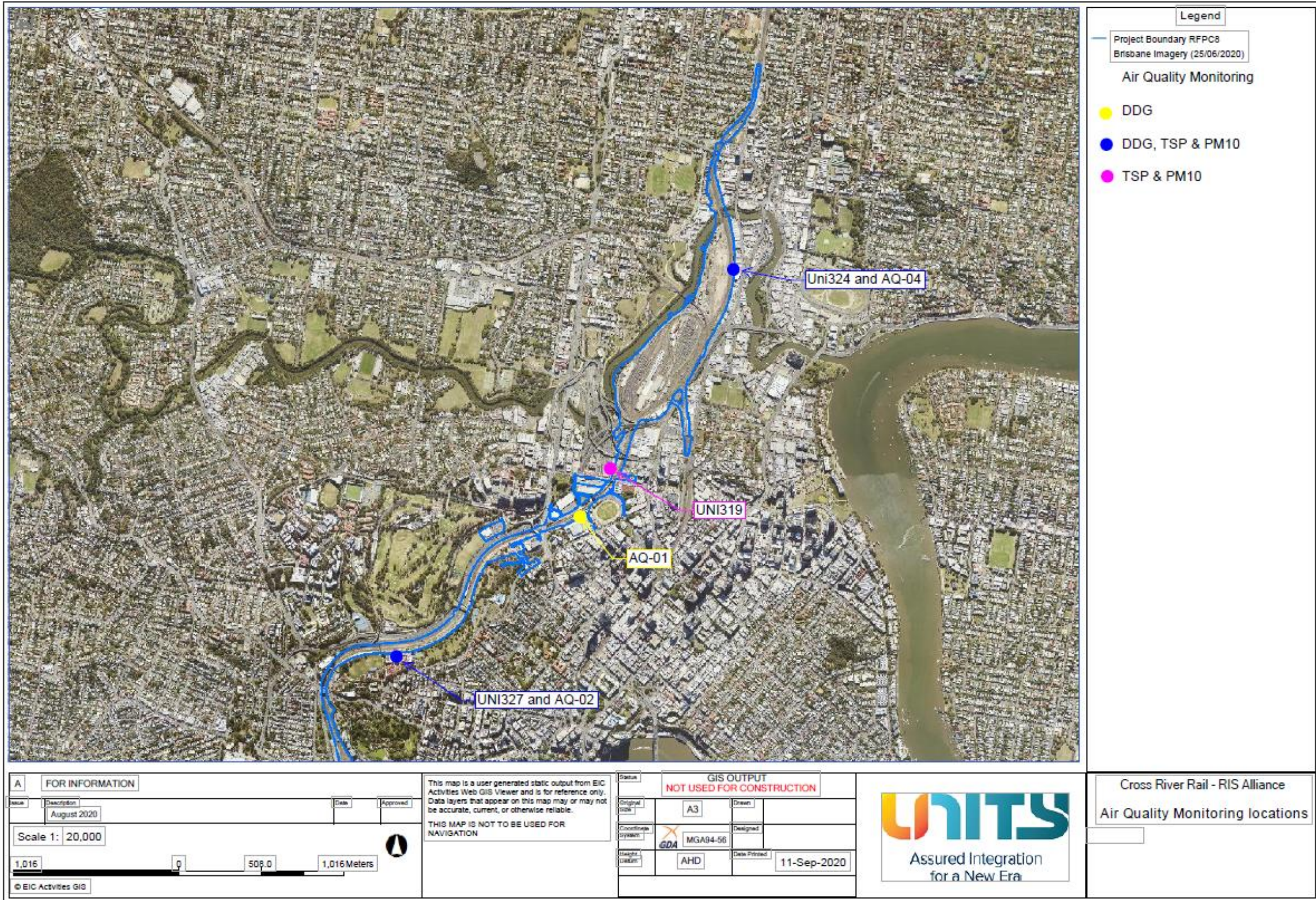
Cross River Rail - RIS Alliance

Noise Monitoring Locations

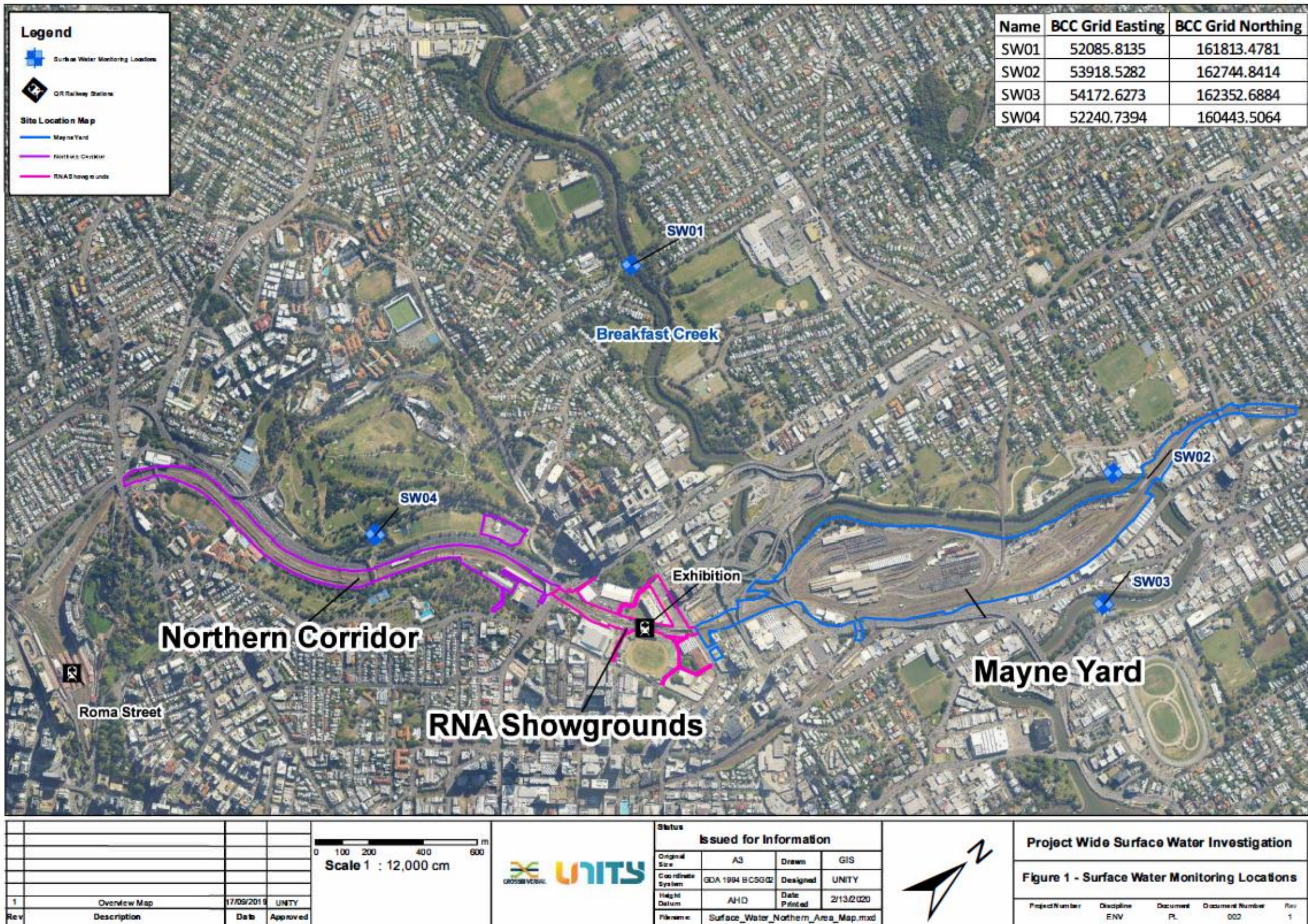
