Construction Monitoring Report September 2022 – February 2023

Sydney Metro City & Southwest – Line-wide Works

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Contents

1. Introduction

1.1 Project Summary

The Sydney Metro City & Southwest (SMCSW) is the second portion of the new standalone rail network known as the Sydney Metro, which is Australia's largest public transport infrastructure project and a priority rail project for the NSW Government. The project will extend Sydney Metro Northwest to the CBD and beyond to Bankstown. The project is being delivered through a suite of contracts for the tunnels, stations, Line-wide infrastructure and systems. Line-wide is a key component of the SMCSW, with works taking place over the full length of the project as shown in Figure 1 below:

Figure 1: Line-wide Locations

1.2 Planning Approval Requirements

The Sydney Metro Authority received planning approval to construct the project from the Department of Planningand Environment. The Conditions of Approval CSSI 7400 cover the works from Chatswood to Sydenham and the Conditions of Approval CSSI 8256 cover the works from Marrickville to Bankstown.

A Construction Environmental Management Plan and sub-plans were developed for the project to address all environmental aspects, including construction monitoring. Approval of the plans enabled commencement of construction on 4 March 2020. The plans for the Line-wide works were developed to address the requirements of both planning approvals in each plan or sub-plan. Construction monitoring requirements are detailed in the Soil, Water and Groundwater Management Sub-Plan C2B and the Construction Noise and Vibration Management Plan – C2B. The plans can be accessed at the CPB Sydney Metro City & Southwest Line-wide Works Project website:

https://www.cpbcon.com.au/en/our-projects/2018/sydney-metro-line-wide-works

The objectives for this report are to provide construction monitoring results for the sixth 6 months of works on the Line-wide Project, from the start of September 2022 to the end of February 2023. This report is provided for information to the Department of Planning and Environment. It is intended to address the requirements of Conditions C16 of CSSI 7400 and C14 of CSSI 8256.

2. Water Quality Monitoring

The Soil, Water and Groundwater Management Sub-Plan C2B requires that water quality monitoring will be undertaken for controlled discharges offsite to watercourses and stormwater drainage to ensure compliance with discharge criteria. The discharge criteria are shown in Table 1 below:

Table 1: Discharge Criteria

Parameter	Measurement and Assessment			Discharge Criteria
	Percentile Concentration Limit	**Sample Method & Frequency**	**Units**	
pH	100	Probe/ grab sample Prior to discharge	pH	6.5-8.5
Total Suspended Solids	100	Probe/ grab sample Prior to discharge	mg/L	<50
Oil and Grease	100	Visual Prior to discharge	mg/L	<10 and no visible trace

2.1 Permit to Dewater

Systems Connect have an internal Permit to Dewater system, which ensures compliance with discharge criteria at all times. Monitoring is done prior to each dewatering event. The Systems Connect Permit to Dewater and Water Quality Monitoring Register is provided in Appendix A. This demonstrates that discharge criteria were met for all discharges.

2.2 Water Treatment Plant

On 1 August 2020, Systems Connect took possession of a portion of the Chatswood Dive site from the Tunneling and Station Excavation Contractor. The portion contains the Chatswood Water Treatment Plant, which is now operated by Systems Connect. It collects surface water from the Chatswood Dive site, and tunnel water from between Barangaroo and the Chatswood Dive.

From November 2021, the Water Treatment Plant at Marrickville became operational. This WTP takes water from the tunnels between Barangaroo and the Marrickville Dive.

A WTP Checklist is completed by the WTP operator daily (working days), where a range of WTP observations, parameters and chemical levels are noted. This includes water discharge parameters required for regulatory compliance. The compliance results from the checklists completed during the reporting period are described in Table 2 below:

Table 2: WTP Compliance Results

WTP	Date	pH	Turbidity (NTU)	Oil and Grease
Chatswood	1/09/2022 to 28/02/2023	6.5 - 8.5	0.1 - 25.3	None visible
Marrickville	1/09/2022 to 28/02/2023	7.2 - 8.16	0.3 - 9.7	None visible

At each water treatment plant under Systems Connect control, the discharge parameters pH, TSS and NTU are to be sampled monthly. Results demonstrating compliance are provided in Appendix B.

2.3 Receiving Water Monitoring

The Soil, Water and Groundwater Management Sub-Plan C2B requires that monitoring of receiving waters will occur three-monthly, while WTPs are active and in SC control. Monitoring parameters are provided in Table 3 below:

Table 3: Surface Water Quality Parameters

Parameter	Sample Method	Analytical method	ANZECC[1, 2] Criteria (freshwater)[7]	ANZECC [1, 3] Criteria (marine water)[8]	EPL 21423	Trigger Values	Action
Temperature (ºC)	Probe	Field Analysis	>80%ile[4] <20%ile[4]			Results are > than the baseline 80th percentile	Environment Coordinators to re-test to confirm results. Environment Coordinator is to undertake an inspection of the Works and propose actions where required Note: There is a delay in receiving the results from grab samples. Environment Coordinator to obtain further grab samples for testing to confirm results. Environment Coordinator to undertake an inspection once results received and establish what activities had been undertaken prior to the tests being undertaken and propose actions where required.
Dissolved Oxygen (%Sat)	Probe	Field Analysis	Lower Limit: 85 Upper Limit: 110	Lower Limit: 90 Upper Limit: 110			
Turbidity (NTU)	Probe	Field Analysis	6-50	0.5-10			
Oil and Grease	Visual analysis, then grab sample if required	Visual Assessment Lab Analysis	-	-	No visible sign of oil and grease	Visible oil and grease	
Conductivity (µS/cm)[6]	Grab Sample and Probe	Field Analysis Lab Analysis	125 – 2200	-		Results are > than the baseline 80th percentile	
Total Suspended Solids (TSS: mg/L)	Grab Sample	Lab Analysis	-	-	50mg/L		
Iron (mg/L)			0.3[5]	-			
Manganese(mg/L)			1.7	0.8			
pH	Grab Sample and Probe	Field Analysis Lab Analysis	Lower Limit: 6.5 Upper Limit: 8.0	Lower Limit: 8.0 Upper Limit: 8.4	6.5 -8.5		

Notes:

[1] 95% protection level – most commonly applied to ecosystems that could be classified as slightly to moderately disturbed.

[2] ANZECC (2000) guidelines for the protection of freshwater aquatic ecosystems

[3] ANZECC (2000) guidelines for the protection of marine aquatic ecosystems

[4] Default trigger value for each ecosystem-type

[5] There is insufficient data at this stage to derive a reliable value for iron. The current Canadian guideline has been used.

[6] Conductivity will not be tested at monitoring points at estuarine/marine catchments.

- No data available

[7] Applicable to monitoring locations SW-SC-01, SW-FR-02, SW-EC-01

[8] Applicable to monitoring locations SW-SC-01, SW-FR-02, SW-MP-01, SW-BP-01, SW-B-01, SW-FC-01, SW-AC-01

Only the receiving waters downstream of the Chatswood WTP and Marrickville WTP are applicable for monitoring during this period. All other WTPs are being operated by other Sydney Metro contractors. The two monitoring sites downstream of the Chatswood WTP are both in the Scotts Creek/Middle Harbour Catchment. The sampling point downstream of the Marrickville WTP is in the Alexandra Canal. Sampling points are described in Table 4 below:

Table 4: Sampling Point Information

Site ID	Site interaction	Relative location	Catchment	Sampling address	Easting	Northing	Type
SW-SC-01	Receiving waters from Chatswood WTP discharges. Monitoring location active while the Chatswood WTP is active and in SC control.	Downstream	Scotts Creek / Middle Harbour	Muston Park, access via Eden Street, Chatswood	330586	6245923	Freshwater
SW-SC-02				Access via North Arm Track, North Arm Road, Chatswood	332788	6246304	Estuarine / Marine
SW-AC-01	Receiving waters from Marrickville WTP discharges. Monitoring location active while the Marrickville WTP is active and in SC control.	Downstream	Alexandra Canal	Access via bicycle track from the end of Coward Street, Mascot	331342	6244783	Estuarine

The results of the receiving water monitoring are provided in Appendix C.

3. Noise and Vibration

The Construction Noise and Vibration Management Plan – C2B includes the Construction Noise and Vibration Monitoring Program. This program requires that the results of construction noise and vibration monitoring will be reported every six months. The results for this monitoring period are included in this report.

3.1 Noise Monitoring

Section 8.1.4 of the CNVMP states that: “Attended monitoring of construction noise levels will be undertaken as follows:

- At the first opportunity following the commencement of construction activity to confirm the effectiveness of actions and measures determined in CNVIS process
- Repeated as described in the CNVIS, as part of the audit cycle to ensure that noise and vibration levels in the adjacent community remain consistent with the predicted levels in the CNVIS
- Where appropriate in response to a noise related complaint(s) (determined on a case-by-case basis)
- During sensitive periods (i.e. night works)
- As directed by an authorised officer of the EPA.

Monitoring would be undertaken at the potentially most exposed receivers in proximity to construction activities. Noise monitoring locations should be consistent with the distances/ locations identified in the CNVIS and will consider factors including:

- The location of previous monitoring sites
- The proximity of the receiver to a worksite
- The sensitivity of the receiver to noise
- Background noise levels
- The expected duration of the impact.”

Summary results of attended noise monitoring conducted by Systems Connect in the reporting period are provided in Appendix D (Systems Connect Noise Monitoring Register), demonstrating compliance with project requirements, including the above extract from the management plan.

Noise monitoring equipment details, including make, model, serial number, last calibration date and NATA testing facility, are provided in Appendix E.

Further details are collected for each field reading, including time, duration, meteorological conditions and extraneous noise sources during reading. Samples of Noise Monitoring Record Sheets are provided in Appendix F. Others are available on request.

3.2 Vibration Monitoring

The Construction Noise and Vibration Management Plan – C2B explains that: “the requirement for real time vibration monitoring will be determined on a site by site basis and identified in the CNVIS for LW worksites between Chatswood and Sydenham. Real time vibration monitoring will be deployed to manage vibration impacts from ‘high risk’ sites, where the CNVIS vibration predictions identify there is a high risk of annoyance (or potential building damage) from construction vibration.”

During the reporting period, there was one location and work campaign where vibration monitoring was done. Summary results demonstrating compliance with vibration criteria are included in Appendix G (Systems Connect Vibration Monitoring Register).

The Vibration Monitoring Report is provided in Appendix H.

Appendix A: Systems Connect Permit to Dewater and Water Quality Monitoring Register

Systems Connect LWW Permit to Dewater and Water Quality Monitoring Register

Permit to Dewater	Date	Location	Detailed Monitoring Location	Single or Continuous	Reason	Discharge Point	Water Quality Analyser	pH	Turbidity NTU	Oil & Grease
Permit to Dewater LWW-217	8/09/2022	Campsie BPS	Anzac Street	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.92	31.6	None Visible
Permit to Dewater LWW-218	9/09/2022 to 9/10/2022	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-219	19/09/2022	SMTF-S	Sump adjacent pre-start sheds	Single	For discharge approval	Stormwater pit	Horiba U-52	8.23	3.1	NA
Permit to Dewater LWW-220	28/09/2022	Campsie BPS	Anzac Street	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.86	12.6	NA
Permit to Dewater LWW-220	28/09/2022	Campsie BPS	South Parade	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.29	29.4	NA
Permit to Dewater LWW-221	6/10/2022 - 11/10/2022	Marrickville	Southern Dive - Marrickville	Continuous	Discharged under approveed 'Controlled Water Overflow Strategy' following major rain event	Stormwater drain adjacent Gate E2	NA	NA	NA	NA
Permit to Dewater LWW-222	6/10/2022	Campsie BPS	South Parade	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	8.48	23.4	NA
Permit to Dewater LWW-222	6/10/2022	Campsie BPS	Anzac Street	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	6.52	11.4	NA
Permit to Dewater LWW-223	06/10/2022 - 13/10/2022	Chatswood Dive	Chatswood Dive	Continuous	Discharged under approveed 'Controlled Water Overflow Strategy' following major rain event	Stormwater Pit	NA	NA	NA	NA
Permit to Dewater LWW-224	06/10/2022 - 13/10/2022	Crows Nest	Crows Nest	Continuous	Discharged under approveed 'Controlled Water Overflow Strategy' following major rain event	Stormwater Pit	NA	NA	NA	NA
Permit to Dewater LWW-225	4/09/2022 - 4/10/2022	Chatswood Dive	N/A	Continuous	For discharge approval	Chatswood WTP Discharge Point 1	NA	NA	NA	NA
Permit to Dewater LWW-226	4/10/2022 - 4/11/2022	Chatswood Dive	N/A	Continuous	For discharge approval	Chatswood WTP Discharge Point 1	NA	NA	NA	NA
Permit to Dewater LWW-227	10/10/2022 - 10/11/2022	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-228	20/10/2022	Campsie BPS	Anzac Street	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.02	27.9	NA
Permit to Dewater LWW-229	25/10/2022	SMTF-S	OPWTP Pit	Single	For discharge approval	Stormwater pit	Horiba U-52	6.63	5.5	NA
Permit to Dewater LWW-230	4/11/2022 - 4/12/2022	Chatswood Dive	Chatswood WTP	Continuous	For discharge approval	Stormwater pit	NA	NA	NA	NA
Permit to Dewater LWW-231	19/11/2022	BPS Surry Hills	Belmore Street Joint Bay	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.98	36	None Visible
Permit to Dewater LWW-232	24/11/2022	BPS Surry Hills	Belmore Street Joint Bay	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	6.82	41.4	None Visible
Permit to Dewater LWW-233	4/12/2022 - 4/01/2023	Chatswood Dive	N/A	Continuous	For discharge approval	Chatswood WTP Discharge Point 1	NA	NA	NA	NA
Permit to Dewater LWW-234	10/11/2022 - 10/12/2022	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-235	10/12/2022 - 10/01/2023	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-236	4/01/2023 - 4/02/2023	Chatswood Dive	N/A	Continuous	For discharge approval	Chatswood WTP Discharge Point 1	NA	NA	NA	NA
Permit to Dewater LWW-237	10/01/2023 - 10/02/2023	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-238	9/01/2023	SMTF-S	OPWTP Pit	Single	For discharge approval	Stormwater pit	Horiba U-52	6.71	3.7	NA
Permit to Dewater LWW-239	24/01/2023	Campsie BPS	South Parade	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.39	44.6	NA
Permit to Dewater LWW-240	4/02/2023 - 4/03/2023	Chatswood Dive	N/A	Continuous	For discharge approval	Chatswood WTP Discharge Point 1	NA	NA	NA	NA
Permit to Dewater LWW-241	9/02/2023	Campsie BPS	Gould Street Joint Bay	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.44	32.6	NA
Permit to Dewater LWW-242	10/02/2023 - 10/03/2023	Marrickville WTP	N/A	Continuous	For discharge approval	Marrickville WTP Discharge Point 2	NA	NA	NA	NA
Permit to Dewater LWW-243	22/02/2023	Campsie BPS	Gould Street	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.2	46.1	NA
Permit to Dewater LWW-243	22/02/2023	Campsie BPS	South Parade	Single	For discharge approval	Roadside stormwater gutter	Horiba U-52	7.96	30.6	NA

