APPENDIX 12-2

SUMMARY OF BACKGROUND SURVEY

APPENDIX 12- 2 BACKGROUND NOISE SURVEY

The noise survey and subsequent data analysis was carried out in accordance with best practice following the guidance contained in the Institute of Acoustics publication *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise* (May 2013), (IOA GPG).

Selection of Measurement Locations and Methodology

The purpose of the noise survey is to determine the background noise at representative noise sensitive locations (NSLs) within the receiving environment surrounding the Proposed Wind Farm site.

The survey locations were identified with consideration of the potential turbine noise contribution from the Proposed Wind Farm assessed using noise prediction modelling and supported by reviewing aerial images and street side images where available on website e.g., Google Earth and Bing Maps.

The assessment methodology in the EIAR is in accordance with the Institute of Acoustics document A Good Practice Guide to the Application of ETSU-R-97 for the Assessment and Rating of Wind Turbine Noise (2013) hereafter referred to as the IOA GPG.

The IOA GPG requires monitoring locations to be selected on a site-specific basis using experienced professional judgement. The principal requirements are summarised below:

- Monitoring locations should be selected to provide representative background sound data for the relevant NSLs, taking account of the local environment and the proposed turbine layout.
- The final monitoring positions should account for practical access and installation constraints while avoiding, where practicable, localised sources of noise or sound that would not be representative of the locations being assessed.
- Where an existing wind farm may influence measured levels, its contribution must be identified and excluded from the measured levels used to derive turbine noise limits for the proposed development.
- The number and distribution of monitoring locations must be determined for the specific site. The selected locations should provide sufficient spatial coverage to characterise background sound conditions at the receptors relevant to the assessment

A robust assessment of the noise impacts of the wind farm necessitates a detailed survey of the background noise at houses in the vicinity of the Proposed Wind Farm.

Measurement Locations

The background noise survey was conducted through installing unattended sound level meters at 10 no. representative locations in the surrounding area. The co-ordinates for selected locations for the noise monitoring locations are outlined in Table 2-1 and identified on a map in Figure 2-1.

Table 2-1. Coordinates of Noise Monitoring Equipment

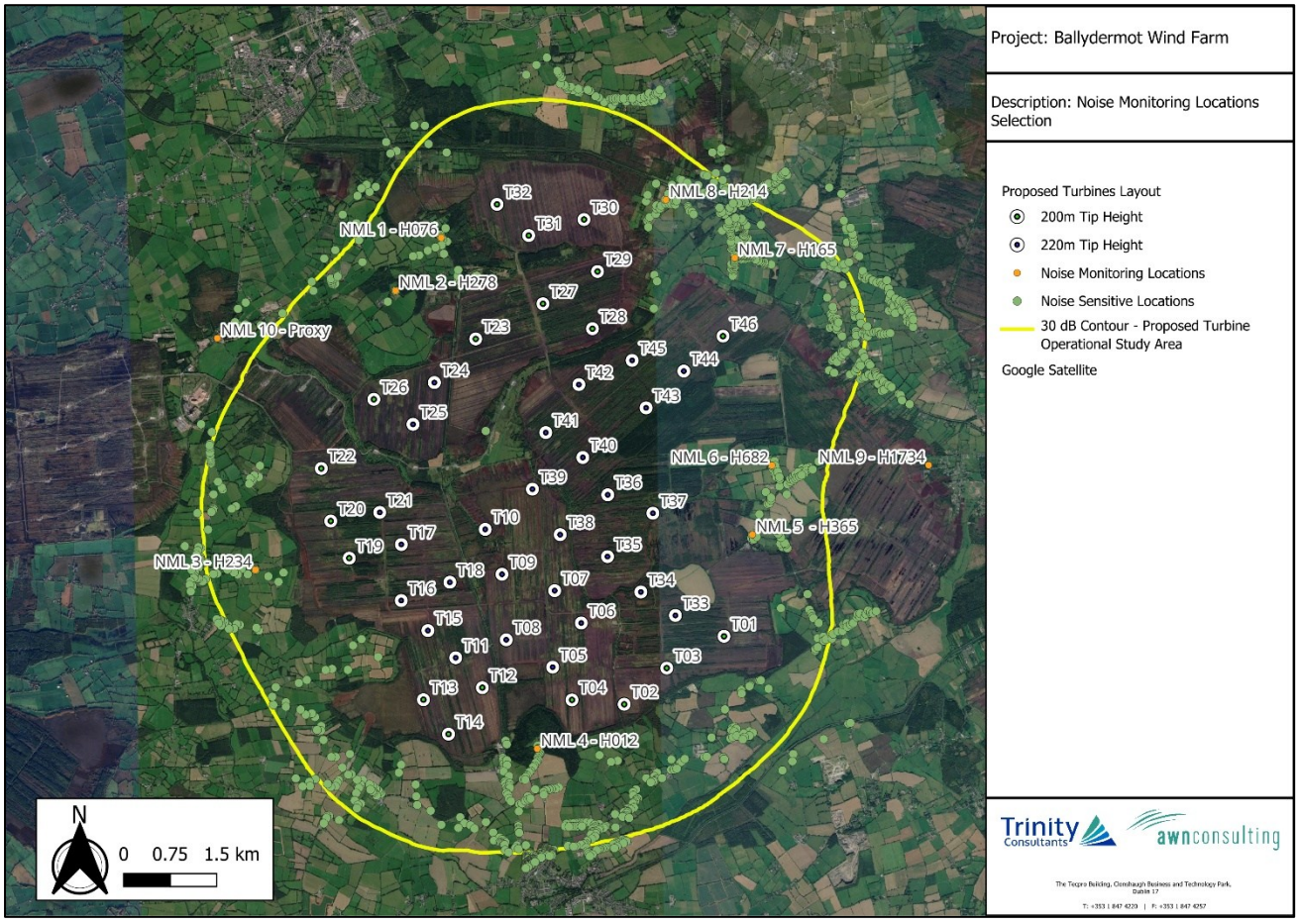
Location	NSL ID / Ref	Coordinates – Irish Transverse Mercator (ITM)	
		ITM X	ITM Y
NML 1	H076	665,011	729,857
NML 2	H278	664,276	729,002
NML 3	H234	662,013	724,491
NML 4	H012	666,561	721,602
NML 5	H365	670,035	725,059

NML 6	H682	670,350	726,180
NML 7	H165	669,752	729,532
NML 8	H214	668,639	730,470
NML 9	H1734	672,879	726,183
NML 10	N/A	661,397	728,233
Temporary Met Mast	Blackriver 100m	667,181	723,944

Site visits by survey personnel were carried out during morning and afternoon periods; during these visits, primary noise sources contributing to noise environment were noted as being occasional local traffic noise and farming activity, birdsongs and distant agricultural activity. In respect of night-time periods, when noise due to traffic on local roads, agricultural activities and other sources tend to reduce, there was no indication of any significant local night-time sources of noise at any location. No sources of vibration were noted at any of the survey locations.

In general, the significant noise sources in the area were noted to be local and distant traffic movements, activity in and around the residences, agricultural activities, wind generated noise from local foliage, and other typical anthropogenic sources typically found in such rural settings.

Figure 2-1 - Noise Monitoring Location Selection



Measurement Periods

A background noise survey was undertaken to establish typical background noise levels at representative NSLs surrounding the Proposed Wind Farm site. The background noise survey was conducted through installing unattended sound level meters at 10 no. representative locations in the surrounding area. This

noise survey was carried out by AWN in April 2021. The period of noise measurements used in the background noise monitoring assessment is outlined in Table 2-2.

It is noted that the baseline noise survey was carried out during a period of restrictions of movement due to the COVID-19 pandemic, and that traffic movements and hence noise levels may have been lower than usual. As the noise criteria are based on the background noise levels, the effect of baseline noise level being lower than normal leads to the noise assessment being considered conservative. Wind-generated noise in foliage surrounding the measurement equipment and noise-sensitive locations was representative of conditions at the survey locations.

Table 2-2 Measurement Period

Location	Start Date	End Date
All except NML 8 and 9	21 April 2021	03 June 2021
NML 8 and NML 9	30 April 2021	03 June 2021

The survey was completed when an adequate number of datasets had been measured as recommended in the IOA GPG to determine a suitable representation of the typical background noise.

Measurement Procedure

Measurements were conducted at all locations over the survey periods outlined in Table 2-2. Data samples for all measurements (noise, rainfall, and wind) were logged continuously at 10-minute interval periods for the duration of the survey. The $L_{Aeq,10min}$ and $L_{A90,10min}$ noise parameters were measured in this instance, and the results were saved to the instrument memory for later analysis.

Survey personnel noted potential primary noise sources contributing to noise build-up during the installation and removal of the sound level meters from site.

Instrumentation

Table 2-3 confirms the details of the noise monitoring instrumentation installed at each location.

Table 2-3. Details of Noise Measurement Instrumentation

Location	Equipment	Serial Number
NML 1	RION-NL 52	186668
NML 2	RION-NL 52	186671
NML 3	RION-NL 52	575785
NML 4	RION-NL 52	564809
NML 5	RION-NL 52	186670
NML 6	RION-NL 52	575802
NML 7	RION-NL 52	998409
NML 8	RION-NL 52	586940
NML 9	RION-NL 52	976162
NML 10	RION-NL 52	164426

Before and after the survey the measurement apparatus was check calibrated using a Bruell & Kjaer type 4231 Sound Level Calibrator where appropriate. Instruments were calibrated on each interim visit and any drift was noted. All calibration drifts were within acceptable tolerances outlined in the IOA GPG.

