



# Construction Monitoring Report – March 2021 to August 2021

SMCSWSSJ-JHL-WSS-EM-REP-000011

## Document and Revision History

Document Details	
Title	Construction Monitoring Report 06
Client	Sydney Metro City & Southwest
Client reference no.	
JHLOR JV contract no.	K44

## Revisions

Revision	Date	Description	Prepared by	Reviewed by
A	03/09/2021	Draft	Ryan Dunne	Daniel Keegan
B	23/10/2021	Update for AA and SM Comments	Ryan Dunne	Daniel Keegan
C	19/01/2021	Updated for corrected water quality data	Ryan Dunne	Daniel Keegan
D	21/01/2021	Minor Corrections in formatting	Ryan Dunne	Daniel Keegan

## Management reviews

Review date	Details	Reviewed by

Controlled: NO Copy no.: Uncontrolled: YES

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**Compliance Matrix**

Condition	Requirement	Reference
C16	The results of the Construction Monitoring Programs must be submitted to the Secretary for information, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program	Section 1.1

## 1. Introduction

The Construction Monitoring Program (CMP) is being implemented to monitor impacts on surrounding surface water quality resources and impacts from noise and vibration on the surrounding areas during the construction phase. The surface water monitoring program and noise and vibration monitoring program are also both designed to assess the effectiveness of the mitigation measures applied as part of the SMu Project. In addition, limited groundwater monitoring took place as part of an update to the CSWMP.

This report provides the results of the CMP for the period March 2021 to August 2021.

### 1.1 Submission Requirements

In accordance with condition C16, this will be submitted to the following agencies for information:

- NSW EPA
- Inner West Council
- DPIE

The Independent Environmental Representative will review and endorse the report as required by Condition of Approval A24(d) prior to submission to the Secretary DPIE.

The previous CMR was submitted on 14/04/2021 to stakeholders for information. No further request was received from any of the agencies following the submission of the previous monitoring report.

### 1.2 Surface Water

The project site is located within the rail corridor at Sydenham Station and several hundred metres to the north and south of the station, 11 Sydenham Road, Marrickville, NSW, the Sydenham Pit and Drainage Pump Station and future precinct areas on Railway Parade and Burrows Avenue, Sydenham, NSW.

The Project site forms part of the overall Cooks River catchment with water from the area discharging into the Cooks River via the Eastern Channel. The catchment area is highly urbanised with mixed residential, commercial and industrial properties. The closest watercourses to the project are man-made, the Eastern Channel and connecting culverts bordering the project. These collect urban stormwater from the surrounding area and typically exhibit low flow rates outside of rain events and the operation of Sydenham drainage pump.

Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Office of Environment and Heritage as part of the Beachwatch programme. The monitoring point is at Kyeemagh Baths at the mouth of the Cooks River in Port Botany. Water quality within the Cooks River catchment is influenced by stormwater, fertilisers, industrial discharges and sewage contamination.

The Project site also includes the Sydenham Pit. The Sydenham Pit is a large stormwater detention structure that captures stormwater from the Marrickville and Newtown area. The water is detained temporarily before being pumped out into the Eastern Channel. The Sydenham Pit is owned and operated by Sydney Water. The project has specific requirements when working within Sydenham Pit regarding water quality and management, which are contained in the project EPL (21147) and Construction Soil and Water Management Plan (CSWMP).

Objectives for water quality management during construction are:

- The prevention of pollution of surface water through appropriate erosion and sediment control
- Maintain existing water quality of surrounding surface watercourses
- Construct the Project in accordance with the NSW Water Quality Objectives

### 1.3 Groundwater Monitoring

The area surrounding the SMu project has a variety of land-uses, including residential, industrial, commercial, and rail corridor. The site sits on Ashfield shale and the Quaternary alluvium geological layers. The Quaternary alluvium underlies the Cooks River and its tributaries and forms an aquifer. There is also groundwater present within localised alluvial deposits in some gullies. The Preliminary Contamination Report (GHD, 2017) found that heavy metals were present within groundwater at elevated concentrations. The Sydney Metro City and Southwest – Chatswood to Sydenham –Sydenham Station and Sydney Metro Trains Facility South Modification Report states that these samples are likely to be representative of the background aquifer. The modification report also states that “groundwater has been observed discharging from open cuttings along the T3 Bankstown Line” and that the “surface groundwater system is likely to be recharged by rainfall and percolation from irrigation of residential gardens and open spaces, as well as incidental runoff from impervious surfaces, such as roads and footpaths”. Groundwater management has been integrated into the SMu Construction Environmental Management Plan due to limited interaction with the groundwater table, and all works that have required groundwater monitoring were completed prior to the current period of the Construction Monitoring Report.

