

# MONA OFFSHORE WIND PROJECT

## Environmental Statement

### Volume 7, Annex 9.1: Baseline Noise Survey

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Image of an offshore wind farm

MONA OFFSHORE WIND PROJECT

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### Glossary

Term	Meaning
Ambient Sound Level, $L_{Aeq,T}$	The steady sound level which, over a period of time T, contains the same amount of A-weighted sound energy as the time varying sound over the same period. Also known as the equivalent continuous sound pressure level.
Background Sound Level, $L_{A90,T}$	The A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using fast time-weighting, F, and quoted to the nearest whole number of decibels.
Decibel (dB)	A unit used to measure or compare the intensity of a sound by comparing it with a given reference level on a logarithmic scale.
Free-field	A situation in which the radiation from a sound source is entirely unaffected by the presence of any reflective boundaries.
Logarithmic averaging	A method by which sound levels in decibels (dB) can be averaged. This account for the fact that higher levels of sound will always dominate in the presence of lower sound levels.
Noise	An unwanted or unexpected sound.
Residual Sound Level	The ambient sound level at a receptor in the absence of influence from the sound source under assessment.
Sound	Fluctuations of pressure within a medium (gas, solid or fluid) within the audible range of loudness and frequencies which excite the sensation of hearing.
Temporal averaging	Averaging a dataset over a given time period.

### Acronyms

Acronym	Description
BS	British Standard
CCBC	Conwy County Borough Council
DCC	Denbighshire County Council
LT	Long-term
ST	Short-term



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### Units

Unit	Description
dB	Decibel
h	Hour
km	Kilometres
m	Metre
m/s	Meters per second
ms	Milliseconds

# 1 BASELINE NOISE SURVEY

## 1.1 Introduction

- 1.1.1.1 This baseline noise survey technical report provides the methodology and results of the baseline sound survey undertaken for the Mona Offshore Wind Project. The report will inform the assessment of noise and vibration impacts reported in Volume 3, Chapter 9: Noise and vibration of the Environmental Statement.
- 1.1.1.2 The purpose of the baseline sound survey is to quantify the existing sound climate at noise-sensitive receptors within the noise and vibration study area. The measured levels inform the derivation of noise criteria against which operational and construction noise impacts arising from the Mona Offshore Wind Project may be assessed in accordance with British Standard (BS) 4142:2014+A1:2019 and BS 5228-1:2009+A1:2014, respectively.
- 1.1.1.3 There are no significant existing sources of vibration impacting the nearest noise-sensitive receptors which require consideration. As such, no vibration survey is deemed necessary, and this annex only contains details of the baseline sound survey. This is in line with the approach set out in the Environmental Impact Assessment (EIA) Scoping Report (Mona Offshore Wind Ltd, 2022). No comments on this approach were raised by The Planning Inspectorate in their Scoping Opinion.
- 1.1.1.4 Two surveys have been undertaken comprising both long-term and short-term monitoring at a total of 24 locations within the Mona Onshore Development Area. The proposed monitoring locations were discussed with Conwy County Borough Council (CCBC) and Denbighshire County Council (DCC) (see Table 1.1) and follows the approach set out in the Mona Offshore Wind Farm Environmental Impact Assessment Scoping Report (Mona Offshore Wind Ltd, 2022).
- 1.1.1.5 The Mona Onshore Development Area has reduced in size since the first baseline survey was undertaken in November 2022. However, all baseline survey data is presented since it provides a useful context for the baseline sound environment in the wider area surrounding the Mona Onshore Development Area.

## 1.2 Study area

- 1.2.1.1 The Mona noise and vibration study area focuses on receptors (landward of Mean High Water Springs (MHWS)) where potential impacts are most likely to occur on receptors sensitive to noise and vibration.
- 1.2.1.2 The assessment of operational noise impacts is typically undertaken at the nearest noise-sensitive receptors to the proposed noise sources. However, to account for the variable local sound climate and any intervening topography, a study area of 1 km has been defined for the assessment of noise impacts due to the Mona Onshore Substation.
- 1.2.1.3 Similarly, a 1 km study area has been defined for the Mona Landfall due to the high noise emission levels and potential night-time works required for trenchless techniques at the Mona Landfall.
- 1.2.1.4 The study area along the Mona Onshore Cable Corridor has been defined as 300 m in line with the guidance in the Design Manual for Roads and Bridges (DMRB) – LA 111 – Noise and Vibration. This study area is greater than that presented in the Mona

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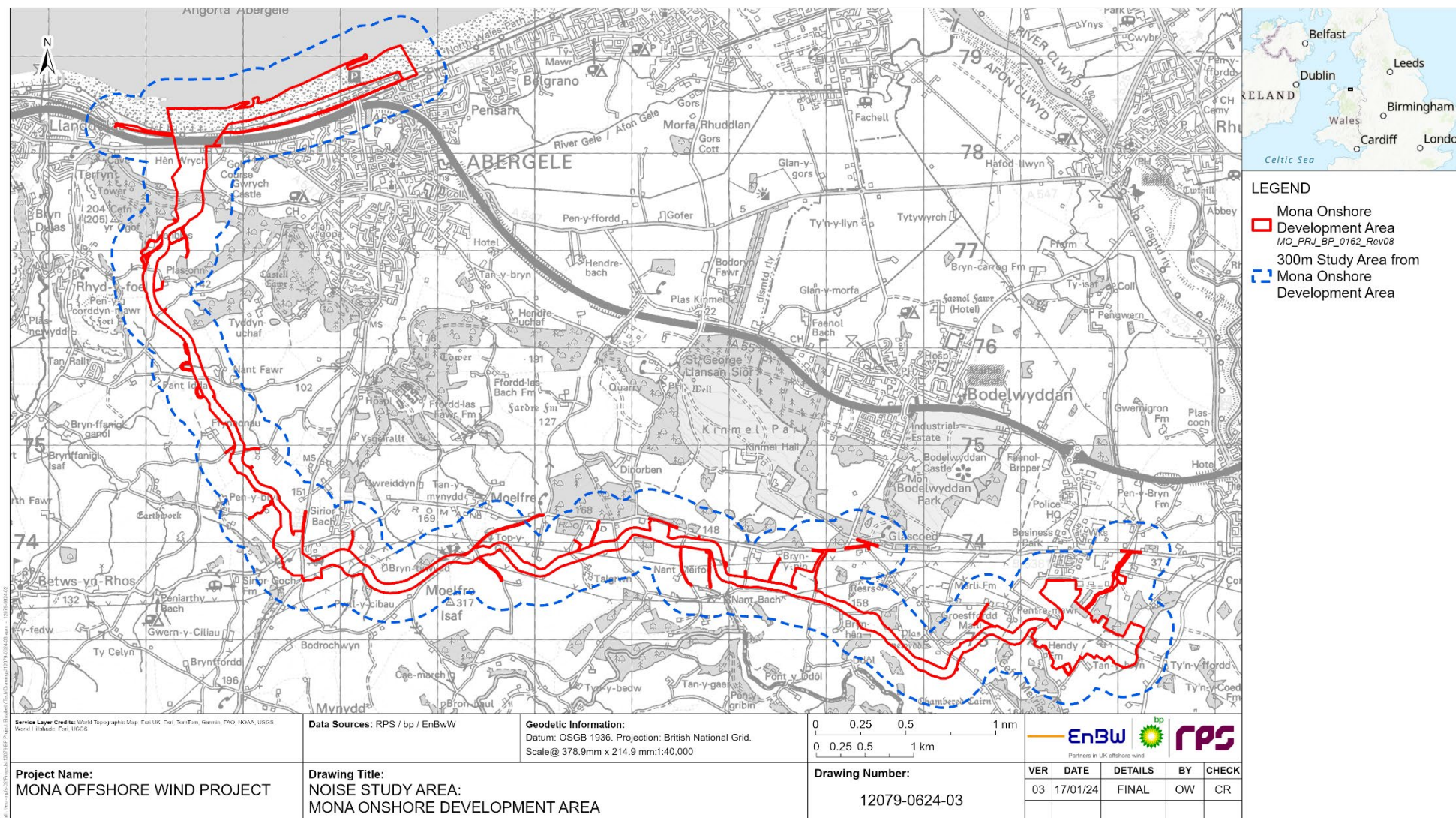
Offshore Wind Farm Environmental Impact Assessment Scoping Report (Mona Offshore Wind Ltd, 2022) and has been increased to better align with guidance.