Appendix B: Monthly WTP Sampling

Monthly Water Quality Monitoring - Chatswood WTP

CHW2 Discharge point

Date	Time	Sample ID	pH	Total Suspended Solids (mg/L)	Turbidity (NTU)
23/09/2022	9:45	CHW2	7.79	7	2.6
27/10/2022	11:41	CHW2	8.04	7	2
25/11/2022	15:17	CHW2	7.86	15	3.1
22/12/2022	9:30	CHW2	8.37	<5	1.7
25/01/2023	10:15	CHW2	7.88	7	1.9
23/02/2023	12:59	CHW2	7.97	7	4.2

Monthly Water Quality Monitoring - Marrickville WTP

MKV2 Discharge point

Date	Time	Sample ID	pH	Total Suspended Solids (mg/L)	Turbidity (NTU)
26/09/2022	8:17:00 AM	MKV2	8.05	<5	2.1
28/10/2022	8:33:00 AM	MKV2	8.12	<5	1.6
22/11/2022	8:05:00 AM	MKV2	7.87	<5	1.3
20/12/2022	8:30:00 AM	MKV2	7.99	8	0.8
24/01/2023	9:00:00 AM	MKV2	8.17	8	1.1
24/02/2023	8:24:00 AM	MKV2	8.25	<5	0.7

Appendix C: Receiving Water Monitoring Results

Quarterly Surface Water Quality Monitoring - Chatswood

			Field Results						Lab Results				
Date	Time	Sample ID	Temperature (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Conductivity (µS/cm)	pH	Oil & Grease (Y/N)	Total Suspended Solids (mg/L)	Iron (Fe)	Manganese (Mn)	pH	Oil & Grease (mg/L)
23/09/2022	11:00:00 AM	SW-SC-01	17.4	99	19.6	327	8.35	N	<5	<0.05	0.006	7.72	Not tested
23/09/2022	11:40:00 AM	SW-SC-02	16.79	76.5	5.7	1790	7.81	N	<5	0.07	0.003	7.77	Not tested
22/12/2022	10:45:00 AM	SW-SC-01	18.22	90.1	17.3	312	8.17	N	22	<0.05	0.002	8.07	Not tested
22/12/2022	11:15:00 AM	SW-SC-02	19.64	80.5	7.6	18200	7.43	N	<5	<0.05	0.027	7.86	Not tested

Quarterly Surface Water Quality Monitoring - Marrickville

			Field Results						Lab Results				
Date	Time	Sample ID	Temperature (C)	Dissolved Oxygen (%)	Turbidity (NTU)	Conductivity (µS/cm)	pH	Oil & Grease (Y/N)	Total Suspended Solids (mg/L)	Iron (Fe)	Manganese (Mn)	pH	Oil & Grease (mg/L)
27/10/2022	9:30:00 AM	SW-AC-01	20.06	27.1	3	30200	7.21	N	6	<0.05	609	7.55	Not Tested
24/01/2023	9:00:00 AM	SW-AC-01	23.03	40.7	6.20	33200	7.6	N	<5	<0.05	651	7.75	Not Tested

Appendix D: Systems Connect Noise Monitoring Register

Systems Connect LWW Noise Monitoring Register

Date	Location	Detailed Monitoring Location	NCA	Predicted Noise Level	Measured L_{Aeq}	Comments
23/09/2022	Artarmon, Reserve road	115 Reserve Road, Artarmon (Freeway Hotel)	OSR	86	79	Below predicted, LW works compliant
23/09/2022	Artarmon, Reserve road	19 Barton Road, Artarmon	AS_01	64	59	Below predicted, LW works compliant
25/09/2022	Southwest Corridor HV Cabling	12 Urunga Parade, Wiley Park	S2B_09	54	53	Below predicted, LW works compliant
25/09/2022	Southwest Corridor HV Cabling	1 Cornelia Street, Wiley Park	S2B_09	70	55	Below predicted, LW works compliant
25/09/2022	Southwest Corridor HV Cabling	122 The Boulevarde, Wiley Park	S2B_09	53	63	Traffic noise dominant, LW works compliant
25/09/2022	Punchbowl TSS	80 South Terrace, Punchbowl	S2B_11	66	65	Below predicted, LW works compliant
25/09/2022	Punchbowl TSS	86 South Terrace, Punchbowl	S2B_11	67	65	Below predicted, LW works compliant
25/09/2022	Punchbowl TSS	88 South Terrace, Punchbowl	S2B_11	67	66	Below predicted, LW works compliant
4/10/2022	Northern Connection	13 Drake Street, Artarmon	CDS_05	75	69	Below predicted, LW works compliant
4/10/2022	Northern Connection	7-11 Nelson Street, Chatswood	CDS-03	66	49	Below predicted, LW works compliant
4/10/2022	Northern Connection	99 Hampden Road, Artarmon	CDS-06	79	61	Below predicted, LW works compliant
4/10/2022	Northern Connection	2 Nelson Street, Chatswood	CDS_03	74	48	Below predicted, LW works compliant
8/10/2022	Dulwich Hill TSS	20 Randall Street, Marrickville	S2B_02	85	74	Below predicted, LW works compliant
8/10/2022	Dulwich Hill TSS	18 Randall Street, Marrickville	S2B_02	74	64	Below predicted, LW works compliant
8/10/2022	Dulwich Hill TSS	7 Randall Street, Marrickville	S2B_02	74	59	Below predicted, LW works compliant
17/10/2022	Chatswood Dive	2 Nelson Street, Chatswood	CDS_03	56	49	Below predicted, LW works compliant
17/10/2022	Chatswood Dive	13 Hopetoun Avenue, Chatswood	CDS_03	36	54	Background noise dominant, LW works compliant
17/10/2022	Chatswood Dive	15 Nelson Street, Chatswood	CDS_03	48	62	Traffic noise dominant, LW works compliant
17/10/2022	Chatswood Dive	2 Nelson Street, Chatswood	CDS_03	53	48	Below predicted, LW works compliant
17/10/2022	Chatswood Dive	13 Hopetoun Avenue, Chatswood	CDS_03	33	51	Background noise dominant, LW works compliant
17/10/2022	Chatswood Dive	15 Nelson Street, Chatswood	CDS_03	45	68	Traffic noise dominant, LW works compliant
20/10/2022	Northern Connection	13 Brand Street, Artarmon	CDS_05	71	64	Below predicted, LW works compliant
20/10/2022	Northern Connection	8-10 Brand Street, Artarmon	CDS_05	68	59	Below predicted, LW works compliant
1/11/2022	Chatswood Dive	11-13 Hopetoun Avenue, Chatswood	CDS_04	63	49	Below predicted, LW works compliant
1/11/2022	Chatswood Dive	84-86 Albert Ave, Chatswood	CDS_03	73	53	Below predicted, LW works compliant
1/11/2022	Chatswood Dive	1-3 Gordon Avenue, Chatswood	CDS_03	68	52	Below predicted, LW works compliant
6/11/2022	Punchbowl TSS	66 South Terrace, Punchbowl	S2B_10	73	70	Below predicted, LW works compliant
6/11/2022	Punchbowl TSS	64 South Terrace, Punchbowl	S2B_10	75	68	Below predicted, LW works compliant
6/11/2022	Punchbowl TSS	60 South Terrace, Punchbowl	S2B_10	71	63	Below predicted, LW works compliant
6/11/2022	Punchbowl TSS	102 Stansfield Ave, Punchbowl	S2B_10	62	45	Below predicted, LW works compliant
6/11/2022	Marrickville Station	9-11 Warburton Street, Marrickville	S2B_01	57	47	Below predicted, LW works compliant
6/11/2022	Marrickville Station	2 Arthur Street, Marrickville	S2B_01	56	60	Traffic noise dominant, LW works compliant

6/11/2022	Marrickville Station	2 Warburton Street, Marrickville	S2B_01	48	42	Below predicted, LW works compliant
17/11/2022	Northern Connection	149 Artarmon Street	CDS_05	56	55.6	Below predicted, LW works compliant
17/11/2022	Northern Connection	1 Brand Street	CDS_05	61	61.8	Above predicted, LW works were adjusted to reduce the construction noise levels. As a result, the subsequent noise levels were below predicted.
17/11/2022	Northern Connection	152 - 156 Hampden Road	CDS_06	62	56.9	Below predicted, LW works compliant
17/11/2022	Northern Connection	2 Brand Street	CDS_05	63	60	Below predicted, LW works compliant
24/11/2022	Chatswood Dive	344-346 Mowbray Rd, Artarmon	CDS_06	50	58	Traffic noise dominant LW works compliant
24/11/2022	Chatswood Dive	7-11 Nelson Street	CDS_03	47	50	Traffic noise dominant, LW works compliant
28/11/2022	Southern Dive	76 Unwins Bridge Road, Marrickville	MDS_04	55	69	Traffic noise dominant, LW works compliant
28/11/2022	Southern Dive	76 Unwins Bridge Road, Marrickville	MDS_04	55	66	Traffic noise dominant, LW works compliant
29/11/2022	Punchbowl Station	38 Urunga Road Punchbowl	S2B_10	60	50	Below predicted, LW works compliant
29/11/2022	Wiley Park Station	2A Cornelia Street Wiley Park	S2B_09	60	57	Below predicted, LW works compliant
30/11/2022	Punchbowl TSS	68 South Terrace, Punchbowl	S2B_10	73	70	Below predicted, LW works compliant
30/11/2022	Punchbowl TSS	64 South Terrace, Punchbowl	S2B_10	75	63	Below predicted, LW works compliant
30/11/2022	Punchbowl TSS	62 South Terrace, Punchbowl	S2B_10	74	65	Below predicted, LW works compliant
9/12/2022	Canterbury Station	11-15 Charles Street Canterbury	S2B_04	75	69	Below predicted, LW works compliant
9/12/2022	Canterbury Station	10B Charles Street Canterbury	S2B_04	70	65	Below predicted, LW works compliant
9/12/2022	Canterbury Station	4 Charles Street Canterbury	S2B_04	65	60	Below predicted, LW works compliant
11/01/2023	Lakemba TSS	17 The Boulevarde, Lakemba	S2B_08	71	64	Below predicted, LW works compliant
11/01/2023	Lakemba TSS	16 The Boulevarde, Lakemba	S2B_08	75	68	Below predicted, LW works compliant
11/01/2023	Lakemba TSS	14 The Boulevarde, Lakemba	S2B_08	71	63	Below predicted, LW works compliant
12/01/2023	Chatswood Dive	344-346 Mowbray Rd, Artarmon NSW 2064	CDS_06	57	62	Traffic noise dominant, LW works compliant
12/01/2023	Chatswood Dive	117-119 Hampden Rd, Artarmon NSW 2064	CDS_06	52	61	Traffic noise dominant, LW works compliant
12/01/2023	Chatswood Dive	15 Nelson St, Chatswood NSW 2067	CDS_03	47	50	Traffic noise dominant, LW works compliant
14/01/2023	Northern Connection	58 Wilson Street, Chatswood	HS-01	64	51	Below predicted, LW works compliant
14/01/2023	Northern Connection	13 Drake Street, Artarmon	CDS_05	73	56	Below predicted, LW works compliant
14/01/2023	Northern Connection	12 Drake Street, Artarmon	CDS_05	74	53	Below predicted, LW works compliant
15/01/2023	Barangaroo Shaft	2 High Street, Millers Point	BN_02	55	53.2	Below predicted, LW works compliant
15/01/2023	Barangaroo Shaft	35-35A Dalgety Road, Millers Point	BN_03	55	60.9	Traffic noise dominant, LW works compliant
15/01/2023	Barangaroo Shaft	1-5 Towns Place, Millers Point	BN_03	58	68.7	Traffic noise dominant, LW works compliant
16/01/2023	Barangaroo Shaft	1-5 Towns Place, Millers Point	BN_02	62	72	Traffic noise dominant, LW works compliant
16/01/2023	Barangaroo Shaft	2 High Street, Millers Point	BN_03	57	56	Below predicted, LW works compliant
16/01/2023	Barangaroo Shaft	2 High Street, Millers Point	BN_03	54	52	Below predicted, LW works compliant
16/01/2023	Barangaroo Shaft	1-5 Towns Place, Millers Point	BN_02	58	65.8	Traffic noise dominant, LW works compliant
30/01/2023	Surry Hills BPS	242-254 Elizabeth Street, Surry Hills	CS_G	70	70.1	Traffic noise dominant, LW works compliant
30/01/2023	Surry Hills BPS	28 Albion Street, Surry Hills	CS_G	70	68.3	Below predicted, LW works compliant