Rain fall was monitored and logged using a Texas Instruments TR-525 console data loggers that were installed at NML 3 and NML 4 for the duration of the survey. The logged rainfall data allows for the identification and removal of sample periods affected by rainfall from the data sets during analysis in line with best practice when calculating the prevailing background noise levels.

Rainfall Data

Rainfall was monitored and logged using two Rain Gauge data loggers that were installed at NML 3 and NML 4 over the duration of the survey.

Wind Data

Wind data was measured using a Met Mast and the data was supplied to AWN for the analysis.

Average wind speed and direction was measured in 10-minute intervals at an on-site meteorological mast and provided to AWN. The coordinates of the met mast are provided in Table 2-4.

Table 2-4. Wind Measurement Location

Co-ordinates (ITM)	
Easting	**Northing**
667,181	723,944

Wind Shear

Wind shear is defined as the increase of wind speed with height above ground. Site specific wind shear is captured in the background noise assessment through simultaneously measurement of noise and deriving wind speeds adjusted to hub height in accordance with guidance in the IOA GPG.

To ensure clearly and consistently defined wind speeds it is standard industry practice to convert and reference wind speeds to the 'Standardised Wind Speed'.

The Standardised Wind Speed is a wind speed measured at a height different than 10 m (generally measured at the turbine hub height) which is expressed to a reference height of 10 m in accordance with the IEC 61400-11 standard.

Wind speed measured at 80 m and 100 m were used to correct the wind speed up to an assessment hub height at 135 m, as per the methodology outlined in the IOA GPG. The wind speeds were then corrected to standardised 10 metre height wind speed.

The IOA GPG presents the following equations in relation to the derivation of a standardised wind speed at 10 m above ground level:

this uses the following equation:

Equation A
Shear Exponent Profile:

$$U = U_{ref}\left[\frac{H}{H_{ref}}\right]^{m}$$

Where:
U calculated wind speed.
U_{ref} measured wind speed.
H height at which the wind speed will be calculated.
H_{ref} height at which the wind speed is measured.
m shear exponent.
this uses the following equation:

Equation B
Roughness Length Shear Profile:

$$U_1 = U_2\frac{\ln(H_1/z)}{\ln(H_2/z)}$$

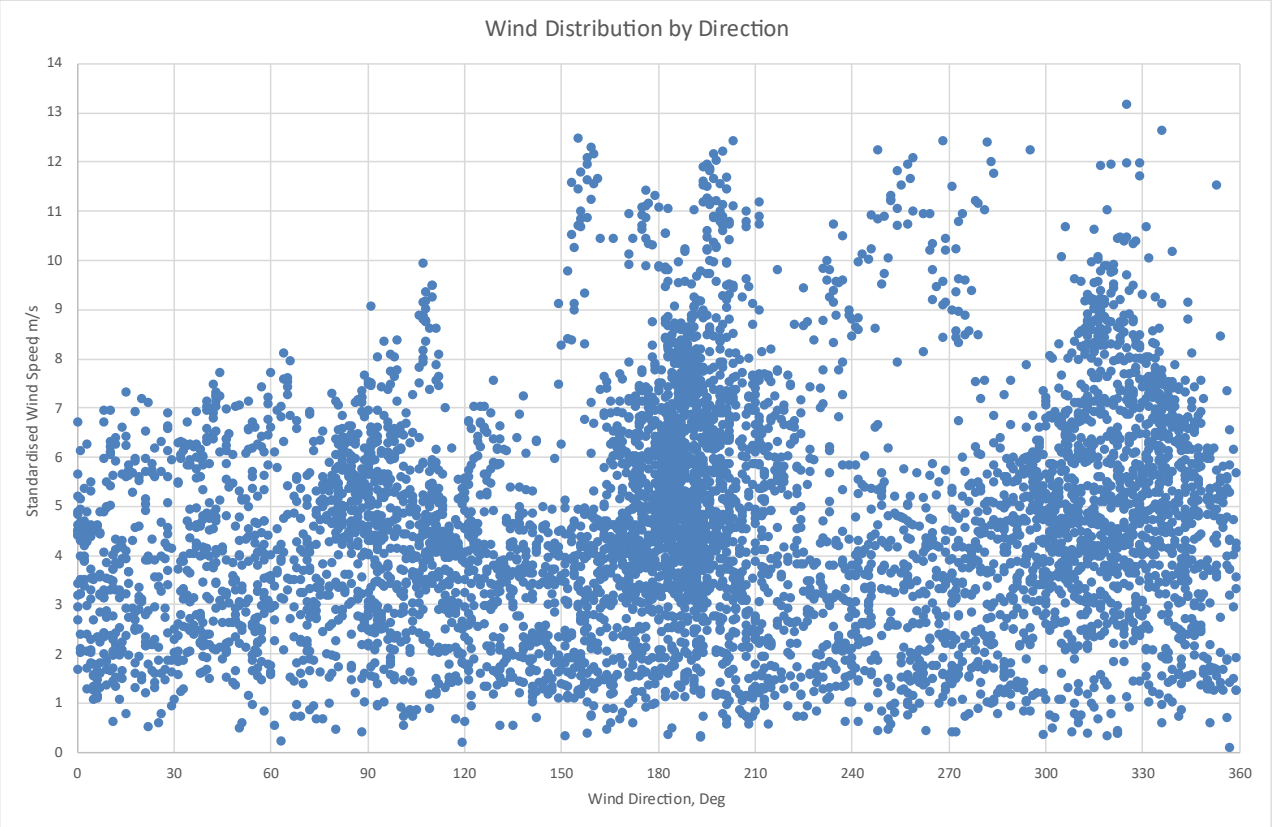
Where:
H_1 the height of the wind speed to be calculated (10m)
H_2 the height of the measured wind speed.
U_1 the wind speed to be calculated.

U_2 the measured wind speed.
z the roughness length.
Note: A roughness length of 0.05m is used to standardise hub height wind speeds to 10m height in the IEC 61400-11:2003 standard, regardless of what the actual roughness length seen on a site may have been. This 'normalisation' procedure was adopted for comparability between test results for different turbines.

Any reference to wind speed in this chapter should be understood to be the standardised 10m height wind speed reference unless otherwise stated.

Figure 2-2 presents the distributions of the measured wind speed and wind direction over the survey period.

Figure 2-2. Distributions of Wind Speeds and Directions Over the Survey Period



Data Analysis

The following sections present a summary of the statistical analysis carried out on the noise monitoring data to derive the background noise curves at each NML. Background noise data sets can be re-analysed for various scenarios should this be required, for instance, if the proposed hub height changes or alternative hub heights are considered.

Assessment Periods

The results presented in the following sections refer to the noise data collated during 'quiet periods' of the day and night as defined in the IOA GPG. These periods are defined in Table 2-5.

Table 2-5. Daytime and Night Periods

Period Description	Period Definition
Daytime (Amenity Hours)	ETSU-R-97 defines the amenity hours as: 18.00 to 23.00 Monday to Friday. 13.00 to 23.00 on Saturdays; and, 07.00 to 23.00 on Sundays.
Night	ETSU-R-97 defines the night-time hours as 23.00 to 07.00 every day

The data sets have been assessed separately for both daytime and night-time periods as outlined in Table 2-5 and analysed with respect to the methods outlined in the IOA GPG.

Atypical Noise Data

The datasets were reviewed to identify and exclude periods influenced by the dawn chorus or other noise sources not representative of the background noise environment at the monitoring location. An example of atypical sources would be short, isolated periods of raised noise levels attributable to local sources, vehicles, agricultural activity, boiler flues, operation of gardening equipment etc. In addition, sample periods affected by rainfall or when rainfall resulted in prolonged periods of atypical noise levels have also been removed from the data sets. This approach is in line with the guidance contained in the IOA GPG.

Derived Background Noise Levels

The derived background noise levels dB $L_{A90,10min}$ for daytime and nighttime are presented in Table 2-6. These levels have been derived using regression analysis carried out on the data sets measured in line with best practice guidance contained in the IOA GPG and its Supplementary Guidance Note No. 2 Data Collection; Background noise levels are calculated based on a hub height of 135 m, this being the highest hub height of the candidate turbines.

Appendix C presents the regression analysis charts for daytime and night-time periods from each NML.

These background noise levels will be used to determine the appropriate turbine noise limits in accordance with the adopted turbine noise criteria as set out in the EIAR Chapter.