1.2.1.5 In summary, the noise and vibration study area relevant to this technical report is defined as:

- The area of land to be temporarily or permanently occupied during the construction, operations and maintenance and decommissioning of the Mona Offshore Wind project (hereafter referred to as the Mona Onshore Development Area)
- Noise sensitive receptors located within 1 km of the Mona Landfall and Onshore Substation
- Noise sensitive receptors located within 300 m of the Mona Onshore Development Area (excluding the Mona Landfall and Onshore Substation).

1.2.1.6 The above descriptors are presented graphically in Figure 1.1 to Figure 1.3 below. The number of receptors and their location in relation to the noise and vibration study area are identified in Annex 9.2: Construction noise and vibration technical report of the Environmental Statement.

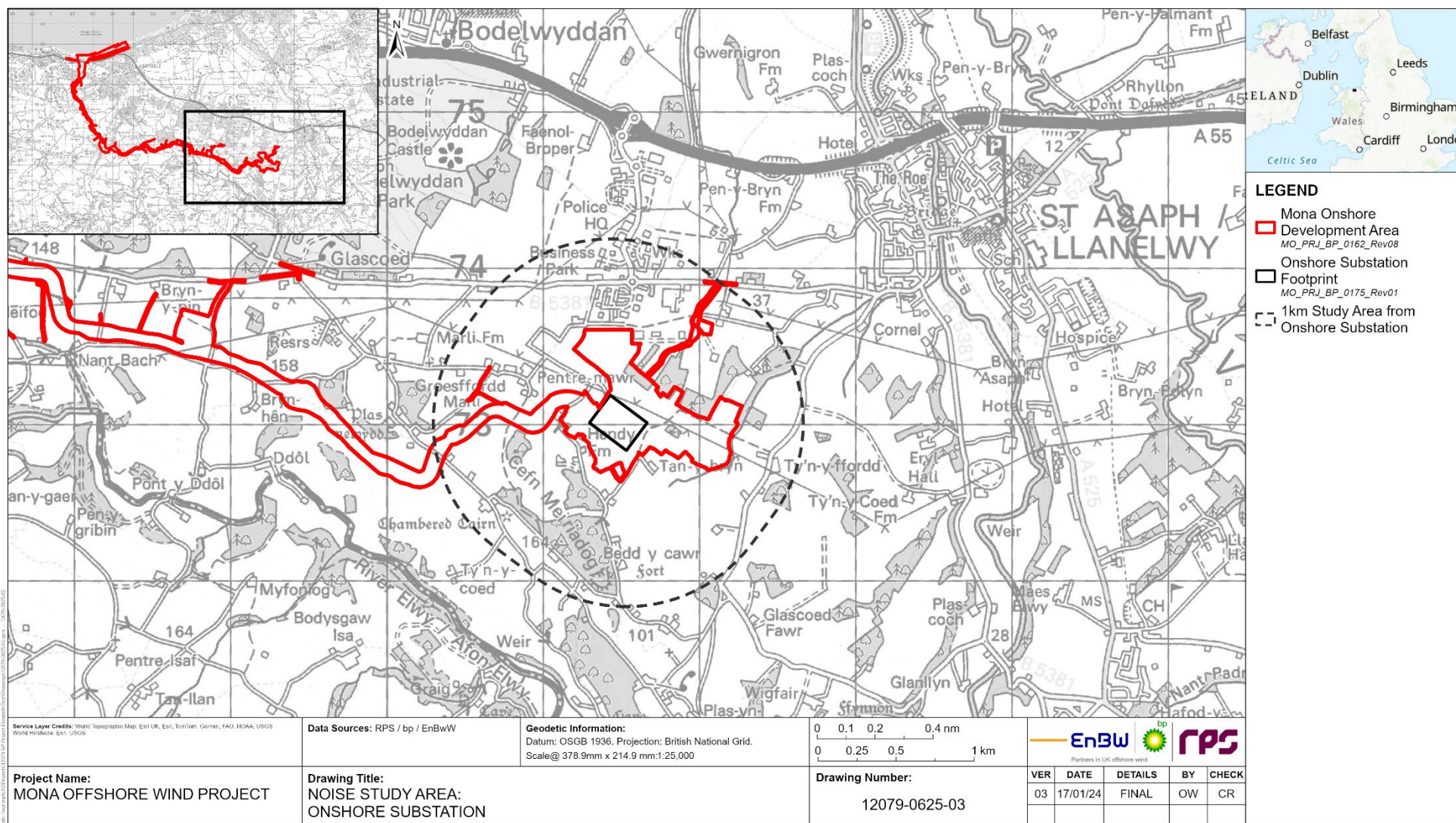
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**Figure 1.1: Noise and vibration study area – Mona Onshore Development Area.**

