

CONSTRUCTION MONITORING REPORT
NOVEMBER 2021 TO APRIL 2022

Sydney Metro City & Southwest

Package 5 & 6

Customer: Sydney Metro

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Compliance Matrix

Condition	Requirement	Compliance
MCoA C14	The results of the Construction Monitoring Programs must be submitted to the Planning Secretary, and relevant regulatory agencies, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	This Construction Monitoring Report

Introduction

This Construction Monitoring Report has been prepared in accordance with Condition C14 of Critical State Significant Infrastructure Planning Approval 8256. It contains the results of Noise and Vibration Monitoring Program and the Water Quality Monitoring Programs, conducted as part of the station upgrades and Metro Services Building (MSB) construction at:

- Dulwich Hill (Package 5)
- Hurlstone Park (Package 6)
- Campsie (Package 5)
- Belmore (Package 6)
- Wiley Park (Package 6)
- Punchbowl (Package 5)

This report details the results of the noise, vibration and surface water monitoring conducted for a period of six (6) months of construction of Package 5 and Package 6 of the Sydney Metro Southwest Project. Construction of these packages commenced on 21 April 2021 and this report details the results of the monitoring undertaken from 8 November 2021 to 7 April 2022. Monitoring results for the first six months (approximately) of the project have been covered in a separate Construction Monitoring Report¹.

SUBMISSION REQUIREMENTS

In accordance with condition the Ministers Conditions of Approval (MCoA) C14, Construction Monitoring Report will be submitted to the following agencies for information:

- Inner West Council;
- City of Canterbury Bankstown; and
- DPE.

The Independent Environmental Representative for DPE will review the report prior to submission.

Surface Water Monitoring

The project sites are located within the rail corridor on the T3 Bankstown line between Dulwich Hill and Punchbowl, New South Wales (NSW). The project sites form part of the overall Cooks River catchment with water from the area discharging into the Cooks River via local stormwater drainage or overland flow. The catchment area is highly urbanised with mixed residential, commercial and industrial properties.

¹ Please refer to documents SMCSWSW5-DEW-WEC-EM-REP-001258 (Package 5) and SMCSWSW6-DEW-WEC-EM-REP-001153 (Package 6).

The closest Project worksite to an existing watercourse is the Wiley Park Station services building, which is located approximately 100m from an unnamed concrete-lined channel, which forms the upper reaches of Coxs Creek and is identified as a first-order stream within the Cooks River Catchment. Water quality is measured on an ongoing basis for the wider Cooks River catchment by the NSW Department of Planning & Environment (DPE) 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. Objectives for water quality management during construction are:

- Minimise pollution of surface water through appropriate erosion and sediment control;
- Maintain existing water quality of surrounding surface watercourses.

The water quality monitoring program, in accordance with Table 13 of the SWMP, is to be undertaken quarterly in response to wet weather events (four wet weather events - >20mm of rain per 24 hours - per year), and also including dry weather sampling. Additional surface water monitoring is undertaken during construction to monitor the effectiveness of measures for managing soil and water impacts implemented. It must be conducted for the duration of construction or unless otherwise agreed to by Downer, Sydney Metro and the Independent Environmental Representative for DPE. Details of the Water Quality Monitoring Program and the mitigation measures to reduce the impact of the construction activities are contained within the Soil and Water Management Plans listed below:

- Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Soil and Water Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website.

https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Dulwich_Hill_Campsie_and_Punchbowl_SWMP_Rev07.pdf

- Southwest Metro – Hurlstone Park, Belmore and Wiley Park Station Upgrades Soil and Water Management Plan. This document can be accessed on the Downer Sydney Metro Environment Documents website:

https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Hurlstone_Park_Belmore_and_Wiley_Park_SWMP_Rev07.pdf

RESULTS - SURFACE WATER MONITORING

In accordance with Table 21.4 of the EIS, Vol. 1B, the water quality trigger values relevant for the project are the following:

Indicator	Criteria (lowland rivers)
Total phosphorus	50 ug/L
Total nitrogen	500 ug/L
Chlorophyll-a	5 ug/L
Turbidity	6-50 NTU
Salinity (electrical conductivity)	125-2,200 uS/cm
Dissolved oxygen (per cent saturation)	85-110 %
pH	6.5-8.5

A summary of the Surface Water Monitoring Results is contained within the table below. The complete Surface Water Monitoring Reports are contained within Appendixes 1-4. Bold red text indicates initial criteria exceedances.

Parameter	12 November 2021		26 November 2021		9-10 February 2022		23 February 2022		9 March 2022	
	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)
Monitoring Event	Wet weather event (mid-construction)		Wet weather event (mid-construction)		Dry weather (mid-construction)		Wet weather event (mid-construction)		Wet weather event (mid-construction)	
Water Depth (m)	0.15	0.20	0.15	0.20	0.05	0.1	0.3-0.4	0.2-0.3	0.15-0.2	0.15-0.2
pH	8.10	8.42	6.07	7.34	8.59	8.78	7.50	7.62	7.78	7.85
Electrical Conductivity (µS/cm)	514	509.2	389.2	484	680	650	230	431	622	659
Dissolved Oxygen (mg/L)	6.42	5.63	9.05	9.31	7.21	5.06	4.94	6	5.38	5.34
Dissolved Oxygen (%)	68	63	98.7	101.9	92	62.2	56.7	72	58.4	58.1
SHE1 Redox Potential (mV)	70.8	80.4	183.7	196.3	240.3	196	261.5	287.6	282.3	290.4
Total Suspended Solids (TSS) (mg/L)	8.4	7.6	16	7.8	<5	<5	18	9.6	17	7.8
Turbidity (NTU)	21	19	25	17	2.9	1.2	37	28	31	22
Total phosphorus (mg/L)	0.15	0.02	0.13	0.18	0.14	0.08	0.23	0.28	0.16	0.14
Total nitrogen (mg/L)	2.7	2.8	1.6	2.4	1.7	1.6	1.64	2.6	1.9	1.8
Chlorophyll-a (mg/L)	<0.002	<0.002	<0.002	<0.0027	<2	<2	<2	<2	<0.002	<0.002
Condition	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity	Clear, Low Turbidity
Oil and Grease (mg/L)	<10	<10	<10	<10	<10	<10	<10	<10	10	<10



Figure 1: WP1 and WP2 location map. Please note that only WP1-DP1 and WP2-DP1 are Downer's discharge points.

For reference, the previous monitoring events at these locations yielded the results below²:

Parameter	10 March 2021		20 March 2021		5 May 2021		1 July 2021	
	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)
Monitoring Event	Dry weather pre-construction baseline measurement		Wet weather event (mid-construction)		Wet weather event (mid-construction)		Quarterly sampling mid-construction event	
Water Depth (m)	0.03	0.03	0.3	0.3	0.05	0.3	0.05	0.1
pH	7.9	7.61	8.10	7.58	7.8	7.73	9.01	8.83
Electrical Conductivity (µS/cm)	54	363	246.2	133.4	2500	92.9	910	530.3
Dissolved Oxygen	5.64	4.09	4.79	3.92	6.35	5.95	11.21	7.92

² Discussion of these results are included in Construction Monitoring Report 1 (April to November 2021), SMCSWSW5-DEW-WEC-EM-REP-001258 (Package 5) and SMCSWSW6-DEW-WEC-EM-REP-001153 (Package 6).

Parameter	10 March 2021		20 March 2021		5 May 2021		1 July 2021	
	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)	WP1 (upstream)	WP2 (downstream)
(mg/L)								
Dissolved Oxygen (%)	63	45.9	52.87	43.18	65.3	62.8	108.8	77.9
SHE1 Redox Potential (mV)	140.7	181.0	122.3	135.9	164.6	109.2	53.7	122.4
Total Suspended Solids (TSS) (mg/L)	<1	<1	9.2	35	4	47	4	4.4
Turbidity (NTU)	2.9	<1	9.3	13	4.3	21	4.1	6.3
Total phosphorus (mg/L)	0.34	0.12	<0.5	<0.5	0.21	0.15	0.18	0.13
Total nitrogen (mg/L)	2.5	1.68	2.3	2.3	5	1	1.3	3.1
Chlorophyll-a (mg/L)	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.001	<0.001
Condition	Clear Low turbidity Sheen observed	Clear Low turbidity Sheen observed	Brown Medium turbidity	Brown Medium turbidity	Clear Low to medium turbidity Sheen observed	Clear Low to medium turbidity	Clear Minor sheen observed	Clear Low turbidity
Oil and Grease (mg/L)	<10	29	<10	<10	<10	<10	<10	<10

Wet weather event (mid-construction): 12 November 2021

The sampling event was considered as a mid-construction wet-weather event based on the rainfall data recorded by two nearby weather stations:

- Canterbury Racecourse AWS station (ID: 066194): approximately 4.6 km from the site with the rainfall data recorded 19.8 mm (i.e. marginally below the 20 mm threshold) over the last 24 hours prior to the field sampling;
- Marrickville Golf Club station (ID: 066036): approximately 6.4 km from the site with the rainfall data recorded 22.0 mm (i.e. above the 20 mm threshold) over the last 24 hours prior to the field sampling.

At the time of sampling, minor flow contribution was observed on discharge point (WP1-DP1) immediately downstream / north of WP1. For the downstream of work area, the two discharge points (WP2-DP1 and WP2-DP2) within the rail corridor immediately upstream / south from WP2 were having minor flow contribution.

The results of the monitoring event indicated that:

- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of inorganics were reported above the adopted assessment criteria with the total nitrogen concentration within both the WP1 and WP2 samples, and the total phosphorous

concentration for WP1, but total phosphorous concentration WP2 (0.020) was below adopted assessment criteria;

- TSS concentrations were detected within both WP1 and WP2, with concentrations of 8.4 mg/L at WP1 and 7.6 mg/L at WP2
- Turbidity ranged from 21 NTU at WP1 to 19 NTU at WP2, values below adopted assessment criteria.