1/02/2023	SMTF-S	108 Railway Road, Sydenham	MDS_05	61	56	Below predicted, LW works compliant
1/02/2023	SMTF-S	115 Railway Road, Sydenham	MDS_05	58	50	Below predicted, LW works compliant
1/02/2023	SMTF-S	11 Swain Street, Sydenham	MDS_04	65	53	Below predicted, LW works compliant
5/02/2023	Hurlstone Park Station	105 Duntroon Street Hurlstone Park	S2B_03	70	59	Below predicted, LW works compliant
5/02/2023	Hurlstone Park Station	2 Hopetoun Street Hurlstone Park	S2B_03	64	56	Below predicted, LW works compliant
5/02/2023	Hurlstone Park Station	19 Floss Street Hurlstone Park	S2B_03	68	60	Below predicted, LW works compliant
5/02/2023	Canterbury TSS	8 Hutton Street, Hurlstone Park	S2B_03	67	55	Below predicted, LW works compliant
5/02/2023	Canterbury TSS	2 Canberra Street, Hurlstone Park	S2B_03	66	63	Below predicted, LW works compliant
5/02/2023	Northern Connection	11-13 Hopetoun Avenue, Chatswood	CDS_04	62	56	Below predicted, LW works compliant
5/02/2023	Northern Connection	84-86 Albert Avenue, Chatswood	CDS_03	74	72	Below predicted, LW works compliant
5/02/2023	Northern Connection	2A Gordon Avenue, Chatswood	CDS_03	64	46	Below predicted, LW works compliant
5/02/2023	Chatswood	344 Mowbray Road Artarmon	CDS_06	79	75.4	Below predicted, LW works compliant
5/02/2023	Chatswood	342 Mowbray Road Artarmon	CDS_06	76	70.1	Below predicted, LW works compliant
5/02/2023	Chatswood	2 Orchard Street Chatswood	CDS_06	59	59.7	Traffic noise dominant, LW works compliant
6/02/2023	Chatswood	344 Mowbray Road Artarmon	CDS_06	79	67.3	Below predicted, LW works compliant
6/02/2023	Chatswood	342 Mowbray Road Artarmon	CDS_06	60	60.2	Traffic noise dominant, LW works compliant
6/02/2023	Chatswood	342 Mowbray Road Artarmon	CDS_06	63	65.8	Traffic noise dominant, LW works compliant
6/02/2023	Chatswood	344 Mowbray Road Artarmon	CDS_06	63	64.6	Traffic noise dominant, LW works compliant
8/02/2023	SMTF-S	76 Unwins Bridge Road, Marrickville	MDS_04	53	66.2	Traffic noise dominant, LW works compliant
8/02/2023	SMTF-S	76 Unwins Bridge Road, Marrickville	MDS_04	53	66	Traffic noise dominant, LW works compliant
20/02/2023	Northern Connection	7-11 Nelson Street, Chatswood	CDS_03	66	50	Below predicted, LW works compliant
20/02/2023	Northern Connection	11-13 Hopetoun Avenue, Chatswood	CDS_03	62	49	Below predicted, LW works compliant
20/02/2023	Northern Connection	2A Gordon Avenue, Chatswood	CDS_03	65	46	Below predicted, LW works compliant

Appendix E: Noise Monitoring Equipment Details

RION Tracking and Calibration Records

Bag No.	Make	Model	Device Serial Number	Previous Calibration Date	External Calibration Date 2022	Place of Calibration
1	RION	NL-42	00509242	7/09/2021	5/09/2022	Acoustic Research Lab
		NC-75 - Portable Calibrator	34202225	7/09/2021	5/09/2022	Acoustic Research Lab
2	RION	NL-42	01000278	18/03/2021	23/03/2022	Acoustic Research Lab
		NC-75 - Portable Calibrator	34212953	18/03/2021	23/03/2022	Acoustic Research Lab
3	RION	NL-42	00269685	9/07/2021	7/07/2022	Acoustic Research Lab
		NC-75 - Portable Calibrator	00970021	8/07/2021	7/07/2022	Acoustic Research Lab
4	RION	NL-42	00469907	27/07/2021	18/08/2022	Acoustic Research Lab
		NC-75 - Portable Calibrator	34502426	27/07/2021	18/08/2022	Acoustic Research Lab
5	RION	NL-21	00877037	5/10/2021	29/09/2022	Acoustic Research Lab
	Pulsar	100B - Portable Calibrator	42184	5/10/2021	29/09/2022 CALIBRATION FAILED, new pulsar ordered	Acoustic Research Lab
	Pulsar	Model 105	98618	Purchased 10/11/2022	10/11/2022	Acoustic Research Lab

Appendix F: Noise Monitoring Record Sheet Samples

Noise Monitoring Record Sheet

DATE:	04-October-2022	**MAIN ACTIVITY**	Sitewide surface treatment and concrete pouring
CONDUCTED BY:	Lachlan Woolf	**LOCATION OF WORKS:**	Northern Connection
METEROLOGICAL CONDITIONS:		Clear sky; air temperature 17°C, wind speed <5 m/s, relative humidity 73%	
DAY, EVENING OR NIGHT PERIOD?		Night	
MAKE / MODEL:	NTi XL2	**SERIAL NUMBER:**	A2A-20889-E0
TIME WEIGHTING:	FAST / ~~SLOW~~	**FREQUENCY WEIGHTING:**	A / ~~C / FLAT~~
FIELD CALIBRATION:	93.9	**POST CALIBRATION CHECK:**	93.9
COMMUNITY NOTIFICATIONS GONE OUT FOR THE WORKS?		YES	
LIGHT SPILL into residences?		-	
Are noise mitigation measures installed?		Yes, noise blankets fitted at Drake Street Gate	

MONITORING LOCATION 1				
LOCATION:	13 Drake Street, Artarmon			
ACTIVITIES:	Sitewide surface treatment and concrete pour			
PLANT:	Agitator truck, positrack, lighting towers, concrete pump truck, hand tools			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
22:19	22:35	34	39	CDS_05
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
69	79	52	74	60
PREDICTED NOISE LEVEL (dBA):		75		
LAeq ABOVE PREDICTED NOISE LEVEL:		-6		
Measured noise level with no construction activity (if applicable)				

MONITORING COMMENTS

22:19 Agitator truck driving up Drake Street (LAF 68)
22:20 Positrack tracking in front of Drake Street gate (LAF 72)
22:22:22 Positrack tracking in front of Drake Street gate (LAF 70-73)
22:22:50 Worker loading equipment into tray of nearby ute (LAF 74)
22:23:33 Positrack tracking in front of Drake Street gate (LAF 73-74)
22:24:10 Positrack tracking in front of Drake Street gate (LAF 72-74)
22:24:46 Worker loading equipment into tray of nearby ute (LAF 74)
22:26:08 Positrack tracking in front of Drake Street gate (LAF 72-74)
22:26:39 Positrack tracking and handheld hammering (LAF 74)
22:27:53 Positrack tracking in front of Drake Street gate (LAF 71-73)
22:29:10 Positrack tracking in front of Drake Street gate (LAF 72-75)
22:30:50 Positrack tracking in front of Drake Street gate (LAF 72-74)
22:31:23 Concrete pump truck idling (LAF 61)
22:32 Positrack tracking in front of Drake Street gate (LAF 70-74)
22:32:36 Handheld hammering (LAF 67)
22:34 Concrete pump unfurling (LAF 57)
22:34:38 17T hi-rail excavator passby (LAF 71)
22:35:09 Positrack tracking in front of Drake Street gate (LAF 70-73)

	The ambient noise environment at the monitoring location is primarily influenced by the positrack tracking in the work area in front of the Drake Street gate. Typically, noise levels associated with this activity were approximately LAF 70-74 dB(A). Loud noise events can be attributed to the positrack tracking activity. The measured LAeq is less than the predicted noise level. This can be attributed to limited use of the agitator truck during the monitoring period.

MONITORING LOCATION 2				
LOCATION:	7-11 Nelson Street, Chatswood			
ACTIVITIES:	Sitewide surface treatment			
PLANT:	8.5T excavator with bucket attachment, lighting tower			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
23:02	23:17	39	44	CDS_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
49	64	44	53	46
PREDICTED NOISE LEVEL (dBA):	66			
Laeq ABOVE PREDICTED NOISE LEVEL:	-17			
Measured noise level with no construction activity (if applicable)			LAF	46-48
MONITORING COMMENTS	23:02 Barely audible movement quacker (LAF 51) 23:05 8.5T excavator with bucket attachment managing ballast shoulder (LAF 56) 23:06 Road traffic noise from Pacific Highway (LAF 51) 23:07 Barely audible lighting tower generator hum (LAF 47) 23:09 17T hi-rail excavator passby (LAF 53) 23:10 8.5T excavator with bucket attachment managing ballast shoulder (LAF 48-50) 23:11 Road traffic noise from Pacific Highway (LAF 58) 23:12 8.5T excavator with bucket attachment managing ballast shoulder (LAF 53) 23:14 8.5T excavator with bucket attachment managing ballast shoulder (LAF 51) 23:15 No audible construction works, barely audible traffic noise (LAF 47) 23:16 No audible construction works, barely audible traffic noise (LAF 46-48) The ambient noise environment at this location is primarily influenced by activity from the 8.5T excavator with bucket attachment. The background noise environment at this location is primarily influenced by road traffic noise from the Pacific Highway. Loud noise events can be attributed to loud excavator bucket scraping whilst adjusting the ballast shoulder as well as loud traffic passbys. The measured LAeq is less than the predicted level. This can be attributed to intermittent measured works, less plant and noise intensive works occuring than anticipated.			

MONITORING LOCATION 3				
LOCATION:	99 Hampden Road, Artarmon			
ACTIVITIES:	Sitewide surface treatment and concrete pour			
PLANT:	Vibration plate compactor, tyred roller, positrack, concrete pump			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
23:29	23:43	39	44	CDS_06
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
61	75	51	65	57
PREDICTED NOISE LEVEL (dBA):	79			
Laeq ABOVE PREDICTED NOISE LEVEL:	-18			
Measured noise level with no construction activity (if applicable)				
MONITORING COMMENTS	23:29 Plate compactor (LAF 56) 23:30 Plate compactor and tyred roller (LAF 58) 23:30:30 Bus passby on Hampden Road (LAF 75) 23:31 17T hi-rail excavator passby (LAF 60) 23:32 Car passby along Hampden Road (LAF 68) 23:33 Plate compactor and tyred roller (LAF 58) 23:33:36 Car passby along Hampden Road (LAF 72) 23:35 Plate compactor, tyred roller and positrack tracking (LAF 64) 23:37 Plate compactor, tyred roller and positrack tracking (LAF 62-64) 23:38 Concrete pump and positrack tracking (LAF 62) 23:39 Positrack tracking (LAF 59-62) 23:39:55 Car passby along Hampden Road (LAF 72) 23:40:20 Plate compactor and positrack tracking (LAF 62-64) 23:41:30 Positrack tracking (LAF 60-62) 23:41:50 Car passby along Hampden Road (LAF 70) 23:43 Positrack tracking (LAF 57)			

	The ambient noise environment is primarily influenced by operation of the plate compactor as well as the tyred roller moving and positrack tracking. The background noise environment is primarily influenced by road traffic noise along Hampden Road and Mowbray Road. Loud noise events can be attributed to road traffic passbys along Hampden Road. The measured LAeq is less than the predicted noise level. This can be attributed to intermittent measured works, less plant and noise intensive works occuring than anticipated.

