Sydney Metro City and Southwest – North Corridor Works

Summary Report – NCW Noise and Vibration Monitoring – November 2018 – April 2019

Project

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Client	Sydney Metro City and Southwest
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Revisions

Date	Version	Description
12/06/2019	V0.1	LOR-NCW-Noise and Vibration Monitoring (Nov18-Apr19) Summary Report
10/07/2020	V0.2	Revised draft report for client review



Technical Report

1. Overview

Main North and North Shore Corridor Works Project (MNNSCW): Portion 7 - Northern Corridor Works (NCW) are being carried out by Laing O'Rourke Australia Construction Pty Ltd (LOR) on behalf of Transport for New South Wales (TfNSW). LOR has engaged Environmental Resources Management Australia Pty Ltd (ERM) to undertake environmental noise and vibration monitoring during select works.

The monitoring is being undertaken with due regard to, and in accordance with, the NCW – Construction Noise and Vibration Management Plan (CNVMP), last updated March 2018 and other relevant policy, guidelines and standards as listed in the reference section of this report.

This technical report has been prepared to summarise the results and findings of operator attended noise and vibration monitoring as well as unattended noise and vibration monitoring completed between November 2018 to April 2019 inclusive.

The noise/vibration monitoring was conducted throughout various track possession works as described in the approved Out-of-Hours Work (OOHW) application forms, application numbers 07 to 23 prepared by LOR i.e. OOHWAF007-023. LOR identified the potential for these works to generate noise/vibration impacts, and as such the monitoring was conducted by qualified and/or suitably experienced specialists to measure levels, evaluated compliance and provide recommendations for any new or modified mitigation.

The structure of this report is as follows:

- Section 1 (this section): brief overview of the 2018/2019 monitoring and report objectives.
- Section 2: summary of the monitoring conducted, highest results and technical discussion.
- Section 3: summary of typical monitoring outcomes and recommendations.
- Appendix A: noise monitoring methodology.
- Appendix B: vibration monitoring methodology.
- Appendix C: complete noise monitoring dataset (attended measurements).
- Appendix D: complete noise monitoring dataset (unattended monitoring).
- Appendix E: complete vibration monitoring dataset.

2. Monitoring Summary (2018)

Table 1 presents a summary of the highest measured site noise levels recorded during operator attended noise measurements. **Table 2** presents a summary of the highest measured site noise levels recorded on the unattended noise monitoring devices. As noted above the full noise data sets are provided in **Appendix B** and **C** for operator attended and unattended monitoring respectively. **Table 3** presents a summary of the highest measured noise levels recorded on the unattended noise monitoring devices not associated with a specific track possession.

Table 4 then presents a summary of the highest measured site vibration events recorded during operator attended vibration measurements. **Table 5** presents a summary of the highest measured site vibration events recorded during unattended vibration monitoring. The full vibration data set is provided in **Appendix D**.



Table 1 – Noise Monitoring Summary (Attended Measurements)

	Measurement Details		Construction Activity at the		s. Measured Asse Leq, 15 minute in dB		
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
A09	1-Nov-18	01:29		40	69	29	Measured site noise level contributions (Leq, 15 minute) were between 41-69 dBA over the
A01	30-Oct-18	23:39	MW17 Works for	40	66	26	track possession, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
A09	1-Nov-18	00:05	Portion 7 of	40	65	25	On average ¹ site noise level contributions for the MW17 works were 22 dBA above the NML,
A01	30-Oct-18	23:59	NCW.	40	65	25	which is to be expected for the type activities being undertaken. On average ¹ , actual emissions associated with MW17 works were 7 dBA above the predicted values in
A01	29-Oct-18	01:45		40	64	24	OOHWAF-020.
Project 013	3-Nov-18	22:31		40	57	17	Measured site noise level contributions (Leq, 15 minute) were 54-63 dBA over the two days
Project 014	3-Nov-18	22:51	WE18 Works for	40	55	15	of monitoring, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
Project 012	3-Nov-18	22:14	Portion 1-6 of	40	54	14	On average ¹ site noise level contributions for the WE18 works were 13 dBA above the
Project 001	3-Nov-18	17:08	NCW.	50	63	13	NML, which is to be expected for the type activities being undertaken. It indicates that on average ¹ , actual emissions associated with WE18 works were 1 dBA above the predicted
Project 011	3-Nov-18	21:59		45	55	10	values in OOHWAF-071.
Project 016	4-Nov-18	00:00		40	72	32	Measured site noise level contributions (Leq, 15 minute) were between 58-72 dBA over the two days, depending on the type of construction activity and the duration of noise events
Project 017	4-Nov-18	00:15	WE40 Wester (40	68	28	that occurred within the sample period. On average1 site noise level contributions for the WE18 works were 24 dBA above the
Project 018	4-Nov-18	00:30	WE18 Works for Portion 7 of NCW.	40	67	27	NML, which is to be expected for the type activities being undertaken. On average ¹ , actual emissions associated with WE18 works were 3 dBA above the predicted values in
Project 015	3-Nov-18	23:26	11077.	40	66	26	OOHWAF-021. It should be noted that the difference in noise levels is partly related to the implementation of INP penalties for offensive noise characteristics. It is therefore apparent
Project 005	3-Nov-18	19:31		46	68	22	that these INP penalties need to be considered during the OOHW applications and incorporated into predicted noise impacts.
Project 011	17-Nov-18	23:45		40	77	37	Measured site noise level contributions (Leq, 15 minutes) were between 56-79 dBA over
Project 001	17-Nov-18	17:26	WE20 Works for Portion 7 of	47	79	32	the two days, depending on the type of construction activity and the duration of noise events that occurred within the sample period. On average ¹ site noise level contributions for
Project 010	17-Nov-18	22:59	NCW.	40	72	32	the WE20 works were 28 dBA above the NML, which is to be expected for the type of activities being undertaken. On average ¹ , actual emissions associated with WE20 works
Project 002	17-Nov-18	17:44		47	76	29	were 2 dBA above the predicted values in OOHWAF-022.

	Measurement Details		Construction Activity at the		s. Measured Asse Leq, 15 minute in dB.		
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
Project 007	17-Nov-18	20:57		46	73	27	
A01	22-Dec-18	14:50		50	53	A01	
A01	22-Dec-18	15:10		50	52	A01	Macaurad aita naisa laval contributions (Lag. 45 minuta) wars 54.74 dDA avar the two days
A02	22-Dec-18	18:22	WE25 Works for	45	60	A02	Measured site noise level contributions (Leq, 15 minute) were 54-74 dBA over the two days of monitoring, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
A02	22-Dec-18	21:20	Portion 1-6 of NCW.	45	69	A02	On average ¹ site noise level contributions for the WE25 works were 21 dBA above the
A02	22-Dec-18	21:51		45	68	A02	NML, which is to be expected for the type activities being undertaken. On average ¹ , actual emissions associated with WE25 works were 10 dBA above the predicted values in OOHWAF-074.
A03	22-Dec-18	23:00		40	66	A03	CONVAL-074.
A03	23-Dec-18	14:45		40	54	A03	
A03	23-Dec-18	14:45		40	54	14	
A02	22-Dec-18	15:44		47	68	21	
A02	22-Dec-18	16:15		47	70	23	Measured site noise level contributions (Leq, 15 minutes) were between 59-67 dBA over
A01	22-Dec-18	16:45	WE25 Works for	47	66	19	the two days, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
A01	22-Dec-18	17:14	Portion 7 of NCW.	47	70	23	On average ¹ site noise level contributions for the WE25 works were 23 dBA above the NML, which is to be expected for the type of activities being undertaken. On average ¹ , actual emissions associated with WE25 works were 9 dBA above the
A03	22-Dec-18	19:14		46	72	26	predicted values in OOHWAF-023.
A03	22-Dec-18	20:15		46	67	21	
A03	23-Dec-18	00:29		40	67	27	

	Measurement Details		Construction Activity at the		s. Measured Asse Leq, 15 minute in dB		
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
A03	23-Dec-18	00:45		40	66	26	
A02	23-Dec-18	15:44		47	70	23	
A02	23-Dec-18	17:14		47	65	18	
A01	23-Dec-18	17:45		47	64	17	
A03	23-Dec-18	18:15		46	66	20	
A03	23-Dec-18	18:30		47	67	20	
L01	4-Jan-19	13:46		40	67	27	
L01	3-Jan-19	23:00		40	63	23	
L02	3-Jan-19	23:30		40	62	22	Measured site noise level contributions (Leq, 15 minutes) were between 30-67 dBA over
L02	5-Jan-19	00:15	MW26 and	40	62	22	the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
L02	4-Jan-19	03:00	WE27 Works for Portion 7 of NCW.	40	61	21	On average ¹ site noise level contributions for the MW26 and WE27 works were 19 dBA above the NML, which is to be expected for the type of activities being undertaken.
L01	3-Jan-19	22:30		40	60	20	On average ¹ , actual emissions associated with MW26 and WE27 works were 3 dBA above the predicted values in OOHWAF-075.
L02	4-Jan-19	03:30		40	60	20	
L02	4-Jan-19	00:00		40	60	20	
L01	5-Jan-19	03:16		40	59	19	

	Measurement Details				s. Measured Asse Leq, 15 minute in dB		
Location ID	Date	Start Time (24 Hr)	Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
L02	5-Jan-19	03:45		40	59	19	
Project 016	14-Feb-19	02:00		40	75	35	
Project 018	14-Feb-19	02:33		40	74	34	
Project 017	14-Feb-19	02:16		40	71	31	
Project 026	15-Feb-19	01:16		40	70	30	Measured site noise level contributions (Leq, 15 minutes) were between 30-75 dBA over
Project 013	13-Feb-19	00:00	MW32 Works for	40	68	28	the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
Project 025	15-Feb-19	01:00	Portion 7 of NCW	40	66	26	On average¹ site noise level contributions for the MW32 works were 25 dBA above the NML, which is to be expected for the type of activities being undertaken. On average¹, actual emissions associated with MW32 works were 5 dBA below the predicted values in OOHWAF-025.
Project 020	14-Feb-19	22:46		40	65	25	
Project 021	14-Feb-19	23:01		40	64	24	
Project 000	11-Feb-19	22:45		40	58	18	
Project 006	12-Feb-19	22:30		40	58	18	
Project 021	22-Feb-19	23:44		40	77	37	Measured site noise level contributions (Leg. 15 minutes) were between 45-77 dBA over
Project 022	23-Feb-19	00:15		40	77	37	the monitoring period, depending on the type of construction activity and the duration of
Project 026	23-Feb-19	02:15	MW33 Works for Portion 7 of	40	76	36	noise events that occurred within the sample period. On average¹ site noise level contributions for the MW33 works were 29 dBA above the
Project 025	23-Feb-19	01:50	NCW	40	74	34	NML, which is to be expected for the type of activities being undertaken. On average¹, actual emissions associated with MW33 works were 3 dBA below the
Project 027	23-Feb-19	02:45		40	73	33	predicted values in OOHWAF-025.
Project 009	19-Feb-19	23:49		40	70	30	

	Measurement Details		Construction Activity at the		s. Measured Asse Leq, 15 minute in dB		
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
Project 014	20-Feb-19	23:30		40	68	28	
Project 016	21-Feb-19	01:00		40	68	28	
Project 018	21-Feb-19	02:30		40	66	26	
Project 010	20-Feb-19	01:46		40	66	26	
Project 006	23-Feb-19	23:16		40	67	27	
Project 011	24-Feb-19	01:30		40	66	26	
Project 014	24-Feb-19	15:45		47	73	26	
Project 007	23-Feb-19	00:02	ME041M 1 (40	65	25	Measured site noise level contributions (Leq, 15 minutes) were between 58-73 dBA over
Project 018	24-Feb-19	19:45	WE34 Works for Portion 7 of	46	70	24	the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period. On average¹ site noise level contributions for the WE34 works were 22 dBA above the NML, which is to be expected for the type of activities being undertaken.
Project 008	23-Feb-19	00:17	NCW	40	63	23	
Project 000	23-Feb-19	20:15		46	69	23	On average ¹ , actual emissions associated with WE34 works were 4 dBA above the
Project 010	24-Feb-19	01:15		40	62	22	predicted values in OOHWAF-025.
Project 003	23-Feb-19	21:15		46	67	21	
Project 009	24-Feb-19	00:45		40	60	20	
Project 003	6-Mar-19	22:30		40	40	0	Management site and in a level and with stimes (I are 45 points as) was a hater and CO 40 dDA area
Project 002	6-Mar-19	22:12	MW/35 Works for	40	40	0	Measured site noise level contributions (Leq, 15 minutes) were between 22-40 dBA over the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period.
Project 004	7-Mar-19	01:00	MW35 Works for Portion 7 of NCW	40	38	-2	On average ¹ site, noise level contributions for the MW35 works were 5 dBA below the NML.
Project 014	7-Mar-19	22:45	INCVV	40	38	-2	On average ¹ , actual emissions associated with MW35 works were 23 dBA below the
Project 013	7-Mar-19	22:31		40	35	-5	predicted values in OOHWAF-027.



Measurement Details		Construction Activity at the	(1	s. Measured Asse Leq, 15 minute in dB		Discussion	
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
Project 016	7-Mar-19	23:15		40	35	-5	
Project 011	7-Mar-19	22:00		40	35	-5	
Project 015	7-Mar-19	23:00		40	35	-5	
Project 005	7-Mar-19	01:15		40	35	-5	
Project 001	6-Mar-19	21:57		46	40	-6	
L01 – Drake St	21-Mar-19	21:00		62	61	-1	
L01 – Drake St	21-Mar-19	21:15		62	59	-3	
L01 – Drake St	21-Mar-19	20:15		62	59	-3	
L01 – Drake St	20-Mar-19	21:45		61	58	-3	Measured site noise level contributions (Leq, 15 minutes) were between 18 - 61 dBA over the monitoring period, depending on the type of construction activity and the duration of
L01 – Drake St	19-Mar-19	23:00	MW37 Works for Portion 7 of	61	52	-9	noise events that occurred within the sample period.
L01 – Drake St	18-Mar-19	22:45	NCW	61	50	-11	On average ¹ site, noise level contributions for the MW37 works were 8 dBA above the NML.
L01 – Drake St	19-Mar-19	22:45		61	49	-12	On average ¹ , actual emissions associated with MW37 works were 10 dBA below the predicted values in OOHWAF-027.
L01 – Drake St	21-Mar-19	20:00		62	48	-14	
L01 – Drake St	19-Mar-19	21:30		61	47	-14	
L01 – Drake St	18-Mar-19	23:15		61	47	-14	
L03 – Drake St	24-Mar-19	17:30	WE38 Works for	69	70	1	Measured site noise level contributions (Leq, 15 minutes) were between 22 - 70 dBA over
L03 – Drake St	24-Mar-19	17:15	- Portion 7 of NCW	69	69	0	the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period.

	Measurement Details		Construction Activity at the NML vs. Measured Assessment (Leq, 15 minute in dBA)				
Location ID	Date	Start Time (24 Hr)	Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML)	Discussion
L02 – Hawkins St	23-Mar-19	20:30		62	68	6	On average ¹ , site noise level contributions for the WE38 works were 17 dBA above the NML.
L03 – Drake St	24-Mar-19	20:00		69	66	-3	On average ¹ , actual emissions associated with WE38 works were 1 dBA below the predicted values in OOHWAF-027.
L03 – Drake St	23-Mar-19	16:45		69	66	-3	
L03 – Drake St	23-Mar-19	21:15		69	65	-4	
L02 – Hawkins St	23-Mar-19	20:45		62	65	3	
L02 – Hawkins St	24-Mar-19	16:30		62	65	3	
L02 – Hawkins St	23-Mar-19	16:15		62	65	3	
L02 – Hawkins St	24-Mar-19	16:45		62	65	3	

The logarithmic average of all measured site noise level contributions was calculated.



^{2.} All noise levels are expressed in dBA re 2 x 10⁻⁵ Pa.

^{3.} Measured site noise levels include consideration of INP penalties for offensive noise characteristics.

Table 2 – Noise Monitoring Summary (Unattended Monitoring)

Measi	Measurement Details				s. Measured Asse eq, 15 minute in di		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML.)	Discussion
	2-Nov-18	01:00		40	64	24	Project site noise contributions at UNM02 were dominated by site noise during times of
UNM02 (see	1-Nov-18	17:45	MW17 Works for	40	62	22	documented activity on site. Estimated site noise level contributions at the nearest receptor varied however Leg, 15 minute emissions up to 64 dBA were identified by
Appendix A below)	1-Nov-18	10:15	Portion 1-6 of NCW.	40	58	18	UNM02 at the nearest receptor.
,	31-Oct-18	11:00		40	58	18	Estimated site noise level contributions were above the NML's at the associated UNM02
	31-Oct-18	15:00		40	58	18	locations, which is expected for the type of activities being undertaken.
	1-Nov-18	11:15		40	68	28	Project site noise contributions at UNM01 were dominated by site noise during times of
UNM01 (Drake	1-Nov-18	12:45	MW17 Works for	40	68	28	documented activity on site. Estimated site noise level contributions at the nearest receptor (12 Drake Street) varied however Leq, 15 minute emissions up to 68 dBA were
Street Rail	1-Nov-18	10:45	Portion 7 of NCW.	40	67	27	identified by UNM01 at the nearest receptor.
Corridor)	1-Nov-18	11:30		40	67	27	Estimated site noise level contributions were above the NML's at UNM01 which is
<u> </u>	1-Nov-18	11:45		40	67	27	expected for the type of activities being undertaken.
	3-Nov-18	22:00		40	61	21	Project site noise contributions at UNM02 were dominated by site noise during times of
UNM02 (Gordon	4-Nov-18	03:15)	40	57	17	documented activity on site. Estimated site noise level contributions at the nearest
Substation temporary site	3-Nov-18	16:45	WE18 Works for Portion 1-6 of NCW.	50	67	17	receptor varied however Leq, 15 minute emissions up to 67 dBA were identified by UNM02 at the nearest receptor.
compound)	3-Nov-18	16:30		50	66	16	Estimated site noise level contributions were above the NML's at UNM02 which is
	4-Nov-18	04:45		40	56	16	expected for the type of activities being undertaken.
	3-Nov-18	22:00		40	61	21	Project site noise contributions at UNM01 were dominated by site noise during times of
UNM01 (Drake	4-Nov-18	03:30		40	60	20	documented activity on site. Estimated site noise level contributions at the nearest receptor (12 Drake Street) varied however Leq, 15 minute emissions up to 61 dBA were
Street Rail	4-Nov-18	03:15	WE18 Works for Portion 7 of NCW.	40	60	20	identified by UNM01 at the nearest receptor
Corridor)	4-Nov-18	03:45	Portion 7 of News.	40	59	19	Estimated site noise level contributions were above the NML's at UNM01 which is
	4-Nov-18	02:45		40	56	16	expected for the type of activities being undertaken.
UNM01 (Drake	18-Nov-18	11:45		47	74	27	
Street Rail	17-Nov-18	22:15	WE20 Works for Portion 7 of NCW.	40	67	27	Project site noise contributions at UNM01 were dominated by site noise during times of documented activity on site. Estimated site noise level contributions at the nearest
Corridor)	18-Nov-18	08:00]	47	70	23	- accumented delivity of the Editification and Tiologic level continuations at the Healest

Meas	urement Detai	ls			s. Measured Asse eq, 15 minute in d		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML.)	Discussion
	18-Nov-18	03:15		40	62	22	receptor (12 Drake Street) varied, however, Leq, 15 minute emissions up to 74 dBA were identified by UNM01 at the nearest receptor.
	18-Nov-18	15:00		47	68	21	Project site noise contributions at UNM02 were dominated by site noise during times of
	18-Nov-18	01:00		40	79	39	documented activity on site. Estimated site noise level contributions at the nearest
UNM02 (Nelson	18-Nov-18	00:45		40	78	38	receptor (5 Nelson Street) varied, however, Leq, 15 minute emissions up to 79 dBA were identified by UNM01 at the nearest receptor.
Street Rail	18-Nov-18	00:15		40	78	38	Estimated site noise level contributions were above the NML's at UNM01 and UNM02,
Corridor)	18-Nov-18	01:15		40	77	37	which is expected for the type of activities being undertaken.
	17-Nov-18	22:15		40	76	36	
UNM01 (Drake	22-Dec-18	10:15		47	80	33	
Street Rail	22-Dec-18	09:45		47	73	26	Noise at UNM01-03 was dominated by project noise emissions during times of
Corridor)	22-Dec-18	04:45		47	73	26	documented activity at the site. Estimated site noise level contributions varied at the nearest receptors, however the highest Leq, 15 minute values were recorded to be
UNM02 (Raleigh	22-Dec-18	07:45	WE25 Works for Portion 7 of NCW.	47	74	27	between: • 73 and 80 dBA at UNM01
Street Rail	23-Dec-18	09:15		47	74	27	
Corridor)	22-Dec-18	14:30]	47	73	26	 73 and 74 dBA at UNM02 79 and 80 dBA at UNM03
UNM03 (Hopetoun	22-Dec-18	10:30]	47	80	33	Estimated site noise level contributions were above the NML's at UNM01 to UNM03,
Street Rail	22-Dec-18	17:15]	47	79	32	which is expected for the type of activities being undertaken.
Corridor)	22-Dec-18	17:00		47	79	32	
	6-Jan-19	07:00		47	76	29	
UNM01 (Drake	6-Jan-19	07:30		47	74	27	Noise at UNM01 and UNM02 was dominated by project noise emissions during times of
Street Rail	4-Jan-19	23:45	MANOC 114/E07	40	72	32	documented activity at the site. Estimated site noise level contributions varied at the nearest receptors, however the highest Leq, 15 minute values were recorded to be
Corridor)	6-Jan-19	08:00	MW26 and WE27 Works for Portion 7 of NCW.	47	70	23	between:
	5-Jan-19	02:00		40	70	30	 70 and 76 dBA at UNM01 66 and 70 dBA at UNM02
UNM02 (Raleigh	5-Jan-19	18:30		46	70	24	66 and 70 dBA at UNM02 Estimated site noise level contributions were above the NML's at UNM01 and UNM02.
Street Rail	5-Jan-19	18:15		46	67	21	which is expected for the type of activities being undertaken.
Corridor)	6-Jan-19	07:15	1	47	66	19	

Meas	urement Detai	ls			s. Measured Asse eq, 15 minute in d		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison ∆ (Meas. – NML.)	Discussion
	5-Jan-19	16:30		47	66	19	
	5-Jan-19	19:15		46	66	20	
	3-Jan-19	09:45		52	73	21	Noise at UNM01 was dominated by project noise emissions during track possession works and activities at the site. Estimated site noise level contributions varied at the
	22-Dec-18	07:30	5 .: 7 (1)011	52	73	21	nearest receptors, however the highest Leq, 15 minute values were recorded to be
UNM01 (Raleigh Street Rail	23-Dec-18	09:00	Portion 7 of NCW: Nov 2018 to	52	73	21	between 70 and 73 dBA. Estimated site noise level contributions during track possession works were above the
Corridor)	22-Dec-18	14:15	Jan 2019	52	72	20	NML's at UNM01, which is expected for the type of activities being undertaken.
			-				During mid-week works within standard construction hours estimated site noise was
	22-Dec-18 03:45		40	70	30	generally below the NML's.	
	5-Feb-19	03:15		40	66	26	Noise at UNM01 was dominated by project noise emissions during track possession works and activities at the site. Estimated site noise level contributions varied at the
UNM01 (Drake	5-Feb-19	03:30	Portion 7 of NCW:	40	64	24	nearest receptors, however the highest Leq, 15 minute values were recorded to be between 70 and 73 dBA.
Street Rail Corridor)	6-Feb-19	03:00	Nov 2018 to Jan 2019	40	62	22	Estimated site noise level contributions during track possession works were above the NML's at UNM01, which is expected for the type of activities being undertaken.
	6-Feb-19	02:45		40	60	20	During mid-week works within standard construction hours estimated site noise was generally below the NML's.
	5-Feb-19	04:15		40	63	23	
UNM02 (Hopetoun	7-Feb-19	00:15		40	62	22	
Avenue)	7-Feb-19	00:00		40	62	22	Noise at UNM01, UNM02 and UNM03 were dominated by project noise emissions during track possession works and activities at the site. Estimated site noise level
	8-Feb-19	00:15	Portion 7 of NCW: Nov 2018 to	40	62	22	contributions varied at the nearest receptors, however the highest Leq, 15 minute values
	8-Feb-19	18:45	Jan 2019	46	51	5	were recorded at 66 dBA.
UNM03 (Raleigh Street Rail	8-Feb-19	19:00		46	44	-2	Estimated site noise level contributions during track possession works were above the NML's at UNM01, UNM02, which is expected for the type of activities being undertaken.
Corridor)	6-Feb-19	00:15		40	37	-3	
	6-Feb-19	00:30		40	37	-3	
UNM01a/b (Drake	14-Feb-19	04:15	MW32 Works for	40	64	24	The highest road traffic noise emissions were associated with the Pacific Highway, Brand
Street / Brand	15-Feb-19	04:15	Portion 7 of NCW.	40	62	22	Street and Mowbray Road.

Meas	urement Detai	ils			s. Measured Asse eq, 15 minute in dl		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison ∆ (Meas. – NML.)	Discussion
Street Rail	12-Feb-19	03:45		40	56	16	Noise at UNM01 and UNM02 was dominated by project noise emissions during times of
Corridor)	14-Feb-19	01:30		40	53	13	documented activity at the site. Estimated site noise level contributions varied at the nearest receptors, however the highest Leq, 15 minute values were recorded to be
UNM02a/b	14-Feb-19	02:00		40	70	30	between:
(Hopetoun Ave /	14-Feb-19	01:45	1	40	69	29	 64 and 53 dBA at UNM01 70 and 62 dBA at UNM02
Nelson Street Rail Corridor)	14-Feb-19	01:30		40	63	23	Estimated site noise level contributions were above the NML's at UNM01 and UNM02,
Corndor)	15-Feb-19	00:15		40	62	22	which is expected for the type of activities being undertaken.
	13-Feb-19	00:15		40	37	-3	Estimated site noise level contributions were below the NML's at UNM03.
` `	UNM03 (Raleigh Street Rail	00:15		40	35	-5	
Corridor)	11-Feb-19	00:00		40	35	-5	
	11-Feb-19	00:30		40	35	-5	
	19-Feb-19	00:15		40	68	28	
UNM01 (Brand Street Rail	19-Feb-19	00:45		40	68	28	
Corridor)	20-Feb-19	01:00		40	62	22	The highest road traffic noise emissions were associated with the Pacific Highway, Brand Street and Mowbray Road.
	19-Feb-19	00:00		40	60	20	Noise at UNM01 and UNM02 was dominated by project noise emissions during times of
	22-Feb-19	01:00		40	78	38	documented activity at the site. Estimated site noise level contributions varied at the
UNM02 (Nelson Street Rail	22-Feb-19	00:45	MW33 Works for	40	78	38	nearest receptors, however the highest Leq, 15 minute values were recorded to be between:
Corridor)	22-Feb-19	00:15	Portion 7 of NCW.	40	76	36	60 and 68 dBA at UNM01
	22-Feb-19	00:15		40	73	33	 78 and 73 dBA at UNM02 44 and 43 dBA at UNM03
	20-Feb-19	01:00		40	44	4	Estimated site noise level contributions were above the NML's at UNM01, UNM02, and
UNM03 (Raleigh Street Rail	19-Feb-19	00:00		40	43	3	periodically at UNM03, which is expected for the type of activities being undertaken.
Corridor)	20-Feb-19	02:45		40	37	-3	
	21-Feb-19	03:30		40	37	-3	
	24-Feb-19	03:45	WE34 Works for	40	72	32	The highest road traffic noise emissions were associated with the Pacific Highway, Brand
	24-Feb-19	09:00	Portion 7 of NCW.	47	78	31	Street and Mowbray Road.

Meas	urement Detai	Is			s. Measured Asse eq, 15 minute in di		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML.)	Discussion
UNM01 (Brand	23-Feb-19	23:30		40	70	30	Noise at UNM01, UNM02 and UNM03 was dominated by project noise emissions during
Street Rail Corridor)	24-Feb-19	06:30		40	66	26	times of documented activity at the site. Estimated site noise level contributions varied at the nearest receptors, however the highest Leq, 15 minute values were recorded to be
	23-Feb-19	06:45		40	69	29	between:
UNM02 (Nelson	23-Feb-19	00:00	1	40	68	28	 78 and 66 dBA at UNM01 69 and 68 dBA at UNM02
Street Temporary work site)	23-Feb-19	00:15		40	68	28	54 and 51 at UNM03
	23-Feb-19	06:30		40	68	28	Estimated site noise level contributions were above the NML's at UNM01, UNM02 and
	24-Feb-19 06:45	06:45		40	54	14	UNM03, which is expected for the type of activities being undertaken.
UNM03 (Raleigh Street Rail	24-Feb-19	06:30		40	51	11	
Corridor)	24-Feb-19	03:45		40	51	11	
	23-Feb-19	23:45		40	51	11	
	5-Mar-19	05:00		40	63	23	
UNM01 (Brand	7-Mar-19	22:30		40	63	23	Noise at UNM01 and UNM03 was dominated by project noise emissions during times of
Street Rail	6-Mar-19	23:45		40	62	22	documented activity at the site. Estimated site noise level contributions varied at the
Corridor)	7-Mar-19	23:00		40	62	22	nearest receptors, however, the highest Leq, 15 minute values were recorded to be
	6-Mar-19	23:30	MW35 Works for Portion 7 of NCW.	40	62	22	between: • 62 and 63 dBA at UNM01
	6/03/2019	22:15	T GRAGITY GITTOVV.	40	40	0	39 and 40 dBA at UNM03
UNM03 (Raleigh	6/03/2019	23:45		40	39	-1	Estimated site noise level contributions were above the NML's at UNM01, which is
Street Rail	7/03/2019	23:15		40	39	-1	expected for the type of activities being undertaken. Estimated site noise level contributions were at or below the NML's at UNM03.
Corridor)	6/03/2019	22:45		40	39	-1	
	4/03/2019	23:45		40	39	-1	
LININAO 4 (D	18/03/2019	23:45		40	79	39	The highest road traffic noise emissions were associated with the Pacific Highway, Brand
UNM01 (Brand Street Rail	19/03/2019	00:00	MW37 Works for	40	74	34	Street and Mowbray Road. Noise at UNM01 and UNM03 was generally dominated by extraneous sources, as
Corridor)	19/03/2019	15:45	Portion 7 of NCW.	46	70	24	project noise emissions were barely audible during times of documented activity at the
	18/03/2019	23:30		40	52	12	site, with the exception of a few isolated events.

Meas	urement Detai	Is		(Le	s. Measured Asse eq, 15 minute in di		Discussion
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML.)	Discussion
	19-Mar-19	00:30		40	49	9	Estimated site noise level contributions varied at the nearest receptors, however, the highest Leg, 15 minute values were recorded to be between 49 and 79 dBA at UNM01
	18-Mar-19	00:15		40	40	0	and 38 and 44 dBA at UNM03.
UNM03 (Raleigh	18-Mar-19	0:45		40	40	0	Estimated site noise level contributions were generally below the NML's at UNM01 and
Street Rail	18-Mar-19	00:00		40	39	-1	UNM03, with the exception of a few isolated events, which is expected for the type of activities being undertaken.
Corridor)	18-Mar-19	04:45		40	38	-2	
	18-Mar-19	20:00		46	44	-2	
	24-Mar-19	11:15		52	78	26	
UNM01 (Brand Street Rail	24-Mar-19	07:15		52	74	22	
Corridor)	23-Mar-19	00:45		40	62	22	
	23-Mar-19	04:30		40	61	21	Noise at UNM01, UNM02 and UNM03 was dominated by project noise emissions during
	24-Mar-19	22:15		40	66	26	times of documented activity at the site. Estimated site noise level contributions varied at the nearest receptors, however, the
UNM02 (Nelson Street Site	24-Mar-19	22:30	WE38 Works for Portion 7 of NCW.	40	62	22	highest Leq, 15 minute values were recorded to be between:
Compound)	24-Mar-19	22:45	Portion / Or New.	40	58	18	 61 and 78 dBA at UNM01 58 and 62 dBA at UNM02
	24-Mar-19	23:00		40	58	18	50 and 53 dBA at UNM03 Estimated site noise level contributions were generally above the NML's at UNM01 and
	24-Mar-19	02:00]	40	53	13	UNM02, which is expected for the type of activities being undertaken.
UNM03 (Raleigh Street Rail	24-Mar-19	4:30 AM		40	53	13	
Corridor)	24-Mar-19	2:30 AM	1 1	40	53	13	
	24-Mar-19	02:45	<u> </u>	40	53	13	

All noise levels are expressed in dBA re 2 x 10⁻⁵ Pa.

Measured site noise levels include consideration of INP penalties for offensive noise characteristics.

Table 3 – Unattended Noise Monitoring Unattended (Unreported)

Meas	urement Detai	Is			s. Measured Asse eq, 15 minute in dl		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison Δ (Meas. – NML.)	Discussion
	28-Dec-18	12:30		52	60	8	Noise at UNM01 is expected to be a combination of site-related noises during standard
	28-Dec-18	15:15		52	60	8	construction (i.e. not during a track possession) and extraneous noise sources (e.g. train and other vehicle movements, wind-blown vegetation, birds and animals etc.).
UNM01	31-Dec-18	19:15	December 2018 Unattended Noise	46	54	8	Estimated site noise level contributions varied at the nearest receptors, however, the
ONIVIOT	20-Dec-18	18:45	Monitoring	46	52	6	highest Leq, 15 minute values were recorded to be between 52 and 60 dBA at UNM01
	20-Dec-18 19:00		46	52	6	Estimated site noise level contributions were generally above the NML's at UNM01, which is expected for the type of activities being undertaken during standard construction works.	
	19-Jan-19	06:15		40	56	16	Noise at UNM01 is expected to be a combination of site-related noises during standard
	10-Jan-19	12:15		52	68	16	construction (i.e. not during a track possession) and extraneous noise sources (e.g. train and other vehicle movements, wind-blown vegetation, birds and animals etc.).
UNM01	10-Jan-19	12:00	January 2019 Unattended Noise	52	68	16	Estimated site noise level contributions varied at the nearest receptors, however, the
UNIVIOT	10-Jan-19	14:00	Monitoring	52	67	15	highest Leq, 15 minute values were recorded to be between 56 and 67 dBA at UNM01
	11-Jan-19	10:30		52	67	15	Estimated site noise level contributions were generally above the NML's at UNM01, which is expected for the type of activities being undertaken during standard construction works.
	09-Feb-19	14:30		47	66	19	
	10-Feb-19	06:00		40	52	12	Noise at UNM01 and UNM03 are expected to be a combination of site-related noises
UNM01	10-Feb-19	05:45		40	52	12	during standard construction (i.e. not during a track possession) and extraneous noise sources (e.g. train and other vehicle movements, wind-blown vegetation, birds and
	10-Feb-19	06:15		40	51	11	animals etc.).
	10-Feb-19	06:45	February 2019 Unattended Noise	40	51	11	Estimated site noise level contributions varied at the nearest receptors, however, the highest Leg. 15 minute values were recorded to be
	09-Feb-19	18:30	Monitoring	46	52	6	between 51 and 66 dBA at UNM01; and
	09-Feb-19	18:45		46	52	6	between 48 and 52 at UNM03 Estimated site paid postributions were generally above the NMI 's at UNM01 and
UNM03	09-Feb-19	18:15		46	51	5	Estimated site noise level contributions were generally above the NML's at UNM01 and UNM03, which is expected for the type of activities being undertaken during standard
	22-Feb-19	12:00		52	50	3	construction works.
	09-Feb-19	19:00		46	48	2	

Meas	surement Detai	Is			s. Measured Asse eq, 15 minute in di		
Location	Date	Start Time (24 Hr)	Construction Activity at the Time of Measurement	Noise Management Level (NML)	Measured Site Noise Level Contribution	Comparison ∆ (Meas. – NML.)	Discussion
	30-Mar-19	04:00		40	51	11	
	30-Mar-19	04:15		40	50	10	
UNM01	M01 27-Mar-19 16:15		52	57	10		
	27-Mar-19	15:45		52	56	9	Noise at UNM01, UNM02 and UNM03 are expected to be a combination of site-related
	30-Mar-19	04:45		40	49	9	noises during standard construction (i.e. not during a track possession) and extraneous noise sources (e.g. train and other vehicle movements, wind-blown vegetation, birds and
	27-Mar-19	06:00		40	50	10	animals etc.).
	27-Mar-19	07:00	- March 2019 Unattended Noise	40	50	10	Estimated site noise level contributions varied at the nearest receptors, however, the highest Leg, 15 minute values were recorded to be:
UNM02	26-Mar-19	07:00 Monitoring	Monitoring	40	50	10	between 49 and 57 dBA at UNM01; 50 dBA at UNM02, and
	27-Mar-19	05:30		40	50	10	 50 dBA at UNM02; and between 42 and 50 at UNM03
	27-Mar-19	05:45		40	50	10	Estimated site noise level contributions were generally above the NML's at UNM01, UNM02 and UNM03 (with the exception of one measurement at UNM03), which is
	12-Mar-19	15:45		52	55	3	expected for the type of activities being undertaken during standard construction works.
	12-Mar-19	11:30		52	54	2	
UNM03	30-Mar-19	04:00		40	42	2	
	30-Mar-19	04:45		40	42	2	
	30-Mar-19	04:15		40	42	2	
	13-Apr-19	12:15		47	47	0	Noise at UNM03 is expected to be a combination of site-related noises during standard
	13-Apr-19	12:30	April 2019	47	47	0	construction (i.e. not during a track possession) and extraneous noise sources (e.g. train and other vehicle movements, wind-blown vegetation, birds and animals etc.).
UNM03)	06-Apr-19	09:45	April 2019 Unattended Noise	47	47	0	Estimated site noise level contributions varied at the nearest receptors, however, the
	13-Apr-19	12:00	Monitoring	47	47	0	highest Leq, 15 minute values were recorded to be between 46 and 47 dBA at UNM03.
	06-Apr-19	09:30		47	46	-1	Estimated site noise level contributions were generally in line, and below the NML at UNM03.

^{1.} All noise levels are expressed in dBA re 2 x 10⁻⁵ Pa.



^{2.} Measured site noise levels include consideration of INP penalties for offensive noise characteristics.

Table 4 – Vibration Monitoring Summary (Attended Measurements)

	Measureme		g	Oursing in		Assessme	nt (Peak Partio , mm/s)	cle Velocity	
				Construction Activity at the	Limiting	Site Vibr	ation Event		Discussion
Location ID	Location	Start time (24 hour)	Date	Time of Measurement	Vibration Limit/Criteria ¹	PPV, mm/s	Frequency, Hz	Comparison to Criteria	
V01	Hawkins Street	09:45	15-Feb-19		15mm/s at 4	16.56	30	Comply	Vibration generated by actual and simulated vibratory rolling works was perceptible at
V01	Hawkins Street	09:47	15-Feb-19		Hz increasing to 20mm/s at 15 Hz	16.26	30	Comply	V01. When in progress the vibration generated by this source dominated the emissions perceived and detected at the receptor. Other general construction activities were also occurring at the same time but
V01	Hawkins Street	09:50	15-Feb-19	Vibratory Rolling	then 20mm/s at 15 Hz increasing	16	30	Comply	vibration generated by these other works was imperceptible. Ambient vibration associated with the existing acoustics environment also remained imperceptible.
V01	Hawkins Street	09:48	15-Feb-19		to 50mm/s at 40 Hz and above	15.84	30	Comply	Despite the vibratory rolling activity generating vibration that was perceptible, clearl detectable and the dominant emission source at this receptor, the highest measure vibration levels (PPV in mm/s) and associated characteristic frequencies (in Hz) are below and compliant with the applicable BS7385 vibration guideline values, as
V01	Hawkins Street	09:46	15-Feb-19			15.8	28	Comply	identified in the CNVMP.
V02	Hawkins Street	11:17	15-Feb-19		15mm/s at 4	6.87	34	Comply	Vibration generated by actual vibratory rolling works was perceptible at V02. When in
V02	Hawkins Street	11:14	15-Feb-19		Hz increasing to 20mm/s at 15 Hz	6.76	34	Comply	progress the vibration generated by this source again dominated the emissions perceived and detected at the receptor. Other general construction activities were also occurring at the same time but
V02	Hawkins Street	11:16	15-Feb-19	Vibratory Rolling	then 20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above	5.7	34	Comply	vibration generated by these other works was imperceptible. Ambient vibration associated with the existing acoustics environment also remained imperceptible. Despite the vibratory rolling activity generating vibration that was perceptible, clearly
V02	Hawkins Street	11:15	15-Feb-19			5.57	34	Comply	detectable and the dominant emission source at this receptor, the highest measured vibration levels (PPV in mm/s) and associated characteristic frequencies (in Hz) are below and compliant with the applicable BS7385 vibration guideline values, as
V02	Hawkins Street	11:13	15-Feb-19			4.81	34	Comply	identified in the CNVMP.

^{1.} Structural Damage Criteria – BS7385



works on site.

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51

Comply

Table 5	- Vibratio	on Monito	ring Sum	mary (Unatte					
	Measure	ment Details			Compliance A	ssessme	nt (Peak Partic mm/s)	le Velocity (PPV),	
			Construction	I invitin o	Site Vil	Site Vibration Event		Discussion	
Location ID	Location	Start time (24 hour)	Date	Activity at the Time of Measurement	Limiting Vibration Limit/Criteria ¹	PPV, mm/s	Frequency, Hz	Comparison to Criteria	
UVM01	Hopetoun Ave	13:00:45	31-Oct-18			4.3	51	Comply	
UVM01	Hopetoun Ave	13:05:40	2-Nov-18	Augured Biling /	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	3.3	43	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including augured piling. Based on the highest vibration events generated by augured piling at UVM01 it is
UVM01	Hopetoun Ave	00:17:45	1-Nov-18	Augured Piling / General Construction Activities	then 20mm/s at 15 Hz increasing	2.9	73	Comply	anticipated that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM01	Hopetoun Ave	00:54:45	1-Nov-18	Activities	to 50mm/s at 40 Hz and above	70mm/s at 0 Hz and 2.3 39 Comply The highest measured vibration I frequency of 51Hz. This PPV val	The highest measured vibration level at UVM01 was 4.3 mm/s (PPV) with its characteristic frequency of 51Hz. This PPV value was measured during a time of known construction works on site.		
UVM01	Hopetoun Ave	15:10:39	30-Oct-18		asovo	1.8	57	Comply	
UVM01	Hopetoun Ave	22:02:54	4-Nov-18		15mm/c at 4	2.7	>100	Comply	
UVM01	Hopetoun Ave	18:58:48	8-Nov-18		15mm/s at 4 Hz increasing to 20mm/s at 15 Hz then 20mm/s at 15 Hz increasing to 50mm/s at	2	47	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including general construction activities. Based on the highest vibration events generated by construction activities at UVM01 it is
UVM01	Hopetoun Ave	07:42:38	8-Nov-18	General Construction Activities		1.9	51	Comply	anticipated that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM01	Hopetoun Ave	15:15:38	8-Nov-18		40 Hz and above	1.9	47	Comply	The highest measured vibration level at UVM01 was 2.7 mm/s (PPV) with its characterist frequency of >100Hz. This PPV value was measured during a time of known construction

Hopetoun

Ave

13:14:39

7-Nov-18

UVM01

	Measurement Details			Compliance Assessment (Peak Particle Velocity (PPV), mm/s)			e Velocity (PPV),		
Lasation		Start time		Construction Activity at the	Limiting		ration Event	Commente on to	Discussion
Location ID	Location	(24 hour)	Date	Time of Measurement	Vibration Limit/Criteria ¹	PPV, mm/s	Frequency, Hz	Comparison to Criteria	
UVM01	Hopetoun Ave	17:35:56	18-Nov-18		15mm/s at 4	5.2	>100	Comply	
UVM01	Hopetoun Ave	17:28:14	18-Nov-18	Jack Hammering / Excavation Activities	Hz increasing to 20mm/s at 15 Hz	3.4	>100	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including jack hammering and excavation activities. Based on the highest vibration events generated by site works at UVM01 it is anticipated
UVM01	Hopetoun Ave	17:09:14	18-Nov-18		then 20mm/s at 15 Hz increasing	2.9	>100	Comply	that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM01	Hopetoun Ave	17:08:14	18-Nov-18		to 50mm/s at 40 Hz and above	2.7	>100	Comply	The highest measured vibration level at UVM01 was 5.2 mm/s (PPV) with its characteris frequency of >100Hz. This PPV value was measured during a time of known constructio works on site.
UVM01	Hopetoun Ave	20:09:47	17-Nov-18			2.7	30	Comply	
UVM02	Nelson St	08:22:40	18-Nov-18			5.2	>100	Comply	
UVM02	Nelson St	08:22:15	18-Nov-18		15mm/s at 4 Hz increasing to 20mm/s at 15 Hz	3.7	>100	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including rock breaking / excavation activities. Based on the highest vibration events generated by site works at UVM02 it is anticipated
UVM02	Nelson St	08:21:15	18-Nov-18	Activities	then 20mm/s at 15	2.2	>100	Comply	that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM02	Nelson St	08:19:15	18-Nov-18		Hz increasing to 50mm/s at 40 Hz and above	1.9	>100	Comply	The highest measured vibration level at UVM02 was 5.2 mm/s (PPV) with its characteristic frequency of >100Hz. This PPV value was measured during a time of known construction works on site.
UVM02	Nelson St	08:20:15	18-Nov-18			1.7	>100	Comply	

	Measurer	ment Details		Construction	Compliance A		mm/s)	e Velocity (PPV),	
Location ID	Location	Start time (24 hour)	Date	Activity at the Time of Measurement	Limiting Vibration Limit/Criteria ¹	Site Vib PPV, mm/s	Frequency, Hz	Comparison to Criteria	Discussion
UVM01	Drake St	22:05:00	22-Dec-18			1	57	Comply	
UVM01	Drake St	22:08	22/12/2018	Excavation and construction Activities	15mm/s at 4 Hz increasing to 20mm/s at	1	30	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including excavation and construction activities. Based on the highest vibration events generated by site works at UVM01 it is anticipated
UVM01	Drake St	22:07	22/12/2018		15 Hz then 20mm/s at 15 Hz increasing	0.81	39	Comply	that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM01	Drake St	22:10	22/12/2018		to 50mm/s at 40 Hz and above	0.65	34	Comply	The highest measured vibration level at UVM01 was 1 mm/s (PPV) with its characteristic frequency of 57 Hz. This PPV value was measured during a time of potential construction works on site.
UVM01	Drake St	14:51	23/12/2018			0.61	34	Comply	
UNM02	Raleigh St	09:32	23/12/2018			2.52	57	Comply	
UNM02	Raleigh St	17:06	21/12/2018		15mm/s at 4 Hz increasing to 20mm/s at	1.71	85	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, excavation and construction activities. Based on the highest vibration events generated by site works at UVM02 it is anticipated
UNM02	Raleigh St	07:16	23/12/2018	construction Activities the 20mm/Hz incurs to 50m 40 H:	15 Hz then 20mm/s at 15 Hz increasing	1.63	16	Comply	that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UNM02	Raleigh St	09:15	23/12/2018		to 50mm/s at 40 Hz and above	1.54	43	Comply	The highest measured vibration level at UVM02 was 2.52 mm/s (PPV) with its characteristic frequency of 57 Hz. This PPV value was measured during a time of potential construction works on site.
UNM02	Raleigh St	08:46	23/12/2018			1.16	57	Comply	



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Summary Report – NCW Noise and Vibration Monitoring – November 2018 – April 2019

	Measurer	ment Details		0	Compliance As		nt (Peak Particl mm/s)	le Velocity (PPV),	
Location ID	Location	Start time (24 hour)	Date	Construction Activity at the Time of Measurement	Limiting Vibration Limit/Criteria ¹	Site Vib PPV, mm/s	ration Event Frequency, Hz	Comparison to	Discussion
UVM01	Hopetoun Ave	Day	22-Feb-19			1.26	0.8 to 1.6	Yes	
UVM01	Hopetoun Ave	Night	22/02/2019 to 23/02/19		Residential buildings 16 hr	0.35	0.4 to 0.8	Yes	Vibration generated by WE38 works was at times perceptible at both UVM01 and UVM02. When vibration-generating activities occurred the vibration generated by the works dominated the emissions perceived and detected at the receptor.
UVM01	Hopetoun Ave	Day	23-Feb-19	WE34 Works for Portion 7 of NCW.	day: 0.8 to 1.6 m/s1.75 Residential buildings 8 hr	0.55	0.8 to 1.6	Yes	General construction activities were occurring throughout WE38 however, vibration generated by the majority of works was imperceptible. Ambient vibration associated with the existing acoustics environment also remained imperceptible.
UVM01	Hopetoun Ave	Night	23/02/2019 to 24/02/19		night: 0.4 to 0.8 m/s1.75	1	0.4 to 0.8	No	Despite certain events being perceptible throughout WE38, the highest measured vibration levels (PPV in mm/s) and associated characteristic frequencies (in Hz) are below and compliant with the applicable BS7385 vibration guideline values, as identified in the CNVMP.
UVM01	Hopetoun Ave	Day	24-Feb-19			0.64	0.8 to 1.6	Yes	
UVM01	Hopetoun Ave	03:26:00	24-Feb-19		15mm/s at 4 Hz increasing	5.32	28	Comply	
UVM01	Hopetoun Ave	03:22:00	24-Feb-19		to 20mm/s at 15 Hz then	5.46	27	Comply	Vibration events have been identified throughout the measured data set and compared to times of known site activity, including excavation and construction activities. Based on the highest vibration events generated by site works at UVM01 it is anticipated
UVM01	Hopetoun Ave	03:26:00	24-Feb-19	WE34 Works for Portion 7 of NCW.	20mm/s at 15 Hz increasing to 50mm/s at	4.19	28	Comply	that vibration was perceptible at the nearest affected receptor locations. The remainder of the measured dataset was dominated by general construction activities on site, and ambient vibration events not associated with the project.
UVM01	Hopetoun Ave	03:14:00	24-Feb-19		40 Hz and above	4.02	37	Comply	The highest measured vibration level at UVM01 was 5.32 mm/s (PPV) with its characteristic frequency of 28 Hz. This PPV value was measured during a time of potential construction works on site.
UVM01	Hopetoun Ave	03:22:00	24-Feb-19			3.48	39	Comply	



	Measure	ment Details		O and a transition	Compliance Assessment (Peak Particle Velocity (PPV), mm/s)				
Location	Start time			Construction Activity at the	Limiting Vibration	Site Vibration Event PPV, Frequency, 0		Comparison to	Discussion
ID	Location	(24 hour)	Date	Time of Measurement	Limit/Criteria ¹	mm/s	Frequency, Hz	Comparison to Criteria	
UVM01	Hopetoun Avenue	03:24:00	24-Mar-19	WE38 Works for Portion 7 of NCW.	15mm/s at 4 Hz increasing to 20mm/s at 15 Hz then 20mm/s at 15 Hz increasing to 50mm/s at 40 Hz and above	2.27	32	Comply	Vibration generated by WE38 works was at times perceptible at both UVM01 and UVM02. When vibration-generating activities occurred the vibration generated by the works dominated the emissions perceived and detected at the receptor. General construction activities were occurring throughout WE38 however, vibration generated by the majority of works was imperceptible. Ambient vibration associated with the existing acoustics environment also remained imperceptible. Despite certain events being perceptible throughout WE38, the highest measured vibration levels (PPV in mm/s) and associated characteristic frequencies (in Hz) are below and compliant with the applicable BS7385 vibration guideline values, as identified in the CNVMP.
UVM01	Hopetoun Avenue	03:14:00	24-Mar-19			2.21	32	Comply	
UVM01	Hopetoun Avenue	03:20:00	24-Mar-19			1.83	30	Comply	
UVM01	Hopetoun Avenue	03:07:00	24-Mar-19			1.79	30	Comply	
UVM01	Hopetoun Avenue	03:12:00	24-Mar-19			1.52	28	Comply	
UVM02	Raleigh Street	06:49	24/03/2019			1.51	22	Comply	
UVM02	Raleigh Street	13:11:00	24-Mar-19			1.43	57	Comply	
UVM02	Raleigh Street	13:19:00	24-Mar-19			1.32	47	Comply	
UVM02	Raleigh Street	13:26:00	24-Mar-19			1.32	51	Comply	



	Measurement Details				Compliance As		nt (Peak Particl mm/s)	e Velocity (PPV),	Discussion
				Construction Activity at the	Limiting	Site Vibration Event			
Location ID	Location	Start time (24 hour)	Date	Time of Measurement	Vibration Limit/Criteria ¹	PPV, mm/s	Frequency, Hz	Comparison to Criteria	
UVM02	Raleigh Street	22:25:00	24-Mar-19			1.3	64	Comply	

^{1.} Structural Damage Criteria – BS7385



Technical Report

3. **Outcomes and Recommendations**

Technical reports were prepared for each monitoring event throughout November 2018 to April 2019 with specific recommendations provided throughout, based on the compliance evaluation and the magnitude and extent of impacts measured and/or observed. LOR (and their subcontractors) were successful in implementing these recommendations where feasible, reasonable, practical and safe to do so.

Examples of the types of noise and vibration reducing mitigation and management measures that have been implemented throughout November 2018 to April 2019 are provided below:

- Respite management measures i.e. providing one hour of respite between every three hours of noise-generating activities.
- Utilising the existing rail corridor noise barriers to reduce site emissions. Based on measurements conducted during 2018-2019, the current rail noise barrier is reducing site noise emissions by approximately 10 dBA or more.
 - This measure has been implemented for OOHW, particularly near the Hopetoun Avenue access/egress point, and for any high noise-generating activities.
 - Additionally, temporary acoustic fencing was established along the fence line near the Drake Street site entrance, which was observed to reduce site noise emissions by approximately 5 dBA.
- Continued implementation of the CNVMP (established with due regard to the CNVIS) during all NCW activities.
- Implementation of the Additional Mitigation Measures Matrix (AMMM) as outlined in the CNVMP.
- Noise (and/or vibration) monitoring as per the requirements specified in the construction noise and vibration monitoring program established for NCW.
- Continued application the TfNSW safe working distances for vibration intensive activities to all works undertaken as part of the project, as far as practicable.

Where measured noise levels were found to repeatedly exceed predicted noise levels for specific work activities, Additional Mitigation Measures were recommended as outlined in the CNVMP. Through consultation with ERM acoustics consultants, training was provided to LOR on how to predict more accurate noise levels for certain construction activities. Future OOHWAs contained more accurate predictions for work activities, which aligned more closely to measured values during attended noise monitoring. More accurate predictions in the OOHWA process allowed for a more appropriate level of mitigation to be applied during specific OOHW activities, to minimise impacts as much as practical during track possessions.

4. Conclusion

LOR continue to remain aware of the potential for nuisance, or unacceptable levels of amenity, to occur due to construction noise and vibration, and continues to plan for and then manage construction works on the NCW project accordingly.

Construction noise and vibration levels have been reduced and impacts minimised with the successful implementation of the actions summarised in **Section 3** above.

Impacts may not always be reduced to negligible levels for all receptors during all construction activities; however, the summarised above have ensured that any residual impacts have been minimised as far as is practically achievable.



Technical Report

References

Laing O'Rourke - Sydney Metro City and Southwest - Northern Corridor Works - Construction Noise and Vibration Impact Statement (CNVIS), prepared by ERM and last updated February 2018

Laing O'Rourke - Sydney Metro City and Southwest - Northern Corridor Works - Construction Noise and Vibration Management Plan (CNVMP), prepared by ERM and dated October 2017

Laing O'Rourke - Sydney Metro City and Southwest - Northern Corridor Works - Construction Noise and Vibration Monitoring Program, prepared by ERM and dated October 2017

NSW Environment Protection Authority – NSW Environmental Noise Management – Industrial Noise Policy (INP), January 2000 and relevant application notes

NSW Department of Environment and Climate Change - NSW Interim Construction Noise Guideline (ICNG), July 2009

NSW Government – Sydney Metro Construction Noise and Vibration Strategy (CNVS), August 2017

Standards Australia AS1055–1997™ (AS1055) – Description and Measurement of Environmental Noise, Parts 1, 2 and 3

Standards Australia AS IEC 61672.1–2004™ (AS61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring or Standards Australia AS1259.2-1990™ (AS1259) – Acoustics – Sound Level Meters - Integrating Averaging

Standards Australia AS/IEC 60942:2004/IEC 60942:2003 (IEC60942) - Australian Standard™ -**Electroacoustics – Sound Calibrators**



Appendix A – Noise Monitoring Methodology

A summary of the noise monitoring methodology is provided below. The monitoring was conducted with due regard to and by the CNVMP and other relevant policy, guidelines and standards as listed in the reference section of this report; and as per the construction noise and vibration monitoring program established for NCW.

1. Overview

1.1 Attended noise monitoring

For all monitoring events. A qualified and suitably experienced operator visited community areas surrounding the NCW works and completed operator attended noise measurements. In all cases, the closest receptors were targeted for monitoring, with actual measurement locations selected based on the position of site works and the potentially most affected receptors.

Overall noise levels (Lmax, Lmin, Leq, L1, L10 and L90 in dBA) were measured at all locations; refer **Figures A1.0 to A17.0**. Based on the measured overall values and observations made during each operator attended noise measurement a site Leq, 15minute noise level contribution in dBA was determined in the absence of any influential source not associated with the project.

1.2 Unattended noise monitoring

Details of the unattended noise monitoring are summarised below:

- Unattended noise monitoring was conducted continuously at the location. Refer to Figures
 A1.0 to A17.0. Overall noise levels (Lmax, Lmin, Leq, L1, L10 and L90 in dBA) were measured
 in 15 minutes samples;
- The unattended noise monitoring devices do not directly measure the site contribution. To estimate potential site noise contributions (in the absence of any influential source not associated with the project), it has been assumed that any measured Leq, 15-minute noise level above 35 dBA at the noise monitoring devices are associated with the site, while works are known to be in progress. These threshold values were determined based on recent monitoring and observations completed near the site;
- Where unattended noise monitors were located onsite, the estimated site noise values were
 extrapolated to the closest receptor location. This extrapolation was based on the distance
 from the works on site to the receptor, and takes into account the presence of noise walls (or
 other mitigation measures implemented) between the receptor and the area of works;

The results of the unattended noise data analysis have been provided in **Appendix D**.

The highest values (and comparison to the NML identified in the CNVMP) for attended and unattended monitoring are presented in **Table 1** and **Table 2** of this report.

1.3 Monitoring Locations

The figures below identify the monitoring locations referenced in this report and other items of importance e.g. nearby roads. Each monitoring location is individually described in the corresponding OOHW technical monitoring report.



2. Technical Requirements

All construction noise monitoring was undertaken in accordance with the "construction noise and vibration monitoring guideline" that is included in Appendix A of the Construction Noise and Vibration Strategy (CNVS) and outlines the minimum requirements for contractors undertaking monitoring on the Sydney Metro Project.

In accordance with the CNVIS, both attended and unattended measurements were the focus of all noise monitoring based on the scope of works for P7. Attended noise monitoring results fed back directly to the project team and actions taken without delay during the works.

In accordance with Condition of Approval (CoA) – C11 monitoring data was made available to the construction team, and LOR and this report can be provided to the Environmental Representative and/or Acoustics Advisor, the Department of Planning and Environment (DP&E) and the NSW Environment Protection Authority (EPA) if needed.

2.1 Noise Monitoring Equipment

All noise measurements were conducted by suitably experienced and qualified personnel with due regard to, and by, the relevant local and international standards for environmental monitoring.

The noise measurement instrumentation used to conduct the monitoring complied with the requirements of AS 61672.1 and AS/IEC 60942. Each noise device had the current National Association of Testing Authorities, Australia (NATA) calibration certificates, with certification at intervals not exceeding two years at the time of use.

Noise instrument calibration was checked prior to monitoring and again at the conclusion with no difference noted between the two measurements. A suitably experienced person has completed all data handling and analysis and subsequently reviewed by a qualified and experienced acoustician.

The equipment utilized during attended noise monitoring is provided below. The quantities of noise logging equipment varied to suit the requirements of each possession.

- ARL Ngara (Type 1) Environmental Noise Loggers
 - Serial 878196, last calibration 23/05/2017 (valid for two years)
 - Serial 878184, last calibration 15/01/2018 (valid for two years)
 - Serial 87801C, last calibration 30/11/2017 (valid for two years)
- Brüel & Kjær 2250 Investigator (Type 1) Sound Analyser (Serial No. 3009001, last calibration 21/12/2017 – valid for two years).
- NTi Audio XL2 Sound Level Meter (Serial No. A2A-06883-E0, last calibration 23/07/2018);
 and
- Brüel & Kjær 4231 (Type 1) Sound Level Calibrator (Serial No. 2605910, last calibration 17/01/2018).

2.2 Other requirements

All attended measurements were conducted by appropriately trained personnel in the analysis and assessment of construction noise and vibration. They are familiar with the requirements of the relevant standards and procedures.



Sydney Metro City and Southwest – North Corridor Works Summary Report – NCW Noise and Vibration Monitoring – November 2018 – April 2019

Technical Report

The noise measurement procedures employed throughout the monitoring were established by the requirements of the Australian Standard (AS) 1055:1997 Acoustics - Description and Measurement of Environmental Noise.

Attended noise measurements were conducted by an operator using a handheld Type 1 'integrating-averaging' sound level meter. All analyses were completed with the sound level meter mounted to a tripod and with a windscreen fitted, at the height of 1.2 to 1.5 metres above the ground.

Instantaneous noise levels for all noted noise emission sources (extraneous or otherwise), meteorological conditions (average and maximum wind speeds, temperature, precipitation and cloud cover etc.) were recorded during all measurements. Relevant measurement parameters, i.e. Leq, Lmin, Lmax, L1, L10 and L90 were recorded in dBA. All noise samples were recorded using the "fast" time response of the sound level meter.

Noise monitoring was not completed within 3.5 metres of any reflective structure or wall, unless behind a barrier. A reduction of up to 2.5 dB was not applied to the measured ambient or site noise contribution (Leq, 15 minute in dBA) as the barrier was reducing noise emissions from the site and in general, did not increase noise due to the reflective properties of the surface.

Noise monitoring was not completed during periods where wind speeds exceeded 5 m/s at the microphone. Noise monitoring was conducted during rain events however the rain was very light and had no effect on the measured data (if applicable).

The general setup of the sound level meter for attended noise measurements was as per Photo 4.1 of the Construction Noise and Vibration Monitoring Program established for NCW, as reproduced below as **Photo A2.1**.



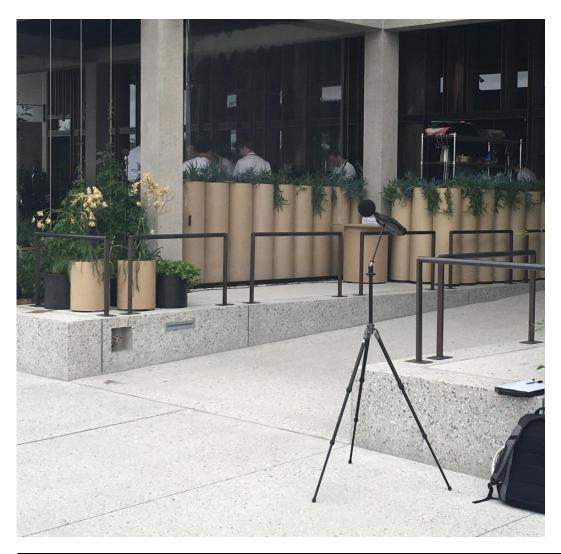


Photo A2.1: Example Attended Noise Monitoring Setup

Attended noise measurements were undertaken at the potentially most affected receptors identified in the LOR noise assessment (adapted for the phase of works) to confirm that the noise levels in the adjacent community were consistent with the predictions provided by LOR. Other potentially affected receptors were also considered as part of the monitoring regime. Monitoring occurred once works were underway but not at the commencement of activities. The duration of all community noise measurement samples was 15 minutes. The device's microphone was focused on the noise emission centre of the equipment being tested.



Figure A1.0 – Raleigh Street - Unattended Noise Monitoring Location

- NCW P7 (November 2018 to January 2019)





Figure A1.0 – Attended (L01-L02) and Unattended (UNM02) Noise Monitoring Locations

- NCW Portion 1-6 - Gordon to Killara- (WE18 - Saturday, 03 November to Sunday, 04 November 2018)

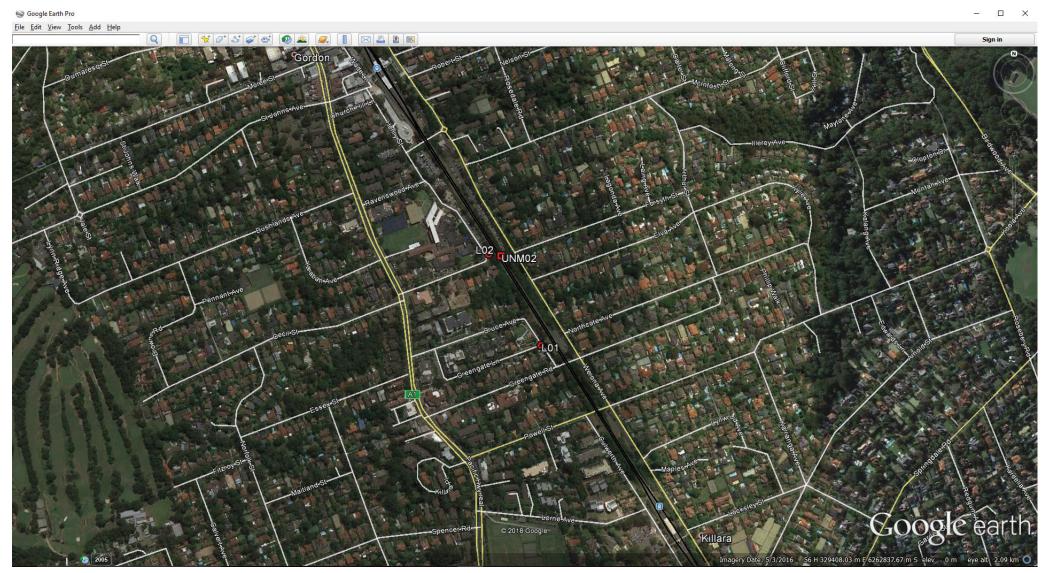
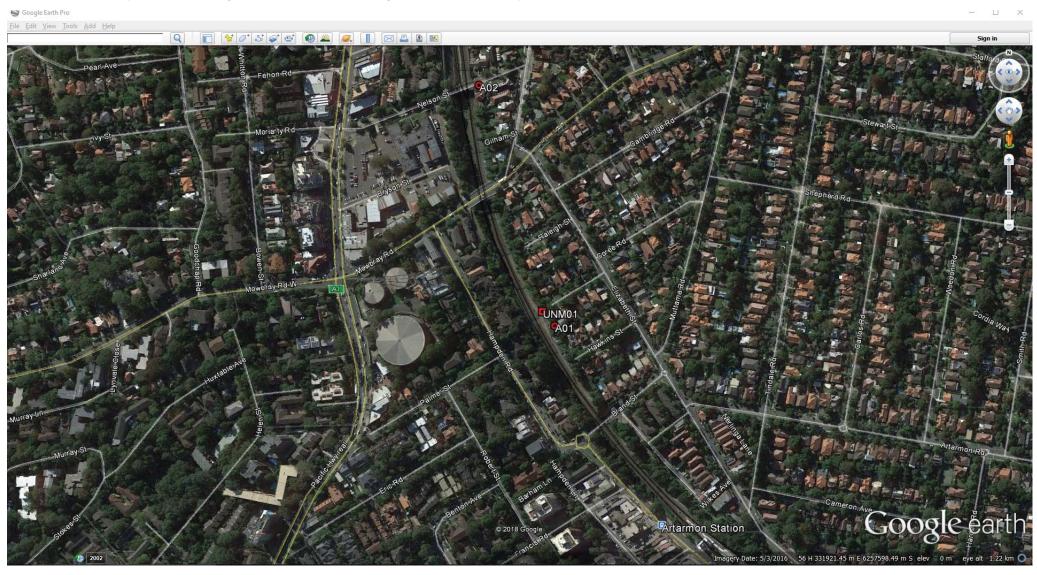




Figure A1.0 – Attended (A01-A02) and Unattended (UNM01) Noise Monitoring Locations

- NCW Portion 7A (WE18 - Saturday, 03 November to Sunday, 04 November 2018)



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Figure A1.0 – Attended (A01-A03) and Unattended (UNM01 and UNM02) Noise Monitoring Locations

- NCW Portion 7A (WE20 - Saturday, 17 November to Sunday, 18 November 2018)

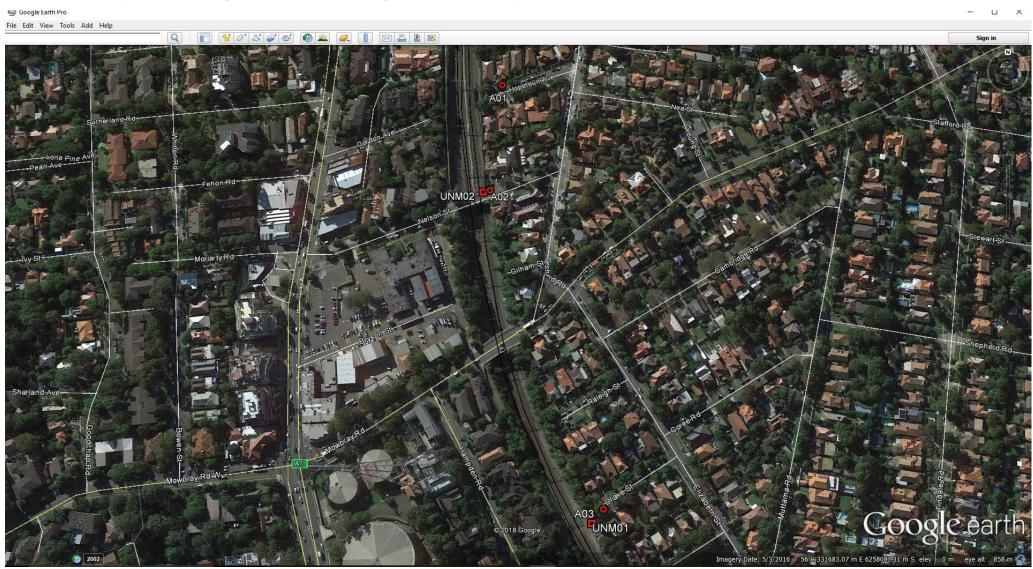




Figure A1.0 – OOHW WE25 – Attended and Unattended Noise Monitoring Locations

- NCW P7 (Saturday, 22 December to Sunday, 23 December 2018)





Figure A1.0 – OOHW WE25 – Attended Noise Monitoring Locations - Killara

- NCW P1-6 (Saturday, 22 December to Sunday, 23 December 2018)





Figure A1.1 – OOHW WE25 – Attended Noise Monitoring Locations - Chatswood

- NCW P1-6 (Saturday, 22 December to Sunday, 23 December 2018)





Figure A1.1 – Portion 7 Attended and Unattended Noise Monitoring Locations

- NCW (MW26 + WE27 - Thursday, 03 January to Monday, 7 January 2018)

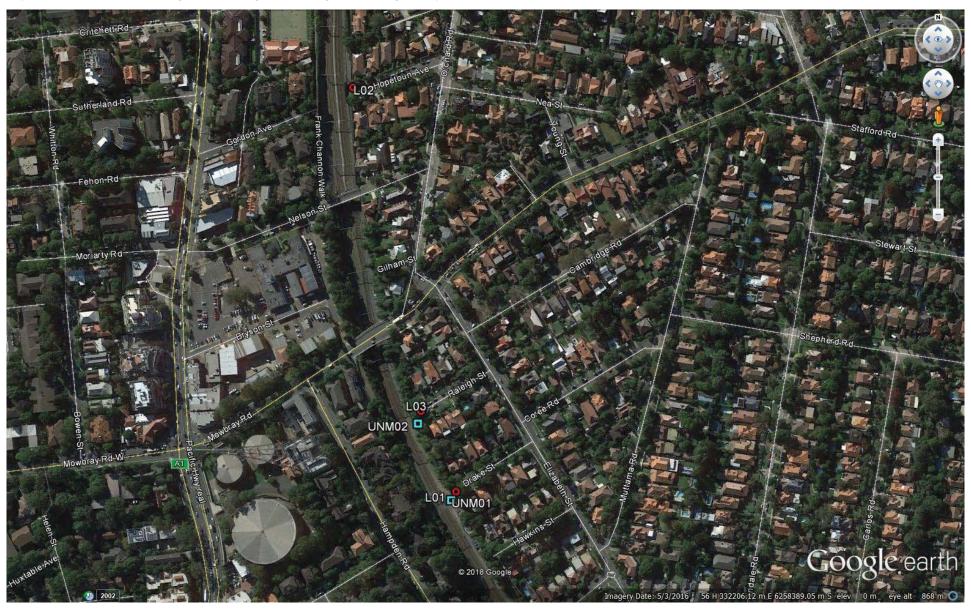




Figure A1.2 – Portion 1-6 Attended Noise Monitoring Locations

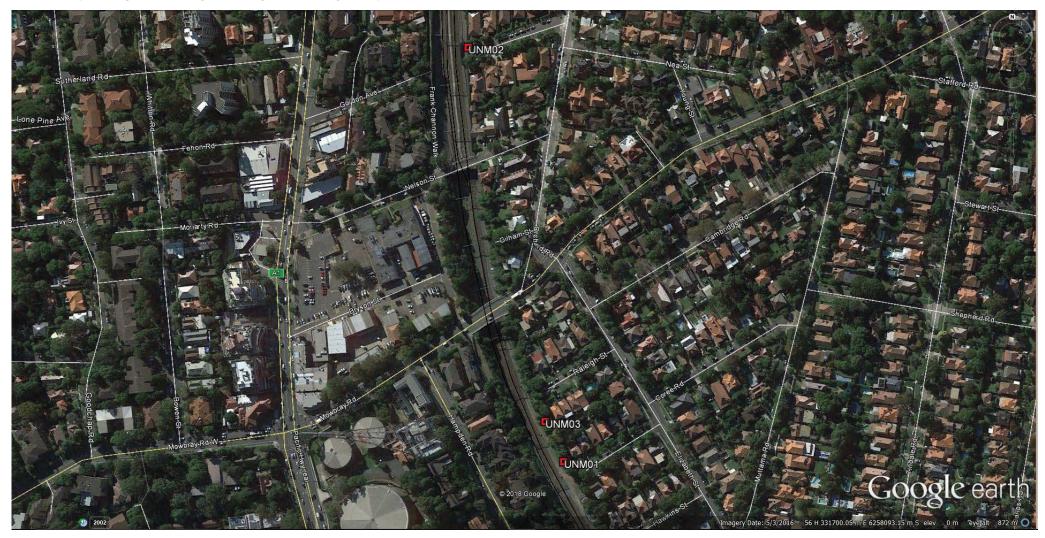
- NCW (MW26 + WE27 - Thursday, 03 January to Monday, 7 January 2018)





Figure A1.0 - OOHW MW31 - Unattended Noise Monitoring Locations

- NCW P7 (Monday, 4 February to Friday, 8 February 2019)



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Figure A1.0 – OOHW MW32 – Attended and Unattended Noise Monitoring Locations

- NCW P7 (Monday, 11 February to Friday, 15 February 2019)

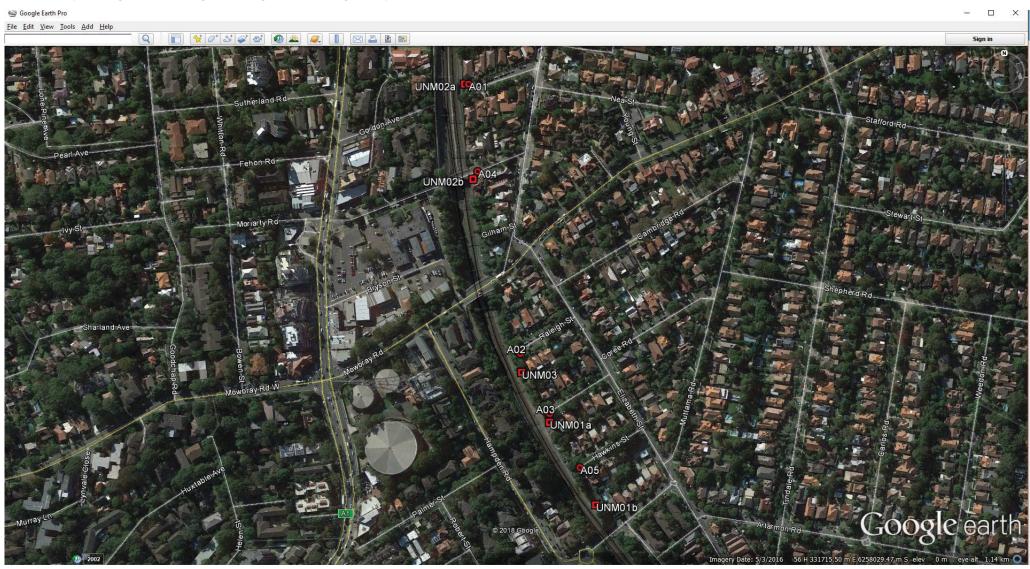
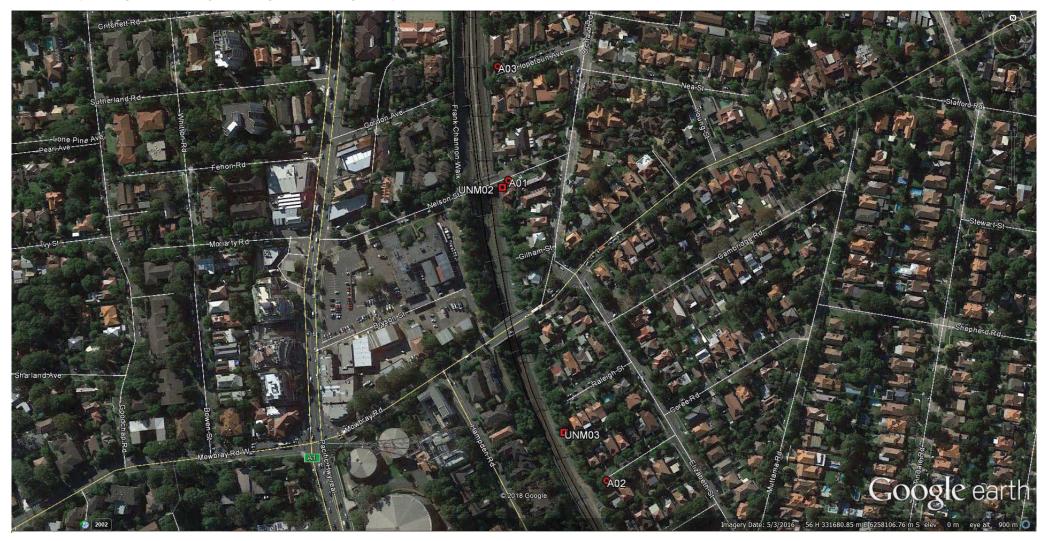




Figure A1.0 – OOHW MW33 – Attended and Unattended Noise Monitoring Locations

- NCW P7 (Monday, 18 February to Friday, 22 February 2019)



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Figure A1.0 – OOHW WE34 – Attended and Unattended Noise (and Vibration) Monitoring Locations

- NCW P7 (Saturday, 23 February to Sunday, 24 February 2019)

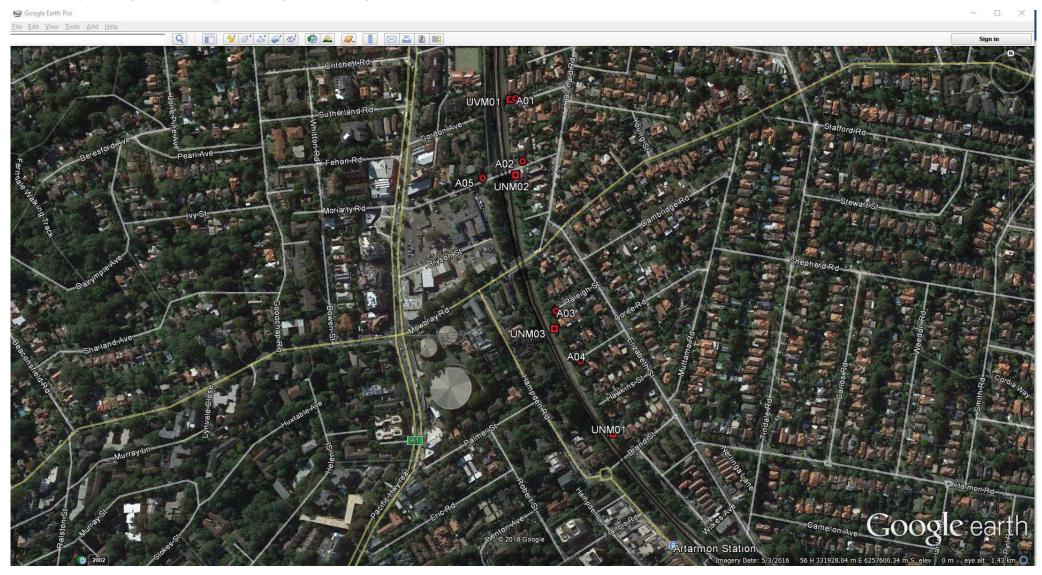




Figure A1.0 – OOHW MW33 – Attended and Unattended Noise, and Unattended Vibration Monitoring Locations

- NCW P7 (Monday, 04 March to Friday, 08 March 2019)

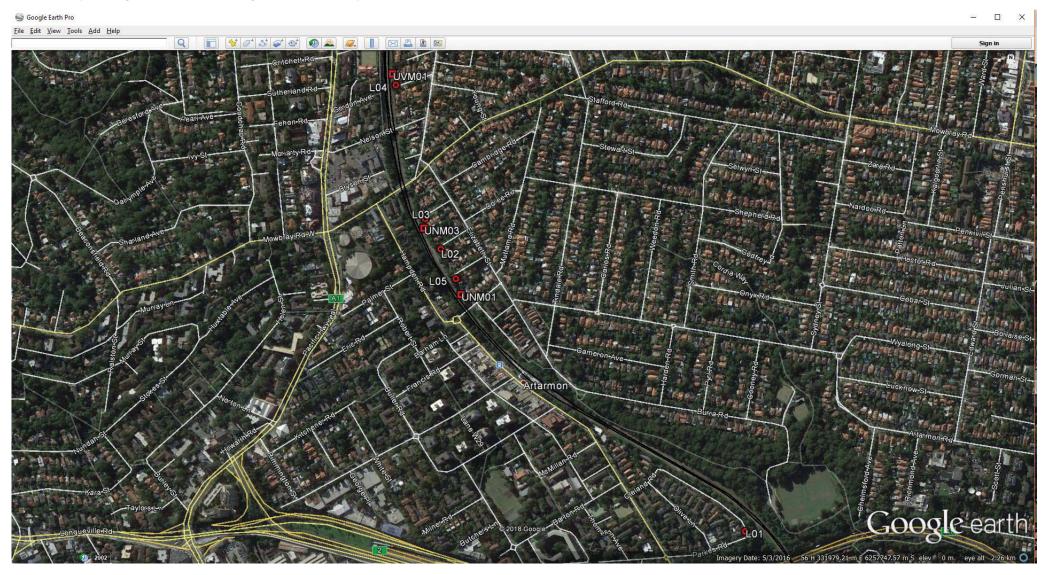




Figure A1.0 – OOHW MW37 – Attended and Unattended Noise Monitoring Locations

- NCW P7 (Monday, 18 March to Friday, 22 March 2019)





Figure A1.0 – OOHW WE38 – Attended and Unattended Noise Monitoring Locations

- NCW P7 (Saturday, 23 March to Sunday, 24 March 2019)



Appendix B – Vibration Monitoring Methodology

1. Monitoring Overview

1.1 Vibration Monitoring

Attended Vibration Monitoring

For all monitoring events, a qualified and suitably experienced operator visited the NCW P7 project site to conduct operator attended noise measurements at the monitoring locations outlines below, refer **Section 1.2** of **Appendix B**. The closest receptors were targeted for monitoring when outside of the rail corridor, with actual measurement locations selected based on the position of site works and the potentially most affected receptors. Vibration levels were measured to determine Peak Particle Velocity (PPV, mm/s and Frequency, Hz); refer **Table 3** of this report.

Unattended vibration monitoring

Unattended vibration monitoring was undertaken within the rail corridor / project site (refer to **Figures B1.0 to B5.0**). The highest results of the measured vibration data at each location are summarised in **Table 4** of this report, the full vibration data set (measured PPV over time, all relevant data captured during the monitoring period) is provided in **Annex E.**

1.2 Monitoring Locations

Figures B1.0 to B3.0 identify the key work areas and all monitoring locations referenced in this report and other items of importance to this. Each monitoring location is individually described in the corresponding OOHW technical monitoring report.

1.3 Vibration Monitoring Equipment

All vibration measurements were conducted by suitably experienced and qualified ERM personnel with due regard to, and in accordance with, the relevant local and international standards for environmental monitoring.

Vibration equipment was calibrated and checked to the manufacturer's specification, with certification at intervals not exceeding one year at the time of use.

A qualified and experienced acoustician has completed all data handling and analysis.

The equipment utilized during attended noise monitoring is provided below. The quantities of vibration logging equipment varied to suit the requirements of each possession.

