



ENVIRONMENTAL MONITORING REPORT, NOVEMBER 2022

PARRAMATTA LIGHT RAIL INFRASTRUCTURE WORKS

28 November 2022

Parramatta
Connect

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1. Introduction

1.1. Background

Parramatta Light Rail Stage 1 ('Stage 1') will connect Westmead to Carlingford via Parramatta Central Business District (CBD) and Camellia. Stage 1 is expected to be operational in 2023.

Stage 1 will create new communities, connect great places and help both local residents and visitors move around and explore what the region has to offer. The route will link Parramatta's CBD and train station to a number of key locations, including the Westmead Precinct, the Parramatta North Growth Centre, the new Western Sydney Stadium, the Camellia Town Centre, the new Powerhouse Museum and Riverside Theatre arts and cultural precinct, the private and social housing redevelopment at Telopea, the Rosehill Gardens Racecourse and the three Western Sydney University campuses.

Key features of Stage 1 include:

- A new dual track light rail network of approximately twelve (12) kilometres in length, including approximately seven (7) kilometres within the existing road corridor and approximately five (5) kilometres within the existing Carlingford Line and Sandown Line, replacing current heavy rail services
- Sixteen (16) stops that are fully accessible and integrated into the urban environment including a terminus stop at each end of Westmead and Carlingford
- High frequency 'turn-up-and-go' services operating seven days a week from 5am to 1am. Weekday services will operate approximately every 7.5 minutes in the peak period between 7am and 7pm
- Modern and comfortable air-conditioned light rail vehicles, nominally 45 metres long and driver-operated, each carrying up to 300 passengers.
- Intermodal interchanges with existing public transport services at Westmead terminus, Parramatta CBD and the Carlingford terminus
- Creation of two light rail and pedestrian zones (no general vehicle access) within the Parramatta CBD along Church Street (generally between Market Street and Macquarie Street) and along Macquarie Street (generally between Horwood Place and Smith Street)
- A Stabling and Maintenance (SaM) Facility located in Camellia for light rail vehicles to be stabled, cleaned and maintained
- New bridge structures along the alignment including over James Ruse Drive and Clay Cliff Creek, Parramatta River (near the Cumberland Hospital), Kissing Point Road and Vineyard Creek, Rydalmere
- Alterations to the existing road network including line marking, additional traffic lanes and turning lanes, new traffic signals, and changes to traffic flows
- Relocation and protection of existing utilities
- Public domain and urban design works along the corridor and at Stop precincts
- Closure of the heavy rail line between Carlingford and Clyde
- Active transport corridors and additional urban design features along sections of the alignment and within Stop precincts
- Integration with the Opal Electronic Ticketing System (ETS)
- Real time information in light rail vehicles and at Stops via visual displays and audio.



1.1.1. Statutory Context

The Parramatta Light Rail is classified as Critical State Significant Infrastructure (CSSI) and was subject to environmental impact assessment under the *Environmental Planning and Assessment Act 1979* (EP&A Act). The EIS assessed impacts for Parramatta Light Rail Stage 1 (Westmead to Carlingford) including the light rail and associated road enabling works.

Stage 1 received Infrastructure Approval from the Minister for Planning under Section 5.19 of the EP&A Act on 29 May 2018 (Critical State Significant Infrastructure Application SSI-8285), subject to the conditions provided in the Instrument of Approval, specifically Schedule B – Ministerial Conditions of Approval.

The Infrastructure Approval was subsequently modified under Section 5.25 of the EP&A Act on 21 December 2018 and 25 January 2019.

The planning approval, modifications and related environmental assessment documents are located at: http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8285.

A Construction Environmental Management Plan (CEMP) has been prepared for the Parramatta Light Rail Package 4 – Infrastructure Works (Infrastructure Works). The purpose of the CEMP and associated Sub-plans is to address the requirements of the:

- Minister’s Conditions of Approval (CoA) SSI-8285
- Revised Environmental Mitigation and Management Measures (REMMMs)
- Environmental Performance Outcomes (EPOs)
- Applicable legislation and contractual requirements, including the PLR Stage 1 Infrastructure Contract Project Deed (ISD-17-6721).