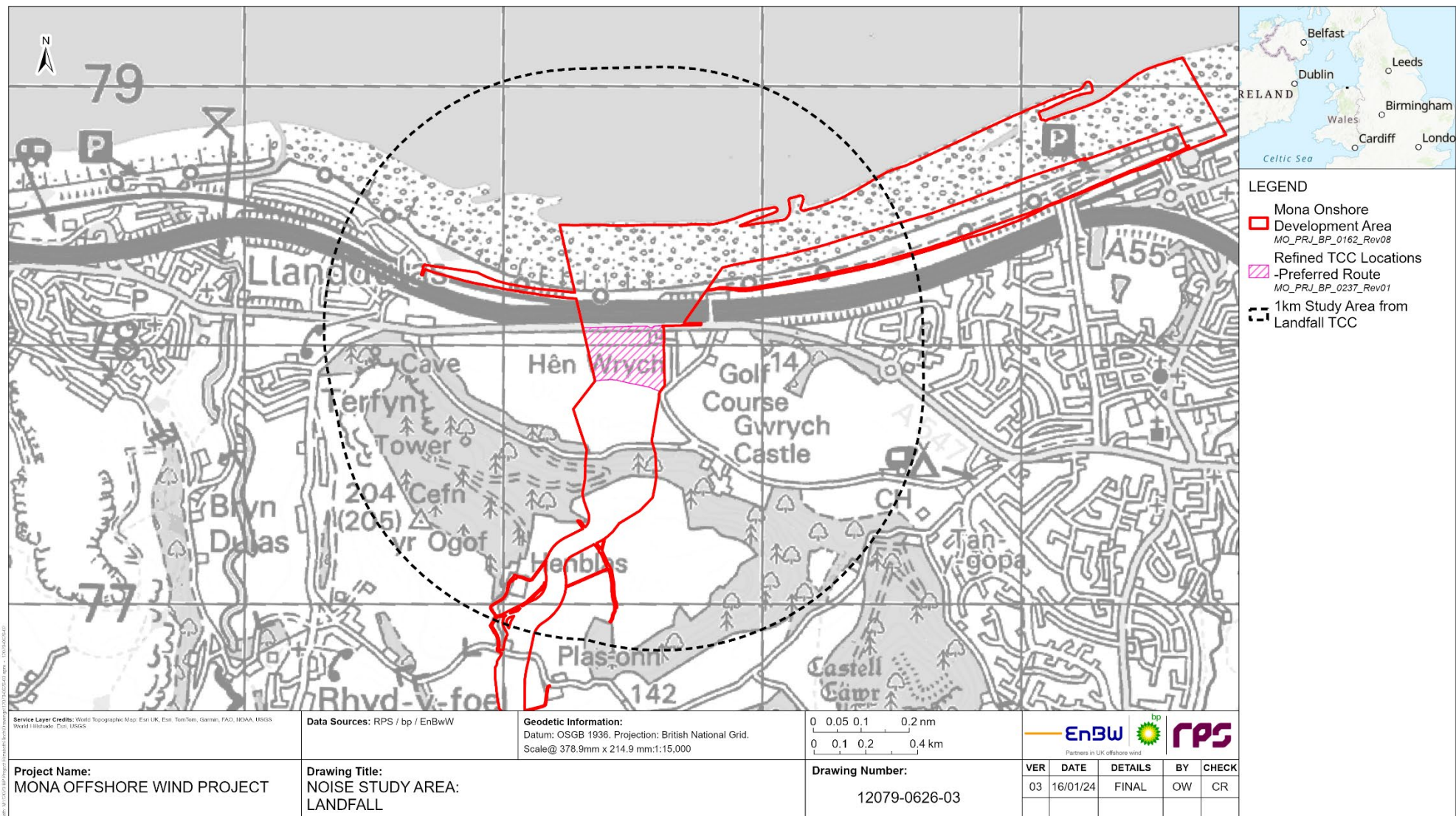


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**Figure 1.2: Noise and vibration study area – Mona Onshore Substation**

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**Figure 1.3: Noise and vibration study area – Mona Landfall**



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### 1.3 Consultation

1.3.1.1 A summary of the key issues raised during consultation activities undertaken to date specific to noise and vibration are presented in Table 1.1 below. Consultation has focused on the proposed locations of the baseline sound survey.

**Table 1.1: Summary of key consultation topics raised during consultation activities undertaken for the Mona Offshore Wind Project relevant to noise and vibration.**

Date	Consultee and type of response	Topics
06 September 2022	Environmental Health Department, CBBC – Email	Consultation to agree the proposed noise survey locations at Landfall.  CCBC did not respond to the request for consultation.
28 September 2022	Environmental Health Department, DCC – Email	Consultation to agree the proposed noise survey methodology for receptors around the proposed Onshore Substation locations.  DCC agreed with the proposal but requested that a long-term location be added to the receptor at Plas yr Esgob.
02 June 2023	S42 Consultee – Email	The consultee is a resident living in close proximity to the Mona Onshore Substation. The baseline sound survey position at LT4 was not accepted as representative of their property due to the distance between the physical siting of the equipment at LT4 and their property.  An additional position was added to the survey for the Mona Onshore Cable Corridor to be sited in their garden to obtain more representative baseline sound levels at their property.
25 August 2023	Environmental Health Department, DCC – Email	Consultation to agree the proposed noise survey locations along the Onshore Cable Corridor.  DCC did not respond to the request for consultation.
01 September 2023	Environmental Health Department, CBBC – Email	Consultation to agree the proposed noise survey locations along the Onshore Cable Corridor.  CCBC agreed with the proposal but requested that the position representative of receptors near Sirior Bach be moved since the property at the proposed location is unoccupied and farming activities may increase the baseline noise levels measured.

### 1.4 Site-specific surveys

#### 1.4.1 Overview

1.4.1.1 A summary of the surveys undertaken to inform the baseline noise environment is outlined in Table 1.2 below.

1.4.1.2 The surveys were coordinated and undertaken by a qualified principal acoustic consultant with a Ph.D. in environmental acoustics and a postgraduate diploma in acoustics and noise control.

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- 1.4.1.3 No baseline vibration surveys were undertaken since there are no existing sources of vibration impacting the nearby noise sensitive receptors. Impacts due to construction vibration are assessed against absolute criteria as defined in Volume 7, Annex 9.2: Construction Noise and Vibration of the Environmental Statement.

**Table 1.2: Summary of surveys undertaken to inform baseline sound environment.**

Title	Extent of survey	Overview of survey	Survey contractor	Date
Baseline sound survey	Mona Landfall	Baseline sound survey at locations representative of the nearest noise-sensitive receptors to Onshore Cable Corridor at the Mona Landfall.	RPS	November 2022
	Onshore Substation option locations	Baseline sound survey at locations representative of the nearest noise-sensitive receptors to the proposed Onshore Substation options.	RPS	November 2022
	Onshore Cable Corridor	Baseline sound survey at locations representative of the nearest noise-sensitive receptors to Onshore Cable Corridor.	RPS/Tetra Tech	September 2023

- 1.4.1.4 Monitoring was undertaken at the Mona Onshore Substation option locations to characterise the baseline sound environment where permanent structures are proposed. Additional monitoring was undertaken at the Mona Landfall to characterise the baseline sound environment at receptors situated near the proposed construction activities.
- 1.4.1.5 Additional monitoring was undertaken along the Mona Onshore Cable Corridor to obtain representative baseline sound levels at receptors situated close to proposed construction activities.