As part of an update to the SMu Construction Soil and Water Management Plan, groundwater monitoring was added specifically for limited interaction with groundwater during underbore works for the 132kv Ausgrid reroute, which was completed in December 2020.

Construction on the underbore was completed in the previous monitoring period, with all results of monitoring included in Construction Monitoring Report 5 produced in December 2020. No further works triggering groundwater monitoring have taken place.

### 1.4 Noise and Vibration

The area surrounding the SMu project contains a variety of land-use types and receivers, including residential receivers, commercial, industrial, and sensitive non-residential receivers. These land-uses are mixed within the identified noise catchments, though in general there are clusters of industrial and commercial areas north of the rail corridor, and primarily residential areas to the south of the rail corridor. The area surrounding the project is affected by rail noise and vibration and is also underneath flight paths from Sydney Airport. There are therefore a number of residential properties under the Sydney Airport Noise Management Plan. Many, though not all, of these residential receivers have been fitted with double glazed windows, leading to lower internal noise levels originating from outdoor sources, when compared with standard windows.

There are three noise sensitive residential areas with a number of residential properties most regularly potentially affected by noise and/or vibration from the proposed construction:

- Edgeware Road / Lord Street – Located within NCA5. Many residences potentially affected by the construction works in this area have been fitted with heavy double glazing as part of the Sydney Airport Noise Management Plan, but some residences still retain standard single glazed windows.
- Burrows Avenue / Railway Road Area – Located within NCA3. All potentially affected residences in this area have been fitted with heavy double glazing as part of the Sydney Airport Noise Management Plan;
- Meeks Road Area – Located within NCA1. Many residences potentially affected by the construction works in this area have been fitted with heavy double glazing as part of the Sydney Airport Noise Management Plan, but some residences still retain standard single glazed windows.

In addition, two sensitive non-residential receivers have been identified as potentially being affected by noise during the project, Tempe High School and Tillman Park Early Learning Centre (both located within NCA2) – see Figure 1. To date, no construction activities have taken place which were identified as significantly affecting these sensitive receivers during their operating hours.

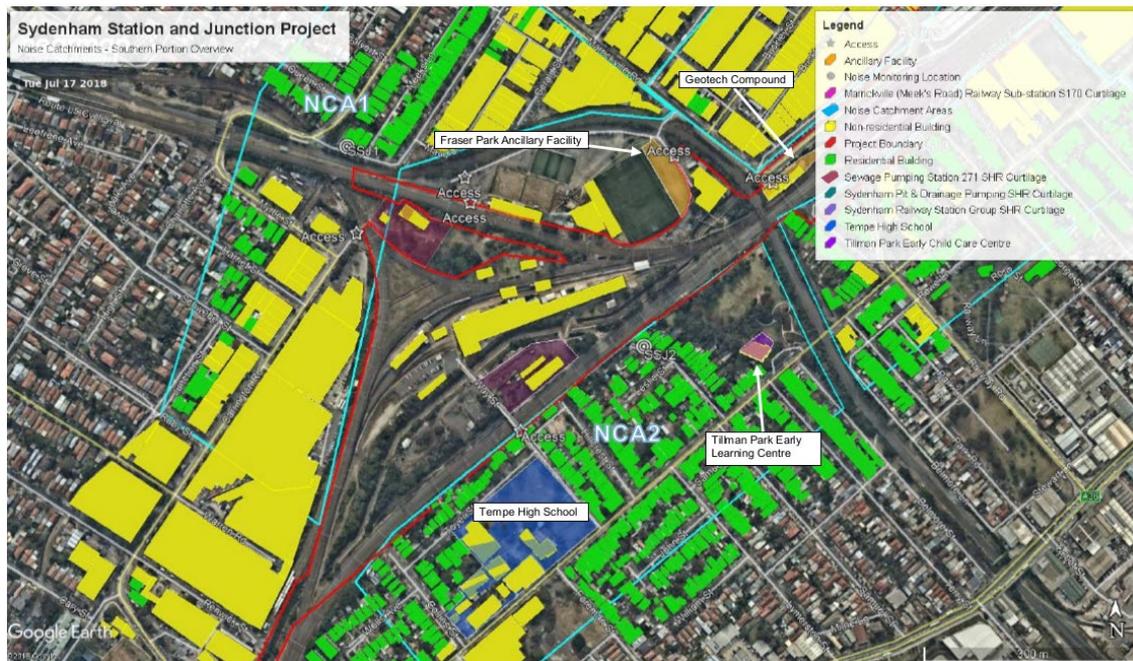


Figure 2 - Surrounding Land-use and Sensitive Non-Residential receivers

Objectives for noise and vibration management on the project are:

- Minimise unreasonable noise and vibration impacts on residents and businesses
- Avoid structural damage to buildings or heritages items as a result of construction vibration

- Maintain positive, co-operative relationships with schools, childcare centres, local residents and building owners and undertake active community consultation

At Meeks Road, Edgeware Road and at properties surrounding Sydenham station, construction noise levels may exceed the noise management levels at residences at times. However, given that most of the construction works are within industrial areas and the rail corridor, noise impact would be expected to be limited primarily to out-of-hours works. Construction noise levels for some SMu work activities are expected to exceed the external noise management level at times, particularly during works outside of standard hours, resulting in noise impacts to outdoor spaces. Internal and external noise levels will be assessed as part of the OOHW protocol and project EPL and monitored accordingly.

Most construction works in this area will not generate vibration which would be perceptible within the nearest residences, but some works, such as compaction by vibratory roller may generate vibration levels above the vibration criteria at the nearest residences in Railway Road.

No blasting will be undertaken, and ground-borne noise and vibration is also unlikely to occur on the SSJ project as it is typically generated by underground activities such as tunnelling.

## 2. Methodology

### 2.1 Surface Water

Surface water monitoring is undertaken at two points, one upstream (EC1) and one downstream (EC 2) of the construction footprint. Both are located in the man-made Eastern Channel running alongside the rail corridor – See Figure 2. The channel is covered for the majority of its length along the east-side of the project following the completion of the new aqueduct across Sydenham pit. The canal remains uncovered west of Sydenham station. The water level in the channel is generally fairly shallow outside of significant rain events (less than 20mm), with limited vegetation. Water sources are diverse urban run-off from collected stormwater.

The two locations identified for surface water monitoring are the only locations that offer safe access. There are several other drainage outlets along the length of the Eastern Channel that may convey water into the channel between the upstream and downstream monitoring locations, however gaining access to the channel at these points is not possible due to obstructions and safety reasons.

In the event of access issues, surface water monitoring will be taken from an accessible point nearby the culvert or Eastern Channel where feasible and noted in monitoring results. There were no occasions where an alternative monitoring point was required during this monitoring period.