The REMMMs and EPOs are listed in Parramatta Light Rail Stage 1 Westmead to Carlingford via Parramatta CBD and Camellia Environmental Impact Statement (the EIS), as amended by the Parramatta Light Rail (Stage 1) Westmead to Carlingford via Parramatta CBD and Camellia Submissions Report (incorporating Preferred Infrastructure Report) (March 2018) (the SPIR). The CEMP and associated Sub-plans were approved the Secretary on the 21 November 2019.

1.2. Scope

The scope of this report is report is to present monthly results of the inspection and monitoring programs outlined in the Infrastructure Works CEMP and associated Sub-plans, including the results of the construction monitoring programs referred to in Condition C9 of the Planning Infrastructure Approval.

Environmental inspections and monitoring are undertaken to:

- Validate the predicted impacts of the Infrastructure Works
- Measure the effectiveness of environmental controls
- Track progress against targets and objectives of the CEMP.

The monitoring requirements for nominated aspects are included in the relevant Sub-plans and summarised in **Table 1-1**.

Where relevant, data will be presented on a progressive basis (i.e. monthly summary) to identify trends. The data of the monitoring programs will also be reviewed annually in the Annual Environment Report.



Table 1-1 Monthly Environmental Monitoring Reporting Requirements

CEMP or Sub-plan	Monitoring program	Distribution
Noise and Vibration Management Sub-plan	<ul style="list-style-type: none"> - Locations and descriptions of monitoring undertaken - Noise monitoring results - Summary of any exceedance of the nominated criteria - Corrective actions 	<ul style="list-style-type: none"> - City of Paramatta Council - Cumberland Council - EPA - NSW Health - TfNSW - IC - ER - AA - Made publicly available
Soil and Water Management Sub-plan	<ul style="list-style-type: none"> - Weather forecasts and observations - Water Quality (Turbidity) monitoring - Discharge and dewatering monitoring 	<ul style="list-style-type: none"> - City of Paramatta Council - Cumberland Council - EPA - DOI Water - TfNSW - IC - Made publicly available
Air Quality and Dust Management Sub-plan	<ul style="list-style-type: none"> - Weather observations - Dust deposition monitoring - Real time aerosol dust monitors - Asbestos fibre air monitoring 	<ul style="list-style-type: none"> - EPA - TfNSW - IC - Made publicly available
Grey-headed Flying-fox (GHFF) Construction Monitoring Program	<ul style="list-style-type: none"> - Weekly visual checks of GHFF camp during high risk periods (1 September to 31 January) 	<ul style="list-style-type: none"> - TfNSW



2. Site Activities

Table 2-1 provides a summary of the site activities for this reporting period (26 October 2022 to 25 November 2022).

Table 2-1 Site activities during reporting period

Precinct	Site Activities
Westmead and North Parramatta	- Defects
Parramatta CBD	- Defects
Camellia and Carlingford line	- Defects

3. Monitoring Results

Section 3 presents a summary of the environmental inspection and monitoring programs completed during the reporting period (26 October 2022 to 25 November 2022). Detailed monitoring results for each activity are presented in the appendices to this report.

3.1. Inspections

A total of three internal inspections were completed during the reporting period.

Table 3-1 provides a summary of the number of actions raised and closed within the agreed timeframe.

Table 3-1 Inspections for reporting period

Date	Number of Inspections	Type	Actions	Closed in Time
16/11/22	1	Internal Inspection	0	N/A
23/11/22	1	Internal Inspection	0	N/A
24/11/22	1	Internal Inspection	0	N/A
Total	3	-	0	-

3.2. Weather

The total rainfall recorded during the reporting period was 36.8 mm with 4 days exceeding one millimetre of rain. One event exceeded the 80th percentile (25.8mm).