- Saros Minimate Plus (Series III) Environmental Vibration Monitor
 - Serial No. BE13734, last calibration 23/04/2018
 - Serial No. BE14130, last calibration 04/05/2018





Figure B1.0 – Unattended (UVM01) Vibration Monitoring Location

- NCW Portion 7A (MW15 to MW18 - Thursday, 18 October to Saturday, 10 November 2018)





Figure B2.0 – Unattended (UVM01 and UVM02) Vibration Monitoring Locations

- NCW Portion 7A (WE20 - Saturday, 17 November to Sunday, 18 November 2018)





Figure B3.0 – OOHW WE25 – Unattended Vibration Monitoring Locations

- NCW P7 (Saturday, 22 December to Sunday, 23 December 2018)





Figure B4.0 – Attended Vibration Monitoring Locations and Indicative Vibratory Rolling Work Areas

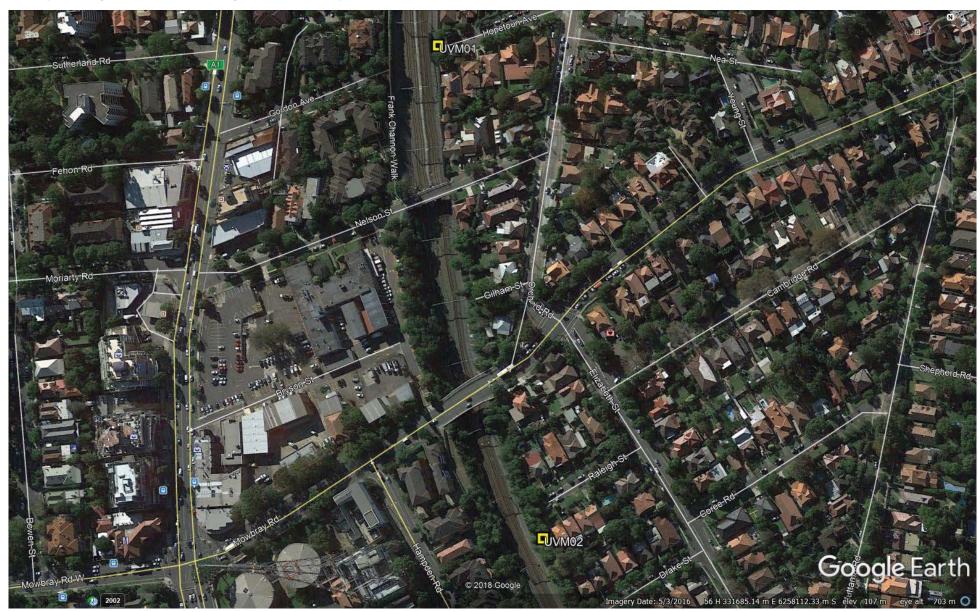
- NCW P7 (Friday, 15 February 2019)





Figure B5.0 – OOHW WE38 – Unattended Vibration Monitoring Locations

- NCW P7 (Saturday, 23 March to Sunday, 24 March 2019)



Sydney Metro City and Southwest – North Corridor Works Summary Report – NCW Noise and Vibration Monitoring – November 2018 – April 2019 **Technical Report**

Appendix C – Completed Noise Data Set – Attended Measurements

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Contribution (%)	Measured Site Noise Level - LAeq, 15minute	NP Imputsive Modifying Factor? NP Tonal Modifying	NP LF Modifying Factor?	Westured She Noise Level - LAmax	NGA	Period	RBL LA90, Period	NML - LAeq, 15 minute	Predicted Site Noise Level - LAeq. 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA30, Period	Com parison to NML - LAeq, 15 minute	Comparison to Predicted Site Notes Level - LAeq, 18minute	Comparison to Skep Disturbance Screening Level - LAmax	- Bescheton
Project 001	03-Nov-18	17:08	00:15:00							70		- 5	D -	77	L01	Day	45	50	57	60	18	13	6	17	Project 001-000 (EVI). Measurement taken on the corner of fance. Avenue and Greengals Laine, near Greengals Park, generally facility seed towards subtless 4-1 (CVIV worlds) and general constitution. Activities, within collabor fee use of a minormal of light vehicles. H-rail part of warring some generations and gripting lainers.
Project 002	03-Nov-18	17:23	00:15:00	74.79	44.08	56.45	67.57	58.83	48.37	50		- 5	D -	70	L01	Day	45	50	57	60	13	8	1	10	Exhibits diseased above contributed to approximately 65-70% of the measured Lifety noise level over the two measurements, with non-project related baffic and other noise sources auditedung on also
Project 011	03-Nov-18	21:59	00:15:00	79.4	48.56	54.8	64.29	54.9	51.42	100			-	79	L02	Evening	40	45	57	55	15	10	-2	24	
Project 012	03-Nov-18	22:14	00:15:00	78.68	46.04	54.42	63.64	54.09	49.41	100				71	L02	Night	35	40	57	50	19	14	-3	21	
Project 013	03-Nov-18	22:31	00:15:00	72.52	46.28	51.71	61.56	52.6	47.77	100		- 5	0 -	70	L02	Night	35	40	57	50	22	17	0	20	Project COT (LCD). Measurement balan at the corner of Cool and Herry Streets, Cordon, facing east towards works within the rail constor and UNBACZ. NCW P1-6 predominantly involved to the control of the
Project 014	03-Nov-18	22:51	00:15:00	64.68	46.58	50.11	60.61	50.5	47.66	100		- 5	D -	49	L02	Night	35	40	57	50	20	15	-2	-1	Activity if Company this Company this Company Sign order), Orther works and general construction activation, within included the use of a light verbea accessivepose, light by Sign orders and paint and engineers and when Orthop News (Included to Sign orders). The sign of the manufact Lively sign of the manufact Lively sign or the air manufacturers, with this project inside Yealfin and other noise accessed Lively sign of the activity of a line.
Project 022	04-Nov-18	16:36	00:15:00	74.48	45.63	55.68	65.37	58.06	48.73	50		- 5	0 -	66	L02	Day	45	50	57	60	13	8	1	6	
Project 023	04-Nov-18	16:54	00:15:00	73.58	49.21	55.7	63.88	57.92	51.51	50		- 5	D -	67	L02	Day	45	50	57	60	13	8	1	7	
Weather 06-Oct-18: Generally Weather 07-Oct-18: Almost co	fine weather, cloudy waterstant rain and low/mor	th low-moderate winds. Temperatu	Femperature ranged bet	ween 18 - 14 13 degrees 0	degrees Cels	sius.																			

File Name	Date	Start Time	Elapsed Time	LAFmax	: LAFmin	ı LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution (%)	Measured She Noise Level - LAeq, 15minute	NP Impulsive Modifying Factor? INP Tonal Modifying Factor?	INP LF Modifying Factor?	Measured Site Noise Level - LAmax	NCA	Perfoot	RBL. - LASO, Period	NML LAcq. 15 minus	Prodicted Site Noise Jevel - LAseq. 15m imate	Siesp Disturbance Screening Level - LAmax	Comparison to RBL LAVIO, Period	Comparison to NML LAcq. 15 minute	Comparison to Predicted Site Notes Level - LAcq. 15minute	Comparison to Step Disturbance Screening Lavel - LAm ax	Descrition
Project 003	03-Nov-18	18:30	00:15:00	85.64	56.05	58.59	62.86	58.9	56.97	90			-	70	NCA-01	Evening	41	46	55	56	17	12	3	14	
Project 004a	03-Nov-18	18.45	00:15:00	72.6	55.8	58	60.5	58.7	57	100			-	63	NCA-01	Evening	41	46	55	56	17	12	3	7	Figigle 200,004-to (LVI). Measurement below their the profession solvings between this and 4-theiries Stretch. Edge yeard branch the sold within the of control, XVIVI P vote analysed and sold solving long or off-sold all size layer imported control controlled. Seeking the electric procession, received the plant their his control or adjournment of the seeking their processions. The procession of the seeking their processions are all their processions and their processions are all their processions and their processions are all their
Project 004b	03-Nov-18	19:01	00:15:00	67	55.4	58.4	61.7	59.4	57.3	100			-	63	NCA-01	Evening	41	46	55	56	17	12	3	7	
Project 005	03-Nov-18	19:31	00:15:00	76.69	53.84	63.19	71.01	65.62	57.51	100		- 5.0	-	74	NCA-01	Evening	41	46	65	56	27	22	3	18	
Project 006	03-Nov-18	19:46	00:15:00	75.64	54.19	60.7	65.33	62.76	56.62	100		- 5.0	-	75	NCA-01	Evening	41	46	65	56	25	20	1	19	
Project 007	03-Nov-18	20:30	00:15:00	75.43	52.24	60.99	65.84	64.26	53.68	100		- 5.0	-	65	NCA-01	Evening	41	46	65	56	25	20	1	9	
Project 008	03-Nov-18	20:45	00:15:00	74.32	53.29	58.13	64.31	60.19	55.17	100		- 5.0	-	65	NCA-01	Evening	41	46	65	56	22	17	-2	9	
Project 009	03-Nov-18	21:01	00:15:00	75.93	49.1	57.85	62.86	60.72	53.22	100		- 5.0	-	63	NCA-01	Evening	41	46	65	56	22	17	-2	7	Project (55,010 and 015,018 (ACT) Measumments taken at outside 2 Nation Street, bodge south west branche writer the red condor. NCW FT works involved a number of activities outside with the CMVAM-019 (including CLX coosing contractions and CMV works) along with greened contractions ariskine, within lockstade the use of excessives and his oil applicant of verying sized, using the collection beautiful and contractions ariskine within lockstade the use of excessives and his oil applicant of activities and beautiful and the contraction ariskine. While the contraction ariskine arisk and provided in the contraction of the desirable and the contraction arisk and the contraction are contracted as a contraction arisk and the contraction are contracted as a contraction arisk and the contraction are contracted as a contraction arisk and the contraction are contracted as a contraction are contracted as a contraction arisk and the contraction are contracted as a contract
Project 010	03-Nov-18	21:16	00:15:00	79.88	47.82	59.62	63.72	61.68	54.43	100		- 5.0	-	74	NCA-01	Evening	41	46	65	56	24	19	0	18	varies total, draft facts, water packers, suber facts, and great fact tools. Bits strictles address drave deviated the measurement and orthodols to 10% of the measured Like incide bear for all for inconvenients, with many paper oriented recess concentrated the transport facts from a first facts of the fact of the deviated from the convenients and oriented to the place of the deviated for measurement and prime as they are for the convenients and the convenients are substantially as a substantial and the convenients are substantially and the convenients are substantially as a substantial
Project 015	03-Nov-18	23:26	00:15:00	77.35	48.51	61.26	65.76	62.76	52.89	100		- 5.0	-	70	NCA-01	Night	35	40	65	50	31	26	1	20	
Project 016	04-Nov-18	00:00	00:15:00	78.98	58.5	67.15	71.14	69.37	62.94	100		- 5.0	-	74	NCA-01	Night	35	40	65	50	37	32	7	24	
Project 017	04-Nov-18	00:15	00:15:00	78.32	50.17	63.1	69.51	65.91	53.01	100		- 5.0	-	70	NCA-01	Night	35	40	65	50	33	28	3	20	
Project 018	04-Nov-18	00:30	00:15:00	91.46	53.17	67.31	76.14	69.62	56.32	100			-	89	NCA-01	Night	35	40	65	50	32	27	2	39	
Project 019	04-Nov-18	14:50	00:15:00	71.78	54.81	56.65	59.75	57.36	55.77	70		- 5.0	-	59	NCA-01	Day	42	47	55	57	18	13	5	2	Project 019 (AD1) Measurements boaton identified above (AD1) NCW PT works mainly included activity, (sign oriest at site) along with general construction activities, which included the use of a lighting bower and general hard, reviewer of plant either the real constitut, and general hard tools. Pleasing stiffic sizing place best was invasible during size activities. Withd-blawn regelation, estimation include 554 dB.A.R. See includes confided both operations for includes and begrowthered and begrowthered and begrowthered and begrowthered and begrowthered by the reasonable (ADI) for the measurement, with non-project related noise accuracy generally audited using times of high wind and low activity on size.
Project 020	04-Nov-18	15:18	00:15:00	74.3	52.38	61.29	68.19	64.4	55.34	100			-	70	NCA-01	Day	42	47	60	57	19	14	1	13	Project 000 and 001 (ADD). Measurements location identified above (ADD), NCW P7 works involved a number of activities cultived within COHNNA-799 (including ILXX crossing construction and CMM works) along with general construction activities, which included the use of executions and first designment of valving sizes, and general than those. She address designed above continued for the accuractive ADM of the researched active laws for only only one from a construction in which of the researched active laws for only one from a construction in which of the researched active laws for other laws and accurate many constructions.
Project 021	04-Nov-18	15:37	00:15:00	83.47	50.76	60.05	68.17	62.21	55	100	60		-	82	NCA-01	Day	42	47	60	57	18	13	0	25	during times of high activity on site.

sealing 10-2-4-0-1. Ex. (i.e., in critical with inflored at with fail, very over-15-5, capts after or sainting right. (implication virial right of control of the control o

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmir	in LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - LAeq, 15minute	NP Impulsive Modifying Factor?	NP Tonal Modifying Factor? NP LF Modifying Factor?	Measured Site Noise Level - LAmax	NGA	Period	REL - LASS, Period	NM. - LAag, 15 minuae	Predicted Site Noise Level - LAcq., 18minube	Seep D Barbance Screening Level - LAmax	Comparison to RBL.	Comparison to NML - LAsq. 15 minute	Comparison to Predicted She Noise Level - L.Aog, 18minute	Compatition to Steep Disturbance Screening Lovel - LAmax	Door friden
Project 001	17-Nov-18	17:26	00:15:00	84.36	53.13	74.31	81.26	77.15	59.61	100		-	5.0 -	82	NCA-01	Day	42	47	79	57	37	32	0	25	Project 071-072 (ATT) Measurements salant 15 Hepstein. Avenue, fusing sent lowers the works within the sal condex. ACM PT works minity included. Activities 0, 15 and 15 (Temping of works), and off rotte seal and occurred copying beam at the Hepstein Avenue Rency largery with great construction activities, with included the use of a lighting turner and genoments with the analysis of the use of a lighting turner and genoments. Turner and work train, Hi Rail equipment and exclusion of varying lazes, concrete saves, justimence, amy public, and prover and general twent both. Silts achietics collined activities of the control of the
Project 002	17-Nov-18	17:44	00:15:00	87.43	54.8	75.52	82.23	78.51	67.9	100		-		78	NCA-01	Day	42	47	79	57	34	29	-3	21	Combination of Residentials and Control or an emediate Long took even over an ear measurement, was recopyright reason took source insulation and emission of Residentials and the Control of R
Project 003	17-Nov-18	18:45	00:15:00	74.17	52.64	58.05	66.4	60.13	54.45	90		-		65	NCA-01	Evening	41	46	60	56	17	12	-2	9	
Project 004	17-Nov-18	19:15	00:15:00	76.54	52.59	60.78	66.79	63.3	55.01	100		-		69	NCA-01	Evening	41	46	60	56	20	15	1	13	Project 033-096 (A22) Measurements later at outside 5 history (pressilly ficing west towards within Fix rad contain. NOW PT works invoked a number of althibition outsides within COPMY-COZ (Tempory of works), exception and installation of misterial parties (pressill present contained, within history, within history first an execution and that all experted of wavey misterial pressillations and the contained of the execution and
Project 005	17-Nov-18	20:00	00:15:00	74.32	49.99		63.67	57.91	51.7	100			5.0 -	69	NCA-01	Evening	41	46	60	56	20	15	1	13	
Project 006 Project 007	17-Nov-18	20:18	00:15:00	87.82 86.64	59.78		77.95	67.97 70.48	63.91	100			5.0 -	81	NCA-01	Evening	41	46	72	56 56	31	26	0	25	
Project 008	17-Nov-18	21:29	00:15:00	89.49	55.31		75.14	68.53	56.75	100			5.0 -	80	NCA-01	Evening	41	46	72	56	31	26	0	24	Project 007-008 (A01) Measurement location identified above (A01) NCW PT works mainly included Activities 9, 15 and 16 (Tamping of worksite, removal of noise wall and concrete capping bears at the hopebour Avenue Rampy along with present construction activities, which included the use of a lighting bears and generation. Tamper are were not that in, It Rail explaners and execution of varying sizes, concrete asia, pulsaries, concrete asia, pulsaries, currently asia, pulsaries and generation 15 (all size activities called solid construction of committed the reasonations of variety and committed activities activities and confidence and construction of the control of the reasonation of the control insulation throughout the measurement during time of activity on site.
Project 009	17-Nov-18	22:00	00:15:00	67.54	56.31	59.38	62.07	60.48	58.16	100		-	5.0 -	61	NCA-01	Night	35	40	60	50	29	24	4	11	Project 000 (ACI) Measurement taken outside 11 Drain Street, generally faving west towards site entance and works within the rail conridor. NCW PT works included a number of administration and works within the rail conridor. NCW PT works included a number of administration administration administration administration. When the administration adminis
Project 010	17-Nov-18	22:59	00:15:00	80.37	56.65	61.74	66.25	64.41	58.9	100		-	5.0 5.0	76	NCA-01	Night	35	40	72	50	37	32	0	26	
Project 011	17-Nov-18	23:45	00:15:00	86.32	53.04	72.23	83.61	76.96	57.57	100			5.0 -	85	NCA-01	Night	35	40	72	50	42	37	5	35	Project 019-013 (AC2) Measurement location (deritted above. NCW PT works involved a number of adulties outlined within ODMMA-022 (Tamping of worksite, excension and institution on a language of the project corrections activities, which included the base of excensions and that all exponent of varying sizes. Tamper and work train, diver purchase and persent about 50% of the advances outlined by 50% office of the exension and some sizes. Tamper and work train, diver purchase and persent about 50% of the advances outlined by 50% office of the exension and some sizes. Tamper and work train, where persent and trains to the sizes of the advances of the
Project 012	18-Nov-18	13:44	00:15:00	86.59	51.19	72.29	81.8	77.38	55.17	100		-		84	NCA-01	Day	42	47	64	57	30	25	8	27	notes source reaudité troughoit the meaurement during times of high activity on also
Project 013	18-Nov-18	14:15	00:15:00	88.77	47.65	74.54	85.3	79	55.74	90		-	- -	85	NCA-01	Day	42	47	72	57	32	27	2	28	
Project 014	18-Nov-18	15:21	00:15:00	95.33	39.81	67.81	75.24	66.48	44.19	80		-	5.0 -	94	NCA-01	Day	42	47	72	57	30	25	0	37	Project 014.015 (A11): Measurement location identified above (A01): NCIN PT works making included Adulties 6, 15 and 16 (Tamping of worksite, move) of roles well and concrute capping on the control time of the project or control to adulties, which included the sacet of sighting bower and governors. Tamper and work trait, HI Rail copponent and executation of varying states, concrete saces, justificaments, camp tools, and power and general land tools. Site activities contined above deminated the researcements and contributed to 50. Which is the measurement state. Also note believe to the measurement, state or project installation to supplement group repair shall be the project the measurement state or contributed to 50.
Project 015	18-Nov-18	15:39	00:15:00	92.48	61.93	66.9	74.53	67.28	64.22	100		-		92	NCA-01	Day	42	47	72	57	25	20	-5	35	To the service of the second o
Project 016	18-Nov-18	17:01	00:15:00	71.55	46.81	57.31	65.85	60.95	49.92	80		-	- -	67	NCA-01	Day	42	47	60	57	14	9	4	10	Project 015-017 (AVI2) Measurement location identified above. NOV PT ento involved a number of arbitries outlined within OCHWA-2021 (Tamping of services, excession and installation and installation along with great correlations activities, which included the use of excessives and have expensed on the arbitries outlined show dominated the measurements and contributed to 85-09% of the measured Livery role level over the two measurements, with non-project related noise sources generally another broughout the measurement dump times of they only the one securements, with non-project related noise sources generally another broughout the measurement dump times of they only the one securements.
Project 017	18-Nov-18	17:30	00:15:00	71.55	48.39	62.61	68.78	65.87	52.1	90		-	- -	70	NCA-01	Day	42	47	60	57	20	15	2	13	
Project 018 Project 019	18-Nov-18	17:52	00:15:00	86.45	51.19		72.54	69.36 74.34	55.29 62.91	100		-	5.0 -	72	NCA-01	Day	42 41	47	72	57	29	24	4	15	Project 018-019 (A11) Measurement location identified above (A01) NON PT words makely included Activities 8, 15 and 16, ill rapping of worksite, removed or finishe wall and concents capping bears in the hippoints. Answers Team of prevention, Transport and order to the highest prevention or the hippoints and removed to the hippoints a
Project 020	18-Nov-18	18:45	00:15:00	85.86	40.78	58.24	70.76	59.2	43.84	70	57	-		67	NCA-01	Evening	41	46	55	56	16	11	2	11	Project GD (AD3) Measurement location identified above (AD3), NCN P7 works included a number of activities undired throughout COHMA-D2 (Trainping of each size, incovered or two medium of falseles; contemps proving, stockpring; along with general commission activates, which includes the one of a light by towns and generation. Turinger and each town, HFBAI measurement above the contemps of two measurements are along the commission of the comm

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File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site No ise Level - LAeq, 15minute	INP Impuisive Modifying Factor?	INP Tonal Modifying Factor?	INP LF Modfying Factor? Measured Site Noise	Lorel - LAMBAX	V Com	Period	RBL - LA10, Period	NML - LAeq. 15 minute	Predicted Site Noise Level - LAeq, 15minute	Steep Disturbance Screening Level - LAmax	Comparison to RBL - LANG, Period	Comparison to NML - LAeq, 15 minute	Comparison to Predicted Site Noise Level - L.Aeq. 15minute	Comparison to Skep Disturbance Screening Level - LAmax	Description
Project 001	22-Dec-18	14:50	00:15:00	79.1	45.0	56.8	66.4	58.2	50.2	40			0.0	54	ı A	01	Day	45	50	60	60	8	3	-7	-6	Project 011 (A01), Measurement taken on Wilson Street, facing east towards works within nal consider. NCW P-I works at this location involved activities 9 (OHW works) and general construction activities, which included the use of a movement of light vehicle. H-rail plant of verying sizes, and general hand tools. Distant halfor, estimated roise 56-75 GBA. Kids playing
Project 002	22-Dec-18	15:10	00:15:00	74.4	45.5	56.2	64.6	58.6	50.3	40		-	0.0	- 56	5 A	01	Day	45	50	60	60	7	2	-8	-4	meatry, estimated noise. 49-57 48A dainy gimes of low site activity. Site activities outlined above contributed to approximately 40% of the measured Likey noise level over the measurement, with non-project related staffs and other noise sources audible during times of low activity on site.
Project 007	22-Dec-18	18:22	00:15:00	79.2	41.8	63.9	73.4	68.8	48.0	40			0.0	68	3 A	02	Evening	40	45	55	55	20	15	5	13	Project 007 and 010 (AGD). Measurement state outside 11 Womon St. Killson, furing post towards worth within the sell condor. NOW 91-4 prodominarity involved Autholy 4 (pignaling constructions) and Autholy 11 (force construction). CHW words and general construction, activities, which included the use of a light which accessivepres, tighting toward and generators.
Project 010	22-Dec-18	21:20	00:15:00	79.1	54.0	65.9	74.4	70.7	56.3	70			5.0	74		02	Evening	40	45	55	55	29	24	14	19	First just and requipment, and hand tools. Passing traffic and seroptimes contrast, estimated notice (51.4 GMA. Bitd activity, estimated notice (51.6 GMA. Bitd activity, contrasts of the contrast of the con
Project 011	22-Dec-18	21:51	00:15:00	78.6	57.1	63.5	73.9	65.5	58.9	90			5.0	66	5 A	03	Evening	40	45	55	55	28	23	13	11	
Project 012	22-Dec-18	23:00	00:15:00	82.7	57.5	61.6	69.5	61.8	59.5	90			5.0	62	2 A	03	Night	35	40	57	50	31	26	9	12	Paged D1, 102 and D1 for infrastions maked a Columb New Killer, facing part baseds not on within the real counter, NCHP F4 particisment, implied planty 4 (signifigation) and recognition of the real page of the
Project 015	23-Dec-18	14:45	00:15:00	84.3	42.2	58.0	70.6	58.5	46.2	40			0.0	61	I A	03	Day	45	40	57	60	9	14	-3	1	

Weather 22-Dec-18: Generally good weather, cloudy with low-moderate winds. Some rain in the evening. Temperature ranged between 18-20 degrees Celsius Weather 23-Dec-18: Weather very fine with low winds and very little cloud. Temperature ranged between 22-25 degrees celsius.

Tools: a lay accessor consists are some transfer or a production of the consist of the contract of the contrac

File Name	Date	Start Time	Elapsed Time	LAFr	max L	AFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - L.Aeq, 15minute	NP impulsive Modifying Factor?	INP Tonal Modifying Factor?	INP L.F Modifying Factor?	Measured Site Noise Lovel - LAmax	NGA	Period	RBL - LA90, Period	- LAeq. 15 minute	Predicted Site Noise Level - L.Acq, 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RBL - LASO, Perio d	Comparison to NML - L.Aeq. 15 minute	Comparison to Predicted Site Noise Level - LAeq, 18minute	Comparison to Siesp Disturbance Screening Level - LAmax	Description
Project 003	22-Dec-18	15:44	00:15:00	77.	.0	58.3	63.0	68.4	65.9	59.2	90		-	5.0	-	69	A02	Day	42	47	60	57	26	21	8	12	Project 003 and 004 (A02). Measurements undertaken to the west of 14 Rideigh Street, facing west towards works within the rail control. NCW PT works involved a number of activities— cultimed within OCMHA-020 (accession), installation of CHVI and structures) along with general construction activities, buckling use of hand and power tools. Site activities deministed the
Project 004	22-Dec-18	16:15	00:15:00	85.	.8	56.9	65.2	72.9	68.8	57.9	100	70		5.0	-	72	A02	Day	42	47	60	57	28	23	10	15	measurement with only minimal input from non-afte related noises.
Project 005	22-Dec-18	16:45	00:15:00	81.	4	48.7	61.8	71.0	65.4	50.9	80	66		5.0	-	77	A01	Day	42	47	60	57	24	19	6	20	Project 005 and 006 (A02) Measurements undertaken to the in front of 13 Disks Street, facing west towards width the nall corridor. NCW P7 works involved a number of activities—collined within OMM-MAC (accountion, installation of CHVI and structures) along with general construction activities, including use of hand and power tools. Sits activities dominated the
Project 006	22-Dec-18	17:14	00:15:00	85.	.0	46.4	65.1	78.4	65.5	48.7	90			5.0	-	78	A01	Day	42	47	60	57	28	23	10	21	measurement with only minimal leput from non-site related notese.
Project 008	22-Dec-18	19:14	00:15:00	93.	.5	51.8	67.2	74.8	61.9	55.4	100			5.0	-	91	A03	Evening	41	45	57	56	31	26	15	35	
Project 009	22-Dec-18	20:15	00:15:00	85.	.8	50.5	61.9	69.2	65.4	53.4	100			5.0	-	67	A03	Evening	41	45	60	56	26	21	7	11	Measurement 008, 000, 013 and 014 (A03), Measurements undertaken in forct of 13 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 40 Measurements undertaken in forct of 13 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 40 Measurement 008, 000, 013 and 014 (A03), Measurements undertaken in forct of 13 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 40 Measurement 008, 000, 013 and 014 (A03), Measurements undertaken in forct of 13 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 13 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor, NCW PT works involved a number of 14 Hepetoun Ave, facing north towards words within the rall corridor.
Project 013	23-Dec-18	00:29	00:15:00	82.	.4	48.2	61.8	75.1	58.2	49.6	100			5.0	-	80	A03	Night	35	40	72	50	32	27	-5	30	-covince dostines areas Contracted Contracted, Educated Contract and Structurery using young gettine controllation automotion, including user or harder and private both. One automotion dostines automotion, including user or harder and private both. One automotion dostines automotion, including user or harder and private both. One automotion dostines are an automotion automotion, including user or harder and private both. One automotion automotion, including user or harder and private both. One automotion automotion, including user or harder and private both.
Project 014	23-Dec-18	00:45	00:15:00	78.	.3	47.2	61.0	69.6	67.0	48.7	100			5.0	-	70	A03	Night	35	40	57	50	31	26	9	20	
Project 016	23-Dec-18	15:44	00:15:00	74.	.3	47.4	61.7	67.4	65.3	49.9	60			5.0	5.0	65	A02	Day	42	47	60	57	28	23	10	8	Project 016 and 017 //ACQ_ Measurements undertaken to the west of 14 Radiegh Street, facing west towards works within the nat contrider. NCW P7 works involved a number of adultities— —outlined within COVM-M-ACQ (occasion), installation of CHVI and structures) along with general construction activities, underlying one of hand and power tools. Sits activities deministed the
Project 017	23-Dec-18	17:14	00:15:00	79.	.5	46.8	60.5	69.6	64.4	50.0	90			5.0	-	71	A02	Day	42	47	60	57	23	18	5	14	Consideration of the residence of the state
Project 018	23-Dec-18	17:45	00:15:00	82.	:5	44.4	59.7	72.0	60.1	47.0	90	64		5.0	-	81	A01	Day	42	47	60	57	22	17	4	24	Project 055 and 056 (A02). Measurements undertaken to the in horst of 13 Drake Street, facing west towards works within the rail conforce. NCW P7 works involved a number of activities outlined within COTHM-A02 (execution, installation of DRHW and structures) along with general construction activities, including use of hand and power tools. Site activities dominated the insecutiveness with only minimal Report from non-oile related notices.
Project 019	23-Dec-18	18:15	00:15:00	73.	.9	47.7	60.7	64.7	62.9	52.8	100	66		5.0	-	78	A03	Evening	41	45	60	56	25	20	6	22	Measurements 019 and 000 (A03), Measurements undertaken in ford of 13 Hopetoun Ave, facing north towards works within the rall contdox: NCW PT works involved a number of activities—cultined within COWHA-022 (occasion), installation of CHVI and structures) along with general construction activities, including use of hand and power tools. Site activities dominated the
Project 020	23-Dec-18	18:30	00:15:00	86.	.9	45.1	62.2	74.0	61.9	48.5	100			5.0	-	71	A03	Day	42	47	60	57	25	20	7	14	Counts are in COVPH-VCU (editorial), restaultor of CVPH and so southers are given general consocions acresses, incoming card in least any power tices, coar acresses commando are measurement at 4th only minimal legicitism non-site reliable findees.

Weather 22-23 Nov 2018: Fine weather with some winds; fairly overcast. Slight rain on Saturday evening. Temperature ranged between 18-25 degrees Celsius over the weekend.

Note: Low frequency, brailing and imputative noise tests were conducted in accordance with the NPT. The measured Leg data was applied in all cases. Modifying factor (penally) values were applied as applicable to the low frequency, brail or impulsive components detectable or attributable to the sites noise emission. The site noise contribution reported here is inclusive of all modifying factors (if applied

File Name	Date	Start Time	Elapsed Time	LAFmax	x LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Confilbution (%)	Measured Site Noise Level - L.A.eq., 1 Smirute	Impulsive Modifying Factor? Tonal Modifying Factor?	LF Modifying Factor?	Measured Site Noise Level - L Amax	NGA	Period	RBL - LA90, Period	- L.Aeq, 15 minute NML	Predicted Site Noise Level - L.Aeq. 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RB L - LA90, Period	Comparison to NML - L.Aeq. 15 minute	Comparison to Predicted Site Noise Level - L.Aeq, 16minute	Comparison to Sieep Disturbance Screening Level - LAmax	Description
Project 000	03-Jan-19	22:30	00:15:00	66	49	51	55	51	50	95	60	3.0 2.0	5.0	65	NCA01	Night	35	40	57	50	25	20	3	15	L01 - Project 000 and 001. Measurements undertaken outside 13 Drake Sheet, Arlamon. Generally facing west bawards site entrance and works within the rail contrict. NCW involved a unumber of activities outlined within OOVHAAOTS (e.g. removal of industriate equipment, installation of OHV and structures) along with general constructions activities, including use of hand
Project 001	03-Jan-19	23:00	00:15:00	68	49	51	56	51	50	95		3.0 5.0	5.0	68	NGA01	Night	35	40	57	50	28	23	6	18	Indicate a set that country safe country of the cou
Project 002	03-Jan-19	23:30	00:15:00	68	46	55	61	58	48	95		3.0 -	5.0	60	NCA01	Night	35	40	57	50	27	22	5	10	L02 - Project G02 and G03. Measurements undertaken to the west of 14 Rakelph Sheet, Astermon. Along the laneway, generally facing west bowness within the rail consider. NOW—Immoved in number of activities outlined within COVM-ACT (e.g. removal of reduction experience), insultation of CHW and structures) along with general construction activities, including use
Project 003	04-Jan-19	00:00	00:15:00	67	46	55	62	59	48	95			5.0	62	NGA01	Night	35	40	57	50	25	20	3	12	Interest a formed to durines Outlook serrir Controvers (e.g. renoted of todatable requirence, manadatin Controvers and serrir Controvers and services are services and services are services and services a
Project 004	04-Jan-19	01:15	00:15:00	53	35	40	48	41	37	10			-	41	NGA01	Night	35	40	57	50	-5	-10	-27	-9	LO3 - Project DO4. Measurements undertaken in front of 13 Hopotium Ave. facing north-sent towards works within the rail control. NCW involved a number of activities cultimed within OXMM-A19 (e.g. rentwal of redundant exp
Project 005	04-Jan-19	01:46	00:15:00	83	52	57	65	58	53	100		- 5.0	5.0	83	NCA01	Night	35	40	57	50	32	27	10	33	101 - Project 905. Measurements undertaken outside 13 Drake Street, Antamon. Generally facing west towards site enhance and works within the rail contider. NCW involved a number of activities outlined within COVHA-075 (e.g. enrowed of redundant equipment, installation of CHV and structure) along with general construction activities, including use of hand and gower tools. Site activities dominated the measurement with only minimal report from non-site related notices.
Project 006	04-Jan-19	02:16	00:15:00	67	35	48	61	49	37	50			-	54	NCA01	Night	35	40	57	50	10	5	-12	4	1.03 - Project 005. Measurements undertaken in foot of 13 Hopstoun Ave, facing north-west towards works within the nal contrior. NCW involved a number of activities cultimed within OOMH-A195 (e.g. revious) of reducation explanent, installation of OHM and obstacles) along with general construction activities, including use of hand and power tools. Site activities cultimed the approximately 50% of the measurement with the remaining sources being non-site related notice (e.g. failfic and insects).
Project 007	04-Jan-19	03:00	00:15:00	69	48	59	66	63	51	100		2.0 -	-	65	NCA01	Night	35	40	57	50	26	21	4	15	L02 - Project GOT and GOB. Measurements undertaken to the west of 14 Rakiegh Street, Astermon. Along the laneaus, generally facing west bowerds works within the rail contrior. NOW—Immoved in number of activities outlined within COVM-ACT (e.g. removal of redundant equipment, insultation of CHW and structures) along with general construction activities, including use
Project 008	04-Jan-19	03:30	00:15:00	69	50	55	61	58	52	100		-	5.0	63	NCA01	Night	35	40	57	50	25	20	3	13	Interest a formed to durines Outlede serrir Controver's (e.g. mindre of relational requirence, manadarin Controver's an accuracy away serry general consecution automos, incoming use of hand and gover tools. Site activities dominated the measurement with only minimal input from non-die related noses.
Project 009	04-Jan-19	22:30	00:15:00	54	38	44	49	45	41	1			-	0	NCA01	Night	35	40	57	50	-41	-16	-33	-50	LO3 - Project 009. Measurements undertaken in front of 13 Hopotium Ave. facing north-send towards works within the rail control.r NCW involved a number of activities cultimed within OXMM-A19 (e.g. removal of returnion requirement, establishment OXMM and structurers) along with general construction, middling use of hand and power tools. Extransous sources (e.g. shafe and tracefol) dominated the measurement and the safe was traudible.
Project 010	04-Jan-19	23:00	00:15:00	68	50	52	59	52	51	80		2.0 -	5.0	60	NCA01	Night	35	40	57	50	23	18	1	10	LOT - Project 900 and 001. Measurements undertaken outside 13 Drake Street, Arlamon. Generally facing west bewelds after enhance and works within the rail contrider. NOW invoked a number of admitted outlined within COMPA-CDS (a.g. removal of redundant equipment, installation of CHVI and structures) along with general construction activities. Noticiting use of hard and power both. Site activities dominated the neasurement with only minimal injust from non-alter related modes.
Project 011	04-Jan-19	23:30	00:15:00	68	42	48	56	49	44	90	56	4.0 -	5.0	68	NCA01	Night	35	40	57	50	21	16	-1	18	LID - Project D11. Measurements undertaken in front of 13 Hejestrun-Aver, facing north-west towards sends within the sel consider, NCW involved a number of activities cultimed within COMM+A-D15 (e.g. removal of redundant equipment, installation of CMM and stochards) along with general construction activities, including use of hand and power book. Site activities cultimed within considerable in reasonable the measurement with only minimal liquit from non-alle valided notices.
Project 012	04-Jan-19	23:45	00:15:00	67	42	50	62	53	43	95			5.0	67	NCA01	Night	35	40	57	50	20	15	-2	17	L02 - Project O12 and O13. Measurements undertaken to the west of 14 Rakelph Sheet, Astermon. Along the laneway, generally facing west bowness within the rail consider. NOW involved an unitor of activities outlined within COVM-ACT (e.g. microal of reduction experience, insultation of CHW and structures) along with general construction activities, including use
Project 013	05-Jan-19	00:15	00:15:00	67	43	53	59	56	46	95		4.0 -	5.0	63	NCA01	Night	35	40	57	50	27	22	5	13	of hand and power tools. Site activities dominated the measurement with only minimal input from non-site related noises.
Project 014	05-Jan-19	00:45	00:15:00	62	39	45	53	45	41	20			-	40	NCA01	Night	35	40	57	50	3	-2	-19	-10	I.D Poject D11. Measurements undertaken in foot of 13 Hopstrum. Facility onth-west towards sends within the sal condor. NCMI modered a number of activities cultilated within OOHH-AVTI (e.g. removal of relandant equipment, tradiation of CHMI and stouchards) along with general construction activities, including use of hand and power bole. Site activities dominated the measurement with only instinual input from non-site related notice.
Project 015	05-Jan-19	01:45	00:15:00	79	32	54	67	49	34	10			-	51		Night	35	40	54	50	9	4	-10	1	1.04 - Project 015. Measurements undertaken outside 1 Werora hierone. Kilizar. Facing south-west towards afte works within the and contact NCW involved a number of solvielles outside within OCHHA4-015 (e.g. seroonal of redundant equipment; installation of CHHA and structures) along with general construction activities, including use of hand and power tools. Estawards ourselve (e.g. serific are fraucist) dominated the measurement with only mineral epoch from size reliable colores.
Project 016	05-Jan-19	02:30	00:15:00	78	37	53	66	48	38	20			-	40		Night	35	40	55	50	11	6	-9	-10	1.55. Project D1S. Measurements undertaken outside 2 Ecropis Street, Conton. Facing south-ward towards side works within the rail conton. NOW involved a number of advisites officed within COVINA-OTS (e.g., amonut of reducted expignment, establistics of CHW and structures) along with general construction activities, including use of hand and power bods. Estameous sources (e.g. traffic and insects) dominated the measurement with only minimal input from site related notates.
Project 017	05-Jan-19	03:16	00:15:00	69	49	51	57	51	50	90		4.0 -	5.0	68	NCA01	Night	35	40	57	50	24	19	2	18	101 - Project 917. Measurements undertaken outdels 13 Daile Street, Actamon. Generally facing sext besends alle enhance and socials within the natioconfor. NCW involved a number of activities outlined within COVHHA-03T (e.g. removal of redundant equipment, installation of OHW and structures) along with general construction activities, including use of head and power book. Size activities deminated the resourcement with only minimal input from non-site reside forties.
Project 018	05-Jan-19	03:45	00:15:00	76	41	57	69	58	44	95	59	2.0 -	-	74	NCA01	Night	35	40	57	50	24	19	2	24	1.02 - Project D18. Measurements undertaken to the west of 14 Raisejs Street, Artumon. Along the laneure, generally facing west towards works within the rail contine. NCW involved a number of activities outlined within ODYHA-075 (e.g. removal of indundant equipment, installation of OHW and structures) along with general construction activities, including use of hand and power tools. Site activities deminated the measurement with only instinal input from non-site related noises.

1 of 2 16/01/2019 at 12:09 PM OOHW P1-6 & 7 - MW26+WE27

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Confilbution (%)	Measured Site Noise Level - L.Aeq. 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	Measured Site Noise Level - L.Amax	NGA	Period	RBL - LA90, Period	NWL - L.Aeq. 15 minute	Predicted Site Noise Level - L.Aeq, 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RBL - LA90, Period	Comparison to NML - L.Aeq. 15 minute	Comparison to Predicted Ste Noise Lovel - L.Aeq. 15min ute	Comparison to Sleep Disturbance Screening Level - LAmax	Description
Project 019	06-Jan-19	02:03	00:15:00	79	42	57	70	52	43	70			-	. 52	-	Night	35	40	54	50	20	15	1	2	LO4 - Project 019 and 000. Measurements undertaken outside 1 Werona Avenue, Kilara. Facing south-west bawerds alle works within the rail control. NOW motived a number of activities.
Project 020	06-Jan-19	02:21	00:15:00	86	42	61	74	59	43	60		-	-	. 60	-	Night	35	40	54	50	24	19	5		-cutined within COVINH-A75 (e.g. removal of redundant equipment, installation of CHM and structures) along with general construction activities, including use of hand and power tools. Standards contributed to approximately 66-70% of the measurement with the remaining sources being non-site related noises (e.g. traffic and insects).
Project 021	06-Jan-19	02:41	00:15:00	73	40	50	64	46	41	80		-	-	. 58	-	Night	35	40	55	50	14	9	-6	8	10.5 - Project 021. Measurements undertaken outside 2 Fornyth Street, Cordon. Fasing south-west bowerds site works within the rail contrior. NCW involved a number of activities outline within DOWH4-075 (e.g. removal of redundant equipment, including or of DePM and structures) along with general construction activities, including use of hand and power bods. Site activities activities activities, including use of hand and power bods. Site activities activities activities.
Project 022	06-Jan-19	21:15	00:15:00	79	38	56	66	60	40	10		-	-	. 62	NCA01	Night	35	40	57	50	11	6	-11	12	101 - Project 017. Measurements undertaken outsides 13 Drake Steed, Adamson. Generally facing west towards site enhance and works within the rail control. NOW involved a number (activates outlined within OOHM-4075 (e.g. removal of redundant equipment, includation of OHM and structures) along with general construction activities, including use of hand and power looks. Enhances sources (e.g. traffic and insents) dominated the measurement with only minimal input from site related noises.
Project 023	06-Jan-19	21:45	00:15:00	69	35	45	53	47	38	40				. 65	NCA01	Night	35	40	57	50	6	1	-16	15	LD2 - Project 018. Measurements undertaken to the weed of 14 Railegis Stees, Astarmon. Along the lareway, generally facing west towards works within the rail contider. NOW involved insurance of activities outlined within OOWH-N-D3 (e.g. removal of redundant equipment, installation of OHW and structure) along with general construction activities, including use of hand and power tools. Extraction according to the reduction of the related rooters.

Neather 03-07 Jan 2019: Fine weather with light winds; fairly overcast. Rain on Sunday night. Temperature ranged between 19-23 degrees Celsius over the monitoring periods.

Note: all predicted noise levels were reproduced from the LOR OOHMAP from for this track possession.

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Note: Low frequency to noise levels were reproduced from the LOR OOHMAP from for this track possession.

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Note: Low frequency to noise levels were reproduced from

File Name	Date	Start Time	Elapsed Time	LAFmax	i LAFmin	LAng	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Vessured Site Noise Level - LAeq. Sminute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor?	Vessured Sile Noise Level - LAmax	NGA	Period	RBL - LA90, Period	NML - LAeq. 15 minube	Predicted Site Noise Level - LAcq. Smirute	Skep Disturbance Screening Level - LAmax	Comparison to RBL - LA90, Period	Comparison to NML - LAeq. 15 minute	Comparison to Predicted Ste Noise Lyrel - LAeq, 15minute	Comparison to Seep Disturbance Screening Level - LAmax	Description
Project 000	11-Feb-19	22:45	00:15:00	64	44	52	57	54	45	80			2.0	5.0	64	NCA01	Night	35	40	61	50	23	18	-3	14	AST - Page CSS, Manuscrens authorities nature 11 Hypoten Annex, Challenced Exchig professed breach and extract and exchise the self control. NCM product, number activities control with an COMM-MAXING agreement of bookers and exercise soldered without accordance of bookers and exercise soldered without a COMM-MAXING and and power tools. She activities dominated the measurement with only minimal lipst from non-site related notices.
Project 001	11-Feb-19	23:15	00:15:00	57	38	44	50	45	40	30			-	5.0	55	NCA01	Night	35	40	56	50	8	3	-13	5	ACC - Project COT. Measurement taken was of 41 Riskeyh Street, Anamon. Along the laneway, generally facing west towards works within the rail contact. NCVI involved a number of auchites accident within COSHA-CCS (as probablished accident and when CHP accident, societying or insteads) along with growed contribution, societion, societying and and promoting accident accide
Project 002	11-Feb-19	23:45	00:15:00	85	34	53	61	46	36	30			-	-	85	NCA01	Night	35	40	56	50	12	7	-9	35	ASS. Page ISS Manuscream understandant ID-bits bits Aprilmo group for large year breach after streets and entire and critical action of critical productions and control of the control of
Project 003	11-Feb-19	00:15	00:15:00	55	37	38	44	39	37	50			-	-	40	NGA01	Night	35	40	56	50	0	-5	-21	-10	ASC. Page 253 Manuscreen Laborator of 1 Stadigh Theor. America. Non-ph service, ground fronty and benefit solds within the sold condex VST howled a careful of the extra condex solds within the sold of the extra condex solds within the sold of the extra condex solds within the extra condex solds within the extra condex solds within the condex sold of the extra condex solds within the extra condex solds within the extra condex solds within the rail condex. Both sits-related coases and extravous sources (e.g. baffic and inexis) contributed everly to the overall note level produced be recursived.
Project 004	12-Feb-19	00:45	00:15:00	55	38	41	44	42	38	60			-	-	43	NCA01	Night	35	40	59	50	4	-1	-20	-7	
Project 005	12-Feb-19	01:01	00:15:00	80	39	45	44	43	40	50			-	-	42	NGA01	Night	35	40	59	50	7	2	-17	-8	
Project 006	12-Feb-19	22:30	00:15:00	71	42	49	58	50	44	80		-	5.0	5.0	66	NGA01	Night	35	40	59	50	23	18	-1	16	ADT - Project DIS, DB Masserment indication coded in 3 high contract flowing coft-week headst all enterior act was with the of confer for VPV invoked number of admissionated with CONFOCK data general of enterior codes, executed on the opposition has trapp, declarated positions for execution of the codes along way in project contraction activities, including use of fourd and power loss, like contributions varied belower measurements, origing belowed 30% – 20% of the covaril vision levels, with the enrainated resources by your device levels and and other loss contributions of the resourcement of the contributions
Project 007	13-Feb-19	01:00	00:15:00	64	44	50	56	52	47	20			-	-	54	NCA01	Night	35	40	59	50	8	3	-16	4	
Project 008	13-Feb-19	01:15	00:15:00	80	44	50	53	50	46	30			5.0	-	60	NCA01	Night	35	40	59	50	14	9	-10	10	
Project 009	13-Feb-19	01:46	00:15:00	66	46	49	52	50	48	10		-	-	-	39	NCA01	Night	35	40	56	50	4	-1	-17	-11	ASA - Project 500 - 100 Massaurements unbediden makels impropry varie die allusted opposite 3 Meison Stevet, Challemond, unbeide the roll contriber. Generally facility and travested alle and contriber. New Workshold in number of a clarifolisies calculated with COVIN-ACSE (sent microbile), preparation for the Nelson Stevet Bridge removal) along with present construction activities.
Project 010	13-Feb-19	02:01	00:15:00	78	47	51	55	51	48	40			-	-	51	NCA01	Night	35	40	56	50	12	7	-9	1	including use of hard and gover tools and movement of verticals and plant at this next associated in accord the national formation and associated in all conflicts. Size contributions used between measurements imaging between 10% - 40% the overall notes terms, producemently influenced by note-size related startle, and other notes sources.
Project 011	13-Feb-19	02:30	00:15:00	58	39	45	51	47	42	30			-	-	45	NCA01	Night	35	40	56	50	4	-1	-17	-5	A22 - Project S11. Measurement taken was of 14 Rakejih Steel, Anamon. Along the laneway, generally facing west towards works within the rail contact. NCVI incidend a number of workflow and selected from the rail contact. The results were selected and the rail contact and the results within the results within the rail contact. Selected and results within the rail contact and results within the results within the rail contact. Selected and results within the results
Project 012	13-Feb-19	22:30	00:15:00	65	44	50	52	51	48	20			-	-	52	NCA01	Night	35	40	56	50	8	3	-13	2	ACI - Project DTZ. Measurements undertaken outside 15 Hopeburn Avenus, Challescod, facing north-west lowered size entrance and works within the seal contract. NCW modered a number auchites admined within COMPM-ACI (by a revocus) of industrial cables, securation of injection. Averance, subcriticing, includition of CST and cables along with general construction. Securities, subcritique of the earth period below, destroyed across a long securities of the entrance securities of securities. According on the entrance securities of securities of the entrance securities of securities.
Project 013	13-Feb-19	00:00	00:15:00	73	49	64	71	67	52	90			5.0	-	73	NGA01	Night	35	40	73	50	33	28	-5	23	AGI. Project DSI. Measurement understaten outside temporary sook sits situated appoints 7 Nation Street, Challancock, outside the rist contain. Generally floring west towards and real use of hard and power book and incomment of vehicles and jurist within and amount the rist contain. Site activities dominated the measurement with only minimal input from non-like related notices.
Project 014	13-Feb-19	00:30	00:15:00	71	43	52	59	56	47	80			5.0	-	65	NGA01	Night	35	40	59	50	21	16	-3	15	ACT - Project D14. Measurements undertaken outside 13 Hopeburn Avenut. Challescool. Facing troth-seed towards site enteriors and works within the and control. NCW modered a number auchines admined with CODINAL D15 by reviewed of indicated codes, secured out if ingritude Avenues, subtracting conditional CODI and codes; along with great construction of indicated codes and cod
Project 015	14-Feb-19	01:01	00:15:00	60	37	41	46	42	38	80		-		-	45	NCA01	Night	35	40	56	50	5	0	-16	-5	A22 - Project 911. Measurement taken west of 14 Raksiph Rised, Actamon. Along the laneway, generally facing west towards works within the rail conduct. NOVI invoked an ambier of auchities colleded within OOMM-A20 (e.g. patialization of cables and other OHM activities, lookpilling of materials, execution writing along within preservor conduction activities, including use and and power but, an involvement of existing paid within the sall conduction. Size during the securities of the involvement of existing paid within the sall conduction. Size during the securities of the involvement of existing paid within the sall conduction. Size during the securities of the involvement of existing interest involvement of existing paid within the sall conduction.

1 of 2 21/02/2019 at 3:37 PM OOHW P7 - MW32

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAsq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - LAcq, 15milnute	Impulsive Modifying Factor?	Tonal Modifying Factor? LF Modifying Factor?	Measured Site Noise Level - LAmax	NCA	Period	RBL - LA90, Period	NML - L'Aeq. 15 minute	Predicted Site Noise Level - LAeq, 15minuse	Skep Disturbance Screening Level - LAmax	Comparison to RBL - LASQ, Period	Comparison to NML - LAeq. 15 milnute	Comparison to Predicted Ste Noise Lovel - LAeq, 15minute	Comparison to Sleep Disturbance Screening Level - LAmax	Description
Project 016	14-Feb-19	02:00	00:15:00	76	50	70	75	73	53	90	75	-	5.0 -	74	NGA01	Night	35	40	73	50	40	35	2	24	
Project 017	14-Feb-19	02:16	00:15:00	75	50	66	72	71	51	90	71	-	5.0 -	72	NGA01	Night	35	40	73	50	36	31	-2	22	AA4 - Project D16 - D18. Measurements undertaken outside temporary work also alkated opposite 2 Nations Street, Chabineod, outside the nationalistic Centrally busing went towards allo contaker. NCVI involved a number of achieties cultimate with OCVIVH-ACS front motions, preparation for the Neison Street Bridge removal jacky with greated construction achieties, including use of hand and power tools and movement of verbices and pair terms and sound for lear control. Else achieties demanded the measurements (approximately 90% contribution across all three measurements) with only minimal tryst from non-site related notices.
Project 018	14-Feb-19	02:33	00:15:00	86	50	75	84	83	52	90	74	-		86	NGA01	Night	35	40	73	50	39	34	1	36	
Project 019	14-Feb-19	03:45	00:15:00	72	43	47	51	47	45	20	40	-		50	NGA01	Night	35	40	59	50	5	0	-19	0	APT - Project 01th Measurement undertaken outside 13 Hoperton Avenue. Chasteword, facing north-west towards site entiraces and words within the sall contact. NOV involved a number of activities contined within COVMM-ACS (s); we recoval of inductant colless, excavation of Hoperton Aven stem, Exhibiting, installations of GST and colless justing with general construction activities, including use of hard and power tools. Entereous sources (s) is tallful and insected the measurement with only minimal pour from site related notices.
Project 020	14-Feb-19	22:46	00:15:00	73	63	65	67	65	64	100	65	-		73	NGA01	Night	35	40	73	50	30	25	-8	23	Ac4 - Project DIS - 121 - Measurements understate notation between years and in distance appoints it is hard appoint in National Street, Challemond, unable the not contact, Centrally being west travestire is and contact. ACM misched an under of activities understand within COVINH-ACS (most modely, preparation for the Netwon Street of things removal) along with gravers or contractions activities.
Project 021	14-Feb-19	23:01	00:15:00	73	63	64	66	65	64	100	64	-		73	NGA01	Night	35	40	73	50	29	24	-9	23	Including use of hard and power books and movement of wholese and part within and amount the neal controls. She activities dominated the measurements pippor annually 100% contribution across all three measurements) with only memoral epid from two clere traded notions.
Project 022	14-Feb-19	23:30	00:15:00	69	41	49	52	51	44	50	50	-	5.0 -	56	NGA01	Night	35	40	59	50	15	10	-9	6	AST. Project DZ. Macroment underlate outside 13 Hopoton Aversa. Chatesook bodg north-west towards sits enterior and under within the sit contice. NCW involved a number of authities contined within COVM-ACCS (e.g. emoval of reducted collect, exacution of Hopoton-Aver area, according, installation of DST and called) along with period contenticion confeders including use of hard and power tools. Both sits-estated reviews and enteriors accurately and involved the contention confeders including use of hard and power tools. Both sits-estated reviews and enteriors accurate (e.g. traffic and investo) contributed every to the overall rosse level throughout the measurement.
Project 023	14-Feb-19	00:00	00:15:00	54	38	41	48	42	39	20	34	-		41	NGA01	Night	35	40	56	50	-1	-6	-22	-9	AZZ - Project OS1. Measurement taken sest of 14 Radios) Street, Adarmon. Along the linenessy, generally facing sest towards sectic width the rail condor. NCW involved a number of auchies on direct width or Windows and project or control on additional condors with COVIN-45, in production of action and office of a condors on the condors with a condors of action and action and action with the condors of action and action and action and action and project with the condors. Extraorise action 45 or \$1.00 actions and the condors of action action and action action and action action action action action. Action action.
Project 024	14-Feb-19	00:30	00:15:00	77	34	51	65	48	36	70	49	-		77	NGA01	Night	35	40	56	50	14	9	-7	27	AD3 - Project DS4. Measurement understam ordinate D12 chains Street, Artamon, generally facing west towards site entirance and works within the self-control. NOW included a number of accidence control works within the self-control control works and the control ordinates, and advantage of manufactures are controlled and ordinates, recklarly and ordinates and ordinates and advantage of manufactures are controlled and ordinates and ordinates and ordinates and ordinates are controlled and ordina
Project 025	15-Feb-19	01:00	00:15:00	64	52	56	59	57	54	100	66	-	5.0 5.0	64	NGA01	Night	35	40	73	50	31	26	-8	14	A44 - Project D25 - D26. Measurements understaten notation temporary sends also situated apposite 2 Nation Street. Challenged, underside the red contact. Generally facing west towards also contact NDV involved or mattern of admitted contacted in MOV MAN (25) from our towards, programation for the Motion Street Endings removal allowing will present contractions are afficient. Actually used of that or power fools and movement of vehicles and part in that and source of an another Size durings sourced in the measurements programately OTMS, contribution.
Project 026	15-Feb-19	01:16	00:15:00	71	55	65	67	66	65	100	70	-	5.0 -	70	NCA01	Night	35	40	73	50	35	30	-3	20	across all three measurements) with only minimal liquid from non-site related noises.
Project 027	15-Feb-19	01:45	00:15:00	56	43	48	52	51	44	80	52	-	5.0 -	52	NGA01	Night	35	40	52	50	17	12	0	2	A01 - Project D27 Measurement understaten outside 13 Hoperton Avenue, Chairescort, facing north-west besends sits enhance and works within the rad contrior. NCW involved a number of auctions outside within CNWHA CASE, as enough of reducated collects, excession of Hoperton Avenue, therefore, including visit part of Tardet called using with general construction. Audition, Number of Avenue Ave
Project 028	15-Feb-19	02:15	00:15:00	55	36	37	39	37	36	20	30	-		39	NGA01	Night	35	40	60	50	-5	-10	-30	-11	ADS - Project OSE. Measurement taken outside 11 Healthris Steet, Artermon. Generally facing west towards works on alle within the rail contribe. NCVI Involved a number of activities outlined with in-OSHA-LOS inscent days for the restaurable models give the great construction activities, reduling use of hard and power both. Estimated according to the contribution of the restaurable for measurement with only remove give from the inhelications.
Project 029	15-Feb-19	02:45	00:15:00	64	54	55	56	55	55	100	55	-		63	NGA01	Night	35	40	56	50	20	15	-1	13	A04. Psylect I23: 303. Measurements underhiben outdide temporary sood also allusted opposite? Nation Street, Challemond, cubide the sell confort. Controlly facility went towards sits and and confort. NOT invalvable a matter of actificies custines within CONNN-ACE (prices coalse), proportion for the Nation Street Edges previous giving years of controllors audition, and confort soot of the Controllors and common of a visit in a controllor and controller of visities and certifies and controller and controller of visities and certifies and controller and controller of visities and certifies and certif
Project 030	15-Feb-19	03:00	00:15:00	72	54	56	58	56	55	100	56	-	- -	56	NGA01	Night	35	40	56	50	21	16	0	6	recasing seld man are power took and incomment of Virefacts and plant with and shifted to shift the measurements population on the shifted to shifted to shift the s
Project 031	15-Feb-19	03:30	00:15:00	53	39	40	41	41	40	30	35	-		41	NGA01	Night	35	40	59	50	0	-5	-24	-9	AST - Popied 10s Measurement underlaken outside 13 Hopetion Avenue, Chatenoods boding north-west towards side enteriors and words within the self-contice. NCW involved a number of activation of interior within COMMA-ACSS (ag. amount of relaxation content of Hopetinus Are zero, according, includion or GST and called judge with pipered constitution activities, including use of hard and power tools. Estimatous sources (e.g. traffic and insenting dominanted the measurement with only minimal input from site related noises.

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File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAsq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Lovel - L'Acq, 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor? Measured Sile Noise Lovel - LAmax	NCA		Period	RBL - LA90, Perfod	NML - LAeq, 15 minute	Predicted Site Noise Lovel - LAeq, 15minute	Skep Disturbance Screening Level - LAmsx	Comparison to RBL - LA90, Period	Comparison to NML - LAgg, 15 minute	Comparison to Predicted Ste Noise Lovel - LAeq, 15minute	Comparison to Seep Disturbance Screening Level - LAmax	Description
Project 001	18-Feb-19	22:00	00:15:00	68	48	55	61	58	50	80		-	-	- 63	NGAO	1	Night	35	40	73	50	19	14	-19	13	A01 - Froject 001 - 000: Managements understands could be temporary week allo situated opposite 2 historic Situat Chatavood, cutable the radication. Generally facing west towards situ and excluding the use of hand and power took, and the recoverent of whole and polar which are diplet within and count of earl control. On the activities communities the measurements phetosen 80% 100% control and power took, and the recoverent of whole and polar which are diplet within and count of earl control. On the activities communities the measurements phetosen 80% 100% control and the country of th
Project 002	18-Feb-19	22:20	00:15:00	75	50	58	65	61	53	100		-	-	- 68	NGA0	1	Night	35	40	73	50	23	18	-15	18	extusing the case of fund and power took, will be inneressed to the case of th
Project 003	18-Feb-19	23:00	00:15:00	68	36	49	59	51	40	40		-	-	- 60	NGA0	1	Night	35	40	56	50	10	5	-11	10	AID. Topic ICO Measurement excludes native 10 trains State of Arternon, perceip finding each treasts site entires call or other fine of controls. ICON invalided in matter of another control excluded in matter controls excluded in matter controls and in matt
Project 004	18-Feb-19	23:35	00:15:00	81	55	57	62	58	56	95		-	-	- 61	NGA0	1	Night	35	40	73	50	22	17	-16	11	
Project 005	19-Feb-19	00:10	00:15:00	79	47	53	63	55	49	50		-	-	- 66	NGA0	1	Night	35	40	73	50	15	10	-23	16	
Project 006	19-Feb-19	21:45	00:15:00	81	57	59	63	59	58	90		-	-	- 70	NGA0	1	Evening	41	46	73	56	17	12	-15	14	
Project 007	19-Feb-19	22:30	00:15:00	71	56	58	60	58	57	100		-	5.0	- 61	NGA0	1	Night	35	40	73	50	28	23	-10	11	
Project 008	19-Feb-19	23:30	00:15:00	70	57	59	66	61	58	100		-	-	- 67	NGA0	1	Night	35	40	73	50	24	19	-14	17	
Project 009	19-Feb-19	23:49	00:15:00	81	57	70	77	75	59	100		-	-	- 78	NGA0	1	Night	35	40	73	50	35	30	-3	28	
Project 010	20-Feb-19	01:46	00:15:00	82	57	61	67	60	58	100		-	5.0	- 80	NGA0	1	Night	35	40	73	50	31	26	-7	30	
Project 011	20-Feb-19	03:17	00:15:00	70	50	59	63	61	51	100		-	5.0	- 68	NGA0	1	Night	35	40	73	50	29	24	-9	18	AG1. Figlied G64. Of 8. Manuscrements extended en obtain bumpoury sent des bilanded appoints 3 Nation Street. Chatanood costole the criticantics. Generally facing west traverside sits and excended NCW travelobed a number of scientifics codified within COVM-ACG from incessity, respectation for the Nation Street Bildings removal, concrete calling also, slaring with greated contraction, activities, including used in hard and power bods and movement of vehicles and pair within and amount the real contract. Site contributions mostly dominated the notice measurements (generally regripped eneroll) for aut of Vision 4 coveral raciose levely interned the north of the resident formation of the resident formation of their real scale and formation of the resident formation of their real scale and formation of the resident formation of their section scale.
Project 012	20-Feb-19	22:45	00:15:00	72	56	60	66	62	58	100		-	5.0	- 67	NGA0	1	Night	35	40	73	50	30	25	-8	17	measurements (generially ranging believen 90% and 100% of the overall noise levels) with more influence from non-site related traffic and other noise sources.
Project 013	20-Feb-19	23:10	00:15:00	72	57	60	67	62	58	100		-	-	- 69	NCAG	1	Night	35	40	73	50	25	20	-13	19	
Project 014	20-Feb-19	23:30	00:15:00	83	58	68	77	72	60	100		-	-	- 81	NGA0	1	Night	35	40	73	50	33	28	-6	31	
Project 015	21-Feb-19	00:40	00:15:00	80	58	65	73	69	59	100		-	-	- 72	NCAG	1	Night	35	40	73	50	30	25	-8	22	25 26 27 28 28 29 29 29 29 29 29 29 29 29 29 29 29 29
Project 016	21-Feb-19	01:00	00:15:00	78	58	68	75	73	59	100		-	-	- 75	NGA0	1	Night	35	40	73	50	33	28	-5	25	
Project 017	21-Feb-19	01:30	00:15:00	78	58	64	71	67	60	100		-	-	- 70	NGA0	1	Night	35	40	73	50	29	24	-9	20	
Project 018	21-Feb-19	02:30	00:15:00	78	57	66	75	70	59	100		-	-	- 75	NGA0	1	Night	35	40	73	50	31	26	-7	25	
Project 019	21-Feb-19	03:00	00:10:00	76	57	64	73	68	58	100	64	-	-	- 74	NCAO	1	Night	35	40	73	50	29	24	-9	24	

THE RESIDENCE OF THE LATTICE CHAPTER CHAPTER CAPTER	Comparison to MML. LAng, 15 minute Comparison to Predicted Strikes Lovel Strikes Lovel Comparison to Strike Comparison to Strike Comparison to Strike	Description
2223 001500 78 44 55 62 68 48 50 60 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	20 1 10	AD - Project 022 Measurement understalen odside 13 Hopetous Annex. Chalaecol facing north-sent forecast site orisone and works within the sell contact. NOV invoked a number of actitate ordered with OOMM-ASS (sig surround or industrial cables, exception of high principles in his man, shallowing, statistical or CST and cables, coverant cating laing with present control and original cables are contacted in cables and caching used in their caps which the School control cables are called principles and cables are called a ca
23.44 00:15:00 89 64 77 85 80 68 100 77 88 NOA11 NgH 35 40 73 50 42	37 4 38	AGL -Popper GS1 - GS2 Management understates solicité temporary and site statuted proposite 2 bisson fibres. Character, contains the sail contains. Character de site de contains contains and an extra de contains contains an extra de activités contains within COVINHA CSS (most notifie), preparation for the Nation State Editing enveroue including concerns contra) along with garant
00.15 00.15.00 85 64 77 81 79 72 100 77 81 NCA11 NgH 35 40 73 50 42	37 4 31	construction activities, including use of head and power tools and movement of whiches and point within and above the self-control. Elea activities dominished the measurements (appreciamately 100% contribution across the loss measurements) with only mineral regulation revokels related relates.
00.40 00.15.00 70 41 53 60 67 44 100 4 - 5.0 - 56 NCA11 Nept 35 40 59 50 23	18 -1 8	ADJ -Pople SDJ - SB, Macaramed principles and add 13 Pople of Arma, College of Arma, Colleg
01:30 00:15:00 66 39 50 57 64 41 100 88 55 NCA11 Nept 36 40 59 50 15	10 -9 5	construction archites, including use of hand and power tools. Bits activities dominated the misassements (pipcomately) 10th contribution across the two measurements) with only minimal input them non-alter indicate forcies.
01:50 00:15:00 85 60 74 81 78 65 100 74 84 NCA01 Neght 35 40 73 50 39	34 1 34	
02.15 00:15:00 89 60 76 84 80 62 100 71 88 NCA1 NgH 35 40 73 50 41	36 3 38	AGL - Project SGL - 105, Management understates calculate temporary work sits shaded propuls in Tables Street, Charlescode, calculate the self-conduct flower of the following street of the following
0246 00:15:00 81 61 73 76 74 70 150 73 77 NCAC1 Nept 36 40 73 50 38	33 0 27	contaction activities, including use of hard and power tools and movement of vehicles and pinet within and award the sall control. Site activities dominised the measurements (approximately 100% contribution across all four measurements) with only methal type from roon dis related moses.
02:14 00:15:00 77 58 65 73 70 60 100 65 69 NCA61 Night 35 40 73 50 30	25 -8 19	

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File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Sile Noise Level - L'Acq. 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor?	Measured Site Noise Level - LAmax	NGA	Period	RBL - LA90, Period	NML - LAng, 15 minuse	Predicted Site Noise Level - Lideq: 15minute	Skep Disturbance Screening Level - LAmbx	Comparison to RBL LASS, Period	Comparison to NML - LAeq, 15 minute	Comparison to Predicted Ste Noise Lorel - LAcq. 15minute	Comparison to Steep Disturbance Screening Level - LAmax	Description
Project 000	23-Feb-19	20:15	00:15:00	92	53	64	76	65	56	90		-	5.0	-	81	NCA01	Evening	41	46	74	56	28	23	-5	25	API - Project 070 - 101 Managements underlated related by 1 Months of America, Collections of Secrity continued treased side entires and works within the sid contact, MCM included a marker of activates without within COMM-XCS (e.g. minused of inductions collects, execution of Reporture America, activations of CEST and collects design with ground
Project 001	23-Feb-19	20:30	00:15:00	67	49	53	57	55	51	100		-	-	5.0	67	NGA01	Evening	41	46	59	56	17	12	-1	11	construction activities, including use of hard and power book. Site activities dominated the measurement with only minimal input from non-site stated noises.
Project 002	23-Feb-19	21:00	00:15:00	77	62	65	70	66	63	100		-	-	-	77	NCA01	Evening	41	46	73	56	24	19	-8	21	AZZ - Project 002 - 003. Measurements underhalm outside temporary work sits situated opposite 1 Nation Street, Chabrecod, outside the rail contdor. Generally facing west towards sits and act ordick NCW involved an unter
Project 003	23-Feb-19	21:15	00:15:00	89	63	67	74	70	64	100		-	-	-	88	NGA01	Evening	41	46	73	56	26	21	-6	32	securing one or nets and process one are recommend. Or foreign all piles framing all which of the distribution of the distribu
Project 004	23-Feb-19	21:47	00:15:00	67	45	53	58	56	48	100		-	-	5.0	63	NCA01	Evening	41	46	59	56	17	12	-1	7	ACT - Project DSL Measurements underlaten cutode 13 Repetion Aversac, Challemoot, Easing north-west braveds after other and works within the rail contact. NCW involved a number of activities, including use of hard and power book. She activities dominated the measurement with only resembling from non-side related notices.
Project 005	23-Feb-19	22:47	00:15:00	68	53	57	62	58	54	100		-	-	-	68	NCA01	Night	35	40	60	50	22	17	4	18	ALX - Rigid CES, Macroment later useful of 8 Risings Dates, Aprillon, Aprillon Description, generally fasting sets function and with the oil control. NCVI impliced a matter and excited solding sets function and excited solding set function and excited solding set function and excited solding set funded and power looks, and received in excited solding sets funded and power looks, and received in excited solding sets funded and power looks, and received in excited solding sets funded and power looks and received solding sets funded sets funded sets funded and received solding sets funded sets funde
Project 006	23-Feb-19	23:16	00:15:00	84	53	67	77	72	57	100		-	-	-	83	NCA01	Night	35	40	60	50	32	27	7	33	AM: Page 405, Macament individual socials 10 flows State, Astron., paredly long and bases as a create and under which as distinct and control of the control
Project 007	23-Feb-19	00:02	00:15:00	77	57	60	64	60	59	100		-	-	5.0	77	NCA01	Night	35	40	73	50	30	25	-8	27	ASZ - People GSZ - 109. Macrosmored underhalen colated benganger yand also shaded appoint it Nation Street, Challendon, unable the set contact. Centrally facing weet branchs die set all contacts. Centrally facing weet branchs die set all contacts of the Water Street Challendon Street, Challendon, unable the set contacts, Centrally facing weet branchs die set. all contacts of the Water Street
Project 008	23-Feb-19	00:17	00:15:00	67	57	58	60	59	58	100		-	-	5.0	63	NCA01	Night	35	40	73	50	28	23	-10	13	Including use of head and power books and movement of vehicles and plant within and amount the real contents. Site activities decreased the measurement of periodical power books and movement of vehicles and plant within and amount the real contents. Site activities decreased the measurement of periodical books to the content of the measurement of periodical books and movement of the content of
Project 009	24-Feb-19	00:45	00:15:00	79	51	55	60	56	53	100		-	-	5.0	74	NCA01	Night	35	40	59	50	25	20	1	24	AD1 - Project 000. Measurements undertaken outside 13 Hopedour Avenue, Challewood, Fasing north-west bowerds site entirence and words within the rail contribs. NCW trooked a number of activities desired letter of the register of the regis
Project 010	24-Feb-19	01:15	00:15:00	81	59	62	70	61	60	100		-	-	-	81	NCA01	Night	35	40	73	50	27	22	-11	31	ASS - Protect 50-011. Nation IS WEST
Project 011	24-Feb-19	01:30	00:15:00	67	59	61	62	61	60	100		-	-	5.0	66	NCA01	Night	35	40	73	50	31	26	-7	16	
Project 012	24-Feb-19	14:33	00:15:00	86	57	61	72	60	58	100		-	5.0	-	74	NCA01	Day	42	47	73	57	24	19	-7	17	AID. Paper 113. Measurement individuals notified temporary work sit shaded opcode. I Males Stant, Chaissand, chaids the self contide. Everything facing used beauth as due to all contides. Chairwards and an amend of administrated used the COMPA-ACTS beauth could propose the Company of the Measurement of Amendment of
Project 013	24-Feb-19	15:15	00:15:00	80	57	66	76	68	60	100		-	-	-	77	NCA01	Day	42	47	60	57	24	19	6	20	AD3 - Project 013 - 014. Measurement taken west of 14 Stakinjh Street, Antamon. Along the laneway, generally facing west towards works within the rail contridor. MCW involved a sumber of achieves under within 40 CMM-M-205 (is, ig installation of collable and other CMM schilder, sociolating of materials) along white general contribution schildred, seed from all or power books, and involvement of verification and seed and in the contribution of the contribution in the count and removatement of the contribution and the contribution in the count and removatement of the contribution in the contribution i
Project 014	24-Feb-19	15:45	00:15:00	82	58	68	75	71	60	100		-	5.0	-	74	NCA01	Day	42	47	60	57	31	26	13	17	toos, and movement of vehicles and plant within the sall control. Site addition dominated the measurement's (proposementy) 10% control. On overall rose measurement's with only interest style from movement of vehicles and plant within the sall control. Site addition dominated the measurement's (proposementy) 10% control. One overall rose measurement's with only interest style from movement of vehicles and plant within the sall control. Site addition dominated the resource of the sall control.
Project 015	24-Feb-19	16:15	00:15:00	81	50	60	67	63	52	100		-	5.0	-	65	NCA01	Day	42	47	60	57	23	18	5	8	AM: Page 15, Manument and indicate scale 15 Data State, Among young long and search as extends and works with the all confident. Notification and extends address and works and works and the search and and an extends address and an extend and page 15 Data State and
Project 016	24-Feb-19	18:00	00:15:00	79	50	59	68	63	52	100		-	5.0	-	68	NCA01	Evening	41	46	60	56	23	18	4	12	ASS. Typic ETES flow content basin and of 15 flowing himse, Automotic Doug the server, promptly long week to each week with the list of colors. NOT included, content of authorise actions desired active act
Project 017	24-Feb-19	18:44	00:15:00	84	53	66	73	68	59	100		-		-	74	NCA01	Evening	41	46	60	56	25	20	6	18	ASS. Type ETT Electrometric statistics and color 12 Paids Statistics provide from your bursts be created as a create and white statistics control entering of the color of the
Project 018	24-Feb-19	19:45	00:15:00	84	59	65	70	67	61	100	70	ı	5.0	-	70	NGA01	Evening	41	46	60	56	29	24	10	14	AG3 - Project 01st. Measurement taken west of 14 Rakiegh Street, Adamson. Along the laneway, generally facing west browness works within the rail condor. NCVI included a number of auchides coldinated within COVIN-MASS (E.g. installation of coldinate and other CHVI achiese, sold-policy of materials) along with general construction achiese, including use of hard and power tools, and nonement of workless and place within the coldinated in coldinated be measurement (populationally). To contribution to the overall notion enseatment with only minimal input from no-side violate foliases (see Chorn regulation, distant traffic etc.).

feather 11-15 Feb 2019: Fine weather with light winds; overcast at times. Temperature ranged between 18-30 degrees Celsius over the monitoring period

Note: Low frequency, brailify and impulsive roise tests were conducted in accordance with the RP. The measured Leg data was applied in all cases. Modifying factor (penalty) values were applied as applicable to the lew frequency, brail or impulsive components detectable or attributable to the sites noise emission. The site noise contribution reported them is inclusive of all modifying factors (if applicable

File Name	Date	Start Time	Bapsed Time	LAFmax	LAFmin	LAcq	LAP1.0	LAF10.9	LAF90.0	Percentage Site Confibration (%)	Measured Site Noise Level - L.Aeq. 18minute	Impulsive Modifying Factor?	To nai Modifying Factor? LF Modifying Factor?	Measured Site Noise Level - LAmax	NGA	Period	RBL - LA90, Period	NWL - LAcq. 15 minute	Predicted Site Noise Level - LAeq, 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RBL - LANO, Period	Comparison to NM. - L.Ang, 15 minute	Comparison to Predicted Ste Noise Lavel - L.Aeq. 15minute	Comparison to Siego Disturbance Screening Level - LAmax	- Gaz-cripton
Project 001	06-Mar-19	21:57	00:15:00	71	48	57	65	58	52	2				54	NGA01	Evening	41	46	58	56	-1	-6	-18	-2	
Project 002	06-Mar-19	22:12	00:15:00	71	47	55	64	56	50	0		-		40	NCA01	Night	35	40	58	50	5	0	-18	-10	A01 - Poject 001-000. Measurements balan nutside 7 Calend Road, facing north-seat tow ands site entrance and sign-in area. NDV predeminarly invalend Activity 1 sudined within COMMA- 027 (Sign-orthif at Claind Road) sings with general construction activities. Including use of hand bods and movement of vehicles and plant within the rail contribs. Extraoreas operating and activities of the property
Project 003	06-Mar-19	22:30	00:15:00	75	46	55	66	57	50	0		-	- -	40	NCA01	Night	35	40	58	50	5	0	-18	-10	
Project 004	07-Mar-19	01:00	00:15:00	69	36	48	63	44	38	10				45	NCA01	Night	35	40	61	50	3	-2	-23	-5	
Project 005	07-Mar-19	01:15	00:15:00	65	38	45	54	47	40	10		-		50	NCA01	Night	35	40	61	50	0	-5	-26	0	AD2 - Project 004-006. Measurements undertaken outside 12 Draise Street, Arizamon, generally facing a west towards side entrance and works within the rad control. NOV involved a number of activities outsides with on COMM4-AD2 (a.g. M. Hedders resourced or the control of the part of activities outsides within the COMM4-AD2 (a.g. M. Hedders resourced or the control of the part of activities outsides within the control of the part of activities. Destination and the control of the part of activities and plant within the rad control. Extransource countries of the control of
Project 006	07-Mar-19	01:30	00:15:00	57	38	43	48	45	40	5		-	- -	41	NCA01	Night	35	40	61	50	-5	-10	-31	-9	
Project 007	07-Mar-19	02:00	00:15:00	57	38	42	48	44	40	1				41	NCA01	Nght	35	40	61	50	-13	-18	-39	-9	ACI - Project COT-7.08. Measurements taken w est of 14 Rakelyh Street, Artamon. Along the benevary, generally facing west towards works within the rail conridor. MCW Involved a number of activities collined within COVIPA-027 (e.g. HV Medicin
Project 008	07-Mar-19	02:15	00:15:00	68	38	43	47	44	40	1		-	- -	41	NCA01	Night	35	40	61	50	-12	-17	-38	-9	relocations, Coble pull/construction vorsis) along with general construction activities, including use of hand tools and movement of vehicles and plant within the nal control. Bit amenus sources (e.g. traffic and insects) dominated the measurement with very minimal contribution from site-related noises.
Project 009	07-Mar-19	02:45	00:15:00	54	38	41	44	42	40	0				30	NCA01	Nght	35	40	61	50	-6	-11	-32	-20	AA4 - Poject 000-010. Measurements undertaken outside 13 Hippetoun Avvenue, Chatter ood, facing north-w est tow ands site entrance and w onts within the nat corntor. NCW involved a number of startifies outlined within 000HeA 027 (e.g. MY feeders —"Recolations, Calle phatemystudin overs) and we glower of construction activities, including use of hand tooks and movement of vehicles and plant within the nat corntor. Extransecus
Project 010	07-Mar-19	03:00	00:15:00	58	39	42	47	44	40	0		-	- -	30	NCA01	Night	35	40	61	50	-5	-10	-31	-20	sources (e.g. partie and insects) dominated the measurement with very minimal contribution films tell-related noises. As the site was completely insudded during Project's 000-0101, the LSD parameter (minus 100Ms) has been used to evaluate a site contribution.
Project 011	07-Mar-19	22:00	00:15:00	66	35	48	63	45	37	5	35	-		45	NCA01	Night	35	40	61	50	0	-5	-26	-5	
Project 012	07-Mar-19	22:15	00:15:00	70	34	48	63	43	36	1		-	- -	40	NCA01	Night	35	40	61	50	-7	-12	-33	-10	
Project 013	07-Mar-19	22:31	00:15:00	67	33	49	64	42	35	5	35	-		40	NCA01	Night	35	40	61	50	0	-5	-26	-10	Ad5 - Roject 011-016. Measurements taken autistic 14 Hawlins Street, Antarmon, generally facing west towards within the rail corridor. NOW involved a number of activities outlined within DOWH-0-207 (e.g. 14 M feeders
Project 014	07-Mar-19	22:45	00:15:00	68	33	48	63	45	35	10		-		51	NGA01	Night	35	40	61	50	3	-2	-23	1	includes. Calls path and reacts) done with) along with general construction statistics, including use of send tools and reversed of vehicles and plant within the rail confort. Bit areaus sources (a ₀ traffic and reacts) dominated the measurement with very minimal contribution from site-related notes.
Project 015	07-Mar-19	23:00	00:15:00	68	32	48	63	42	34	5		-	- -	41	NCA01	Night	35	40	61	50	0	-5	-26	-9	
Project 016	07-Mar-19	23:15	00:15:00	67	31	48	63	41	33	5	35	ı		39	NCA01	Nght	35	40	61	50	0	-5	-26	-11	

eather 05-07 Mar 2019: Generally overcast weather, with light-moderate winds. Temperature ranged between 18-21 degrees Celsius over the monitoring periods.

Note: Low frequency, tonally and impulsive noise tests were conducted in accordance with the NP. The measured Leg data was applied in all cases. Medifying factors (if explicible) values were applied as applicable to the low frequency, tonal or impulsive components detectable or attributable to the sites noise emission. The site noise centribution reported here is inclusive of all medifying factors (if explicible) values were applied as applicable.

