Sydney Metro City and Southwest – North Corridor Works

Summary Report – NCW Noise and Vibration Monitoring – October 2019 – May 2020

Project

Title	NCW Noise and Vibration Monitoring - Summary Report - October 2019 to May 2020
Client	Sydney Metro City and Southwest
Document Reference No.	LOR-NCW-Noise and Vibration Monitoring-Oct19-May20 Summary Report V0.2
Laing O'Rourke Project No.	K38

Document

Date	29 July 2020
Monitoring Period	October 2019 to May 2020
Prepared by:	Angel Sanz, Thomas Buchan
Reviewed by:	Danyil Skora

Revisions

Date	Version	Description
12/06/2020	V0.1	LOR-NCW-Noise and Vibration Monitoring-Nov19-May20 Summary Report
29/07/2020	V0.2	Address Sydney Metro commens and reissue

1. Overview

Main North and North Shore Corridor Works Project (MNNSCW): Portion 7 - Northern Corridor Works (NCW) was carried out by Laing O'Rourke Australia Construction Pty Ltd (LOR) on behalf of Sydney Metro. LOR engaged Environmental Resources Management Australia Pty Ltd (ERM) to undertake environmental noise and vibration monitoring during select works.

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

This technical report was prepared to summarise the results and findings of operator attended noise and vibration monitoring as well as unattended noise and vibration monitoring completed from October 2019 to May 2020 inclusive.

The noise and vibration monitoring was conducted throughout various track possession works as described in the approved Out-of-Hours Work (OOHW) application forms (OOHWAF), application numbers 31 to 39 prepared by LOR (i.e. OOHWAF031-039). LOR identified the potential for these works to generate noise and 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 aim of this summary report is to provide an overview of recent monitoring activities, information on the outcomes, and any further recommendations to reduce noise and vibration-related impacts. The structure of this report is as follows:

- Section 1 (this section): brief overview of the 2019-2020 monitoring period and report objectives.
- Section 2: summary of the monitoring conducted and technical discussion.
- Section 3: summary of typical monitoring outcomes and recommendations.
- Section 4: conclusion.
- Appendix A: noise and vibration monitoring methodology.

This report is supported by the *LOR-NCW-Noise and Vibration Monitoring-Oct19-May20 Addendum*, which contains monitoring location maps, recorded data sets and supporting graphs of noise and vibration monitoring conducted for each monitoring period.

2. Monitoring Summary (2019-2020)

Table 2.1 presents a summary of the noise and vibration monitoring activities, both attended and unattended, for the period inclusive of October 2019 to May 2020. The full noise and vibration data sets are provided in the *LOR-NCW-Noise and Vibration Monitoring-Oct19-May20 Addendum*.

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
04.10.19 (RP40 – Hopetoun Avenue works, refer to Appendix A of the	RP40 – Hopetoun venue works,included plant and equipment generally observed on site during monitoring:received regardir during the monitor	No complaints were received regarding noise during the monitoring period.	Attended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the Hopetoun Avenue works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead.	
addendum document)		ChainsHand toolsLight vehicles	ıck +		Measured site noise level contributions (Leq, 15 minutes) were between 67 - 80 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the Hopetoun Avenue works were 23 dBA above the Noise Management Level (NML).
					No unattended noise monitoring was undertaken during this period.

Table 2.1 – Noise and Vibration Monitoring Events Summary

3/8

Date (Report - Approvals Possession Ref.) Documentatio	Summary of Works	Complaints	Monitoring Type	Discussion
11.11.19 to OOHWAF-031 15.11.19 (RP42 – MW19, refer to Appendix B of the addendum document)	 MW19 works included: Signalling and Commissioning Construction Works Overhead Wiring preparation works for Temporary Down Slew (TDS) Installation and removal of OHW Structures Delivery of materials Down GST Installation Material Movement 	Complaints were received relating to demobilisation of plant and equipment through the site access point at Drake Street. Noise measurements were undertaken at Drake Street (measurement location A02) throughout the MW19 works to confirm site related noise levels	Attended and Unattended Noise	 During attended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW19 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead. Measured site noise level contributions (Leq, 15 minutes) were between 48 - 73 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the MW19 works were 24 dBA above the NML. Comparison of site noise levels to the predicted values presented in OOHWAF-031 indicate that on average, actual emissions associated with MW19 works were 2 dBA above the predicted values. Exceedances in predicted values. Exceedances in predicted values onted when several vehicles arrived and were poorly managed at the Drake Street site entrance. LOR was informed of the exceedance and the site manager co-ordinated site vehicle movements to prevent further exceedances. All relevant AMMs were in place during this activity (notification, noise monitoring and respite/alternative accommodation, where required). The exceedances did not result in the application of additional AMMs. During unattended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW19 works was generally dominated by non-project related road traffic on public roads and other non-project missions including: those generated by residences near the measurement position non-project related rail traffic (outside of track the possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead

Date (Report - A) Possession Ref.) De	pprovals ocumentation	Summary of Works	Complaints	Monitoring Type	Discussion
16.11.19 to Or 17.11.19 (RP43a – WE20, refer to Appendix C of the addendum document)	OHWAF-031	 WE20 works included: Signalling and Commissioning Construction works Steelwork modifications- installation and removal of OHW structures Construction of Skeleton Track Guard Rail Installation 11+159 Footing Construction and OHW Steel installation and removal Temporary Cess Drains Down on GST installation Installation of Tuning Units and Surface Run Conduits Demobilisation of plant at Drake Street Stockpile Management at Lower Brand Street 		Attended and Unattended Noise	 During attended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE20 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead. Measured site noise level contributions (Leq. 15 minutes) were between 46 and 70 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the WE20 works were 17 dBA above the NML. Comparison of site noise levels to the predicted values presented in OOHWAF-031 indicated that on average, actual emissions associated with WE20 works were 2 dBA below the predicted values. During unattended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE20 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including: those generated by residences near the measurement position non-project related rail traffic (outside of track possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead Noise at UNM01, UNM02, UNM03, UNM04, UNM05 and UNM06 was dominated by project noise level contributions were generally above the NML's at all unattended devices, which is expected for the type of activities being undertaken.

LAING O'ROURK

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
16.11.19 to 17.11.19 (RP43b – WE20, refer to Appendix D of the addendum document)	OOHWAF-031	 WE20 works included: Signalling and Commissioning Construction works Steelwork modifications- installation and removal of OHW structures Construction of Skeleton Track Guard Rail Installation 11+159 Footing Construction and OHW Steel installation and removal Temporary Cess Drains Down on GST installation Installation of Tuning Units and Surface Run Conduits Demobilisation of plant at Drake Street Stockpile Management at Lower Brand Street 		Unattended Vibration	Vibration generated by WE20 works was at times perceptible at UVM01. 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 WE20 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 WE20, the highest measured vibration levels (0.9 mm/s) and associated characteristic frequencies (<1Hz) are below and compliant with the applicable BS7385 vibration guideline values, as identified in the CNVMP.



6/8

Date (Report -ApprovalsPossession Ref.)Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
27.01.20 to 28.01.20 (RP44 – MW30, refer to Appendix E of the addendum document)	 MW30 works included: Signalling and Commissioning Construction works Standby OHW Crew Rail Movements Construction of Skeleton Track St Leonards Sliding Ballast Movements Movement of Sleepers Hampden Road Stockpile Management Installation of Tuning Units and Surface Run Conduits Construction of GST Hill Street material movement Grouting of 225 Drainage Line Removal of footing 10+765 Demobilisation of plan at Drake Street Installation of ballast mats 	J	Attended and Unattended Noise	 During attended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW30 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead. Measured site noise level contributions (Leq. 15 minutes) were between 23 - 73 dBA over the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the MW30 works were 20 dBA above the NML. Comparison of site noise levels to the predicted values presented in OOHWAF-033 indicated that on average, actual emissions associated with MW30 works were 2 dBA below the predicted values in OOHWAF-033. During unattended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW30 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including: those generated by residences near the measurement position non-project related rail traffic (outside of track the possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML's at UNM01, which is expected for the type of activities being undertaken. Estimated site noise level contributions were below the NML's at UNM02, with the exception of the two highest values recorded at UNM02.

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
03.02.20 to 07.02.20 (RP45 – MW31, refer to Appendix F of the addendum	OOHWAF-034	MW31 works included: • OHW Slew Preparation • Track construction to support track slew • Hampden road			During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW31 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead.
document)		 Maniputer rotat material movement Possession prep works at various locations Construction of tuning 	Noise measurements were undertaken at select locations throughout MW31 works to confirm site related noise emissions and characteristics.		Measured site noise level contributions (Leq, 15 minutes) were between 30 - 66 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the MW31 works were 18 dBA above the NML.
		unitsConstruction of GST along down cess			Comparison of site noise levels to the predicted values presented in OOHWAF- 034 indicated that on average, actual emissions associated with MW31 works were 5 dBA below the predicted values in OOHWAF-034.
					During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW31 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including:
					 those generated by residences near the measurement position non-project related rail traffic (outside of track possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead
					Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at UNM01 and UNM02, which is expected for the type of activities being undertaken.

8/8

Date (Report - Approvals Possession Ref.) Documentati	Summary of Works	Complaints	Monitoring Type	Discussion
08.02.20 to 09.02.20 (RP46 – WE32, refer to Appendix G of the addendum document)	 WE32 works included: Signalling and Commissioning Construction works Overhead wiring - temporary down shore slew Track slew on TDS Ballast drop and tamping Track Adjustments St Leonards sliding ballast movements Stockpile management (Lower Brand St) Construction of tuning units Hill Street plant movement Demobilisation of plar at Drake Street 		Attended and Unattended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE32 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead. Measured site noise level contributions (Leq, 15 minutes) were between 44 - 72 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the W32 works were 22 dBA above the NML . Comparison of site noise levels to the predicted values presented in OOHWAF-034 indicated that on average, actual emissions associated with W32 works were 2 dBA below the predicted values in OOHWAF-034. During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE32 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including: • those generated by residences near the measurement position • non-project related rail traffic (outside of track possession hours) • animals (birds and insects, domestic animals) • wind-blown vegetation and aircraft passing overhead Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at UNM01 and UNM02, which is expected for the type of activities being undertaken.

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
10.02.20 to 14.02.20 (RP47 – MW32, refer to Appendix H of the	OOHWAF-034	MW32 works included: • Track Adjustments	Complaints were received in relation to the operation of construction plant and equipment within the rail corridor during the MW32 monitoring period.	Attended and Unattended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW32 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead.
addendum document)			Noise measurements were undertaken at select locations throughout MW32 works to confirm site related noise emissions and characteristics.		Measured site noise level contributions (Leq, 15 minutes) were between 27 - 67 dBA over the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the MW32 works were 17 dBA above the NML .
					Comparison of site noise levels to the predicted values presented in OOHWAF- 034 indicated that on average, actual emissions associated with MW32 works were 6 dBA below the predicted values in OOHWAF-034.
					During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW32 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including:
					 those generated by residences near the measurement position non-project related rail traffic (outside of track the possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead
					Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at UNM01 and UNM02, which is expected for the type of activities being undertaken.

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
02.03.20 to 06.03.20 (RP48 – MW35, refer to Appendix I of the addendum	OOHWAF-036	 MW35 works included: (OOHWAF-036) Possession Preparation Works Track Adjustments 	Complaints were received in relation to the operation of construction plant and equipment within the rail corridor during the MW35 monitoring period.	Attended and Unattended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW35 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead.
document)			Noise measurements were undertaken at select locations throughout MW35 works to confirm site related noise emissions and characteristics.		Measured site noise level contributions (Leq, 15 minutes) were between 30 - 61 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the MW35 works were 14 dBA above the NML .
					Comparison of site noise levels to the predicted values presented in OOHWAF-036 indicated that on average, actual emissions associated with MW35 works were 7 dBA below the predicted values in OOHWAF-036.
					During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW35 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including:
					 those generated by residences near the measurement position non-project related rail traffic (outside of track possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead
					Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at UNM01 and UNM02, which is expected for the type of activities being undertaken.

Date (Report - Approvals Possession Ref.) Documentatio	Summary of Works	Complaints	Monitoring Type	Discussion
07.03.20 to 08.03.20 (RP49 – WE36, refer to Appendix J of the addendum document)	 WE36 works included: Removal of Redundant OHW Structures, Earthing & bonding testing and Weight Adjustments Signal support, Signal Commissioning works and Compressed Air Removal Move and install concrete barriers along temp alignment Removal of OHWS Footings Temporary Cess Drain completion Brand Street material laydown area Combined service route works Demobilisation of plant Removal and installation of Timber Isolation Fencing Hill Street material delivery and transport to site 		Attended and Unattended Noise	 During attended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE36 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead. Measured site noise level contributions (Leq, 15 minutes) were between 48 - 68 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average site, noise level contributions for the WE36 works were 19 dBA above the NML. Comparison of site noise levels to the predicted values presented in OOHWAF-036 indicated that on average, actual emissions associated with WE36 works were 3 dBA below the predicted values in OOHWAF-036. During unattended noise monitoring, the existing noise environment (in the absence of site noise) at the majority of community locations near to the WE36 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including: those generated by residences near the measurement position non-project related rail traffic (outside of track possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML's at UNM01 and UNM02, which is expected for the type of activities being undertaken.



Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
27.03.20 to 29.04.20 (RP50a – Special Works, refer to Appendix K of the addendum document)	N/A – Works were completed during standard construction hours.	 Special Works included: Delivery of materials and equipment Excavation works Compaction works Laying new pavements (asphalt, concrete or unsealed pavements depending on the area) 	No complaints were received regarding noise during the Special Works monitoring period.	Attended and Unattended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the Special Works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects, and domestic animals), wind-blown vegetation, distant traffic and aircraft passing overhead. Measured site noise level contributions (Leq, 15 minutes) were between 36 - 75 dBA over the monitoring period, depending on the type of construction activity and the duration of noise events that occurred within the sample period. As works were undertaken during standard construction hours, no OOHWAF was warranted, and as such, predicted site noise levels have been compared to the noise management levels presented in the CNVMP. On average site, noise level contributions for the Special Works were 9 dBA above the NML .
					During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the Special Works was generally dominated by non-project related road traffic on public roads and other non-project emissions including:
					 those generated by residences near the measurement position non-project related rail traffic (outside of track the possession hours) animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead
					Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at UNM01 and UNM02, which is expected for the type of activities being undertaken.



13/8

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
01.04.20 to 03.04.20 (RP50a – MW39, refer to Appendix K of the addendum	OOHWAF-039	 MW39 works included: Sign on/off at Elizabeth Street (Library), Artarmon Installation of permanent survey 	No complaints regarding noise were received during the MW39 monitoring period.	Attended and Unattended Noise	During attended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW39 works was generally dominated by non-project related noise emissions, including those generated by residences near the measurement position, animals (birds and insects and domestic animals), wind-blown vegetation and aircraft passing overhead.
document)		plaques			Measured site noise level contributions (Leq, 15 minutes) were between 25 - 65 dBA over the monitoring period, depending on the type (and proximity) of construction activity and the duration of noise events that occurred within the sample period. On average, site noise level contributions for the MW39 works were 11 dBA above the NML .
					Comparison of site noise levels to the predicted values presented in OOHWAF- 039 indicated that on average, actual emissions associated with MW39 works were 5 dBA below the predicted values in OOHWAF-039.
					During unattended noise monitoring , the existing noise environment (in the absence of site noise) at the majority of community locations near to the MW39 works was generally dominated by non-project related road traffic on public roads and other non-project emissions including:
					 those generated by residences near the measurement position animals (birds and insects, domestic animals) wind-blown vegetation and aircraft passing overhead
					Noise at UNM01 and UNM02 was dominated by project noise emissions during times of documented activity at the site. Estimated site noise level contributions were above the NML 's at all unattended devices, which is expected for the type of activities being undertaken.

Date (Report - Possession Ref.)	Approvals Documentation	Summary of Works	Complaints	Monitoring Type	Discussion
27.03.20 to 29.04.20 (RP50b – Special Works / MW39, refer to Appendix L of the addendum document)	OOHWAF-039	 Special Works included: Delivery of materials and equipment. Excavation works. Compaction works. Laying new pavements (asphalt, concrete or unsealed pavements depending on the area) MW39 works included: Sign on/off at Elizabeth Street (Library), Artarmon Installation of permanent survey plaques 	No complaints were received regarding vibration during the Special Works / MW39 monitoring period.	Unattended Vibration	Vibration generated by Special Works / MW39 was at times perceptible at 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 Special Works / MW39 however, and were perceptible at times. It is expected that these activities contributed to the perceptible vibration levels and VDV exceedances. As noted above, the VDV criteria for "adverse comment possible" was exceeded on three occasions during the MW39 monitoring period, however no complaints were received during the monitoring period. It should also be noted that the vibration generating activities than the most sensitive receptors. As a result, recorded vibration levels are higher than those that would be experienced at nearby sensitive receptors. Despite certain events being perceptible throughout Special Works / MW39, the highest measured vibration levels (6.3 mm/s and 5.7 mm/s respectively) and associated characteristic frequencies (34Hz and 34Hz respectively) are below and compliant with the applicable BS7385 vibration guideline values , as identified in the CNVMP.

3. Outcomes and Recommendations

Technical reports were prepared for each monitoring period throughout October 2019 to May 2020 with specific recommendations provided throughout, based on the compliance evaluation and the magnitude and extent of impacts measured and/or observed. LOR (and their sub-contractors) were successful in implementing these recommendations where feasible, reasonable, practical and safe to do so.

Examples of the noise and vibration-reducing mitigation and management measures that were implemented throughout October 2019 to May 2020 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 2019-2020, the current rail noise barrier reduced site noise emissions by approximately 10 dBA or more.
 - This measure was implemented for OOHW, particularly near the Hopetoun Avenue access/egress point (prior to its removal), 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 Construction Noise and Vibration Impact Statement (CNVIS)) during all NCW activities.
- Continued prediction of noise levels in support of the OOHWAF and ensuring that additional/all locations (e.g. where works could occur and monitoring may be required) are assessed. LOR assessed all receptors that may be impacted by a work activity to ensure additional mitigation measures were correctly applied. This information is then summarised in the OOHWAF.
- 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.
- Continued consideration of Peak Particle Velocity (PPV, mm/s) and Vibration Dose Values (VDV, m/s^{1.75}) to estimate potential for vibration generating activities to impact nearby sensitive receptors throughout future OOHWA, with reference to the Safe Working Distances of the CNVMP.
 - continuous vibration monitoring (attended or unattended) at the nearest sensitive receptors whenever vibration generating activities need to take place inside the TfNSW safe-working distances.
 - quantify the vibration levels associated with these construction activities and in the event of a complaint being received, as per the requirements specified in the construction noise and vibration monitoring program established for NCW.

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 derived 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 remained aware of the potential for nuisance, or unacceptable levels of amenity to occur due to construction noise and vibration in order to appropriately manage the NCW.

Construction noise and vibration levels were 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 measures summarised above have ensured that any residual impacts were minimised as far as practically achievable.

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 and Vibration Monitoring Methodology

Noise Monitoring

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. 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. 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.

1.3 Monitoring Locations

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 8781B2, last calibration 18/01/2019
 - Serial 878184, last calibration 15/01/2019
 - Serial 87801C, last calibration 10/01/2020
- Brüel & Kjær 2250 Investigator (Type 1) Sound Analyser (Serial No. 3009001, last calibration 19/02/2020);
- NTi Audio XL2 Sound Level Meter (Serial No. A2A-06272-E0, last calibration 15/02/2019); and
- Brüel & Kjær 4231 (Type 1) Sound Level Calibrator (Serial No. 1897736, last calibration 19/02/2020).

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.

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**.

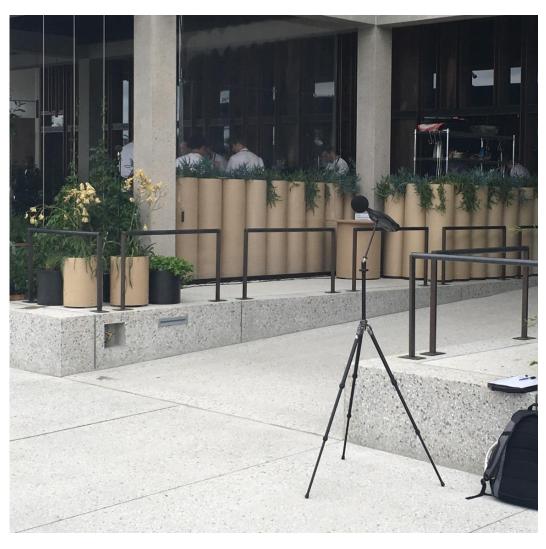


Photo A2.1: Example Attended Noise Monitoring Setup

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.

Vibration Monitoring Methodology

1. Monitoring Overview

1.1 Vibration Monitoring

Attended Vibration Monitoring

No attended vibration monitoring was warranted or conducted throughout the October 2019 - May 2020 period.

Unattended vibration monitoring

Unattended vibration monitoring was undertaken as requested by LOR during periods of extended, potentially vibration-generating works within the rail corridor. 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) for structural damage, and Vibration Dose Value (VDV, in m/s^{1.75}) for human annoyance (in accordance with the CNVMP).

1.2 Monitoring Locations

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 Monitors
 - o Serial No. BE13734, last calibration 13/05/2019
 - o Serial No. BE14130, last calibration 07/06/2019

END OF DOCUMENT

- THIS PAGE IS INTENTIONALLY LEFT BLANK

Sydney Metro City and Southwest – North Corridor Works

Addendum – NCW Noise and Vibration Monitoring – October 2019 – May 2020

Project

Title	NCW Noise and Vibration Monitoring - Addendum - October 2019 to May 2020
Client	Sydney Metro City and Southwest
Document Reference No.	LOR-NCW-Noise and Vibration Monitoring-Oct19-May20 Addendum.V01
Laing O'Rourke Project No.	K38

Document

Date	27 July 2020
Monitoring Period	October 2019 to May 2020
Prepared by:	Angel Sanz, Thomas Buchan
Reviewed by:	Danyil Skora

Revisions

Date	Version	Description
12/06/2020	V0.1	LOR-NCW-Noise and Vibration Monitoring-Oct19-May20 Addendum
27/07/2020	V0.2	Address comments and reissue

2/8

1. Introduction

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.

This addendum provides supporting information to LOR-NCW-Noise and Vibration Monitoring-October 2019 to May 2020 - Summary Report, which was prepared by ERM in June 2020. The addendum includes monitoring location maps, data tables and supporting graphs of noise and vibration monitoring activities in chronological order.

The structure of this addendum is as follows:

- Appendix A Monitoring Report (RP40): Noise Monitoring OOHW P7: Hopetoun Avenue Works 4 October 2019.
- Appendix B Monitoring Report (RP42): Noise Monitoring OOHW P7: MW19 11 to 15 November 2019.
- Appendix C Monitoring Report (RP43a): Noise Monitoring OOHW P7: WE20 16 to 17 November 2019.
- Appendix D Monitoring Report (RP43b): Vibration Monitoring OOHW P7: WE20 16 to 17 November 2019.
- Appendix E Monitoring Report (RP44): Noise Monitoring OOHW P7: MW30 27 to 28 January 2020.
- Appendix F Monitoring Report (RP45): Noise Monitoring OOHW P7: MW31 3 to 7 February 2020.
- Appendix G Monitoring Report (RP46): Noise Monitoring OOHW P7: WE32 8 to 9 February 2020.
- Appendix H Monitoring Report (RP47): Noise Monitoring OOHW P7: MW32 10 to 14 February 2020.
- Appendix I Monitoring Report (RP48): Noise Monitoring OOHW P7: MW35 2 to 6 March 2020.
- Appendix J Monitoring Report (RP49): Noise Monitoring OOHW P7: WE36 7 to 8 March 2020.
- Appendix K Monitoring Report (RP50a): Noise Monitoring OOHW P7: Special Works / MW39 - 27 March to 29 April 2020.
- Appendix L Monitoring Report (RP50b): Vibration Monitoring OOHW P7: Special Works / MW39 - 27 March to 29 April 2020.

Addendum

Appendix A – Monitoring Report (RP40)

Noise Monitoring – OOHW P7: Hopetoun Avenue works - 4 October 2019

ERM

Figure A1.0 – Attended Noise Monitoring Locations

– NCW P7 (Friday, 4 October 2019)



Environmental Resources Management Australia Pty Ltd

File Nam	e Date	Start Time	Elapsed Time	LAFmax	c LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contribution (%)	Measured Site Noise Level - LAeq, 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor?	Measured Site Noise Level - LAmax	NCA	Period	Location	RBL - LA90, Period	NML - LAeq, 15 minute	Highly Noise Affected Management Level (HNAML)	- LAeg, 15 minute	Comparison to RBL - LA90, Period	Comparison to NML - LAeq, 15 minute	Comparison to HNAML - LAeq, 15 minute	Description
Project 001	04-Oct-19	08:36	00:15:00	93.5	44.0	69.9	77.8	74.7	47.9	100	75	0.0	5.0	0.0	85	NCA01	Day	A01	42	52	75	5	33	23	0	A01 - Project 001-002. Measurements taken outside 13 Hopetoun Avenue. Site noise level contributions included the operation of a crane truck (and chains), hand clangs and bangs. Site-related noises contributed to 100% of the overall noise level. Extraneous sources were observed to include windblown vegetation and pass
Project 002	04-Oct-19	09:24	00:15:00	80.6	72.9	74.9	78.1	76.0	73.8	100	80	0.0	5.0	0.0	80	NCA01	Day	A01	42	52	75	5	38	28	5	rail corridor.
Project 003	04-Oct-19	09:40	00:15:00	90.7	65.1	68.4	74.9	69.5	66.4	100	73	0.0	5.0	0.0	80	NCA01	Day	A02	42	52	75	5	31	21	-2	
Project 004	04-Oct-19	09:55	00:15:00	77.8	64.8	67.3	70.3	68.5	66.0	100	72	0.0	5.0	0.0	75	NCA01	Day	A02	42	52	75	5	30	20	-3	A02 - Project 003-006. Measurements taken outside 12 Hopetoun Avenue. Site noise level contributions included the operation of a crane truck (and chains), hand
Project 005	04-Oct-19	10:11	00:15:00	84.7	64.9	67.4	70.3	68.2	66.2	100	67	0.0	0.0	0.0	80	NCA01	Day	A02	42	52	75	5	25	15	-8	clangs and bangs. Site-related noises contributed to 100% of the overall noise level. Extraneous sources were observed to include windblown vegetation and pase rail corridor.
Project 006	04-Oct-19	10:26	00:04:00	74.3	62.8	67.1	70.8	68.7	64.2	100	72	0.0	5.0	0.0	74	NCA01	Day	A02	42	52	75	5	30	20	-3	

Weather 4 October: Generally fine weather, hot with moderate winds. Temperatures ranged between 26 - 29 degrees Celsius over the monitoring period. Note: Low frequency, tonality and impulsive noise tests were conducted in accordance with the INP. The measured Leq data was applied in all cases. Modifying factor (penalty) values were applied as applicable to the sites noise emission. The site noise contribution reported here is inclusive of all modifying factors (if applicable).

11/10/2019 at 2:33 PM





Addendum

Appendix B – Monitoring Report (RP42)

Noise Monitoring - OOHW P7: MW19 - 11 to 15 November 2019

ERM: Level 15, 309 Kent Street Sydney, NSW 2000. T: (02) 8584 8888. F: (02) 8584 8800. www.erm.com

Figure A1.0 – OOHW MW19 – Attended and Unattended Noise Monitoring Locations

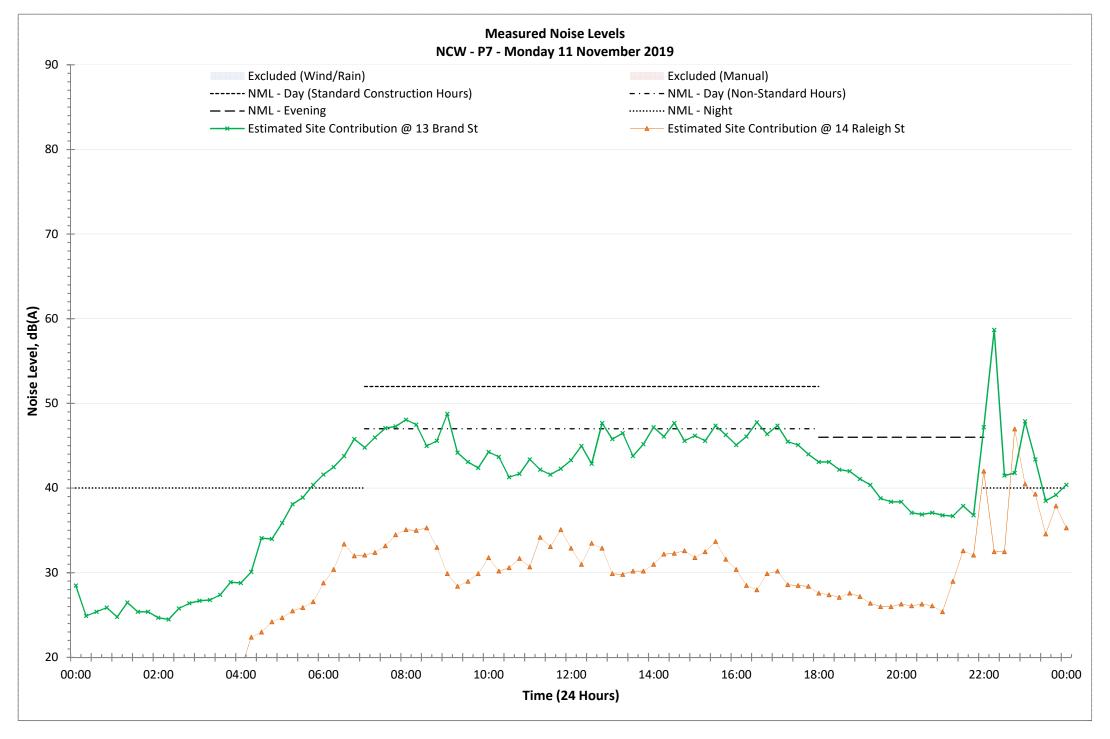
- NCW P7 (Monday, 11 November to Friday, 15 November 2019)

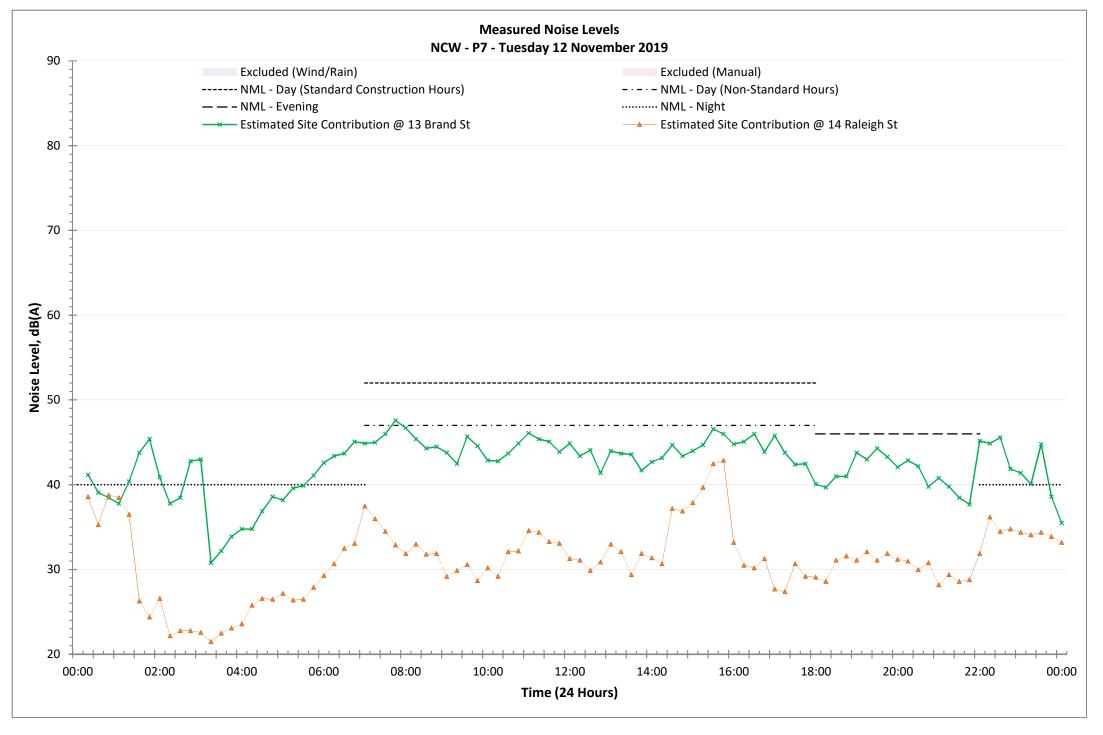


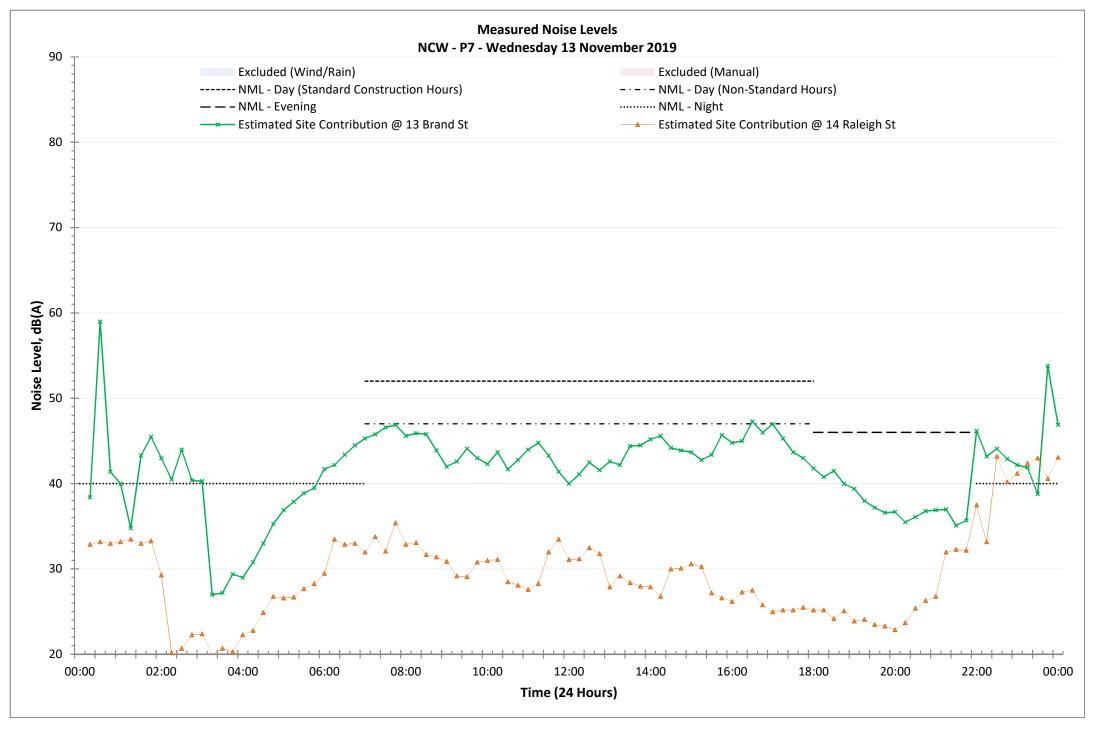


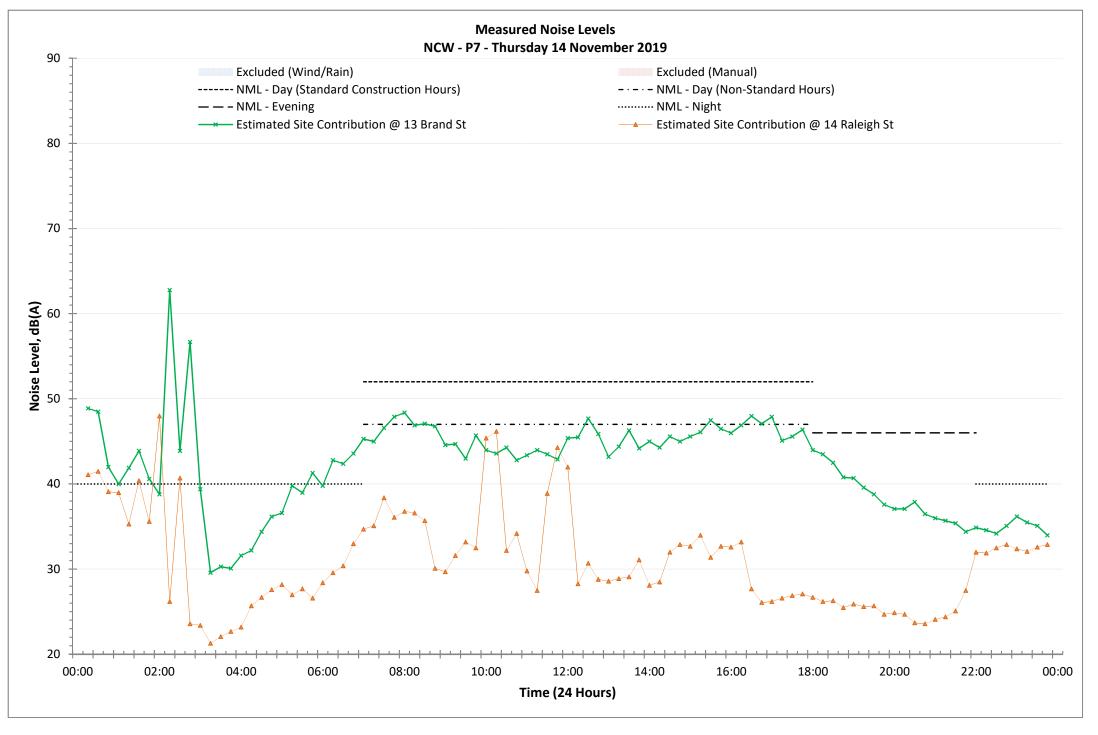
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0 L	AF10.0 LAI	66 Percentage Sile Contilbution (%)	Messured Ste Noise Level - LAeq. 19minute	Impulsive Modifying Factor?	T on al Modifying Factor?	LF Modifying Factor? Measured Ste Noise Level - LAmax	NCA	Pettod	Location	RBL • LA90, Period	NML - LA eq. 15 minute	Predicted Site Noise Level - LAeq. 15minute	Sleep Disturb ance Screening Level - LAmax	Comparison to RBL - LA 30, Period	Comparison to NML - LA eq. 15 minute	C omparison to Predicted Sits Noise Level - LAeq. fisminute	Comparison to Steep Disturbance Screening Level - L Amax	Description
Project 001	11-Nov-19	22:17	00:15:00	84.0	50.1	63.2	73.6	65.6 5	6.5 100	63	0.0	0.0	0.0 75	NCAD1	Night	A01	35	40	65	50	28	23	-2	25	All - Project 001. Measurement tale noticids 10 Daske Streat, Mammon, georally boring west tawards site entrance and works within the rail controls. Site-initiated noise mealand from movement and unloading of plant and machinery, raining and bargs, and oth access/spress of work vehicles. Site-initiate noises were the dominant feature of the measurement and contributed to 100% of the overall Leg (15 mm). Estameous sources were not identified during the measurement.
Project 002	11-Nov-19	23:21	00:15:00	63.3	49.4	51.3	57.7	51.8 5	0.2 100	51	0.0	0.0	0.0 60	NCAD1	Night	A02	35	40	53	50	16	11	-2	10	
Project 003	11-Nov-19	23:44	00:15:00	89.8	52.4	68.2	75.8	70.4 5	7.4 100	73	0.0	5.0	0.0 85	NCAD1	Night	A02	35	40	65	50	38	33	8	35	Ad2 - Project 002-004. Measurements lake outside 12 Date Street, Aftamon, generally facing west lowards afte entrance and works within the nal contox. Site-valued noise resulted from site mobilisation, derivey of material and expanses, and the operation of exaculators and other tri-sal plant within the nal contox. Site-valued noises were the dominant feature of the measurements and contributed to 100% of the overal Leg (15 min). Extrances sources were not identified during the measurement.
Project 004	12-Nov-19	00:00	00:15:00	78.6	53.4	64.2	74.0	67.0 5	4.9 100	69	0.0	0.0	5.0 77	NCAD1	Night	A02	35	40	65	50	34	29	4	27	
Project 005	12-Nov-19	00:30	00:15:00	79.1	52.8	59.5	67.1	62.6 5	4.3 100	59	0.0	0.0	0.0 79	NCAD1	Night	A03	35	40	63	50	24	19	-4	29	Al3 - Project 005. Measurement undertakan on Gillam Street, adjacent to 2 Orchard Road, facing west bawards works within the rail contaior. Stev-related noise resulted from the and the operation of exavators and other h-rail plant within the rail contaior. The distribution of halant along the train the, damp and bary and DAW works. Stev-related noise were the dominant feature of the measurement and contributes to 100% of the overall Leg (15 min). Extraneous sources were dentified to include cristes and oud passing cars.
Project 006	12-Nov-19	01:15	00:04:00	69.2	51.1	56.4	63.5	60.4 5	2.5 100	56	0.0	0.0	0.0 64	NCAD1	Night	A02	35	40	53	50	21	16	3	14	Al2 - Project 006. Measurement take outside 12 Draie Street, Artamon, generally blong west towards site entrance and works within the rail contidor. Site-valued noise resulted from the operation of exavations and other H-rail plant within the rail controls, damp and bang, and site accessingers of work vehicles. Site-valued noises were the dominant feature of the measurement and contributed to 100% of the overall Leq (15 min). Estraineous sources were not identified during the measurement.
Project 007	12-Nov-19	01:45	00:15:00	66.2	45.3	51.7	59.5	55.0 4	6.8 100	57	0.0	5.0	0.0 63	NCAD1	Night	A04	35	40	56	50	22	17	1	13	A04 - Project 007-008, Massurements take outside 12 Hopetouri Avenue, Chatascood, generally facing west towards site entrance and works within the rail contider. Site-related noise
Project 008	12-Nov-19	02:00	00:15:00	72.2	38.0	49.1	57.3	52.2 3	9.5 100	49	0.0	0.0	2.0 66	NCAD1	Night	A04	35	40	48	50	14	9	1	16	resulted from the movement and operation of exceeders and other th-rad planet which the rad context, thend food, clarge, and hange and CMW works. Site-induced rokes were the dominant feature of the measurements and contributed to 100% of the overall Leg (15 mm). Extraneous sources were not identified during the measurement.
Project 009	12-Nov-19	22:22	00:15:00	93.8	52.3	67.7	78.6	68.2 5	6.1 100	68	0.0	0.0	0.0 92	NCAD1	Night	A02	35	40	65	50	33	28	3	42	
Project 010	12-Nov-19	23:25	00:15:00	81.2	51.2	65.1	71.0	66.8 5	5.6 100	65	0.0	0.0	0.0 75	NCAD1	Night	A02	35	40	65	50	30	25	0	25	A22 - Project 000-011. Mesurements bale outside 12 Drake Sheet, Attamon, generally tacing west towards site entrance and works within the rail contox. Site-related noise resulted from site mobilisation, oblivery of material are expirent, dis-plant and work whiches at the site entrance, and the moviment of expirent within the rail contox. Site-related noises were the dominant beature of the measurements and contributed to 100% of the overall Leg (15 min). Extrancous sources were identified to incloke wind-blow wegetation.
Project 011	12-Nov-19	23:42	00:15:00	78.7	63.7	65.4	69.2	66.3 6	4.5 100	70	0.0	5.0	0.0 75	NCAD1	Night	A02	35	40	65	50	35	30	5	25	
Project 012	13-Nov-19	00:00	00:15:00	75.7	62.6	65.9	68.0	65.8 6	5.1 100	71	0.0	5.0	0.0 71	NCAD1	Night	A05	35	40	65	50	36	31	6	21	AGS - Project 012. Measurement take outside 13 Drake Street, Artamon, generally tacing west towards site entrance and works within the rail contidor. Site-related noise resulted from movement and unicating of plant and manzheny, and clarge and barge. Site-related noises were the dominant feature of the measurement and contributed to 100% of the overall Leg (15 mil). Extraineous sources were not identified during the measurement.
Project 013	13-Nov-19	00:35	00:15:00	62.6	45.7	49.1	53.2	50.2 4	7.3 100	49	0.0	0.0	0.0 50	NCA01	Night	A05	35	40	48	50	14	9	1	o	A06 - Project 013-014. Measurements take outside 13 Hopetoun Avenue, Chatavooci, generally facing west towards site entrance and works within the rail constor. Site-related noise
Project 014	13-Nov-19	00:51	00:15:00	61.7	45.6	49.0	54.3	51.4 4	6.9 100	54	0.0	5.0	0.0 55	NCAD1	Night	A05	35	40	48	50	19	14	6	5	 resulted from the use of hard task, dang and taging and lighting towers/generation. She-related noises were the contrast feature of the measurements and contributed to 10%, of the overall Leg (15 mir). Ethaneous sources were identified to include wind-blow regetation, distant tanfic and TEE works.
Project 015	13-Nov-19	01:32	00:15:00	73.3	59.5	67.0	70.3	68.3 6	4.2 100	67	0.0	0.0	0.0 73	NCA01	Ngtz	A02	35	40	65	50	32	27	2	23	
Project 016	13-Nov-19	23:28	00:15:00	79.7	48.6	62.4	73.7	66.1 5	12.8 100	62	0.0	0.0	0.0 75	NCA01	Ngtz	A02	35	40	65	50	27	22	-3	25	A22 - Project 015-017. Measurements take outside 12 Drake Sheet, Attamon, generally tacing west towards site entitiance and works within the nal contox. Site-related noise resulted from all mobilisation, delivery of material and equipment, "spaced dock" alam torses, and dangs and bangs. Site-related noises were the dominant feature of the measurements and contributed to 100% of the overall Leg (15 mit). Estancous sources were not identified during the measurement.
Project 017	13-Nov-19	23:45	00:15:00	73.8	51.3	55.3	61.0	57.9 5	12.8 100	55	0.0	0.0	0.0 65	NCA01	Night	A02	35	40	52	50	20	15	3	15	
Project 018	14-Nov-19	00:18	00:14:47	74.5	48.1	54.2	61.9	55.7 5	0.3 100	54	0.0	0.0	0.0 65	NCA01	Night	A07	35	40	59	50	19	14	-5	15	A07 - Project D18. Measurement take outside 14 Rakingh Street, Artamon, generally facing west towards alle entrance and works within the rail controls. Silv-estated noise resulted from the measurement and openation plant and 1-and machinery within the rail controls, using and targe, and squarked duct alarm tomes. Silv-estated noises were the dominant feature of the measurement and contributed to 100% of the overall Leq (15 mir). Extrancols sources were not dentified during the measurement.