Attachment 3 Monitoring Locations – Vibration

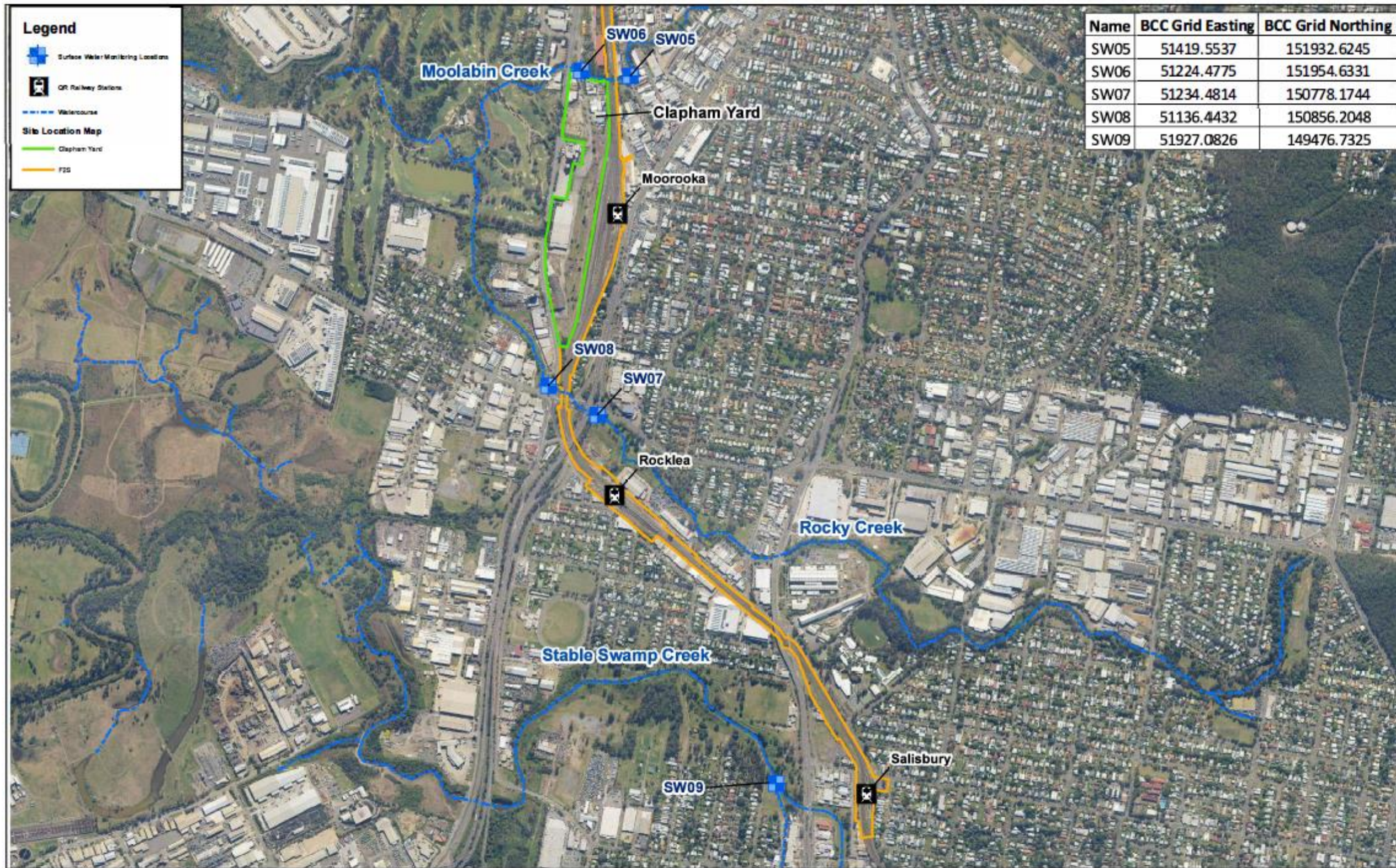
Not triggered during this monitoring period