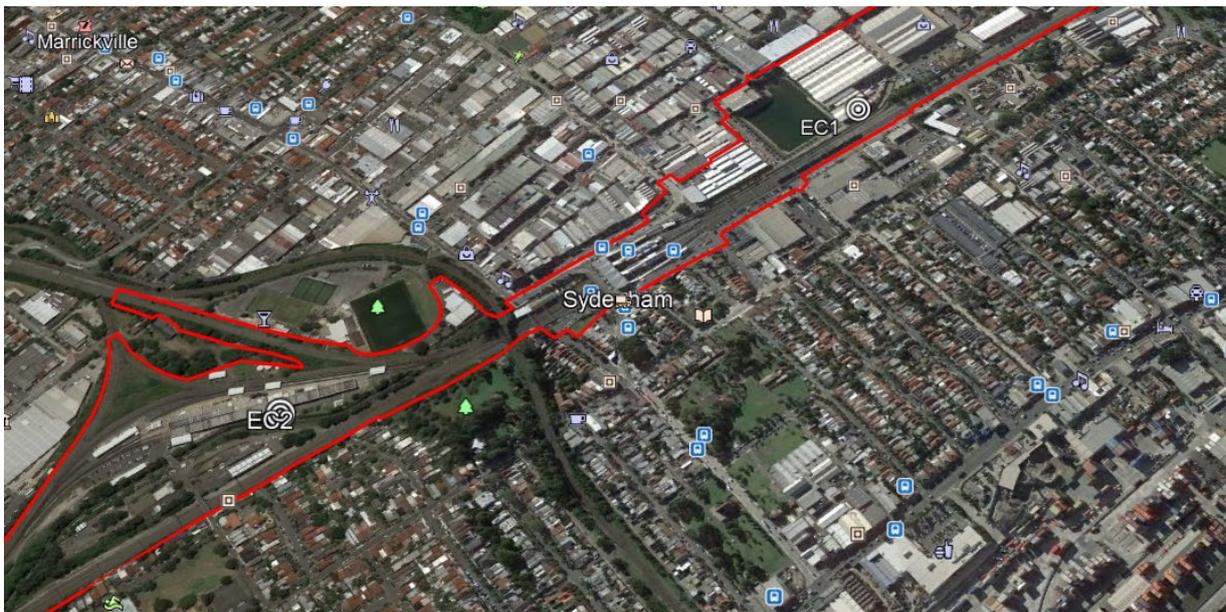


Figure 1 - Surface Water Monitoring Locations

Surface water quality monitoring will be undertaken as follows for the parameters in Table 1:

- Pre-construction – monthly following site control
- SSJ construction stage – every three months & up to 4 wet weather events per year

Pre-construction monitoring was conducted at points EC1 and EC2 monthly, once the project was given site control. Surface water quality monitoring of the receiving environment prior to construction is highly unlikely to define suitable standards or benchmarks for water quality discharges from the SSJ Works given that:

- Waterways along the site are mostly ephemeral
- Water quality from urban areas is highly variable and changes according to prevailing weather patterns and day-to-day during rainfall.

The Environment Protection Licence (#21147) provides the project with criteria to discharge off-site through approved discharge points. These criteria must be met prior to discharge. A record of monitoring for dewatering on the project is maintained and made available on the project website and EPA website. There are currently no active sediment basins on the project, and none have been identified during the construction phase of the project to date.

Sydney Airport Bureau of Meteorology (BOM) weather observations were used to report the amount of rainfall 24hrs prior to monitoring and to determine when a reportable rain event occurs.

SSJ also monitors water quality prior to any planned discharges to ensure water quality is within the parameters listed within the Environmental Protection Licence (No.21147), to minimise any potential impacts to surrounding waterways.

Table 1 - Water Monitoring Parameters

Parameter	Sampling Methods	Analytical Method	ANZECC Criteria* Freshwater	Proposed Trigger Values	Proposed Actions
Temperature (°C)	Probe	Field analysis	> 80%ile < 20%ile	Downstream results are > than upstream results in rainfall events up to and including the significant event threshold of >20mm in 24 hours.	Environment Manager (or delegate) to re-test to confirm results and undertake an inspection of the adjacent works and propose actions where required.
Dissolved Oxygen (DO)	Probe	Field analysis	Lower limit – 85 Upper limit – 110		
Turbidity (NTU)	Probe	Field analysis	6 – 50		
Oil and grease	Visual analysis, then grab sample if required	Visual assessment. Confirmed with lab analysis if required	-		
pH	Probe, grab sample if required	Field analysis, lab analysis if required	Lower limit – 6.5 Upper limit – 8.5		
Salinity (EC)	Probe	Field analysis	125 – 2200		
Total Suspended Solids (TSS)	Probe, grab sample if required	Field analysis, lab analysis if required	-		

**2.2 Noise and Vibration Monitoring**

As part of the Noise and Vibration Assessment within the Modification Report and Submissions Report, the area surrounding the Project site was divided into 3 Noise Catchment Areas (NCAs). Noise monitoring was undertaken in 2015 and 2016 to determine the Rating Background Level for these catchments. During the development of the Construction Noise and Vibration Impact Statement (CNVIS) further background noise monitoring was undertaken within the surrounding area between 18th & 27th June 2018. The additional monitoring has taken place at the following locations;

- NCA2 – 25 Bridge St, Tempe
- NCA3 – 4 Burrows Avenue, Sydenham
- NCA4 - 80 Unwins Bridge Road, St Peters

Following the development of the CNVIS and the additional monitoring, the area surrounding the project has been split into 6 Noise Catchment Areas. Current Rating Background Levels for all NCAs are shown in Table 2.