Results for upstream and downstream sampling on 12 November 2021 were comparable to baseline measurements, with the exception of:

- Dissolved Oxygen (DO) saturation measured at both WP1 and WP2 were outside the adopted criterion range. The downstream WP2 location had slightly lower DO (63%) compared to the upstream WP2 location (68%). Overall, this is not considered to be a significant issue, based on similar results obtained from both previous mid-construction wet-weather sampling events on 20 March 2021 and 5 May 2021. Also, the DO saturation measurements undertaken during the pre-construction dry-baseline event on 10 March 2021 returned 63.0% for WP1 and 45.9% for WP2 indicating these mid-construction wet-weather results are closer to the adopted thresholds than the baseline event;
- Phosphorous result was above the adopted threshold at upstream WP1 sample (0.15 mg/L). However, the concentration was lower at the downstream WP2 sample (0.02 mg/L) and below the adopted threshold; and
- Nitrogen levels were comparable to baseline values at WP1 (2.7 mg/L), with slightly higher levels at WP2 (2.8 mg/L).

The comparison of the wet-weather mid-construction event on 12 November 2021 with two previous wet-weather sampling events on 20 March 2021 and 5 May 2021 showed no significant difference. Based on comparison to the criteria, comparison with two previous mid-construction wet-weather events, and comparison of the upstream and downstream results, the results reported for the 12 November 2021 sampling event are not considered to reflect an adverse impact to water quality due to construction activities.

Wet weather event (mid-construction): 26 November 2021

The sampling event was considered as a mid-construction wet-weather event based on the rainfall data recorded by two nearby weather stations:

- Canterbury Racecourse AWS station (ID: 066194): approximately 4.6 km from the site with the rainfall data recorded 43.8 mm (i.e. above the 20 mm threshold) over the last 24 hours prior to the field sampling;
- Marrickville Golf Club station (ID: 066036): approximately 6.4 km from the site with the rainfall data recorded 46.0 mm (i.e. above the 20 mm threshold) over the last 24 hours prior to the field sampling.

At the time of sampling, flow contribution was observed on discharge point (WP1-DP1) immediately downstream / north of WP1 (upstream of work area). The two discharge points (WP2-DP1 and WP2-DP2) within the rail corridor immediately upstream / south from WP2 also had flow contribution at the time of sampling.

The results of the monitoring event indicated that:

- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and/or adopted assessment criteria at all sample locations;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of inorganics were reported above the adopted assessment criteria with the total nitrogen concentration within both the WP1 and WP2 samples, and the total phosphorous concentration within both the WP1 and WP2;
- TSS concentrations were detected within both WP1 and WP2, with concentrations of 16 mg/L at WP1 and 7.8 mg/L at WP2; and
- Turbidity ranged from 25 NTU at WP1 to 17 NTU at WP2.

Results for upstream and downstream sampling on 26 November 2021 were comparable, with the exception of:

- pH was outside the adopted criterion range at upstream WP1 sample (6.07); however, within the adopted criterion range at downstream WP2 sample (7.34).
- Concentrations of total phosphorous and total nitrogen were outside the adopted criterion range at upstream and downstream sampling locations and the downstream showed to have slightly higher concentrations compared to the upstream sample. However, the concentrations were generally consistent with the previous two mid-construction wet-weather events.

The comparison of the wet-weather mid-construction event on 26 November 2021 with two previous wet-weather sampling events on 20 March 2021 and 5 May 2021 showed no significant difference. Based on comparison to the criteria, comparison with two previous mid-construction wet-weather events, and comparison of the upstream and downstream results, the results reported for the 26 November 2021 sampling event are not considered to reflect an adverse impact to water quality due to construction activities.

Mid-Construction Dry-Weather Event – 9 and 10³ February 2022

The sampling event was undertaken on 9 February 2022 during a dry-weather event with 0 mm precipitation over the last 24 hours prior to the field sampling (rainfall data was obtained from the closest Bureau of Meteorology weather station, i.e. Canterbury Racecourse AWS - station ID: 066194).

The results of the monitoring event indicate that:

- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at all sample locations;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of inorganics were reported above the adopted assessment criteria with the total nitrogen concentration and the total phosphorous concentration within both the WP1 and WP2 samples;
- Total Suspended Solids (TSS) concentrations were reported below laboratory detection limit at all sample locations; and
- Turbidity ranged from 2.9 NTU at WP1 to 1.2 NTU at WP2.

³ Chlorophyll-a was resampled at both WP1 and WP2 on 10 February 2022 due to damage of the sample containers during the transportation following the initial sampling work on 9 February.

Results for the mid-construction dry-weather event sampled on 9 and 10 February 2022 generally showed monitored parameters were within the adopted threshold criteria, with the exception of dissolved oxygen, total nitrogen, total phosphorous, and pH:

- Dissolved oxygen saturation measured at WP1 (92.0%) was within the adopted criterion range whereas WP2 (62.2%) was below the adopted criterion range. This is not considered to be a significant issue, due to the pre-construction monitoring results showing saturations of 63% and 45.9% for WP1 and WP2 respectively, indicating this mid-construction results are close to the adopted thresholds than the preconstruction event;
- Total nitrogen measured at both WP1 and WP2 were above the adopted criterion range with the analytical results of 1.7 mg/L and 1.6 mg/L for WP1 and WP2 respectively. Overall, this is not considered to be a significant issue, due to the pre-construction monitoring results showing the total nitrogen concentrations of 2.5 mg/L and 1.68 mg/L for WP1 and WP2 respectively, indicating mid-construction results are closer to the adopted thresholds than the pre-construction event;
- Phosphorous measured at both WP1 and WP2 were above the adopted criterion range with the analytical results of 0.14 mg/L and 0.08 mg/L for WP1 and WP2 respectively. Overall, this is not considered to be a significant issue, due to the pre-construction monitoring results showing total phosphorus of 0.34 mg/L and 0.12 mg/L for WP1 and WP2 respectively, indicating mid-construction results are closer to the adopted thresholds than the pre-construction event;
- pH results were above the adopted criterion range in both sampling locations with the analytical results of 8.59 and 8.78 for WP1 and WP2 respectively. Overall, this is not considered to be a significant issue since the exceedance is only slightly above the adopted criteria.

Results between upstream and downstream samples collected during the mid-construction dry-weather event were comparable, with the exception of:

- pH results were slightly above the adopted threshold in both sampling locations, with similar results of 8.78 at the downstream sample and 8.59 at the upstream sample. Overall, this is not considered to be a significant issue since the difference of the upstream and downstream pH results is less than 2.5%.

Overall, conditions are similar in the pre-construction results and the mid-construction sampling event on 9 and 10 February 2022. Results between upstream and downstream samples collected during the mid-construction dry-weather event were comparable with exception of a slight increase (less than 0.2 pH unit) in pH measured at the downstream sample compared to the upstream sample. These minor exceedances are not considered to reflect an adverse impact to water quality due to construction activities.

Mid-Construction Wet-weather Event – 23 February 2022

The sampling event was considered as a mid-construction wet-weather event based on the rainfall data recorded by the nearby weather station:

- Canterbury Racecourse AWS station (ID: 066194): approximately 4.6 km from the site with the rainfall data recorded 117.8 mm over the last 24 hours prior to the field sampling.

At the time of sampling, one discharge point (WP1-DP1) was observed immediately downstream / north of WP1 with high flow contribution to the stream. During the sampling event, the two discharge points (WP2-DP1 and WP2-DP2) within the rail corridor immediately upstream / south from WP2 were observed. High

flow contribution from both discharge points were observed at the time of sampling. It is noted that WP2-DP2 was observed to have greater flow contribution than WP2-DP1.

The results of the monitoring event indicate that:

- Concentrations of Chlorophyll-a were reported below the laboratory detection limit and adopted assessment criteria at both sample locations;
- Concentrations of Oil and Grease were reported below laboratory detection limit at all sample locations;
- Concentrations of total nitrogen and the total phosphorous were reported above the adopted assessment criteria within both WP1 and WP2 samples.
- TSS concentrations were detected within both WP1 and WP2, with concentrations of 18 mg/L at WP1 and 9.6 mg/L at WP2; and
- Turbidity was detected with concentration of 37 NTU at WP1 to 28 NTU at WP2.

Results for the mid-construction wet-weather event sampled on 23 February generally showed monitored parameters were within the adopted threshold criteria, with the exception of dissolved oxygen saturation, total nitrogen, and total phosphorous.

- Dissolved oxygen saturation measured at both WP1 (56.7%) and WP2 (72%) were below the adopted criterion range. However, this is not considered to be a significant issue because the concentration of dissolved oxygen saturation at WP2 (downstream) was closer to the adopted criterion range in comparison to WP1 (upstream);
- Total nitrogen measured at both WP1 (1.64 mg/L) and WP2 (2.6 mg/L) were above the adopted criterion range. However, the results from the previous mid-construction wet-weather sampling events show that total nitrogen at WP1 fluctuated between 1.6 mg/L and 5.0 mg/L whereas total nitrogen for WP2 fluctuated between 1.0 mg/L and 2.8 mg/L. Furthermore, the total nitrogen for both WP1 and WP2 sampled on the 23 February 2022 monitoring event were similar to the previous event ranges. As such, this increase in total nitrogen is not considered to be a significant issue.
- Total phosphorous measured at both WP1 (0.23 mg/L) and WP2 (0.28 mg/L) were above the adopted criterion range. However, the results are similar to the results from previous mid-construction wet-weather.

Results for upstream and downstream sampling on 23 February 2022 were comparable, with the exception of:

- Dissolved Oxygen (DO) saturation measured at the downstream WP2 location had higher DO saturation (72%) compared to the upstream WP1 location (56.7%). However, this is not considered to be a significant issue since the downstream result was closer to the criterion range in comparison to the upstream;
- Concentrations of total nitrogen at downstream sample was slightly higher than the upstream sample. However, this is not considered to be a significant issue, since the concentrations were generally consistent with the previous four mid-construction wet-weather events;
- Concentrations of total phosphorous results at downstream sample was slightly higher than the upstream sample. However, this is not considered to be a significant issue since the results were generally consistent with the previous four mid-construction wet-weather events;
- The pH result at downstream sample (7.62) was slightly higher than the result at upstream sample (7.50). However, this is not considered to be a significant issue since the pH measurements at

both sample points were within the adopted criterion range and the difference of the upstream and downstream pH results is only 1.6%;

- The Electrical Conductivity (EC) result at the downstream sample (431 $\mu\text{S}/\text{cm}$) was higher than the upstream sample (230 $\mu\text{S}/\text{cm}$). However, this is not considered to be a significant issue since the EC measurements at both sample points were within the adopted criterion range and the EC values were generally consistent with the previous four mid-construction wet-weather events.