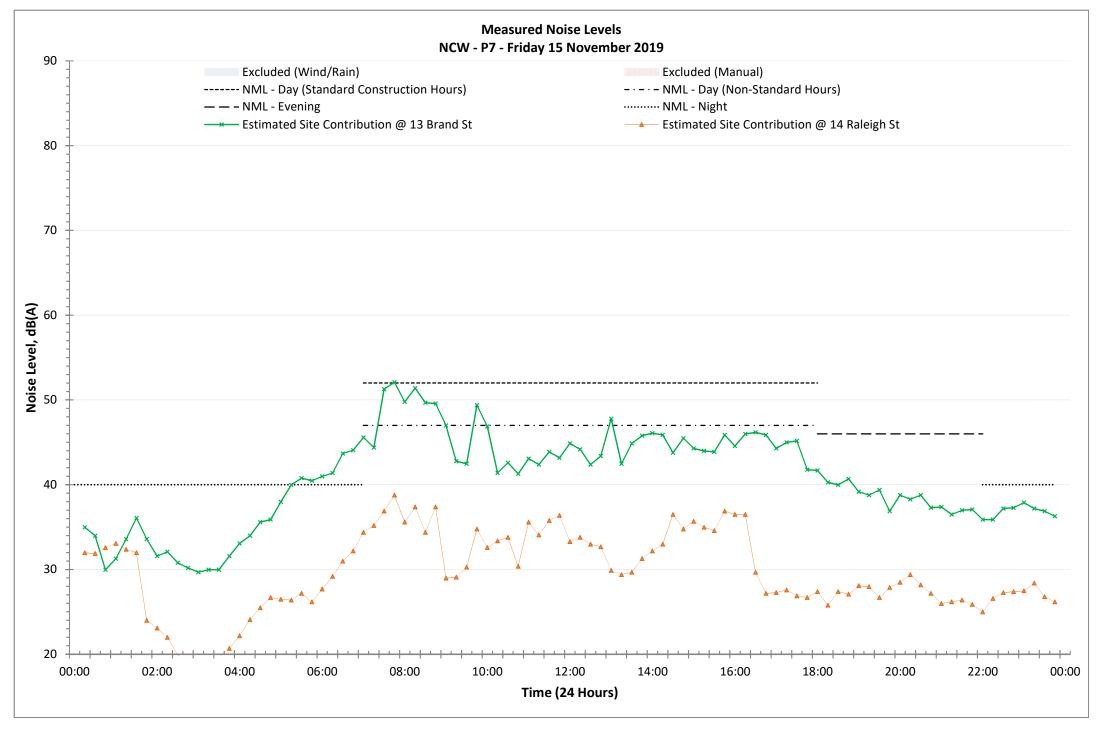
File Name	Date	Start Time	Elapsed Time	LAFmax L	AFmin	LAeq	LAF1.0 LAB	10.0 LAF	8 Percentage Sile Contribution (%)	Measured Ste Noise Level - LAeq, 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor? Measured Ste Noise Levid - LAmax	NCA	Period	Location	RBL - LA39, Period	NML - LAoq, 18minute	Prediceed Site Noise Loval - LAeq., 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 00, Pariod	Comparison to NML - LA eq., 15 minute	Comparison to Predicted Site Noise Level - LAeq. Haminute	- Marka Constanting Constantin
Project 019	14-Nov-19	00:51	00:15:00	88.1	38.4	64.5	75.1 6	3.6 50	7 100	70	0.0	5.0 (1.0 77	NCAD1	Night	ADS	35	40	64	50	35	30	6	AG8 - Project 019. Measurement taken outside 38 Hampten Road apartment block, generally locing north-north east lowards within the nal contox (rear the Artamon Mosque). 20 and the second of the sec
Project 020	14-Nov-19	01:17	00:15:00	73.3	44.3	51.3	57.4 5	1.8 45	5 100	51	0.0	0.0 (1.0 60	NCAD1	Night	A04	35	40	48	50	16	11	3	x02-Project 203. Measurement take outside 12 Datale Street, Advances, generally facing event towards all extrance and works within the nal contract. Sile-related noise resulted from movement of plant and machinery in the nal contract, clarge and targe, and Suppa,
Project 021	14-Nov-19	01:33	00:15:00	65.6	49.5	53.0	59.0 5	5.2 50	9 100	58	0.0	5.0 (1.0 60	NCAD1	Nght	A05	35	40	56	50	23	18	2	10 A06 - Project 021-022. Measuments take outside 13 Hopoton Avenue, Chatewood, generally tiong west towards site entrance and works within the rail contor. Site-related nois resulted from the movement and operation of H-rail plant and matchery, "spaanhed duck" alam tones, hand toots and clangs and bargs. Site-related noise were the dominant feature
Project 022	14-Nov-19	01:48	00:15:00	64.4	44.1	49.6	57.2 5	2.4 45	5 100	50	0.0	0.0 (1.0 57	NCAD1	Night	A05	35	40	48	50	15	10	2	measurements and contributed to 100% of the overall Leg (15 mit). Extraneous sources were not identified during the measurement.
Project 023	14-Nov-19	02:36	00:15:00	74.1	51.6	55.8	62.3 5	8.0 53	0 100	56	0.0	0.0	1.0 70	NCAD1	Night	A02	35	40	60	50	21	16	4	A02 - Poject 023. Measurement take outside 12 Datas Street, Artumon, generally facing west lowards site entrance and works within the rail contider. Site-initiated noise resulted from movement of plant and machinery in the rail contider, dangs and bags, a
Project 024	14-Nov-19	22:30	00:15:00	75.9	49.4	54.2	64.4 5	1.9 50	3 100	54	0.0	0.0	1.0 74	NCAD1	Night	A05	35	40	60	50	19	14	-6	24
Project 025	14-Nov-19	22:48	00:15:00	80.8	49.4	58.3	71.3 5	5.7 50	8 100	58	0.0	0.0	0.0 75	NCAD1	Night	A05	35	40	60	50	23	18	-2	A05 - Project 024-026. Measurements take outside 13 Date Street, Artamon, generally toxing west towards alte entance and works within the nal controls. Site-visited noise resulted site mobilitation, power toxis, clarge and barge, the operation of encovators are of ther h-rail plant within the rail controls, and the passing of the works train. Site-visited noise were dominant feature of the measurements and controluted to 100% of the overall Leg (15 mil). Estamoons sources were identified to include insects and disart traffic.
Project 026	14-Nov-19	23:07	00:15:00	57.7	50.5	52.0	53.4 5	2.6 51	5 100	57	0.0	5.0	1.0 57	NCAD1	Night	A05	35	40	60	50	22	17	-3	7
Project 027	14-Nov-19	23:38	00:15:00	70.4	47.3	56.4	68.1 5	8.1 49	1 100	56	0.0	0.0	0.0 69	NCAD1	Night	A07	35	40	59	50	21	16	-3	19 ADT - Project CDT-208. Measurements take autholds M Relingh Steet, Antennum, generatly facing west based on devices and works within the sail controls. Site valided noise results from the movement and operation of plant and the Intel modifiers within the nal model on the devices take authority takes measurement and controlscel for 000 of the overall Lect Terminy. Entropy Stores are extended for the location and takes measurement and controlscel for 000 of the overall Lect Terminy. Entropy Stores are extended for the location and takes measurement and controlscel for 000 of the overall Lect Terminy. Entropy Stores are extended for the location and takes measurements
Project 028	15-Nov-19	00:01	00:15:00	60.5	46.9	51.6	59.5 5	2.9 48	6 100	57	0.0	5.0	.0 59	NCAD1	Night	A07	35	40	59	50	22	17	-2	measurement and composed to 100% of the overall Leg (15 mm). Estateous sources were comments to include mixeds and ossant trainic.
Project 029	15-Nov-19	00:37	00:15:00	59.5	52.6	54.8	57.9 5	3.0 53	8 60	53	0.0	0.0	0.0 59	NCAD1	Night	A09	35	40	56	50	18	13	-3	ADI - Project 029-020. Massurements undertaken outside 2 Berbaley Court, generally bolog west towach works within the rail corritor. Sile-related noise resulted from the operational of a general and other th-cal place within the rail corritor. The device of the other and call and the second other
Project 030	15-Nov-19	00:56	00:15:00	72.5	51.8	54.1	56.0 5	1.7 53	0 60	52	0.0	0.0	0.0 69	NCAD1	Night	A09	35	40	56	50	17	12	-4	19
Project 031	15-Nov-19	01:21	00:15:00	61.7	43.4	48.8	57.7 5	1.5 44	9 100	49	0.0	0.0	0.0 59	NCAD1	Night	A04	35	40	48	50	14	9	1	Apple 101-022. Measurements take cutcle 12 Hopotrum Avenue, Chatterood, genorally facing west treases sele entrance and works within the rail context. Site-violated noise and power and the context set of the main section of the context set of the
Project 032	15-Nov-19	01:42	00:15:00	63.0	42.1	48.3	58.3 5	1.9 43	3 100	48	0.0	0.0	0.0 60	NCAD1	Night	A04	35	40	46	50	13	8	2	
Project 033	15-Nov-19	02:12	00:15:00	83.8	49.8	60.2	69.8 6	8.0 51	.0 100	65	0.0	5.0	0.0 83	NCAD1	Night	A05	35	40	65	50	30	25	0	33 A02 - Project 033-034. Measurements take outside 12 Draie Street. Adamon, generally facing west towards alle entance and works within the rail controls: Sile-initiand noise resulted to draivery of material and equipment. It has nonement and operation of exacultors and other his rail card and a street and motion. Sile-initiant or the measurement noises were the draimate ward results and controls and street and and the street and street and and the street and and and street and and and street. Since street are rol identified during the measurement.
Project 034	15-Nov-19	02:28	00:15:00	79.3	49.7	60.6	71.0 6	1.2 50	7 100	61	0.0	0.0	0.0 78	NCAD1	Night	A05	35	40	65	50	25	21	-4	28
ather 11-15 November: G te: all predicted noise levels te: Low frequency, tonality a	Senerally fine weather, son s were reproduced from the and impulsive noise tests v	ne low-moderate winds. I e LOR OOHWA Form for were conducted in accord	ow cloud coverage. Ten this track possession. lance with the INP. The	nperatures ranged measured Leg dat	between 13 a was applie	3 - 20 degree led in all cas	es Celsius over the es. Modifying fack	monitoring pe r (penalty) val	riod. ues were applied	as applicable to	the low frequ	ncy, tonal or i	mpulsive compor	ents detectable or	attributable to the sib	s noise emission. T	he site noise contribu	ution reported here i	is inclusive of all mo	odifying factors (if ap	plicable).			











Appendix C – Monitoring Report (RP43a)

Noise Monitoring - OOHW P7: WE20 - 16 to 17 November 2019

Figure A1.0 – OOHW WE20 – Attended and Unattended Noise Monitoring Locations – Artarmon

– NCW P7 (Saturday, 16 November and Sunday, 17 November 2019)



ERM

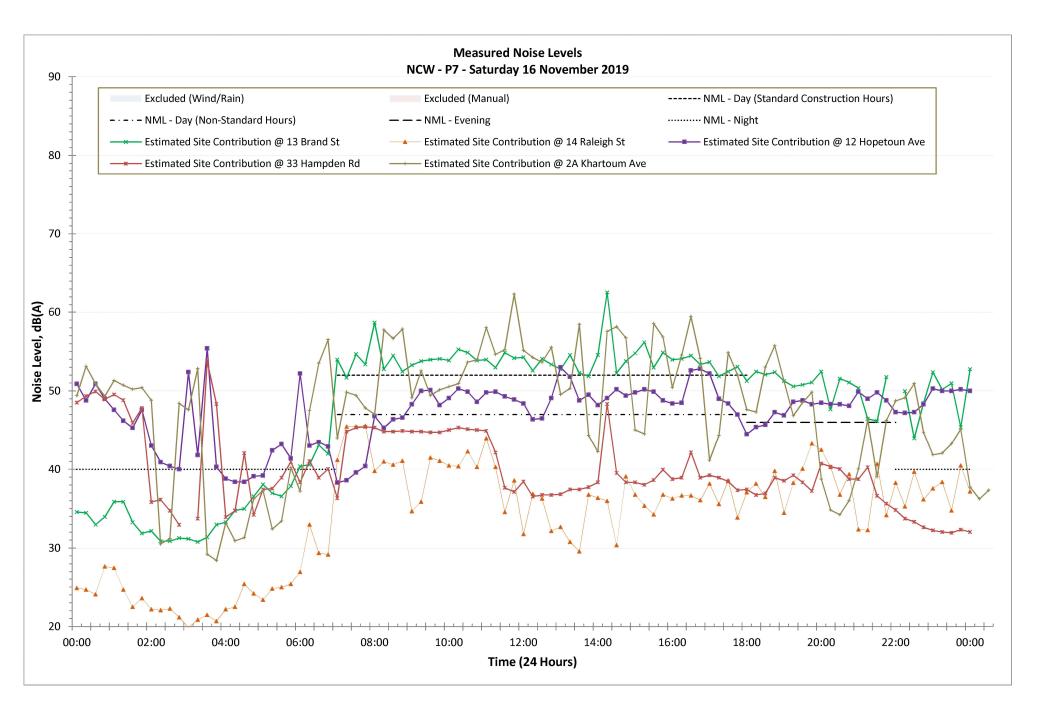
Figure A1.1 – OOHW WE20 – Unattended Noise Monitoring Location - Gordon

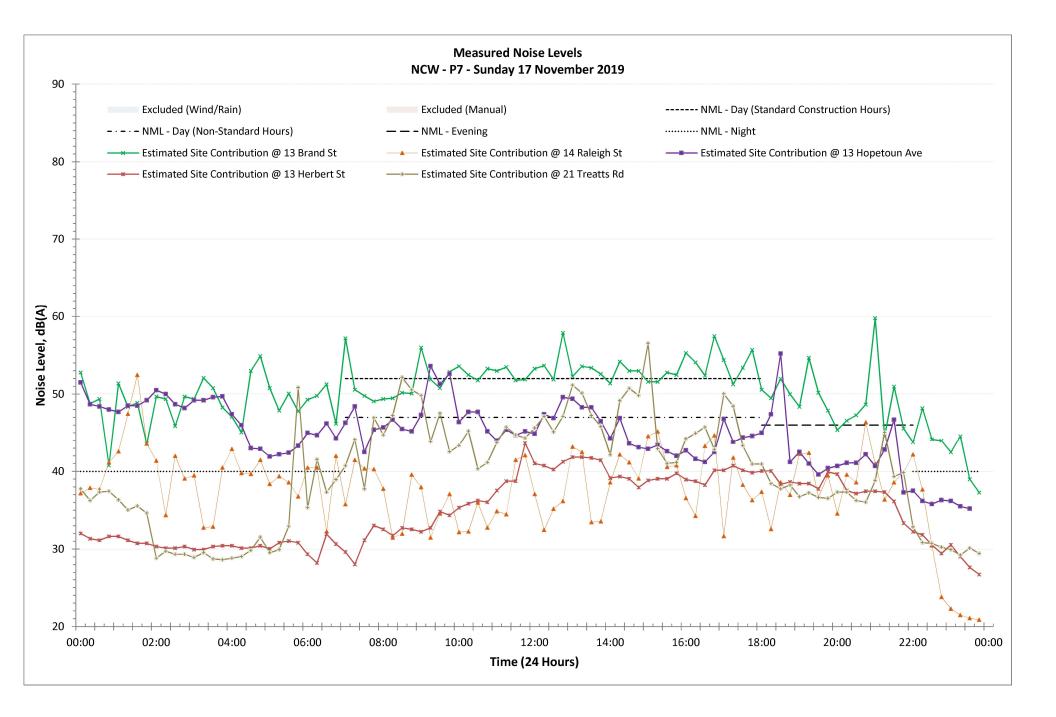
– NCW P7 (Saturday, 16 November and Sunday, 17 November 2019)



File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0 LA	F10.0 LAP	8 Percentage Sile Contribution (%)	Measured Ste Noise Level - LAeq, 15minute	Impulsive Modifying Factor? Tonal Modifying Factor?	LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	R BL - LA 30, Period	NM. - LAtey, 15minute	Predicted Site Noise Lovel - LAcq, 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 19, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Sile Noise Level - LAeq, Haminute	Comparison to Seep Disturban ce Screening Level - L Amax	Description
Project 001	16/11/2019	17:30	0:15:00	75.0	43.8	54.9	66.3 5	7.1 46	3 50	57	0.0 5.0	0.0	74	NCA01	A01	Day	42	47	60	57	15	10	-3	17	
Project 002	16/11/2019	17:50	0:15:00	75.3	43.0	53.1	62.8 5	5.3 45	2 50	55	0.0 5.0	0.0	72	NCA01	A01	Day	41	46	60	56	14	9	-5	16	A01 - Project 01-033. Measurements laten outside 13 Data Street, Antarmon, generally facing west low ands site enthance and works within the nal contor. Site-related noise resulted from site mobilisation, power tools, clange and bargs, the operation of excavators and other initial giant within the nal contor. Site-related noises controlked to approximately 50-75% of the overall Leg (15 mil) throughout the measurements. Estimateous sources were identified to include biols, distant taffic, with observ regatation and neary residents.
Project 003	16/11/2019	18:08	0:15:00	76.3	44.5	58.4	67.5 6	2.2 48	2 70	57	0.0 0.0	0.0	72	NCA01	A01	Evening	41	46	60	56	16	11	-3	16	
Project 004	16/11/2019	18:33	0:15:00	63.7	44.6	50.3	56.6 5	2.9 47	3 50	47	0.0 0.0	0.0	58	NCA01	A02	Evening	41	46	59	56	6	1	-12	2	Ar2 - Poject 004-005. Measurements taken outside 14 Rategh Street, facing west low ands works within the rail corridor. Site-related noise resulted from the operation of trucks and other th
Project 005	16/11/2019	18:50	0:15:00	64.5	46.4	50.9	57.3 5	3.2 48	3 50	48	0.0 0.0	0.0	58	NCA01	A02	Evening	41	46	59	56	7	2	-11	2	AQ2 - Registro CO4:005. Measurement balen natios 14 Religit Send, facing wet tow are volve with the national conductive states and other the national plane within the nationality of the send and the send send send send send send send sen
Project 006	16/11/2019	20:01	0:15:00	69.5	43.0	48.6	54.1 4	9.4 46	0 80	48	0.0 0.0	0.0	51	NCA01	A03	Evening	41	46	52	56	7	2	-4	-5	A03 - Poject 006-007. Measurements taken outside 14 Hawins Sheet, facing was towards works within the rail contoor. Site-related noise resulted from staff taking, pow er tools,
Project 007	16/11/2019	20:18	0:15:00	63.5	42.0	47.2	56.4 4	9.1 43	1 80	46	0.0 0.0	0.0	62	NCA01	A03	Evening	41	46	52	56	5	0	-6	6	operation of hucks and other Is-sal plant within the rail controls, holding motion alarm. Site-related noises controlsed to approximately SVN of the overall Log (15 mit) throughout the measurements. Extranscoss sources were identified to include insects, distant traffic and nearly traffic.
Project 008	16/11/2019	20:50	0:15:00	72.0	50.8	56.6	62.6	8.0 54	0 80	61	0.0 5.0	0.0	62	NCA01	A04	Evening	41	46	62	56	20	15	-1	6	A04 - Project 008-009. Measurements taken on Gillam Street, adjacent to 2 Orchard Read, facing west tow ands works within the rail contribor. Siles-related noise resulted from hand tools,
Project 009	16/11/2019	21:10	0:15:00	66.6	51.0	55.9	61.6	7.7 53	7 80	55	0.0 0.0	0.0	60	NCA01	A04	Evening	41	46	62	56	14	9	-7	4	operation of excervators and dher H-sal plant within the rule controls, including motion alarms. Sile-related noises contributed to approximately BVH of the overall Leg (15 mm) throughout the measurements. Bit nanoous sources were identified to include insects, nearby residents, distant traffic and rearby traffic.
Project 010	16/11/2019	21:32	0:15:00	73.6	48.3	52.1	58.4 5	3.9 49	6 50	49	0.0 0.0	0.0	55	NCA01	A05	Evening	41	46	62	56	8	3	-13	.1	ADS - Piget 010-011 Measurements balan outside 1 Benkley Court, facing west towards works within the rail contor. Sile-violated noise resulted from hand took, operation of encoursors and other hir rail part within the rail contorie, including robon adarms and trans. Sile-violated noise contributed to agroamment 50 - 80% of the overall Let (15 mit) throughout
Project 011	16/11/2019	21:48	0:15:00	63.8	46.2	50.0	55.1 5	2.1 47	7 80	49	0.0 0.0	0.0	56	NCA01	A05	Evening	41	46	62	56	8	3	-13	0	ecolvators and other h-rain pair within the rain control, including motion auther band notes, controlater to approximately solvators of the overall and (15 min) throughout. the measurments. Estimational sources were destified to include the chalawood dive site hum, distant traffic and nearly staffic.
Project 012	16/11/2019	22:23	0:15:00	63.8	48.0	51.2	61.6	2.3 48	9 100	56	0.0 0.0	5.0	63	NCA01	A06	Nght	35	40	56	50	21	16	0	13	
Project 013	16/11/2019	22:41	0:15:00	72.2	48.8	52.1	58.6 5	3.2 49	7 100	57	0.0 5.0	0.0	58	NCA01	A06	Night	35	40	56	50	22	17	1	8	AGE - Poject 012-015. Measurements taken outside 12 Hypetoon Avenue, facing west low ands alte entrance and works within the nail contribor. Site-related noise resulted from the operation
Project 014	16/11/2019	22:59	0:15:00	77.9	49.5	55.4	61.8 5	7.3 52	2 100	55	0.0 0.0	0.0	73	NCA01	A06	Night	35	40	56	50	20	15	-1	23	— of clases, ecovers, generators and the Is-calipter within the cal controls, relading motion airms. She-related noises dominate the measurement controlling 100% of the overall Leg (15 mit). Entraneous sources were identified to include dataset nuflic.
Project 015	16/11/2019	23:17	0:15:00	70.5	50.6	56.9	64.9 6	0.1 52	1 100	57	0.0 0.0	0.0	70	NCA01	A06	Night	35	40	56	50	22	17	1	20	
Project 016	17/11/2019	00:04	0:15:00	76.4	53.4	61.5	70.9 6	3.9 56	0 100	67	0.0 5.0	0.0	73	NCA01	A01	Nght	35	40	65	50	32	27	2	23	Apt - Repct 05.617. Massements taken ustale 13 Data Street. Artemise generally facility e will be early as the endors and write with the final context. Site-instead online metabolic formale includeation, the operation of coreax trucks, accordance, provide and the her liptice with the real context, producing motion advance. Bits-instead online metabolic measurements controlling 1000 with endors and large (11) and large endors accorded and large endors and large endors. Bits-instead online metabolic measurements controlling 1000 with endors and large (11) and large endors accorded and endors large endors and large (11) and large endors accorded and endors large endors and large endors. Bits-instead endors accorded and endors accorded and endors large endors accorded and endors accorded and endors large endors accorded and endors accorded
Project 017	17/11/2019	00.22	0:15:00	82.0	50.9	61.1	73.2 6	1.3 51	8 100	61	0.0 0.0	0.0	82	NCA01	A01	Nght	35	40	63	50	26	21	-2	32	Inverse moneyadur, ver upwawn u ulifist, titols, escavator, generator an other hraupare with ne na control, notuding motion allans. Bit-felated noise dominated the measurement comburing 100% of the overal Leg (15 m), Estaneous sources were dentified to include nects.
Project 018	17/11/2019	00:45	0:15:00	65.7	43.0	50.4	60.1 5	2.9 45	2 90	55	0.0 0.0	5.0	61	NCA01	A02	Night	35	40	59	50	20	15	4	11	AQ - Regist (016-01). Measurements taken outsids 14 Raisp) Street, frange west tow and works within the nal contexr. Site-related noise resulted from the operation of trucks and other h - rail plant within the nal contexr, including motion atoms. Site-related noises dominated the measurement contributing 100% of the one at Let (15 min). Extravous sources we are benefited
Project 019	17/11/2019	01:05	0:15:00	59.4	42.5	45.8	50.6 4	7.0 44	4 90	50	0.0 0.0	5.0	51	NCA01	A02	Night	35	40	59	50	15	10	-9	1	a part with the nationaxy, notioning moon auma, sak-reased noises onnaises the meau element controlling turbut of the overall leq (15 mm). Estandous sources were common to include tartis, dataset tartific and trades.

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution (%)	Measured Ste Noise Level - LAeq. Hanimute	Impulsive Modifying Factor?	T on al Modifying Factor? LF Modifying Factor?	Moasured Ste Noise Level - LAmax	NCA	Location	Period	RBL • LA93, Period	NML - LAeq, 15minute	Predicted Sile Noise Level - LAcq, 15minute	Sieep Disturbance Screening Level - LAmax	Comparison to RBL - LA30, Period	Comparison to NML - LAeq, 15 minule	Comparison to Predicted Site Noise Level - LAeq. 15minute	Comparison to Sleep Disturbance Screening Level - LAmax	Description
Project 020	17/11/2019	01:36	0:15:00	59.6	47.1	51.1	55.1	53.9	48.2	100		0.0	0.0 0.0	56	NCA01	A05	Nght	35	40	62	50	16	11	-11	6	AdS - Project 020-021. Measurements balen outside 5 Berkelay Court, facing west low ands works within the rail contider. Ster-related noise resulted from hand tools, operation of cranes exclusions and other hiral plant within the rail controls, including motion atoms and homs. Ster-related noises dominated the measurement controlluting 100% of the overal Leq (15 mil).
Project 021	17/11/2019	01:52	0:15:00	67.6	48.0	52.6	59.4	54.6	49.5	100		0.0	0.0 0.0	61	NCA01	A05	Nght	35	40	62	50	18	13	-9	11	exclusions and other n-rait pairs when the rais controls, inclusing means aams and roths, sale-relies howed contrakes the measurement controlung tools of the overal lad (15 mm). Extravelous sources were dentified to include the chainwood dive site hum.
Project 022	17/11/2019	02:19	0:15:00	70	49.9	56.5	63.9	59.8	51.8	100		0.0	5.0 0.0	70	NCA01	A06	Nght	35	40	62	50	26	21	-1	20	AGE - Roject 022-202. Measurements taken outside 12 Hopetourn Avenue, facing wiest towards site entrance and works within the nal corridor. Site-related noise resulted from the operation
Project 023	17/11/2019	02:37	0:15:00	75.3	48.7	55.6	62.3	58.0	51.0	100		0.0	0.0 0.0	75	NCA01	A05	Nght	35	40	62	50	21	16	-6	25	- d cranes, escavators, generators and other H-ral plant within the rail controls, including motion aitums and home. Site-statest noises dominated the measurement contributing 100% of th overall Leg (15 min). Bitrameous sources were identified to include insects.
Project 024	17/11/2019	16:13	0:15:00	81.7	47.2	64.6	75.7	68.3	49.8	90		0.0	5.0 0.0	75	NCA01	A01	Бау	42	47	65	57	27	22	4	18	A01 - Project 024-025. Measurements taken outside 13 Dake Street, Artamon, generally facing west tow with west and works within the rail controlor. Ste-related noise resulted
Project 025	17/11/2019	16:30	0:15:00	93.4	52.2	63.9	69.9	64.6	58.4	100		0.0	5.0 0.0	69	NCA01	A01	Day	42	47	65	57	27	22	4	12	fromsie mobilisation, the operation of crames, trucks, excervators, generators and other Is-inal part within the rail controls, holding motion admits. Bite-related noises dontrated the measurement contributing 90 - 100% of the overal Leq (15 min). Bitraneous sources were identified to include blefs, dogs and distant traffic.
Project 026	17/11/2019	16:48	0:15:00	77.8	46.0	55.3	63.8	58.4	48.3	50		0.0	0.0 0.0	65	NCA01	A02	Бау	42	47	59	57	10	5	-7	8	A02 - Roject 026-027. Measurements taken outside 14 Relegin Street, facing west low and works within the rail combor. Site-related noise resulted from the operation of trucks.
Project 027	17/11/2019	17:06	0:15:00	66.4	43.9	50.4	57.5	53.1	46.7	60		0.0	0.0 0.0	60	NCA01	A02	Day	42	47	59	57	6	1	-11	3	— excavors and other 16-ral plate within the ral control, hisking motion alarms and home. Site-related noises contributed to approximately 68-80% of the overall Log (15 min) throughout the measurements. Extraneous sources were identified to include binds, nearby residents, distant traffic and nearby traffic
Project 028	17/11/2019	17:35	0:15:00	69.8	45.9	52.1	56.3	54.0	48.4	50		0.0	0.0 0.0	69	NCA01	A05	Day	42	47	62	57	7	2	-13	12	Adds - Projet 029-4029. Measurements taken outside 5 Berkeley Court Sochg west fow ands w onls w tibs the real constor. Site-related note resulted from hand tools, operation of accurators and other hir ral paint within the rail constor, including motion aliams and homes. Site-related notes contributed to approximately 309-50% of the overal Leq (15 min) througho
Project 029	17/11/2019	17:53	0:15:00	70.6	46.8	51.4	58.4	53.5	48.4	30		0.0	0.0 0.0	54	NCA01	A05	Day	42	47	62	57	4	-1	-16	-3	— ecovarist and order in-starparts minime and comport, including motion aliante and forms, sale-stated notatio, obtained and composition of the overall Lag (1) mini throughout the measurements. Estameous sources were identified to include the challewood dive site hum, bited, dataset traffic and nearby traffic.
Project 030	17/11/2019	18:13	0:15:00	72.1	45.0	53.3	62.0	55.8	48.1	80		0.0	0.0 0.0	62	NCA01	A05	Evening	41	46	56	56	11	6	4	6	Add - Pojec (030-031. Measurements balen outside 12 Hypetion Avenue, facing west towards site entrance and works within the rail contor. Site-related noise resulted from the operand of cranes, executors, generators and other H-rail plant within the rail contridor, including motion aims and hom. Site-related noises dominated the measurement contributing 80 - 100%
Project 031	17/11/2019	18:32	0:15:00	71.5	55.4	59.3	68.0	61.4	56.4	100		0.0	0.0 0.0	71	NCA01	A05	Evening	41	46	56	56	18	13	3	15	— or clears, excavers, greateness which is not part of the rest of clears, and the start of the scale test of the scale test clears and the measurement contracting exc- non- the overall Leg (15 mm). Entraneous sources were identified to include tests, distant thatfits and nearby traffic.
Project 032	17/11/2019	19:04	0:15:00	68.8	43.8	52.6	62.9	55.3	46.6	100		0.0	0.0 0.0	68	NCA01	A01	Evening	41	46	60	56	12	7	-7	12	
Project 033	17/11/2019	19:22	0:30:00	79.9	44.3	55.3	64.3	58.1	46.4	70		0.0	5.0 0.0	71	NCA01	A01	Evening	41	46	60	56	18	13	-1	15	AD1 - Project 022-034. Measurements balam outside 13 Datas Bitred, Arlamon, generally facing west low ands with an entropy of the second of th
Project 034	17/11/2019	19:40	0:30:00	79.9	79.9	66.3	44.5	66.3	46.4	80		0.0	5.0 0.0	75	NCA01	A01	Evening	41	46	65	56	29	24	5	19	
eather 16-17 November 20 ote: all predicted noise levels ote: Low frequency, tonality a	119: Generally fine weath were reproduced from th and impulsive noise tests	er, overcast with calm wil le LOR OOHWA Form for t were conducted in accorr	ds. Temperature range his track possession. lance with the INP. The	d between 17- measured Leq	20 degrees Co 1 data was ap	elsius over the plied in all cas	e monitoring per ses. Modifying f	riods. factor (penal	lty) values w e	re applied as	applicable to the	low frequen	cy, tonal or imp	isive components	detectable or attribu	table to the sites n	oise emission. The	site noise contributio	on reported here is in	clusive of all modify	ying factors (if appl	icable).				





Appendix D – Monitoring Report (RP43b)

Vibration Monitoring – OOHW P7: WE20 - 16 to 17 November 2019

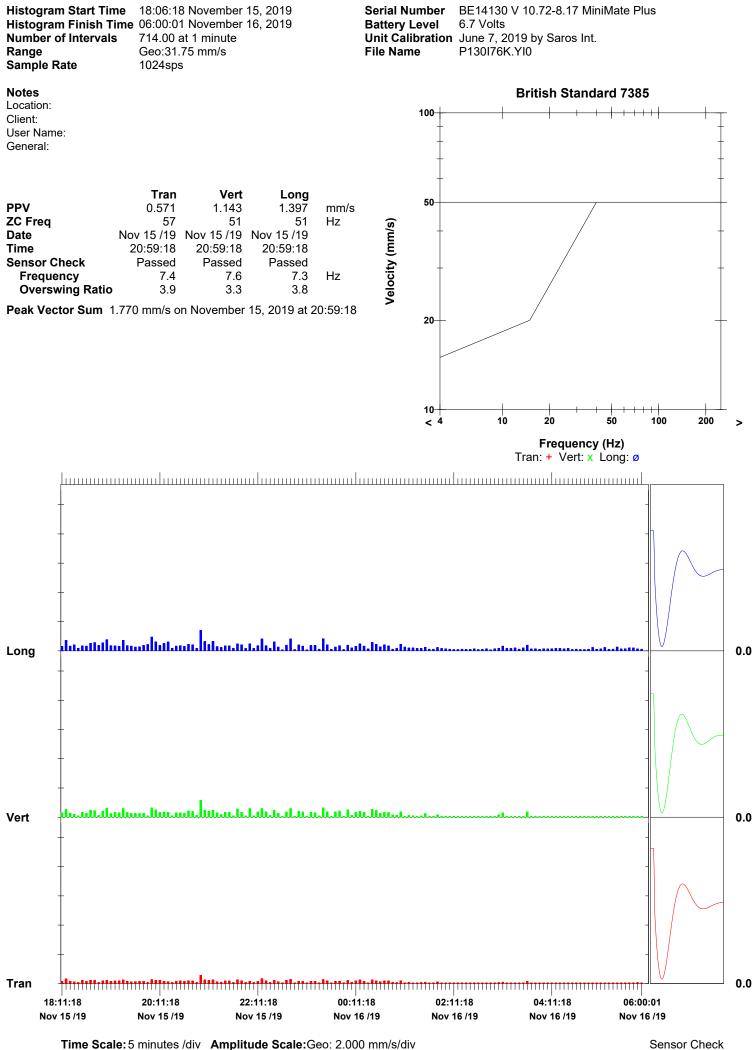
Figure A1.0 – OOHW WE20 – Unattended Vibration Monitoring Locations

– NCW P7 (Saturday, 16 November to Sunday, 17 November 2019)

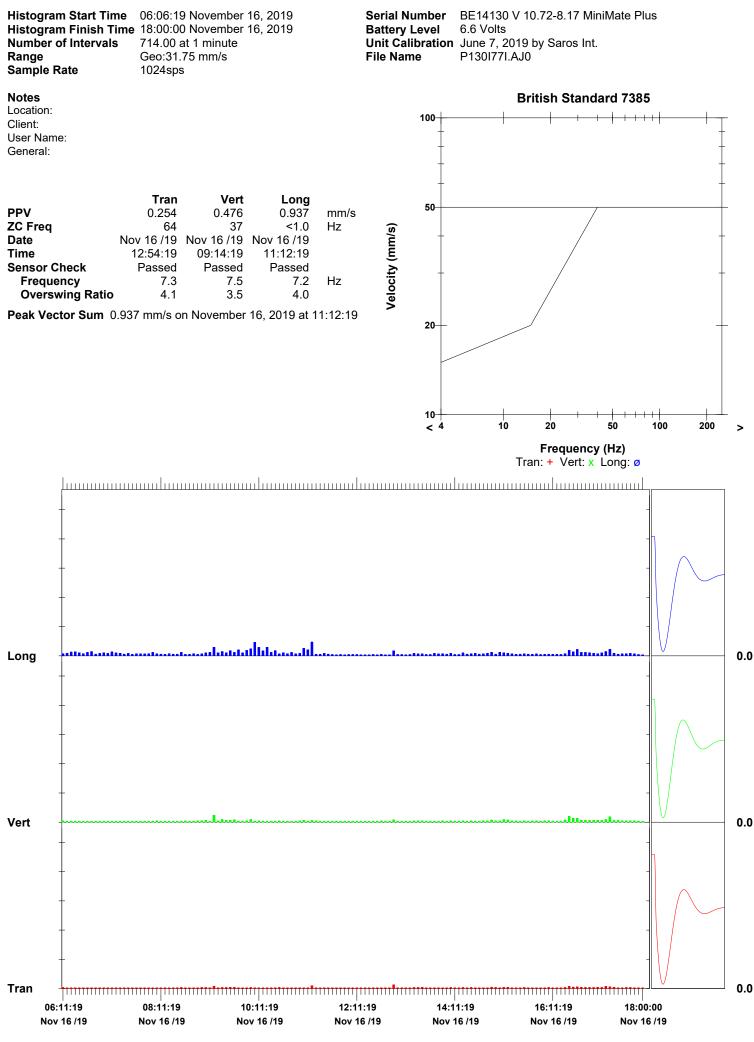






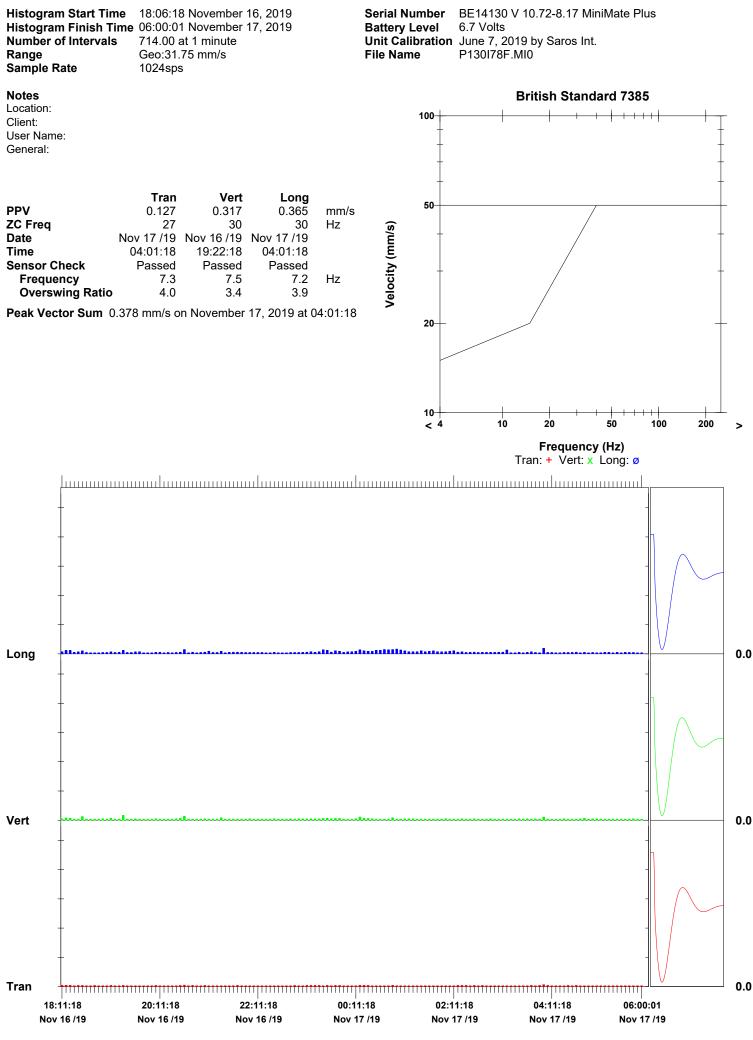






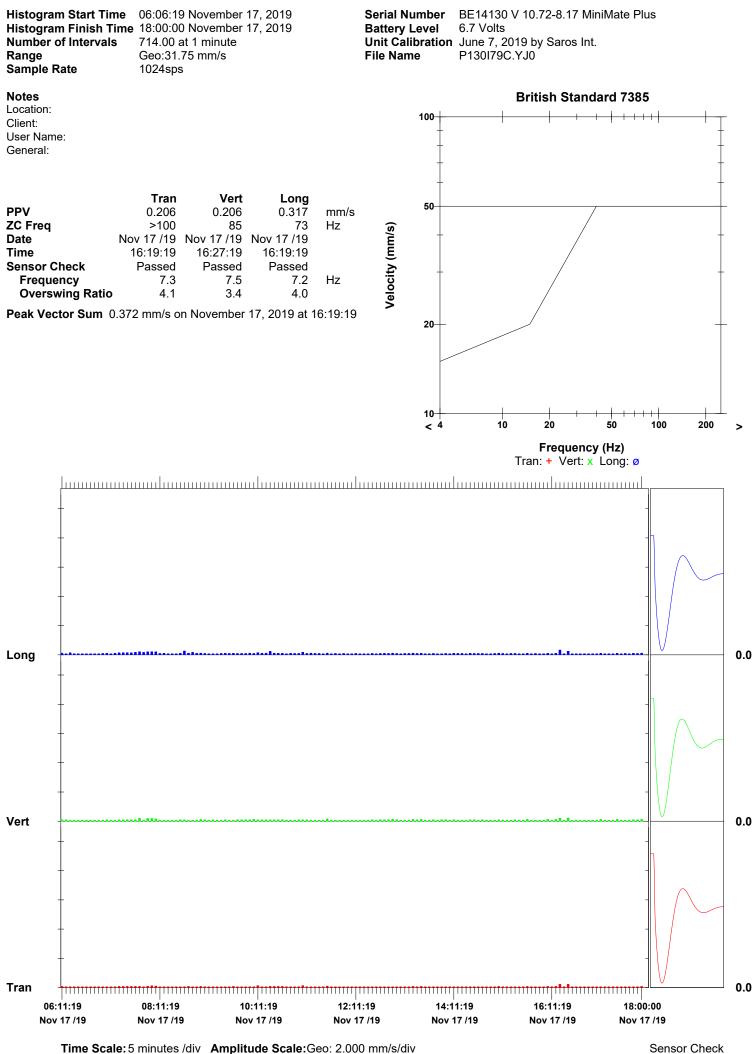
Time Scale: 5 minutes /div Amplitude Scale: Geo: 2.000 mm/s/div