Table 2 - RBLs for SSJ Noise Catchment Areas

NCA	Daytime RBL (7am to 6pm)	Evening RBL (6pm to 10pm)	Night RBL (10pm to 7am)
1*	47	45	40
2	41	46	40
3	51	49	42
4	58	51	43
5**	58	52	38
6***	52	43	38

\*Noise levels adopted from Sydenham to Bankstown EIS

\*\*Noise levels adopted from Chatswood to Sydenham EIS

\*\*\*Noise levels adopted from TSE Marrickville Dive Construction Site

Note: Reported RBLs are as per CNVIS findings, including in NCA2 where daytime is lower than evening.

Based on planned work in the construction phase, the areas most regularly impacted by construction noise and vibration are expected to be NCA1, NCA3 and NCA5. These three catchments contain a number of residential properties – See Figure 3 below.



Figure 21 - NCAs and identified residential and non-residential receivers

Monitoring is required to be undertaken during construction activities (including out of hours works) where required in accordance with Section 8 of the CNVIS and for validation purposes. Attended noise monitoring is also undertaken in the event of a noise complaint. Monitoring will be undertaken at the complainant’s property, nearest to any work.

Vibration monitoring will be undertaken before and during works where buildings or structures exist within the safe work distances of vibratory plant. Monitoring will also be undertaken where vibration generating activities have the potential to impact on heritage items. In accordance with CoA – E28 and the requirements of the CNVIS, the vibration limits have been set out in the British Standard BS 7385-2:1993.

The Modification Report states that “based on the typical nature of buildings around the proposed modification, the cosmetic damage screening criteria of 7.5mm/s for unreinforced or light framed structures has been uniformly applied. This same screening criteria is also relevant for heritage items”. No heritage items in the footprint of the project have been screened as ‘structurally unsound.’

During activities that are expected to generate maximum noise levels at impacted receivers, as identified in the CNVIS, continuous real-time noise and vibration monitoring will be undertaken. Continuous real-time noise and vibration monitoring will be undertaken on the project boundary adjacent to one of the closest residences in the Burrows Avenue / Railway Road Area, at one of the closest residences in the Meeks Road Area, and at one of the closest residences in Lord Street/Edgeware Road to determine the LAeq15min and LAMax levels during times of nearby work.

There will be periods of time where no works will be occurring and it is not reasonable to have the real-time system in operation during these periods. There is a high likelihood that ambient noise and vibration levels from non-construction sources will need to be accounted for, particularly on the boundary of the rail corridor. Where the noise and vibration alert levels are exceeded as a result of project related works, the construction method and equipment will be reviewed/modified.

Details of noise and vibration monitoring equipment used during the reporting period are included in Table 3 below:

Table 3: Noise and Vibration Monitoring Details

Model	Serial Number	Most Recent Calibration Date*
Svantek SV971 Noise Monitor	61522	17/06/2021
Svantek SV958 Noise and Vibration Monitor	H3407	17/06/2021
Svantek SV84 Triaxle Accelerometer	69017	17/06/2021
Svantek SV44 Sound Calibrator	90201	17/06/2021

### 3. Results

#### 3.1 Surface Water

Pre-construction monitoring took place over 3 months from June-August 2018, with 4 samples collected from two identified points. As noted in section 1.2 and surface water background results, the culvert has several inflows from the surrounding urban environment, including between the two monitoring points due to access limitations. As recorded in baseline monitoring, this has been noted as accounting for the high base Total Suspended Solids (TSS) recorded and turbidity noted in subsequent surface water monitoring, particularly when taken after a rain event. Turbid inflows of water from urban stormwater into the culvert have been visually confirmed in post-rainfall inspections.

Monitoring during the reporting period took place once per quarter at each of the two monitoring locations (EC1 and EC2), dated 26/03/2021 and 08/06/2021. In addition, sampling was conducted at EC1 and EC2 during two wet weather events on 06/05/2021 and 25/08/2021. – see results in Table 4.

Change in pH between upstream and downstream monitoring points varied within the acceptable range. Temperature varied significantly, likely due to the low flow levels in the concrete culvert during monitoring. As noted, Turbidity (TSS) levels within the channel have been exceeded in some baseline readings, and it is considered likely that external factors (e.g. industry/residence in the area and other rail/residential building projects nearby) are connected to the higher turbidity readings, including from inflows present from between EC1 and EC2 where a discrepancy has been noted. Variance in background readings are also considered as explanation for differences in salinity, as tidal water and surface water enter through different parts of the stormwater system feeding into the canal may cause changes to upstream and downstream readings.