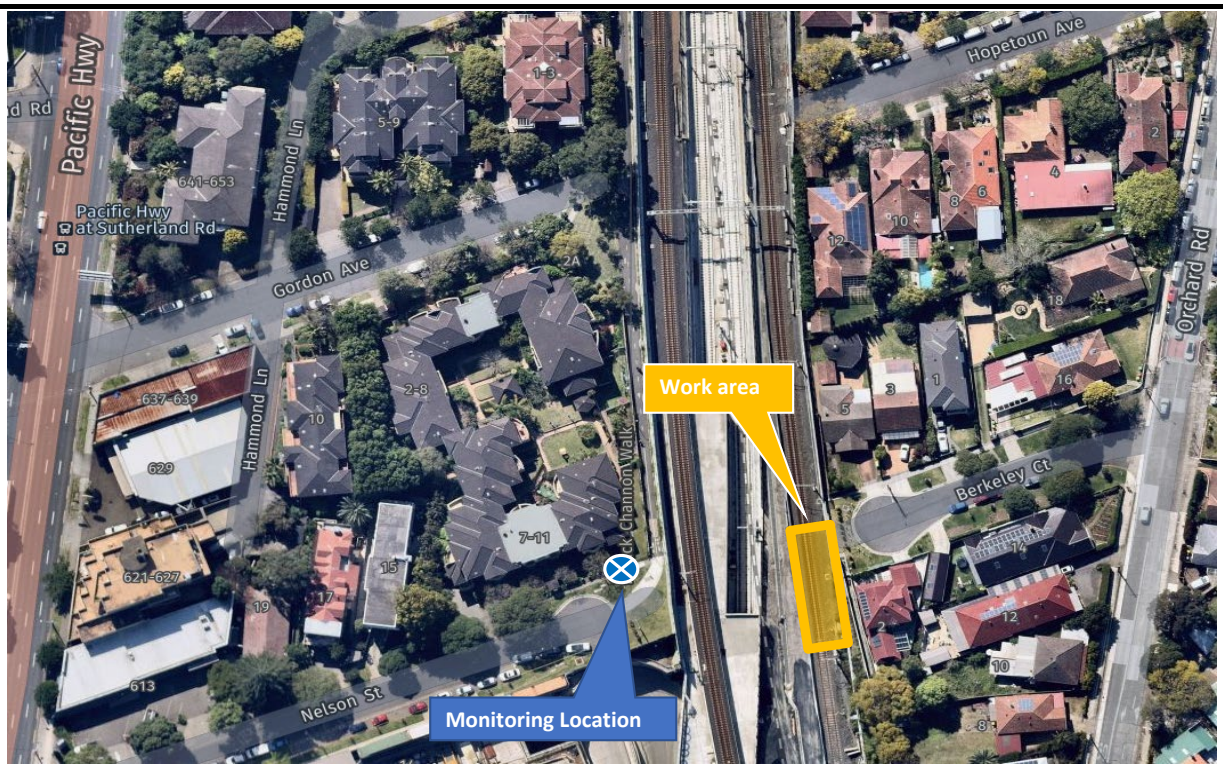
MONITORING LOCATION 4				
LOCATION:	2 Nelson Street, Chatswood			
ACTIVITIES:	Sitewide surface treatment			
PLANT:	8.5T excavator with bucket attachment, positrack, lighting tower			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
23:51	0:06	39	44	CDS_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
48	64	40	53	41
PREDICTED NOISE LEVEL (dBA):		74		
LAeq ABOVE PREDICTED NOISE LEVEL:		-27		
Measured noise level with no construction activity (if applicable)			LAF	40-42
MONITORING COMMENTS	23:51 8.5T excavator idling (LAF 48-50) 23:52 8.5T excavator tracking (LAF 55) 23:53:10 8.5T excavator tracking (LAF 55-58) 23:53:42 Dropped item (LAF 64) 23:55:20 17T hi-rail excavator passby (LAF 54) 23:56 No audible construction works, barely audible road traffic (LAF 42) 23:58 17T hi-rail excavator passby (LAF 52) 23:59 Barely audible lighting tower hum and distant road traffic (LAF 41) 00:00 Positrack tracking up ramp towards Mowbray Road compound (LAF 48) 00:02 Movement quacker (LAF 44) 00:03 Movement quacker (LAF 43) 00:03:30 Distant dropped item (LAF 50) 00:04 Barely audible lighting tower hum and distant road traffic (LAF 42) 00:05 Plant horn (LAF 51) The ambient noise environment at this location was primarily influenced by operation of the 8.5T excavator and positrack. The background noise environment at this location is primarily influenced by distant road traffic noise from Orchard Road and Albert Avenue. Loud noise events can be attributed to dropped items in the work area. The measured LAeq is less than the predicted noise level. This can be attributed to intermittent measured works, less plant operating than anticipated as well as reduced noise intensive works.			

LOCATION 1 - DIAGRAMS AND PHOTOS

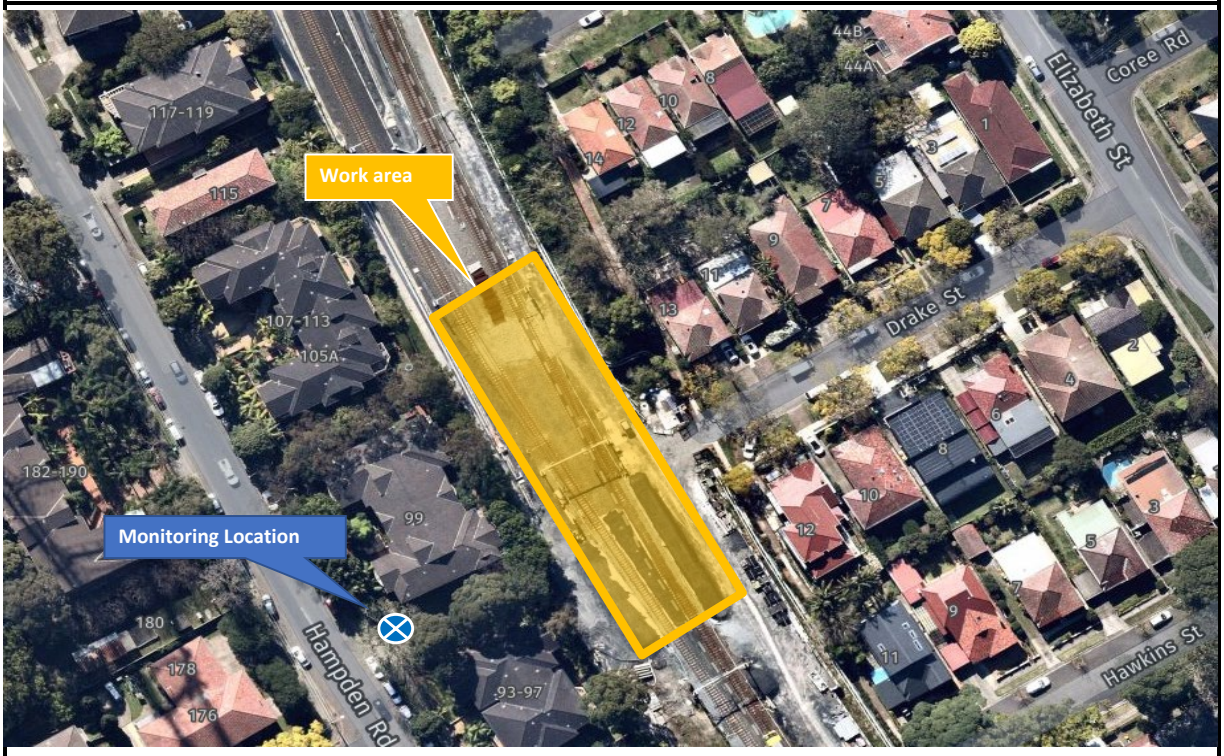
Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location

LOCATION 2 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location



LOCATION 3 - DIAGRAMS AND PHOTOS
Insert: **- Photo of works being monitored** **- Map showing monitoring location or Screenshot of GPS Location**



LOCATION 4 - DIAGRAMS AND PHOTOS
Insert: **- Photo of works being monitored** **- Map showing monitoring location or Screenshot of GPS Location**

Noise Monitoring Record Sheet

DATE:	05-February-2023	**MAIN ACTIVITY**	Steelwork crane lift and installation. (HV Cable Jointing was completed on Saturday 04/02/2023)	
CONDUCTED BY:	Dustin Auld	**LOCATION OF WORKS:**	Steelwork: Within rail corridor; adjacent to Hutton Street HV Cable Jointing: City side of Melford Street overpass	
METEROLOGICAL CONDITIONS:		Clear sky; air temperature 23°C, wind speed <5 m/s, relative humidity 56%		
DAY, EVENING OR NIGHT PERIOD?		Day OOH		
MAKE / MODEL:	NTi XL2	**SERIAL NUMBER:**	A2A-20889-E0	
TIME WEIGHTING:	FAST / ~~SLOW~~	**FREQUENCY WEIGHTING:**		A / ~~C / FLAT~~
FIELD CALIBRATION:	94	**POST CALIBRATION CHECK:**		94
COMMUNITY NOTIFICATIONS GONE OUT FOR THE WORKS?		YES		
LIGHT SPILL into residences?		-		
Are noise mitigation measures installed?		N/A		

MONITORING LOCATION 1				
LOCATION:	8 Hutton Street, Hurlstone Park			
ACTIVITIES:	Crane lift and install steelwork			
PROPOSED PLANT (as per OOHW application)	EWPs, handtools, delivery trucks, 45t mobile crane, franna crane, telehandler, light vehicles			
MEASURED PLANT:	45t mobile crane, handtools (rattle gun and drill) and light vehicles			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
8:00	8:15	38	43	S2B_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
55	68	48	58	50
PREDICTED NOISE LEVEL (dBA):		67		
LAeq ABOVE PREDICTED NOISE LEVEL:		-12		
Measured noise level with no construction activity (if applicable)				
MONITORING COMMENTS	08:00-08:15 Traffic control light vehicle idle 3 metres from monitoring location (LAF 50) 08:00 Rattle gun within Canterbury TSS (LAF 59) 08:02 Rattle gun within Canterbury TSS (LAF 55) 08:03 Rattle gun within Canterbury TSS (LAF 58) 08:04 Handheld drill on metal within Canterbury TSS (LAF 68) 08:05 Rattle gun within Canterbury TSS (LAF 58) 08:06 Hammering steel within Canterbury TSS (LAF 61) 08:10 Rattle gun within Canterbury TSS (LAF 59) 08:11 Rattle gun and drill operating concurrently within Canterbury TSS (LAF 66) 08:12 Rattle gun within Canterbury TSS (LAF 58) 08:14 Rattle gun within Canterbury TSS (LAF 56) 08:14 Hammering steel within Canterbury TSS (LAF 62)			

	The ambient noise environment at the monitoring location was primarily influenced by the steelworks within the Canterbury TSS. The background noise environment at this location is influenced by distant road traffic noise. Loud noise events can be attributed to drilling and hammering of steel within the Canterbury TSS. The measured LAeq is less than the predicted noise level. It was noted that the crane lifts were not audible at the monitoring location. Furthermore, the installation of the steel works were within the enclosed structure of the Canterbury TSS providing shielding of the handtools from the monitoring location. Measured works were intermittent.