During the reporting period, there were 31 days where the maximum wind gust recorded was greater than 25km/h, six days where the maximum wind gust recorded was greater than 50km/h and three days where the maximum wind gust recorded was greater than 60km/h. There were 10 days where wind speeds greater than 25km/hr were forecast and two days where wind speeds greater than 50km/hr were forecast. On these days, a notification was issued to the construction team to alert them of the strong winds forecast, including direction for necessary controls to be implemented.

A summary of the weather observations and weather events during the reporting period of relevance to the Soil and Water Management Sub-plan and Air Quality Management Sub-plan Trigger Action Response Plans (TARPs) are summarised in **Table 7-2**. A comparison between long term monthly means and recorded values can be found in **Figure 3-2**.

Detailed weather observation records for the reporting period are presented in **Appendix A-1**.

Table 3-2 Weather summary and trigger weather events for reporting period¹

Weather Event	Forecast	Observation
Minimum temperature	8.0°C	8.2°C
Maximum temperature	29.0°C	28.8°C
Total rainfall	28.6 mm	36.8 mm



Weather Event	Forecast	Observation
Number of days with rain (>1mm)	6 days	4 days
>80 th percentile (25.8mm) rain events	1 event	1 event
>85 th percentile (33.1mm) rain events	No events	No events
Flood warning / events	No events	No events
>25km/hr wind ²	14 days	31 days
>50km/hr wind	2 days	6 days
>60km/hr wind	No days	3 days

¹Weather summary based on data from the 26 October 2022 to 25 November 2022 (31 days).

²Wind data from Sydney Olympic Park AWS (Archery Centre) {station 066212}. Weather data from Parramatta North (Masons Drive) {station 066124}.

Note: Red text indicates observation greater than forecast.