During this wet-weather monitoring event, sampling results showed monitored parameters were generally within the adopted screening criteria with the exception of dissolved oxygen saturation, total nitrogen, and total phosphorous. The comparison of the mid-construction wet-weather event conducted on 23 February 2022 to the four previous wet-weather sampling events on 20 March, 5 May, 12 November and 26 November 2021 showed no significant difference.

During this wet-weather monitoring event, the results between upstream and downstream were generally comparable with the exceptions of pH, EC, DO, total nitrogen, and total phosphorous. The pH and EC measurements at the downstream sample were slightly higher than the upstream sample, but both downstream and upstream results were within the criterion range. The DO result at the downstream sample was higher than the upstream sample, but it was closer to the adopted criterion range compared to the upstream sample. The total nitrogen and total phosphorous results at the downstream sample were slightly higher than the upstream sample, but the results at both upstream and downstream samples were generally consistent with the previous four mid-construction wet-weather events. Overall, the comparison of the upstream and downstream samples conducted on 23 February showed no significant difference.

Based on comparison to the criteria, comparison with four previous mid-construction wet-weather events, and comparison of the upstream and downstream results, the results reported for the 23 February 2022 sampling event are not considered to reflect an adverse impact to water quality due to construction activities.

Mid-Construction Wet-weather Event – 9 March 2022

The sampling event was considered as a mid-construction wet-weather event based on the rainfall data recorded by the nearby weather station:

- Canterbury Racecourse AWS station (ID: 066194): approximately 4.6 km from the site with the rainfall data recorded 68.6 mm over the last 24 hours prior to the field sampling.

At the time of sampling, WP1 (upstream of work area) contained high flowing clear water with low turbidity, as well as WP2 (downstream of work area). One discharge point (WP1-DP1) was observed immediately downstream/ north of WP1. Medium flow contribution was observed at the time of sampling. For WP2 (downstream of work area), the two discharge points (WP2-DP1 and WP2-DP2) within the rail corridor immediately upstream / south from WP2 were observed. Medium level of flow contribution was observed from discharge point WP2-DP1 and high level of flow contribution was observed from discharge point WP2-DP2.

The results of the monitoring event indicate that:

- Concentrations of Chlorophyll-a were reported below the laboratory detection limit at both sample locations;
- Concentrations of Oil and Grease were reported at 10 mg/L within the upstream sample (WP1) and below laboratory detection limit within the downstream sample (WP2);

- Concentrations of total nitrogen and the total phosphorous were reported above the adopted criteria within both WP1 and WP2 samples;
- TSS were reported with concentration of 17 mg/L at upstream sample (WP1) and 7.8 mg/L at downstream sample WP2; and
- Turbidity was reported with concentration of 31 NTU at upstream sample (WP1) and 22 NTU at downstream sample (WP2).

One sampling event during the pre-construction period (baseline event) was undertaken on 10 March 2021 which was during dry condition. It should be noted that wet-weather and storm-event pre-construction monitoring was not able to be conducted because of the lack of rainfall. The monitoring results of baseline event (10 March 2021) has not been used for comparison with the monitoring results under this report because the conditions encountered were different (i.e. non-trigger for wet-weather event criteria). However, five previous mid-construction wet weather sampling events were used to compare and check if there is any potential adverse impact to the water quality caused by the construction activities. Overall, conditions are similar between upstream and downstream samples on 9 March 2022 and previous mid-construction wet weather events.

Results for the mid-construction wet-weather event sampled on 9 March 2022 generally showed monitored parameters were within the adopted threshold criteria, with the exception of dissolved oxygen saturation, total nitrogen, and total phosphorous:

- Dissolved oxygen saturation measured at both upstream sample (WP1: 58.4%) and downstream sample (WP2: 58.1%) were outside of the adopted criterion range (i.e., 85% to 110%). However, this is not considered to be a significant issue as the difference measured between WP1 and WP2 is minor with only 0.5% difference;
- Total nitrogen measured at both upstream sample (WP1: 1.9 mg/L) and downstream sample (WP2: 1.8 mg/L) were above the adopted criteria (i.e. 0.350 mg/L). However, the results from the previous mid-construction wet-weather sampling events show that total nitrogen at WP1 fluctuated between 1.6 mg/L and 5.0 mg/L whereas total nitrogen for WP2 fluctuated between 1.0 mg/L and 2.8 mg/L. Furthermore, the total nitrogen for both WP1 and WP2 sampled on the 9 March 2022 monitoring event were similar to the previous event ranges. As such, this elevated in total nitrogen concentrations is not considered to be a significant issue;
- Total phosphorous measured at both upstream sample (WP1: 0.16 mg/L) and downstream sample (WP2: 0.14 mg/L) were above the adopted criteria (i.e. 0.025 mg/L). However, the results from the previous mid-construction wet-weather sampling events show that total phosphorous at WP1 fluctuated between 0.13 mg/L and 0.23 mg/L whereas total phosphorous at WP2 fluctuated between 0.02 mg/L and 0.28 mg/L. Furthermore, the total phosphorous for both WP1 and WP2 sampled on the 9 March 2022 monitoring event were similar to the previous event ranges. As such, this elevated in total phosphorus concentrations is not considered to be a significant issue;
- The pH result at upstream sample (WP1: 7.78) was measured slightly lower than the result at downstream sample (WP2: 7.85). However, this is not considered to be a significant issue since the pH measurements at both sample points were within the adopted criterion range and the difference of the upstream and downstream pH results is only 0.9%.
- The EC result at the upstream sample (WP1: 622 μ S/cm) was measured lower than the downstream sample (WP2: 659 μ S/cm). However, this is not considered to be a significant issue since the EC measurements at both sample points were within the adopted criterion range (125

$\mu\text{S/cm}$ to 2,200 $\mu\text{S/cm}$) and the difference of the upstream and downstream pH results is only 5.6%.

During this wet-weather monitoring event, sampling results showed monitored parameters were generally within the adopted screening criteria with the exception of dissolved oxygen saturation, total nitrogen, and total phosphorous. The comparison of the mid-construction wet-weather event conducted on 9 March 2022 to the four previous wet-weather sampling events on 20 March, 5 May, 12 November, 26 November 2021 and 23 February 2022 showed no significant difference.

During this wet-weather monitoring event, the results between upstream and downstream were generally comparable with the exceptions of pH and EC. The pH and EC measurements at the downstream sample were slightly higher than the upstream sample, but both downstream and upstream results were within the criterion range. Overall, the comparison of the upstream and downstream samples conducted on 9 March 2022 showed no significant difference.

Based on comparison to the criteria, comparison with four previous mid-construction wet-weather events, and comparison of the upstream and downstream results, the results reported for the 9 March 2022 sampling event are not considered to reflect an adverse impact to water quality due to construction activities at the subject site.

DISCUSSION - SURFACE WATER MONITORING

The results of the surface water monitoring showed that monitored parameters were generally within the adopted screening criteria; however, some results showed parameters outside of the screening criteria. Overall, the comparison of the upstream and downstream samples conducted on 23 February showed no significant difference. Based on comparison to the criteria, comparison with four previous mid-construction wet-weather events, and comparison of the upstream and downstream results, the results reported for the 23 February 2022 sampling event are not considered to reflect an adverse impact to water quality due to construction activities. No recommendations were put forward in response to the surface water monitoring results.

Downer conducts regular inspection of the environmental controls, including sediment and erosion controls at Wiley Park to ensure that all sediments and erosion controls were in place, well maintained and functioning correctly. These inspections are conducted by the Project Team and Environmental Team. This proactive approach ensures that environmental controls are functioning properly rather than reactively inspecting the worksite following monitoring and reporting.

Noise and vibration

The area surrounding the project sites contains a variety of land-use types and receivers, including residential, commercial, industrial and sensitive non-residential receivers. These land-uses are mixed within the identified noise catchments, although in general there are clusters of industrial and commercial areas surrounding stations, primarily residential areas between stations. The area surrounding the project sites are affected by rail noise and vibration. The majority of works will occur within the rail corridor, on the station platforms and buildings and within the Metro Services Building Areas, works will mainly occur adjacent to residential properties.

Noise and vibration monitoring must be carried out for the duration of Construction. The predominant reason for monitoring noise and vibration associated with the construction works is to ensure compliance with modelled results for noisy works and to ensure compliance with modelled results and the project's Conditions of Approval(s) and NVMP. Modelling undertaken prior to noisy construction activities assesses if Respite Offers (RO) and Alternate Accommodation (AA) are required to be provided to sensitive receivers that are impacted by noise from works conducted outside of standard working hours.

Other reasons to conduct noise and vibration monitoring include:

- In response to noise or vibration complaints;
- If requested by Sydney Metro, the ER, DPE or EPA;
- To augment baseline noise levels, if the noise environment at a receiver is considered to be different from the noise logger locations used for the EIS;
- To validate predicted noise levels associated with each works scenario assessed in the CNVIS, at the commencement of works and new construction activities or location;
- To confirm baseline vibration levels currently experienced at heritage-listed structures and at any vibration-sensitive equipment;
- Where vibration levels are predicted to exceed the vibration screening level, attended vibration monitoring would be carried out to ensure vibration levels remain below appropriate limits for that structure, in accordance with Revised Environmental Mitigation Measure (REMM) NVC12; and
- As part of a plant noise audit.

The methodology and rationale for conducting noise and vibration monitoring is contained within the relevant Noise and Vibration Monitoring Plans, being:

- Southwest Metro – Dulwich Hill, Campsie and Punchbowl Station Upgrades Noise and Vibration Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website, https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Dulwich_Hill_Campsie_and_Punchbowl_Station_Upgrades_NVMP_Rev06_131221_C2.pdf
- Southwest Metro – Hurlstone Park, Belmore and Wiley Park Station Upgrades Noise and Vibration Management Plan. This document can be accessed via the Downer Sydney Metro Environment Documents website, https://www.downergroup.com/Content/cms/Documents/Sydney_Metro_package_5_6/Hurlstone_Park_Belmore_and_Wiley_Park_Station_Upgrades_NVMP_Rev06_131221_C2.pdf

RESULTS – NOISE MONITORING

The table below contains a summary of the noise monitoring results. The complete reports are provided in Appendixes 6 – 8.

