Appendix 7

Noise & Vibration

Appendix 7.1 – Baseline Noise Measurements

Appendix 7.2 – Equipment Calibration Certificates

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Appendix 7.6 – Predicted Noise Levels from Coom Green Energy Park at Nearby Noise Sensitive Locations

Appendix 7.7 – Assessment Against Noise Limits Derived Using Draft Revised Wind Energy Development Guidelines

Appendix 7.8 – Predicted Cumulative Noise Levels from Coom Green Energy Park and Other Adjacent Wind Energy Developments at Nearby Noise Sensitive Locations

Appendix 7.9 Predicted Cumulative Noise Levels from Coom Green Energy Park and Other Adjacent Wind Energy Developments at Nearby Noise Sensitive Locations – With Mitigation Measures

APPENDIX 7.1

BASELINE NOISE MEASUREMENTS

Baseline Noise Measurements

Baseline noise monitoring was undertaken at 18 receptor locations surrounding the proposed Coom Green Energy Park Wind Farm development to establish the existing background noise levels in the vicinity of the proposed wind farm.

Selection of Monitoring Locations

Due to access constraints to some dwellings, some of the monitoring locations are proxy locations for receivers. Section 2.2.5 of the Institute of Acoustics', *A Good Practice Guide to the Application of ETSU-R-97 for the Assessment at Rating of Wind Turbine Noise* (2013) regarding use of proxy locations states "*When choosing a location that will serve as a proxy for others, the basis for selection is that it can reasonably be claimed, from inspection and observation, to be representative of the non-surveyed locations, in line with the criteria of Section 2.5. Measurement locations outside a property's curtilage (such as an adjacent field) may be used when access to a representative property cannot be obtained, provided that such a location can be justified as being representative. No general guidance can therefore be given on the number of measurement locations as this will be site-specific.*" Section 2.5 of the GPG is summarised in Table 7.1.1 with the applicability of the proxy locations selected for Coom Green Energy Park Wind Farm.

Table 7.1.1: IOA GPG Section 2.5 Criteria and Applicability to Coom Green Energy Park Wind Farm Monitoring Locations

Requirements of Section 2.5	Coom Green Energy Park Wind Farm Monitoring Locations
2.5.1 *Where possible, measurements should be made in the vicinity of a dwelling in an area frequently used for rest and recreation.*	This was adhered to where possible. In some instances, access to the dwellings of interest were denied.
2.5.2 *Equipment should be placed at outdoor positions where noise levels are representative of typical 'low' levels likely to be experienced in the vicinity of a dwelling (or group of dwellings if the measurements are intended to be applied to more than one dwelling). The overriding consideration is that it can reasonably be claimed, from inspection and observation, that there are no other suitable noise-sensitive locations, in the vicinity of any selected location and close to a dwelling, where background noise levels would be expected to be consistently lower than the levels at the selected position.*	This was adhered to where possible. In some instances, access to the dwellings of interest were denied.
2.5.3 *Ideally the position should be one which would be exposed to noise from the wind turbines whilst being best-screened from other noise sources such as nearby roads or vegetation.*	The locations were in open areas or within the curtilage of a property, set back from local roads and vegetation/ forestry.
2.5.4 *The background surveys provide the basis for setting both daytime and night-time noise limits: the measurement position must therefore reasonably represent external areas (for daytime noise) and also building façades containing windows (for night-time noise).*	The locations being used to derive limits are representative of external areas and façade locations.
2.5.5 *In most locations, background noise levels will be determined by wind in trees and vegetation and noise sources external to the property such as traffic noise. The presence of local noise sources such as boiler flues, garden fountains, domestic drains, watercourses and farm equipment should be identified.*	There were some local noise sources described below. Also, there were no watercourses adjacent to some of the monitoring locations.

Requirements of Section 2.5	Coom Green Energy Park Wind Farm Monitoring Locations
2.5.6 *Where it is not possible to exclude the influence of variable local noise sources by selection of monitoring position, it is generally possible to identify such data from inspection of noise level time histories and therefore to exclude it from the data set used to derive noise limits*	Attendance at the monitoring location during installation, checks, battery changes and equipment collection did not identify any variable noise sources. Atypical data was removed from data analysis.
2.5.7 *In all cases, microphones should be supported at a height of 1.2 – 1.5 metres above the ground and no closer than 3.5 metres to any significant reflecting surface (such as a building or fence), except the ground. The position should be within 20 metres of the dwelling unless there are particular reasons for measuring at a more distant position (such as the presence of vegetation or denial of access); if so, the reasons should be explained.*	The microphones were elevated on tripods at approximate height of 1.5 m and no closer than 3.5 m to any significant reflecting surface. Where possible the noise monitors were located within 20 m. When the noise monitors were located at more distant locations this was due to either the refusal of access or presence of vegetation.
2.5.8 *A resident at a selected property may request that measurements are made at a position which is considered inappropriate; perhaps because the preferred location(s) are inconvenient (it might obstruct lawn mowing, for example). In this situation the consultant should explain clearly the reasons why the measurements could be compromised; if no agreement can be reached, an alternative property or location should be sought. The assistance of the EHO may help to resolve these situations.*	This was not an issue.

Monitoring Locations

Eighteen noise monitoring locations were selected for obtaining a detailed representation of the background noise levels in the area. The chosen noise monitoring locations were representative of the different noise environments in the vicinity of the proposed Coom Green Energy Park Wind Farm development as well as being located at some of the closest dwellings (or their representative proxies) to the proposed wind farm development. Details of the noise monitoring locations are provided in Table 7.1.2 overleaf. The position of the monitoring locations are shown in Figure 7.2.

Table 7.1.2: Details on the Noise Monitoring Locations

Location ID	Easting	Northing	Description	Photograph
N1	165294	90322	Located to the front of a residential property (R55) approximately 20m from the façade.	Plate 7.1-1
N2	166167	91598	Located to the rear of a residential property (R77) approximately 20m from the façade.	Plate 7.1-2
N3	163690	93502	Located to the rear of a residential property (R40) approximately 10m from the façade.	Plate 7.1-3
N4	162828	91801	Located to the rear of a residential property (R20) approximately 10m from the façade.	Plate 7.1-4
N5	163088	91910	Located in an agricultural field (R25) approximately 50m from the façade.	Plate 7.1-5
N6	165141	93544	Located to the rear of a residential property (R51) approximately 10m from the façade.	Plate 7.1-6
N7	165526	90085	Located to the front of a residential property (R60) approximately 12m from the façade.	Plate 7.1-7
N8	163458	88504	Located to the side of a residential property (R36) approximately 10m from the façade.	Plate 7.1-8
N9	161429	90619	Located to the front of a residential property (R153) approximately 20m from the façade.	Plate 7.1-9
N10	165444	90155	Located to the front of a residential property (R56) approximately 10m from the façade.	Plate 7.1-10
N11	162438	91160	Located to the front of a residential property (R4) approximately 20m from the façade.	Plate 7.1-11
N12	165995	91671	Located to the front of a residential property (R71) approximately 8m from the façade.	Plate 7.1-12
N13	167420	93186	Located to the rear farm sheds approximately 85m from the dwelling (R101).	Plate 7.1-13
N14	167705	91216	Located to the rear of a residential property (R106) approximately 7m from the façade.	Plate 7.1-14
N15	167852	92391	Located to the front of a residential property (R107) approximately 30m from the façade.	Plate 7.1-15
N16	168991	91354	Located to the rear of a residential property (R118) approximately 6m from the façade.	Plate 7.1-16
N17	169117	93055	Located adjacent to a residential property (R121) approximately 12m from the façade.	Plate 7.1-17
N18	169526	92984	Located to the rear of a residential property (R122) approximately 16m from the façade.	Plate 7.1-18

Location N1, at receiver R55. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the front of the dwelling approximate 20m from the façade. The area is mowed with bushes and a wooden fence surrounding the perimeter, located beside the gravel driveway and c. 60m from the local country road. Rustling of foliage, noise from the music studio, dog barking, bird song, and faint noise from the forestry could be heard at this location.

Plate A7.1: Monitoring Location N1

Location N2, at receiver R77. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was situated at the rear of the dwelling approximate 20m from the façade. The area is mowed with bushes and trees surrounding the perimeter with a netted trampoline c.10m from the noise meter. Rustling of foliage, bird song and activity from the residents could be heard at this location.

Plate A7.2: Monitoring Location N2

Location N3, at receiver R40. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was situated at the rear of the dwelling approximate 10m from the façade. The noise meter is located against a 0.70 m high wooden fence and c. 1m away from a wall in the dwellings garden and c. 10m from a children's swing set. The area is surrounded with trees at the perimeter. Rustling of foliage, bird song and livestock could be heard at this location.

Plate A7.3: Monitoring Location N3

Location N4, at receiver R20. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the rear of the dwelling approximate 10m from the façade. The area is mowed with a construction area between the dwelling and the noise monitor, there is a garden shed c.10m from the meter and c. 60m from the local country road. Livestock and distant traffic noise could be heard at this location.

Plate A7.4: Monitoring Location N4

Location N5, adjacent to receiver R25. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was situated in a field adjacent to the residence, 60m from the side of the dwelling. There is Perennial ryegrass *(Lolium perenne)* with trees and a wire fence surrounding the perimeter. Livestock, bird song and agricultural activities could be heard at this location.

Plate A7.5: Monitoring Location N5

Location N6, at receiver R51. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the rear of the dwelling approximate 10m from the façade. The area is mowed with a wire fence surrounding the perimeter with a wooden shed approximately 8m from the noise meter. Rustling of foliage, bird song and distant traffic noise could be heard at this location.

Plate A7.6: Monitoring Location N6

Location N7, at receiver R60. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the front of the dwelling approximate 12m from the façade. The area is mowed with a wooden fence surrounding the perimeter, located beside the gravel driveway and c. 20m from the local country road. Bird song and occasional noise from a gate rattling could be heard at this location.

Plate A7.7: Monitoring Location N7

Location N8, at receiver R36. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the side of the dwelling approximate 10m from the façade. The area is mowed with brushes and trees surrounding the perimeter with a wooden shed approximately 5m from the noise meter. Rustling of foliage, bird song and faint noise from the forestry could be heard at this location.

Plate A7.8: Monitoring Location N8

Location N9, at receiver R153. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the front of the dwelling approximate 20m from the façade. The area is mowed with trees and brushes surrounding the perimeter, located beside the gravel driveway and c. 40m from the local country road. Rustling of foliage, bird song and distant traffic noise could be heard at this location.

Plate A7.9: Monitoring Location N9

Location N10, at receiver R56. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor and rain gauge were located at the front of the dwelling approximate 10m from the façade. The area is mowed with brushes and a cement wall surrounding the perimeter, located beside the gravel driveway and c. 20m from the local country road. Rustling of foliage, bird song and distant traffic noise could be heard at this location.

Plate A7.10: Monitoring Location N10

Location N11, at receiver R4. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the front of the dwelling approximate 20m from the façade. The area is mowed with brushes and a cement wall surrounding the perimeter, located beside the gravel driveway and c. 20m from the local country road. Rustling of foliage, bird song and distant traffic noise could be heard at this location.

Plate A7.11: Monitoring Location N11

Location N12, at receiver R71. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor was located at the front of the dwelling approximate 8m from the façade. The area is mowed with a cement wall and large trees surrounding the perimeter, located beside the tarmac driveway and c. 20m from the local country road. Rustling of foliage, bird song and activity from the adjacent farm yard could be heard at this location.

Plate A7.12: Monitoring Location N12

Location N13, at adjacent receiver R101 at the rear of farm sheds. This location was chosen as the noise environment is representative of the noise environment present at receiver R101 and other nearby noise sensitive locations. The noise monitor was located approximately 85m from the dwelling. The area surrounding was a grassed open area with trees surrounding the perimeter. Rustling of foliage, bird song and activity from the adjacent farm yard could be heard at this location.

Plate A7.11: Monitoring Location N13

Location N14, at receiver R106. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor located to the rear of the dwelling approximately 7m from the dwelling. The noise meter was located at a patio area. There are shrubs, hedges and trees in the vicinity of this monitoring location. Rustling of foliage, bird song and occasional noise from livestock could be heard at this location.

Plate A7.14: Monitoring Location N14

Location N15, at receiver R107. This location was chosen as the noise environment is representative of the n noise environment at this location. The dwelling is located adjacent to a piggery. The noise monitor was located on land to front of the dwelling approximately 30m from the dwelling. The noise meter was located on area of scrub adjacent to a gravel road and forestry. Rustling of foliage, bird song and occasional trucks travelling along the gravel road and noise from livestock could be heard at this location.

Plate A7.15: Monitoring Location N15

Location N16, at receiver R118. This location was chosen as the noise environment is representative of the noise environment present at the proposed wind farm. The noise monitor at an adjacent farm approximate 6m from the dwelling. The area is maintained lawn with trees and shrubs surrounding the perimeter. Rustling of foliage, bird song and occasional activity from within a shed could be heard at this location.

Plate A7.16: Monitoring Location N16

Location N17, at receiver R121. This location was chosen as the noise environment is one of the closest dwellings to the proposed wind farm. The noise monitor is located approximately 12m from the façade of the dwelling. The area consists of maintained lawn with trees surrounding the perimeter of the garden. Rustling of foliage, bird song, occasional dog barking and noise from livestock could be heard at this location.

Plate A7.17: Monitoring Location N17

Location N18, at receiver R122. This location was chosen as this dwelling is one of the closest dwellings to the proposed wind farm. The noise monitor is located approximately 16m from the rear façade. The area is maintained lawn with trees and shrubs surrounding the perimeter of the garden. Rustling of foliage, bird song, occasional dogs barking and activity at the dwelling could be heard at this location.

Plate A7.18: Monitoring Location N18

Measurement Periods

The IoA GPG states "*The duration of a background noise survey is determined only by the need to acquire sufficient valid data over the range of wind speeds. It is unlikely that this requirement can be met in less than 2 weeks.*" If insufficient wind data is collected after two weeks, the monitoring periods will be extended subject to acquiring sufficient valid data over the range of wind speeds. Sufficient data was captured at all monitoring locations with a minimum of two weeks' worth of data captured at all monitoring locations.

Definition of Time Periods

The following periods were analysed for this report:

Amenity/Quiet Daytime hours	18:00 – 23:00 Monday to Friday 13:00 – 18:00 Saturday 07:00 – 18:00 Sunday
Night-time hours	23:00 – 07:00

Monitoring Equipment

Baseline noise monitoring was carried out using Bruel & Kjaer Type 2238 Class 1 sound level meter, Svantek Svan 977 Class 1 sound level meters. Details of the noise monitoring equipment are presented in Table 7.1.3. The sound level meters were fitted with 1/2" microphones. The microphones connected to the Bruel & Kjaer sound level meter was fitted with B&K UA1404 outdoor microphone assembly. The microphones connected to the Svantek sound level meters were fitted with a UA-0237 type wind shield made from open-pored polyurethane foam with a diameter of 90mm. These were surrounded by a secondary windshield in keeping with ESTU W/13/00386/REP, Noise Measurements in Windy Conditions and IOA Good Practice Guidelines, 2013. Calibration certificates for each sound level meter are provided in Appendix 7.2.

Table 7.1.3: Details of Noise Monitoring Equipment

Monitoring Location	Meter Type -	Serial Number
N1	Svan 977	69552
N2	Svan 977	69558
N3	Svan 977	66556
N4	Svan 977	45458
N5	Svan 977	45466
N6	Svan 977	36432
N7	Svan 977A	69557
N8	B & K 2238	2590900
N9	Svan 977A	69557
N10	Svan 977A	69556
N11	Svan 977A	69558
N12	Svan 977A	69552
N13	Svan 977A	69558
N14	Svan 977A	69552
N15	Svan 977A	69556
N16	Svan 977	34876
N17	Svan 977	34875
N18	Svan 977	34173

A CR200 Series data logger was used to record rainfall (ARG 100) and this was located at N2, N10 and N17. This meteorological data was acquired every 10 minutes simultaneously with noise data.

Monitoring Protocol

Baseline noise measurements were undertaken at 18 locations surrounding the proposed wind farm. Equipment was installed in three lots: 1) from 24th October to 14th November 2018, 2) from 20th December 2018 to 10th January 2019, and 3) 6th February to 1st March 2019. These measurements included all eighteen monitoring locations N1, N2, N3 N4, N5, N6, N7, N8, N9, N10, N11, N12, N13, N14, N15, N16, N17 and N18.

The following monitoring protocol was carried out at each of the monitoring locations:

1. The sound level meters were calibrated on-site and set to log L_{A90} statistics on a fast time weighted response every ten minutes.
2. Each sound level meter microphone was mounted at 1.5 m above ground level and fitted with an enhanced windshield. Each microphone was placed at least 3.5 m from reflecting surfaces to obtain 'free field' conditions.
3. Wind speed and wind direction measurements were taken from a Lidar Unit installed on site. Wind speed was measured at a range of heights. The standardised 10 m wind speed was obtained from the turbine hub height wind speed by correcting it to 10 m height using a ground roughness factor of 0.05 m. Roughness length (or logarithmic) shear profile:

$$U_1 = U_2 \frac{ln\left({}^{H_1}/_{z}\right)}{ln\left({}^{H_2}/_{z}\right)}$$

where U_1 is the wind speed to be calculated, U_2 is the measured wind speed, H_1 is the height of the measured wind speed to be calculated (10m), H_2 is the height of the measured wind speed and z is the ground roughness length (m). A roughness length of 0.05m is used to standardise hub height wind speeds to 10m height in the IEC 61400-11:2012 standard.

4. The L_{A90} statistic measurements were synchronised with the 10 m standardised wind speeds derived from the on-site meteorological mast data.
5. A logging rain gauge was also installed (at monitoring location N2 for lot 1, N10 for lot 2 and N17 for lot 3) and similarly logged rainfall events over successive 10 minute intervals, also synchronised to the noise level and wind speed measurements.
6. After the monitoring was completed, the noise meters were re-tested using the calibration noise source to ensure that the meters had not drifted.

Analysis of the Baseline Data

Following collection of the site data, the following protocol was used to analyse the baseline data:

1. The raw baseline L_{A90} noise data was reviewed to determine whether there are any periods of non-consistent noise level due to equipment malfunction. If there was any data which was inconsistent, these noise level data points were removed from the raw data set and detailed in the report. There was no such data.
2. The raw noise level data was then correlated with the time synchronised wind speed and rainfall data. Preliminary data analysis was used to remove datasets (L_{A90}, wind speed and occurrence of rainfall event) which contain a rainfall event as these data sets are required to be removed from further analysis in line with best practice as outlined in the IoA Good Practice Guide and Supplementary Guidance Note 2 on Data Processing.
3. Early morning periods were also excluded to remove the dawn chorus which is not prevalent through that whole year.
4. Once the dawn chorus, rainfall events and snow events have been accounted for, the remaining data was graphed using a wind speed based plot to establish whether there are any remaining data outliers, representing atypical noise sources or events.
5. Once the remaining data sets were found to be representative of the noise environment, they were analysed to ensure that sufficient data remained to provide sufficient data coverage over the necessary wind speeds. The IoA Good Practice Guide (May 2013) requires, as a minimum, no fewer than five valid data sets across each 1 m/s wind speed from turbine cut-in to rated power. Where integer wind speeds have less than five valid data sets, the prevailing background noise trend will not be extended beyond the range covered by adequate data sets. See Section 'Data Sets Available for Determination of Prevailing Background Noise Levels' for details.
6. A 'best fit' trend (not higher than a fourth order polynomial) was then derived to present the assumed prevailing background noise level at each monitoring location. See 'Results' for details.

Data Available for Determination of Prevailing Background Noise Levels

The requirement for the survey duration is dictated by the range of wind speeds to be collected. The IOA Good Practice Guide to the Application of ETSU-R-97[1] for the Assessment and Rating of Wind Turbine Noise, (May 2013) states that *"As a guideline, no fewer than 200 data points should be recorded in each of the amenity hours and night-time periods with no fewer than 5 data points in any 1 m/s wind speed bin."*

The Wind Energy Development Guidelines (2006) do not provide the specific periods which are represented by daytime and night-time hours, therefore the definitions from ETSU-R-97 are taken as 07:00 to 23:00 hrs for daytime and 23:00 to 07:00 hrs for night-time. The 2006 guidelines require daytime background noise data to derive the appropriate daytime noise limit. As this assessment also considers the requirements in the Draft Revised Wind Energy Development Guidelines, night-time background noise data is required to derive daytime, evening and night-time noise limits.

[1] Department of Trade and Industry (1996), The Assessment and Rating of Noise from Wind Farms Report ETSU-R-97

Prevailing background noise levels were derived for daytime and night-time periods. The number of valid datasets are shown in Tables A7.1.4 – A7.1.6 with wind speed ranges greyed out which did not satisfy the criteria of at least 5 data points in any 1 m/s wind speed bin.

Table A7.1.4: Number of Valid Datasets: Noise Monitoring Locations N1 – N18

Wind Speed (at standardised 10 m height), m/s	Valid Datasets											
	N1		N2		N3		N4		N5		N6	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
0	0	2	0	1	0	1	0	1	0	0	0	1
1	4	14	11	10	10	10	10	10	10	4	10	10
2	40	13	48	23	50	23	49	23	50	10	50	23
3	54	59	90	56	93	60	88	61	94	29	94	62
4	71	102	75	108	106	131	102	131	107	67	107	128
5	115	126	99	107	146	145	151	165	148	84	150	152
6	119	135	111	173	168	208	183	226	173	95	174	197
7	167	148	87	108	136	139	141	148	134	79	134	142
8	64	64	27	37	34	58	36	58	35	34	35	58
9	22	27	19	33	19	37	19	40	19	24	19	40
10	11	25	6	8	6	18	6	23	6	13	6	23
11	0	16	0	3	0	4	0	6	0	5	0	6
12	0	3	0	0	0	0	0	1	0	0	0	1
13	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0
Total Number of Data Points	667	734	573	667	768	834	785	893	776	444	779	843

Table A7.1.5: Number of Valid Datasets: Noise Monitoring Locations N7 – N12

Wind Speed (at standardised 10 m height), m/s	Valid Datasets											
	N7		N8		N9		N10		N11		N12	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
0	0	1	0	0	3	2	3	12	2	3	12	3
1	11	10	6	0	48	32	48	52	25	36	52	48
2	50	23	26	5	93	89	96	106	100	71	106	96
3	94	62	40	31	192	164	225	178	159	220	177	225
4	107	130	77	77	296	203	362	236	216	343	235	362
5	146	143	136	127	201	181	254	234	226	237	234	254
6	172	177	133	140	178	226	219	260	229	195	259	219
7	134	132	176	162	135	166	140	184	142	110	183	140
8	34	53	58	81	102	113	103	114	79	72	112	103
9	18	40	22	36	96	50	97	50	35	46	48	97
10	6	23	11	25	50	29	50	30	21	30	30	50
11	0	6	0	16	14	17	14	17	13	4	17	14
12	0	1	0	3	4	8	4	8	8	1	8	4
13	0	0	0	0	2	1	2	1	1	2	1	2
14	0	0	0	0	2	1	2	1	1	2	1	2
15	0	0	0	0	4	0	4	0	0	4	0	4
16	0	0	0	0	1	0	1	0	0	1	0	1
17	0	0	0	0	0	0	0	0	0	0	0	0
Total Number of Data Points	772	801	685	703	1421	1282	1624	1483	1257	1377	1475	1624

Table A7.1.6: Number of Valid Datasets: Noise Monitoring Locations N13 – N18

Wind Speed (at standardised 10 m height), m/s	Valid Datasets											
	N13		N14		N15		N16		N17		N18	
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0
2	3	0	3	0	3	0	3	0	3	0	3	0
3	13	3	13	3	13	3	13	3	13	0	9	3
4	42	12	43	12	43	12	42	12	41	3	42	12
5	32	26	34	28	34	28	34	28	27	13	32	16
6	55	24	55	24	55	24	55	24	42	16	54	17
7	37	62	39	62	39	62	39	62	32	58	39	61
8	40	84	41	84	41	84	41	84	23	75	39	75
9	66	61	71	61	70	61	71	61	65	45	70	45
10	74	35	80	34	80	35	80	35	78	32	79	32
11	50	14	51	14	51	14	51	14	51	10	51	10
12	47	24	47	23	47	24	47	23	47	22	47	22
13	35	13	35	13	35	13	34	13	31	13	31	13
14	42	7	42	7	42	7	42	7	39	7	39	7
15	12	22	12	22	12	20	12	21	12	21	12	20
16	0	24	0	24	0	24	0	24	0	24	0	24
17	0	4	0	5	0	5	0	5	0	5	0	4
Total Number of Data Points	548	415	566	416	565	416	564	416	504	344	547	361

Results

In this section, the prevailing background noise level in dB L_{A90} relative to 10 m standardised wind speeds are provided for each monitoring location as per the requirements of the survey. The prevailing background noise level is plotted as a solid line for each daytime and night-time periods at each monitoring location. In all cases, the highest order of polynomial used is a third order polynomials provided lines of best fit to the scatter data.