## 1.4.2 Methodology and Instrumentation

### Mona Landfall and Onshore Substation – November 2022

- 1.4.2.1 The baseline sound surveys comprised a combination of unattended long-term and short-term attended surveys. The long-term surveys involved the installation of monitors for between one and two weeks in secure locations. Meteorological equipment including a rain gauge and a mast for monitoring wind were also installed at a measurement position near the Mona Landfall and at a measurement position further in-land to account for the variation in meteorological conditions with distance from the coas.
- 1.4.2.2 Short-term monitoring was carried out over four 15-minute periods during the daytime between 7am and 11pm, and two 15-minute periods during the night-time between 11pm and 7am. At the start of each measurement, the wind speed and direction were measured using a hand-held anemometer to ensure that the direction and magnitude are acceptable for sound monitoring. No short-term attended monitoring surveys were carried out during periods of significant rainfall.
- 1.4.2.3 The locations for the long-term sound survey were selected to be representative of the nearest noise-sensitive human receptors to the construction works at landfall and the Mona Onshore Substation locations. The short-term sound survey locations were

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selected to supplement the long-term survey data and obtain a more detailed understanding of the spatial variation in the local sound climate. These locations are described in Table 1.3 and Table 1.4 for locations at the Mona Landfall and around the Mona Onshore Substation respectively and are shown in Appendix A:

1.4.2.4 At all locations, measurements were undertaken in the free-field at approximately 1.5 m above local ground level.

**Table 1.3: Descriptions of long term (LT) and short-term (ST) sound monitoring locations at the Mona Landfall.**

Position	Location		Description	Representative receptor
	x-coordinate	y-coordinate		
LT1	293627.00	37768.70	North boundary of Abergele Golf Course	Noise sensitive receptors on Troon Way and surrounding residential area.
LT2	292797.6044	377923.1622	West boundary of Abergele Golf Course	Noise sensitive receptor at Gwyrch House and neighbouring properties.
ST1	293347.9658	378273.0002	North boundary of Castle Cove Caravan Park.	Static caravans at Castle Cove Caravan Park.
ST2	291678.0794	378122.6140	South boundary of land at Tan yr Ogof Farm.	Noise sensitive receptors at Tan yr Ogof Farm and Tan yr Ogof Caravan Park.

**Table 1.4: Descriptions of long term (LT) and short-term (ST) sound monitoring locations near the Onshore Substation.**

Position	Location		Description	Representative receptor
	x-coordinate	y-coordinate		
LT3	301047.9307	373606.8890	Southwest boundary of the land west of Waen Meredydd	Residential receptor at Waen Meredydd
LT4	301011.0525	373286.6453	East boundary of the land west of Tyddyn Meredydd	Noise sensitive receptors south of Tyddyn Meredydd
LT5	302877.8515	373770.7900	Rear garden of the property at Cae yr Haul, Lon Coed Esgob.	Noise sensitive receptors on Lon Coed Esgob and Glascoed Road.
LT6	302261.4401	373716.6587	West boundary of the land east of Plas yr Esgob.	Noise sensitive receptors at Plas yr Esgob and Coed yr Esgob.
LT7	302950.6347	372502.3279	East boundary of the land east of Tyn y Ffordd Fawr.	Noise sensitive receptors near Cefnmeiriadog and caravans at Lyons Eryl Hall Caravan Park and Country Club.
LT8	302079.7281	372365.2572	Southeast boundary of the land at Tyn y Ffordd Newydd.	Noise sensitive receptors at Tyn y Ffordd Newydd, Rhos Aber, and Isfryn.

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Position	Location		Description	Representative receptor
	x-coordinate	y-coordinate		
ST3	302341.0767	373353.8919	South boundary of the land north of Coed yr Esgob.	Noise sensitive receptor at Coed yr Esgob.
ST4	302466.1157	372552.6271	West boundary of the land east of Tyn y Ffordd Fawr	Noise sensitive receptors near Cefnmeiriadog.

1.4.2.5 The long-term survey equipment was deployed between 12.45pm on Wednesday 09 November and 2.15pm on Thursday 10 November 2022 and was collected between 2.15pm on Tuesday 22 November and 10am on Wednesday 23 November 2022.

1.4.2.6 Short-term measurements at ST1 and ST2 were undertaken whilst deploying the long-term monitoring equipment on Wednesday 09 November, with ST3 and ST4 being undertaken upon collection on Wednesday 23 November.

1.4.2.7 Measurements of the  $L_{Aeq}$ ,  $L_{Amax}$ , and  $L_{A90}$  were undertaken at 100 millisecond (ms) intervals and temporally averaged over 15-minute periods for the duration of the survey period. The equipment listed in Table 1.5 below was used to undertake the survey.

**Table 1.5 Equipment used during the baseline sound survey.**

A The calibration level of 94.0 dB was recorded at all positions upon completion of the short-term measurements.

Position	Make/model	Serial number	Calibration at start (dB) (Ref: 94.0 dB)	Calibration at end (dB) (Ref: 94.0 dB)	Last manufacturers' calibration date
Calibrator	Rion NC-74	110118	N/A	N/A	17/10/2022
LT1	Rion NL-52	01087404	94.0	94.0	14/07/2022
LT2	Rion NL-52	01143556	94.0	94.0	10/05/2022
LT3	Rion NL-52	00231668	94.0	94.0	11/02/2022
LT4	Rion NL-52	00220558	94.0	94.0	16/06/2022
LT5	Rion NL-52	00620870	94.0	94.0	20/05/2022
LT6	Rion NL-52	00620864	94.0	94.0	22/09/2022
LT7	Rion NL-52	00164424	94.0	93.8	16/06/2021
LT8	Rion NL-52	00943367	94.0	94.0	19/04/2021
ST1	Rion NL-52	386735	94.0	93.9	19/11/2020
ST2-ST4	Rion NL-52	164423	94.0	94.0a	19/04/2021

1.4.2.8 The equipment was installed within weatherproof enclosures which includes a Rion WS-15 windshield on the microphone. The equipment was calibrated upon commencement and conclusion of the noise survey to confirm an acceptable degree of accuracy. As shown in Table 1.5 above, no significant drift ( $\pm 0.5$  dB) was noted to have occurred.