Attachment 4 Monitoring Locations – Air Quality



Attachment 5 Monitoring Locations – Surface Water





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Appendix B – TSD Monthly Report

COORDINATOR-GENERAL'S MONTHLY REPORT: DECEMBER 2020

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

1. Monthly Monitoring Summary

It is the Project'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 seventeen (17) occasions, and noise monitoring was conducted on seven (7) occasions during December 2020. Each vibration and noise monitoring event confirmed works adhered to project requirements.

Ambient air quality monitoring was conducted at the Roma Street, Albert Street, Woolloongabba and Boggo Road precinct sites during December 2020. Air quality monitoring confirmed works adhered to project requirements.

Water quality monitoring was conducted before the release of water from the site on ten (10) occasions. Each monitoring event confirmed project requirements were adhered to. One (1) round of surface water quality monitoring was also conducted that 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	Project works have been conducted compliant 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 works were conducted in accordance with the Construction Environmental Management Plan (CEMP) (Rev 7).
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	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	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	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	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	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	The Project possesses processes that 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	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 Project 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	Yes	The Project possesses processes that ensure erosion & sediment control is managed in accordance with Imposed Condition 18.

CG Condition	Requirement Summary	Compliance Met (Yes/No/NA)	Comment
	Department of Transport and Main Roads' Technical Standard MRTS52.		
19.	Acid Sulfate Soils managed as per the <i>Queensland Acid Sulfate Soil Technical Manual</i> .	Yes	The Project possesses processes that ensure acid sulphate soils are managed in accordance with Imposed Condition 19.
20.	Landscape and open space – general requirement to minimise impacts on landscapes and open space values and specific requirements around Victoria park	Yes	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	Project works are designed and implemented in accordance with Condition 21.

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 exist that these goals may not be achieved.

Seventeen (17) vibration monitoring sessions were conducted during December 2020.

All vibration monitoring adhered to project requirements and is detailed in the table below.

Table 2: Vibration Monitoring Data

Start Date	Time (AM/PM)	Finish Date	Location (Street Name) (Construction Precinct)	Average Vibration level (mm/s)	Max Vibration Level (mm/s)	Vibration Goal (mm/s)	Receiver / Goal Type	Adhered to Project Requirements (Yes / No)
01/12/2020	11:25:00 AM	02/12/2020	Albert Street (Albert Street Precinct)	0.18	0.73	2	Heritage Structure	Yes
01/12/2020	4:16:00 PM	01/12/2020	Albert Street (Albert Street Precinct)	-	5.5	50	Controlled Blast (Residential Structure)	Yes
01/12/2020	4:16:00 PM	01/12/2020	Mary Street (Albert Street Precinct)	-	4.15	50	Controlled Blast (Commercial Structure)	Yes
02/12/2020	2:05:00 PM	07/12/2020	Albert Street (Albert Street Precinct)	0.12	0.47	2	Heritage Structure	Yes
09/12/2020	1:52:00 PM	13/12/2020	Roma Street (Roma Street Precinct)	0.15	10.2	50	Structure	Yes

Start Date	Time (AM/PM)	Finish Date	Location (Street Name) (Construction Precinct)	Average Vibration level (mm/s)	Max Vibration Level (mm/s)	Vibration Goal (mm/s)	Receiver / Goal Type	Adhered to Project Requirements (Yes / No)
14/12/2020	3:40:00 PM	14/12/2020	Roma Street (Roma Street Precinct)	-	1.75	10	Controlled Blast (Heritage Structure)	Yes
14/12/2020	3:40:00 PM	14/12/2020	Roma Street (Roma Street Precinct)	-	1.95	50	Controlled Blast (Structure)	Yes
14/12/2020	3:40:00 PM	14/12/2020	George Street (Roma Street Precinct)	-	1.2	10	Controlled Blast (Heritage Structure)	Yes
14/12/2020	3:40:00 PM	14/12/2020	Roma Street (Roma Street Precinct)	-	0.65	50	Controlled Blast (Court)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	2.3	10	Controlled Blast (Heritage Structure)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	7.75	10	Controlled Blast (Heritage Structure)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	2.5	10	Controlled Blast (Heritage Structure)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	2.3	10	Controlled Blast (Heritage Structure)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	11.8	50	Controlled Blast (Structure)	Yes
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	1.95	50	Controlled Blast (Structure)	Yes

Start Date	Time (AM/PM)	Finish Date	Location (Street Name) (Construction Precinct)	Average Vibration level (mm/s)	Max Vibration Level (mm/s)	Vibration Goal (mm/s)	Receiver / Goal Type	Adhered to Project Requirements (Yes / No)
18/12/2020	1:15:00 PM	18/12/2020	Roma Street (Roma Street Precinct)	-	0.65	50	Controlled Blast (Court)	Yes
18/12/2020	1:15:00 PM	18/12/2020	George Street (Roma Street Precinct)	-	1.05	10	Controlled Blast (Heritage Structure)	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 seven (7) occasions during December 2020. All noise monitoring data adhered to project requirements and is provided in the table below.