Table 2-6. Derived Background Noise Levels at Assessment Hub Height

Location	Period	Derived $L_{A90,\ 10\ min}$ Levels (dB) at various Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NML 1	Day	33	33	33.1	33.7	34.8	36.3	38.2	40.5
	Night	18.6	19.1	20.1	21.8	24.1	27.2	31.2	36.2
NML 2	Day	34.7	34.7	34.7	35.1	35.8	37.1	38.8	41.2
	Night	21.7	22.3	23.3	24.9	27.2	30.3	34.3	39.2
NML 3	Day	32.2	32.2	32.7	33.9	35.6	38	41	44.6
	Night	18.1	18.9	20.5	22.9	26.1	30.1	34.8	40.5
NML 4	Day	32.1	32.4	33.2	34.4	36	37.8	39.7	41.8
	Night	18.8	19	20.4	23	26.6	31.1	36.4	42.4
NML 5	Day	28.7	29	30	31.5	33.5	35.9	38.9	42.2
	Night	17.2	17.9	19.4	21.7	24.8	28.5	32.8	37.6
NML 6	Day	31.1	31.6	32.8	34.7	37.2	40.1	43.3	46.7
	Night	17.3	18.7	21.2	24.6	28.8	33.6	38.9	44.4
NML 7	Day	30.9	31.1	31.6	32.5	33.7	35.4	37.6	40.3
	Night	18.5	19	20.1	21.9	24.5	27.9	32.3	37.6
NML 8	Day	30.1	30.1	31.1	32.9	35.4	38.1	41.1	44
	Night	18.3	18.7	20	22.1	25	28.6	32.8	37.6
NML 9	Day	31.6	31.8	32.5	33.7	35.3	37.4	39.9	42.7
	Night	19	19.4	20.5	22.2	24.6	27.6	31.3	35.6

Location	Period	Derived $L_{A90,\ 10\ min}$ Levels (dB) at various Standardised 10 m Height Wind Speed (m/s)							
		3	4	5	6	7	8	9	10
NML 10	Day	36.1	36.2	36.6	37.5	38.7	40.1	41.9	43.8
	Night	31.2	31.4	31.7	32.1	33	34.5	36.6	39.6

APPENDIX A INSTALLATION PHOTOGRAPHS

Plate 2-1 to Plate 2-21 illustrate the installed noise monitoring equipment at each location. Yellow ellipses are added to the photographs in the following sections to highlight the position of the noise monitoring equipment.

NML 1

The noise meter at NML 1 was positioned in an open field beside location H076. This location was judged to be representative of the typical background noise at NSL locations in the surrounding area. Occasional local road traffic noise and farming activities were noted.

Plate 2-1 NML 1 – Picture 1



Plate 2-2 NML 1 – Picture 2



NML 2

The noise meter at NML 2 was positioned in the rear garden of location H278 to the rear of the property. The main sources of noise at this location were noted to be farming activities and birdsong.

Plate 2-4 NML 2 – Picture 1



Plate 2-5 NML 2 – Picture 3



NML 3

The noise meter at NML 3 was positioned in an open field beside location H234. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and birdsongs were noted. A rain gauge was installed at this location.

Plate 2-6 NML 3 – Picture 1



Plate 2-7 NML 3 – Picture 2



NML 4

The noise meter at NML 4 was positioned in an open field beside location H012. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and farming activities were noted. A rain gauge was installed at this location for the duration of the survey.

Plate 2-8 NML 4 – Picture 1



Plate 2-9 NML 4 – Picture 2



NML 5

The noise meter at NML 5 was positioned in an open field beside location H365. This location was judged to be representative of the typical background noise at NSL locations in the surrounding area. Occasional local road traffic noise and farming activities were noted.

Plate 2-10 NML 5 – Picture 1

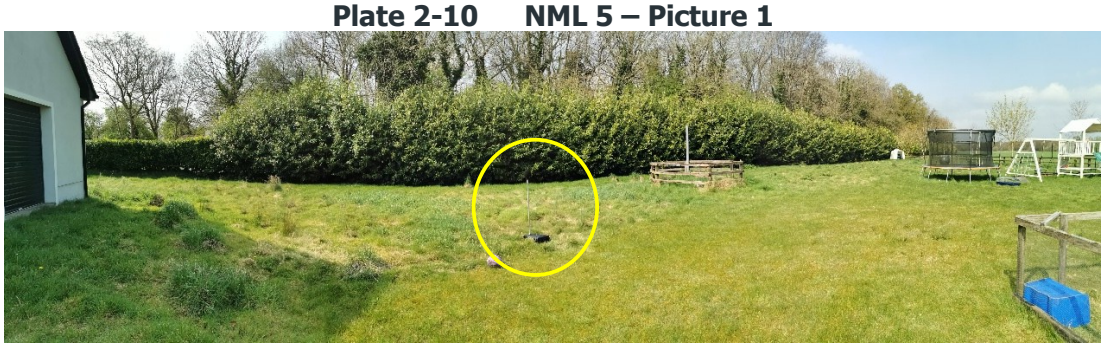


Plate 2-11 NML 5 – Picture 2



NML 6

The noise meter at NML 6 was positioned in an open field beside location H682. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and farming activities were noted.

Plate 2-12 NML 6 – Picture 1



Plate 2-13 NML 1 – Picture 2



NML 7

The noise meter at NML 7 was positioned in an open field beside location H165. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and residential activities were noted.

Plate 2-14 NML 7 – Picture 1

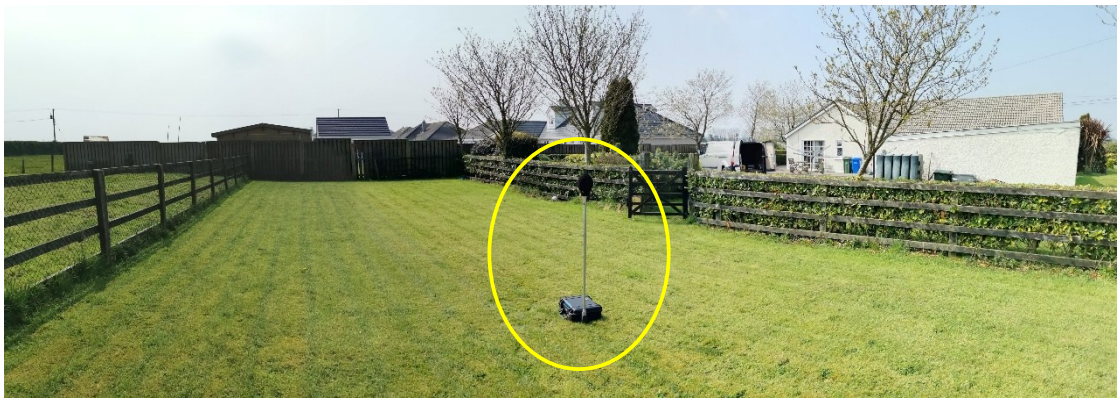


Plate 2-15 NML 7 – Picture 2



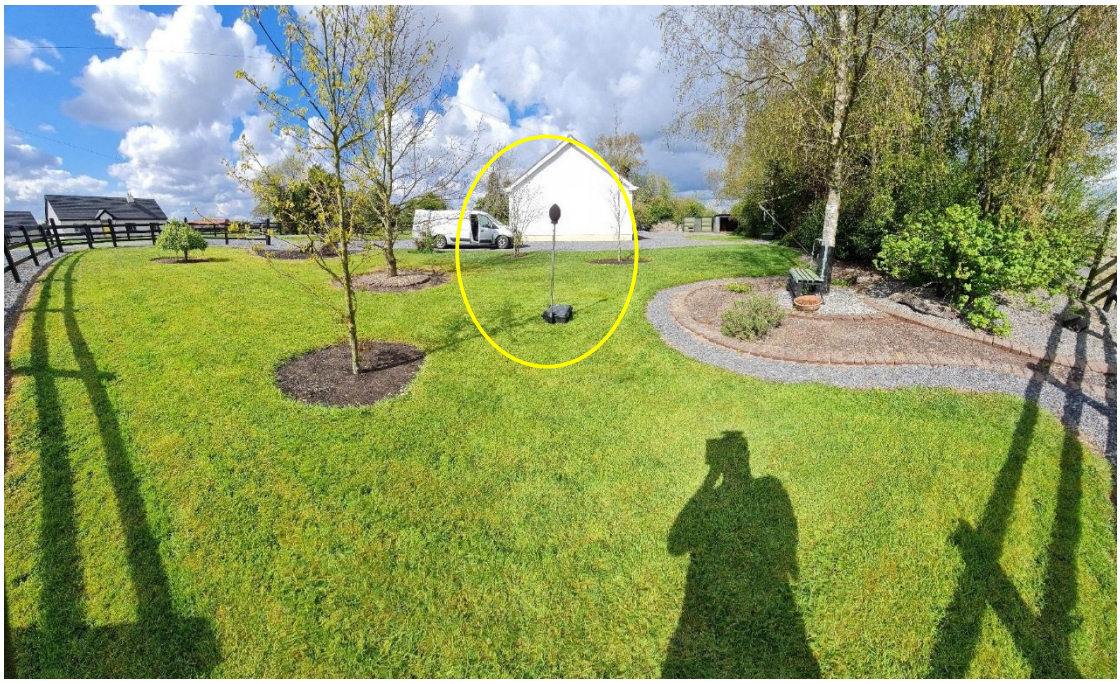
NML 8

The noise meter at NML 8 was positioned in an open field beside location H214. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and residential activities were noted.

Plate 2-16 NML 8 – Picture 1



Plate 2-17 NML 8 – Picture 2



NML 9

The noise meter at NML 9 was positioned in an open field beside location H1734. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and farming activities were noted.

Plate 2-18 NML 9 – Picture 1



Plate 2-19 NML 9 – Picture 2



NML 10

The noise meter at NML 10 was positioned at a property located outside of the study area at proximity of H989. This location was judged to be representative of the typical background noise at NSL location in the surrounding area, occasional local road traffic noise and farming activities were noted.