Table 4 - Surface Water Monitoring Results for Pre-construction and Construction Phases

Date	Site Activities	Total Rainfall in Previous 24hrs (mm)	Comments	EC 1								EC 2									
				Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil / Grease	Time	TSS (mg/l)	Temp (°C)	pH	Salinity (mS/cm)	Turbidity (NTU)	DO%	TDS (g/l)	Visible Oil/Grease
26/03/2021	Retaining wall construction, CSR, culvert and confluence works	0.2	<b>Quarter Monitoring:</b> Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – low flows slightly turbid	14:13	105	22.44	8.15	0.002	201	216.3	0.009	No	14:35	104	23:27	7.86	0.006	189	213.7	0.004	No
06/05/2021	Retaining wall construction, paving of station, backfilling track area	39	<b>Post Rainfall:</b> Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – medium flows slightly turbid	14:33	102	19.41	8.21	0.283	193	124.7	0.302	No	15:12	92	20:01	8.33	0.32	178	150.3	0.309	No
8/06/2021	Retaining wall construction, paving of station, CSR installation, backfilling track area	0	<b>Quarterly Monitoring:</b> Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – low flows slightly turbid	10:43	88	21.62	7.82	0.004	102	195.7	0.414	No	11:39	84	21.8	7.67	0	98	203.9	0.408	No
25/08/2021	CSR installation, track construction and ballast, tiling of plaza	79	<b>Post Rainfall:</b> Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – medium flows slightly turbid	11:52	92	12.22	8.01	0.008	163	187.2	0.055	No	11:20	97	12.34	7.8	0.065	187	191.8	0.042	No

### 3.2 Noise and Vibration Monitoring

Attended noise monitoring was undertaken as required for OOHW and possessions, where noise modelling predicted significant exceedance of Rating Background Levels or otherwise required validation using this method. As modelled in the CVNIS, the majority of noise and vibration impacts have occurred in NCA 3 as a result of required out-of-hours work, during both rail and local possession, under lower evening and night-time RBLs. As part of attended noise monitoring, significant extraneous noise has been recorded as impacting receivers and monitoring results, including throughout the night-time period, well above the given RBLs. Monitoring locations and timing has been adjusted where necessary to try to isolate construction impact, however this is often not feasible. Common extraneous noise sources include:

- Loud noise from air traffic, as area is part of Sydney Airport Noise Management Plan and heavily affected by flight-path
- Road traffic, particularly near Gleeson Ave, as nearby industrial, commercial and other nearby construction projects use cause frequent heavy trucks trafficking the area
- Rail replacement buses during rail possessions
- Noise from trains passing and train signalling horns

Attended noise monitoring has been conducted for activities with significant predicted exceedances of noise management levels, mostly occurring where works are conducted in the evening or night-time periods. This occurred for seven rail possessions and seven local area works within the reporting period. SSJ have committed to review impacts and mitigation of construction activity and document outcomes where an exceedance is recorded or a complaint is made related to project construction activities. To date there have been no exceedances of predicted construction related noise levels assessed as relating to ongoing construction activities on the project. All elevated noise levels above predicted levels recorded by attended monitoring have been attributed to extraneous noise rather than construction activity, specifically due to traffic and rail noise or other non-project construction during lower impact works with lower predicted exceedance easily impacted by external sources. This occurred on 04/05/21, 30/05/21, and 28/08/21. These are detailed in the results shown below in Table 5.

Continuous real-time noise and vibration monitoring has been undertaken during two rail possessions and a period of piling near receivers at Bedwin Road track slab during the reporting period, in order to assess potential noise and vibration impacts. Vibration monitoring was undertaken during a representative period of works near retained Sydenham Station Buildings and Sydenham Pump House, including culvert demolition works and piling, underboring works, station trenching and footing works, and compacting of Bedwin Road track slab adjacent to properties on rail corridor to demonstrate that vibration screening was within relevant criteria. Vibration results have been included in Table 6. The data has been made available in real-time as per condition C11 and all detailed records are maintained. Several rail possessions conducted during the reporting period were considered low risk due to work only taking place at height or limited in scope. Two rail possessions were considered low risk for noise and vibration with significant external works taking place in close proximity, therefore only attended noise monitoring was undertaken. During one possession no valid real-time monitoring could be undertaken due to inclement weather (high winds and heavy rainfall). To date, there have been no exceedances of vibration from construction activities, and recorded vibration (PPV in mm/s) has been below cosmetic vibration limits for affected structures. As above, attended noise and vibration monitoring has identified that external non-construction noise and vibration sources are frequent in the area, which is also expected to reflect in the results of any real-time continuous monitoring.