Table 3: Noise Monitoring Data

Date	Time (AM / PM)	Location (Street Name) (Construction Precinct)	Purpose of Monitoring	Internal or External ^[3] Monitoring	Activity	Dominate noise source	Noise Goal LA10 ^[1]	Noise level LA10 ^[1]	Noise Goal LAeq ^[2]	Noise level LAeq ^[2]	Adhered to Project Requirements (Yes / No)
1/12/2020	4:16:00 PM	Albert Street (Albert Street)	Controlled Blast	External	Controlled Blast	Construction	130 ^[4]	131 ^{[4][6]}	NA	NA	Yes
8/12/2020	8:15:00 AM	Joe Baker Street (Boggo Road Precinct)	Construction Monitoring at Sensitive Places	External	Excavation	Construction	77	76.8	67	73.5	Yes
10/12/2020	10:50:00 AM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	External	Structural Demolition	Construction	67	72.3	57	70.2	Yes
10/12/2020	11:10:00 AM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	Internal	Structural Demolition	Construction	60	74.4	50	71.6	Yes
11/12/2020	9:41:00 AM	Roma Street (Roma Street Precinct)	Construction Monitoring at Sensitive Places	Internal	Structural Demolition	Construction	60	74.4	50	71	Yes

Date	Time (AM / PM)	Location (Street Name) (Construction Precinct)	Purpose of Monitoring	Internal or External ^[3] Monitoring	Activity	Dominate noise source	Noise Goal LA10 ^[1]	Noise level LA10 ^[1]	Noise Goal LAeq ^[2]	Noise level LAeq ^[2]	Adhered to Project Requirements (Yes / No)
14/12/2020	3:40:00 PM	Roma Street (Roma Street Precinct)	Controlled Blast	External	Controlled Blast	Construction	130 ^[4]	115 ^[4]	NA	NA	Yes
18/12/2020	1:15:00 PM	Roma Street (Roma Street Precinct)	Controlled Blast	External	Controlled Blast	Construction	130 ^[4]	114 ^[4]	NA	NA	Yes

- [1] Intermittent noise goal (LA10)
- [2] Continuous noise goal (LAeq)
- [3] 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.
- [4] Blasting is measured in dB Linear Peak.
- [6] CBGU design, plan (blast plan), and implement project works (including the application of mitigation measures in accordance with the CEMP) that demonstrates the noise goals were aimed for.

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 exist that these goals may not be achieved.

Dust deposition monitoring was performed during December 2020. The dust deposition gauges result for the reporting period are detailed below, and all monitoring data adhered to project requirements.

Table 4: Air Quality Monitoring – Deposited Dust Data

Location	Project Wide Air Quality Criteria & Goals ^[1]			Monitoring results	Comments
	Criterion	Air Quality Indicator	Goal		
Roma Street Precinct/ Northern Portal	Nuisance	Deposited dust	120 mg/m ² /day	21 mg/m ² /day	Air quality monitoring was performed during the reporting period. Project works adhered to project requirements.
Albert Street Precinct				30 mg/m ² /day	
Woolloongabba Precinct				46 mg/m ² /day 85 mg/m ² /day	
Boggo Road Precinct				175 mg/m ² /day 42 mg/m ² /day	
Southern Portal				41 mg/m ² /day	

- [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.

The 175.0 mg /m²/day result recorded at Boggo Roads (northern) Deposition gauge is not a non-compliance event, due to the following factors:

- o During the reporting period, the prevailing wind conditions were North North East (refer to Figure 1 - wind direction blows toward the site). Meaning the dust deposition gauge was upwind from the Boggo Road Precinct.
- o Field observations for visible dust during routine environmental inspections did not identify visible dust beyond the project boundaries.
- o There were no recorded exceedances of the daily TSP or PM₁₀ Air Quality Goal during the reporting period.
- o The monitoring method, as set out in the Australian Standard, has its limitations and does not allow anyone to be quantitatively definitive about contributions to measured results.
- o No dust or air quality community complaints were received during the month.

What can be determined from the measured results and the supporting data is that it is very unlikely CBGU works would have caused the exceedance alone.

It is very likely that there are other dust sources in the area that contributed enough dust to Boggo Roads (northern) Deposition gauge to cause to the exceedance. On this basis, CBGU works adhered to project requirements.

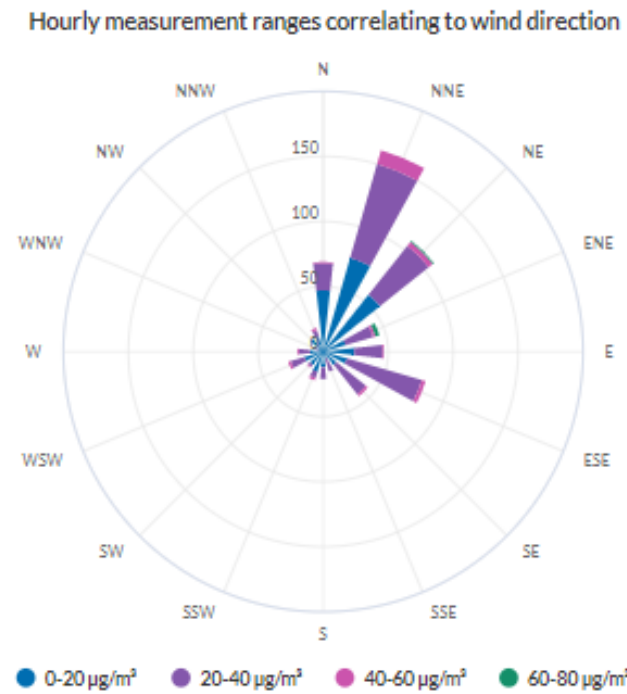


Figure 1: Prevalent Wind Conditions during monitoring period

3.3.2 Particulates and Ambient Air Quality Results

Total Suspended Particulates (TSP) and particulate matter less than 10µm (PM10) monitoring was conducted during December 2020.