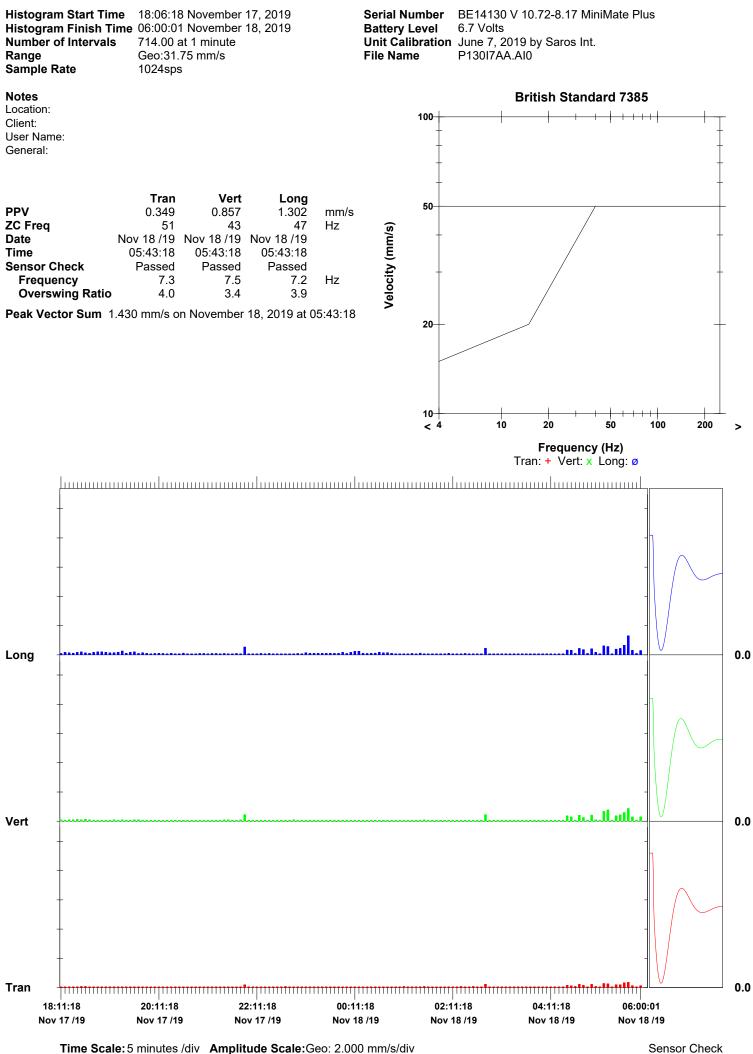


Time Scale: 5 minutes /div Amplitude Scale: Geo: 2.000 mm/s/div









Appendix E – Monitoring Report (RP44)

Noise Monitoring – OOHW P7: MW30 - 27 to 28 January 2020

Figure A1.0 – OOHW MW30 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood –

NCW P7 (Monday, 27 January to Tuesday, 28 January 2020)

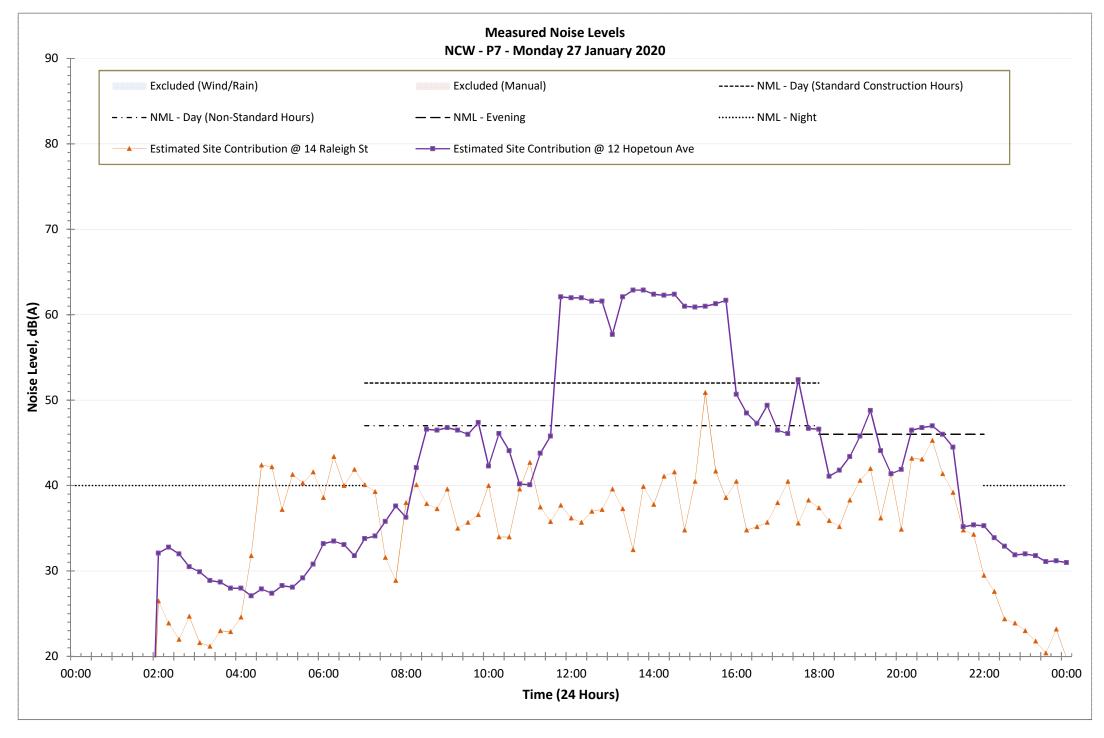


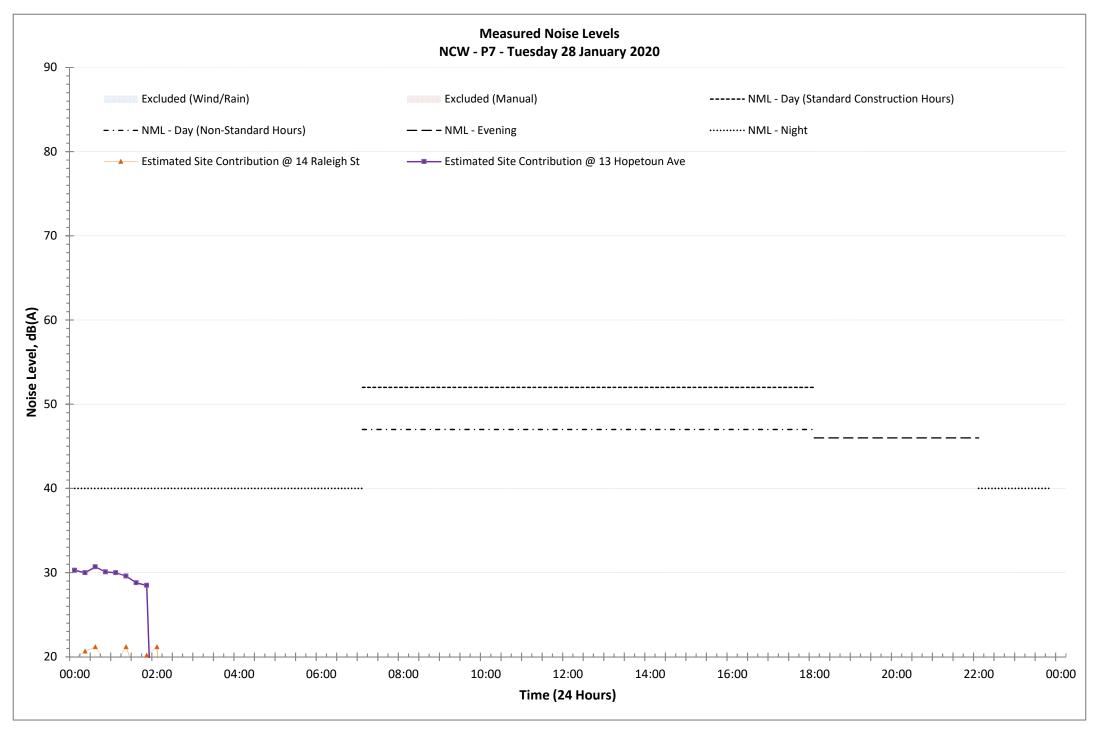
ERM

File Nam	• Dato	Start Time	Elapsed Time	LAFmax	LAFmin	LAeq LAF1	.0 LAF10.0	Percentage Sile Contribution	(2) Measured Ste Noise Level - LAeq, 15minule	Impulsive Modifying Factor?	Tonal Modifying Factor? LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	RBL - LA90, Period	NML - LAsq, 15minute	Predicted Site Noise Level - LAeq, 15minute	Sieep Disturbance Screening Lovd - LAmax	Comparison to RBL - LA 30, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Sile Noise Level - LAeq, 18minute	Comparison to Seep Disturbance Screening Level - L Amax	Description
Project 001	27/01/2020	05:21	0:15:00	91.3	55.7	67.4 74.4	69.8	61.5 10	67			85	NCAD1	AD1	Night	35	40	71	50	32	27	-4	35	A01 - Project 001-002. Measurements taken outside 13 Data Breek, Aramon, generally toong west towards alte entance and works within the nat controls. Sile-resided noise resulted
Project 002	27/01/2020	05:39	0:15:00	78.3	53.5	65.4 73.2	70.7	56.1 10	0 65			π	NCAD1	A01	Night	35	40	66	50	30	25	-1	27	from site mobilisation, clargs and bargs, and the operation of excavators and other in Fail plant within the rail controls. Site-related noises contributed to approximately 100% of the overal Le (15 min) throughout the measurements. Exitaneous sources were not identified during the measurements.
Project 003	27/01/2020	06:01	0:15:00	76.8	46.2	53.8 61.7	56.6	48.5 9	53		- 5.0	63	NCAD1	A02	Night	35	40	59	50	23	18	-1	13	A22 - Project 003-004. Measurements taken outside 11 Hawkins Street, facing west towards works within the nall contour, Stan-related note resulted from the operation of trucks and other
Project 004	27/01/2020	06:17	0:15:00	67.2	45.6	52.8 61.3	55.5	47.5 9	57		- 5.0	64	NCAD1	A02	Night	35	40	59	50	22	17	-2	14	b-cal plant within the rail controls, including motion starm, and convenzations on site. Situ-related notes: contributed to approximately 50% of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified to include birds and distant traffic.
Project 005	27/01/2020	06:35	0:15:00	78.3	40.9	58.5 65.0	62.1	43.7 8	63		- 5.0	73	NCAD1	A03	Night	35	40	60	50	28	23	3	23	A03 - Project 005-006, Musuumenents taken nutude B-10 Brand Shiret on Valetits Lane, facing southwest towards works within the rail contor. Site-related noise resulted from hand tools, operation of houls, exemutors and h-rail giant within the rail contorb, and conversations on alls. Site-related noise contributed to approximately (ID-90%) of the overall Las (15 min)
Project 006	27/01/2020	06:53	0:15:00	88.9	52.3	67.0 73.8	68.6	63.2 9	67			85	NCA01	A03	Night	35	40	60	50	32	27	7	35	operation of hudis, escanators and h-ral giant within the ral context, and conversations on site. Site-satisfact roles contributed is approximately (65-05); of the overal Lag (15 min) Broughout the measurements. Extraneous sources were identified to include triels and datant hath:
Project 007	27/01/2020	07:41	0:15:00	68.7	41.9	52.7 61.8	56.7	45.0 10	53			61	NCA01	A04	Day	42	47	58	57	11	6	-5	4	A64 - Peger 007-002 Measurements balan outside 14 Balage Direct. Song west baseds works within the nationative. Site instead noise insulated from the operation of accession and other hiral plant within the nationative, and dated take-related constructions works within the trait accession. The malant works are instead from the exercise of the overall Leg (16 min) through but within the machine structs. The instead is a structure in the exercise of the machine structs and the instead instead is a structure instead in the instead instead is a structure in the structure instead in the machine structs. Structure is instead instead in the exercise instead in the instead instead in the exercise instead in the instead instead instead in the instead instead in the instead instead in the instead inste
Project 008	27/01/2020	08:01	0:15:00	68.9	41.5	50.9 60.9	53.0	44.7 10	53		- 2.0	61	NCAD1	A04	Day	42	47	58	57	11	6	-5	4	 - oner in-car part winn me all comport, and statut sub-related construction work winn's me fail comport, sub-related coster controllated or approximately sub-right measurements. - Bitraneous sources (bries) were identified during the measurements.
Project 009a	27/01/2020	08:24	0:15:00	70.1	43.7	53.3 62.4	55.9	46.5 10	53			67	NCAD1	A05	Day	42	47	57	57	11	6	4	10	A05 - Project 009-010. Measurements taken on Gillam Street, adjucert to 2 Orchard Road, facing west towards works within the nal contdor. Site-related noise resulted from the unloading
Project 009b	27/01/2020	08:41	0:15:00	65.8	43.9	52.7 61.4	55.3	46.7 5	50			54	NCAD1	A05	Day	42	47	57	57	8	3	-7	-3	and bading of ballast and materials, the operation of executors and other h-red plant within the rel acomotic, holding motion admin. Site-related noises contributed to approximately 55- 100% of the overall Leq (15 min) throughout the measurements. Extransous sources were identified to include datent halfs and brids.
Project 010	27/01/2020	09:04	0:15:00	64.4	42.6	49.2 55.8	51.7	45.0 9	51		- 2.0	64	NCAD1	A06	Day	42	47	60	57	9	4	-9	7	A06 - Prijed 011-012. Measurements taken outside 5 Berkeley Court, boing west towards works within the rail controlor. Site-related noise resulted from the loading and unboding of balance
Project 011	27/01/2020	09:20	0:15:00	72.7	40.7	50.5 56.8	51.9	44.9 8	50			58	NCAD1	A06	Day	42	47	60	57	8	3	-10	1	and materials, and the operation of N-rail plant within the rail controls, including motion alarms. Site-related noises dominated the measurement contributing 80-90% of the overall Leg (15 m Extrameous sources were identified to include distant staffic, passing planes and nearby residents.
Project 012	27/01/2020	10:03	0:15:00	74.1	48.3	58.5 67.8	60.8	52.4 10	0 58			72	NCAD1	A07	Day	42	47	61	57	16	11	-3	15	AUT - Project 013-014. Measurements taken at the western and of Hopetoun Avenue, facing west lowards alle entrance and works within the nal controls. Sile-related noise resulted from
Project 013	27/01/2020	10:22	0:15:00	75.5	43.1	55.0 66.3	56.4	46.9 9	57		- 2.0	66	NCAD1	A07	Day	42	47	61	57	15	10	-4	9	be bading and unicading of balant and materials, the operation of his all just within the all contract, hand both and workers bading Site-etised roles dominated the measurement contributing 90-100% of the overall Leg (15 min). Extraneous sources were identified to include distant traffic and bins.
Project 014	27/01/2020	11:32	0:15:00	74.0	51.0	63.3 70.6	65.7	57.4 10	5 63			72	NCAD1	A03	Day	42	47	60	57	21	16	3	15	A03 - Project 015-016. Nessurements taken outside 5-10 Brand Street on Valeta Lane, taking southwest towards works within the rail contidor. Silo-related noise resulted from the operation
Project 015	27/01/2020	11:49	0:15:00	77.3	54.2	63.7 71.4	64.8	59.2 10	5 64			72	NCAD1	A03	Day	42	47	60	57	22	17	4	15	of trucks and hi-all plant within the all contour, unloading of materials, and conversitions on site. Site-instead rotoes contributed to approximately 100% of the overal Leg (15 min) throughout the measurements. Extramous sources were identified to include trints, cicadas and detaret traffic.
Project 016	27/01/2020	12:11	0:15:00	73.8	43.4	57.7 67.6	61.1	48.9 6	55			69	NCAD1	A02	Day	42	47	59	57	13	8	-4	12	A22 - Project 017218. Measurements taken outside 11 Hawkins Street, facing west lowerds works within the rail contidor: Sile-related noise resulted from the operation of encavators and
Project 017	27/01/2020	12:28	0:15:00	73.9	43.2	52.8 62.9	55.6	45.1 4	49			60	NCAD1	A02	Day	42	47	59	57	7	2	-10	3	other trical part (crares) within the rail control, and toda, and datasi she-stated works within the rail control. She-valued roades contributed to approximately 440% of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified to include birds and meatry (and datari) traffic.
Project 018	27/01/2020	13:27	0:15:00	90.1	51.6	63.2 73.9	63.6	53.6 10				85	NCAD1	A01	Day	42	47	66	57	21	16	-3	28	A01 - Project 019-2020. Measurements taken outside 13 Data Street, Atuminor, generally facing west lowards after entrance and works within the rail contrider. Sile-related noise resulted to their data works in takino. Sile-related noise resulted to their data works in takino sile

File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq LAF	1.0 LAF10	Pessentates Sign Contribution	(%) Measured Ste Note	Level - LAeq, 15minute	Impulsive Modifying Factor? Tonal Modifying Factor?	LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	RBL - LA 90, Period	NM. - LAeq. 15 minute	Predicted Site Noise Level - Lûeq. 15m inu te	Sieep Disturbance Screening Level - LAmax	Comparison to RBL - LA M, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Site Noise Level - LAeq. Heminute	Comparison to Steep Disturbance Scritening Level - L.Amax	Description
Project 019	27/01/2020	13:43	0:15:00	77.0	49.9	59.0 66	9 63.4	52.7 1		59		-	72	NCAD1	A01	Day	42	47	66	57	17	12	-7	15	overal Leg (15 mil) throughout the measurements. Extraneous sources were identified to include brids.
Project 020	27/01/2020	14:02	0:15:00	62.5	41.8	52.2 61	6 55.7	44.1	10	52			54	NCAD1	A04	Day	42	47	58	57	10	5	-6	-3	A&I - Project 021. Measurement taken outside 14 Raisong Bitterst. Buring west lowards works within the nationations. Site-initiated route resulted from the operation of horal plant within the nationation, and dataset seturement constore, and dataset seturement and the seturement to include berds, classias and already seture by the seturement to include berds, classias and already seturements by:
Project 021	27/01/2020	14:27	0:15:00	86	65.5	69.0 72	4 70.9	66.8 1		59		-	72	NCAD1	A07	Day	42	47	70	57	27	22	А	15	
Project 022	27/01/2020	16:02	0:15:00	78.0	49.6	58.7 67	3 61.6	52.9 1		59		-	73	NCAD1	A07	Day	42	47	61	57	17	12	-2	16	A07 - Project 022-024. Measurements taken outside 12 Hopeton Avenue, tuding west lowards alle entrance and works within the rail controls. Tak-valated rosis masulted from the operation of trucks and H-rail plant within the nail controls, loading and unitading of balasis and other materials, and truck home. She-valated noises dominated the measurements contributing 100% of the overall Lag (15 min). Extraneous sources were identified to include bried, distant traffic, narray residents and wind-blow registration.
Project 023	27/01/2020	16:25	0:15:00	77.3	44.6	59.9 64	4 62.7	49.2 1		52		2.0	64	NCA01	A07	Day	42	47	61	57	20	15	1	7	
Project 024	27/01/2020	16:52	0:15:00	65.4	41.5	51.0 58	2 53.6	45.5 1		53		2.0	64	NCA01	A06	Day	42	47	60	57	11	6	-7	7	A06 - Project 025. Measurement taken codate 5 Berkeley Court, bacing west lowards works within the nationation. Site-related noise escaled from the loading and unbacking that and materials, the operation of N-rail plant within the nationation, including motion alarma, and dangs are bangs. Site-related noises dominated the measurement combining 100% of the overall Leg (15 mit). Extrameous sources were identified to include datant traffic, insects and bink.
Project 025	27/01/2020	17:16	0:15:00	65.4	45.7	54.2 60	7 57.6	49.1	80	47		-	58	NCA01	A05	Day	42	47	57	57	5	o	-10	1	Ad5 - Project DD5. Measurement taken on Gittam Street, adjacent to 2 Orchard Fload, facing west lowards works within the nal contor, site-related noise resulted from the unloading and loading of balast and materials, the operation of excavators and other h-rail plant within the nal contod, and clargs and bangs. Site-related noises combuted to approximately 20% of the overall Leg (15 mm) throughout the measurement. Extraneous sources were dominant, and included distart fuelfs, wind-blown vegetation, nearby residents and birds.
Project 026	27/01/2020	18:05	0:15:00	67.9	45.6	55.5 64	2 59.7	47.9 1		56		-	67	NCA01	A01	Evening	41	46	66	56	15	10	-11	11	A01 - Project 027. Measurement taken outside 13 Dake Street, Artamon, generally fouring west towards alte entrance and works within the rail condor. Site-related noise rescaled from site mobilination, the operation of excavators and other in-tail joint (graves) within the rail condor (including loading/unikading material), and die joint and explanent Site-related noises contributed to approximately 100% of the overall Leg (15 mit) throughout the measurement. Eitheroous sources were identified to include bries and distant (and nearby) traffic.
Project 027	27/01/2020	18:38	0:15:00	60.9	40.3	48.1 56	9 50.9	42.9 1		48			59	NCAD1	A04	Evening	41	46	58	56	7	2	-10	3	A04 - Project 028. Measurement taken outside 14 Rategit Street, bucing west towards works within the nal contror. Site-related noise resulted from the operation of excavators and other hind just within the nal contror, and dangs and bangs. Site-related noises contributed to approximately 100% of the overal Log (15 min) throughout the measurement. Extraneous sources were identified to include birds, nearly residents and datart hafts.
Project 028	27/01/2020	19:21	0:15:00	76.6	47.9	61.4 69	9 63.4	57.9 1		51		-	72	NCAD1	A03	Evening	41	46	60	56	20	15	1	16	A03 - Project 028. Measurement taken outside 8-10 Brand Street on Valeta Lane, bacing southweat towards works within the rail control. Site-related noise resulted from the operation of front-end loaders and other plant within the nal control (deep execution), and clargs and bargs. Bite-related noises contributed to approximately 100% of the overall Log (15 mir) throughout the measurement. Extraneous sources were identified to include bries, passing and datant traffic, and nearby residents.
Project 029	27/01/2020	19:47	0:15:00	75.5	48.5	56.1 69	8 55.3	49.9 1		51		5.0	70	NCAD1	A02	Evening	41	46	61	56	20	15	o	14	A02 - Project 00. Measurement taken outside 11 Hawkins Street, fuorig west towards works within the rail contox. Site-valued noise resulted from the operation of ascarubors and other total plant (cranes) within the rail contox, change and burgs, lighting bavers and del plant/equipment. Site-related noise controluted to approximately 100% of the overall Leq (15 mm) throughout the measurement. Extraneous sources were identified to include birds, wind down vegetation and datart traffic.
Project 030	27/01/2020	21:09	0:15:00	83.9	39.6	55.6 67	1 56.5	41.8 1		56			75	NCAD1	A07	Evening	41	46	61	56	15	10	-5	19	A07 - Project 031. Measurement taken outside 12 Hopetoon Avenue, tacing west towards atte entrance and works within the nal contor. Site-related noise resulted from the operation of trucks and 1-rad joint within the nal contor, loading and unicading of balast and other materials, and huck horns. Site-related noises dominated the measurement contributing approximately 100% of the overal Lag (15 mm). Extranous sources were dentified to include birds, distant traffic, nearby resident and wind-down vegetation.
Project 031	27/01/2020	21:29	0:15:00	58	39.3	48.0 55	6 51.4	41.7	ro	46		-	58	NCAD1	A06	Evening	41	46	60	56	5	0	-14	2	AGE - Poject 322. Measurement taken outside 5 Berkelary Court, bucing west towards works within the nationrisor. Site-related noise resulted from the loading and unisading of balast and materials, the operation of hucks and h-air just within the nationrisor, and during and bargs. Site-related noises controluted to approximately 70% of the overal Log (15 min) throughout the measurement. Exitanceus sources were identified to include didant hards and passing aircraft.
Project 032	27/01/2020	21:49	0:30:00	71	44.2	51.3 60	1 53.5	45.8	80	55		5.0	65	NCAD1	A05	Evening	41	46	57	56	14	9	-2	9	Ad5 - Project 033 Measurement taken on Gitam Street, adjacent to 2 Orchard Road, ducing west towards works within the rail contridor. Site-related noise resulted noise resulted from the unloading and loading of statust and materinals, and the operation of excavolars and other trial) plant within the rail control. Site-related noises controllated to approximately 8% of the overall Leg (15 min) throughout the measurement. Extraneous noise sources included distant traffic, passing around and insets.
Project 033	27/01/2020	22:32	0:15:00	92.1	52.5	67.6 80	3 67.5	54.5 1		73		5.0	92	NCAD1	A01	Night	35	40	71	50	38	33	2	42	A01 - Project 034. Measurement taken outside 13 Daike Street, Artumone, generally facing west towards site enhance and works within the rail contox. Site-related noise resulted from site mobilisation, the operation of excavators and other Hrail plant (zomer) within the nail contox (including loading/unitading matrixe), hour mevements, and die plant and exponent. Site- related noises contributed to approximately (100% of the overall Leg (15 min) throughout the measurement. Extrancous sources were not identified during the measurement.
Project 034	27/01/2020	22:56	0:15:00	63.8	46.1	47.5 49	7 47.9	46.8 1		58	- 5.0	5.0	63	NCAD1	A02	Night	35	40	59	50	23	18	-2	13	A22 - Projec 055. Measurement taken outsids 11 Hawkins Street, facing west towards works within the rail contidsr. Site-related noise resulted from ide pairs and explanent on site, lighting towers and dargs + bargs. Site-related noises contributed to approximately 100% of the oweral Lex (15 mm) throughout the measurement. Extraneous sources were identified to include distant and nearly traffic.
Project 035	27/01/2020	23:16	0:15:00	75.4	33.5	56.7 69	5 59.3	37.9	2	40			61	NCAD1	A03	Nght	35	40	60	50	5	0	-20	11	AD1 - Project OIX. Measurement taken outside 8-10 Band Street on Valeta Lane, facing southwest lowards works which fire nal control. Site-related noise resulted from dosing and opening of doors on site and staff taking. Site-related noises were barely audite, and contributed to approximately 3% of the overal Lag (15 min) Broughout the measurement. Extraneous sources were dominant, and included insects, dottant and meanly traffic, and rearby residents.
Project 036	27/01/2020	23:51	0:15:00	64.9	34.1	38.4 46	8 38.5	35.6	22	32			38	NCAD1	A07	Nght	35	40	61	50	-3	-8	-29	-12	A07 - Project 027. Measurement taken outside 12 Hopeton: Acenue, tooing west towards site entrance and works within the rail contider. Site-related noise resulted from hand tools on site. Site-related noises were barely audite, and contributed to approximately 22% of the overall lac (15 mm) throughout the measurement. Extraineous sources were dominant, and included inscrite, addreadly taffic, and nearby taffic, and nearby residents.
Project 037	28/01/2020	00:11	0:15:00	54.9	34.4	37.5 45	2 37.8	35.6	50	39		5.0	40	NCAD1	A06	Night	35	40	60	50	4	-1	-21	-10	A05 - Project (322 Measurement taken outside 5 Benkelay Court, facting west lowerds works within the rail control. Site-related noise resulted from the numble of engines on site. Site-related noises controlled to approximately 50% of the overall Leq (15 mit) throughout the measurement. Extraneous sources were identified to include datant traffic and insects.







Appendix F – Monitoring Report (RP45)

Noise Monitoring - OOHW P7: MW31 - 3 to 7 February 2020

Figure A1.0 – OOHW MW31 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood

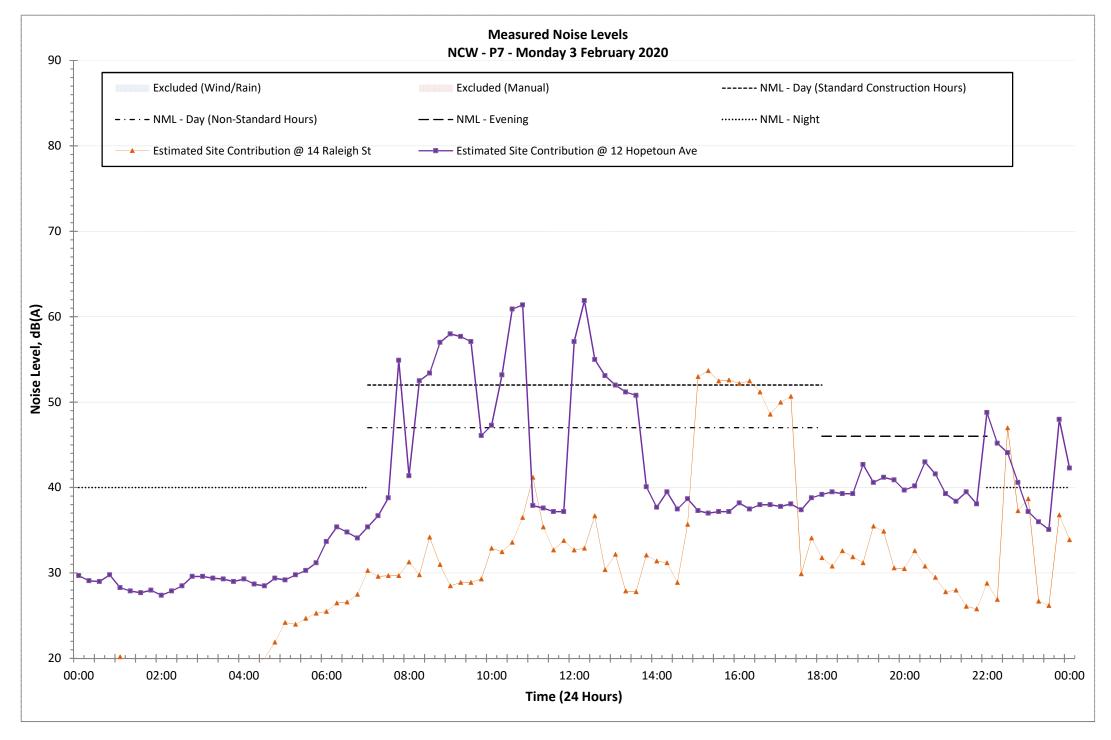
- NCW P7 (Monday, 3 February to Friday, 7 February 2020)

