



Construction Monitoring Report - September 2018 to February 2019

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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 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.

1.1 Submission Requirements

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

- NSW EPA
- Inner West Council
- DP&E

The Independent Environmental Representative will review and endorse the report prior to submission.

1.2 Surface Water

The project site is located within the rail corridor at Sydenham Station and several hundred meters 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, however these works have not yet commenced in the period covered by this report.

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 Noise and Vibration

The area surrounding the SMu project contains a variety of land-use types and receivers, including residential receivers, commercial, industrial, 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 areas potentially affected by 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 in the duration of 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.

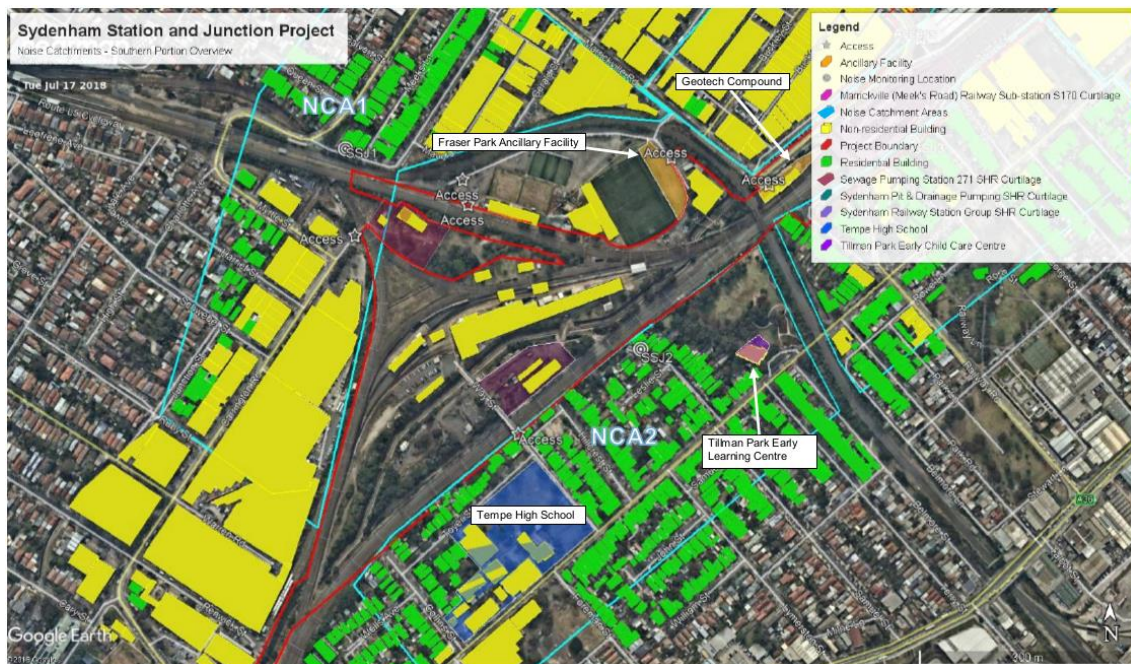


Figure 1 - Surrounding Land-use and Sensitive Non-Residential receivers

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

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 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. At Meeks Road, construction noise levels may exceed the noise management levels at residences at times. However, given that most of the construction works are well removed from Meeks Road, noise impact would be expected to be limited. Equally, vibration levels above the criteria are unlikely to occur in Meeks 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 construction footprint. Both are located in the man-made eastern channel running alongside the rail corridor – See Figure 2. The channel is uncovered for the majority of its length along the project. The water level in the channel is generally fairly shallow outside of significant rain events (less than 20cm), 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 point is not possible due to access and safety reasons.