TSP and PM10 are monitored using portable air quality units, as well as nearby Government air quality stations. Targeted monitoring of potential dust-generating activities is conducted by the mobile air quality units and was completed at the Roma Street, Albert Street, Woolloongabba, and Boggo Road Precincts during December 2020. Three (3) Government air quality stations near to the Construction Precincts are also utilised.

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

Date	Woolloongabba				Roma Street				Boggo Road				Albert Street			
	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10
	(µg/m3/24 hr)															
01-Dec-20	80	8.80	50	8.71	80	14.24	50	14.2	80	11.27	50	11.24	80	14.91	50	14.86
02-Dec-20	80	9.96	50	9.87	80	18.26	50	18.19	80	13.58	50	13.56	80	17.78	50	17.71
03-Dec-20	80	4.57	50	4.49	80	6.48	50	6.46	80	5.42	50	5.39	80	7.92	50	7.87
04-Dec-20	80	4.53	50	4.45	80	7.27	50	7.24	80	4.87	50	4.86	80	3.03	50	2.97
05-Dec-20	80	12.00	50	11.91	80	20.24	50	20.21	80	17.3	50	17.28	80	9.76	50	9.76
06-Dec-20	80	5.30	50	5.17	80	9.48	50	9.43	80	6.18	50	6.15	80	3.92	50	3.92
07-Dec-20	80	11.98	50	11.78	80	19.7	50	19.63	80	17.09	50	16.9	80	0.88	50	0.87
08-Dec-20	80	7.30	50	7.01	80	10.59	50	10.47	80	8.04	50	8	80	3.02	50	3.02
09-Dec-20	80	4.55	50	4.45	80	8.66	50	8.62	80	5.17	50	5.17	80	0.55	50	0.54
10-Dec-20	80	3.81	50	3.68	80	6.9	50	6.87	80	4.11	50	4.11	80	1.05	50	1.05
11-Dec-20	80	2.37	50	2.27	80	6.3	50	6.25	80	4.05	50	4.03	80	2.03	50	2.03
12-Dec-20	80	1.77	50	1.71	80	3.42	50	3.39	80	1.73	50	1.73	80	22.95	50	22.95
13-Dec-20	80	2.97	50	2.92	80	4.45	50	4.32	80	2.22	50	2.22	80	NA ^[1]	50	NA ^[1]
14-Dec-20	80	4.12	50	4.10	80	7.36	50	7.35	80	4.32	50	4.32	80	NA ^[1]	50	NA ^[1]
15-Dec-20	80	4.20	50	4.17	80	7.21	50	7.18	80	5.3	50	5.28	80	1.11	50	1.11
16-Dec-20	80	8.42	50	8.37	80	11.25	50	11.21	80	7.89	50	7.89	80	2.31	50	2.31

Date	Woolloongabba				Roma Street				Boggo Road				Albert Street			
	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10	TSP GOAL	TSP	PM10 GOAL	PM10
	(µg/m ³ /24 hr)															
17-Dec-20	80	7.67	50	7.64	80	14.69	50	14.66	80	7.95	50	7.94	80	1.42	50	1.42
18-Dec-20	80	7.06	50	7.00	80	12.13	50	12.11	80	6.64	50	6.64	80	3.18	50	3.18
19-Dec-20	80	6.27	50	6.24	80	10.89	50	10.87	80	6	50	6	80	3.00	50	2.98
20-Dec-20	80	4.42	50	4.36	80	8.11	50	8.11	80	4.43	50	4.43	80	NA ^[1]	50	NA ^[1]
21-Dec-20	80	4.37	50	4.31	80	7.36	50	7.32	80	4.15	50	4.15	80	3.90	50	3.90
22-Dec-20	80	5.68	50	5.61	80	7.24	50	7.19	80	4.08	50	4.08	80	3.65	50	3.64
23-Dec-20	80	4.91	50	4.76	80	6.57	50	6.53	80	3.6	50	3.59	80	11.09	50	11.06
24-Dec-20	80	3.64	50	3.58	80	7.68	50	7.63	80	3.61	50	3.61	80	15.90	50	15.89
25-Dec-20	80	3.27	50	3.24	80	7.69	50	7.66	80	3.7	50	3.7	80	4.13	50	4.13
26-Dec-20	80	2.21	50	2.18	80	5.8	50	5.79	80	2.76	50	2.76	80	9.74	50	9.73
27-Dec-20	80	5.74	50	5.68	80	5.4	50	5.4	80	3.75	50	3.75	80	8.23	50	8.23
28-Dec-20	80	3.14	50	3.11	80	5.91	50	5.89	80	3	50	2.99	80	5.64	50	5.64
29-Dec-20	80	4.19	50	4.17	80	7.19	50	7.17	80	5.5	50	5.5	80	6.70	50	6.70
30-Dec-20	80	3.49	50	3.43	80	7.24	50	7.24	80	3.93	50	3.92	80	12.88	50	12.87
31-Dec-20	80	2.77	50	2.73	80	6.27	50	6.24	80	3.49	50	3.49	80	10.23	50	10.23

- [1] Due to a technical fault, the Albert Street mobile air quality unit stopped functioning between 13th, 14th and 20th December 2020. The fault occurred over the weekend and rectified as soon as practicable. A nearby (Brisbane CBD) DES Air Quality Station demonstrated compliant air quality during December. The levels are also consistent with levels recorded early in the month when the unit was operating.