Assessment Point	Measured Plant	Predicted noise level dB(A)	Measured noise level		Above predicted noise level	Comments
			LAeq(15min)	LAmx		
18 th – 19 th December 2021	TL927-1-19F01 WE25 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIX 6					
105 Duntroon Street, Hurlstone Park	Two 4T excavator with bucket attachment, two hi-rail Moxy trucks and handheld cutter 18.12.2021 08:17am - 08:31am	82 _T (T: Predicted LAeq, 15min for Typical activities)	69	77	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the majority of the works were occurring on the western side of the platform at a lower ground level compared to monitoring location. As a result, the works were mostly shielded at this monitoring location. Furthermore, only two 4T excavators with bucket attachments, two hi-rail Moxy trucks and a handheld cutter were operating intermittently during this measurement. In the prediction model, the distance between the work area and the receiver is approximately 3 metres. The measured works were approximately 35m away from the monitoring location. These factors contribute to the measured noise level from the works being less noisy than the predicted noise level.
3A Commons Street, Hurlstone Park	Two 4T excavator with bucket attachment, two hi-rail Moxy trucks and handheld cutter 18.12.2021 08:36am - 08:52am	80 _T (T: Predicted LAeq, 15min for Typical activities)	63	83	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted level. Factors contributing to this include the intermittent nature of the works during the measurement and less noisy plant operating during this measurement compared to the prediction assumptions. Furthermore, the measured works were approximately 45m away from the monitoring location, which is further than in the prediction model, where the distance between the closest typical impact work area and the most affected facade is approximately 10 metres.
57A Ewart Lane, Dulwich Hill	Handheld drill, vacuum truck, concrete saw and 5T excavator with hammer attachment 18.12.2021 09:43am - 09:59am	77 _H (H: Predicted LAeq, 15min for High impact activities)	73* (*: 5dB(A) penalty applied for hammering works)	98	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured construction activity was approximately 35 metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 20 metres.
59 Ewart Street, Dulwich Hill	Handheld drill, vacuum truck, concrete saw and 5T excavator with hammer attachment 18.12.2021 10:00am - 10:15am	74 _H (H: Predicted LAeq, 15min for High impact activities)	68* (*: 5dB(A) penalty applied for hammering works)	89	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the rockhammering activity only occurred for approximately 2 minutes of the 15 minute measurement period. Furthermore, the measured construction activity was approximately 40 metres away from the measurement location. In the prediction model, the distance

						between the closest high impact work area and the most affected facade is approximately 25 metres.
13-15 Anglo Road, Campsie	Vacuum truck and 7T excavator with bucket attachment 18.12.2021 11:30am - 11:45am	74 _T (T: Predicted LAeq, 15min for Typical activities)	61	73	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because less noisy plant were operating during this measurement compared to the prediction assumptions. Furthermore, the measured construction activity was approximately 80 to 95 metres away from the measurement location. In the prediction model, the distance between the closest typical work area and the most affected facade is approximately 15 metres.
3 Wilfred Avenue, Campsie	Vacuum truck and 7T excavator with bucket attachment 18.12.2021 11:55am - 12:10pm	69 _T (T: Predicted LAeq, 15min for Typical activities)	60	90	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is lower than the predicted noise level because only the vacuum truck and 7T excavator with bucket attachment were operating during this measurement, compared to noisier plant in the prediction assumptions. Furthermore, the measured construction activity was approximately 60 to 65 metres away from the measurement location. In the prediction model, the distance between the closest typical work area and the most affected facade is approximately 25 metres.
41 Urunga Parade, Punchbowl	4T excavator with hammer attachment, vacuum truck and handheld cutter 18.12.2021 02:04pm - 02:20pm	72 _H (H: Predicted LAeq, 15min for High impact activities)	61* (*: 5dB(A) penalty applied for hammering works)	81	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the measured noise level is significantly lower than the predicted noise level because only the 4T excavator with hammer attachment, vacuum truck and handheld cutter were operating during this measurement, compared to noisier plant in the prediction assumptions. Furthermore, the measured construction activity was approximately 100 to 110 metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 80 metres.
228 The Boulevard, Punchbowl	Handheld jackhammer, 4T excavator with hammer attachment and 4T excavator with bucket attachment 18.12.2021 02:37pm - 02:52pm	70 _H (H: Predicted LAeq, 15min for High impact activities)	75* (*: 5dB(A) penalty applied for hammering works)	84	Yes (LAeq, 15min)	The measurement location is a commercial receiver. The measured LAeq, 15min is higher than the predicted noise level, after applying the 5 dB(A) penalty. Note that this monitoring location was heavily affected by the constant road traffic along The Boulevard throughout the measurement. It was not possible to measure the construction activity in the absence of traffic noise.
3 Shadforth Street, Wiley Park	Pressure washer 18.12.2021 03:09pm - 03:24pm	79 _T (T: Predicted LAeq, 15min for Typical activities)	71	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted level. Note that the measured construction activity was approximately 15 metres away from the measurement location. In the prediction model, the distance

26 th – 30 th December 2021						
TL927-1-20F01 SHUTDOWN 2 NOISE AND VIBRATION MONITORING REPORT (R2) - APPENDIX 7						
13-15 Anglo Road, Campsie	Two multi-crane hi-rail vehicles, handheld drills, concrete saw, hammering 26.12.2021 09:11pm – 09:26pm	74 _T (T: Predicted LAeq, 15min for Typical activities)	60	83	No	between the closest typical impact work area and the most affected facade is approximately 10 metres. The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works occurring were located approximately 25m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Some plant operation and hi-rail movements were partially shielded by the station building.
	Concrete agitator and concrete pump truck 29.12.2021 09:45pm – 10:00pm	74 _T (T: Predicted LAeq, 15min for Typical activities)	73	82	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the concrete agitator and the concrete pump truck was located directly opposite of 13-15 Anglo Road receiver, approximately 10 metres away from the monitoring location.
	Concrete pump truck, plate compactor, hand tools including rattle gun and hammer 30.12.2021 09:00pm – 09:15pm	74 _T (T: Predicted LAeq, 15min for Typical activities)	59	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the platform works were intermittent during this measurement.
35 North Parade, Campsie	3T Excavator with hammer attachment 26.12.2021 09:15pm – 09:30pm	57 _T (T: Predicted LAeq, 15min for Typical activities)	67* (*: 5dB(A) penalty applied for hammering works)	77	Yes (LAeq, 15min)	The Gatewave model was based on typical impact activities, not high impact activities (i.e no rockhammer). The difference between typical and high impact activities sound power level is 10-12dB. The measured level is 10dB above the predicted level. This is consistent with a predicted level for high impact activities including rockhammer. The exceedance was identified immediately by the Project Noise & Vibration consultant and reported to the Construction Environmental Manager. The Environmental Manager managed the exceedance in accordance with the Project Construction Environmental Management Plan and Noise & Vibration Management Plan.
5 London Street, Campsie	Concrete truck, jumping jack	67 _T	52	70	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant

	<p>compactor, hand tools</p> <p>28.12.2021 10:25pm – 10:40pm</p>	(T: Predicted LAeq, 15min for Typical activities)				<p>items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 65m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the platform works were intermittent during this measurement. The paving works at the corner of Beamish Street and North Parade were occurring during this measurement and was not audible at this monitoring location.</p>
	<p>Concrete agitator and concrete pump truck, hand grinder</p> <p>29.12.2021 09:54pm – 10:10pm</p>	67 _T (T: Predicted LAeq, 15min for Typical activities)	55	75	No (LAeq, 15min)	<p>The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 60m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the platform works were intermittent during this measurement.</p>
	<p>Concrete agitator and concrete pump truck, handheld power drill, 8T excavator with bucket attachment</p> <p>30.12.2021 08:56pm – 09:11pm</p>	67 _T (T: Predicted LAeq, 15min for Typical activities)	53	77	No (LAeq, 15min)	<p>The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 60m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the platform works were intermittent during this measurement.</p>
1 Acacia Street, Belmore	<p>Pressure washer</p> <p>26.12.2021 09:56pm – 10:04pm</p>	65 _T (T: Predicted LAeq, 15min for Typical activities)	N/A	N/A	N/A	<p>Note that during this measurement, it started to rain after 8 minutes into the measurement. As a result, this measurement was adversely affected by the environmental conditions and have been deemed as an invalid measurement.</p>
	<p>Handheld jackhammer, light tower, concrete saw, handheld power tools</p> <p>28.12.2021 09:29pm – 09:45pm</p>	65 _T (T: Predicted LAeq, 15min for Typical activities)	60* (*: 5dB(A) penalty applied for hammering works)	68	No (LAeq, 15min)	<p>The measured LAeq, 15min is lower than the predicted noise level. Note that the handheld jackhammering activity was located approximately 65m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the handheld jackhammering activity was shielded and intermittent during this measurement.</p>