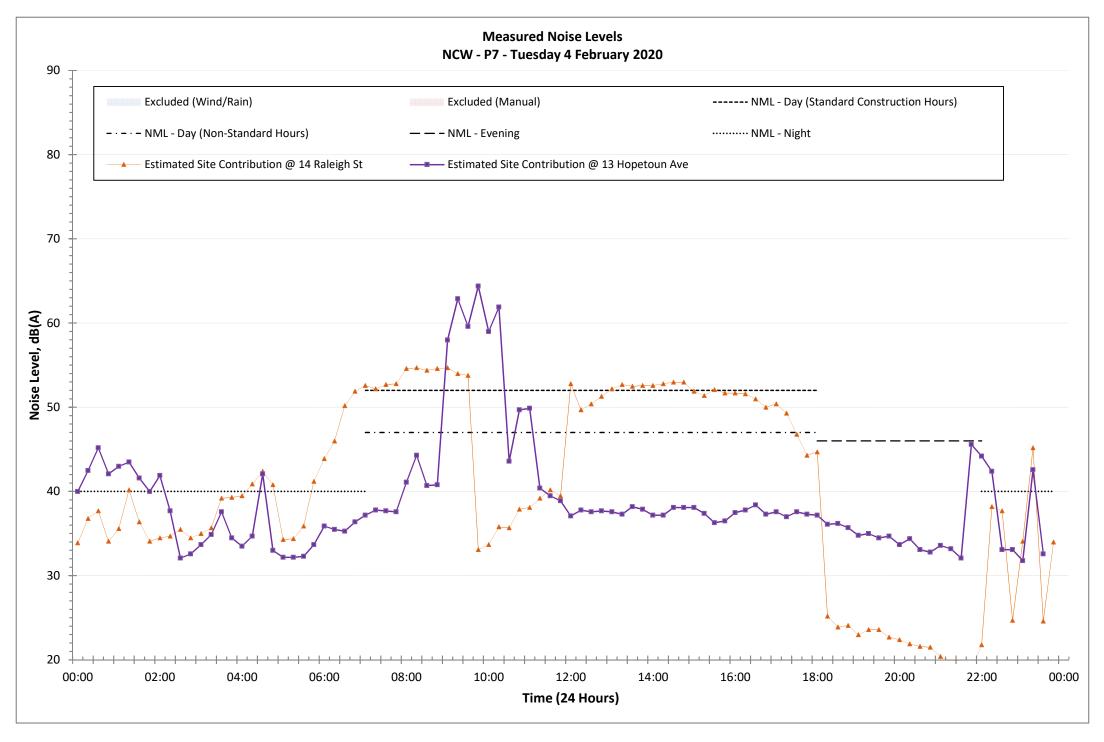


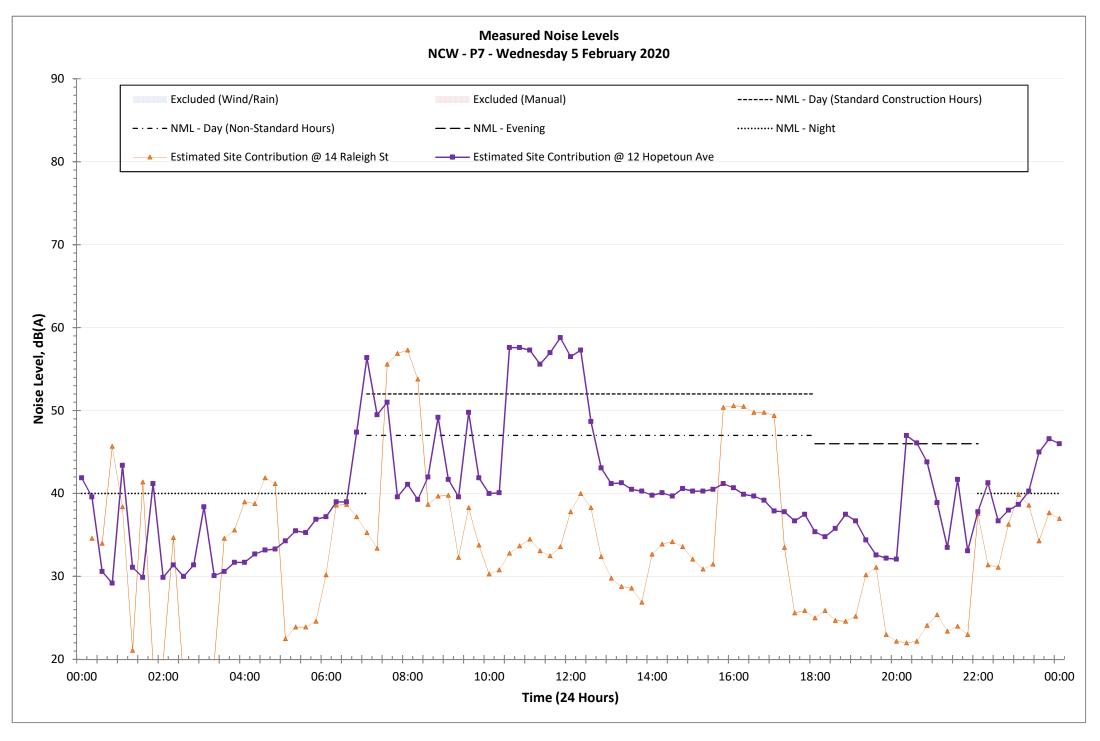
ERM

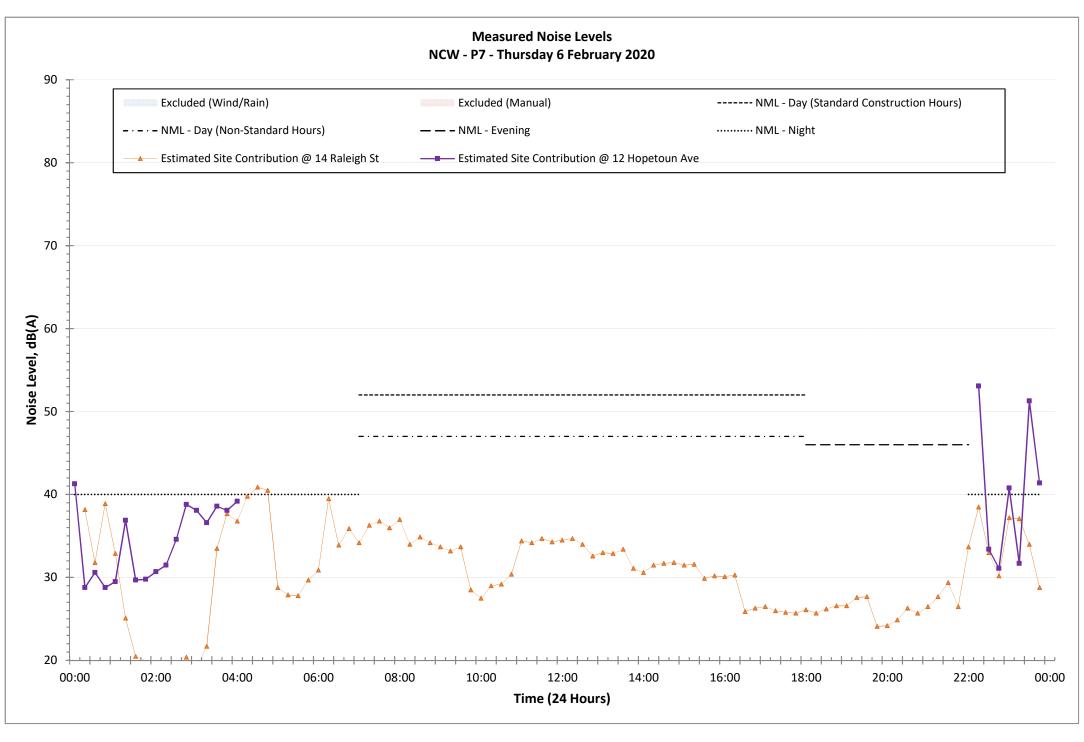
File Nam	e Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution (%)	Measured Ste Noise Levil - LAeq, 15m inute	Impulsive Modifying Factor?	T on al No difying Factor? LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	R BL - LA 30, Period	NM. - LAce, 15 minute	Pindickid Sila Nojae Level - LAeq. 15m inute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 10, Period	Comparison to NML - LAng, 15 minute	Comparison to Predicted Site Noise Level - LAeq. teminute	Comparison to Sleep Disturbance Sceening Level - LAmax	Becription
Project 001	3/02/2020	23:30	0:15:00	75.5	37.9	60.5	73.2	62.0	41.5	100			5.0 -	70	NCAD1	A01	Night	35	40	69	50	31	26	-4	20	A01 - Project 001-002. Measurements taken custode 11 Databe Street, Adamon, generally lacing west towards also entrance and works within the nal constore. Site-related noise resulted
Project 002	4/02/2020	23:48	0:15:00	73.6	40.8	60.1	67.2	63.2	47.4	100		-	- 5.0	68	NCAD1	A01	Night	35	40	69	50	30	25	-4	18	- from ale mobilisation, clargs and bargs, staff taking, and the operation of excavations and direr h-rail pairs within the rail control. Site-related noises contributed to approximately 100% of the overall Leg (15 min) throughout the measurements. Estameous sources were identified throughout the measurements to include wind-blown vegetation.
Project 003	4/02/2020	00:07	0:15:00	62.1	38.7	47.4	56.1	51.7	41.4	100		-	- 5.0	62	NCAD1	A02	Night	35	40	59	50	17	12	-7	12	A02 - Project 003. Measurement taken outside 14 Rategin Street, tacing west lowards works within the rail controls. Sile-related noise resulted from the operation of excavators and other hingli plant which the mail controls, disturt also-related constructions works within the mail controls, clangs and hangs, and reverse alarms. Sile-related noises contributed to approximately 100% of the overall Leg (15 mm) throughout the measurement. Extraneous sources were identified during the measurements and include passing aircraft, wind-blown vegetation, insects and dataset traffic.
Project 004	4/02/2020	00:40	0:15:00	69.3	37.0	50.7	61.9	52.2	40.1	100		-		68	NCAD1	A03	Nght	35	40	58	50	16	11	-7	18	A03 - Poject 004.005. Massemments balan at the vectors and of Nookona Avenue, taring sect towards dia extravol and vectors within the rail context. Site included note insulted from the touching and vectored and an attractive, the operation of the rail plane within the rail context, thend to be and vectors talking. Site-meated notes dominand the massements contractive growthing (TOM) with or event all (L) (TIM). Extensions across were selected to include data tractice and vectors talking.
Project 005	4/02/2020	01:00	0:15:00	64.7	35.5	47.0	54.3	48.7	41.3	100		-	- 5.0	64	NCAD1	A03	Nght	35	40	58	50	17	12	-6	14	ent contry and unicating to statute of instruct, the operation in the statute control of any involves stands, and work-book notices controlled to the control of the operation of the control of the cont
Project 006	4/02/2020	01:22	0:15:00	66.4	39.7	49.6	59.7	52.3	41.2	100			- 5.0	66	NCAD1	A04	Night	35	40	54	50	20	15	1	16	Act- Project 005. Measurement taken outside 15 Bankelay Court, Saling west towards works within the nil controls: Silv-stated note resulted from the loading and unloading of balant and materials, dragging of executor buckets to tailant, the queation of two plant within the nil controls, reluting motion alorms, and dangs and hangs. Silv-stated noises dominated the measurement controllung to 100% of the overall Lag (15 mil). Estimated sources were identified to include datart tartle, inaccts and werd-boxen registrices.
Project 007	4/02/2020	01:43	0:15:00	66.2	41.5	49.6	57.3	52.1	44.7	100		-		62	NCAD1	A05	Night	35	40	55	50	15	10	-5	12	Ad5 - Project 007. Measurement taken on Gillam Street, adjacent to 2 Orchard Raad, facing west towards works within the rail contairs. Size-related noise resulted from the unitsading and loading of materials, the operation of executions and other th-rail plant within the rail contairs, holding notion aliams, clarge, and loady, and hold viola. Size-related noises contributed to approximately (00% of the overall Leq (15 mit) throughout the materialment. Extensions sources were identified to include distant taffic and wind down wegetalion.
Project 008	4/02/2020	02:24	0:15:00	70.5	37.6	51.5	60.4	55.0	41.3	100		-	- 5.0	61	NCAD1	A06	Night	35	40	61	50	22	17	-5	11	A05 - Project 006. Measurement taken outside 11 Hawkins Street, facing west lowards works within the rail contrior. Site-stated noise resulted from the operation of encavoiors and other h-rail part (promet) within the rail control, dragging of encavoits buckets across stated, buding and unbading dimitensis, and dangs and bargs. Site-stated roises contributed to approximately (10% of the overall Leq (15 mit) throughout the measurements. Extremous sources were itsettind to include birts and nearly (and distant) until:
Project 009	4/02/2020	11:35	0:15:00	75.2	34.7	56.4	69.9	57.4	37.9	5		-		53	NCAD1	A07	Night	35	40	61	50	8	3	-18	3	AUT - Project 009-010. Measurements taken outside 111 Hampdon Road, facing east beards works within the nal contrior. Sile-stated noise resulted from the operation of excavation and
Project 010	4/02/2020	23:53	0:15:00	73.5	35.2	54.8	68.5	55.6	37.3	8		-		46	NCAD1	A07	Night	35	40	61	50	9	4	-17	-4	-dher bisi jater with he ail control, generativelyging towns and cargo, and targo. She valued orace were minimal and controllated to approximately 51th of the overal Leq (15 mir) Broughout the measurements. Extraneous sources were dominant and included datant and passing traffic (including bases and ambulances) and nearby residents.
Project 011	5/02/2020	00:29	0:15:00	75.8	41.1	55.6	65.1	59.2	44.7	100				65	NCAD1	A03	Night	35	40	58	50	21	16	-2	15	A33. Project 011. Measurement taken all the vestem and of Hopotrum Averue, facing west baseds able entrance and works within the rail control. Sile-related noise resulted from the loading and unloading of baland and materials, the operation of H-rail plant within the rail control. The Hopotrum Averue taking Sile-related moles dominated for measurement contributing 100% of the overall Leg (15 mm). Extrances sources were identified to include datast take, needs and conventions with residents.
Project 012	5/02/2020	01:00	0:15:00	67.9	35.4	48.8	59.7	51.7	37.1	100		-		65	NCAD1	A04	Night	35	40	54	50	14	9	-5	15	A64 - Project 912-913. Measurements taken rouble 5 Bentelyy Court facing and travels works within the nationation Standard roles resulted from the loading and unloading of balance.
Project 013	5/02/2020	01:18	0:15:00	68.4	37.5	49.0	59.7	51.8	39.8	100		-		68	NCA01	A04	Nght	35	40	54	50	14	9	-5	18	and materials, dragging of econvator bockte, on balaita, the operation of thrian jane within the nationrisos, staff talang, and catego and sange. Site statistic costes dominated the measurements contributing to 100% of the overall Let (15 min). Extransous sources were identified to include distant traffic.
Project 014	5/02/2020	01:39	0:15:00	63.9	41.8	48.6	58.9	51.8	43.0	100		-	- 5.0	61	NCA01	A05	Nght	35	40	55	50	19	14	-1	11	Ad5Project D14. Measurement lation on Gillum Binet adjacent to 2 Orchard Read, facing west traveds works within the nal contair. Site-related noise resulted noise resulted from the unitability and loading of materials, the operation of encombons and other hirst plant within the nal contribu. clarge and tangs, and staff tabling. Site-related noises contributed to approximately 100% of the overall Leg (15 mit) throughout the measurement. Estimations sources were identified to include datant traffic and marky traffic, and inaccs.
Project 015	5/02/2020	02:15	0:15:00	56.7	29.9	36.1	43.7	38.1	31.6	36				45	NCA01	A02	Night	35	40	59	50	-3	-8	-27	-5	X02. Project 015. Measurement taken outside M Raking Street, buring week towards works within the rail controls: Else-valued value multicle form, datart class-valued controls on sources were dominant during the measurements. Bitameous sources were dominant during the measurements and included moleces, and datart and readly traffic.
Project 016	5/02/2020	02:41	0:15:00	52.8	26.7	35.8	46.9	39.2	28.1	26				50	NCA01	A01	Night	35	40	60	50	-5	-10	-30	0	A11. Project D16. Meansament taken outside 13 Dates Street Adamon, generally locing wait based alte entrance and werks within the not contace. She valued noise resulted how combinated to approximately 20% of the overall Lag (15 min) throughout the measurements. Extrancous sources were dominant throughout the measurement and included animals and intexts, and distant and nearly traffic.
Project 017	5/02/2020	23:14	0:15:00	85.3	52.6	59.4	65.7	60.6	54.3	100		-	- 5.0	79	NCAD1	A01	Nght	35	40	69	50	29	24	-5	29	Ant. Project 017. Measurement taken outside 13 Datas Brand, Adamon, generally locking wait baseds alte entrance and works within the nat conduct Sole-related noise resoluted from frequent clarge and barge, staff taking, and the specific on the conduct and the 11-ball plan within the rule conduct (including movement or frequent). Sile-related noise constructor to approximately 100% of the overall Let (15 min (includios) and the macument. Extensions sources were deterified frequency the measurement to include datast and nearly table.
Project 018	5/02/2020	23:38	0:15:00	76.6	38.1	57.9	70.8	60.2	41.1	3				56	NCA01	A07	Night	35	40	61	50	8	3	-18	6	AUT - Paged 2014.010 Measurements takes notable 111 Hampdee Road, foring east taxada works within the rail contair. Sile-wished coale revealed from the specifier of excessions and other K-rail planet within the rail controls, working and other hand to clear, and target and target. Sile-wished coales were minimit and contributed to agronomicity. 2007, or there can all large (ff mmi) Revigited the measurements. Extraces sources were dominant and child detatat and assign faile (notifying target) and sites and nearly
Project 019	5/02/2020	23:54	0:15:00	80.9	36.9	58.8	72.6	58.5	39.7	20	52			57	NCA01	A07	Night	35	40	61	50	17	12	-9	7	min) throughout the measurements. Extraneous sources were dominant and included distut and passing traffic (including buses, anthulances and motorsycles), insects, and nearby residents.

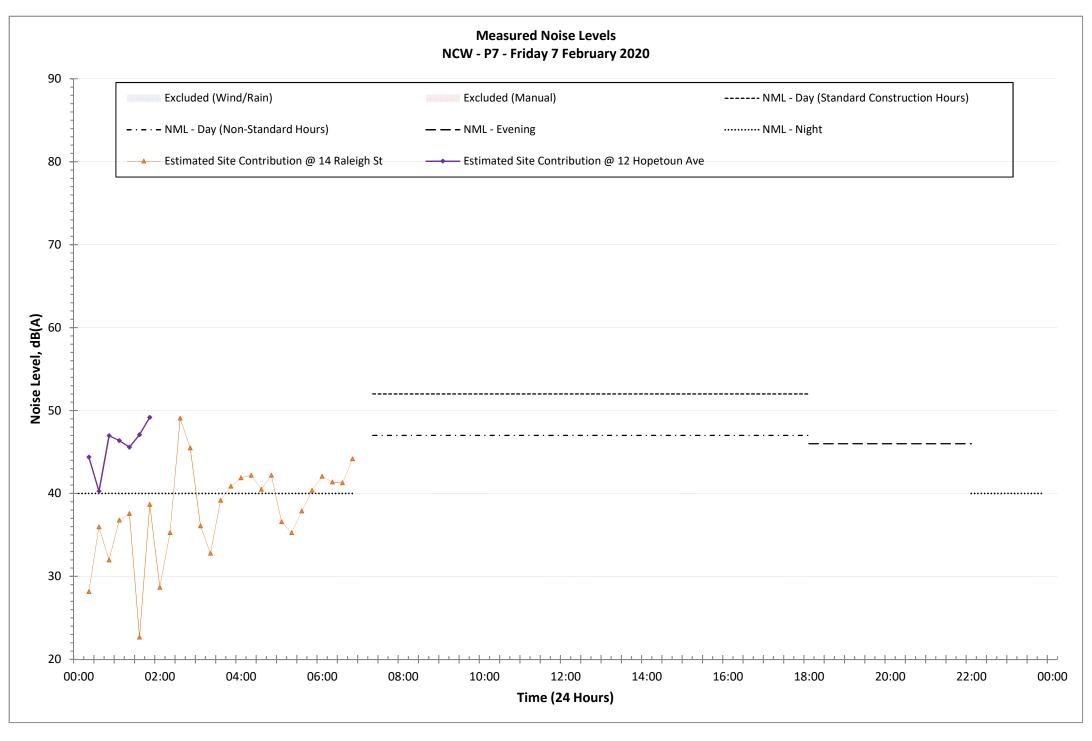
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution (%)	Messured Ste Noise Level - LAeq, 15minute	Impulsive Modifying Factor?	T on al Modifying Factor?	LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	L ocation	Period	- LA 39, Period	NML - LA oq, 15 minute	Predicaed Site Noise Level - LAcq, 15m inute	Sleep Disturbance Screening Lovel - LAmax	Compatison to RBL - LA10, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Site Noias Level - LAeq, 15m inute	C omparison to Sleep Disturbance Scriening Level L Amax	Description
Project 020	6/02/2020	00:25	0:15:00	69.4	38.6	50.1	59.5	53.2	41.0	70				5.0	57	NCA01	A06	Night	35	40	61	50	19	14	-7	7	Ad6 - Project 020. Measurement taken outside 11 Heavitres Street, facing west baverds works within the rail contrider. Site-reliated noise resulted from the operation of excavator backets across balast, loading and unstading of materials, lighting towersignmentors, and clarge and barge. Site include clarge strength within the rail contrider. If the operation of excavator backets across balast, loading and unstading of materials, lighting towersignmentors, and clarge and barge. Site include clarge strength within the rail controls. If the operation of excavator backets across balast, backing and unstading of materials, lighting towersignmentors, and clarge and barge. Site include clarge strength of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified to include distant traffic and nearly road we grant Street.
Project 021	6/02/2020	00:46	0:15:00	76.6	52.8	60.7	69.0	64.0	53.6	100				5.0	74	NCAD1	A01	Night	35	40	69	50	31	26	-3	24	A1 - Project 021. Measurement taken outside 13 Drake Street, Arturnon, generally facing west lowards alle entrance and works within the nal contdor. Site-related noise resulted change and bangs, staff taking, lighting beverlapmentors, and the operation of exclusions and other hirst plant within the nal contdor (inclusion movement of materials and balas related noises contributed to approximately 10% of the overall Leg (15 mit) throughout the measurement. Estatewook sources were not identified during the measurement.
Project 022	6/02/2020	01:28	0:15:00	63	37.0	46.5	54.2	49.9	38.9	100				5.0	56	NCA01	A04	Night	35	40	54	50	17	12	-3	6	A04 - Project 022 Measurement taken outside 5 Beheley Court, facing west towards works within the rail contor. Site-related noise resulted from the dragging of exclusion buckts ablaut, grinding/siting/site/hammering, the operation of h-rail plant within the rail contor, including motion alarms, and clangs and bangs. Site-related noises dominated the meas contributing to 100% of the overal Leq (15 min). Extraneous sources were identified to include insects.
Project 023	6/02/2020	01:51	0:15:00	70.9	36.6	49.3	61.1	50.1	43.2	40				5.0	51	NCA01	A05	Night	35	40	55	50	15	10	-5	1	46. Polyof D14 Measurement taken on Gillam Street, adjacent to 2 Onthard Road, footing west towards works within the nal constor. Site-related noise resulted too the unioxid loading of materials, the operation of excanders and other hard giver within the nal constor, including matter alarms, clarge and hange, and staff taking and lighting towards performance of the including matter alarms, clarge and hange, and staff taking and lighting towards performance of the including matter alarms. Clarge and hange, and staff taking and lighting towards performance of the including matter alarms constrained by a performance 40% of the overal Leg (15 min) throughout the measurement. Extraveous sources were dominant and included distart traffic and near and nearby width.
Project 024	7/02/2020	01:54	0:15:00	62.1	34.5	41.1	48.6	42.8	36.7	100				5.0	47	NCA01	A04	Night	35	40	54	50	11	6	-8	-3	A04 - Project 024. Measurement taken outside 5 Beheley Court, bacing west towards works within the rail contidor. Stas-related noise resulted noise segments and share year with controls, including motion aimms, staff taking, lighting towersignmations, and clarge and bargs. Sta-related noises dominated the measurement contributing to 100% of the over min). Extraneous sources were identified to include distart and nearby taffic.
Project 025	7/02/2020	02:26	0:15:00	73.5	34.6	51.5	63.2	52.1	36.6	100			5.0	5.0	71	NCAD1	A01	Night	35	40	69	50	27	22	-8	21	A1 - Pojed D25 Measurement taken statistis 10 bake Street, Artamon, generally being west towards alle entences and works within the rail constor. Sile-related nesses to the street bake statistical galaxies and the descented of backs on alle. Sile-related nesses contributed to approximatility 100% of the overall Leg (15 mit) The measurement Extension success were towards to include the statistical galaxies.











Appendix G – Monitoring Report (RP46)

Noise Monitoring - OOHW P7: WE32 - 8 to 9 February 2020

ENVIRONMENTAL RESOURCES MANAGEMENT AUSTRALIA PTY LTD

ERM: Level 15, 309 Kent Street Sydney, NSW 2000. T: (02) 8584 8888. F: (02) 8584 8800. www.erm.com

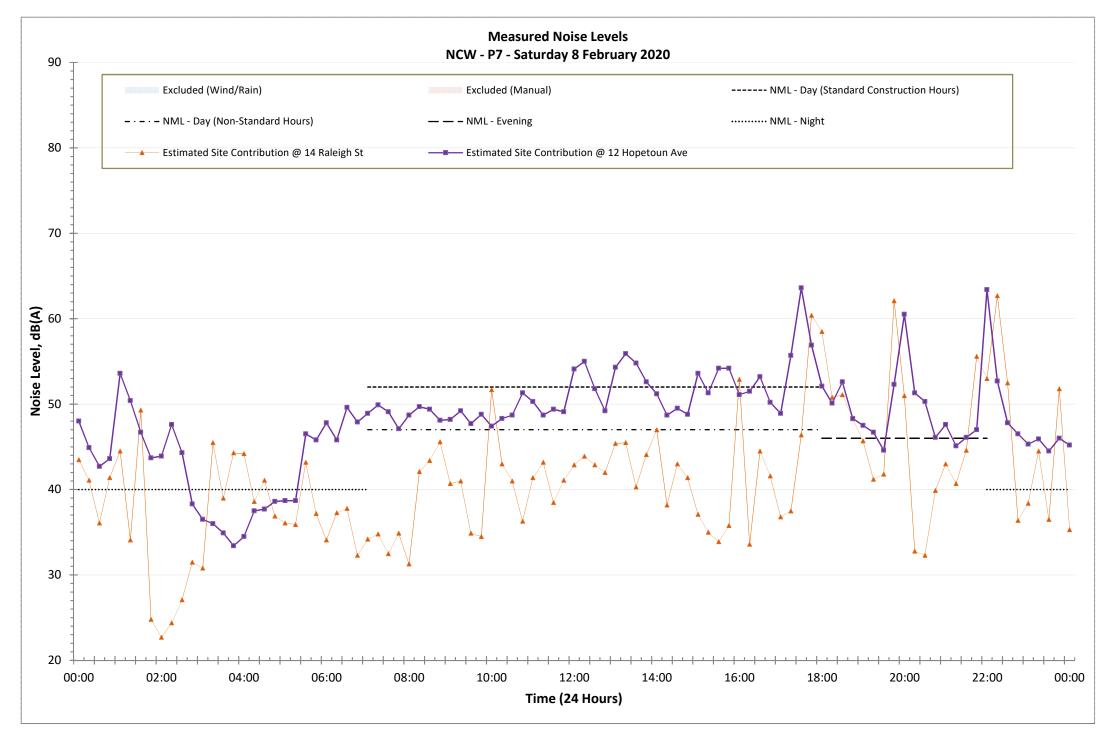
Figure A1.0 – OOHW WE32 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood

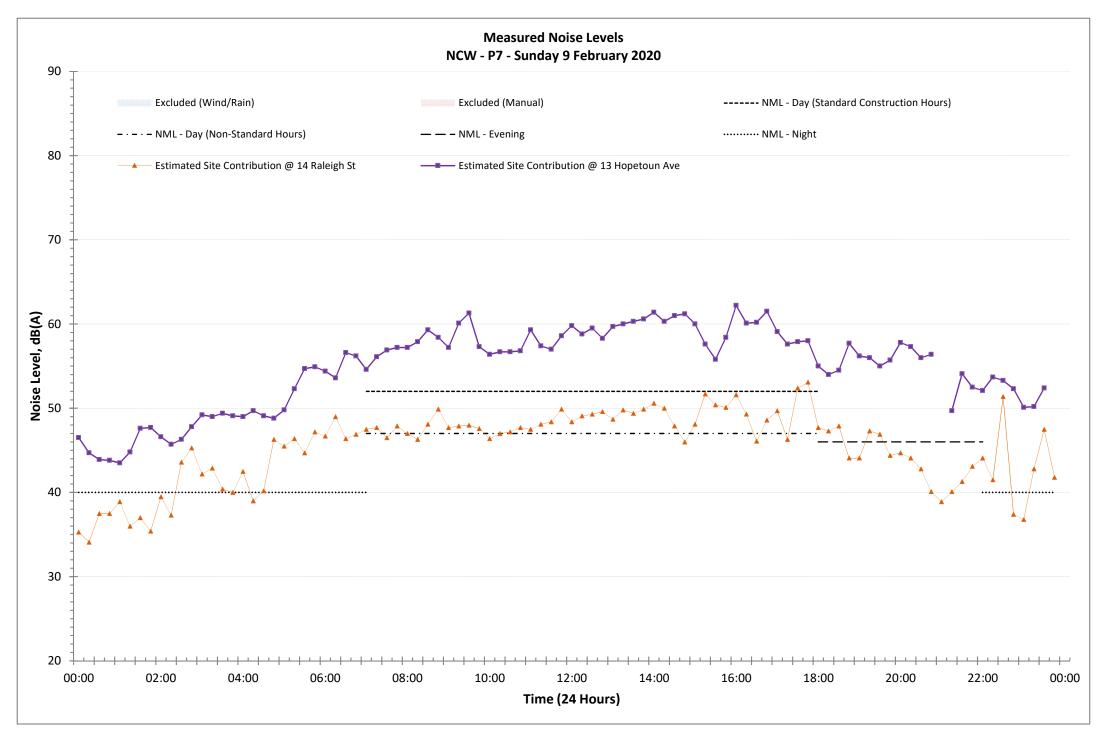
– NCW P7 (Saturday, 8 February and Sunday, 9 February 2020)



File Name	Date	Start Time	Bapsed Time	LAFmax	LAFmin	LAcq	LAF1.0	LAF10.0	0.0664 Percentage Site Contribution (%)	Measured Ste Noise Level - Laeo, Herrinule	limpulsive Modifying Factor? Tonal Modifying Factor?	Low Frequency Modifying Factor?	Measured Ste Noise Levid - LAmax	NCA	Location	Petiod	RBL - LA30, Period	NM. - LAcq. 15minute	Predicted Site Noise Level - LAeq. 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 00, Period	Comparison to NML - LAcq. 15 minute	Comparison to Predicted Site Noise Level - LAeq, Haminute	Comparison to Steep Disturbance Screening Level - LAmax	Description
Project 001	8/02/2020	04:17:08	0:15:00	76.2	54.7	60.6	71.0	61.7	55.6 100	63		2.0	76	NCA01	A01	Ngit	35	40	61	50	28	23	2	26	AD1. Project 001. Measurements lation cutofol hear land Stand, Arlumons generally facing a well be and a site entrance and evolve within the nat consider. Stavelated noise resulted from lighting taxes, workers taking, accounter opening, meanement of took, work taxis, loading of materials and head just at within the nat consider. Stavelated noises contributed to approximately 105% of the overall Leg (15 mit) throughout the measurements. There were no extraneous sources destified.
Project 002	8/02/2020	04:45:02	0:15:00	81.5	53.5	67.8	76.9	72.2	58.5 100	68			82	NCA01	A02	Ngtz	35	40	72	50	33	28	-4	32	Alz - Reject 002 003. Messurements lalen outside Davie Street, Artamon, generally facing west towards alle entrance and works within the rail contridy. Sile-related noise resulted from occurator and to cranes operating, worker's laking and beeps, Sile-related rokes contributed to approximately 000% of the overall Les (15 mit) throughout the messurements. Extraneous
Project 003	8/02/2020	05:03:04	0:15:00	77.3	62.2	64.5	71.2	65.3	63.1 100	70		5.0	π	NCA01	A02	Nght	35	40	72	50	35	30	-3	27	sources were identified to include cars passing by.
Project 004	8/02/2020	05:50:02	0:15:00	86.1	46.4	55.9	64.1	56.7	49.7 100	61		5.0	85	NCA01	A03	Nght	35	40	71	50	25	21	-10	36	A03 - Reject 004-005. Measuments taken outside Hopetourn Avenue, facing west tow and a works within the nationation. Size-related noise resulted from the operation of accavator, workers taken, hand took, eiting operations and interventer of tables. Size-related noises contributed to approximately 100% of the overall Leg (15 me) throughout the measurements.
Project 005	8/02/2020	06:07:06	0:15:00	78.8	47.5	56.6	65.4	58.9	49.0 100	62		5.0	79	NCA01	A03	Nght	35	40	71	50	27	22	-9	29	
Project 006	8/02/2020	06:28:10	0:15:00	71.9	43.9	52.2	61.9	53.4	47.1 90	57		5.0	72	NCA01	A04	Night	35	40	71	50	22	17	-14	22	AV4 - Reject 006-007. Measurements latern adade Benkely Court, facing w ast towards works within the rail contoor. Site-related noise resulted from excavator operating, hand look and work with measurements. Site-related measure combuted to approximately SVK of the overall Lac (15 mm) throughout the measurements. Batramenes sources were identified to include dataet function was and another.
Project 007	8/02/2020	06:46:04	0:15:00	70.3	43.8	49.7	55.7	51.8	46.0 90	54		5.0	70	NCA01	A04	Nght	35	40	71	50	19	14	-17	20	
Project 008	8/02/2020	07:06:08	0:15:00	67.6	48.3	54.9	61.2	57.3	51.1 70	55		2.0	70	NCA01	A05	Day	42	47	54	57	13	8	1	13	AGS - Reject 2014. Neuraments balan on Glaim Street, adjacent b 2 O'chard Reut, facing w exitow arb w orks with the rail contact. Site-related noises control tools and operation of executors. Site-related noises controllated to approximately 70% of the overall Leg (15 mm) throughout the measurements. Enteneous sources were identified to lates and datart fauffic.
Project 009	8/02/2020	19:55:04	0:15:00	80.1	59.5	69.0	74.1	71.8	64.1 100	69		-	80	NCA01	A03	Evening	41	46	70	56	28	23	-1	24	AG3 - Regist (196-70). Measurements laken outside Hopeton Avenue, faching w est tow ands w works within the nationation. Silv-rolated value resulted from the operation of escawatore, measurement of balant and horns. Silv-rolated noises contributed to approximately 100% of the overal Leg (15 mit) throughout the measurements. There w ere no estraineous sources identified.
Project 010	8/02/2020	20:12:08	0:15:00	69.3	53.0		67.5		56.6 100		· ·	-	69	NCA01	A03	Evening	41	46	70	56	22	17	-7	13	
Project 011	8/02/2020	20:32:16	0:15:00	72.6	45.5	62.6	69.3 59.5		47.6 90	62 57		5.0	73	NCA01	A04	Evening	41	46	70	56	21	16	-8	17	Al0 - Regist 011-012. Messurements balan duska Benlely Court, facing west to wards all entrance and works within the rail contor. Site-related noise resulted from the operation of accentures, th-air jums, datart works and movement of balant. Site-related noises dominate the measurement contributing 00% of the overall Leg (15 mm). Behanicus parces were identified to include coadus, wind, datart traffic, vehicles passing by and neighbours taking.
Project 012 Project 013	8/02/2020	21:09:04	0:15:00	67.2	45.5		60.8		52.8 80			5.0	67	NCA01	A04 A05	Evening	41	40	70	56	16	9	-13	11	A/JS - Reject 013. Measurements taken on Gilaus Street, adjocent to 2 Ochard Read, facing west towards works within the nal contox. Site-related noise resulted from operation of excavators and home. Site-related roles contributed to approximately 60% of the overall Lac (15 mm) throughout the measurements. Extraveces ascurces were leadtried to datart traffic,
Project 014	8/02/2020	22:13:10	0:15:00	74.9	53.7	58.4	67.0		54.8 80		 		75	NCA01	A01	Nght	35	40	61	50	22	17	-4	25	horns and wind.
Project 015	8/02/2020	22:32:10	0:15:00	75.2	53.5	57.3	66.1		54.8 80	61		5.0	75	NCA01	A01	Nght	35	40	61	50	26	21	0	25	A01 - Reject 014-015. Measurements taken outside Hawkins Street, Artumon, generally facing well twa ands alte entance and works within the rail contidor. Sile-visited noise resulted from wrk train erginn's humand operation of excenter. Sile-visited noises contributed to approximately 80% of the overall Leg (15 mit) throughout the measurements. Extraneous sources were identified to see ding running water and nutling trees.
Project 016	8/02/2020	22:52.06	0:15:00	85.8	55.9	62.8	72.6	63.0	58.4 100	63		-	86	NCA01	A02	Nght	35	40	72	50	28	23	-9	36	
Project 017	8/02/2020	23:21:04	0:15:00	80.8	57.5	67.8	78.1	73.1	58.8 100	68		-	81	NGA01	A02	Nght	35	40	72	50	33	28	-4	31	A20 - Registration of USG/11 Measurements balan pasks Data Strate Advances, generally a law on low acts due entrance and works with the sub-contact. Shak-tabled main masked from momenter of materia strate lighting two much in a strate advances of entrances of entrances. Shak-tabled makes dominated the measurement controluting 100% of the overall Leq (15 mm). There were no entrances sources dentified.
Project 018	9/02/2020	00:37:04	0:15:00	95.6	46.1	64.1	66.7	55.2	48.0 100	64		-	96	NCA01	A06	Nght	35	40	59	50	29	24	5	46	Add - Regist 018-019. Measurements laten outside Rategh Street, funding west towards works within the nal controls. Stev-related route resulted from the distant works, operation of
Project 019	9/02/2020	01:05:02	0:15:00	77.5	47.4	55.5	67.1	54.8	49.5 100	61		5.0	78	NCA01	A06	Nght	35	40	59	50	26	21	2	28	-exception and head work has not harm how. She valued noises dominated he measurement contributing 100% of the overall Leq (15 mm). Estamona sources were identified to include dataset harms, which and water running.

File Nam e	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0 1	.AF10.0	LAF90.0	Percentage Sile Contribution (%)	Measured Ste Noise Level - LAeq, 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	Low Frequency Modifying Factor?	Messured Ste Noise Levid - LAmax Nr.A		Location	Period	RBL - LA 90, Period	NML - LAtaq, 15 minute	Predicted Site Noise Level - LAcq, 15minute	Sleep Disturbanze Screening Levid - LAmax	Comparison to RBL - LÁ 90, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Site Noise Level - LAeq, Heminute	C omparison to Sleep Disturbance Screening Level - L Amax	Perangkan
Project 020	9/02/2020	01:58:08	0:15:00	69.3	47.4	54.2	63.9	57.1	49.4	100				5.0	64 NC/	.01	A03	Nght	35	40	65	50	24	19	-6	14	A03 - Reject 022. Measurements balan outside Hopeton Avenue, facing west lowards within the nal contox. Sile-valued noise insolided inter-specialize of excervalues, band harmening and mexement of balant. Sile-valued noises dominated the measurement contributing 100% of the overall Leg (15 mit). Extraneous sources were identified to include wate noming.
Project 021	9/02/2020	02:38:10	0:15:00	78.5	51.6	55.6	63.3	56.2	52.6	100			-	5.0	79 NC/	.01	A02	Nght	35	40	71	50	26	21	- 10	29	Al2 - Right Q1. Measurements taken outside Drate Street, facing west low ands works white the rail constor. Site-related noise resulted from lighting low or, operation of excavator hand took and vertices entiring the site. Site-related noises dominand the measurement contributing 10% of the overall Leq. (15 mil). Estamona sources were identified to include which and routing trees.
Project 022	9/02/2020	18:35:02	0:15:00	81	56.3	62.7	73.6	64.0	57.6	50			-		81 NC/	.01	A05	Evening	41	46	59	56	19	14	1	25	Adi - Popol 02-202. Measurements taken outside Reliegh Sheet facing west towards alle entrance and works within the rail contox. Site-related noise resulted from the operational controls - Relieved to the second of the operation of the operation of the control - Site-related noise resulted from the operation of the c
Project 023	9/02/2020	19:21:05	0:15:00	76.8	59.9	66.6	73.6	69.7	61.4	10			-		77 NG/	.01	A05	Evening	41	46	59	56	16	11	-2	21	reconstruction and provide the second s Second second s Second second se Second second sec
Project 024	9/02/2020	19:52:04	0:15:00	99.1	56.1	73.4	81.2	72.5	58.9	80				-	99 NC/	.01	A02	Evening	41	46	72	56	31	26	0	43	A013- Project DA-4055. Measurements taken outsite Date Street. Arternon, generally facing a vest the artis site entrance and works which the rail context. Site-initial roles results are contained or came, tracks entering in the site, hand take and lighting timer. Site-initial roles downlink the measurement contributing ID-50% of the overall Leg (5 mm). Site
Project 025	9/02/2020	20:10:04	0:15:00	87.5	61.8	70.3	77.3	72.9	63.8	90					88 NC/	.01	A02	Evening	41	46	72	56	29	24	-2	32	— The definition of orders, these entering in the site, hand book and igting the eff. site-realed noises dominated the measurement controlling survey or the overal Leg (15 mm), sate powers were identified to include rating and wind.
Project 026	9/02/2020	21:20:22	0:15:00	69.5	50.2	56.8	64.0	59.2	52.5	5					70 NC/	.01	A03	Evening	41	46	65	56	3	-2	-21	14	A03 - Paged 205. Massurements taken outside Repetition Avenue, facing w est tow ands w ontis w thim the rail contract. Site-related noise resulted from the mobilisation of the lowest Adde closes contributed to approximately this of the sovial Lag (CS mit) throughout the measurement. Extramol ancurate were laterfact to include lating and with





Addendum

Appendix H – Monitoring Report (RP47)

Noise Monitoring - OOHW P7: MW32 - 10 to 14 February 2020

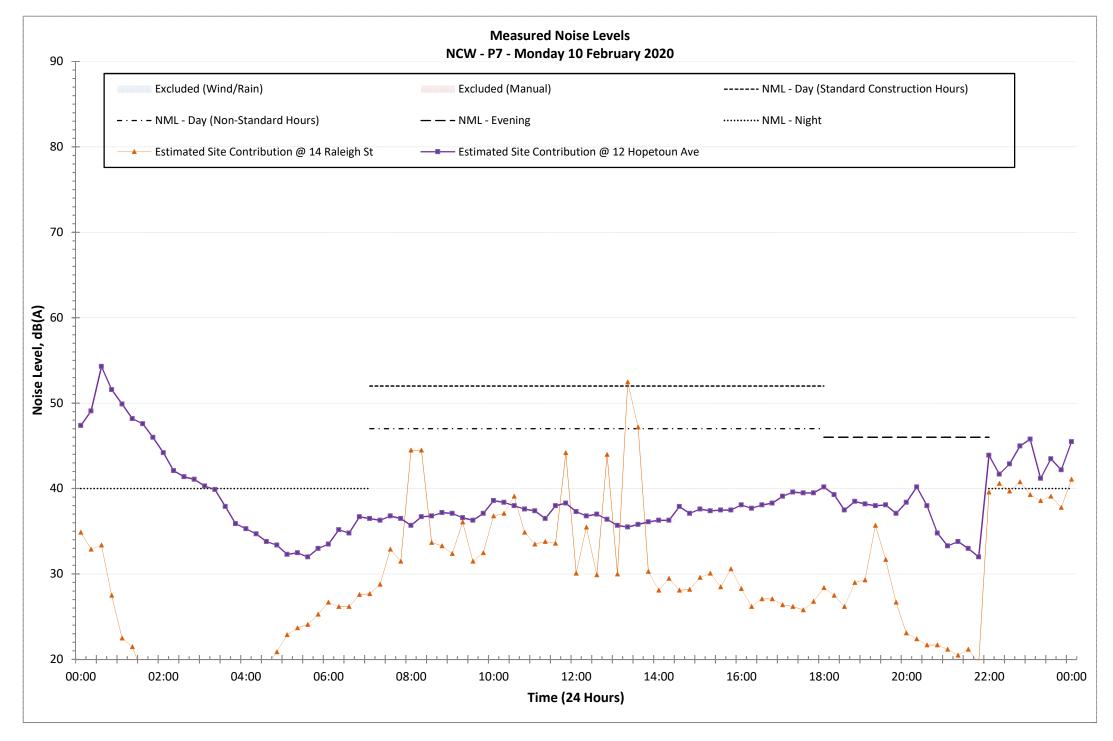
Figure A1.0 – OOHW MW32 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood

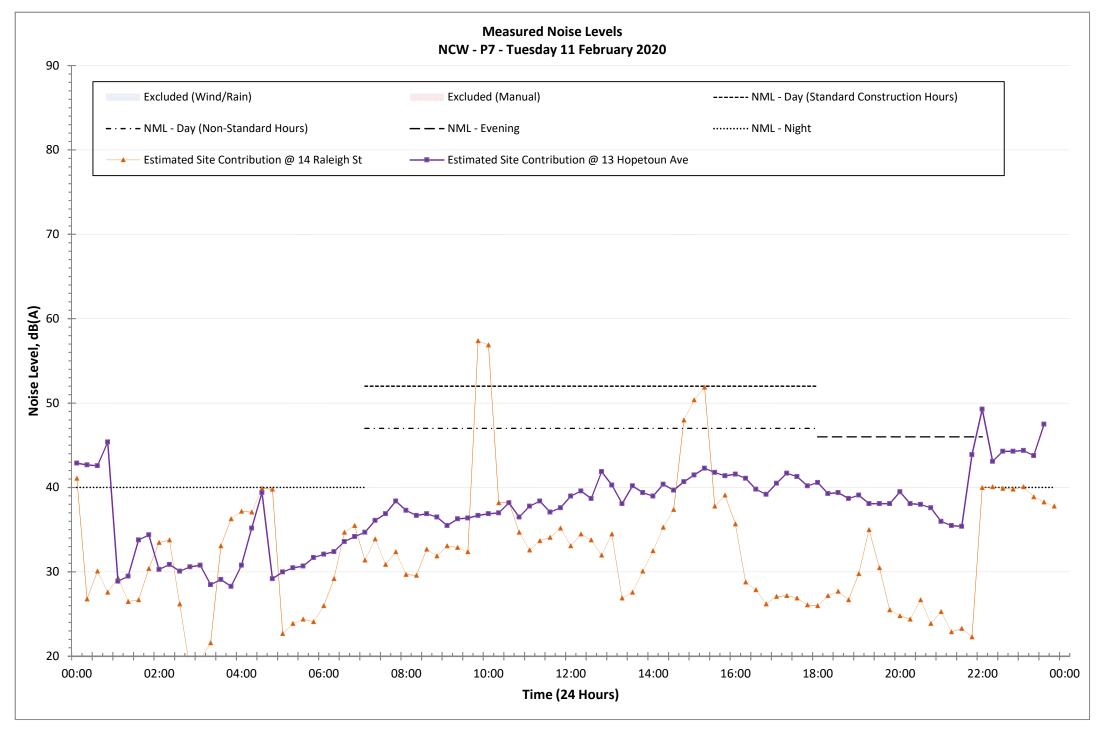
- NCW P7 (Monday, 10 February to Friday, 14 February 2020)