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

- Brisbane CBD: PM₁₀ daily Maximum average: **34.1 µg/m³/24 hr** (<https://apps.des.qld.gov.au/air-quality/chart/?station=cbd¶meter=18&date=1/12/2020&timeframe=month>)
- South Brisbane: PM₁₀ daily Maximum average: **45.8 µg/m³/24 hr** (<https://apps.des.qld.gov.au/air-quality/chart/?station=sbr¶meter=18&date=1/12/2020&timeframe=month>)
- Woolloongabba: PM₁₀ daily Maximum average: **33.7 µg/m³/24 hr** (<https://apps.des.qld.gov.au/air-quality/chart/?station=woo¶meter=18&date=1/12/2020&timeframe=month>)

The graphical representation of the Government air quality data is presented in the below charts (refer to Figure 2-4).

Particle PM₁₀ at Brisbane CBD, 1–31 December 2020 [about Particle PM₁₀](#)

[Brisbane CBD station overview](#)

The guideline for Particle PM₁₀ is 120µg/m³ (1hr avg) and 50µg/m³ (24hr avg).

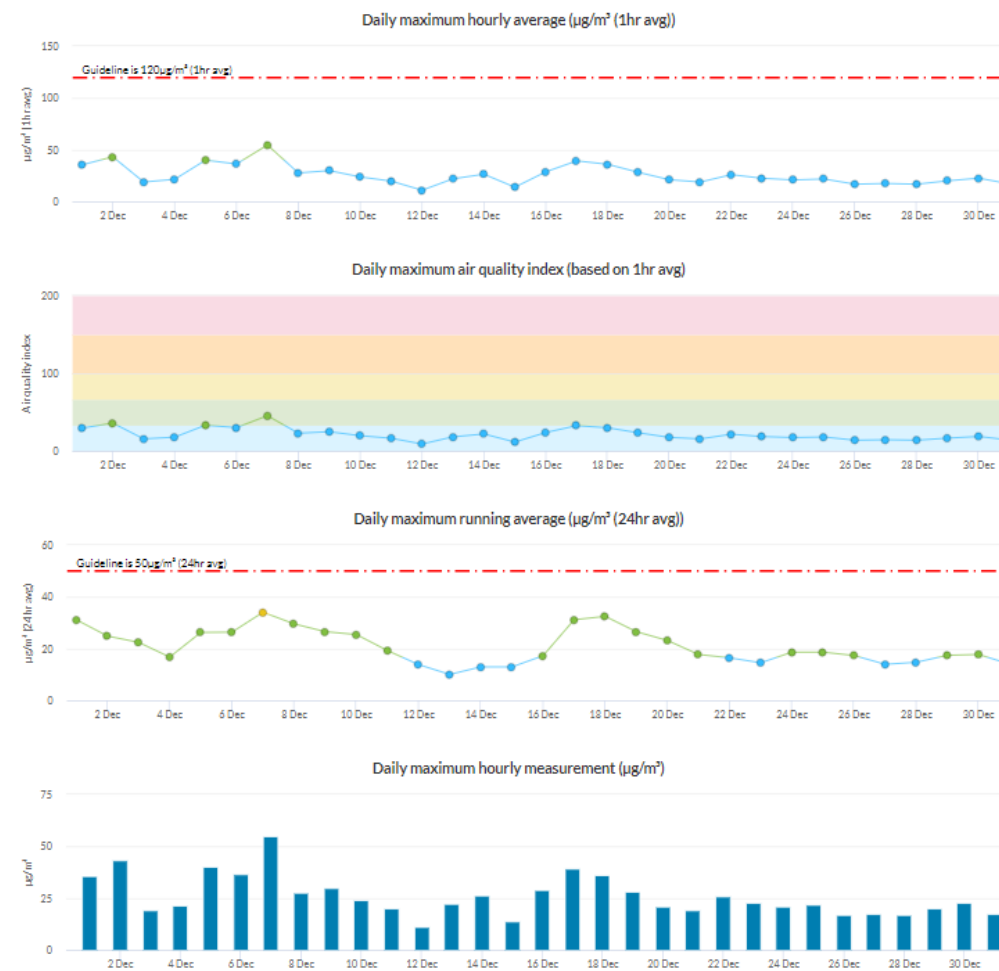


Figure 2: Brisbane CBD – DES Station - PM₁₀ graph for December 2020 (reproduction from the DES website).

Particle PM10 at South Brisbane, 1–31 December 2020 [about Particle PM10](#)

[South Brisbane station overview](#)

The guideline for Particle PM₁₀ is 120µg/m³ (1hr avg) and 50µg/m³ (24hr avg).