Table 5 - Attended Noise Monitoring Results

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
08/03/2021	0:00	15	360 Edgeware Rd	Installation of Throw Screens	Traffic, Intermittent power tools	56.8	81.7	Night	Intermittent power tools and truck movement	43	71	Yes	Non-construction traffic continuous, construction noise loud but intermittent
29/03/2021	23:00	15	344 Edgeware Rd	Line-removal	Line removal Truck	63.6	72.7	Night	Faint	43	65	Yes	LaMax from car
2/04/2021	23:42	15	30 Hogan Ave	Asphalting preparation	Traffic and Hi-Rail Loader	52	75.6	Night	Hi-Rail loader	49	70	Yes	LaMax from motorbike
02/04/2021	0:00	15	136 George st	Sawing of Asphalt	Sawing	62	86	Night	Road Saw intermittent	47	70	Yes	LaMax from truck

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSI construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
03/04/2021	14:53	15	360 Edgeware Rd	Piling of Southern side of Bridge	Traffic	62.4	81.4	Day	Faint piling	52	70	Yes	LaMax from passing motorbike
17/04/2021	13:28	15	360 Edgeware Rd	Throw screen install, Excavator	Traffic and wind	61.3	77.4	Day	Powertools, excavator	68	72	Yes	Laeq and LaMax from passing traffic
18/04/2021	8:11	15	360 Edgeware Rd	Shoring box Install	Excavator	58	71	Day	Excavator, powertools, truck	68	72	Yes	
3/05/2021	21:14	15	134 George St	Line Marking	Linemarking Truck	69.9	84.2	Evening	Crane faint, EWP, occasional powertools	47	70	Yes	LaMax from Overhead plane

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
4/05/2021	22:32	15	11 Swain St	Road Saw	Buses idling	64.1	80.5	Day	Excavator digging, reversing quacker	47	62	Yes	LAeq and LaMax from extraneous noise, including rail and road traffic
17/05/21	21:16	15	30 Hogan Ave	Winching of Main	Winch and Traffic	57.6	79.2	Evening	Winch Truck	47	77	Yes	LaMax from Air Traffic
26/05/2021	21:20	15	26 Hogan Ave	Milling and Sweeping of Road	Milling and Sweeping of Road	58.5	73	Evening	Milling	47	82	Yes	
29/05/2021	2:40	15	136 George St	Platform 2/3 preparation	Traffic, Excavator, saw and generator	57	68.5	Night	Faint	47	66	Yes	LaEq and LaMax from passing traffic

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
29/05/2021	23:30	15	360 Edgeware Rd	OHW and hydreema movement	Handtools and Hydreema	54.4	73.9	Night	Hydreema Movement	43	63	Yes	
29/05/2021	0:31	15	133 Meeks Rd	GST	Traffic	49.3	71.7	Night	None	45	59	Yes	LaEq and LaMax from Traffic
30/05/2021	19:27	15	30 Hogan Ave	Station and Platform works	Non-project rail work	60.1	75.8	Night	Faint Compactor Plate	59	64	Yes	LaEq due to non-project rail work (Vac Truck) LaMax due to overhead plane.
26/06/2021	13:12	15	360 Edgeware Rd	Piling on Bedwin Bridge	Traffic	55.7	70.3	Day	Faint Augur	63	66	Yes	LaMax from Traffic

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
26/06/21	15:39	15	30 Hogan Ave	Drilling on EWP	Traffic, Trains	58.1	80.3	Day	Powertools (infrequent)	59	63	Yes	LaMax from Plane
1/07/2021	1:20	15	360 Edgeware Rd	Barrier Movement	Grinder and Truck	54.2	66.7	Night	Grinder	43	70	Yes	LaMax from Traffic
2/07/21	22:08	15	360 Edgeware Rd	Linemarking Switch	Linemarking, Traffic	57.4	75.6	Night	Linemarking Truck	43	70	Yes	LaMax from passing motorbike
04/07/21	2:55	15	108 Burrows Ave	GST work in corridor	Road Traffic	53.2	74.7	Night	Lighting Tower and excavator	47	64	Yes	LaMax from Traffic