File Name	Date	Start Time	Elapsed Time	LAFmax	x LAFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - L.Aeq, 15minute	Impulsive Modifying Factor?	LF Modifying Factor?	Messured Site Noise Level - LAmax	NGA	Period	RBL - LA99, Period	NMIL. -L.Aeq.15 minute	Predicted Site Noise Level - L.Aeq, 15minute	Seep Disturbance Screening Level - L. Amax	Comparison to RBL LA99, Period	Comparison to NML - LAeq. 15 minute	Comparison to Predicted Site Noise Lovel - L.Aeq. 15minute	Comparison to Steep Disturbance Screening Level- LAmax	- Geenrifition
Project 001	18-Mar-19	22:45	00:15:00	68	36	50	58	56	39	100				60	NCA01	Night	35	40	61	50	15	10	-11	10	
Project 002	18-Mar-19	23:00	00:15:00	68	36	43	51	45	39	100				50	NCA01	Night	35	40	61	50	8	3	-18	0	
Project 003	18-Mar-19	23:15	00:15:00	71	35	47	58	48	38	100				65	NCA01	Night	35	40	61	50	12	7	-14	15	LD1 - Project 001-005. Measurements undertaken outside 12 Draie Street, Antamon, generally facing west towards site entirance and works within the rail condor. NCW involved a number of activates outlined within 0019HA-027 (e.g. HV feeders relocations, Castle pullConstruction works) along with general construction activities, including use of hand bods and movement of ventices and part within the rail condor. Site-related notices deminated the majority of measurements with approximately 15-100% contribution. Extransous sources were also observed to include train, traited on streets.
Project 004	18-Mar-19	23:31	00:14:33	63	35	40	46	42	37	50				45	NCA01	Night	35	40	61	50	2	-3	-24	-5	
Project 005	18-Mar-19	23:45	00:15:00	64	37	43	52	44	39	15				45	NCA01	Night	35	40	61	50	d	-6	-27	-5	
Project 006	19-Mar-19	00:15	00:15:00	62	34	41	51	43	36	100				55	NCA01	Night	35	40	61	50	6	1	-20	5	
Project 007	19-Mar-19	00:30	00:15:00	67	33	42	52	44	35	100				55	NCA01	Night	35	40	61	50	7	2	-19	5	U.2 - Project 005-005. Measurements undertaken outside 14 Hawkins Street, Artamon, generally facing south west towards the works within the rail control. NVI involved a number of activities outlined within COVIN-ACT? (e.g. HV bedoes relocations, Cable pull/Construction wints) along with general construction activities, including use of hard took and involvement of written and plant within the rail control. Site-related noises dominated the majority of measurements with approximately 15-100% combuston. Extransous sources were also observed to relocation into the ordinates.
Project 008	19-Mar-19	00:45	00:15:00	68	34	39	46	40	35	15				45	NCA01	Night	35	40	61	50	-4	-9	-30	-5	
Project 009	19-Mar-19	21:30	00:15:00	71	38	53	66	54	41	30				55	NCA01	Evening	41	46	61	56	6	1	-14	-1	
Project 010	19-Mar-19	21:45	00:15:00	69	36	53	66	51	40	20				55	NCA01	Evening	41	46	61	56	5	0	-15	-1	
Project 011	19-Mar-19	22:00	00:15:00	74	37	51	65	48	40	30				53	NCA01	Night	35	40	61	50	10	5	-16	3	
Project 012	19-Mar-19	22:45	00:15:00	68	38	50	61	52	41	70				58	NCA01	Night	35	40	61	50	14	9	-12	8	LD1 - Project 009:0016. Measurements undertaken outside 1'2 Drake Street, Arlamon, generally bodry west towards site enhance and works within the rail contrior. NOW involved a number of autivities cultimos within 00164-Mo27 (e.g. HV feeders relocations, Cable pull/Construction works) alony with general construction activities, including use of hand bolds and movement of
Project 013	19-Mar-19	23:00	00:15:00	74	37	52	64	53	41	100				65	NCA01	Night	35	40	61	50	17	12	-9	15	values colored with Color-rock (e.g. in recent resolution), value plan Colored and plan gained activation activates, fluiding user states use an investment of values and plan for all controls. Set-related noises dominated the majority of measurements with approximately 25-100% contribution. Extransous sources were also observed to value fraint, traffic and insects.
Project 014	20-Mar-19	21:45	00:15:00	76	44	58	69	61	45	100				75	NCA01	Night	35	40	61	50	23	18	-3	25	
Project 015	20-Mar-19	22:00	00:15:00	70	44	52	67	49	46	20				60	NCA01	Night	35	40	61	50	10	5	-16	10	
Project 016	20-Mar-19	22:45	00:15:00	63	44	49	55	52	45	20				55	NCA01	Night	35	40	61	50	7	2	-19	5	
Project 017	20-Mar-19	23:15	00:15:00	84	40	55	64	59	42	0				0	NCA01	Night	35	40	61	50	-13	-18	-39	-50	
Project 018	20-Mar-19	23:30	00:15:00	54	39	43	48	45	41	0				0	NCA01	Night	35	40	61	50	-14	-19	-40	-50	20 Pojec 017-015 Measurements undertaken natiode 14 Rekigh Street, Arlamon, generally bading west lowards the works within the sel control. NCHI involved a number of activates outlined within COMM-ACET (e.g. HV Redes relocations, Cable part Construction works) along with general construction activates, including use of hand took and movement of wholes are more than the second of the control
Project 019	20-Mar-19	23:45	00:15:00	65	39	51	62	53	41	<5				31	NCA01	Night	35	40	61	50	-14	-19	-40	-19	

File Name	Date	Start Time	Elapsed Time	LAFma	ax LAFmir	n LAe	eq LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - L.Aeq, 15minute	Impulsive Modifying Factor? Tonal Modifying Factor?	LF Modifying Factor?	Measured Site Noise Level - L.Amax	NGA	Period	RBL - LA90, Period	NML -L.Aeq. 15 minute	Predicted Site Noise Level - L.Aeq. 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RB L - LA90, Pario d	Comparison to NML - L.Aeq. 15 minute	Comparison to Predicted Site Noise Level - L.Aeq. 18minute	Comparison to Steep Disturbance Screening Level - LAmax	Description
Project 020	21-Mar-19	00:30	00:15:00	57	36	40	0 46	42	38	0			-	0	NGA01	Night	35	40	61	50	-17	-22	-43	-50	L01 - Project 020-021 Measurements undertaken outside 12 Drake Street, Artumnon, generally facing west towards site entiraces and works within the rail contrict. NOV involved a number of activities outlined within 00YM-AU27 (e.g. HV feeders relocations, Calle pull/Construction works) along with general construction activities, including use of hand tools and movement of
Project 021	21-Mar-19	00:45	00:15:00	52	37	41	1 45	42	39	0				0	NGA01	Night	35	40	61	50	-16	-21	-42	-50	vehicles and plant within the nall corridor. Extraveous sources dominated the majority of measurements with site noise being insustible. Extraveous sources were observed to include traffic and insects.
Project 022	21-Mar-19	01:15	00:15:00	63	40	43	3 49	45	41	2				42	NCA01	Night	35	40	61	50	-9	-14	-35	-8	LIJ - Project 022-2023. Measurements undertakten outside 14 Räsligh Street, Arlammon, generally facing west bawards the works within the sall contridor. NCW involved a number of activities. GUINHA-027 (e.g. IH V Redester relocations, Cable pull Construction works) along with general construction activities, including use of hand tools and movement of vehicles and
Project 023	21-Mar-19	01:30	00:15:00	55	39	43	3 49	44	40	0			-	0	NCA01	Night	35	40	61	50	-15	-20	-41	-50	plart while the rail counter. Extraceous sources dominated the majority of measurements with site noise being largely inaudible (at most 2% contribution from alle noise). Extraceous sources were observed to include trains, traffic and insects.
Project 024	21-Mar-19	19:45	00:15:00	71	47	58	8 69	58	52	0			-	0	NCA01	Evening	41	46	62	56	-9	-14	-30	-56	LD1 - Project D23. Measurement undertaken outside 12 Drake Street, Asturmon, generally boding west bissaries site enhance and works within the rail contricts. NOW involved a number of architect outlined within COVM-ACOT (e.g. 9H) Redders indications, Cable pull/Construction works) along with general construction activities, including use of hard bole and movement of wheleles and plant within the rail contrict. Extraerous sources dominated the majority of measurements with site noise being insudable. Extraerous sources were observed to include trains, training and research.
Project 025	21-Mar-19	20:00	00:14:49	75	42	56	6 67	58	44	15			-	65	NCA01	Evening	41	46	62	56	7	2	-14	9	L01 - Project 001-005. Measurements undertaken outside 12 Drake Street, Artamon, generally fissing west towards site entrance and works within the rail condor. NOV involved a number of activities outlined within 007894-027 (e.g. HV feeders relocations, Cable pullCorestruction works) along with general construction activities, including use of hand stooks and movement of
Project 026	21-Mar-19	20:15	00:15:00	79	41	59	9 70	62	43	100			-	70	NCA01	Evening	41	46	62	56	18	13	-3	14	whicks and plat within the rail contion. Site-related notes dominated the majority of measurements with approximately 15-100% contribution. Extraneous sources were also observed to include trains, hartful and insects.
Project 027	21-Mar-19	20:30	00:15:00	70	40	55	5 68	53	44	0			-	0	NCA01	Evening	41	46	62	56	-17	-22	-38	-56	L01 - Project C03 - C07. Measurement undertaken outside 12 Drake Street, Arlamon, generally facing west towards site enhance and works within the rail condor. NOV involved a number of activities outlined within C0094-M207 (e.g. HV feeders relocations, Cable pull/Construction works) allony with general construction activities, including use of hand tools and movement of
Project 028	21-Mar-19	20:45	00:15:00	68	42	54	4 67	52	44	0			-	0	NCA01	Evening	41	46	62	56	-17	-22	-38	-56	whites and just with the rist control. Extraeous sources dominated the majority of measurements with site notes being haudelib. Estraeous sources were deserted to include transport traffic and part funds.
Project 029	21-Mar-19	21:00	00:15:00	78	41	58	8 69	63	44	100		3.0 -		75	NCA01	Evening	41	46	62	56	20	15	-1	19	L01 - Project GDS-000. Measurements undertaken outside 12 Drake Street, Artismon, generally fiscing west towards after entrance and works within the rail control. NCW involved a number of artificiate outlined within 000MM-ADZ (e.g. HV feeders relocations, Cable pullCorrelocidos works) along with general construction activities, including use of hard stools and involvement of
Project 030	21-Mar-19	21:15	00:15:00	77	41	57	7 70	57	44	100		2.0 -	-	75	NCA01	Evening	41	46	62	56	18	13	-3	19	whicks and part within the rail corridor. Site-related noises dominated the majority of measurments with approximately 100% contribution. Extraneous sources were also observed to include trains, traffic, residents and insects.

File Name	Date	Start Time	Elapsed Time	LAFma	ıx LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - LAeq, 15minute	Impulsive Modifying Factor?	LF Modifying Factor?	Measund She Noise Level - Lamax	NGA	Period	RBL - LA90, Period	- L'Aeq. 15 minute	Predicted Site Noise Level - L.Aeq. 15minute	Step Disturbance Screening Lavel - L.Amax	Comparison to RB L - LA99, Period	Comparison to NML - LArq. 15 minute	Comparison to Predicted Ste Noise Lavel - L.Aeq, 15minute	Comparison to Sleep Disturbance Screening Level- LAmax	Description
Project 001	23-Mar-19	15:00	00:15:00	81	44	66	76	70	52	2		-		54	NGA01	Day	42	47	65	-	7	2	-16	-	L01 - Project 001-002. Measurements taken outside 13 Brand Street, floring north-west bowards works within the rail control. NOW involved a number of activities outlined within OOWH4- 007 (e.g. Drainage Works, HV feeders relocations and Netion SE Bridge removal) along with general construction activities, including use of hand took and movement of vehicles and plant
Project 002	23-Mar-19	15:30	00:15:00	80	49	67	76	71	55	30				62	NCA01	Day	42	47	65	-	19	14	4	-	within the real contribor. Extraneous sources (e.g., traffic and tains) dominated the measurement with <5 to 30 % contribution from site-related noises.
Project 003	23-Mar-19	16:00	00:15:00	70	45	57	67	59	48	100		-		65	NGA01	Day	42	47	62	-	15	10	-5	-	L02 - Project 000-004. Measumments taken outside 14 Hawkins Street, facing west towards works within the nal contrider. NCW involved a number of activities collined within COWHA-027— (e.g. Drainage Works, NY feeders introduction and Nethors St Bridge removal) along with general construction activities, including use of hand both and movement of whiches and plant within the nall controls. See the construction for activation controls (e.g. Tartific).
Project 004	23-Mar-19	16:15	00:15:00	73	54	60	69	62	56	100		- 5	0 -	68	NCA01	Day	42	47	62	-	23	18	3	-	The faccorroot sate nose dominated the measurements with minimal contribution from estateous noises (e.g., (rathc.).
Project 005	23-Mar-19	16:45	00:15:00	83	48	66	75	69	53	100				80	NCA01	Day	42	47	69	-	24	19	-3	-	L03 - Project 005-006. Measurements taken outside 12 Drake Street, floring west towards works within the rail contridor. NCVV involved a number of activities outlined within COVMHA-027—(e.g. Drainags-Works, MY feeders introductions and Nebon SI Bridge removal) along with general construction authitisels, including use of hand tools and movement of vehicles and plant within the rail corrisol. Set loss dominated the reasonments with minimal conduction from advances oncise (e.g. Tartific.).
Project 006	23-Mar-19	17:00	00:15:00	80	54	65	73	68	60	100				78	NCA01	Day	42	47	69	-	23	18	4	-	_
Project 007	23-Mar-19	17:30	00:15:00	67	52	57	66	60	53	100				62	NCA01	Day	42	47	59	-	15	10	-2	-	LO4 - Project CO7-COB. Measurements taken outside: 14 Ratiegy Street, facing west founds works within the rail corridor. NCW involved a number of activities outlined within COWH4-027 (e.g. Drainage Works, HY Redesis inducations and Netion SI Bridge removal) along with general construction activities, including use of hand tools and movement of vehicles and plant within the rail corrisos. Set loss dominated the near-sements with minimal conduction from advances oncise (e.g. Tartific.)
Project 008	23-Mar-19	17:45	00:14:57	70	43	55	65	56	52	100		-		62	NCA01	Day	42	47	59		13	8	4	-	_
Project 009	23-Mar-19	19:00	00:15:00	81	42	65	75	69	47	2		-		52	NCA01	Evening	41	46	65	-	7	2	-17	-	L01 - Project 009-010. Measurements taken outside 13 Brand Street, ficining north-west towards works within the rail contdor. NOW involved a number of activities outlined within OOWH4- COZ (e.g. Daningey Works, HV feeders relocations and Netion St Bridge removal) along with general construction activities, including use of hard tools and novement of vehicles and plant within the rail confort. Extracreous sources (e.g. Wilder and strail, jointains the reasurement will "be" contributed in ones.
Project 010	23-Mar-19	19:15	00:15:00	77	45	64	74	69	50	2		-		52	NCA01	Evening	41	46	65	-	6	1	-18	-	
Project 011	23-Mar-19	20:30	00:15:00	83	48	58	67	59	50	100		- 5	0 5.0	78	NCA01	Evening	41	46	62	-	27	22	6	-	L02 - Project 011-012. Measurements taken outside 14 Hawkins Street, fooling west towards works within the nal corrisor. NCW involved a number of advivites outlined within COVHH-A-027 e.g. Drainage Works, HV feeders info
Project 012	23-Mar-19	20:45	00:15:00	70	48	55	66	57	50	100		- 5	0 5.0	78	NCA01	Evening	41	46	62	-	24	19	3	-	
Project 013	23-Mar-19	21:15	00:15:00	88	51	62	70	65	53	100		3.0		70	NCA01	Evening	41	46	69	-	24	19	4	-	LG3 - Project 013-014. Measurements taken outside 12 brake Street, flucing west towards works within the rail comidor. NCW involved a number of achities outlined within COWH4-027 (e.g. Draings Works, NY feeders indications and Neison St Biologie removal aligns all premail controlled involved, including use of hand books and movement of vehicles and plant within the rail corrisos. Set raises obtained between excentered as the minimal controllution than activations contend (e.g. Tartific).
Project 014	23-Mar-19	21:30	00:15:00	77	46	59	69	65	47	100		- 5	0 -	75	NCA01	Evening	41	46	69	-	23	18	-5	-	
Project 015	23-Mar-19	22:00	00:15:00	57	41	45	51	48	43	0		-		0	NGA01	Night	35	40	59	50	-12	-17	-36	-50	LO4 - Project 015-016. Measurements taken cutside 14 Raleigh Street, facing west towards works within the rail corridor. NOW involved a number of activities outlined within COWHA-027 (e.g. Dranage Works, NY Bedosts indications and beloan St Biologie removal aliques of the primary control activities, including use of hand tooks and movement of wholices and plant within the rail corridor. Extensional sources (e.g. staff and restance) commented with the size invariant grounded by the department of the restanting restances for the department of the restances and restances are restanting restances.
Project 016	23-Mar-19	22:15	00:15:00	54	41	45	49	47	42	0		-		0	NGA01	Night	35	40	59	50	-13	-18	-37	-50	
Project 017	23-Mar-19	22:45	00:15:00	67	46	49	55	51	48	0		-		0	NCA01	Night	35	40	80	50	-7	-12	-52	-50	1.5 Project 017-018. Measurements balan codate 5 Netices Street, facing west breads works within the real conditor. NCIV involved a number of activities outlined within 00WHA-027 1.5 Project 017-018. Measurements balan codations and Netices 018 Resign removally along with general consolution activities, including use of hand fools and revenient of vehicles and plant within the real condition. Extranspost sources (in g. studie, and involved for measurement with the site remaining braudited for the devaluation of the involved conditions.)
Project 018	23-Mar-19	23:00	00:15:00	59	45	49	55	51	47	0		-		0	NCA01	Night	35	40	80	50	-8	-13	-53	-50	
Project 019	23-Mar-19	23:30	00:15:00	60	55	57	57	57	56	0	36		-	0	NCA01	Night	35	40	69	50	1	4	-33	-50	1.05. Pages OffSc03. Measurements bless cutiled 51 Hopstoon Answer, Early was travelled under contract. NCM Hookeds an under of activities collected within COMH- 207 (e.g. Draingay Works. HV feeders relocations and Nelson SI Biology removal) along with general construction satisfies, relucting use of hand book and movement of vehicles and plant within the rail contribe. Estimators sources (e.g. staffic and insects) contracted the measurement with the site remaining househilds for the duration of the measurements.

File Name	Date	Start Time	Elapsed Time	LAFmai	c LAFmir	n LAeq	LAF1.0	LAF10.1	0 LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - L.Aeq, 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	Measured Sile Noise	Level - LAmax	NUA	Period	RBL - L.A90, Period	NML - L.Aeq. 15 minute	Predicted Site Noise Level - LAcq. 15minute	Seep Disturbance Screening Level - L.Amax	Comparison to RB L - LA90, Pario d	Comparison to NML - L.Aeq. 15 minute	Comparison to Predicted Site Notes Level - L.Aeq. 15min ute	Comparison to Siesp Disturbance Screening Level - LAmax	O escription
Project 020	23-Mar-19	23:45	00:15:00	68	55	56	57	57	56	0	36		-	- a	NC	:A01	Night	35	40	69	50	1	-4	-33	-50	1.56. Poljed 019-020 Massumments taken outside 13 Hoppeton Avenue, facility west bewards works within the rail contrider. NCW modest a number of activities outlined within COVMA- 027 (e.g. Drainage Works, HV feeders relocations and Netson 8) Bridge removal) along with general construction activities, including use of hand bods and movement of vehicles and plant within the rail contriber. Estimators sources (e.g. staffic and freects) dominated the measurement with the rails contribe for the duration of the measurements.
Project 021	24-Mar-19	15:45	00:15:00	86	46	68	78	71	57	1		-	-	- 51) NC	A01	Day	42	47	65	-	6	1	-17	-	L01 - Project 021-022. Measurements taken outside 13 Brand Street, faining north-west towards works within the rall contrior, NCW models a number of authorities callined within OOWHA
Project 022	24-Mar-19	16:00	00:15:00	79	45	66	75	69	54	1			-	- 50	ž NC	:A01	Day	42	47	65	-	4	-1	-19	-	The type of image from the two types and the decision of comprehensive management with 45% contribution from site-violate noises. With the rail contribr. Elemenous sources (e.g. stiffs and tains) dominated the measurement with 45% contribution from site-violate noises.
Project 023	24-Mar-19	16:30	00:15:00	80	59	62	68	63	60	100		3.0	-	- 71) NC	A01	Day	42	47	62	-	23	18	3	-	LG2 - Project CG2-CG4. Measurements taken outside: 14 Hawkins Steer, fusing west towards works within the rail contact. NCW involved a number of achildres outlined within COWH4-ACZ? — (e., Drainage Works, HV fleeters indications and Neton SS Bridge removal) along with general construction achildres, including use of hand tools and movement of vehicles and joint and within a company of the contract of the contr
Project 024	24-Mar-19	16:45	00:15:00	78	48	62	71	65	54	100		3.0	-	- 73	ž NC	A01	Day	42	47	62	-	23	18	3		— (leg utunage works, in visions in socious) are treated in service and provide a company of the contract of t
Project 025	24-Mar-19	17:15	00:15:00	93	52	66	74	66	60	100		3.0	-	- 9	I NC	A01	Day	42	47	69	-	27	22	0	-	LID - Project 025-026. Measurements taken codade 12 Drate Street, facing west towards works within the rail contridor. NCW involved a number of activities cultined within OCWHM-027.
Project 026	24-Mar-19	17:30	00:15:00	93	52	70	76	73	57	100			-	- 90	3 NC	:A01	Day	42	47	69	-	28	23	1	-	—(e.g. Drainage Works, FV) feeders indications and Netion SS birdge removal) along with general construction activities, including use of hand tools and movement of vehicles and plant within the rail contribut. Sile noise dominated the measurements with minimal contribution from entaneous noises (e.g. Traffic.)
Project 027	24-Mar-19	18:00	00:15:00	75	57	63	70	65	60	100			-	- 71) NC	(A01	Evening	41	46	59	-	22	17	4	-	1.4 - Project 027.203. Measurements below outside 14 Bailegip Street, bodry west towards works within the nal contriet. NCW involved a number of adulties collined within COWHA.CZZZ. — (e., Disingay Works, HV Meeters relocations and Nation St Bridge removal) along with general construction authinities, including use of hard tools and movement of vehicles and plant within the contribution authinities.
Project 028	24-Mar-19	18:15	00:15:00	78	57	63	69	65	59	100	65	2.0	-	- 71	5 NC	A01	Evening	41	46	59	-	24	19	6		— (e.g. urange voras, ny secons reaccions are heacon se lange renoval) along with general construction between, incurring user of hard toos aren movement of versions are past with the rail contribor. Site notice dominated the measurements with minimal contribution from estateneous notices (e.g. Traffic).
Project 029	24-Mar-19	19:30	00:15:00	87	49	59	68	61	51	100	63	4.0	-	- 83	ž NC	A01	Evening	41	46	69	-	22	17	-6	-	10- Project 029. Measurements taken outside 13 Hopeboun Avenue, facing west brawds works within the rail contact. NCW involved a number of activities cultimed within OOWHA-027 (e.g. Drainage Works, HV feeders relocations and Netion SS titrigs removal) along with general construction activities, including use of hard tools and movement of vehicles and plant within the rail contact. Site notes dominated the measurements with minimal contribution from nethaneous notes (e.g. Traffic).
Project 030	24-Mar-19	20:00	00:15:00	82	52	66	77	71	53	100			-	- 81) NC	(A01	Evening	41	46	69	-	25	20	-3	-	
Project 031	24-Mar-19	20:15	00:15:00	76	49	60	68	63	51	100			-	. 70	5 NC	(A01	Evening	41	46	69	-	19	14	-9	-	103 - Project 030-032: Measurements taken outside 12 Drake Street, facing west towards works within the rail contrior. NCW involved a number of activities outlined within COWHA-027 (e.g. Drainage Works, HV bedons resocutions and Netion S Bridge removal) along with general construction activities, including use of hand tools and movement of vehicles and plant within the rail contrior. Site none dominated the measurements with minimal contribution from estatemous notices (e.g. Traillic).
Project 032	24-Mar-19	20:30	00:15:00	73	51	59	66	62	53	100		3.0	-	- 61	B NC	A01	Evening	41	46	69	-	21	16	-7	-	

Weather 23-24 Mar 2019: Generally overcast weather, with light to calm wind conditions. Temperature ranged between 21-30 degrees Celsius over the monitoring periods.

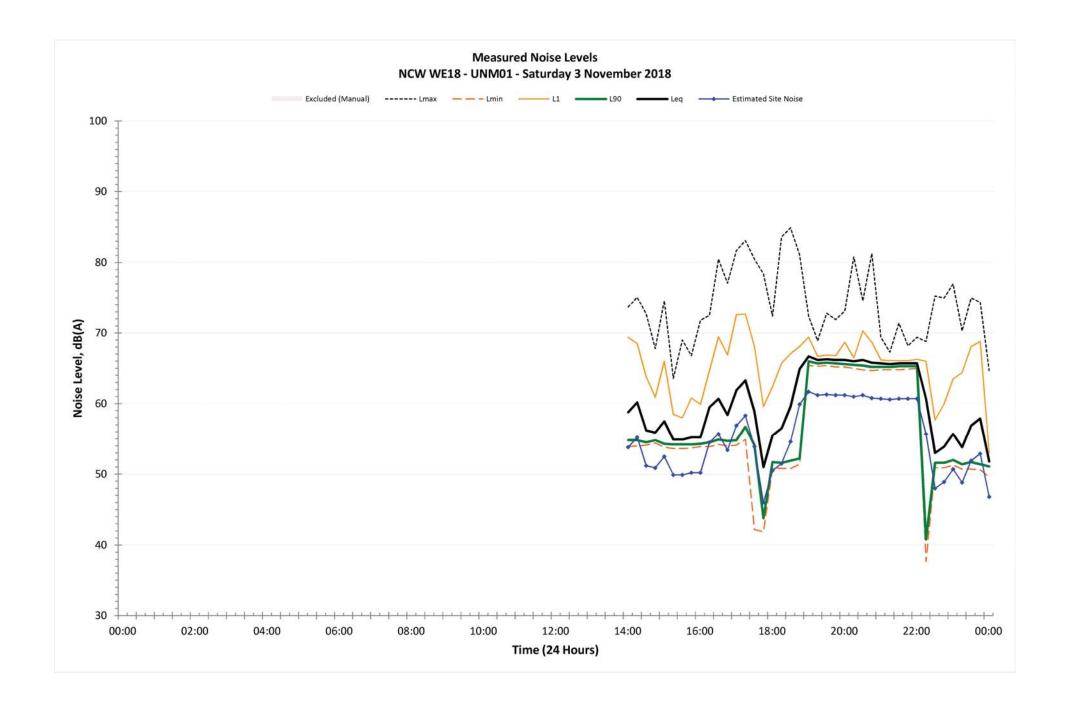
Note: all processor notes levels use the reproduced from the LLH CULHYIN A-room for track possession.

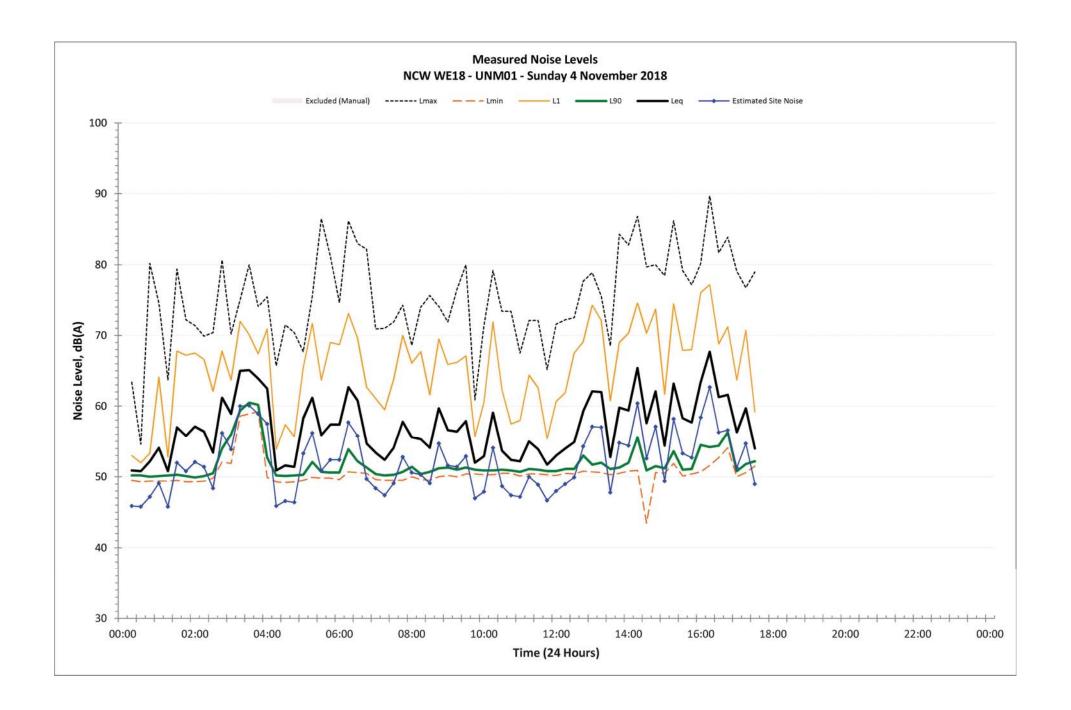
Note: Low frequency, tonsid or impulsive components detectable or attributable to the sites note emission. The site noise contribution reported here is inclusive of all modifying factors (if a

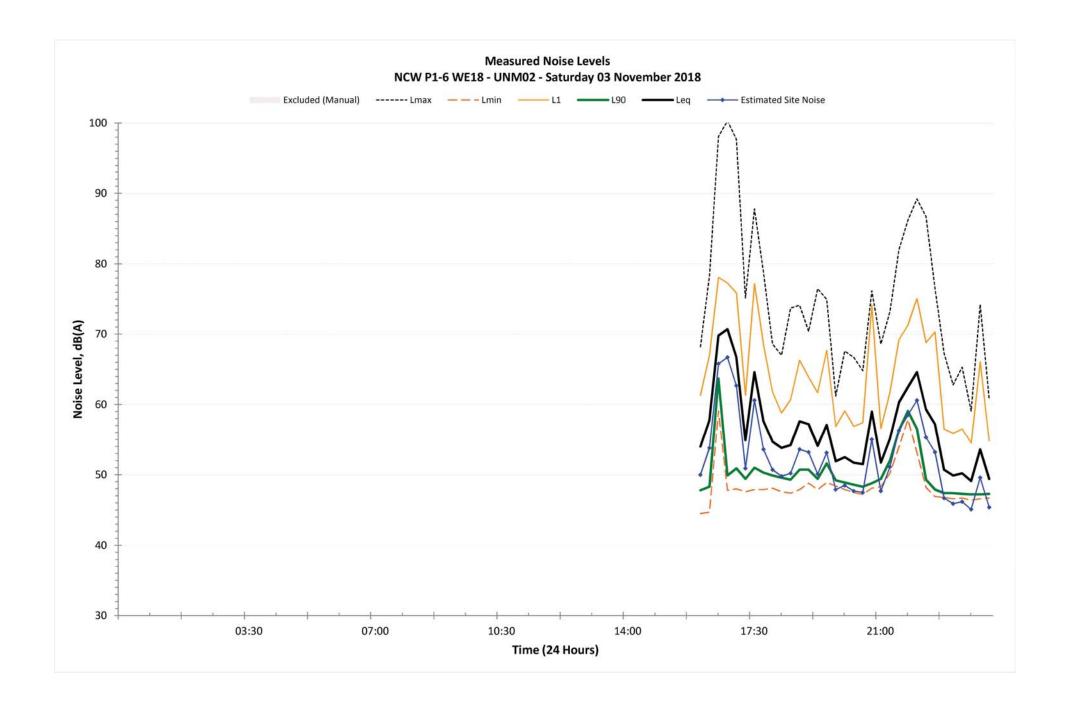
Technical Report

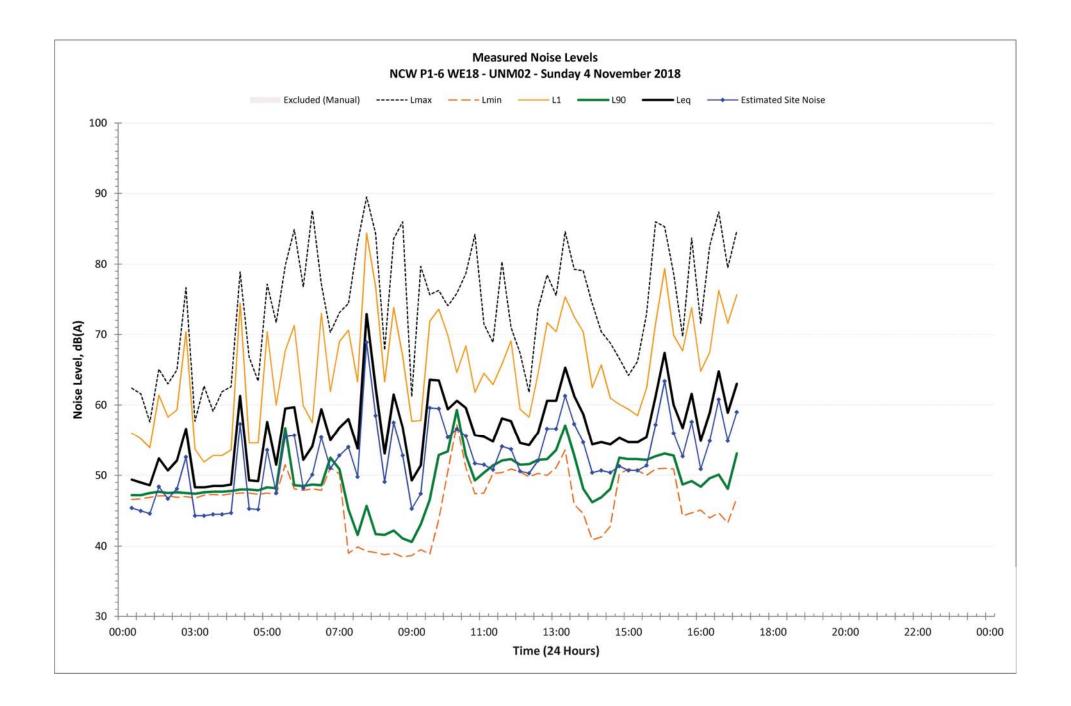
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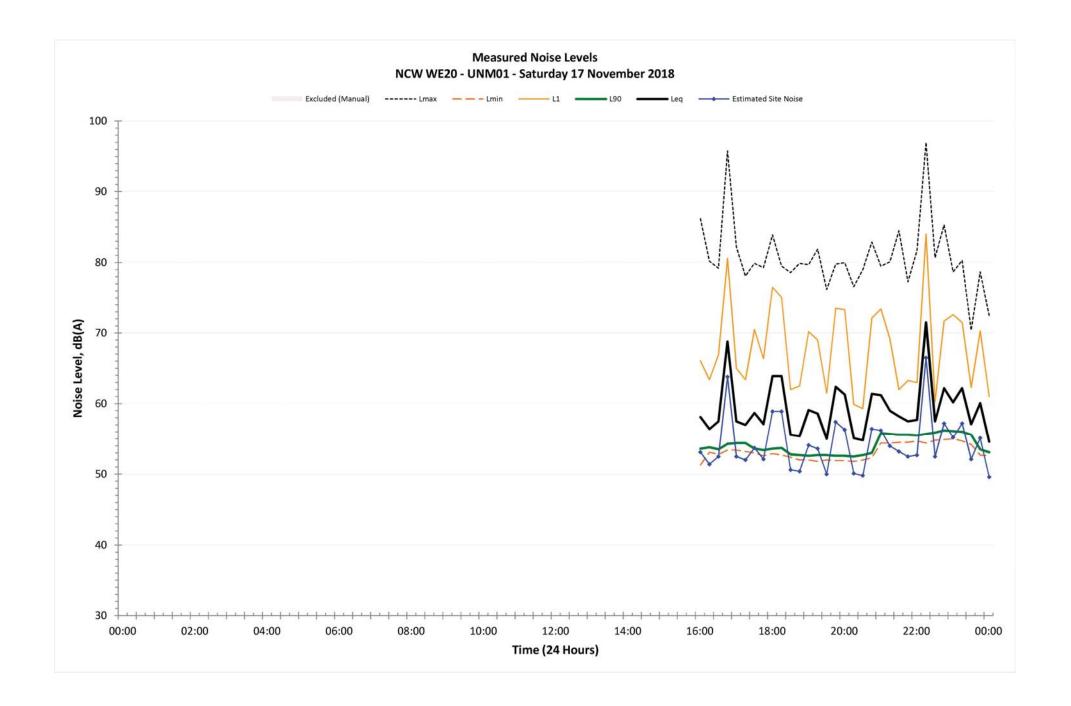
Appendix D – Complete Noise Data Set – Unattended Monitoring