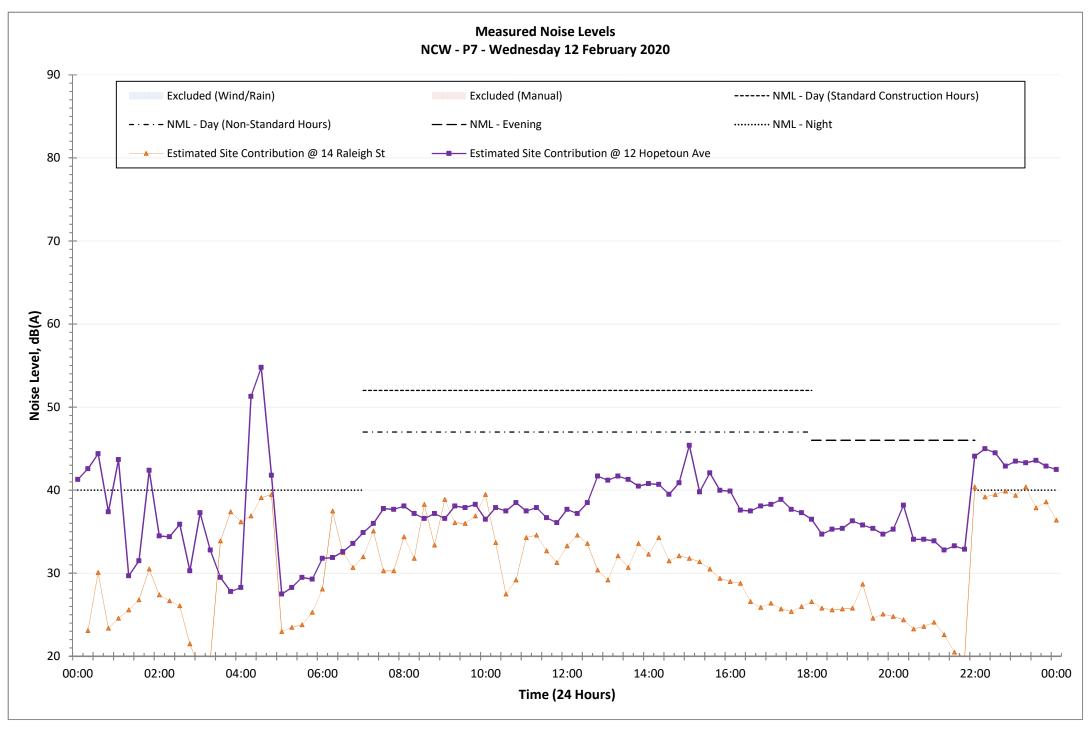


ERM

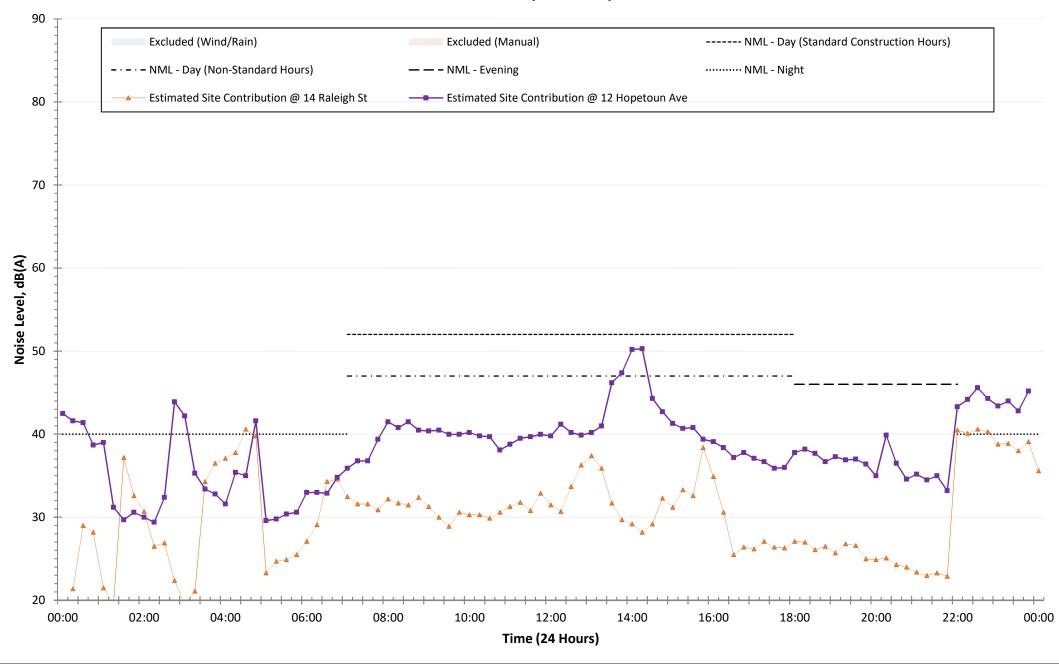
File Name	Date	Start Time	Elapsed Time	LAFmax	c LAFmin	LAcq	LAF1.0	LAF10.0	Peccentage Site Contribution	Measured Ste Noise Level - LAeq. 15minute	Impulsive Modifying Factor?	Tonal Modifying Factor?	LF Modifying Factor? Measured Ste Noise	Levis - LAmax NCA	Location	Period	RBL • LA93, Period	N.M. - L.A.eq, 15 minute	Predicted Site Noise Level - LAcq, 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 30, Period	Comparison to NML - LA eq. 15 minute	C omparison to Predicted Site Notise Level - LAeq. Haminute	Comparison to Sleep Disturbance Screening Level - LAmax	Description
Project 000	11/02/2020	00:24:20	0:15:00	82.2	31.1	58.1	67.9	62.0	34.1 100	63		5.0	- 8	D NCAD1	A01	Night	35	40	69	50	28	23	-6	30	A01 - Pojed 000-001 Measuments taken outside 12 Dake Steel, Atamon, generally tachy west towards site entance and works within the nal contor. Stev-related note multide from the saveling of whicks to the adv. general and coloring of oth door, damming the whick door, damp and hardyon, landrodon, undering the instruments by start, and wear and staff starting Stevenide notes contracted to appointing for the normal (see 1) for improving the meanment. Extrances are deterfield broughout the
Project 001	11/02/2020	00:40:18	0:15:00	84.6	32.5	57.7	65.1	59.8	53.4 80	67		5.0	i.0 7	NCAD1	AD1	Nght	35	40	69	50	32	27	-2	29	lower and staff taking Steveletich noises controlled to approximately 100% of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified throughout the measurements to include insects and trains.
Project 002	11/02/2020	01:27:04	0:15:00	52.8	32.3	38.4	46.7	41.4	34.3 32	33		-	- 5	I NCAD1	A02	Night	35	40	54	50	-2	-7	-21	1	
Project 003	11/02/2020	01:53:02	0:15:00	74.4	34.4	52.7	65.8	52.4	37.9 100	53		-	. 7	NCA01	A02	Night	35	40	54	50	18	13	-1	24	A02 - Project 002-005. Measurements taken outside 5 Benkeley Court, facing west towards works within the rail controls: Site-related noise resulted from hand tools, generator, reverse
Project 004	11/02/2020	02:13:26	0:15:00	65.3	35.5	45.2	55.8	47.3	38.5 81	44			- 5	5 NCAD1	A02	Night	35	40	54	50	9	4	-10	5	- Jam, N rail movement of vehicle, rail aw, grinding, staff taking and dangs and bangs. Site-related noises were generally dominant and contributed to approximately 30-105 of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified during the measurements and include insects and distant traffic.
Project 005	11/02/2020	02:32:30	0:15:00	63.1	36.6	45.2	55.6	48.2	38.2 65	43			- 5	D NCAD1	A02	Ngtz	35	40	54	50	8	3	-11	0	
Project 006	11/02/2020	02:55:56	0:15:00	54.7	34.4	39.6	48.6	41.4	35.7 45	36			- 4	5 NCAD1	A03	Nght	35	40	57	50	1	4	-21	-4	A03 - Project 006-007 Measurements taken on Gillam Street, adjacent to 2 Ochard Road, facing west towards works within the rail contobr. Sile-related noise resulted from hand tools,
Project 007	11/02/2020	03:12:40	0:15:00	57.1	33.7	45.0	49.7	47.7	36.1 97	45			- 5	D NCAD1	A03	Nght	35	40	57	50	10	5	-12	0	-generator, reverse atam, nel saw, staff tabling and clangs and baings. Sile-reliated rotates save generally dominant and contributed to approximately 45-0% of the overal Leg (15 min) throughout the measurements. Estimateous sources were identified to include distant traffic and wind-blown vegetation.
Project 008	11/02/2020	03:35:44	0:15:00	66.2	32.4	36.6	43.4	36.8	33.7 10.5	27			- 3	3 NCAD1	A04	Nght	35	40	58	50	-8	-13	-31	-12	A04 - Project 005. Measurement taken at the western end of Hopebun Avenue, budrg west towards site walks and works within the nall corridor. Site-related noise resulted from reverse aliam, site vehicle and clargs and bargs. Site-related roses were minimal and contributed to approximately 11% of the overall Leq (15 min) throughout the measurement. Estranoous sour were dominant and included distant and passing furthe and reacts.
Project 009	12/02/2020	01:08:28	0:15:00	73.4	31.5	53.4	67.9	54.0	34.8 75.0	57		5.0	. 7	D NCAD1	A01	Ngtz	35	40	59	50	22	17	-2	20	A01 - Project 000-010 Measurements taken outside 12 Dake Street, Atsmon, generally tacing vest towards alle entrance and works within the rail contor. Stor-estated note instauted from traveling of vehicles to the site, stamming the vehicle does, damp and bangs, hand tools, proparation of instruments by staff, inverse ataum, light lower and staff tailing. Stor-estated
Project 010	12/02/2020	01:33:48	0:15:00	65.2	46.4	48.8	55.6	49.8	47.0 100.0	59		5.0	i.0 6	3 NCAD1	A01	Night	35	40	59	50	24	19	o	13	—Torn traveling of vehicles to the sits, stamming the vehicle doors, dangs and bargs, hand tools, proparation of instruments by staff, reverse alarm, light lower and staff taking. Site-stated noses dominated the measurement contributing 100% of the overall Leq (15 min). Estraneous sources were identified to include datast traffic, insects and readwork noise.
Project 011	12/02/2020	02:09:42	0:15:00	58.1	31.5	41.3	51.9	44.6	33.1 100.	41			- 5	5 NCA01	A04	Night	35	40	58	50	6	1	-17	5	A04 - Pegict 011. Measurement taken at the western end of Hopetoun Avenue, facing west lowards site walls and works within the nall controls. Site-related noise resulted from hand tool in a law, staff walking and dangs and bangs. Site-related noises dominated the measurement controlluting to 100% of the overal Leg (15 mm). Estimatoous sources were identified to indu dataset traffic.
Project 012	12/02/2020	02:44:32	0:15:00	57.3	34.9	41.9	47.0	43.8	37.1 100.1	47		5.0	. 4	NCA01	A05	Night	35	40	54	50	12	7	.7	-1	Ad5 - Project 012:013. Measurements taken on 9-11 Netion Street, tacing east towards works within the nal controls. Site-related noise resulted from hand book, generator, nal saw,
Project 013	12/02/2020	03:02:08	0:15:00	57.5	40.7	45.8	50.0	47.4	42.5 100.0	46			- 5	7 NCA01	A05	Night	35	40	54	50	11	6	-8	7	-pinding, welling, staff laking and clangs and bargs. Site-related noises contributed to approximately 100% of the overall Leg (15 min) throughout the measurements. Extraneous sources are latertified to include distint traffic and nearby warehouse vertilation, and meets.
Project 014	12/02/2020	03:35:42	0:15:00	66.8	29.3	40.9	52.9	38.9	31.3 9.0	30			- 3	3 NCA01	A02	Night	35	40	54	50	-5	-10	-24	-12	A22 - Project 014. Measurement taken outside 5 Berkelyy Court, bacing west towards works within the rail contidor. Sile-related noise resulted from hand tools, generator, grinding, welding, and dangs and bangs. Sile-related noises contributed to approximately (1% of the overal Leq (15 min) throughout the measurement. Exitateneous sources were deminant during the measurements and included insects, and distant and nearly staffic.
Veather 3-7 February 2020: O lote: all predicted noise levels i lote: Low frequency, tonality ar	Generally fine weather, ov were reproduced from th nd impulsive noise tests v	ercast with periods of ra s LOR OOHWA Form fo vere conducted in accorr	in throughout the latter ha this track possession. dance with the INP. The r	alf of the wee	ek. Temperatu eq data was aj	ure ranged beh	ween 19-23 d ses. Modifyir	degrees Celsius ng factor (penal	over the monitoring	periods. ed as applicable !	the low frequ	ency, tonal or i	mpulsive com	onents detectable or attri	butable to the sites	noise emission. Th	e site noise contribu	ution reported here	is inclusive of all m	odifying factors (if a	pplicable).				

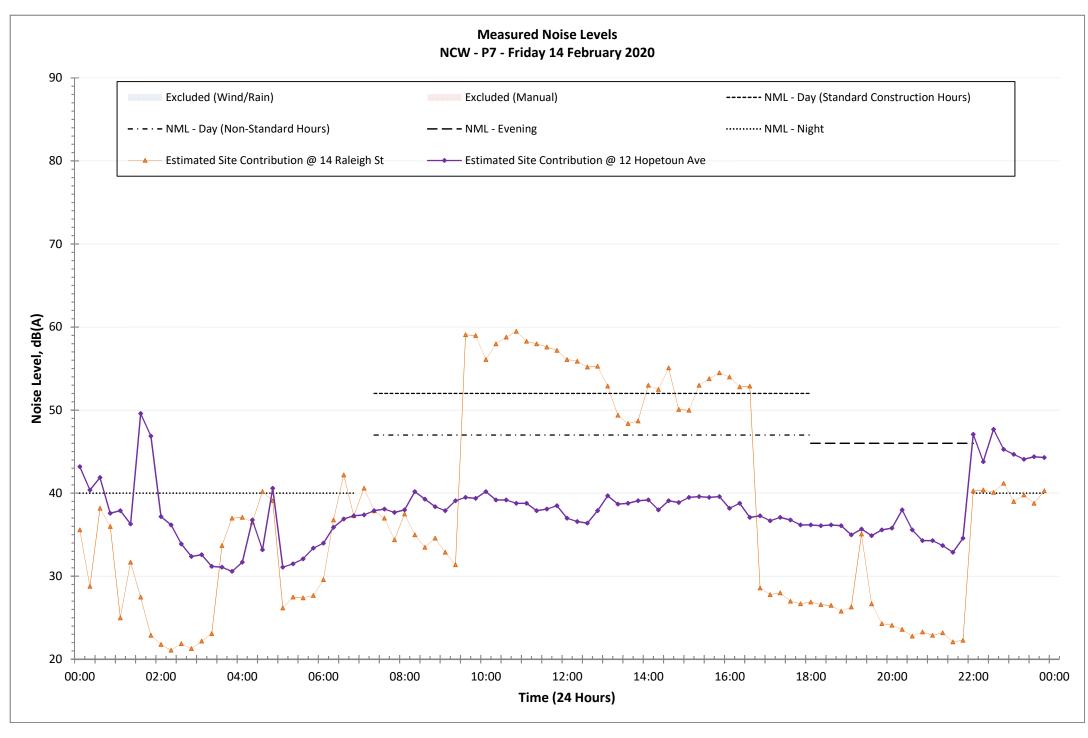






Measured Noise Levels NCW - P7 - Thursday 13 February 2020





Addendum

Appendix I – Monitoring Report (RP48)

Noise Monitoring – OOHW P7: MW35 - 2 to 6 March 2020

Figure A1.0 – OOHW MW35 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood

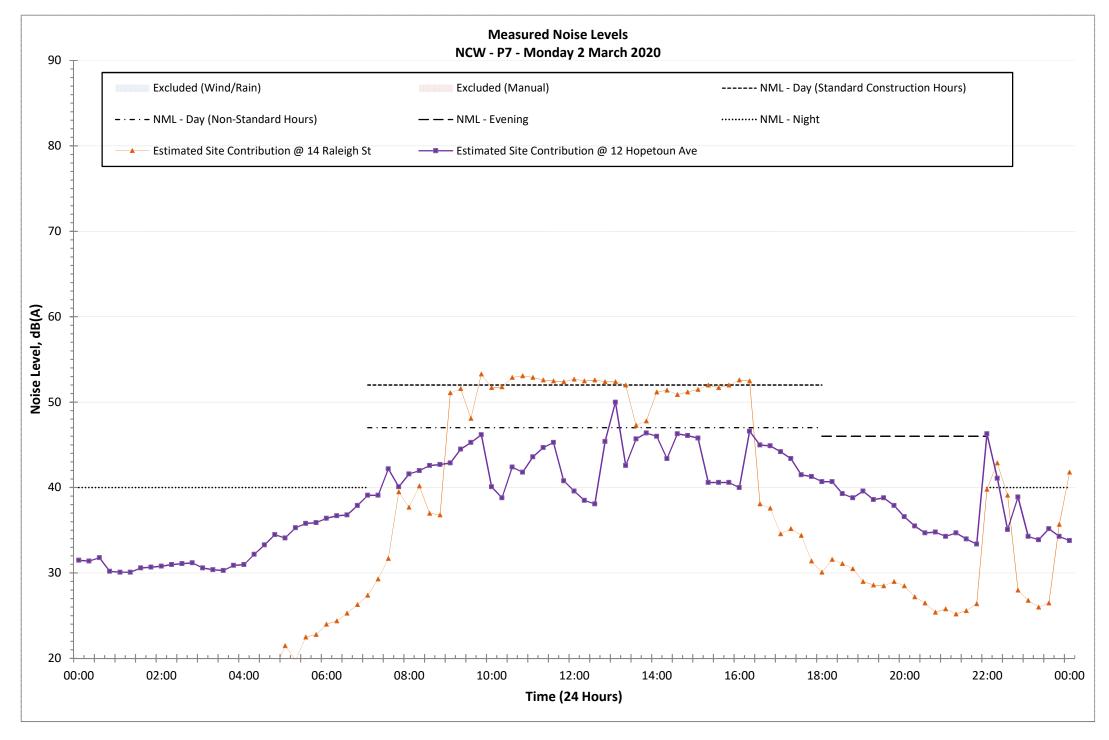
– NCW P7 (Monday, 2 March to Friday, 6 March 2020)

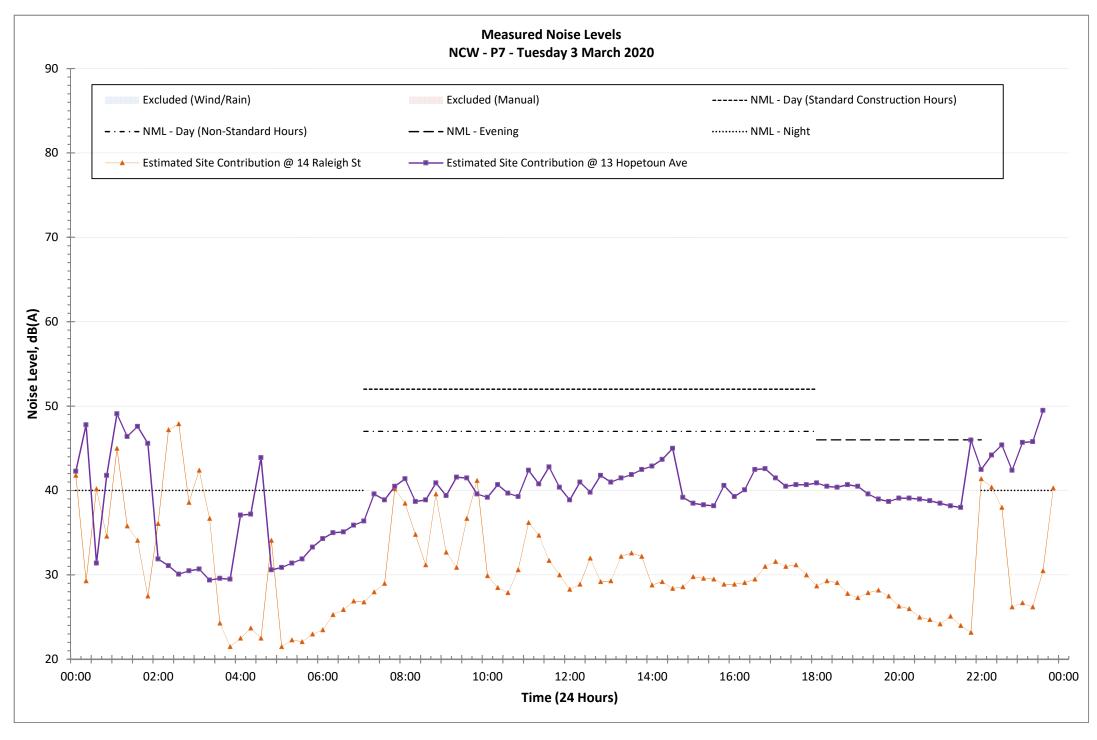


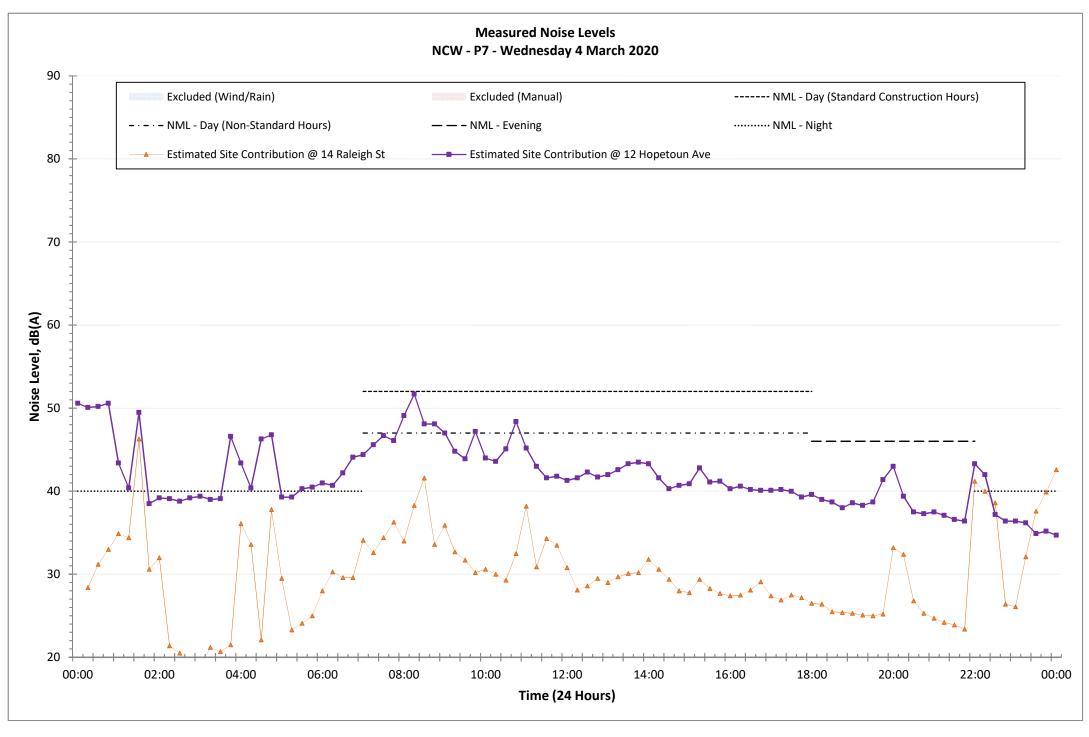
ERM

File Nam	Date	Start Time	Bapsed Time	LAFmax	c LAFmi	n LAeg	LAF1.0	LAF10.0	0.064PT Percent age Site Contribution	(2)	Messured Ste Noise Level - LAeq, 15minute	impulsive Modifying Factor? Tonal Modifying Factor?	LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	R BL - LA 30, Period	NM. - LAter, 16 minute	Pandiched Sile Noise Levid - LAog, 15milnuse	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 30, Period	Comparison to NML - LAeq. 15 minute	Comparison to Predicted Site Noise Level - LAeq, tisminute	Comparison to Sleep Disturbance Screening Level - L Amax	Des araption
Project 000	2020-03-02	23:13:42	0:15:00	74	42.4	48.8	57.7	50.5	43.6 1	00	59	- 5.0	5.0	72	NCA01	A01	Nght	35	40	52	50	24	19	7	22	A1 - Reject 000-001. Measurements taken outside 12 Date Street. Arturnon, generally tacing west twe ands site enhance and works within the rail consist. Site-related noise resulted from preparation of encavator, the transferring of vehicles to the site, lamming the vehicle door, lampa and bargo, Lamhord and halfing conditions, and statiling Site install noise, constructs to approximity (100). The nort lack (116) improvable the measurement to include
Project 001	2020-03-02	23:34:26	0:15:00	75.4	37.2	52	62.8	56.6	39.8 1	00	52			74	NCA01	A01	Nght	35	40	52	50	17	12	o	24	reliable noises onthibited a sproximitely (00% of the overal Lag (15 mit) throughout the measurements. Extraneous sources were identified throughout the measurements to include inaccels, distant haffs, car passing by and wind-store in vegetation.
Project 002	2020-03-03	00:06:26	0:15:00	65	33.6	39.1	46.4	40.2	35.5 1	00	39			58	NGAD1	A02	Nght	35	40	62	50	4	-1	-23	8	Ali2 - Page: 002.003. Measurements taken at the vestion end of Hopetura Avenue, fuorigi vest towards site vals and vorks within the nat contor. Ste-related noise resulted from h-rait -accurator, clargs and bangs, hand toke, revens atom, backing and unbacking of materials, and staff takens, Ste-related noises combibilities approximately (XON) of the overall.cg (15 m)
Project 003	2020-03-03	00:24:02	0:15:00	80.8	33.9	55.3	65.9	53.7	36.4 1	00	55			76	NCA01	A02	Nght	35	40	62	50	20	15	-7	26	hroughout the measurements. Extraneous sources were identified throughout the measurements to include reacts, datant traffic, residents, alroadt, and who blown vegetation.
Project 004	2020-03-03	00:50:30	0:15:00	55.4	32.5	38.3	44.1	39.4	35.9 3	36	34			49	NCA01	A03	Nght	35	40	62	50	-1	-6	-28	-1	AD - Project OX. Massurement taken outside 5 Berkely Court, facing west towards works within the rail control. Silo-related noise resulted from evene airum, in rail excavator, staff taking and clangs and bargs. Silo-related noises were minimal and contributed to approximately 39% of the overal Leg (15 mir) throughout the measurements. Extraneous sources were identified during the measurements and include tracets and distant tarific, residents, and wind born vegetation.
Project 005	2020-03-03	01:12:05	0:15:00	61.8	36.1	47.6	58.1	51	38.9 5	53	45			59	NCA01	A04	Nght	35	40	62	50	10	5	-17	9	A04- Project 000. Measurement taken on Olam Street, adjacent to 2 Orchard Read, facing w est low ands w ords w tim the rail control. Site-related noise resulted from h rail enclands and changs and hangs. Site-related noises were generally dominant and combinate to approximately SI% of the overall Leg (15 mit) throughout the measurements. Estimatous sources were identified to include distant turlit, insects and wind-blow regulation.
Project 006	2020-03-03	01:39:54	0:15:00	54.6	35.5	40	46.3	41.9	37.3 1	10	30			46	NCA01	A05	Nght	35	40	53	50	-5	-10	-23	-4	Add - Reject 000-007, Masourement taken outside 14 Relieg). Steed, facing west twa with works write the natioantider. Site-related noise resulted from staff waking and taking, widding/growing generative and cating and hange. There index does are reprenedly command and combuside to approximately 50% of the overall Leg (15 mit) throughout the massumember. Therement sources were definited to include data farting results and write date workgaland.
Project 007	2020-03-03	01:56:46	0:15:00	67.3	34.8	54.4	62.4	57.6	37.7 1	00	54			65	NCA01	A05	Nght	35	40	53	50	19	14	1	15	messurements. Estanaous sources were dentified to include distant traffic, insects and wind-blow in vegetation.
Project 008	2020-03-03	02:23:38	0:15:00	78.4	33	56	66.9	60.1	36.3 1	00	56		•	71	NCAD1	A01	Night	35	40	52	50	21	16	4	21	A01-Poyce1009-1009 Mescurements laken outside 12 Daale Steed, Arturnon, generally facing w est tow ands site entrance and w onts w thin the rail constor. Stev-related noise resulted from hirst all executions, site vehicins, summing the vehicle doors, movement of balanci, clingar and bagins, generator, greenidary and staff talling. Site vehicles, steaded noise contributed to approximately 100% of the overall call, clings hirstynals for executions. State access access we testifted throughout the measurement to house access are use testifted throughout the measurement. Statewasce access we testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement. Statewasce access we testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement. Statewasce access we testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted through the measurement to house access are use testifted throughout the measurement to house access are use testifted throughout the measurement to house access are use testifted through the measurement to house access are use testifted throughout the measurement to house access are use testifted through the measurement to house access are used through through through the measurement to house access are used throughout through throughout the measurement to house ac
Project 009	2020-03-04	00:17:46	0:15:00	80.4	41	57.3	68.4	58.1	48 1	00	57			71	NCAD1	A01	Nght	35	40	52	50	22	17	5	21	(10% of the overal Leg (15 me) throughout the measurements. Extrameous sources were leftified throughout the measurements to include now people and distant traffic.
Project 010	2020-03-04	00:42:32	0:15:00	61.3	35.2	43.6	50.8	47.5	37.1 1	00	44			56	NCA01	A05	Night	35	40	53	50	9	4	.9	6	A05 - Project D10. Measurement taken outside 14 Raingh Street, Tacing w est twe write write write neal contract: Star-related noise resulted from ecowards; staff waking and taking, hand took, and chang are bangs. Star-related noises were generally domant and contributed to approximately 100% of the overal Log (15 mm) Proughout the measurements. Estatemous pources were identified to include dokunt taffic, residents, and insects.
Project 011	2020-03-04	01:12:58	0:15:00	79.9	35.4	57.6	72.1	53.3	36.8 1	1.5	44			52	NCAD1	A05	Night	35	40	51	50	9	4	-7	2	AGE - Riged 101. Macurement taken 111 Hangken faust. Bereinder vision readert formalings and bang, profingliveleting, exclusion removed atem and out of all allog de installed moises combands faust and analysis (all of taken imposing the measurements. Exclusione as compared was faust and the strange of the faust and the moise was and the strange of the faust and the measurement. Exclusion as compared are more associated was and the strange of the faust and the strange. Exclusion and the strange of the faust and the strange of the fau
Project 012	2020-03-04	01:38:44	0:15:00	76.8	32.6	54.2	66.5	56.3	34.4 1	00	54			76	NCAD1	A02	Night	35	40	62	50	19	14	-8	25	A02 - Project D12 Measurement laten at the western end of Hopeton Avenue, facing westlow ands alle walks and works within the nal condox. Site-related noise resulted from movement of excender, clining and barge, land bole, and staff silving. Site-related noise contributed to approximately 57% of the overal L50 (15 mm) throughout the measurements. Estimatoos poorces were identified throughout the measurements to include inscels, datant traffe, resident a, and needs.
Project 013	2020-03-04	23:03:48	0:15:00	69.7	39.1	54	64	58.7	42.7 1	00	43			61	NCA01	A01	Nght	35	40	52	50	8	3	-9	11	A01-Project 013-014. Measurements taken at the vesterm and of Daale Street, facing vest tow ands alle walts and vorise within the nat constor. Site-related noise resulted from excavator, cincips and bargs, grindrighvesting, alterming the door, take vestelses, and staff taking. Site-related noise southout has a paperametery (VDN) of the versal Legi (15min) thready and the measurements. Editoreas sources ware definited introduction the located intestic, facilitation (15min) thready and the integration.
Project 014	2020-03-04	23-22:40	0:15:00	71.7	39	56	66.4	60.4	43.1 1	00	56		-	69	NGA01	A01	Nght	35	40	52	50	21	16	4	19	
Project 015	2020-03-04	23:49:46	0:15:00	83.7	37.9	63.6	77.1	63.8	41.7 5	55	44			49	NCA01	A05	Nght	35	40	51	50	9	4	-7	4	A05- Poject 015. Measurement taken at 111 Henpdon Read: Sto-related noise resulted from clarge and barry, encavator movement alam and safet balling. Silo-related noises contributed to approximately 1.5% of the overall act (15 mit) throughout the measurements. Extranova sources were itselfied throughout the measurements to include meets, car possibly, and avera resuggeding. The second lact (15 mit) throughout the measurements. Extranova sources were itselfied through the private parking and the take noise ware more audited this week, as 5 dB correction is applied.
Project 016	2020-03-05	00:18:44	0:15:00	62.2	43.9	51.2	56.5	53.7	46.9 1	00	51		-	54	NCA01	A07	Nght	35	40	60	50	16	11	-9	4	Alz - Flogd 101 Maximment bian at 32 bian bay flast. Be-indiar done resultation onlinegia and bargis, encoustor movement atem granting widing movement of balasia and staff balang Ba-indiar done contributed bayonmately. (35 of the overall Leg (15 min) throughout the measurements. Extraneous sources were identified throughout the measurements b include fraeds, car passing by, and wind-down vegation.
Project 017	2020-03-05	00:49:44	0:15:00	63.8	40.8	48.9	54.7	51.2	44.2 1	00	49		-	57	NCA01	A04	Nght	35	40	60	50	14	9	-11	7	ACP-Paged 107. Measurement taken on Callem Street, algoort to 2 orthout Read, facing var othow with work with the real controls. Bio-related mode insulated from hir all exclusion moment all man all movement of balant. Sites relation allow relative and another solution of the second relation of the second relative and another balant and another allow relative and another balant and another allow relative and wind allow in vegetation.
Project 018	2020-03-05	01:12:28	0:15:00	53	36.4	39.8	43	41	38.3 8	30	41		2.0	44	NCA01	A03	Nght	35	40	60	50	6	1	-19	-6	AD = Project 10. Maximment take addies 5 Bentely, Obart, Lacia y west twards works with the actionation. Sele-selater index results from reverse atum. In all exactavor, land flows, suif affaiting and anyone, Stee-Internet senses combined associationative (Stee-Internet) for the overall Leg (15 min) horsignault the masurements. Extranses sources were identified during the measurements and include insects and distinit taffic, aircraft, and insects.
Project 019	2020-03-05	01:34:40	0:15:00	55.4	35.3	39.4	47.2	40	37.2 3	38	35			46	NCAD1	A02	Nght	35	40	62	50	0	-5	-27	-4	A02 - Project 018. Macurements later at the western end of Hopeton Avenue, floring west tow ands also waiks and works within the rail context. Site-rotated noise resulted from executed, clarge and bangs, movement of balaxis, and staff talking. Site-related noises combuted to approximately 38% of the overall Leq (15 mm) throughout the measurements. Bitraneous sources were identified throughout the measurements to include insects, and car passing by.

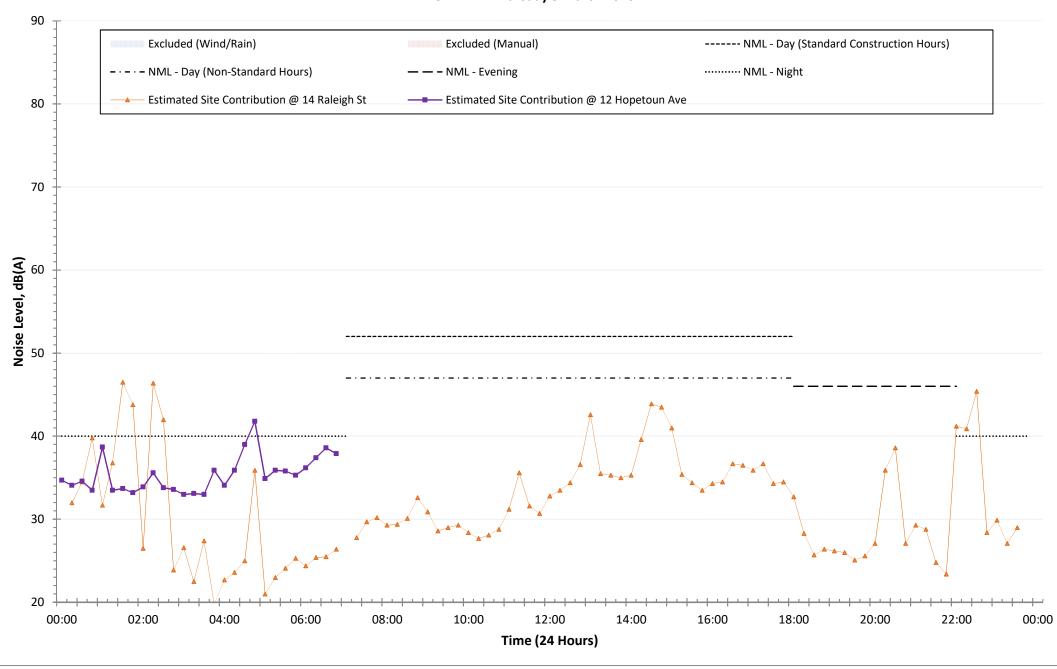
File Name	Date	Start Time	Elapsed Time	LAFmax	x LAFmin	LAeq	LAF1.0	LAF10.0	0.06497 Percentage Sile Contribution	vou Measured Ste Noise Level - Lives, 15minute		Tonal Modifying Factor?	LF Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Peetod	RBL - LA90, Period	NML - LA eq. 15 minute	Predicted Site Noise Level - LAcq, 15minute	Sieep Disturbance Screening Level - LÅmax	Comparison to RBL - LA 10, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Site Noise Level - LAeq. Haminute	Companison to Seep Disturbance Screening Level - L Amax	Des cription
Project 020	2020-03-05	02:03:04	0:15:00	67.8	38.1	57.5	63.5	60.6	41.6 10	58				67	NCA01	A05	Nght	35	40	53	50	23	18	5	17	Acc. 7-period COS Maximum Landon and Landon Y Mangh Dime Long and the set of the site of the of control discholard data mandel for moltability movement, hard tools, generator, and the period Long Acceleratory and any and any and and any and the period discholard data mandel control and a period data period data and any and any anticipation of the site
Project 021	2020-03-05	22:38:46	0:15:00	82	39.4	56.3	63.8	58.8	43.7 10	61			5.0	82	NCA01	A01	Nght	35	40	52	50	26	21	9	32	A01-Phylot (121-022 Macurements balan onlick 12 Data Steet Alterno, generally forig a well tax ands she entance and a rosk as the hite of confact. She velated noise resulted from Inicial excavator, eccavator working, alle velacies, dangs and bang, generator, and staff takes; Bit-initian cosise combutor to approximately (10% of the overall Leg (15 mit)
Project 022	2020-03-06	00:52:18	0:15:00	72	33.5	49.1	60.5	52.7	36.7 10	49			-	72	NCA01	A01	Nght	35	40	52	50	14	9	-3	22	throughout the measurements. Extraneous sources were identified throughout the measurements to include noisy people and distant traffic
Weather 2-6 March 2020: Ge Note: all predicted noise levels Note: Low frequency, tonality	were reproduced from th	te LOR OOHWA Form for	this track possession.								to the low 1	requency, to	nal or impulsi	ve components	detectable or attrib	utable to the sites r	noise emission. The	site noise contributi	ion reported here is	inclusive of all mod	ifying factors (if	applicable).				



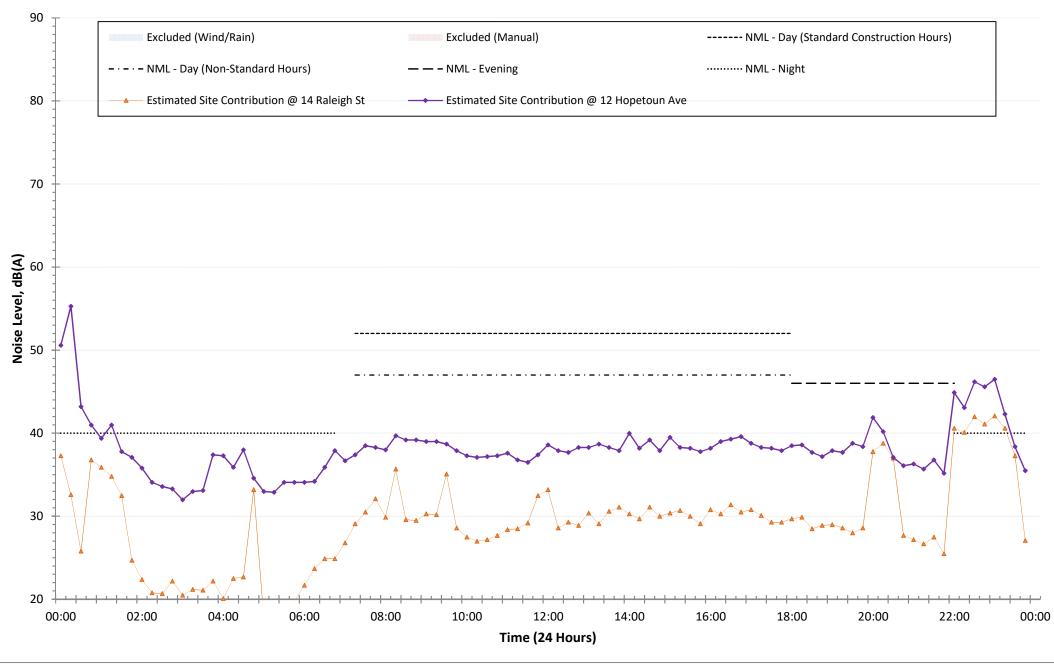




Measured Noise Levels NCW - P7 - Thursday 5 March 2020



Measured Noise Levels NCW - P7 - Friday 6 March 2020



Addendum

Appendix J – Monitoring Report (RP49)

Noise Monitoring - OOHW P7: WE36 - 7 to 8 March 2020

Figure A1.0 – OOHW WE36 – Attended and Unattended Noise Monitoring Locations – Artarmon to Chatswood

– NCW P7 (Saturday, 7 March and Sunday, 8 March 2020)