Plate 2-20 NML 10 – Picture 1



Plate 2-21 NML 10 – Picture 2



APPENDIX B. REGRESSION ANALYSIS ON DATA SETS

B.1 NML 1

Figure 2-3 and Figure 2-4 present the measured background noise levels at NML 1.

Daytime Quiet Periods

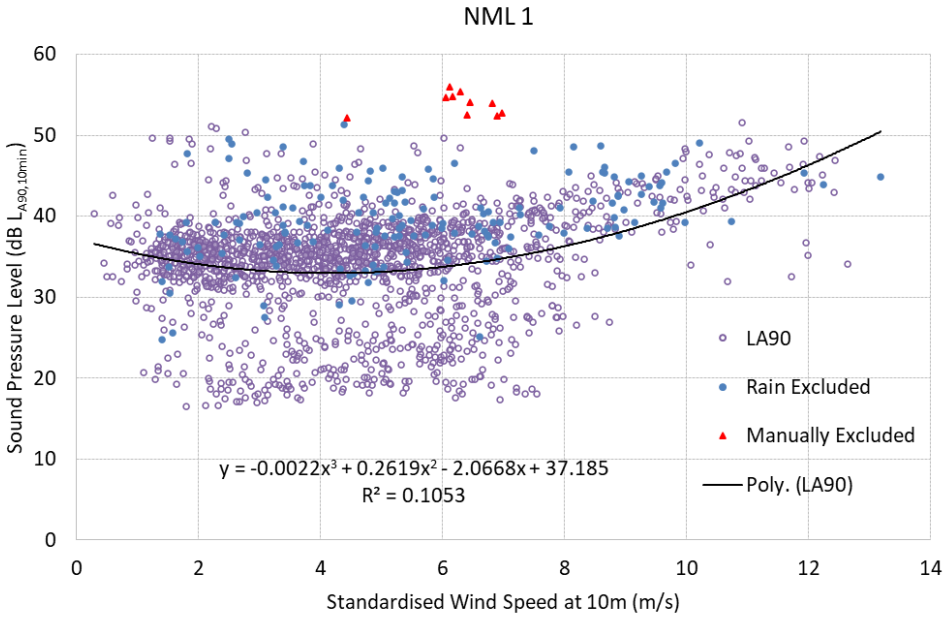


Figure 2-3 NML 1 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

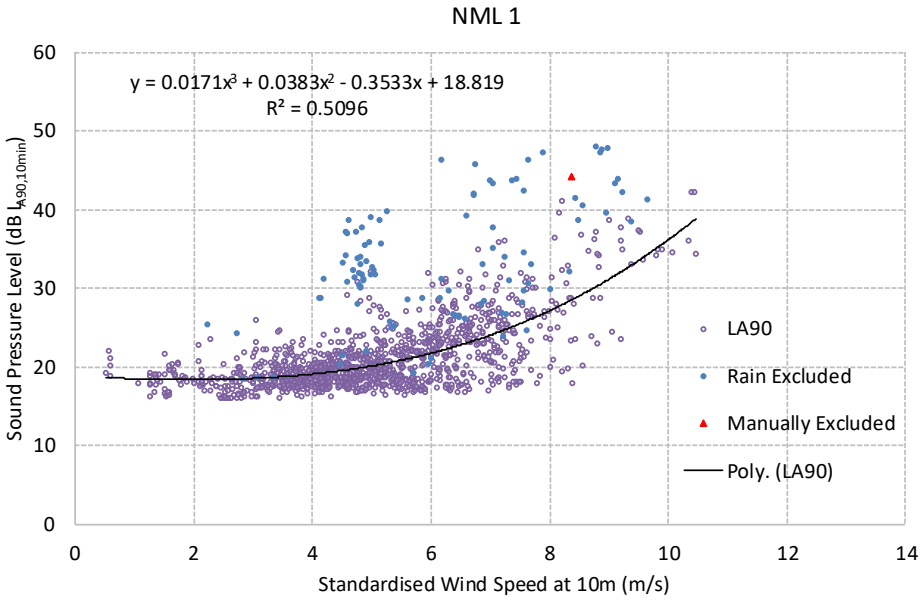


Figure 2-4 NML 1 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B.2. NML 2

NML 2 lies to the north and west of the Proposed Turbines. Figure 2-5 and Figure 2-6 present the measured background noise levels at NML 2.

Daytime Quiet Periods

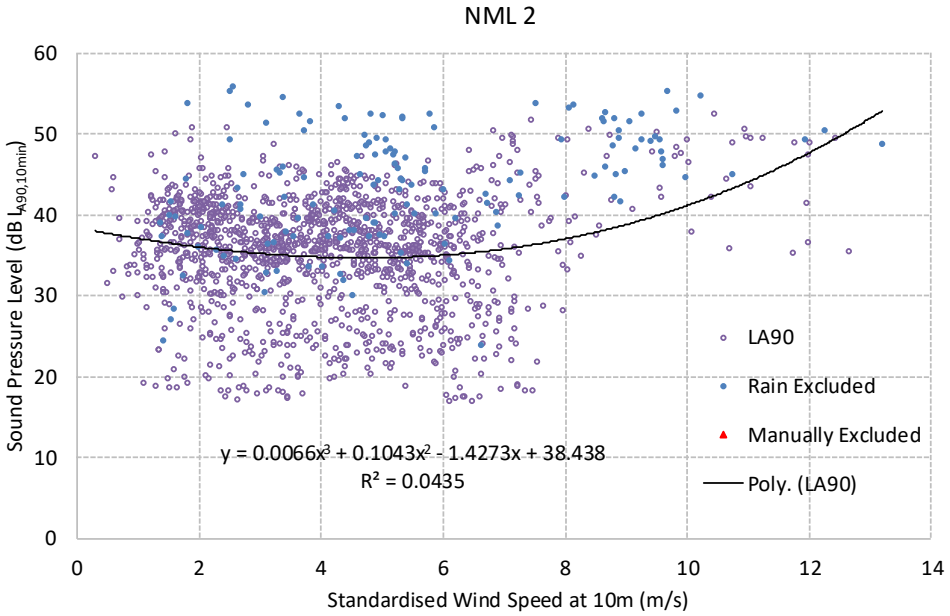


Figure 2-5 NML 2 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

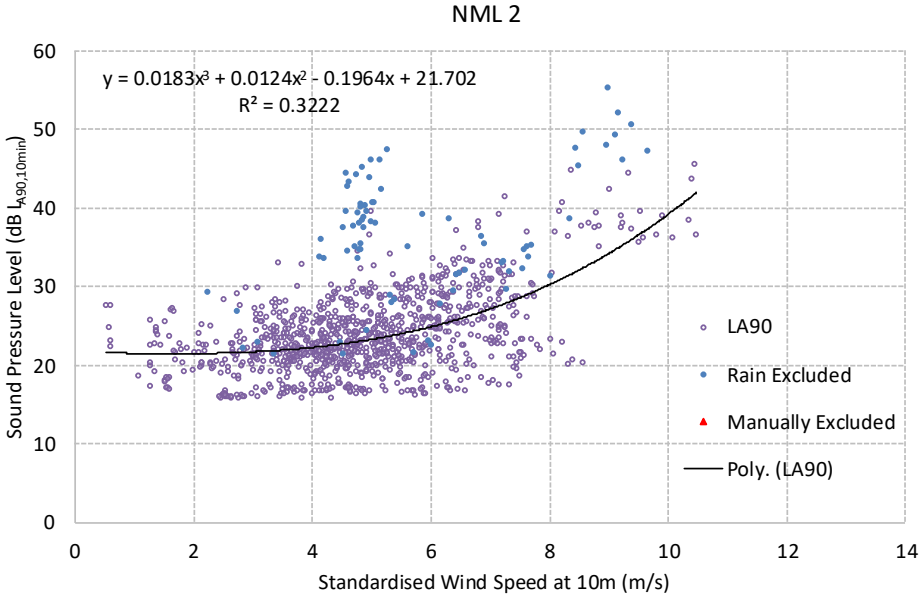


Figure 2-6 NML 2 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B.3 NML 3

NML 3 lies to the west of the Proposed Turbines. Figure 2-7 and Figure 2-8 present the measured background noise levels at NML 3.

