Construction Monitoring Report – September 2021 to February 2022

SMCSWSSJ-JHL-WSS-EM-REP-000012

Document and Revision History

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Revisions

Revision	Date	Description	Prepared by	Reviewed by
A	10/03/2022	Draft	Ryan Dunne	Lucas Dobrolot
B	23/03/2022	Final	Ryan Dunne	Lucas Dobrolot

Management reviews

Review date	Details	Reviewed by

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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.

This report provides the results of the CMP for the period September 2021 to February 2022.

1.1 Submission Requirements

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

- NSW EPA
- Inner West Council
- DPE

The previous CMR was submitted on 15/11/2021 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

The project is nearing the end of the construction phase and most areas have had ground cover restored. No further significant disturbance of ground cover is anticipated and as a result residual risks to impact local watercourses are low.

1.3 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 . To date, no construction activities have taken place which were identified as significantly affecting these sensitive receivers during their operating hours.

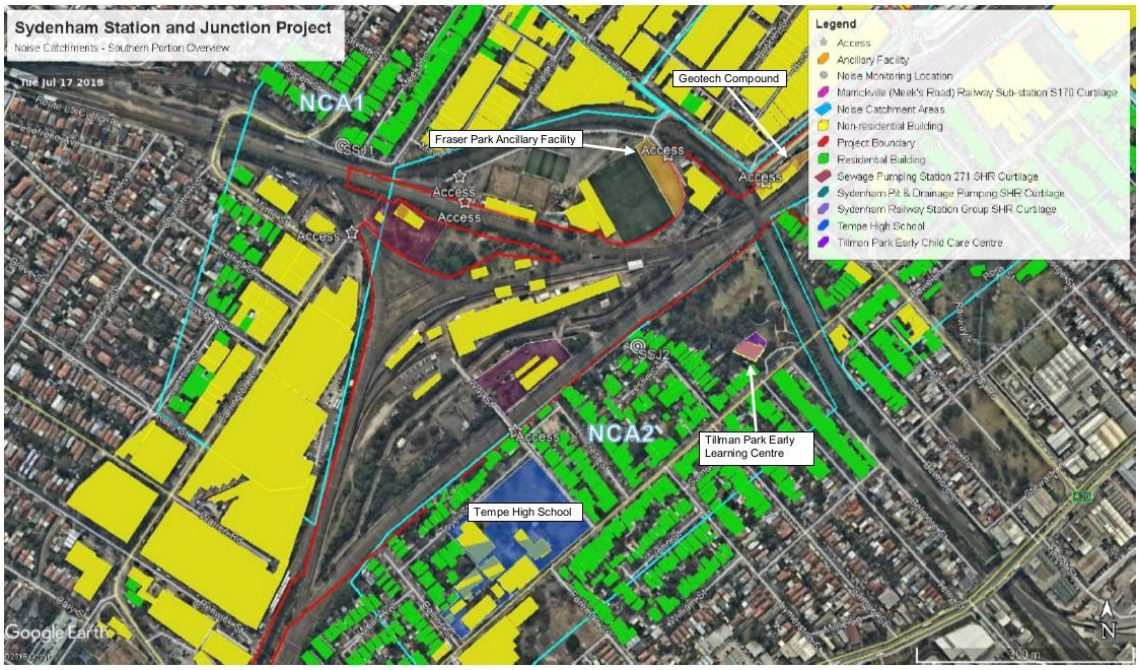

Figure 2 - Surrounding Land-use and Sensitive Non-Residential receivers

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. Now that the project is nearing the end of the construction phase, remaining construction is largely limited to defect work during standard construction hours and therefore further noise and vibration impacts are expected to be very limited.

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 1. 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.