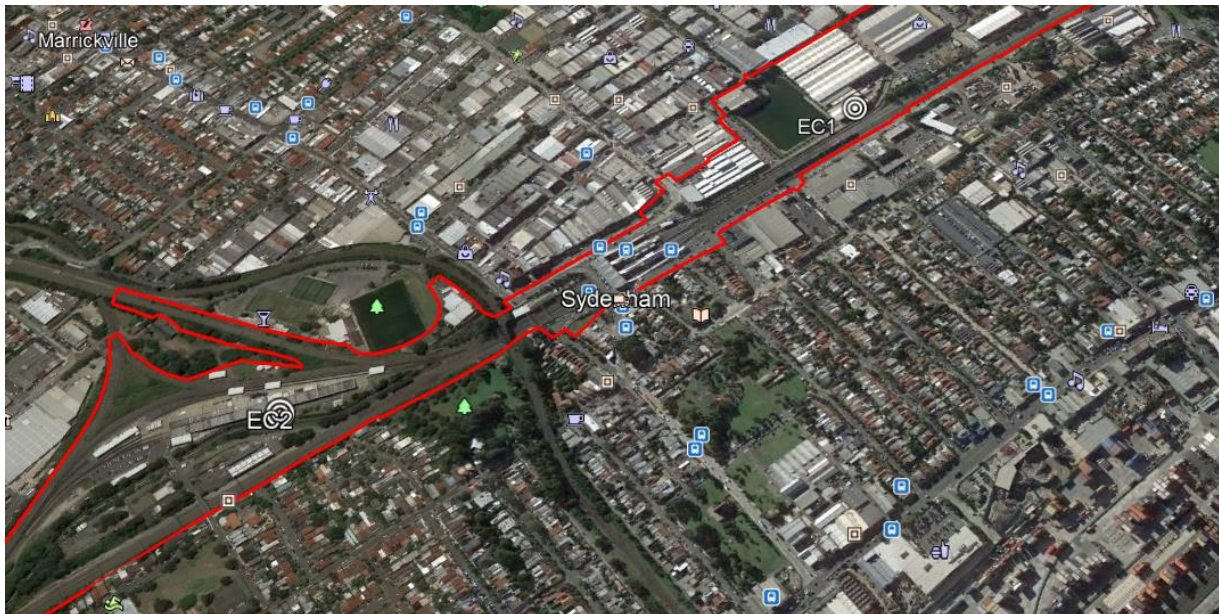


Figure 2 - Surface Water Monitoring Locations

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

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

Pre-construction monitoring was taken 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 mostly ephemeral
- Water quality from urban areas is highly variable and changes according to prevailing weather patterns and day-to-day during rainfall.

During the monitoring period, there was one occasion where safe access could not be arranged to point EC2. 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.

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 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.

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 CNVIS and the additional monitoring, the area surrounding the project has now 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

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



Figure 3 - NCA's and identified residential and non-residential receivers

Monitoring will be undertaken during construction activities (including out of hours works) where required in accordance with Section 8 of the CNVS and for validation purposes. Attended noise monitoring would be 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 that 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, continuous real-time noise and vibration monitoring will be undertaken, as identified in the CNVIS. 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 completed and it is not reasonable to have the real-time system in operation during these periods. There is a high likelihood of 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 by SSJ Project related works, the construction method and equipment will be reviewed/modified.

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 surface water background, 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 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 construction phase took place once per quarter at two identified points. In addition, two monitoring events were recorded between September 2018 and February 2019 – see Table 3

All results for pH were within the accepted range for discharge. Change in pH between upstream and downstream monitoring points tended to be minor shift towards 7.5pH. 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 recorded from both EC1 and EC2 even when no construction activities have taken place. This has been observed particularly after high rainfall prior to monitoring, which is consistent with baseline readings obtained after a rain event. In combination with prior identification of the ephemeral nature of the watercourse, 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.

Table 3 - 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
20/06/2018	Pre-construction - Baseline	26	-	9:13	214	14.9	7.97	0.368	195	114.21	0.239	No	9:44	332	15.5	7.79	0.331	289	114.49	0.215	No
30/06/2018	Pre-construction - Baseline	0.2	Low flows at both locations	18:07	40	14.96	7.89	0.438	36.4	120.1	0.285	No	18:27	126	13.15	7.84	0.478	118	118.43	0.317	No
25/07/2018	Pre-construction - Baseline	0	Low flows at both locations	15:40	4	17.9	8.17	0.374	4.4	128.52	0.243	No	16:06	25	17.21	7.98	0.348	21.4	128.57	0.226	No
22/08/2018	Pre-construction - Baseline	0	Low flows at both locations	8:18	1	13.17	7.77	0.553	1.2	110.15	0.348	No	8:43	7	13.12	7.63	0.364	5.1	119.36	0.233	No
5/10/2018	None - works ceased due to rain	35.2	Eastern side visibly more turbid than western side of channel No activities on site - higher turbidity D/S reflects baseline results	11:14	116	16.83	7.29	0.406	127	103.47	0.264	No	12:07	398	16.79	7.58	0.225	67.5	118.81	0.146	No
18/11/2018	WE23 Possession	3.6	Quarterly Monitoring	15:47	46	20.09	7.15	0.382	29.4	104.84	0.249	No	16:12	30	20.14	7.71	0.486	24.6	103.19	0.316	No