Daytime Quiet Periods

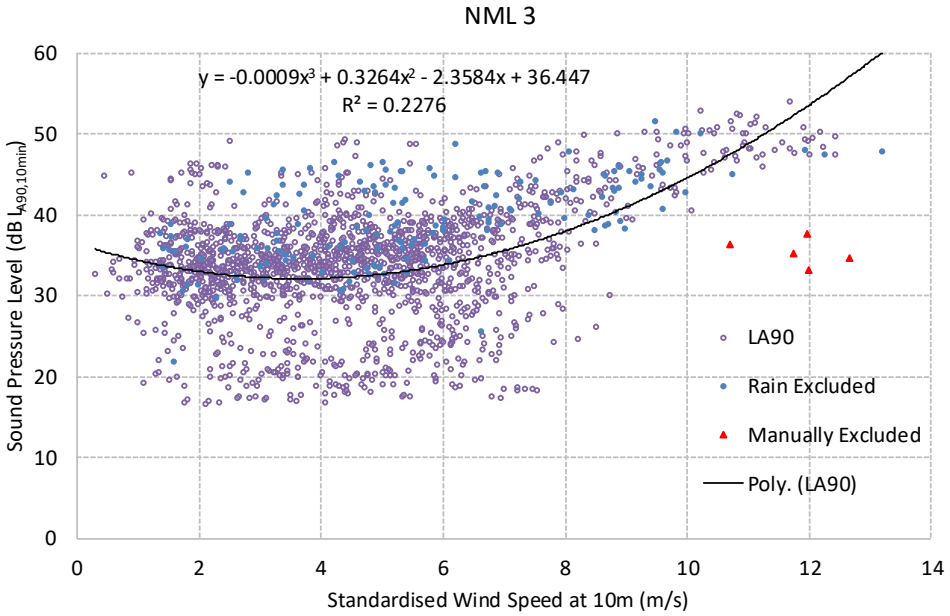


Figure 2-7 NML 3 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

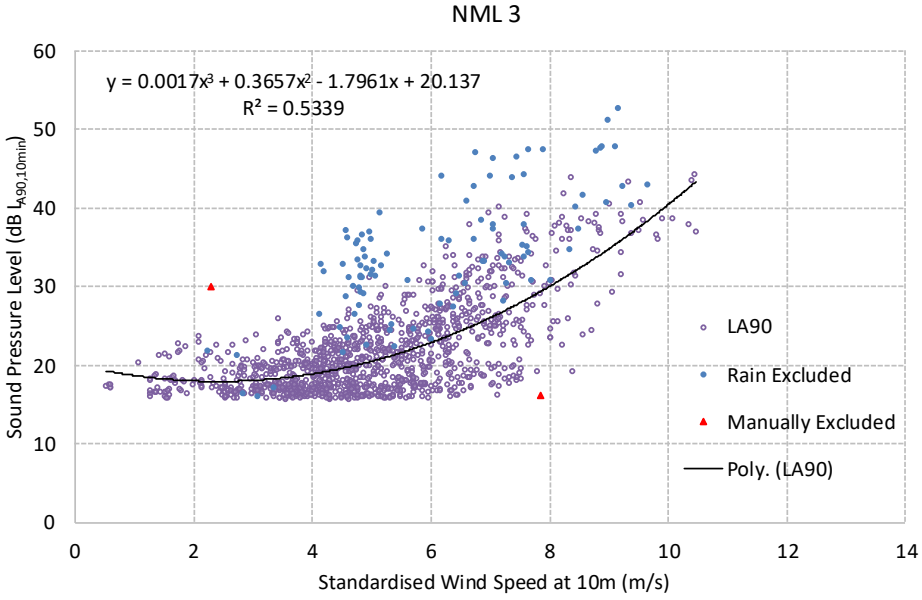


Figure 2-8 NML 3 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B.4 NML 4

NML 4 lies to the south of the Proposed Turbines. Figure 2-9 and Figure 2-10 present the measured background noise levels at NML 4.

Daytime Quiet Periods

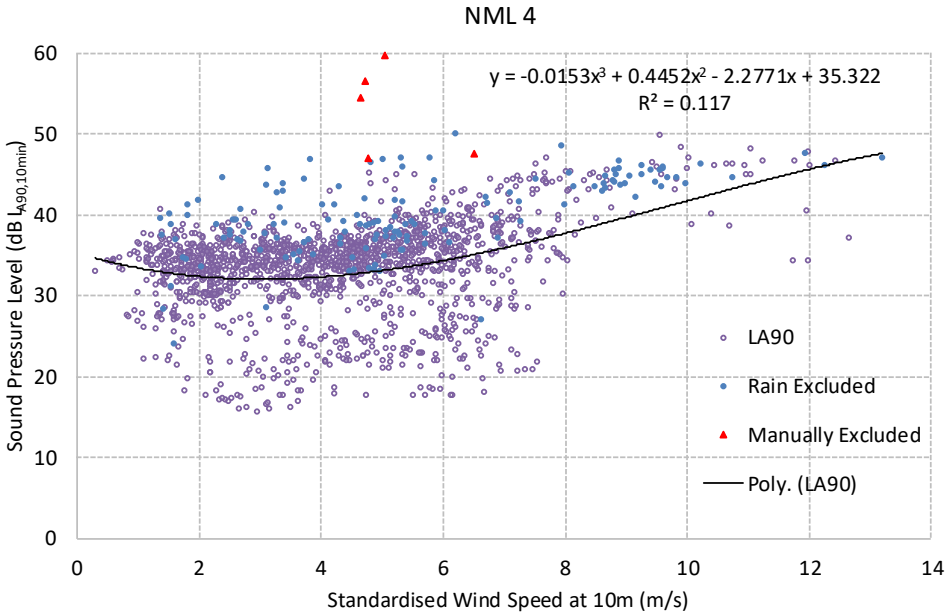


Figure 2-9 NML 4 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

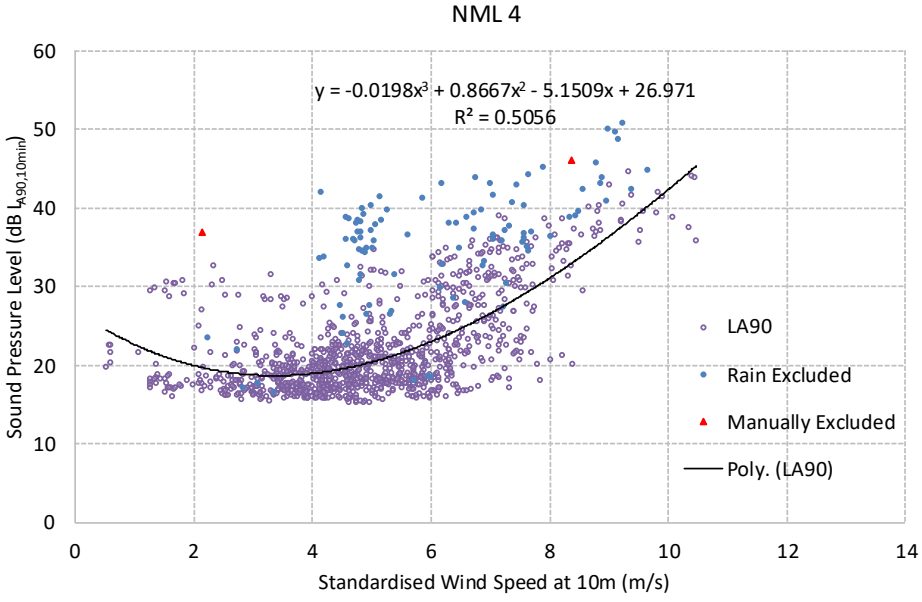


Figure 2-10 NML 4 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B.5 NML 5

NML 5 lies to the east of the Proposed Turbines. Figure 2-11 and Figure 2-12 present the measured background noise levels at NML 5.

Daytime Quiet Periods

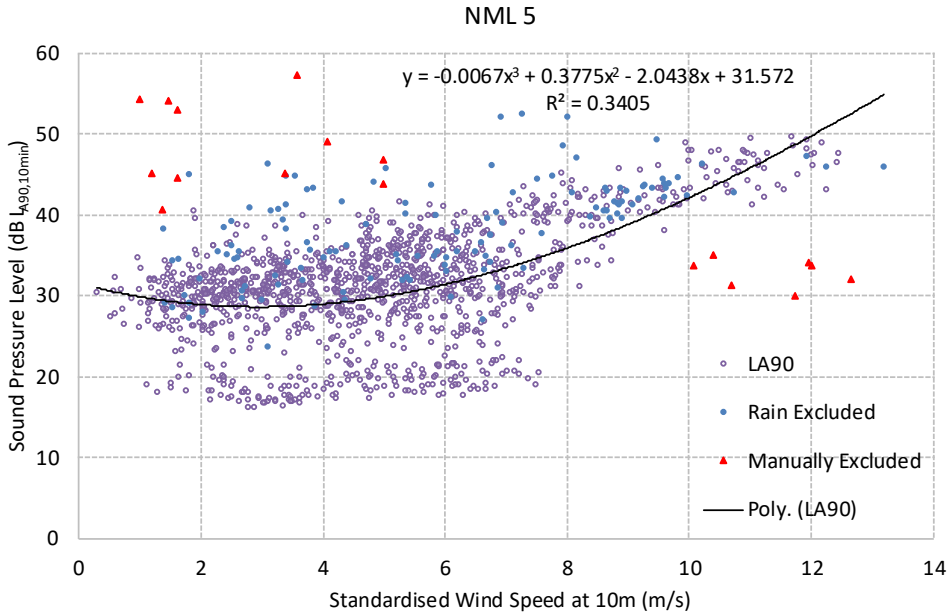


Figure 2-11 NML 5 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

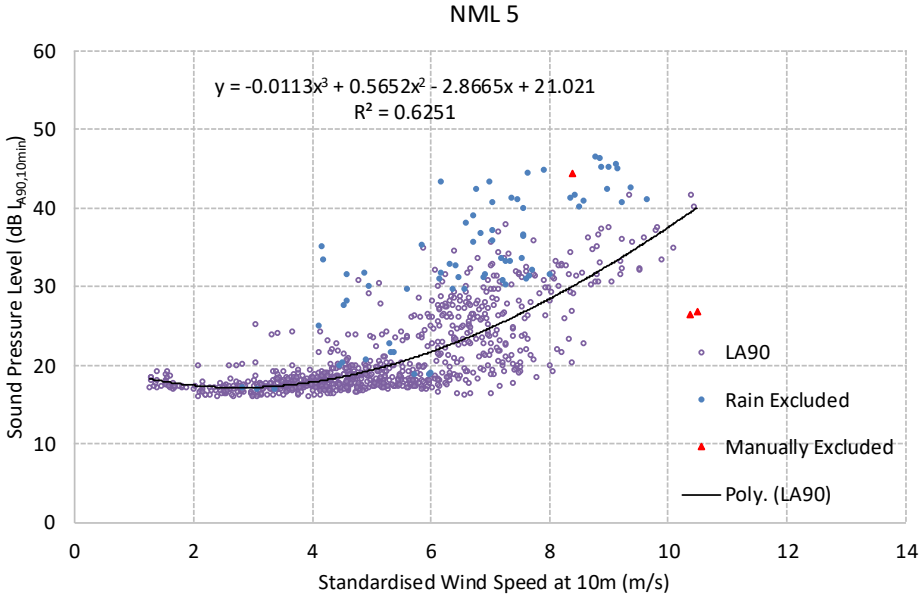


Figure 2-12 NML 5 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B.6 NML 6

NML 6 lies to the north and west of the Proposed Turbines. Figure 2-13 and Figure 2-14 present the measured background noise levels at NML 6.