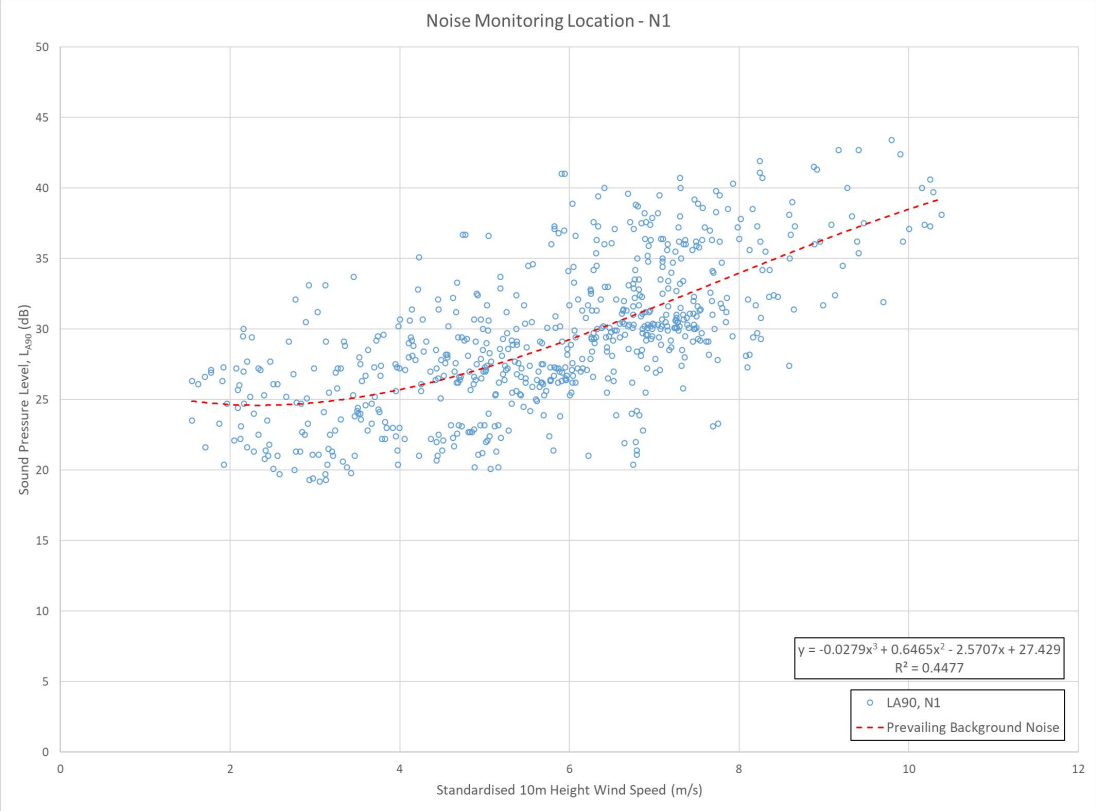

Figure A7.1: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N1

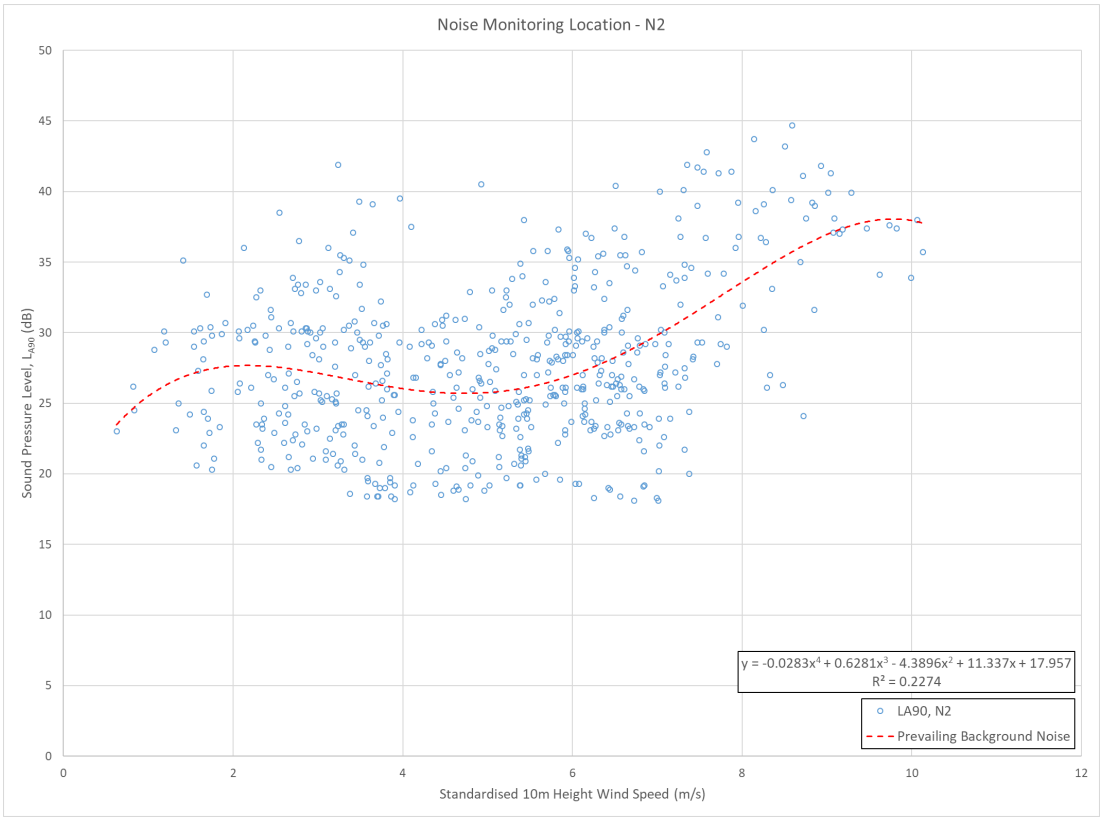

Figure A7.2: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N2

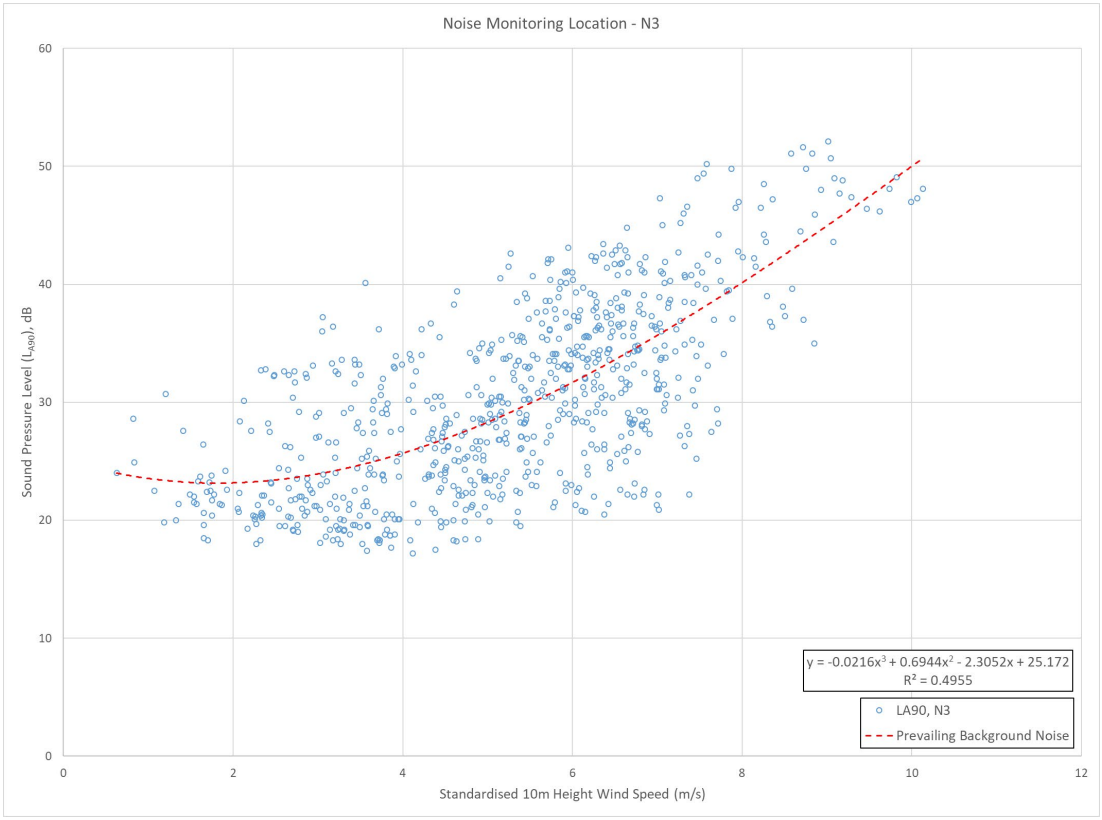

Figure A7.3: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N3

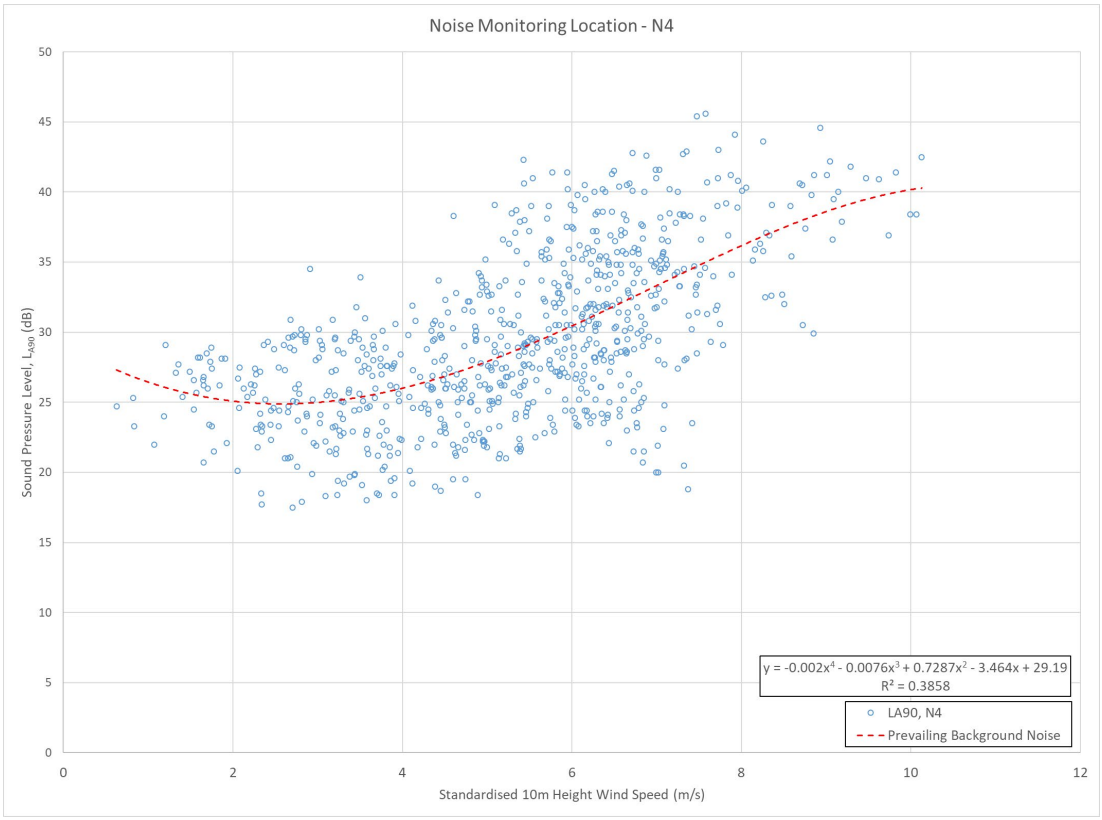

Figure A7.4: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N4

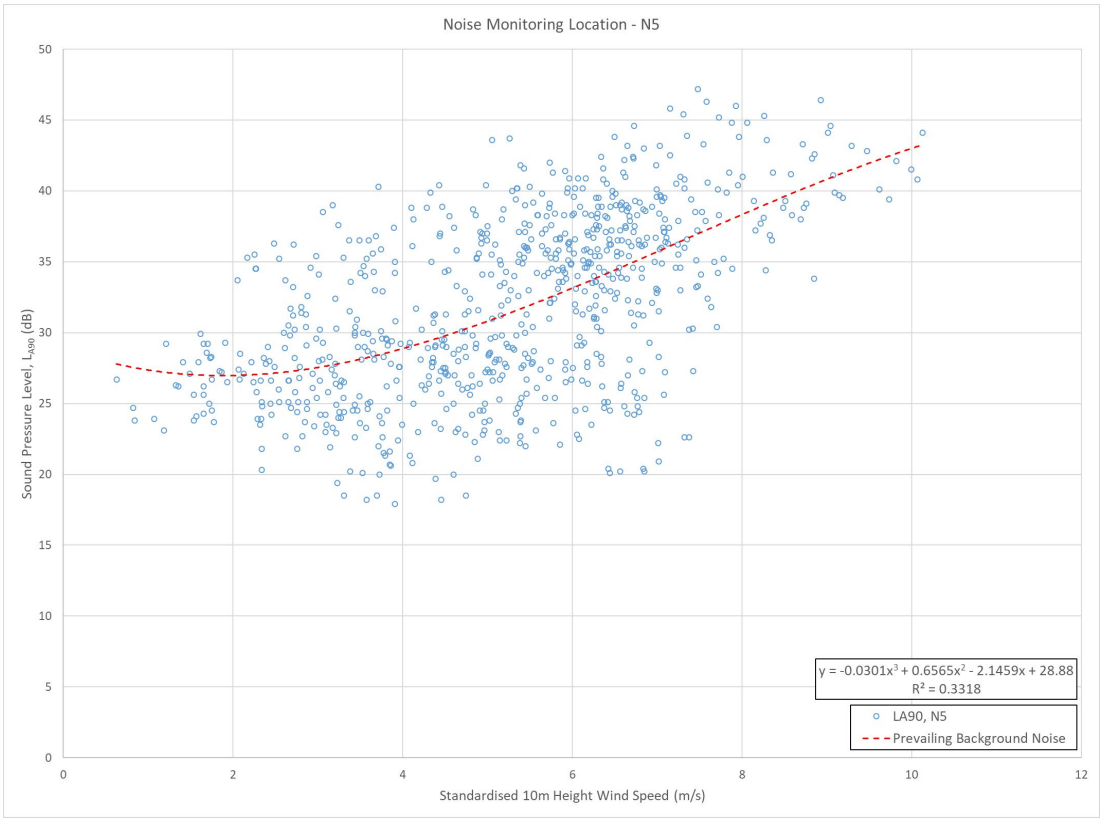

Figure A7.5: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N5

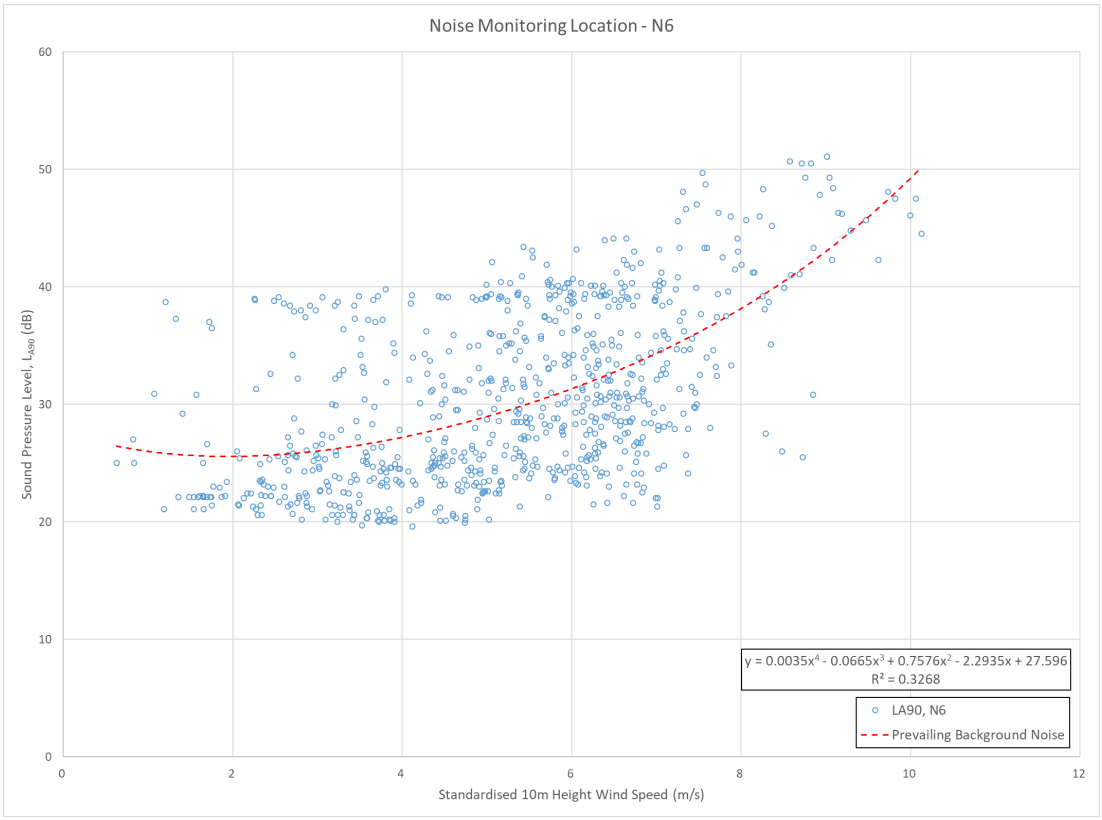

Figure A7.6: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N6

Figure A7.7: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N7

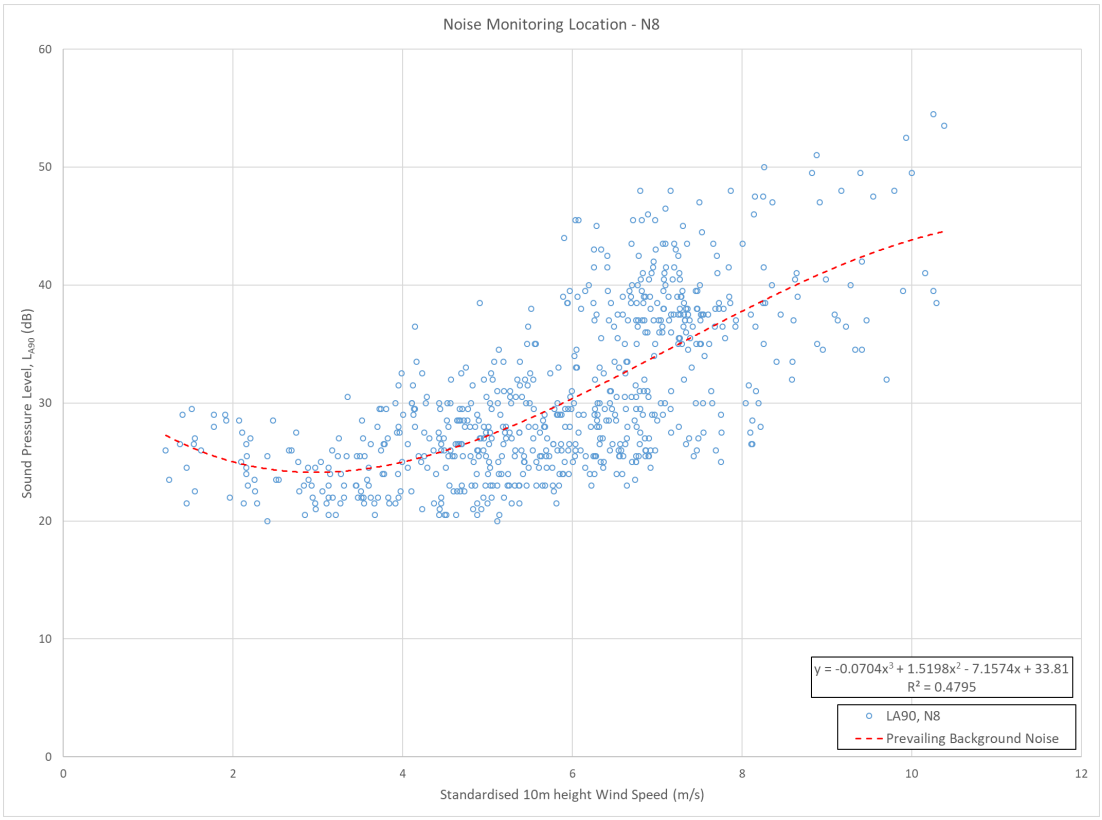

Figure A7.8: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N8

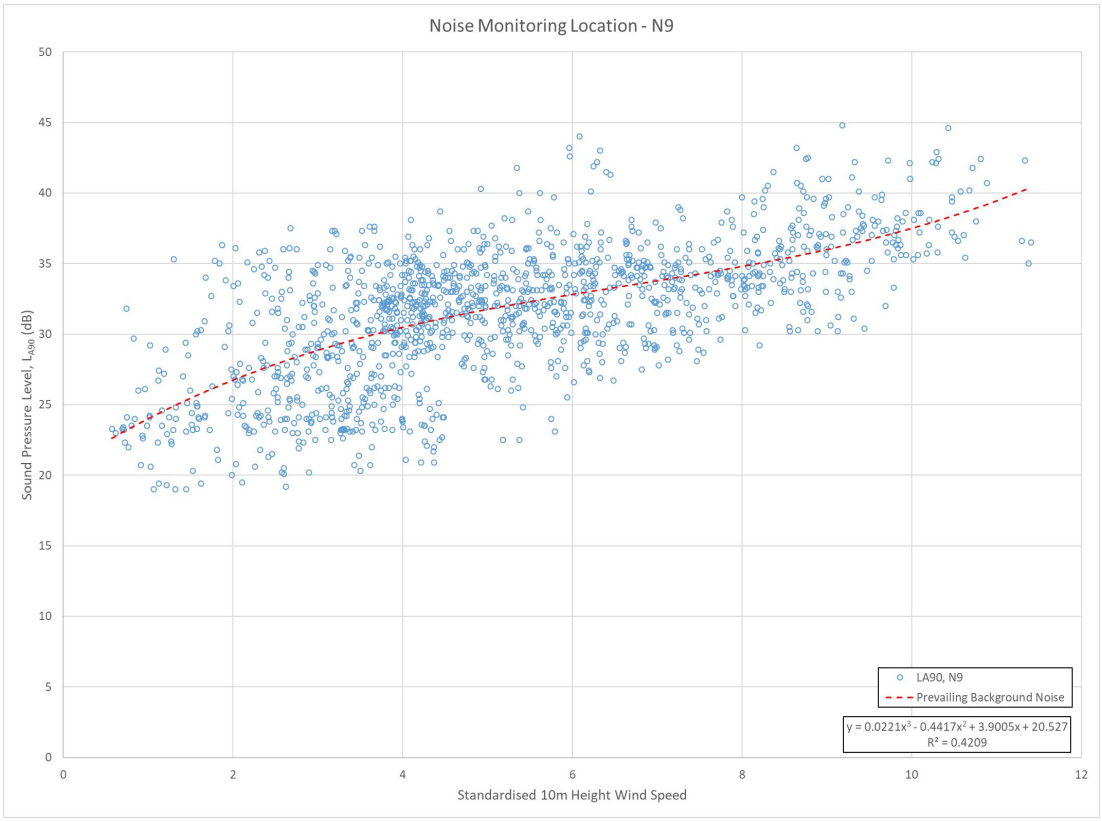

Figure A7.9: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N9

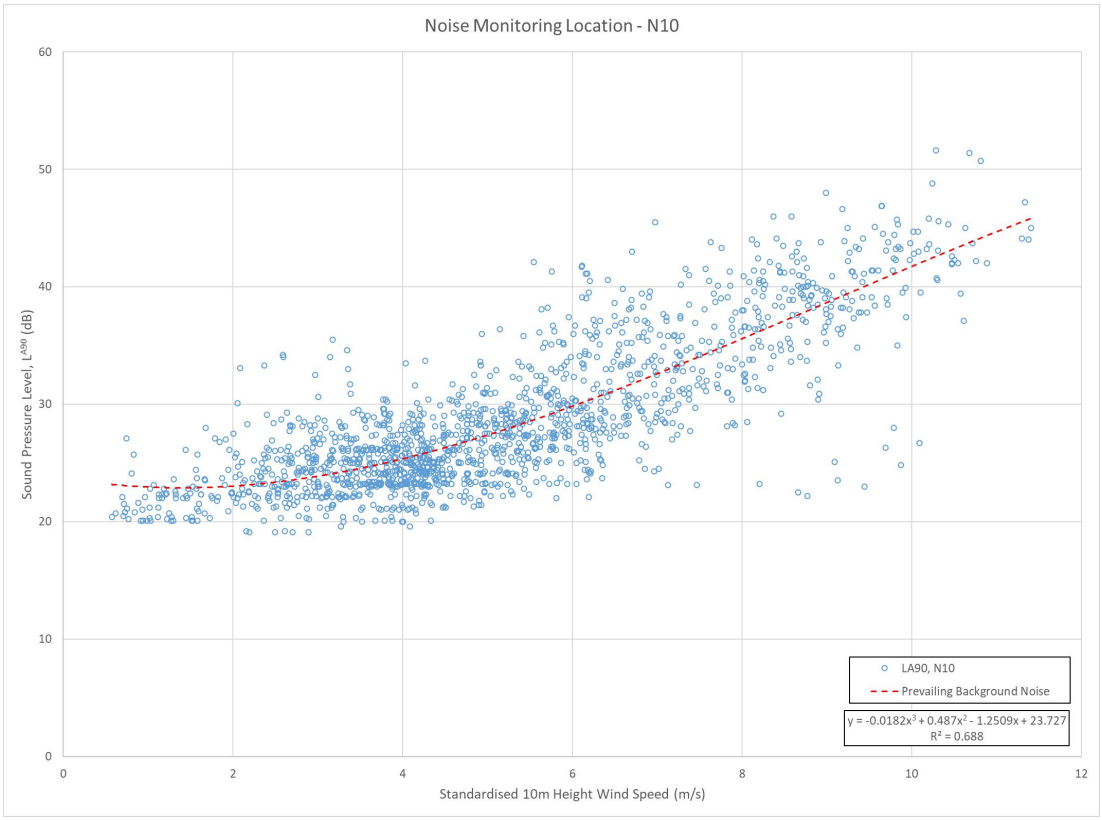