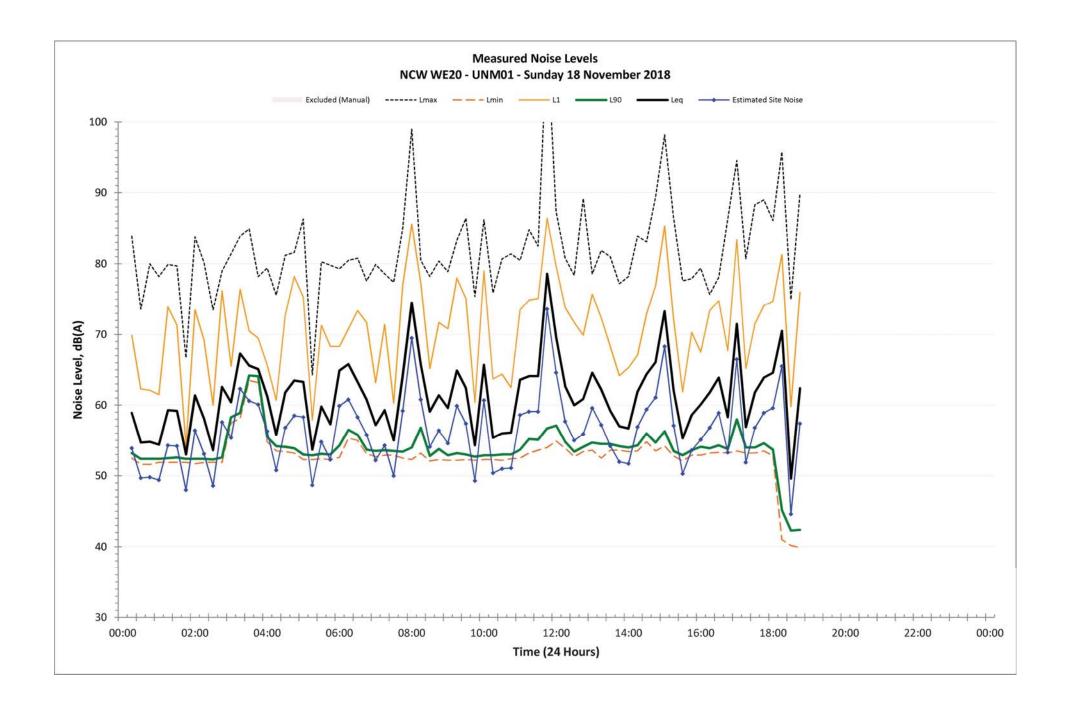


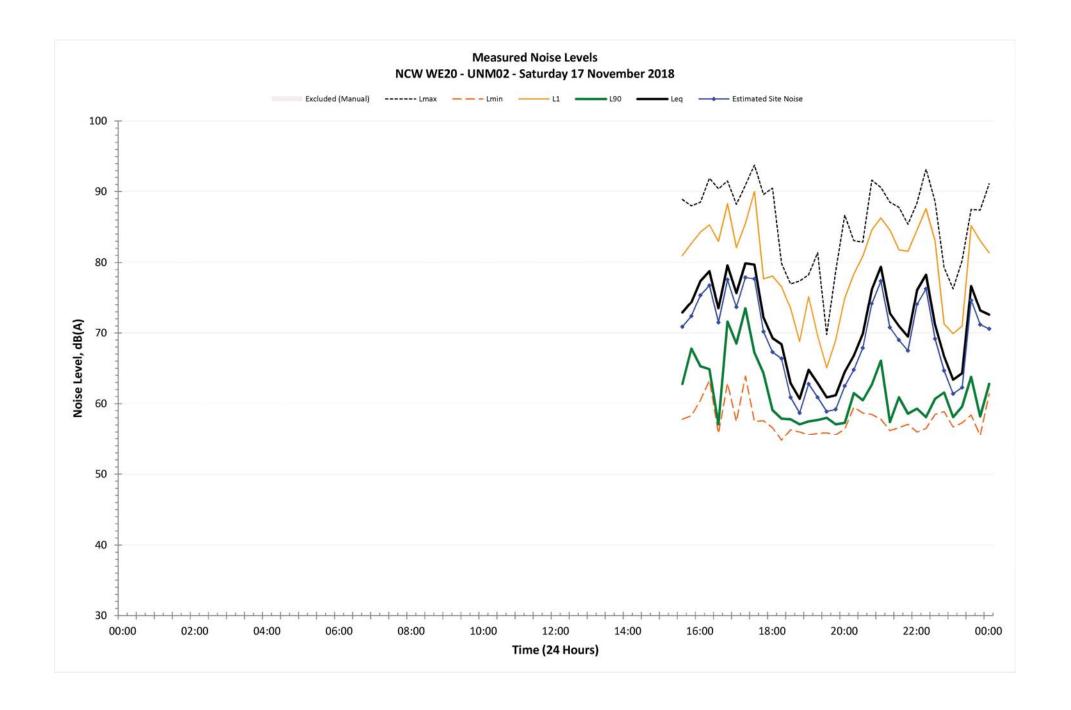


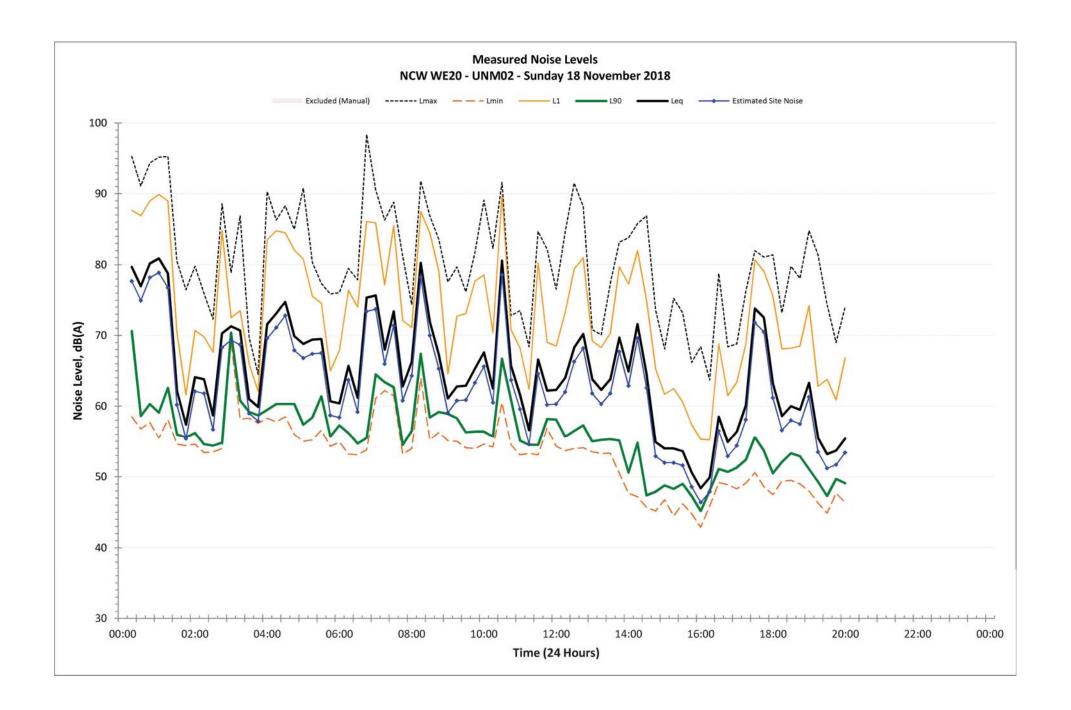


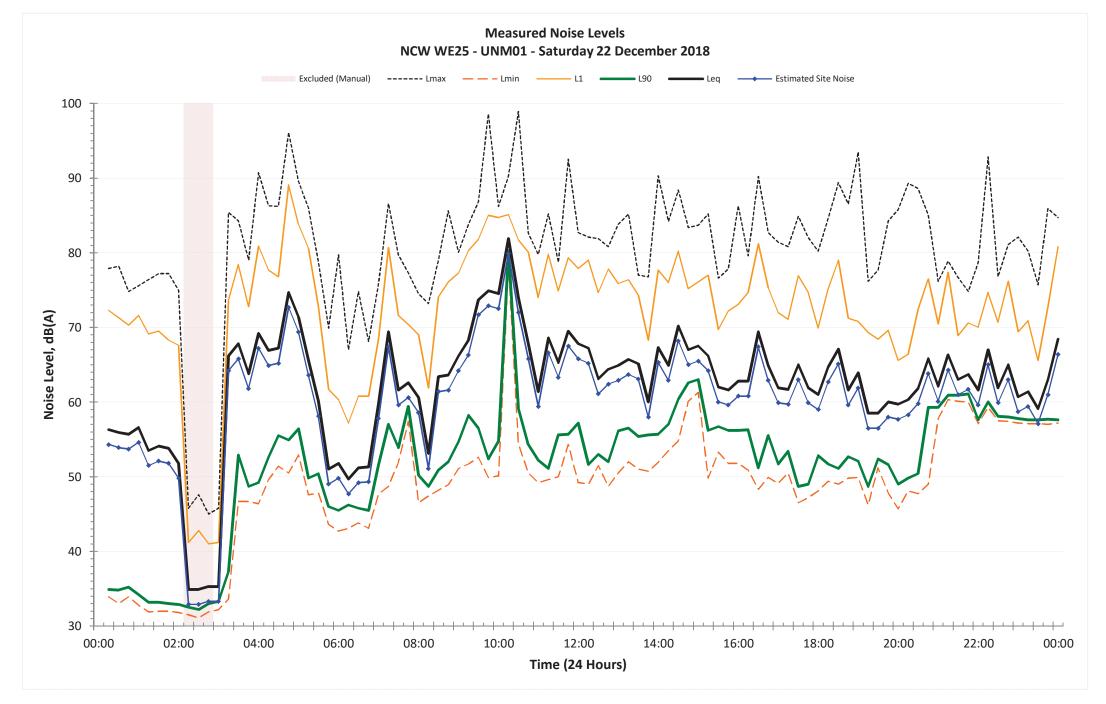


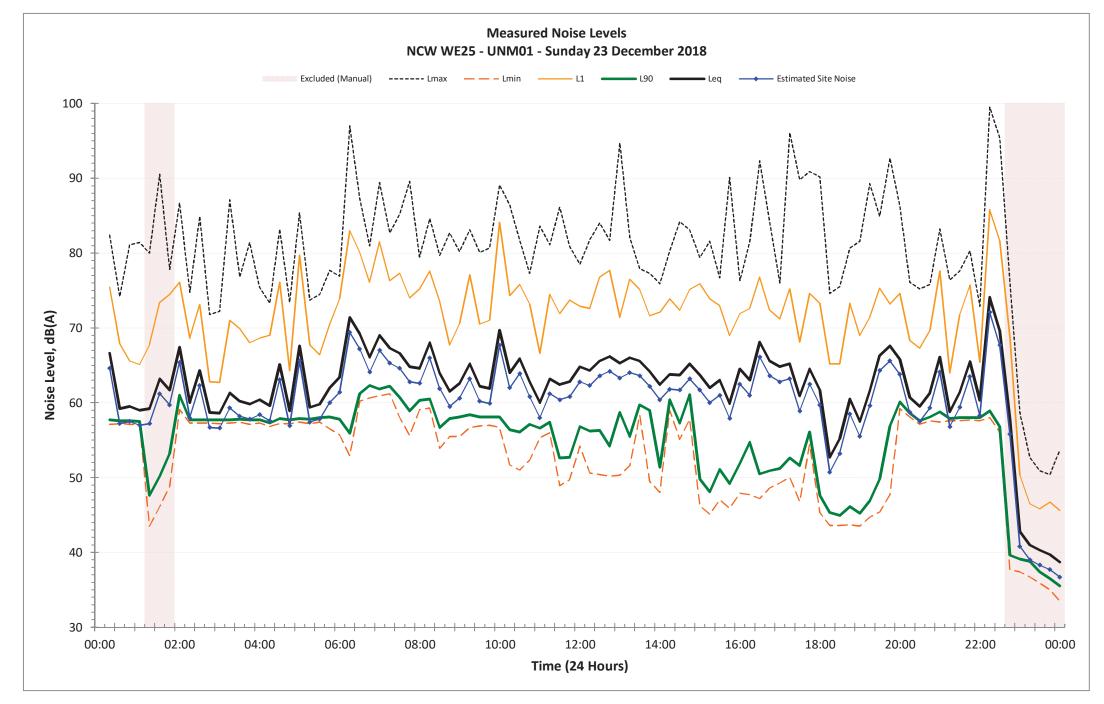


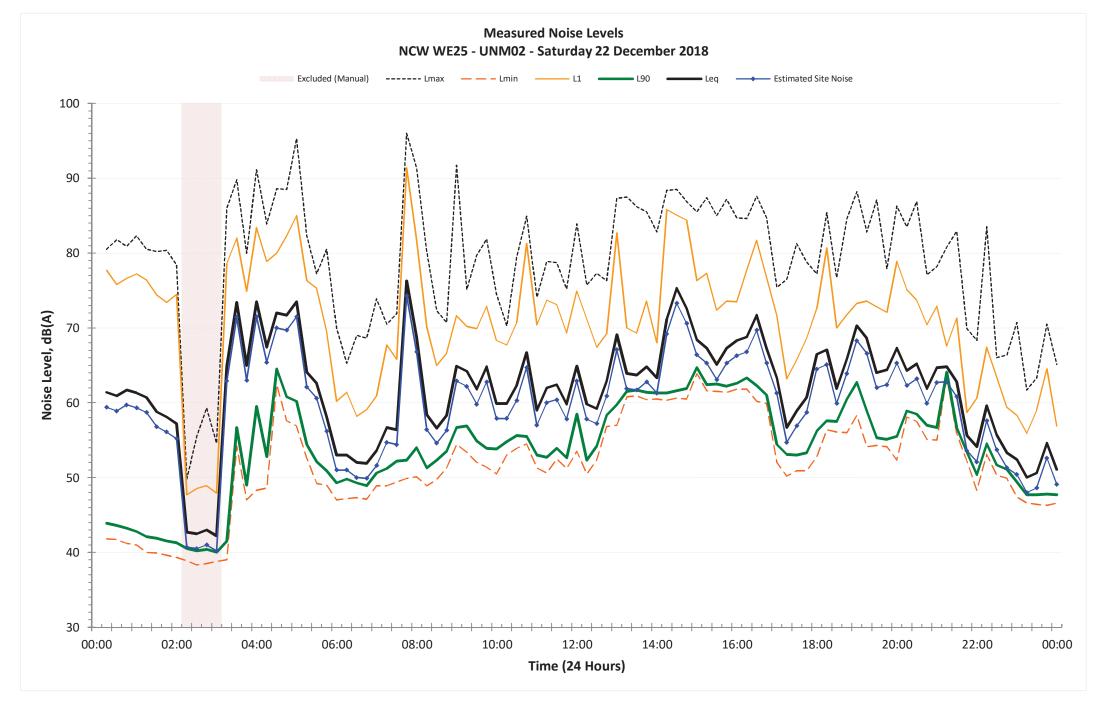


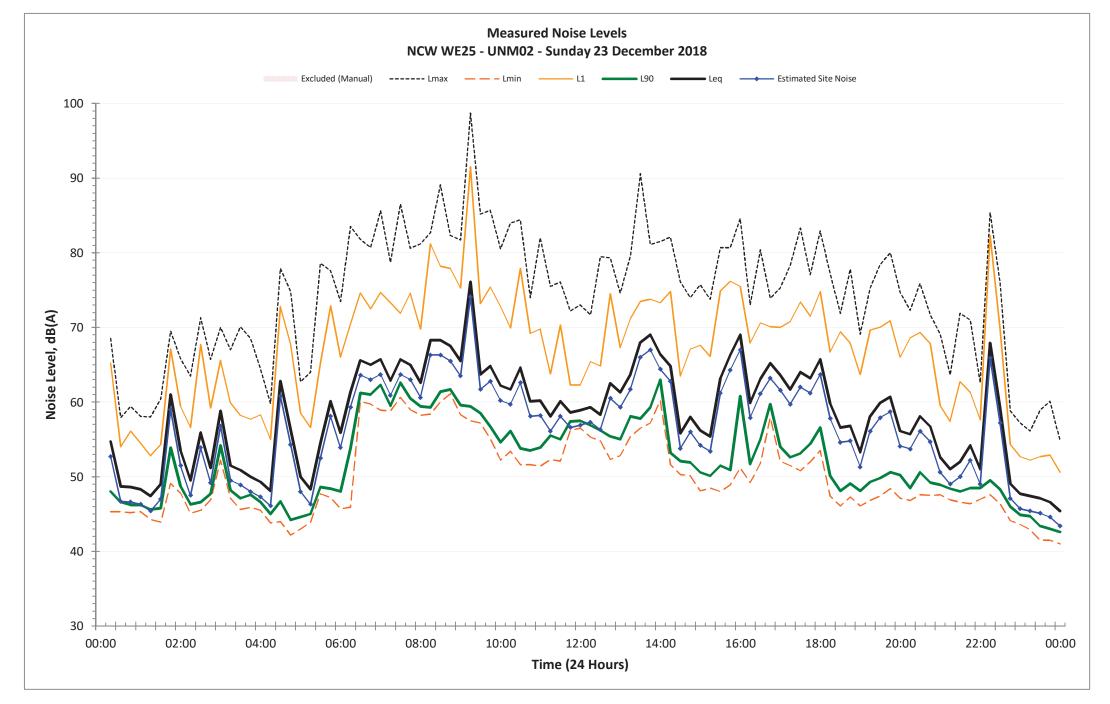


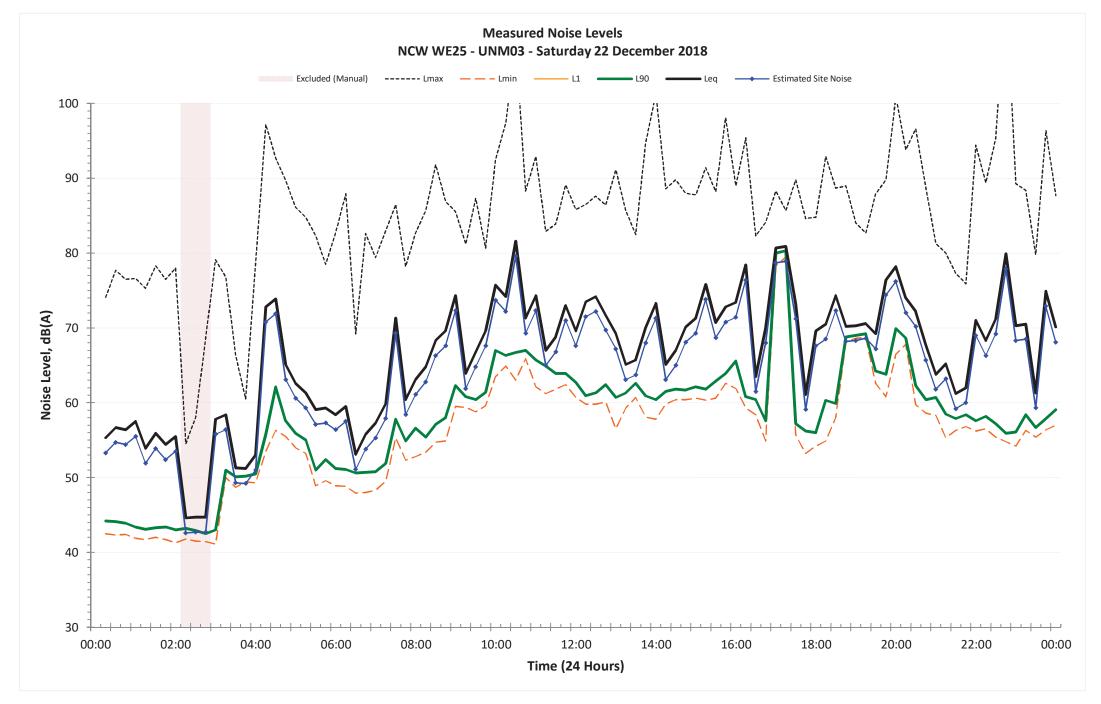


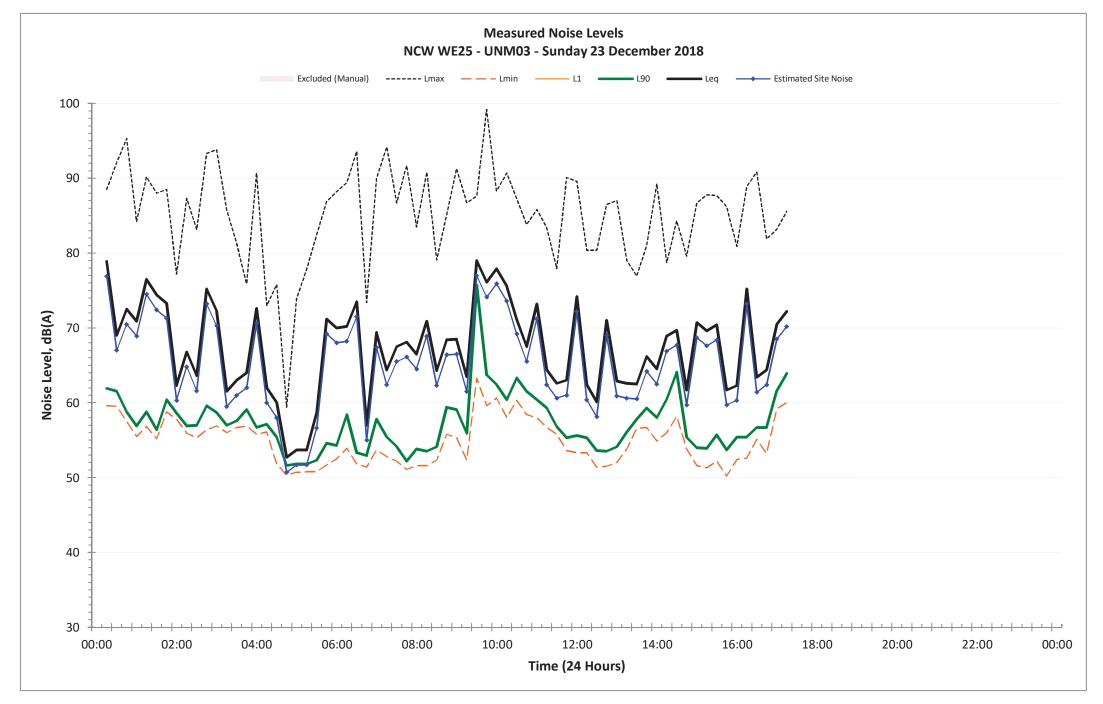


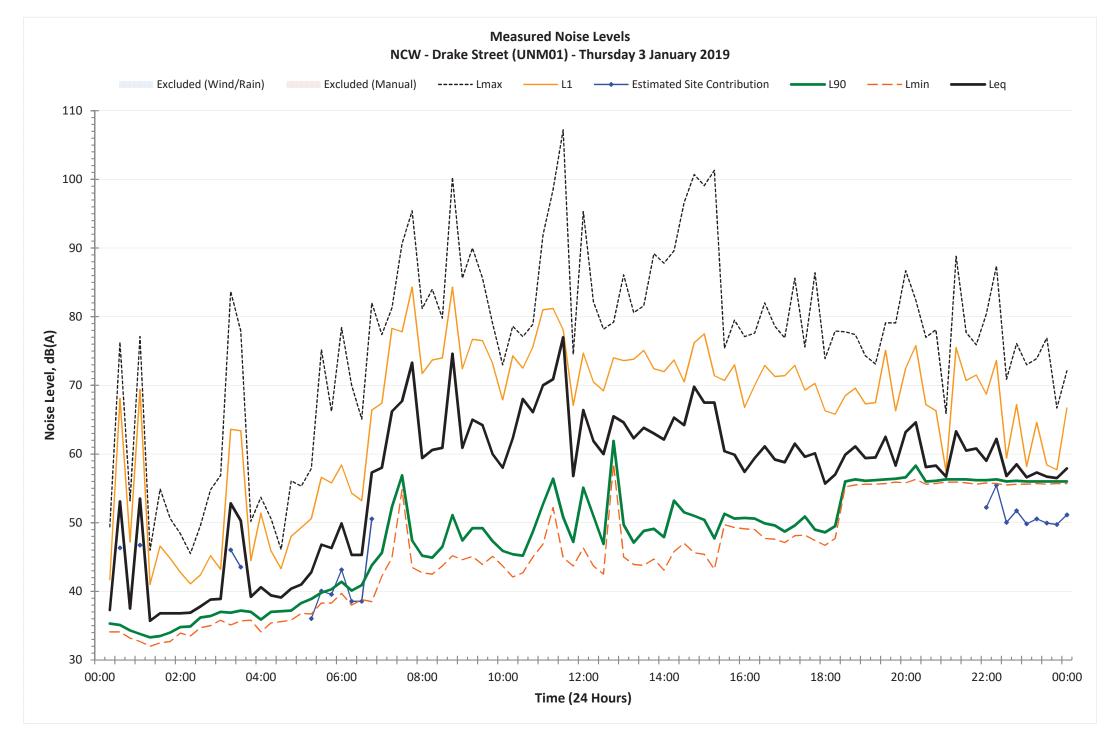


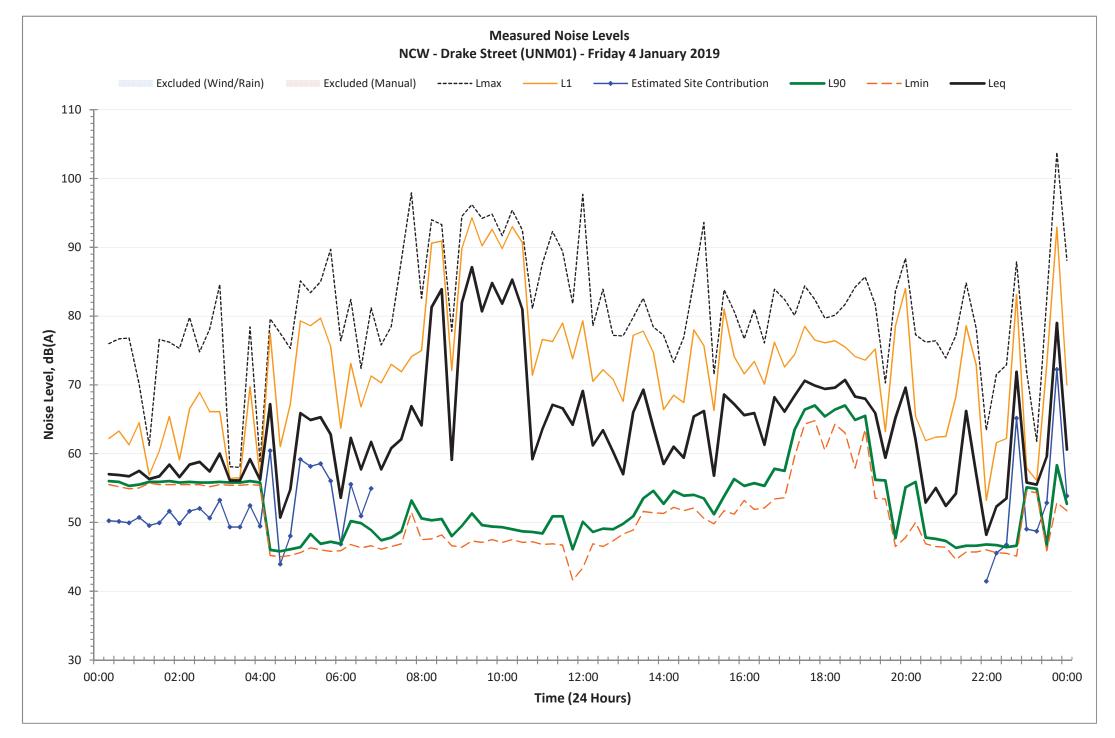


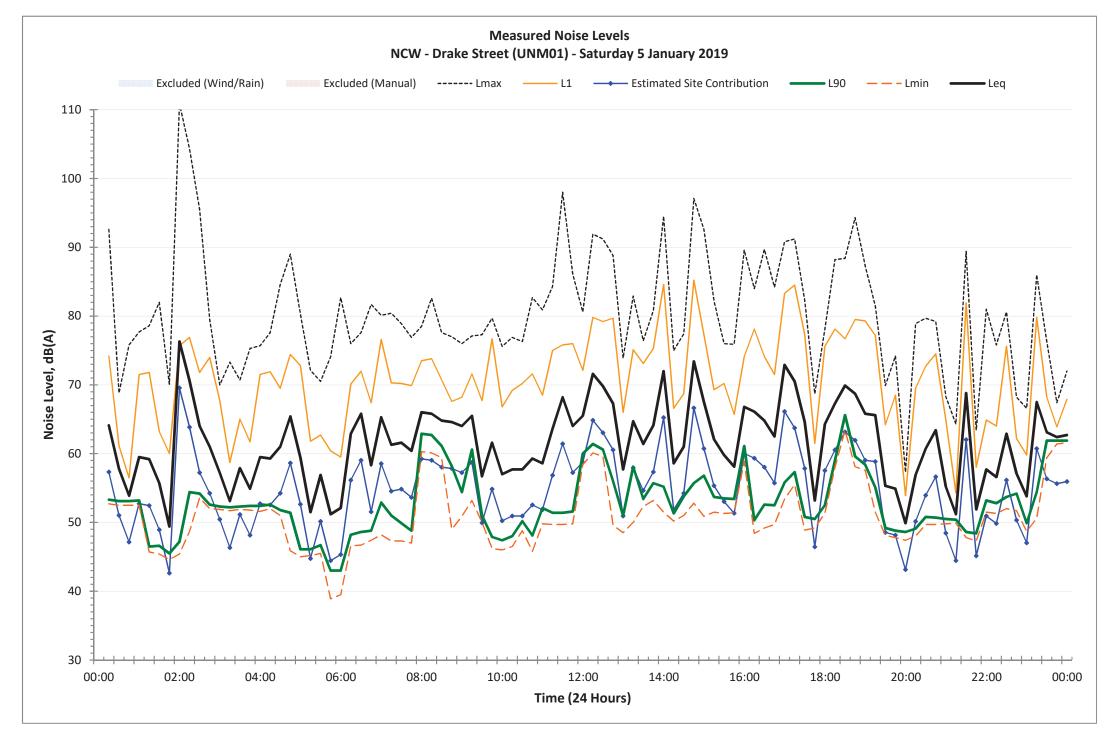


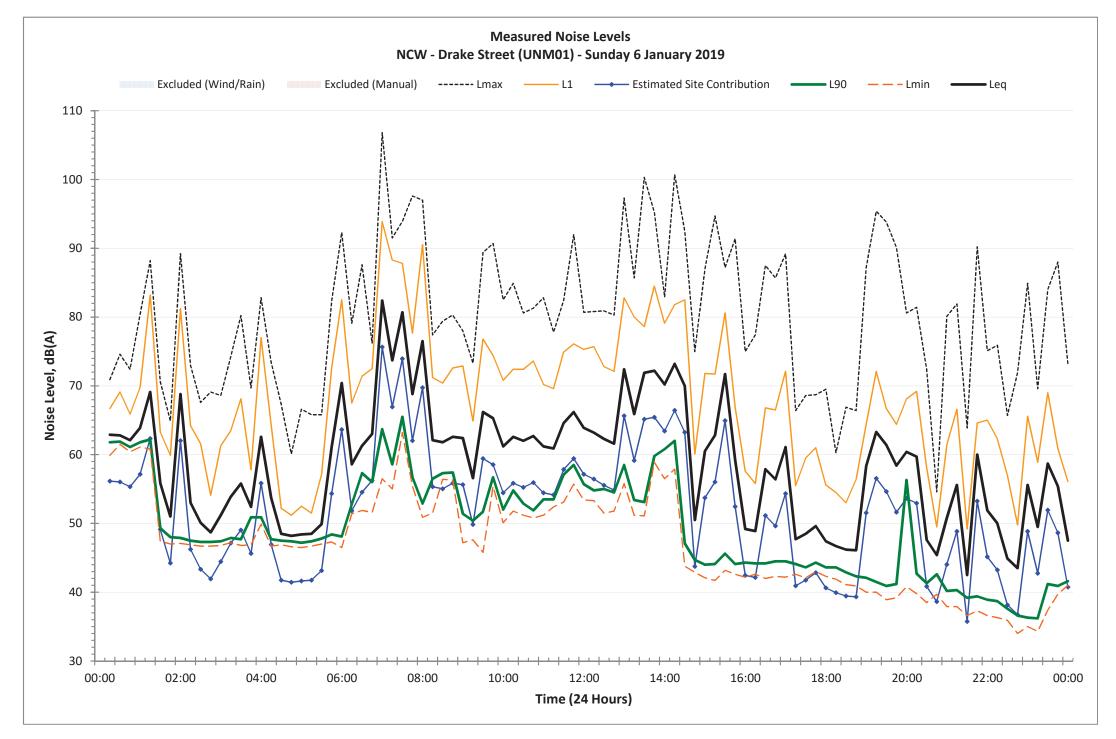


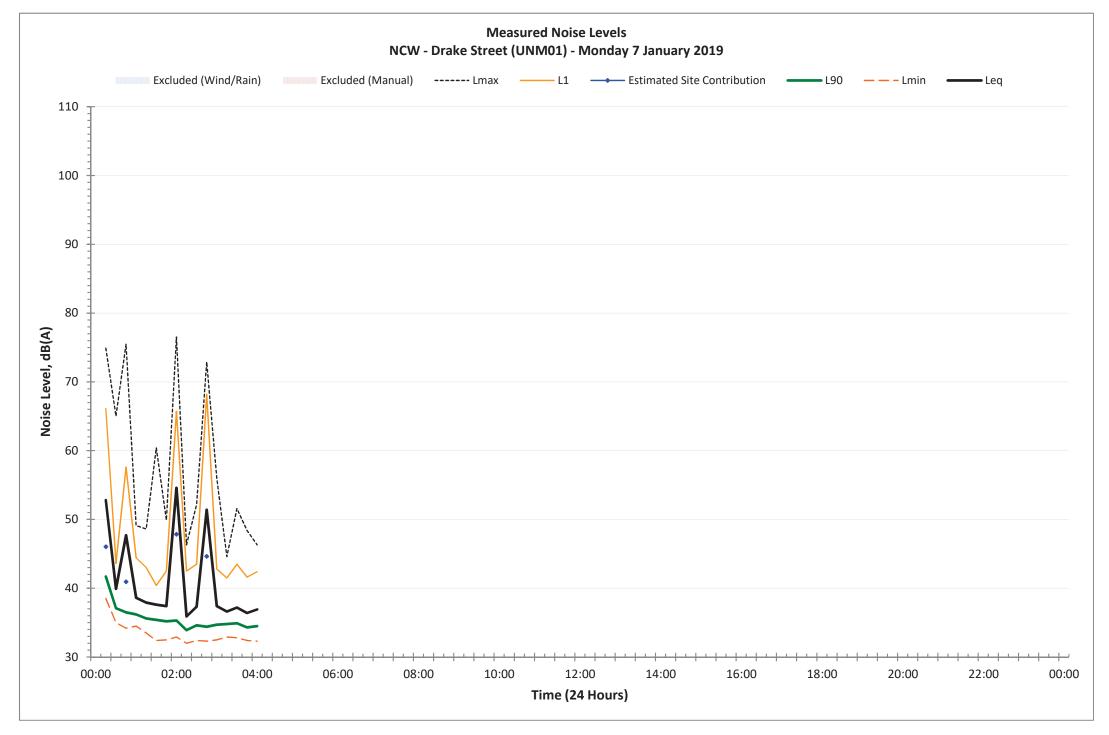


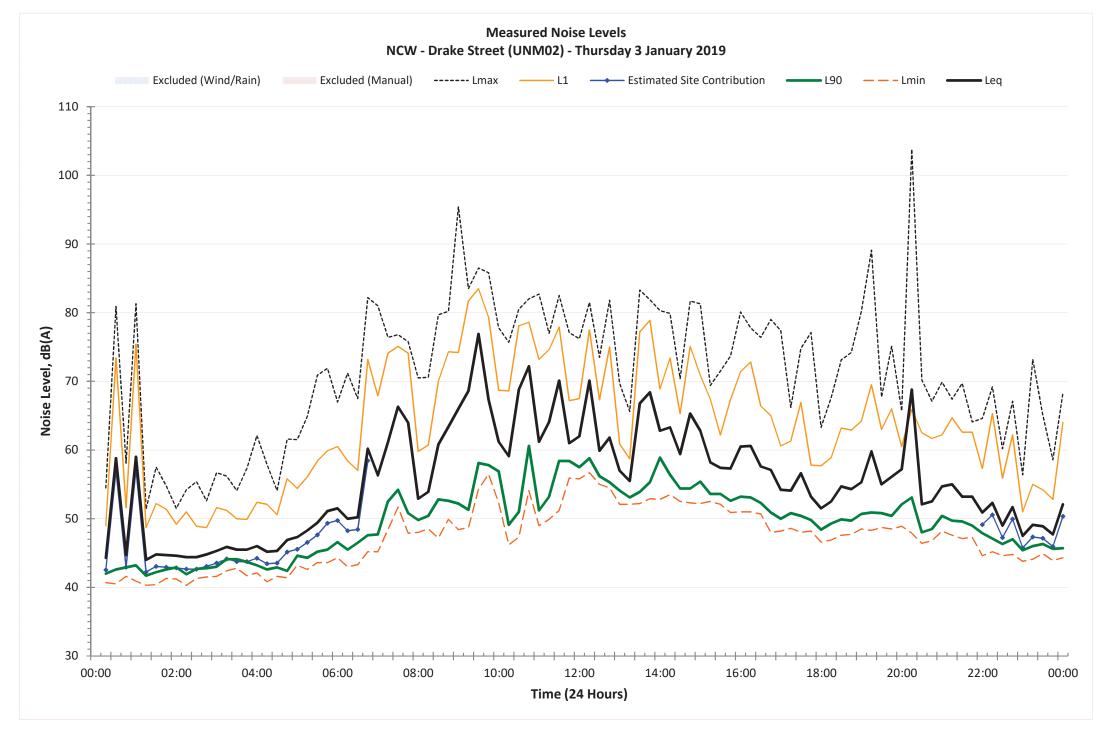


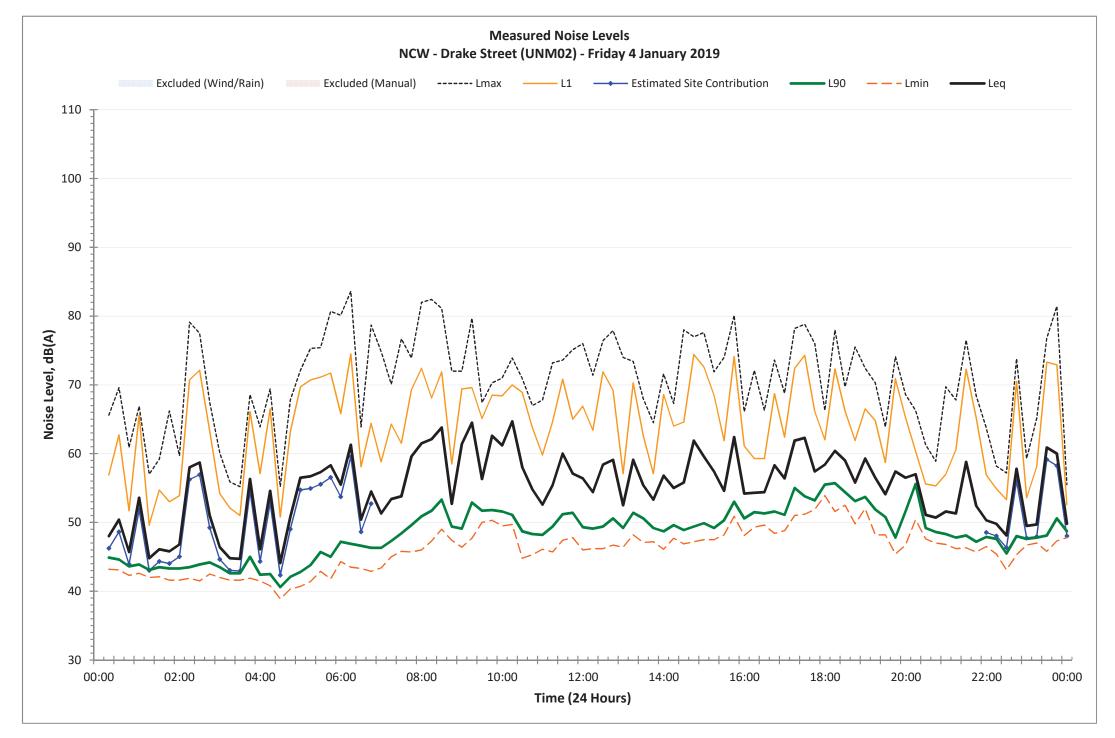


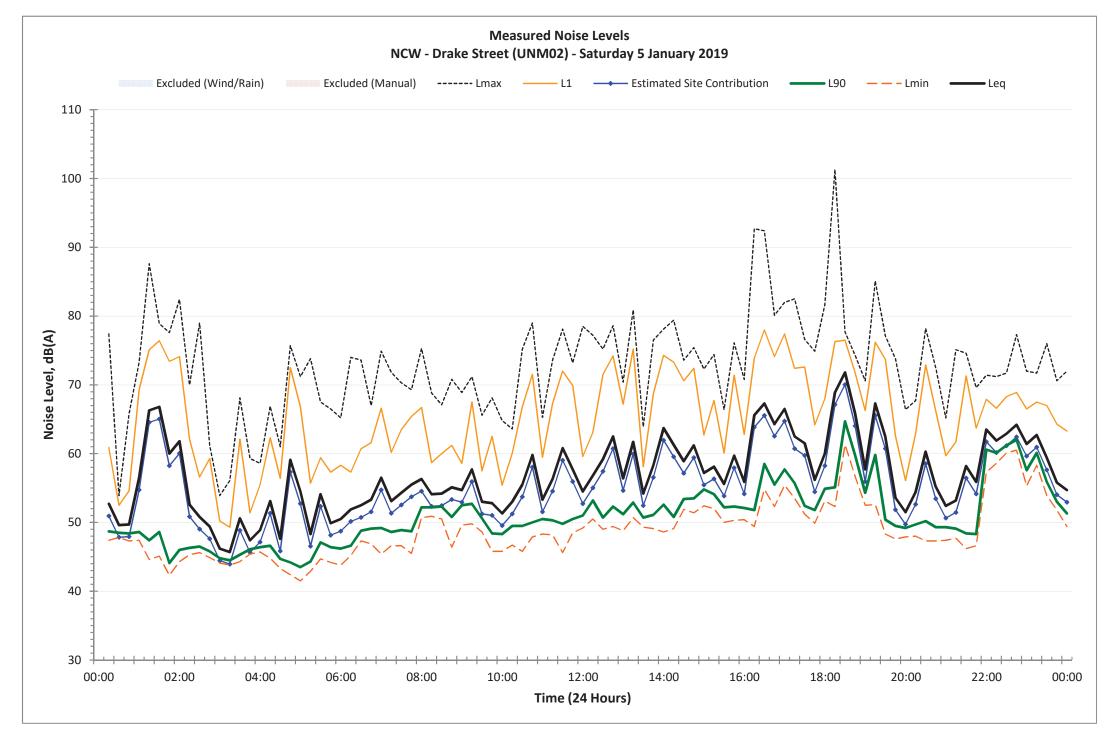


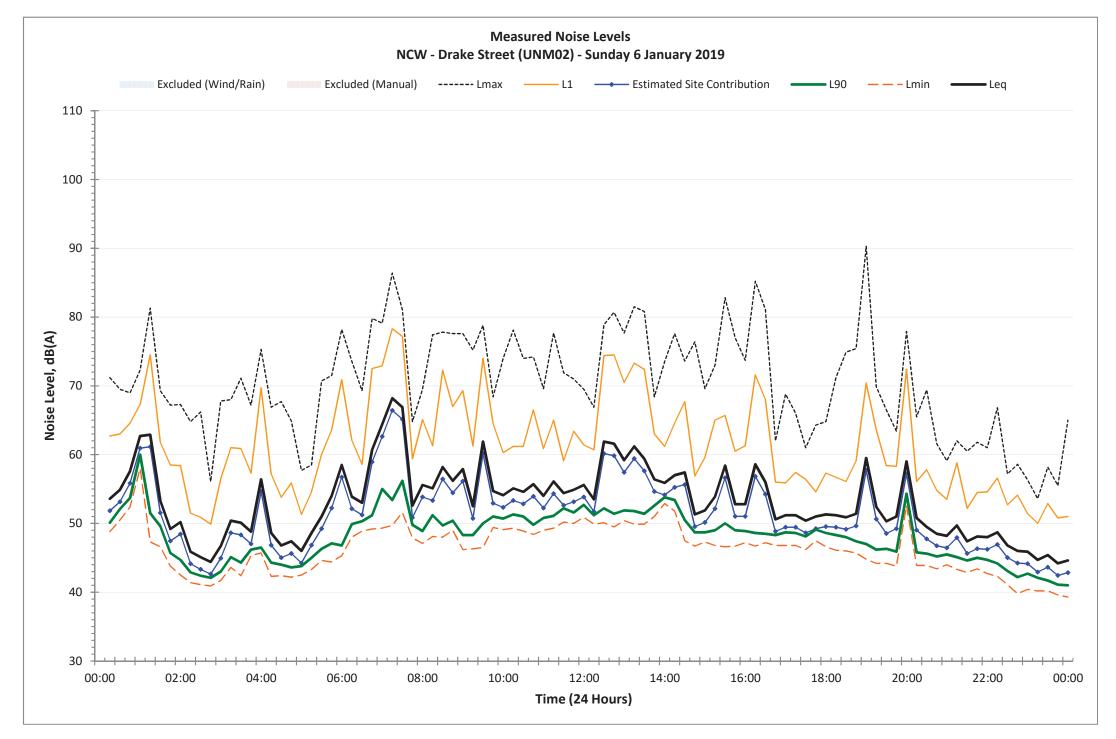


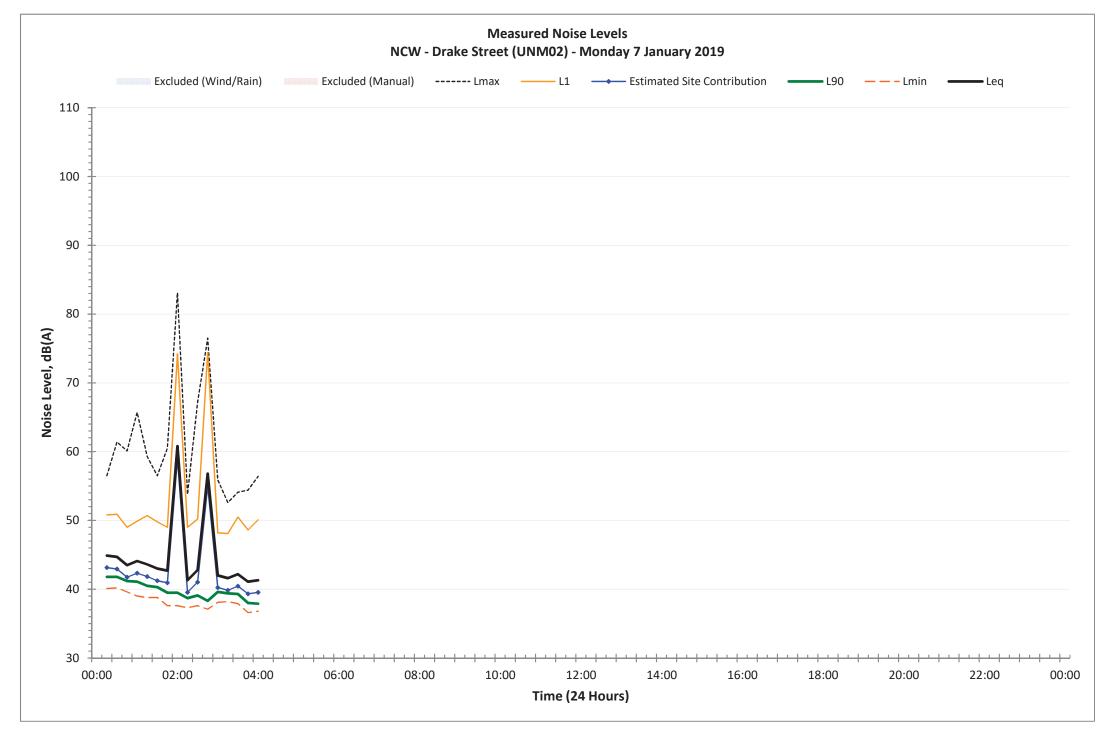


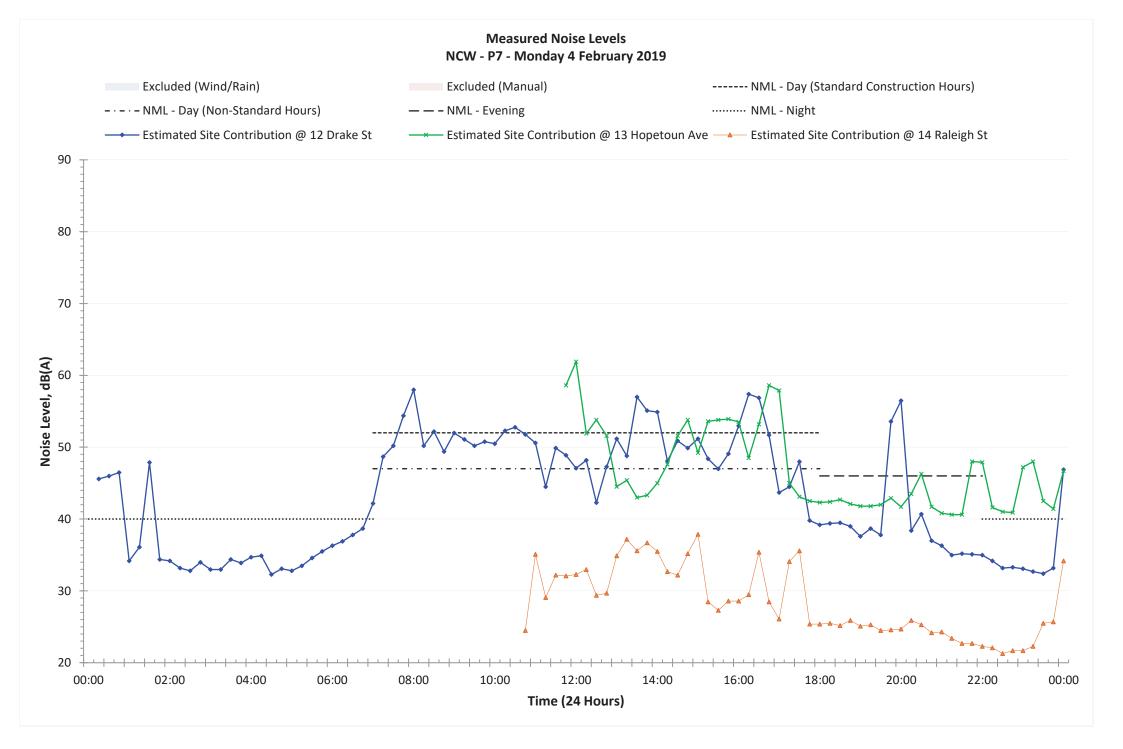


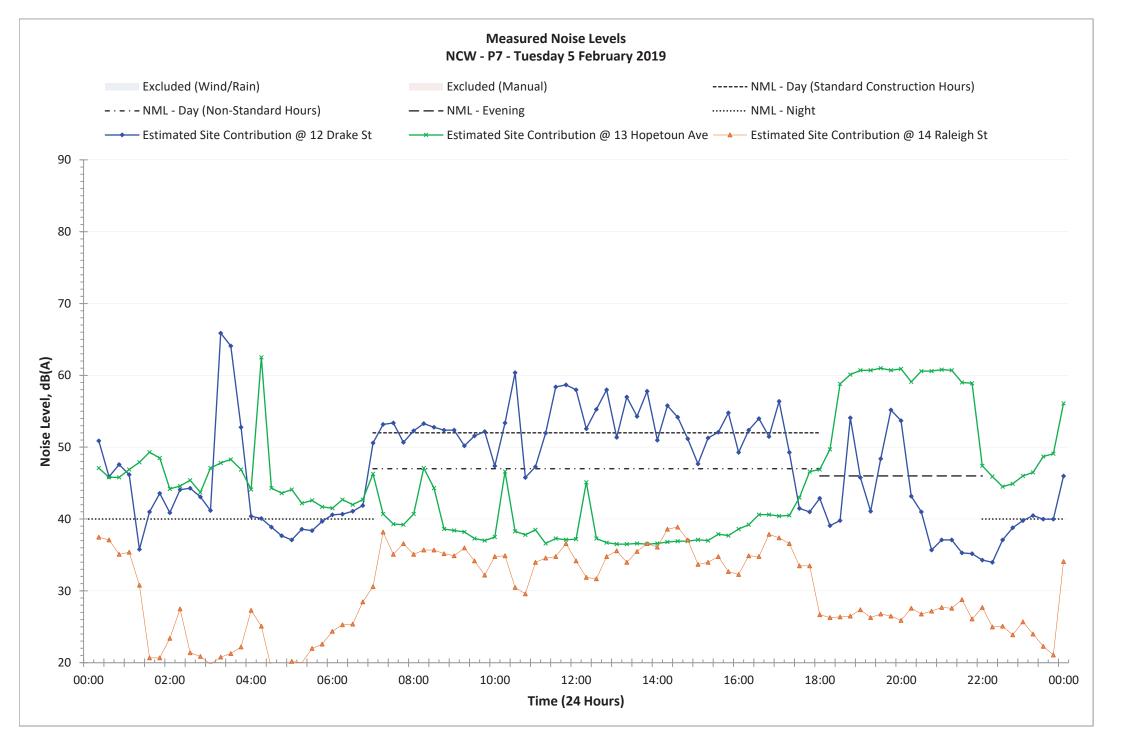


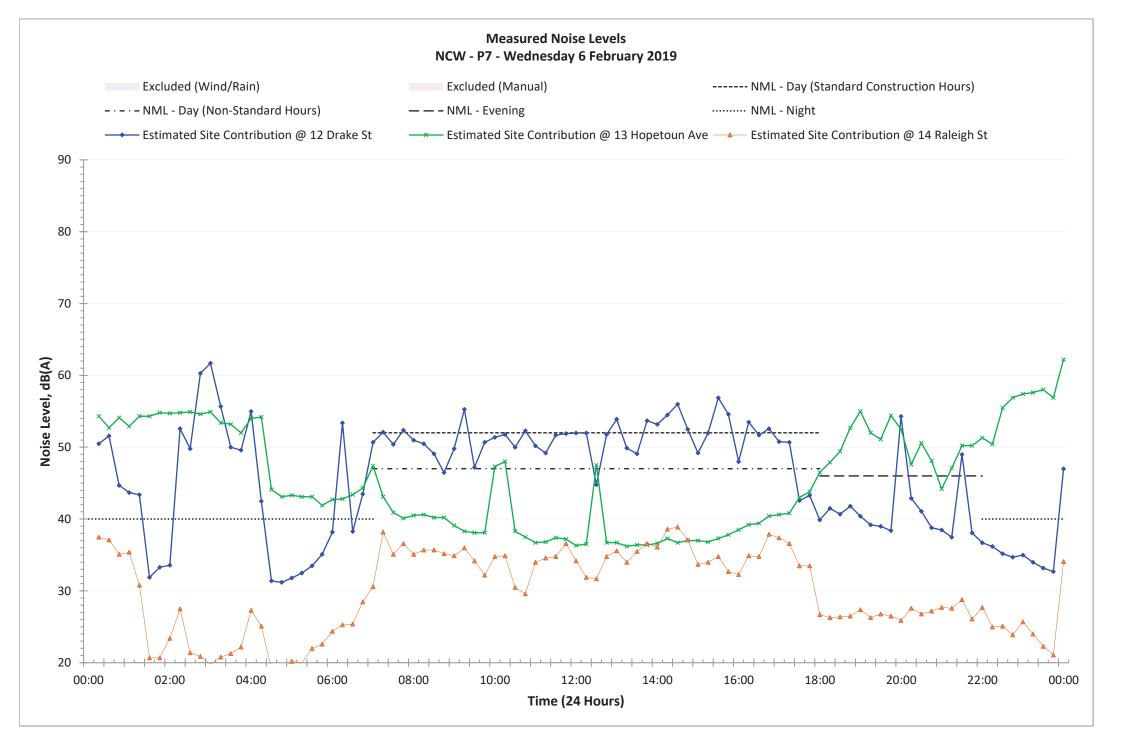


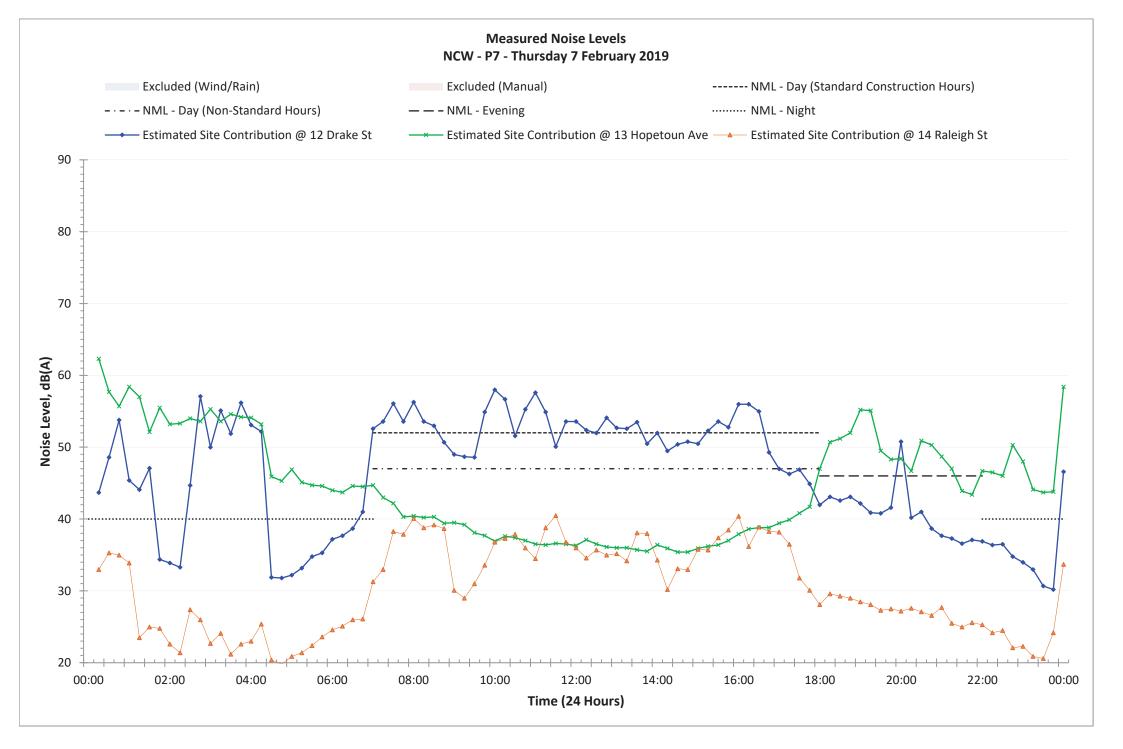


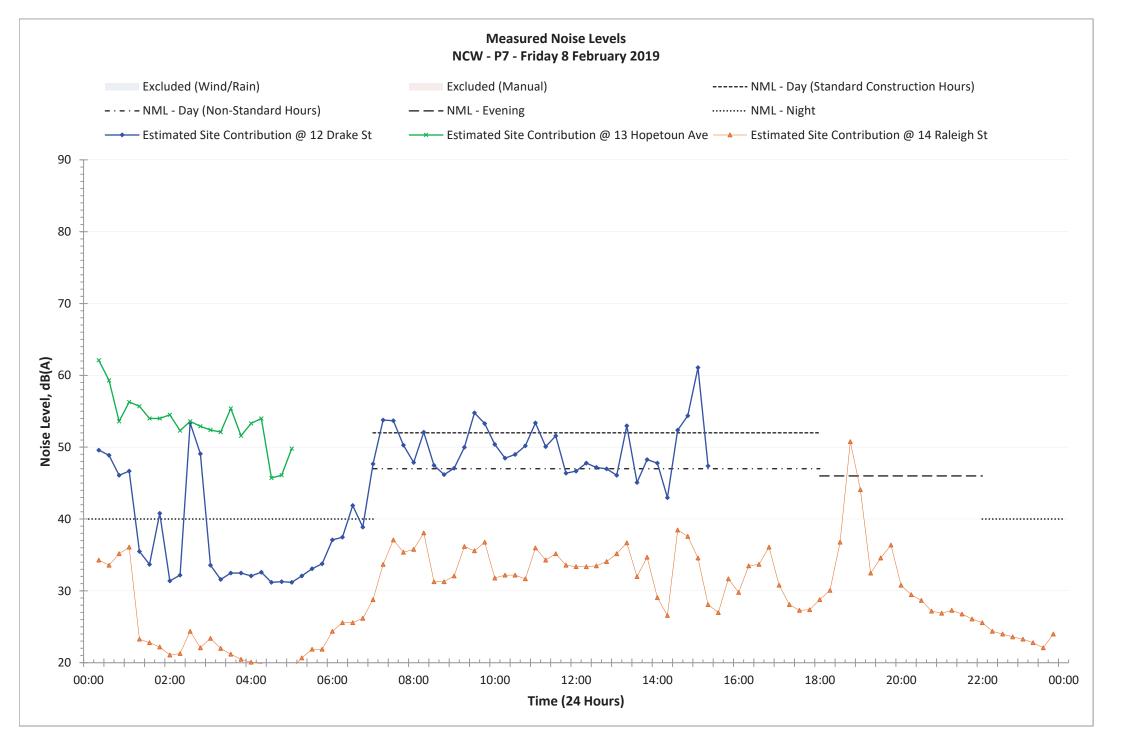


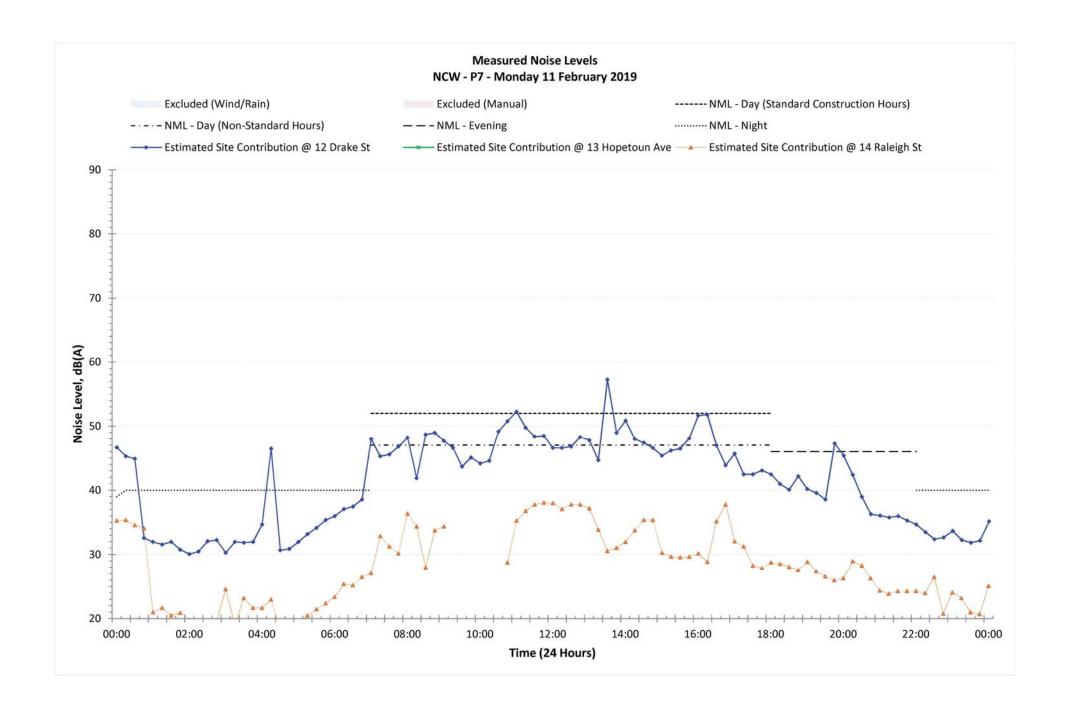


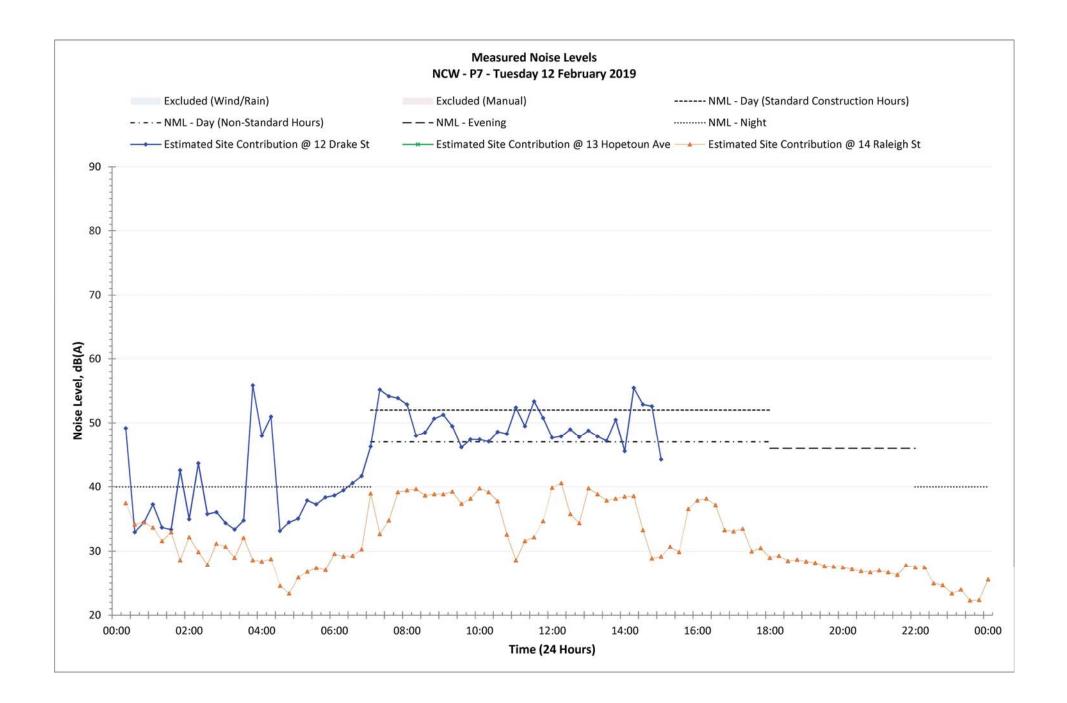




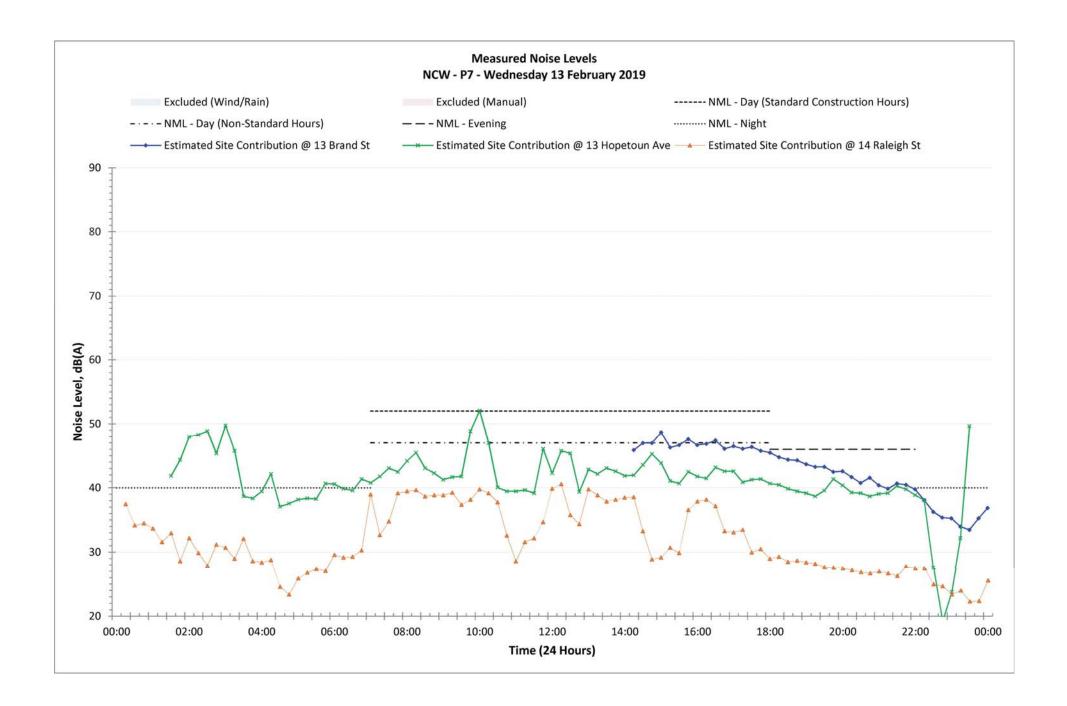


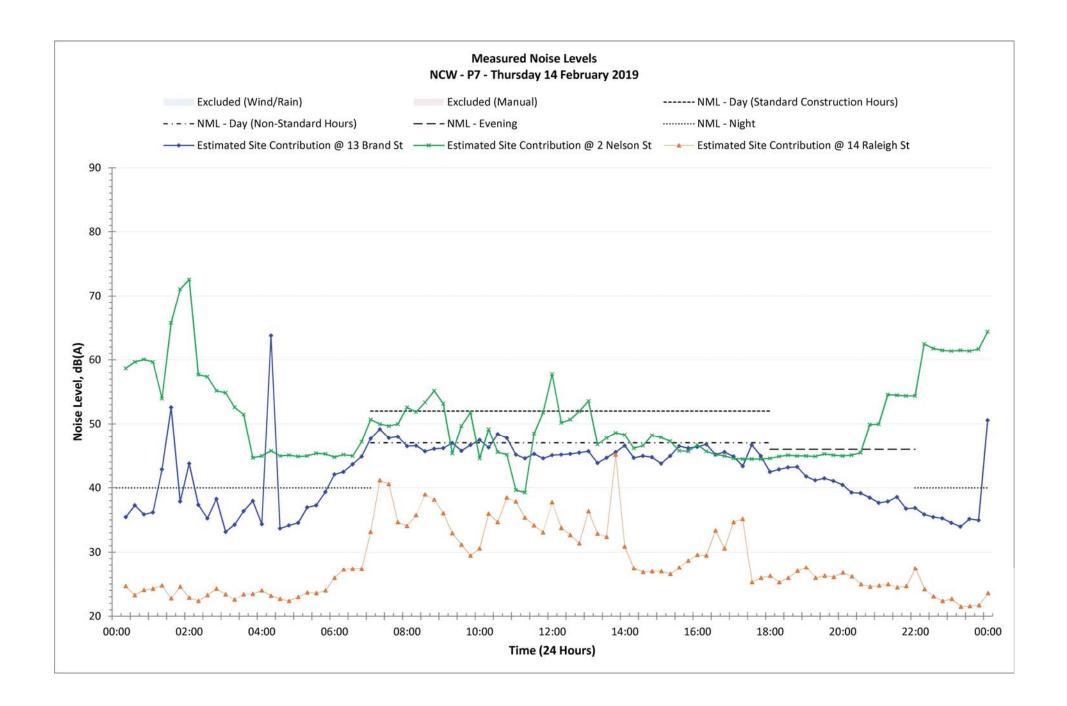


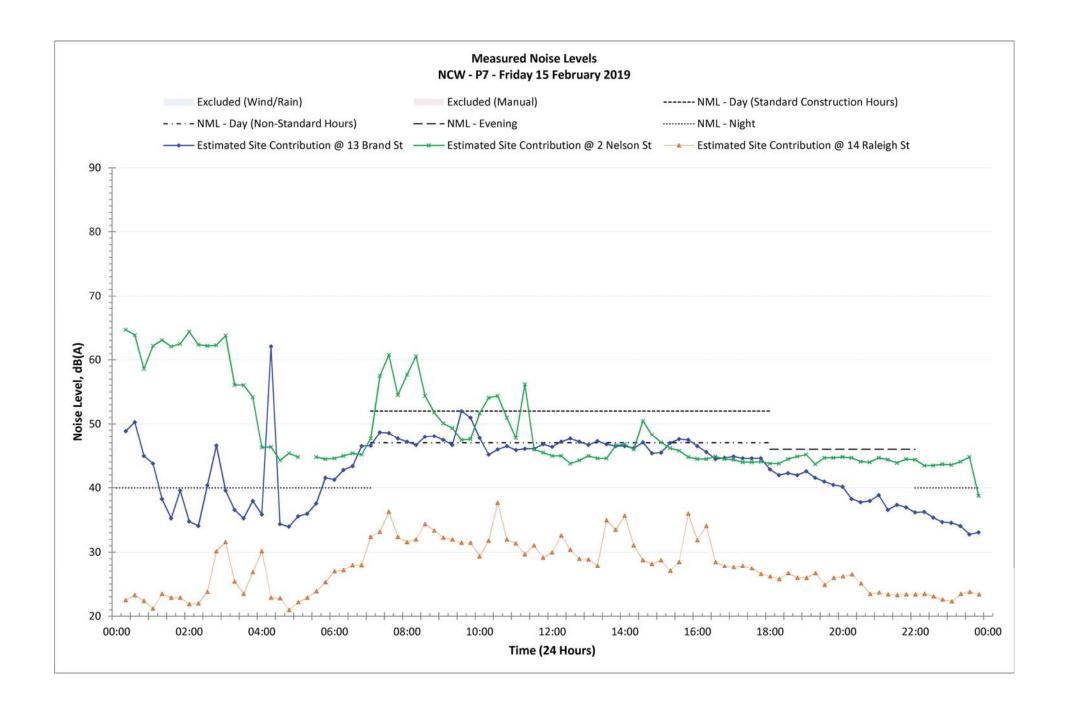


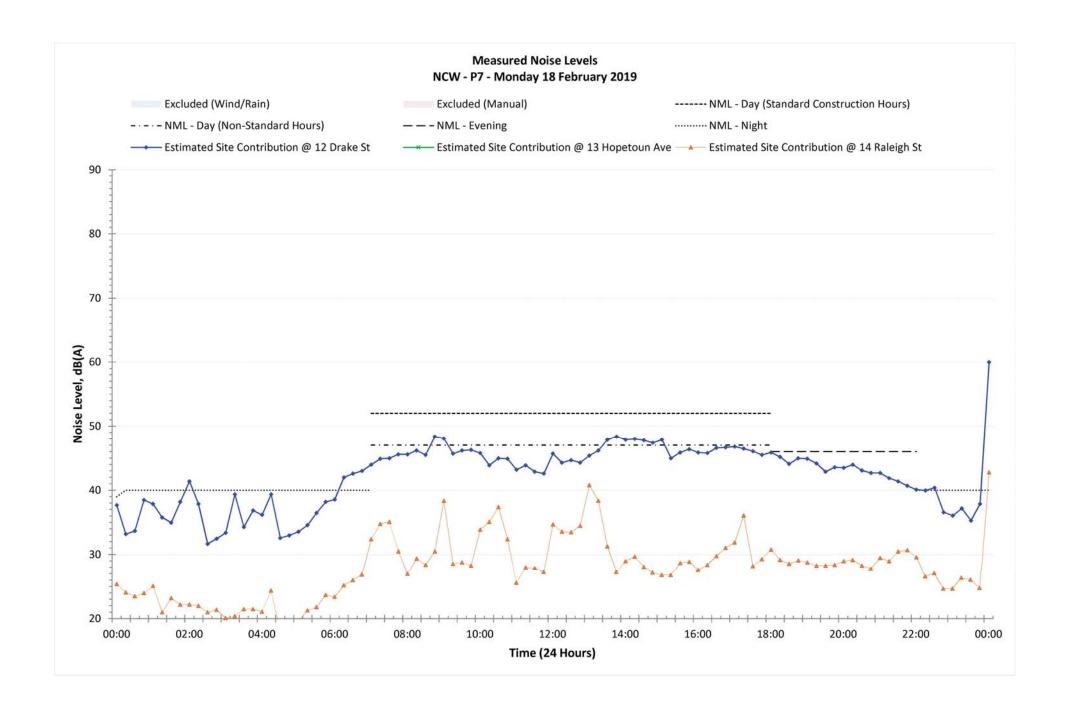


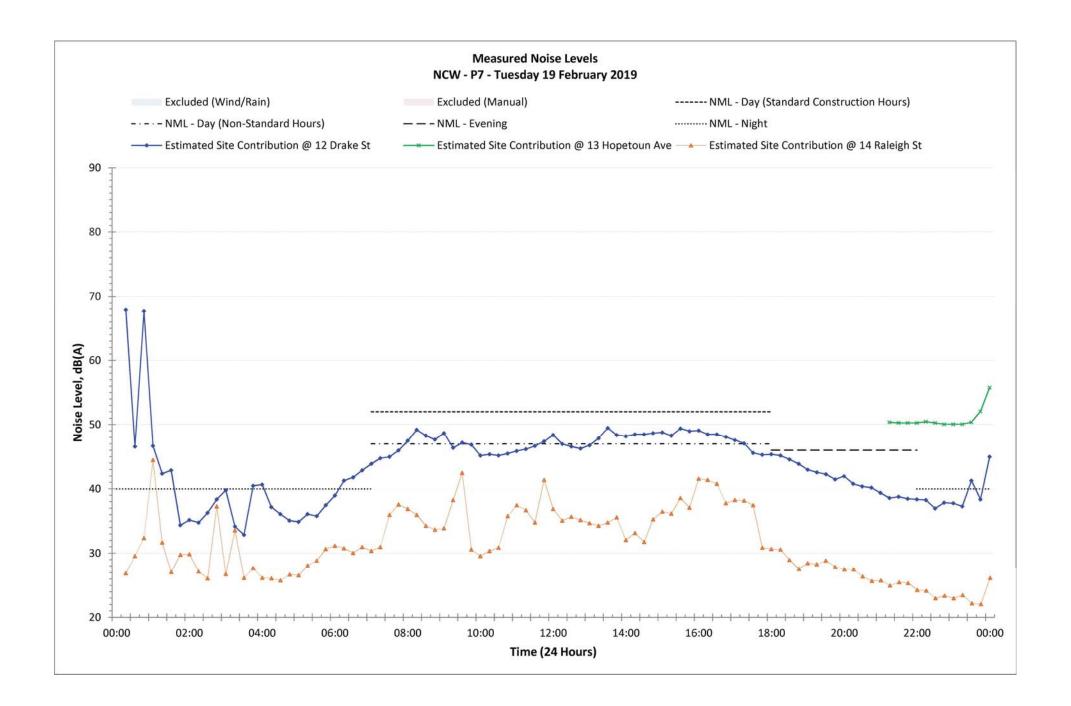
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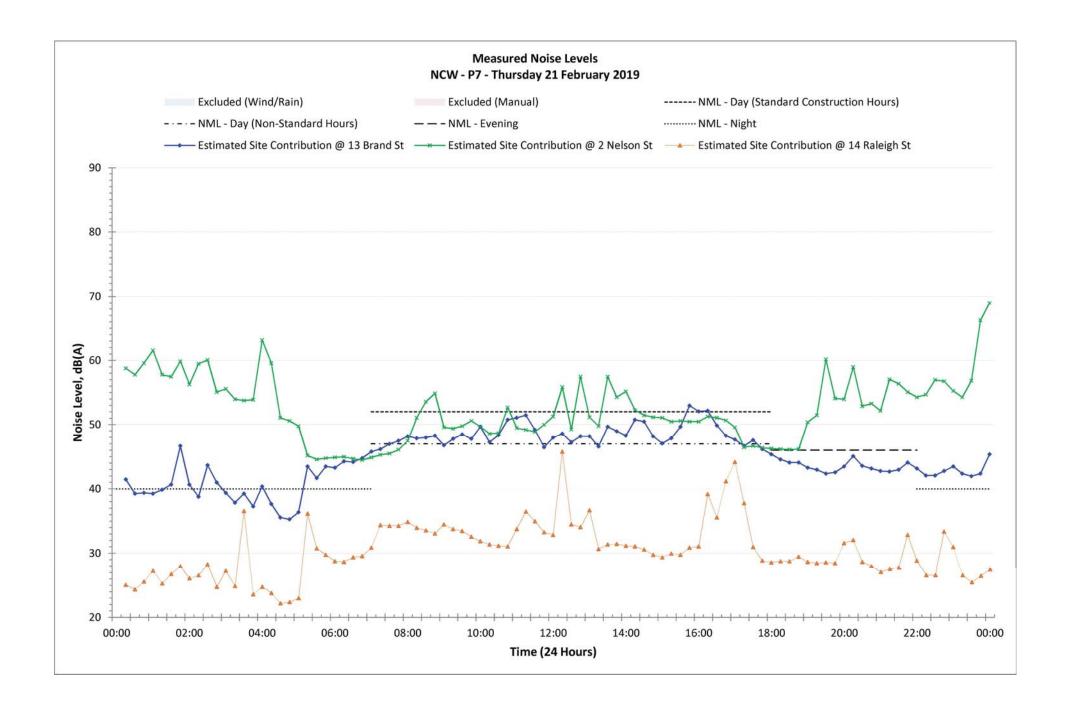


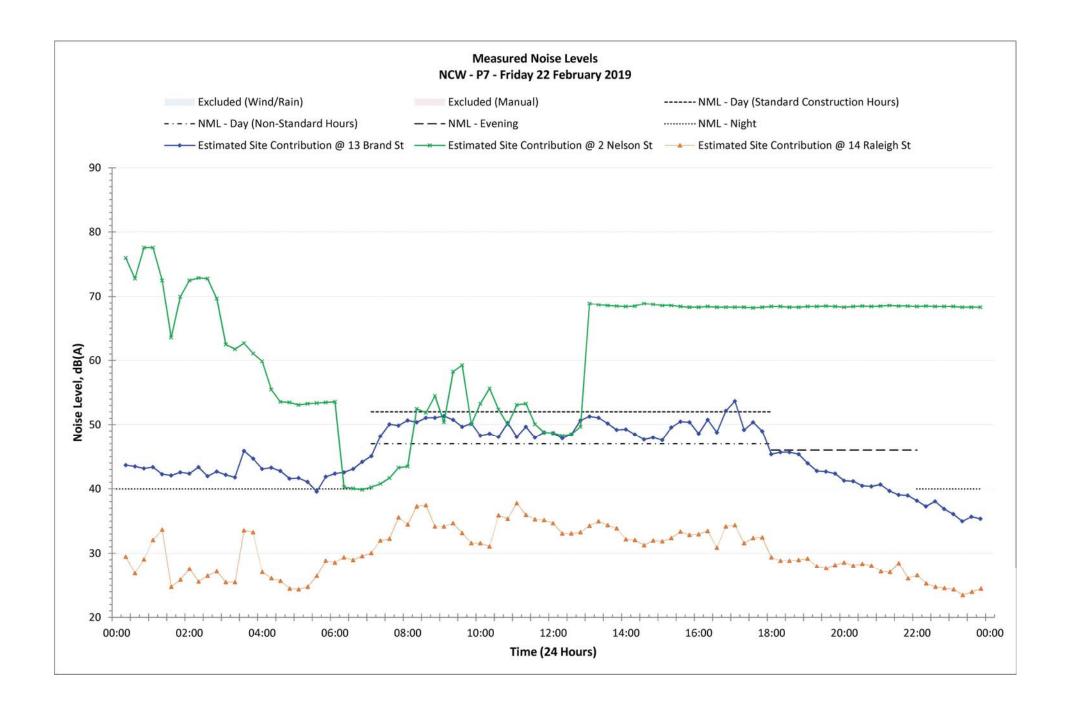


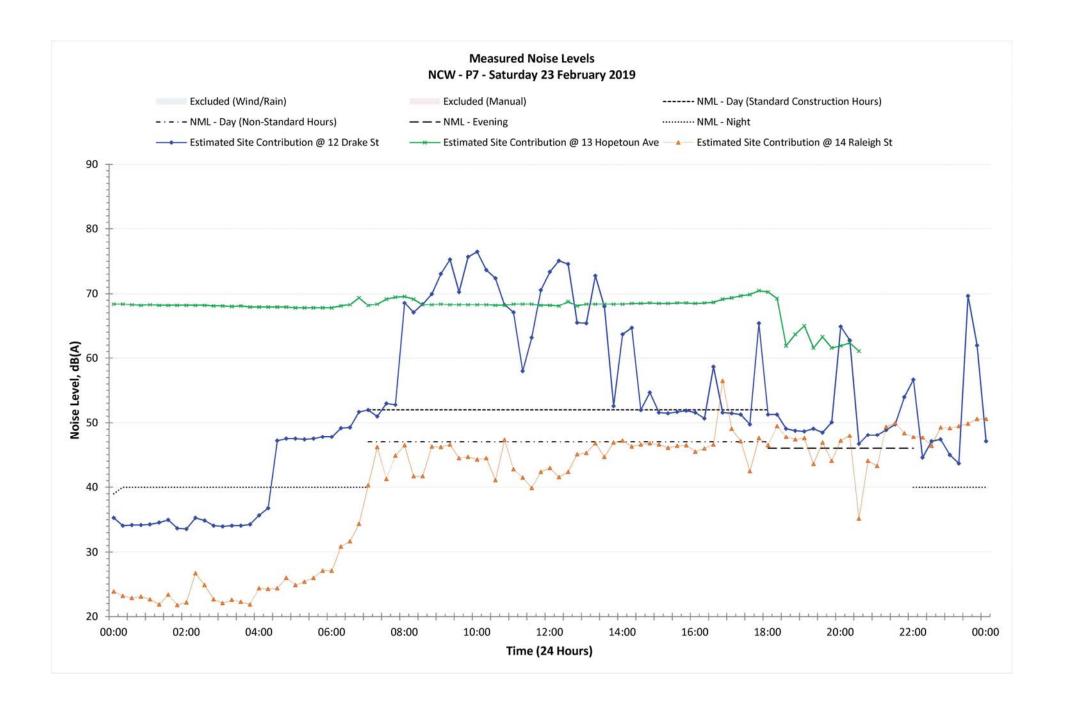


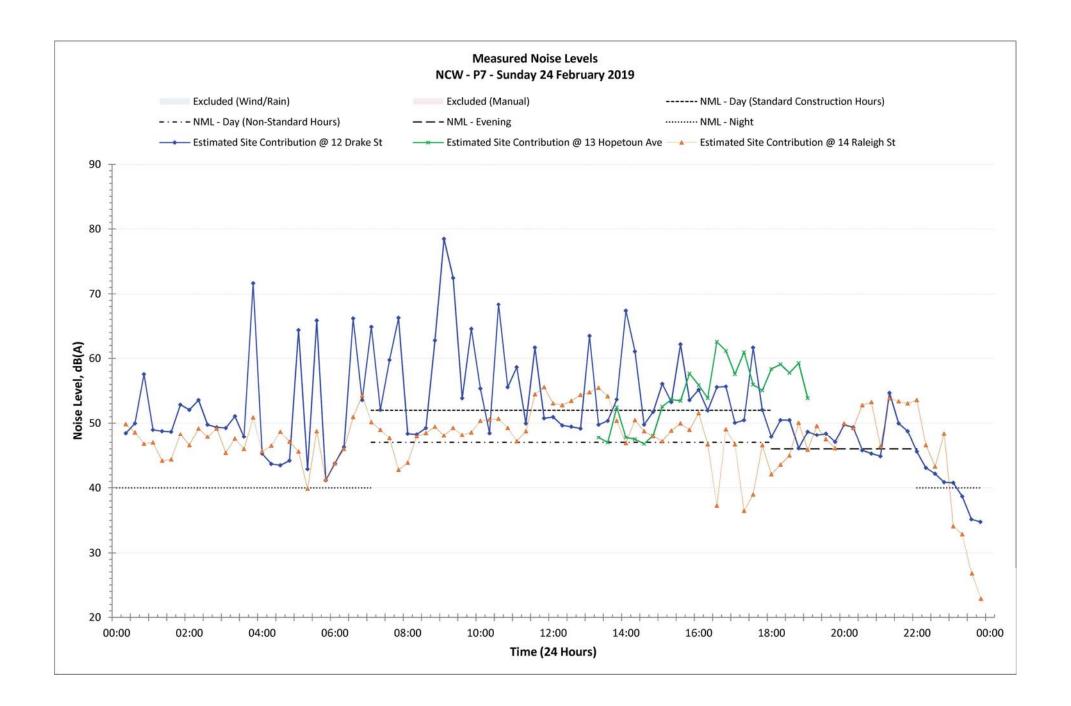


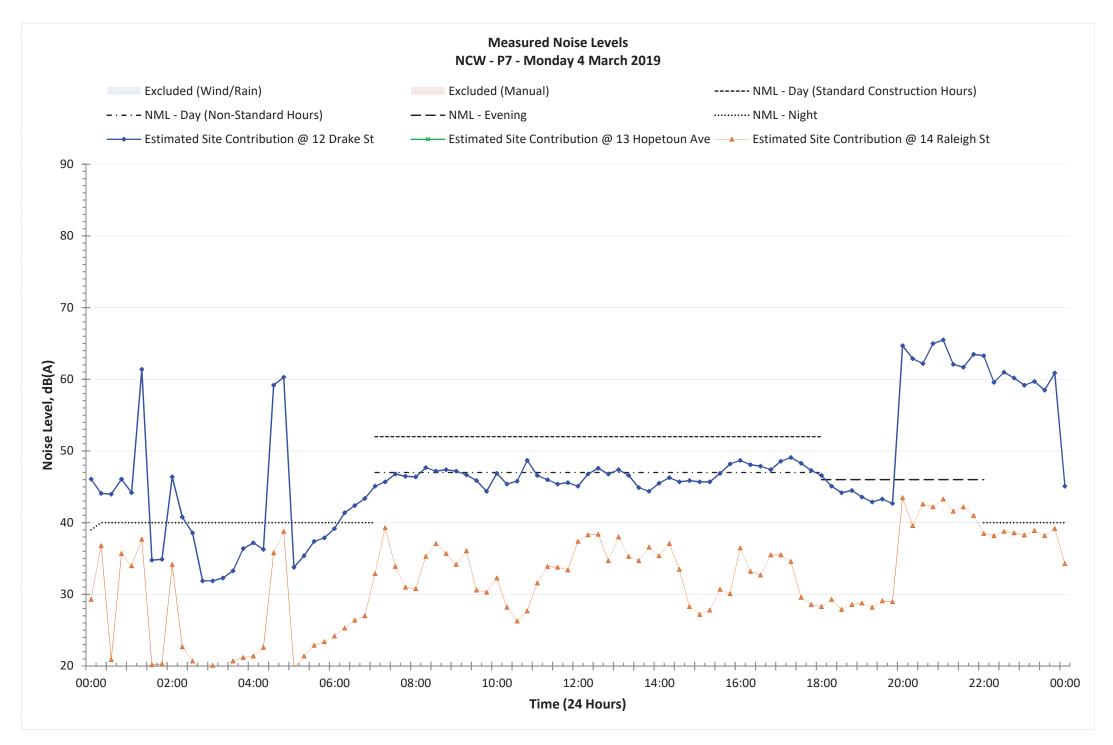


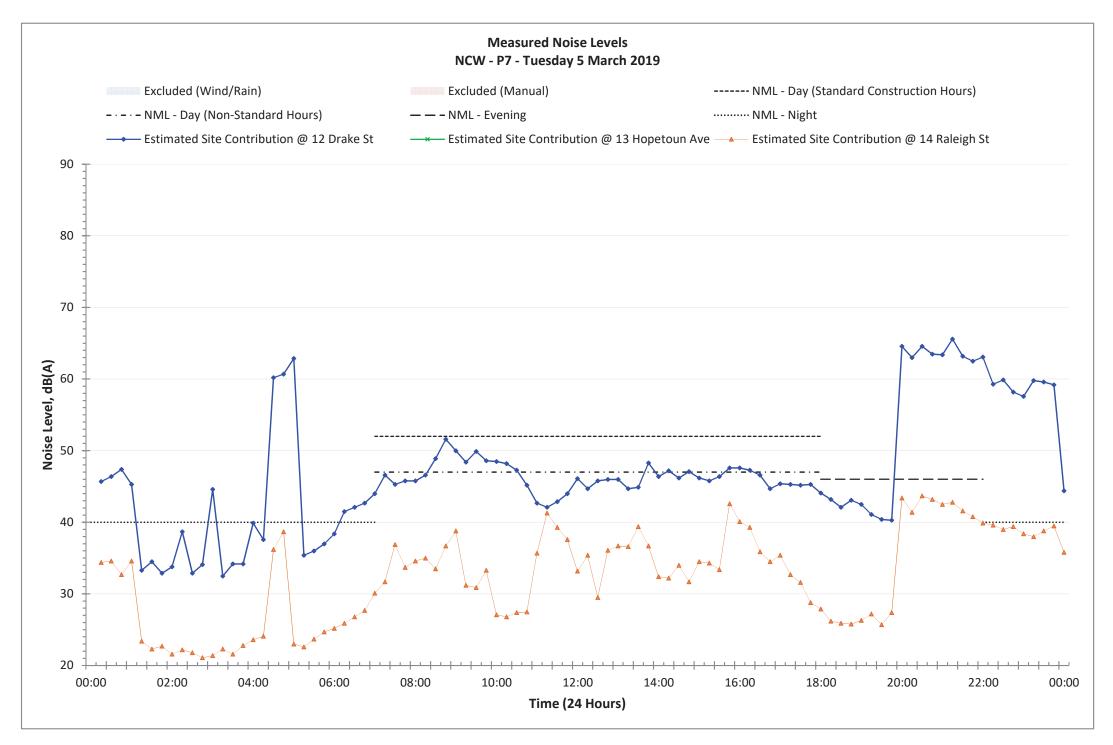


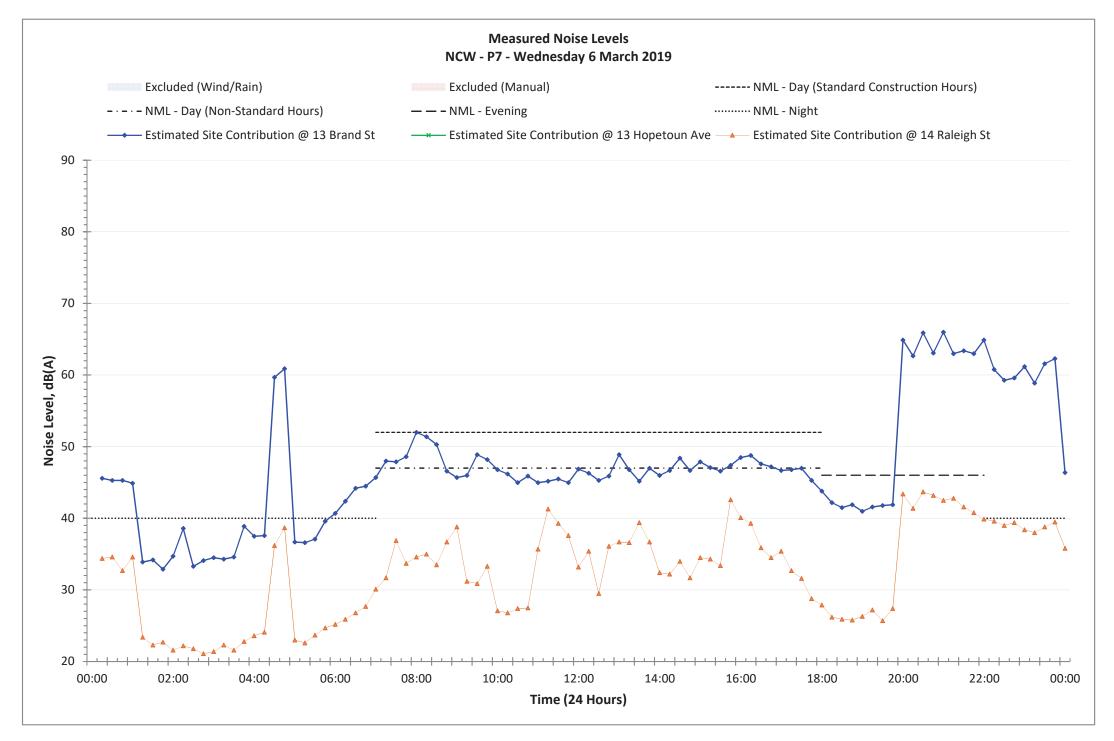


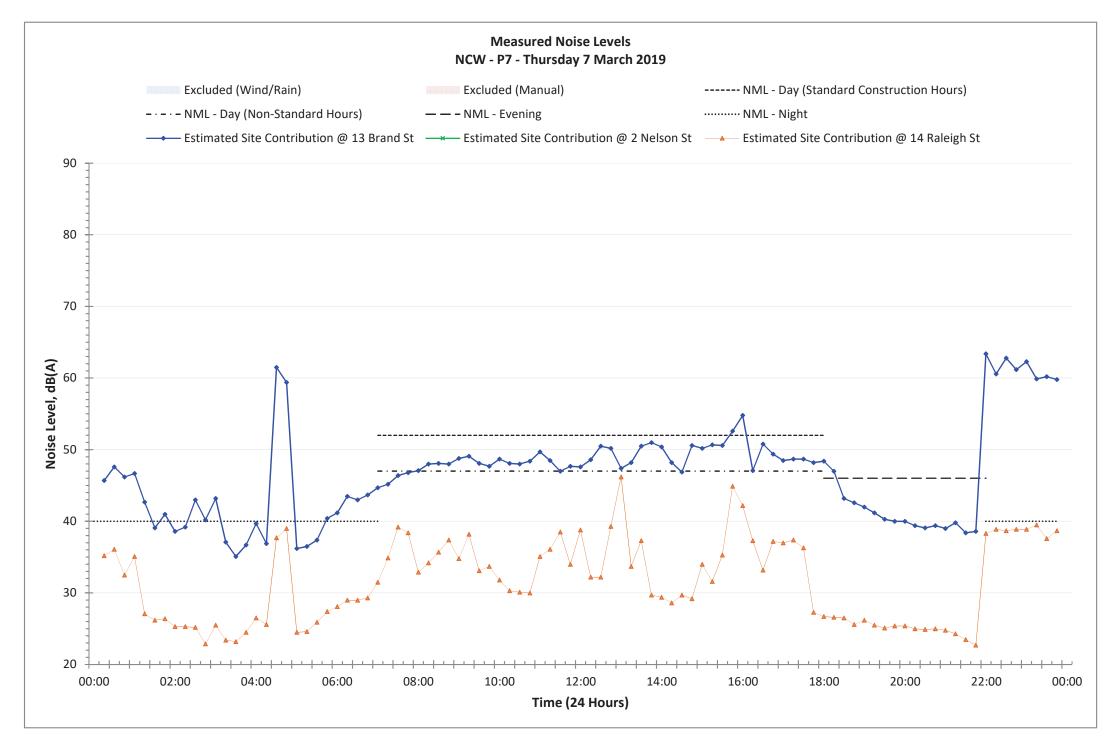


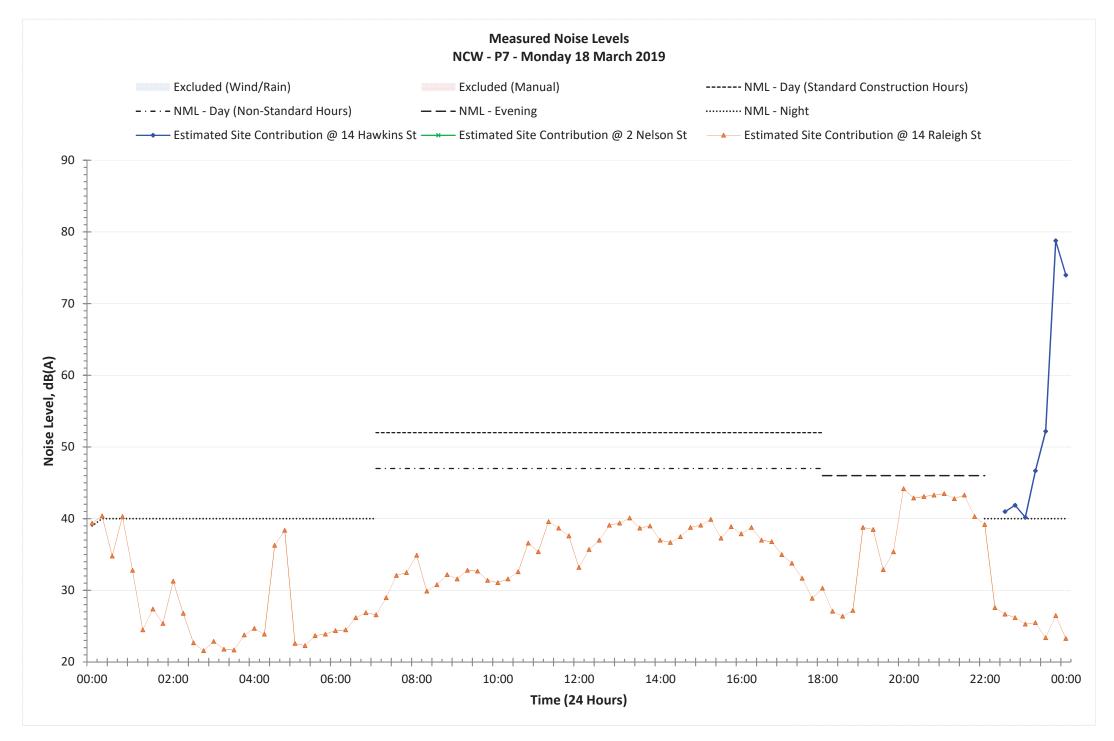


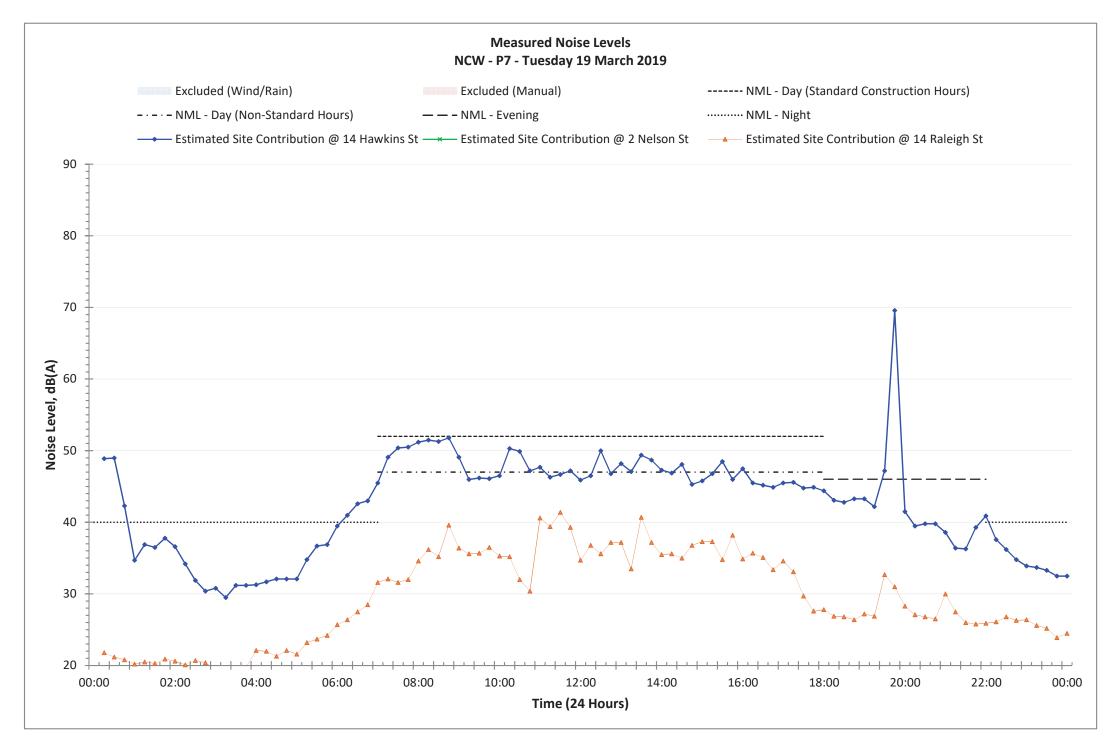


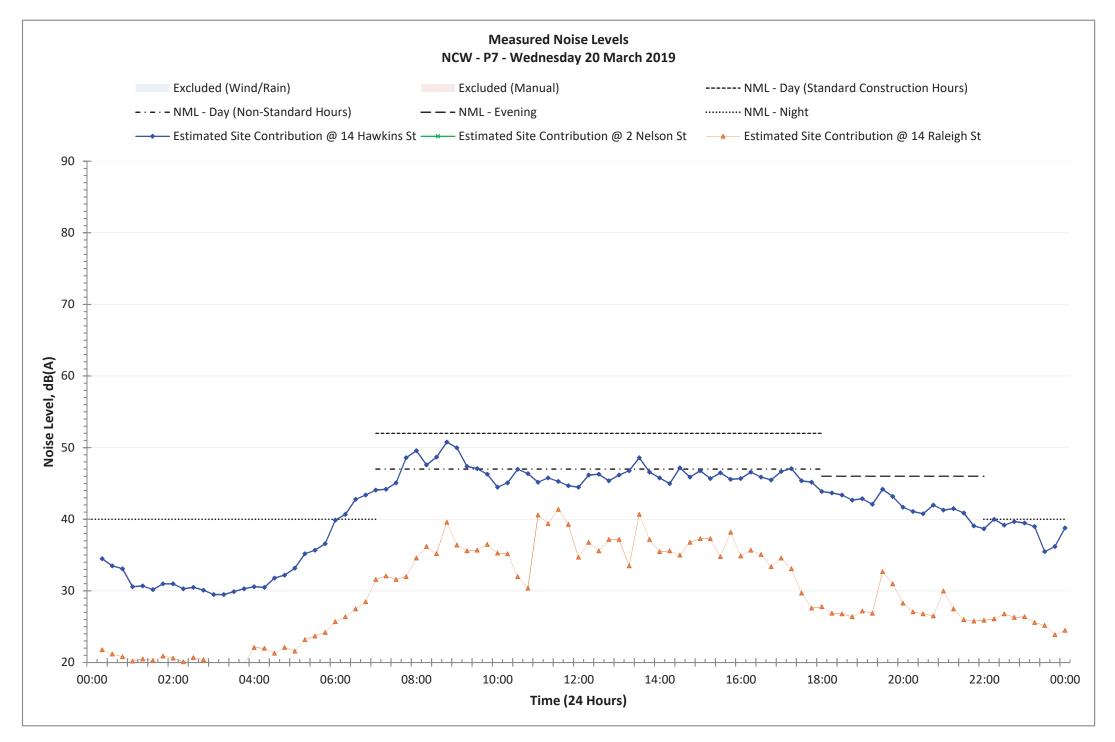


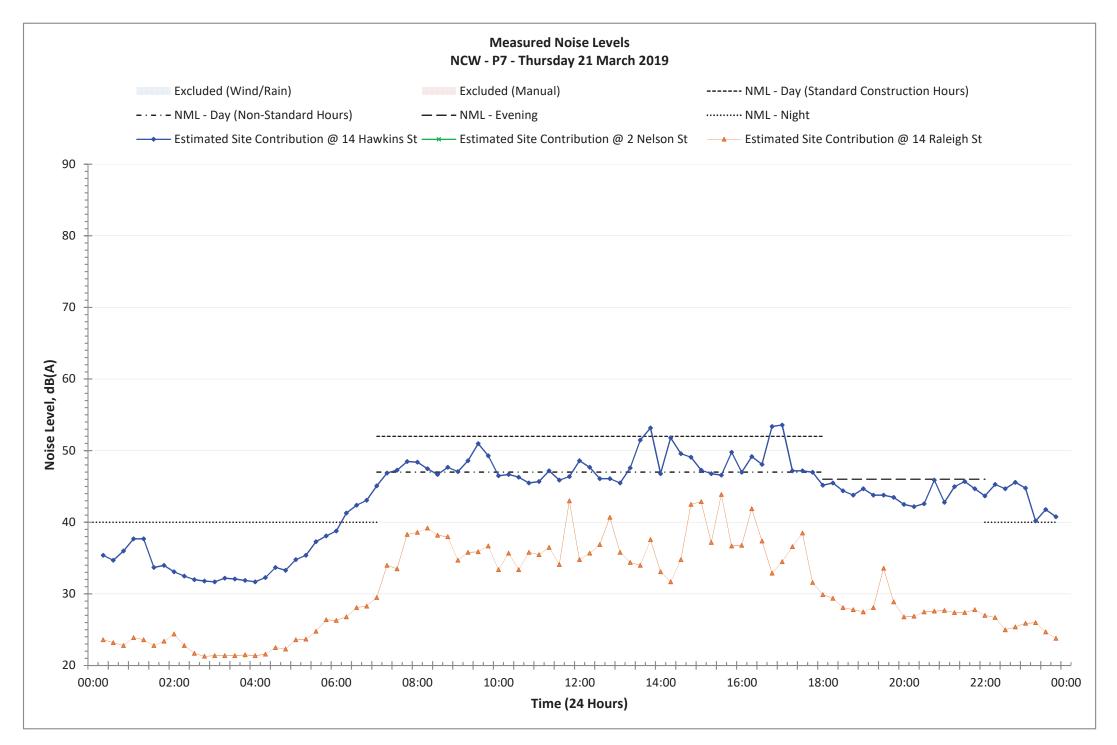


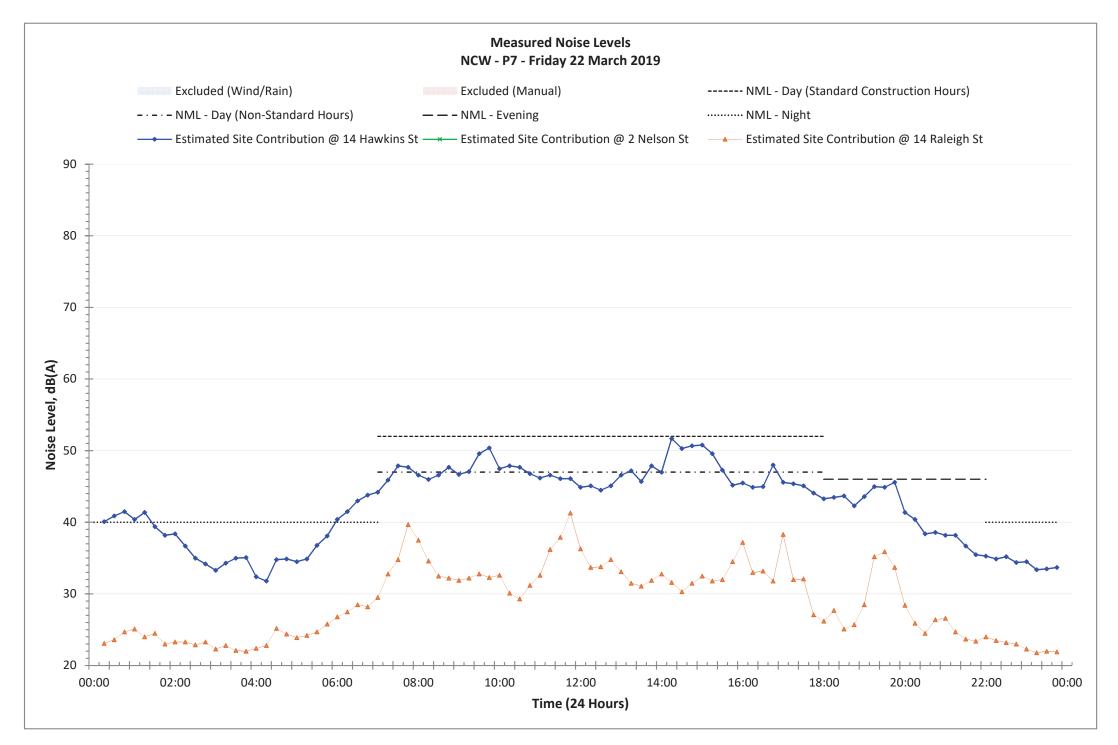


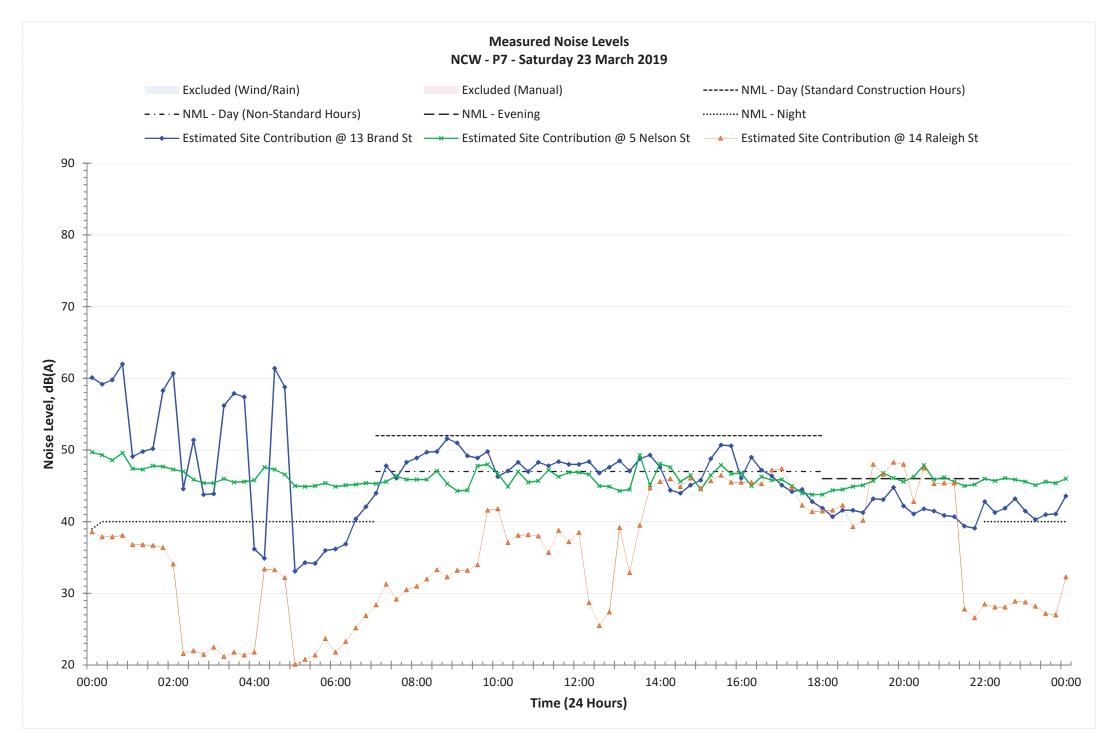


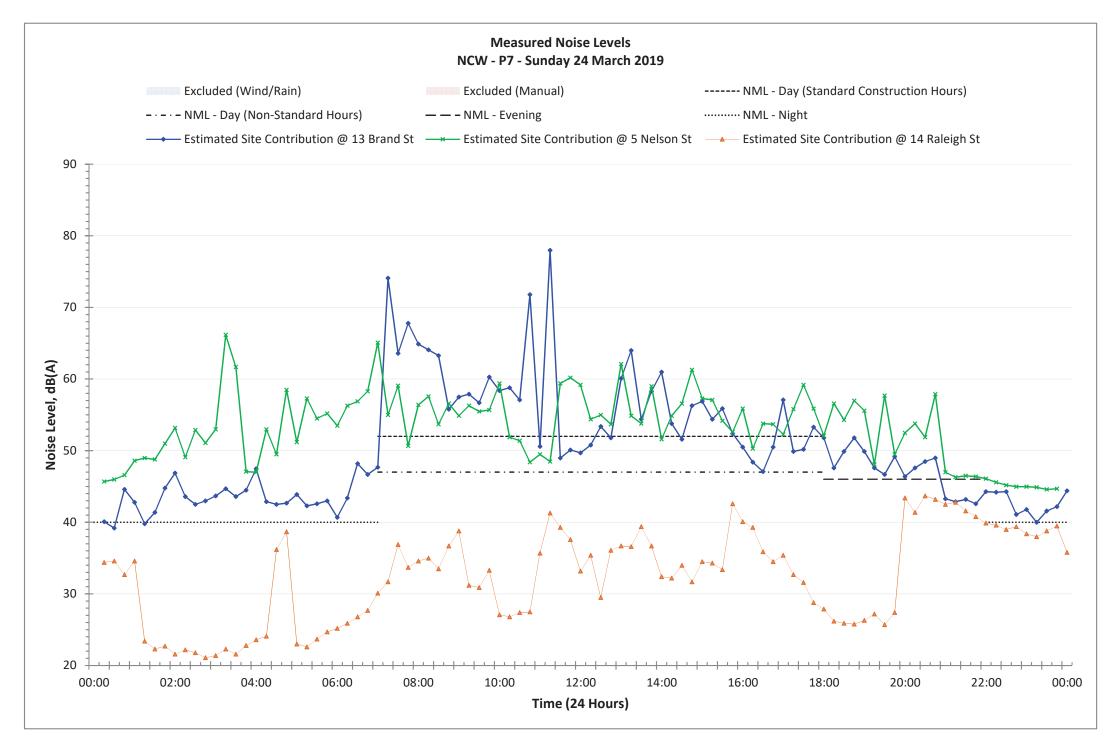










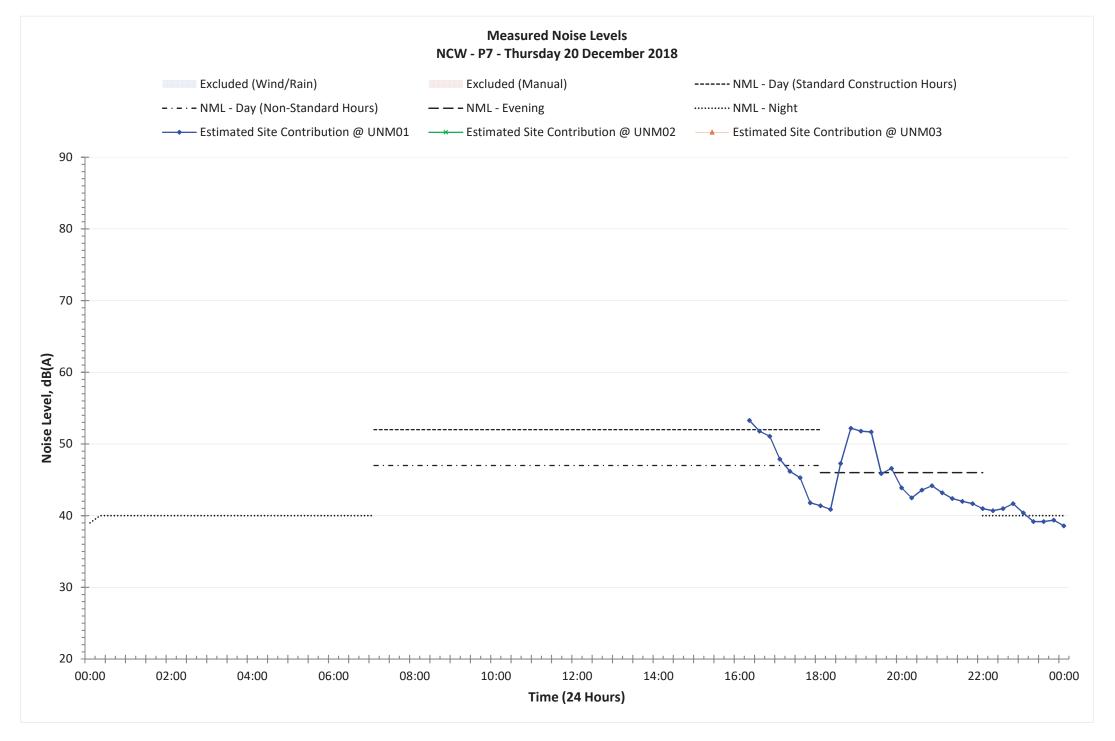


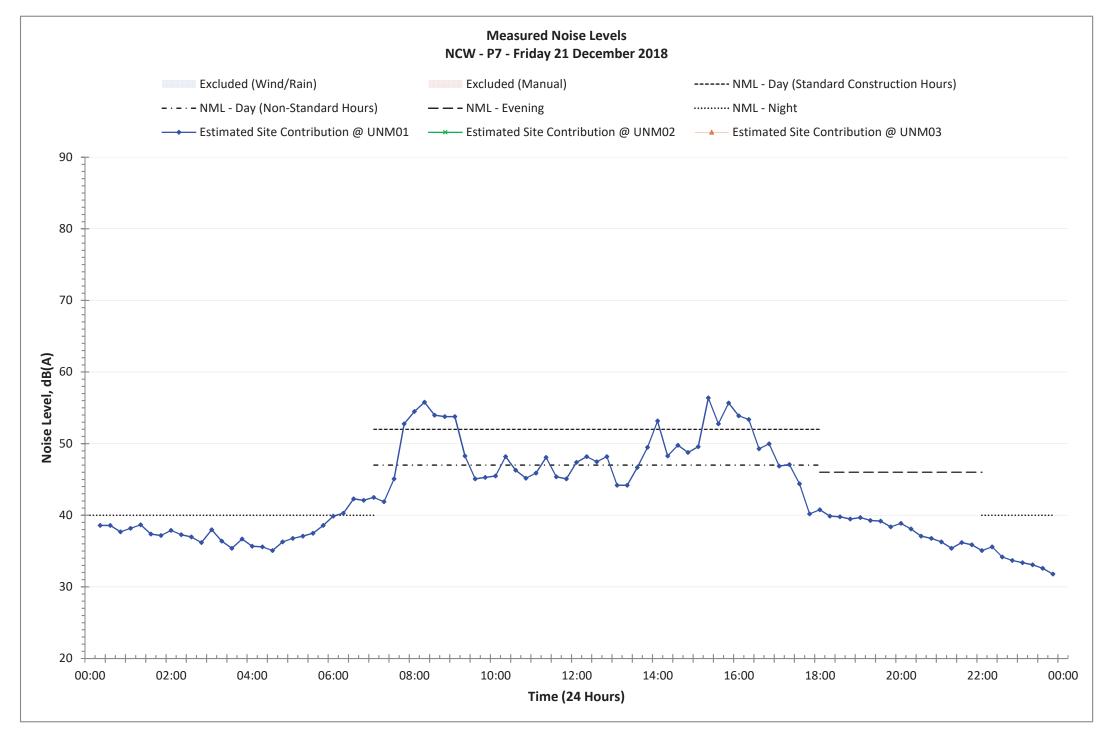
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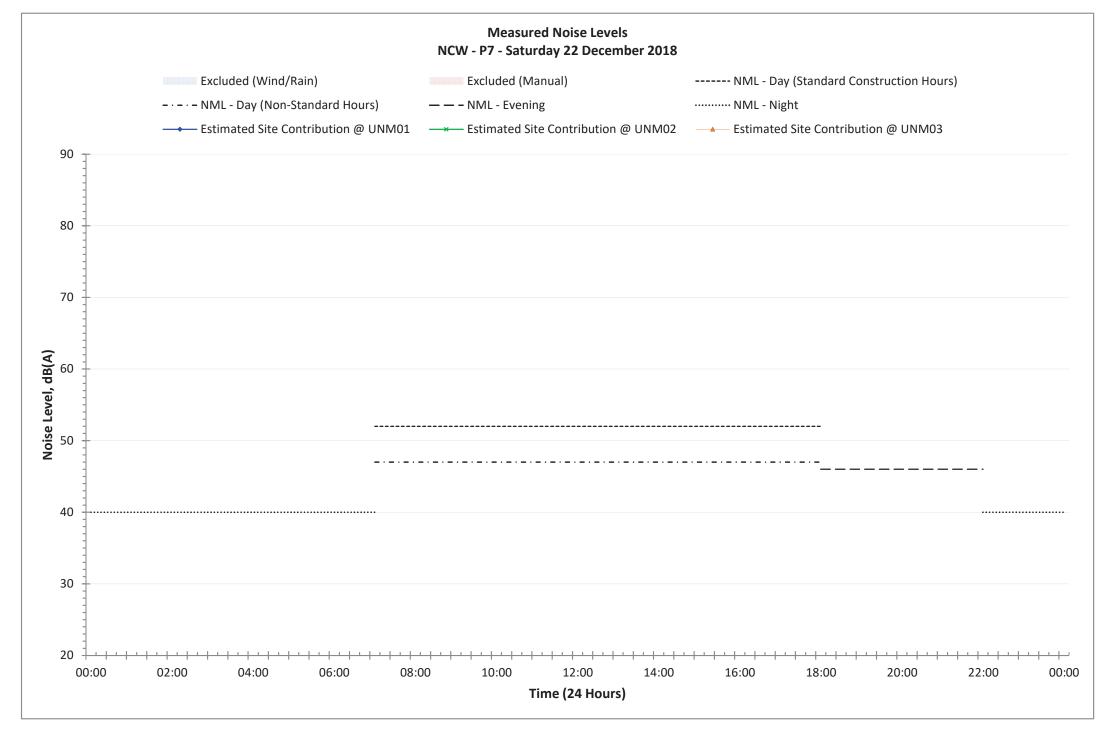
Technical Report

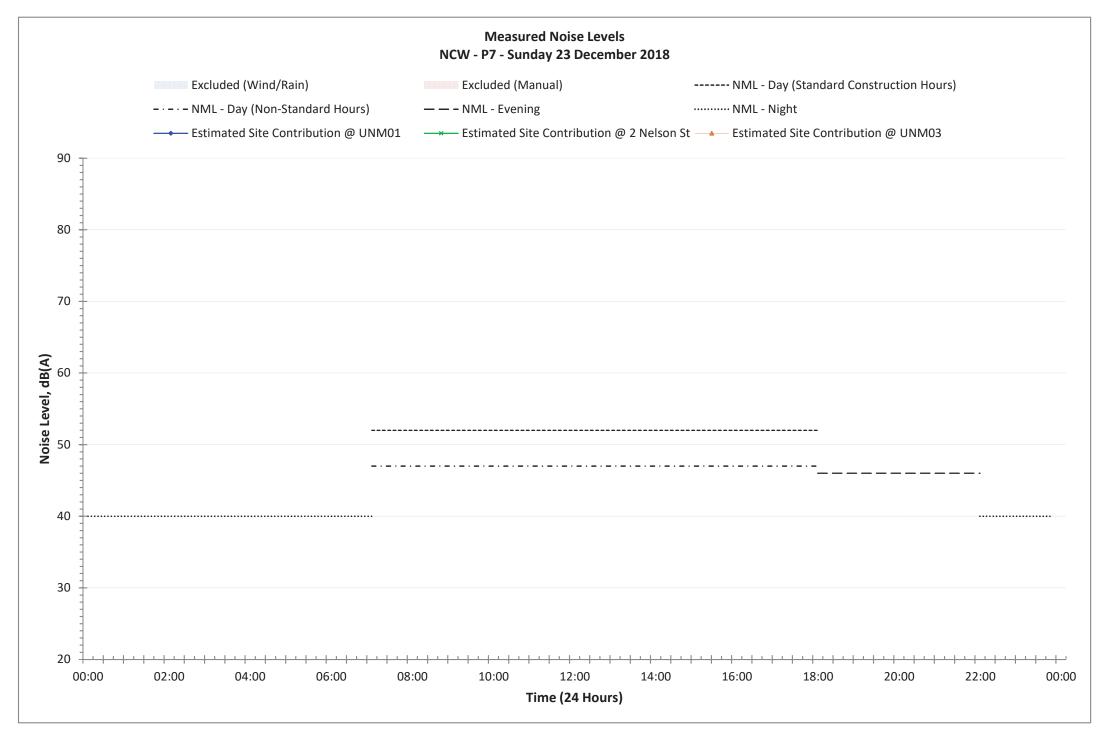
Appendix E – Unreported Unattended Noise Monitoring Charts – November 2018 to April 2019