	Hand tools including hand grinder and power drills 29.12.2021 10:30pm – 10:46pm	65 _T (T: Predicted LA _{Aeq} , 15min for Typical activities)	50	64	No (LA _{Aeq} , 15min)	The measured LA _{Aeq} , 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 40m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the platform works were intermittent during this measurement.
	Handheld electric jackhammer, handheld power tools including grinder and drill, 15T excavator with bucket attachment 30.12.2021 09:41pm – 09:56pm	65 _T (T: Predicted LA _{Aeq} , 15min for Typical activities)	58* (*: 5dB(A) penalty applied for hammering works)	73	No (LA _{Aeq} , 15min)	The measured LA _{Aeq} , 15min is lower than the predicted noise level. Note that the handheld jackhammering activity was located approximately 65m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that the handheld jackhammering activity was shielded and intermittent during this measurement.
30 Redman Parade, Belmore	Handheld jackhammer and handheld grinder 28.12.2021 09:35pm – 09:50pm	63 _T (T: Predicted LA _{Aeq} , 15min for Typical activities)	59* (*: 5dB(A) penalty applied for hammering works)	71	No (LA _{Aeq} , 15min)	The measured LA _{Aeq} , 15min is lower than the predicted noise level. Note that the handheld jackhammering activity was located approximately 65m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 50 metres. Note that the handheld jackhammering activity was shielded and intermittent during this measurement.
	Excavator with quackers alarm 29.12.2021 10:24pm – 10:39pm	63 _T (T: Predicted LA _{Aeq} , 15min for Typical activities)	54	73	No (LA _{Aeq} , 15min)	The measured LA _{Aeq} , 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 85m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 50 metres. Note that the platform works were intermittent during this measurement.
	Plate compactor and handheld electric jackhammer 30.12.2021 09:39pm – 09:54pm	63 _T (T: Predicted LA _{Aeq} , 15min for Typical activities)	59* (*: 5dB(A) penalty applied for hammering works)	73	No (LA _{Aeq} , 15min)	The measured LA _{Aeq} , 15min is lower than the predicted noise level. Note that the handheld jackhammering activity was located approximately 65m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 50 metres. Note that

						the handheld jackhammering activity was shielded and intermittent during this measurement.
41 Urunga Parade, Punchbowl	5T excavator with bucket attachment, lighting towers, Distant 8T excavator with bucket attachment, dump truck 26.12.2021 11:14pm – 11:29pm	65 _T (T: Predicted LAeq, 15min for Typical activities)	54	72	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. It is noted that the majority of plant operation occurred at the station building approximately 90m away from the measurement location. The background noise level at this location was dominated by generator hum from lighting towers located approximately 25m away from the measurement location. Measured excavator activity at this location occurred near the alignment approximately 50-60m away.
	Rattlegun, handheld power tools, hi-rail multi-crane vehicle, lighting towers 28.12.2021 11:44pm – 11:59pm	65 _T (T: Predicted LAeq, 15min for Typical activities)	53	70	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 15 metres. Some plant operation and hi-rail movements were partially shielded by the station building. Note that the platform works were intermittent during this measurement.
	Lighting towers, hi-rail 8T excavator with crane attachment 29.12.2021 08:17pm – 08:32pm	65 _T (T: Predicted LAeq, 15min for Typical activities)	53	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 30m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 15 metres. Some plant operation and hi-rail movements were partially shielded by the station building. Note that the platform works were intermittent during this measurement.
	Light towers, 5.5T excavator with bucket attachment, 8T excavator with bucket attachment 30.12.2021 10:54pm – 11:09pm	65 _T (T: Predicted LAeq, 15min for Typical activities)	54	74	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away from the measurement location. The background noise level during the measurement was dominated by idle engine noise from the 5.5T excavator with bucket attachment. In the prediction model, the distance

						between the closest work area and the most affected facade is approximately 15 metres. Note that the platform works was intermittent during this measurement.
14 Arthur Street, Punchbowl	No construction noise was audible at this monitoring location 26.12.2021 11:17pm – 11:32pm	50 _T (T: Predicted LAeq, 15min for Typical activities)	54 (44) ₁ (1: Calculated LAeq, 15min contribution from the construction activity, given that the construction noise was not audible or barely audible at the monitoring location)	70	No (LAeq, 15min)	The measured LAeq, 15min is higher than the predicted noise level. Note that the platform works occurring at Punchbowl Station was not audible at this monitoring location. The measured LAeq, 15min of 54 dB(A) was solely caused by vehicles movement along The Boulevard and Arthur Street. Given that the construction noise was not audible at this monitoring location, the contribution from the construction works can be assumed to be 10dB below the measured LAeq, 15min. As a result, the contribution from the construction works can be calculated to be 44 dB(A), which is below the predicted noise level of 50 dB(A). Note that the measured works were shielded and approximately 90 metres away from the measurement location.
	Lighting tower (which was barely audible when there was no road traffic along The Boulevard and Arthur Street) 28.12.2021 11:48pm – 12:03am	50 _T (T: Predicted LAeq, 15min for Typical activities)	55 (45) ₁ (1: Calculated LAeq, 15min contribution from the construction activity, given that the construction noise was not audible or barely audible at the monitoring location)	76	Yes (LAeq, 15min)	The measured LAeq, 15min is higher than the predicted noise level. Note that the platform works occurring at Punchbowl Station was not audible at this monitoring location (a lighting tower was barely audible when there was no road traffic along The Boulevard and Arthur Street). The measured LAeq, 15min of 55 dB(A) was solely caused by vehicles movement along The Boulevard and Arthur Street. Given that the construction noise was barely audible at this monitoring location, the contribution from the construction works can be assumed to be 10dB below the measured LAeq, 15min. As a result, the contribution from the construction works can be calculated to be 45 dB(A), which is below the predicted noise level of 50 dB(A). Note that the measured works were shielded and approximately 90 metres away from the measurement location.
	Handheld grinder (which was barely audible when there was no road traffic along The Boulevard and Arthur Street) 29.12.2021 08:10pm – 08:25pm	50 _T (T: Predicted LAeq, 15min for Typical activities)	56 (46) ₁ (1: Calculated LAeq, 15min contribution from the construction activity, given that the construction noise was not audible or barely audible at the monitoring location)	85	No (LAeq, 15min)	The measured LAeq, 15min is higher than the predicted noise level. Note that the platform works occurring at Punchbowl Station were not audible at this monitoring location (a handheld grinder was barely audible when there was no road traffic along The Boulevard and Arthur Street). The measured LAeq, 15min of 56 dB(A) was solely caused by vehicles movement along The Boulevard and Arthur Street. Given that the construction noise was barely audible at this monitoring location, the contribution from the construction works can be assumed to be 10dB below the measured LAeq, 15min. As a result, the contribution from the construction works can be calculated

						to be 46 dB(A), which is below the predicted noise level of 50 dB(A). Note that the measured works were shielded and approximately 90 metres away from the measurement location.
	No construction noise was audible at this monitoring location 30.12.2021 10:56pm – 11:11pm	50 _T (T: Predicted LAeq, 15min for Typical activities)	57 (47) ₁ (1: Calculated LAeq, 15min contribution from the construction activity, given that the construction noise was not audible or barely audible at the monitoring location)	82	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the platform works occurring at Punchbowl Station was not audible at this monitoring location. The measured LAeq, 15min of 57 dB(A) was solely caused by vehicles movement along The Boulevard and Arthur Street. Given that the construction noise was not audible at this monitoring location, the contribution from the construction works can be assumed to be 10dB below the measured LAeq, 15min. As a result, the contribution from the construction works can be calculated to be 47 dB(A), which is below the predicted noise level of 50 dB(A). Note that the measured works were shielded and approximately 90 metres away from the measurement location.
1-3 Shadforth Street, Wiley Park	Two 22.5T excavators with bucket attachment, handheld cutter, lighting towers 26.12.2021 11:50pm – 11:54pm	79 _T (T: Predicted LAeq, 15min for Typical activities)	N/A	N/A	N/A	Note that during this measurement, it started to rain after 4 minutes into the measurement. As a result, this measurement was adversely affected by the environmental conditions and have been deemed as an invalid measurement.
	Concrete saw, hi-rail excavators and lighting tower 27.12.2021 08:03pm – 08:18pm	81 _H (H: Predicted LAeq, 15min for High impact activities)	69* (*: 5dB(A) penalty applied for hammering works)	75	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the concrete sawing activity was shielded and approximately 65 metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 10 metres. Note that the concrete sawing activity was intermittent during this measurement.
	22.5T excavator with crane attachment, light towers, two 5T excavators with bucket attachment, hi-rail dump truck vehicles, bobcat, rattlegun, hand tools 28.12.2021 11:09pm – 11:25pm	79 _T (T: Predicted LAeq, 15min for Typical activities)	60	72	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Some plant operation and hi-rail movements were partially shielded by the station

						building. Note that the platform works were intermittent during this measurement.
	22.5T excavator with crane attachment, 8T excavator with auger attachment, hand grinders, hand tools, concrete saw 29.12.2021 08:55pm – 09:10pm	81H (H: Predicted LAeq, 15min for High impact activities)	68* (*: 5dB(A) penalty applied for hammering works)	79	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the concrete sawing activity was shielded and approximately 20m metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 10 metres. Note that the concrete sawing activity was intermittent during this measurement.
	5T excavator with auger attachment, hand power tools including power drill, handheld grinder 30.12.2021 10:21pm – 10:36pm	79T (T: Predicted LAeq, 15min for Typical activities)	57	78	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the platform works was shielded and intermittent during this measurement.
2 Shadforth Street, Wiley Park	22.5T excavator with crane attachment, shovel 28.12.2021 11:10pm – 11:25pm	81T (T: Predicted LAeq, 15min for Typical activities)	53	65	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 40m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Some plant operation and hi-rail movements were partially shielded by the station building. Note that the platform works were intermittent during this measurement.
	22.5T excavator with crane attachment, concrete saw, rattle gun 29.12.2021 08:50pm – 09:05pm	83H (H: Predicted LAeq, 15min for High impact activities)	65* (*: 5dB(A) penalty applied for hammering works)	73	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the concrete sawing activity was shielded and approximately 25m metres away from the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 10 metres. Note that the concrete sawing

						activity was intermittent during this measurement.
	Hand tools including rattle gun and hammer 30.12.2021 10:19pm – 10:34pm	81 _T (T: Predicted LAeq, 15min for Typical activities)	55	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 30m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the platform works was shielded and intermittent during this measurement.
1 Bedford Crescent, Dulwich Hill	Handtools (grinder and hammer), hi-rail multi-crane vehicle, 13T excavator with crane attachment 28.12.2021 08:14pm – 8:29pm	75 _T (T: Predicted LAeq, 15min for Typical activities)	57	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works occurring were located approximately 50m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Some plant operation and hi-rail movements were partially shielded by the station building.
	Handheld jackhammer and lighting tower 29.12.2021 11:11pm – 11:26pm	76 _H (H: Predicted LAeq, 15min for High impact activities)	60* (*: 5dB(A) penalty applied for hammering works)	73	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the handheld jackhammering works occurring were located approximately 50m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest high impact work area and the most affected facade is approximately 40 metres. Note that the jackhammering works were shielded and intermittent during this measurement.
	Concrete agitator and concrete pump truck 30.12.2021 08:03pm – 08:18pm	75 _T (T: Predicted LAeq, 15min for Typical activities)	59	76	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 80m away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres.