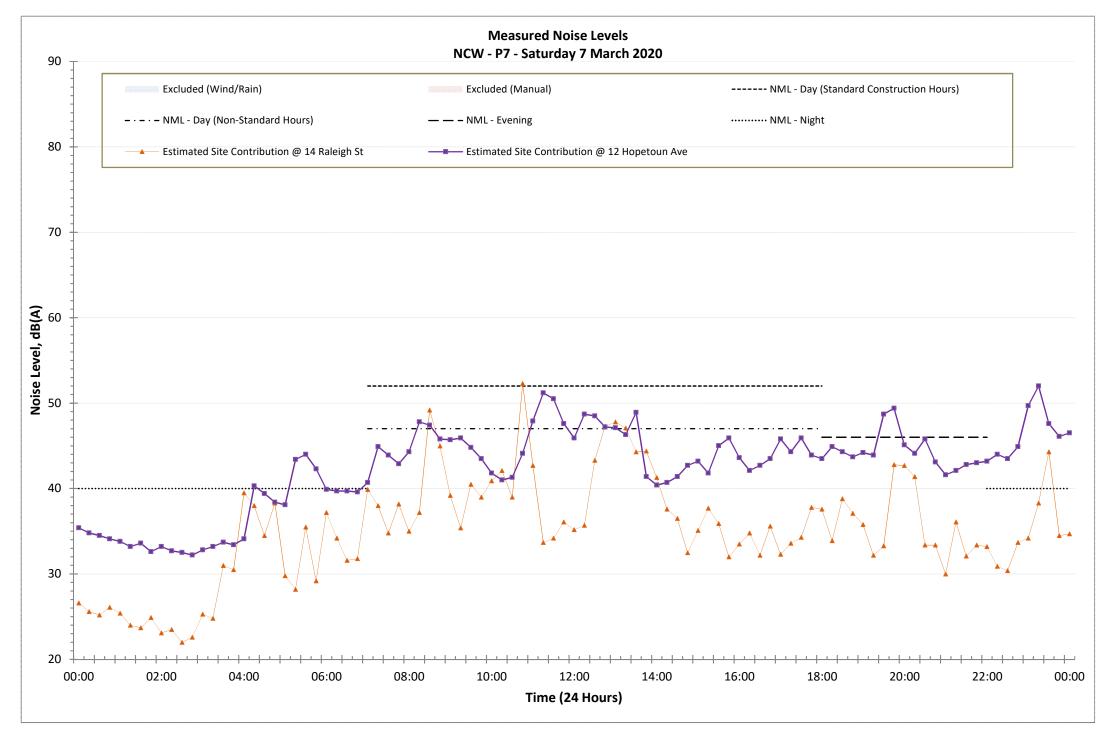
ERM

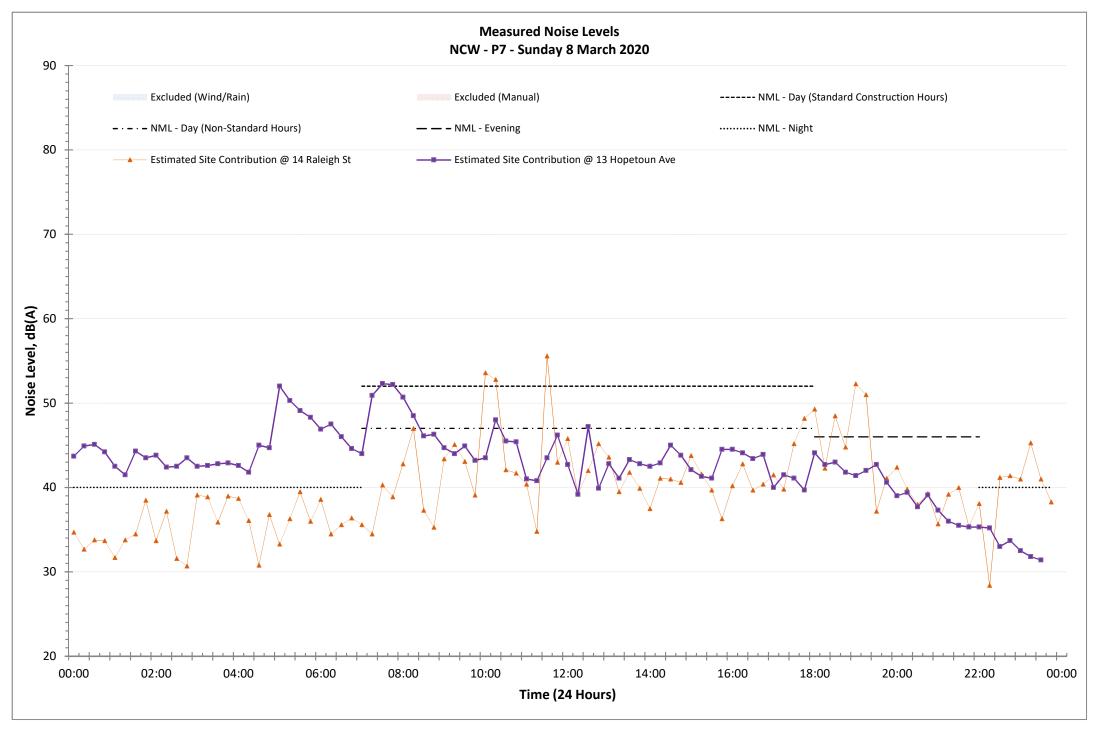
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	Låeg Lå	1F1.0 LA	1F10.0 LJ	0.066JY Percentage Sile Contribution (%)	Measured Ste Noise Level - LAeq, 15minule	Impulsive Modifying Factor?	T on al Modifying Factor? Low Frequency Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	L ocation	Period	- LA®, Period	NM. - LAq, 15minute	Predicted Site Noise Loval - Lacq, 15minute	Sieep Disturbance Screening Lovid - LAmax	Comparison to RBL - LA90, Period	Comparison to NML - LA eq. 15 minute	Comparison to Predicted Sile Noise Level - LAeq. Himinute	Comparison to Steep Disturbance Scrienning Level - L Amax	Ossoription
Project 001	7/03/2020	03:15	0:15:00	83.3	52.0	63.4 7	0.7 6	64.9	56.9 100	63			81	NCA01	A01	Nght	35	40	68	50	28	23	-5	31	
Project 002	7/03/2020	03:33	0:15:00	76.7	52.2	58.1 6	6.3 6	61.0	53.4 100	58			68	NCA01	A01	Nght	35	40	68	50	23	18	-10	18	A01-Project 001-000. Measurements taken oxide 10 Draie Street, Artumos, generally facing e est tox ande alle entrance and works withit he nal contain. She valued note from the measurement of plant and works as within a do of all to all the site entrance, generation of given and clangs and hangs. She valued noises contributed to approximately 100% of the on work as (cit massurements. Extransons sources we en not identified during the measurements.
Project 003	7/03/2020	03:49	0:15:00	81.9	52.9	63.7 6	9.9 E	66.2	58.9 100	64			79	NCAD1	A01	Nght	35	40	68	50	29	24	-4	29	
Project 004	7/03/2020	04:30	0:15:00	61.1	36.7	47.8 5	5.6 5	51.6	41.1 100	48			58	NCA01	A02	Nght	35	40	55	50	13	8	-7	8	A2 - Rright D4. Measurement balan outside 13 Hopeton Avenue, facing west low and w onls within the nal corridor. Site-related noise resulted from the operation of excavators (recluding the kocoping and hithing of baland), squashed duct revers alorm, and datant alse wrisk. Site-related noises contributed to approximately (DV) of the overal Leg (15 mm) throughout the measurement. Estaneous sources were not identified during the measurement.
Project 005	7/03/2020	05:00	0:15:00	67.7	42.4	49.3 5	6.5 5	52.1	45.3 100	49			67	NCA01	A03	Nght	35	40	55	50	14	9	-6	17	A23 - Rright 006. Neasurement taken at the eastern end of Nelson Street facing east low ands works within the nal contdor. Site-related node resulted from the operation movement and d excausions (including the 'scooperg' and 'shifting' of balant's, bypashed back' revenue atoms, charge and bargs, Site-related nodes combined to approximately 100% of the overall Leg (15 mt) throughout the measurement. Essences sources we en not identified b include deare traffic and croates.
Project 006	7/03/2020	05:37	0:15:00	73.4	51.2	59.9 6	9.9 6	61.0	53.5 100	60			71	NCA01	A04	Nght	35	40	61	50	25	20	-1	21	ANA - Right DSE Measurement balan on the some of Valata Land and Frederation Lane (near Band Stred), Locky west the with writh the rail contrider. Sile-related relation recalled from the operation of a commit meer lightatic true, change and sega and squashed duck reverse alarms. Sile-related noises contributed to approximately 100% of the overall Leg (15 me) throughout the measurement. Extrancous sources were identified to include nearby tords.
Project 007	7/03/2020	05:00	0:15:00	72.5	45.3	54.9 6	8.2 5	55.0	47.0 40	51			60	NCA01	A05	Nght	35	40	47	50	16	11	4	10	AGS - Right QT. Measurement taken cuickle Religh Struct, funcing work tow ands all entitizes and works within the rule contacts. Site-initial route resulted from the operation of distant measuration, hand bolk, revenue toms (bith equathed data and boal) and the droping of balant. Site-initial routes excelled for approximately 40% of the overall Leg (15 mit). Distances sources were dominant and included distant and passing staffice, nearby tarks and passing planes.
Project 008	7/03/2020	05:38	0:15:00	75.4	52.9	59.5 6	8.7 6	62.7	54.1 100	64		- 5.0	72	NCA01	A01	Nght	35	40	68	50	29	24	-4	22	A01 - Popol 050,000 Measurements biase notable Drais Street, Advances, generally locing well buy ands site entraces and works within the nationation. Site voltated noise resulted from the spectro of and and excitement within the nationative come entration and having as before to area. Transacted dust means shown and efforts ands. Site voltated noise
Project 009	7/03/2020	06:55	0:15:00	66.6	51.1	54.9 6	2.8 5	56.8	52.3 100	60		- 5.0	64	NCA01	A01	Nght	35	40	68	50	25	20	-8	14	Be operation of just and explained within the cal contrib, crose wettering and barring site. by they take the structure and struct work. She related noises contributed to approximately 100% of the overal Leg (15 mit) throughout the measurements. Extransional sources were identified to include nearby teris.
Project 010	7/03/2020	20:06	0:15:00	62.0	44.3	48.3 5	4.5 5	50.2	45.8 70	52		- 5.0	55	NCA01	A05	Evening	41	46	61	56	11	6	-9	-1	A/3.2 - Roject 010. Measurement taken outside 24 Gordon Avenue apartments (along Frank Chamnon Walk), facing east tow ands the rule control. Site-related noise mealted from the operation of excavators, scooping of taikat, power tools, lighting beens and changs and brangs. Site-related noises dominated the measurement combuding approximating 70% of the overall Leq (15 mi). Estimated as sources were identified to include distant traffic, nearby packetarians and crickets.
Project 011	7/03/2020	21:38	0:15:00	70.4	45.0	48.7 5	6.0 4	49.6	46.7 70	52		- 5.0	56	NGA01	A05	Evening	41	46	47	56	11	6	5	0	Ad5 - Reject011. Measurements taken outside 14 Bakingk Street, facing west low ands all entrance and worke within the rail contor. Site-stated noise resulted from lighting towers, conversations on site, part within the nationator, durps and target and target and duck revenue alterns. Site-stated noise dominated the measurement contributing between approximately 60-70% of the overall Leg (15 m). Estamoots sources were alternified to include datant traffic, nearby readered, include and places passing by.
Project 012	7/03/2020	22:01	0:15:00	64.6	45.2	50.4 5	6.0 5	52.4	47.9 90	55		- 5.0	60	NCA01	A07	Nght	41	46	63	56	14	9	-8	4	A07 - Rejoch 02.011. Measurements taken outside 2 Benkley Court, facing west towards works within the nal corritor. Sile-initiated robie resulted from movement and operation of jater within the nal corritor, faithing towers, power took, clance and baroa, and towarded duck revense alarms. Sile-related noises contraded the measurement contribution accounted with 1006
Project 013	7/03/2020	22:16	0:15:00	67.8	46.7	53.4 6	0.3 5	56.3	48.8 100	58		- 5.0	64	NCA01	A07	Nght	41	46	63	56	17	12	-5	8	within the rail corridor, lighting tow one, pow or tools, change and seques not Squashed duck revenes alarms. Site-related notes constrained the measurement contributing approximately 100% of the overall Leg (15 mm). Betraneous sources were identified to include distant traffic.
Project 014	7/03/2020	23:32	0:15:00	74.2	52.1	59.7 6	9.6 6	62.4	53.4 100	65		- 5.0	74	NCA01	A01	Nght	35	40	68	50	30	25	-3	24	A01 - Reject 014-015. Measurements taken oxistle 12 Date Bitted, Artamon, generally facing west towards site entrance and works within the nal contrior. Site-related noise resulted from lyting tow er, stiff taking and gening alle gate, charge and barge, lob plant in the rail contrior and passing plant along the nall tacks. Site-related noises dominated the measurement
Project 015	7/03/2020	23:47	0:15:00	73.8	51.5	55.7 6	6.1 S	57.6	52.6 100	61		- 5.0	69	NGA01	A01	Nght	35	40	68	50	25	21	-7	19	Interference to be a set of the s
Project 016	8/03/2020	00:12	0:15:00	62.9	41.3	48.0 5	5.2 f	50.7	43.3 100	53		- 5.0	57	NCA01	A02	Nght	35	40	55	50	18	13	-2	7	A02 - Reject 016-107. Massumments taken outside 13 Hopeton Avenue, facing west tweads works within the rail contor, Stevelated noise resulted from the question of excavators within the rail contor, squashed duct reverse alarms, lighing twees, carge and barge, hand tools and datast site works. Stevelated noise contributed to approximately 100% of the
Project 017	8/03/2020	00:28	0:15:00	63.9	45.4	48.8 5	2.9 1	50.9	46.5 100	54		- 5.0	55	NCA01	A02	Nght	35	40	55	50	19	14	-1	5	within the relicontary, squadeed out reverse airms, gring bevers, carge and barge, hand book and obtains all work, sale-stated holes controllede to appointing yours of the overall Leg (15 m) throughout the measurements. Estimateous sources were sterified to include nearby readems, circlest and running water post-raifail event.
Project 018	8/03/2020	01:39	0:15:00	75.5	48.9	56.7 6	6.2 (60.0	50.0 100	62		- 5.0	70	NCA01	A01	Nght	35	40	68	50	27	22	-6	20	Att - Reject 016-019. Manusmenters taken outside 12 Date Street, funcing west towards works within the nationation. Site-related roken resulted from the genation of eccenters and Anti-Reject 016-019. Manusmenters taken outside 12 Date Street, function and have to be a been formated during more advance. Site-related roken resulted from the genation of eccenters and
Project 019	8/03/2020	02:00	0:15:00	74.3	48.1	55.6 6	6.8 5	58.3	49.4 100	61		- 5.0	73	NCA01	A01	Nght	35	40	68	50	25	21	-7	23	-Indennas with the rationator, lighting towers, whichis entering and barring the site, and "squarable duck" reverse alarms. Site-related noises dominated the measurements, contributing 100% of the overall Leg (15mm). Bitraneous sources were identified to include marby residents.

File Name	Date	Start Time	Elspsed Time	LAFmax	LAFmin	LAog	LAFIJ	LAF10.0	LAF90.0	Percentage Sile Contribution (%)	Messured Ste Noire Level - LAeq, 15minute	impulsive Modifying Factor?	Tonal Modifying Factor? Low Frequency Modifying	Factor Measured Ste Noise Level - LAmax	NCA	Location	Period	R BL - LA 30, Period	NML - LAcq. 15minute	Prediceed Site Noise Level - LAeq. 15minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA 99, Period	Comparison to NML - LAoq, 15 minute	Comparison to Predicted Site Noise Level - LAeq. 18minute	Comparison to Seep Disturbance Screening Level - L Amax	Distription
Project 020	8/03/2020	02:23	0:15:00	74.7	43.4	54.9	67.3	56.1	45.2	100		-		. 72	NGA01	A02	Nght	35	40	55	50	20	15	0	22	Al2 - Reject 020. Measurement taken outside 13 Hopelson Avenue, facing west low ands works within the rail controls. State-stated noise resulted from the operation of escawators (rockulty the 'accoupty' and 'damping' of tables), "operated door's reverse alorms, lighting lowers, and the screaching of plant and practice. State-stated noises contributed to approximately 100% of the overall key (15 min) throughout the measurement. Estamatous sources were not identified using the measurement.
Project 021	8/03/2020	17:17	0:15:00	79.5	51.2	59.8	68.7	62.1	54.2	100				.0 75	NGA01	A01	Day	42	47	68	57	20	15	-6	18	A01 - Project 021-022, Measurements taken outside 12 Date Street, filoring west tow and a works within the nationation. Site-related note resulted from the operation and movement of plant within nat control (including scooping balaud), movement of plant along in all tracks, clarge and barrys, tak websites enter and lake a tak and conversations on itsk. Site-related notes
Project 022	8/03/2020	17:33	0:15:00	84	49.4	60.7	71.0	62.7	53.0	100		-	-	. п	NGA01	A01	Day	42	47	68	57	19	14	-7	20	warm a control (riccoldy scoping unlosing, interference) and any in a stack, starp and barge, set referes ear and serve as all control and the development ones dominated the resourcements, controlling 100% of the overal Leg (15 ms). Estaneous socies were bentified to include birds and ready residents.
Project 023	8/03/2020	18:25	0:15:00	67.4	40.8	50.9	59.9	53.5	44.1	80		-	-	- 65	NGA01	A07	Evening	41	45	53	56	9	4	-3	9	AGY - Project 023. Measurement taken outside 2 Benkelry Court, facing west twentie within the nationation. Stevenistic roles resulted from movement and operation of plant within the nationation. Stevenistic down and the measurement contributing approximately 100% of the overall Leg (15 m). Ethanocan sources were identified to include datant halfs, birds and planes passing by.
Project 024	8/03/2020	18:51	0:15:00	72.3	42.6	53.7	59.9	57.6	46.0	80		-		- 69	NGA01	A05	Evening	41	45	61	56	12	7	-8	13	ARS - Poject DIA Measurement failen outside 3A Gordon Avenue apartments (along Frank Dammen Hold), forsing east Inwards the rail controls. Site-related noise resulted from the operation of exacutors and other plant, scooping of balaut, power tools, dangs and bangs and bageable discrit reverse alarms. Site-related noise dominated for measurement controlling approximately (RN of the overal Leq (15 ms). Battemeous sources were identified to include datant traffic, nearly podations and plane passing by.
Project 025	8/03/2020	19:38	0:15:00	78.0	52.6	58.6	64.9	61.1	54.8	100			- 5	.0 72	NGA01	A01	Evening	41	46	68	56	23	18	-4	16	
Project 026	8/03/2020	19:54	0:15:00	75.6	52.5	56.8	65.1	58.2	54.1	100		-		.0 69	NGA01	A01	Evening	41	45	68	56	21	16	-6	13	
Project 027	8/03/2020	20:09	0:15:00	81.6	50.2	57.7	64.5	60.7	52.0	100		-		.0 75	NGA01	A01	Evening	41	45	68	56	22	17	-5	19	
Project 028	8/03/2020	20:25	0:15:00	91.0	51.5	61.1	65.7	59.4	53.1	100		-		- 85	NGA01	A01	Evening	41	45	68	56	20	15	-7	29	A01-Reject 025-011. Neasurements laken octade 12 Daiks Breet, Artamon, generally facing wet tow ands also entrance and works with the rail contacts. Site-related noise resulted from the operator of plant within a controls, entranks and barge, lighting barens, street are egen on Daike Breet, Yaquahed duck reverse area area physicals. Site interface on controls de plant out to much is, change and barge, lighting barens, street are egen on Daike Breet, Yaquahed duck reverse area area physicals. Breetand encounted in the subsection control barg to paporimetry 100% of the overal Leq (15
Project 029	8/03/2020	20:41	0:15:00	89.5	51.2	64.1	72.0	64.7	52.9	100		-		- 88	NCA01	A01	Evening	41	45	68	56	23	18	-4	32	
Project 030	8/03/2020	21:02	0:15:00	89.6	55.5	68.3	79.9	70.0	60.2	100				- 85	NGA01	A01	Evening	41	46	68	56	27	22	0	29	
Project 031	8/03/2020	21:17	0:15:00	81.4	50.3	65.2	75.6	70.8	53.4	100				. 79	NCA01	A01	Evening	41	46	68	56	24	19	-3	23	

. Temperature ranged between 18-22 degrees Celsius over the monitoring periods.

ssession. here The measured Leg data was applied in all cases. Meditying factor (penalty) values were applied as appliedele to be low frequency, total or impulsive components detectable or attributable to the sites noise emission. The site noise contribution reported here is inclusive of all modifying factors (# applicable).





Appendix K – Monitoring Report (RP50a)

Noise Monitoring – OOHW P7: Special Works / MW39 - 27 March to 29 April 2020

Addendum

Figure A1.0 – Spec Works – Attended and Unattended Monitoring Locations

- NCW P7 (Thursday, 27 March to Wednesday, 29 April 2020)

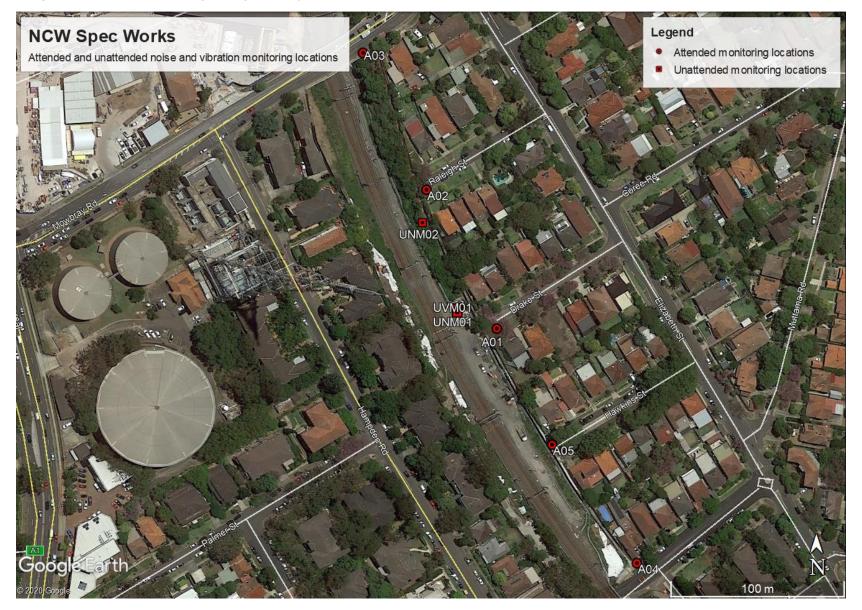




Figure A1.1 – OOHW MW39 – Attended and Unattended Noise Monitoring Locations

– NCW P7 (Friday, 3 April 2020)



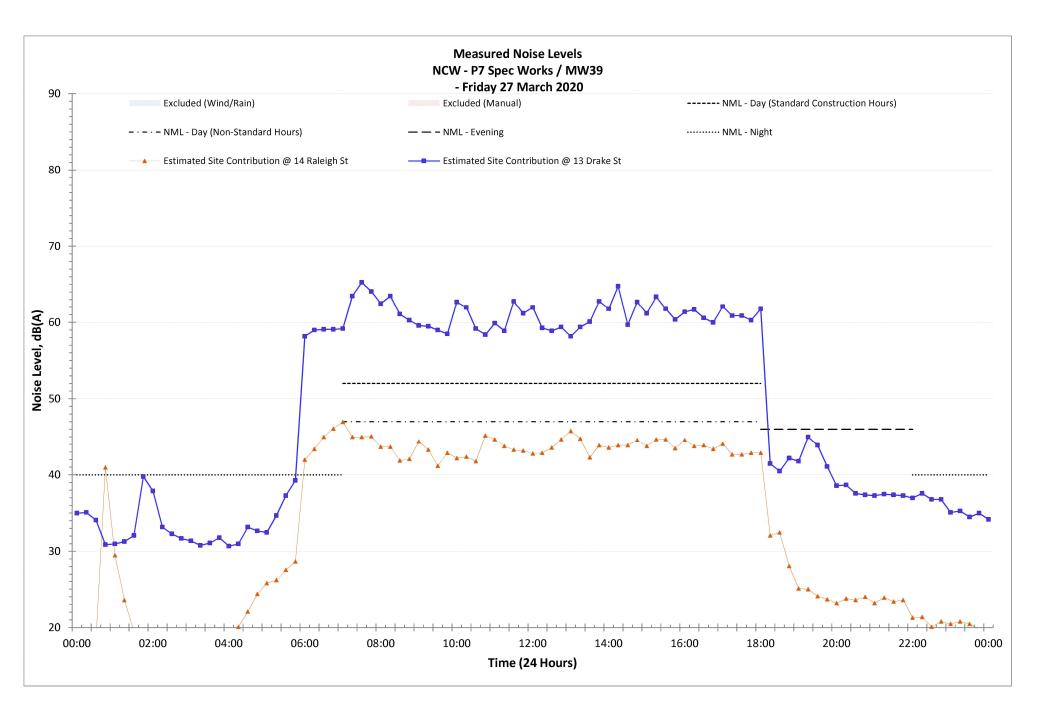


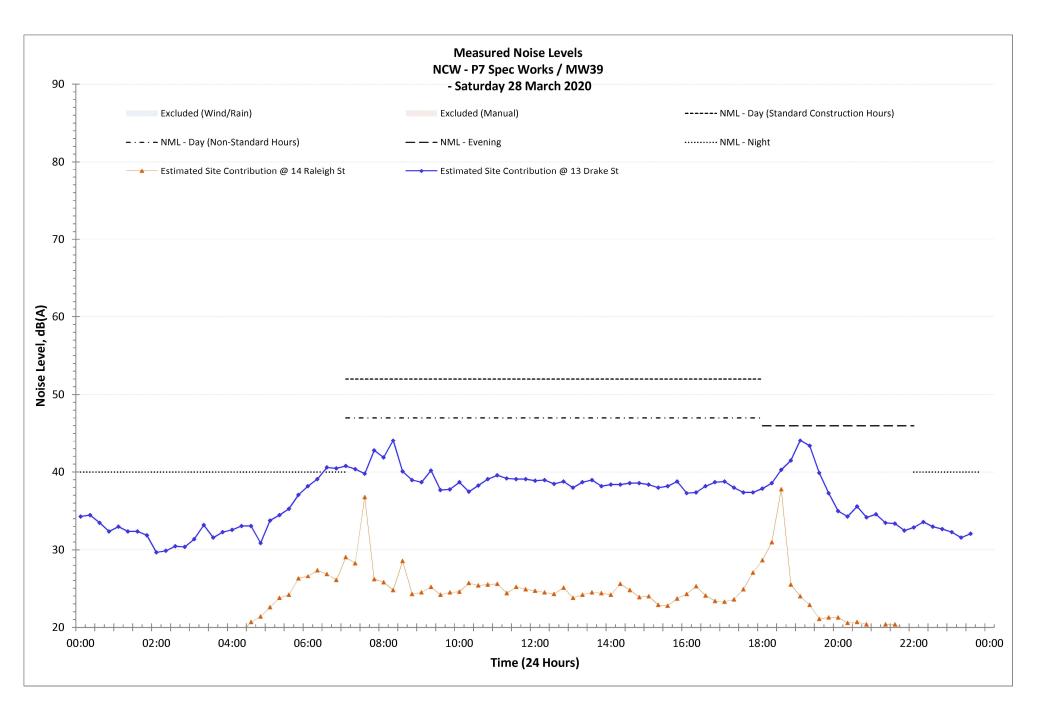
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin LAc	a LAF1.0	D LAF10.0	eoremage Sile Contribution	Measured Ste Noize Level - L.Aeq., 15minure	Impulsive Modifying Factor?	T on al Mod Fying Factor?	Low Frequency Modifying Factor?	Measured Ste Noise Level - LAmax	NCA	Location	Period	RBL - LA90, Period	NML - Lóoq, 15 mhute	Seep Disturbance Screening Level - LAmax	Comparison to RBL - LA90, Pariod	Comparison to NML - LA6q. 15 mhute	Comparison to Sleep Dis turbance Screening Level - LAmax	Peszrision
Project 001	2020-03-27	08:21:26	0:15:00	83.7	44 63.	76.3	66.1	46.2 50	60				76	NCA01	A01	Day	42	52	57	18	8	19	A01 - Project 001-002. Measurements taken outside 12 Drake Street, Anamon, generally facing west towards site entrance and works within the nail contrider. Site-related noise resulted noise movement of vehicles within and cut of the site entrance, openation of machinery within the nail contrider, that lakery and dang and bangs and bangs. The site of the site entrance and approximately 30-50% of the venual Leut (in the provide the machinery and the site and the site of the site of the site entrance and
Project 002	2020-03-27	08:38:48	0:15:00	71	44.9 58.	67.6	63.1	48 20	52			•	64	NCA01	A01	Day	42	52	57	10	0	7	apromisery zoon o ne orea col (15 m) e rodjou ne mediarenes. En alvos socies rei doman ano code spray mero ani, regisco cosiciusis, regisco cas, distartard boaltartic
Project 003	2020-03-27	09:02:24	0:15:00	73.8	46.2 55.	64.1	60	47.8 35	51	•		•	61	NCA01	A02	Day	42	52	57	9	-1	4	A02 - Project 003-004. Measurement taken outside Raileigh Street, facing west towards site entrance and works within the rail controls. Site-related noise resulted from the operation of distant excavators, site whickes, hand tools and reverse toxes. Site-related moises contributed to approximately 35-40% of the overall Log (15 mil). Examinous sources were dominant and included
Project 004	2020-03-27	09:20:48	0:15:00	76.4	46 58	69.2	59.8	48.4 40	54			•	65	NCA01	A02	Day	42	52	57	12	2	8	Sydney metro train, distant and passing trailic, nearby birds and passing planes.
Project 005	2020-03-27	09:50:04	0:15:00	88.1	73.1 75.	79.8	76.4	73.9 10	75		•	•	80	NCA01	A03	Day	42	52	57	33	23	23	A00 - Project 005. Measurement taken outside 340 Mexhory Road , facing west towards site entrance and werks within the nal contain. Site entitled note resulted from the operation of generator, dilling and staff taking. Site related noises contributed to approximately 100% of the overall Leq (15 mit). Extraveous sources included datant and passing traffic.
Project 006	2020-03-27	10:13:58	0:15:00	76.1	53.5 59.	66.2	62.2	56 40	56			•	67	NCA01	A02	Day	42	52	57	14	4	10	At2 - Project 006. Measurement taken outside Raitegin Street, taking towards alle works within the nail contidor. Site related noise resulted from the operation of excavator, datard dragging, h- all excavator, generator, movement of material and clangs and bangs. Site-related noises contributed to approximately 40% of the overall Leg (15 min). Extraneous sources included distant and Sydrey metho trains.
Project 007	2020-03-27	10:33:26	0:15:00	82.4	42.6 61.	74.7	62.5	45.6 70	60			•	82	NCA01	A01	Day	42	52	57	18	8	25	
Project 008	2020-03-27	10:59:08	0:15:00	72.6	43.4 56	67.3	58.3	45.9 30	51			•	61	NCA01	A01	Day	42	52	57	9	-1	4	
Project 009	2020-03-27	11:20:50	0:15:00	75.6	43.6 55.	67.5	55.2	45.9 1	36			•	49	NCA01	A01	Day	42	52	57	-6	-16	-8	A01 - Project 007-012. Measurements taken outside 12 Datas Street, Antamon, generally facing west towards site entrance and works within the nat contider. Site-related noise resulted from the movement of alle vehicles within and out of the site entrance, trucks, attiff laking, carding and bargs. Site-related noise corebuild to approximately 17-10% of the enauted and out of the intervention in relative of the measurement. Inclusion, section 2014, control and antamotic antamotic and antamotic and antamotic and antamotic and antamotic and antamotic and antamotic and antamotic ant
Project 010	2020-03-27	11:39:14	0:15:00	80.1	44.9 61	72.8	64.9	48.6 30	56	•		•	80	NCA01	A01	Day	42	52	57	14	4	23	ne measuaments sumanous sources noused systey meno trains, negroour contranctions, mower, negroour cais, unte, neares, who down vegetation, occurrante, people taking
Project 011	2020-03-27	12:01:10	0:15:00	84.3	47.1 63.	π	66	49.2 30	59		•	•	84	NCA01	A01	Day	42	52	57	17	7	27	
Project 012	2020-03-30	08:42:26	0:15:00	72.9	43 57.	67.4	63.3	45.8 10	48	•	•	•	51	NCA01	A01	Day	42	52	57	6	-4	-6	
Project 013	2020-03-30	09:03:48	0:15:00	76	46.5 56.	64.5	59.3	49.5 30	51	•	•	•	61	NCA01	A02	Day	42	52	57	9	-1	4	A02 - Project 013.014. Measurement taken outside Rakigh Street, lacing west towards site entrance and works within the nat consider. Site-indused noise resulted from the operation of distant excavators, hand took, reverse towers, staff taking and charges. Site-indused noises contributed to approximately 25.30% of the oriental Leg (15 mil). Extranscus sources were dominant and included Sydery metric transci, matter and service frame. We also matter and the oriental Leg (15 mil). Extranscus sources were dominant and included Sydery metric transci, matter and service frame. We also matter and the oriental to the orientation of the orie
Project 014	2020-03-30	09:22:16	0:15:00	73.5	45 56.	65	59.1	48.4 25	50		•	•	61	NCA01	A02	Day	42	52	57	8	-2	4	en a nuise o up a y neoro nemo, soere en pasar y estillo, illi Ordoni riggicalato, tegi soor sala atto rea dy bato.
Project 015	2020-03-30	09:45:32	0:15:00	78	39.2 59.	70	64	43.6 5	46	•	•	•	53	NCA01	A01	Day	42	52	57	4	-6	-4	A01 - Project 015-016. Measurements belan outside 12 Drate Sheet (Ansmon, generally hadring well breach a file interance and works while the sal anordar. Sub-related neiver resulted from the sale whiches, wheeld from end laader, clarge and lange, mommer of measurements, and sale hadred and sale
Project 016	2020-03-30	10:02:24	0:15:00	76.7	41.8 58.	68.1	64.5	44.7 6	46	·	•	•	67	NCA01	A01	Day	42	52	57	4	-6	10	takog.
Project 017	2020-03-30	10:25:42	0:15:00	81.3	46.5 65.	76.2	67.5	51.4 10	55			•	76	NCA01	A04	Day	42	52	57	13	3	19	A04 - Project 017. Measurements taken at the vestem end of Hawkins Street, Antamon, generally facing towards the site and works within the rail contider. Site related noise resulted from the site vehicles, wheeled front-end backr, dragging and movement atum. Site-vehicle noises contributed to approximately 10% of the overal Leq (15 min) throughout the measurements. Extraneous sources were dominant and included Systemy metro trains, than thom, dogs barking, cas passing by, local and distant traffic.
Project 018	2020-03-30	10:47:48	0:15:00	69.7	40.4 51.	62.1	54.8	42.8 6	40			•	61	NCA01	A05	Day	42	52	57	-2	-12	4	Ad5 - Project 018. Measurements taken outside 13 Brand Street, Artamon, generally facing towards the site entrance and works within the rail condor. Site-related noise resulted from the site whicks, trailers, staff taking and working. Site-related noises contributed to approximately 6% of the ownal Leg (15 min) throughout the measurements. Extraneous sources were dominant and included Sydney metric trains, train horn, birds, local and distart traffic.
Project 019	2020-03-30	11:11:28	0:15:00	78.2	45.1 53:	63.7	55.9	46.7 15	46				59	NCA01	A02	Day	42	52	57	4	-6	2	A22 - Poged 019 Maxaumment laken outside Rakey) Breed, loong want lowerts site entrance and works within the rail contox. Site-related noise moulded from the operation of dataset assessing traffic, reserve y long and passing planes.

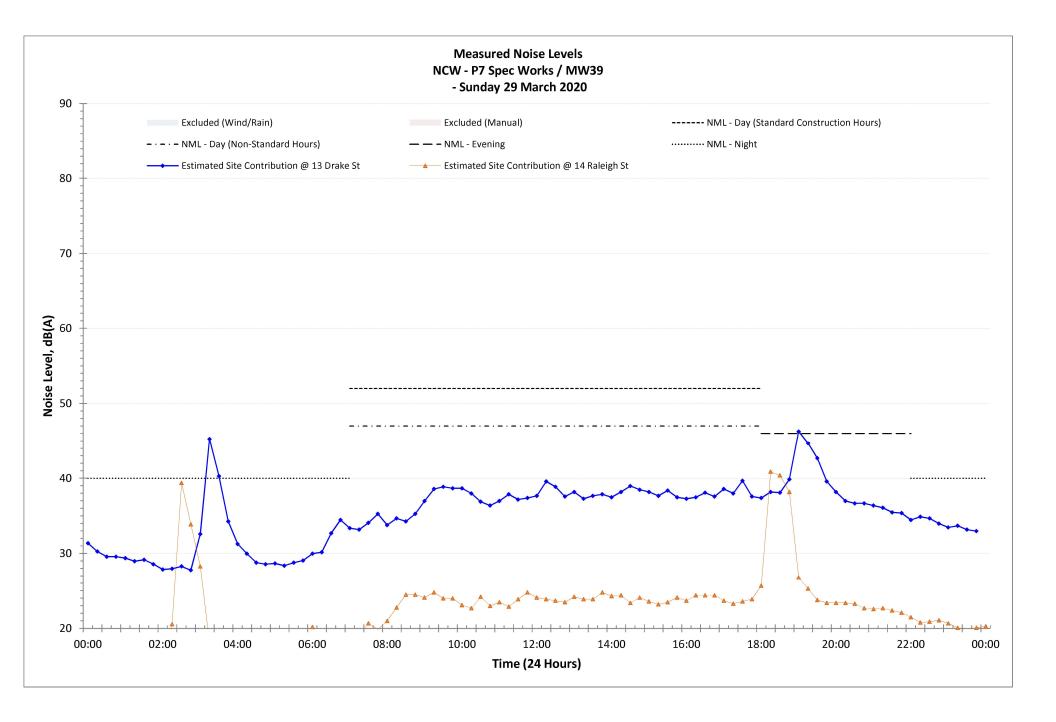
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution [%]	Measured Site Noise Level - LAeq. 15minute	Imputsive Modifying Factor?	Tonal Modifying Factor?	Low Frequency Modifying Factor?	Measured Site Noise Level - LAmax	NCA	Location	Period	R BL - LAGO, Period	NML - Løeg. 15 minute	Sleep Disturbance Screening Level - LAmax	Comparison to RBL - LA90, Period	Comparison to NML - LAoq. 15 minuto	Comparison to Steep Dis turbance Screening Level -	gescription
Project 020	2020-03-30	11:36:00	0:15:00	72.6	43.4	56.4	67	59.5	46.5	20		•			61	NCA01	A01	Day	42	52	57	7	-3	4	A01 - Project 020. Measurements taken outlide 12 Draie Street, Artamon, generally locing west towards site entrance and works within the nail contdor. Site-related noise resulted from the movement of wholes within and out of the site entrance, operation of machinery within the nail contrider, hand tooks, and staff taking dragging and clargs and tangs. Site-related noise scottributed to appointable 20% of the overall Leq (15 min) throughout the measurements. Extranceus sources were dominant and include Slydwey metro trans, datant and local traffic, neighbour cars and needs.
Project 021	2020-04-01	08:29:56	0:15:00	73.2	49.8	59.9	68.3	64.9	51.1	70		•	•	•	71	NCA01	A01	Day	42	52	57	16	6	14	Ant - Project 01:1022 Measurements balan nucles 11 Dalas Sinasi, Marrano, general y locing set tawards alle entences and acris while the sal confor Sale valued orise resulted in our fe movement of whiche within acts of the alle entences, operation of moltymy within the sal confort, tarditions, excessions, act staff taking tagging and sings and bangs. Bis-valued rokes contributed to approximately 70% of the overal Leq (15 ms) throughout the measurements. Estamonos sources were dominant and included synthey metro trans, datant and local tablic, neighbox contributed to approximately 70% of the overal Leq (15 ms) throughout the measurements. Estamonos sources were dominant and included synthey metro trans, datant and local tablic, neighbox contra and measts.
Project 022	2020-04-01	08:45:36	0:15:00	79	41.6	58.5	67.9	63.9	44.4	70		•	•	•	75	NCA01	A01	Day	42	52	57	15	5	18	
Project 023	2020-04-01	09:04:28	0:15:00	79.7	38.8	55	63	57.5	42.4	25		•	•		58	NCA01	A05	Day	42	52	57	7	-3	1	A66 - Polyciel 023. Massuments takin at Lawkin Struck, Atsminn, generally lineigo tawards all works within the nat condex. Site valuated roke measurement or vehicles wheeld forse enclusion and taking Site interdises combined registrominely 25% of the so-cental leq (15 min) throughout the measurements. Estameous sources were dominant and included Sydray meto trans, neighbour construction, distant and local traffic, neighbour cars and reacts.
Project 024	2020-04-01	09:25:08	0:15:00	73.1	44.1	57.5	65.9	59.7	51.4	100		•	•	•	60	NCA01	A02	Day	42	52	57	16	6	3	A22 - Project 024-025. Measurements taken outside Ralleigh Street, facing west treads alle entrance and works within the rail conduct. Site-related noise resulted from the operation of distant excavation, tuncks, wheeled front-end laader, movement of material, clange and share load. Ben-related noise combund and supportunately 80-1076, of the overall Leg (15 mil). Examples our conduct and the conduct of the material share and the clange and the load Benefits and the advection.
Project 025	2020-04-01	09:42:58	0:15:00	71.5	48	56.6	65.7	59.3	50.9	80		•	•	2.0	67	NCA01	A02	Day	42	52	57	16	6	10	Art - Project 028, Measurements taken outlide 12 Drake Street, Artamon, generally facing west towards site entrance and works within the rail contridor. Site-related note resulted from the
Project 026	2020-04-01	10:08:18	0:15:00	81.6	41.5	62.4	75.7	65.2	43.7	100		•	•	•	81	NCA01	AD1	Day	42	52	57	20	10	24	movement of alle wholese within and out of the site entrance, trucks, tatel tables, clangs and bargs. Site-telated troises contributed to approximately 100% of the overall Leq (15 min) throughout the measurements. Extrained as ources included System metro traine, neighbour constructions, movie, neighbour constructions, movie, neighbour constructions, birds, insects, wind-blaw vegetation, local traffic, people tables.
Project 027	2020-04-01	10:29:38	0:15:00	68	42.8	54.7	62.5	59.1	45.5	35		•	•	•	61	NCA01	A05	Day	42	52	57	8	-2	4	AGS - Played G27. Measurement taken all takens's Steek A charmon, genorally facing treamsh the site and socks within the nal contack. Site visited in the site visites, tacks, accurator and soft taking. Site-relation can construct to approximately 50% of the overall Leq (15 min) throughout the measurement. Extraneous sources included Sydey metro trains, train form, brink, wink bleven vegitation and distant traffic.
Project 028	2020-04-01	10:50:42	0:15:00	94.4	43.9	67.4	77.1	68.8	50.1	15	59		•	•	94	NCA01	A04	Day	42	52	57	17	7	37	AQ4 - Project 028-629, Massurements taken outside 13 Band Street, Artamon, generally facing towards the site entrance and works within the nal controls. Site-related noise resulted from the site whicks, staters, generativ, trucks, statt laking and clargs, and target, Site-related noises combuted to approximately (1% of the overal Leg (15 mit) throughout the masurements. Estraneous sources were dominant and included Systey metro taris, train horn, brid, wirk biown registration, aircraft, local and distant traffic.
Project 030	2020-04-01	11:28:58	0:15:00	87.6	44.5	60.4	69.4	63.8	47.1	70	59				87	NCA01	A01	Day	42	52	57	10	7	30	A01 - Project 030, Measurement taken outside 12 Drake Street, Artamon, generally locing west towards alle entrance and works within the sall contider. Sile-related ross e resulted from the movement of alle wholes within and out of the sile entrance, trucks, staff taking, cange and bargs. Sile-related rosses contributed to appointingly 70% of the overall Leg (15 mig) throughout the
Project 031	23/04/2020	08:15:05	0:15:00	83.78	49.8	61.43	67.57	64.46	55.75	100					79	NCA01	A01	Day	42	52	57	19	9	22	measurement. Extraneous sources included Systemy metro trains, neighbour constructions, mower, neighbour cars, bind, insects, wind blown vegetation, local Intillic and people taking.
Project 032	23/04/2020	08:33:03	0:15:00	72.3	47.9	60.4	69	64.1	52.6	90					72	NCA01	A01	Day	42	52	57	18	8	15	A01 - Project (03-033. Measurements taken outside 12 Deale Street, Artamon, generally locing west towards site entrance and works within the nal contridor. Site-related noise resulted from the operation of excavators and dree plant within the relations, movement of taken wholes within and out of the site entrance, datart site works, have tooks, staff subject hores and change. Site-related noise relations are contraduct to generative (50-000) of the control and (50-000) of the measurement. Extension as subject movement of taken and the measurement. Extension as subject movements and the measurements. Extension as subject
Project 033	23/04/2020	08:51:03	0:15:00	78.7	47	60.4	68.7	64.3	50.4	60					72	NCA01	A01	Day	42	52	57	16	6	15	registouring residences, and brids.
Project 034	23/04/2020	09:14:04	0:15:00	76.69	49.06	62.03	69.85	65.36	54.49	70				2.0	72	NCA01	A05	Day	42	52	57	20	10	15	A05 - Project 034-035. Measurements taken at Hawkins Street, Antamon, generally facing towards the site and works within the nall controls. Site-related noise resulted from trucks, distant site
Project 035	23/04/2020	09:33:05	0:15:00	77.17	38.96	55.93	65.77	59.43	43.73	20		•	-		58	NCA01	A05	Day	42	52	57	7	-3	1	Act - High Lor-Vois Inschertelles later in Heine Setter, von annut, particular juncify and all of the local Heine (15 mit) through out a final account of the later in Heine Setter in the later in the later in Heine Setter in the later in Heine Setter in the later intervent interven
Project 036	23/04/2020	09:59:03	0:15:00	68.48	42.87	52.91	62.55	56.15	45.65	20					57	NCA01	A02	Day	42	52	57	4	-6	0	A22 - Projec 036-037. Measurements taken outside Raleigh Street, facing west towards alle entrance and works within the nal contider. Sile-related noise resulted from the operation of distant
Project 037	23/04/2020	10:17:04	0:15:00	70.98	40.46	52.87	63.19	56.17	44.55	15					58	NCA01	A02	Day	42	52	57	3	-7	1	works and excavators, die plant and explorent, trucks, and unkading of material. Site-related noises combiblied to approximately 15-20% of the overall Leg (15 min) throughout the measurements. Existraneous sources included Sydney metro frans, train horn, distant traffic, and nearly blots and other animati.
Project 038	23/04/2020	10:45:05	0:15:00	86.5	53.3	70.2	77.9	73.4	59.3	5					71	NCA01	A03	Day	42	52	57	15	5	14	AGT - Project CIR-CIS. Measurements taken statiske 340 Montery Road, factog west beards welke within the nal scentur. Size-related noise resulted from the operation of excenture, drilling, clarge and bangs, hard took and which movements. Be-initiated noises contributed to approximately (Fix of the owall Leq.) (E mini prodycol the measurements, and the measurements and initiated Service) Trans. Beard and assign falling on Measurements and initiated Service Transmission. Size devices and the greater of coreas and the privategement within the TEE size compand.
Project 039	23/04/2020	11:03:00	0:15:00	89.5	59.7	71.1	80.4	74.2	64.4	5	58				78	NCA01	A03	Day	42	52	57	16	6	21	the measurements and included Systemy Traine, distant and passing traffic on Molecary Read, and the operation of cranes and other plantequipment within the TSE site compound.