1.4.2.9 Measurements undertaken in accordance with British Standard 7445-2:1991 – 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data. All sound level meters used meet the 'Class 1' criteria defined

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within BS EN 61672-2:2013+A1:2017 – ‘Electroacoustics. Sound level meters – Pattern evaluation tests’. All calibrators used meet the ‘Class 1’ criteria defined within BS EN IEC 60942 – ‘Electroacoustics. Sound Calibrators’.

### 1.4.3 Meteorological conditions

- 1.4.3.1 A weather station was deployed alongside the survey equipment to monitor the variation in meteorological conditions throughout the survey period.
- 1.4.3.2 A Davies Instruments Vantage Vue 6250 weather station was deployed at LT2, adjacent to Gwyrch House, to monitor the conditions at the landfall. An additional Lufft WS600-UMB weather station was deployed at position LT3, Waen Meredydd, to monitor the conditions further in-land at positions around the onshore substation location.
- 1.4.3.3 Both weather stations were temporally synchronised with the sound survey equipment and any periods where precipitation events or wind speeds greater than 5 m/s occurred, were omitted during the analysis of the measured data.

### 1.4.4 Existing sound climate

- 1.4.4.1 A subjective description of the existing sound climate at each position is presented in Table 1.6 below.

**Table 1.6 Subjective description of noise climate at baseline sound survey positions.**

Position	Subjective description of noise climate
LT1	Dominant noise source noted to be road traffic on the A547 to the north of the survey position.
LT2	Primarily dominated by road traffic noise on the A547 and A55. Further influence was noted from activity on the golf course such as speech and golf karts although their influence is less significant.
LT3	This location was noted to be rural and thus quiet overall. Distant traffic from the A55 was noted to be audible and there will be influence from traffic on country lane adjacent to survey position. Upon collection, farming machinery was noted to be audible on land to the north.
LT4	This location was noted to be rural. Distant road traffic on local roads was noted to be audible but otherwise the sound climate was noted to be quiet. It was noted whilst deploying the equipment that a generator was audible on the property at Y Bwthyn to the east. The meter was installed sufficiently far away so as not to be influenced by this source. The data shows no influence on the measured levels and the generator was not running upon collection.
LT5	Glascoed Road runs from east to west to the north of this position. The noise climate was noted to be dominated by local traffic on this road and others in the area.
LT6	Distant traffic noise on Glascoed Road and the A55 was dominant at this position. Farming machinery was in operation at Plas yr Esgob Farm upon deployment.
LT7	The sound climate at this position was noted to be quiet with only distant traffic noise audible whilst on-site.

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Position	Subjective description of noise climate
LT8	Similar to LT7, the sound climate was noted to be quiet with very distant traffic noise being audible on local roads. Upon collection, the landowner informed surveyors that on Saturday 19 November, hunters were active on the land during the daytime and thus noise levels were likely to be higher due to the influence of guns being fired. This has been accounted for in the analysis of the data.
ST1	This position was in relatively close proximity to the A55 and thus traffic noise dominated. A railway line separates the caravan park from the A55 and passing trains were noted to be influential upon the measured levels.
ST2	Traffic noise on the A55 to the north and A547 to the south dominated the noise climate.
ST3	The sound climate was noted to be quiet with distant traffic noise the primary source of noise.
ST4	The sound climate at this position was noted to be quiet with only distant traffic noise audible whilst on-site.

### 1.4.5 Results

1.4.5.1 The results of the baseline sound survey at the long-term monitoring positions are presented graphically in Appendix B. A tabulated schedule of the results obtained at the short-term monitoring positions is presented in Appendix C:

1.4.5.2 The range of measured sound levels is presented in Table 1.7 below.

**Table 1.7 Range of measured sound levels at long-term monitoring positions.**

Location	Measured Sound Level, (dB)					
	Day			Evening	Night	
	$L_{Aeq,16h}$ (0700-2300)	$L_{Aeq,12h}$ (0700-1900)	$L_{A90,1h}$ (0700-2300)	$L_{Aeq,4h}$ (1900-2300)	$L_{Aeq,8h}$ (2300-0700)	$L_{A90,15min}$ (2300-0700)
LT1	50 – 56	51 – 57	30 – 55	44 – 54	41 – 53	25 – 51
LT2	47 – 58	48 – 58	35 – 58	41 – 55	45 – 51	29 – 56
LT3	42 – 60	43 – 60	26 – 56	36 – 59	35 – 60	25 – 54
LT4	42 – 61	43 – 62	26 – 57	35 – 59	38 – 61	27 – 55
LT5	44 – 54	45 – 55	32 – 53	38 – 54	37 – 57	27 – 55
LT6	43 – 57	44 – 56	30 – 55	39 – 57	36 – 59	27 – 55
LT7	40 – 58	41 – 58	27 – 58	35 – 58	34 – 62	25 – 59
LT8	37 – 52	38 – 53	25 – 53	27 – 53	28 – 55	25 – 54

### Mona Onshore Cable Corridor – September 2023

1.4.5.3 The baseline sound surveys along the Mona Onshore Cable Corridor comprised long-term monitoring at 12 locations at locations representative of receptors situated in the vicinity of the proposed construction works along the Onshore Cable Corridor. These locations are described in Table 1.8 and are presented graphically in Appendix A: below.



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1.4.5.4 No short-term measurements were undertaken since access was available for long-term noise monitoring at all the proposed locations.

**Table 1.8: Descriptions of long term (LT) sound monitoring locations along the Mona Onshore Cable Corridor.**

Position	Location		Description	Representative receptor
	x-coordinate	y-coordinate		
LT9	292009.0615	376850.2973	Southeast boundary of land at Llys Awel.	Noise sensitive receptors west of Rhyd-y-Foel.
LT10	292616.5158	375697.9405	South boundary of land to the north of Y Nentydd Road, Abergle.	Noise sensitive receptors around Y Nentydd Road.
LT11	293255.8762	374777.6776	North boundary of land to the east of Pen-y-Bryn Farm.	Noise sensitive receptors around Betws yn Rhos Road.
LT12	294480.4854	373599.3176	West boundary of land to the west of Penrefail Crossroads, Moelfre.	Noise sensitive receptors around Penrefail Crossroads.
LT13	293403.3421	373826.3581	South boundary of the land at Bryn Tywydd, Moelfre.	Noise sensitive receptors around Bryn Tywydd.
LT14	296628.3515	373785.7596	North boundary of Dinorben Farm, St George.	Noise sensitive receptors around Roman Road (B5381).
LT15	299759.4304	372982.411	South boundary of land adjoining Tyn-y-Mynydd, Moelfre.	Noise sensitive receptors to the south of Tyn-y-Mynydd.
LT16	599138.7208	747877.3069	Northeast boundary of Dinorben Farm (Plas Bryn Celyn).	Noise sensitive receptors to the east of Dinorben Farm.
LT17	298426.1744	373582.2585	Northwest boundary of land adjoining Ddol Farm, Groesffordd Marli.	Noise sensitive receptors south of Roman Road (B5381).
LT18	295711.9278	374103.5592	Northwest boundary of Plas Hafod, Groesffordd Marli.	Noise sensitive receptors to the north in Groesffordd Marli.
LT19	298030.2258	373882.9516	East boundary of land at Maes Cefn, Meiriadog.	Noise sensitive receptors to the south of Groesffordd Marli.
LT20	301090.5058	373090.7629	North boundary of property at Tyddyn Meredydd, Cefmeiriadog.	Residential dwelling at Tyddyn Meredydd.