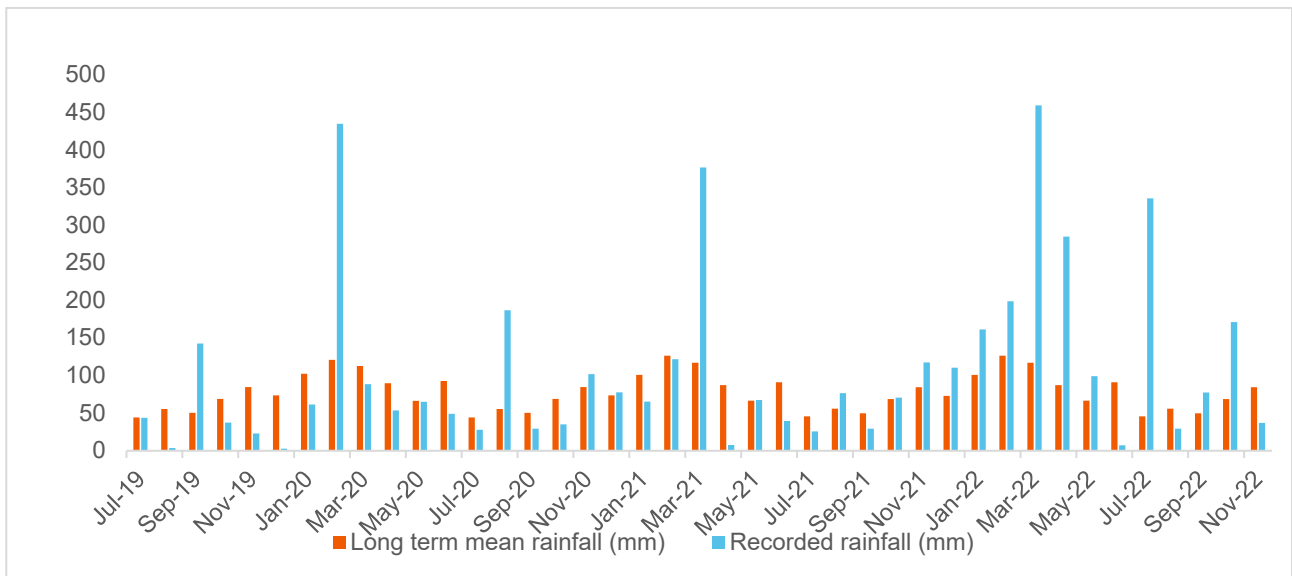


Figure 3-1 Monthly rainfall comparison

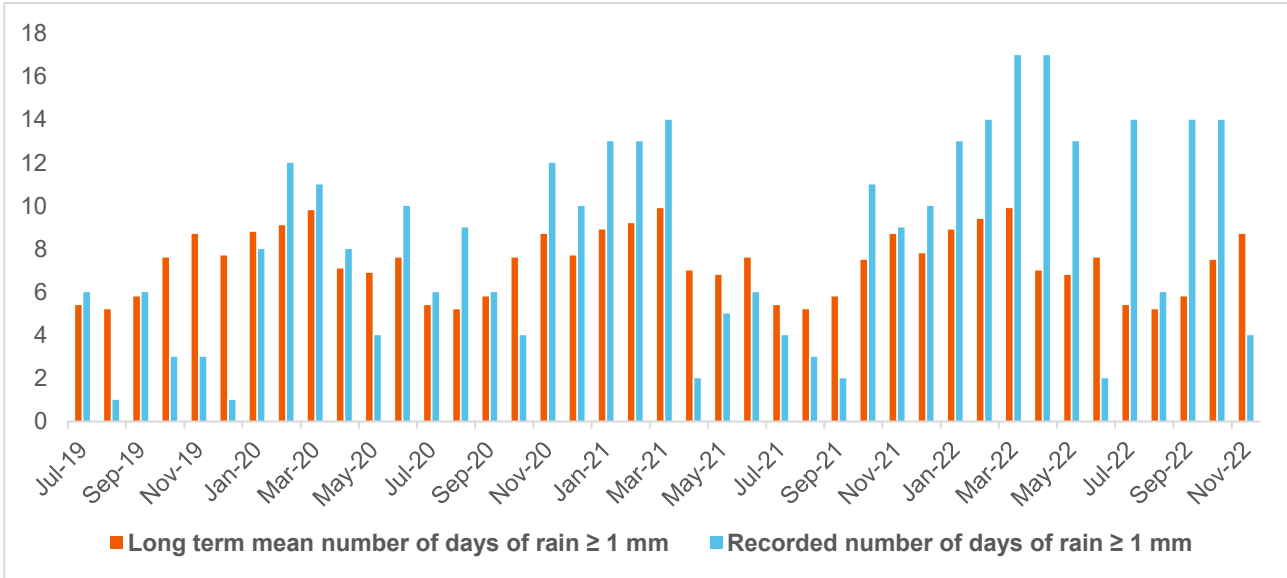


Figure 3-2 Monthly rain days comparison

3.3. Noise and Vibration

Table 3-3 provides a summary of noise monitoring events conducted during the reporting period. Detailed noise monitoring results and comments are presented in **Appendix A-2**. During the reporting period, no attended noise monitoring was undertaken and as such, there are no entries in **Table 3-3**.

Additional information on the hours of works, respite requirements and alternative accommodation is provided in the Noise and Vibration Management Sub-plan (Section 11.3).

Vibration monitoring events completed during the reporting period are summarised in **Table 3-4** and detailed in **Appendix A-2**. During the reporting period, no attended vibration monitoring was undertaken and as such, there are no entries in **Table A-2-2**.

All noise and vibration monitors available during the reporting period, together with current NATA calibration data, are provided in **Table 3-5**.

Continuous noise and vibration monitoring commenced in June 2020 at medical facilities in Westmead that have been identified as sensitive receivers. The locations of the noise and vibration monitors and the trigger levels were developed by noise and vibration consultant Renzo Tonin in December 2019 (HAC Assessment System, 19 December 2019). Reflecting the completion of significant construction works, the continuous noise and vibration monitoring program was concluded on 6 July 2022. On this date, all noise and vibration monitors were removed with the agreement of HAC.