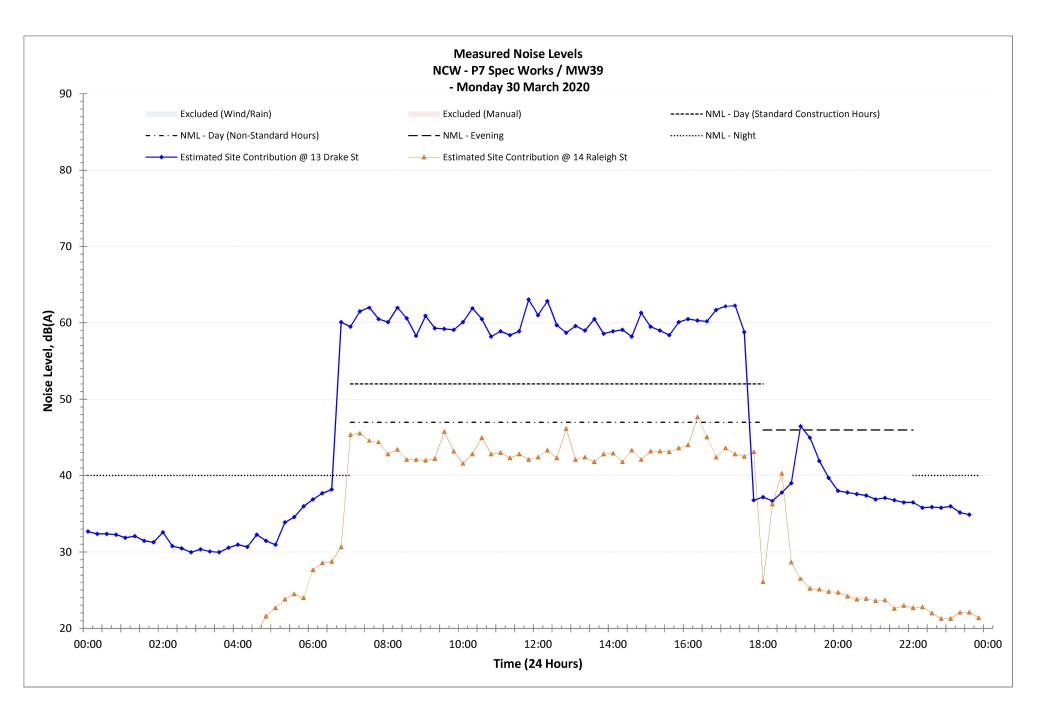
File Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAcq	LAF1.0	LAF10.0	LAF90.0	Percentage Sile Contribution [%]	Measured Ste Noise Level - LAeq, 15minure	impulsive Modifying Factor?	Tonal Modifying Factor? Low Frequency Modifying	Factor? Measured Ste Noise	Leves - Lantax	Losation	Period	RBL - LA90, Period	NML - LÅog, 15 mhute	Steep Disturbance Screening Level - LAmax	Comparison to RBL - LA90, Pariod	Comparison to MML - LAeq. 15 minure	Comparison to Sleep Dis turbance Screening Level - LAmax	Description
Project 040	27/04/2020	08:18:05	0:15:00	72.19	42.91	59.01	69.01	64.23	46.36	15				- 61	3 NCA01	A01	Day	42	52	57	9	-1	11	
Project 041	27/04/2020	08:36:05	0:15:00	70.13	45.17	58.3	67.74	63.32	50.56	40				- 63	3 NCA01	A01	Day	42	52	57	12	2	6	A01 - Phojed 40-042. Measurements taken outside 12 Drake Street, Antamicon, generally lacing west towards alls entrances and words within the rail corridor. Site-related noise resulted from the operation of excavators and other plant within the rail corridor, movement of site vehicles within and out of the site entrance, hand tools, staff taking, and reverse alternal. Site-related noises contributed to approximately 15-0/N of the overal Log (15 min) throughout the measurements. Extrancous sources included Siydery metro trains, train home, bind and dard traffic.
Project 042	27/04/2020	08:54:07	0:15:00	75.42	44.91	58.64	68.12	62.62	50.01	30				- 63	2 NCA01	A01	Day	42	52	57	11	1	5	
Project 043	27/04/2020	09:17:04	0:15:00	73.45	45.83	55.68	63.35	58.58	49.64	50				- 6'	I NCA01	A02	Day	42	52	57	11	1	4	
Project 044	27/04/2020	09:37:04	0:15:00	71.91	42.19	53.93	63.45	56.67	45.9	60				- 5	7 NCA01	A02	Day	42	52	57	10	0	o	A22 - Project 042-055. Measuments bian cubick Religit Struct, fucing west toxeds all entraces and works within the nationalist. Site-related mole number of a special of datast and nearly executions, deplant and equipment, movement of trucks, and datast rate works (Meaking) Rd). Site-related moles controlated to approximately 50-60% of the overall Laq (15 min) throughout the measurements. Estimates account sculaded System nation trains, han from, dataset traits, and nearly terds.
Project 045	27/04/2020	09:56:06	0:15:00	70.64	45.83	57.97	64.06	61.52	51	60			- 3	2.0 63	3 NCA01	A02	Day	42	52	57	16	6	6	
Project 046	27/04/2020	10:43:03	0:15:00	84.59	59.59	70.74	78.13	74.06	63.69	5				- 84	NCA01	A03	Day	42	52	57	16	6	27	A03 - Project 046-047. Measurements taken outside 340 Monkray Road, facing west towards works within the rail contidor. Site-related noise resulted from the operation of escawators, movement of balast, revense alarms, and datart at an elabed works within the rail controls. Site-related response alarms,
Project 047	27/04/2020	11:01:15	0:15:00	82.98	59.09	70.15	п.п	73.72	63.24	5				- 73	2 NCA01	A03	Day	42	52	57	15	5	15	Extraneous sources dominated the measurements and included Sydney Trains, datant and passing half con Mokinay Road, birds, nearby residents, and the operation of cranes and other plantlopulgment within the TSE site compound.
Project 048	27/04/2020	11:34:04	0:15:00	69.48	43.7	55.2	64.19	58.95	46.69	50				- 6	r NCA01	A05	Day	42	52	57	10	0	10	A/G - Project 048. Measurement taken at Heakins Street, Artamon, generally facing towards the site and works within the nal contridor. Site-related noise resulted from trucks, excavators operating, clangs, and langs, and staff taking. Site-related noises combuted to approximately 50% of the overall Leq (15 min) throughout the measurement. Estimaneous sources included Sydey metro trains, birds, and nearly residents.
Weather 27, 31 March and 1, Note: all predicted noise levels 1 Note: Low frequency, tonality ar	vere reproduced from the I	LOR OOHWA Form for thi	s track possession.							las applicab	le to the low freque	ency, tonal o	r impulsive comp	conents detecta	able or attributable to the	sites noise emission.	The site noise cont	ribution reported h	ere is inclusive of all n	nodifying factors (if a	applicable).			

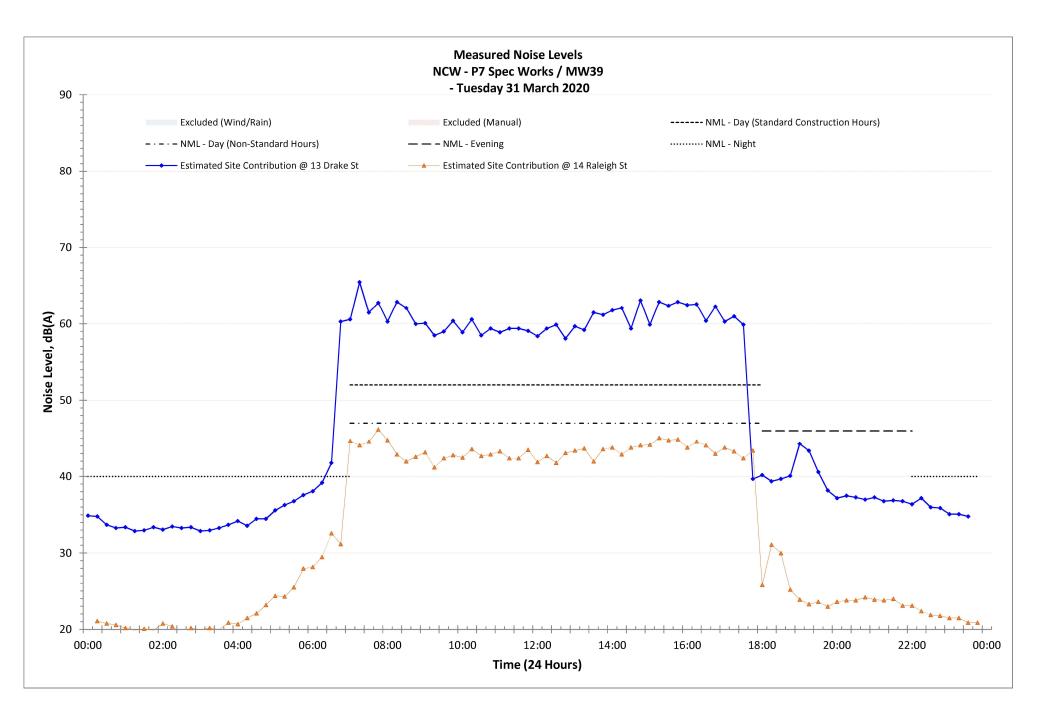
Fik Name	Date	Start Time	Elapsed Time	LAFmax	LAFmin	LAsa	LAF1.0	LAF10.0	LAF90.0	Percentage Site Contributio	Measured Silo Noise Level - L.Aeq. 15min use	mpultive Modifying Factor	To nai Mod Pying Factor? Low Finemency Modifyling	Pactor?	Measured Slos Noise Lovel - L.Amax	NCA	Lo at b n	Particod	RBL - L <i>4</i> 00, Period	NML - L.Aaq, 15 minuus	Predicted Site No ise Level - LAcq. 19min.uto	Sisep Disturbance Screenin Level - LAmax	Comparison to RBL - L/80, Period	Comparison to NML - LAsq. 15 minute	Comparison to Predicted Bits Noise Level - L.Acq. 15minute	Comparison to Sloep Disturbance Screening Leve - LAmax	Astrology
Project 001	3/04/2020	01:02	0:15:00	86.9	35.7	54.5	65.5	55.7	37.5	50				-	66	NCA01	AD1	Night	35	40	64	50	16	11	-13	16	A01 - Project 001. Measurement takan oxidaki 12 Detaka Simari, Artamon, generakiy kacing warit twende sika emance and works within the rail contide. Ske-velated notae resulted from movement of whiching within and rail of the law emance, and working similar takan controls. Bio initiatio social controls within the rail contide. Similar throughout managements. Editory on control were with defined in colds: controls within the rail control. Similar throughout managements. Editory on control were similar to colds: controls. March takan terms from the memory control were also with the cold control.
Project 002	3/04/2020	01:25	0:15:00	52.9	37.9	42.0	47.6	43.4	39.9	0					0	NCA01	A02	Night	35	40	48	50	-5	-10	-18	-50	A22 - Project 022, Maximum taken codels Rakeys Binet, facing exert leases size entrance and werks within the call contain. Reasonment, Extensions sources were deminent and include datars and passing taility, and cickae.
Project 003	3/04/2020	01:58	0:15:00	57.6	34.5	38.6	43.9	39.6	36.3	0					0	NCA01	A03	Night	35	40	48	50	-9	-14	-22	-50	A01 Project 033. Measurement taken calcels 13 Repetion Anoval, focing wast breach works within the tail contract. Site-related noise was not audite during the measurement. Enterneous sources was dominant and included detaint and passing traffic, and codes.
Project 004	3/04/2020	06:59	0:15:00	75.7	41.7	58.5	69.1	62.2	44.3	40					63	NCA01	AD1	Night	35	40	64	50	20	15	-9	13	
Project 005	3/04/2020	07:16	0:15:00	82.1	48.2	63.5	72.7	67.1	51.5	90				-	77	NCA01	A01	Day	42	52	64	57	21	11	-1	20	A01 - regis (10 4-00, Measurement alates analelis (12 dalla (Alateria, ganati) lacing esta based alla esta dalla d
Project 006	3/04/2020	07:33	0:15:00	83.6	54.0	65.5	75.3	68.8	57.3	90				-	80	NCA01	A01	Day	42	52	64	57	23	13	1	23	
Project 007	3/04/2020	07:50	0:15:00	76.5	47.0	57.7	68.4	62.0	50.0	90					69	NCA01	A02	Day	42	52	64	57	15	5	-7	12	ACI - Project 007: Measurement taken contails Raining Street, fucing went twends die entervice and worke within the relic contrart. Size waland molas resultand from dataer size walaway was an and contrart. Size waland molas resultand from dataer size walaway and the contrart and passing strafts, manity being and passing strafts, manity being and passing.