1.4.5.5 The long-term survey equipment was deployed between 10.30am and 1pm on Thursday 14 September 2023 and was collected between 10.15am and 2pm on Tuesday 19 September 2023.

1.4.5.6 Measurements of the  $L_{Aeq}$ ,  $L_{Amax}$ , and  $L_{A90}$  were undertaken at 100 ms intervals and temporally averaged over 15-minute periods for the duration of the survey period. The equipment listed in Table 1.9 below was used to undertake the survey.

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**Table 1.9 Equipment used during the baseline sound survey.**

A The calibration level of 94.0 dB was recorded at all positions upon completion of the short-term measurements.

Position	Make/model	Serial number	Calibration at start (dB) (Ref: 94.0 dB)	Calibration at end (dB) (Ref: 94.0 dB)	Last manufacturers' calibration date
LT9	Rion NL-52	01221576	94.0	94.0	30/06/2022
LT10	Norsonic 140	1404090	114.0	114.0	27/02/2023
LT11	Norsonic 140	1403345	114.0	114.0	02/12/2021
LT12	Norsonic 140	1405677	114.0	114.0	15/06/2023
LT13	Norsonic 140	1403354	114.0	114.0	02/12/2021
LT14	Norsonic 140	1404354	114.0	114.0	02/02/2022
LT15	Rion NL-52	710312	94.0	94.0	26/09/2023
LT16	Rion NL-52	1021257	94.0	94.0	27/04/2022
LT17	Rion NL-52	0810558	94.0	94.0	08/12/2021
LT18	Rion NL-52	0810559	94.0	94.1	08/12/2021
LT19	Rion NL-52	0219905	94.0	94.0	26/05/2023
LT20	Norsonic 140	1405091	114.0	114.0	27/07/2023

1.4.5.7 The equipment was installed within weatherproof enclosures which includes a Rion WS-15 windshield and Nor4529 windscreen on the microphones. The equipment was calibrated upon commencement and conclusion of the noise survey to confirm an acceptable degree of accuracy. As shown in Table 1.9 above, no significant drift ( $\pm 0.5$  dB) was noted to have occurred.

1.4.5.8 Measurements undertaken in accordance with British Standard 7445-2:1991 – 'Description and measurement of environmental noise – Part 2: Guide to the acquisition of data. All sound level meters used meet the 'Class 1' criteria defined within BS EN 61672-2:2013+A1:2017 – 'Electroacoustics. Sound level meters – Pattern evaluation tests'. All calibrators used meet the 'Class 1' criteria defined within BS EN IEC 60942 – 'Electroacoustics. Sound Calibrators'.

### 1.4.6 Meteorological conditions

1.4.6.1 A weather station was deployed alongside the survey equipment to monitor the variation in meteorological conditions throughout the survey period.

1.4.6.2 A Davies Instruments Vantage Vue 6250 weather station was deployed at LT9, Llys Awel, to monitor the conditions closer to the coast. An additional Lufft WS600-UMB weather station was deployed at position LT19, Maes Cefn, to monitor the conditions further in-land.

1.4.6.3 Both weather stations were temporally synchronised with the sound survey equipment and any periods, where precipitation events or wind speeds greater than 5 m/s occurred, were omitted during the analysis of the measured data.

## MONA OFFSHORE WIND PROJECT

### 1.4.7 Existing sound climate

1.4.7.1 A subjective description of the existing sound climate at each position is presented in Table 1.10 below.

**Table 1.10 Subjective description of noise climate at baseline sound survey positions.**

Position	Subjective description of noise climate
LT9	Noise climate dominated by distance traffic on the A55 and local highway networks.
LT10	Primarily dominated by distant road traffic on the A55 and Abergele Road.
LT11	Some farming machinery was audible during deployment of the equipment. Overall, the noise climate was noted to be dominated by road traffic on the A548.
LT12	Noise climate noted to be quiet overall with influence from pass-bys on adjacent roads.
LT13	This location was noted to be fairly rural with distance traffic noise on local roads audible.
LT14	Dominant noise source noted to be traffic on Roman Road (B5381) but noted to be generally quiet overall.
LT15	As above, a rural location resulting in low baseline noise levels with distant traffic being the dominant source.
LT16	Noise climate influenced primarily by traffic on Roman Road (B5381).
LT17	Similar to LT16 but noted to be quieter due to increased distance from local roads.
LT18	A rural location and thus noted to be quiet. Distant traffic was audible.
LT19	Similar to LT18, however some influence from activities within Plas Hafod Kennels.
LT20	The sound climate at this position was noted to be quiet with only distant traffic noise audible whilst on-site.

### 1.4.8 Results

1.4.8.1 The results of the baseline sound survey at the long-term monitoring positions are presented graphically in Appendix B:

1.4.8.2 The range of measured sound levels is presented in Table 1.11 below.

**Table 1.11 Range of measured sound levels at long-term monitoring positions.**

Location	Measured Sound Level, (dB)					
	Day			Evening	Night	
	$L_{Aeq,16h}$ (0700-2300)	$L_{Aeq,12h}$ (0700-1900)	$L_{A90,1h}$ (0700-2300)	$L_{Aeq,4h}$ (1900-2300)	$L_{Aeq,8h}$ (2300-0700)	$L_{A90,15min}$ (2300-0700)
LT9	40 – 64	41 – 64	26 – 54	34 – 47	32 – 51	26 – 48
LT10	37 – 58	37 – 58	25 – 54	33 – 43	33 – 48	25 – 49
LT11	41 – 61	41 – 61	25 – 56	35 – 49	33 – 48	25 – 51
LT12	46 – 69	45 – 69	25 – 65	45 – 60	25 – 45	25 – 45
LT13	37 – 55	36 – 55	25 – 53	33 – 41	24 – 33	25 – 47
LT14	45 – 61	45 – 61	25 – 52	42 – 52	39 – 57	25 – 50
LT15	38 – 58	38 – 58	26 – 56	35 – 44	33 – 45	26 – 46

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Location	Measured Sound Level, (dB)					
	Day			Evening	Night	
	$L_{Aeq,16h}$ (0700-2300)	$L_{Aeq,12h}$ (0700-1900)	$L_{A90,1h}$ (0700-2300)	$L_{Aeq,4h}$ (1900-2300)	$L_{Aeq,8h}$ (2300-0700)	$L_{A90,15min}$ (2300-0700)
LT16	43 – 66	44 – 66	25 – 61	38 – 52	35 – 51	25 – 49
LT17	38 – 58	38 – 58	26 – 45	36 – 44	27 – 43	26 – 42
LT18	37 – 69	38 – 69	26 – 50	32 – 41	26 – 31	26 – 52
LT19	36 – 61	35 – 61	26 – 51	33 – 49	37 – 45	26 – 48
LT20	43 – 60	43 – 60	25 – 51	37 – 44	37 – 46	25 – 40

## 1.5 References

British Standards Institution (1991), '*British Standard 7445-2:1991 Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*'.