Daytime Quiet Periods

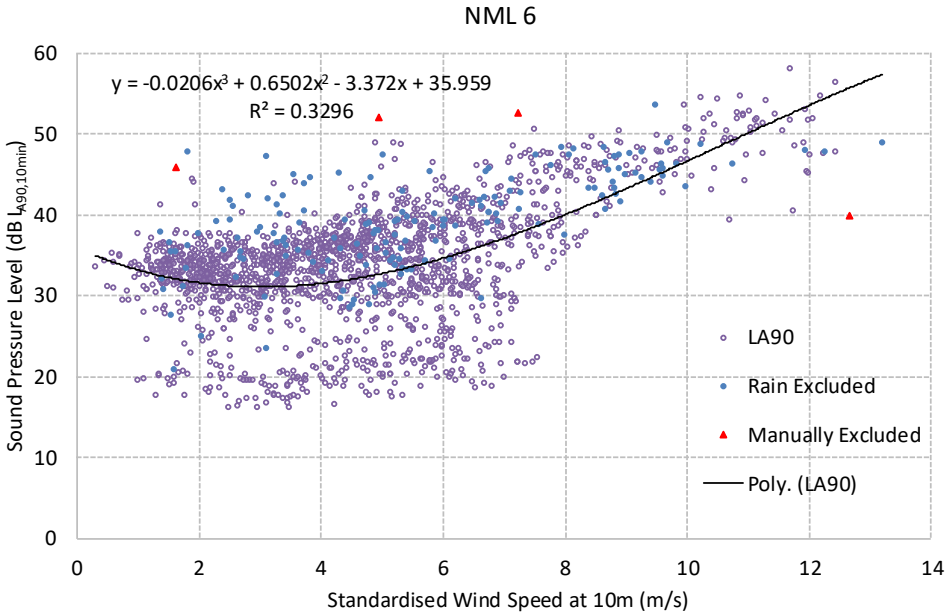


Figure 2-13 NML 6 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

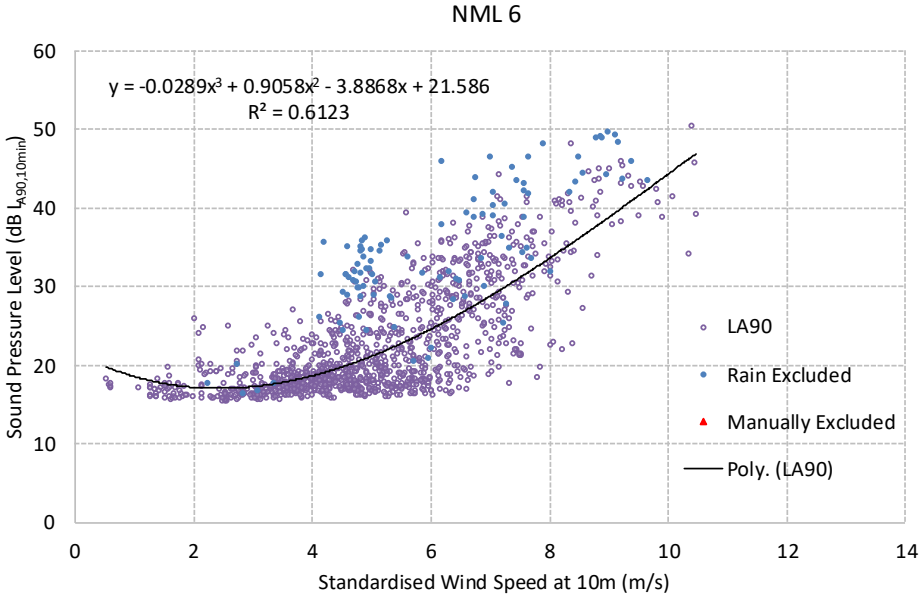


Figure 2-14 NML 6 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B. 7 NML 7

NML 7 lies to the north and east of the Proposed Turbines. Figure 2-15 and Figure 2-16 present the measured background noise levels at NML 7.

Daytime Quiet Periods

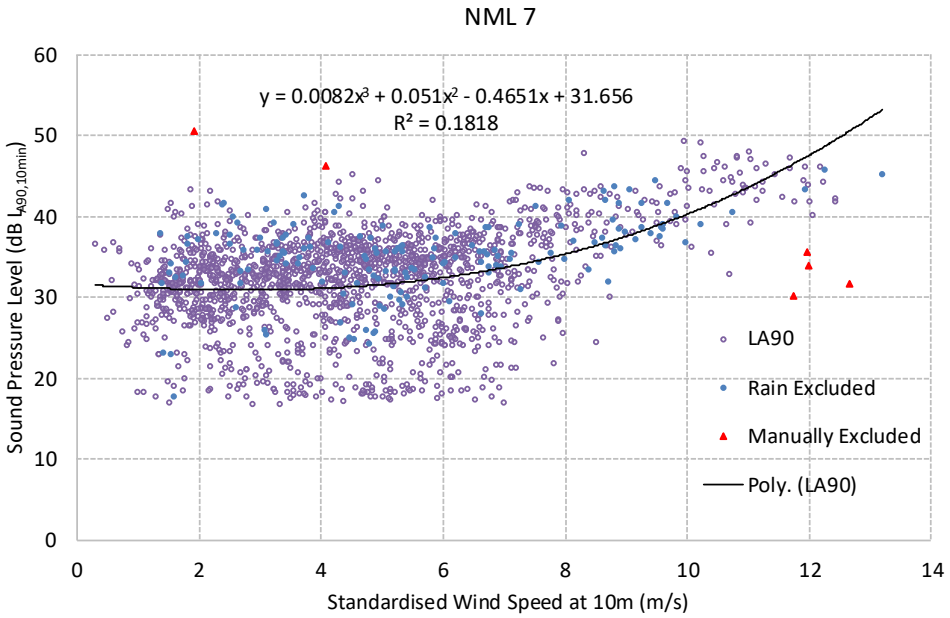


Figure 2-15 NML 7 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

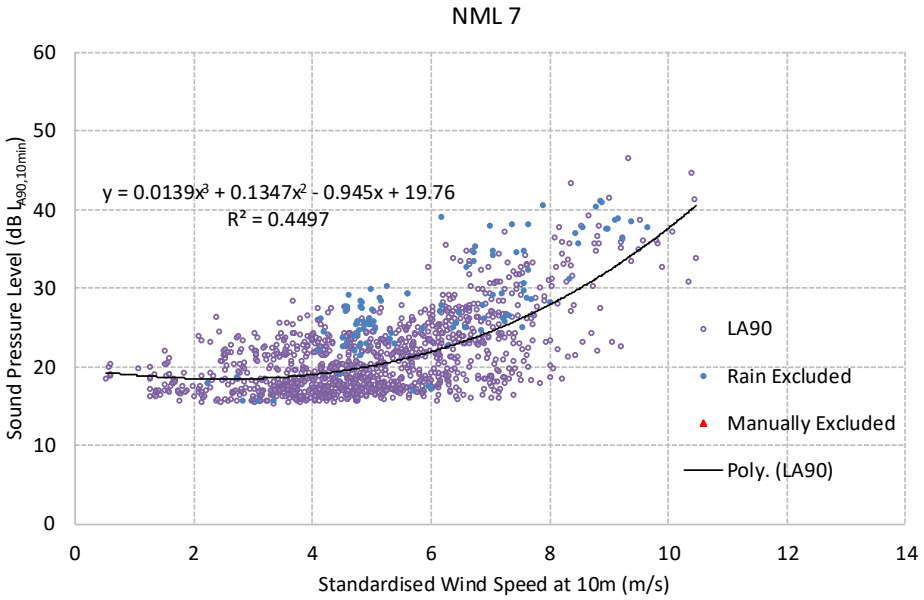


Figure 2-16 NML 7 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B. 8 NML 8

NML 8 lies to the north and east of the Proposed Turbines. Figure 2-17 and Figure 2-18 present the measured background noise levels at NML 8.