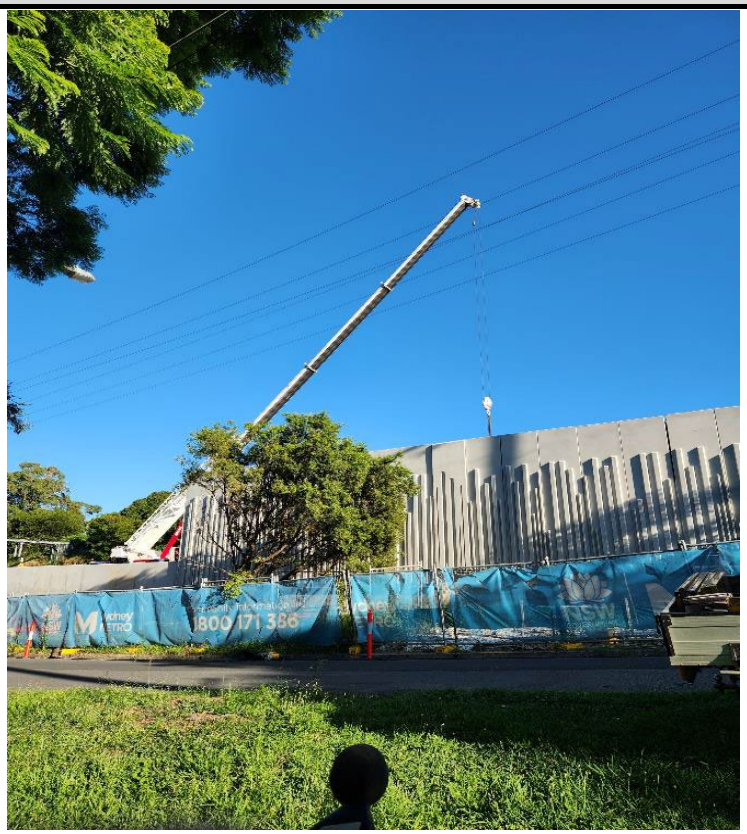
MONITORING LOCATION 2				
LOCATION:	2 Canberra Street, Hurlstone Park			
ACTIVITIES:	Crane lift and install steelwork			
PROPOSED PLANT (as per OOHW application)	EWPs, handtools, delivery trucks, 45t mobile crane, franna crane, telehandler, light vehicles			
MEASURED PLANT:	Excavator, hydrema, vacuum truck, concrete agi and chainsaw x2, rattle guns			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
8:24	8:39	40	45	S2B_04
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
63	78	53	67	56
PREDICTED NOISE LEVEL (dBA):	66			
Laeq ABOVE PREDICTED NOISE LEVEL:	-3			
Measured noise level with no construction activity (if applicable)				
MONITORING COMMENTS	08:24-08:36 Vacuum truck idling approxiamately 20 metres from the monitoring location along Canberra Street (LAF 57) 08:24 Chainsaws within rail corridor North side of rail (LAF 66) 08:25 Chainsaws within rail corridor North side of rail (LAF 68) 08:27 Cahinsaws within rail corridor North side of rail (LAF 66) 08:28 Excavator horn within rail corridor (LAF 72) 08:28 Excavator rail movement and quacker alarm (LAF 65) 08:29 Chainsaws within rail corridor North side of rail (LAF 73) 08:31 Chainsaws within rail corridor North side of rail (LAF 70) 08:33 Chainsaws within rail corridor North side of rail (LAF 70) 08:34 Concrete agi pass by on Canberra Street (LAF 74) 08:34 Hydrema rail movement with quacker alarm (LAF 61) 08:36 Concrete agi pass by on Canberra Street (LAF 72) 08:36 Rattle gun within Canterbury TSS (LAF 66) 08:37 Rattle gun and chainsaws operating concurrently (LAF 72) 08:38 Rattle gun and chainsaws operating concurrently (LAF 71) Vacuum truck, hydrema, excavator, concrete agi trucks and chainsaws were by other contractors The ambient noise environment at the monitoring location was primarily influenced by operation of chainsaws within the rail corridor along Canberra Street. The background noise environment at this location is influenced by the vacuum truck idling on Canberra Street. Loud noise events can be attributed to the concrete agi passbys along Canberra Street. The measured LAeq is less than the predicted noise level. Note the mobile crane was not audible from the monitoring location.			

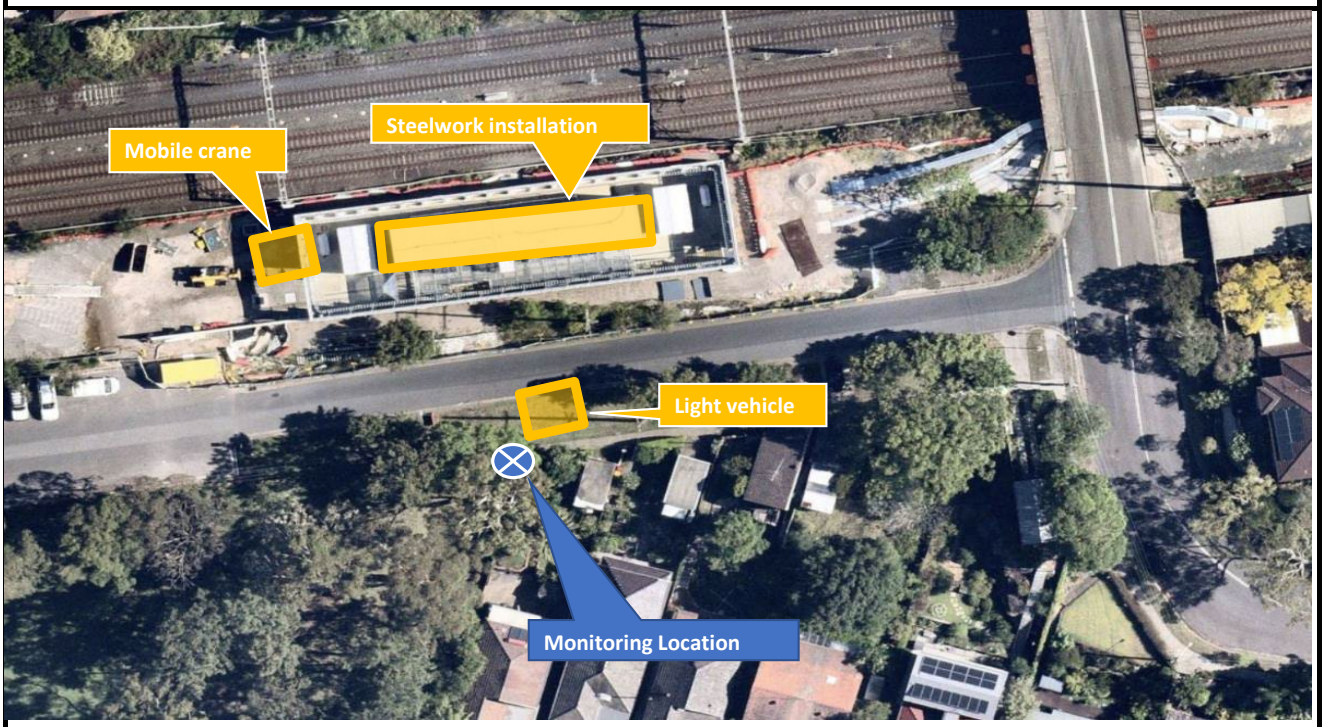
MONITORING LOCATION 3				
LOCATION:	63 Melford Street, Hurlstone Park			
ACTIVITIES:	Work by other contractors. HV cable jointing by Systems Connect was completed on Saturday 04/02/2023			
PROPOSED PLANT (as per OOHW application)	Hi-rail EWP, cable joinitng hand tools			
MEASURED PLANT:	Chainsaws, rotary drill rig, excavator, handtools and mobile crane (all belonging to other contractors)			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
8:45	9:00	38	43	S2B_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
66	82	52	69	57
PREDICTED NOISE LEVEL (dBA):	62			
Laeq ABOVE PREDICTED NOISE LEVEL:	4			
Measured noise level with no construction activity (if applicable)				
MONITORING COMMENTS	08:45-09:00 Rotary drill rig on city side of Melford Street overpass (LAF 55-60) (LAFmax 75) 08:45 Light vehicle pulling up on Melford Street overpass (LAF 69) 08:47 Car horn on Melford Street (LAF 79) 08:48 Chainsaws within rail corridor North side of the rail (LAF 66) 08:51 Chainsaws within rail corridor North side of the rail (LAF 64) 08:51 Hammering of steel within Canterbury TSS (LAF 62) 08:51 Car pass by on Melford Street (LAF 69)			

	08:52 Franna crane pass by on Melford Street (LAF 82) 08:53 Chainsaws within rail corridor North side of the rail (LAF 63) 08:54 Delivery truck pass by on Melford Street (LAF 75) 08:55 Concrete agi start up on Canberra Street (LAF 69) 08:56 Concrete agi pass by on Melford Street (LAF 80) 08:58 Chainsaws within rail corridor North side of the rail (LAF 67) 08:59 Chainsaws within rail corridor North side of the rail (LAF 66) 09:00 Chainsaws within rail corridor North side of the rail (LAF 66)
	All of the measured activities at this monitoring location were by other contractors.
	The ambient noise environment at the monitoring location was primarily influenced by operation of the chainsaws to the East and West of the monitoring location located on the North side of the rail. The background noise environment at this location is influenced by the operation of the rotary drill rig. Loud noise events can be attributed to heavy vehicle pass bys on Melford Street. The measured LAeq is greater than the predicted noise level. This can be attributed to the inclusion of plants not specified in the OOHW application such as the chainsaws and rotary drill rig. The chainsaws and rotary drill rig were ongoing for the duration of the measurement being one of the main contributors to the LAeq.

LOCATION 1 - DIAGRAMS AND PHOTOS

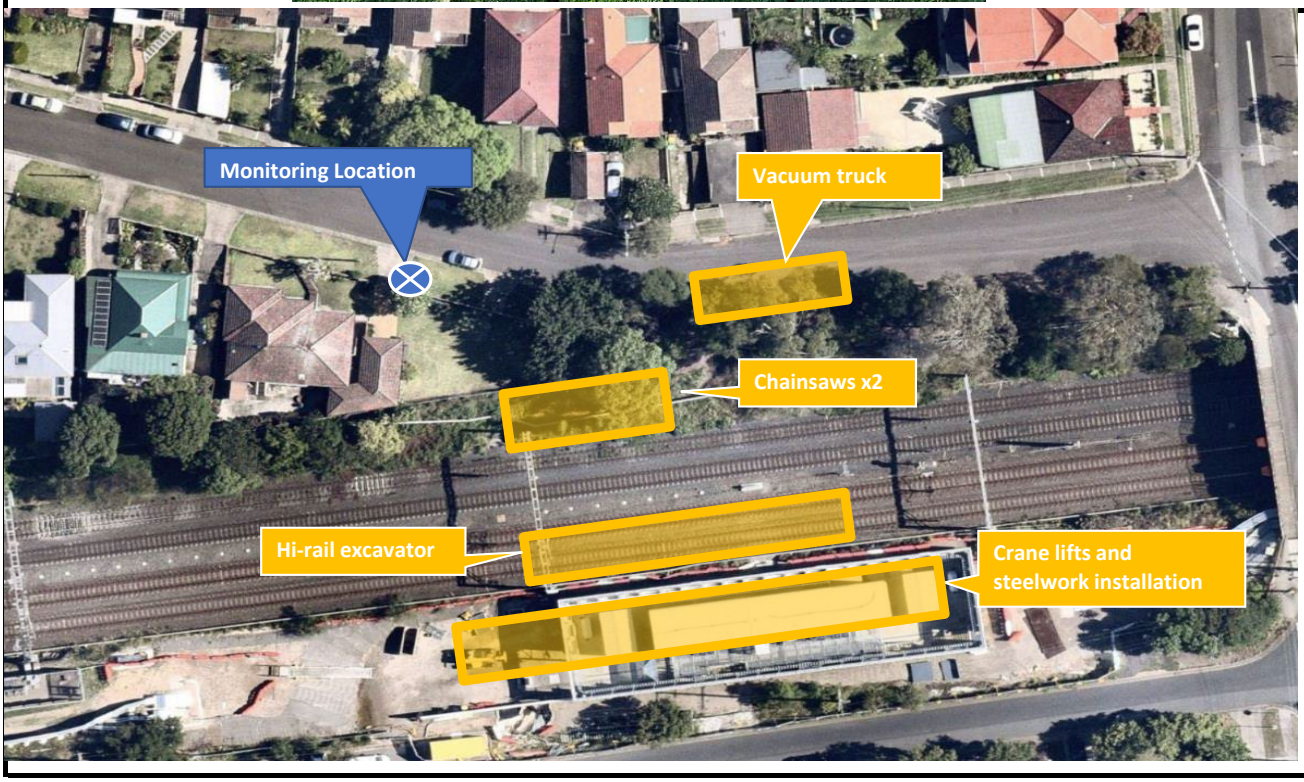
Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location





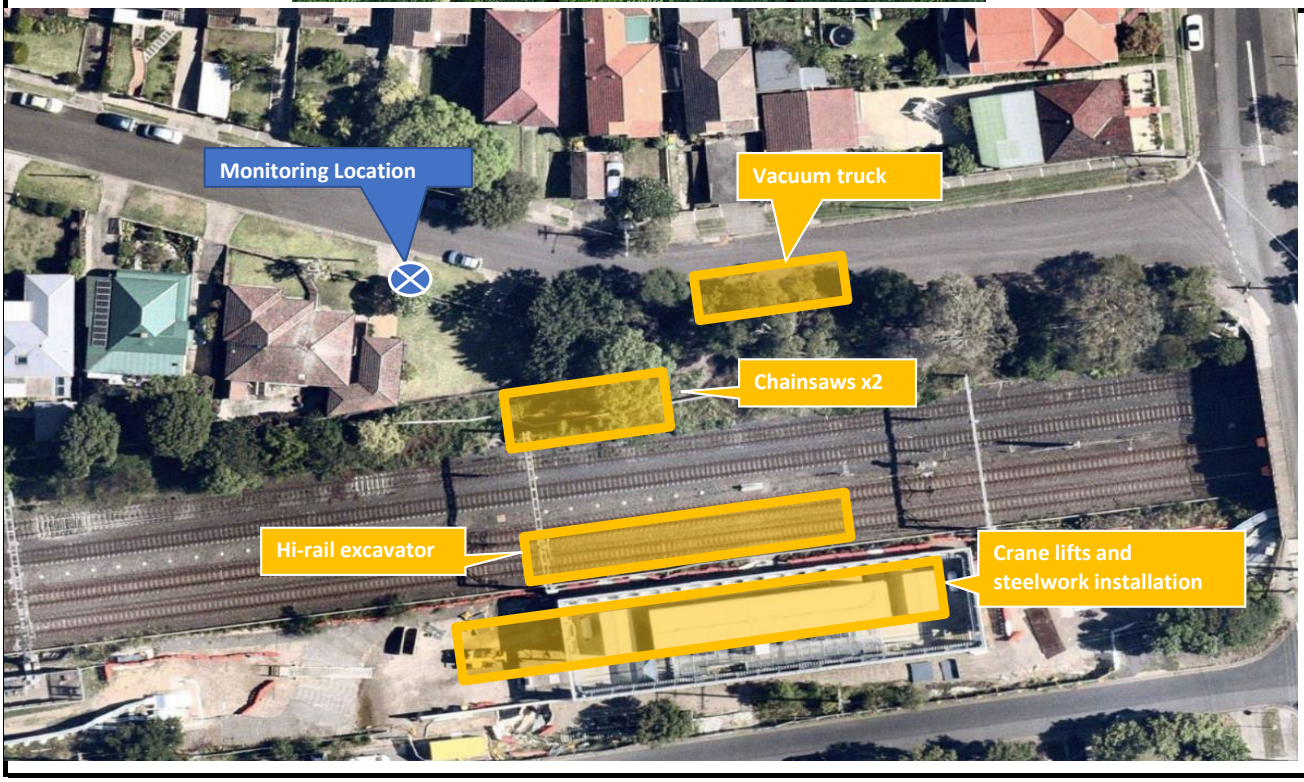
LOCATION 2 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location