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
14/07/2021	22:36	15	360 Edgeware Rd	Installation of Handrail	Powertools	58.9	77	Night	Yes (infrequent)	43	68	Yes	LaMax from Plane
18/07/2021	6:04	15	360 Edgeware Rd	Throw Screen Installation	Grinder	47	79.9	Night	Faint grinder, continuous	43	61	Yes	LaMax from Truck
6/08/2021	22:30	15	30 Hogan Ave	Road slab repair	Traffic	46.3	69.9	Night	Faint Excavator	47	65	Yes	LaEq from traffic, construction largely inaudible, LaMax from Traffic
9/08/2021	23:08	15	360 Edgeware Rd	Gutter rectification	Grinder, power tools	60.9	87.7	Night	Grinder	38	68	Yes	LaMax from Truck

Date	Time (hrs)	Duration (mins)	Location	Construction Activities	Main source of noise	LA(eq)	LA(max)	Period	Audible noise from SSJ construction activities	NML	Predicted construction sound pressure level (LA(eq,15min))	Compliance	Comment
14/08/2021	6:50	15	133 Meeks Rd	GST Install	Construction activities are barely audible	48.8	67	Night	Faint power tools	40	60	Yes	LaMax from Van
20/08/2021	22:58	15	136 George St	Joint Slab construction	Excavator hammering and Rail	60.3	80.4	Night	Excavator hammering	47	61	Yes	LaMax from Trains
28/08/2021	17:46	15	30 Hogan Ave	Road Slab Demolition	Traffic and Rail, excavator intermittently audible	56.1	74.1	Evening	Excavator	54	57	Yes	LaMax from Trains
28/08/2021	22:16	15	136 George St	Road Slab Formwork	Traffic and Rail	55.9	74.3	Night	No	47	55	Yes	Construction activities are not audible. LaEQ and LaMax from passing traffic, trains and trucks
29/08/2021	21:49	15	136 George St	Road Slab Concreting	Traffic and Rail	51.1	73.2	Night	No	47	54	Yes	Construction activities are not audible. LaEQ and LaMax from passing traffic, trains and trucks

Table 6 - Vibration monitoring data

Monitoring Location	Date	Works being carried out	Attended or continuous	Event Based Monitoring Y/N	Measured PPV (mm/s)	Cosmetic Damage criteria (mm/s)	Compliant Y/N	Comments
Sydenham Pit Pump Station	12/04/2021	Compaction of backfill	Attended	Y	0.708	7.5	Y	
Sydenham Pit Pump Station	25/05/2021	Compaction of capping material	Attended	Y	6.31	7.5	Y	
Platform 2/3 Station Building - City End	13/07/2021-21/07/2021	Backfill for track between Platforms 1 and 2	Continuous	Y	3.936	7.5	Y	Continuous monitoring over a week – some vibration detection appears to be linked to train movements in active corridor (readings while no works were active in area)

## 4. Mitigation Measures

### 4.1 Noise and Vibration

Standard mitigation measures were implemented as per Section 7 of the Construction Noise and Vibration Management Plan, and Sections 6.2 and 6.4 of the Construction Noise and Vibration Impact Statement. These were considered effective during the reporting period.

### 4.2 Water

Standard mitigation measures were implemented as per Section 6 of the Construction Soil and Water Management Plan. Controls were repaired as required and were effective during the reporting period.

## 5. Conclusion

Pre-construction surface water monitoring began in June 2018, with results showing potentially high turbidity and fluctuations due to urban environment. Turbidity in monitoring results fluctuated slightly from upstream to downstream, suggesting no adverse impacts from the project. Surface water data does not provide a clear correlation between construction activities and water quality, due to channel access issues and the ephemeral nature of the channel.

Erosion-sediment control plans are maintained and reviewed regularly, and JHLOR conducts weekly, pre- and post-rainfall environmental inspections. The Environment Representative also conducts bi-weekly inspections and any observations are actioned by the project.

Noise monitoring records have validated modelling and are consistent with the predicted impact of construction activities on noise catchment areas, including sensitive receivers. There have not been any recorded exceedances regarding noise and vibration impacts attributed to construction activities.

Real time noise and vibration monitoring is conducted during relevant periods of construction. Both real-time and attended noise monitoring has observed exceedances due to non-construction sources, such as air, road and rail traffic. Vibration results conducted during relevant activities indicated low levels of vibration from works within project vibration guidelines at nearby heritage structures.