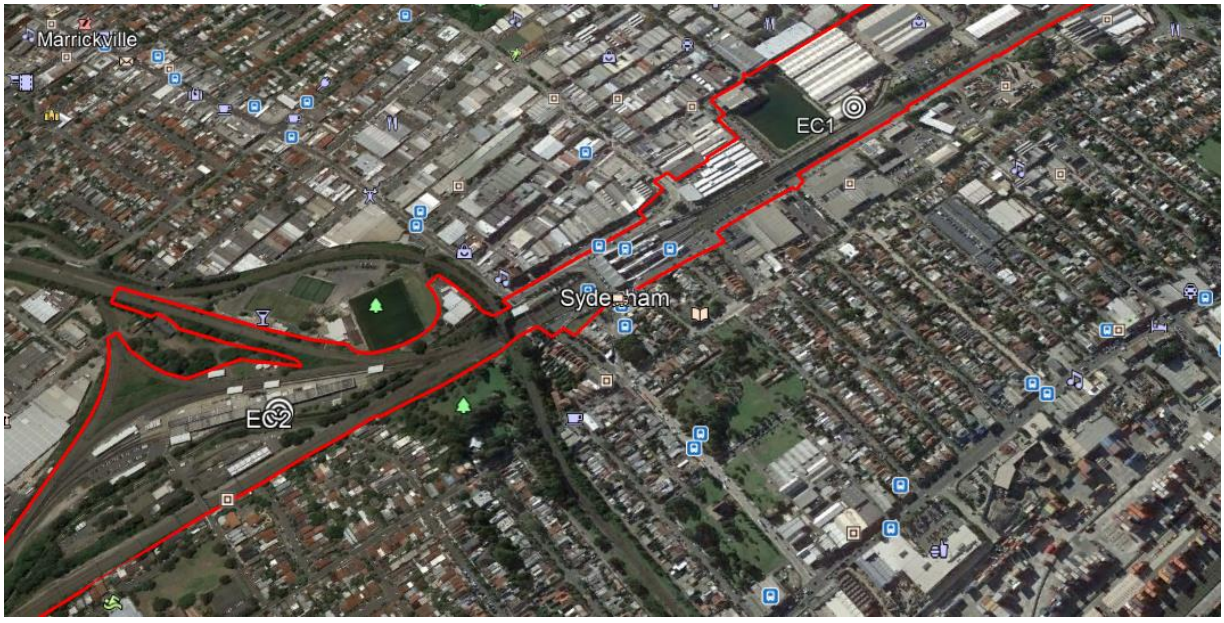

Figure 1 - Surface Water Monitoring Locations

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.

Now that the project is nearing the end of the construction phase, remaining construction is largely limited to defect work during standard construction hours and therefore further noise impacts are expected to be very limited across all NCAs.