51 Ewart Lane, Dulwich Hill	Concrete saw, 8T excavator with crane attachment, hi-rail multi-crane vehicle, 13T excavator with crane attachment, lighting towers 28.12.2021 08:28pm – 08:43pm	74H (H: Predicted LAeq, 15min for High impact activities)	68* (*: 5dB(A) penalty applied for hammering works)	78	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the concrete sawing activity was located approximately 30m away from the measurement location. The background noise level during this measurement was dominated by generator noise from the lighting towers. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the concrete sawing activity was intermittent during this measurement.
	Generators, lighting towers, cement mixers, 1.75T excavator with hammer attachment 29.12.2021 11:20pm – 11:36pm	72T (T: Predicted LAeq, 15min for Typical activities)	59	74	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the rockhammering activity was located approximately 20m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the rockhammering was intermittent during this measurement.
	Cement agitator, handheld cement vibrator, light towers 30.12.2021 08:07pm – 08:22pm	72T (T: Predicted LAeq, 15min for Typical activities)	60	77	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 20m away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres.
05th February TL927-1-21F01 2022 WE32 NOISE AND VIBRATION MONITORING REPORT (R1) – APPENDIX 8						
41 Urunga Parade, Punchbowl	Excavator with bucket attachment 05.02.2022 12:24pm – 12:39pm	73T (T: Predicted LAeq, 15min for Typical activities)	54	74	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works were located approximately 60 metres away. In the prediction model, the distance between the closest work area and the most affected facade is approximately 15 metres. Note that the platform works were intermittent during this measurement.

3A Commons Street, Hurlstone Park	3.5T Excavator with hammer attachment and hi-rail hydrera 05.02.2022 01:25pm – 01:40pm	82H (H: Predicted LAeq, 15min for High impact activities)	69* (*: 5dB(A) penalty applied for hammering works)	84	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works were located approximately 15 metres away. In the prediction model, the distance between the closest work area and the most affected facade is approximately 5 metres. Note that the platform works were intermittent during this measurement.
2 Hopetoun Street, Hurlstone Park	Vacuum truck and telehandler 05.02.2022 01:55pm – 02:10pm	75T (T: Predicted LAeq, 15min for Typical activities)	72	89	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the vacuum truck and telehandler activity were located directly opposite the monitoring location, approximately 10 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 9 metres.
51 Ewart Lane, Dulwich Hill	Telehandler, hi-rail excavator with bucket attachment and handheld grinder 05.02.2022 02:58pm – 03:13pm	72T (T: Predicted LAeq, 15min for Typical activities)	63	81	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the telehandler activity was located directly opposite the monitoring location, and repeatedly moved between 20 metres to 40 metres from the monitoring location during the measurement. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres.
1 Bedford Crescent, Dulwich Hill	Handheld grinder, hi-rail hydrera and handtools (hammer) 05.02.2022 03:30pm – 03:45pm	75T (T: Predicted LAeq, 15min for Typical activities)	56	77	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works were located approximately 60 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Some plant operation and hi-rail movements were partially shielded by the station building. Note that the platform works were intermittent during this measurement.
30 Redman Parade, Belmore	Handheld grinder 05.02.2022 04:24pm – 04:39pm	63T (T: Predicted LAeq, 15min for Typical activities)	63	87	No (LAeq, 15min)	The measured LAeq, 15min is the same as the predicted noise level. Note that the handheld grinder activity was located 60 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 50 metres. Note that this measurement location was

						heavily affected by road traffic noise along Redman Parade.
1 Acacia Street, Belmore	Vacuum truck, handheld grinder and hand tools (hammer) 05.02.2022 04:49pm – 05:04pm	65 _T (T: Predicted LAeq, 15min for Typical activities)	61	89	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. Note that the handheld grinder activity was located approximately 50 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 35 metres. Note that this measurement location was heavily affected by road traffic noise along Acacia Street.
13-15 Anglo Road, Campsie	Excavator with bucket attachment, hi-rail hydrema and handtools (hammer) 05.02.2022 06:20pm – 06:35pm	74 _T (T: Predicted LAeq, 15min for Typical activities)	57	78	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 90 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the platform works were intermittent during this measurement.
2 Wilfred Avenue, Campsie	Hi-rail hydrema, plate compactor and excavator with bucket attachment 05.02.2022 06:57pm – 07:12pm	70 _T (T: Predicted LAeq, 15min for Typical activities)	59	75	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 45 metres away from the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 25 metres. Note that the platform works were intermittent during this measurement. Note that the platform works were intermittent during this measurement.
1-3 Shadforth Street, Wiley Park	3 x EWP, excavator with bucket, rattle gun, 400T telescopic crane and handtools 05.02.2022 07:44pm – 07:59pm	79 _T (T: Predicted LAeq, 15min for Typical activities)	60	77	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 35 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 10 metres. Note that the platform works were intermittent during this measurement. Note that the platform works were intermittent during this measurement.

7 Shadforth Street, Wiley Park	2 x EWP, rattle gun and 400T telescopic crane 05.02.2022 08:03pm – 08:18pm	65 τ (T: Predicted LAeq, 15min for Typical activities)	56	79	No (LAeq, 15min)	The measured LAeq, 15min is lower than the predicted noise level. This can be attributed to lesser quantity of plant items operating during the measurement compared to the predicted noisier plant in the prediction assumptions. Furthermore, the platform works was located approximately 65 metres away and at a lower ground level than the measurement location. In the prediction model, the distance between the closest work area and the most affected facade is approximately 50 metres. Note that the platform works were intermittent during this measurement. Note that the platform works were intermittent during this measurement.
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RESULTS – VIBRATION MONITORING

The sections below contains a summary of the vibration monitoring results. The complete reports are provided in Appendixes 5 – 8. The established criteria for cosmetic damage in the Sydney Metro Construction Noise and Vibration Statement is as follows:

- Reinforced or framed structures: 25.0 mm/s;
- Unreinforced or light framed structures: 7.5 mm/s;
- Heritage structures (structurally sound): 7.5 mm/s; and
- Heritage structures (structurally unsound): 2.5 mm/s.

Also, in accordance with the Hurlstone Park Station Vibration Monitoring Plan developed in consultation with the Project consulting structural engineers (Appendix 9), the established vibration limits for the affected garage structure at a residential property on Commons Street are shown below:

- Greater than or equal to 4 mm/s (cosmetic damage is possible);
- Greater than or equal to 8 mm/s (cosmetic damage becoming more likely).

During the reporting period, vibration monitoring was undertaken at the following locations:

	Date	Location
1	29 th November – 3 rd December 2021	Residential property on Commons Street, Hurlstone Park
2	18-19 th December 2021	Hurlstone Park and Campsie Stations
3	18-19 th December 2021	Residential property on Commons Street, Hurlstone Park
4	26 th December 2021 – 09 January 2022	Residential property on Commons Street, Hurlstone Park
5	2 nd January – 9 th January 2022	Platform 1 Station Building, Hurlstone Park Station
6	4 th – 7 th February 2022	Residential property on Commons Street, Hurlstone Park

1 – Residential property on Commons Street, Hurlstone Park (29th November - 3rd December)

The results of the unattended vibration measurements for the neighbouring garage structure at a residential property on Commons Street are presented below:

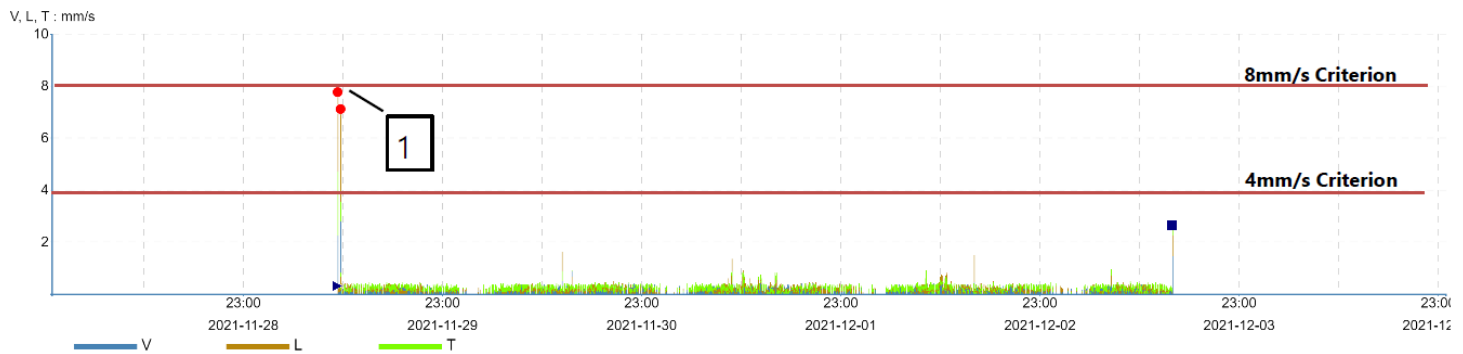


Fig. 1 – Unattended vibration monitoring location 1 results (residential property on Commons Street, 29th November – 03rd December 2021)

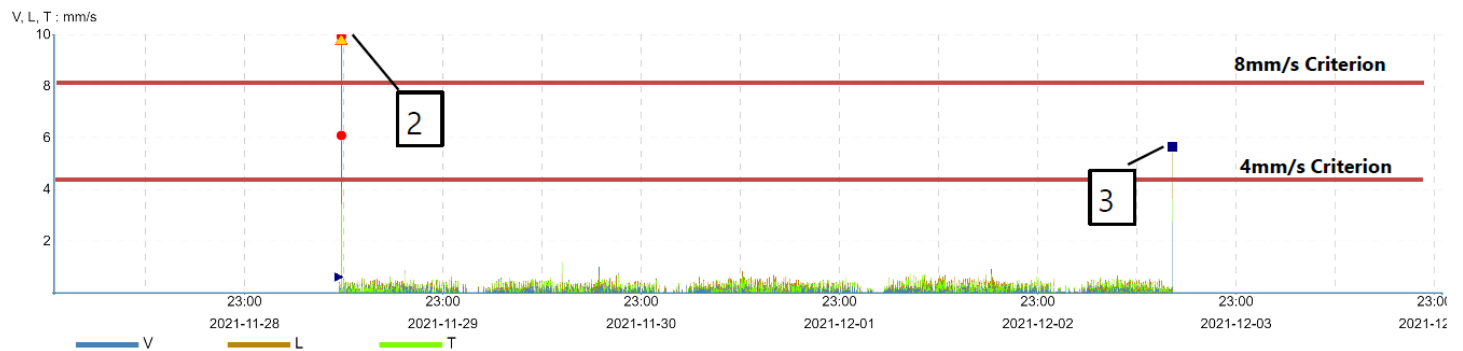


Fig. 2 – Unattended vibration monitoring location 2 results (residential property on Commons Street, 29th November – 03rd December 2021)

It can be seen in Figure 1 and Figure 2 that the vibration levels produced from the vibration intensive works in the vicinity of the affected garage structure is below 4 mm/s. Note that there were events that resulted in an instantaneous vibration level of above 4 mm/s which are justified in the table below.