British Standards Institution (2003), '*British Standard 7445-1:2003. Description and measurement of environmental noise – Part 1: Guide to environmental quantities and procedures*'

British Standards Institution (2017), '*BS EN 61672-2:2013+A1:2017 – 'Electroacoustics. Sound level meters – Pattern evaluation tests*'

British Standards Institution (2018), '*BS EN IEC 60942 – 'Electroacoustics. Sound Calibrators*'

Mona Offshore Wind Ltd. (2022) Mona Offshore Wind Farm Environmental Impact Assessment Scoping Report

## Appendix A: Baseline Sound Survey Locations



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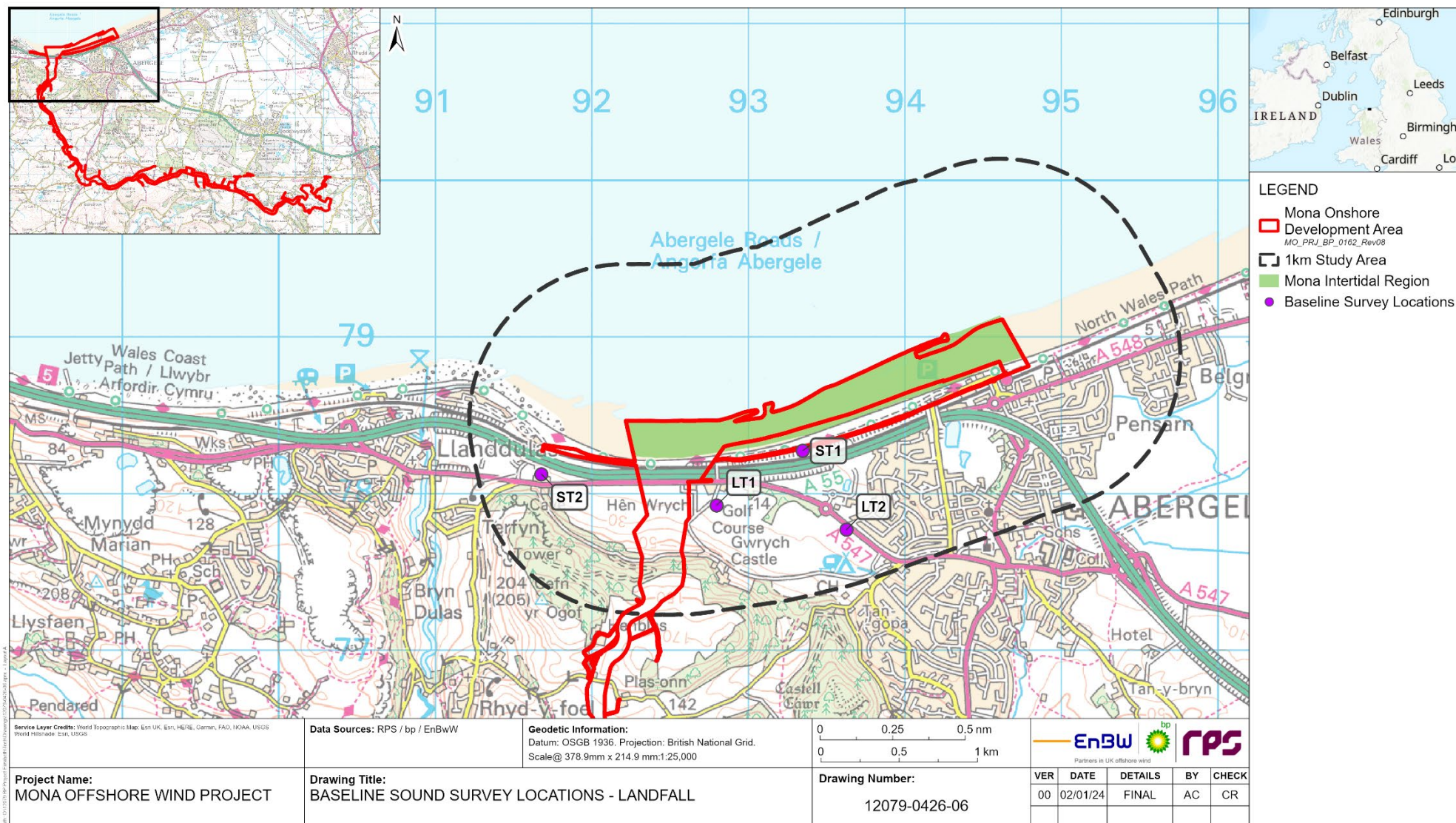
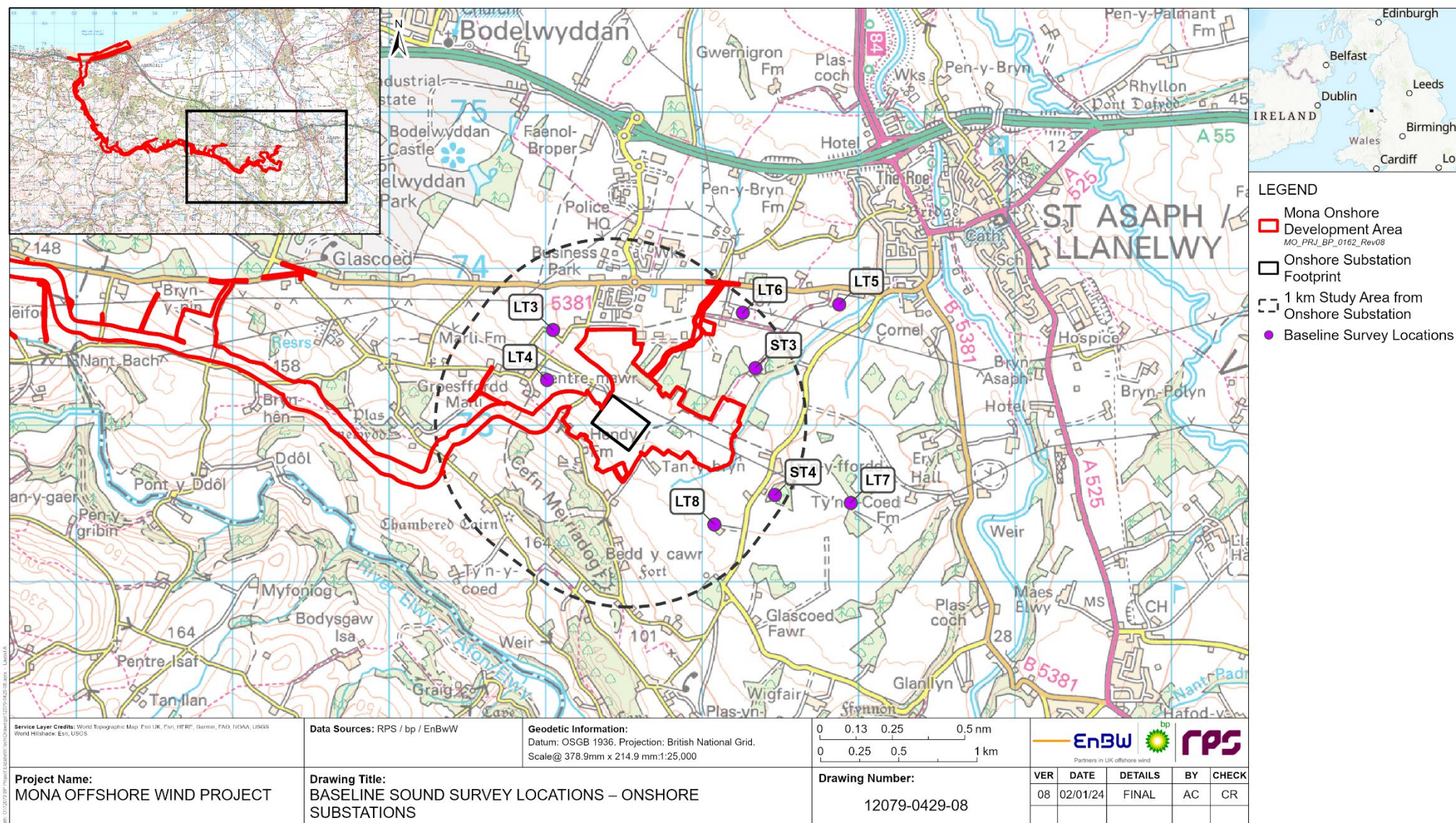