Figure A7.10: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N10

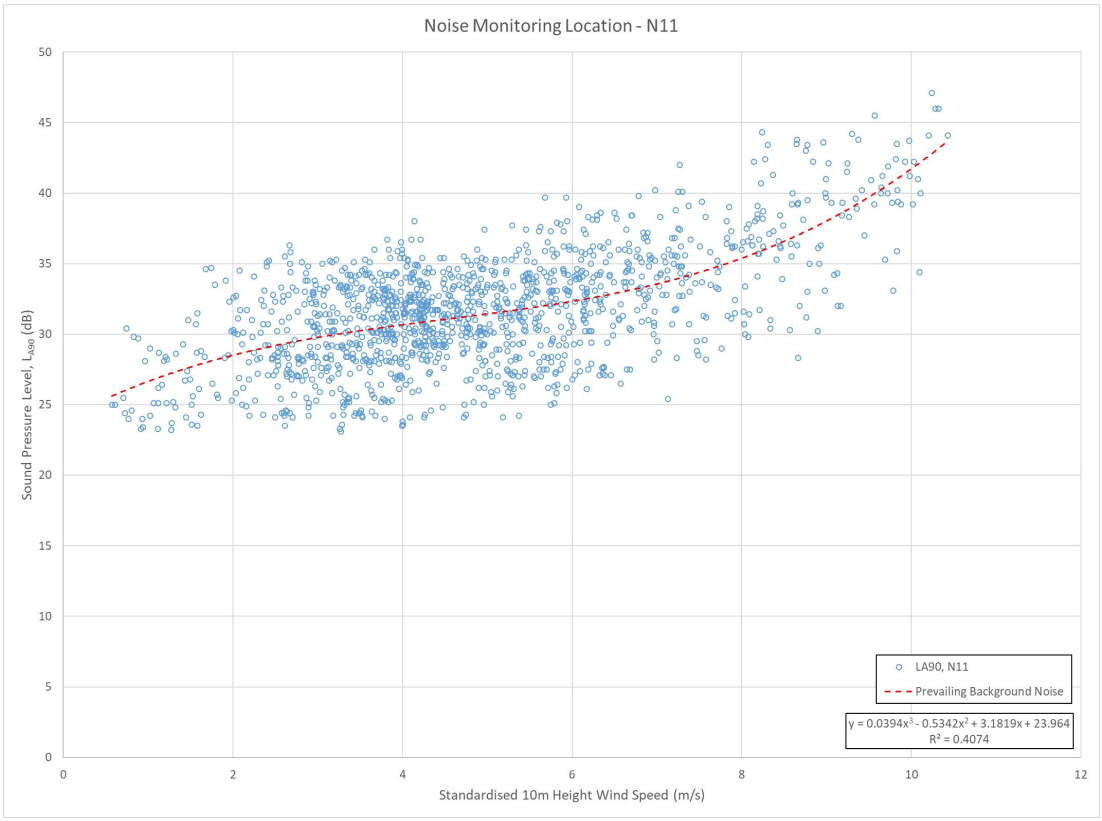

Figure A7.11: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N11

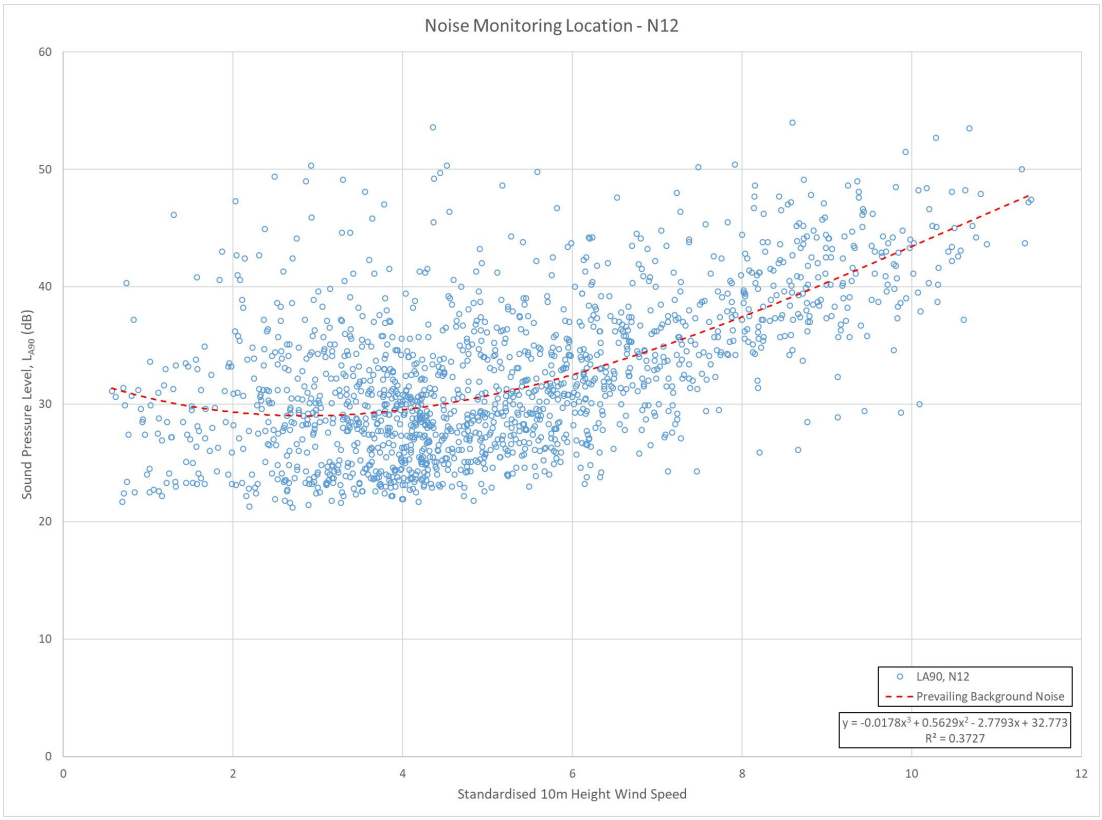

Figure A7.12: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N12

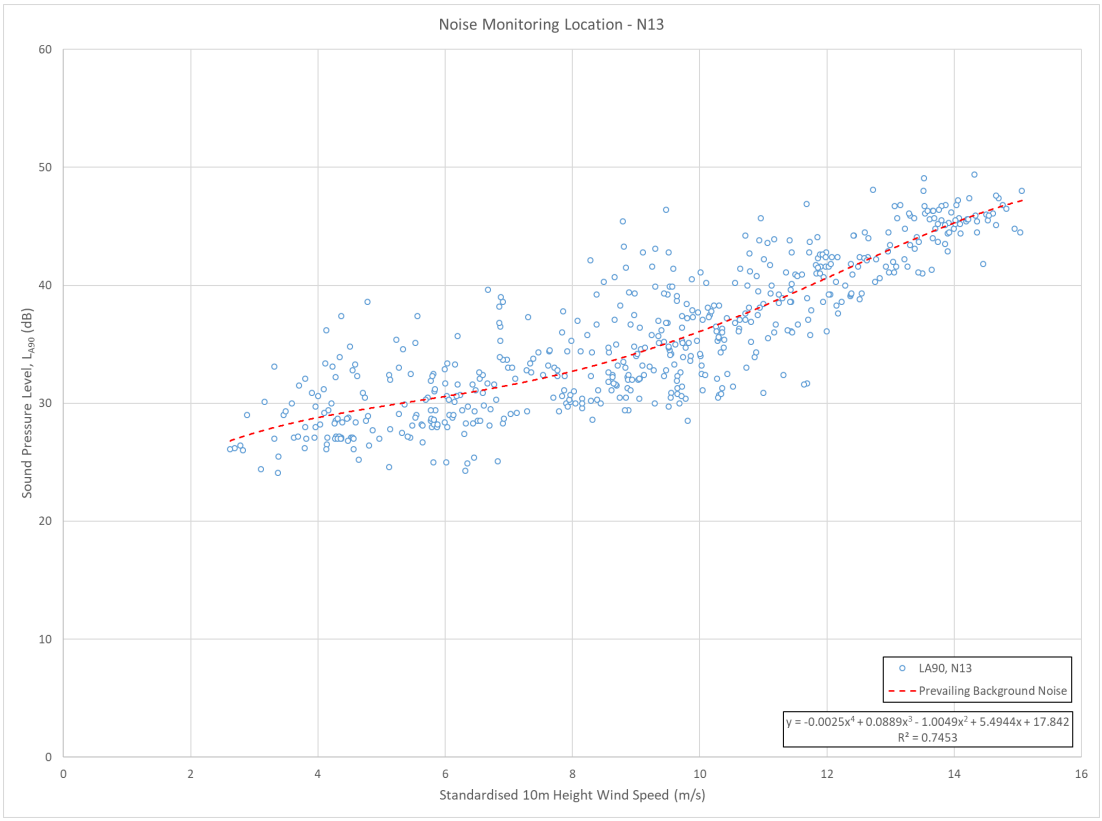

Figure A7.13: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N13

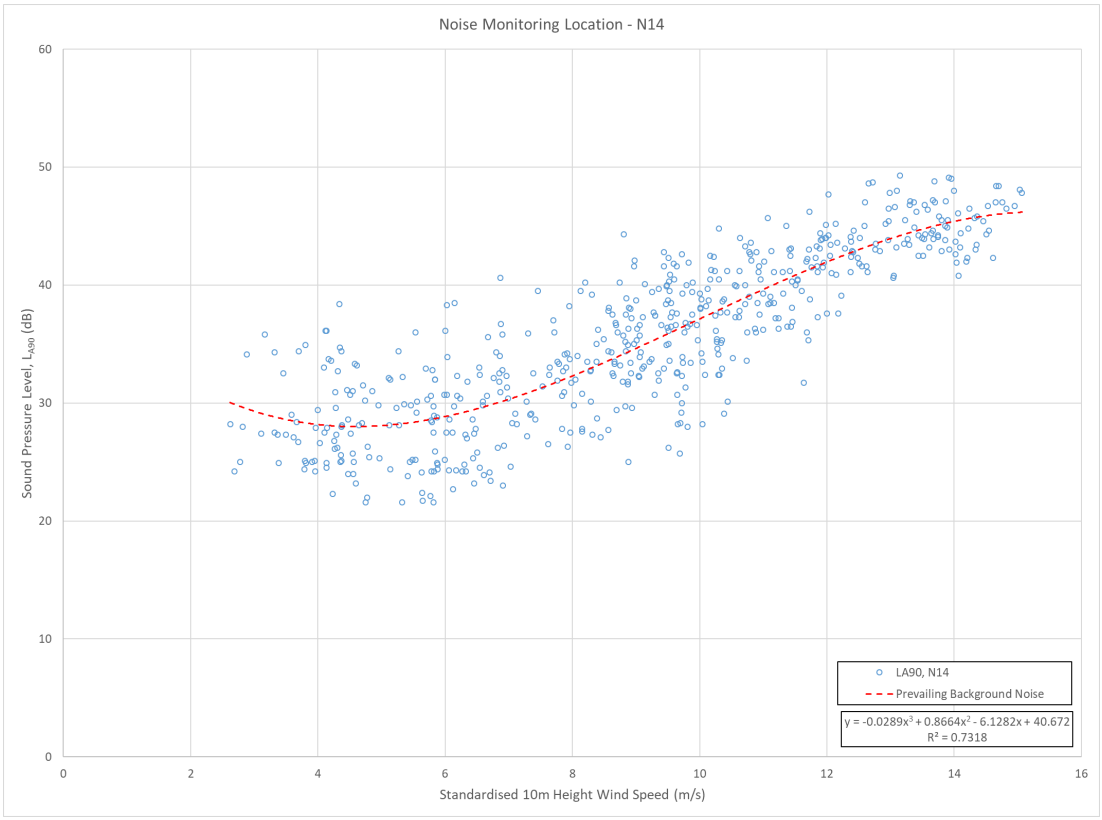

Figure A7.14: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N14

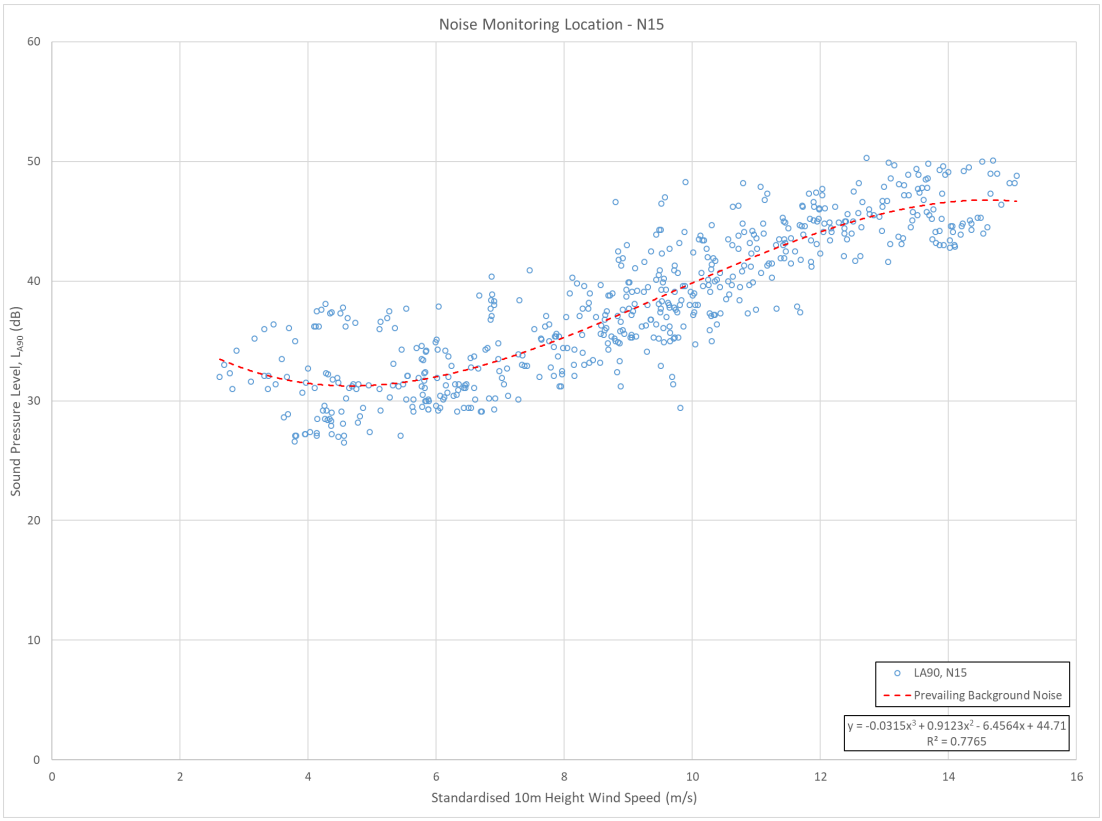

Figure A7.15: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N15

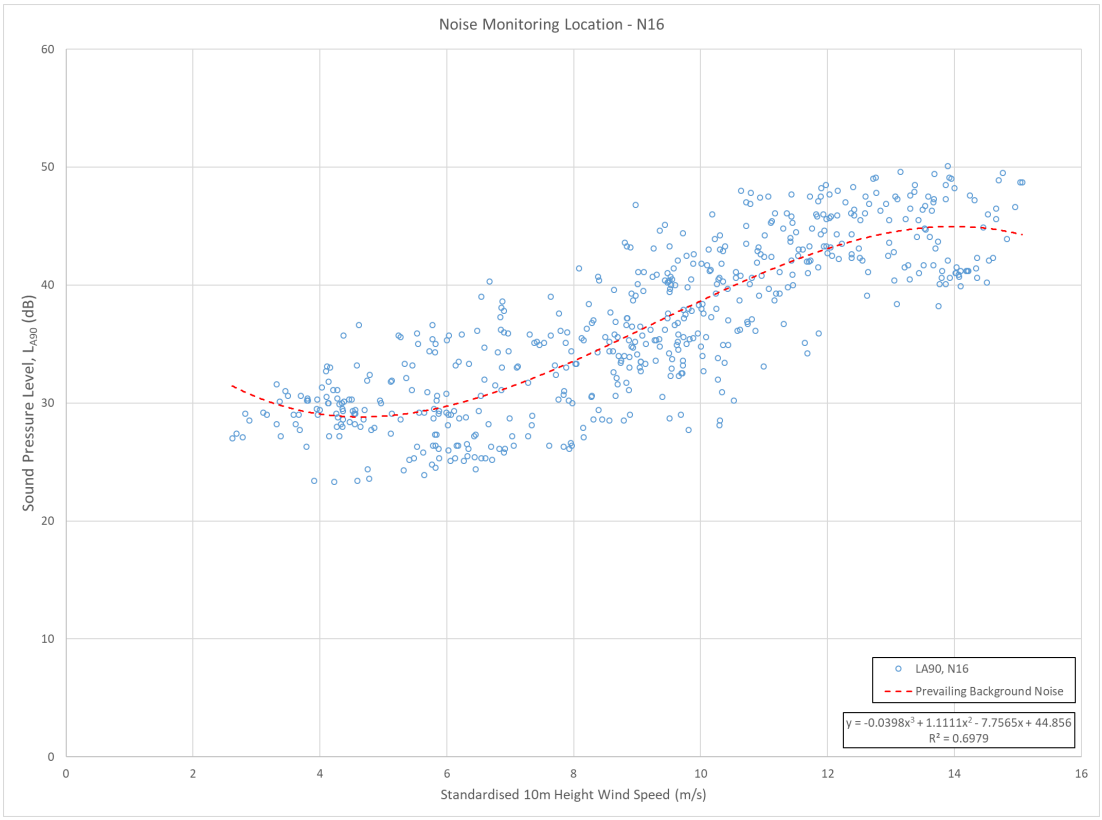

Figure A7.16: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N16

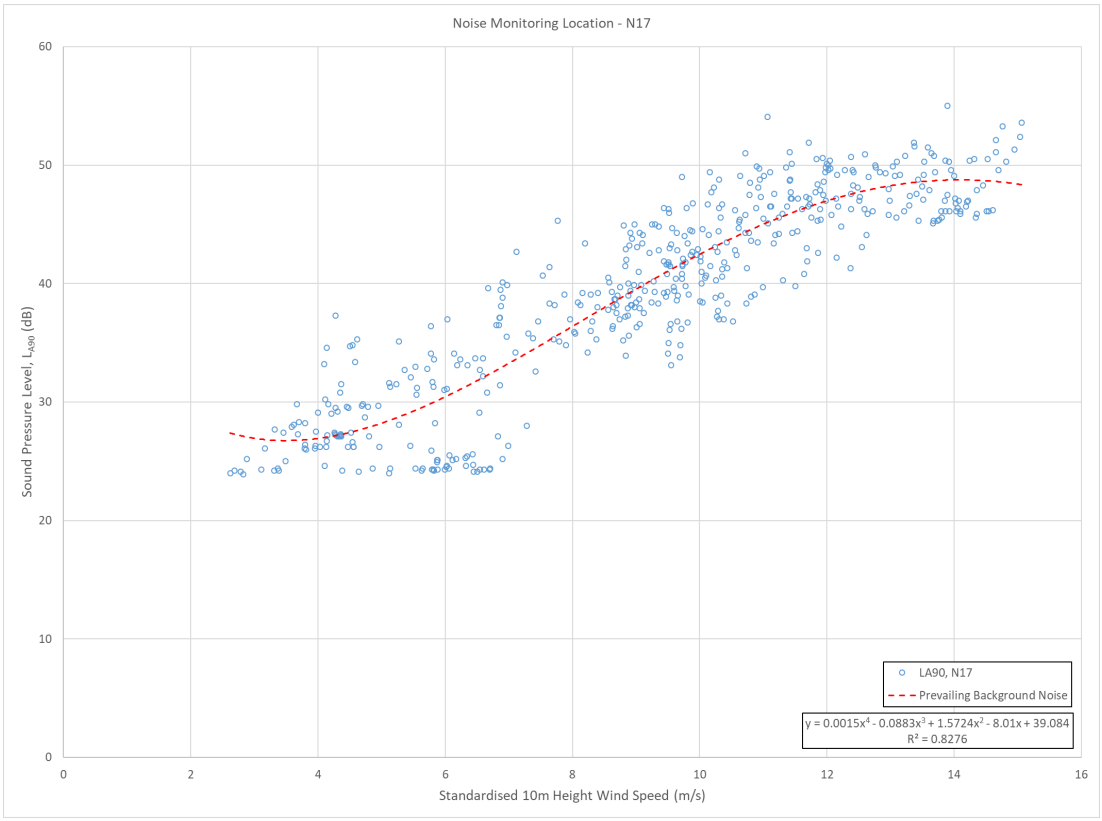

Figure A7.17: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N17

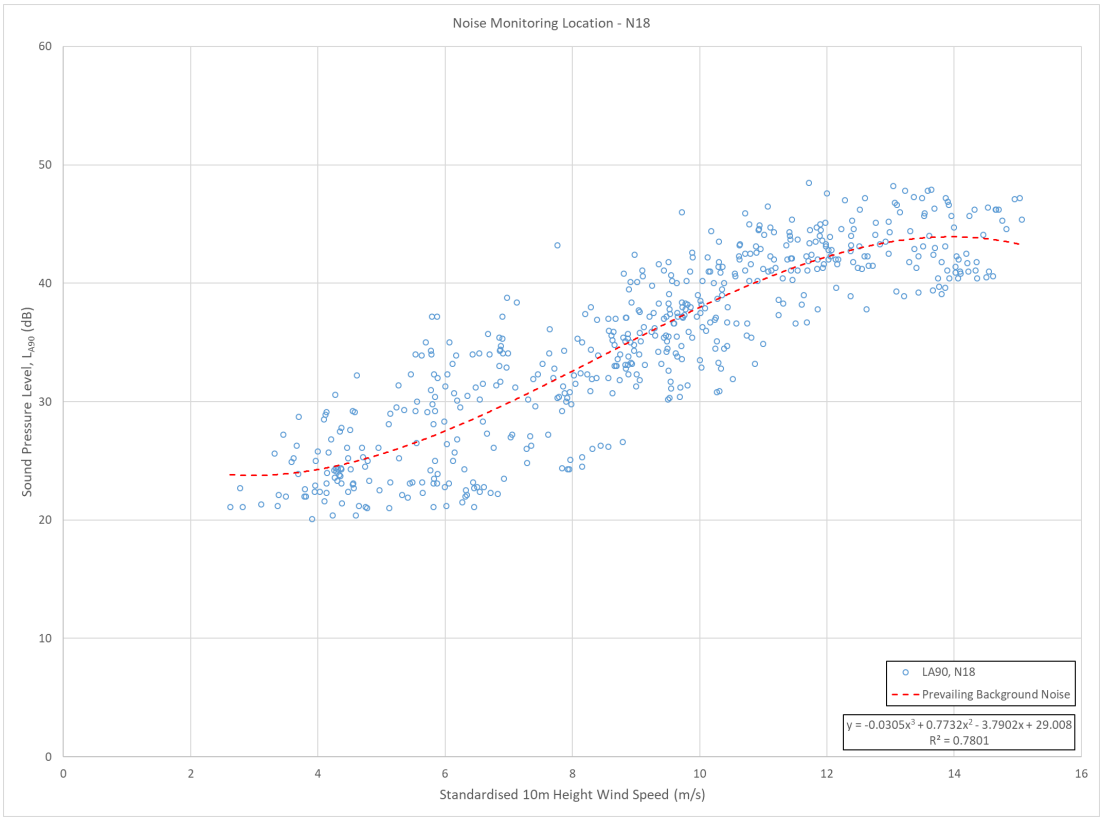

Figure A7.18: Prevailing Amenity/Daytime Background (L_{A90}) Noise Levels at N18