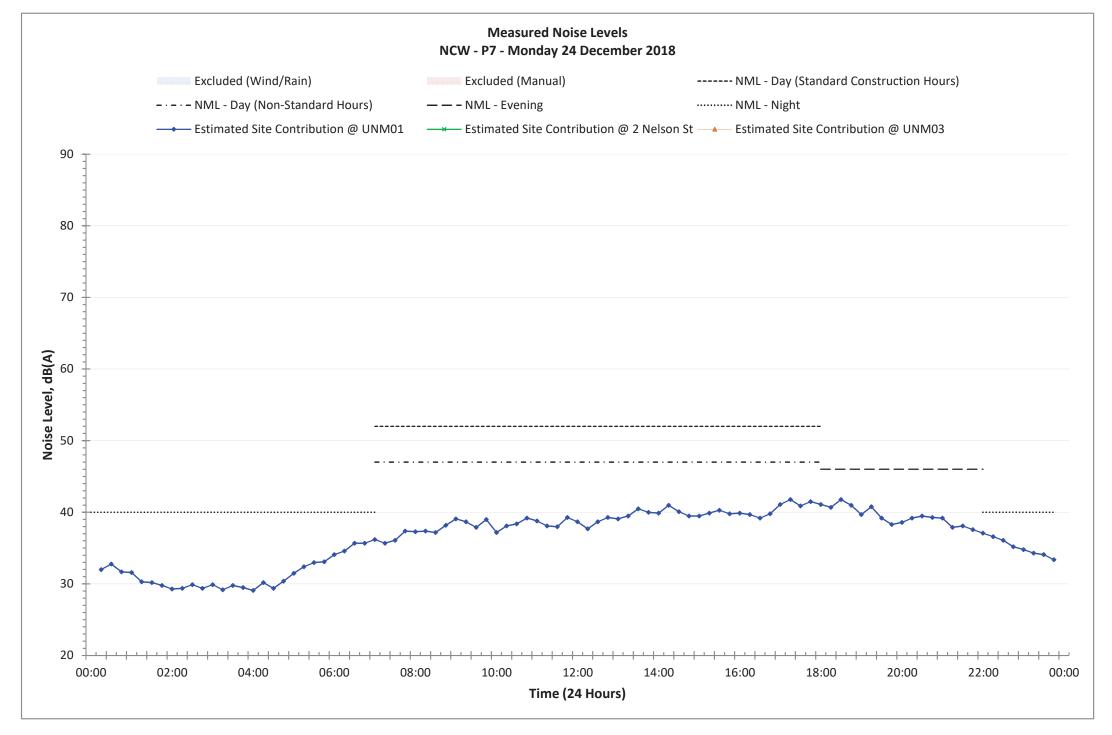


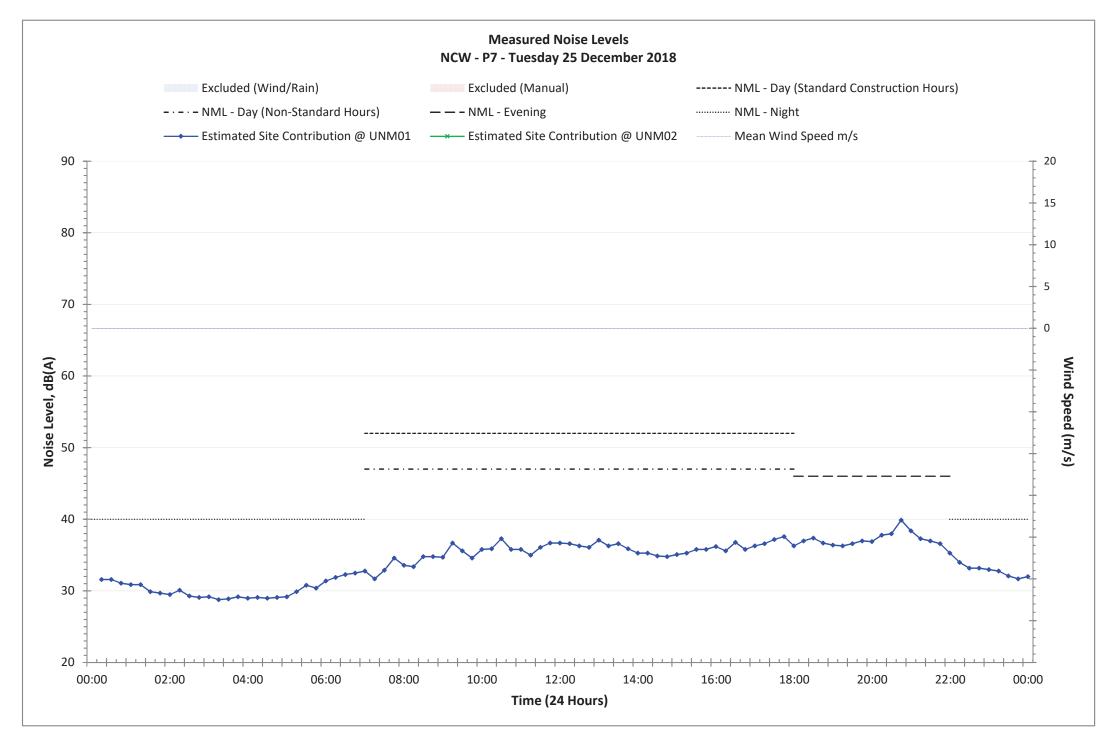


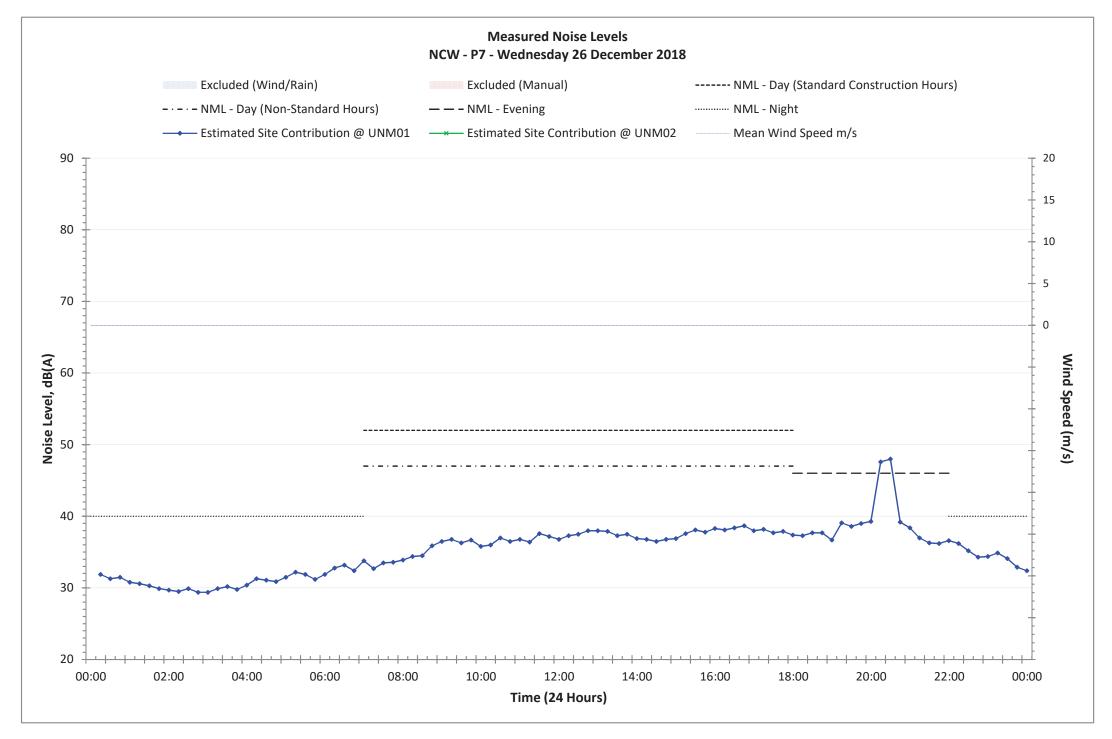


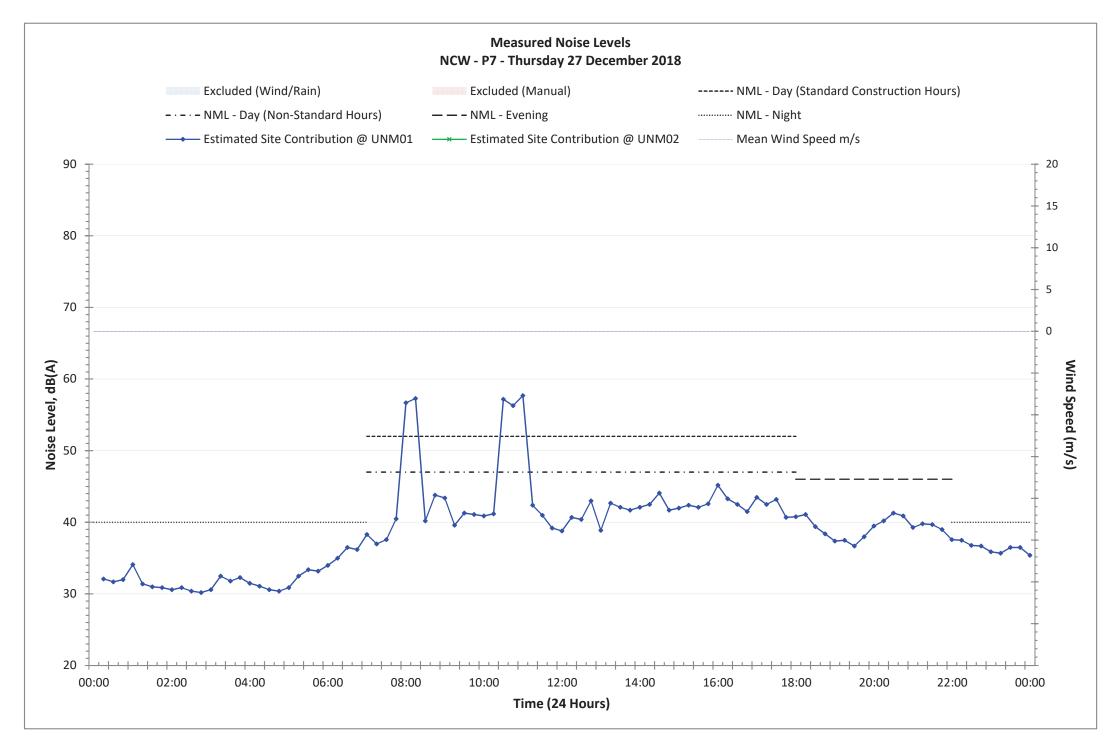


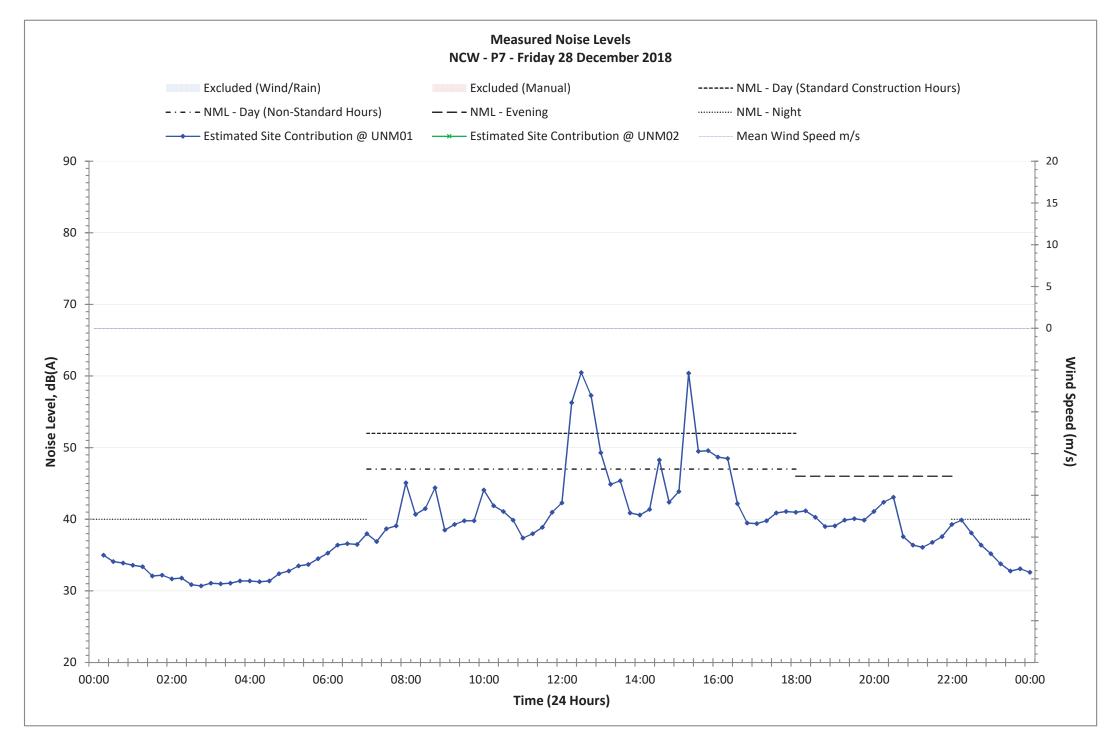


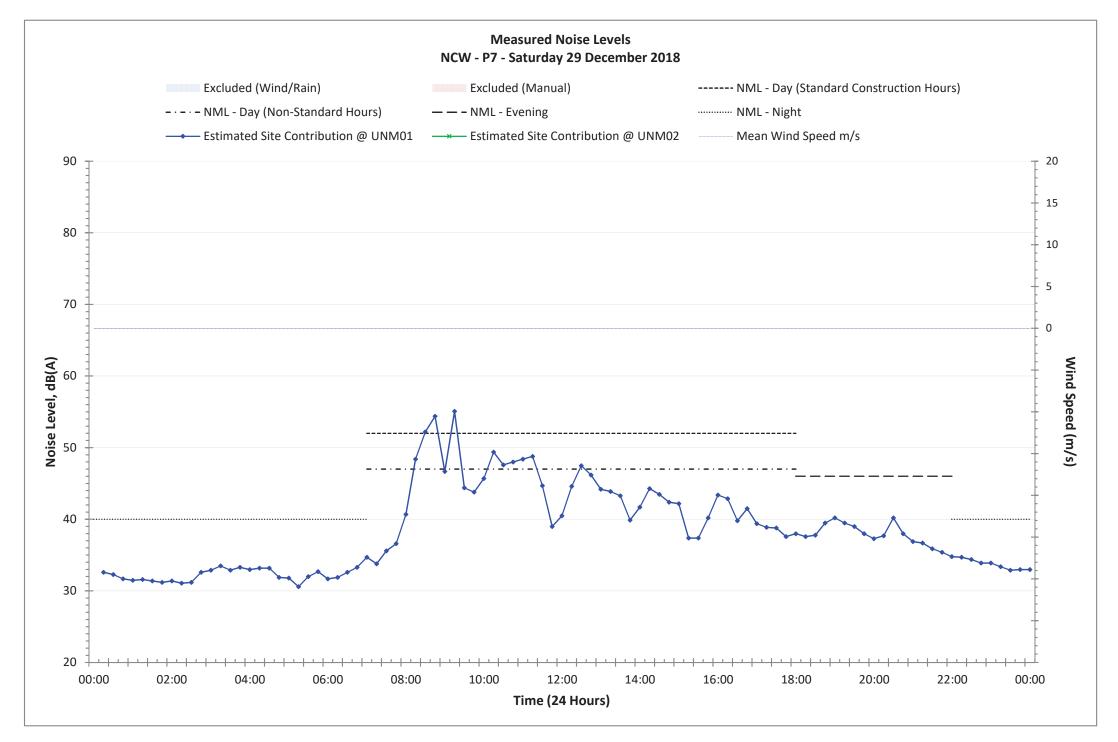


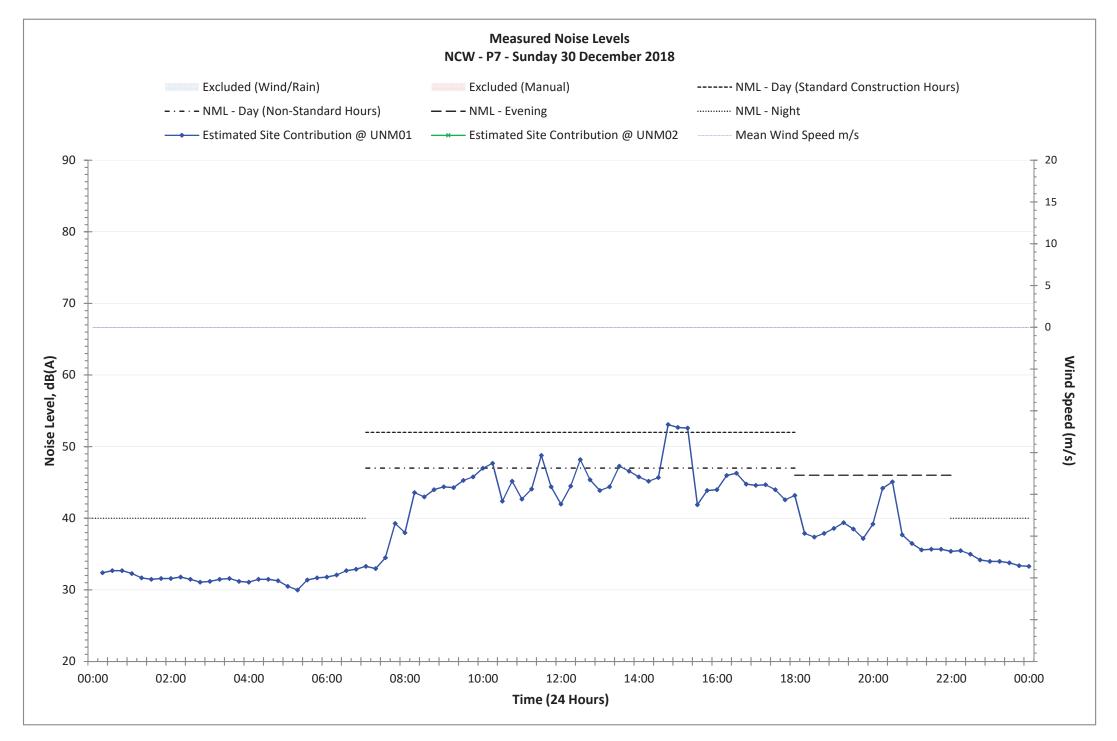


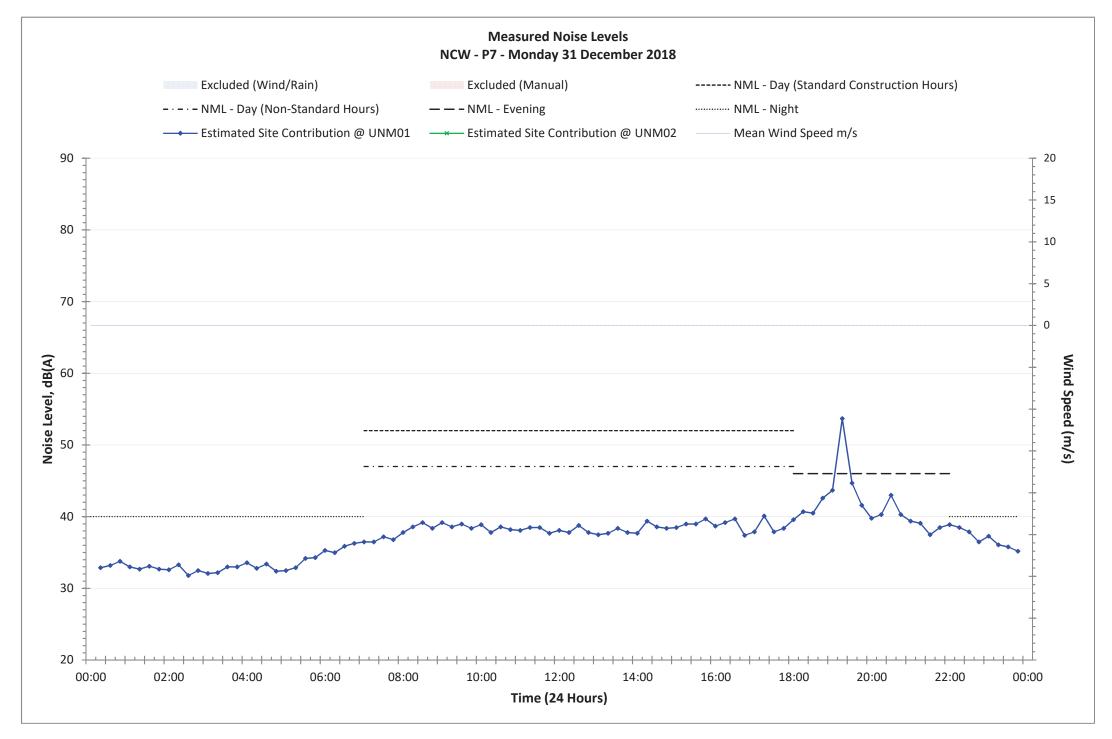


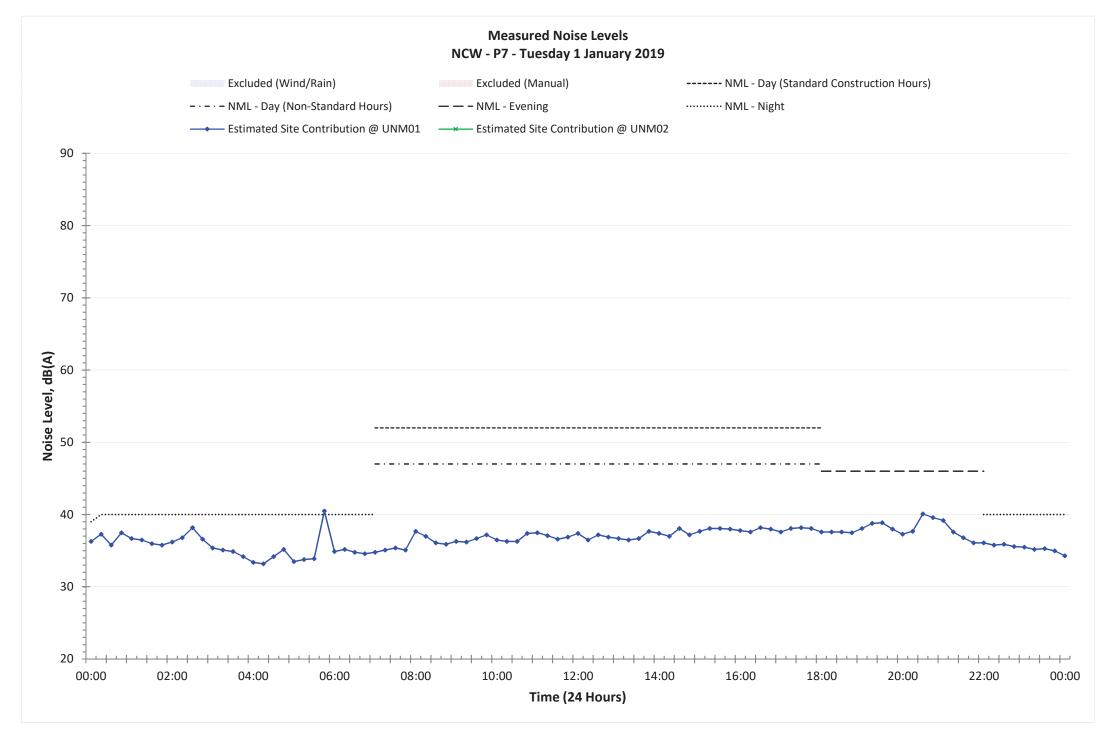


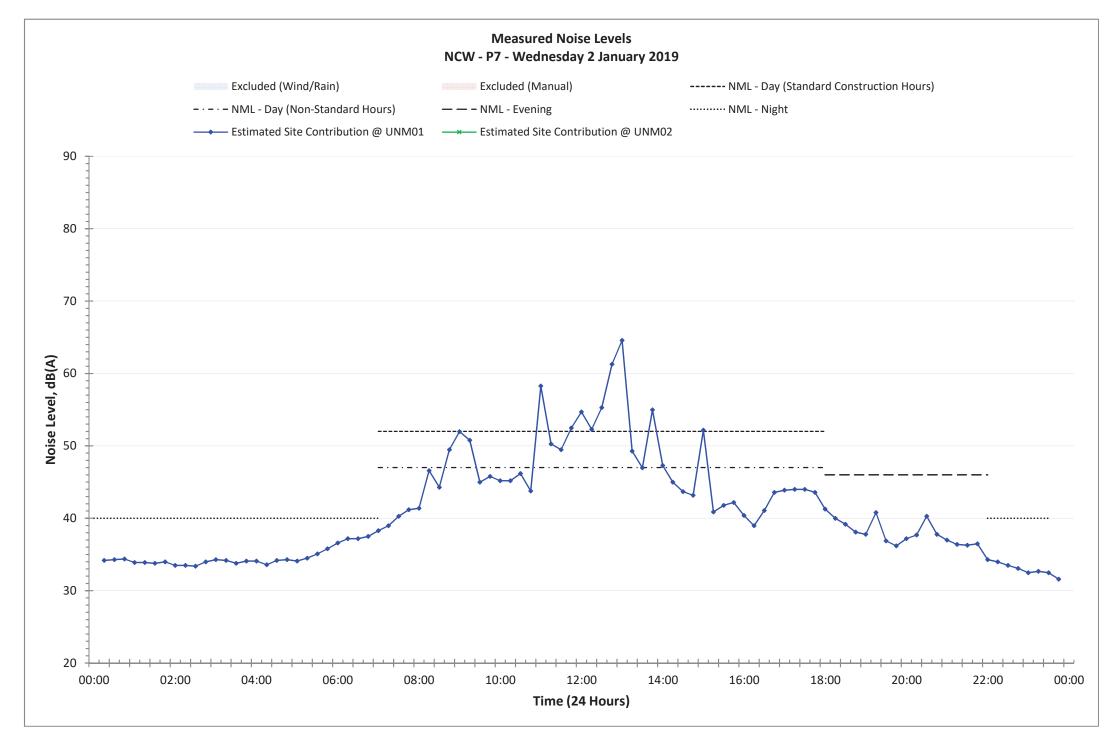


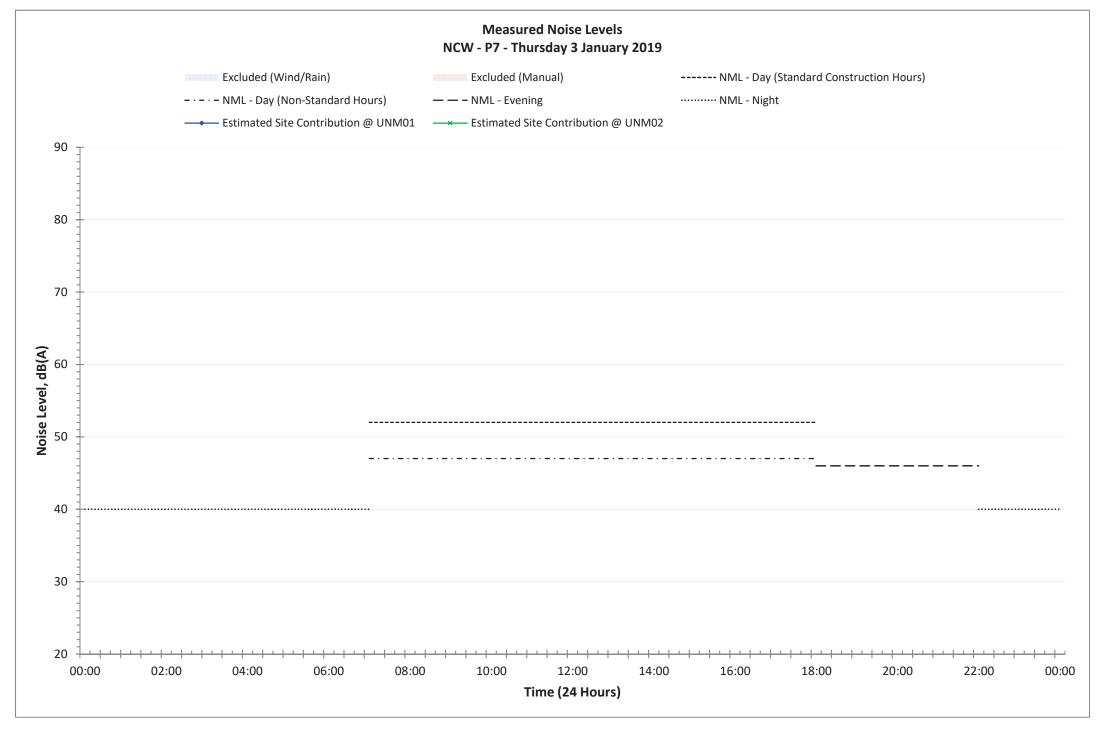


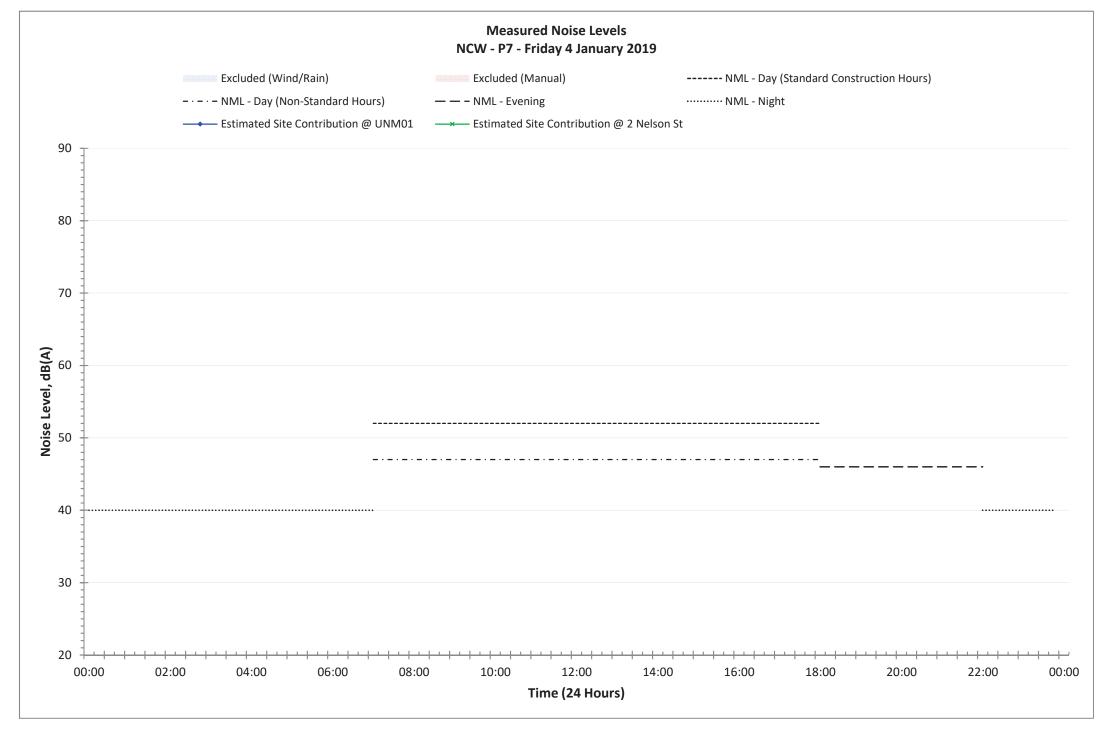


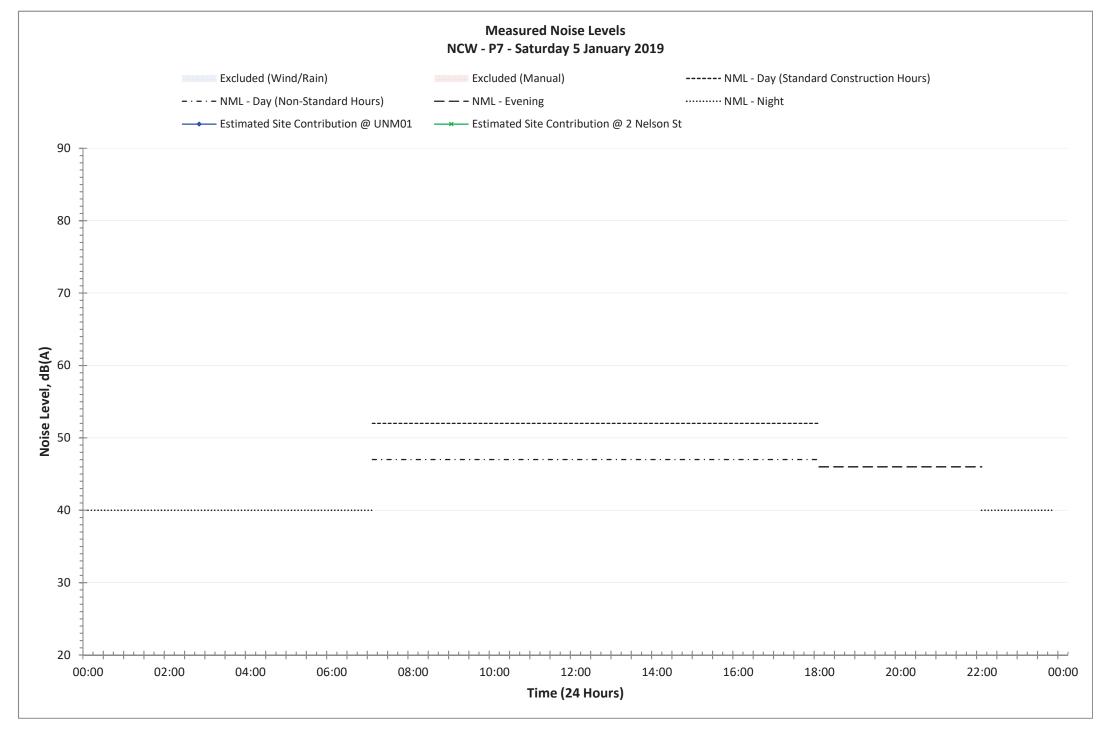


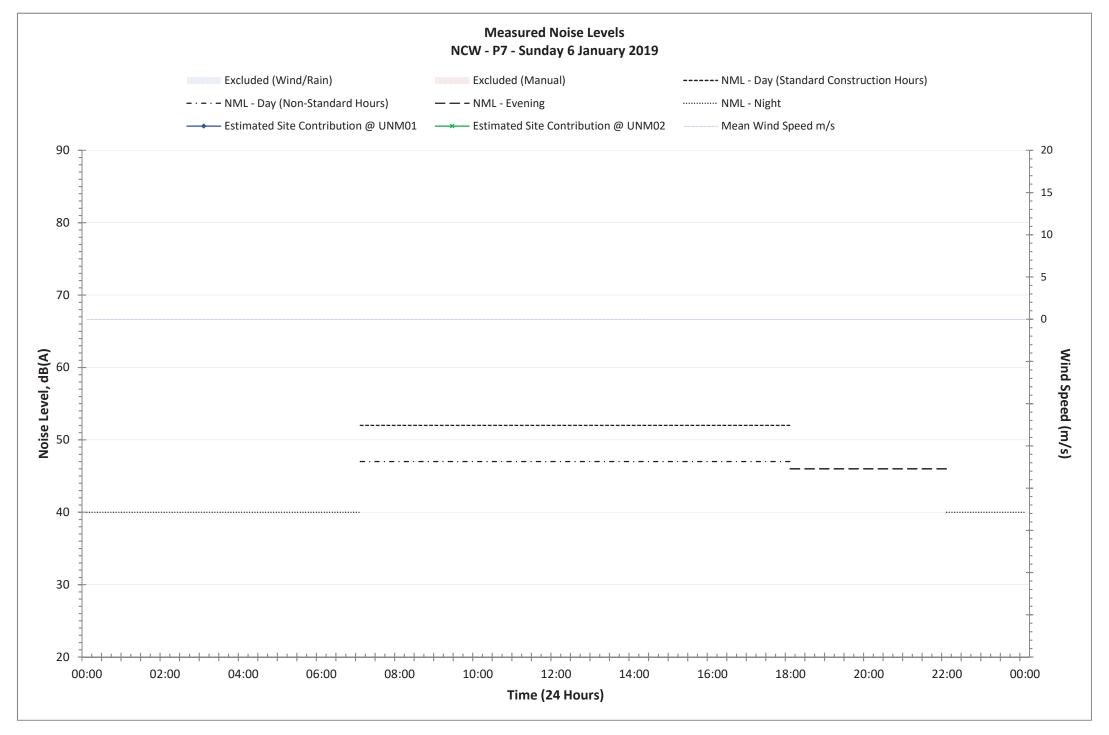


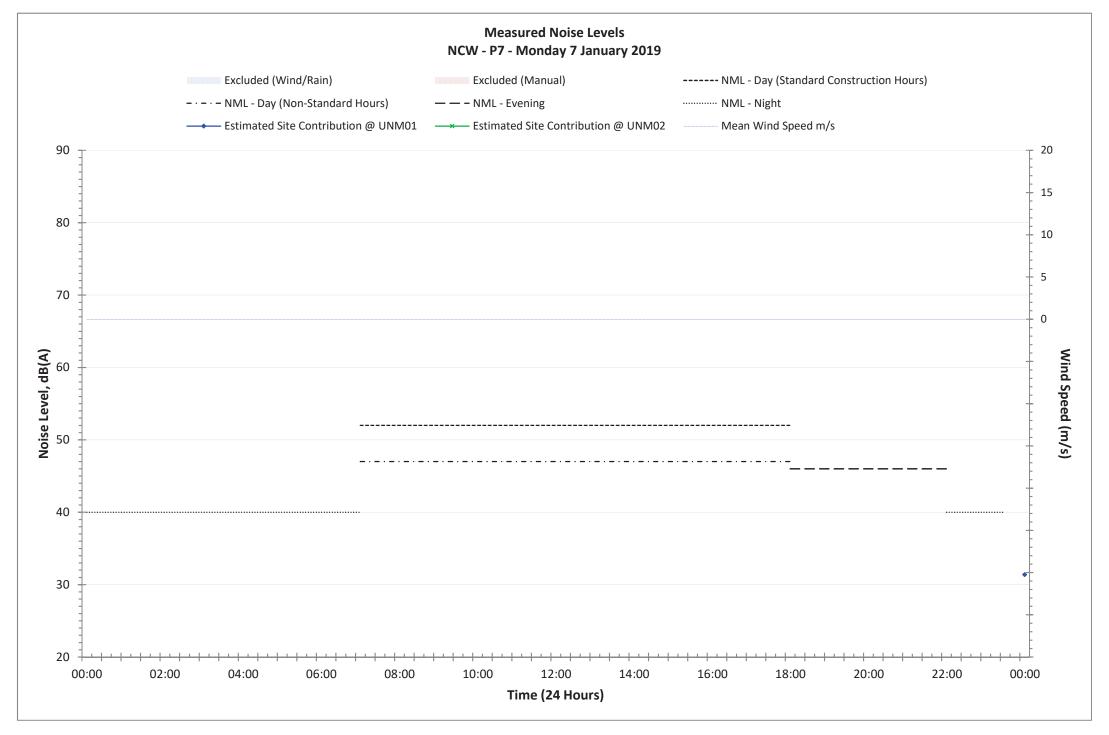


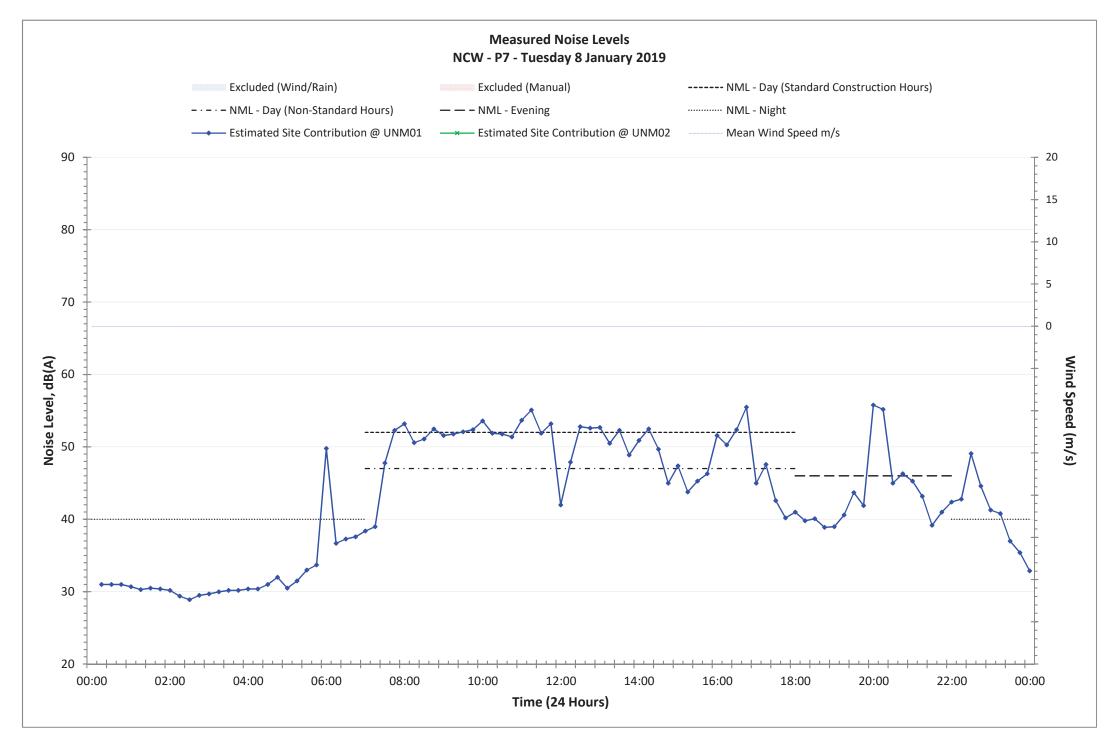


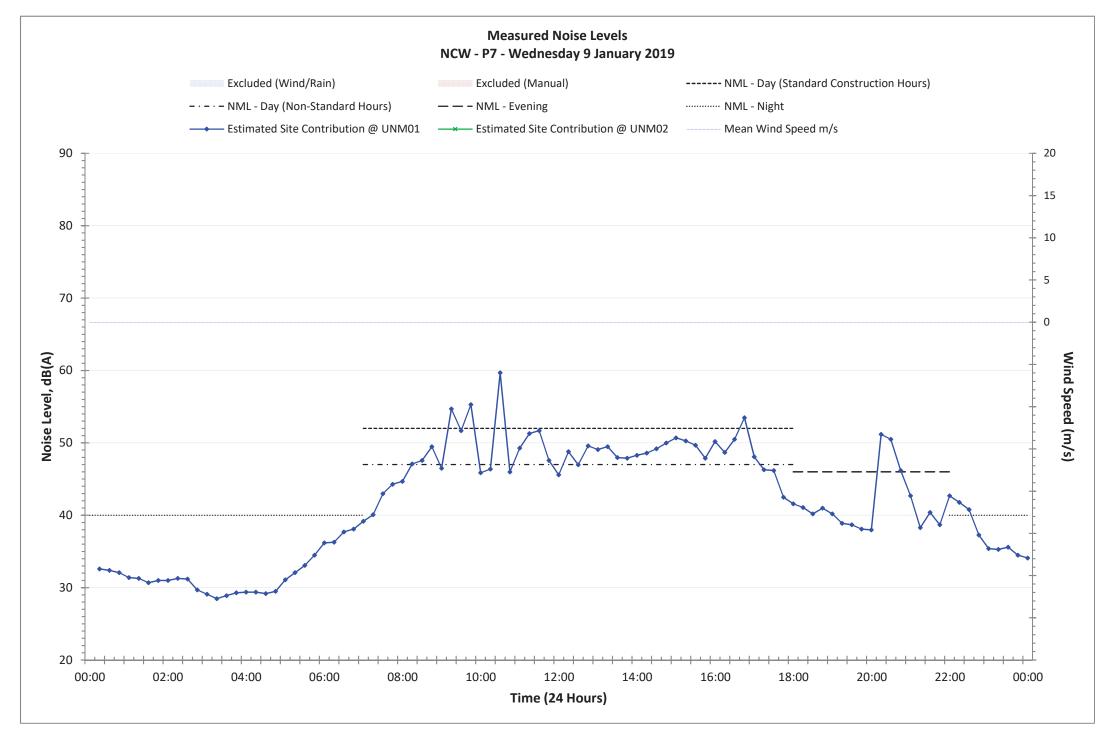


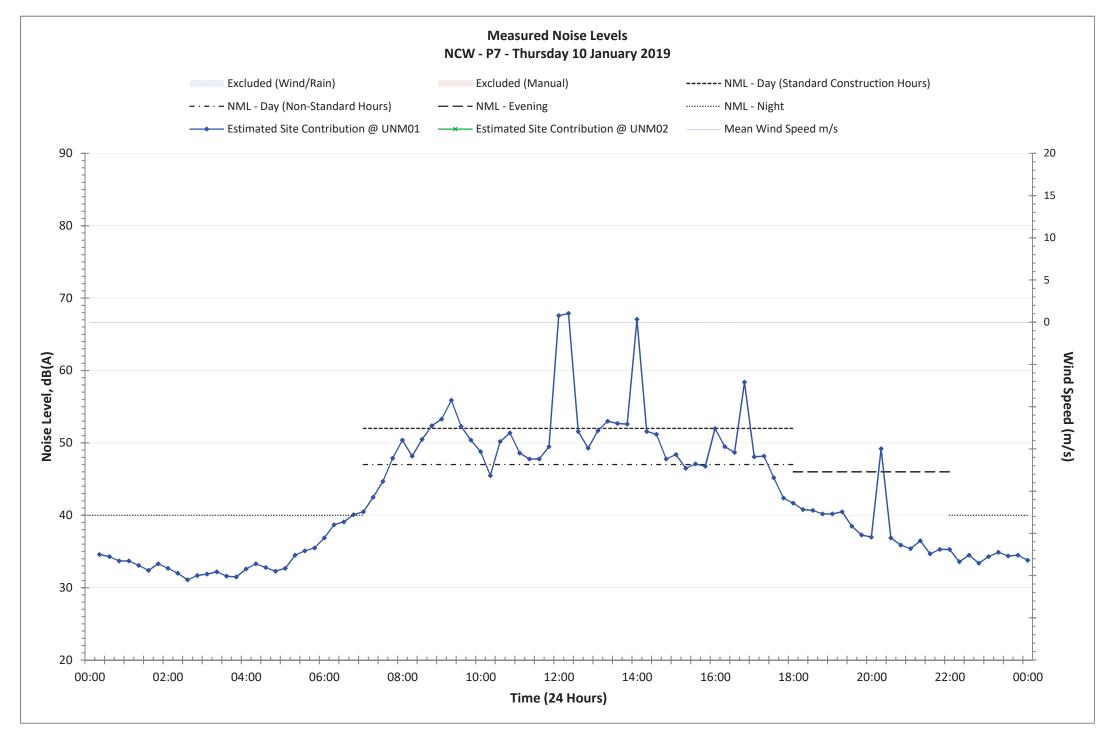


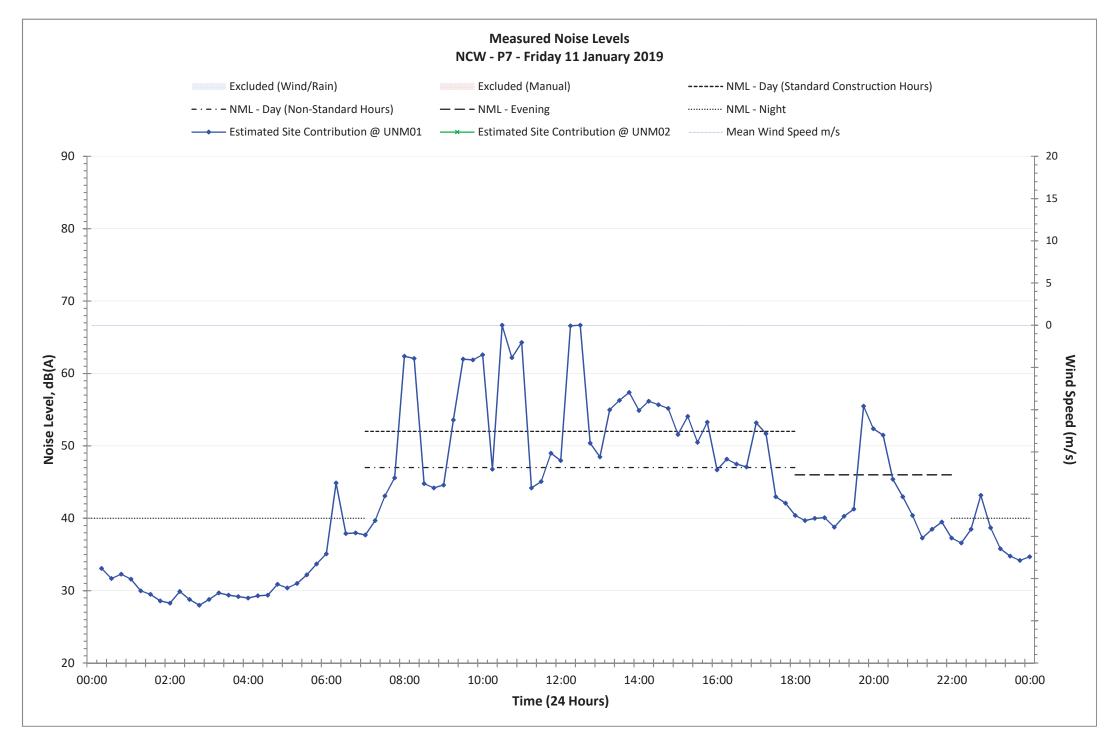


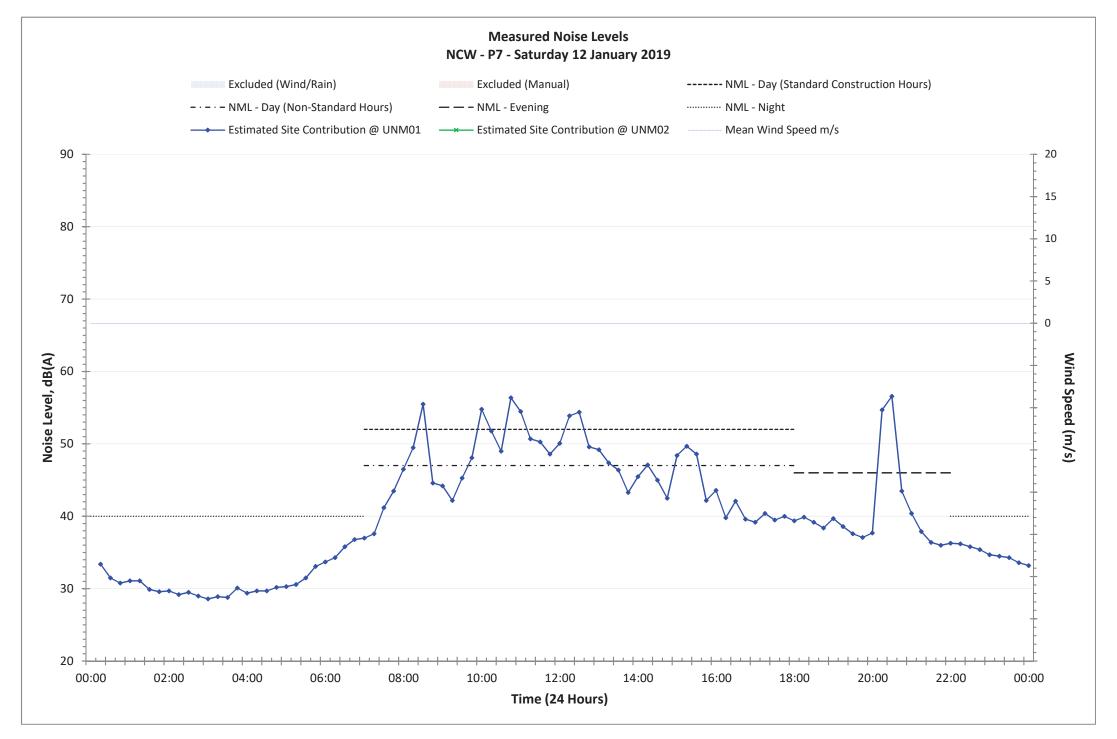


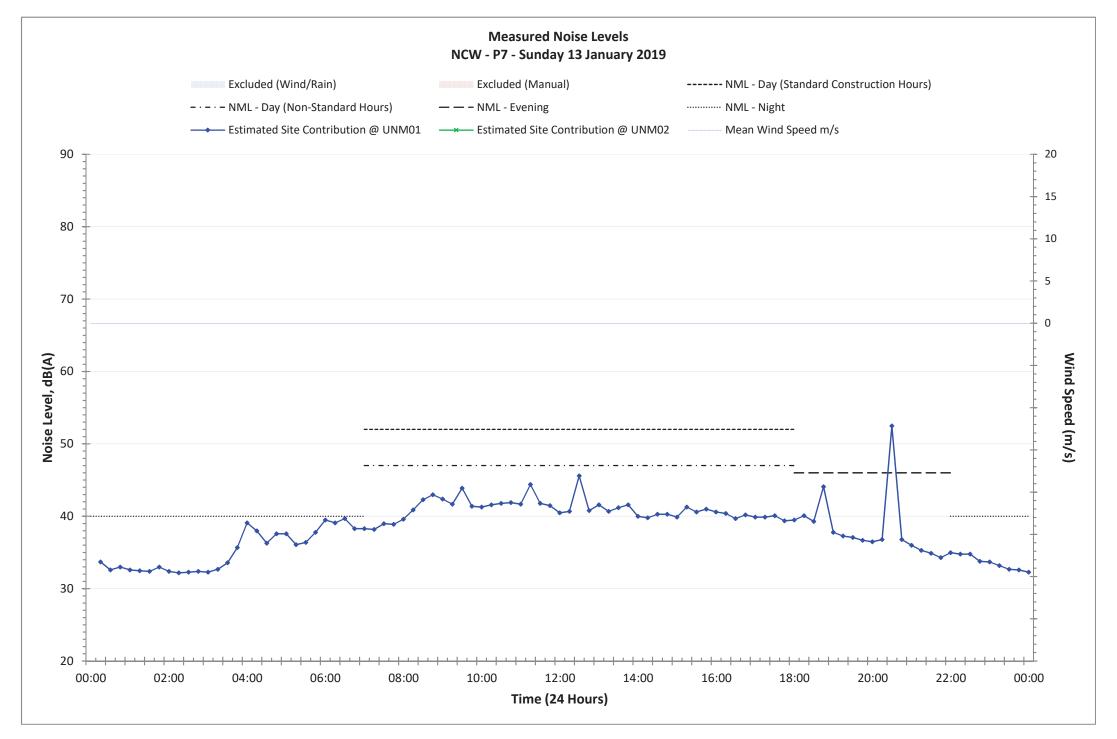


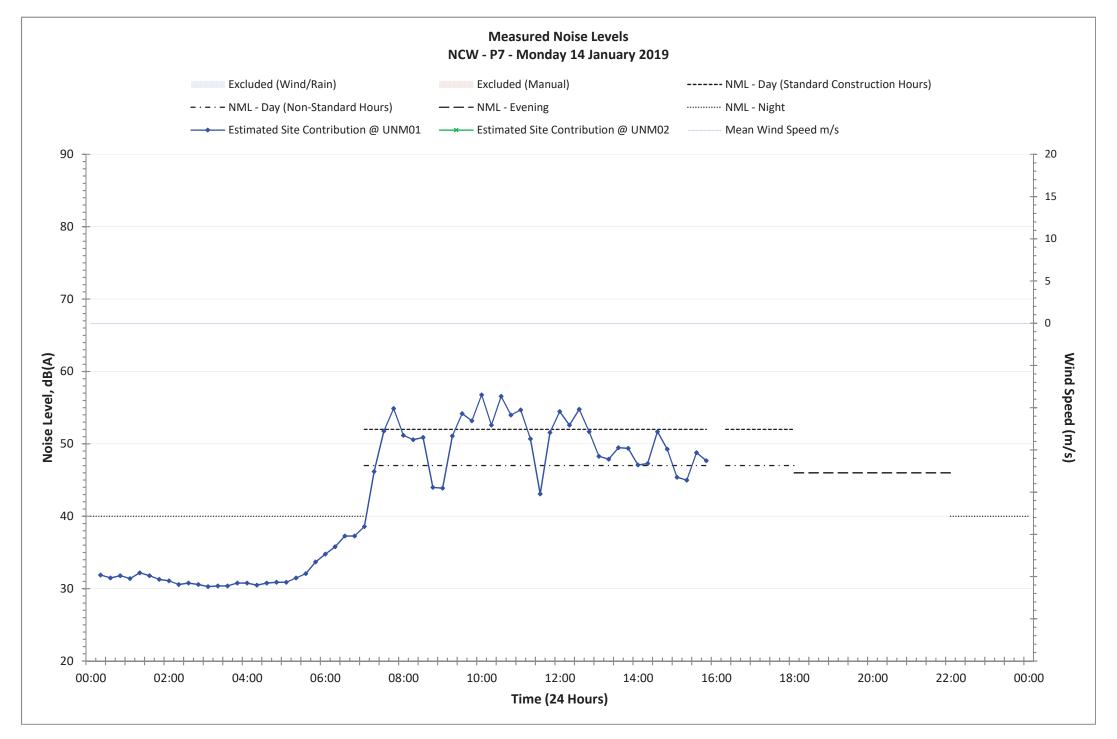


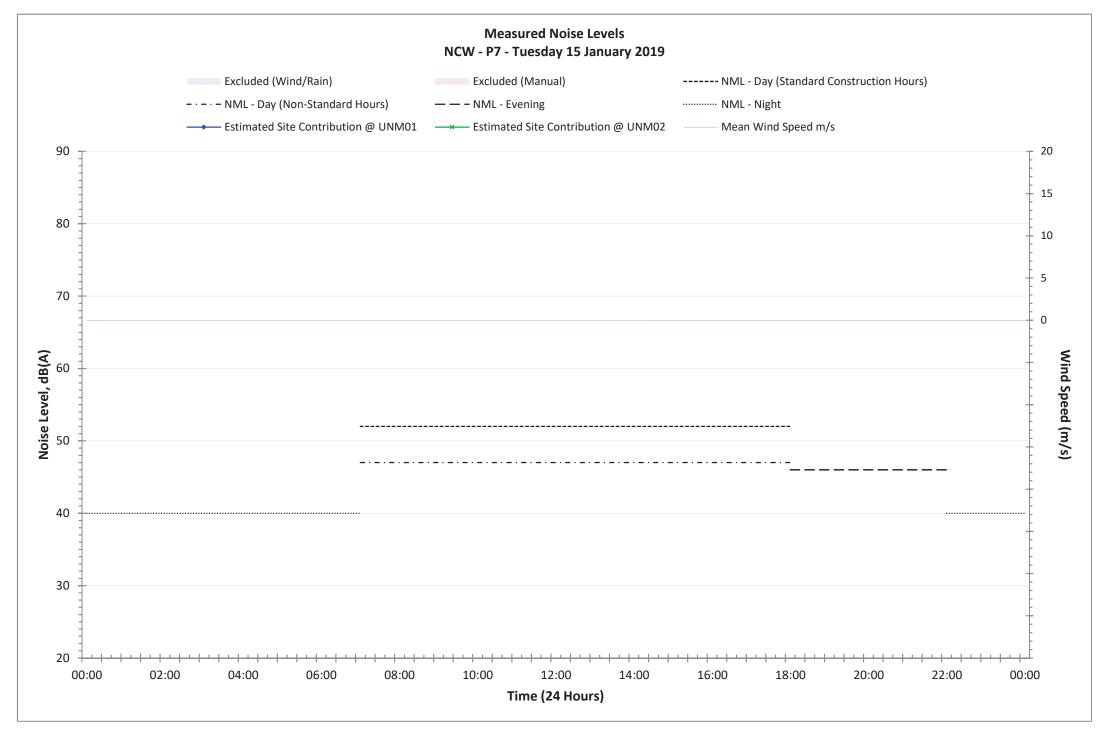


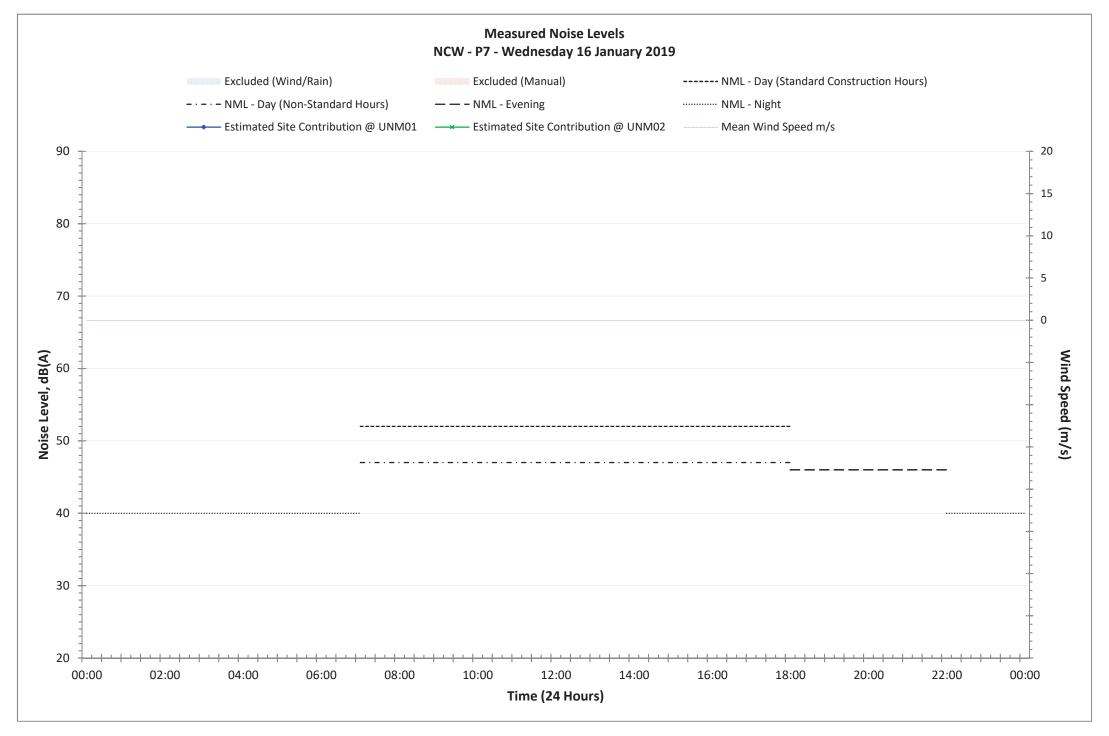


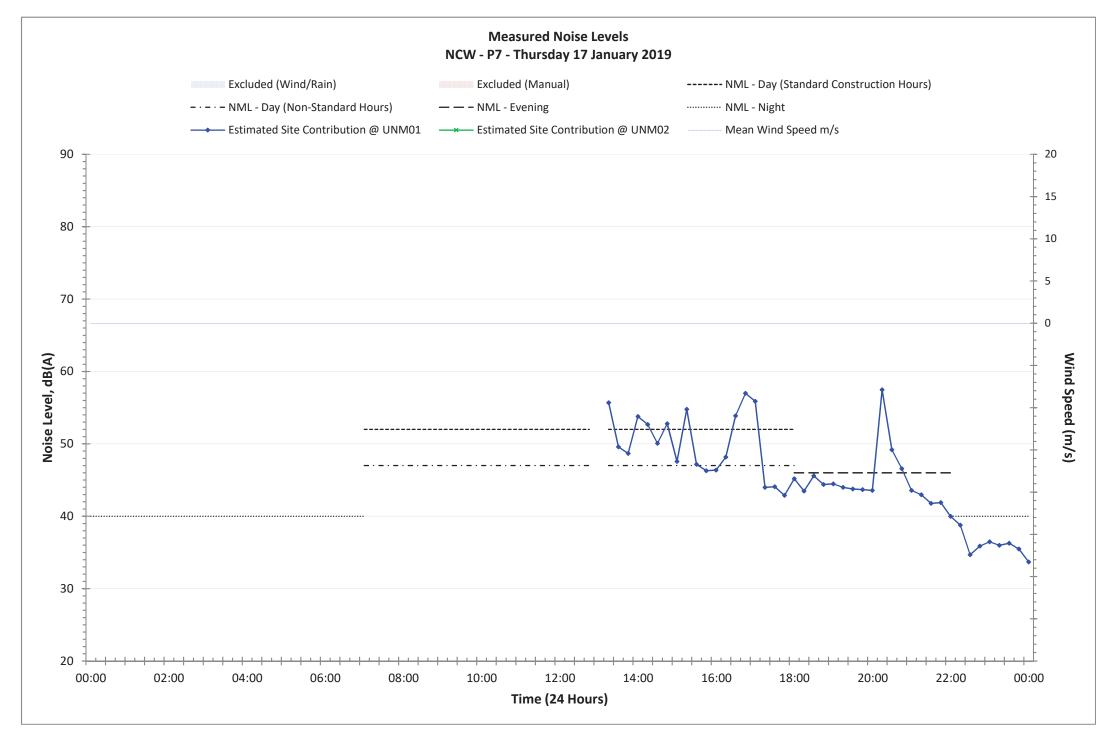


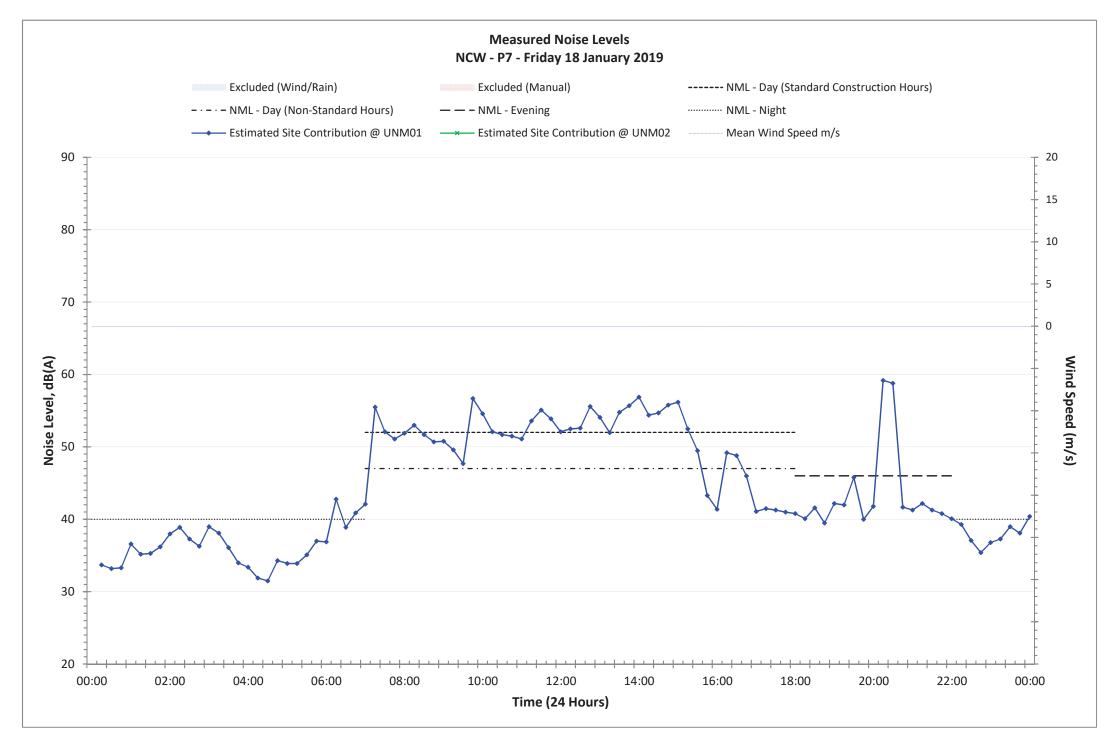


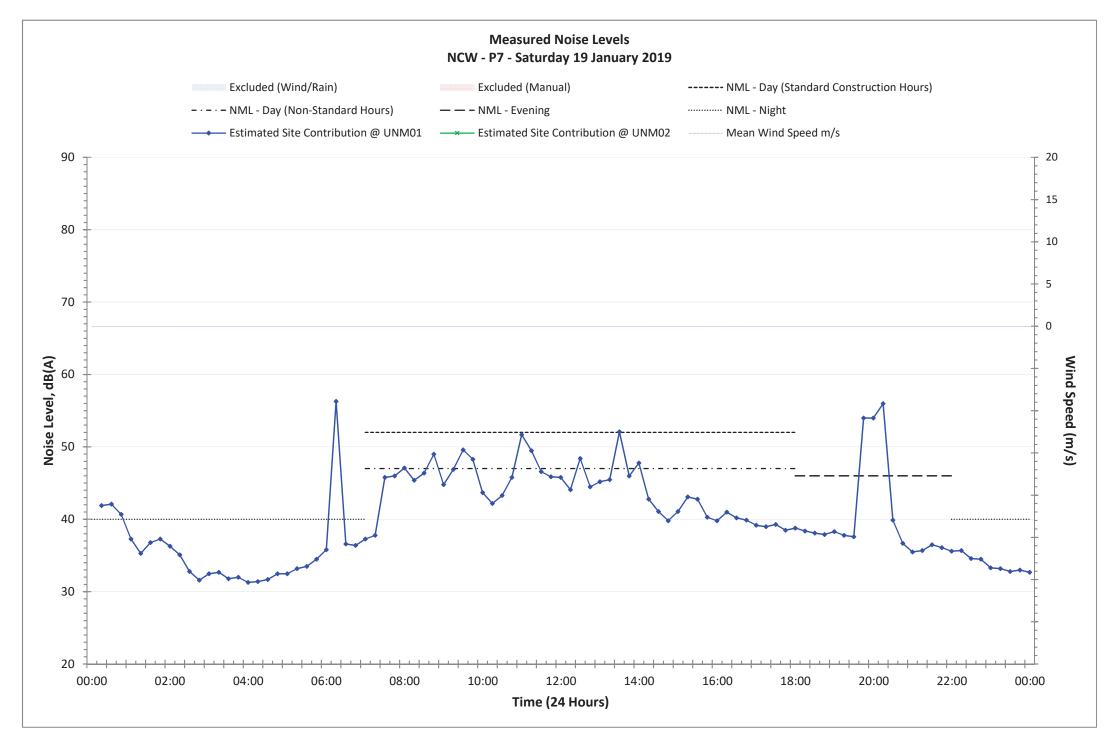


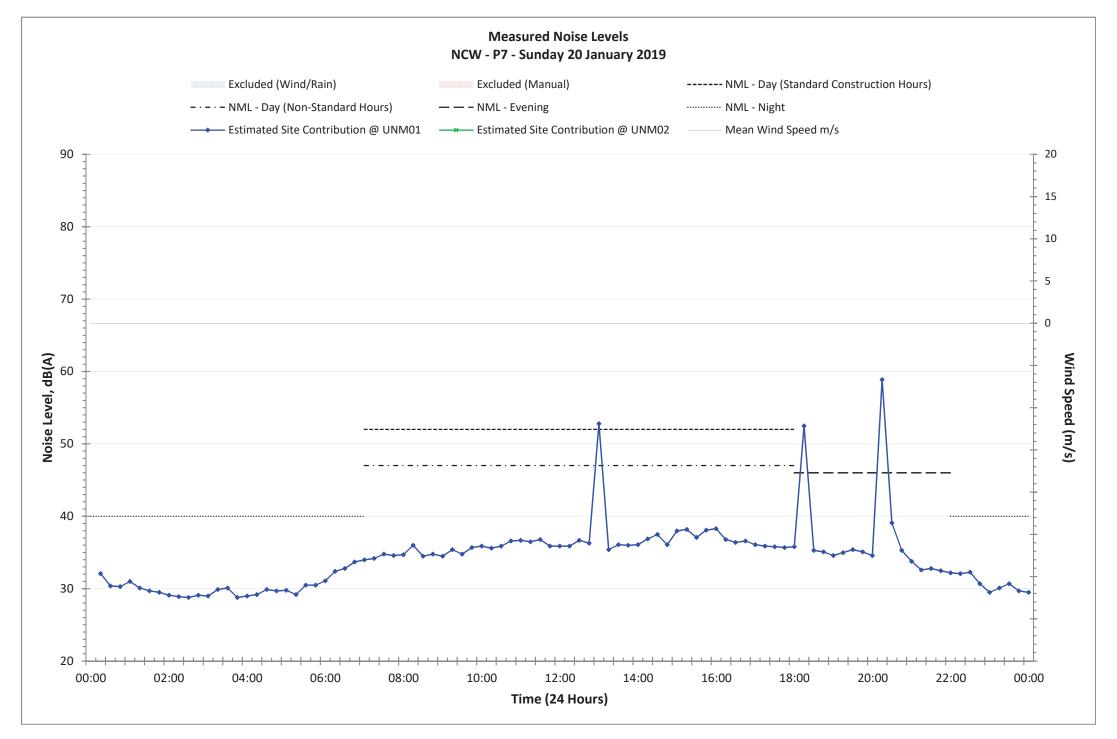


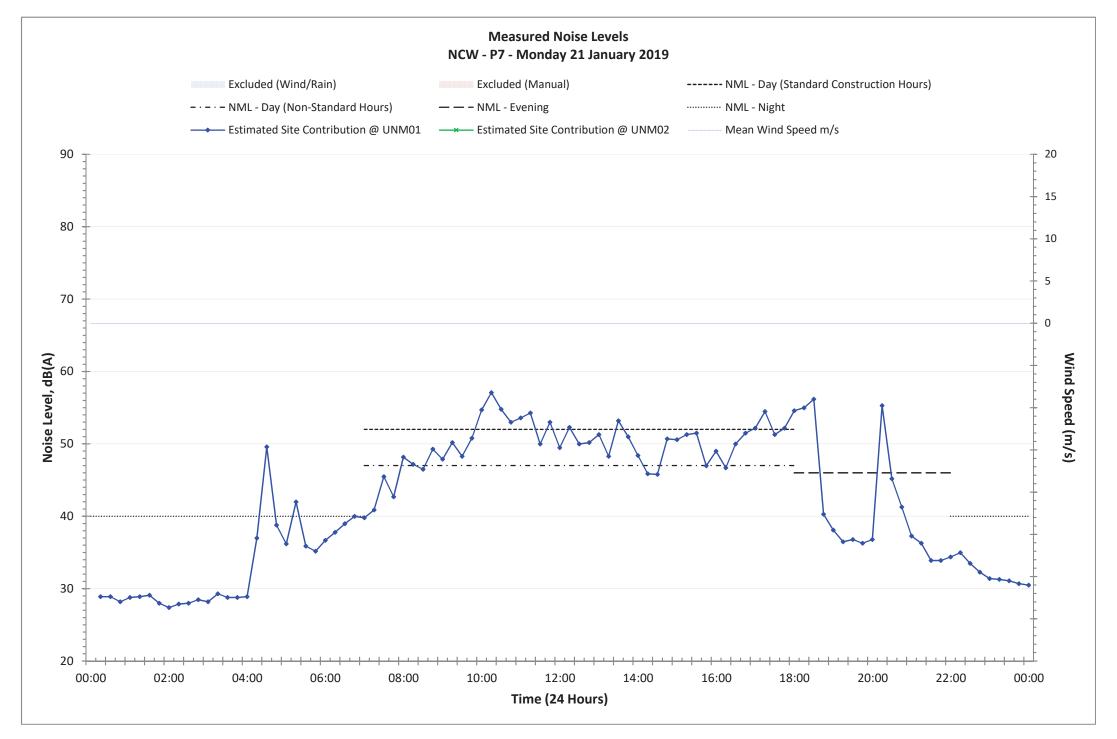


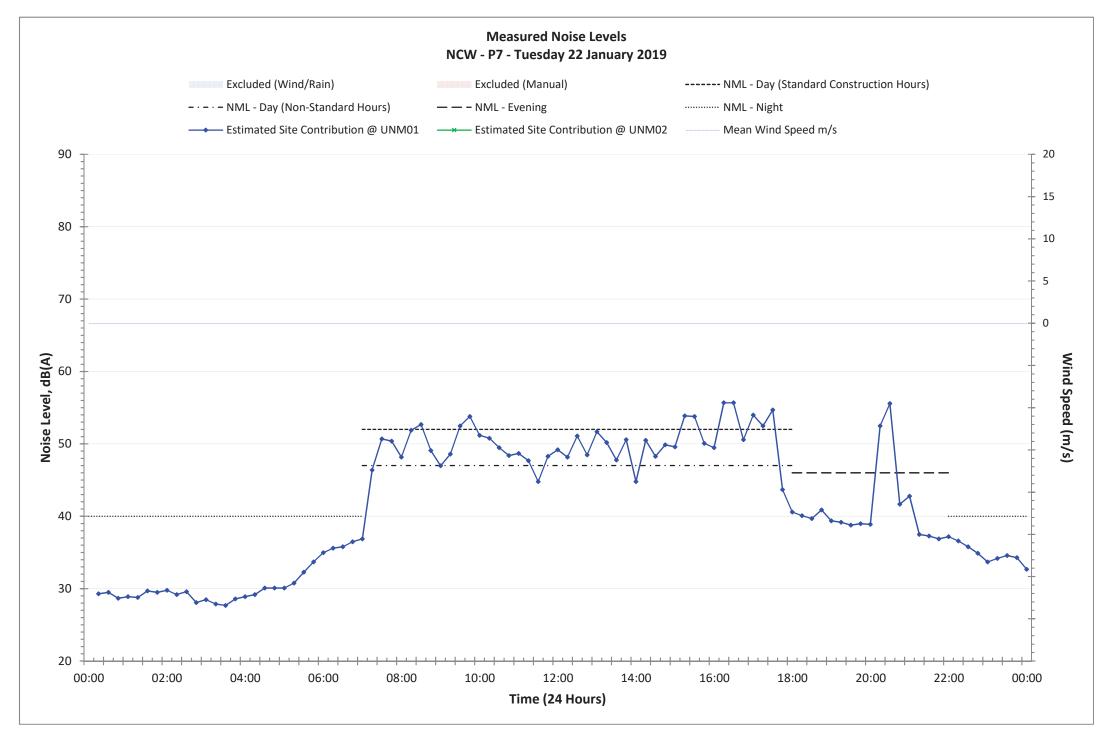


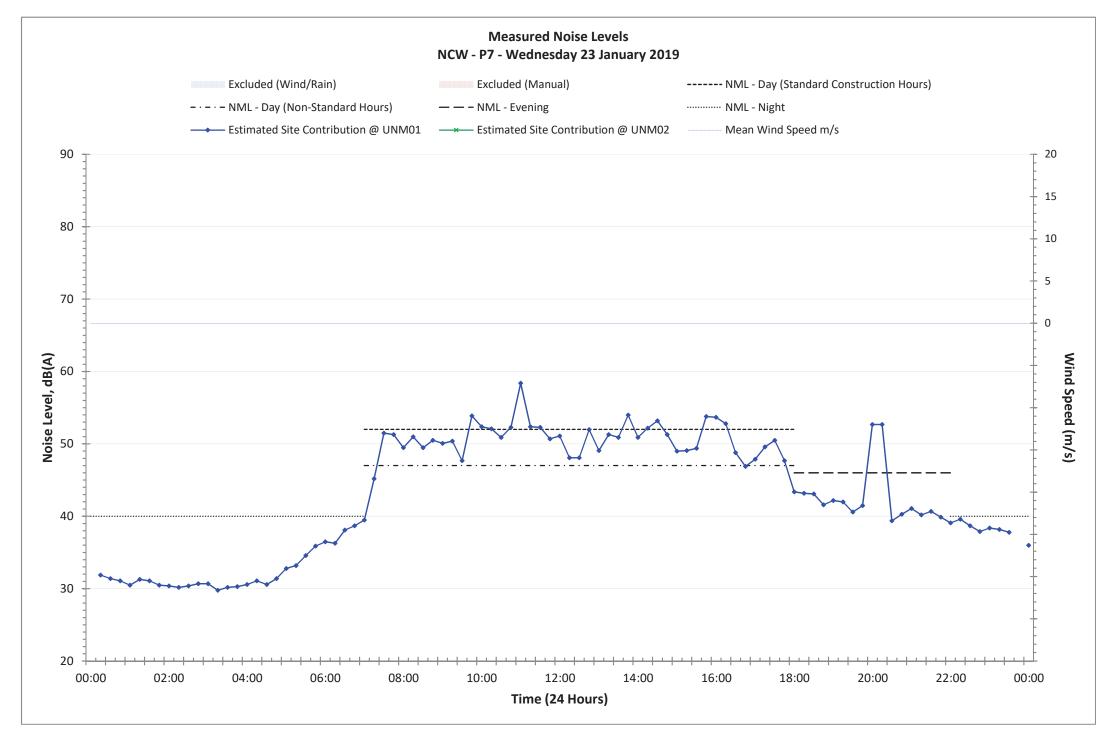


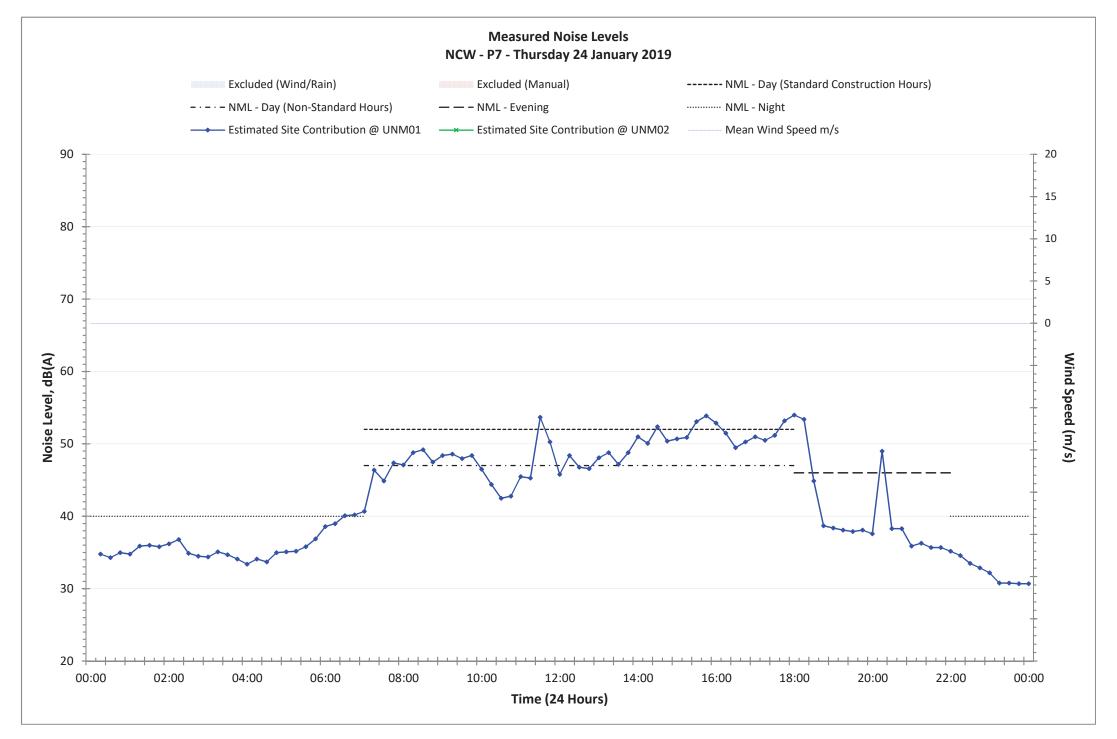


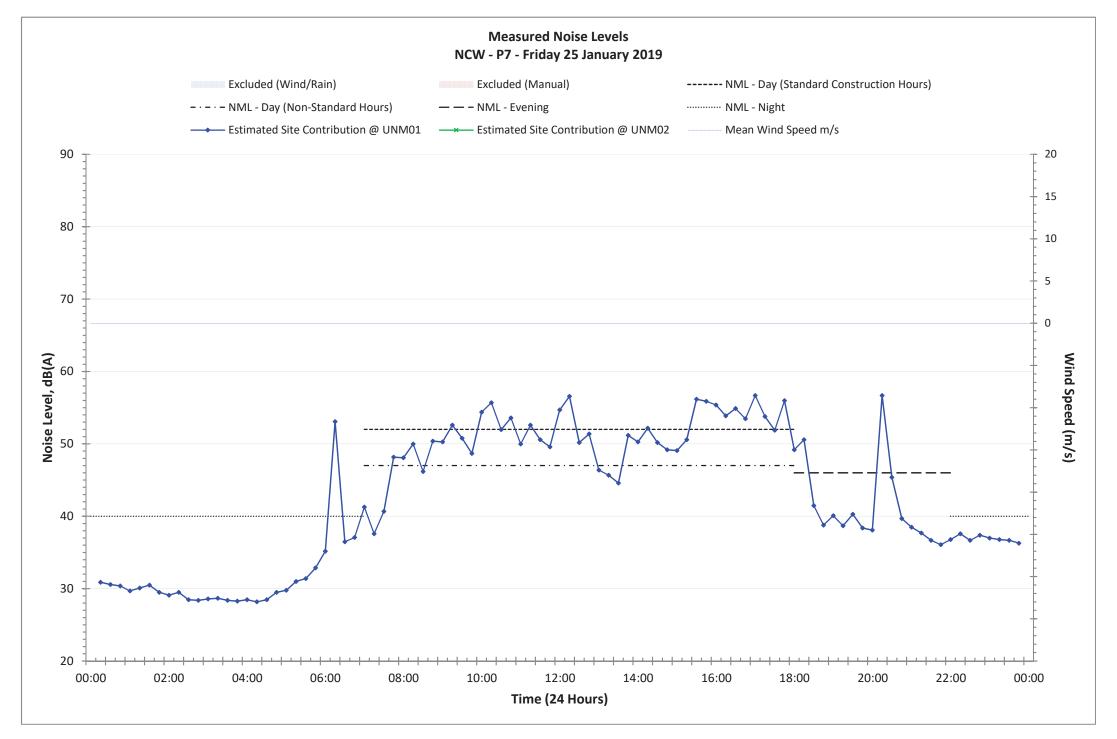


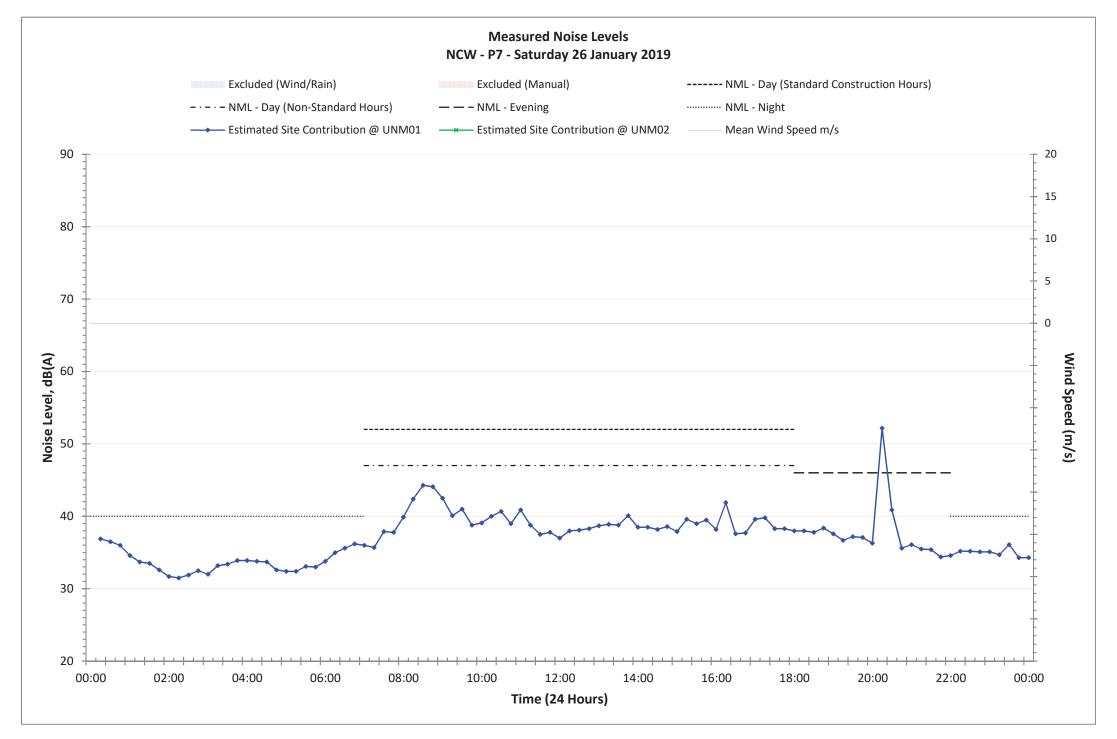


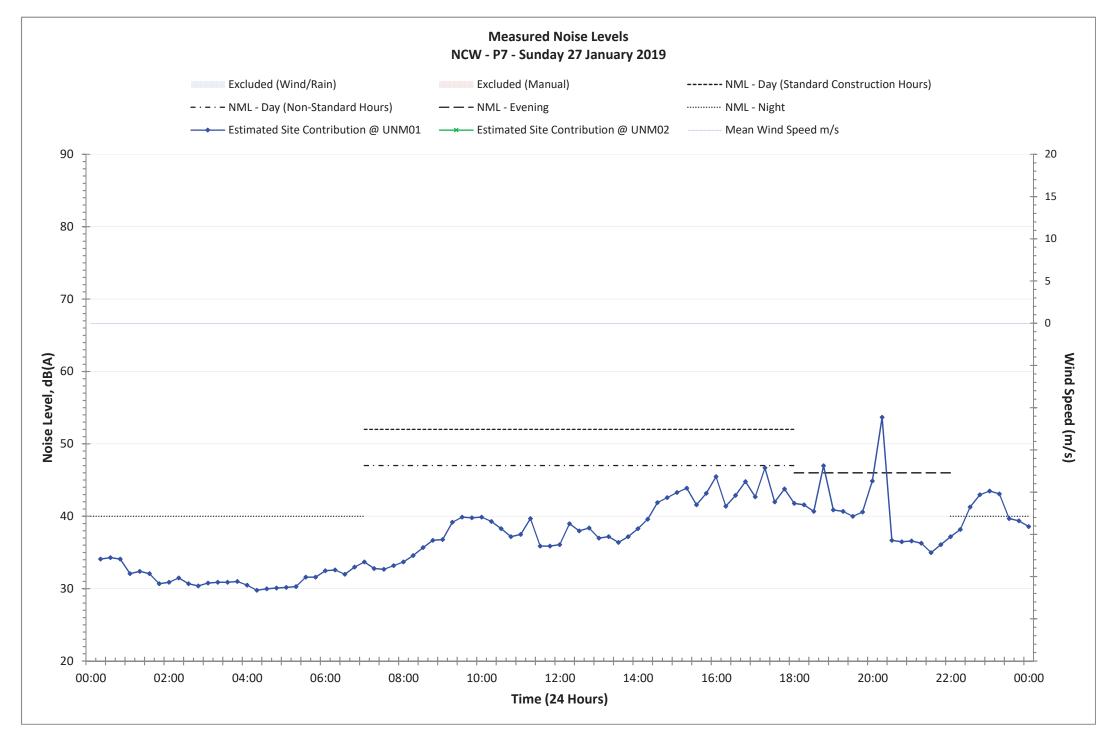


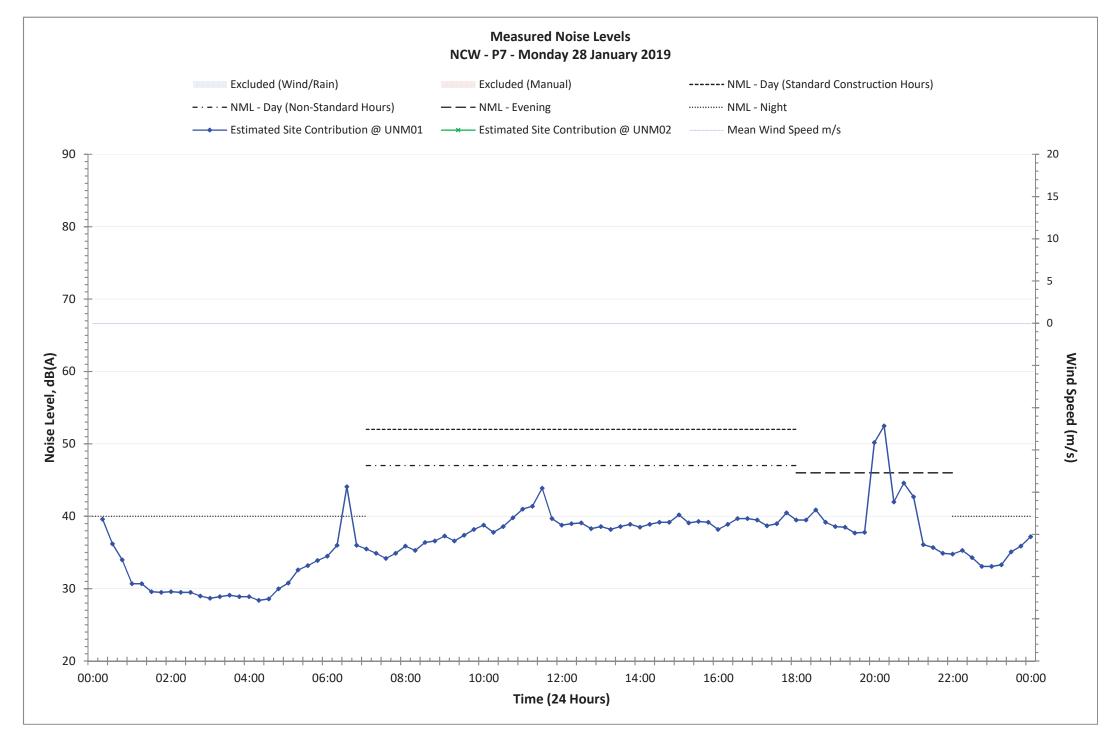


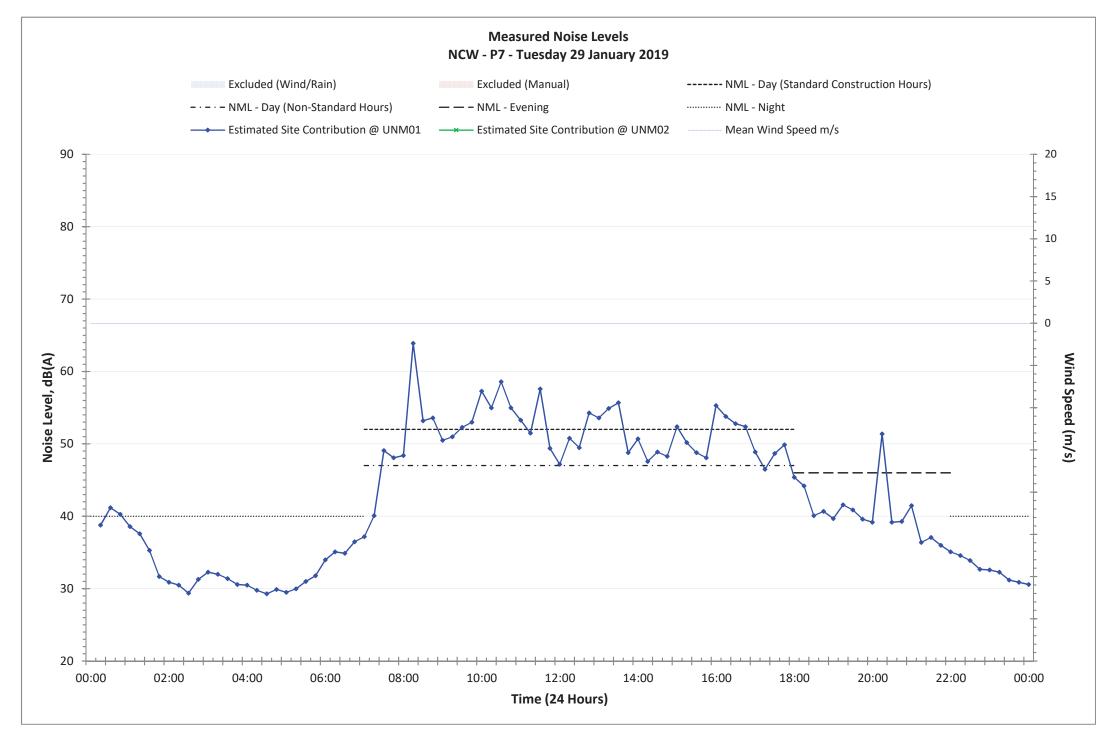


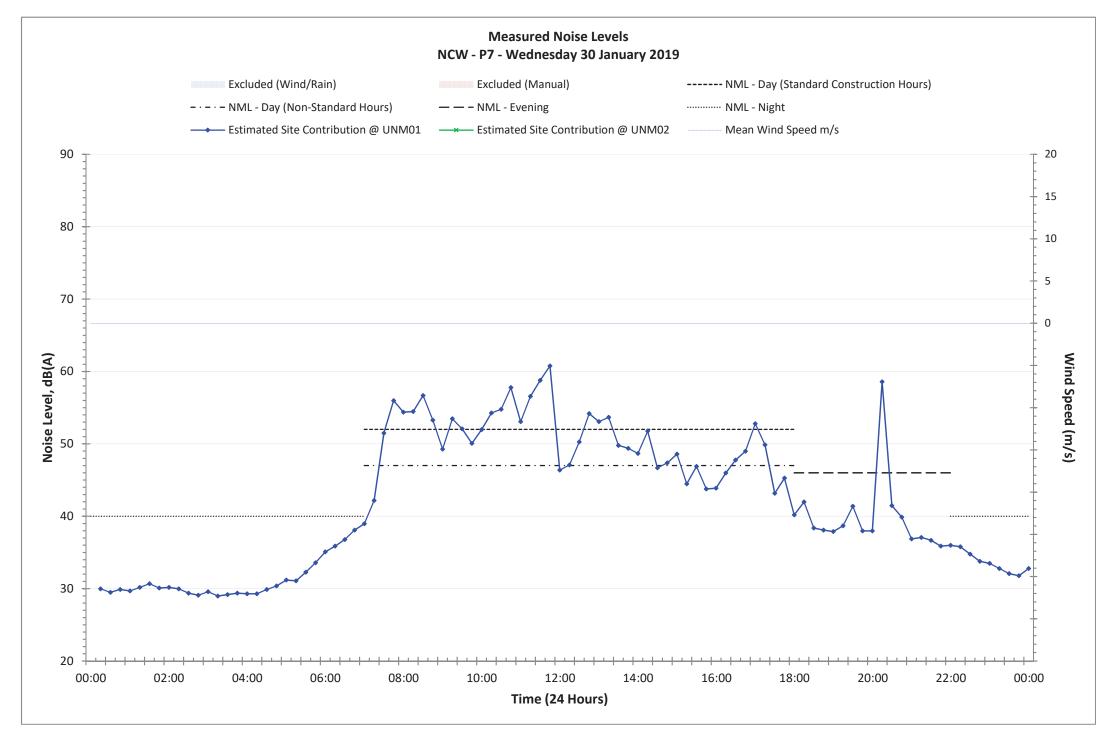


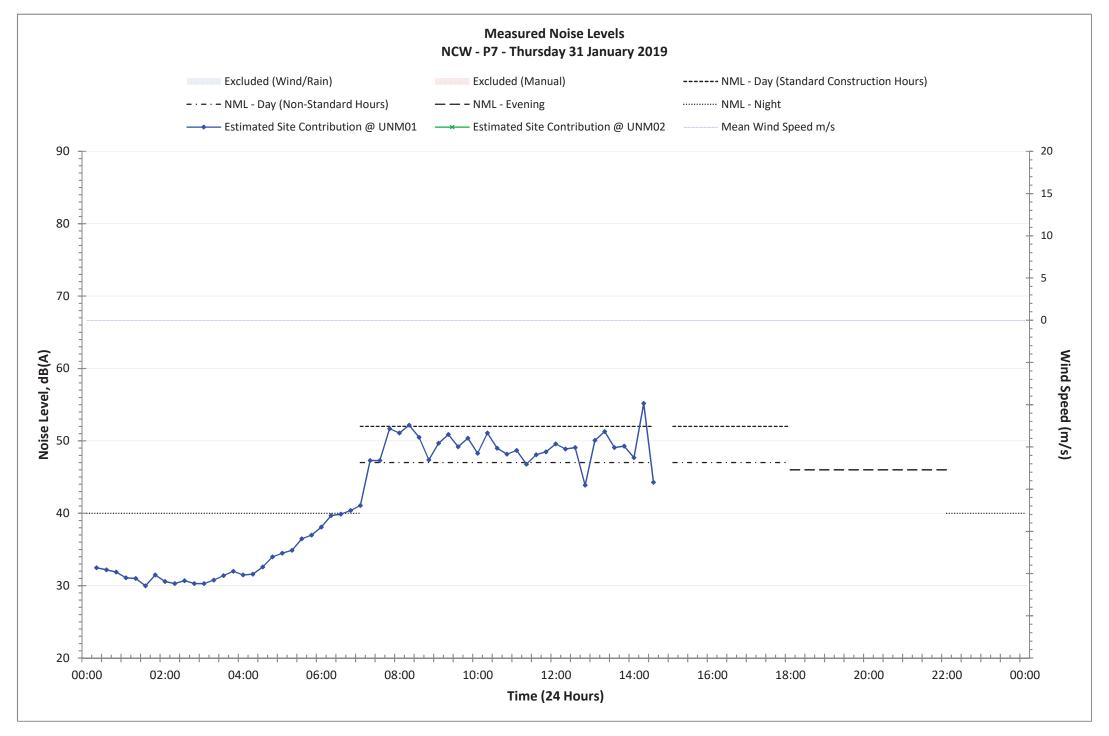


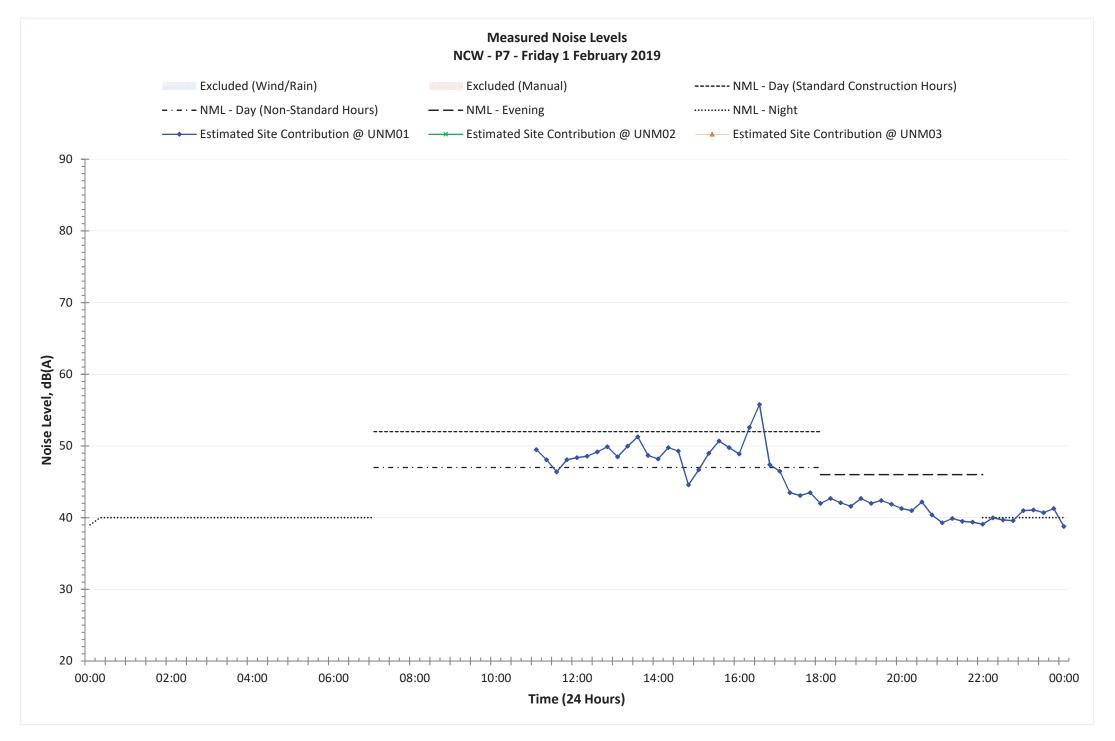


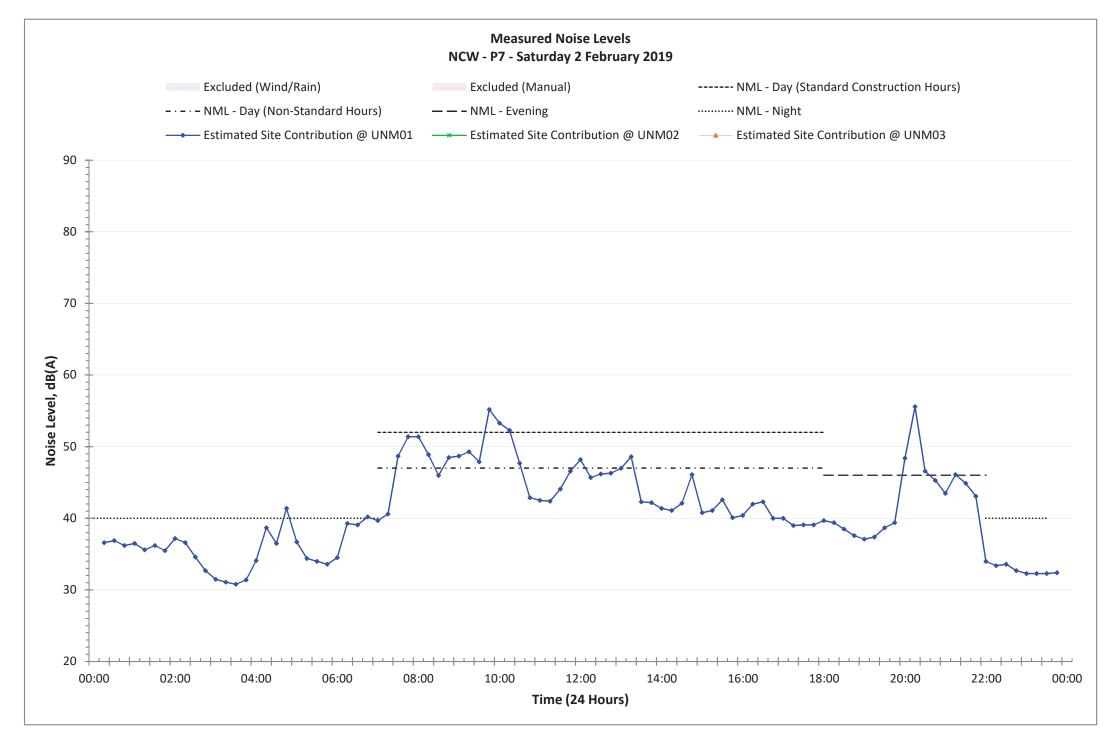


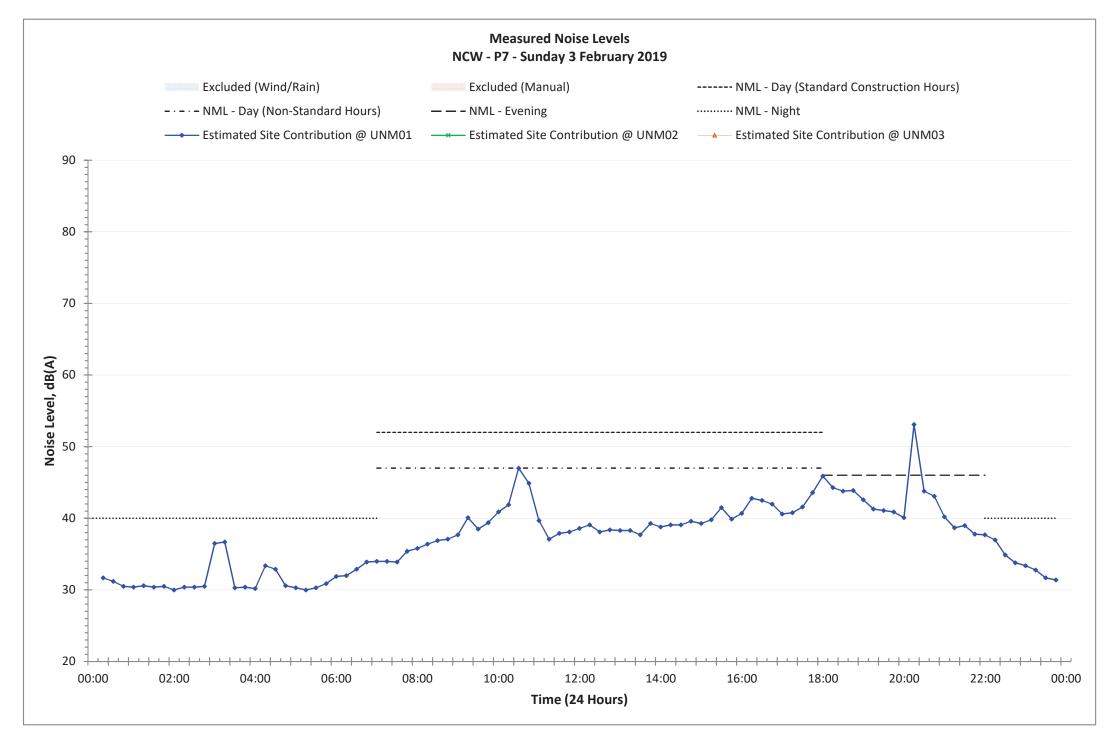


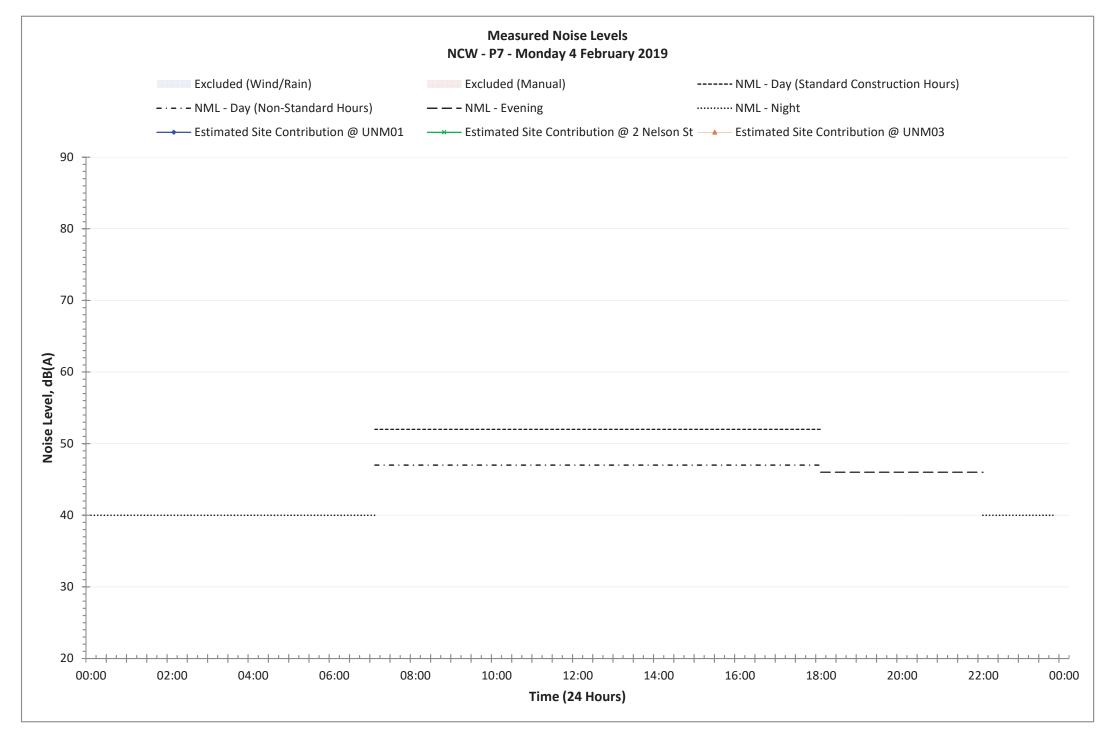


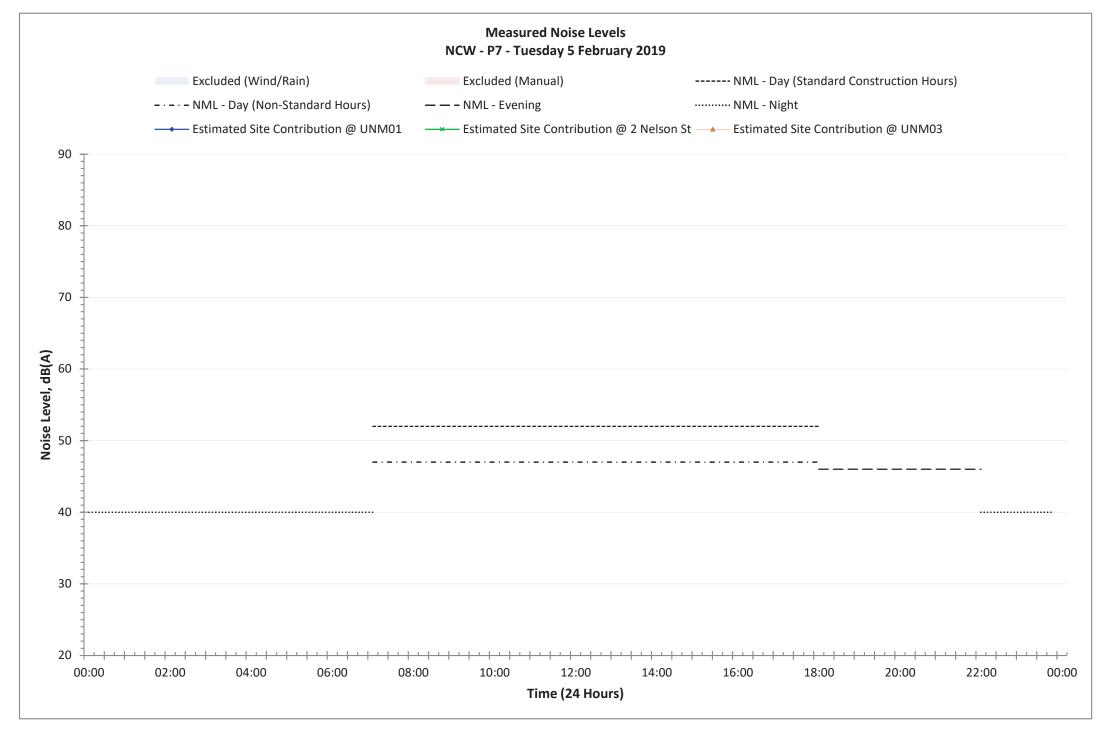


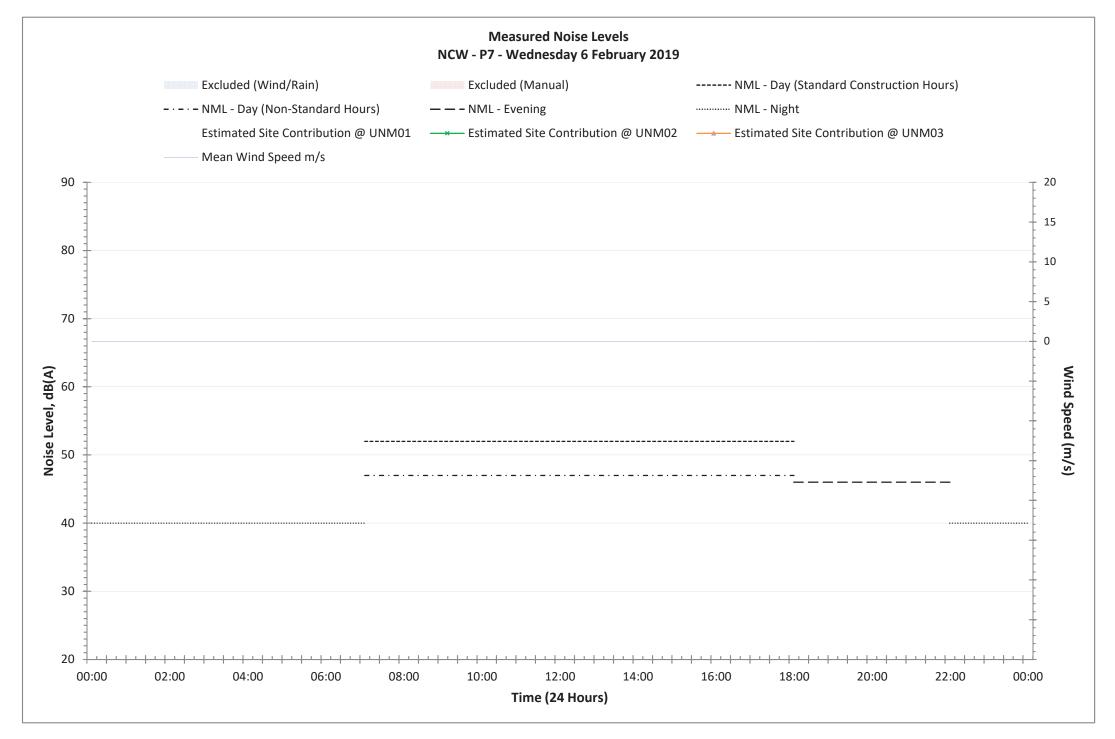


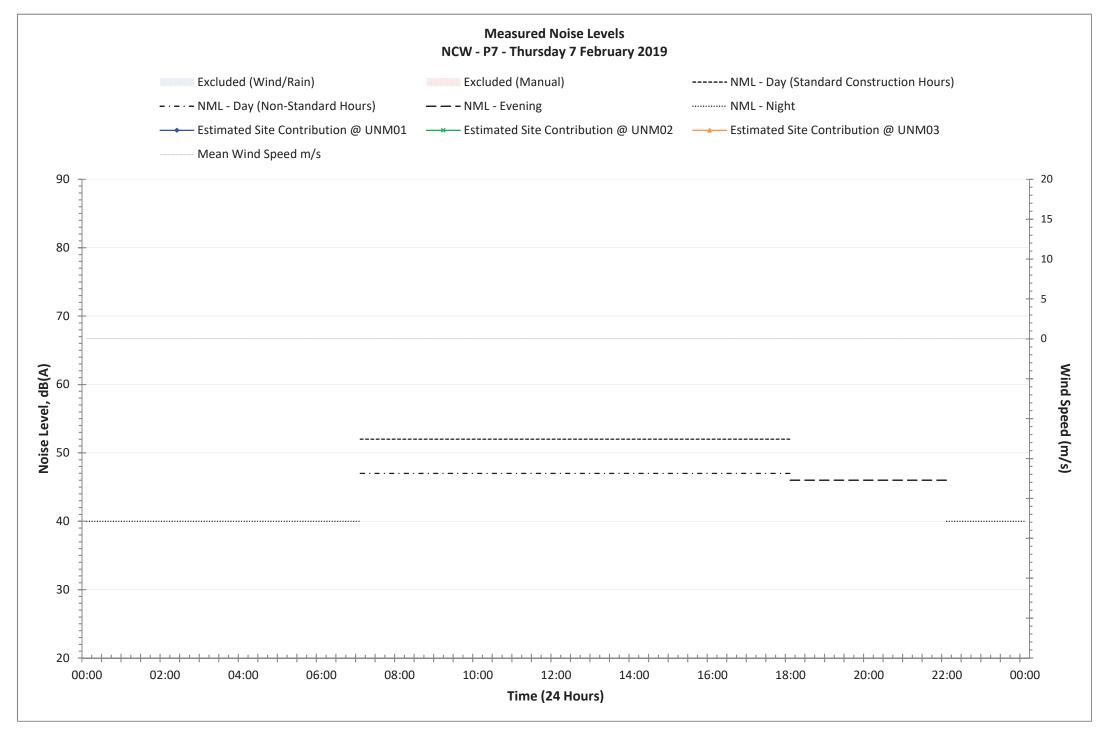


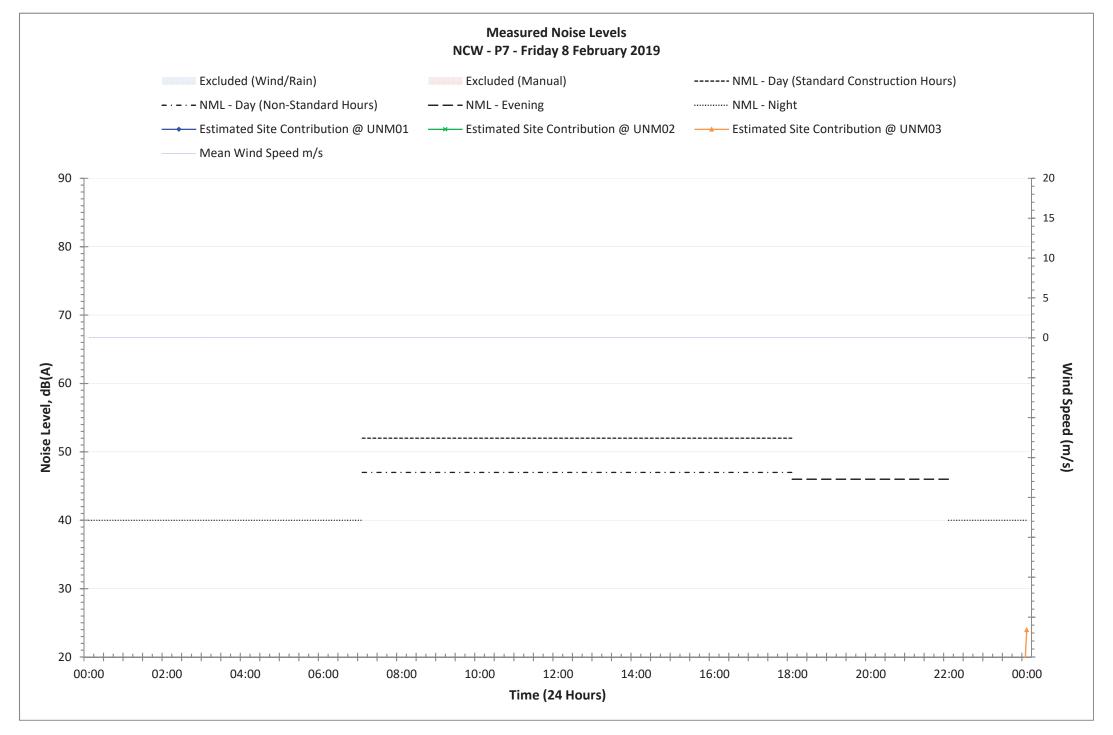


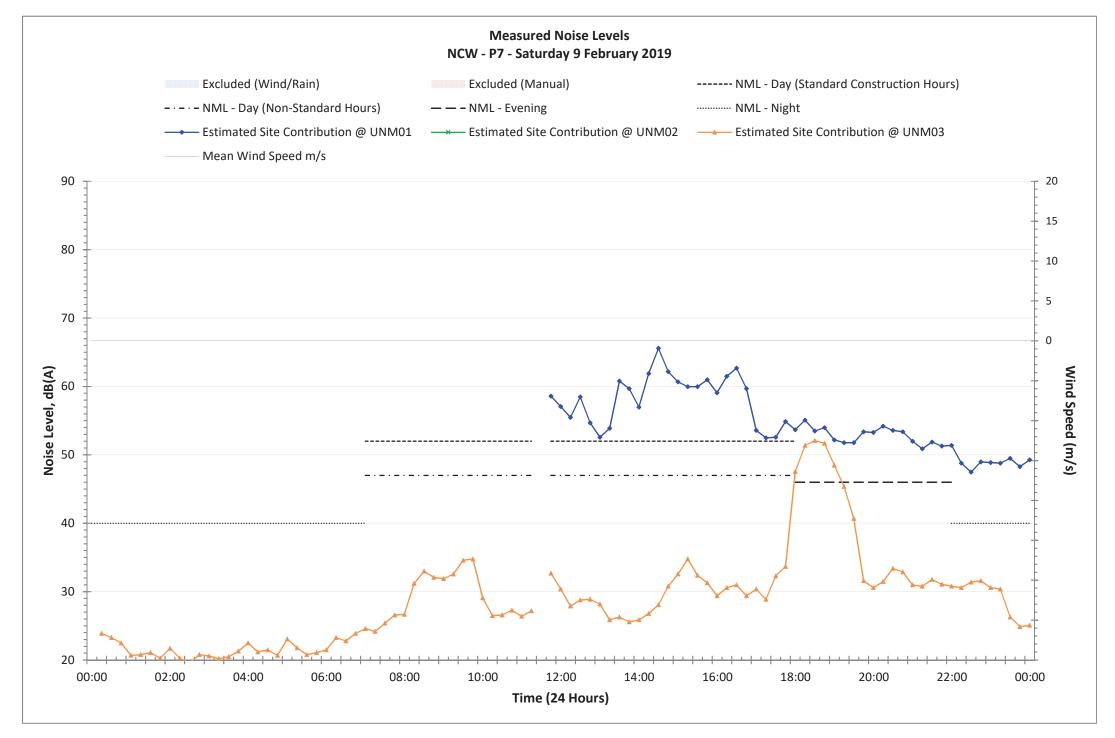


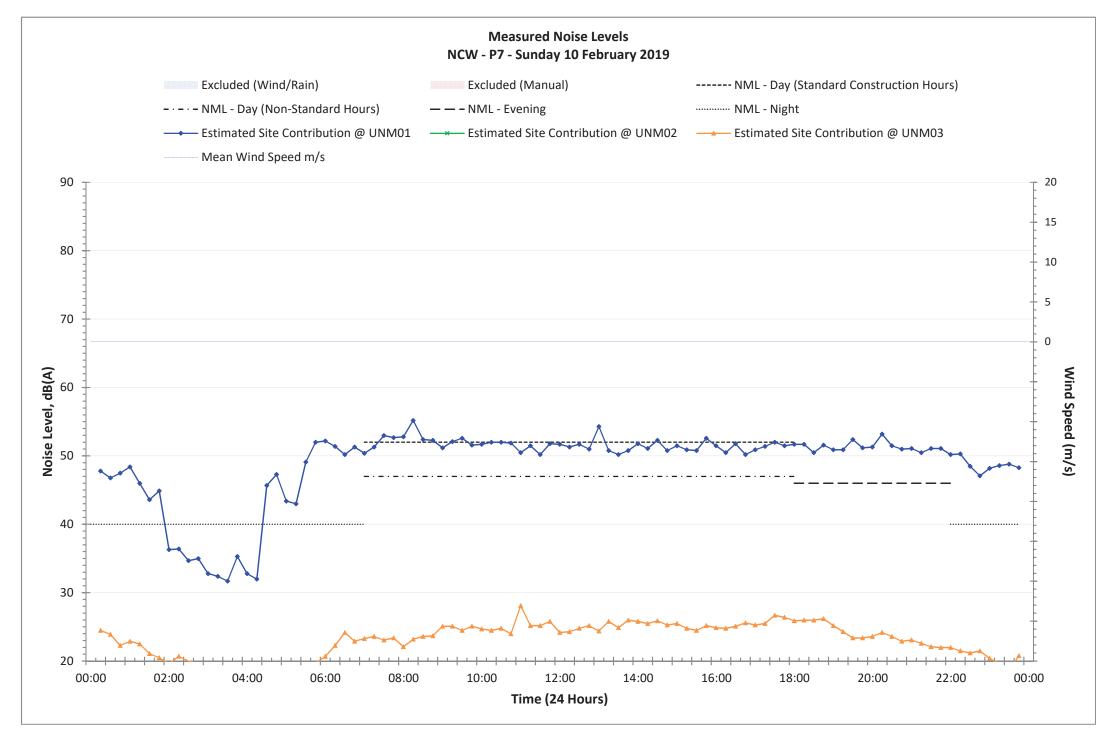


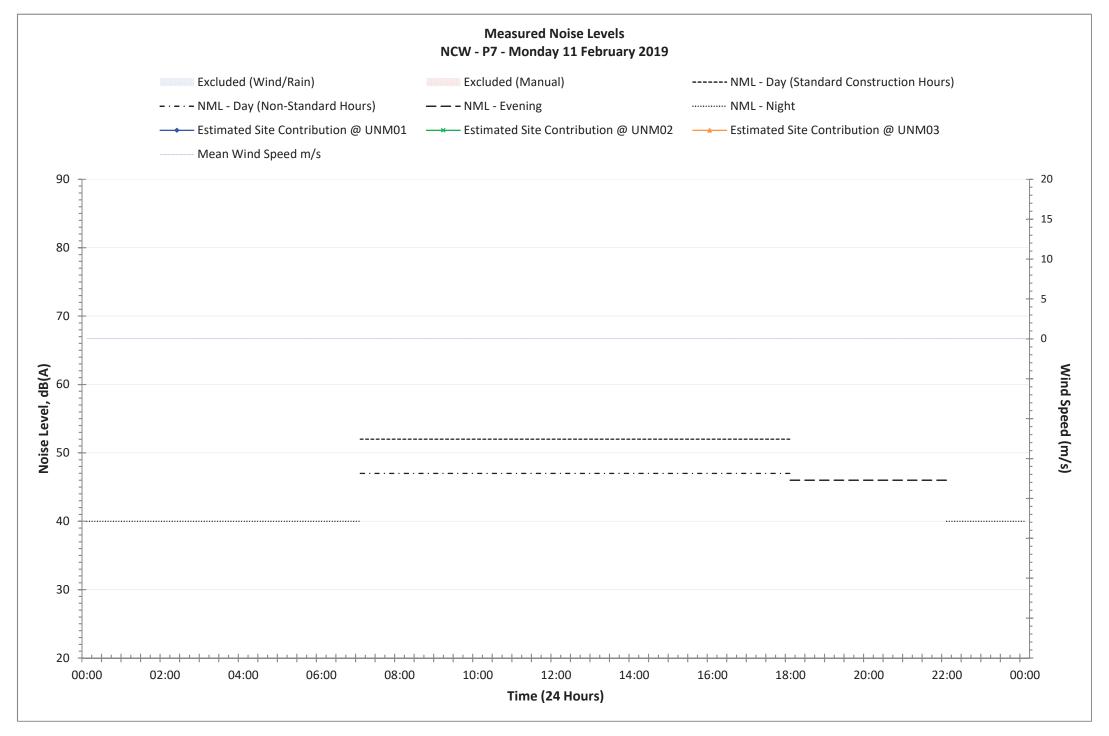


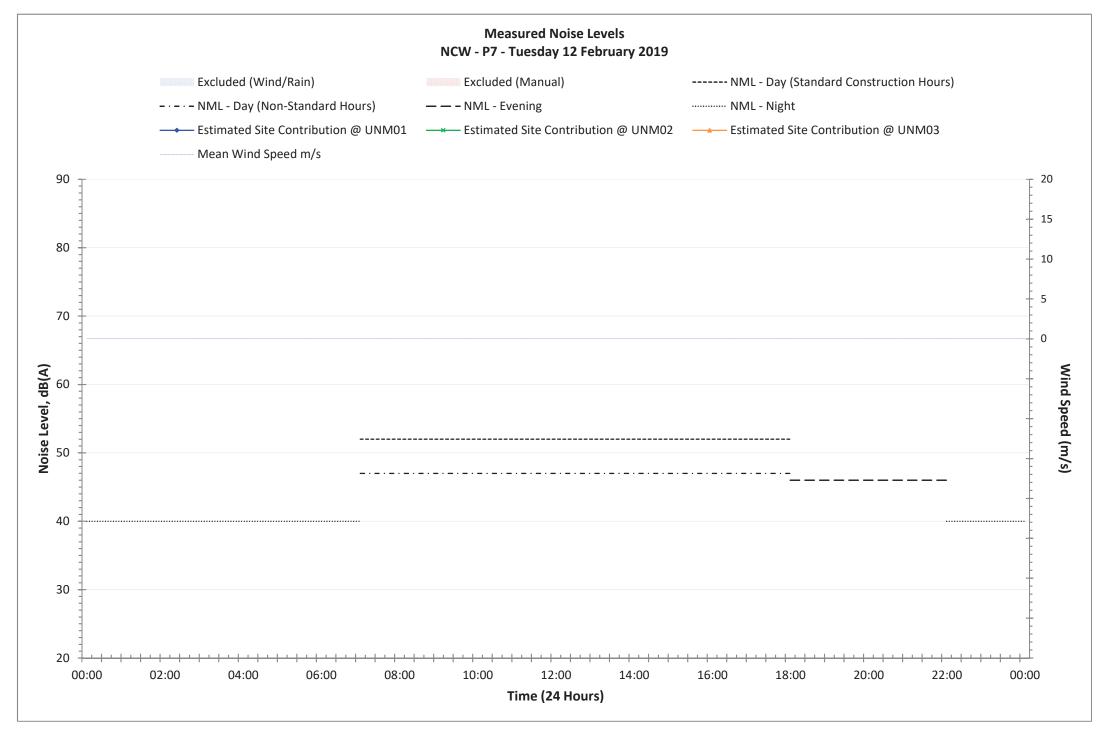


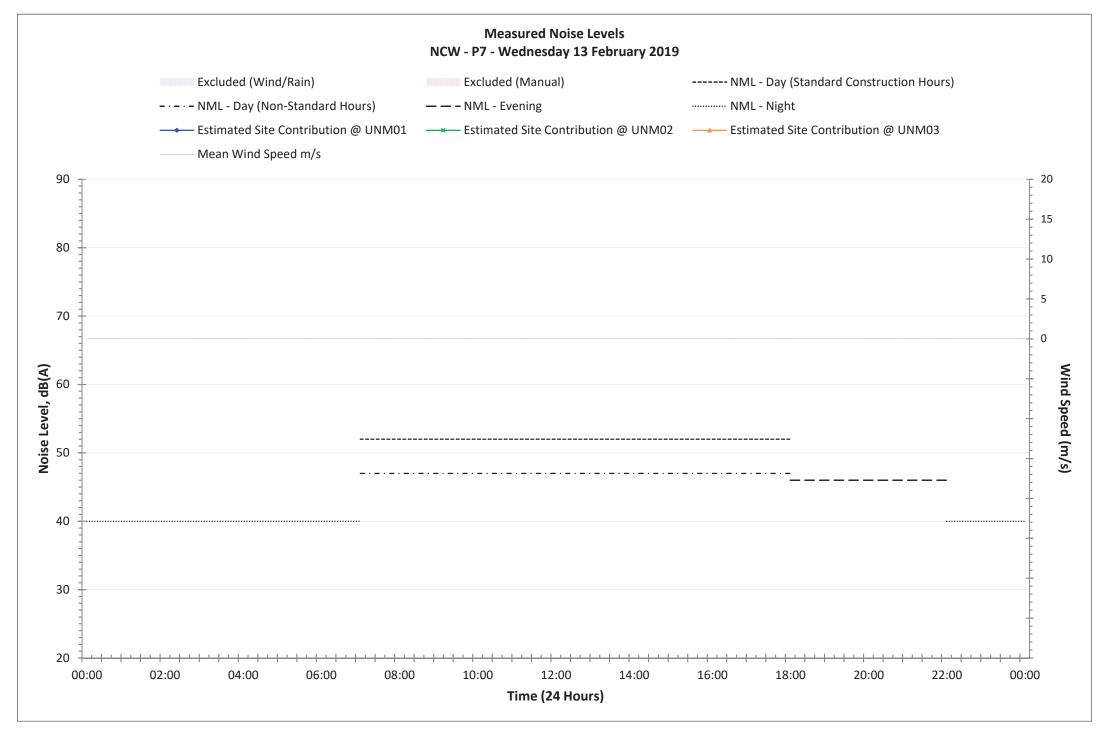


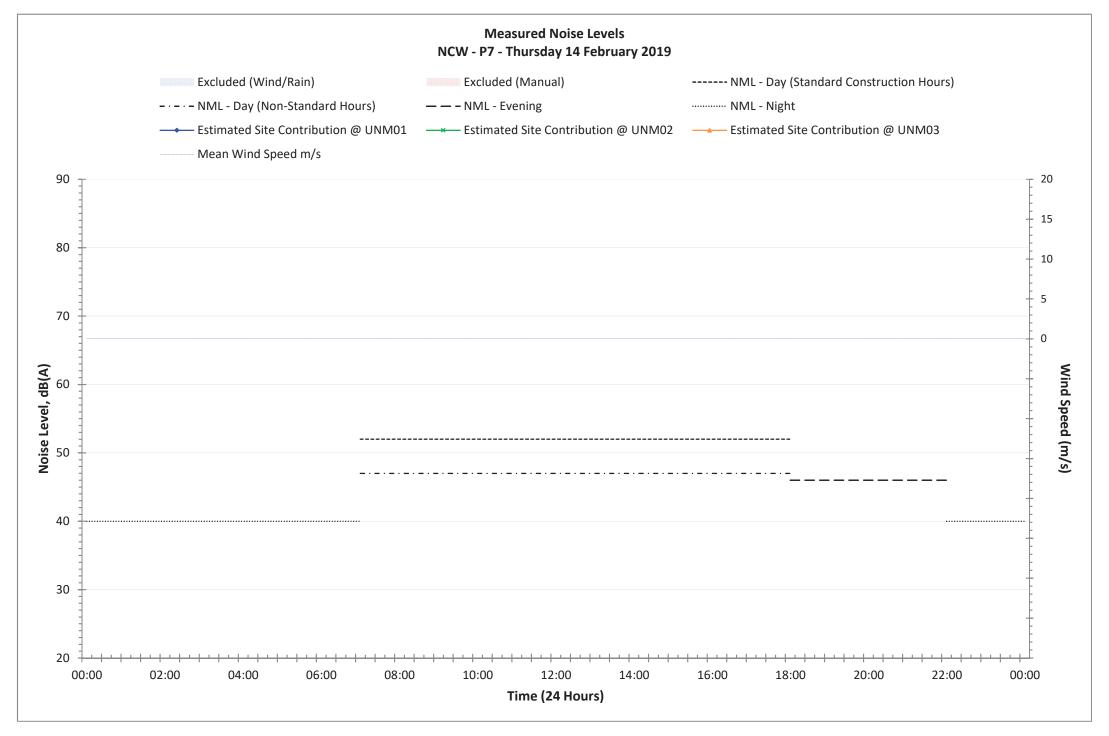


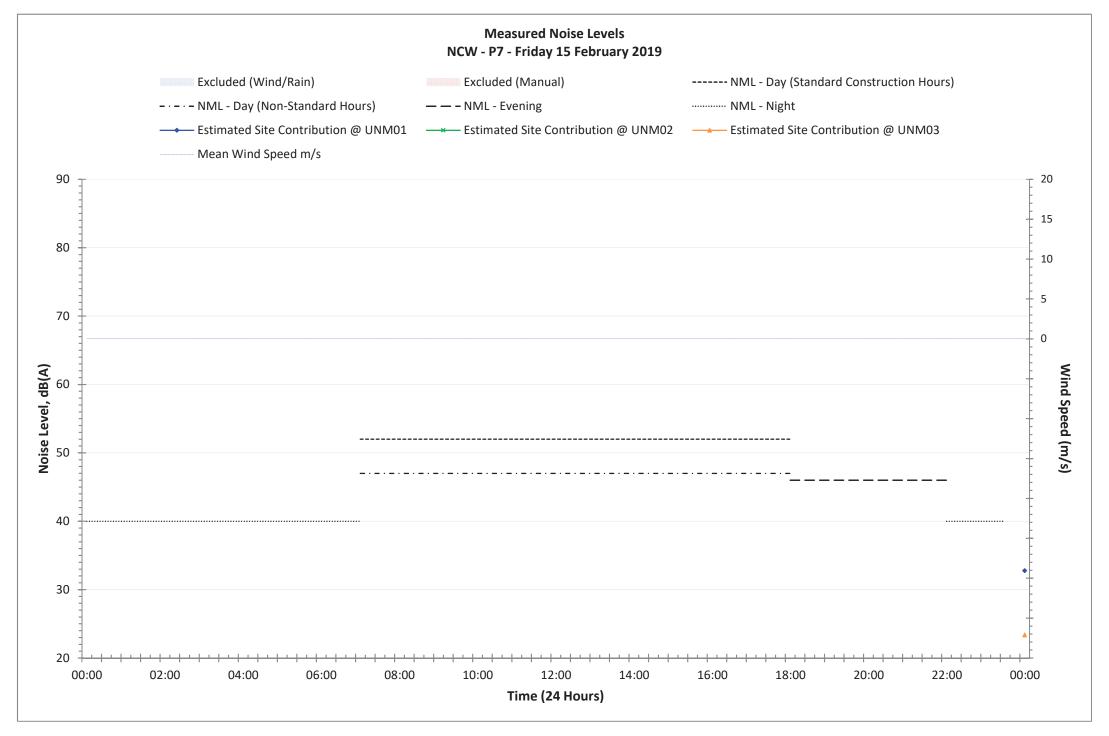


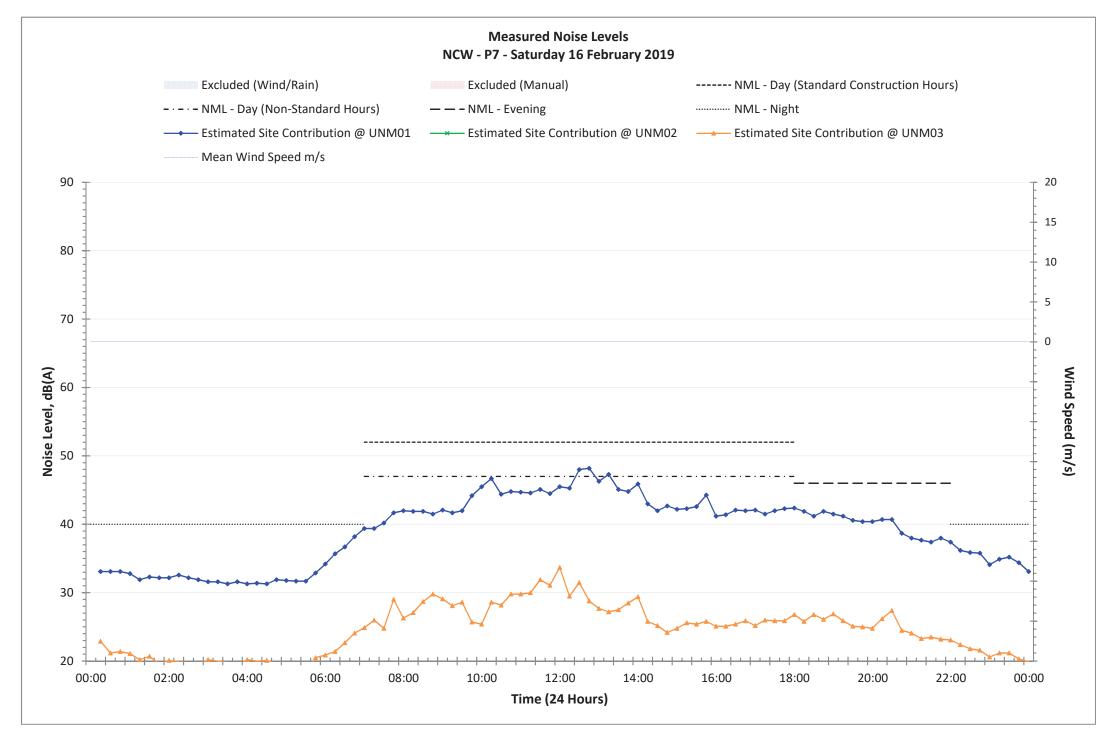


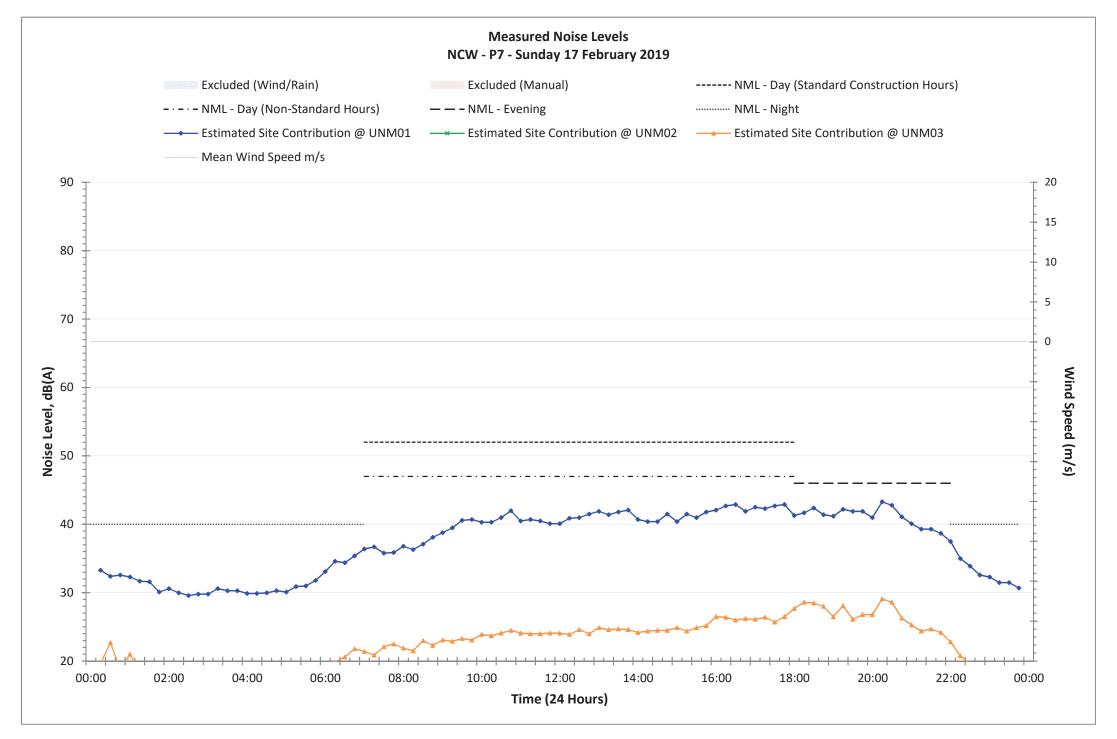


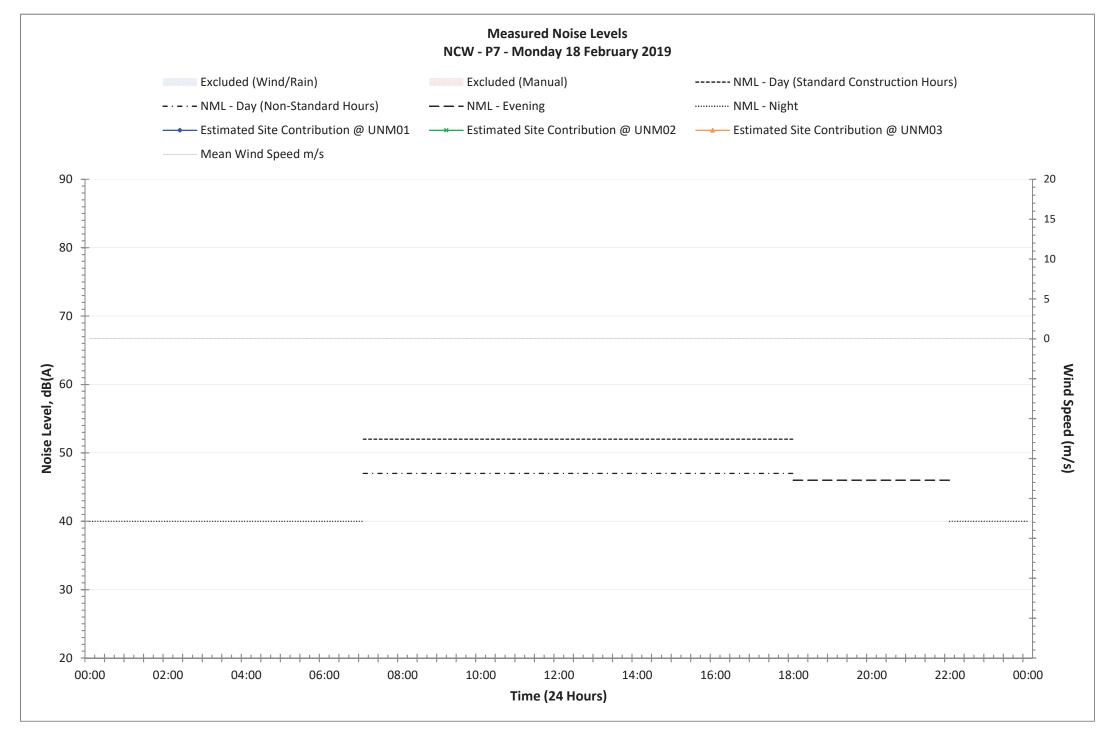


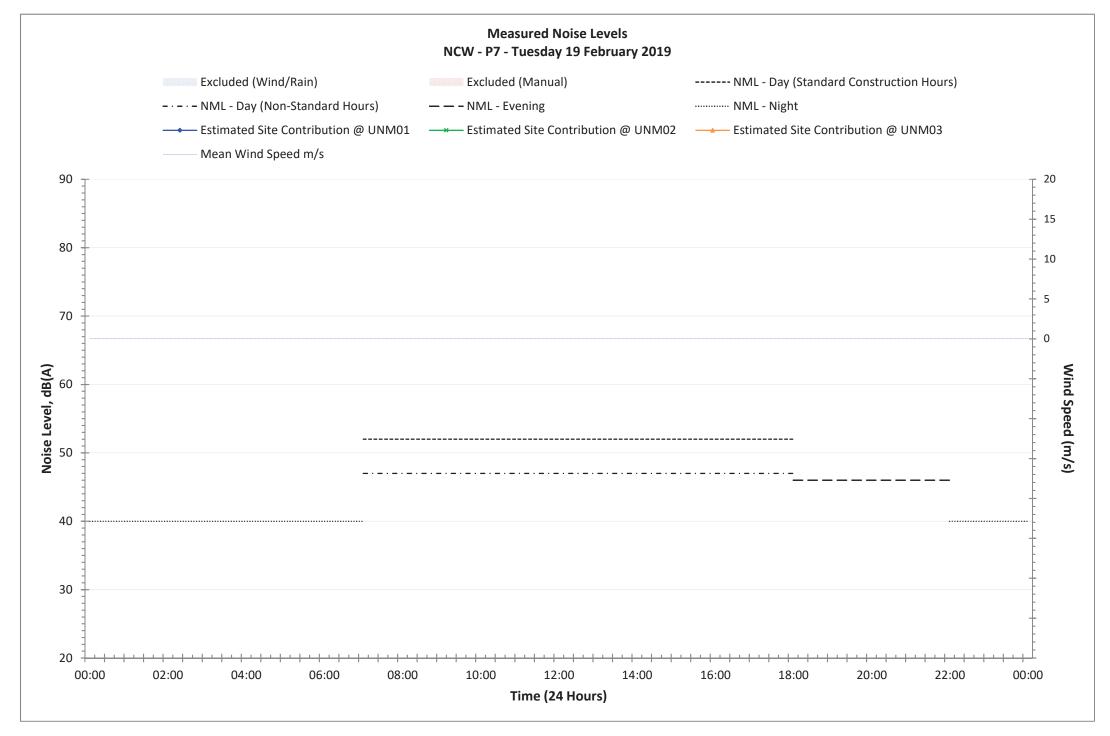


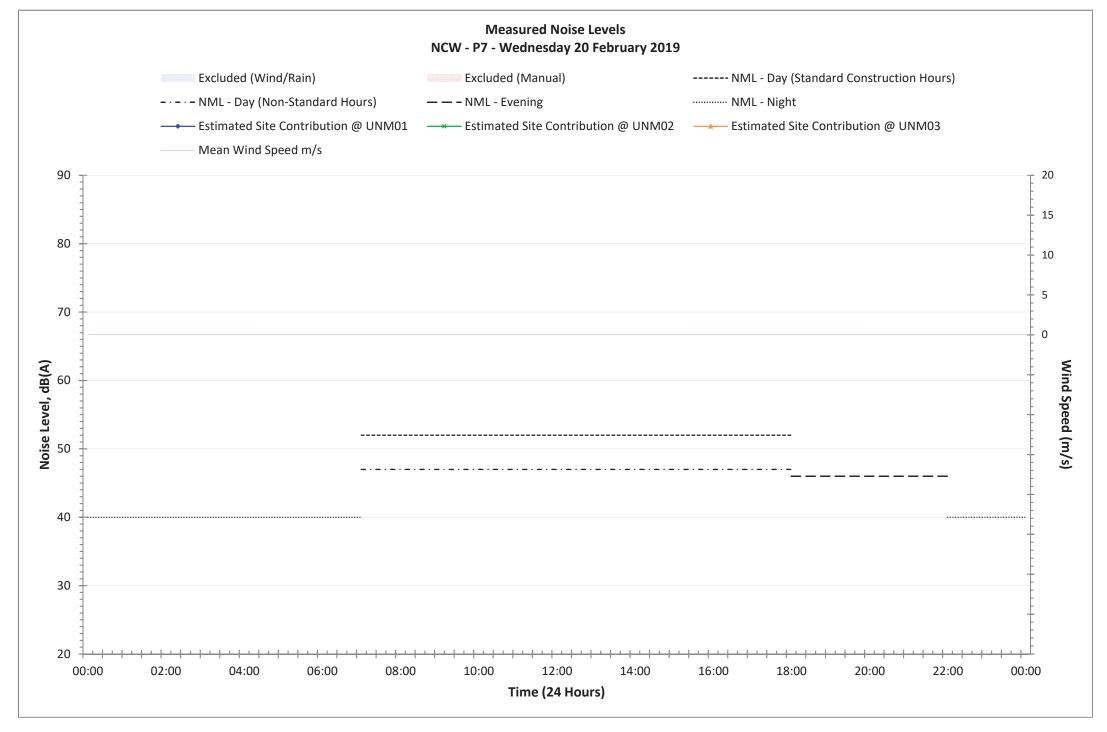


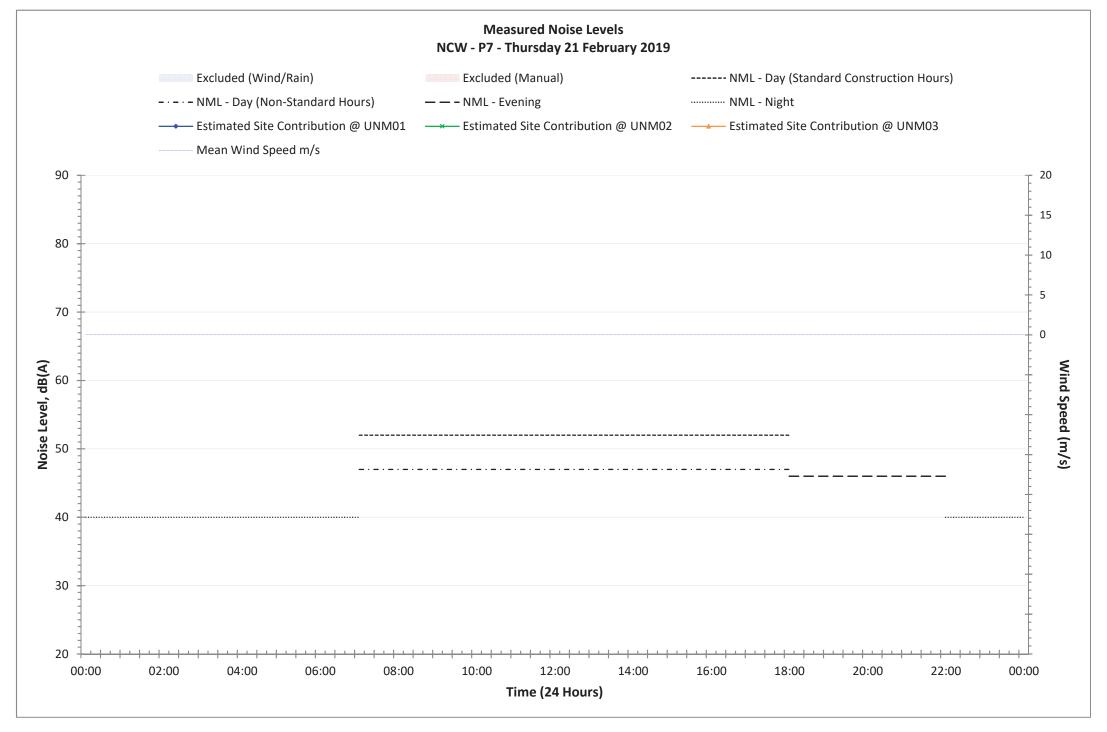


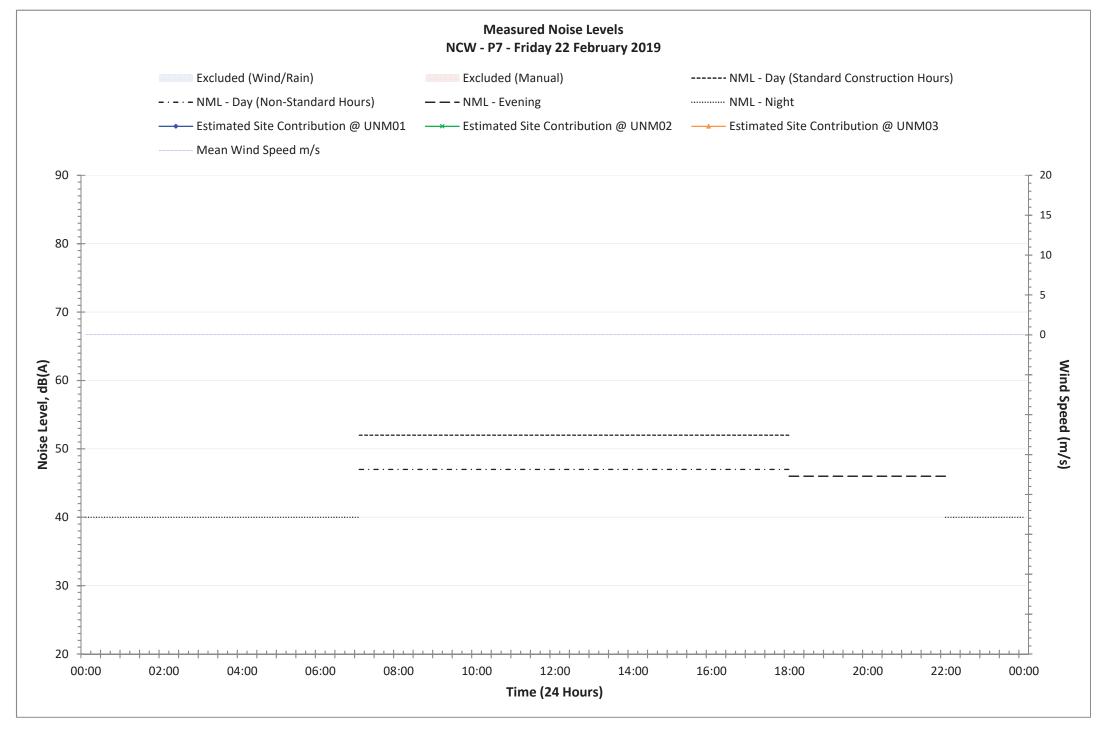


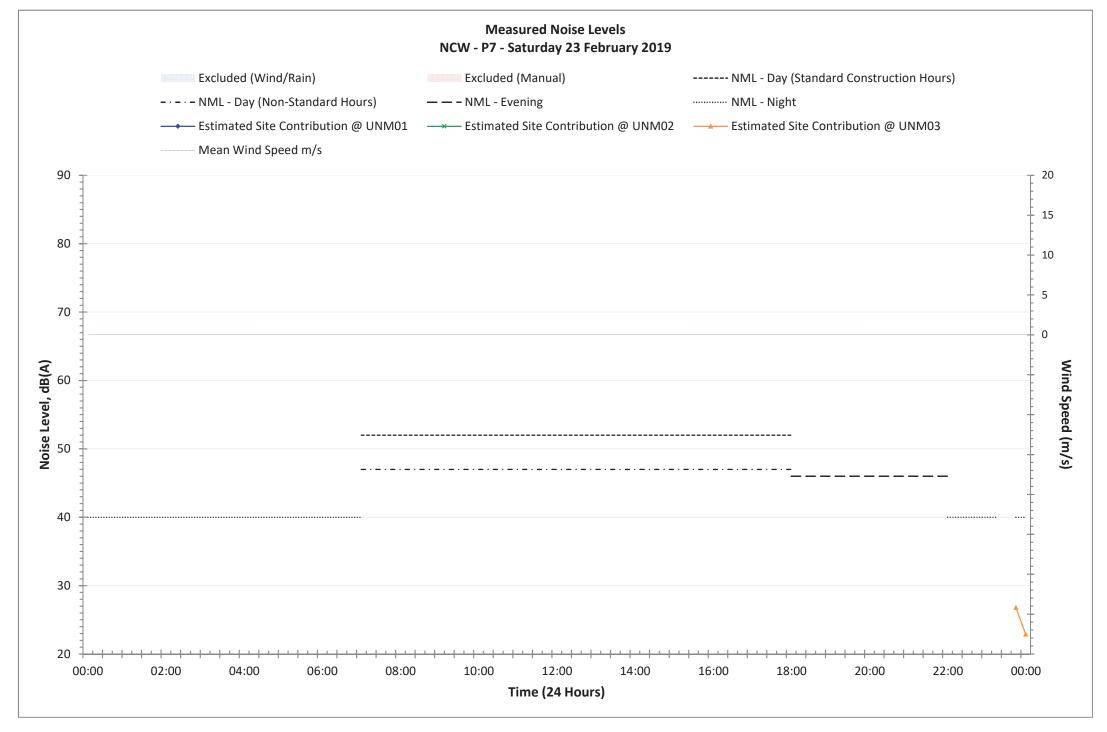


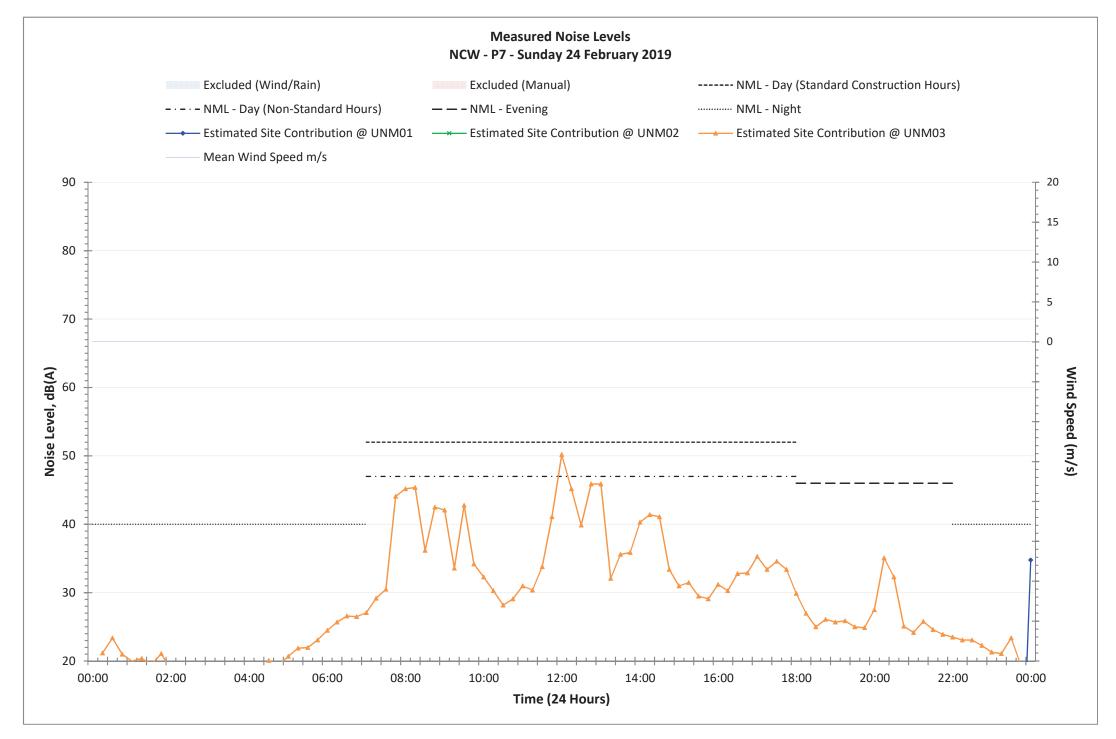


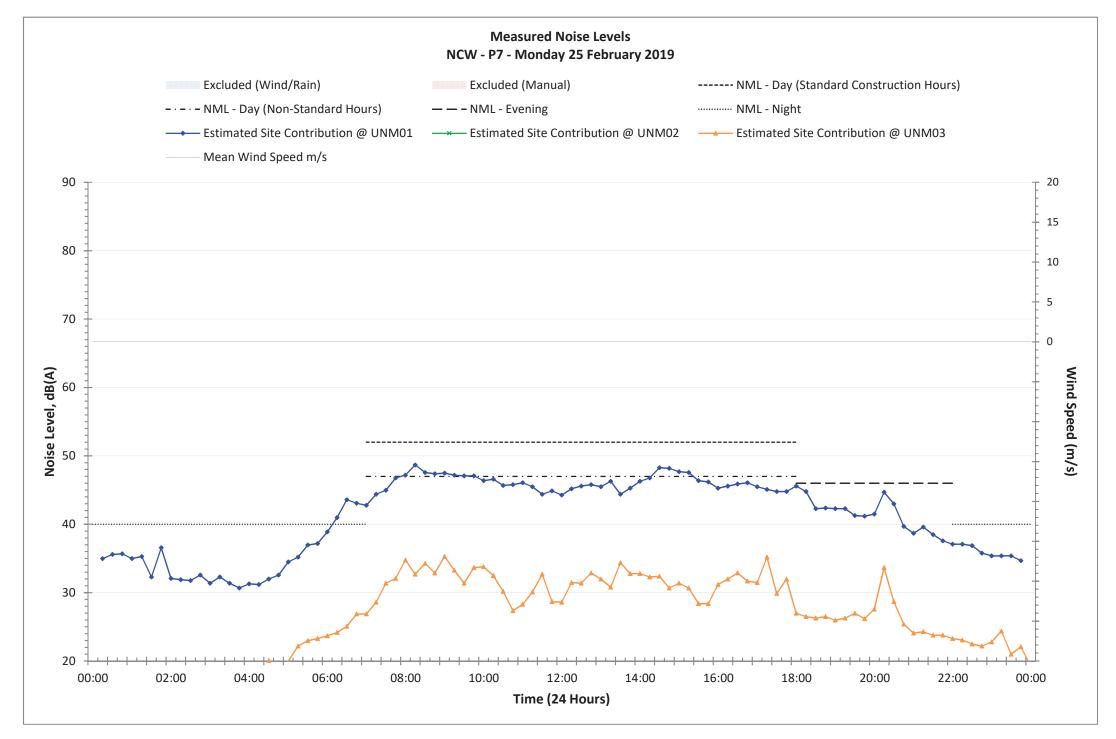


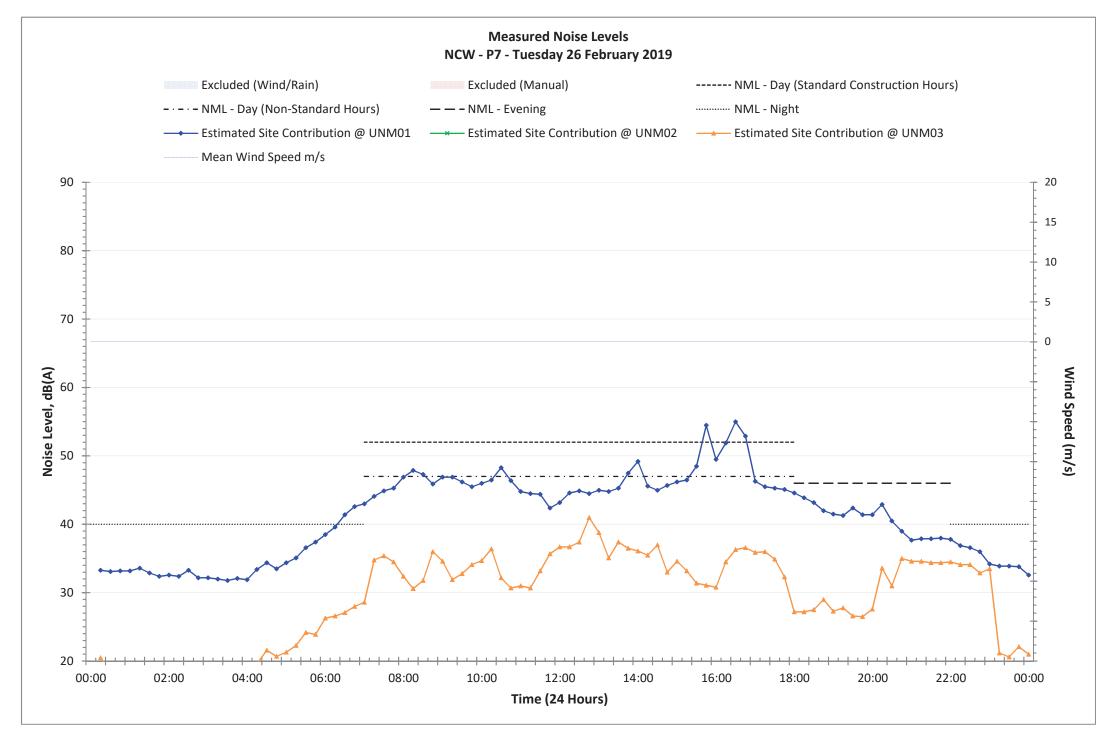


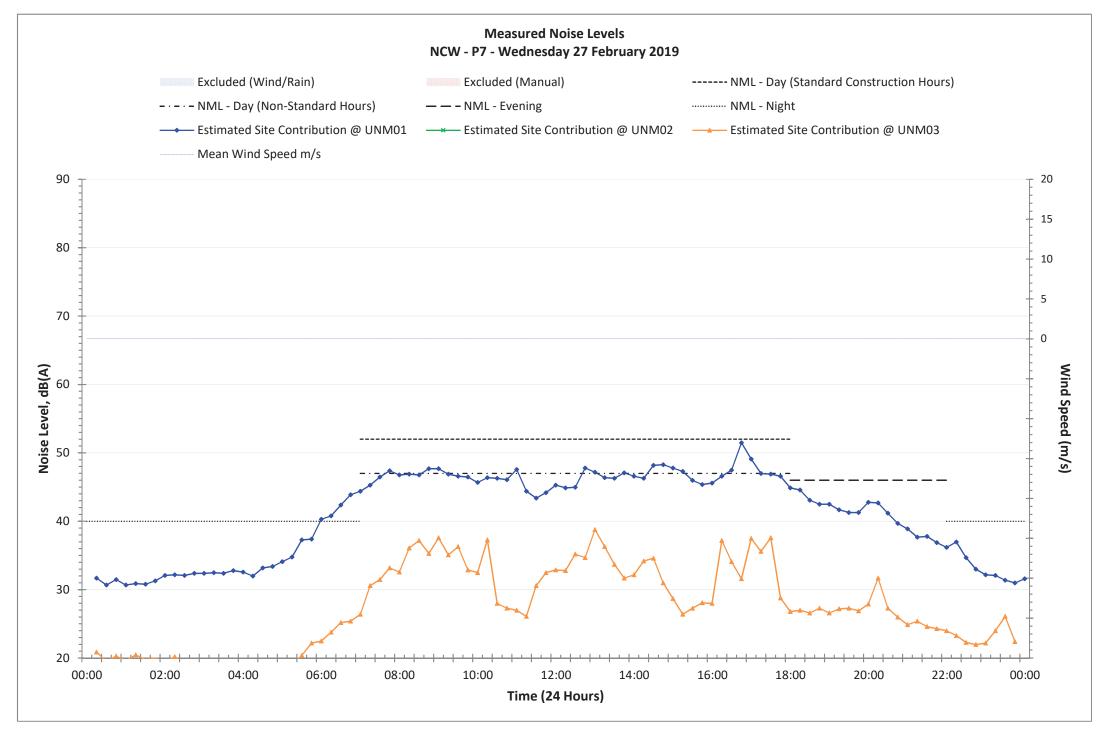


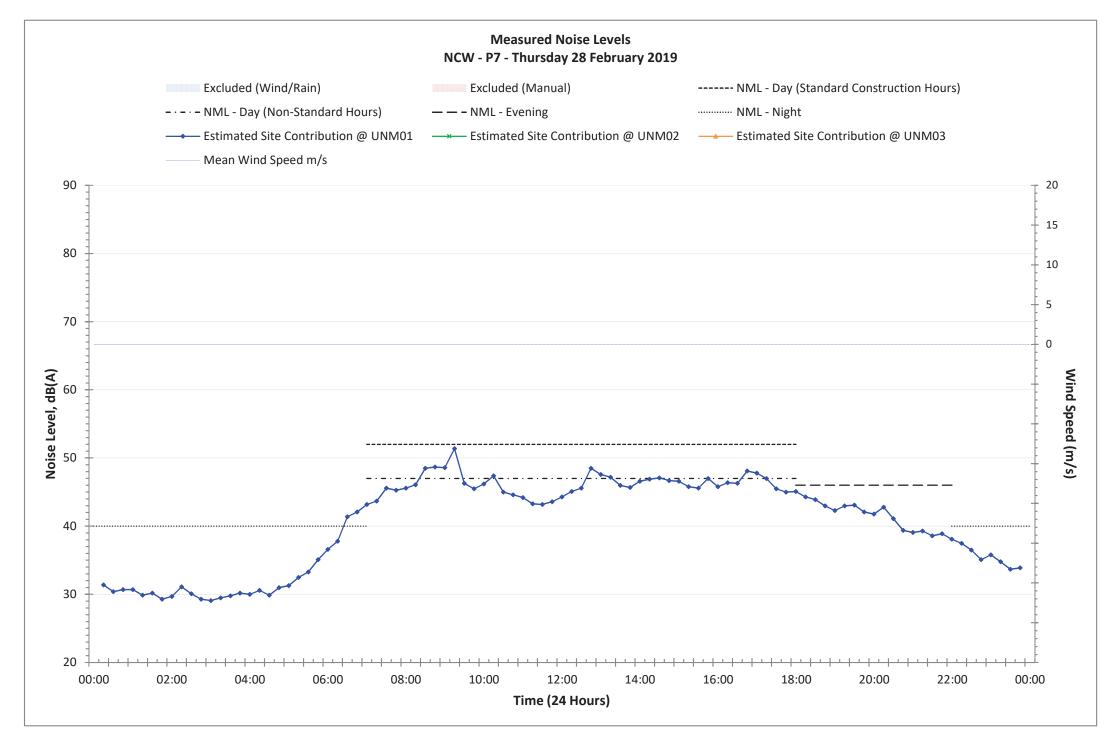


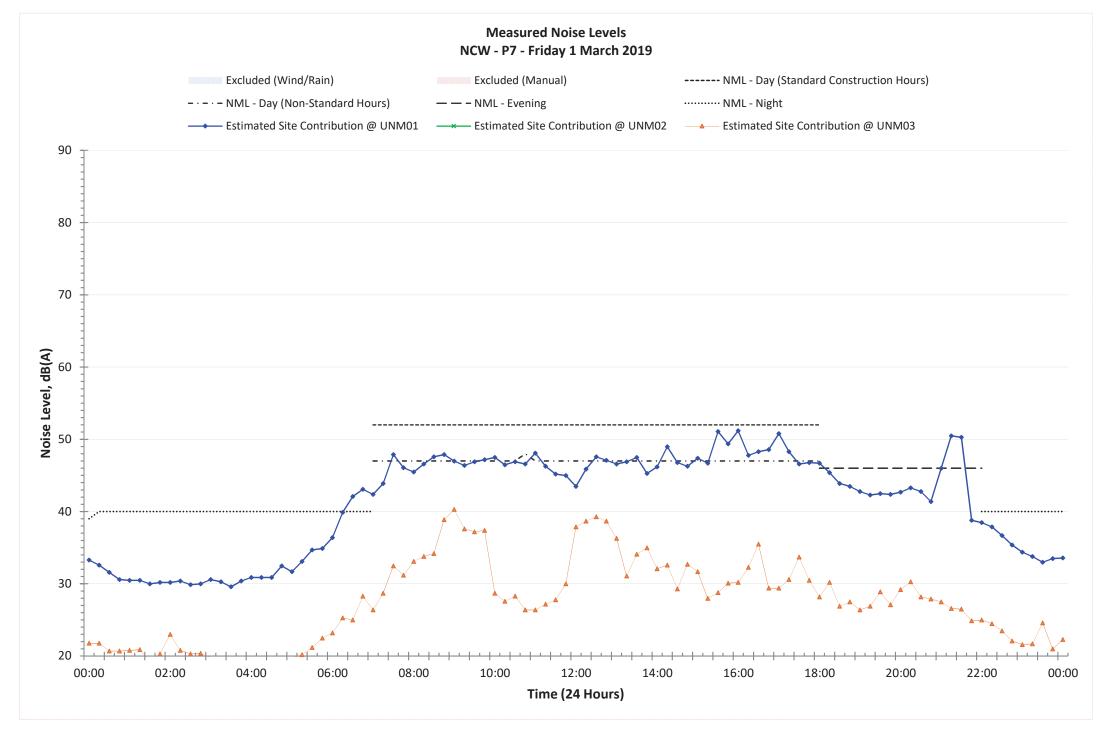


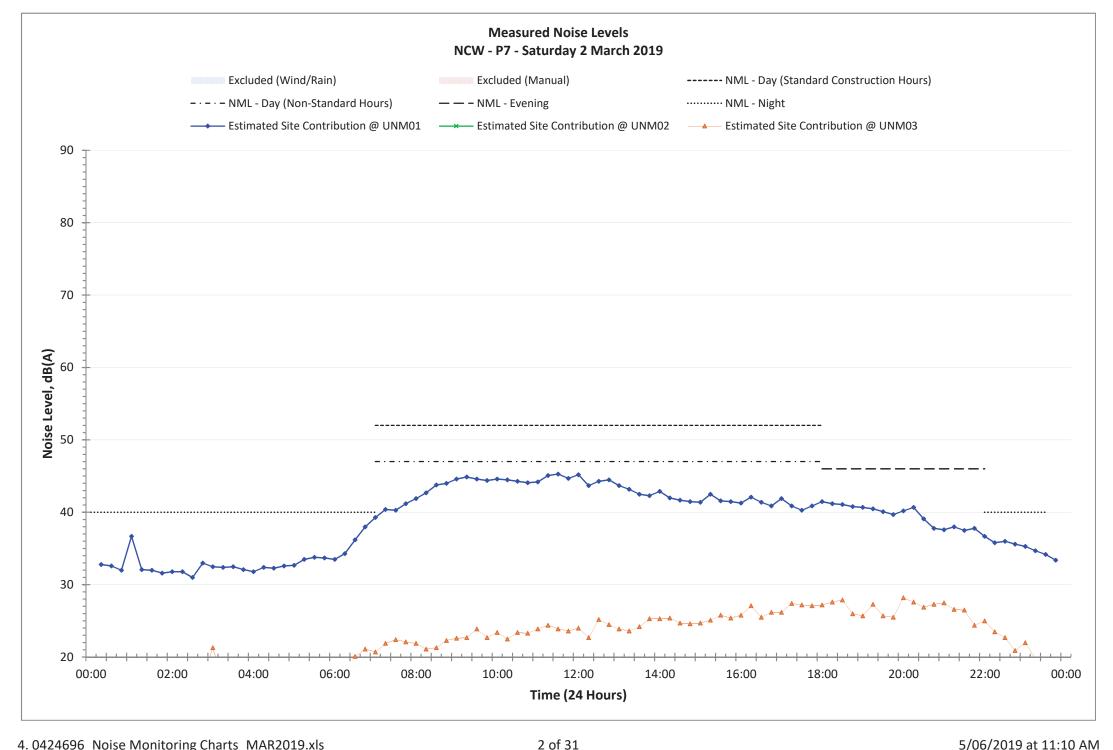