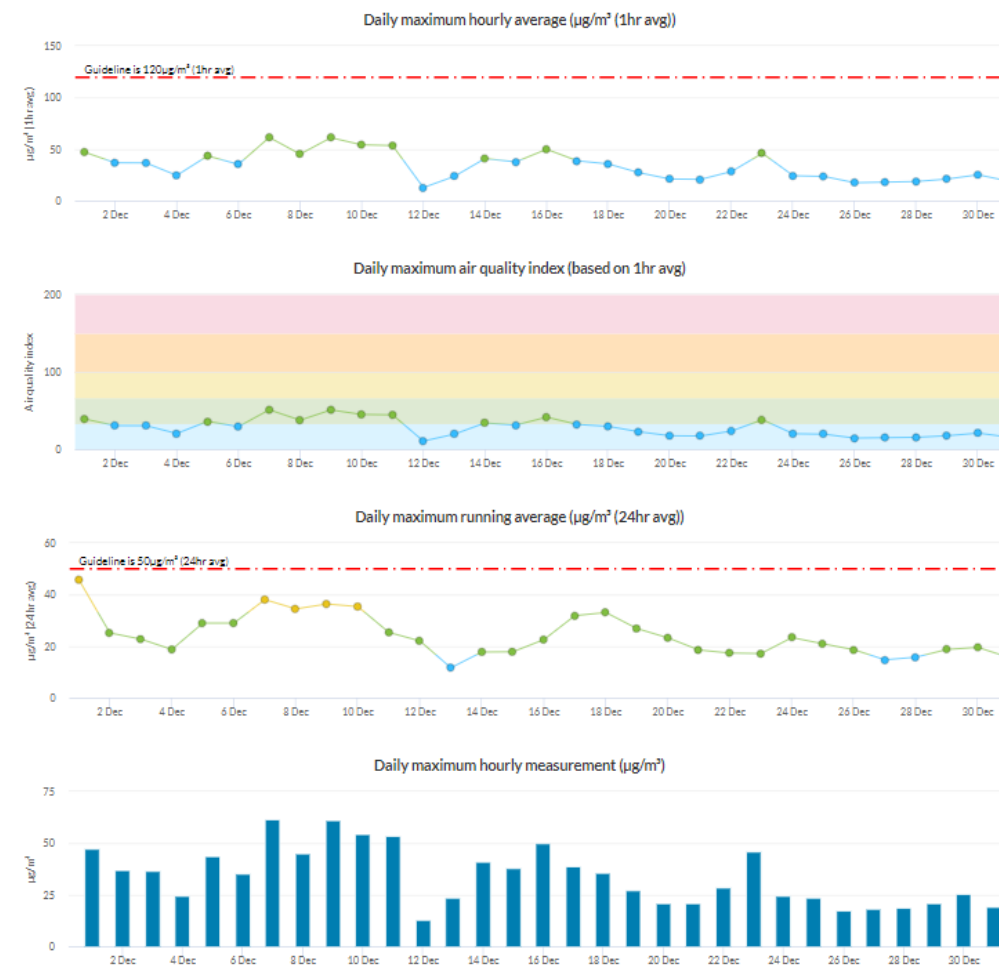


Figure 3: South Brisbane – DES Station - PM10 graph for December 2020 (reproduction from the DES website accessed).

Particle PM₁₀ at Woolloongabba, 1–31 December 2020 [about Particle PM₁₀](#)

[Woolloongabba station overview](#)

The guideline for Particle PM₁₀ is 120µg/m³ (1hr avg) and 50µg/m³ (24hr avg).

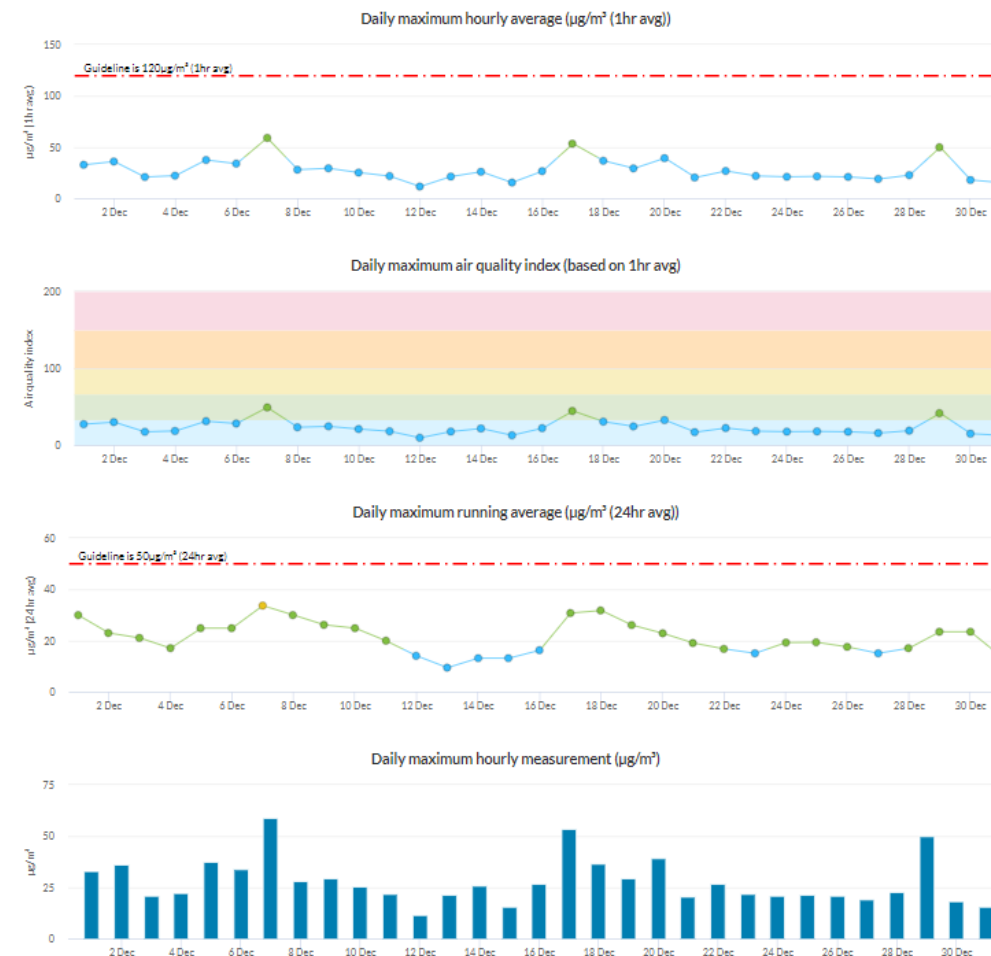


Figure 4: Woolloongabba – DES Station - PM₁₀ graph for December 2020 (reproduction from the DES website).

3.4 Water Quality – Discharge

CBGU undertook ten (10) water quality monitoring events prior to the release (groundwater and surface water) from the site during December 2020.