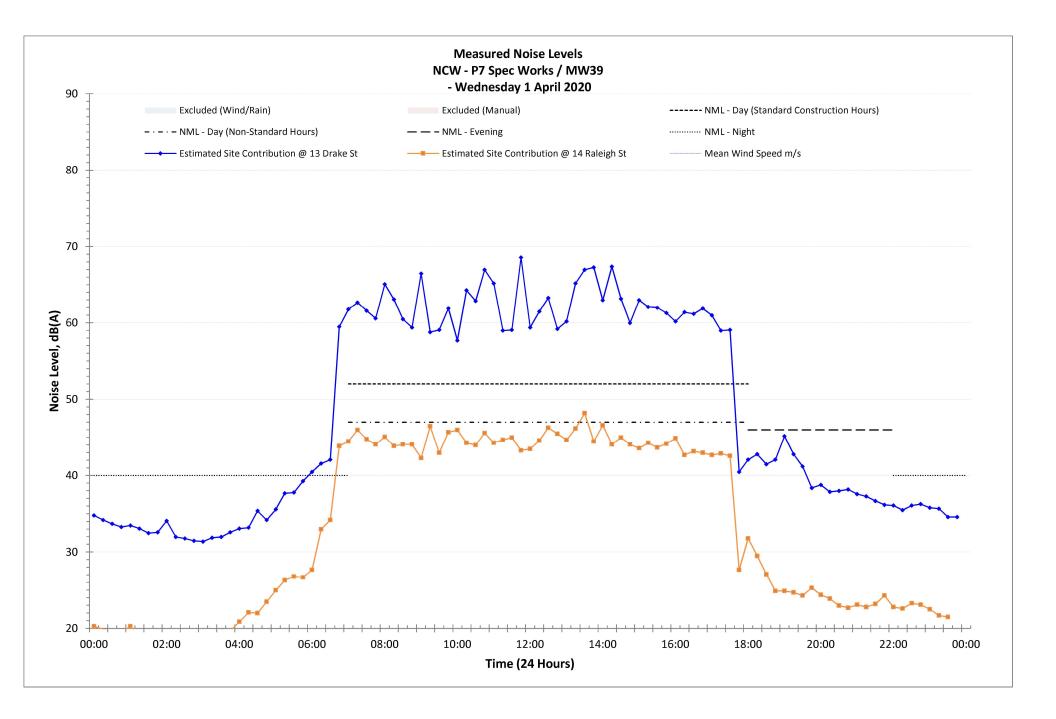


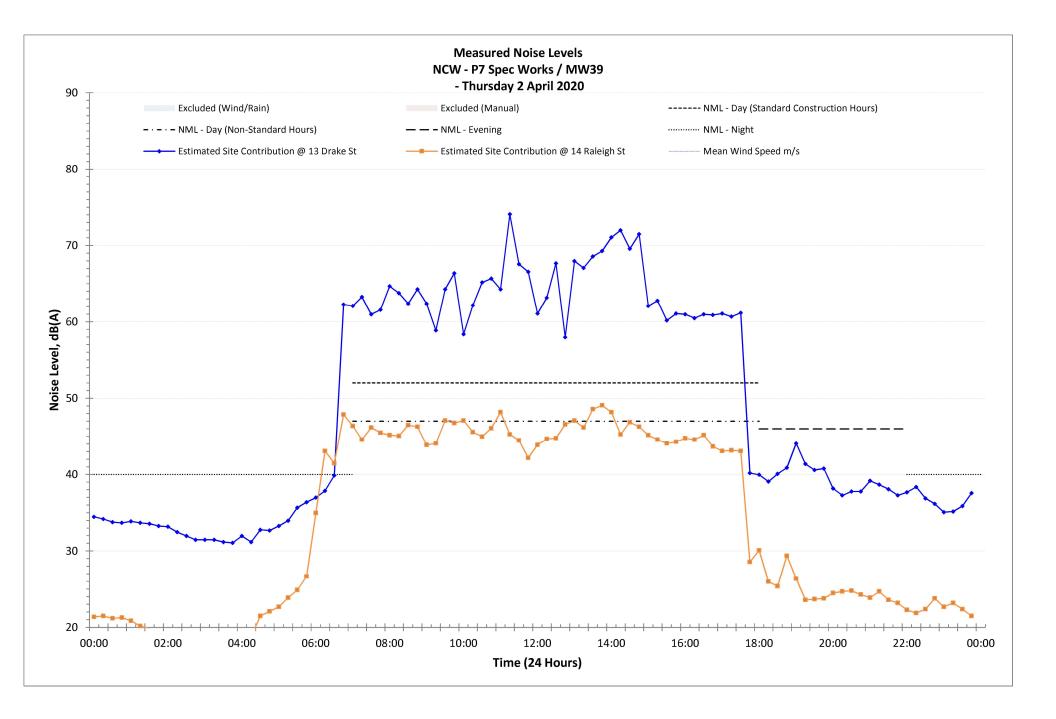


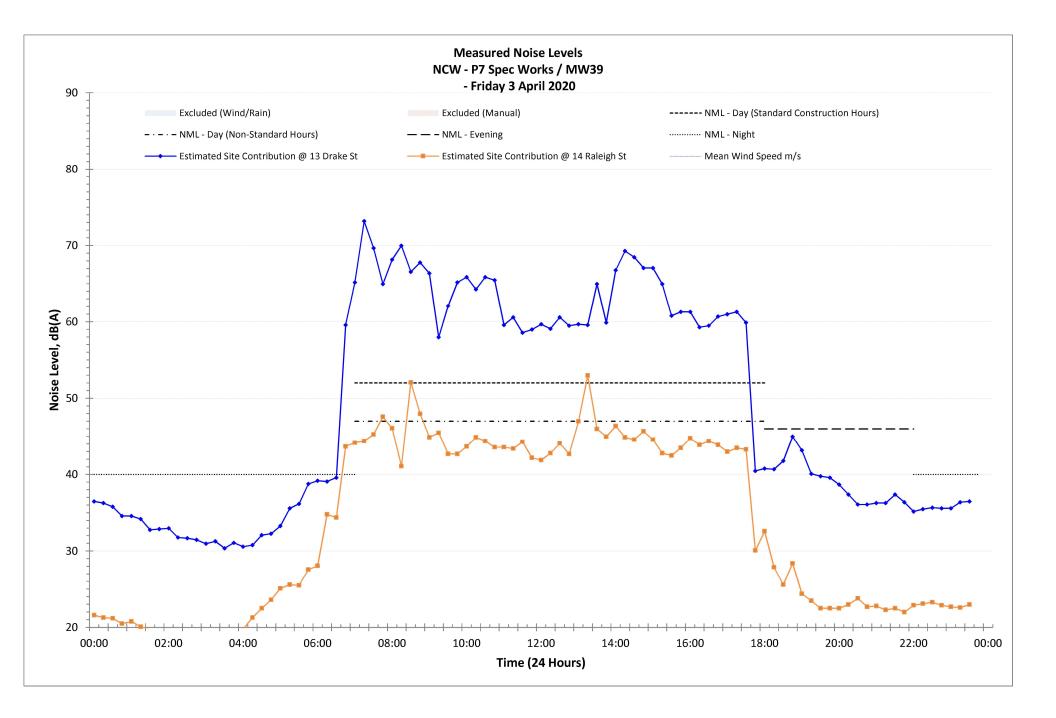


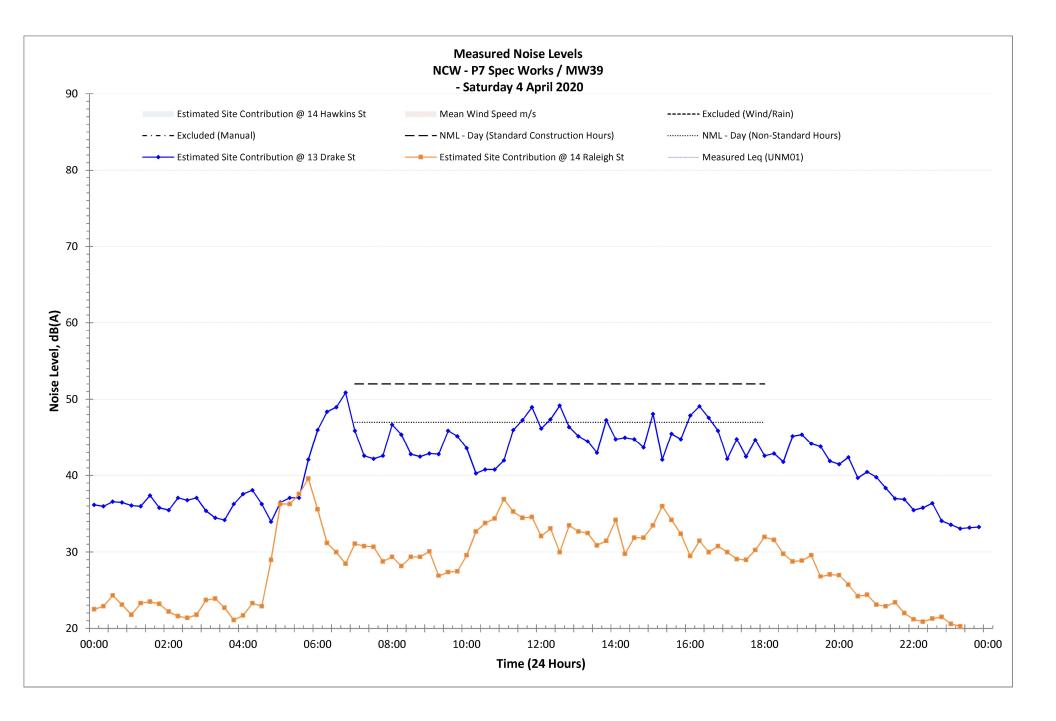


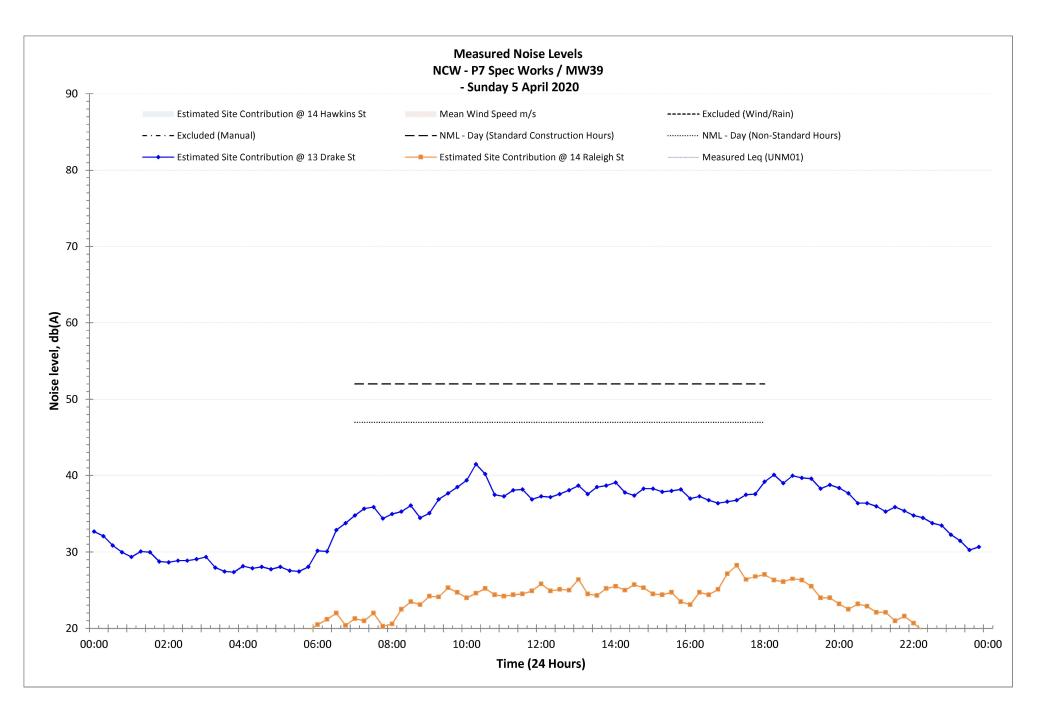


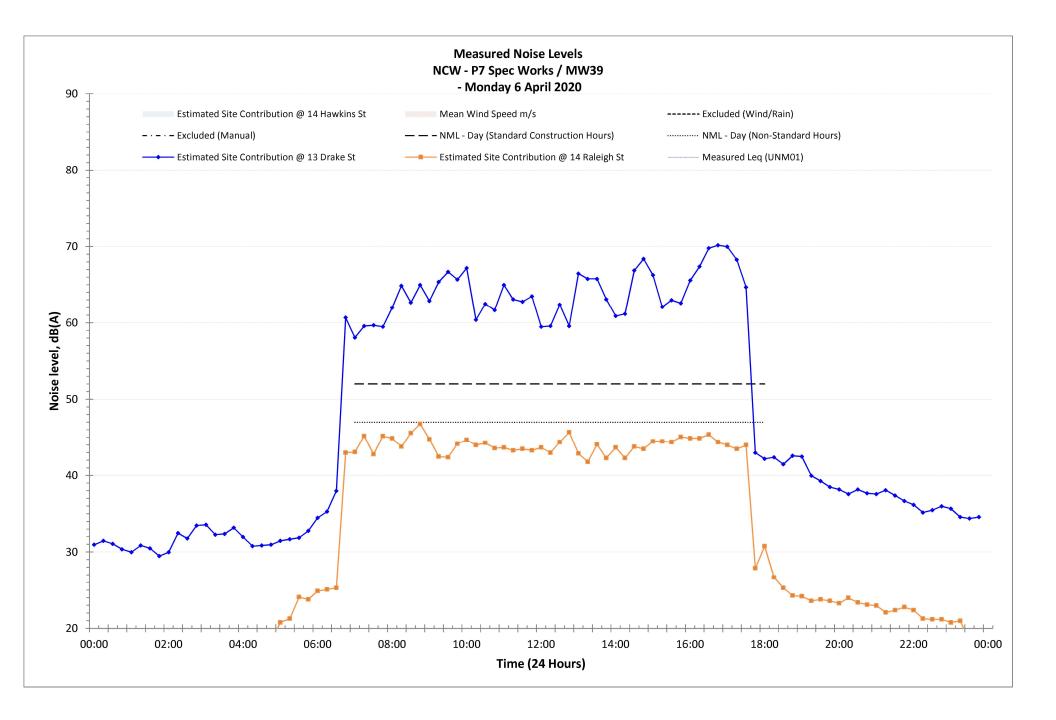


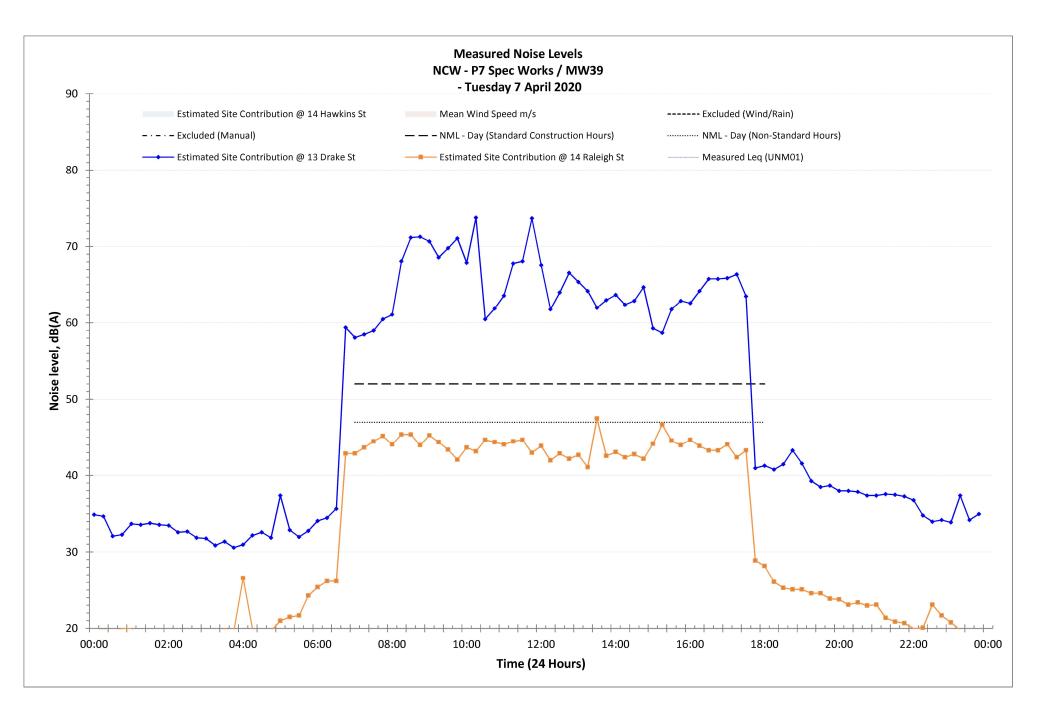


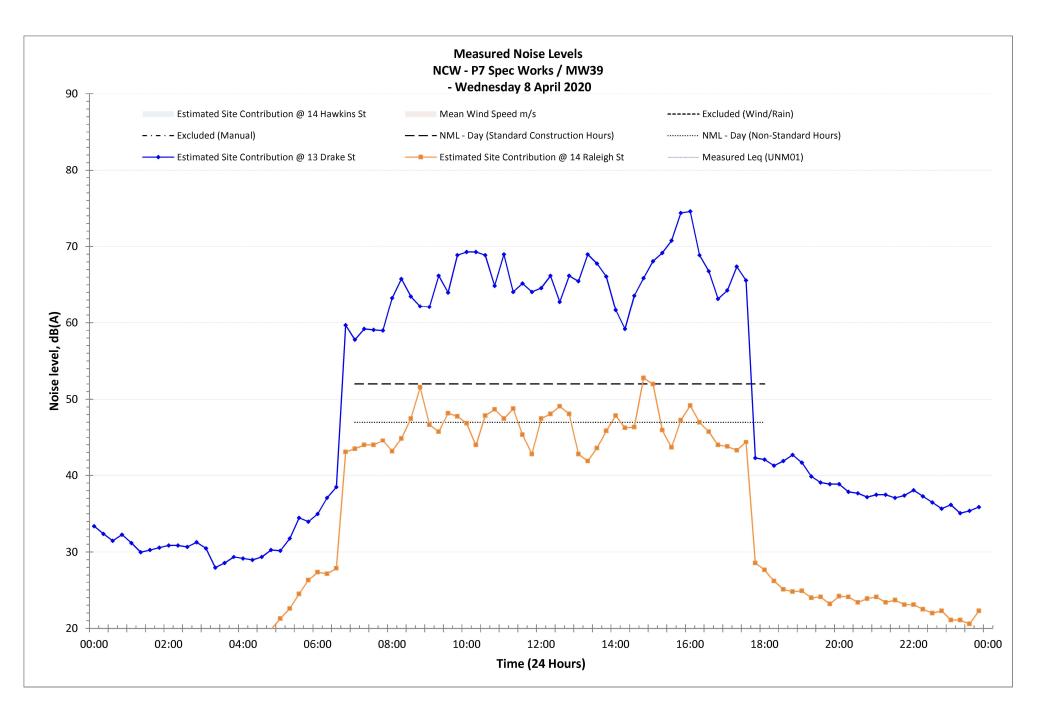


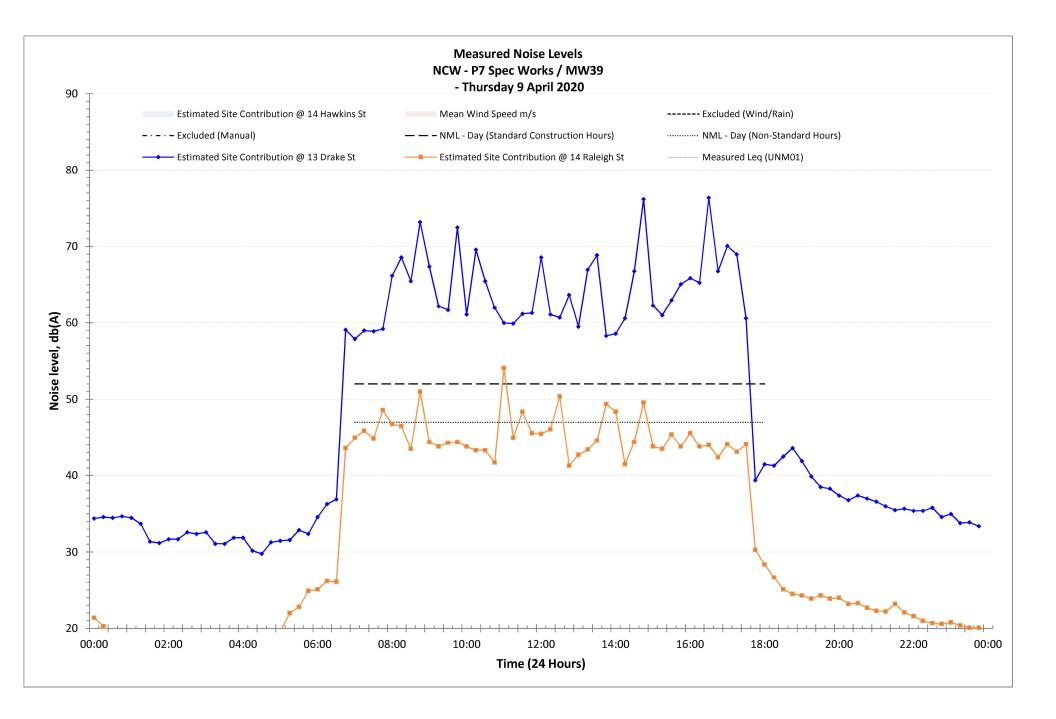


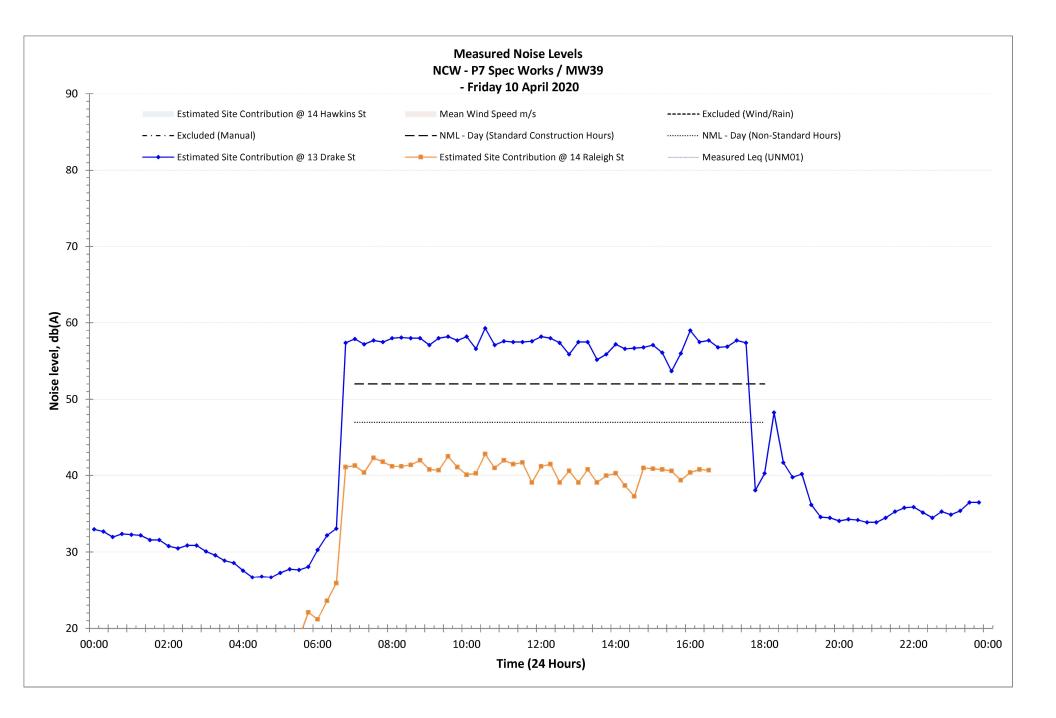


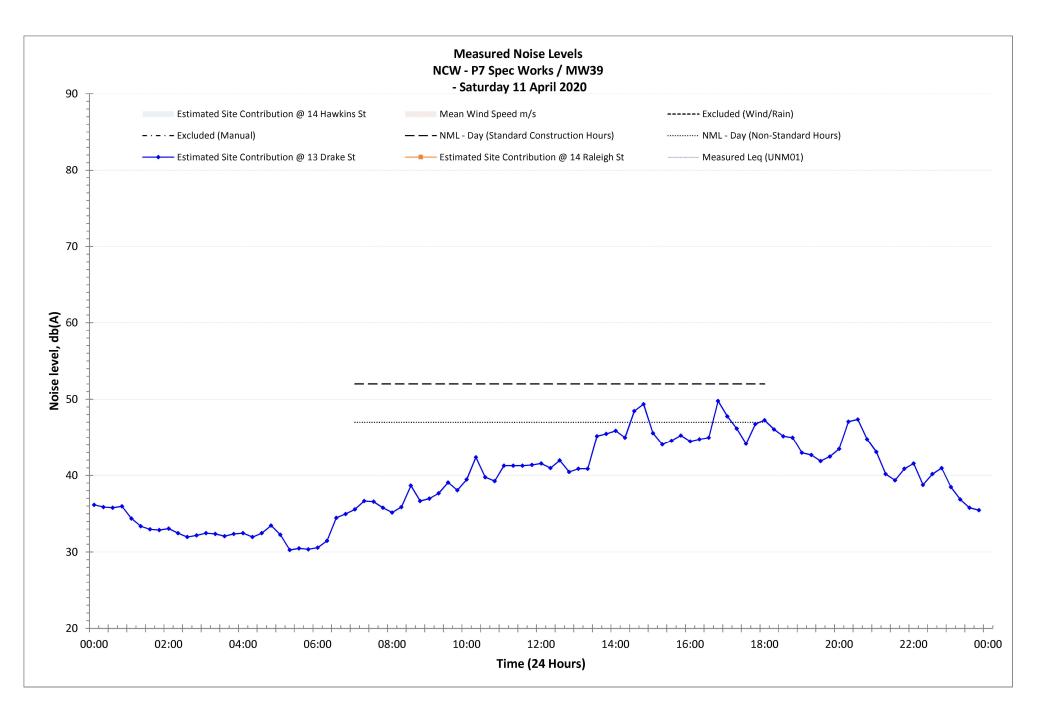


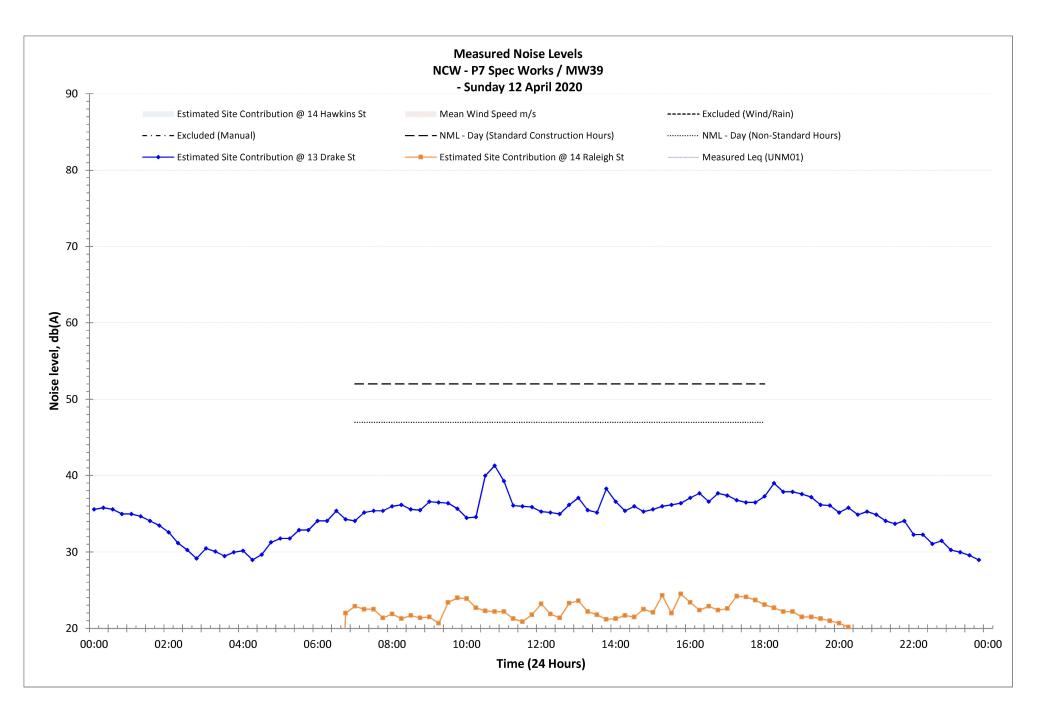


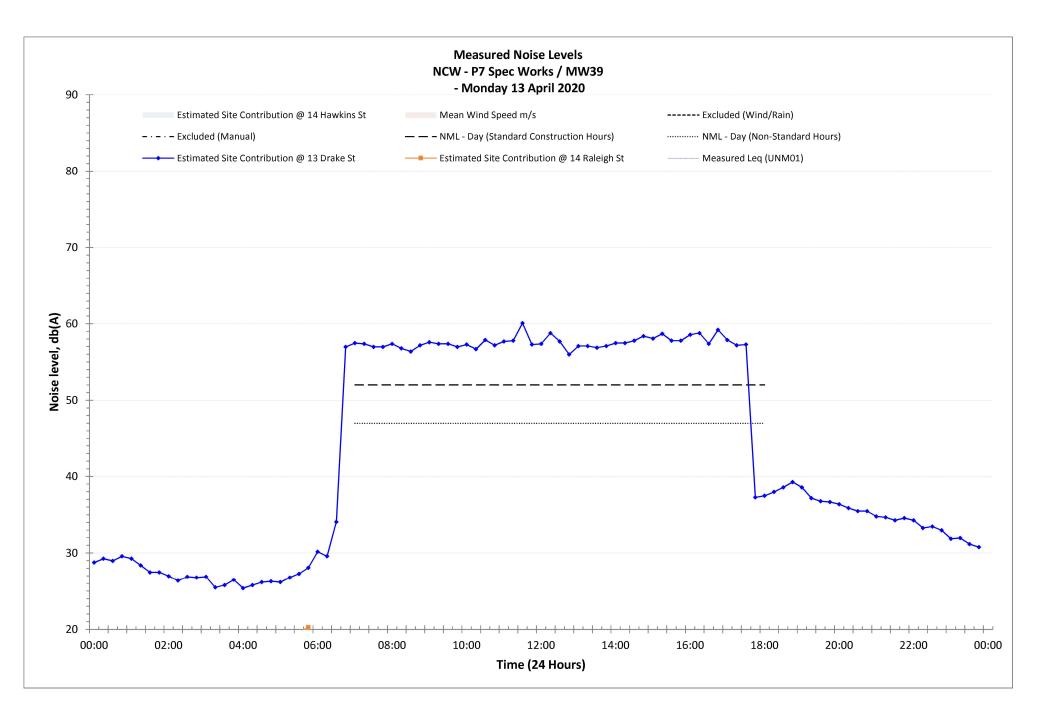


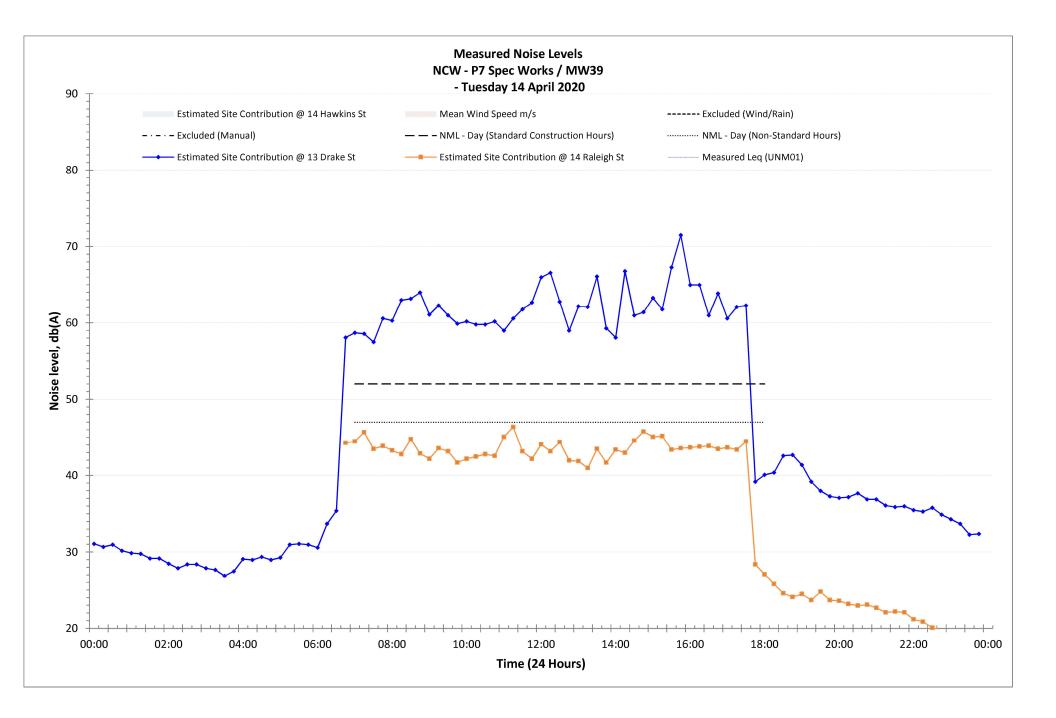


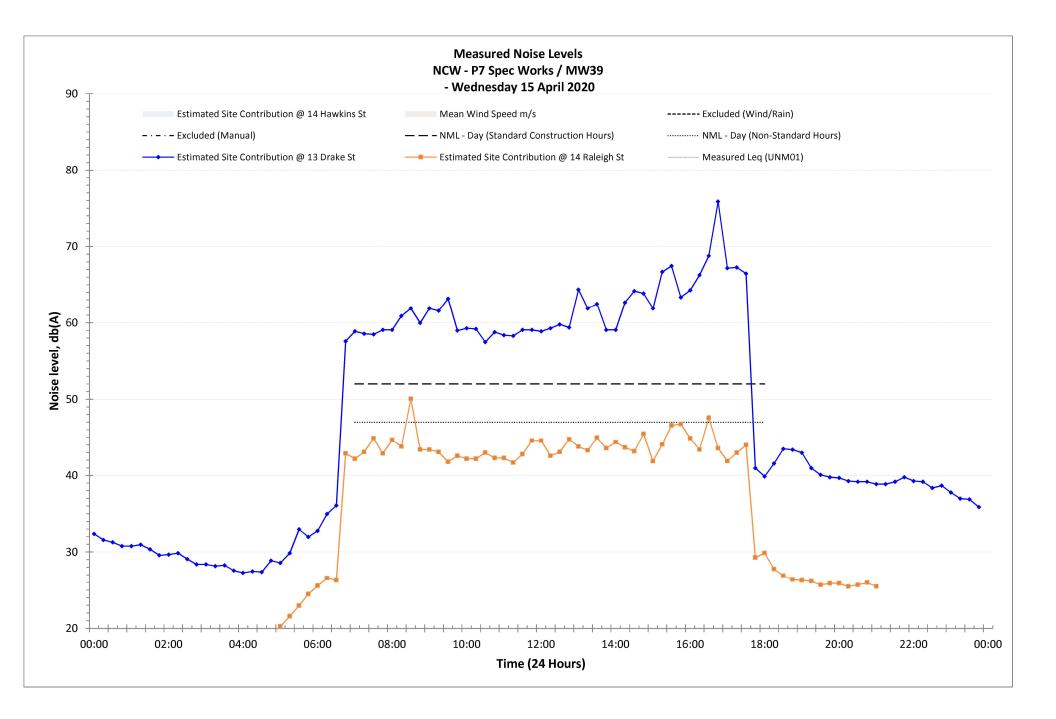


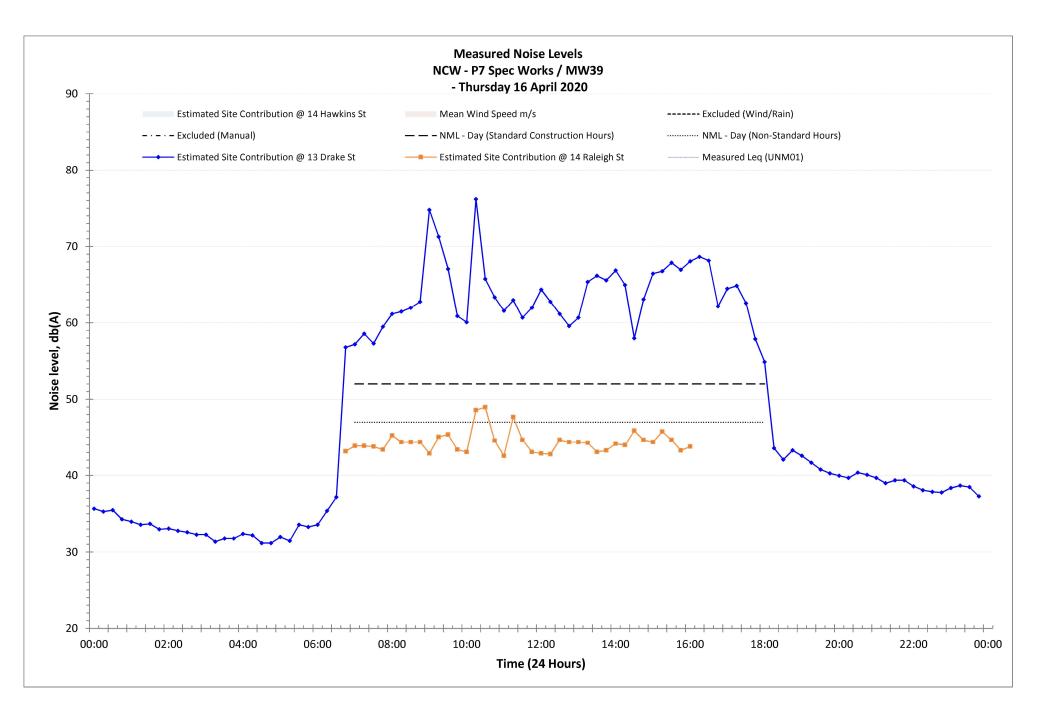


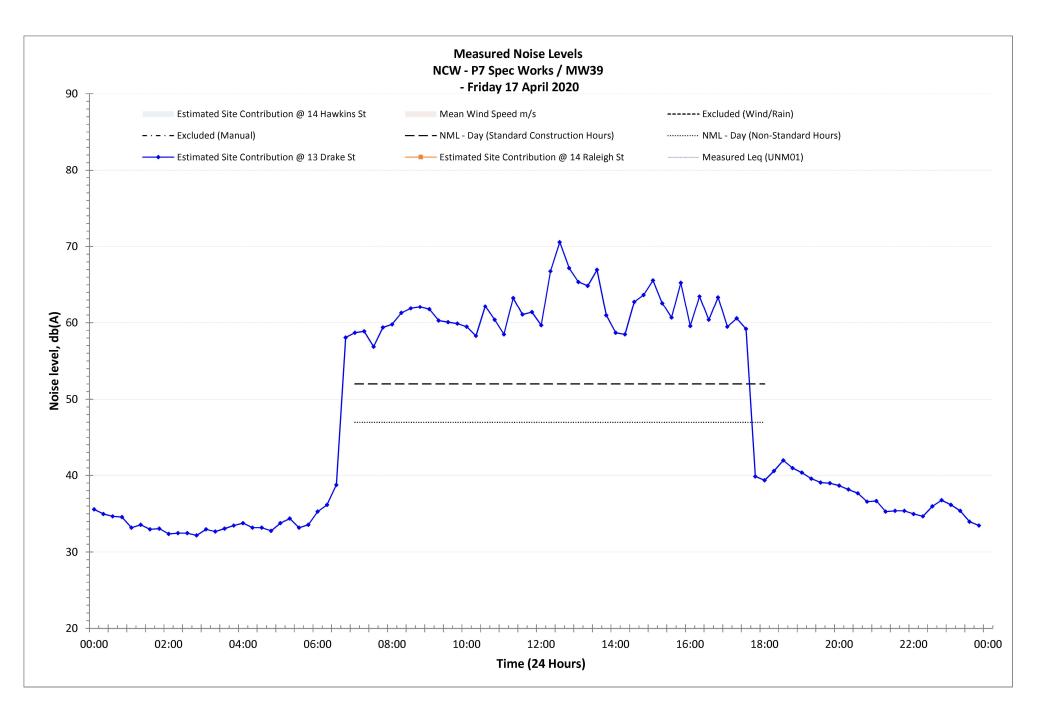


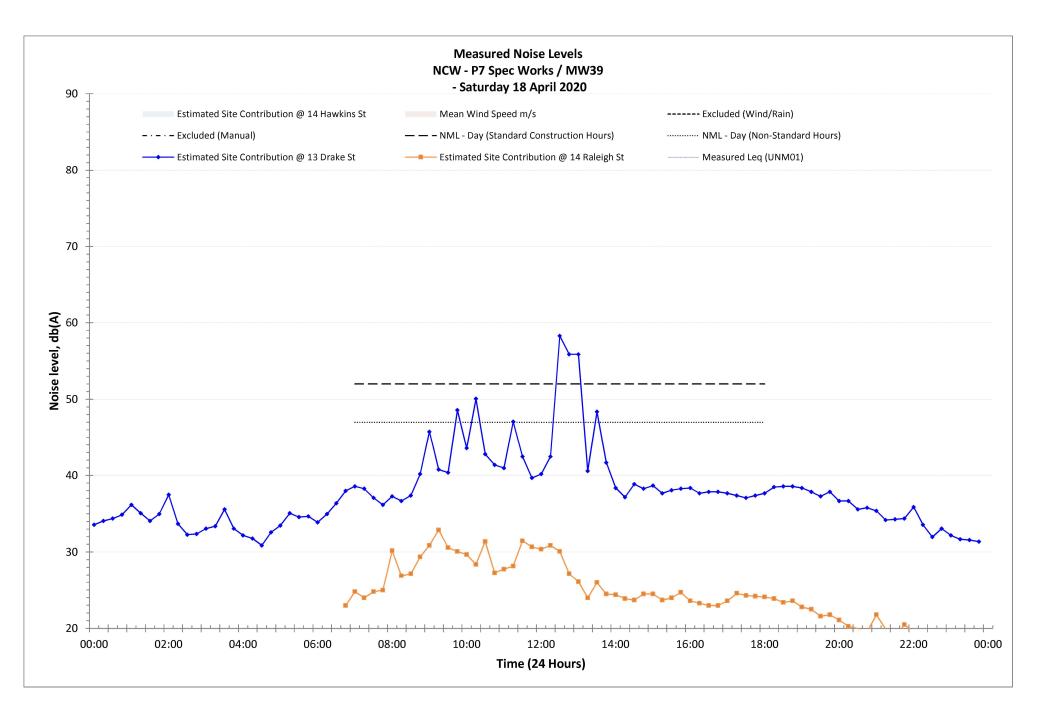


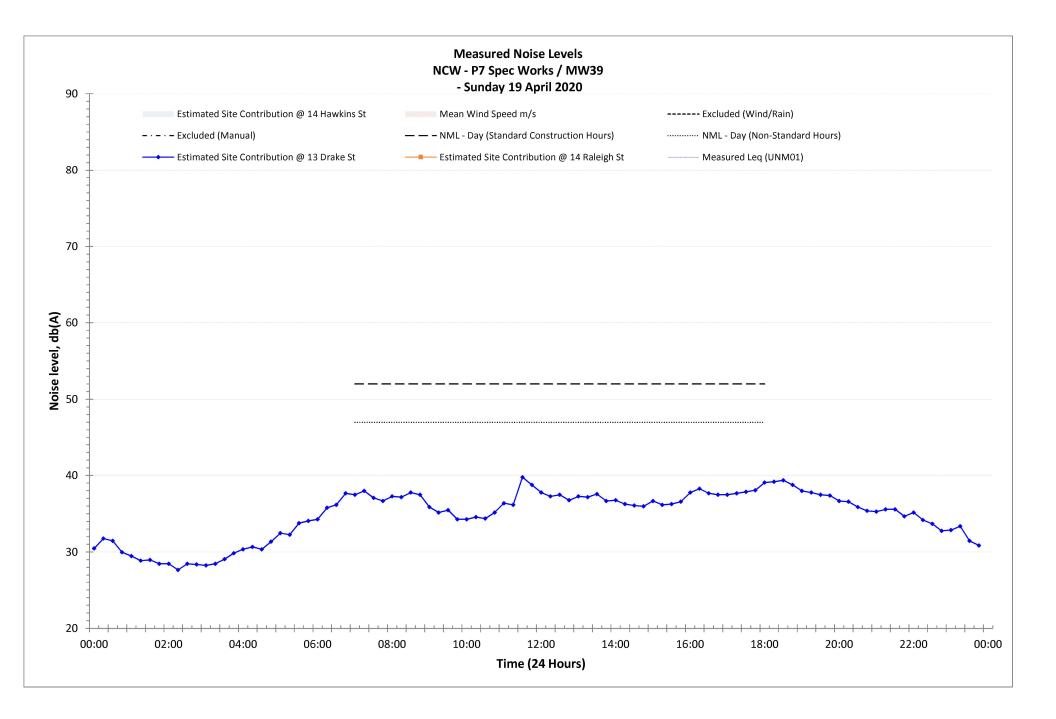


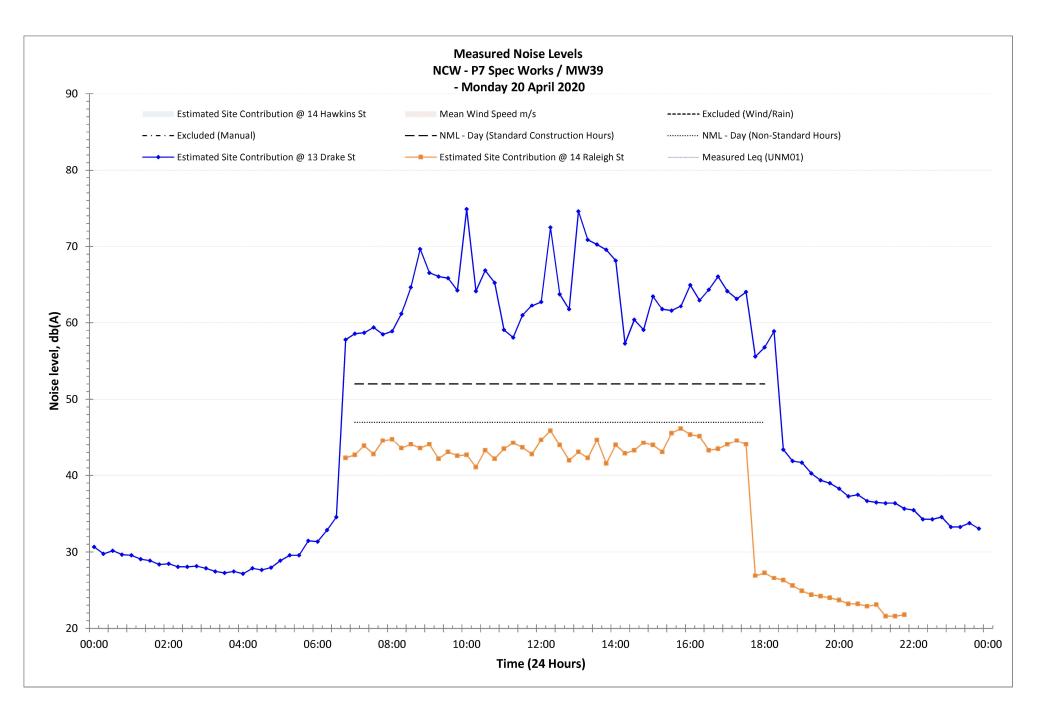


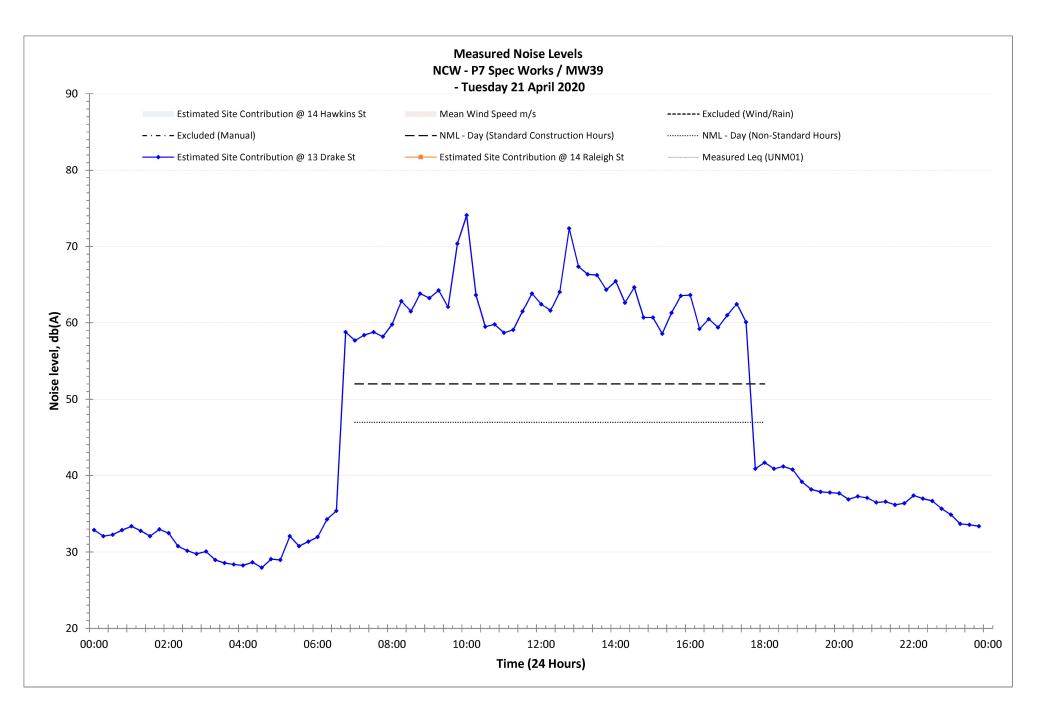


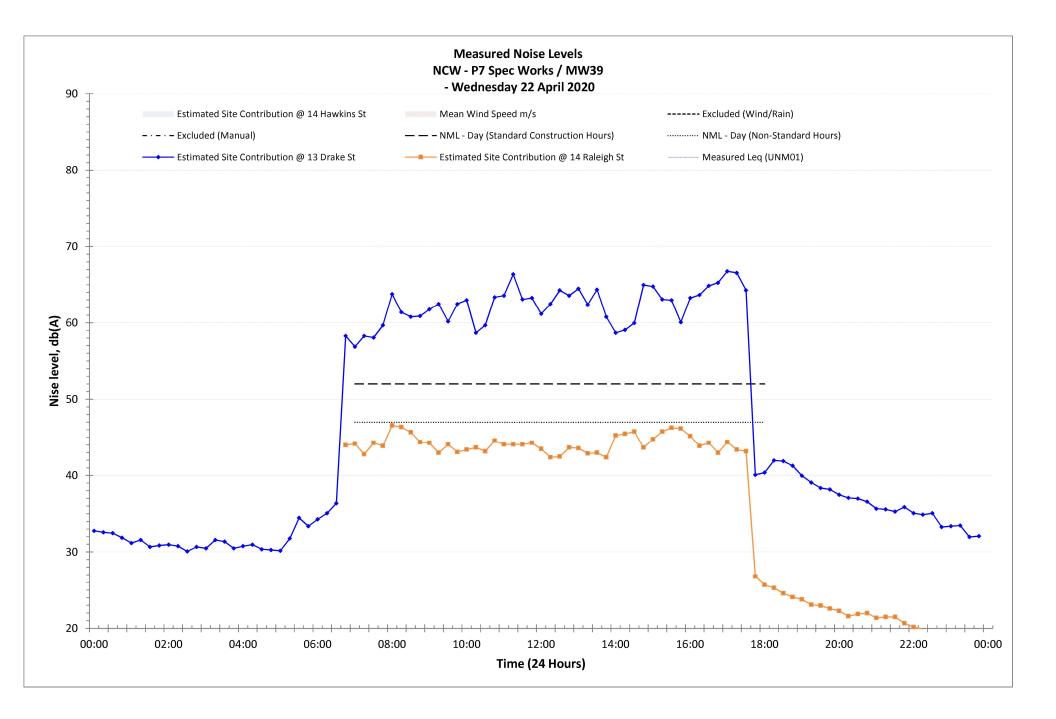


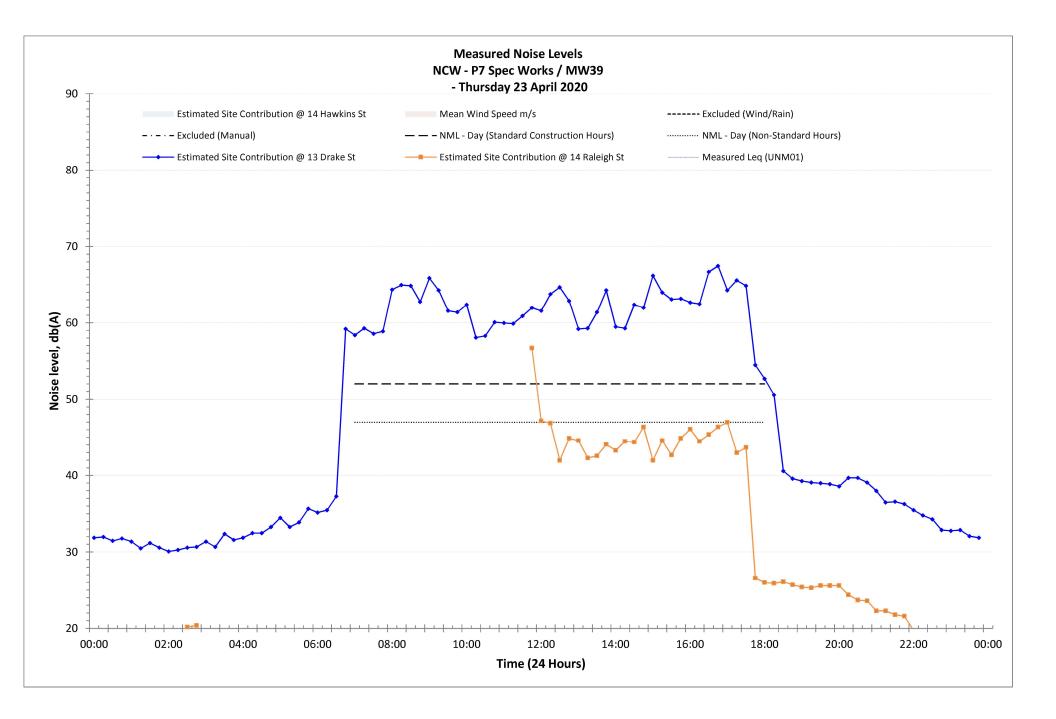


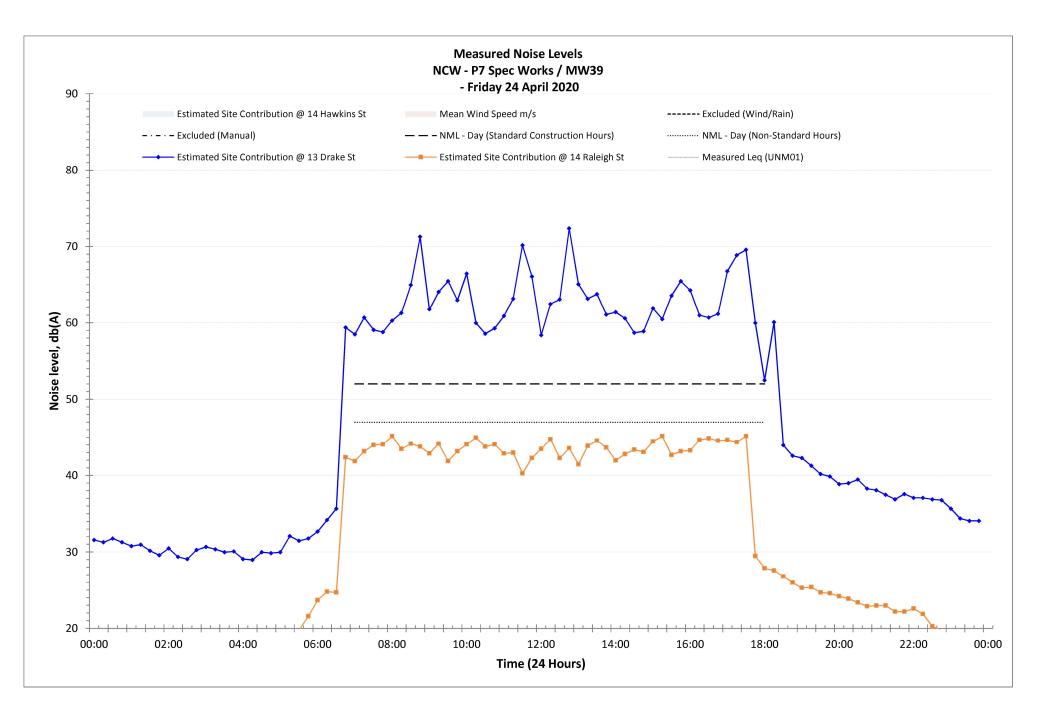


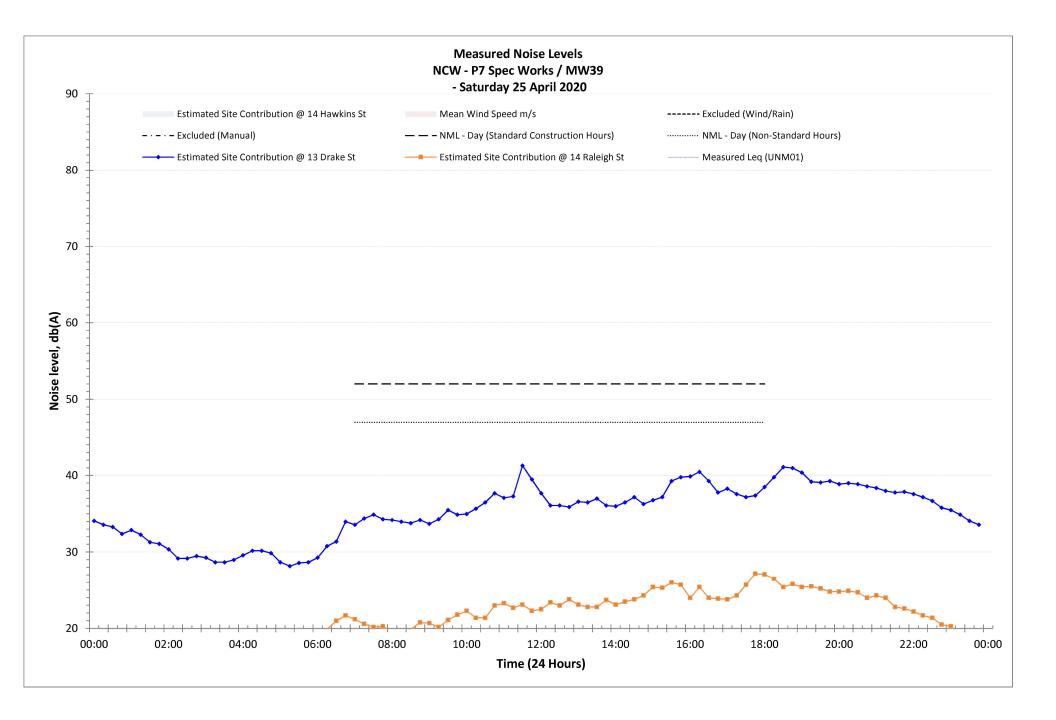


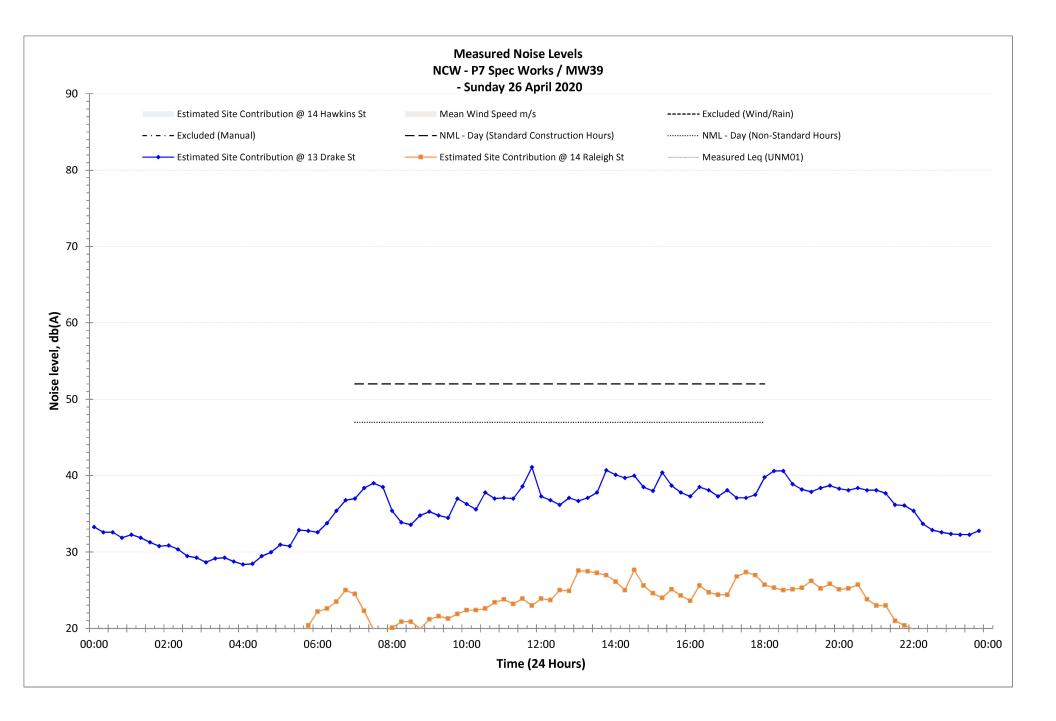


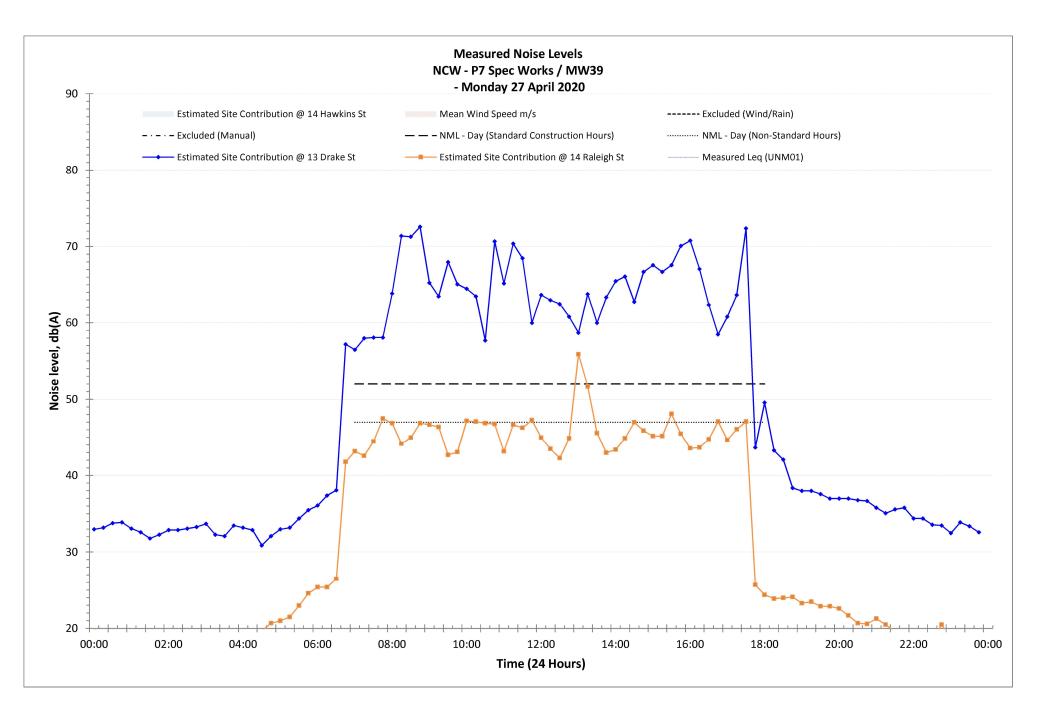


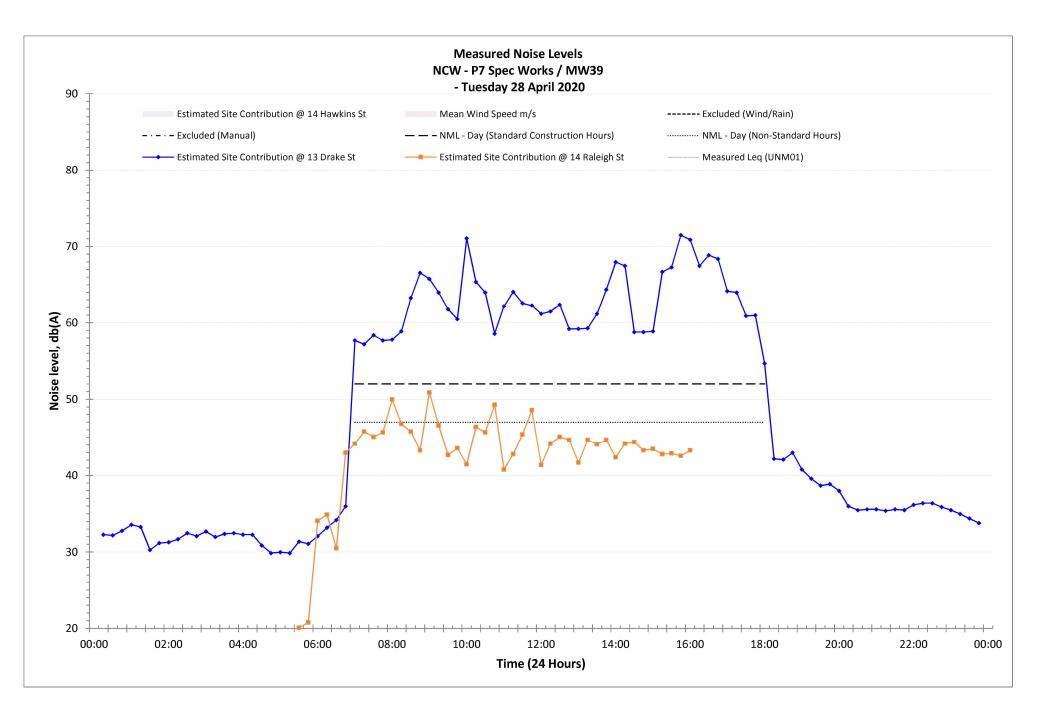


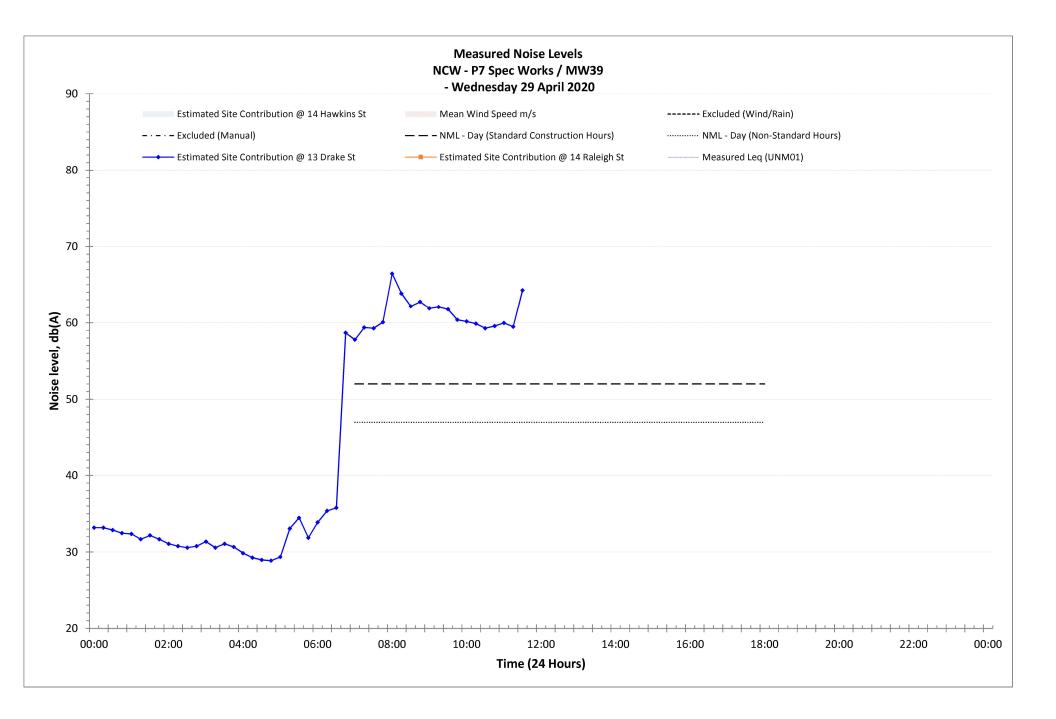












Appendix L – Monitoring Report (RP50b)

Vibration Monitoring – OOHW P7: Special Works / MW39 - 27 March to 29 April 2020

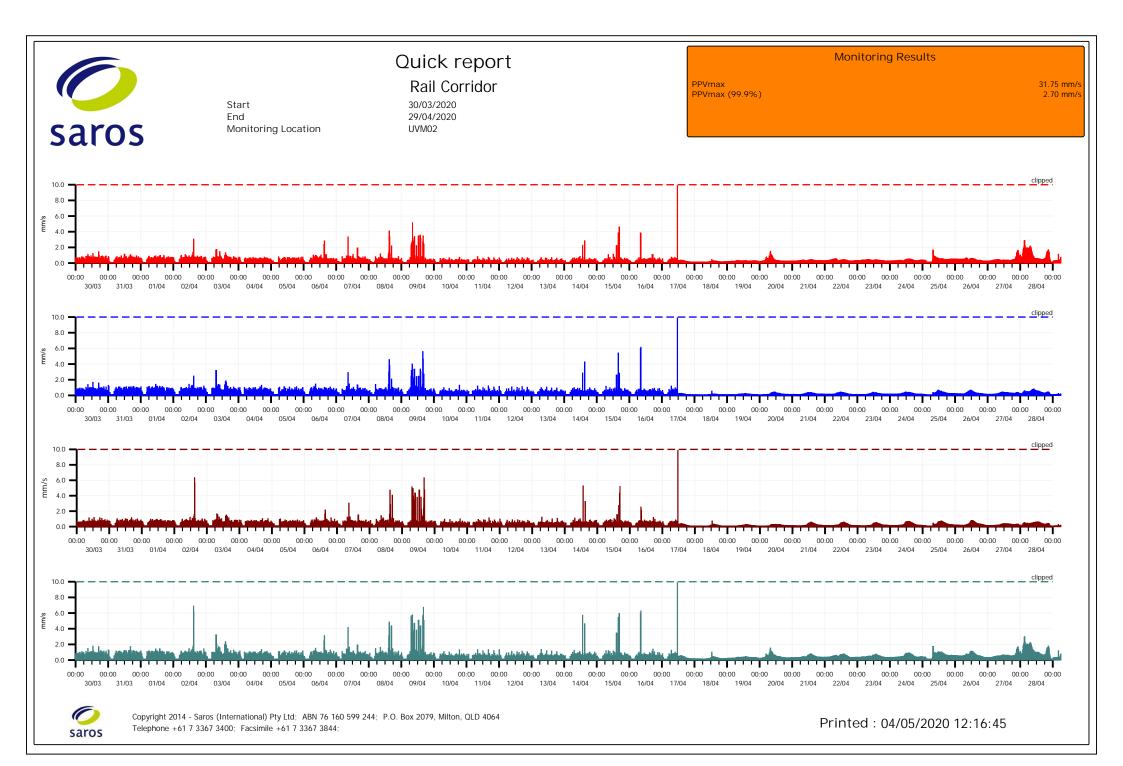
ERM: Level 15, 309 Kent Street Sydney, NSW 2000. T: (02) 8584 8888. F: (02) 8584 8800. www.erm.com

Figure A1.0 – Spec Works and OOHW MW39 Monitoring Period – Unattended Vibration Monitoring Locations

- NCW P7 (Thursday, 27 March to Wednesday, 29 April 2020)



ERM



Sydney Metro City and Southwest – North Corridor Works Addendum – NCW Noise and Vibration Monitoring – October 2019 – May 2020

END OF DOCUMENT

- THIS PAGE IS INTENTIONALLY LEFT BLANK

Addendum

Appendix A – Monitoring Report (RP40)

Noise Monitoring – OOHW P7: Hopetoun Avenue works - 4 October 2019

Addendum

Appendix B – Monitoring Report (RP42)

Noise Monitoring - OOHW P7: MW19 - 11 to 15 November 2019

Appendix C – Monitoring Report (RP43a)

Noise Monitoring - OOHW P7: WE20 - 16 to 17 November 2019

Appendix D – Monitoring Report (RP43b)

Vibration Monitoring – OOHW P7: WE20 - 16 to 17 November 2019

Appendix E – Monitoring Report (RP44)

Noise Monitoring – OOHW P7: MW30 - 27 to 28 January 2020

Appendix F – Monitoring Report (RP45)

Noise Monitoring - OOHW P7: MW31 - 3 to 7 February 2020

Appendix G – Monitoring Report (RP46)

Noise Monitoring - OOHW P7: WE32 - 8 to 9 February 2020

Appendix H – Monitoring Report (RP47)

Noise Monitoring – OOHW P7: MW32 - 10 to 14 February 2020

Appendix I – Monitoring Report (RP48)

Noise Monitoring – OOHW P7: MW35 - 2 to 6 March 2020

Appendix J – Monitoring Report (RP49)

Noise Monitoring - OOHW P7: WE36 - 7 to 8 March 2020

Appendix K – Monitoring Report (RP50a)

Noise Monitoring – OOHW P7: Special Works / MW39 - 27 March to 29 April 2020

Addendum

Appendix L – Monitoring Report (RP50b)

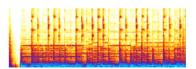
Vibration Monitoring – OOHW P7: Special Works / MW39 - 27 March to 29 April 2020

Sydney Metro City and Southwest – North Corridor Works Addendum – NCW Noise and Vibration Monitoring – October 2019 – May 2020

END OF DOCUMENT

- THIS PAGE IS INTENTIONALLY LEFT BLANK





acoustic studio

ENDORSEMENT CITY & SOUTHWEST ACOUSTIC ADVISOR

Review of	Laing O'Rourke North Corridor Works Noise and Vibration Monitoring Report October 2019 – May 2020	Document reference:	LOR-NCW-Noise and Vibration Monitoring-Oct19- May20 Summary Report V0.2
Prepared by:	Larry Clark, Alternate Acoustics Advisor		Dated 29 July 2020
Date of issue:	11 August 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 October 2019 – May 2020 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.

Carry Clark

Larry Clark, City & Southwest Alternate Acoustics Advisor