As of October 2022, the construction noise and vibration verification monitoring program was concluded to reflect the completion of major construction works. In the event of a complaint investigation, the commencement of major defect works, or the conduct of vibration generating activities that have the potential to impact on heritage listed items, further noise and vibration monitoring may be carried out as deemed necessary.

The conclusion of the construction noise and vibration verification monitoring program is reflected in Revision 12 of the Noise and Vibration Management Sub-plan which was endorsed by the ER and submitted to DPE for information.



Table 3-3 Summary of noise monitoring for reporting period

Date	Monitoring Location	Attended/Continuous	Description
-	-	-	-

Table 3-4 Summary of vibration monitoring for reporting period

Date	Monitoring Location	Attended/Continuous	Description
-	-	-	-

Table 3-5 Noise and vibration monitors and NATA Calibration

Equipment	Serial Number	Calibration Date
Noise Level Meter	00973277	2/12/2023
Noise Level Meter	00661732	15/06/2023
Noise Level Meter	00973275	17/12/2023
Vibration Monitor	BE14639	10/02/2023
Vibration Monitor	BE17441	14/07/2023

3.4. Soil and Water

3.4.1. Water quality in receiving waters

A pre-construction investigation to establish water quality objectives for the project is included within the EIS Technical Paper 6 – Water Quality Assessment.

No water sampling was undertaken during the reporting period.

As of October 2022, the Construction Phase sampling of the Water Quality Monitoring program was concluded as all drainage works were completed and areas were sealed. In the event of an incident, dewatering works, or commencement of major defect works, further water quality monitoring may be carried out as deemed necessary.

The conclusion of the Water Quality Monitoring program is reflected in Revision 12 of the Soil and Water Management Sub-plan which was endorsed by the ER and submitted to DPE for information.

Table 3-6 Water Quality in Receiving Waters

Date	Type	Type of Results	Wet / Dry	Locations
-	-	-	-	-

Table 3-7 Water Monitor Calibration

Equipment ¹	Serial Number	Calibration Date
Water Quality Monitor	TN4DYW19	03/02/2023

¹All equipment is calibrated by NATA standards.

3.4.2. Discharge and dewatering

There were no discharge events during the reporting period.



3.5. Air Quality

3.5.1. Dust Deposition Monitoring

A dust deposition gauge was installed at 13A Grand Avenue in Camellia in December 2019 in advance of works which commenced at the beginning of February 2020. Additional dust gauges were progressively installed at Rydalmere Station, Dundas Station, Carlingford and Telopea in advance of large-scale earthworks.

As of November 2021, the gauges at Carlingford, Telopea and 13A Grand Avenue were removed following conclusion of large-scale earthworks. In December 2021 and early January 2022, the gauges at Rydalmere Station and Dundas Station, respectively, were similarly removed. As such, the dust deposition monitoring program has concluded.

3.5.2. Asbestos Fibre Monitoring

Asbestos air monitoring is completed in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC: 3003(2005)], with NATA certification applying to all sample collection, handling and analytical procedures.

During the reporting period, asbestos air monitoring was not required to be undertaken.

3.6. Flora and Fauna

3.6.1. Grey-Headed Flying Fox Monitoring

A Grey-Headed Flying Fox (GHFF) camp is located in Parramatta Park which lies approximately 150m from the project boundary at the nearest point.

Under Condition of Approval C9, a GHFF Construction Monitoring Program has been developed by TfNSW. The requirements of this Program have been reflected in the Flora and Fauna Management Sub-plan and include visual inspections on a weekly basis during the 'high risk' months of September to January. If distress is observed within the camp, immediate notification must be provided to TfNSW.

In addition, as required by the Environmental Work Method Statement for Bridge Road Bridge, a trained ecologist from Narla Environmental is required to undertake additional inspections of the camp during bridge piling works (**Table 3-9**).

During the reporting period, no Parramatta Connect works were conducted within the vicinity of the camp.