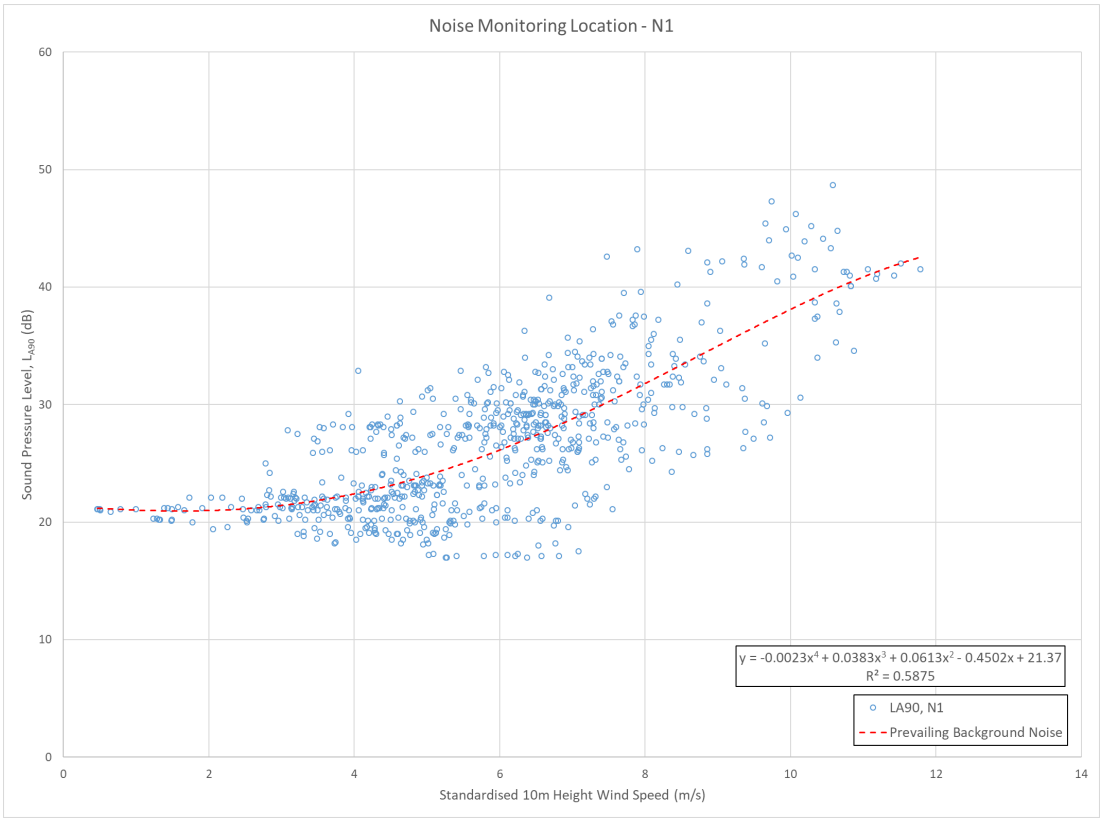

Figure A7.19: Prevailing Night-time Background (L_{A90}) Noise Levels at N1

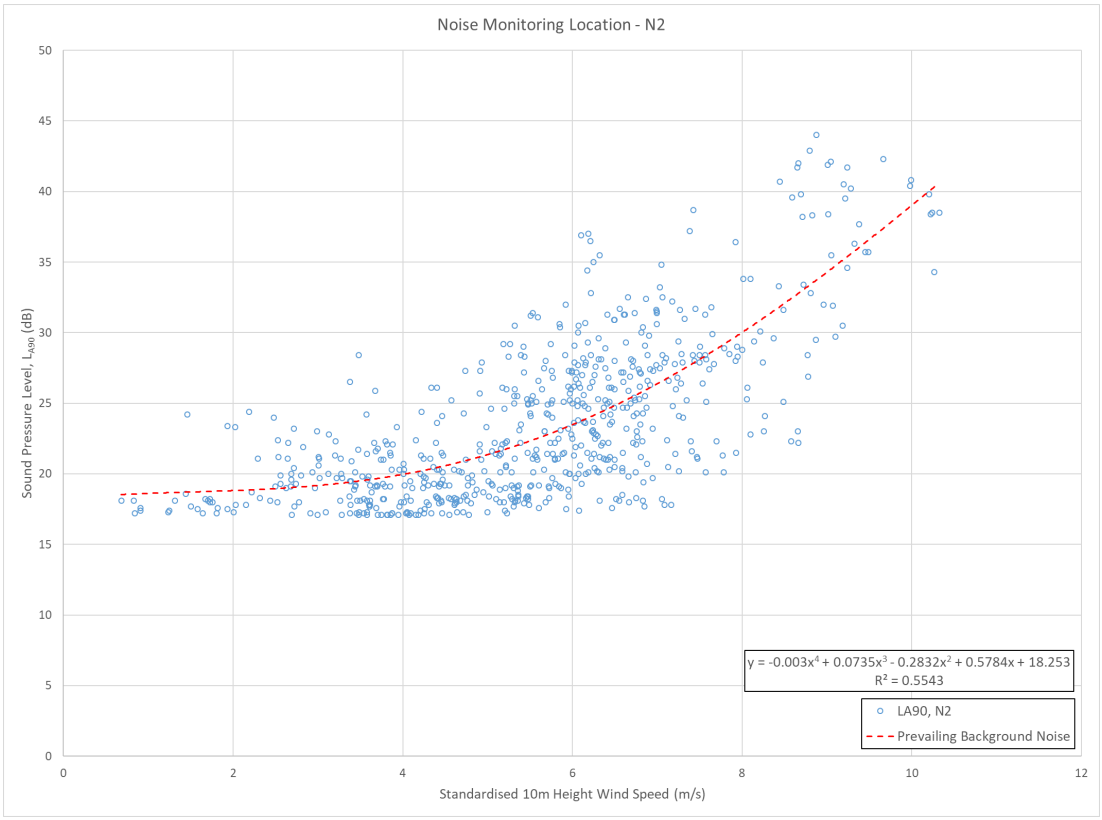

Figure A7.20: Prevailing Night-time Background (L_{A90}) Noise Levels at N2

Figure A7.21: Prevailing Night-time Background (L_{A90}) Noise Levels at N3

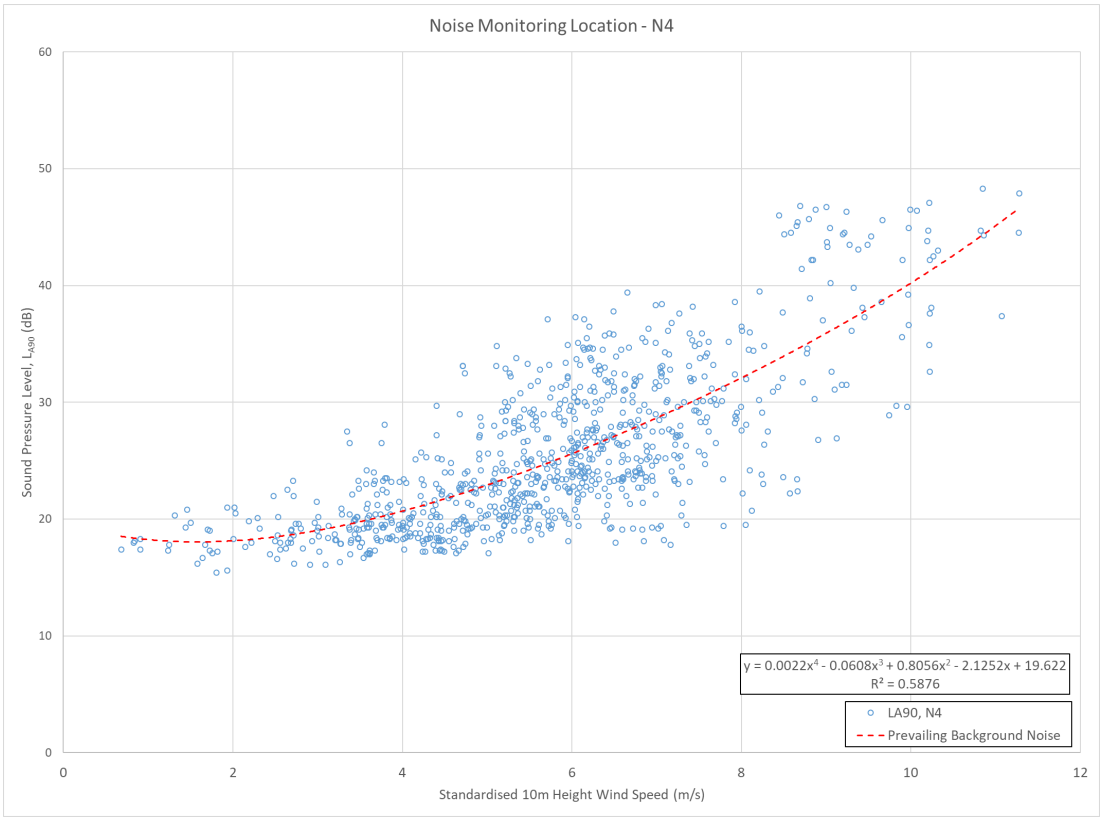

Figure A7.22: Prevailing Night-time Background (L_{A90}) Noise Levels at N4

Figure A7.23: Prevailing Night-time Background (L_{A90}) Noise Levels at N5

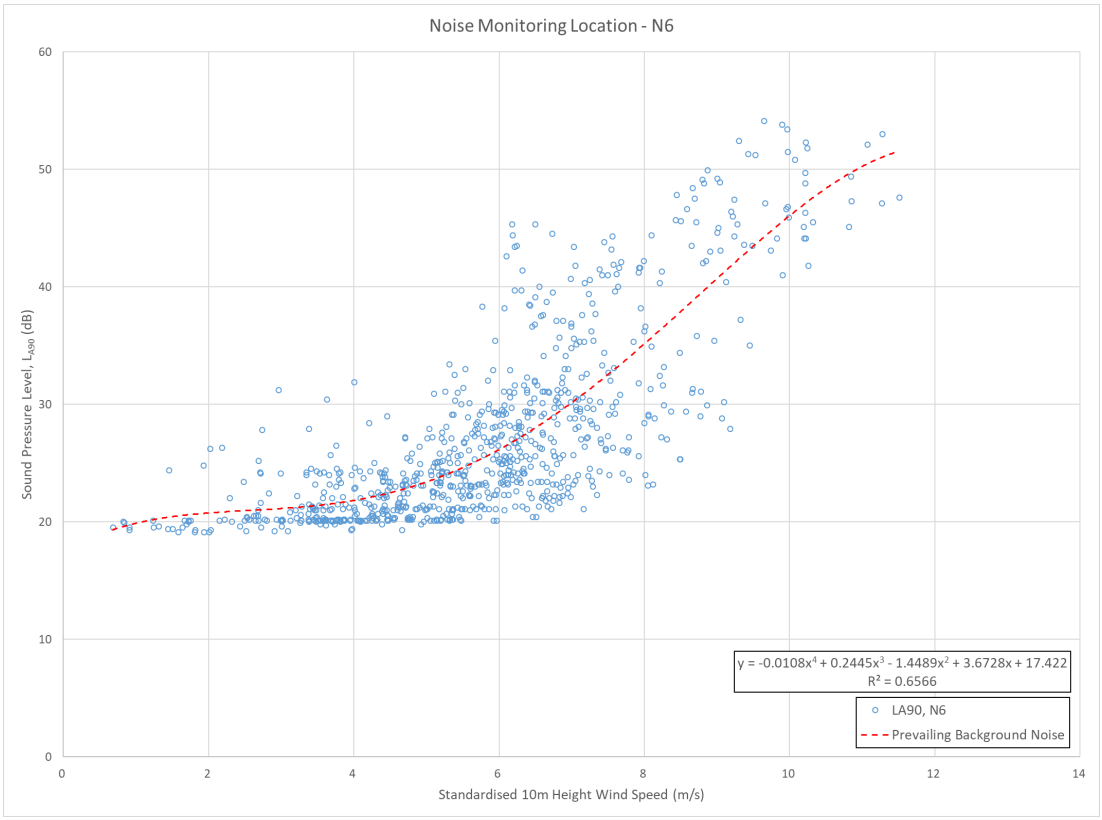

Figure A7.24: Prevailing Night-time Background (L_{A90}) Noise Levels at N6

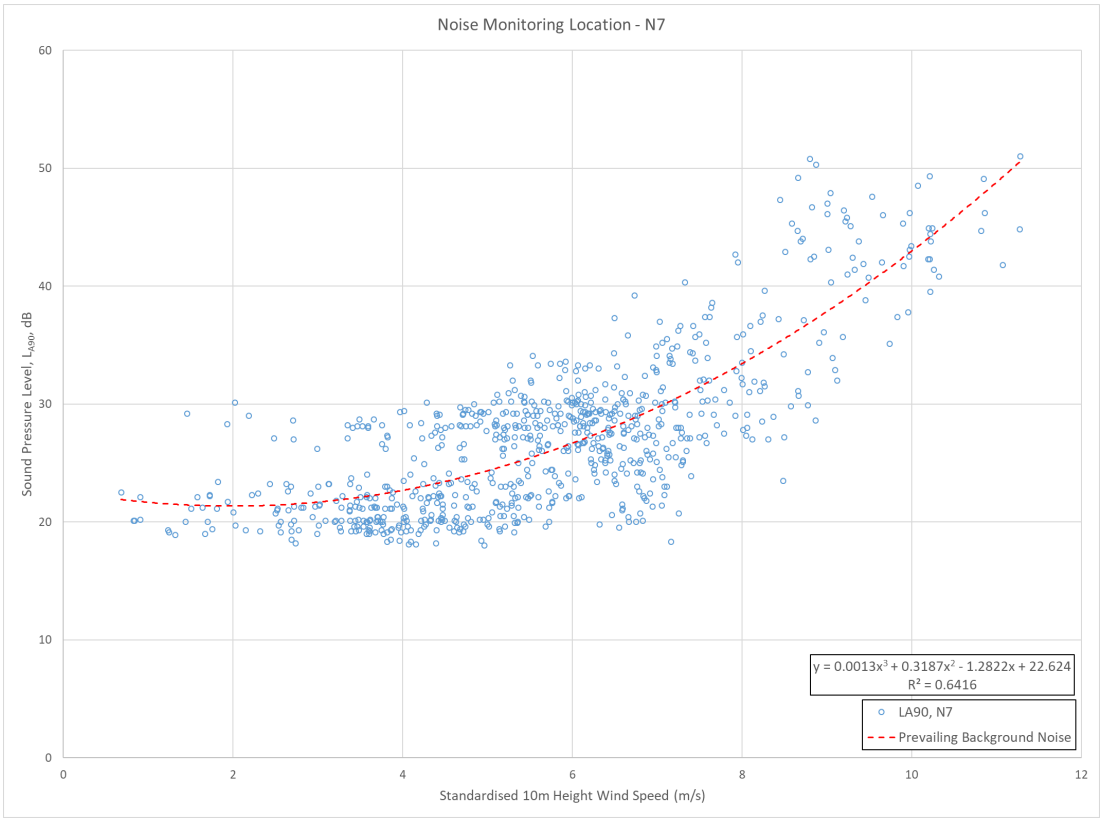

Figure A7.25: Prevailing Night-time Background (L_{A90}) Noise Levels at N7

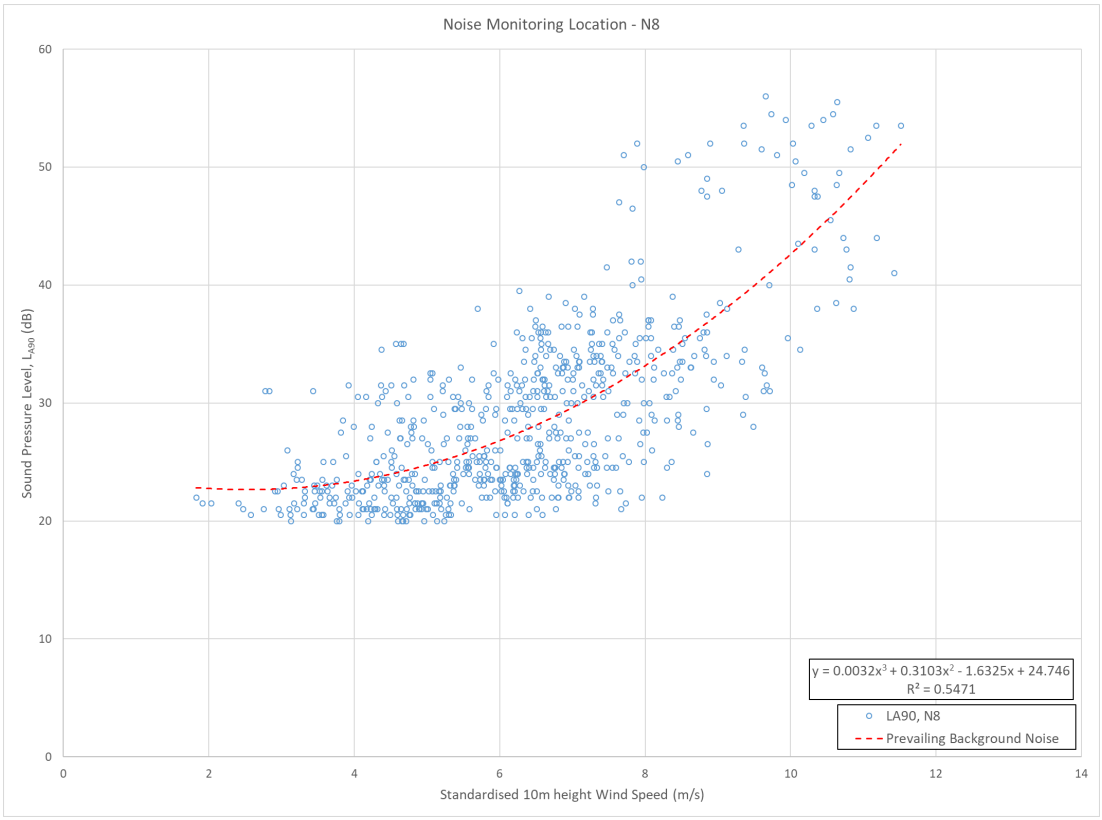

Figure A7.26: Prevailing Night-time Background (L_{A90}) Noise Levels at N8

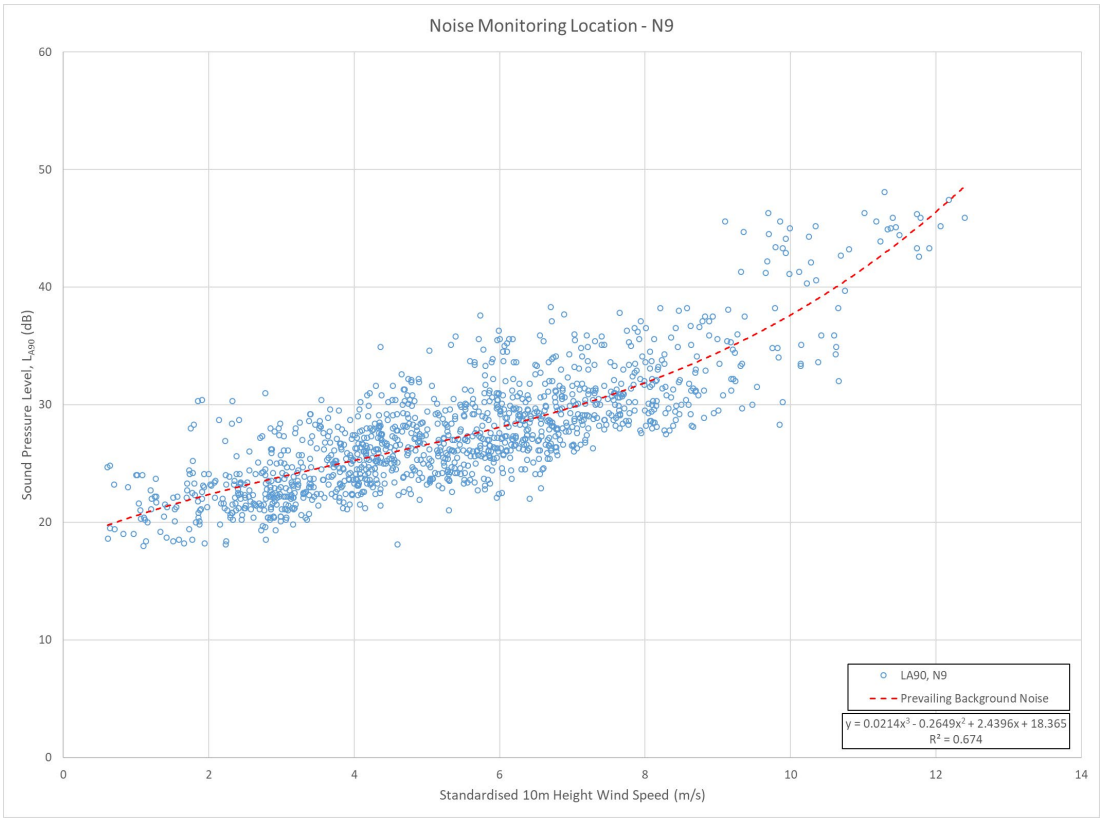

Figure A7.27: Prevailing Night-time Background (L_{A90}) Noise Levels at N9

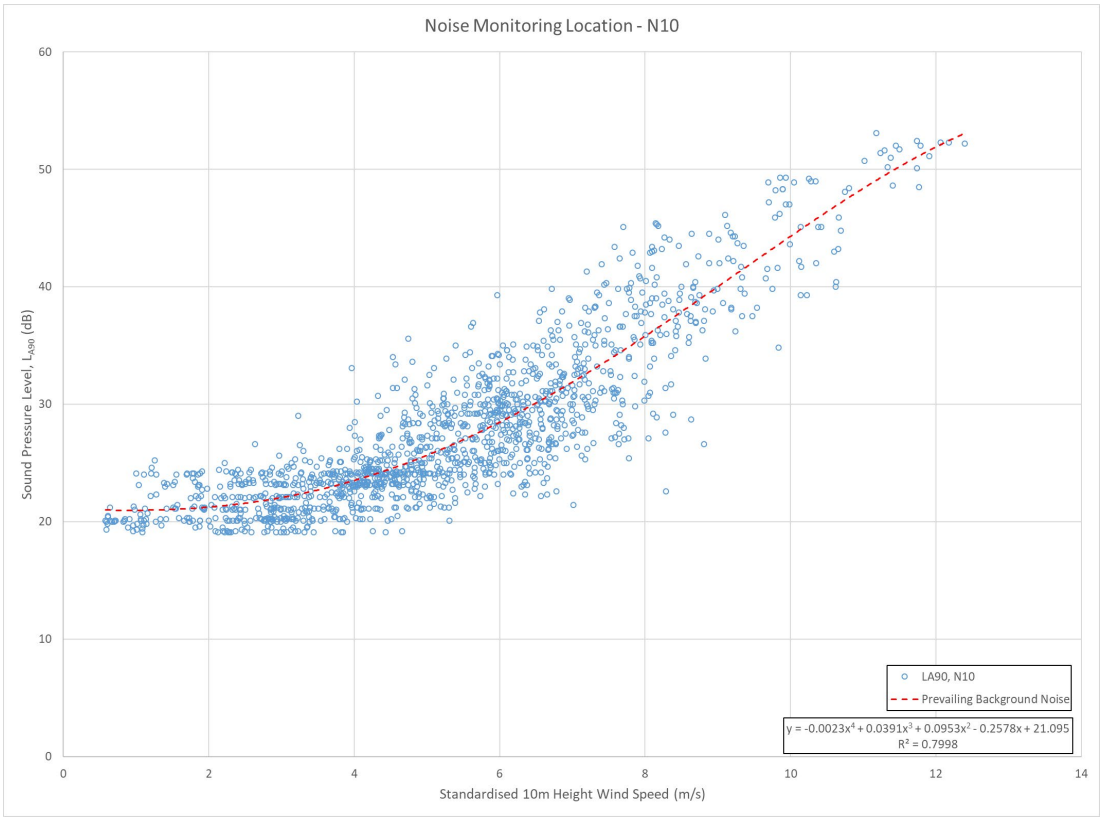

Figure A7.28: Prevailing Night-time Background (L_{A90}) Noise Levels at N10

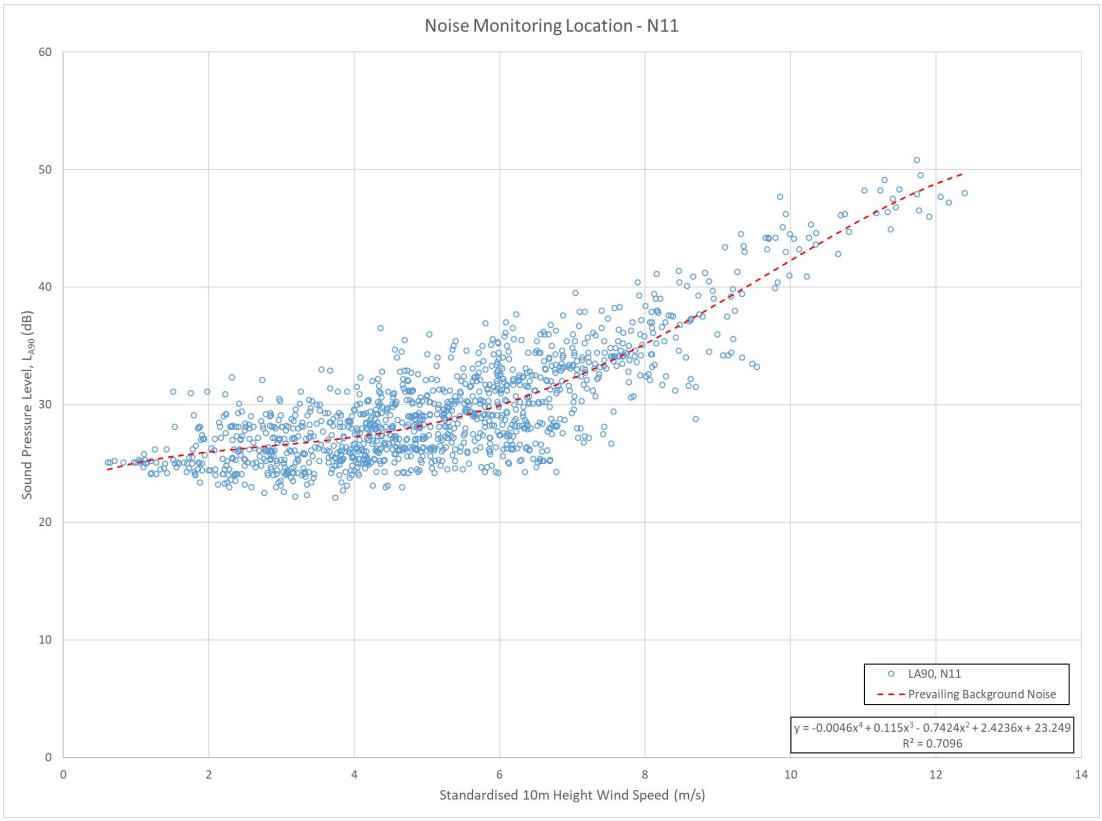

Figure A7.29: Prevailing Night-time Background (L_{A90}) Noise Levels at N11

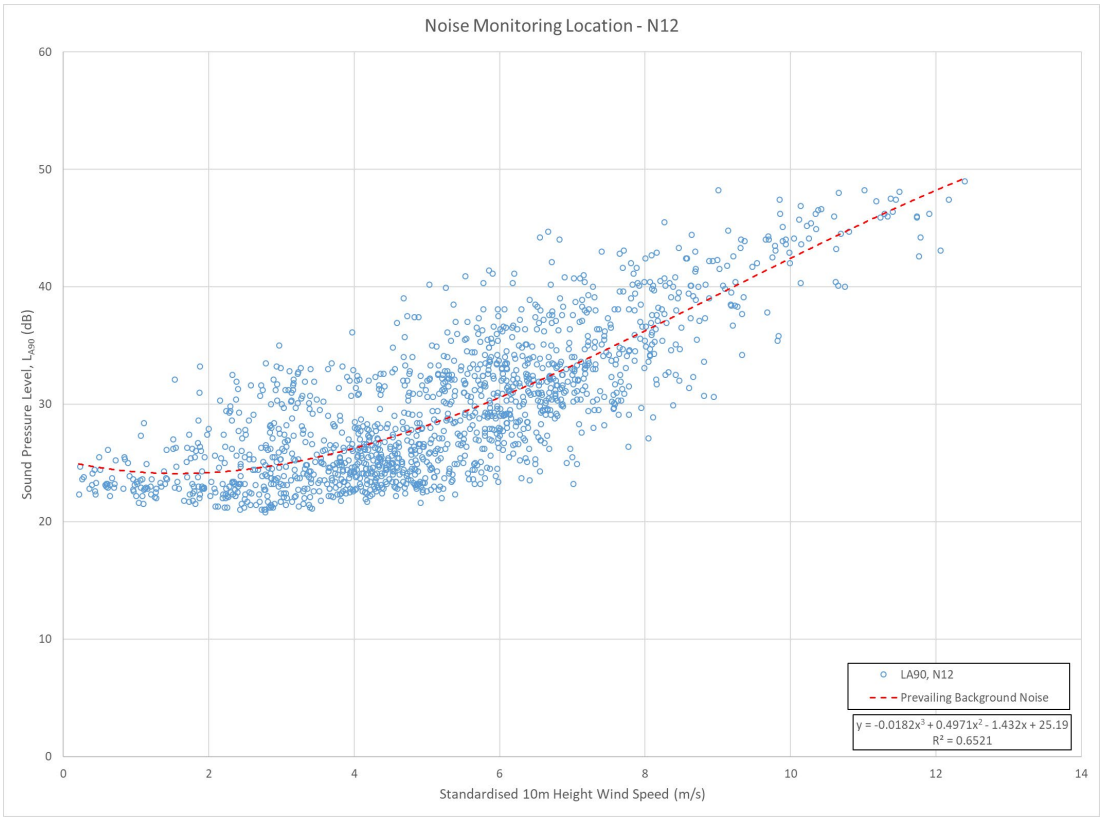

Figure A7.30: Prevailing Night-time Background (L_{A90}) Noise Levels at N12

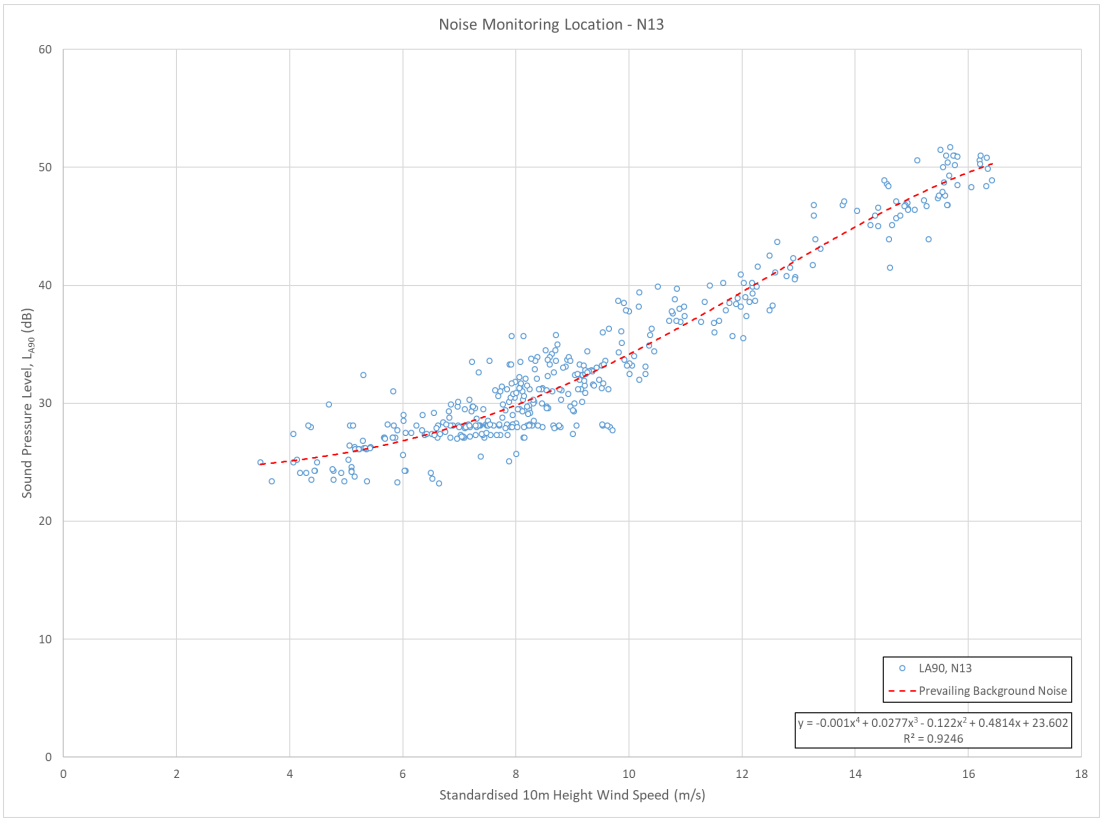

Figure A7.31: Prevailing Night-time Background (L_{A90}) Noise Levels at N13

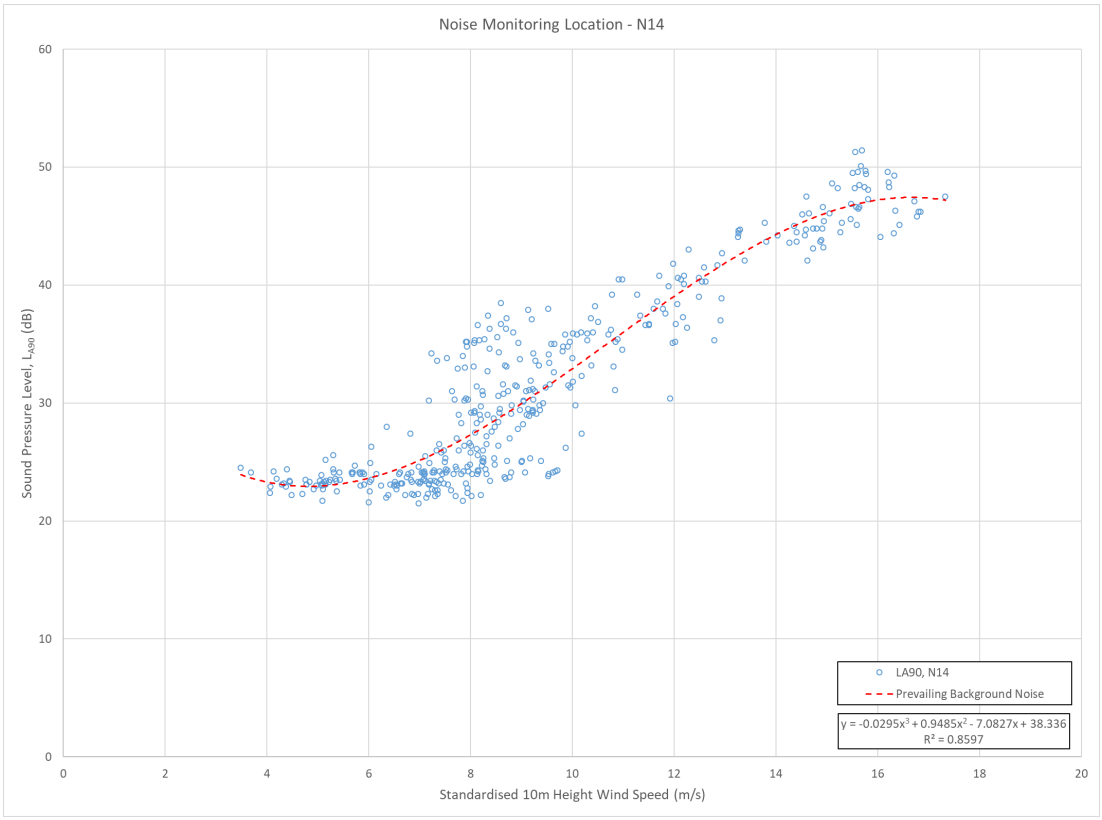

Figure A7.32: Prevailing Night-time Background (L_{A90}) Noise Levels at N14

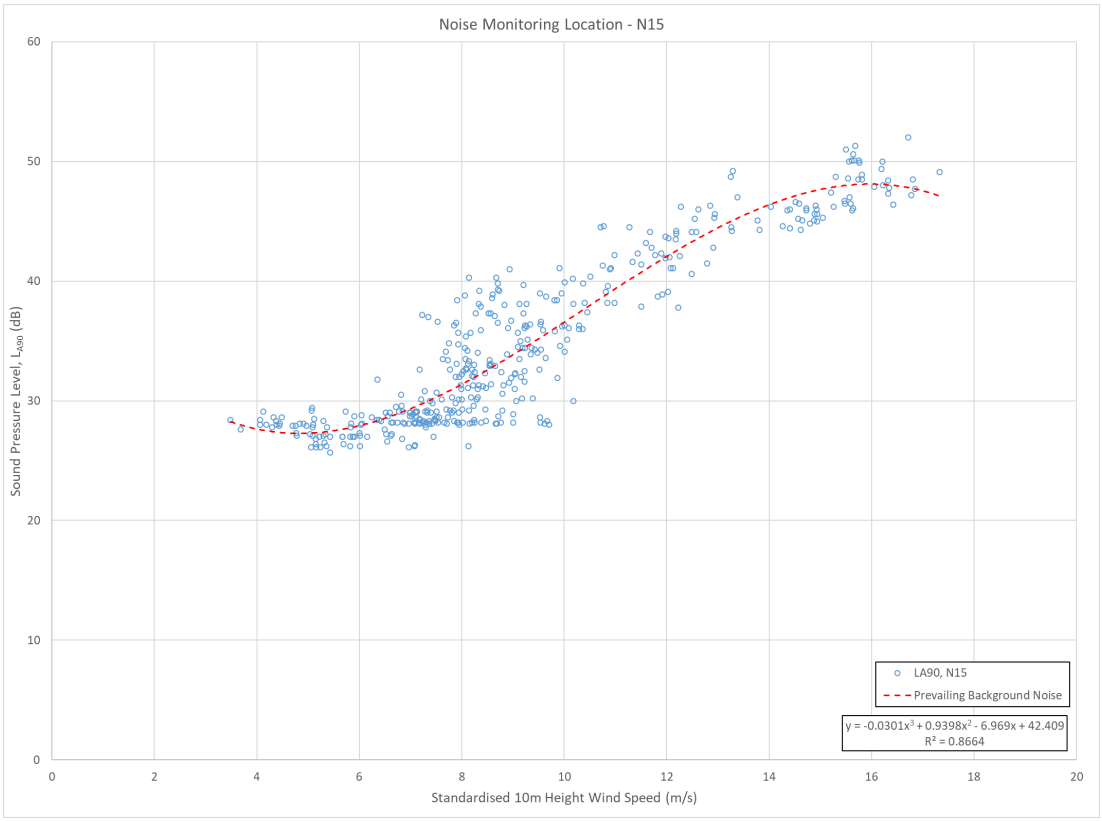

Figure A7.33: Prevailing Night-time Background (L_{A90}) Noise Levels at N15

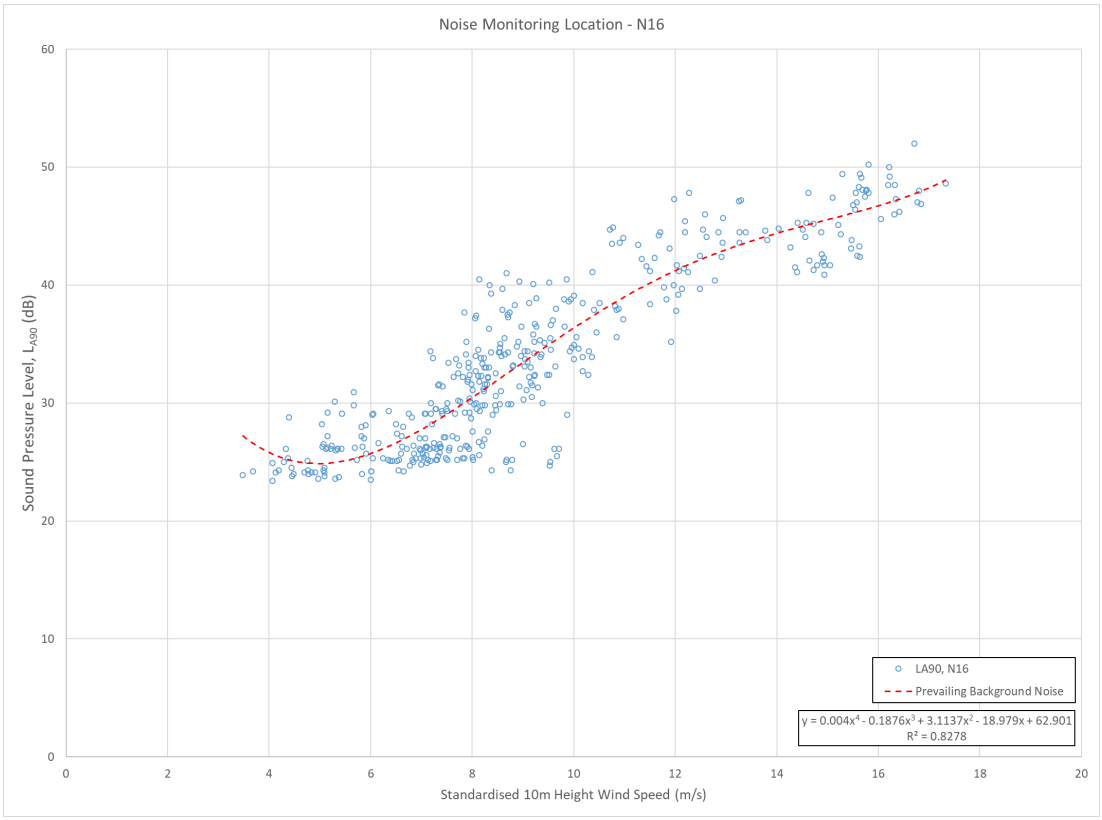

Figure A7.34: Prevailing Night-time Background (L_{A90}) Noise Levels at N16

Figure A7.35: Prevailing Night-time Background (L_{A90}) Noise Levels at N17

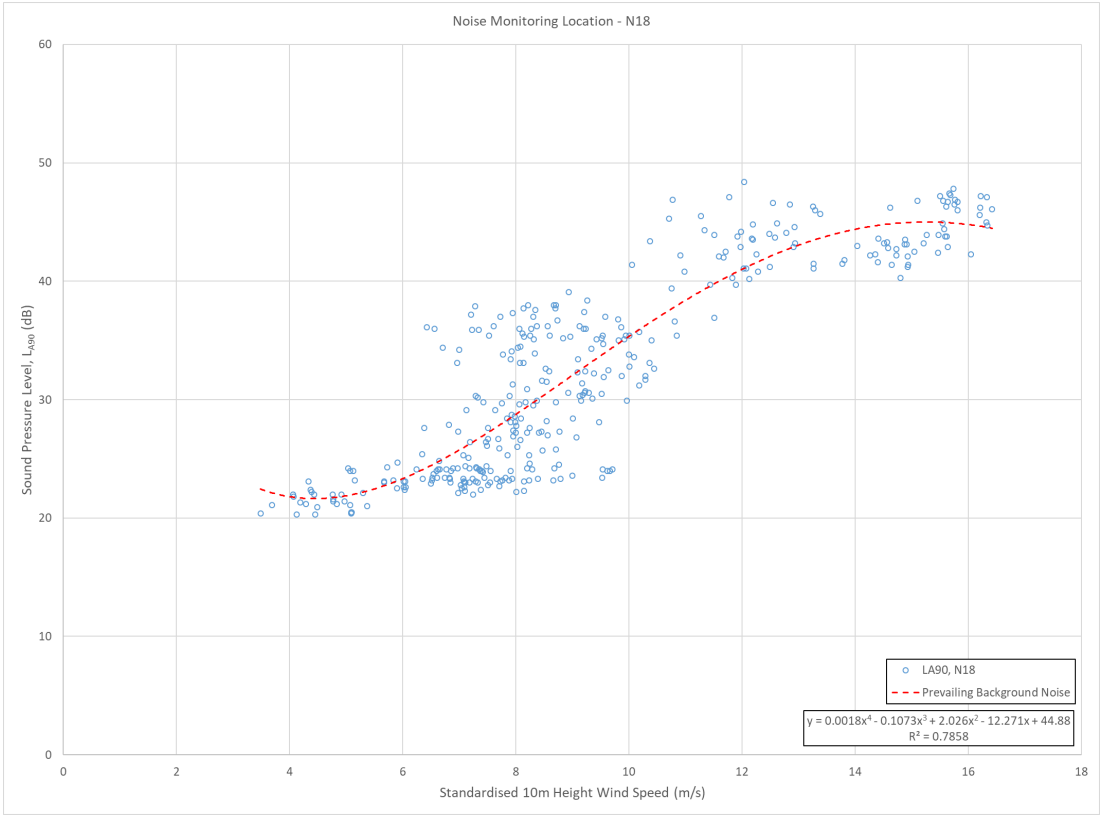

Figure A7.36: Prevailing Night-time Background (L_{A90}) Noise Levels at N18

The assumed prevailing noise levels at the 18 noise monitoring locations are presented in Table A7.1.7 and A7.1.8, for daytime and night-time periods, respectively.

Table A7.1.7: Prevailing Background Noise during Daytime Periods

Location	Prevailing Background Noise $L_{A90,10min}$ (dB) at 10 m Standardised wind speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
N1	24.8	25.7	27.3	29.3	31.5	34.0	36.3	38.5	38.5§	38.5§
N2	25.7*	25.7*	25.7	26.9	29.7	33.4	36.6	37.5	37.5§	37.5§
N3	23.9	25.7	28.3	31.7	35.7	40.1	44.9	50.0	50.0§	50.0§
N4	25.0	26.0	27.9	30.4	33.2	36.0	38.4	39.8	39.8§	39.8§
N5	27.5	28.9	30.8	33.1	35.7	38.3	40.8	43.0	43.0§	43.0§
N6	26.0	27.2	28.9	31.3	34.3	38.0	42.8	48.9	48.9§	48.9§
N7	24.2	25.5	27.1	29.2	31.9	35.6	40.2	46.1	46.1§	46.1§
N8	24.1	25.0	27.2	30.4	34.0	37.8	41.2	43.8	43.8§	43.8§
N9	28.8	30.5	31.7	32.8	33.8	34.8	36.0	37.5	39.4§	39.4§
N10	23.9	25.4	27.4	29.8	32.6	35.6	38.6	41.7	44.7§	44.7§
N11	29.8	30.7	31.4	32.3	33.6	35.4	38.1	41.8	46.8§	46.8§
N12	29.0	29.5	30.7	32.5	34.8	37.5	40.4	43.5	46.6§	46.6§
N13	27.5	28.8	29.7	30.6	31.6	32.8	34.3	36.2	38.4	40.8
N14	28.1*	28.1*	28.1	28.9	30.3	32.3	34.6	37.1	39.6	42.0

Location	Prevailing Background Noise $L_{A90,10min}$ (dB) at 10 m Standardised wind speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
N15	31.3*	31.3*	31.3	32.0	33.4	35.3	37.5	39.9	42.2	44.2
N16	28.9*	28.9*	28.9	29.7	31.4	33.5	36.0	38.6	41.0	43.0
N17	26.9	26.9	28.2	30.5	33.4	36.6	39.8	42.9	45.7	47.9
N18	23.8	24.3	25.6	27.5	29.9	32.6	35.3	37.9	40.3	42.2

* - lowest derived background noise level is adopted for all wind speeds below where this derived minimum occurs. For example, at monitoring location N2 the lowest derived background noise level occurs at a wind speed of 5 m/s. The trend line fitted to noise data showed a higher noise level at 3 and 4 m/s. Therefore, using this criterion, the noise level at 3 and 4 m/s has been assumed to be equal to that of the noise level at 5 m/s.

§ - noise level restricted to the highest derived point

Table A7.1.8: Prevailing Background Noise during Night-time Periods

Location	Prevailing Background Noise $L_{A90,10min}$ (dB) at 10 m Standardised wind speed (m/s)									
	3	4	5	6	7	8	9	10	11	12
N1	21.4	22.4	24.0	26.2	28.8	31.9	35.1	38.3	38.3§	38.3§
N2	19.2	20.0	21.4	23.5	26.4	30.1	34.4	39.2	39.2§	39.2§
N3	19.1	21.3	24.7	28.8	33.5	38.5	43.5	48.2	48.2§	48.2§
N4	19.0	20.7	22.9	25.6	28.6	32.1	35.9	40.1	40.1§	40.1§
N5	18.6	20.3	23.2	26.9	31.1	35.4	39.6	43.2	43.2§	43.2§
N6	21.1	21.8	23.4	26.1	30.1	35.0	40.5	45.8	45.8§	45.8§
N7	21.7	22.7	24.3	26.7	29.7	33.4	37.8	43.0	43§	43§
N8	22.7	23.4	24.7	26.8	29.6	33.2	37.5	42.7	42.7§	42.7§
N9	23.9	25.3	26.6	28.1	29.8	31.9	34.5	37.7	41.6	46.5
N10	22.0	23.5	25.6	28.4	31.8	35.7	39.9	44.1	48.2	51.6
N11	26.6	27.2	28.3	29.9	32.2	35.2	38.6	42.2	45.8	48.8
N12	24.9	26.3	28.2	30.6	33.3	36.2	39.3	42.4	45.4	48.1
N13	24.6	25.1	25.8	26.8	28.1	29.7	31.7	33.9	36.4	38.9
N14	22.9*	22.9*	22.9	23.6	25.1	27.3	29.9	32.9	35.9	39.0
N15	27.3*	27.3*	27.3	27.9	29.4	31.4	33.9	36.6	39.4	42.1
N16	24.9*	24.9*	24.9	25.8	27.9	30.7	33.8	36.9	39.8	42.3
N17	-	25.2*	25.2	25.3	27.8	31.5	35.7	39.5	42.7	45.0
N18	21.8*	21.8	21.9	23.3	25.8	28.8	32.1	35.5	38.6	41.3

* - lowest derived background noise level is adopted for all wind speeds below where this derived minimum occurs. For example, at monitoring location N2 the lowest derived background noise level occurs at a wind speed of 5 m/s. The trend line fitted to noise data showed a higher noise level at 3 and 4 m/s. Therefore, using this criterion, the noise level at 3 and 4 m/s has been assumed to be equal to that of the noise level at 5 m/s.

§ - noise level restricted to the highest derived point

APPENDIX 7.2

EQUIPMENT CALIBRATION CERTIFICATES

NSAI

National Metrology Laboratory

Certificate of Calibration

Issued to	Fehily Timoney & Company J5 Plaza North Park Business Park North Road Dublin 11
Attention of	John Mahon

Certificate Number	173660
Item Calibrated	Svantek SVAN 977 Sound Level Meter with ACO 7052E Microphone
Serial Number	34173 (SLM) and 54691 (Microphone)
Client ID Number	#3
Order Number	6308
Date Received	20 Oct 2017
NML Procedure Number	AP-NM-09

Method

The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).

Calibration Standards

Norsonic 1504A Calibration System incorporating:
SR DS360 Signal Generator, No. 0735 [Cal Due Date: 18 Nov 2017]
Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 07 Nov 2017]
B&K 4134 Measuring Microphone, No. 0742 [Cal Due Date: 18 Jan 2018]
B&K 4228 Pistonphone, No. 0741 [Cal Due Date: 08 Jan 2018]
B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 15 May 2018]

Calibrated by	David Fleming	Approved by	Paul Hetherington
Date of Calibration	31 Oct 2017	Date of Issue	01 Nov 2017

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

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NSAI