Exceedance ID	Date and Time	Cause of exceedance
1	29.11.2021, 10:30am	At this time, the vibration monitor was mounted on the ground spike to commence monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process
2	29.11.2021, 11:00am	At this time, the vibration monitor was mounted on the ground spike to commence monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.
3	03.12.2021, 03:00pm	At this time, the vibration monitor was removed from the ground spike at the completion of monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process

2 – Hurlstone Park Station and Campsie Station (18-19th December)

The results of the vibration monitoring at Hurlstone Park and Campsie Stations are presented in the table below. The applicable vibration criteria for cosmetic damage from the Sydney Metro Construction Noise & Vibration Statement is defined below as the screening level.

Station	Plant	Screening Level (mm/s)	Distance from source	95th percentile PPV (mm/s)	Maximum PPV (mm/s)	Above predicted vibration level	Comments
	19 th December 2021	TL927-1-19F01 WE25 NOISE AND VIBRATION MONITORING REPORT (R2) – APPENDIX 5					
Hurlstone Park Station	4T excavator with bucket attachment	2.5	1m	0.90	0.95	No	At a distance of 1 metre away, the 4T excavator with bucket attachment produced vibration levels that are below the established vibration screening criteria.
Campsie Station	7T excavator with hammer attachment	2.5	5.5m	0.60	0.58	No	At a distance of 5.5 metres away, the 7T excavator with hammer attachment produced vibration levels that are below the established vibration screening criteria. Vibration monitor was attached on the nearest affected structure.
			2.5m	1.60	1.53	No	At a distance of 2.5 metres away, the 7T excavator with hammer attachment produced vibration levels that are below the established vibration screening criteria. Vibration monitor was attached on the nearest affected structure.
	Core drilling		6m	0.13	0.16	No	At a distance of 6 metres away, the core drilling activity produced vibration levels that are below the established vibration screening criteria.

It can be seen from the table above that the measured vibration levels were below the established criteria for heritage, reinforced or unreinforced structures. As a result, the risk of cosmetic damage from the measured plant items are considered to be low.

Based on the attended vibration measurement at Hurlstone Park and Campsie Station, the measured vibration levels were below the established vibration criteria for heritage, reinforced or unreinforced structures.

3 – Residential property on Commons Street, Hurlstone Park (18-19th December)

The results of the unattended vibration measurements for the neighbouring garage structure at a residential property on Commons Street are presented below:

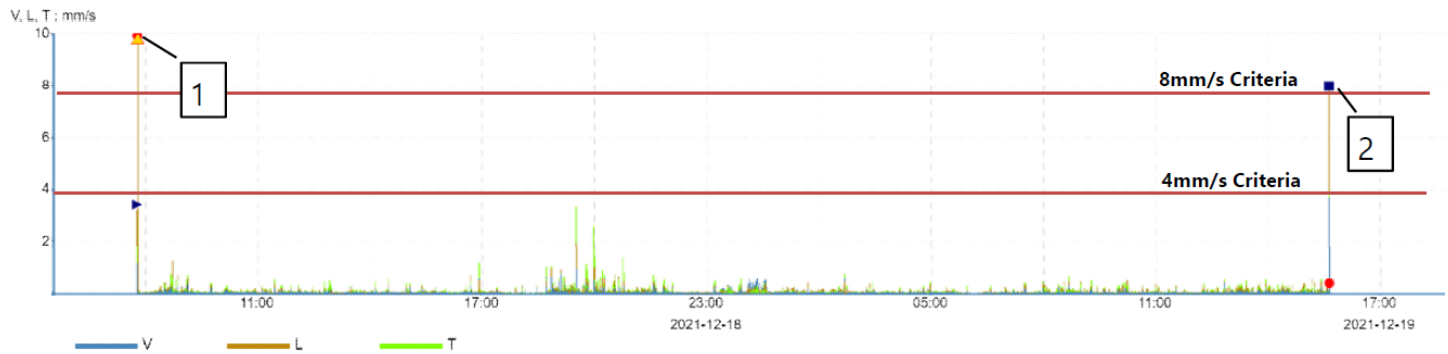


Fig. 3 – Unattended vibration monitoring location 1 results (residential property on Commons Street, 18th December – 19th December 2021)

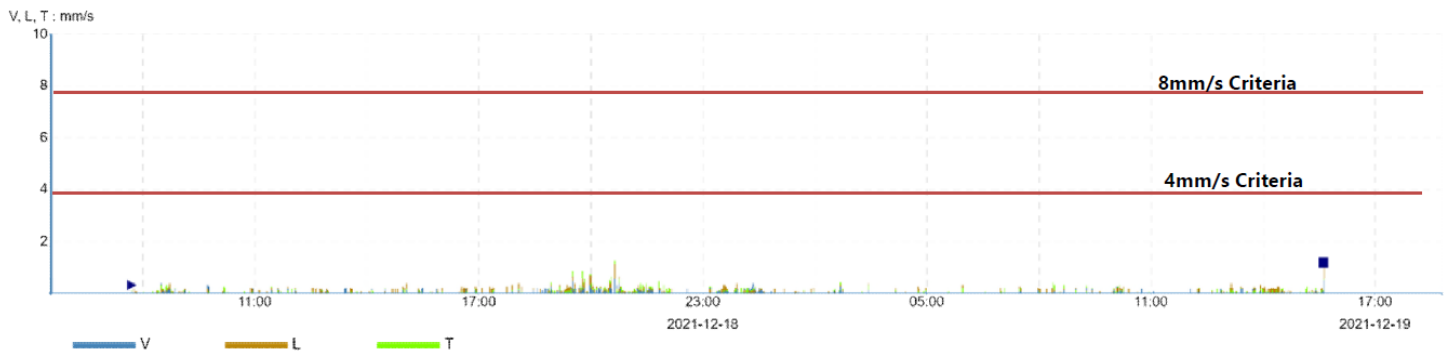


Fig. 4 – Unattended vibration monitoring location 2 results (residential property on Commons Street, 18th December – 19th December 2021)

The discussion of the unattended vibration measurements is summarised in the table below:

Exceedance ID	Date and Time	Cause of exceedance
1	18.12.2021 07:47am	At this time, the vibration monitor was mounted on the ground spike to commence monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process
2	19.12.2021 03:41pm	At this time, the vibration monitor was removed from the ground spike to complete the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process

It can be seen in Figure 3 and Figure 4 that the vibration levels produced from the vibration intensive works in the vicinity of the affected garage structure is below 4 mm/s. Note that there were events that resulted in an instantaneous vibration level of above 4 mm/s, however these were not caused by the nearby construction activities, as justified in the table above.

4 – Residential property on Commons Street, Hurlstone Park (26th December - 9th January)

The results of the unattended vibration measurements for the neighbouring garage structure at a residential property on Commons Street are presented below:

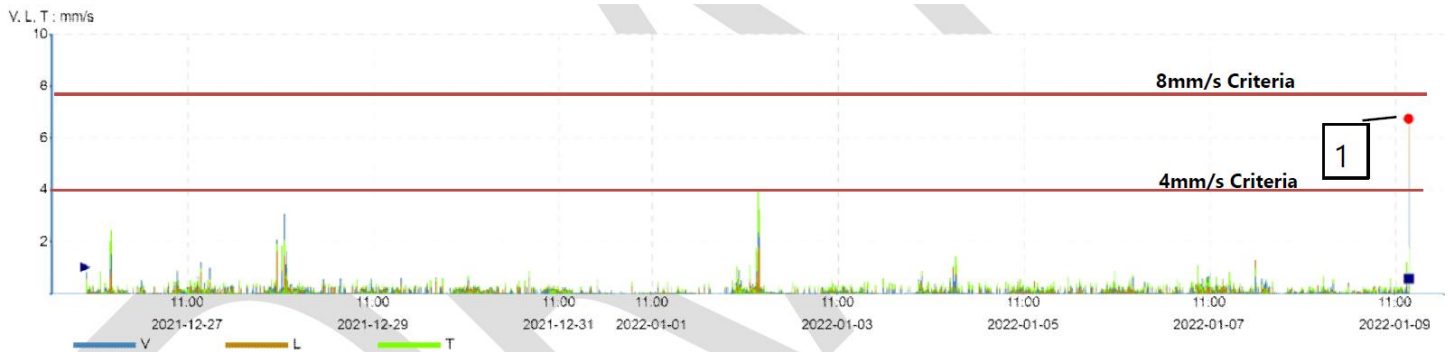


Fig. 5 – Unattended vibration monitoring location 1 results (residential property on Commons Street, 26th December 2021 – 9th January 2022)

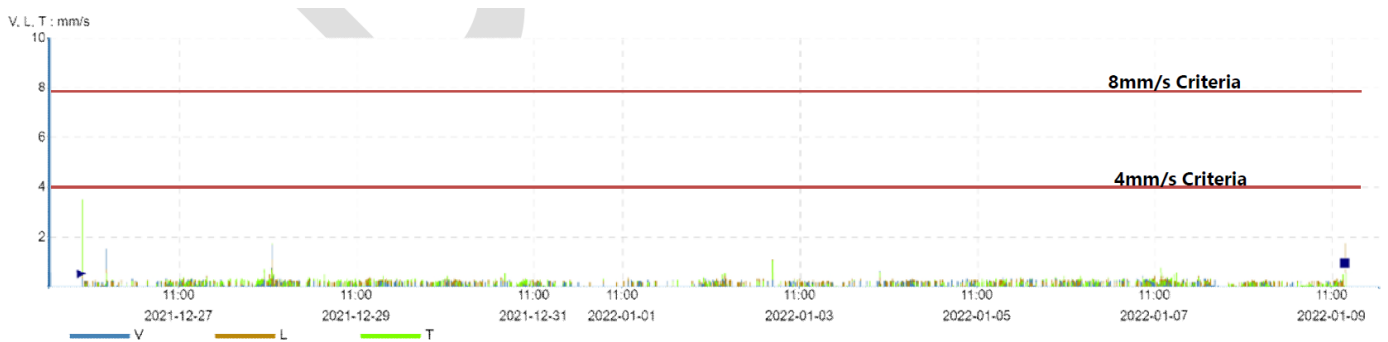


Fig. 6 – Unattended vibration monitoring location 2 results (residential property on Commons Street, 26th December 2021 – 9th January 2022)

Exceedance ID	Date and Time	Cause of exceedance
1	09.01.2022 02:25pm	At this time, the vibration monitor was removed from the ground spike to complete the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.