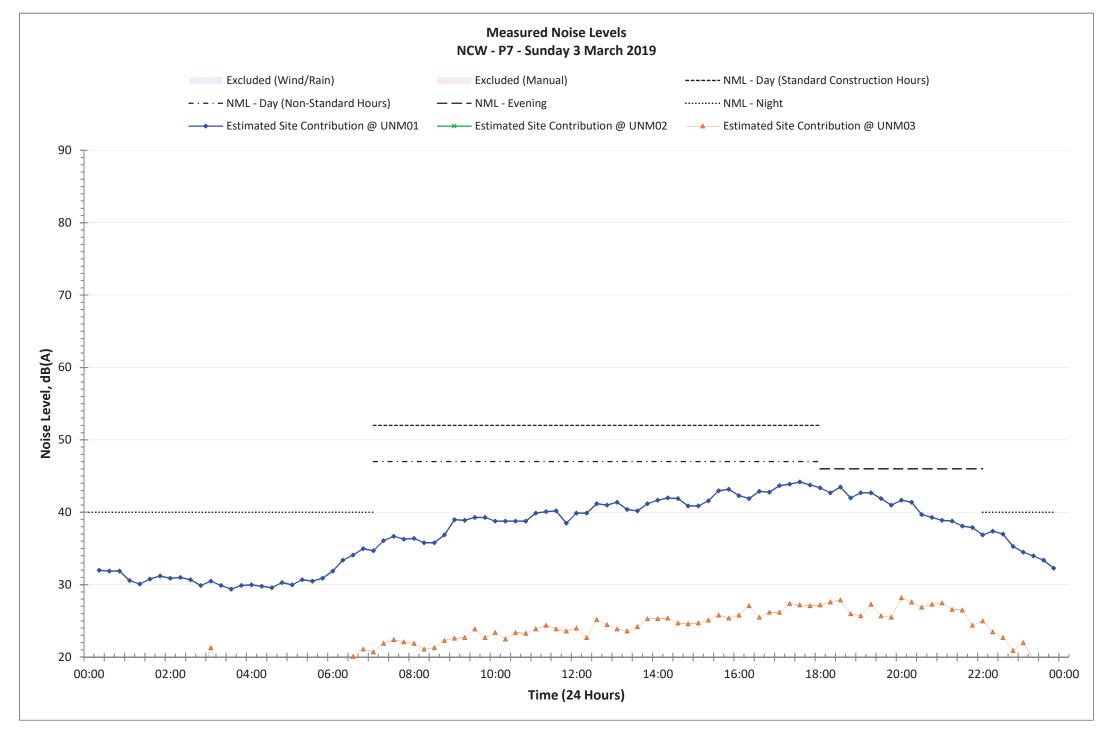


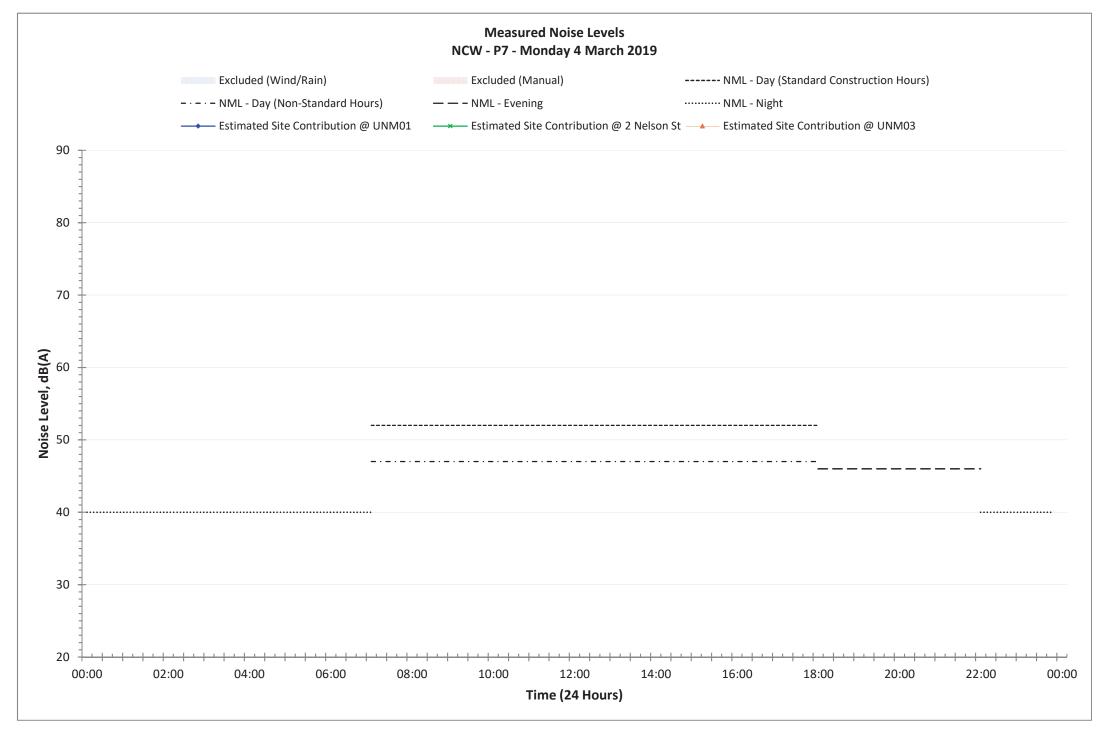


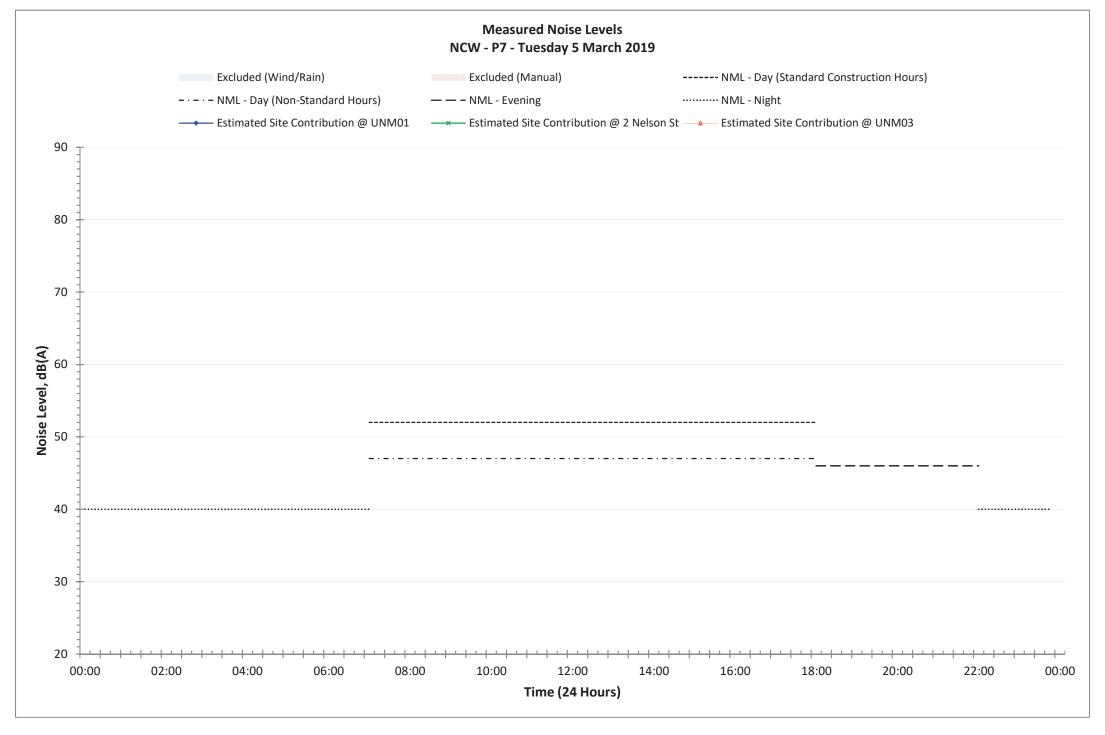


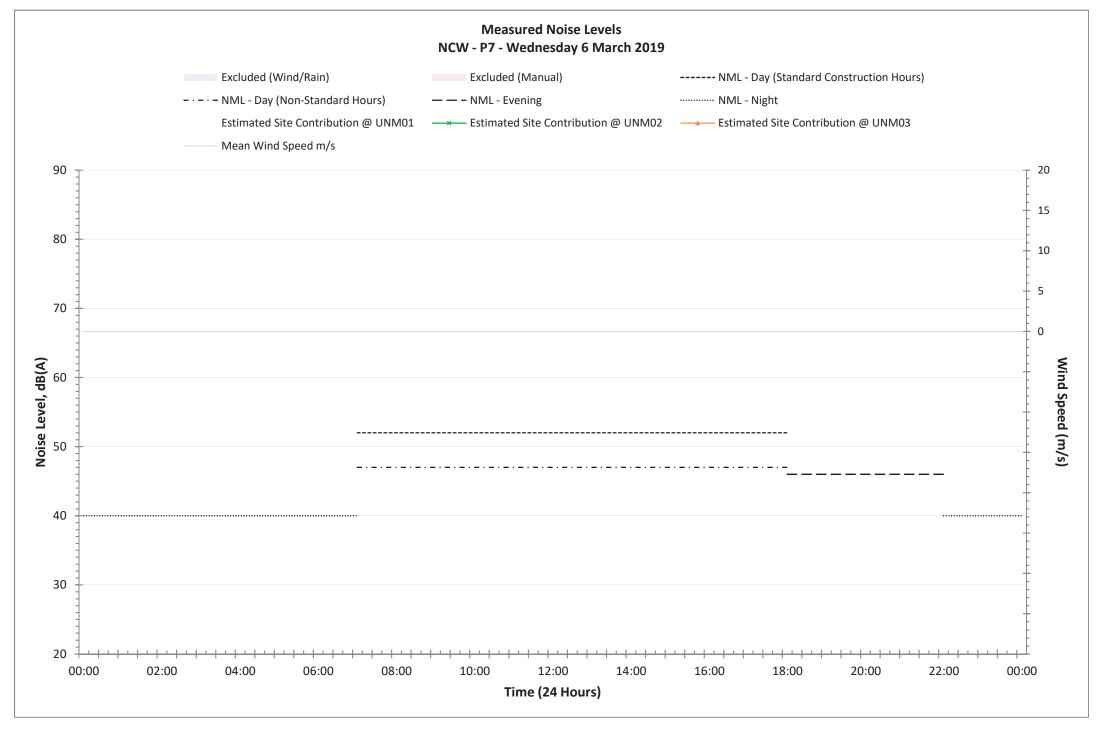


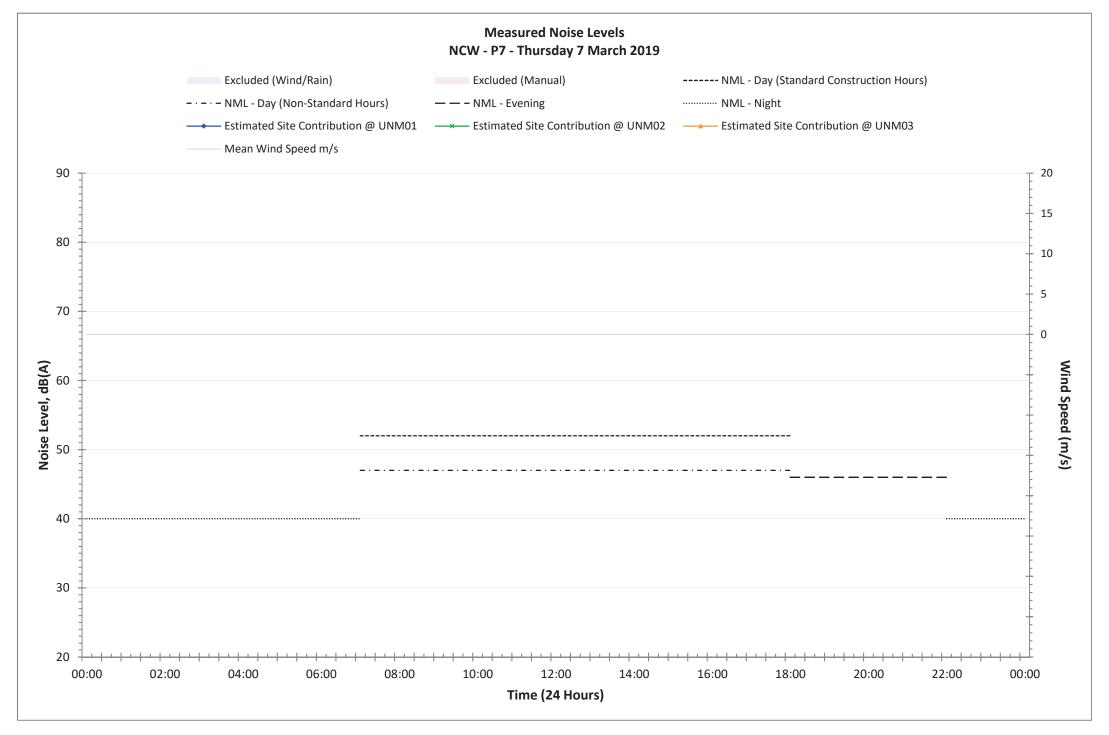


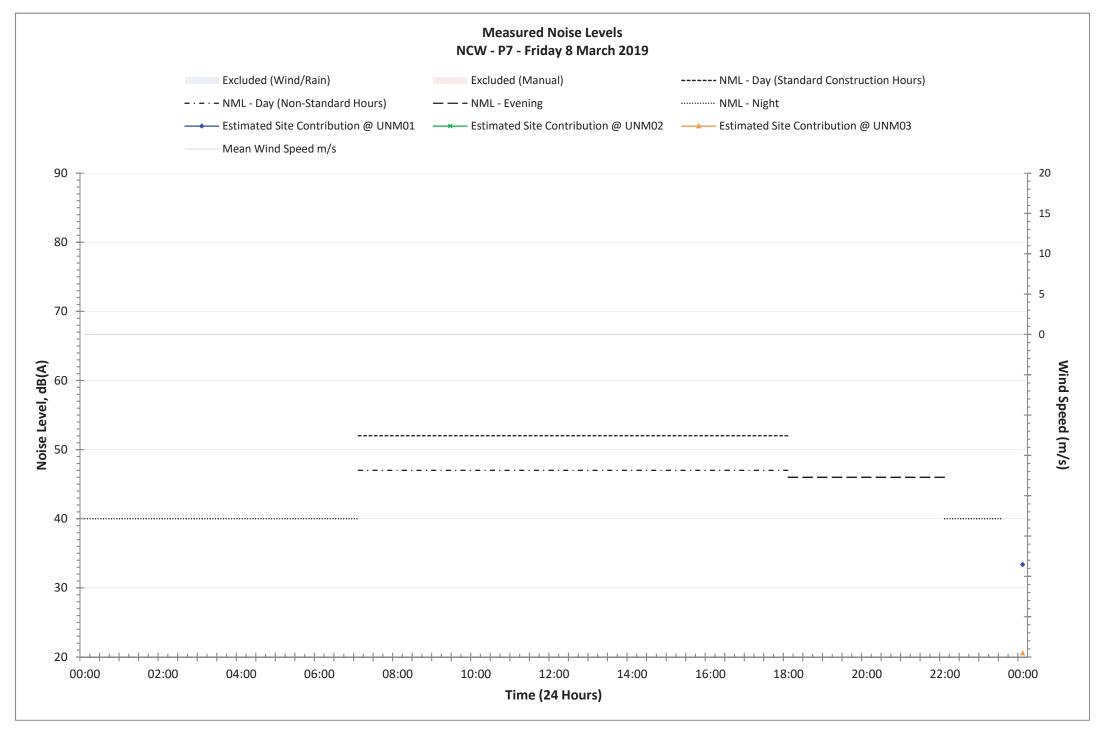


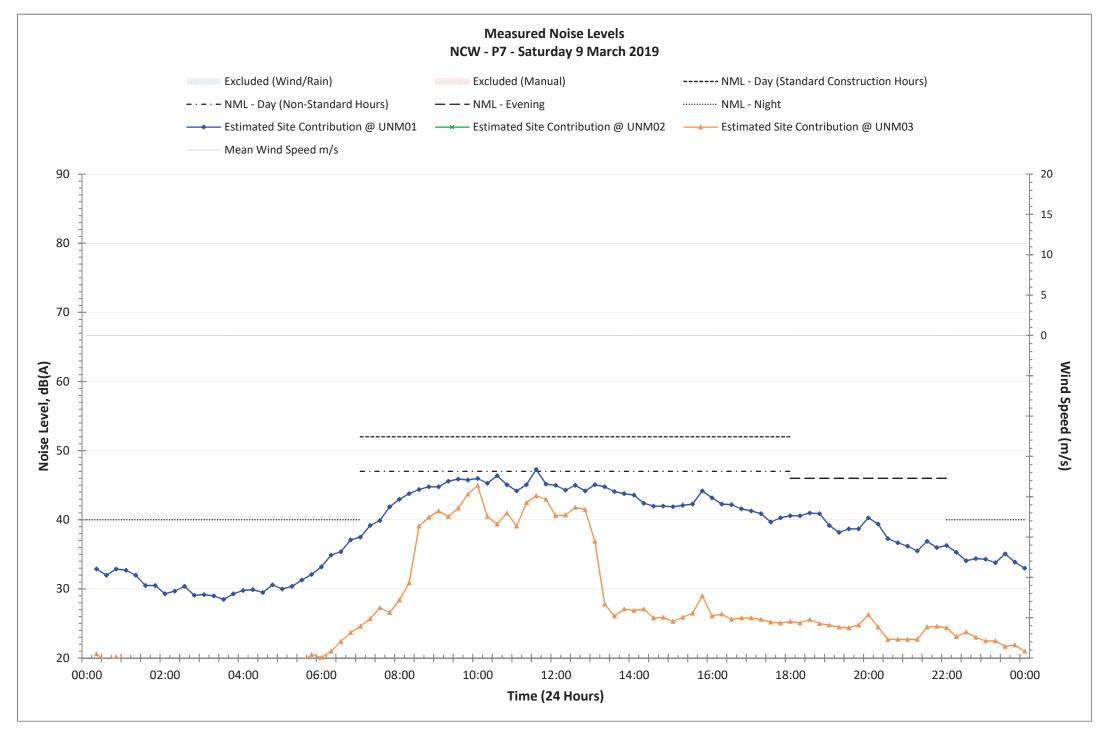


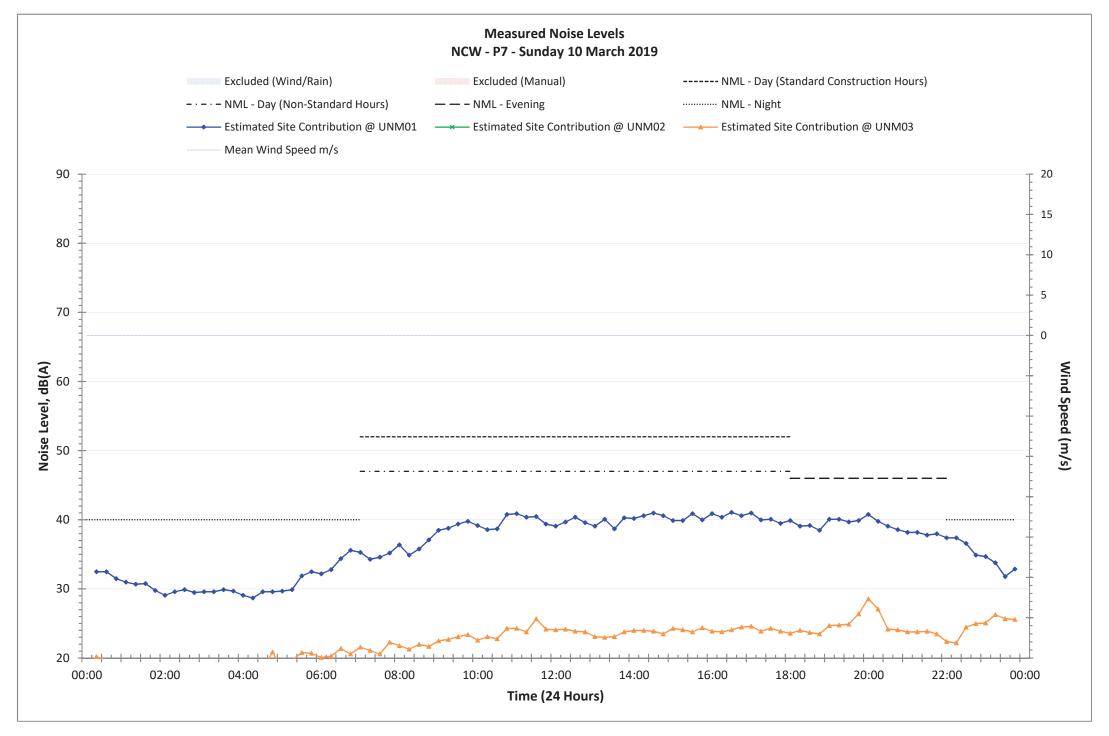


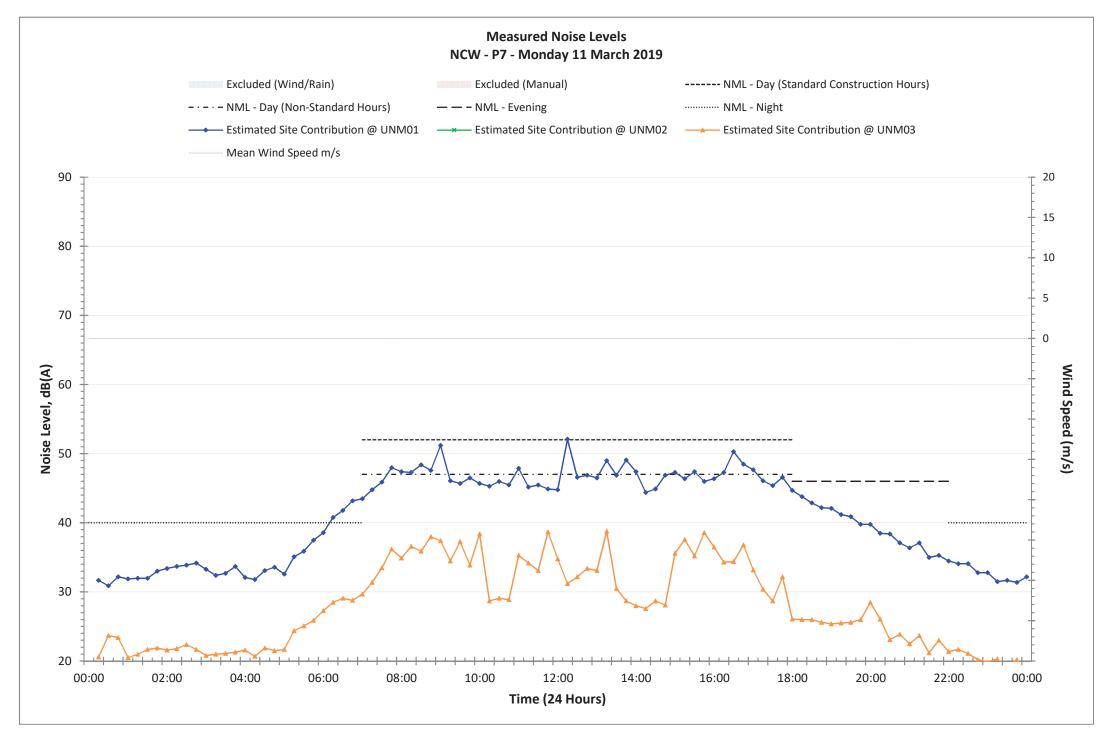


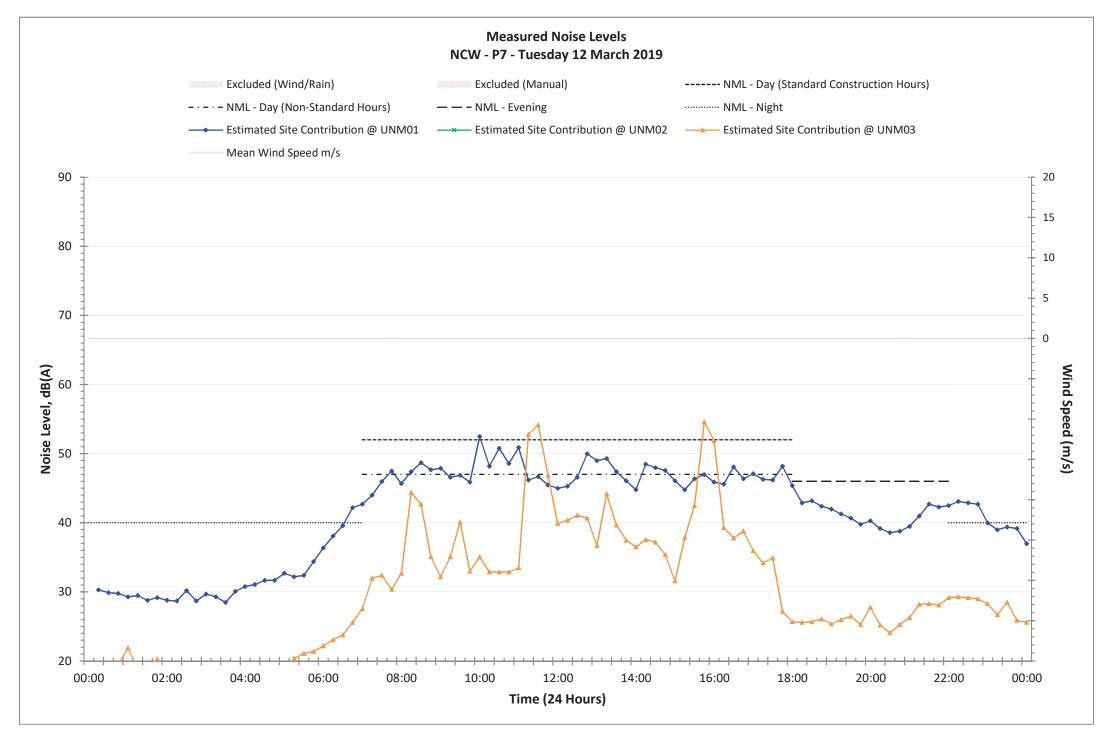


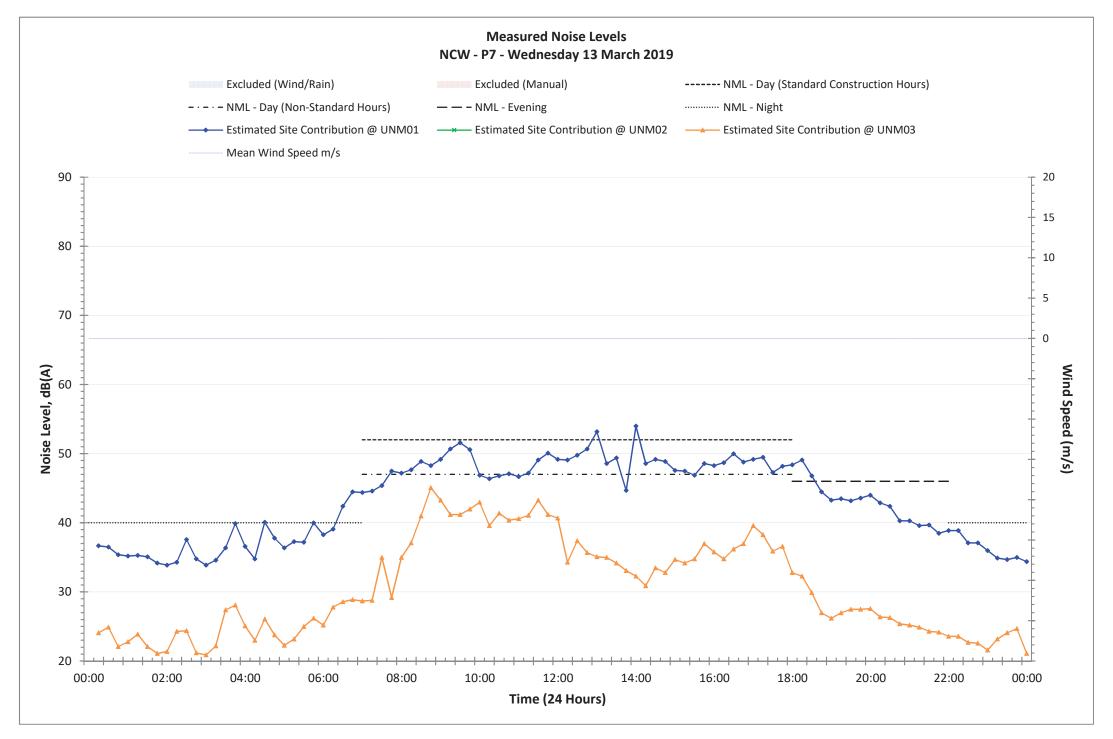


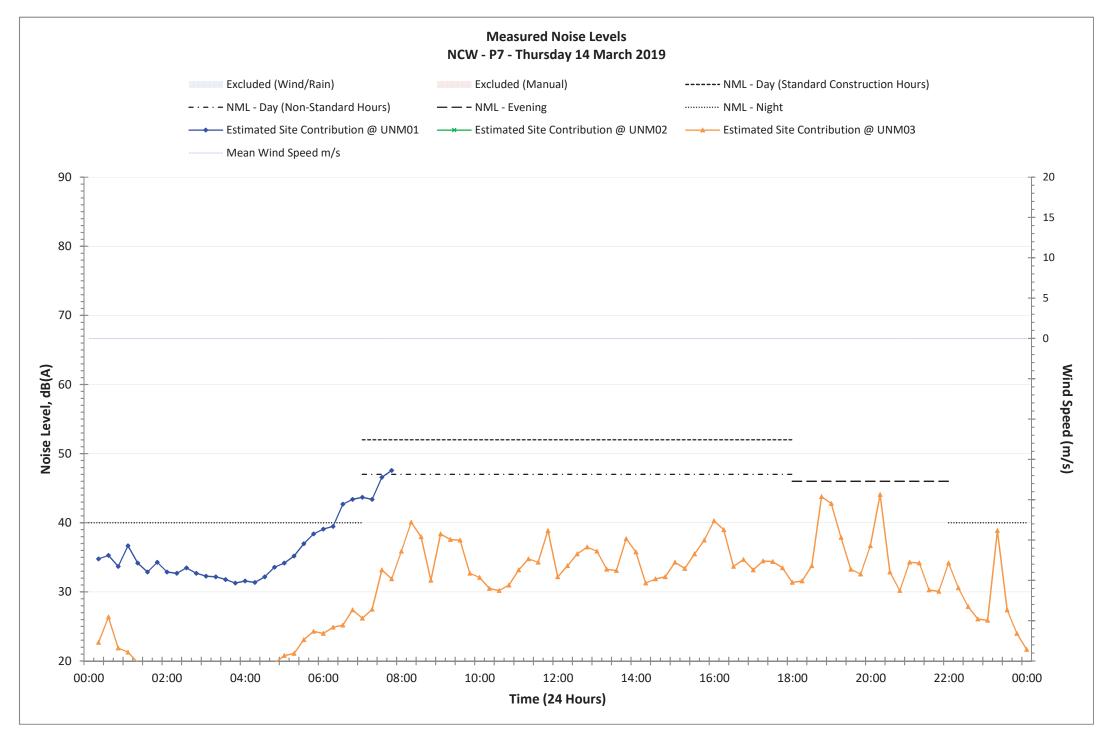


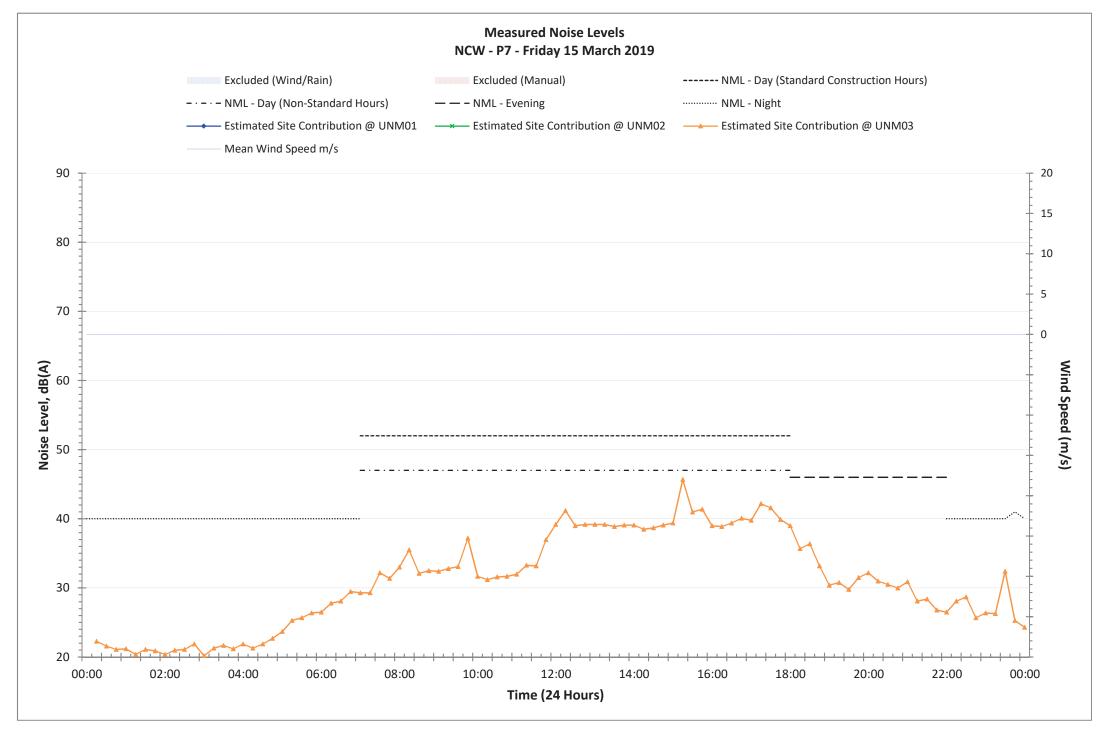


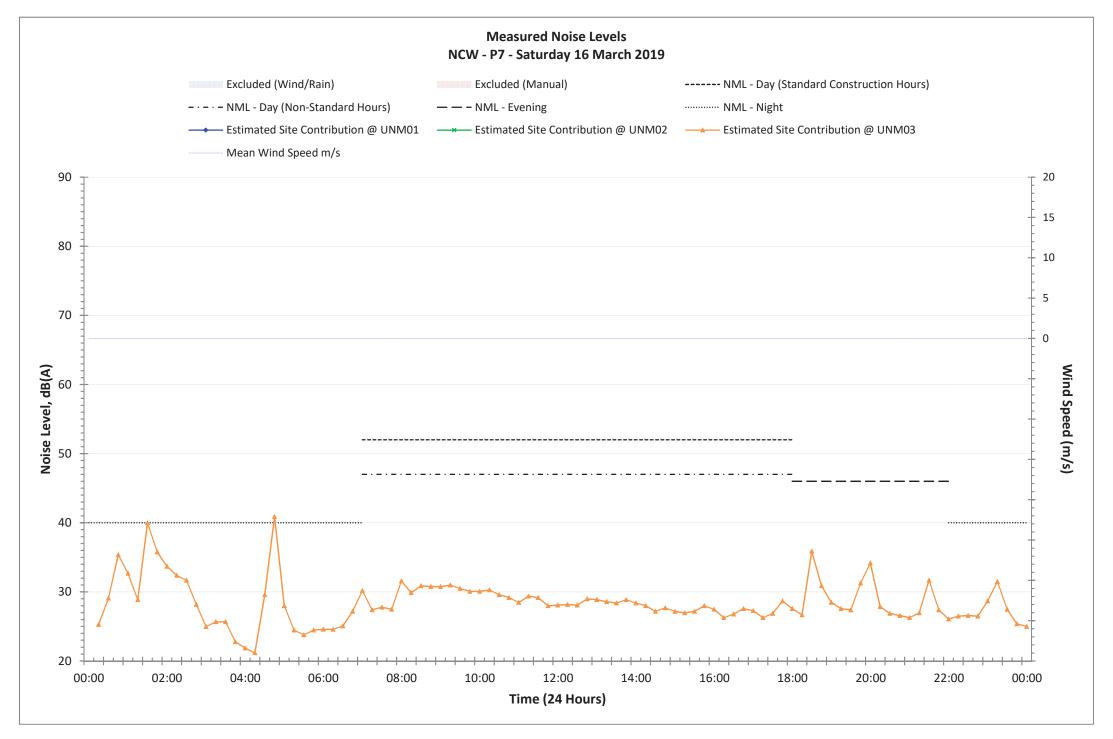


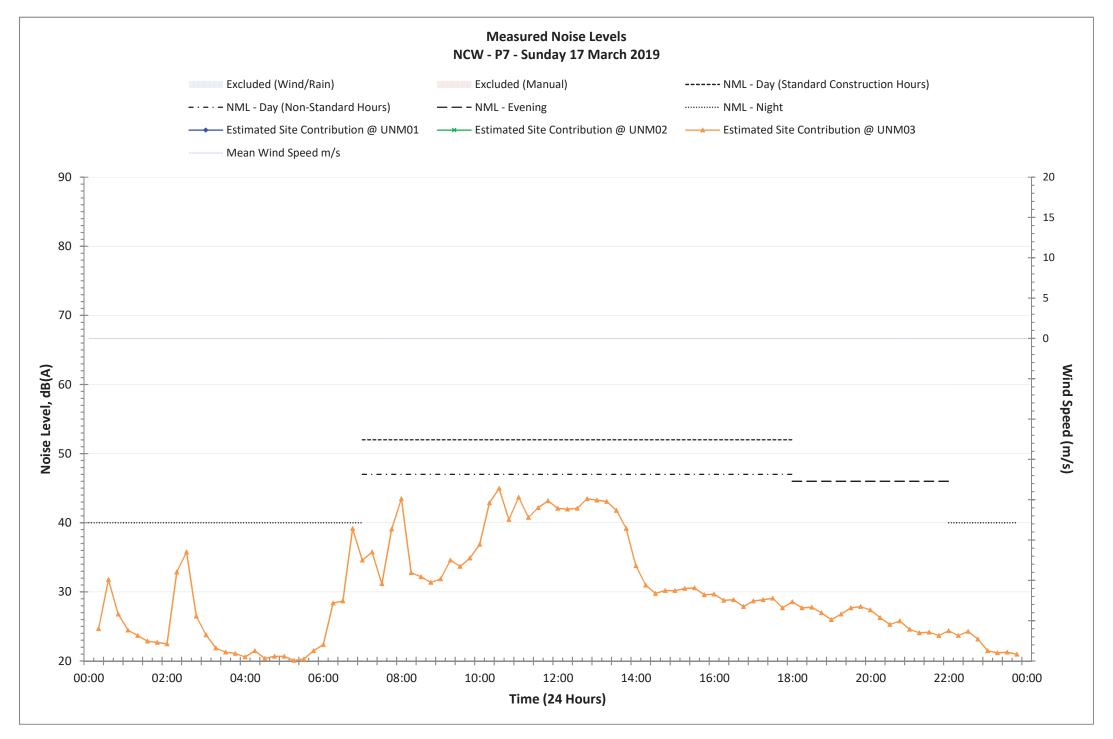


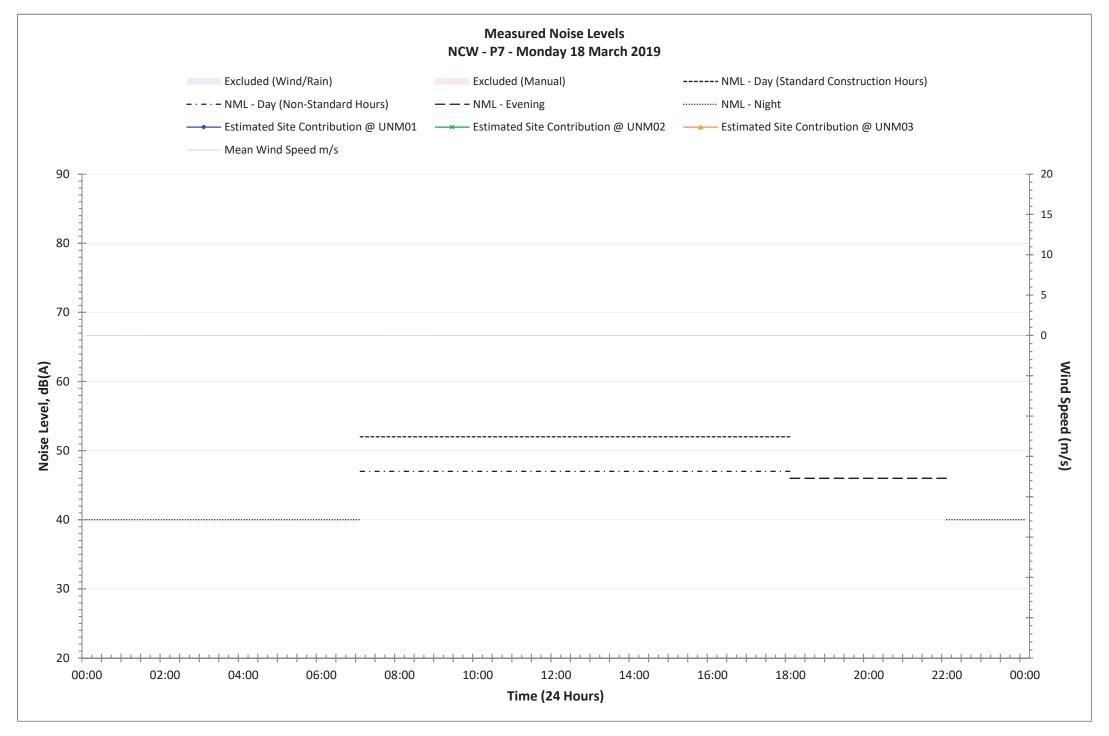


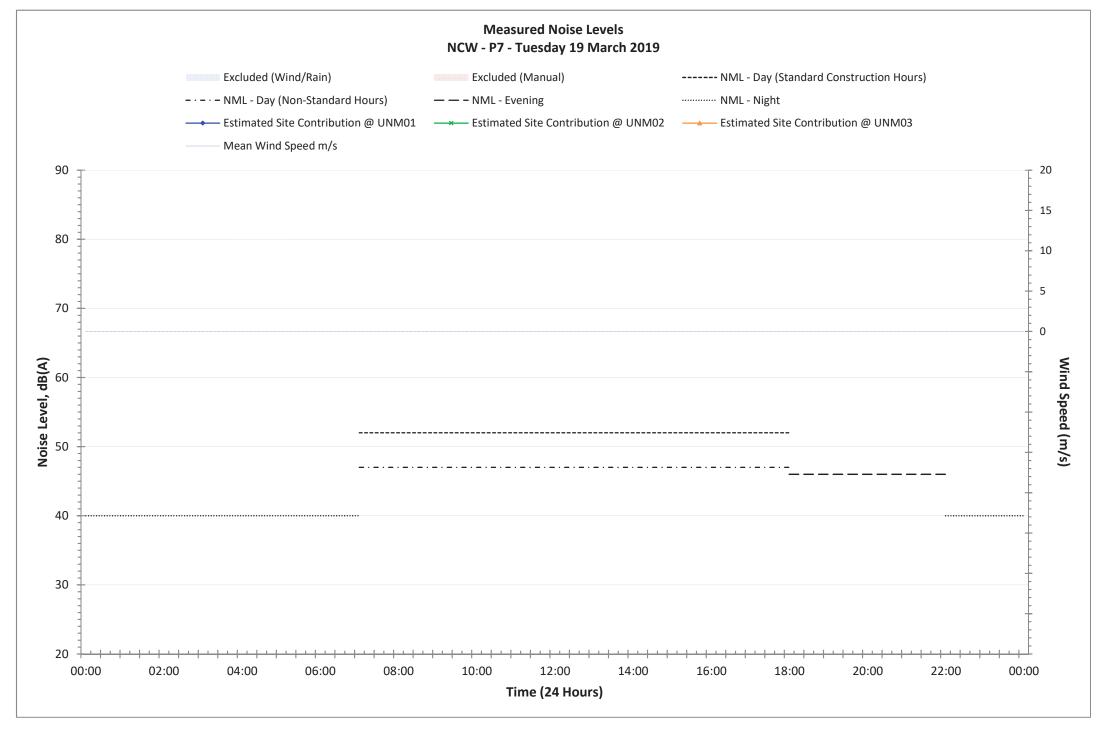


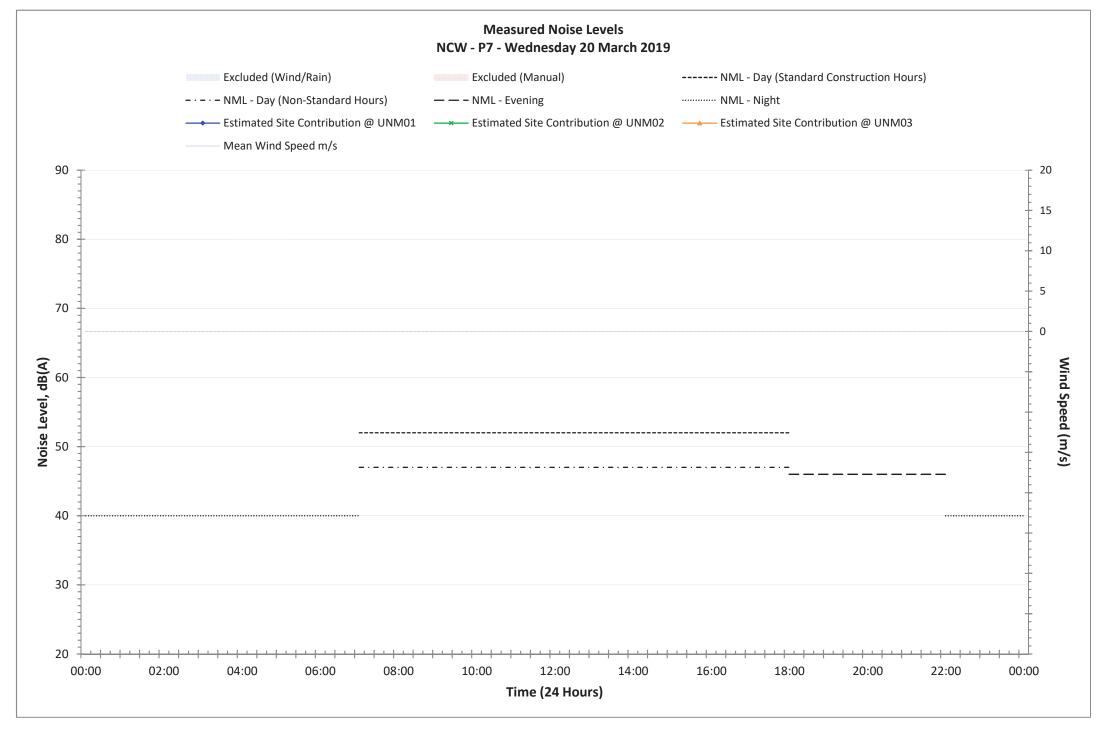


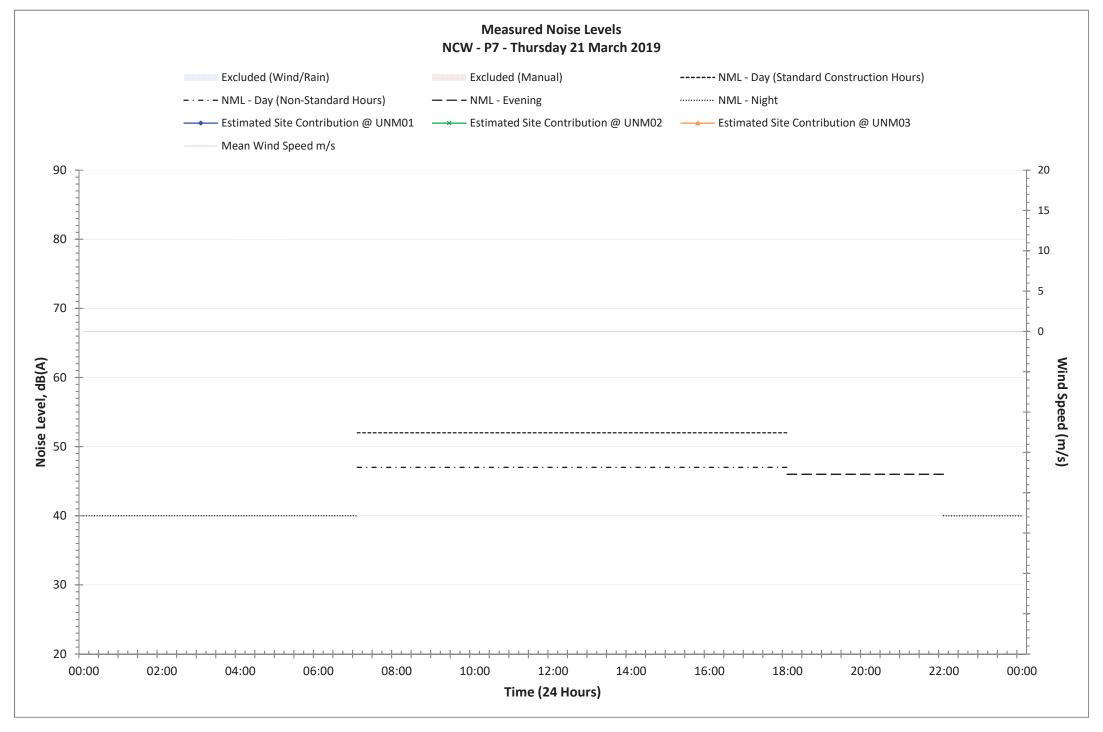


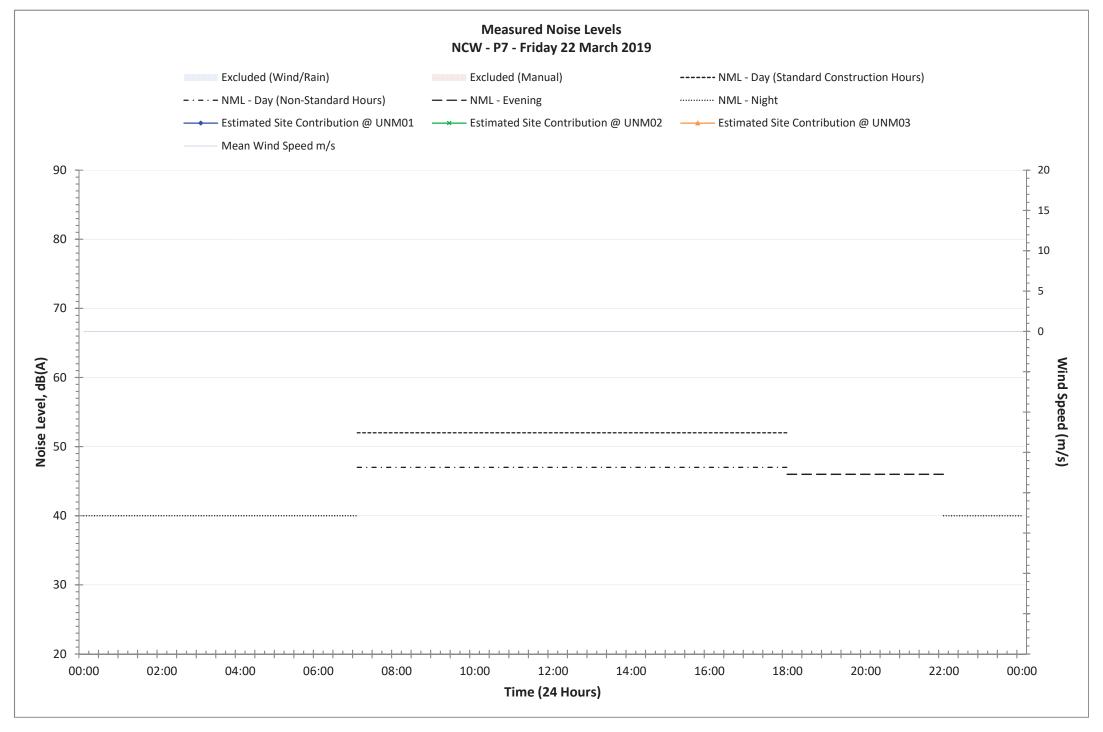


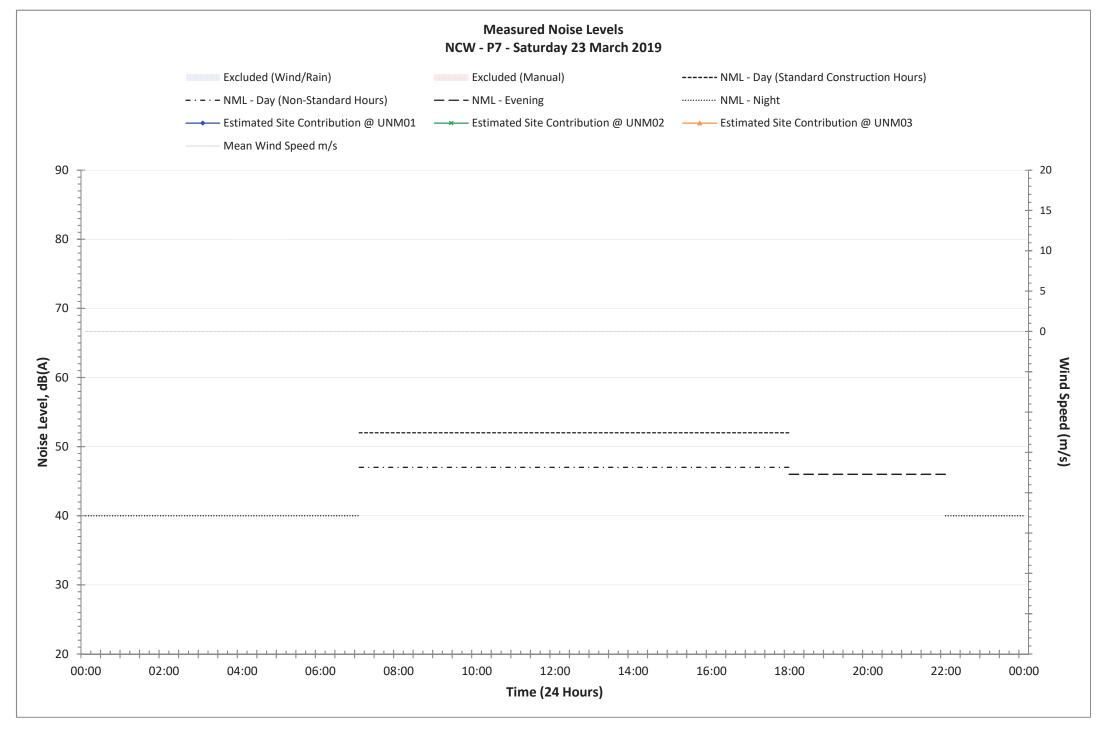


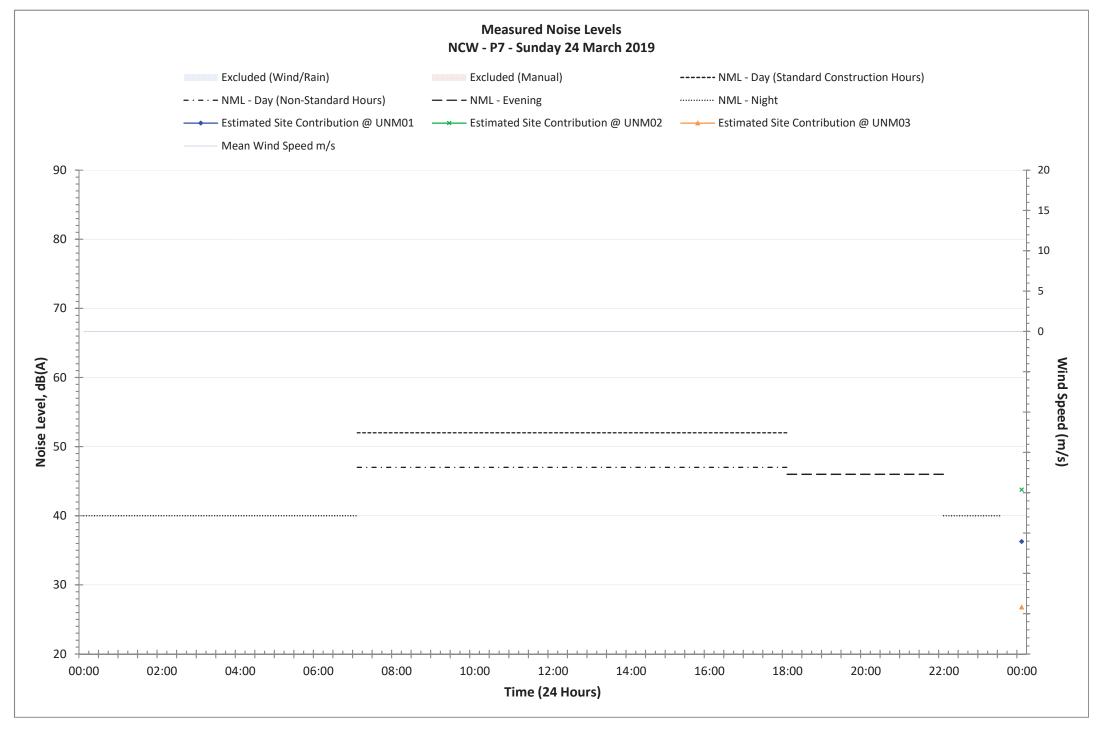


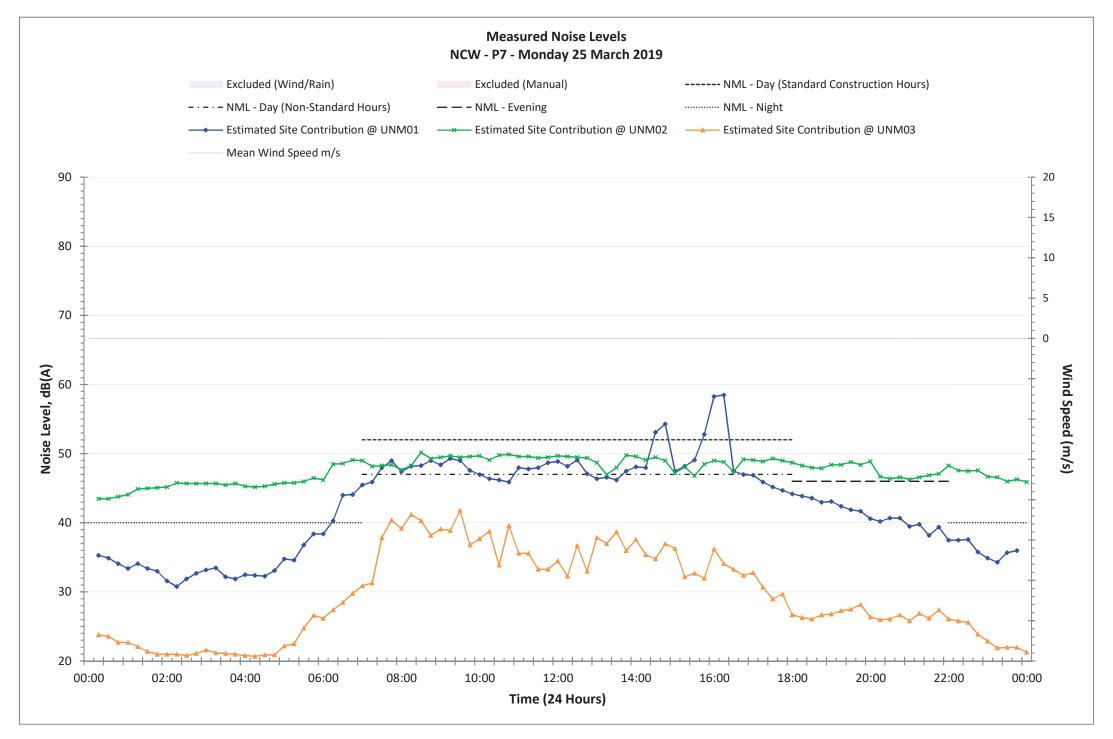


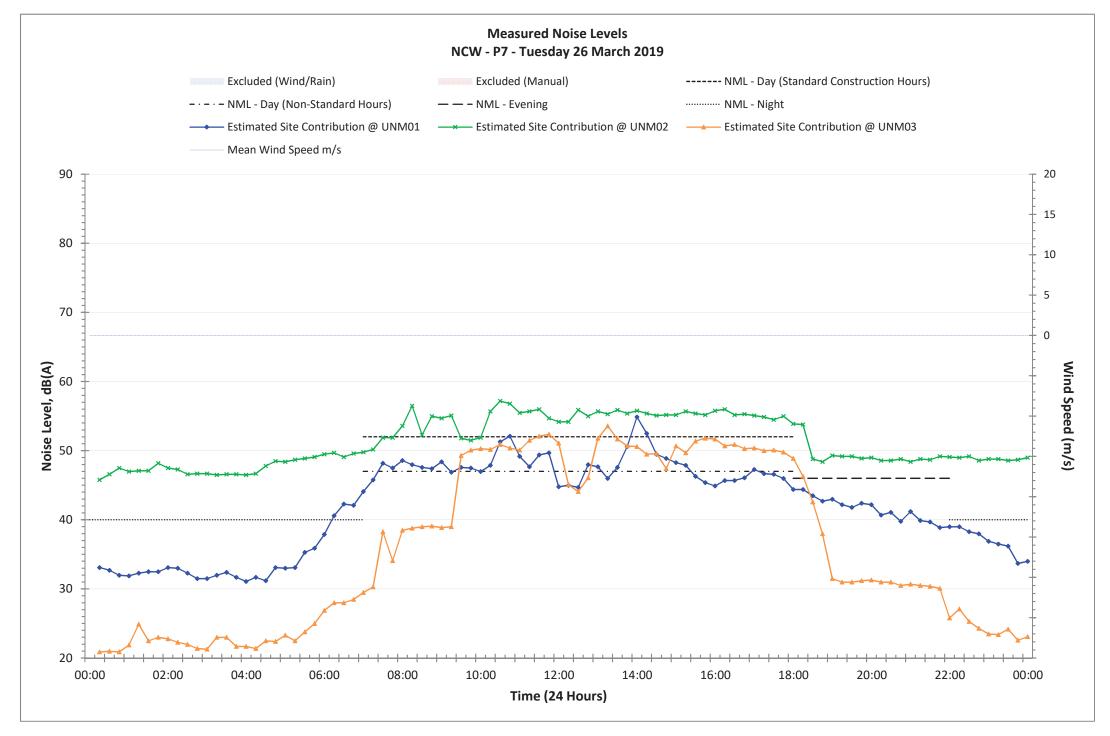


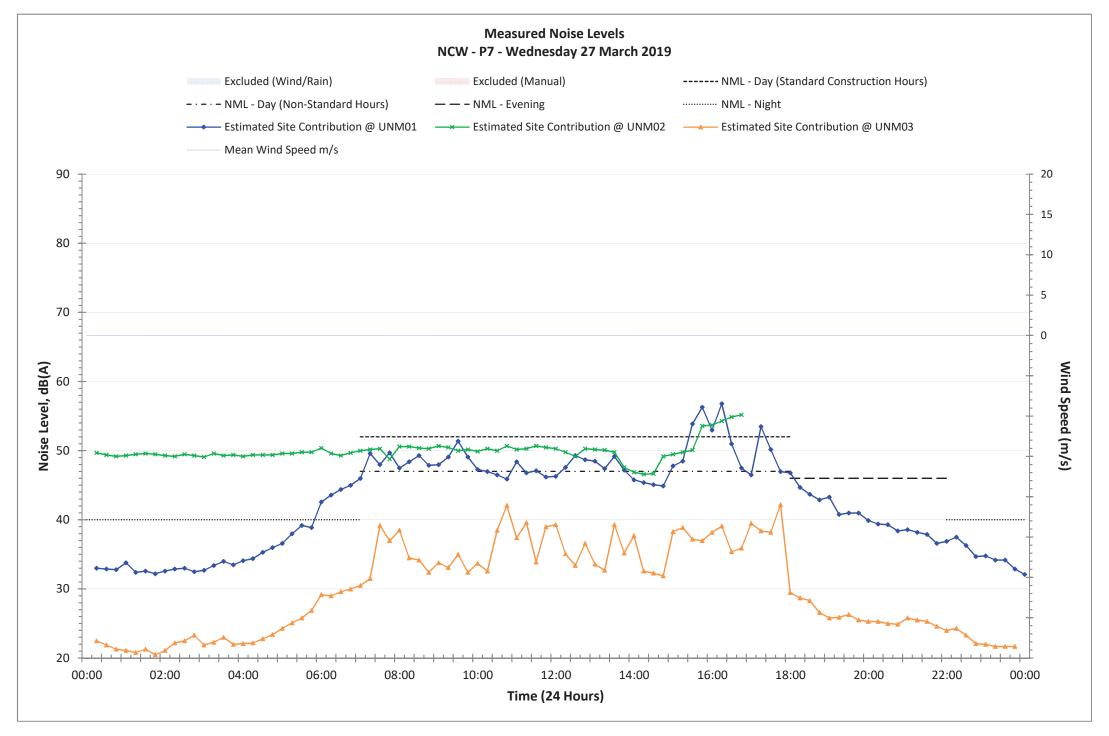


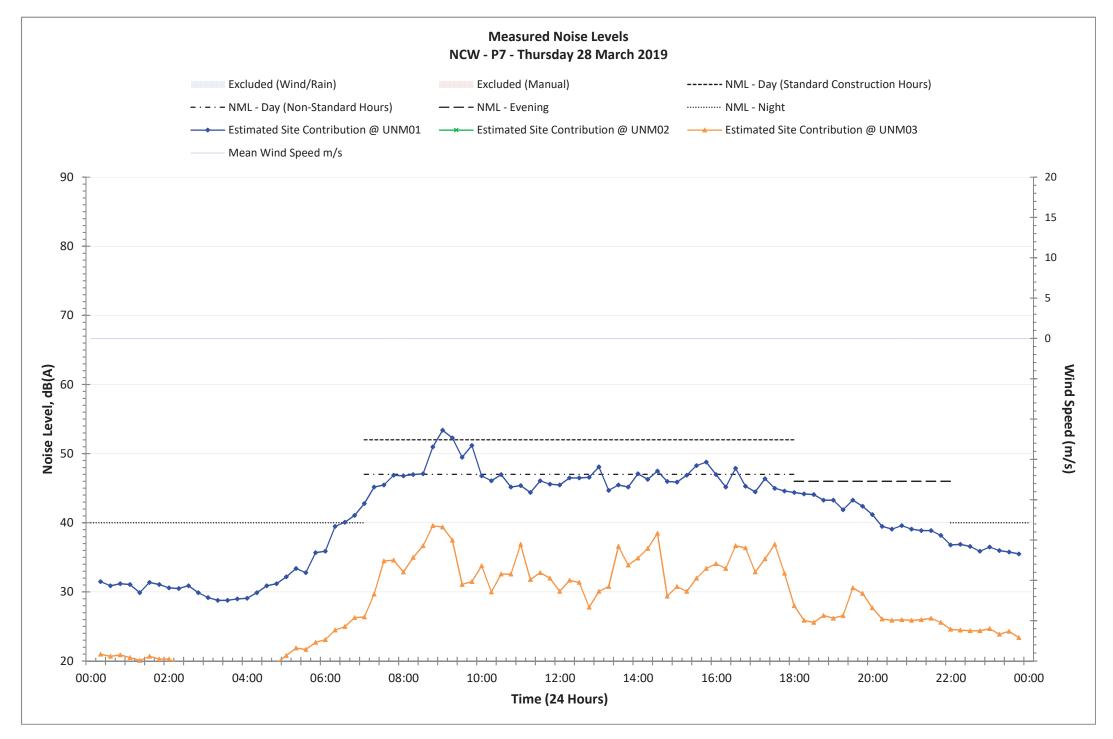


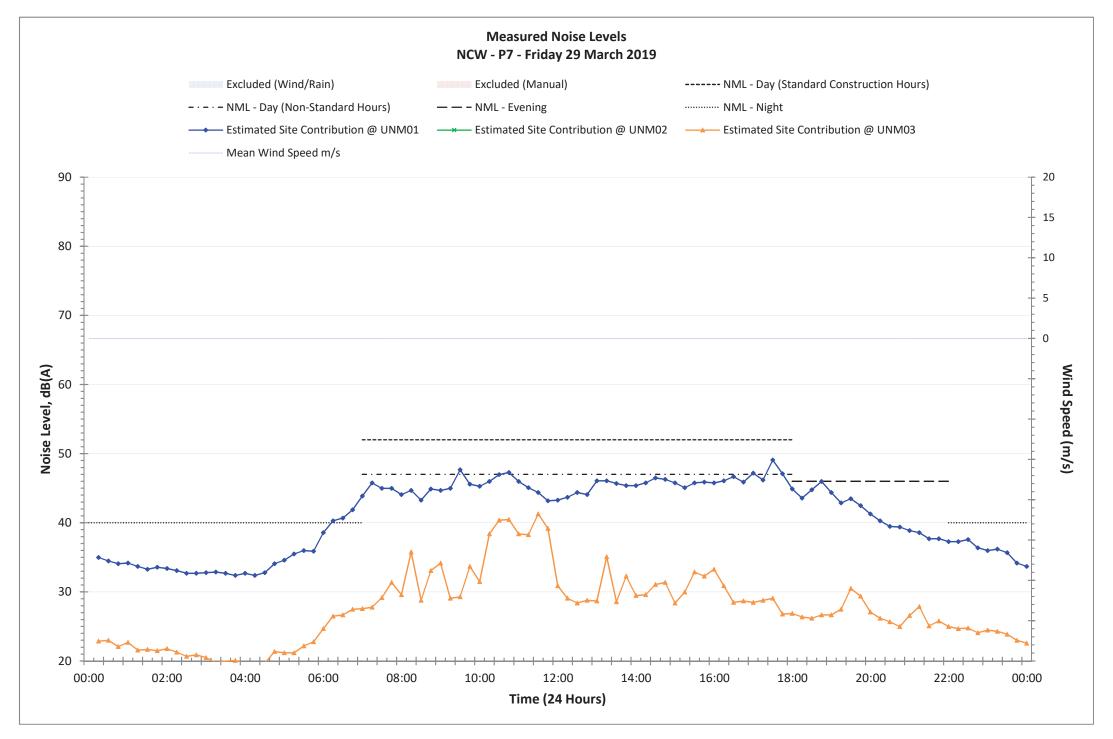


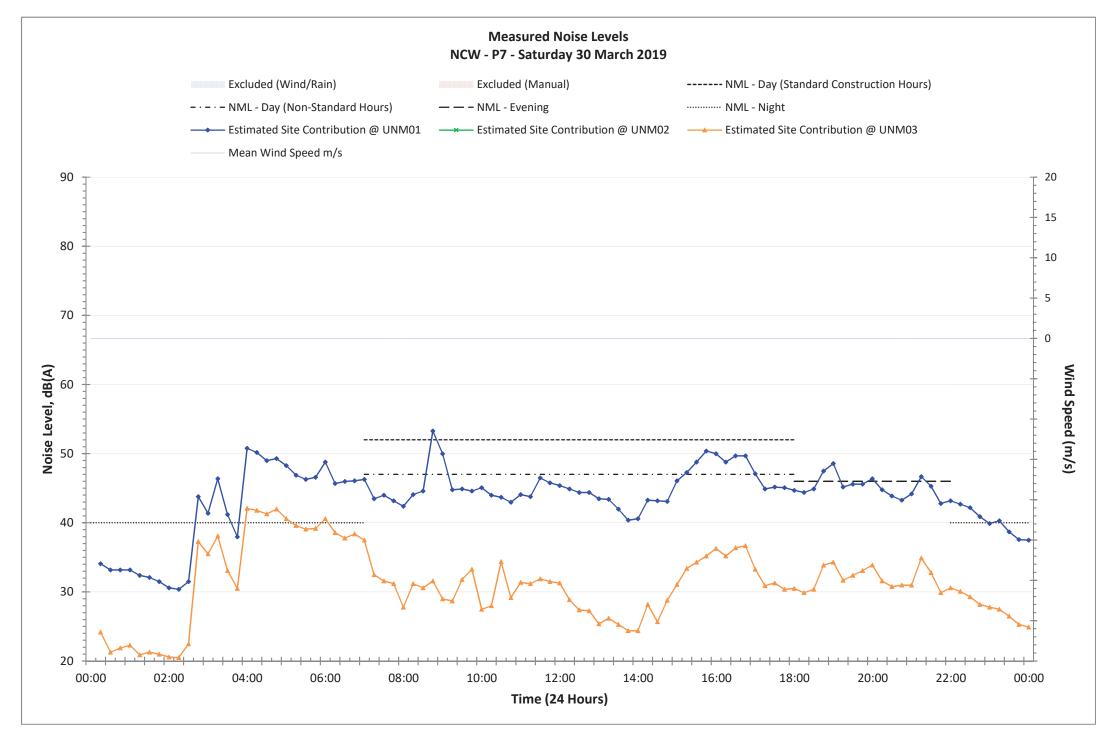


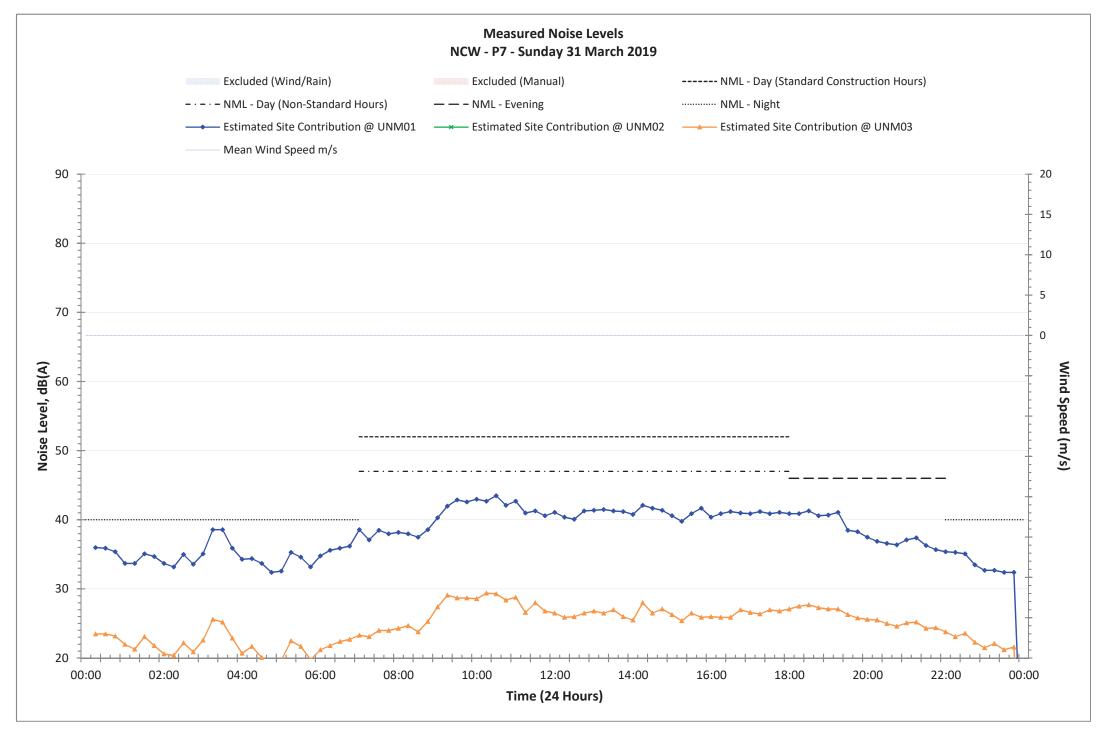


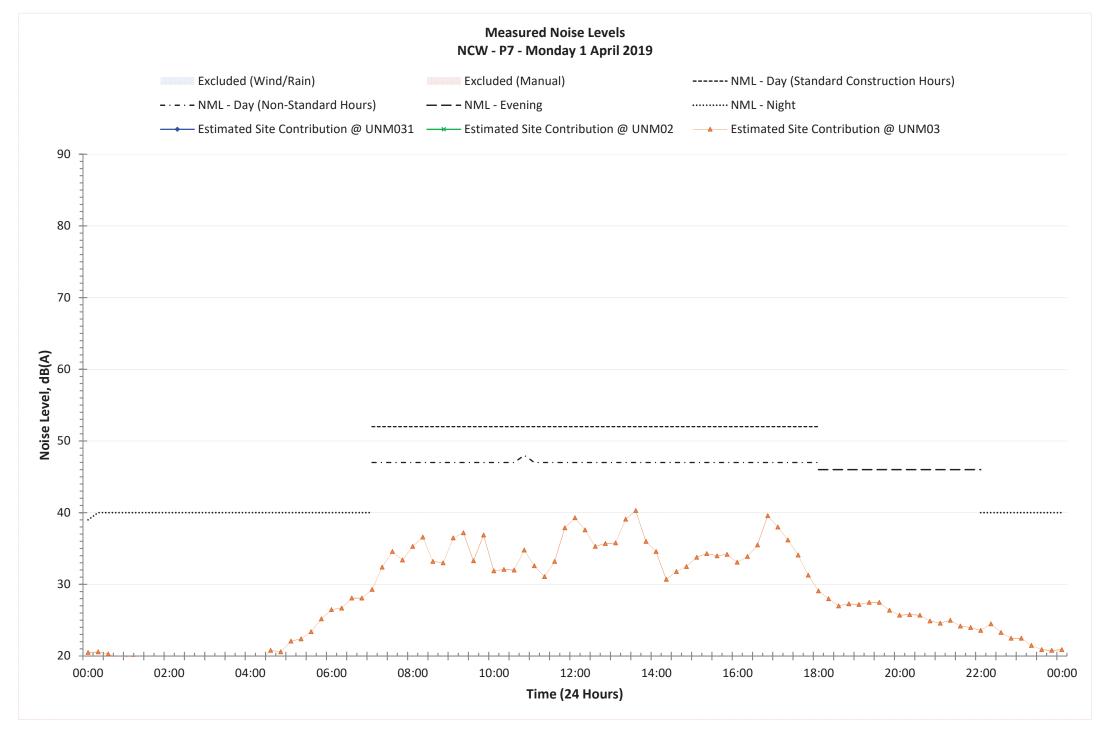


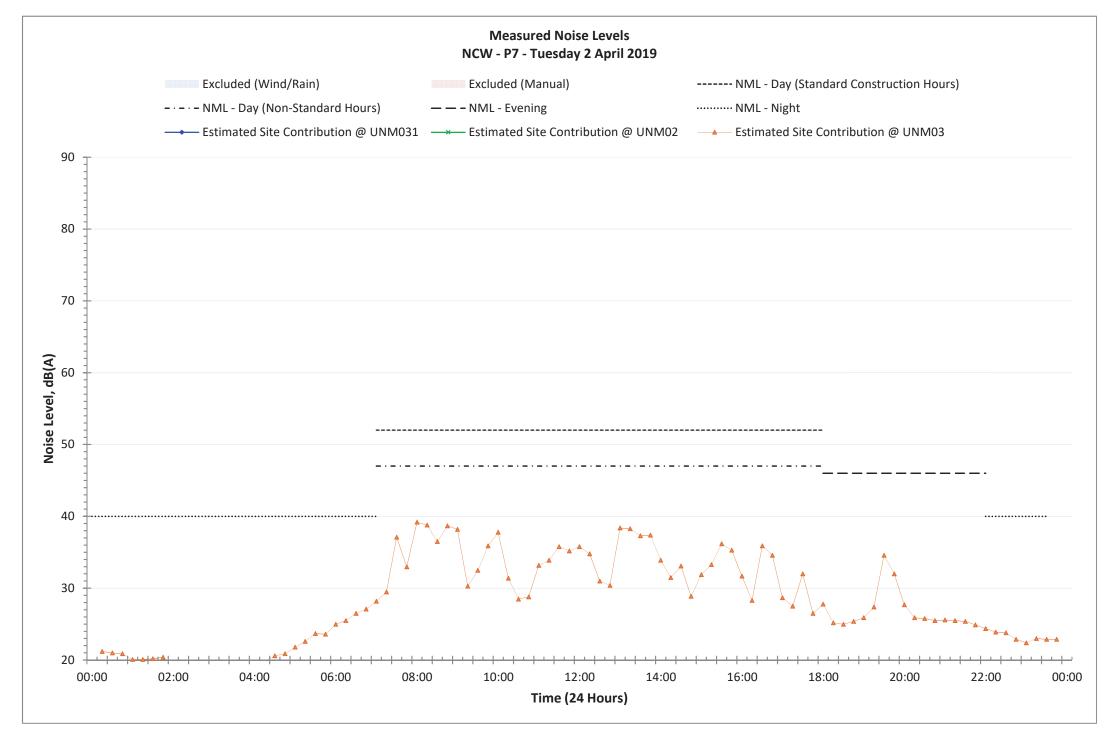


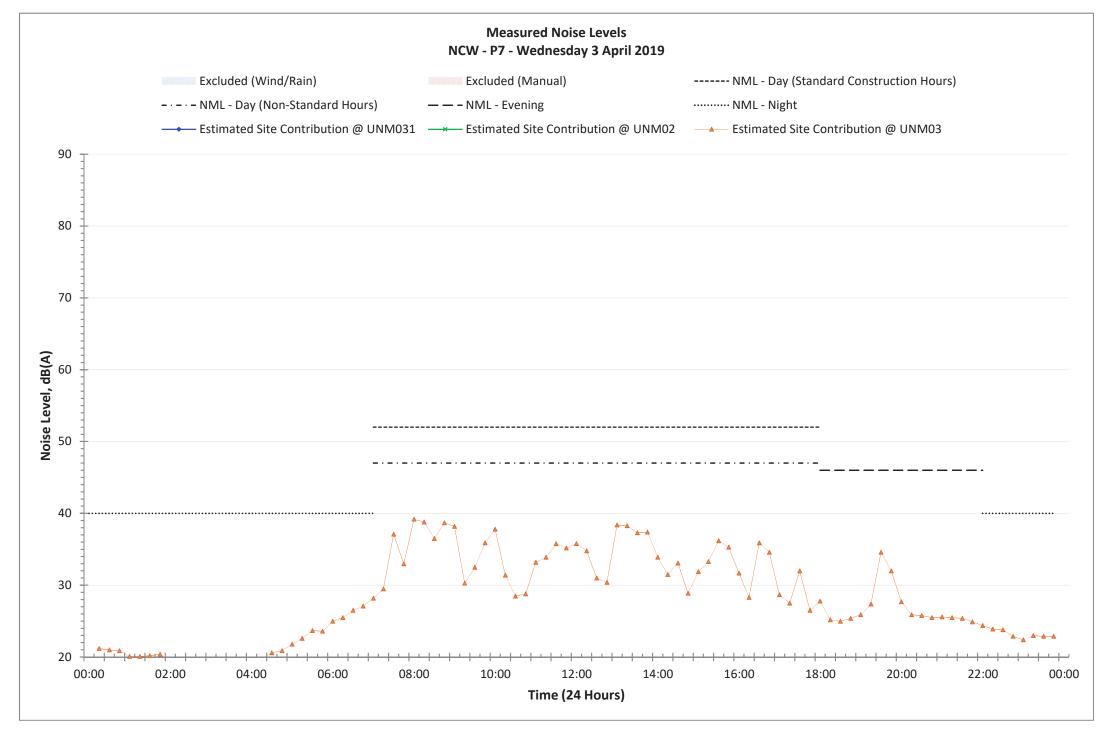


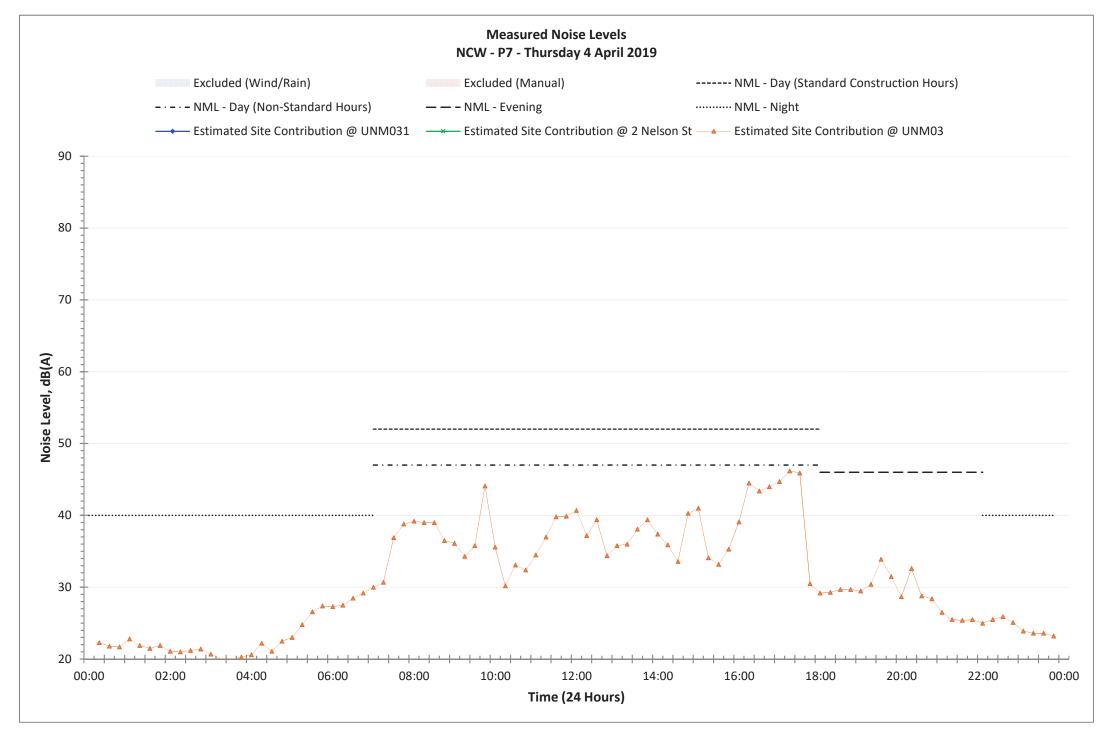


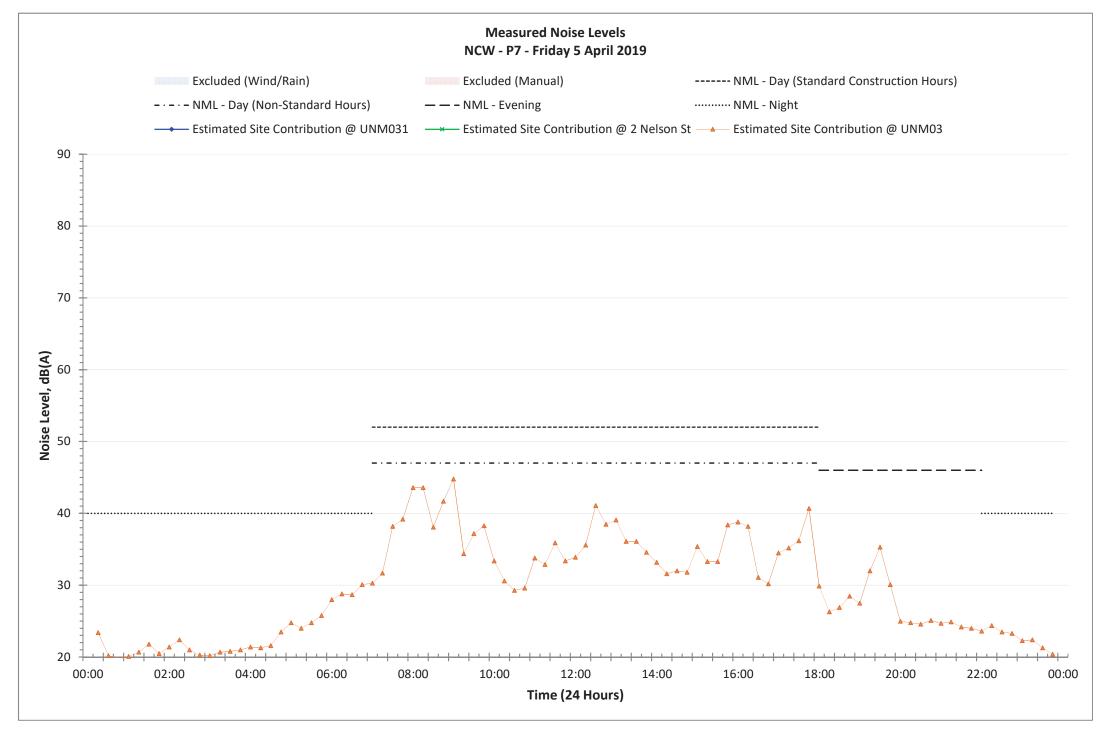


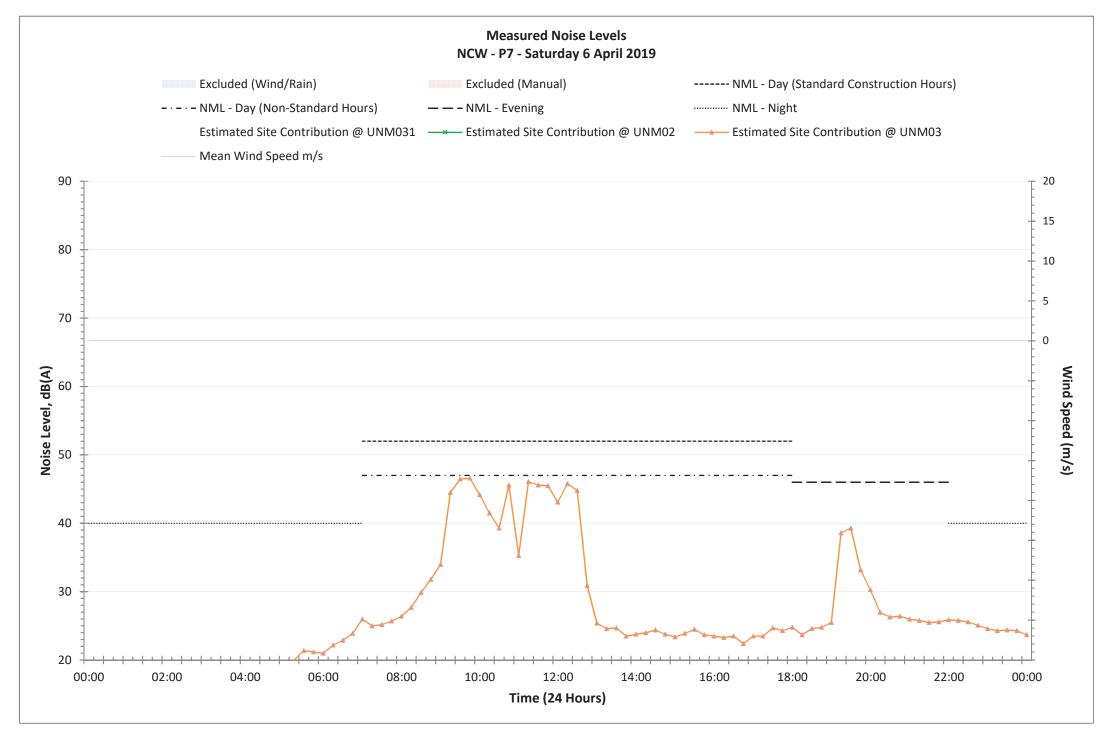


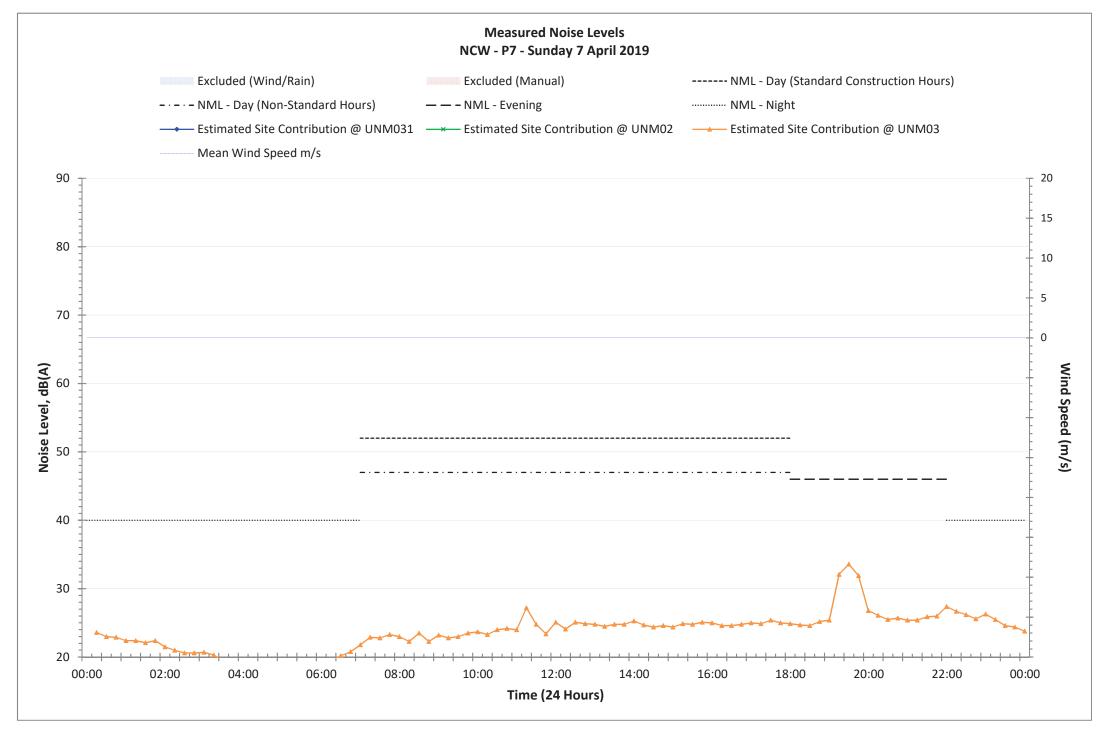


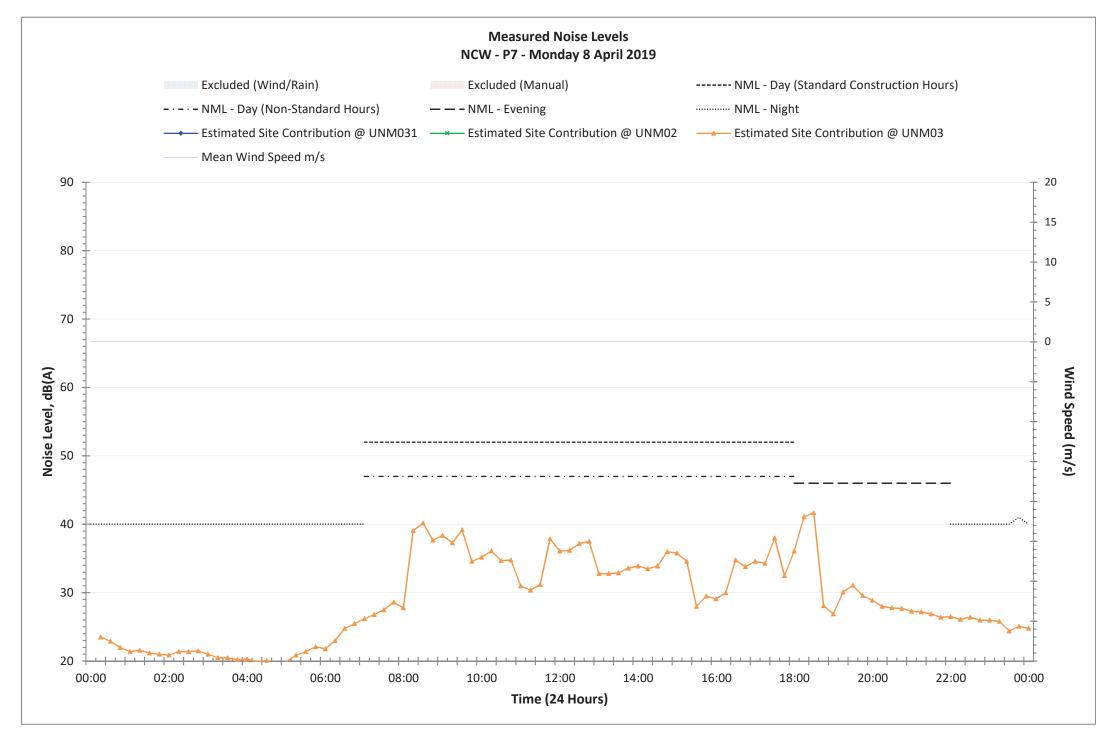


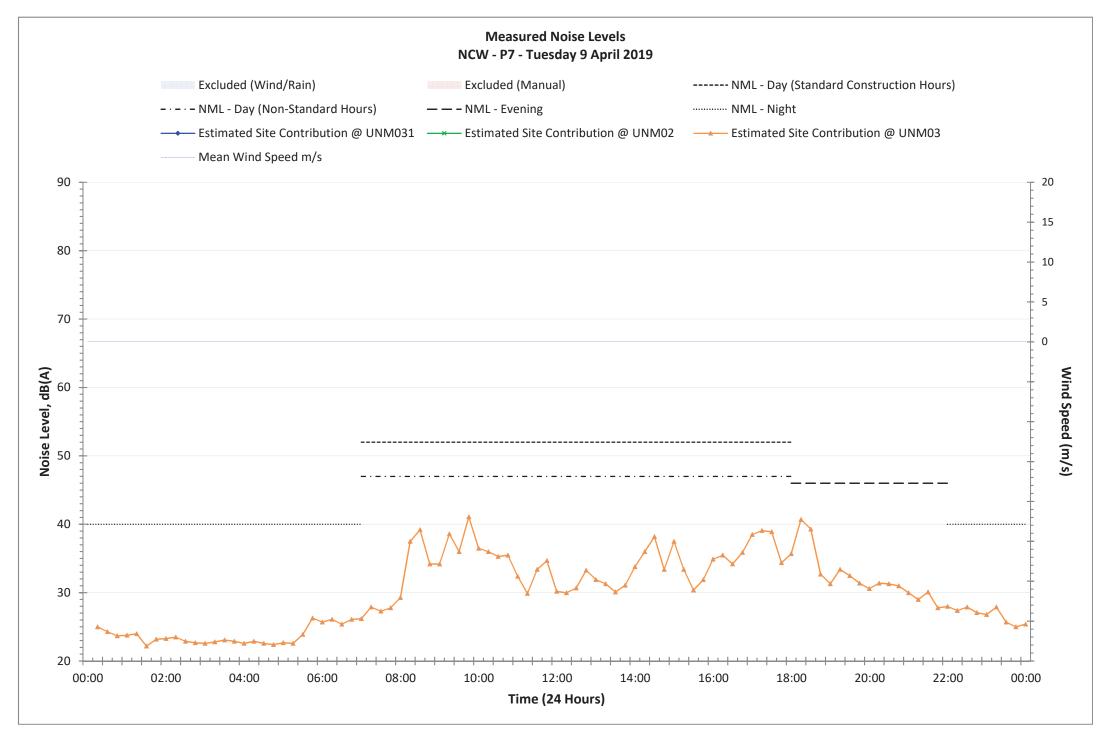


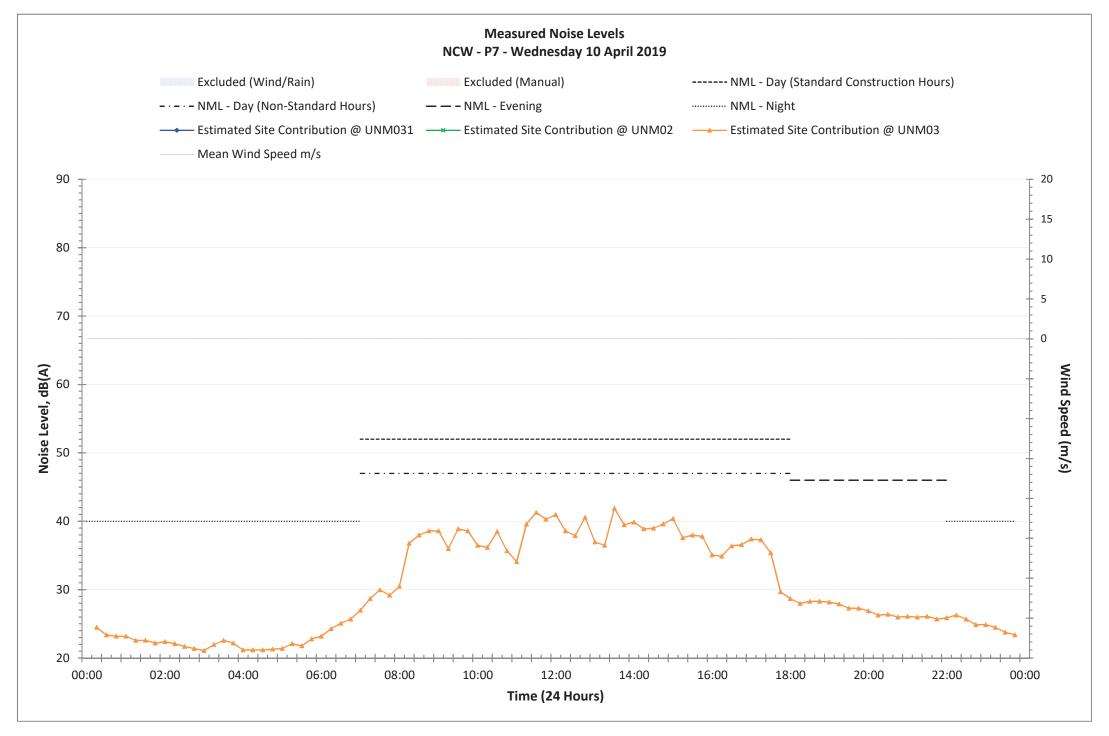


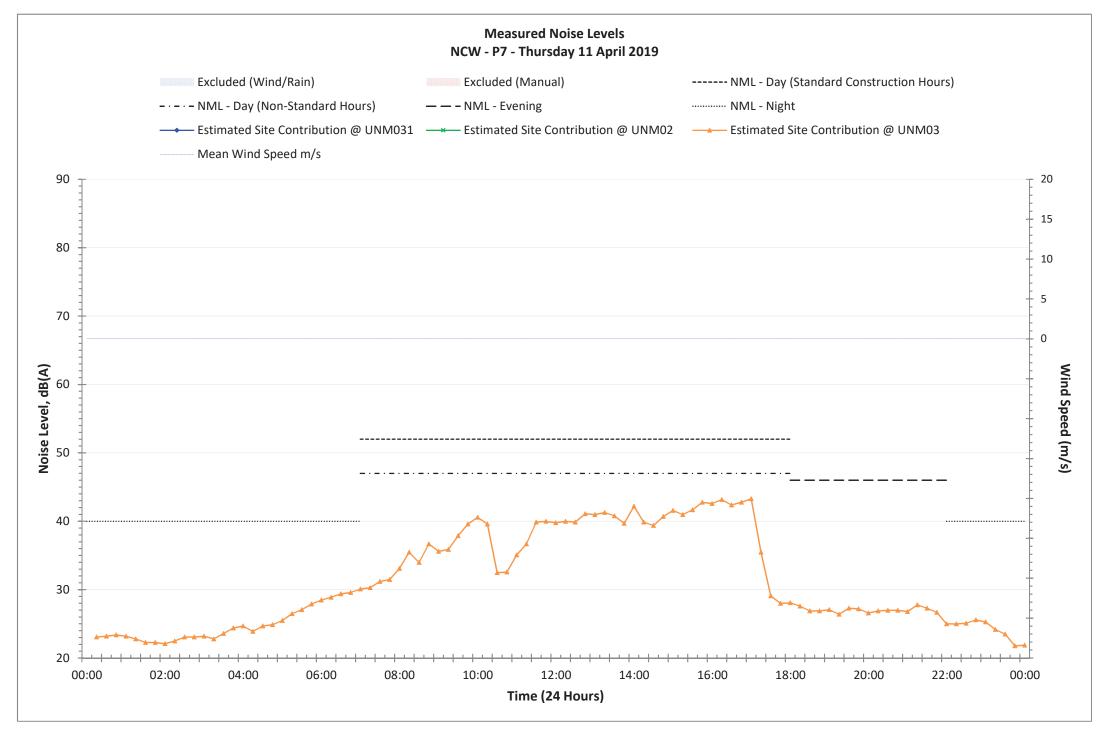


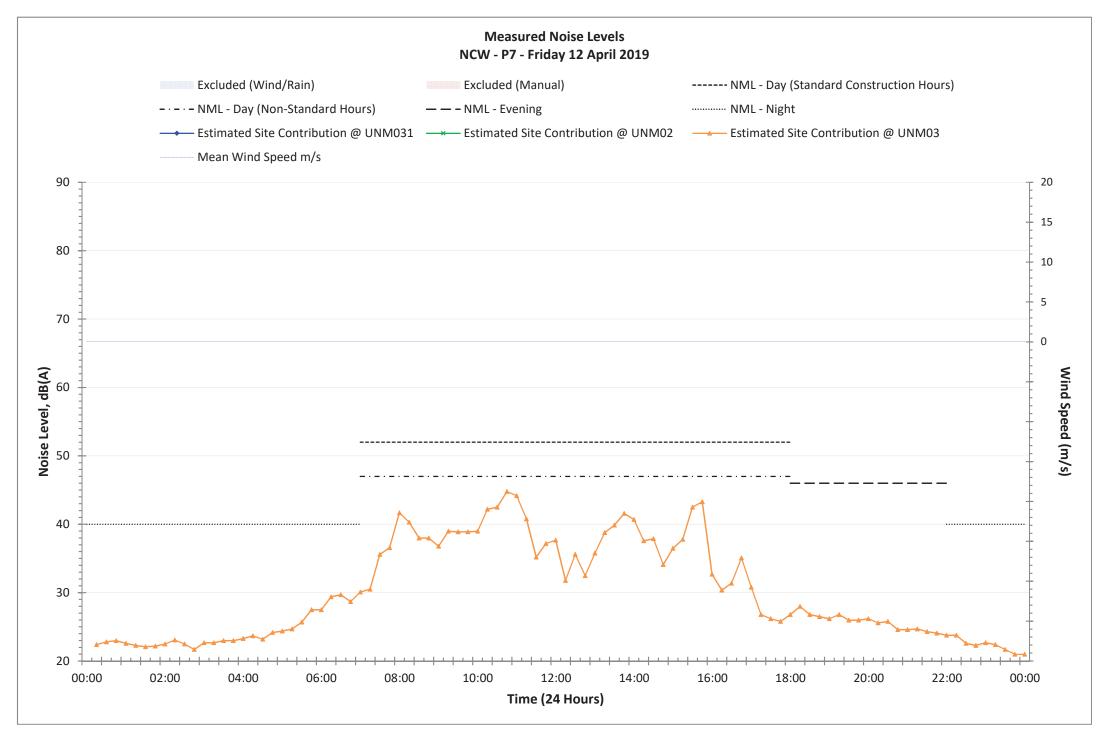


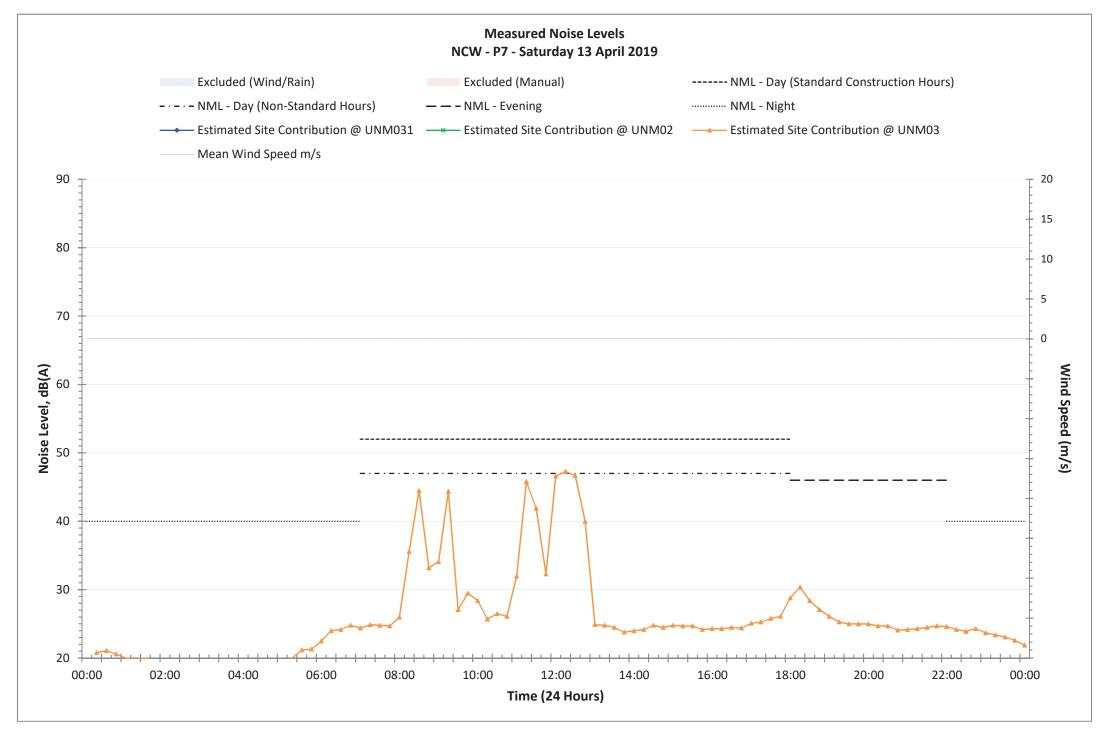


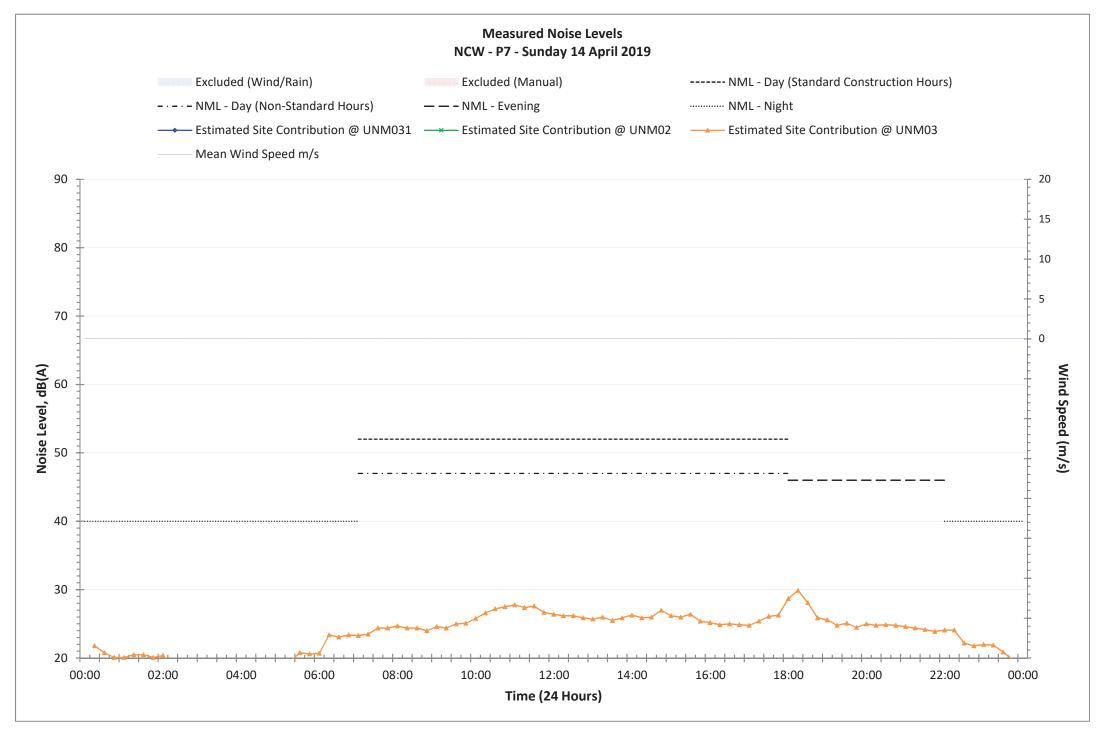


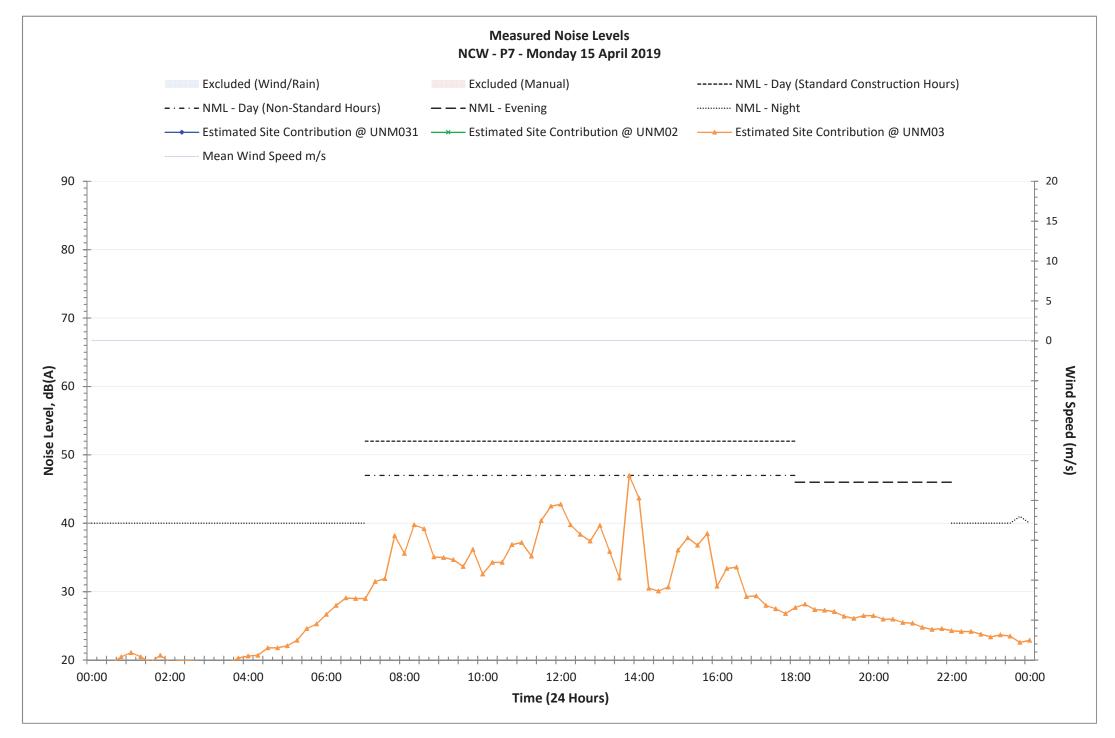


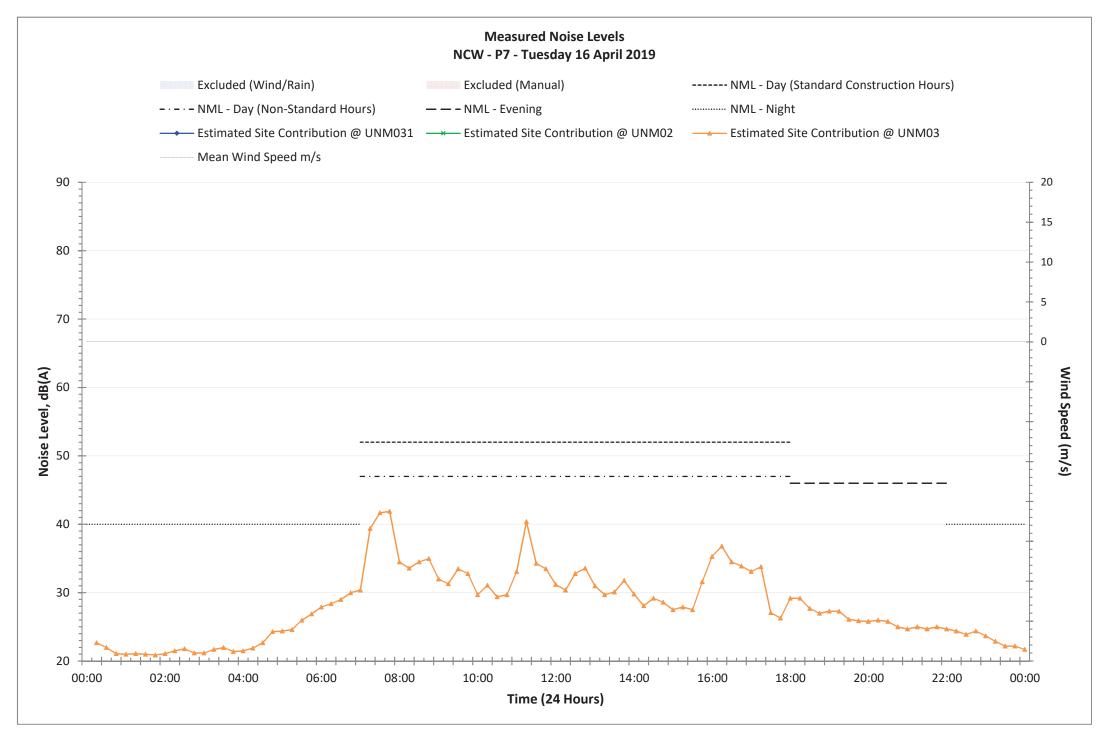


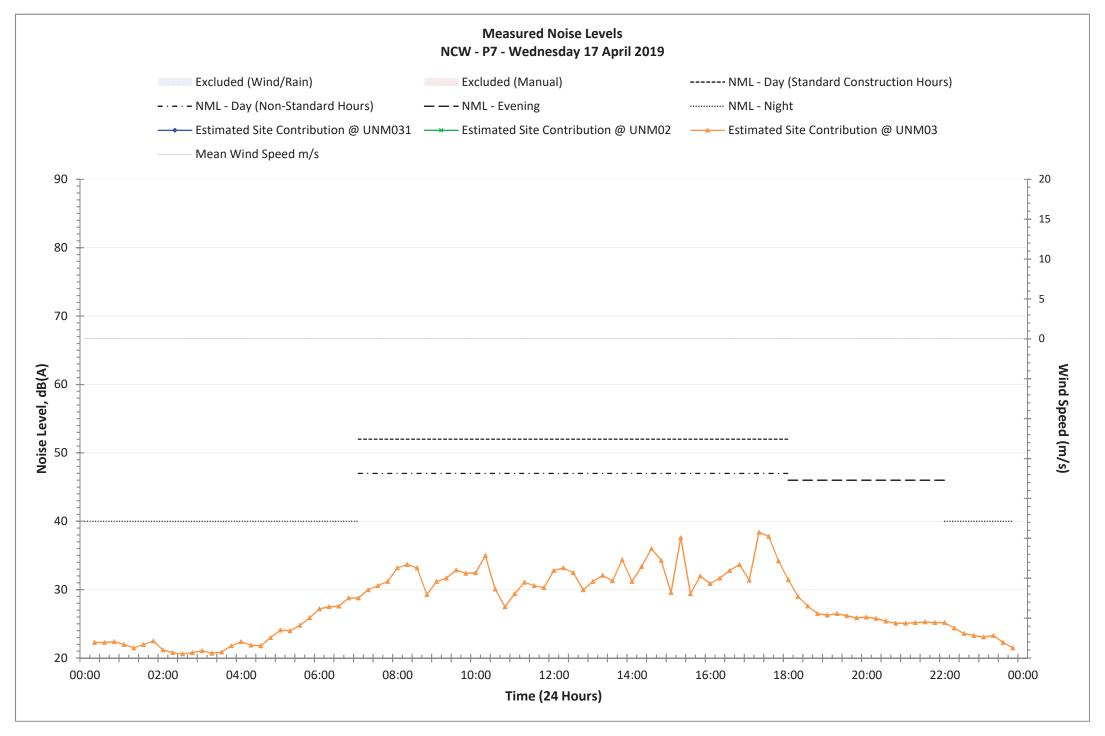


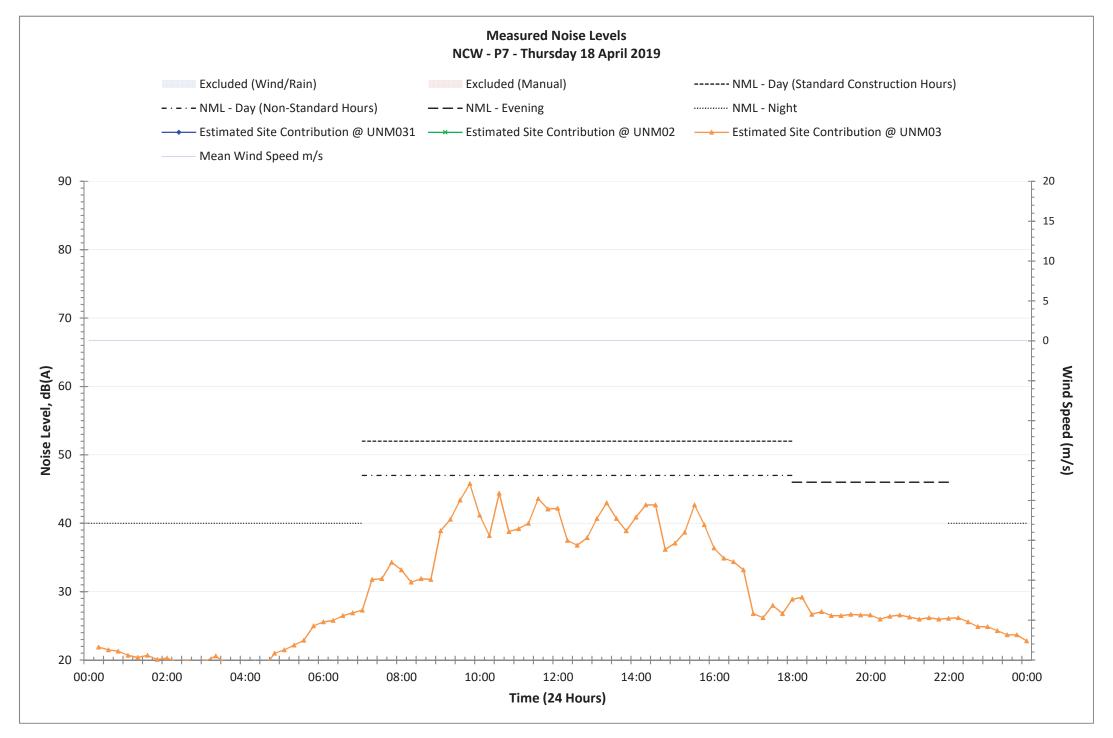


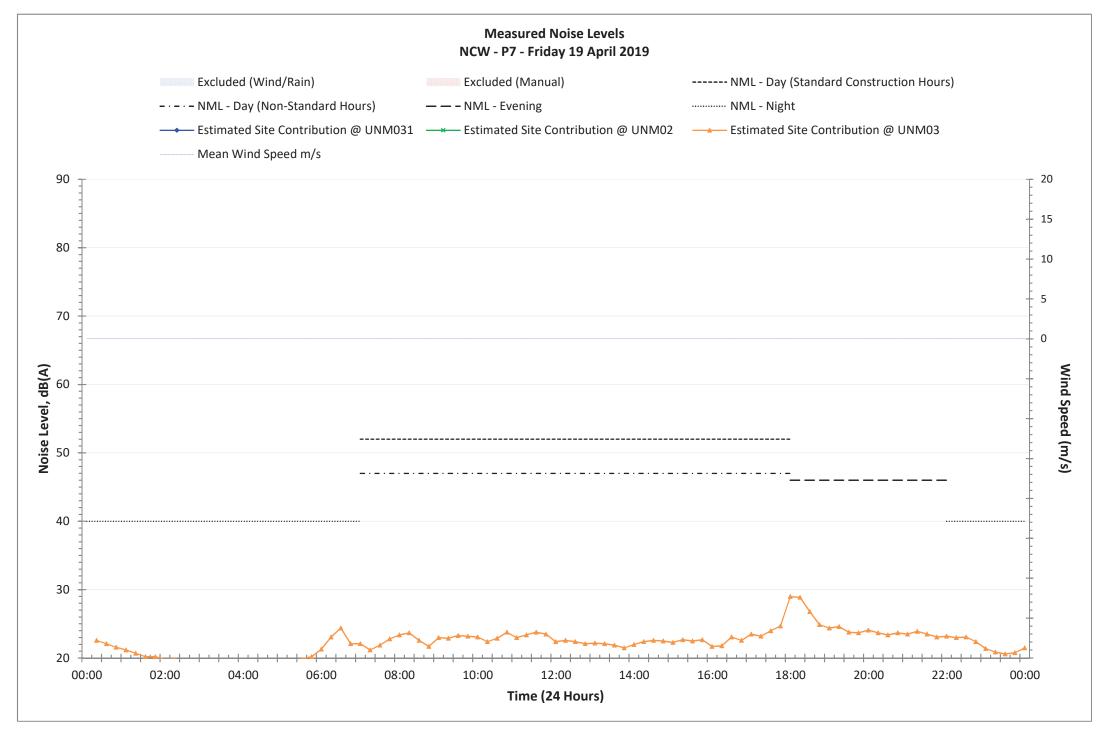


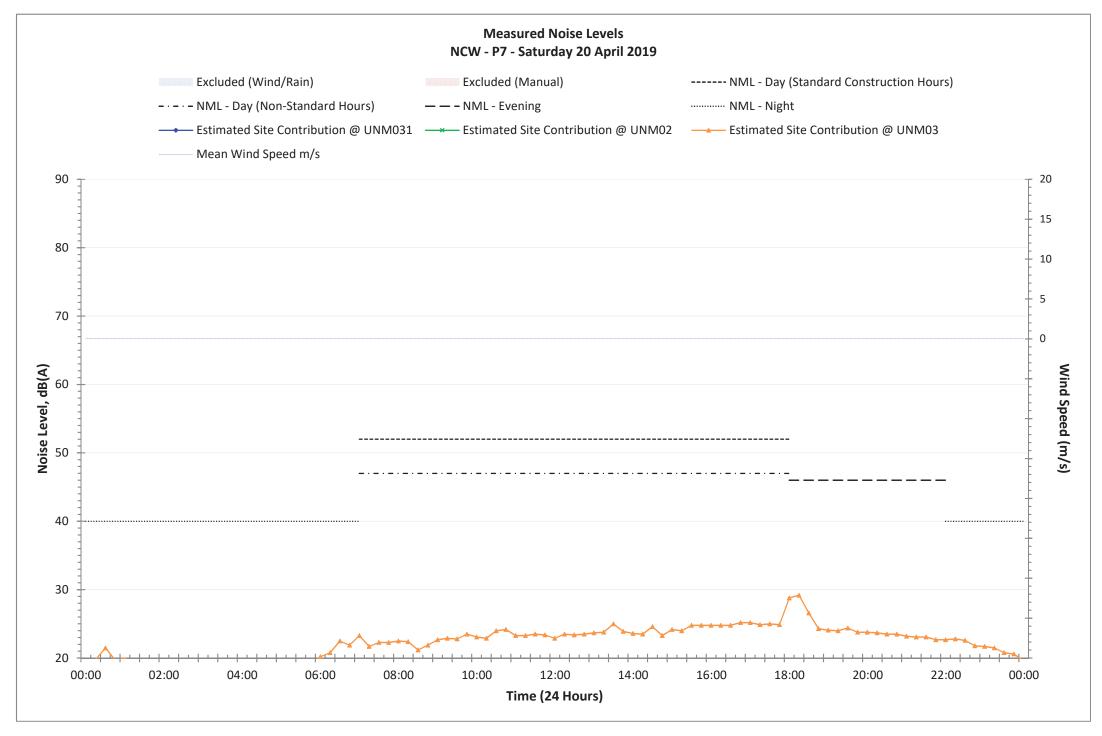


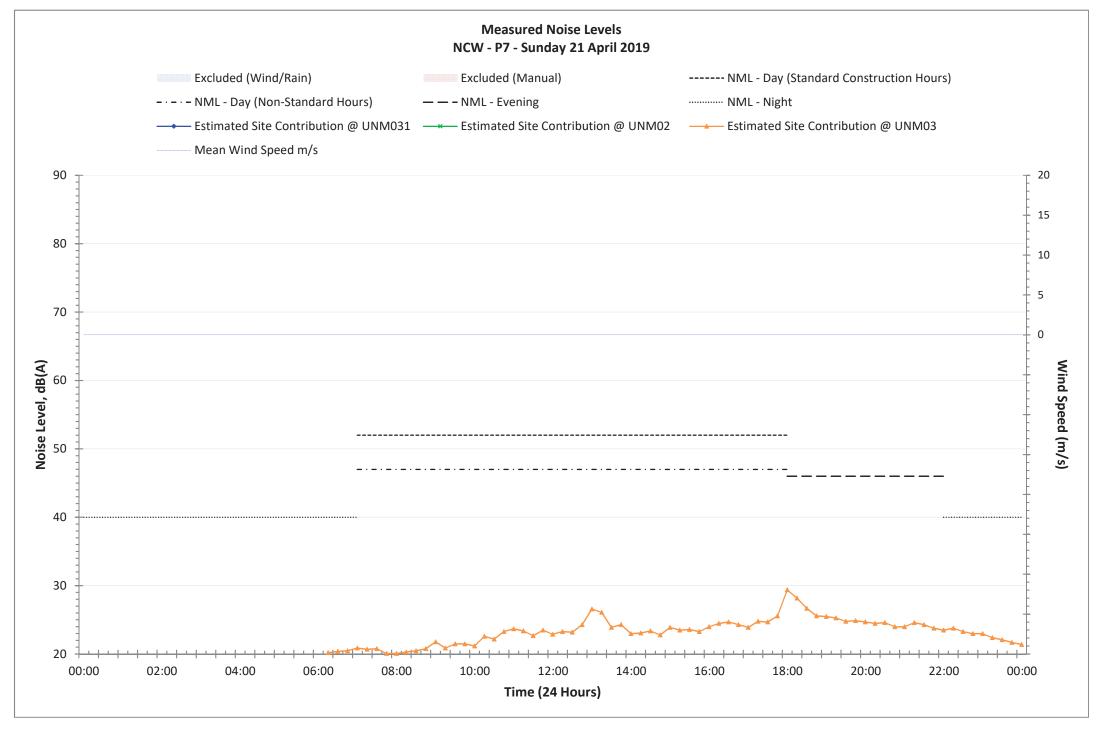


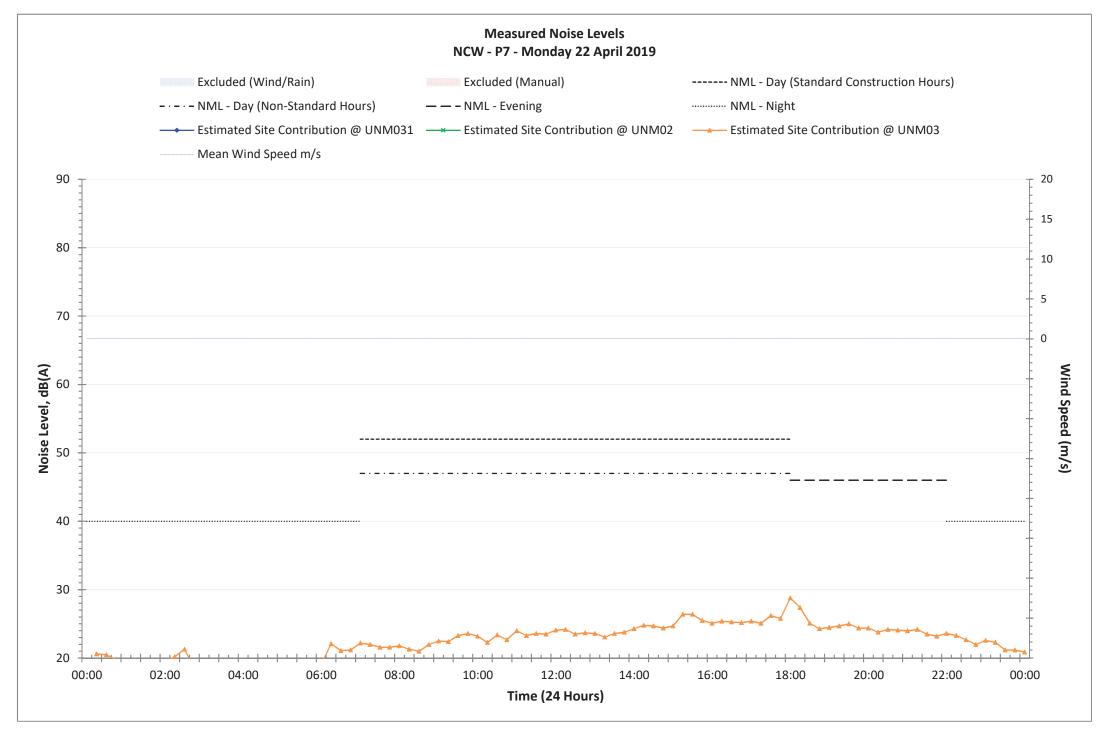


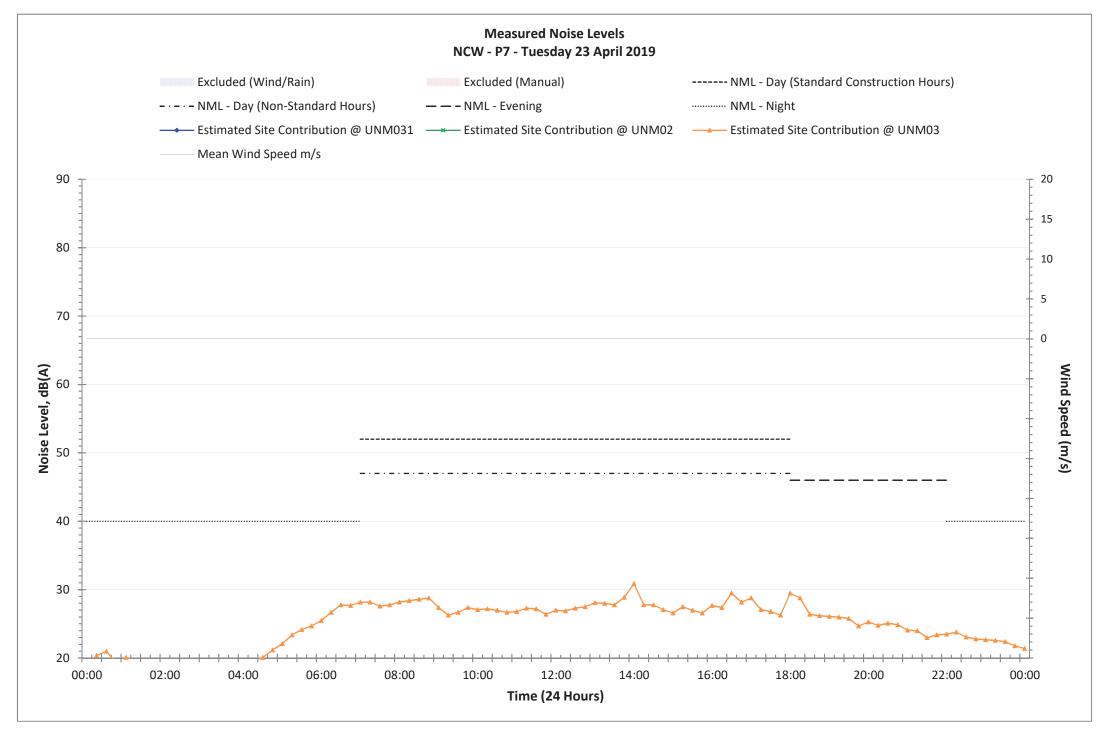


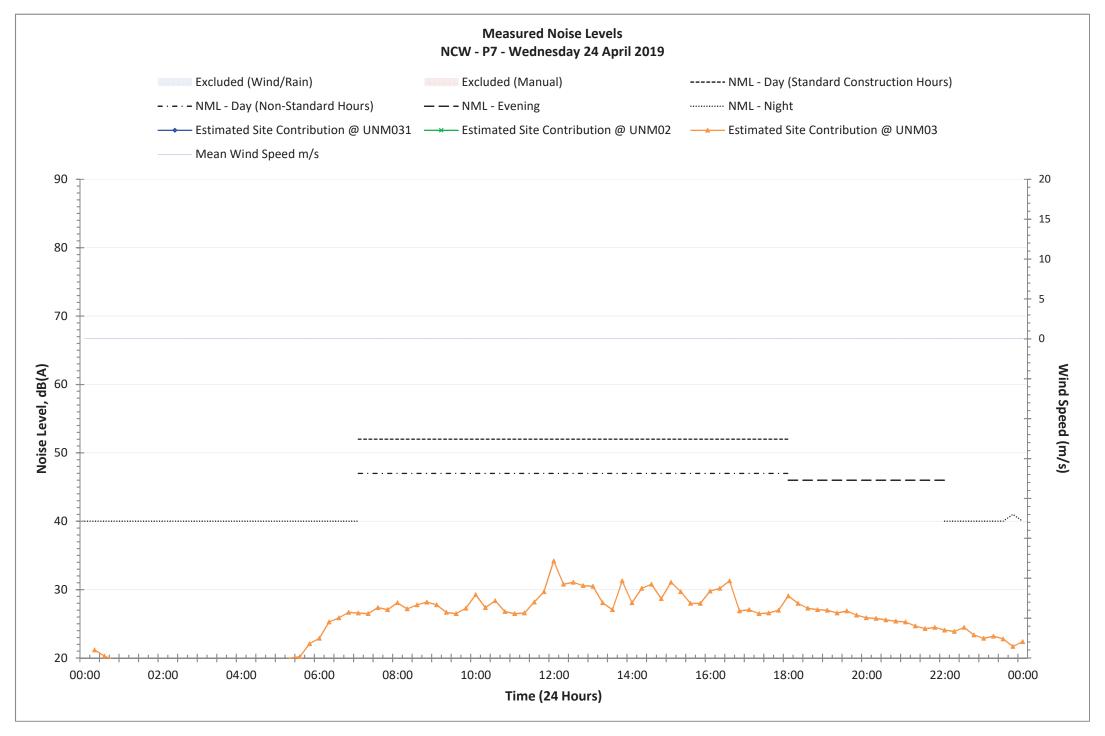


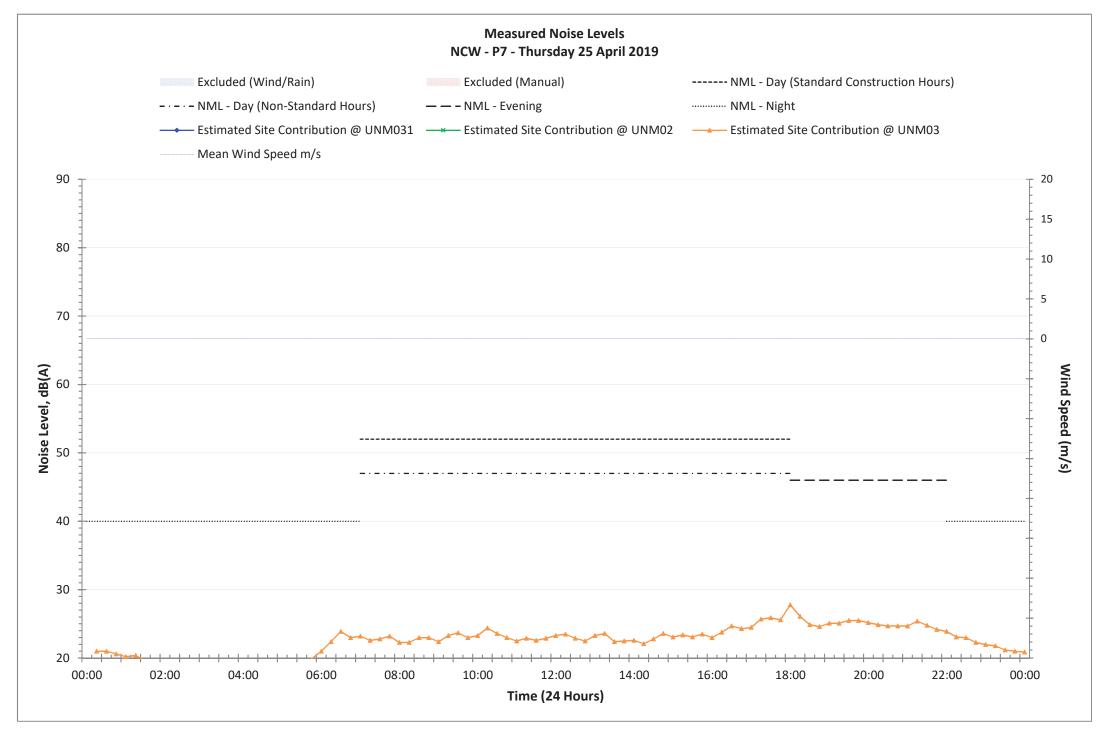


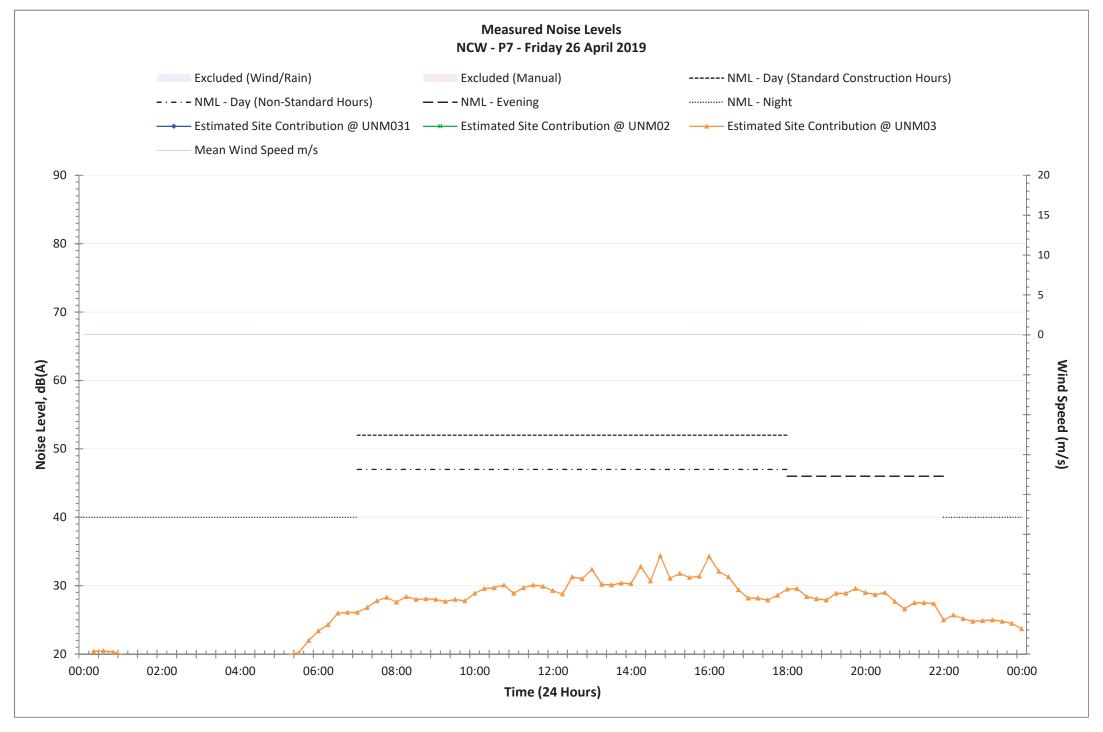


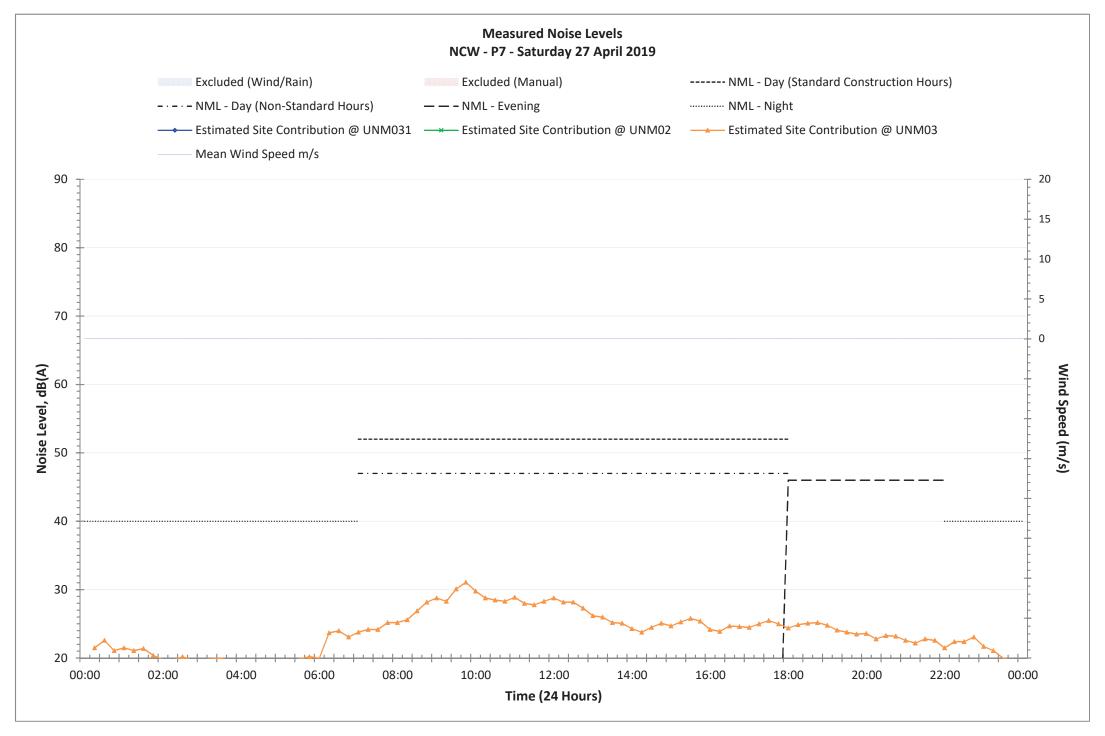


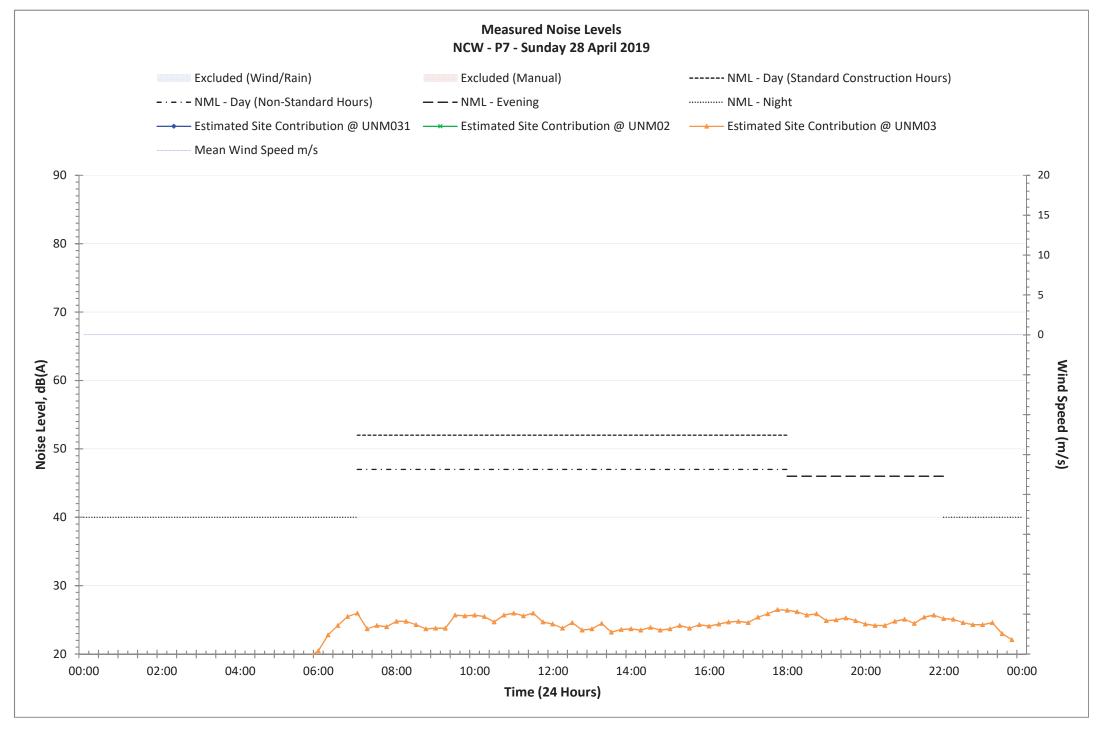


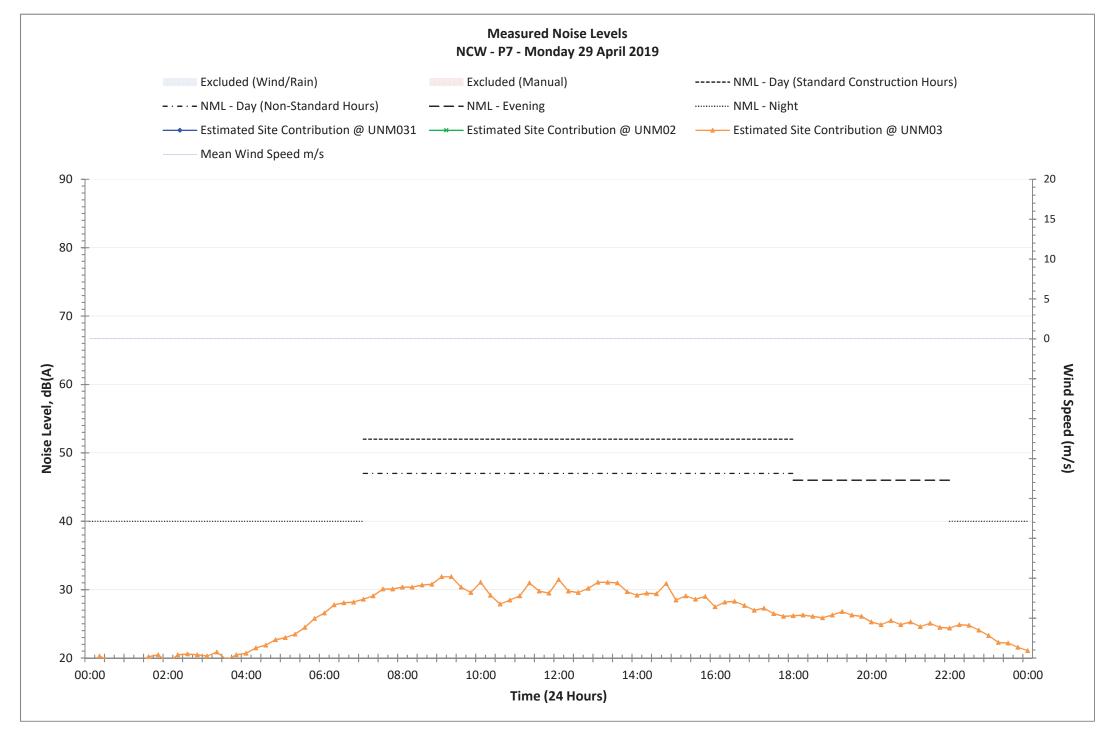


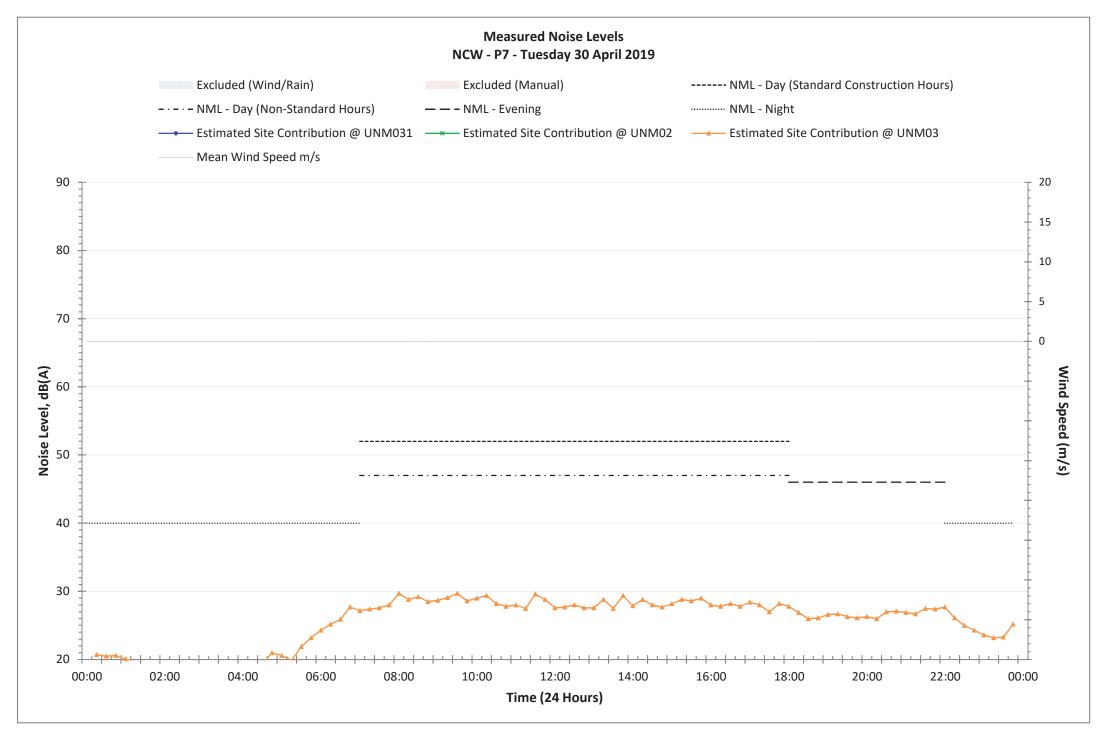












Technical Report

Sydney Metro City and Southwest – North Corridor Works Summary Report – NCW Noise and Vibration Monitoring – November 2018 – April 2019

Appendix F – Complete 2018 Vibration Data Set

Start

Monitoring Location

End

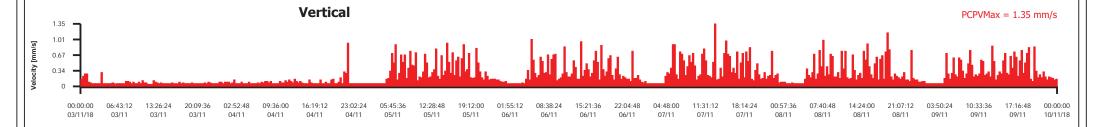
NCW MW18

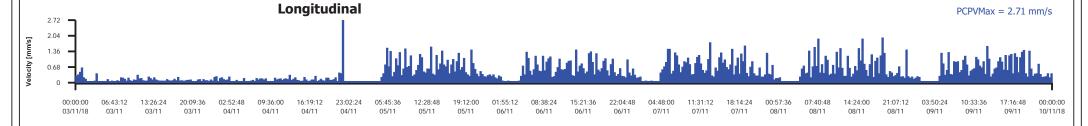
Rail Corridor

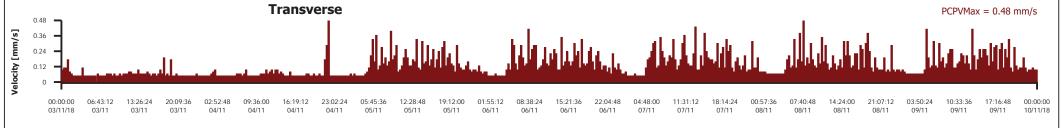
3/11/2018 10/11/2018 UVM01

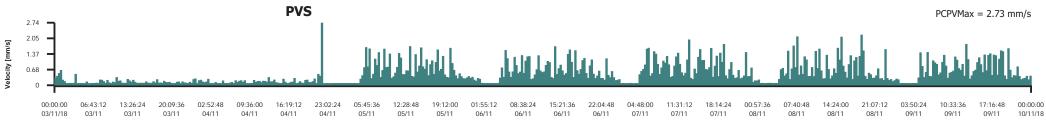