National Metrology Laboratory

Certificate of Calibration

Issued to	Fehily Timoney & Company J5 Plaza North Business Park North Road Dublin 11
Attention of	John Mahon

Certificate Number	180301
Item Calibrated	Svantek SVAN 977 Sound Level Meter with ACO 7052E Microphone
Serial Number	34875 (SLM) and 56430 (Microphone)
Client ID Number	#1
Order Number	6252
Date Received	24 Jan 2018
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters*. This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 21 Dec 2018] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 17 Nov 2018] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 28 Apr 2019] B&K 4228 Pistonphone, No. 0740 [Cal Due Date: 21 Mar 2019] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 15 May 2018]

Calibrated by	David Fleming	Approved by	Paul Hetherington
Date of Calibration	31 Jan 2018	Date of Issue	31 Jan 2018

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

NSAI
National Metrology Laboratory

Certificate of Calibration

Issued to	Fehily Timoney & Company J5 Plaza North Business Park North Road Dublin 11
Attention of	John Mahon

Certificate Number	180300
Item Calibrated	Svantek SVAN 977 Sound Level Meter with ACO 7052E Microphone
Serial Number	34876 (SLM) and 56429 (Microphone)
Client ID Number	#2
Order Number	6252
Date Received	24 Jan 2018
NML Procedure Number	AP-NM-09
Method	The above sound level meter was allowed to stabilise for a suitable period in laboratory conditions. It was then calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), *Periodic tests, specification for the verification of sound level meters.* This standard specifies a procedure for the periodic verification of conformance of a sound level meter or integrating-averaging meter to IEC 61672-1 (2003).
Calibration Standards	Norsonic 1504A Calibration System incorporating: SR DS360 Signal Generator, No. 0735 [Cal Due Date: 21 Dec 2018] Agilent 34401A Digital Multimeter, No. 0736 [Cal Due Date: 17 Nov 2018] B&K 4134 Measuring Microphone, No. 0743 [Cal Due Date: 28 Apr 2019] B&K 4228 Pistonphone, No. 0740 [Cal Due Date: 21 Mar 2019] B&K 4226 Acoustical Calibrator, No. 0150 [Cal Due Date: 15 May 2018]

Calibrated by	David Fleming	Approved by	Paul Hetherington
Date of Calibration	31 Jan 2018	Date of Issue	31 Jan 2018

CIPM MRA

This certificate is consistent with Calibration and Measurement Capabilities (CMC's) that are included in Appendix C of the Mutual Recognition Arrangement (MRA) drawn up by the International Committee for Weights and Measures. Under the MRA, all participating institutes recognize the validity of each other's calibration certificates and measurement reports for quantities, ranges and measurement uncertainties specified in Appendix C (for details see www.bipm.org)

Glas Naíon | Baile Átha Cliath 11 | Eire
Glasnevin | Dublin 11 | Ireland T+ 353 1 808 2609 | F+353 1 808 2603 | NSAI.ie

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200095

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69552

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69552
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	21.6	°C
Relative Humidity:	45	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	18.6
Microphone replaced by electrical input device fitted with short circuit	A	7.3
	C	7.3
	Z	12.6

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.5	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.8	-0.2	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.2	0.2	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.1	0.1	1.5	-1.5
125	95.0	95.1	0.1	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	95.1	0.1	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.0	0.0	1.1
	44.0	44.0	0.0	1.1
	39.0	39.0	0.0	1.1
	38.0	38.0	0.0	1.1
	37.0	37.0	0.0	1.1
	36.0	36.0	0.0	1.1
	35.0	35.0	0.0	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.9	-0.1	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.3	-0.1	1.4
Neg ½ cycle	500 Hz	137.4	137.3	-0.1	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	140.0		
Neg. ½ cycle at 4 kHz	140.0		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200096

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69556

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69556
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	22.5	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	21.2
Microphone replaced by electrical input device fitted with short circuit	A	8.7
	C	8.7
	Z	8.7

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.1	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	94.9	-0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	94.9	-0.1	1.5	-1.5
125	95.0	95.3	0.3	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.1	0.1	1.1
	135.0	135.1	0.1	1.1
	136.0	136.1	0.1	1.1
	137.0	137.1	0.1	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.1	0.1	1.1
	44.0	44.1	0.1	1.1
	43.0	43.2	0.2	1.1
	42.0	42.2	0.2	1.1
	41.0	41.2	0.2	1.1
	40.0	40.3	0.3	1.1
	39.0	39.4	0.4	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.2	-0.2	2.4
Pos ½ cycle	500 Hz	137.4	137.3	-0.1	1.4
Neg ½ cycle	500 Hz	137.4	137.3	-0.1	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	140.6		
Neg. ½ cycle at 4 kHz	140.7		
Level difference		-0.1	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200093

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69557

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69557
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	23.5	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	21.6
Microphone replaced by electrical input device fitted with short circuit	A	7.9
	C	7.9
	Z	7.9

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.2	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	94.9	-0.1	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.0	0.0	1.1
	44.0	44.0	0.0	1.1
	39.0	38.9	-0.1	1.1
	38.0	37.8	-0.2	1.1
	37.0	37.0	0.0	1.1
	36.0	36.0	0.0	1.1
	35.0	35.0	0.0	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.5	-0.1	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.4	0	1.4
Neg ½ cycle	500 Hz	137.4	137.4	0	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	139.5		
Neg. ½ cycle at 4 kHz	139.5		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Statement of Calibration

Issued to:	Calibration Reference
Fehily Timoney J5 Plaza North Park Business Park North Road Dublin 11	SLM200094

Test Date: 03/06/2020
Procedure: TP-SLM-1

Equipment

Item Calibrated:	Sound Level Meter	**Model**	977
Make:	Svantek	**Serial Number:**	69558

Calibration Procedure

The sound level meter was allowed to stabilize for a suitable period, as described in the manufacturer's instruction manual, in laboratory conditions. The sound level meter was calibrated by carrying out the verification tests detailed in IEC 61672-3 (2006), Periodic tests, specification of sound level meters. Tolerances for verification procedures are specified in IEC 61672-1 (2003).