Table 3-9 Observations from Visual Monitoring of Grey Headed Flying Fox Camp

Date	Time	Weather Conditions	Works	Notification Triggers ¹	Comments
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- - - - -

¹Notification triggers include: >50% of the roost takes flight for over 20 minutes, GHFF leaving the roost in daylight hours, unusual vocalisations, located on or 2m from the ground, panting, saliva spreading, adults moving away from young, GHFF injured or killed on site (including aborted foetuses).

3.7. Issues/incidents/non-compliance

Table 3-10 provides a summary of environmental compliance during the reporting period. There were no environmental incidents or non-compliances identified during the reporting period.

Table 3-10 Issues/incidents/non-compliances



Date	Location	Description
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-	-	-
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Appendices

A-1 Weather Observations

Table A-1-1 Weather Observations: Parramatta North (Masons Drive) {station 066124}

Date	Temperatures		Rain	Temp	RH	9:00 AM		
	Min	Max				Cld	Dir	Spd
	°C	°C	mm	%	8th			
26/10/2022	15.8	28.8	1.6	22.4	79	4	WNW	4
27/10/2022	17	27.2	0	22.8	53	5	NW	6
28/10/2022	13.2	24.6	1.4	20	47	0	WNW	15
29/10/2022	12.8	26	0	19.8	38	0	WSW	13
30/10/2022	10.7	23.6	0	17.8	49	3	SW	6
31/10/2022	13.2	28.2	0	22.8	49	6	N	6
1/11/2022	17	23.2	1	19.8	45	4	NW	22
2/11/2022	9.8	20	0.2	14	49	4	WSW	22
3/11/2022	8.4	21.3	0	16	48	1	WSW	9
4/11/2022	11.5	20.5	0.2	18	64	6	SE	2
5/11/2022	11.4	22.4	0.2	18.2	64	6	NE	2
6/11/2022	10.2	24.5	0	19.5	68	4	NE	7
7/11/2022	11.8	24.2	0	19.8	78	6	ENE	2
8/11/2022	13	23	0	19.8	69	6	NE	4
9/11/2022	12.5	24	0	19.6	69	5	N	2
10/11/2022	11.4	24.2	0	19.4	68	5	ESE	2
11/11/2022	12	27.5	0	20	64	5	N	4
12/11/2022	13.8	27	0.4	22.2	72	0	NE	2
13/11/2022	17	27.4	0	20.3	81	8	WNW	2
14/11/2022	17.8	27.5	30	22	67	2	WNW	6
15/11/2022	13	24.2	0	21	57	5	WSW	6
16/11/2022	11	20.2	0	16	43	2	WSW	15
17/11/2022	8.2	20.8	0	15.8	54	2	WSW	4
18/11/2022	11.2	21	0	17	52	2	SW	9
19/11/2022	10.8	24.7	0	19.2	66	5	N	4
20/11/2022	16.2	26	1.8	24.6	47	2	WSW	19
21/11/2022	15.2	23.5	0	22	36	3	WSW	28
22/11/2022	10.6	23.2	0	15.2	38	1	WSW	22
23/11/2022	10	28	0	19.2	49	1	WSW	9
24/11/2022	12.8	25.5	0	20.8	50	1	SW	6
25/11/2022	13.5	26.8	0	22	66	2	W	2



Table A-1-2 Wind Observations: Sydney Olympic Park AWS (Archery Centre) {station 066212}.