29/11/2018	None - works ceased due to rain	60	Moderate flows through both channels	8:32	100	18.55	7.16	0.668	142	100.69	0.428	No	8:52	92	18.73	7.19	0.632	107	101.6	0.404	No
18/02/2019	Works at EC1 No SMU works at EC2	0	Quarterly Monitoring Hot, sunny day EC1 - Low flow EC2 - Water could not be sampled from in ground culvert due to no safe access. Water was sampled from eastern channel nearby. Low flow with visible sediment	13:34	17	30.5	7.83	3.49	82.1	96.01	2.23	No	14:14	80	31.24	7.73	1.22	113	90.93	0.779	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 eight rail possessions and one local possession of RMS road 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 or complaints assessed as relating to ongoing construction activities on the project. All exceedances recorded by attended monitoring have been attributed to extraneous noise rather than construction activity. These are detailed in the results shown below in Table 4

Continuous real-time noise and vibration monitoring has been undertaken during eight rail possessions and during demolition works at 11 Sydenham rd during the reporting period, in order to assess noise and vibration impacts and that works fall within relevant criteria. The data is made available in real-time as per condition C11 and all detailed records are stored. To date, there have been no exceedances of vibration from construction activities, and recorded vibration (PPV in mm/s) has been well below cosmetic vibration limits for affected structures. As above, attended noise and vibration monitoring have 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 4 - Attended Noise Monitoring Results

Date	Time	Duration Mins	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	Comments
8/09/2018	19:34	15	ULX service searching	Other	74.0	93.1	Evening	Excavator, lighting tower, hydrema	54	60	Y	Major contributor to noise was heavy traffic on Unwins Bridge Road
8/09/2018	20:25	15	Platform works	Other	63.8	91.6	Evening	Excavator, lighting tower	54	80	Y	Trains, buses and traffic were the main contributor to noise.
8/09/2018	20:50	15	ULX works	Other	62.3	81.3	Evening	Excavator, lighting tower, Hydrema	54	65	Y	Trains, planes and buses were the main contributor to noise
9/09/2018	0:33	15	ULX local routes, Platform works	Other	66.9	86.0	Night	Excavator barely audible	47	60	Y	Major contributor to noise was heavy traffic on Unwins Bridge Road
9/09/2018	1:02	15	ULX works	Construction	55.8	75.6	Night	Excavator, Hydrema, lighting tower	47	65	Y	Some traffic but construction was the main contributor to noise
9/09/2018	1:29	15	Platform works	Construction	59.0	74.3	Night	Excavator, light tower	47	80	Y	Construction was the main contributor to noise
15/09/2018	7:57	15	Demolition	Construction	70.3	90	Night/Day	Saw cutting, jack hammer, workers talking	47	80	Y	Rail replacement bus, traffic, planes overhead.
15/09/2018	21:42	15	Demolition	Construction	63.8	84.1	Evening	Rock breaking	54	80	Y	Rail replacement bus, traffic were also heavy contributors
16/09/2018	1:01	15	Hoarding/Demolition	Construction	68.7	88.7	Night	Hand tools, loading materials to a truck	47	80	Y	Rail replacement bus, traffic were also heavy contributors
16/09/2018	16:32	15	Hoarding	Other	72.8	93.9	Day	Hand tools	56	55	Y	Rail replacement bus, traffic were also heavy contributors
16/10/2018	1:15	15	NDD works	Other	66.5	87.9	Night/Day	NDD Truck	45	55	Y	Concurrent Sydney Trains work and passing road and rail traffic dominant noise sources

Date	Time	Duration Mins	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	Comments
17/11/2018	22:50	15	Platform works	Other	70.0	87	Night	NDD Truck	47	71	Y	
17/11/2018	23:27	15	Platform works	Other	55.5	76	Night	None	42	55	Y	Slight exceedance, due to extraneous noise and within calibration
18/11/2018	1:49	15	Platform works	Other	46.9	62	Night	None	45	58	Y	
18/11/2018	2:19	15	Excavation	Construction	65.2	73	Night	Excavator and compactor	47	71	Y	
24/11/2018	3:41	15	Piling and Asphalt removal	Construction	67.3	83.1	Night	None	47	70	Y	
25/11/2018	0:11	15	Tamping	Traffic and Pedestrians	54.5	79.3	Night	None	43	52	Y	Exceeded due to extraneous noise (primarily traffic on nearby road).
25/11/2018	0:37	15	Tamping	Road Traffic	70.5	90.4	Night	Tamping	47	62	Y	Exceeded due to extraneous noise (primarily traffic on nearby road)
25/11/2018	1:33	15	Excavation on Platform	Road and Rail Traffic	60.3	78.3	Night	Powered Tools and Excavator	47	50	Y	Exceeded due to extraneous noise (primarily idling buses)
25/11/2018	1:54	15	Crane lifting pile cages	Construction	63.3	81.3	Night	Crane	47	70	Y	Fire truck passing created significant LAmax
8/12/2018	22:19	15	Excavation of Platform 4/5	Air and Road Traffic	72.1	94	Night	Excavator	47	71	Y	Exceedance due to extraneous noise (primarily air traffic)
9/12/2018	0:31	15	Concreting	Construction	51.2	68.9	Night	Concrete Pump, Hydrema	45	59	Y	
9/12/2018	22:50	15	Sawing Platform 4/5	Construction	69.7	90.6	Night	Concrete Saw, Compactor, Excavator with Augur	47	71	Y	