Monitoring Results

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 2.71 mm/s 1.49 mm/s 1.41 mm/s 1.18 mm/s 0.94 mm/s











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17/11/18

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17/11

17/11

18/11

18/11

18/11

18/11

Start

Monitoring Location

End

NCW WE20

Rail Corridor

17/11/2018 2:00:00 PM 18/11/2018 7:00:00 PM UVM01

Monitoring Results

18/11

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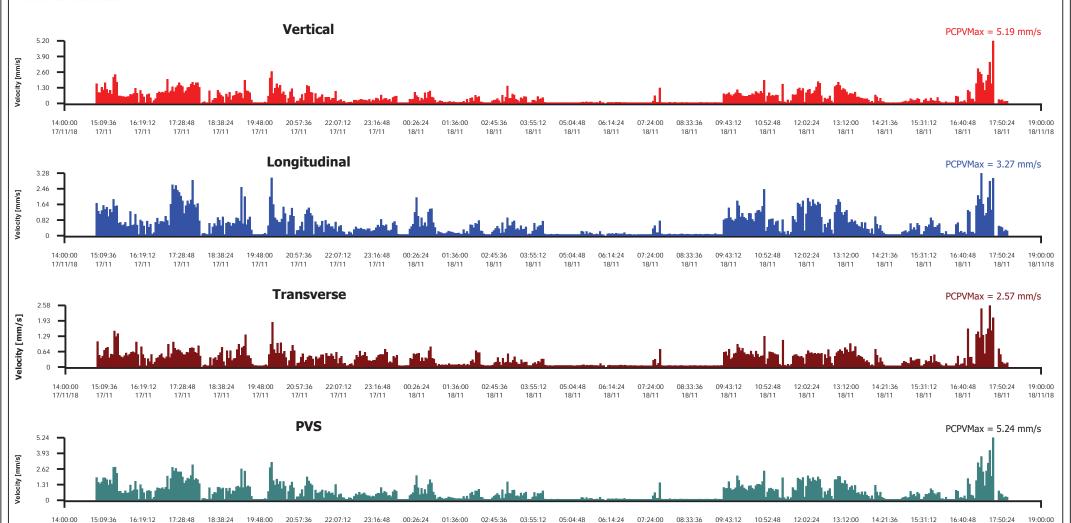
18/11

18/11

18/11

18/11/18

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 5.19 mm/s 3.43 mm/s 3.03 mm/s 2.65 mm/s 2.43 mm/s



18/11

18/11

18/11

18/11

18/11

18/11

18/11

18/11

Start

Monitoring Location

End

NCW WE20

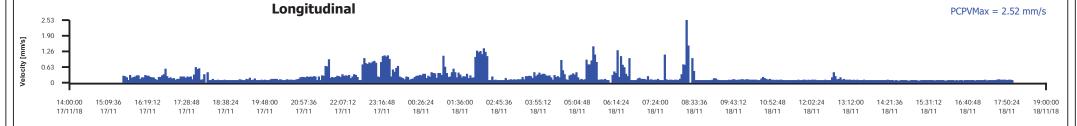
Rail Corridor

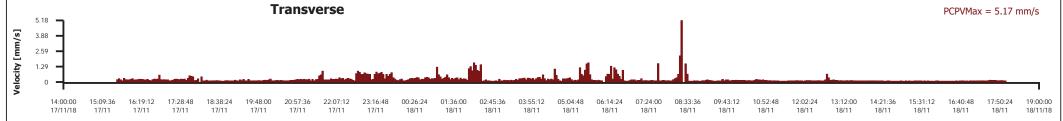
17/11/2018 2:00:00 PM 18/11/2018 7:00:00 PM UVM02

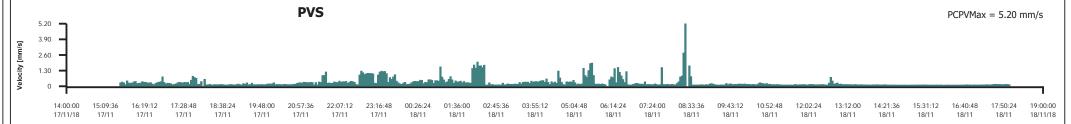
Monitoring Results

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 5.17 mm/s 3.71 mm/s 2.35 mm/s 1.56 mm/s 1.30 mm/s











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Start

Monitoring Location

End

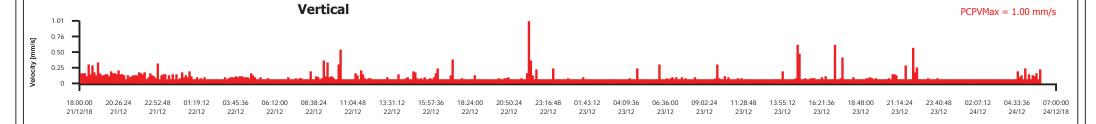
NCW WE25

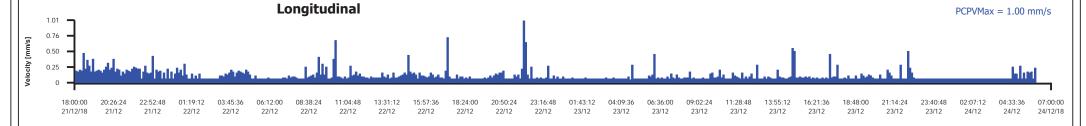
Rail Corridor

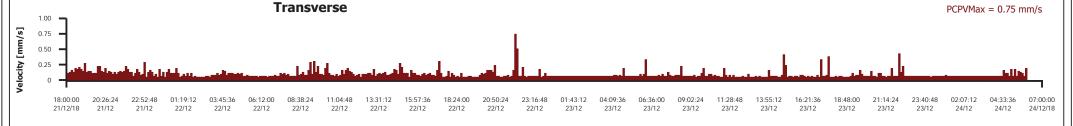
21/12/2018 6:00:00 PM 24/12/2018 7:00:00 AM UVM01

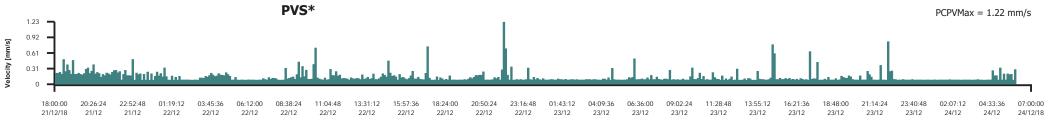


PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 1.00 mm/s 0.73 mm/s 0.62 mm/s 0.41 mm/s 0.27 mm/s











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Start

Monitoring Location

End

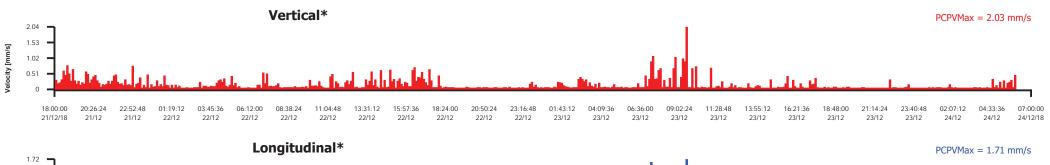
NCW WE25

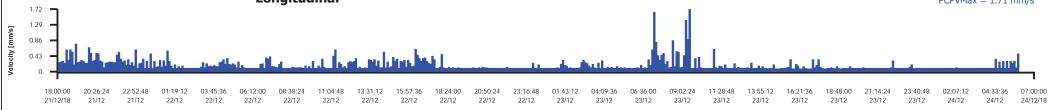
Rail Corridor

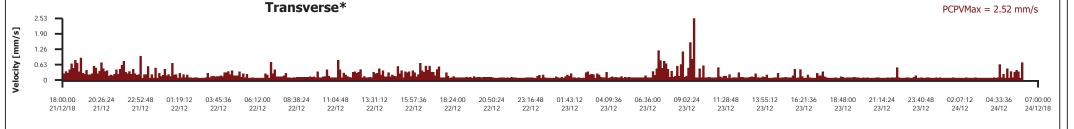
21/12/2018 6:00:00 PM 24/12/2018 7:00:00 AM UVM02

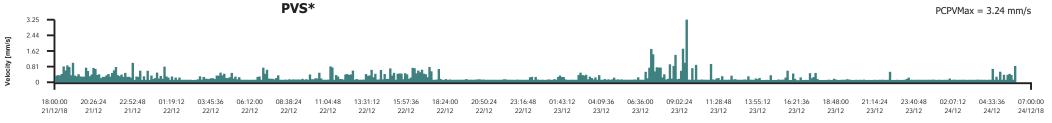
Monitoring Results

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 2.52 mm/s 1.16 mm/s 0.91 mm/s 0.73 mm/s 0.62 mm/s











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23/02

23/02/19

23/02

23/02

Velocity [mm/s]

Start

Monitoring Location

23/02

23/02

23/02

23/02

End

NCW MW34

Rail Corridor

23/02/2019 25/02/2019 UVM01

23/02

23/02

23/02

23/02

Monitoring Results

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 5.46 mm/s 4.19 mm/s 3.68 mm/s 3.02 mm/s

1.92 mm/s



24/02

24/02

24/02

24/02

24/02

24/02

24/02

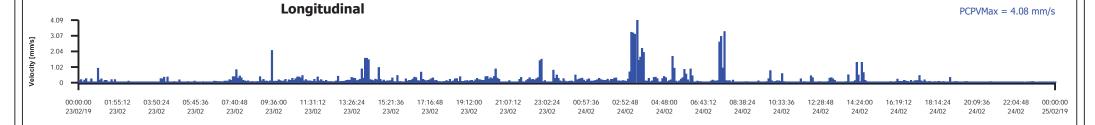
24/02

24/02

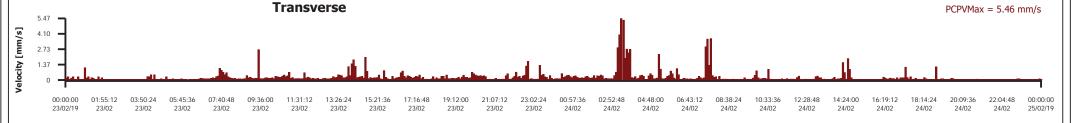
24/02

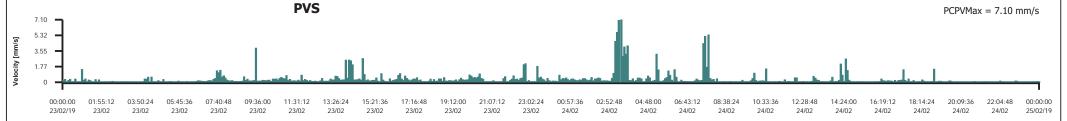
24/02

24/02



23/02







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0.61

0.30

00:00:00

23/03/19

00:57:36 01:55:12

Velocity [mm/s]

Start

03:50:24

04:48:00 05:45:36

Monitoring Location

End

NCW WE38

Rail Corridor

23/03/2019 24/03/2019 UVM01

06:43:12 07:40:48 08:38:24 09:36:00

Monitoring Results

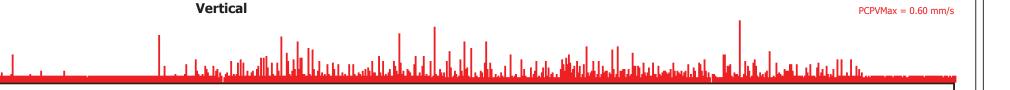
PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%)