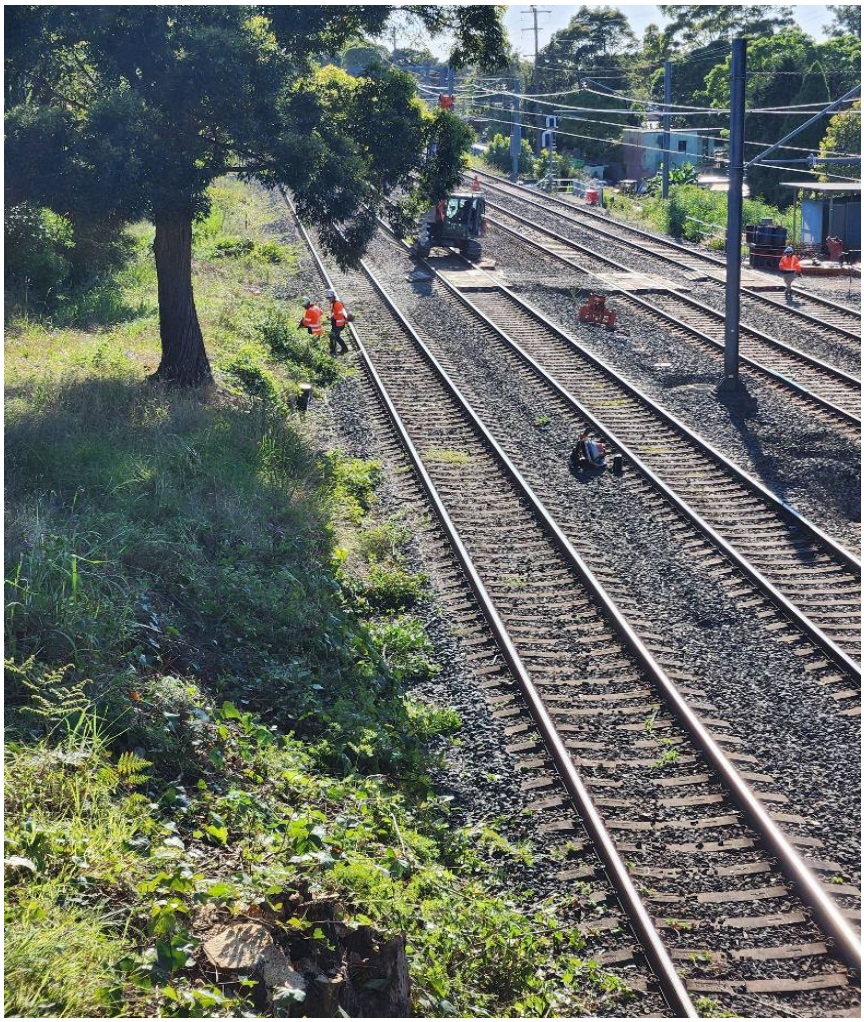
LOCATION 2 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location



ADDITIONAL PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location



Noise Monitoring Record Sheet

DATE:	20/02/2023 - 21/02/2023	**MAIN ACTIVITY**	NC WK34 Possessions Works	
CONDUCTED BY:	Dustin Auld	**LOCATION OF WORKS:**	Within Northern Connection rail corridor	
METEROLOGICAL CONDITIONS:		Clear sky; air temperature 25°C, wind speed <5 m/s, relative humidity 58%		
DAY, EVENING OR NIGHT PERIOD?		Night		
MAKE / MODEL:	NTi XL2	**SERIAL NUMBER:**	A2A-16217-E0	
TIME WEIGHTING:	FAST / ~~SLOW~~	**FREQUENCY WEIGHTING:**		A / ~~C / FLAT~~
FIELD CALIBRATION:	94	**POST CALIBRATION CHECK:**		94
COMMUNITY NOTIFICATIONS GONE OUT FOR THE WORKS?			YES	
LIGHT SPILL into residences?		-		
Are noise mitigation measures installed?		No		

MONITORING LOCATION 1				
LOCATION:	7-11 Nelson Street, Chatswood			
ACTIVITIES:	NC WK34 Possessions Works			
PROPOSED PLANT (as per OOHW application)	EWPs, power hand tools and battery powered task lighting			
MEASURED PLANT:	EWP, battery powered task lighting (inaudible)			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
23:38	23:53	39	44	CDS_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
50	66	38	49	40
PREDICTED NOISE LEVEL (dBA):		66		
LAeq ABOVE PREDICTED NOISE LEVEL:		-16		
Measured noise level with no construction activity (if applicable)				40.0
MONITORING COMMENTS	23:38 EWP with quacker alarm outside of dive (LAF 53) 23:43 Pedestrian talking (LAF 54) 23:43 Train passby (LAF 62) 23:44 Train passby (LAF 66) 23:47 Metal piece dragged on ground (LAF 47) 23:47 Workers talking (LAF 45) 23:51 Metal dropped (LAF 48) 23:51 Train passby (LAF 65) The background noise environment at this location is influenced by distant road traffic along Pacific Highway and insect noises. Loud noise events can be attributed to train passbys. The measured LAeq is less than the predicted noise level. It was noted that there is a permanent noise wall between the monitoring location and the rail corridor. Furthermore, the possession works were occuring within the dive which were inaudlible from the monitoring location except for EWP movements outside of the dive.			

MONITORING LOCATION 2	
LOCATION:	11-13 Hopetoun Street, Chatswood

ACTIVITIES:	NC WK34 Possessions Works			
PROPOSED PLANT (as per OOHW application)	EWPs, power hand tools and battery powered task lighting			
MEASURED PLANT:	EWP, battery powered task lighting (inaudible)			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
0:07	0:22	50	55	CDS_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
49	66	34	47	36
PREDICTED NOISE LEVEL (dBA):	62			
Laeq ABOVE PREDICTED NOISE LEVEL:	-13			
Measured noise level with no construction activity (if applicable)				36
MONITORING COMMENTS	00:08 EWP movement outside of dive with quacker alarm (LAF 52) 00:09 EWP movement outside of dive with quacker alarm (LAF 48) 00:12 EWP movement outside of dive with quacker alarm (LAF 46) 00:13 Train passby (LAF 62) 00:19 motorbike passby (LAF 53) 00:21 Train passby (LAF 64) 00:21 Train passby (LAF 66) The background noise environment at this location is influenced by the road traffic noise on Pacific Highway and insect noise. Loud niose events can be attributed to the train passbys. The measured LAeq is below the predicted noise level. It was noted that there is a permanent noise wall between the monitoring location and the rail corridor. Furthermore, the possession works were occuring within the dive which were inaudlible from the monitoring location except for EWP movements outside of the dive.			

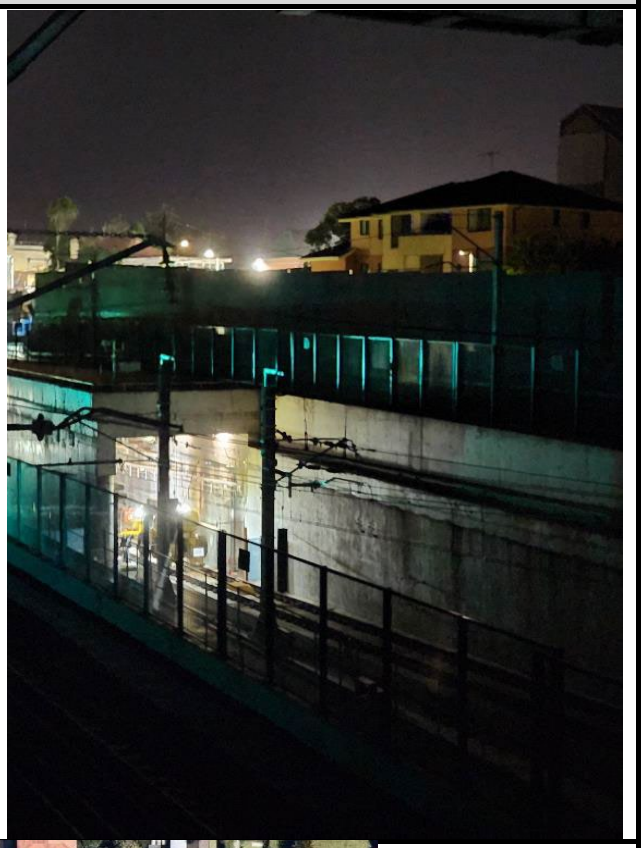
MONITORING LOCATION 3				
LOCATION:	2A Gordon Avenue, Chatswood			
ACTIVITIES:	NC WK34 Possessions Works			
PROPOSED PLANT (as per OOHW application)	EWPs, power hand tools and battery powered task lighting			
MEASURED PLANT:	Battery powered task lighting (inaudible)			
START TIME	**END TIME**	**RBL (dBA)**	**NML (dBA)**	**NCA**
0:43	0:58	50	55	CDS_03
L_{Aeq} (dBA)	**L_{AFmax} (dBA)**	**L_{AFmin} (dBA)**	**L_{A10} (dBA)**	**L_{A90} (dBA)**
46	69	35	41	36
PREDICTED NOISE LEVEL (dBA):	65			
Laeq ABOVE PREDICTED NOISE LEVEL:	-19			
Measured noise level with no construction activity (if applicable)				36
MONITORING COMMENTS	00:48 Pedestrian talking (LAF 62) 00:50 Train passby (LAF 69) The background noise environment at this location is influenced by the road traffic noise along Pacific Highway and insect noise. Loud noise events can be attributed to train passbys. The measured LAeq is less than the predicted noise level. It is noted that no construction works were audible at this monitoring location. The possession works were occuring within the dive which were inaudible from the monitoring location.			

LOCATION 1 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location

LOCATION 2 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location



LOCATION 3 - DIAGRAMS AND PHOTOS

Insert:
- Photo of works being monitored
- Map showing monitoring location or Screenshot of GPS Location

Appendix G: Systems Connect Vibration Monitoring Register

Systems Connect Vibration Monitoring Register

Start Date	End Date	Conducted By	Location	Detailed Monitoring Location	Attended or Continuous	Vibration Criteria mm/s	Compliant with Vibration Criteria or Monitorong Protocol Y/N
2/11/2022	15/11/2022	Jason Fenton	Blues Point	Blues Point Road, McMahons Point	Attended	2.5	Y

Appendix H: Vibration Monitoring Report Samples

Vibration Monitoring Record Sheet

START DATE:	2/11/2022	**PROJECT AREA:**	Footpath of Henery Lawson Avenue, McMahons Point NSW
FINISH DATE:	15/11/2022	**MAIN ACTIVITY**	Footpath replacement, inclusive of service installation works
CONDUCTED BY:	Jason Fenton and Adam Binning	**LOCATION OF WORKS:**	Blues Point Road, McMahons Point NSW
DAY, EVENING OR NIGHT PERIOD:		Day	
MONITORING EQUIPMENT:		Sigicom INFRA C12 vibration monitor (supplied by Renzo Tonin)	
VIBRATION MONITORING PLAN:		TK685-03-11F04 CNVIS_ADD2 Blues Point Streetscaping Works, dated: 16.06.2022, Revision 2; and Blues Point Vibration Memo, AMBS (Ref: 19683), dated: 01/07/2022	

LOCATION:	Footpath along Henery Lawson Avenue, McMahons Point NSW - extending through heritage listed bus shelter		
DATES:	2nd to the 15th of November 2022		
ACTIVITIES:	Footpath removal works (hand tools to remove bricks), excavation, concreting and footpath (brick) installation		
PLANT:	Hand tools (crowbars and shovels) and 5T excavator with bucket		
STRUCTURE TYPE:	Heritage listed bus shelter - Unreinforced structures (heritage)		
VIBRATION CRITERIA:	Unreinforced structures (heritage): 2.5 mm/s		
APPLICABLE MWD:	7m	**ACTUAL WORKING DISTANCE:**	Various
VIBRATION MONITOR MOUNTING METHOD:	Steel baseplate placed on bus shelter surface or seating bench. Mounting conducted by Jason Fenton/Adam Binning.		