Calibration Standards

Description	Serial Number
National Instruments PXI-4461	19C91D2
Stanford Research DS360	123803

The standards used in this calibration are traceable to NIST and/or other National Measurement Institutes (NMI's) that are signatories of the International Committee of Weights and Measures (CIPM) mutual recognition agreement (MRA).

Signed on behalf of Sonitus Systems:

SONITUS SYSTEMS

Calibration Report

Equipment Description

Model:	Svantek	**Serial Number:**	69558
Model:	977	**Microphone Model:**	ACO 7052E

Ambient Conditions

Measurement conditions were within the tolerances defined in IEC 61672-1 and IEC 60942.

Barometric Pressure:	1030	hPa
Temperature:	23.4	°C
Relative Humidity:	39	%

Results Summary

IEC 61672 Test #	Test Description	Result
10	Self-generated noise	-
11	Frequency weighting (acoustical)	PASS
12	Frequency weighting (electrical)	PASS
13	Frequency and time weighting (1kHz)	PASS
14	Level linearity on reference level range	PASS
15	Level linearity with level range control	-
16	Toneburst response	PASS
17	Peak C sound level	PASS
18	Overload indication	PASS

As public evidence was available, from a testing organization responsible for approving the results of pattern evaluation tests, to demonstrate that the model of sound level meter fully conformed to the requirements for pattern evaluation described in IEC 61672:2003, the sound level meter tested is considered to conform to all the Class 1 requirements of IEC 61672:2003.

The manufacturer's guidelines concerning appropriate set up for measurement under various conditions should be observed during usage.

Prior to carrying out the verification tests the sound level meter was adjusted to read correctly using the acoustic calibrator held by the testing lab (Cirrus CR511ES, Serial number: 60871). The calibration procedure is described in the manufacturer's instruction manual.

Self-generated noise - IEC 61672-3 Test #10
SLM Measuring Mode: Leq

SLM Configuration	Freq. Weighting Network	SLM Reading
Microphone Installed	A	18.8
Microphone replaced by electrical input device fitted with short circuit	A	10.6
	C	10.6
	Z	10.6

Acoustical signal test of a frequency weighting - IEC 61672-3 Test #11
Range: reference level range
Frequency Weighting: C
Time Weighting: Slow

Input	Freq	Expected Level	Deviation	Tol +/-
94 dB	1000 Hz	94.0	0.0	1.0
	125 Hz	93.7	0.2	1.0
	4000 Hz	92.3	0.5	1.0

The frequency response was tested using an electrostatic actuator. Appropriate correction factors were applied where available from the manufacturer's instruction manual.

Electrical tests of frequency weighting - IEC 61672-3 Test #12
Range: reference level range

A-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	94.9	-0.1	1.5	-1.5
250	95.0	94.9	-0.1	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

C-weighting

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.4	0.4	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.1	0.1	1.6	-1.6
4000	95.0	95.1	0.1	1.6	-1.6
8000	95.0	95.1	0.1	2.1	-3.1
16000	95.0	94.7	-0.3	3.5	-17.0

Linear

Freq	Expected Level	SLM Reading	Deviation	Tol +	Tol -
63	95.0	95.0	0.0	1.5	-1.5
125	95.0	95.0	0.0	1.5	-1.5
250	95.0	95.0	0.0	1.4	-1.4
500	95.0	95.0	0.0	1.4	-1.4
1000	95.0	95.0	0.0	1.1	-1.1
2000	95.0	95.0	0.0	1.6	-1.6
4000	95.0	95.0	0.0	1.6	-1.6
8000	95.0	95.0	0.0	2.1	-3.1
16000	95.0	95.0	0.0	3.5	-17.0

Frequency and Time Weightings at 1 kHz IEC 61672-3 Test #13
Range: reference level range

Time Weighting	Freq. Weighting	Expected Level	Deviation	Tol +/-
Fast	A	94.0	ref	
	C	94.0	0.0	0.2
Slow	A	94.0	0.0	0.2
LEQ	A	94.0	0.0	0.2

Linearity level on reference range - IEC 61672-3 Test #14
Input frequency: 8 kHz
SLM Measuring Mode: SPL

Range	Expected Level	SLM Reading	Deviation	Tol +/-
123 dB	94.0	94.0	0.0	1.1
	99.0	99.0	0.0	1.1
	104.0	104.0	0.0	1.1
	109.0	109.0	0.0	1.1
	114.0	114.0	0.0	1.1
	119.0	119.0	0.0	1.1
	124.0	124.0	0.0	1.1
	129.0	129.0	0.0	1.1
	134.0	134.0	0.0	1.1
	135.0	135.0	0.0	1.1
	136.0	136.0	0.0	1.1
	137.0	137.0	0.0	1.1
	89.0	89.0	0.0	1.1
	84.0	84.0	0.0	1.1
	79.0	79.0	0.0	1.1
	74.0	74.0	0.0	1.1
	69.0	69.0	0.0	1.1
	64.0	64.0	0.0	1.1
	59.0	59.0	0.0	1.1
	54.0	54.0	0.0	1.1
	49.0	49.1	0.1	1.1
	44.0	44.1	0.1	1.1
	39.0	39.1	0.1	1.1
	38.0	38.1	0.1	1.1
	37.0	37.2	0.2	1.1
	36.0	36.2	0.2	1.1
	35.0	35.3	0.3	1.1

Toneburst response - IEC 61672-3 Test #16
Range: reference level range

Burst Type	Response	Expected Level	SLM Reading	Deviation	Tol +	Tol -
0.25 ms	LAF_{MAX}	111.0	110.8	-0.2	0.8	-0.8
2.0 ms	LAF_{MAX}	120.0	119.9	-0.1	1.3	-1.3
200 ms	LAF_{MAX}	137.0	137.0	0.0	1.3	-3.3
2.0 ms	LAS_{MAX}	111.0	111.3	0.3	0.8	-0.8
200 ms	LAS_{MAX}	130.6	130.6	0.0	1.3	-3.3

Peak C sound level - IEC 61672-3 Test #17
Range: reference level range

Pulse Type	Freq	Expected Level	SLM Reading	Deviation	Tol +/-
1 cycle	8 kHz	135.4	135.3	-0.1	2.4
Pos ½ cycle	500 Hz	137.4	137.4	0	1.4
Neg ½ cycle	500 Hz	137.4	137.4	0	1.4

Overload indication IEC 61672-3 Test #18

Test Description	Overload at	Meas. Diff. (Pos – Neg)	Tol +/-
Pos. ½ cycle at 4 kHz	142.5		
Neg. ½ cycle at 4 kHz	142.5		
Level difference		0.0	1.8

Calibration Notes

1. The manufacturer's instruction manual was accessed through the manufacturer's website.
2. The sound level meter was powered by a regulated 9V power supply provided by the testing laboratory.

Brüel & Kjær

The Calibration Laboratory
Skodsborgvej 307, DK-2850 Nærum, Denmark

ilac-MRA DANAK CAL Reg.nr. 307

CERTIFICATE OF CALIBRATION

No: CDK1802543

CALIBRATION OF

Sound Level Meter:	Brüel & Kjær Type 2238	No: 2590900 Id: -
Microphone:	Brüel & Kjær Type 4188	No: 1773652

CUSTOMER

Enfonic Ltd
Charlestown Centre
Dublin
D11 KXC7
Ireland

CALIBRATION CONDITIONS

Preconditioning: 4 hours at 23°C ± 3°C

Environment conditions: Pressure: 101,3kPa ± 3kPa. Humidity: 25% - 70% RH. Temperature: 23°C ± 3°C.

SPECIFICATIONS

The Sound Level Meter Brüel & Kjær Type 2238 has been calibrated in accordance with the requirements as specified in IEC 60651 and 60804 type 1. The accreditation assures the traceability to the international units system SI.

PROCEDURE

The measurements have been performed with the assistance of Brüel & Kjær Sound Level Meter Calibration System 3630 with application software type 7763 (version 5.0 - DB: 5.00) by using procedure 2238-4188-BZ7125.

RESULTS

Calibration Mode: **Calibration as received.**

The reported expanded uncertainty is based on the standard uncertainty multiplied by a coverage factor $k = 2$ providing a level of confidence of approximately 95 %. The uncertainty evaluation has been carried out in accordance with EA-4/02 from elements originating from the standards, calibration method, effect of environmental conditions and any short time contribution from the device under calibration.

Date of calibration: 2018-04-04

Date of issue: 2018-04-04

M. Önder

Mikail Önder
Calibration Technician

Erik Bruus
Approved Signatory

APPENDIX 7.3

DERIVED WIND FARM NOISE LIMITS DRAFT REVISED WIND ENERGY DEVELOPMENT GUIDELINES

The proposed development was assessed against the 'Wind Energy Development Guidelines' (2006) as these guidelines are currently in-force. However, the proposed development was also assessed against the 'Draft Revised Wind Energy Development Guidelines' (December 2019). The proposed amendments to the Wind Energy Development Guidelines 2006 were out to public consultation until the 19th February 2020 and may be subject to further revision. The Draft Guidelines states…

> *Relative rated noise levels (LA rated, 10min) resulting from wind energy development and taking into account the cumulative impact of noise levels resulting from other existing and approved wind energy developments shall not exceed:*
>
> > *(1) Background noise levels by more than 5 dB(A) within the range 35-43 dB(A), or*
> > *(2) 43 dB(A).*
> > *both measured as $L_{90,10\ min}$ outdoors at specified noise sensitive locations.*

Table A7.6 presents the noise limits derived in accordance with the Draft Revised Wind Energy Development Guidelines.

Table 7.1: Derived Noise Limits – Draft Revised Wind Energy Development Guidelines

Location	Period	Prevailing Background Noise $L_{A90,10min}$ (dB) at 10 m Standardised wind speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
N1	Daytime	36.4	37.4	39.0	41.2	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	36.2	38.8	41.9	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	36.9	40.1	43.0	43.0	43.0
N2	Daytime	35.0	35.0	36.4	38.5	41.4	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	35.0	36.4	40.1	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	35.1	39.4	43.0	43.0	43.0
N3	Daytime	35.0	36.3	39.7	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	38.8	43.0	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	38.5	43.0	43.0	43.0	43.0	43.0
N4	Daytime	35.0	35.7	37.9	40.6	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	35.6	38.6	42.1	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	37.1	40.9	43.0	43.0	43.0
N5	Daytime	35.0	35.3	38.2	41.9	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	36.9	41.1	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	36.1	40.4	43.0	43.0	43.0	43.0
N6	Daytime	36.1	36.8	38.4	41.1	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	36.1	40.1	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.1	40.0	43.0	43.0	43.0	43.0
N7	Daytime	36.7	37.7	39.3	41.7	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	36.7	39.7	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	38.4	42.8	43.0	43.0	43.0
N8	Daytime	37.7	38.4	39.7	41.8	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	36.8	39.6	43.0	43.0	43.0	43.0	43.0

Location	Period	Prevailing Background Noise $L_{A90,10min}$ (dB) at 10 m Standardised wind speed (m/s)									
		3	4	5	6	7	8	9	10	11	12
	Night-time	35.0	35.0	35.0	35.0	35.0	38.2	42.5	43.0	43.0	43.0
N9	Daytime	38.9	40.3	41.6	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.3	36.6	38.1	39.8	41.9	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	36.9	39.5	42.7	43.0	43.0
N10	Daytime	37.0	38.5	40.6	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.6	38.4	41.8	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	36.8	40.7	43.0	43.0	43.0	43.0
N11	Daytime	41.6	42.2	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	36.6	37.2	38.3	39.9	42.2	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	37.2	40.2	43.0	43.0	43.0	43.0
N12	Daytime	39.9	41.3	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	36.3	38.2	40.6	43.0	43.0	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.6	38.3	41.2	43.0	43.0	43.0	43.0
N13	Daytime	39.6	40.1	40.8	41.8	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.1	35.8	36.8	38.1	39.7	41.7	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	35.0	36.7	38.9	41.4	43.0
N14	Daytime	37.9	37.9	37.9	38.6	40.1	42.3	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	35.0	35.1	37.3	39.9	42.9	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	35.0	35.0	37.9	40.9	43.0
N15	Daytime	42.3	42.3	42.3	42.9	43.0	43.0	43.0	43.0	43.0	43.0
	Evening	37.3	37.3	37.3	37.9	39.4	41.4	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	36.4	38.9	41.6	43.0	43.0
N16	Daytime	39.9	39.9	39.9	40.8	42.9	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	35.8	37.9	40.7	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	35.7	38.8	41.9	43.0	43.0
N17	Daytime	-	40.2	40.2	40.3	42.8	43.0	43.0	43.0	43.0	43.0
	Evening	-	35.2	35.2	35.3	37.8	41.5	43.0	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	36.5	40.7	43.0	43.0	43.0
N18	Daytime	36.8	36.8	36.9	38.3	40.8	43.0	43.0	43.0	43.0	43.0
	Evening	35.0	35.0	35.0	35.0	35.8	38.8	42.1	43.0	43.0	43.0
	Night-time	35.0	35.0	35.0	35.0	35.0	35.0	37.1	40.5	43.0	43.0

APPENDIX 7.4

NOISE SENSITIVE LOCATIONS

Table A7.4.1: Noise Sensitive Location Details

Receptor ID	Description	Easting	Northing
R1	Residential	561722.9	589775.1
R2	Residential & Commercial	562257.8	591325.8
R3	Residential	562324.1	591239.5
R4	Residential	562423.5	591222.8
R5	Residential	562487.5	591142.9
R8	Residential & Commercial	562645.3	592349.2
R9	Residential & Commercial	562658.3	591236.6
R10	Residential	562691.5	591116.3
R11	Residential	562702.8	592402.5
R12	Residential	562708.9	592666.0
R13	Residential	562719.7	591654.7
R15	Residential	562741.8	591679.1
R16	Residential	562743.3	591728.3
R17	Residential & Commercial	562758.4	592200.2
R18	Residential	562757.3	592463.6
R19	Residential	562782.2	592330.3
R20	Residential	562790.8	591860.3
R21	Residential & Commercial	562802.4	592306.6
R23	Residential & Commercial	563037.7	593014.5
R24	Residential	563062.4	591901.8
R25	Residential & Commercial	563076.8	591949.0
R26	Residential & Commercial	563103.7	593033.0
R27	Residential	563112.9	591916.2
R29	Residential	563184.9	593128.7
R30	Residential	563243.8	593208.2
R32	Residential	563282.3	593241.5
R34	Residential	563344.6	593889.5
R35	Residential	563382.8	593754.8
R36	Residential	563422.2	588599.9
R38	Residential	563461.2	593669.0
R40	Residential	563651.1	593522.3
R43	Residential	564133.0	593542.8
R51	Residential	565083.9	593595.8
R52	Residential	565162.7	593480.0
R55	Residential & Commercial	565232.9	590376.7
R56	Residential & Commercial	565351.5	590232.5
R58	Residential & Commercial	565397.1	590294.4

Receptor ID	Description	Easting	Northing
R60	Residential	565473.5	590144.1
R70	Residential & Commercial	565906.9	591765.8
R71	Residential	565933.3	591717.1
R72	Residential & Commercial	565942.8	592154.1
R73	Residential	565958.7	591463.6
R74	Residential	565981.0	591721.0
R75	Residential & Commercial	566055.2	591683.3
R77	Residential	566087.0	591651.4
R78	Residential	566094.0	591601.5
R81	Residential & Commercial	566180.8	591343.8
R82	Residential	566193.9	591574.2
R83	Residential	566271.2	594014.9
R84	Residential & Commercial	566572.8	593358.4
R85	Residential	566527.8	591414.3
R86	Residential	566592.3	593713.2
R88	Residential & Commercial	566730.9	593589.1
R89	Residential & Commercial	566833.3	593468.4
R91	Residential & Commercial	566908.9	593346.8
R92	Residential	567036.7	593359.1
R93	Residential	567074.9	593098.8
R94	Residential	567094.0	593331.0
R95	Residential & Commercial	567127.5	591935.8
R96	Residential & Commercial	567165.3	593217.3
R98	Residential & Commercial	567248.7	590976.6
R100	Residential & Commercial	567300.3	590989.7
R101	Residential	567308.5	593211.8
R103	Residential & Commercial	567513.9	592487.3
R104	Residential & Commercial	567515.8	591937.9
R105	Residential & Commercial	567653.7	591291.0
R106	Residential	567654.4	591286.1
R107	Residential & Commercial	567850.5	592457.9
R108	Residential	567970.3	590816.0
R114	Residential	568649.0	590643.8
R116	Residential	568835.0	590841.7
R117	Residential & Commercial	568941.3	590914.0
R118	Residential & Commercial	568945.8	591427.4
R119	Residential & Commercial	569009.0	590851.2
R120	Residential & Commercial	569041.3	590809.1
R121	Residential & Commercial	569050.2	593133.5

Receptor ID	Description	Easting	Northing
R122	Residential	569498.7	593070.7
R125	Residential & Commercial	569918.9	593140.4
R142	Residential	571134.9	593124.3
R146	Residential	562810.1	588460.1
R147	Residential & Commercial	562501.3	588608.4
R148	Residential & Commercial	561852.2	591586.0
R149	Residential & Commercial	562126.3	591596.3
R151	Residential & Commercial	561557.3	590786.3
R152	Residential	562154.7	591391.0
R153	Residential	561420.0	590644.5
R154	Residential	561849.0	590666.0
R156	Residential	563441.4	588256.0
R163	Residential	562108.1	592442.4
R164	Residential	562243.7	592493.3
R165	Residential	561689.6	591757.0
R170	Residential	562311.5	592840.2
R171	Residential	562142.1	592489.3
R175	Residential	562347.4	592810.1
R178	Residential	561749.8	591584.3
R180	Residential & Commercial	564499.4	588354.2
R181	Residential & Commercial	564421.6	588401.9
R182	Residential	564262.0	588442.8
R185	Residential & Commercial	565378.2	588966.4
R187	Residential	566894.7	591970.1
R190	Residential	565815.7	589459.1
R191	Residential & Commercial	565827.8	589535.5
R194	Residential & Commercial	567086.0	590936.6
R195	Residential	566854.2	591080.7
R196	Residential & Commercial	566672.8	591247.4
R197	Residential	566756.9	591924.2
R198	Residential	566847.4	591975.7
R199	Residential & Commercial	566883.9	591935.2

APPENDIX 7.5

NOISE PREDICTIONS – VALLEY CORRECTION

Table 7.5.1 presents the valley correction for each wind turbine / noise sensitive location combination. The numbering is not sequential as only the noise sensitive locations within the 35 dB L_{A90} noise contour are presented. Commercial receptors, derelict and uninhabited dwellings were not considered.

Table 7.5.1: Valley correction for each wind turbine / noise sensitive location combination

Location ID	Description	Turbine ID and Valley Correction																				
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R1	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R2	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R3	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R4	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R5	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R8	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R9	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R10	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R11	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R12	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R13	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R15	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R16	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R17	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R18	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R19	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R20	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R21	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R23	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0

Location ID	Description	Turbine ID and Valley Correction																					
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R24	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R25	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R26	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R27	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R29	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R30	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R32	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R34	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0
R35	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
R36	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R38	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R40	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R43	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R51	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R52	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R55	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3
R56	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R58	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R60	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R70	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R71	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0

Location ID	Description	Turbine ID and Valley Correction																					
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R72	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R73	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R74	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R75	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R77	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R78	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R81	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	0
R82	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R83	Residential	3	3	3	3	3	3	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0
R84	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R85	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R86	Residential	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R88	Residential & Commercial	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R89	Residential & Commercial	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R91	Residential & Commercial	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R92	Residential	3	3	3	3	3	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0
R93	Residential	3	0	0	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R94	Residential	3	3	3	3	3	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0
R95	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0

Location ID	Description	Turbine ID and Valley Correction																					
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R96	Residential & Commercial	3	0	3	3	3	3	0	3	0	0	0	0	3	0	0	0	0	0	0	0	0	0
R98	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R100	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R101	Residential	3	3	3	3	3	3	3	3	3	0	0	3	3	3	0	0	0	0	0	0	0	0
R103	Residential & Commercial	3	0	3	3	3	3	0	0	0	0	0	0	3	3	0	0	0	0	0	0	0	0
R104	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	0
R105	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R106	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R107	Residential & Commercial	3	0	3	3	3	3	3	3	0	0	0	0	3	3	0	0	0	0	0	0	3	0
R108	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R114	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R116	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R117	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	3	0
R118	Residential & Commercial	3	0	0	3	0	0	0	0	0	0	0	0	3	3	0	0	0	0	3	3	3	0
R119	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	3	0
R120	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	3	3	3	0
R121	Residential & Commercial	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0

Location ID	Description	Turbine ID and Valley Correction																					
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R122	Residential	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0
R125	Residential & Commercial	3	3	3	3	3	3	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0
R142	Residential	3	3	3	3	3	3	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
R146	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R147	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R148	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R149	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R151	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R152	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R153	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R154	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R156	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3
R163	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R164	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R165	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R170	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R171	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R175	Residential	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R178	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R180	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	3	3	3	3
R181	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	3	3	3	3	3	3	3

Location ID	Description	Turbine ID and Valley Correction																					
		T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16	T17	T18	T19	T20	T21	T22	T23
R182	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3	3	3
R185	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3
R187	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R190	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R191	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	3
R194	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R195	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	3	0
R196	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R197	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R198	Residential	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0
R199	Residential & Commercial	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	0

APPENDIX 7.6

PREDICTED NOISE LEVELS FROM COOM ENERGY WIND PARK AT NEARBY NOISE SENSITIVE LOCATIONS

Table 7.6.1 presents the predicted noise levels (L_{A90}) from wind turbines for the proposed Coom Green Energy Park at noise sensitive locations for Standardised 10m height wind speeds from 3 m/s to 9 m/s. The numbering is not sequential as only the noise sensitive locations within the 35 dB L_{A90} noise contour are presented. Commercial receptors, derelict and uninhabited dwellings were not considered.