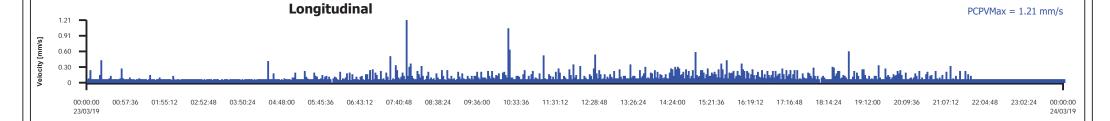
11:31:12 12:28:48 13:26:24 14:24:00 15:21:36 16:19:12 17:16:48 18:14:24 19:12:00 20:09:36

1.21 mm/s 1.05 mm/s 0.64 mm/s 0.51 mm/s 0.36 mm/s

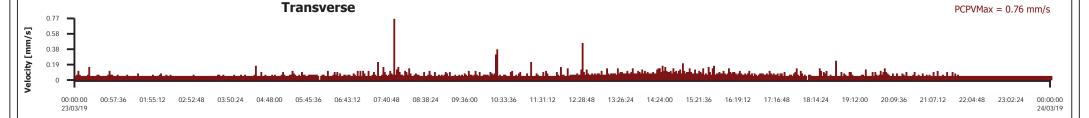
24/03/19

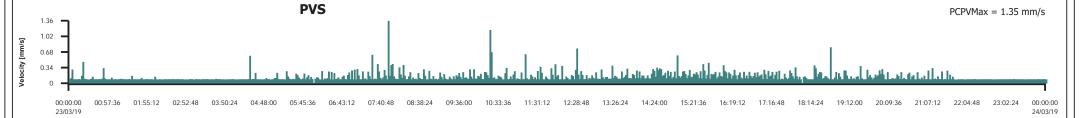
21:07:12 22:04:48 23:02:24





10:33:36







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Start

Monitoring Location

End

NCW WE38

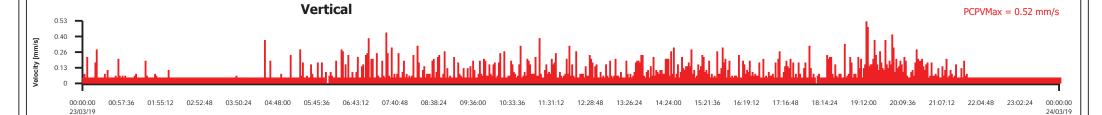
Rail Corridor

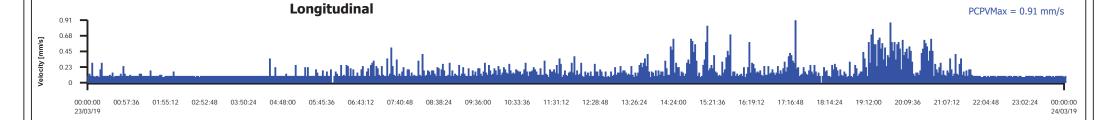
23/03/2019 24/03/2019 UVM02

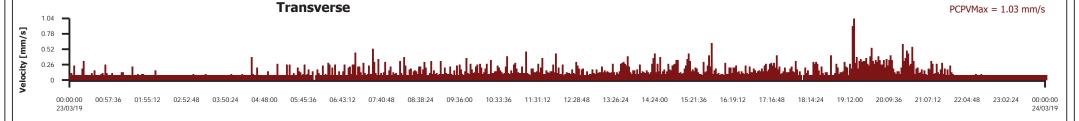
Monitoring Results

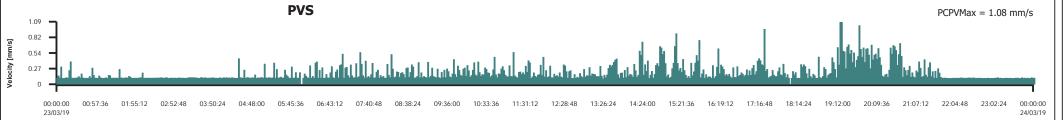
PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 1.03 mm/s 0.91 mm/s 0.91 mm/s 0.64 mm/s

0.60 mm/s











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Start

Monitoring Location

End

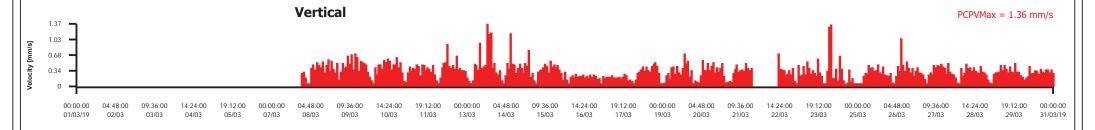
Unattended Vibration Monitoring

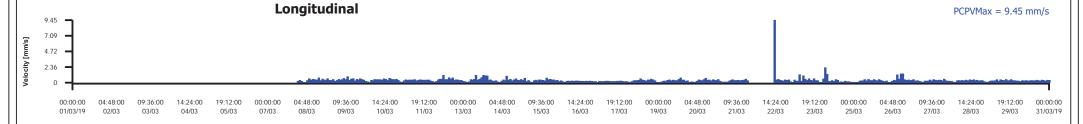
NCW - March 2019

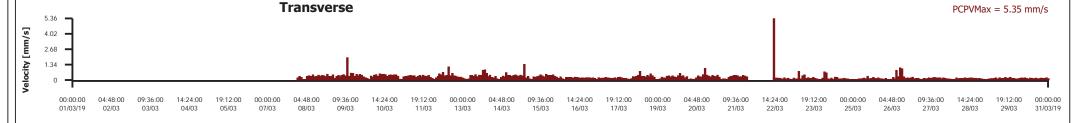
1/03/2019 31/03/2019 UVM01

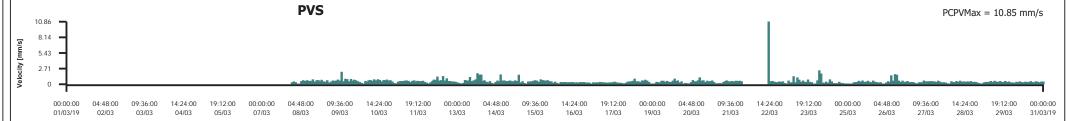
Monitoring Results

PPVmax PPVmax (99.9%) PPVmax (99.8%) PPVmax (99.5%) PPVmax (99.0%) 9.45 mm/s 1.00 mm/s 0.65 mm/s 0.49 mm/s 0.41 mm/s











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Unattended Vibration Monitoring

NCW - April 2019

Start End Monitoring Location 1/04/2019 30/04/2019 UVM01

Monitoring Results

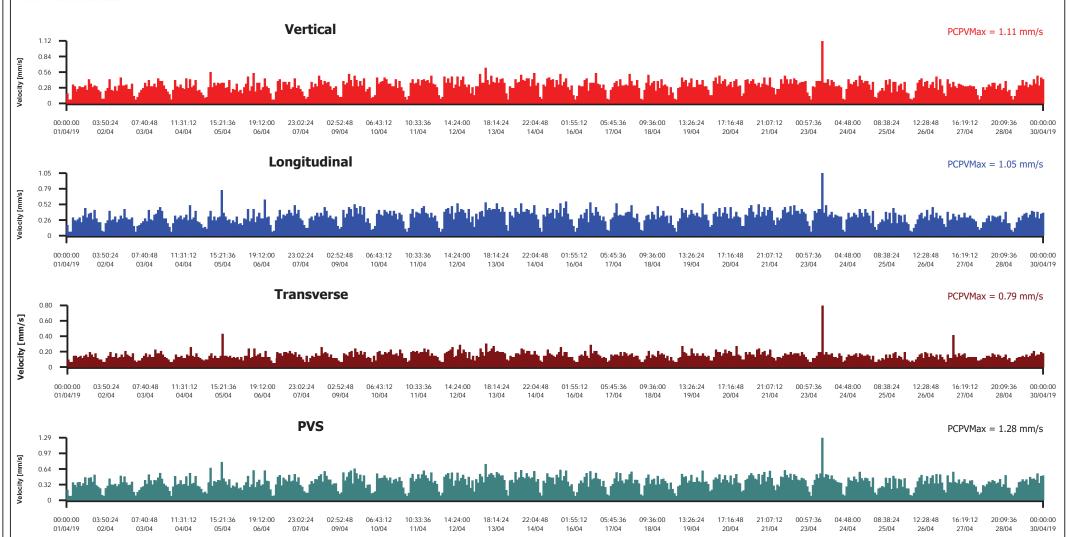
 PPVmax
 1.11 mm/s

 PPVmax (99.9%)
 0.49 mm/s

 PPVmax (99.8%)
 0.44 mm/s

 PPVmax (99.5%)
 0.40 mm/s

 PPVmax (99.0%)
 0.35 mm/s





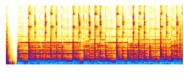
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ENDORSEMENT CITY & SOUTHWEST ACOUSTIC ADVISOR

Review of	Laing O'Rourke North Corridor Works Noise and Vibration Monitoring Report November 2018 – April 2019	Document reference:	LOR-NCW-Noise and Vibration Monitoring-Nov18- Apr19 Summary Report.V0.2
Prepared by:	Larry Clark, Alternate Acoustic Advisor		Dated 10 July 2020
Date of issue:	24 July 2020		

As approved Alternate Acoustics Advisor for the Sydney Metro City & Southwest project, I have reviewed and provided comment on the Noise and Vibration Monitoring Report November 2018 – April 2019 for the North Corridor Works (NCW), as required under A27 (d) of the project approval conditions.

I previously reviewed and commented on Version 1 of the Report. Version 2 has been updated to satisfactorily address my comments.

The NCW Noise and Vibration Monitoring Report is to be submitted to the Department of Planning and Environment in accordance with Condition of Approval C16 and the LOR Construction Noise and Vibration Monitoring Plan (CNVMP).

I have reviewed the monitoring report and am satisfied that it meets the requirements for construction noise and vibration monitoring for NCW, as outlined in the NCW CNVMP. I endorse the report.

Larry Clark, City & Southwest Alternate Acoustics Advisor