Daytime Quiet Periods

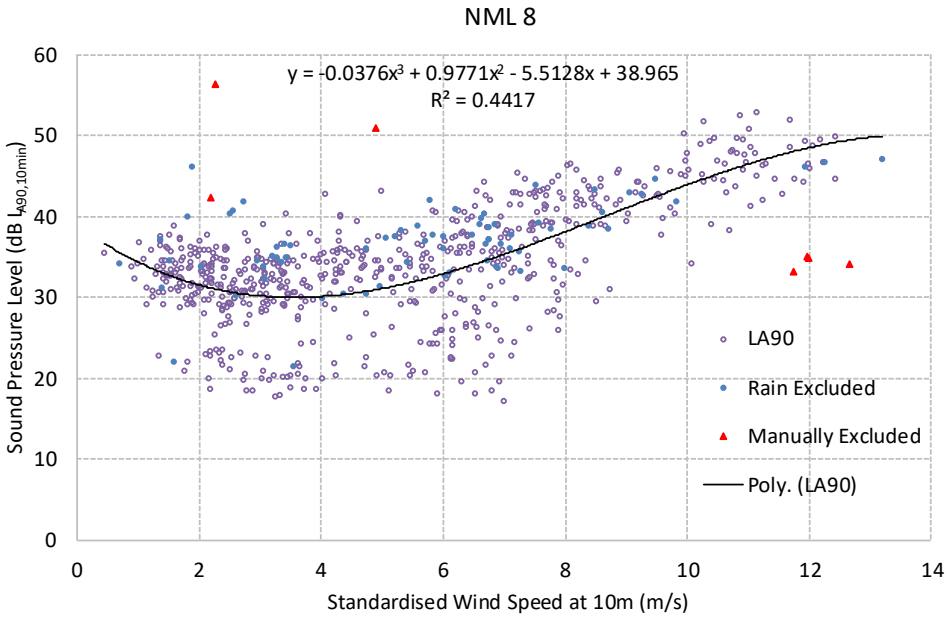


Figure 2-17 NML 8 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

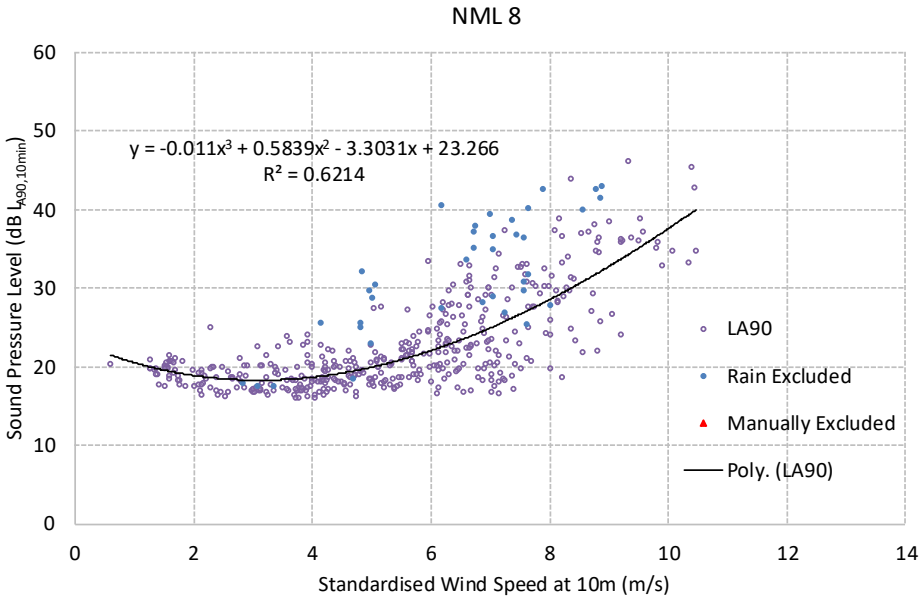


Figure 2-18 NML 8 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B. 9 NML 9

NML 9 lies to the east of the Proposed Turbines. Figure 2-19 and Figure 2-20 present the measured background noise levels at NML 9.

Daytime Quiet Periods

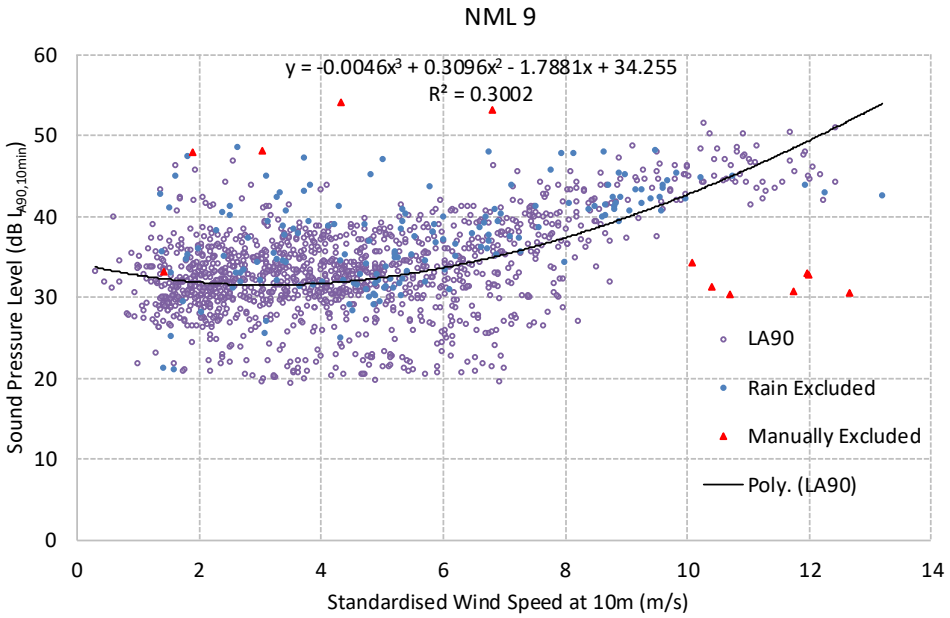


Figure 2-19 NML 9 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

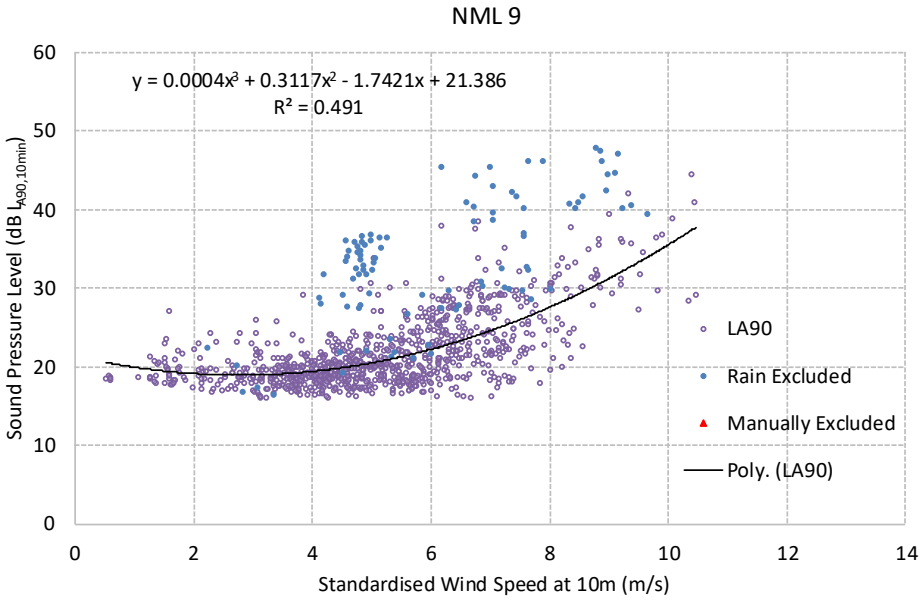


Figure 2-20 NML 9 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

B. 10 NML 10

NML 10 lies to the north and west of the Proposed Turbines. Figure 2-21 and Figure 2-22 present the measured background noise levels at NML 10.