Table 7.6.1: Predicted noise levels (L_{A90}) from Coom Green Energy Park at noise sensitive locations for Standardised 10m Wind speeds from 3 m/s to 9 m/s

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R1	Residential	21.5	28.8	34.2	36.6	37.3	37.3	37.4	37.4
R2	Residential & Commercial	22.4	29.6	34.9	37.3	38.0	38.0	38.1	38.1
R3	Residential	23.0	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R4	Residential	23.5	30.7	36.1	38.5	39.2	39.2	39.3	39.3
R5	Residential	24.1	31.3	36.7	39.1	39.8	39.8	39.9	39.9
R8	Residential & Commercial	22.3	29.2	34.5	36.9	37.6	37.6	37.7	37.7
R9	Residential & Commercial	24.7	31.9	37.3	39.7	40.4	40.4	40.5	40.5
R10	Residential	25.2	32.5	37.8	40.2	40.9	40.9	41.0	41.0
R11	Residential	22.5	29.4	34.7	37.1	37.8	37.8	37.9	37.9
R12	Residential	22.0	28.7	34.0	36.4	37.1	37.1	37.2	37.2
R13	Residential	24.1	31.2	36.6	39.0	39.7	39.7	39.8	39.8
R15	Residential	24.2	31.4	36.7	39.1	39.8	39.8	39.9	39.9
R16	Residential	24.1	31.2	36.6	39.0	39.7	39.7	39.8	39.8
R17	Residential & Commercial	23.2	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R18	Residential	22.7	29.5	34.8	37.2	37.9	37.9	38.0	38.0
R19	Residential	23.1	30.0	35.3	37.7	38.4	38.4	38.5	38.5
R20	Residential	24.1	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R21	Residential & Commercial	23.2	30.2	35.5	37.9	38.6	38.6	38.7	38.7

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R23	Residential & Commercial	24.2	29.9	34.9	37.3	38.0	38.0	38.1	38.1
R24	Residential	26.2	33.0	38.3	40.7	41.4	41.4	41.5	41.5
R25	Residential & Commercial	26.2	33.0	38.3	40.6	41.3	41.3	41.4	41.4
R26	Residential & Commercial	24.6	30.2	35.2	37.6	38.3	38.3	38.4	38.4
R27	Residential	26.5	33.3	38.6	41.0	41.7	41.7	41.8	41.8
R29	Residential	23.4	30.0	35.2	37.6	38.3	38.3	38.4	38.4
R30	Residential	23.5	29.9	35.2	37.5	38.2	38.2	38.3	38.3
R32	Residential	23.6	30.0	35.2	37.5	38.2	38.2	38.3	38.3
R34	Residential	20.9	26.8	31.9	34.3	35.0	35.0	35.1	35.1
R35	Residential	21.7	27.6	32.8	35.1	35.8	35.8	35.9	35.9
R36	Residential	22.8	30.0	35.4	37.8	38.5	38.5	38.6	38.6
R38	Residential	22.4	28.4	33.5	35.9	36.6	36.6	36.7	36.7
R40	Residential	24.1	30.0	35.1	37.5	38.2	38.2	38.3	38.3
R43	Residential	29.1	32.6	36.8	38.9	39.6	39.6	39.7	39.7
R51	Residential	25.3	30.8	35.8	38.1	38.8	38.8	38.9	38.9
R52	Residential	25.7	31.4	36.5	38.8	39.5	39.5	39.6	39.6
R55	Residential & Commercial	25.4	32.4	37.8	40.2	40.9	40.9	41.0	41.0
R56	Residential & Commercial	24.2	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R58	Residential & Commercial	24.1	31.1	36.4	38.8	39.5	39.5	39.6	39.6
R60	Residential	22.9	30.1	35.5	37.9	38.6	38.6	38.7	38.7
R70	Residential & Commercial	24.2	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R71	Residential	24.0	31.0	36.3	38.7	39.4	39.4	39.5	39.5
R72	Residential & Commercial	24.4	31.3	36.7	39.0	39.7	39.7	39.8	39.8

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R73	Residential	23.6	30.6	35.9	38.3	39.0	39.0	39.1	39.1
R74	Residential	23.7	30.7	36.0	38.4	39.1	39.1	39.2	39.2
R75	Residential & Commercial	23.3	30.3	35.6	38.0	38.7	38.7	38.8	38.8
R77	Residential	23.1	30.1	35.4	37.8	38.5	38.5	38.6	38.6
R78	Residential	23.0	30.0	35.3	37.7	38.4	38.4	38.5	38.5
R81	Residential & Commercial	23.0	29.6	34.8	37.2	37.9	37.9	38.0	38.0
R82	Residential	22.5	29.5	34.8	37.2	37.9	37.9	38.0	38.0
R83	Residential	20.8	27.4	32.6	35.0	35.7	35.7	35.8	35.8
R84	Residential & Commercial	21.8	28.6	33.8	36.2	36.9	36.9	37.0	37.0
R85	Residential	21.3	28.2	33.5	35.9	36.6	36.6	36.7	36.7
R86	Residential	21.7	28.5	33.8	36.2	36.9	36.9	37.0	37.0
R88	Residential & Commercial	22.2	29.1	34.4	36.8	37.5	37.5	37.6	37.6
R89	Residential & Commercial	22.6	29.6	34.9	37.3	38.0	38.0	38.1	38.1
R91	Residential & Commercial	22.8	29.8	35.1	37.5	38.2	38.2	38.3	38.3
R92	Residential	23.6	30.7	36.1	38.4	39.1	39.1	39.2	39.2
R93	Residential	23.1	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R94	Residential	24.2	31.1	36.4	38.8	39.4	39.4	39.5	39.5
R95	Residential & Commercial	21.9	29.0	34.3	36.7	37.4	37.4	37.5	37.5
R96	Residential & Commercial	24.3	31.2	36.5	38.8	39.5	39.5	39.6	39.6
R98	Residential & Commercial	20.2	27.2	32.5	34.9	35.6	35.6	35.7	35.7
R100	Residential & Commercial	20.3	27.3	32.6	35.0	35.7	35.7	35.8	35.8
R101	Residential	25.2	32.2	37.5	39.9	40.6	40.6	40.7	40.7
R103	Residential & Commercial	24.2	31.1	36.5	38.9	39.6	39.6	39.7	39.7

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R104	Residential & Commercial	23.9	30.9	36.2	38.6	39.3	39.3	39.4	39.4
R105	Residential & Commercial	23.0	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R106	Residential	23.0	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R107	Residential & Commercial	26.0	33.2	38.5	40.9	41.6	41.6	41.7	41.7
R108	Residential	21.0	28.1	33.4	35.8	36.5	36.5	36.6	36.6
R114	Residential	19.8	26.6	31.9	34.3	35.0	35.0	35.1	35.1
R116	Residential	20.5	27.3	32.6	35.0	35.7	35.7	35.8	35.8
R117	Residential & Commercial	20.7	27.5	32.8	35.2	35.9	35.9	36.0	36.0
R118	Residential & Commercial	23.7	30.7	36.1	38.5	39.2	39.2	39.3	39.3
R119	Residential & Commercial	20.1	26.8	32.1	34.5	35.2	35.2	35.3	35.3
R120	Residential & Commercial	19.7	26.5	31.7	34.1	34.8	34.8	34.9	34.9
R121	Residential & Commercial	26.4	33.5	38.8	41.2	41.9	41.9	42.0	42.0
R122	Residential	24.6	31.2	36.5	38.8	39.5	39.5	39.6	39.6
R125	Residential & Commercial	26.3	31.0	35.8	38.0	38.7	38.7	38.8	38.8
R142	Residential	28.8	29.7	31.8	33.2	33.7	33.7	33.8	33.8
R146	Residential	20.8	28.1	33.4	35.8	36.5	36.5	36.6	36.6
R147	Residential & Commercial	20.7	28.0	33.4	35.8	36.5	36.5	36.6	36.6
R148	Residential & Commercial	19.9	27.0	32.3	34.7	35.4	35.4	35.5	35.5
R149	Residential & Commercial	21.1	28.2	33.5	35.9	36.6	36.6	36.7	36.7
R151	Residential & Commercial	20.2	27.3	32.7	35.1	35.8	35.8	35.9	35.9
R152	Residential	21.7	28.9	34.2	36.6	37.3	37.3	37.4	37.4
R153	Residential	19.6	26.8	32.1	34.5	35.2	35.2	35.3	35.3
R154	Residential	22.4	29.7	35.1	37.5	38.2	38.2	38.3	38.3

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R156	Residential	20.1	27.4	32.7	35.1	35.8	35.8	35.9	35.9
R163	Residential	19.8	26.7	32.0	34.4	35.1	35.1	35.1	35.1
R164	Residential	20.3	27.1	32.4	34.8	35.5	35.5	35.6	35.6
R165	Residential	19.5	26.6	31.9	34.3	35.0	35.0	35.1	35.1
R170	Residential	19.9	26.6	31.8	34.2	34.9	34.9	35.0	35.0
R171	Residential	19.9	26.7	32.0	34.4	35.1	35.1	35.2	35.2
R175	Residential	20.1	26.8	32.1	34.5	35.1	35.1	35.2	35.2
R178	Residential	19.5	26.5	31.8	34.2	34.9	34.9	35.0	35.0
R180	Residential & Commercial	19.6	26.6	31.9	34.3	35.0	35.0	35.1	35.1
R181	Residential & Commercial	20.0	27.0	32.4	34.8	35.5	35.5	35.6	35.6
R182	Residential	20.3	27.5	32.9	35.3	36.0	36.0	36.1	36.1
R185	Residential & Commercial	19.3	26.5	31.8	34.2	34.9	34.9	35.0	35.0
R187	Residential	21.8	28.8	34.1	36.5	37.2	37.2	37.3	37.3
R190	Residential	19.4	26.5	31.9	34.2	34.9	34.9	35.0	35.0
R191	Residential & Commercial	19.6	26.7	32.0	34.4	35.1	35.1	35.2	35.2
R194	Residential & Commercial	19.9	26.9	32.2	34.6	35.3	35.3	35.4	35.4
R195	Residential	21.0	27.5	32.7	35.1	35.8	35.8	35.9	35.9
R196	Residential & Commercial	21.3	27.8	33.0	35.4	36.1	36.1	36.2	36.2
R197	Residential	21.7	28.6	33.9	36.3	37.0	37.0	37.1	37.1
R198	Residential	21.8	28.7	34.0	36.4	37.1	37.1	37.2	37.2
R199	Residential & Commercial	21.7	28.7	34.0	36.4	37.1	37.1	37.2	37.2

APPENDIX 7.7

ASSESSMENT AGAINST NOISE LIMITS DERIVED USING DRAFT REVISED WIND ENERGY DEVELOPMENT GUIDELINES

Table 7.2: Assessment of Predicted L_{A90} Noise Levels for Coom Green Energy Park Operation against Daytime, Evening and Night-time Noise Limits Derived using the Draft Revised Wind Energy Development Guidelines (December 2019)

Receptor ID	Description	Predicted L_{A90} Sound Pressure Level at 10m Standardised Wind Speed, dB									
		3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
R10	Predicted Level	25.2	32.5	37.8	40.2	40.9	40.9	41.0	41.0	41.0	41.0
	Daytime limit	41.6	42.2	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	36.6	37.2	38.3	39.9	42.2	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	-	0.3	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	37.2	40.2	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	2.8	5.2	3.7	0.8	-	-	-	-
R20	Predicted Level	24.1	31.2	36.5	38.9	39.6	39.6	39.7	39.7	39.7	39.7
	Daytime limit	35.0	35.7	37.9	40.6	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	35.6	38.6	42.1	43.0	43.0	43.0	43.0
	Evening Excess	-	-	1.5	3.3	1.0	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	37.1	40.9	43.0	43.0	43.0
	Night-time Excess	-	-	1.5	3.9	4.6	2.6	-	-	-	-
R27	Predicted Level	26.5	33.3	38.6	41.0	41.7	41.7	41.8	41.8	41.8	41.8
	Daytime limit	35.0	35.3	38.2	41.9	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	0.4	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	36.9	41.1	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	3.6	4.1	0.6	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	36.1	40.4	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	3.6	6.0	5.6	1.3	-	-	-	-
R36	Predicted Level	22.8	30.0	35.4	37.8	38.5	38.5	38.6	38.6	38.6	38.6
	Daytime limit	37.7	38.4	39.7	41.8	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-

Receptor ID	Description	Predicted L_{A90} Sound Pressure Level at 10m Standardised Wind Speed, dB									
		3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
	Evening limit	35.0	35.0	35.0	36.8	39.6	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	0.4	1.0	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	38.2	42.5	43.0	43.0	43.0
	Night-time Excess	-	-	0.4	2.8	3.5	0.3	-	-	-	-
R40	Predicted Level	24.1	30.0	35.1	37.5	38.2	38.2	38.3	38.3	38.3	38.3
	Daytime limit	35.0	36.3	39.7	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	38.8	43.0	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	0.1	-	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	38.5	43.0	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	0.1	2.5	-	-	-	-	-	-
R52	Predicted Level	25.7	31.4	36.5	38.8	39.5	39.5	39.6	39.6	39.6	39.6
	Daytime limit	36.1	36.8	38.4	41.1	43.0	43.0	43	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	36.1	40.1	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	1.5	2.7	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.1	40.0	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	1.5	3.8	4.4	-	-	-	-	-
R55	Predicted Level	25.4	32.4	37.8	40.2	40.9	40.9	41.0	41.0	41.0	41.0
	Daytime limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	-	-	-	-	-	-	-	-
	Night-time limit	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	-	-	-	-	-	-	-	-
R56	Predicted Level	24.2	31.2	36.5	38.9	39.6	39.6	39.7	39.7	39.7	39.7
	Daytime limit	37.0	38.5	40.6	43.0	43.0	43.0	43.0	43.0	43.0	43.0

Receptor ID	Description	Predicted L_{A90} Sound Pressure Level at 10m Standardised Wind Speed, dB									
		3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.6	38.4	41.8	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	0.9	0.5	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	36.8	40.7	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	1.5	3.9	2.8	-	-	-	-	-
R60	Predicted Level	22.9	30.1	35.5	37.9	38.6	38.6	38.7	38.7	38.7	38.7
	Daytime limit	36.7	37.7	39.3	41.7	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	36.7	39.7	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	0.5	1.2	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	38.4	42.8	43.0	43.0	43.0
	Night-time Excess	-	-	0.5	2.9	3.6	0.1	-	-	-	-
R71	Predicted Level	24.0	31.0	36.3	38.7	39.4	39.4	39.5	39.5	39.5	39.5
	Daytime limit	39.9	41.3	43.0	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	36.3	38.2	40.6	43.0	43.0	43.0	43.0	43.0	43.0
	Evening Excess	-	-	-	-	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.6	38.3	41.2	43.0	43.0	43.0	43.0
	Night-time Excess	-	-	1.3	3.2	1.1	-	-	-	-	-
R77	Predicted Level	23.1	30.1	35.4	37.8	38.5	38.5	38.6	38.6	38.6	38.6
	Daytime limit	35.0	35.0	36.4	38.5	41.4	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	35.0	36.4	40.1	43.0	43.0	43.0	43.0
	Evening Excess	-	-	0.4	2.8	2.1	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	35.1	39.4	43.0	43.0	43.0
	Night-time Excess	-	-	0.4	2.8	3.5	3.4	-	-	-	-
R101	Predicted Level	25.2	32.2	37.5	39.9	40.6	40.6	40.7	40.7	40.7	40.7

Receptor ID	Description	Predicted L_{A90} Sound Pressure Level at 10m Standardised Wind Speed, dB									
		3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
	Daytime limit	39.6	40.1	40.8	41.8	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.1	35.8	36.8	38.1	39.7	41.7	43.0	43.0	43.0
	Evening Excess	-	-	1.7	3.1	2.5	0.8	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	35.0	36.7	38.9	41.4	43.0
	Night-time Excess	-	-	2.5	4.9	5.6	5.6	4.0	1.8	-	-
R105	Predicted Level	23.0	30.2	35.5	37.9	38.6	38.6	38.7	38.7	38.7	38.7
	Daytime limit	37.9	37.9	37.9	38.6	40.1	42.3	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	35.0	35.1	37.3	39.9	42.9	43.0	43.0
	Evening Excess	-	-	0.5	2.9	3.5	1.4	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	35.0	35.0	37.9	40.9	43.0
	Night-time Excess	-	-	0.5	2.9	3.6	3.6	3.7	0.9	-	-
R107	Predicted Level	26.0	33.2	38.5	40.9	41.6	41.6	41.7	41.7	41.7	41.7
	Daytime limit	42.3	42.3	42.3	42.9	43.0	43.0	43.0	43.0		
	Daytime Excess	-	-	-	-	-	-	-	-	41.7	41.7
	Evening limit	37.3	37.3	37.3	37.9	39.4	41.4	43.0	43.0	43.0	43.0
	Evening Excess	-	-	1.2	3.0	2.3	0.2	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	36.4	38.9	41.6	43.0	43.0
	Night-time Excess	-	-	3.5	5.9	6.6	5.2	2.9	0.1	-	-
R118	Predicted Level	23.7	30.7	36.1	38.5	39.2	39.2	39.3	39.3	39.3	39.3
	Daytime limit	39.9	39.9	39.9	40.8	42.9	43.0	43.0	43.0		
	Daytime Excess	-	-	-	-	-	-	-	-	39.3	39.3
	Evening limit	35.0	35.0	35.0	35.8	37.9	40.7	43.0	43.0	43.0	43.0
	Evening Excess	-	-	1.1	2.7	1.3	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	35.7	38.8	41.9	43.0	43.0
	Night-time Excess	-	-	1.1	3.5	4.2	3.5	0.5	-	-	-

Receptor ID	Description	Predicted L_{A90} Sound Pressure Level at 10m Standardised Wind Speed, dB									
		3 m/s	4 m/s	5 m/s	6 m/s	7 m/s	8 m/s	9 m/s	10 m/s	11 m/s	12 m/s
R121	Predicted Level	26.4	33.5	38.8	41.2	41.9	41.9	42.0	42.0	42.0	42.0
	Daytime limit	-	40.2	40.2	40.3	42.8	43.0	43.0	43.0	43.0	43.0
	Evening limit	-	-	-	0.9	-	-	-	-	-	-
	Evening Excess	-	35.2	35.2	35.3	37.8	41.5	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	3.6	5.9	4.1	0.3	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	36.5	40.7	43.0	43.0	43.0
	Night-time Excess	-	-	3.8	6.2	6.9	5.3	1.3	-	-	-
R122	Predicted Level	24.6	31.2	36.5	38.8	39.5	39.5	39.6	39.6	39.6	39.6
	Daytime limit	36.8	36.8	36.9	38.3	40.8	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	0.5	-	-	-	-	-	-
	Evening limit	35.0	35.0	35.0	35.0	35.8	38.8	42.1	43.0	43.0	43.0
	Evening Excess	-	-	1.5	3.8	3.8	0.7	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	35.0	37.1	40.5	43.0	43.0
	Night-time Excess	-	-	1.5	3.8	4.5	4.5	2.5	-	-	-
R154	Predicted Level	22.4	29.7	35.1	37.5	38.2	38.2	38.3	38.3	38.3	38.3
	Daytime limit	38.9	40.3	41.6	43.0	43.0	43.0	43.0	43.0	43.0	43.0
	Daytime Excess	-	-	-	-	-	-	-	-	-	-
	Evening limit	35.0	35.3	36.6	38.1	39.8	41.9	43.0	43.0	43.0	43.0
	Evening Excess	-	-	-	-	-	-	-	-	-	-
	Night-time limit	35.0	35.0	35.0	35.0	35.0	36.9	39.5	42.7	43.0	43.0
	Night-time Excess	-	-	0.1	2.5	3.2	1.3	-	-	-	-

APPENDIX 7.8

PREDICTED CUMULATIVE NOISE LEVELS FROM COOM GREEN ENERGY PARK AND OTHER ADJACENT WIND ENERGY DEVELOPMENTS AT NEARBY NOISE SENSITIVE LOCATIONS

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R1	Residential	21.5	28.8	34.2	36.6	37.3	37.3	37.4	37.4
R2	Residential & Commercial	22.4	29.6	34.9	37.3	38.0	38.0	38.1	38.1
R3	Residential	23.0	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R4	Residential	23.5	30.7	36.1	38.5	39.2	39.2	39.3	39.3
R5	Residential	24.1	31.3	36.7	39.1	39.8	39.8	39.9	39.9
R8	Residential & Commercial	22.3	29.2	34.5	36.9	37.6	37.6	37.7	37.7
R9	Residential & Commercial	24.7	31.9	37.3	39.7	40.4	40.4	40.5	40.5
R10	Residential	25.2	32.5	37.8	40.2	40.9	40.9	41.0	41.0
R11	Residential	22.5	29.4	34.7	37.1	37.8	37.8	37.9	37.9
R12	Residential	22.0	28.7	34.0	36.4	37.1	37.1	37.2	37.2
R13	Residential	24.1	31.2	36.6	39.0	39.7	39.7	39.8	39.8
R15	Residential	24.2	31.4	36.7	39.1	39.8	39.8	39.9	39.9
R16	Residential	24.1	31.2	36.6	39.0	39.7	39.7	39.8	39.8
R17	Residential & Commercial	23.2	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R18	Residential	22.7	29.5	34.8	37.2	37.9	37.9	38.0	38.0
R19	Residential	23.1	30.0	35.3	37.7	38.4	38.4	38.5	38.5
R20	Residential	24.1	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R21	Residential & Commercial	23.2	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R23	Residential & Commercial	24.2	29.9	34.9	37.3	38.0	38.0	38.1	38.1
R24	Residential	26.2	33.0	38.3	40.7	41.4	41.4	41.5	41.5
R25	Residential & Commercial	26.2	33.0	38.3	40.6	41.3	41.3	41.4	41.4
R26	Residential & Commercial	24.6	30.2	35.2	37.6	38.3	38.3	38.4	38.4
R27	Residential	26.5	33.3	38.6	41.0	41.7	41.7	41.8	41.8

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R29	Residential	23.5	30.0	35.2	37.6	38.3	38.3	38.4	38.4
R30	Residential	23.5	29.9	35.2	37.5	38.2	38.2	38.3	38.3
R32	Residential	23.6	30.0	35.2	37.5	38.2	38.2	38.3	38.3
R34	Residential	20.9	26.8	31.9	34.3	35.0	35.0	35.1	35.1
R35	Residential	21.7	27.7	32.8	35.1	35.8	35.8	35.9	35.9
R36	Residential	22.8	30.0	35.4	37.8	38.5	38.5	38.6	38.6
R38	Residential	22.5	28.4	33.5	35.9	36.6	36.6	36.7	36.7
R40	Residential	24.1	30.0	35.1	37.5	38.2	38.2	38.3	38.3
R43	Residential	29.1	32.6	36.8	38.9	39.6	39.6	39.7	39.7
R51	Residential	25.3	30.8	35.8	38.1	38.8	38.8	38.9	38.9
R52	Residential	25.7	31.4	36.5	38.8	39.5	39.5	39.6	39.6
R55	Residential & Commercial	25.4	32.4	37.8	40.2	40.9	40.9	41.0	41.0
R56	Residential & Commercial	24.2	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R58	Residential & Commercial	24.1	31.1	36.4	38.8	39.5	39.5	39.6	39.6
R60	Residential	23.0	30.1	35.5	37.9	38.6	38.6	38.7	38.7
R70	Residential & Commercial	24.2	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R71	Residential	24.0	31.0	36.3	38.7	39.4	39.4	39.5	39.5
R72	Residential & Commercial	24.4	31.3	36.7	39.0	39.7	39.7	39.8	39.8
R73	Residential	23.6	30.6	35.9	38.3	39.0	39.0	39.1	39.1
R74	Residential	23.7	30.7	36.0	38.4	39.1	39.1	39.2	39.2
R75	Residential & Commercial	23.3	30.3	35.6	38.0	38.7	38.7	38.8	38.8
R77	Residential	23.1	30.1	35.4	37.8	38.5	38.5	38.6	38.6
R78	Residential	23.0	30.0	35.3	37.7	38.4	38.4	38.5	38.5

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R81	Residential & Commercial	23.1	29.6	34.8	37.2	37.9	37.9	38.0	38.0
R82	Residential	22.6	29.5	34.8	37.2	37.9	37.9	38.0	38.0
R83	Residential	20.9	27.4	32.6	35.0	35.7	35.7	35.8	35.8
R84	Residential & Commercial	21.9	28.6	33.9	36.2	36.9	36.9	37.0	37.0
R85	Residential	21.3	28.2	33.5	35.9	36.6	36.6	36.7	36.7
R86	Residential	21.8	28.5	33.8	36.2	36.9	36.9	37.0	37.0
R88	Residential & Commercial	22.3	29.1	34.4	36.8	37.5	37.5	37.6	37.6
R89	Residential & Commercial	22.7	29.6	34.9	37.3	38.0	38.0	38.1	38.1
R91	Residential & Commercial	22.9	29.8	35.1	37.5	38.2	38.2	38.3	38.3
R92	Residential	23.7	30.7	36.1	38.5	39.2	39.2	39.3	39.3
R93	Residential	23.2	30.2	35.5	37.9	38.6	38.6	38.7	38.7
R94	Residential	24.3	31.1	36.4	38.8	39.5	39.5	39.6	39.6
R95	Residential & Commercial	22.1	29.0	34.3	36.7	37.4	37.4	37.5	37.5
R96	Residential & Commercial	24.4	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R98	Residential & Commercial	20.3	27.2	32.5	34.9	35.6	35.6	35.7	35.7
R100	Residential & Commercial	20.5	27.3	32.6	35.0	35.7	35.7	35.9	35.8
R101	Residential	25.3	32.2	37.5	39.9	40.6	40.6	40.7	40.7
R103	Residential & Commercial	24.3	31.2	36.5	38.9	39.6	39.6	39.7	39.7
R104	Residential & Commercial	24.1	30.9	36.2	38.6	39.3	39.3	39.4	39.4
R105	Residential & Commercial	23.1	30.2	35.6	38.0	38.7	38.7	38.8	38.8
R106	Residential	23.1	30.2	35.6	38.0	38.7	38.7	38.8	38.8
R107	Residential & Commercial	26.2	33.2	38.5	40.9	41.6	41.6	41.7	41.7
R108	Residential	21.2	28.1	33.4	35.8	36.5	36.5	36.6	36.6

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R114	Residential	20.2	26.7	31.9	34.3	35.0	35.0	35.1	35.1
R116	Residential	20.9	27.4	32.7	35.1	35.8	35.8	35.9	35.9
R117	Residential & Commercial	21.1	27.6	32.8	35.2	35.9	35.9	36.0	36.0
R118	Residential & Commercial	24.0	30.8	36.1	38.5	39.2	39.2	39.3	39.3
R119	Residential & Commercial	20.6	26.9	32.1	34.5	35.2	35.3	35.4	35.4
R120	Residential & Commercial	20.3	26.6	31.8	34.2	34.9	34.9	35.0	35.0
R121	Residential & Commercial	26.8	33.5	38.8	41.2	41.9	42.0	42.1	42.1
R122	Residential	26.1	31.6	36.6	39.0	39.8	39.9	40.0	40.0
R125	Residential & Commercial	30.7	33.0	36.5	39.1	40.3	40.9	41.1	41.1
R142	Residential	30.1	30.9	32.5	34.4	35.6	36.2	36.4	36.5
R146	Residential	20.8	28.1	33.4	35.8	36.5	36.5	36.6	36.6
R147	Residential & Commercial	20.7	28.0	33.4	35.8	36.5	36.5	36.6	36.6
R148	Residential & Commercial	19.9	27.0	32.3	34.7	35.4	35.4	35.5	35.5
R149	Residential & Commercial	21.1	28.2	33.5	35.9	36.6	36.6	36.7	36.7
R151	Residential & Commercial	20.2	27.4	32.7	35.1	35.8	35.8	35.9	35.9
R152	Residential	21.7	28.9	34.2	36.6	37.3	37.3	37.4	37.4
R153	Residential	19.6	26.8	32.1	34.5	35.2	35.2	35.3	35.3
R154	Residential	22.4	29.7	35.1	37.5	38.2	38.2	38.3	38.3
R156	Residential	20.1	27.4	32.7	35.1	35.8	35.8	35.9	35.9
R163	Residential	19.9	26.7	32.0	34.4	35.1	35.1	35.2	35.2
R164	Residential	20.3	27.1	32.4	34.8	35.5	35.5	35.6	35.6
R165	Residential	19.6	26.6	31.9	34.3	35.0	35.0	35.1	35.1
R170	Residential	19.9	26.6	31.8	34.2	34.9	34.9	35.0	35.0

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)							
		3	4	5	6	7	8	9	10
R171	Residential	19.9	26.7	32.0	34.4	35.1	35.1	35.2	35.2
R175	Residential	20.1	26.8	32.1	34.5	35.2	35.2	35.3	35.2
R178	Residential	19.5	26.5	31.8	34.2	34.9	34.9	35.0	35.0
R180	Residential & Commercial	19.7	26.6	31.9	34.3	35.0	35.0	35.1	35.1
R181	Residential & Commercial	20.1	27.1	32.4	34.8	35.5	35.5	35.6	35.6
R182	Residential	20.3	27.5	32.9	35.3	36.0	36.0	36.1	36.1
R185	Residential & Commercial	19.4	26.5	31.8	34.2	34.9	34.9	35.0	35.0
R187	Residential	21.9	28.8	34.1	36.5	37.2	37.2	37.3	37.3
R190	Residential	19.5	26.5	31.9	34.3	35.0	35.0	35.1	35.1
R191	Residential & Commercial	19.7	26.7	32.0	34.4	35.1	35.1	35.2	35.2
R194	Residential & Commercial	20.1	26.9	32.2	34.6	35.3	35.3	35.4	35.4
R195	Residential	21.1	27.5	32.7	35.1	35.8	35.8	35.9	35.9
R196	Residential & Commercial	21.4	27.8	33.0	35.4	36.1	36.1	36.2	36.2
R197	Residential	21.8	28.6	33.9	36.3	37.0	37.0	37.1	37.1
R198	Residential	21.9	28.7	34.1	36.4	37.1	37.1	37.3	37.2
R199	Residential & Commercial	21.8	28.7	34.0	36.4	37.1	37.1	37.2	37.2