EXCEEDENCES OF VIBRATION CRITERIA (Refer to monitoring data for all results)

Date and Time	V (mm/s)	L (mm/s)	T (mm/s)	Reason
Please refer to attached time trace graph				

COMPLIANT WITH VIBRATION CRITERIA:	Yes

MONITORING COMMENTS OR ACTIONS TAKEN TO ADDRESS EXCEEDENCES OF VIBRATION CRITERIA

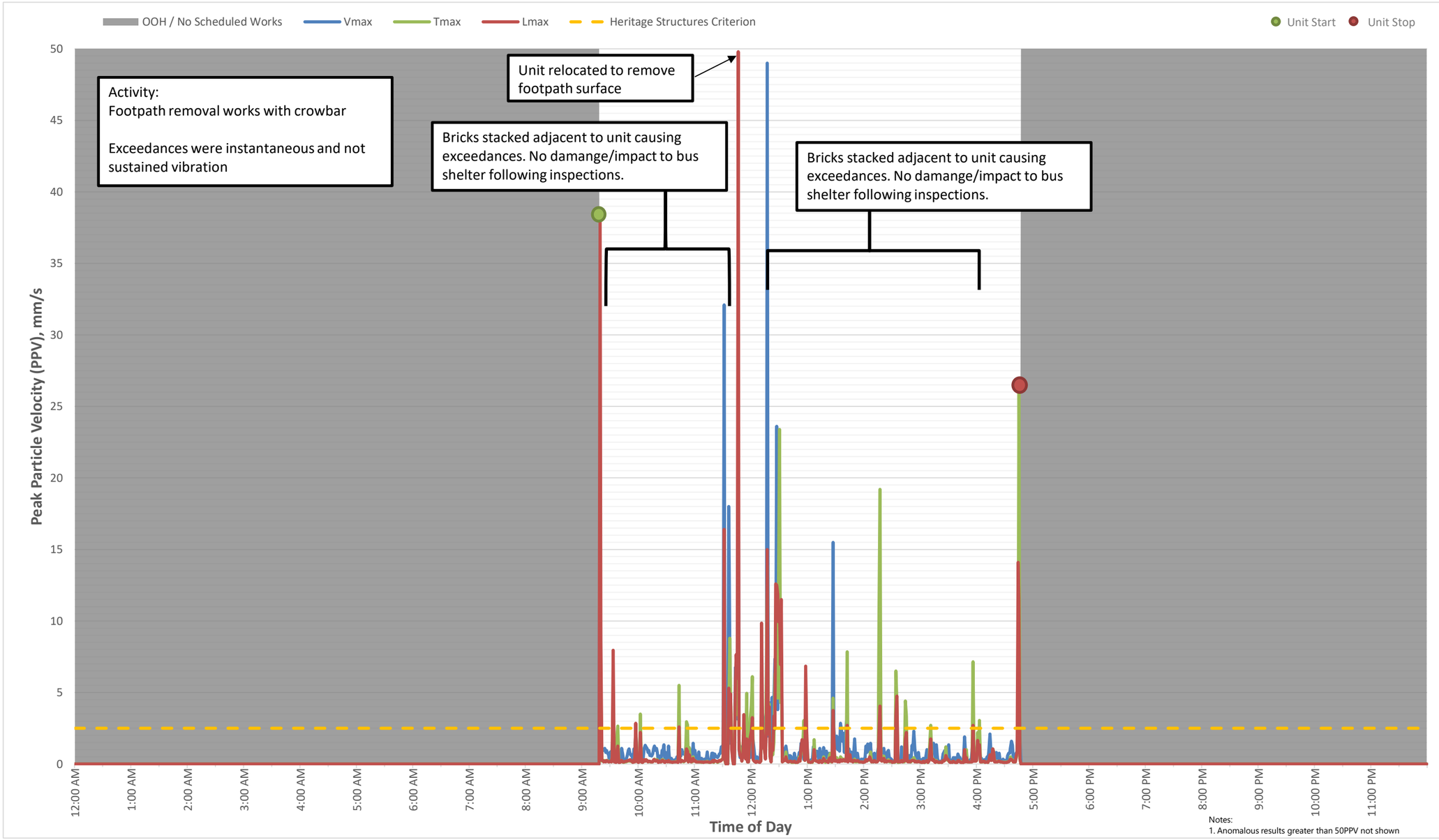
The Blues Point vibration time trace graph shows results of monitoring undertaken for the required construction work activities conducted in a campaigned basis. Non-vibratory construction activities and vibratory activities undertaken outside the minimum working distances were not monitored during the defined working period (unless the heritage consultant advised differently). The structural engineering report for the bus shelter at Blues Point was silent on the matter of being structurally sound, therefore the very stringent criteria for heritage structures (2.5 mm/S) was adopted for the works. The methodologies for the work were adjusted to avoid vibratory works as much as possible within minimum working distances, for example a crowbar and hands were used to remove indivdual footpath bricks as opposed to the vibratory intensive jackhammer.

Unattended Vibration Monitoring Results

Blues Point **D1 - D7**

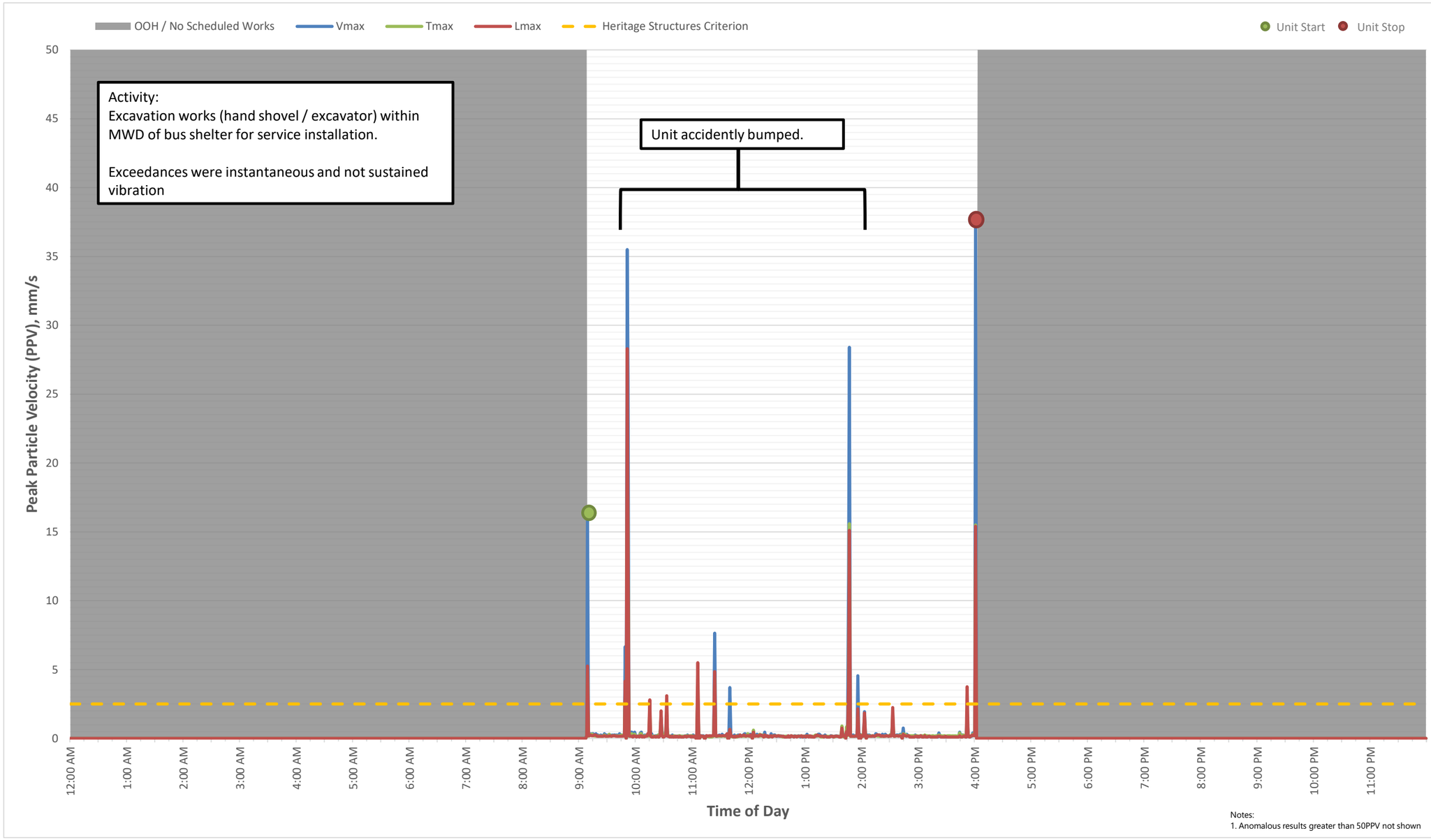
Monitor Location: Bus Shelter

2022-11-02 **D1**



Notes:
1. Anomalous results greater than 50PPV not shown

2022-11-04 **D3**



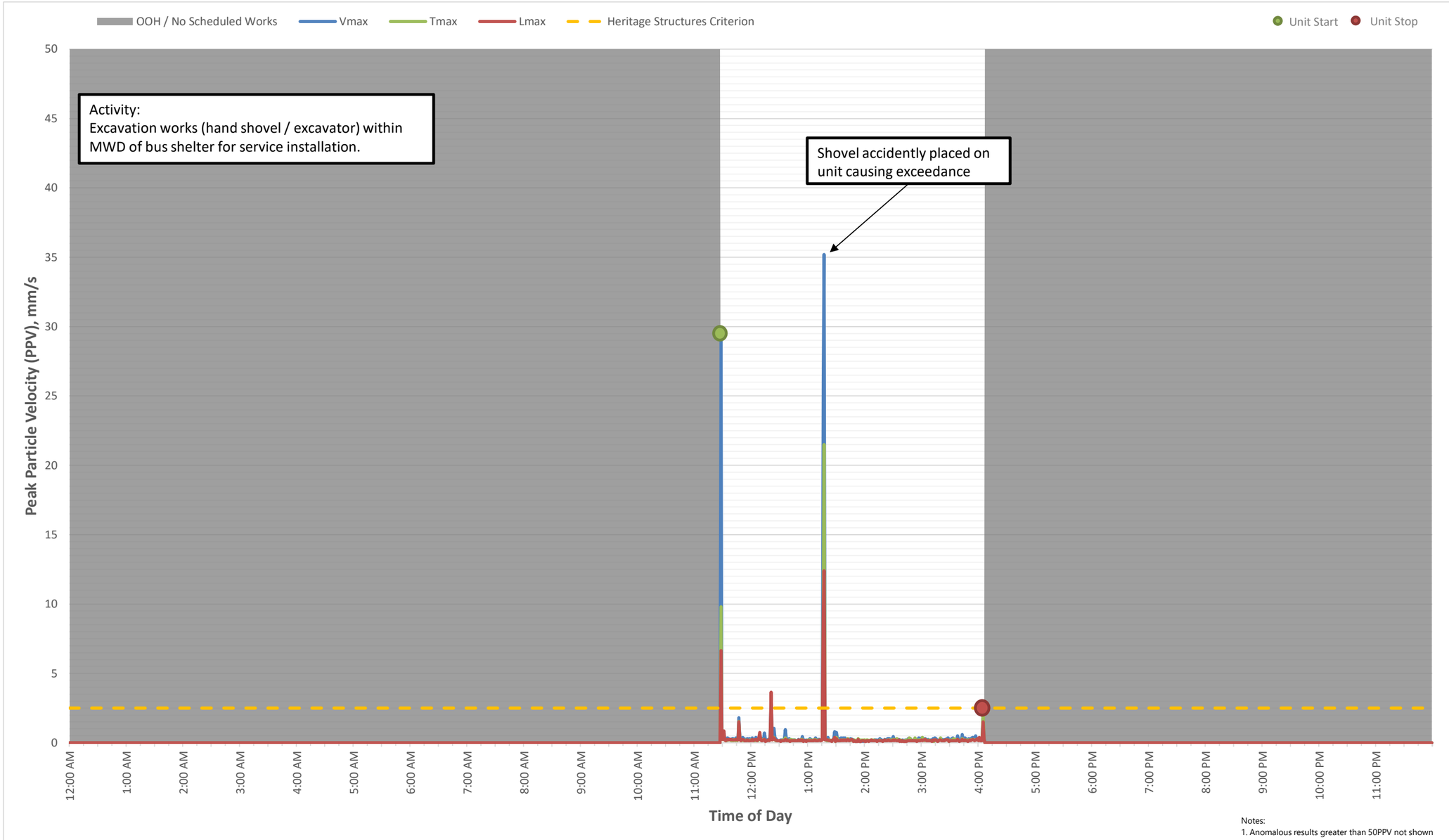
Notes:
1. Anomalous results greater than 50PPV not shown