Daytime Quiet Periods

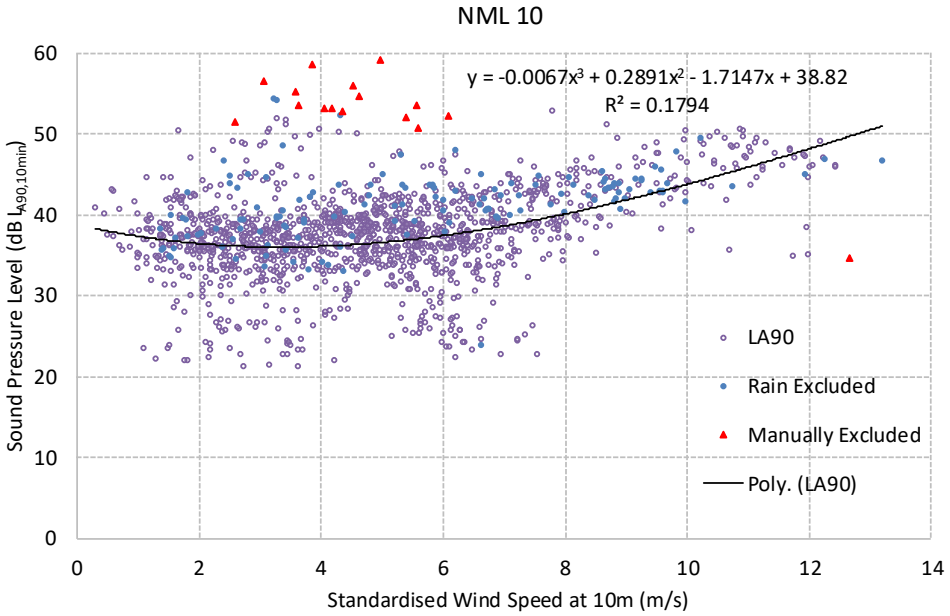


Figure 2-21 NML 10 - Background Noise Levels dB $L_{A90,\ 10\ min}$ – Daytime

Night-time Quiet Periods

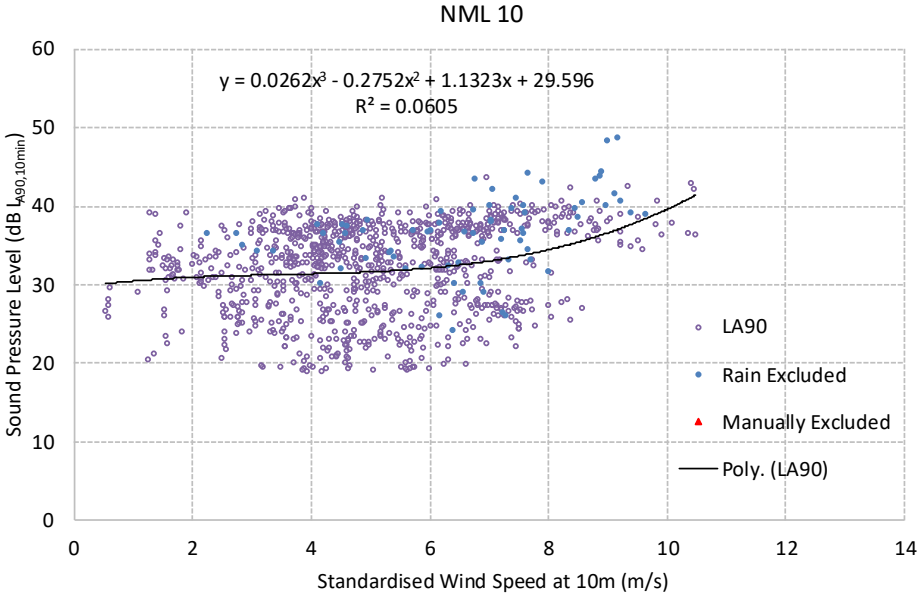


Figure 2-22 NML 10 - Background Noise Levels dB $L_{A90,\ 10\ min}$ –Night-time

APPENDIX C CALIBRATION CERTIFICATES

MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 07 May 2020

Certificate Number: UCRT20/1405

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
Milton Keynes MK5 8HL
Telephone 01908 642846 Fax 01908 642814
E-Mail: info@noise-and-vibration.co.uk
Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17
Order No.	RM/20/Cal019
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00186668
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76701
Rion	Microphone	UC-59	12813
Brüel & Kjær	Calibrator	4231	2205805
	Calibrator adaptor type if applicable		UC 0210

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 30 April 2020 ANV Job No. UKAS20/04240

Date Calibrated 07 May 2020

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	20 April 2018	UCRT18/1436	0653

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MEASUREMENT SYSTEMS

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 12 May 2020

Certificate Number: UCRT20/1415

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17
Order No.	RM/20/Cal019
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00186671
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76821
Rion	Microphone	UC-59	16877
Brüel & Kjær	Calibrator	4231	2205805
	Calibrator adaptor type if applicable		UC 0210

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 30 April 2020 ANV Job No. UKAS20/04240

Date Calibrated 12 May 2020

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	20 April 2018	UCRT18/1437	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 31 July 2019 **Certificate Number: UCRT19/1856**

Issued by:
ANV Measurement Systems
Beaufort Court
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17

Order No.	1999			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00575785
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	65812
	Rion	Microphone	UC-59	11406
	Brüel & Kjær	Calibrator	4231	2460007
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49			
	Procedures from IEC 61672-3:2006 were used to perform the periodic tests.			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	30 July 2019	ANV Job No.	UKAS19/07499	
Date Calibrated	31 July 2019			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	28 July 2017	UCRT17/1627	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 15 September 2020 **Certificate Number: UCRT20/1868**

Calibrated at & Certificate issued by:
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Beaufort Court
17 Roebuck Way
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting Limited The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17 Ireland			
Order No.	2074			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00564809
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	64934
	Rion	Microphone	UC-59	09447
	Rion	Calibrator	NC-74	34536109
		Calibrator adaptor type if applicable		NC-74-002
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	14 September 2020	ANV Job No.	UKAS20/09501	
Date Calibrated	15 September 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	22 August 2018	UCRT18/1866	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 05 May 2020 **Certificate Number: UCRT20/1392**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Telephone 01908 642846 Fax 01908 642814
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17

Order No.	RM/20/Cal019			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00186670
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	76820
	Rion	Microphone	UC-59	12816
	Brüel & Kjær	Calibrator	4231	2205805
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49			
	Procedures from IEC 61672-3:2006 were used to perform the periodic tests.			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	30 April 2020	ANV Job No.	UKAS20/04240	
Date Calibrated	05 May 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	20 April 2018	UCRT18/1435	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 21 July 2020 **Certificate Number: UCRT20/1678**

Issued by:
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Beaufort Court
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Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17
Order No.	2055
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00575802
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	75829
Rion	Microphone	UC-59	11426
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 16 July 2020 ANV Job No. UKAS20/07375

Date Calibrated 21 July 2020

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	31 July 2019	UCRT19/1857	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 07 May 2020 **Certificate Number: UCRT20/1406**

Issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17			
Order No.	RM/20/Cal019			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00998409
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	98623
	Rion	Microphone	UC-59	15915
	Brüel & Kjær	Calibrator	4231	2205805
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	30 April 2020	ANV Job No.	UKAS20/04240	
Date Calibrated	07 May 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	22 January 2020	UCRT20/1097	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 28 October 2020 **Certificate Number: UCRT20/2049**

Calibrated at & Certificate issued by:
ANV Measurement Systems
Beaufort Court
17 Roebuck Way
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Telephone 01908 642846 Fax 01908 642814
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory



K. Mistry

Customer	AWN Consulting Limited The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17 Ireland			
Order No.	PO-2083			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00586940
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	87059
	Rion	Microphone	UC-59	17049
	Brüel & Kjær	Calibrator	4231	3010369
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	19 October 2020	ANV Job No.	UKAS20/10584	
Date Calibrated	28 October 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	15 August 2018	UCRT18/1831	0653

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CERTIFICATE OF CALIBRATION

0653

Date of Issue: 17 July 2020 **Certificate Number: UCRT20/1661**

Issued by:
ANV Measurement Systems
Beaufort Court
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17
Order No.	2055
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator

Identification

Manufacturer	*Instrument*	*Type*	*Serial No. / Version*
Rion	Sound Level Meter	NL-52	00976162
Rion	Firmware		2.0
Rion	Pre Amplifier	NH-25	76279
Rion	Microphone	UC-59	12055
Rion	Calibrator	NC-74	34536109
	Calibrator adaptor type if applicable		NC-74-002

Performance Class 1

Test Procedure TP 2.SLM 61672-3 TPS-49

Procedures from IEC 61672-3:2006 were used to perform the periodic tests.

Type Approved to IEC 61672-1:2002 YES Approval Number 21.21 / 13.02

If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003

Date Received 16 July 2020 ANV Job No. UKAS20/07375

Date Calibrated 17 July 2020

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	23 August 2019	UCRT19/1930	0653

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

CERTIFICATE OF CALIBRATION

0653

Date of Issue: 05 May 2020 **Certificate Number: UCRT20/1394**

Issued by:
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Web: www.noise-and-vibration.co.uk
Acoustics Noise and Vibration Ltd trading as ANV Measurement Systems

Approved Signatory

K. Mistry

Customer	AWN Consulting The Tecpro Building IDA Business and Technology Park Clonshaugh Dublin 17			
Order No.	RM/20/Cal019			
Description	Sound Level Meter / Pre-amp / Microphone / Associated Calibrator			
Identification	*Manufacturer*	*Instrument*	*Type*	*Serial No. / Version*
	Rion	Sound Level Meter	NL-52	00164426
	Rion	Firmware		2.0
	Rion	Pre Amplifier	NH-25	54559
	Rion	Microphone	UC-59	09207
	Brüel & Kjær	Calibrator	4231	2205805
		Calibrator adaptor type if applicable		UC 0210
Performance Class	1			
Test Procedure	TP 2.SLM 61672-3 TPS-49 *Procedures from IEC 61672-3:2006 were used to perform the periodic tests.*			
Type Approved to IEC 61672-1:2002	YES	Approval Number	21.21 / 13.02	
	If YES above there is public evidence that the SLM has successfully completed the applicable pattern evaluation tests of IEC 61672-2:2003			
Date Received	30 April 2020	ANV Job No.	UKAS20/04240	
Date Calibrated	05 May 2020			

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed. As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation tests performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Previous Certificate	*Dated*	*Certificate No.*	*Laboratory*
	09 April 2018	TCRT18/1308	ANV Measurement Systems

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