APPENDIX 7.9

PREDICTED CUMULATIVE NOISE LEVELS FROM COOM GREEN ENERGY PARK AND OTHER ADJACENT WIND ENERGY DEVELOPMENTS AT NEARBY NOISE SENSITIVE LOCATIONS - WITH MITIGATION MEASURES

Table 7.9.1: Predicted Cumulative Noise Levels (L_{A90}) from Coom Green Energy Park and Adjacent Wind Farms with Mitigation at Noise Sensitive Locations for Standardised 10m Wind speeds from 5 m/s to 7 m/s

Location ID	Description	Predicted Cumulative Daytime Noise Level (dB L_{A90}) with Mitigation at Standardised 10m Height Wind Speeds (m/s)		
		5	6	7
R1	Residential	34.2	36.0	37.2
R2	Residential & Commercial	34.9	36.4	37.9
R3	Residential	35.5	37.0	38.5
R4	Residential	36.1	37.6	39.1
R5	Residential	36.7	38.2	39.7
R8	Residential & Commercial	34.5	35.9	37.4
R9	Residential & Commercial	37.3	38.7	40.3
R10	Residential	37.8	39.3	40.8
R11	Residential	34.7	36.1	37.6
R12	Residential	34.0	35.5	36.9
R13	Residential	36.6	38.0	39.6
R15	Residential	36.7	38.1	39.7
R16	Residential	36.5	38.0	39.5
R17	Residential & Commercial	35.5	36.9	38.4
R18	Residential	34.8	36.3	37.7
R19	Residential	35.3	36.8	38.2
R20	Residential	36.5	38.0	39.5
R21	Residential & Commercial	35.5	37.0	38.4
R23	Residential & Commercial	34.9	36.5	37.7
R24	Residential	38.3	39.8	41.2

Location ID	Description	Predicted Cumulative Daytime Noise Level (dB L_{A90}) with Mitigation at Standardised 10m Height Wind Speeds (m/s)		
		5	6	7
R25	Residential & Commercial	38.3	39.8	41.2
R26	Residential & Commercial	35.2	36.8	38.0
R27	Residential	38.6	40.2	41.6
R29	Residential	35.2	36.8	38.0
R30	Residential	35.1	36.8	38.0
R32	Residential	35.2	36.8	38.0
R34	Residential	31.9	33.3	34.6
R35	Residential	32.7	34.2	35.4
R36	Residential	35.4	36.7	38.4
R38	Residential	33.5	35.0	36.2
R40	Residential	35.1	36.7	37.8
R43	Residential	36.7	38.2	39.1
R51	Residential	35.7	36.7	37.7
R52	Residential	36.4	37.3	38.2
R55	Residential & Commercial	37.7	35.9	40.5
R56	Residential & Commercial	36.5	34.9	39.2
R58	Residential & Commercial	36.4	34.9	39.1
R60	Residential	35.4	34.1	38.2
R70	Residential & Commercial	36.5	36.0	38.1
R71	Residential	36.3	35.7	38.0
R72	Residential & Commercial	36.6	36.4	38.0
R73	Residential	35.8	35.2	37.8

Location ID	Description	Predicted Cumulative Daytime Noise Level (dB L_{A90}) with Mitigation at Standardised 10m Height Wind Speeds (m/s)		
		5	6	7
R74	Residential	36.0	35.5	37.7
R75	Residential & Commercial	35.5	35.0	37.4
R77	Residential	35.3	34.8	37.2
R78	Residential	35.2	34.7	37.1
R81	Residential & Commercial	34.6	34.0	36.7
R82	Residential	34.7	34.2	36.7
R83	Residential	32.4	32.6	34.6
R84	Residential & Commercial	33.5	33.5	35.8
R85	Residential	33.3	32.8	35.5
R86	Residential	33.4	33.6	35.9
R88	Residential & Commercial	34.0	34.2	36.6
R89	Residential & Commercial	34.5	34.5	37.0
R91	Residential & Commercial	34.6	34.7	37.2
R92	Residential	35.6	35.6	38.2
R93	Residential	34.9	34.8	37.5
R94	Residential	35.9	35.8	38.5
R95	Residential & Commercial	33.8	33.1	36.3
R96	Residential & Commercial	35.9	35.8	38.5
R98	Residential & Commercial	32.1	31.2	34.8
R100	Residential & Commercial	32.3	31.3	34.9
R101	Residential	36.8	36.8	39.5
R103	Residential & Commercial	35.6	35.0	38.2

Location ID	Description	Predicted Cumulative Daytime Noise Level (dB L_{A90}) with Mitigation at Standardised 10m Height Wind Speeds (m/s)		
		5	6	7
R104	Residential & Commercial	35.7	34.4	38.4
R105	Residential & Commercial	35.2	33.5	38.1
R106	Residential	35.2	33.5	38.1
R107	Residential & Commercial	37.4	36.6	40.1
R108	Residential	33.0	31.5	35.9
R114	Residential	31.4	30.0	34.2
R116	Residential	32.1	30.7	34.9
R117	Residential & Commercial	32.2	30.8	35.0
R118	Residential & Commercial	35.5	33.9	38.3
R119	Residential & Commercial	31.6	30.2	34.3
R120	Residential & Commercial	31.2	29.9	33.9
R121	Residential & Commercial	37.4	36.9	39.5
R122	Residential	35.4	34.6	37.0
R125	Residential & Commercial	35.1	34.0	35.9
R142	Residential	31.5	31.0	32.0
R146	Residential	33.4	34.9	36.5
R147	Residential & Commercial	33.4	35.0	36.4
R148	Residential & Commercial	32.3	33.7	35.2
R149	Residential & Commercial	33.5	34.9	36.5
R151	Residential & Commercial	32.7	34.3	35.7
R152	Residential	34.2	35.7	37.2
R153	Residential	32.1	33.8	35.1

Location ID	Description	Predicted Cumulative Daytime Noise Level (dB L_{A90}) with Mitigation at Standardised 10m Height Wind Speeds (m/s)		
		5	6	7
R154	Residential	35.1	36.9	38.1
R156	Residential	32.7	33.8	35.8
R163	Residential	32.0	33.4	34.8
R164	Residential	32.4	33.8	35.3
R165	Residential	31.9	33.4	34.8
R170	Residential	31.8	33.2	34.7
R171	Residential	32.0	33.4	34.9
R175	Residential	32.1	33.5	34.9
R178	Residential	31.8	33.2	34.8
R180	Residential & Commercial	31.9	32.1	34.9
R181	Residential & Commercial	32.3	32.6	35.3
R182	Residential	32.9	33.2	35.9
R185	Residential & Commercial	31.8	31.3	34.7
R187	Residential	33.7	33.2	36.1
R190	Residential	31.8	31.0	34.6
R191	Residential & Commercial	31.9	31.2	34.7
R194	Residential & Commercial	31.9	31.1	34.4
R195	Residential	32.4	31.7	34.9
R196	Residential & Commercial	32.8	32.2	35.1
R197	Residential	33.6	33.2	35.9
R198	Residential	33.7	33.2	36.0
R199	Residential & Commercial	33.6	33.1	36.0

Table 7.9.2: Required Turbine Curtailment/Mitigation to Meet Dradt Guidelines Noise Limits

Turbine ID	Required Noise Reduced Modes to meet Noise Limits Standardised 10m Height Wind Speeds (m/s)											
	Daytime		Evening				Night-time					
	5	6	5	6	7	8	5	6	7	8	9	10
T2	NRO	NRO	NRO	NRO	NRO	NRO	NRO7	NRO7	NRO5	NRO2	NRO	NRO
T3	NRO	NRO	NRO	NRO1	NRO	NRO	NRO	NRO2	NRO5	NRO	NRO	NRO
T4	NRO	NRO	NRO	NRO	NRO	NRO	NRO4	NRO5	NRO	NRO	NRO	NRO
T5	NRO	NRO	NRO	NRO	NRO	NRO	NRO	NRO2	NRO3	NRO	NRO	NRO
T6	NRO	NRO	NRO2	NRO4	NRO	NRO	NRO2	NRO5	NRO4	NRO	NRO	NRO
T7	NRO4	NRO	NRO5	NRO4	NRO1	NRO	NRO7	NRO8	NRO5	NRO2	NRO	NRO
T8	NRO	NRO	NRO8	NRO8	NRO4	NRO	NRO8	NRO8	NRO8	NRO7	NRO	NRO
T9	NRO	NRO	NRO6	NRO4	NRO	NRO	NRO4	NRO6	NRO5	NRO2	NRO	NRO
T10	NRO	NRO	NRO7	NRO7	NRO3	NRO	NRO7	NRO6	NRO8	NRO5	NRO	NRO
T11	NRO3	NRO	NRO6	NRO4	NRO	NRO	NRO5	NRO6	NRO7	NRO3	NRO	NRO
T12	NRO	NRO	NRO8	NRO7	NRO3	NRO	NRO7	NRO7	NRO7	NRO5	NRO	NRO
T13	NRO	NRO	NRO4	NRO2	NRO2	NRO	NRO2	NRO4	NRO3	NRO4	NRO	NRO
T14	NRO	NRO	NRO	NRO4	NRO5	NRO	NRO	NRO5	NRO5	NRO7	NRO	NRO
T15	NRO	NRO	NRO4	NRO4	NRO2	NRO	NRO5	NRO5	NRO6	NRO3	NRO	NRO
T16	NRO	NRO	NRO4	NRO4	NRO4	NRO	NRO5	NRO5	NRO6	NRO7	NRO	NRO
T17	NRO	NRO	NRO	NRO3	NRO4	NRO3	NRO5	NRO6	NRO6	NRO5	NRO6	NRO2
T18	NRO	NRO2	NRO7	NRO7	NRO5	NRO	NRO7	NRO7	NRO7	NRO6	NRO4	NRO
T19	NRO	NRO1	NRO7	NRO7	NRO4	NRO1	NRO6	NRO7	NRO7	NRO7	NRO6	NRO3
T20	NRO	NRO	NRO4	NRO6	NRO3	NRO	NRO4	NRO7	NRO7	NRO5	NRO5	NRO2
T21	NRO	NRO	NRO5	NRO1	NRO3	NRO2	NRO5	NRO6	NRO5	NRO7	NRO7	NRO4
T22	NRO	NRO2	NRO7	NRO8	NRO5	NRO2	NRO8	NRO7	NRO8	NRO7	NRO4	NRO
T23	NRO	NRO	NRO2	NRO4	NRO6	NRO2	NRO3	NRO3	NRO4	NRO7	NRO4	NRO

Table 7.9.3: Predicted Cumulative Noise Levels (L_{A90}) from Coom Green Energy Park and Adjacent Wind Farms with Mitigation at Noise Sensitive Locations for Standardised 10m Wind speeds from 5 m/s to 10 m/s

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)											
		Daytime		Evening				Night-time					
		5	6	5	6	7	8	5	6	7	8	9	10
R1	Residential	34.1	36.6	33.7	35.8	36.9	37.3	31.3	31.5	33.7	35.9	37.3	37.4
R2	Residential & Commercial	34.6	37.3	33.1	35.0	37.0	38.0	31.5	31.4	33.3	35.6	38.1	38.1
R3	Residential	35.2	37.9	33.8	35.8	37.6	38.6	32.0	32.0	34.0	36.3	38.7	38.7
R4	Residential	35.7	38.5	34.2	36.2	38.1	39.2	32.5	32.5	34.5	36.8	39.2	39.3
R5	Residential	36.4	39.1	35.0	37.0	38.8	39.8	33.1	33.1	35.2	37.5	39.9	39.9
R8	Residential & Commercial	34.0	36.9	31.2	33.0	36.0	37.5	31.2	31.1	31.7	34.3	37.6	37.6
R9	Residential & Commercial	36.8	39.7	35.0	36.9	39.1	40.4	33.6	33.5	35.4	37.7	40.4	40.4
R10	Residential	37.4	40.2	35.8	37.8	39.8	40.9	34.1	34.1	36.1	38.4	41.0	41.0
R11	Residential	34.2	37.0	31.4	33.2	36.2	37.7	31.4	31.3	31.9	34.4	37.8	37.8
R12	Residential	33.6	36.4	30.8	32.6	35.6	37.1	30.9	30.8	31.2	33.8	37.1	37.2
R13	Residential	36.0	39.0	33.4	35.2	38.0	39.7	32.9	32.7	34.0	36.5	39.7	39.8
R15	Residential	36.1	39.1	33.5	35.2	38.1	39.8	32.9	32.8	34.1	36.5	39.9	39.9
R16	Residential	35.9	38.9	33.3	35.1	37.9	39.6	32.8	32.7	33.9	36.4	39.7	39.7
R17	Residential & Commercial	35.0	37.9	32.1	33.9	36.9	38.5	32.1	32.0	32.6	35.2	38.6	38.6
R18	Residential	34.4	37.2	31.5	33.3	36.3	37.9	31.6	31.5	32.0	34.6	37.9	38.0
R19	Residential	34.8	37.7	31.9	33.7	36.8	38.4	31.9	31.9	32.5	35.0	38.4	38.5
R20	Residential	35.9	38.9	33.1	34.9	37.9	39.6	32.8	32.7	33.7	36.2	39.7	39.7
R21	Residential & Commercial	35.0	37.9	32.1	33.9	36.9	38.6	32.1	32.0	32.6	35.2	38.6	38.7
R23	Residential & Commercial	34.6	37.3	31.7	33.5	36.6	37.9	32.0	31.9	31.9	34.7	38.0	38.0
R24	Residential	37.6	40.7	34.4	36.2	39.4	41.4	34.5	34.3	35.1	37.7	41.4	41.5

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)											
		Daytime		Evening				Night-time					
		5	6	5	6	7	8	5	6	7	8	9	10
R25	Residential & Commercial	37.6	40.6	34.4	36.1	39.5	41.3	34.5	34.4	35.1	37.7	41.4	41.4
R26	Residential & Commercial	34.9	37.6	32.0	33.8	36.9	38.2	32.3	32.3	32.2	35.0	38.3	38.3
R27	Residential	37.9	41.0	34.6	36.4	39.8	41.7	34.8	34.7	35.4	38.0	41.8	41.8
R29	Residential	34.9	37.5	31.9	33.7	36.9	38.2	32.2	32.2	32.1	35.0	38.3	38.3
R30	Residential	34.9	37.5	31.9	33.7	36.9	38.2	32.2	32.2	32.0	34.9	38.2	38.3
R32	Residential	34.9	37.5	31.9	33.8	37.0	38.2	32.2	32.2	32.0	35.0	38.3	38.3
R34	Residential	31.7	34.3	29.1	30.7	33.4	34.9	29.2	29.2	29.2	31.6	34.9	35.0
R35	Residential	32.5	35.1	29.8	31.5	34.3	35.8	30.0	30.0	29.9	32.5	35.8	35.8
R36	Residential	35.3	37.8	34.9	36.6	38.2	38.5	34.5	34.8	34.8	38.0	38.5	38.6
R38	Residential	33.3	35.9	30.6	32.2	35.1	36.5	30.8	30.8	30.6	33.2	36.5	36.6
R40	Residential	34.9	37.5	32.1	33.9	36.8	38.1	32.3	32.4	32.1	34.9	38.2	38.2
R43	Residential	36.6	38.9	34.4	35.7	38.2	39.5	34.5	34.5	34.3	36.5	39.5	39.6
R51	Residential	35.7	38.1	33.5	34.7	36.5	38.7	33.2	33.5	33.2	34.8	38.6	38.7
R52	Residential	36.4	38.8	34.2	35.4	37.1	39.4	33.9	34.2	33.9	35.4	39.3	39.5
R55	Residential & Commercial	37.7	40.1	35.5	36.4	39.2	40.8	35.4	35.3	35.3	38.2	40.9	40.9
R56	Residential & Commercial	36.4	38.9	34.4	35.4	38.0	39.6	34.3	34.1	34.3	37.2	39.6	39.6
R58	Residential & Commercial	36.3	38.8	34.3	35.2	37.9	39.5	34.2	34.0	34.2	36.9	39.5	39.5
R60	Residential	35.4	37.8	33.5	34.5	37.0	38.5	33.3	33.1	33.4	36.1	38.5	38.6
R70	Residential & Commercial	36.5	38.9	34.7	35.4	36.8	39.5	34.7	34.1	34.3	35.1	39.4	39.6
R71	Residential	36.3	38.7	34.5	35.2	36.6	39.3	34.5	33.9	34.1	34.9	39.2	39.4
R72	Residential & Commercial	36.6	39.0	34.7	35.6	36.9	39.6	34.5	34.3	34.3	35.0	39.4	39.6
R73	Residential	35.9	38.3	34.1	34.8	36.3	38.9	34.1	33.5	33.7	34.7	38.7	38.9

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)											
		Daytime		Evening				Night-time					
		5	6	5	6	7	8	5	6	7	8	9	10
R74	Residential	36.0	38.4	34.2	34.9	36.3	39.0	34.1	33.6	33.8	34.6	38.8	39.1
R75	Residential & Commercial	35.5	37.9	33.8	34.5	35.9	38.5	33.6	33.2	33.3	34.3	38.3	38.6
R77	Residential	35.3	37.7	33.5	34.3	35.7	38.3	33.4	32.9	33.1	34.1	38.1	38.4
R78	Residential	35.2	37.6	33.4	34.2	35.7	38.2	33.3	32.8	33.0	34.1	38.0	38.3
R81	Residential & Commercial	34.7	37.0	32.8	33.5	35.2	37.6	32.7	32.2	32.4	33.7	37.3	37.7
R82	Residential	34.7	37.1	32.9	33.7	35.2	37.7	32.7	32.3	32.5	33.6	37.4	37.7
R83	Residential	32.6	34.8	30.2	31.8	33.0	35.1	30.1	29.8	30.1	31.0	33.9	34.9
R84	Residential & Commercial	33.8	36.0	31.2	32.9	33.9	36.2	31.1	30.8	31.1	31.7	34.6	35.9
R85	Residential	33.5	35.7	31.5	32.4	33.9	36.2	31.2	30.8	31.1	32.4	35.6	36.3
R86	Residential	33.8	35.9	31.1	33.1	33.9	36.0	31.0	30.7	31.0	31.7	34.1	35.6
R88	Residential & Commercial	34.4	36.5	31.7	33.8	34.5	36.6	31.6	31.2	31.7	32.2	34.4	36.1
R89	Residential & Commercial	34.9	37.0	32.1	34.2	34.9	37.0	32.0	31.6	32.1	32.5	34.7	36.5
R91	Residential & Commercial	35.1	37.2	32.3	34.3	35.1	37.3	32.3	31.8	32.3	32.8	34.8	36.7
R92	Residential	36.0	38.1	33.2	35.3	36.0	38.2	33.2	32.6	33.2	33.6	35.5	37.6
R93	Residential	35.5	37.5	32.6	34.3	35.4	37.7	32.5	32.0	32.4	33.1	35.1	37.2
R94	Residential	36.4	38.4	33.5	35.5	36.3	38.4	33.5	32.9	33.5	33.8	35.7	37.8
R95	Residential & Commercial	34.3	36.3	32.2	33.0	34.0	36.4	31.3	31.1	31.4	32.6	34.7	36.5
R96	Residential & Commercial	36.5	38.5	33.5	35.4	36.3	38.6	33.5	32.9	33.4	33.9	35.8	38.0
R98	Residential & Commercial	32.5	34.6	30.9	31.4	32.5	34.6	29.7	29.5	29.8	31.3	33.3	34.8
R100	Residential & Commercial	32.6	34.8	31.1	31.6	32.6	34.7	29.8	29.6	29.9	31.4	33.3	34.9
R101	Residential	37.5	39.5	34.4	36.3	37.3	39.6	34.5	33.8	34.4	34.9	36.7	38.9
R103	Residential & Commercial	36.5	38.3	33.8	34.5	35.9	38.7	33.3	32.8	33.1	34.4	36.1	38.5

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)											
		Daytime		Evening				Night-time					
		5	6	5	6	7	8	5	6	7	8	9	10
R104	Residential & Commercial	36.2	38.2	34.6	35.0	35.6	37.9	33.0	32.9	33.1	34.4	35.6	38.2
R105	Residential & Commercial	35.5	37.7	34.5	34.7	35.0	37.0	32.5	32.4	32.6	34.1	34.9	37.5
R106	Residential	35.5	37.7	34.5	34.7	35.0	37.0	32.5	32.4	32.6	34.1	34.9	37.5
R107	Residential & Commercial	38.5	40.1	35.6	36.0	37.7	40.7	34.9	34.5	34.8	36.2	37.8	40.7
R108	Residential	33.4	35.5	32.3	32.5	32.9	35.0	30.4	30.2	30.5	32.0	33.0	35.5
R114	Residential	31.9	33.9	30.6	30.8	31.4	33.6	28.8	28.7	29.0	30.5	31.5	34.0
R116	Residential	32.7	34.6	31.3	31.6	32.1	34.3	29.6	29.5	29.8	31.3	32.1	34.8
R117	Residential & Commercial	32.8	34.8	31.4	31.6	32.2	34.5	29.6	29.6	29.9	31.3	32.3	34.9
R118	Residential & Commercial	36.1	38.0	34.7	34.8	35.3	37.7	32.8	32.7	33.0	34.5	35.2	38.2
R119	Residential & Commercial	32.1	34.1	30.6	30.9	31.5	33.9	29.0	28.9	29.3	30.7	31.7	34.3
R120	Residential & Commercial	31.8	33.7	30.2	30.5	31.2	33.6	28.6	28.6	28.9	30.4	31.5	34.0
R121	Residential & Commercial	38.8	40.2	35.2	35.3	37.8	41.0	34.8	34.9	34.8	36.1	38.3	41.3
R122	Residential	36.6	38.2	33.8	34.1	35.8	38.8	33.3	34.0	34.2	34.8	36.8	39.5
R125	Residential & Commercial	36.5	38.7	35.0	36.1	37.8	40.1	34.7	36.3	37.5	38.2	39.4	40.9
R142	Residential	32.5	34.2	31.8	32.7	34.1	35.7	31.6	32.8	34.0	34.7	35.4	36.3
R146	Residential	33.4	35.8	32.9	34.7	36.2	36.5	32.2	32.5	33.0	35.9	36.6	36.6
R147	Residential & Commercial	33.3	35.8	32.9	34.7	36.2	36.5	32.0	32.2	33.0	35.8	36.5	36.6
R148	Residential & Commercial	32.0	34.7	30.4	32.3	34.3	35.4	29.1	29.0	30.6	32.9	35.4	35.5
R149	Residential & Commercial	33.2	35.9	31.4	33.3	35.4	36.6	30.2	30.2	31.7	34.1	36.7	36.7
R151	Residential & Commercial	32.5	35.1	31.7	33.8	35.2	35.8	29.5	29.6	31.7	34.0	35.9	35.9
R152	Residential	33.9	36.6	32.3	34.3	36.2	37.3	30.8	30.8	32.6	34.9	37.4	37.4
R153	Residential	32.0	34.5	31.2	33.2	34.6	35.2	29.0	29.1	31.2	33.4	35.3	35.3

Location ID	Description	Predicted Noise Level (dB L_{A90}) at Standardised 10m Height Wind Speeds (m/s)											
		Daytime		Evening				Night-time					
		5	6	5	6	7	8	5	6	7	8	9	10
R154	Residential	34.9	37.4	34.3	36.4	37.7	38.1	31.6	31.7	34.1	36.4	38.2	38.2
R156	Residential	32.7	35.1	32.1	33.9	35.5	35.8	31.6	31.8	32.1	35.1	35.9	35.9
R163	Residential	31.6	34.3	29.5	31.3	33.7	35.0	28.7	28.6	29.6	32.1	35.1	35.1
R164	Residential	32.0	34.8	29.8	31.7	34.1	35.5	29.1	29.1	30.0	32.5	35.5	35.6
R165	Residential	31.6	34.3	30.2	32.2	34.0	35.0	28.5	28.5	30.2	32.6	35.0	35.1
R170	Residential	31.5	34.2	29.1	30.9	33.5	34.9	28.7	28.6	29.3	31.8	34.9	35.0
R171	Residential	31.6	34.4	29.5	31.3	33.7	35.1	28.7	28.7	29.6	32.1	35.1	35.2
R175	Residential	31.7	34.4	29.3	31.1	33.7	35.1	28.9	28.9	29.5	32.0	35.1	35.2
R178	Residential	31.5	34.2	30.0	31.9	33.8	34.9	28.6	28.6	30.2	32.5	34.9	35.0
R180	Residential & Commercial	31.9	34.3	31.0	32.7	34.4	35.0	30.6	30.7	31.1	34.0	35.0	35.1
R181	Residential & Commercial	32.3	34.7	31.5	33.2	34.9	35.4	31.1	31.2	31.6	34.5	35.4	35.5
R182	Residential	32.9	35.3	32.1	33.8	35.5	36.0	31.7	31.9	32.2	35.1	36.0	36.1
R185	Residential & Commercial	31.8	34.2	30.5	31.9	33.9	34.9	30.2	30.1	30.6	33.4	34.8	34.9
R187	Residential	34.1	36.2	31.9	32.8	34.0	36.4	31.3	31.0	31.2	32.5	35.0	36.4
R190	Residential	31.8	34.2	30.1	31.3	33.6	34.8	29.9	29.7	30.1	32.8	34.7	34.9
R191	Residential & Commercial	31.9	34.4	30.3	31.5	33.7	35.0	30.0	29.9	30.3	32.9	34.9	35.1
R194	Residential & Commercial	32.1	34.3	30.5	31.1	32.3	34.5	29.5	29.3	29.6	31.1	33.4	34.6
R195	Residential	32.7	34.9	30.8	31.5	33.0	35.2	30.2	29.9	30.2	31.6	34.2	35.2
R196	Residential & Commercial	33.0	35.2	31.1	31.9	33.4	35.6	30.6	30.3	30.6	32.0	34.9	35.7
R197	Residential	33.9	36.1	31.8	32.7	34.0	36.4	31.3	31.0	31.2	32.4	35.3	36.4
R198	Residential	34.0	36.1	31.9	32.8	34.0	36.4	31.3	31.0	31.2	32.4	35.1	36.4
R199	Residential & Commercial	34.0	36.1	31.9	32.7	34.0	36.4	31.3	31.0	31.2	32.4	35.0	36.4