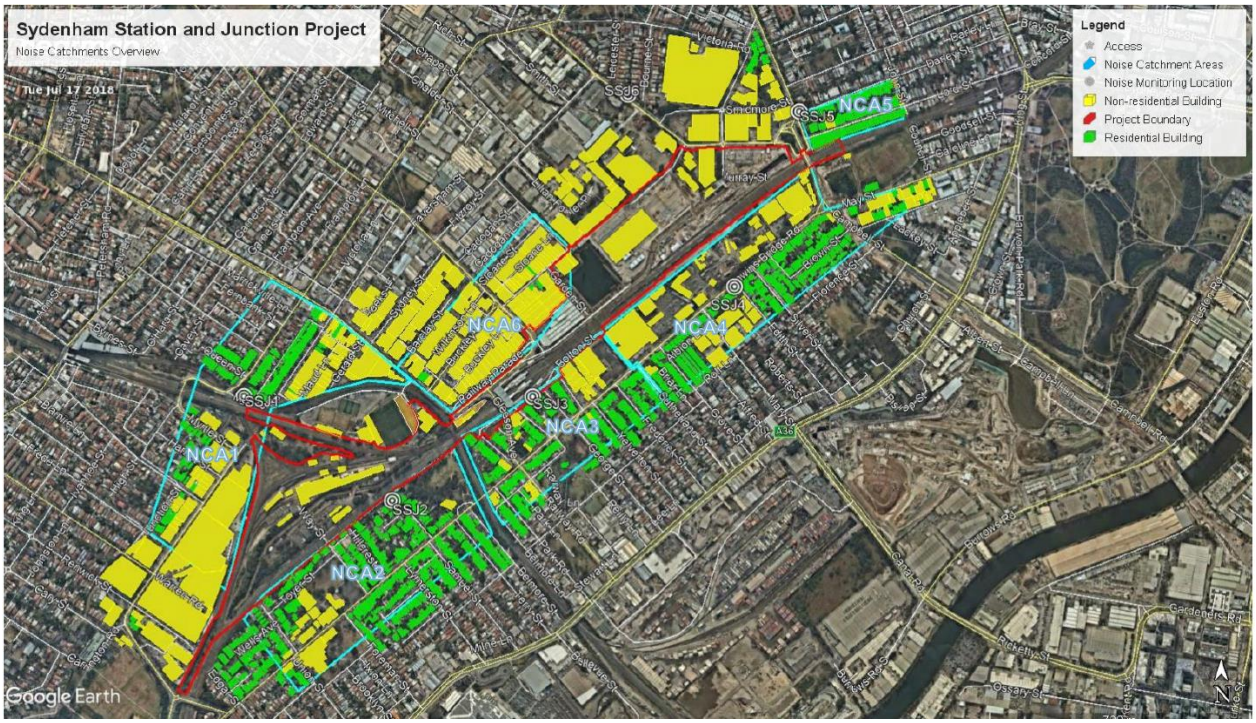

Figure 2 - NCAs and identified residential and non-residential receivers

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 actives 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* *as of date report was written
Svantek SV971 Noise Monitor	61522	17/06/2021
Svantek SV958 Noise and Vibration Monitor	H3407	18/06/2021
Svantek SV84 Triaxle Accelerometer	69017	18/06/2021
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 06/10/2021 and 12/01/2022. In addition, sampling was conducted at EC1 and EC2 during two wet weather events on 11/11/2021 and 28/02/2022. – see results in Table 4.

Change in pH between upstream and downstream monitoring points varied within the acceptable range. Temperature varied significantly, likely in cases where there were low flow levels in the concrete culvert during monitoring. As noted, Turbidity (NTU) 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

				EC 1									EC 2							
Date	Site Activities	Total Rainfall in Previous 24hrs (mm)	Comments	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
06/10/2021	CSR installation, Electrical install, Excavation of Secondary Plaza	0	**Quarter Monitoring**: Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – low flows with little turbidity	10:32	44	17.54	7.49	0.259	71.9	163.6	0.055	No	11:07	37	17.89	7.76	0.621	62.2	167.1	0.397	No
11/11/2021	Defect work and electrical installation, Secondary Plaza Asphalting	11.8	**Post Rainfall:** Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – medium flows low turbidity	8:04	60	19.26	7.88	0	138	235.1	0	No	7:12	**61**	19.96	7.68	0	**141**	230.6	0	No
12/01/2022	Retaining wall construction, paving of station, CSR installation, backfilling track area	0	**Quarterly Monitoring:** Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – low flows with little turbidity	13:01	58	21.63	7.91	0.14	71.3	188.4	0.377	No	13:39	53	22.88	7.72	0.182	70.1	160.1	0.341	No
28/02/2022	CSR installation, track construction and ballast, tiling of plaza	23 (60mm in 36 hours)	**Post Rainfall:** Upstream - upstream sample taken within closed culvert, visual of source no longer possible. Downstream – high flows noticeably turbid	11:45	166	22.52	7.91	0.034	184	101.3	0.087	No	12:23	134	23.78	7.94	0.099	169	93.5	0.065	No

3.2 Noise and Vibration Monitoring

Attended noise monitoring was undertaken as required for a single instance of OOHW during the past 6 months, where noise modelling predicted significant exceedance of Rating Background Levels or otherwise required validation using this method. The low instance of noise impacts is due to the stage of construction on the project, as most rail and road construction had been completed prior to this period. Historically, 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

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. Noise monitoring results are detailed in the results shown below in Table 5.

Continuous vibration monitoring has been undertaken during a representative period of works on two occasions of jackhammering near neighbouring properties at 11 Sydenham rd during the reporting period, in order 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. Works during rail possessions conducted during the reporting period did not require monitoring due to work only taking place far from sensitive structures and receivers or due to limited scope.

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
26/10/2021	21:22	15	30 Hogan Ave	Line-marking of Sydenham Rd	Traffic, including passing trains	57.8	77.9	Evening	Line-marking truck movement barely audible	54	60	Yes	Non-construction traffic continuous, passing trains source of LaMax

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
Boundary to 13 Sydenham Rd	5/12/21 and 6/12/21	Jackhammering and removal of concrete slab	Continuous	Y	1.047	7.5	Y	
Boundary to 13 Sydenham Rd	13/12/21-15/12/21	Jackhammering and removal of concrete slab	Attended and Continuous	Y	2.291	7.5	Y	Attended for approx. 20 mins to confirm hammering activity was recorded

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. Potential noise and vibration impacts have been very limited on the project since the end of 2021. Vibration results conducted during relevant activities indicated low levels of vibration from works within project vibration guidelines at nearby structures.