Date	Time	Duration Mins	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	Comments
27/01/2019	22.1	15	Excavation and Piling	Construction	58.5	-	Night	None	41	66	Y	
27/01/2019	22.45	15	Excavation and Piling	Air and Road Traffic	71.2	-	Night	Excavator	49	70	Y	Exceedance due to non-construction noise
27/01/2019	23.1	15	Excavation and Piling	Construction	60.3	-	Night	None	49	64	Y	
28/01/2019	16.45	15	ULX Backfill	Construction	61.6	78.7	Day	Excavator	41	66	Y	
28/01/2019	17:10	15	Piling Works	Construction	62.8	81.8	Day	Piling Rig	51	70	Y	
28/01/2019	17:30	15	NDD excavation	Air and Road Traffic	71.1	92.6	Day	None	51	64	Y	Exceedance due to non-construction noise
5/02/2019	22:50	15	NDD behind platform 5, handtools	Traffic	53.3	80.1	Night	None	47	67	Y	Additional attenuation from hoarding
25/02/2019	22:48	15	Saw cut of asphalt	Construction	62.5	81.0	Night	Concrete Saw, Excavator	47	75	Y	
25/02/2019	23:25	15	NDD of excavation	Construction	69.4	75.8	Night	NDD Truck	47	75	Y	
25/02/2019	23:46	15	NDD of excavation	Traffic and Trains	69.6	81.1	Night	NDD Truck	47	71	Y	
26/02/2019	0:03	15	NDD of excavation	Trains	61.2	78.6	Night	NDD Truck	47	67	Y	

3.3 Vibration

Table 5 - Vibration monitoring data

Monitoring Location	Date	Works being carried out	Attended or continuous	Event Base Monitoring Y/N	Measured PPV (mm/s)	Cosmetic Damage criteria (mm/s)	Compliant Y/N	Comments
Platform 6 building	8/9/18 to 9/9/18	Piling Demolition works	Continuous	Y	9.03	7.5	Y	There were a number of exceedances due to the monitor being impacted by nearby workers storing material adjacent. No exceedances were noted during the construction activities.
Platform 4/5 Building	15/9/18 to 16/9/18	Piling	Continuous	Y	2.97	7.5	Y	-
Platform 4/5 Building	24/11/18 to 25/11/18	Piling	Continuous	Y	1.58	7.5	Y	-
Geotech Building	7/12/18 to 9/12/18	ULX Excavations	Continuous	Y	5.35	25	Y	Trains passing on the Bankstown Line
Geotech Building	27/1/19 to 28/1/19	ULX Excavations	Continuous	Y	6.71	25	Y	-
19 Sydenham Road	12/2/19 to 15/2/19	Demolition of 11 Sydenham Road	Continuous	Y	8.26	25	Y	-

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 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. Construction monitoring results from locations upstream and downstream of channel show pH has remained within acceptable range, but all other parameters vary between rain events and channel conditions, including between upstream and downstream samples. Surface water data does not provide clear relation between construction activities and water quality, due to channel access issues and ephemeral nature of channel.

Erosion-sediment control plans are maintained and reviewed regularly, and JHLOR conducts weekly and post rain environmental inspections. The Environment Representative also conducts bi-weekly inspections and any observations are closed out within agreed timeframes.

Monitoring records have validated modelled noise and are consistent with the predicted impact of construction activities on noise catchment areas, including sensitive receivers. There have not been any recorded exceedances or project-related complaints regarding noise and vibration impacts.

Real time noise and vibration monitoring is conducted during relevant periods of construction, including for the duration of rail possessions. Both real-time and attended noise and vibration monitoring has observed exceedances due to non-construction sources, such as air, road and rail traffic.

Sydney Airport BOM weather observations were used to report the amount of rainfall 24hrs prior to monitoring and to determine when 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. This data is published monthly on the project website.