Date	Maximum Wind Gusts			9:00 AM		3:00 PM	
	Direction	Speed	Time	Direction	Speed	Direction	Speed
		km/h	local		km/h		km/h
26/10/2022	WNW	41	11:57	WNW	13	NW	19
27/10/2022	W	50	11:35	NW	13	NNW	13
28/10/2022	W	54	16:25	WNW	20	WNW	20
29/10/2022	WNW	43	18:50	WNW	17	NW	19
30/10/2022	E	35	13:01	SW	13	E	17
31/10/2022	WNW	61	12:06	NNW	6	NNW	9
1/11/2022	WNW	59	10:57	NW	26	WNW	20
2/11/2022	WNW	48	16:15	WSW	20	W	17
3/11/2022	W	33	7:10	WSW	17	E	13
4/11/2022	E	31	14:52	E	7	E	13
5/11/2022	E	35	12:52	NE	4	E	13
6/11/2022	E	33	12:45	NNW	7	E	20
7/11/2022	E	33	13:26	E	7	E	19
8/11/2022	E	37	14:44	E	9	E	19
9/11/2022	E	39	12:37	WNW	4	E	17
10/11/2022	E	39	12:27	ESE	7	ENE	13
11/11/2022	ESE	28	13:03	SE	4	E	11
12/11/2022	ESE	31	10:44	E	2	ESE	19
13/11/2022	N	41	14:15	WNW	7	NNW	20
14/11/2022	WNW	59	13:04	WNW	7	WNW	26
15/11/2022	SW	30	10:11	S	11	ENE	11
16/11/2022	WNW	43	10:47	WSW	17	WSW	20
17/11/2022	ESE	39	11:25	WSW	9	E	20
18/11/2022	E	37	13:25	SSW	13	ESE	22
19/11/2022	E	35	12:37	NNW	7	ENE	15
20/11/2022	W	69	12:41	W	20	W	28
21/11/2022	W	65	12:41	W	22	W	33
22/11/2022	W	48	8:12	WSW	24	WSW	17
23/11/2022	W	39	9:09	W	17	S	17
24/11/2022	ENE	35	15:48	SW	7	ENE	20
25/11/2022	ESE	35	12:37	W	9	E	24

Notes:

Blue text indicates a rain event greater than 1mm of rain.

The orange text indicates a rain event greater than the 80th percentile of 25.8mm, and a wind speed of greater than 25km/hr

Red text indicates a rain event greater than the 85th percentile of 33.1mm, and a wind speed greater than 50km/hr.

* Data was unavailable.



A-2 Noise and Vibration Monitoring Results

Table A-2-1 Noise Monitoring Results

Date	Time	Works Period	Construction Activity	Activity Location	Monitoring Location	NML Predicted (dBA)	Predicted (dBA)	Additional Mitigation Measures	L _{Amax}	Recorded L _{eq, 15min} (dBA)	Exceedance of Predicted (dBA)	Exceedance of Predicted	Comments
-	-	-	-	-	-	-	-	-	-	-	-	-	-

Standard hours:

- a) All areas excluding Eat Street and Camellia – Monday to Friday 7:00 am to 7:00 pm. Saturday 8:00 am to 6:00 pm
- b) Eat Street (Church Street between Palmer Street and George Street) – Monday to Friday 7:00 am to 6:00 pm. Saturday 8:00 am to 12:00 pm)
- c) Camellia, Rosehill and Rydalmere (east of James Ruse Drive to Victoria Road) – 24 hours a day and seven days a week provided that sensitive receivers are not affected by noise levels of greater than 5 dBA above the rating background level at any residence

OOHW Period 1 is defined as:

- a) 6:00pm to 10:00pm (evenings) Monday to Saturday
- b) 7:00am to 8:00am and 1:00pm to 10:00pm (day & evening) Saturday and
- c) 8:00am to 6:00pm Sunday and public holidays (days).

OOHW Period 2 is defined as:

- a) 10:00pm to 7:00am (nights) Monday to Saturday and 6:00pm to 8:00am (nights) Sundays and public holidays.

Additional Mitigation Measures

- PN = Project Notification
- V = Verification Monitoring
- RP = Respite Period
- AA = Alternate Accommodation
- SN = Specific Notification / individual briefing or phone call
- DR = Duration Reduction
- RO = Project Specific Respite Offer

A-5 Air Quality Monitoring Results



Table A-4-1 Summary of Asbestos Fibre Monitoring

Report Number	Date	Location	Start time	End time	Result (Fibres/Fields)	Result (Fibres/mL)
-	-	-	-	-	-	-