It can be seen in Figure 5 and 6 that the vibration levels produced from the vibration intensive works in the vicinity of the affected garage structure is below 4 mm/s. Note that there was an event that resulted in an instantaneous vibration level of above 4 mm/s, however this event was not caused by the nearby construction activities, as justified in the table above.

5 – Platform 1 station building at Hurlstone Park Station vibration monitoring (2nd – 9th January 2022)

The applicable vibration criteria for cosmetic damage from the Sydney Metro Construction Noise & Vibration Statement is as follow:

- Unreinforced or light framed structures: 7.5 mm/s
- Heritage structures (structurally sound): 7.5mm/s

The results of the unattended vibration monitoring for the station building are presented below:

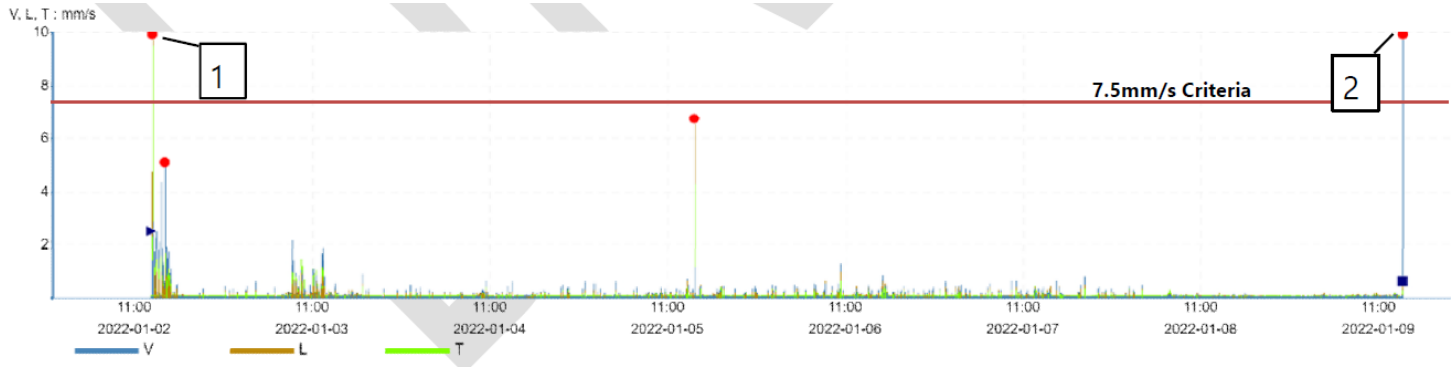


Fig. 6 – Unattended vibration monitoring at platform 1 results (2nd – 9th January 2022)

It can be seen in Figure 6 that the vibration levels produced from the jackhammering works in the vicinity of the station building on platform 1 is below 7.5 mm/s. Note that there were events that resulted in an instantaneous vibration level of above 7.5 mm/s, however these were not caused by the nearby construction activities, as justified in the table below.

Exceedance ID	Date and Time	Cause of exceedance
1	09.01.2022 02:25pm	At this time, the vibration monitor was mounted inside the station building to commence monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.
2	09.01.2022 02:12pm	At this time, the vibration monitor was removed from the station building to complete the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.

The results of the unattended vibration measurements were typically below the established vibration criteria presented in the Hurlstone Park Station Vibration Monitoring Plan prepared for the works.

6 – Residential property on Commons Street, Hurlstone Park (7th February 2022)

The results of the unattended vibration measurements for the neighbouring garage structure at a residential property on Commons Street are presented below:

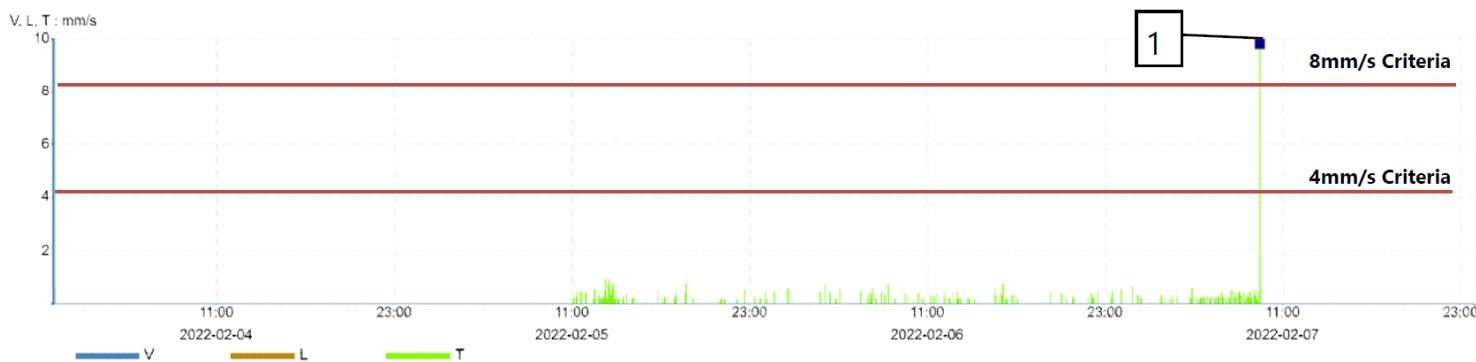


Fig. 7 – Unattended vibration monitoring location 1 results (residential property on Commons Street, 7th February 2022)

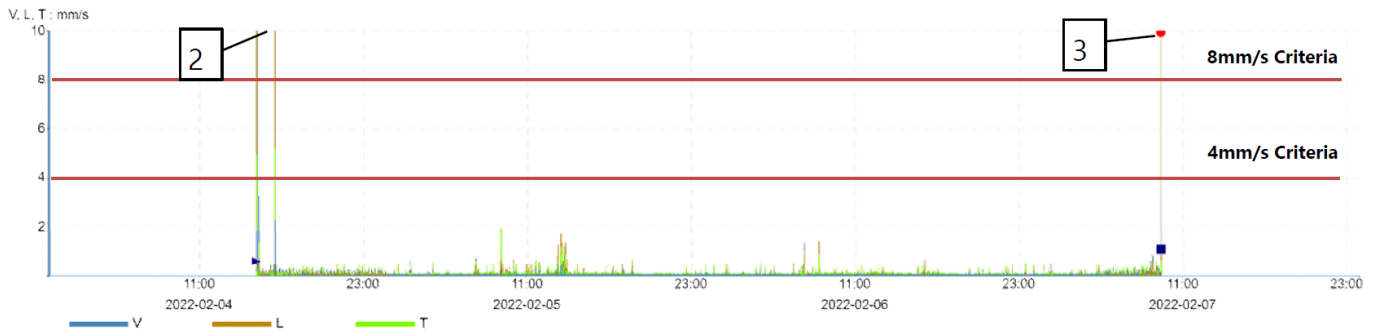


Fig. 8 – Unattended vibration monitoring location 2 results (residential property on Commons Street, 7th February 2022)

The results of the noise measurements were below the predicted $LA_{eq\ 15minutes}$ levels presented in the Gatewave model prepared for the works. The results of the unattended vibration measurements were typically below the established vibration criteria established for the location. There were events that resulted in an instantaneous vibration level of above the established vibration criteria, however, the cause of these events was not related to construction activity, as outlined in the table below.

Exceedance ID	Date and Time	Cause of exceedance
1	07.02.2022 09:24am	At this time, the vibration monitor was removed from the ground spike to complete the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.
2	04.02.2022 03:10pm	At this time, the vibration monitor was installed on the ground spike to start the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.
3	07.02.2022 09:20am	At this time, the vibration monitor was re moved from the ground spike to complete the monitoring. Exceedance was not caused by the nearby construction activities. The exceedance was the result of the monitor instillation process.

DISCUSSION – NOISE AND VIBRATION MONITORING

The noise monitoring results did not identify any exceedances of the predicted noise levels with the exception of two instances, one where traffic noise was compounding to the construction activities (making the readings less reliable) and the second one where noise levels were 10dB above predicted, which is consistent with high noise impact activities including the use of a rockhammer.

As the great majority of results did not exceed the predicted levels, the provision of construction noise mitigation measures is considered to be appropriate.

The vibration monitoring results have indicated that the construction activities have not caused vibration impacts above the screening levels.

It should also be noted that Downer conducts regular inspection of the environmental controls, including noise and vibration mitigation measures, across all work sites. These inspections are conducted by the Project Team and the Environmental Team. This proactive approach ensures that environmental controls are functioning properly rather than reactively inspecting the worksite following monitoring and reporting.

Appendix 1 – Surface Water Monitoring Report - Wiley Park Station - NE30161_R005_SWM_WileyPark_Rev0_R

Appendix 2 – Surface Water Monitoring Report - NE30161_R006_SWM_WileyPark_Rev0

Appendix 3 – Surface Water Monitoring Report – Wiley Park Station NE30161_R007_SWM_WileyPark_Rev0_R

Appendix 4 – Surface Water Monitoring Report – Wiley Park Station NE30161_R008_SWM_WileyPark_Rev0

Appendix 5 – TL927-1-18F01 Hurlstone Park Station Vibration Monitoring Report (r1)

Appendix 6 – TL927-1-19F01 WE25 Noise and Vibration Monitoring Report (r2)

Appendix 7 – TL927-1-20F01 Shutdown 2 Noise and Vibration Monitoring Report (r2)

Appendix 8 – TL927-1-21F01 2022 WE32 Noise and Vibration Monitoring Report (r1)

Appendix 9 – EDS-16589-HPS-18_0: Sydney Metro Package 5 and 6 – Hurlstone Park Station Monitoring of Garage Wall