Unattended Vibration Monitoring Results

Blues Point **D8 - D14**

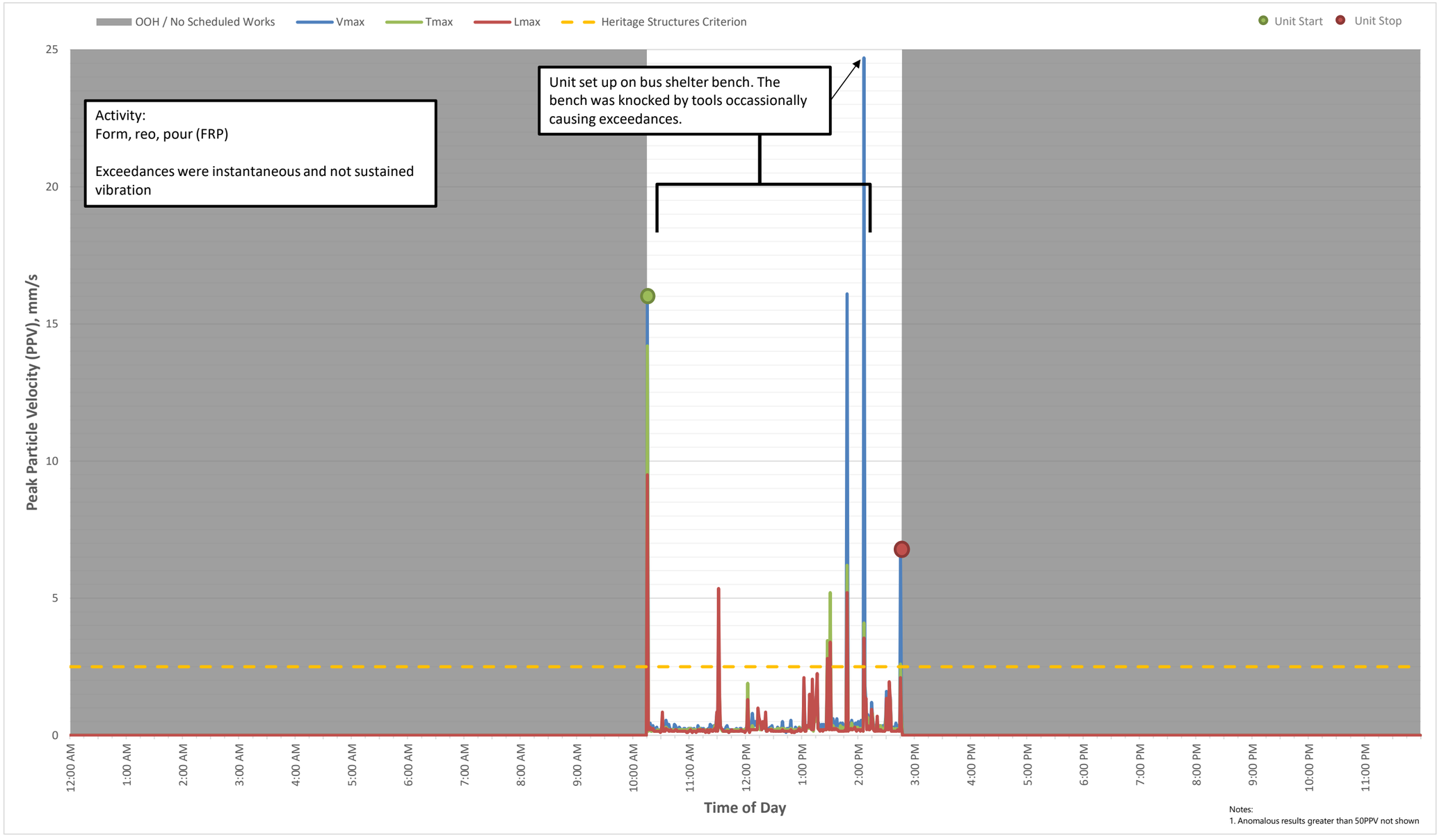
Monitor Location: Bus Shelter

2022-11-09 **D8**



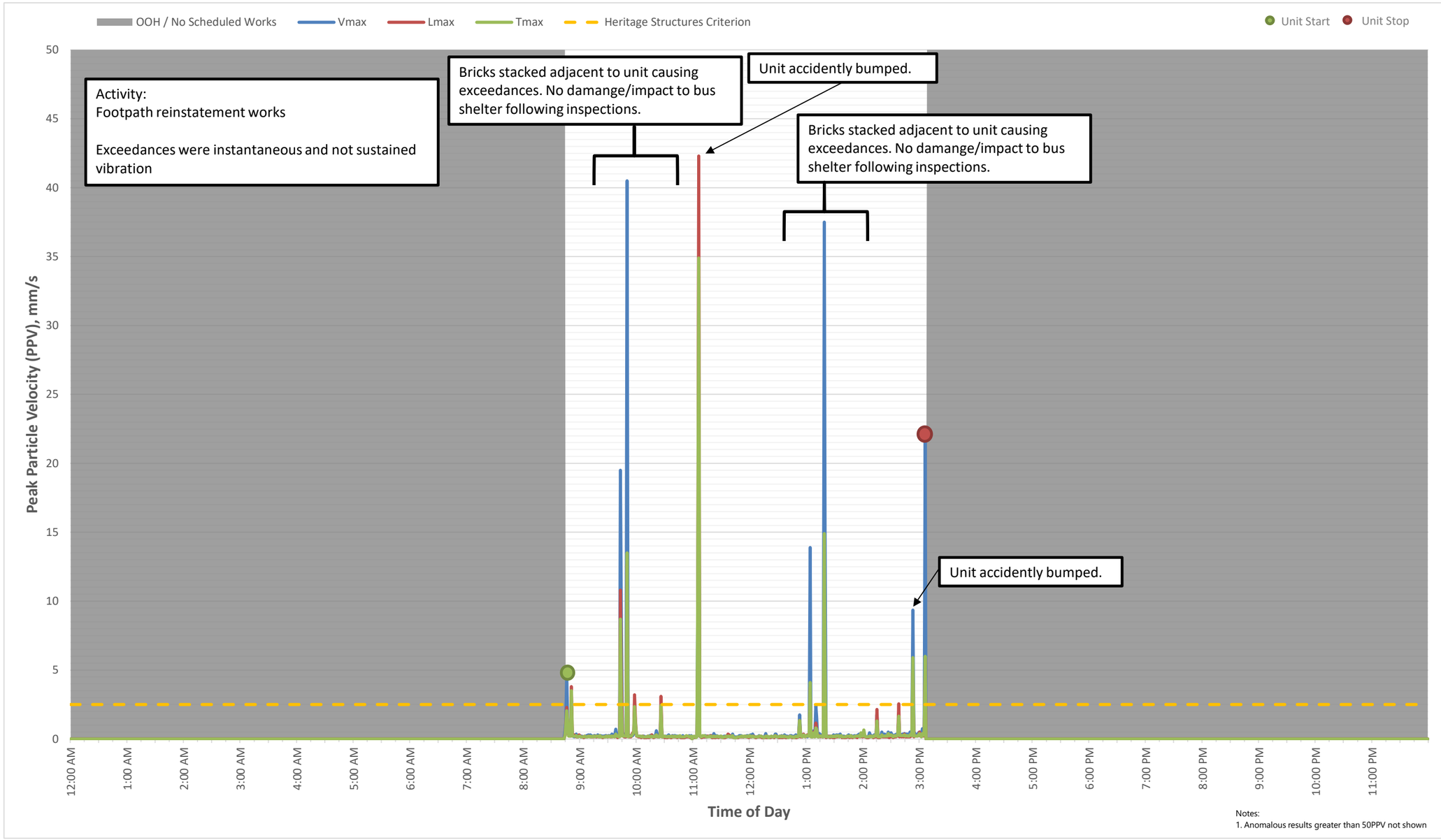
Notes:
1. Anomalous results greater than 50PPV not shown

2022-11-10 **D9**



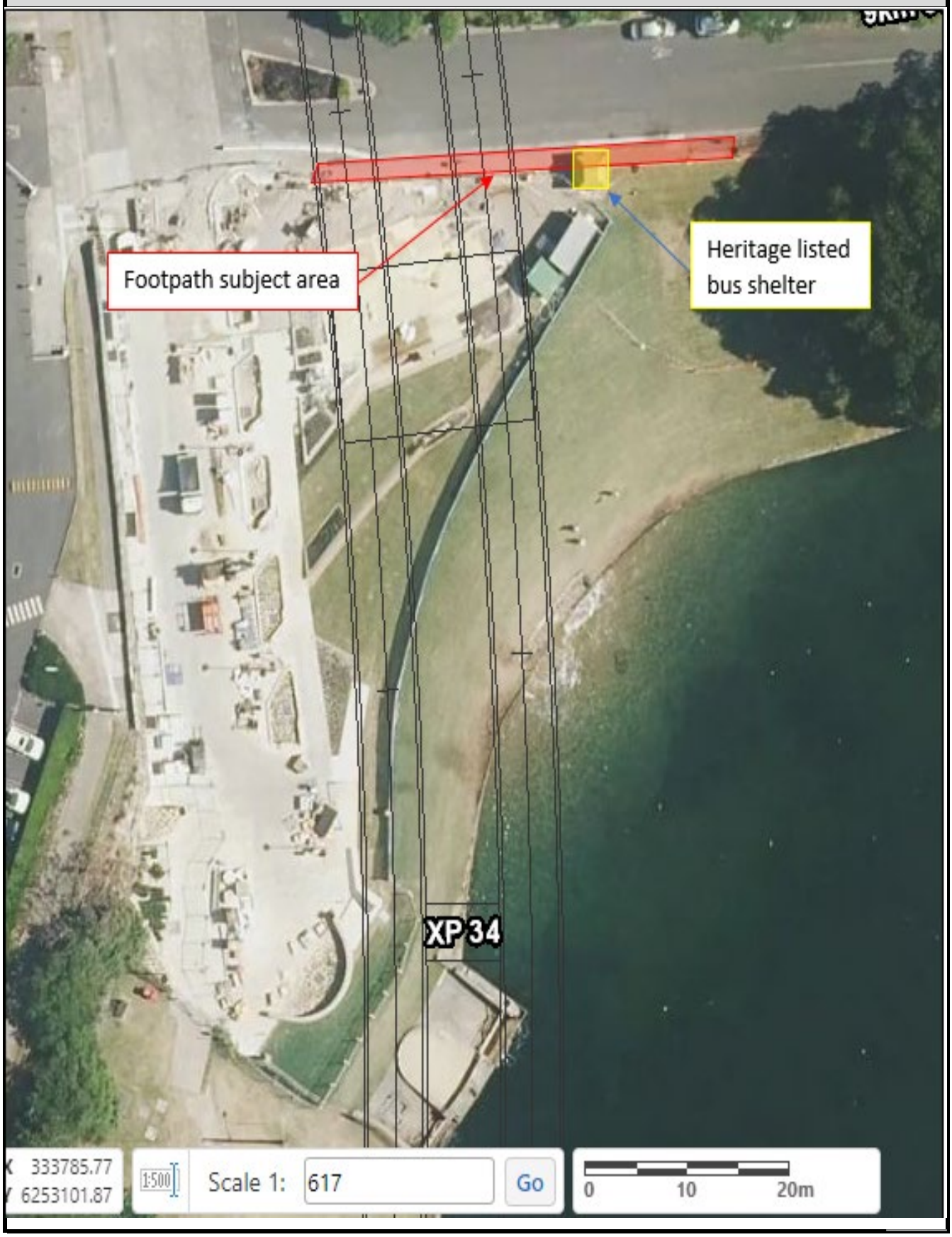
Notes:
1. Anomalous results greater than 50PPV not shown

2022-11-15 **D14**



Notes:
1. Anomalous results greater than 50PPV not shown

DIAGRAMS


Footpath subject area
Heritage listed bus shelter
XP 34
333785.77
6253101.87
1:500
Scale 1:
617
Go
0
10
20m

PHOTOS		
02/11/2022	12:20	
04/11/2022	12:00	

04/11/2022	14:10	
10/11/2022	10:30	

10/11/2022	13:50	
15/11/2022	9:30	

APPROVAL
CITY & SOUTHWEST ACOUSTICS ADVISOR

Review of	**Construction Monitoring Report September 22 to February 2023**	**Document reference:**	**Construction Monitoring Report September 2022 to February 2023 Sydney Metro City & Southwest – Line-wide Works** *N21063 SMCSWLWC-SYC-CSW-EM-REP-016003 Dated 12 April 2023 Revision 0*
Prepared by:	Carl Fokkema Alternate Acoustics Advisor		
Date of issue:	28 April 2023		

As approved Alternate Acoustics Advisor for the Sydney Metro City & Southwest project, I have reviewed the Construction Monitoring Report September 2022 to February 2023 Sydney Metro City & Southwest – Line-wide Works Document No. SMCSWLWC-SYC-CSW-EM-REP-016003 dated 12 April 2023, as required under A27 (d) of the project approval conditions (SSI 15-7400).

The Line-wide CMR is to be submitted to the Department of Planning and Environment in accordance with Condition of Approval C16 (CSSI 7400), C14 (CSSI 8256) and monitoring requirements of the Construction Noise and Vibration Management Plan C2B.

I have reviewed the monitoring report and am satisfied that it meets the requirements for construction noise and vibration monitoring for Line-wide. I endorse the report.

Carl Fokkema, City & Southwest Alternate Acoustics Advisor