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	Water Quality Objectives ^[1]											Adhered to Project Requirements (Yes / No)
		Turbidity (NTU)	Suspended solids (mg/L)	Chlorophyll a (µg/L)	Total nitrogen (µg/L) ^[3]	Oxidised N (µg/L) ^[3]	Ammonia N (µg/L) ^[3]	Organic N (µg/L) ^[3]	Total phosphorus (µg/L)	Filterable reactive phosphorus (FRP) (µg/L)	Dissolved oxygen (%) ^[2]	pH	
Albert Street	14/12/2020	0.80	<5	<1	2700.00	80.00	20.00	900.00	20.00	<10	80.63	7.49	Yes
Boggo Road	14/12/2020	0.90	<5	<1	700.00	40.00	140.00	400.00	220.00	10.00	84.72	7.10	Yes
Roma Street	15/12/2020	0.70	<5	<1	1100.00	100.0	680.00	300.0	20.00	<10	85.13	7.94	Yes

- [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] Adhered to project requirements regarding aiming to achieve the water quality objective. 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] Adhered to project requirements regarding aiming to achieve the water quality objective. These samples identified results generally consistent with pre-construction conditions, and no external influences were introduced by construction activity.
- Note: 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

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

Table 7: Surface Water Discharge - Water Quality Monitoring Data

Location	Date	Water Quality Objectives ^[1]		Adhered to Project Requirements (Yes / No)
		Turbidity (NTU)	pH	
Boggo Road	01/12/2020	13.36	7.75	Yes
Boggo Road	07/12/2020	3.01	8.29	Yes
Boggo Road	11/12/2020	4.12	7.90	Yes
Woolloongabba	13/12/2020	28.00	6.71	Yes
Woolloongabba	14/12/2020	1.00	7.30	Yes
Boggo Road	15/12/2020	10.62	8.03	Yes
Boggo Road	18/12/2020	16.04	8.01	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*.

3.5 Water Quality – Surface Water

During December 2020, CBGU JV undertook one (1) round of surface water sampling at four (4) locations (upstream and downstream).

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 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
Woolloongabba	Upstream	11/12/2020	Monthly	27.0	>3999	93.19	7.45
Woolloongabba	Downstream	11/12/2020	Monthly	24.1	>3999	96.82	7.77
Boggo Road ^[1]	Downstream	11/12/2020	Monthly	8.68	>3999	02.42	7.23
Albert Street	Upstream	14/12/2020	Monthly	32.2	44200	88.11	7.86
Albert Street	Downstream	14/12/2020	Monthly	42.7	44100	94.23	7.7
Roma Street	Upstream	15/12/2020	Monthly	58.8	36000	78.67	7.76
Roma Street	Downstream	15/12/2020	Monthly	50.8	35700	76.25	7.78

- [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

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
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Nil for this reporting period

5 Complaints

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

During December 2020, seven (7) 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.	02/12/20	Roma Street and Herschel Street (Roma Street Precinct)	Pedestrian safety	A stakeholder contacted the Project regarding the pedestrian management at the corner of Roma Street and Herschel Street. CBGU provided the stakeholder with an overview of the traffic and pedestrian set up and advise them the design had been consulted and confirmed with Brisbane City Council. CBGU reviewed the arrangements and will continue to monitor the pedestrian set up.	Closed

No.	Date	Location	Description of Issue	Responses	Status of Event
2.	04/12/20	Hubert Street (Woolloongabba precinct)	Noise	A stakeholder contacted the Project regarding noise from the Woolloongabba precinct during non-standard construction hours. CBGU provided the stakeholder with an overview of the works occurring and their duration at the Woolloongabba precinct. The Project also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. The Project also reviewed the circumstances and monitoring confirmed works adhered to project noise requirements.	Closed
3.	09/12/2020	Albert Street (Albert Street Precinct)	Worker Behaviour	A stakeholder contacted the Project regard inappropriate workforce behaviour at Albert Street precinct. CBGU install additional privacy measures and addressed the workforce via a toolbox talk about appropriate behaviour.	Closed
4.	11/12/2020	Mary Street (Albert Street Precinct)	Worker Behaviour	A stakeholder contacted the Project regard inappropriate workforce behaviour at Albert Street precinct. CBGU addressed the workforce via toolbox talk about appropriate behaviour when working adjacent to the public and pedestrians.	Closed
5.	11/12/2020	Roma Street (Roma Street Precinct)	Noise	A stakeholder contacted the Project regarding noise from the Roma Street precinct during standard construction hours. CBGU provided the stakeholder with an overview of the works occurring and their duration at the Roma Street precinct. The Project also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. The Project also reviewed the circumstances and monitoring confirmed works adhered to project noise requirements.	Closed
6.	11/12/2020	Albert Street (Albert Street Precinct)	Noise	A stakeholder contacted the Project regarding noise from the Albert Street precinct during non-standard construction hours. CBGU provided the stakeholder with an overview of the works occurring and their duration at the Albert Street precinct. The Project also outlined the mitigation measures used to alleviate potential impacts and ensure compliance.	Closed

No.	Date	Location	Description of Issue	Responses	Status of Event
				The Project also reviewed the circumstances and monitoring confirmed works adhered to project noise requirements.	
7.	19/12/2020	Albert Street (Albert Street Precinct)	Noise	A stakeholder contacted the Project regarding noise from the Albert Street precinct during standard construction hours. CBGU provided the stakeholder with an overview of the works occurring and their duration at the Albert Street precinct. The Project also outlined the mitigation measures used to alleviate potential impacts and ensure compliance. The Project also reviewed the circumstances and monitoring confirmed works adhered to project noise requirements.	Closed