Figure A. 1: Baseline sound survey locations - landfall



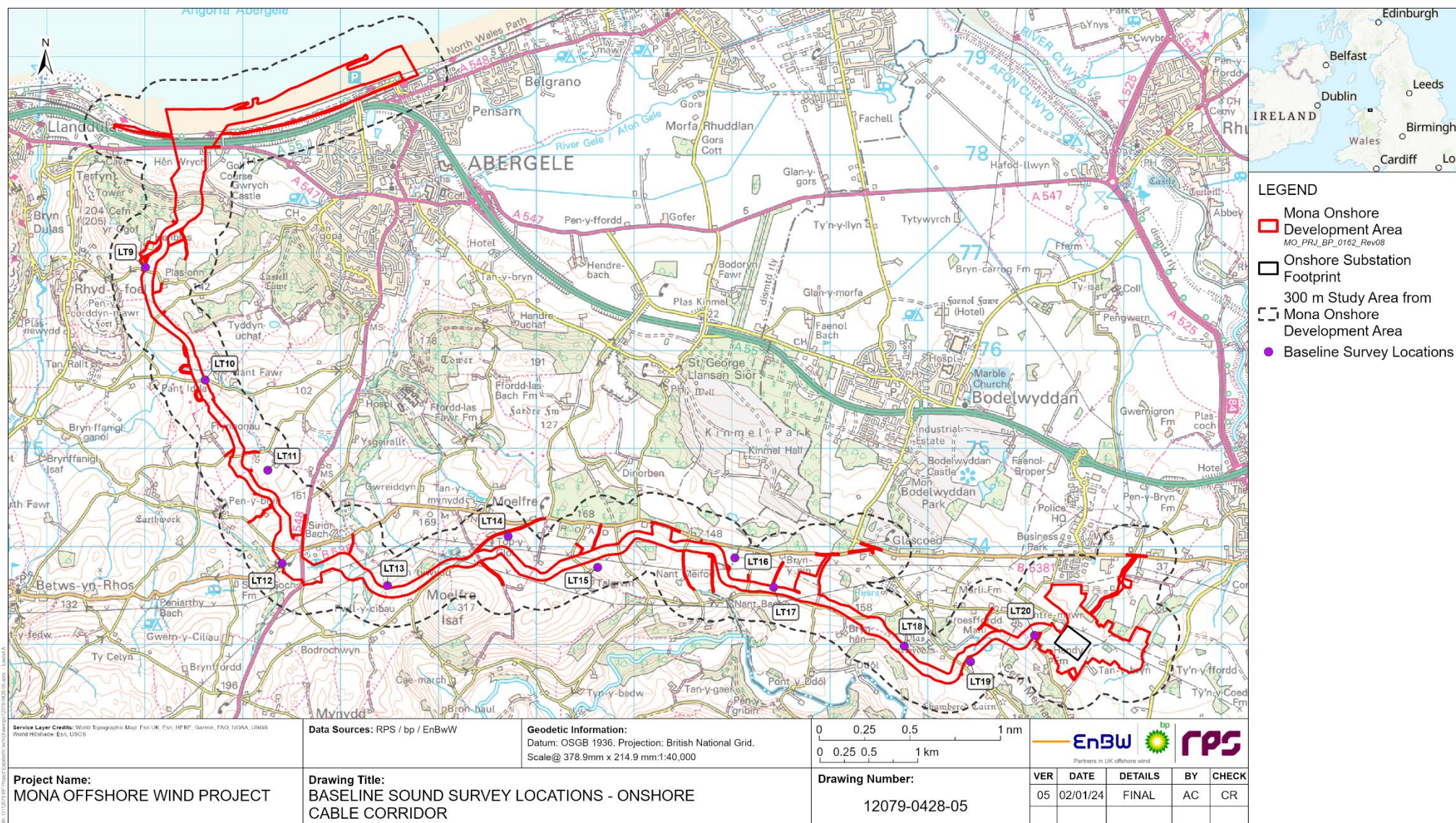
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**Figure A. 2: Baseline sound survey locations – onshore substation**



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**Figure A. 3: Baseline sound survey locations – Onshore Cable Corridor**

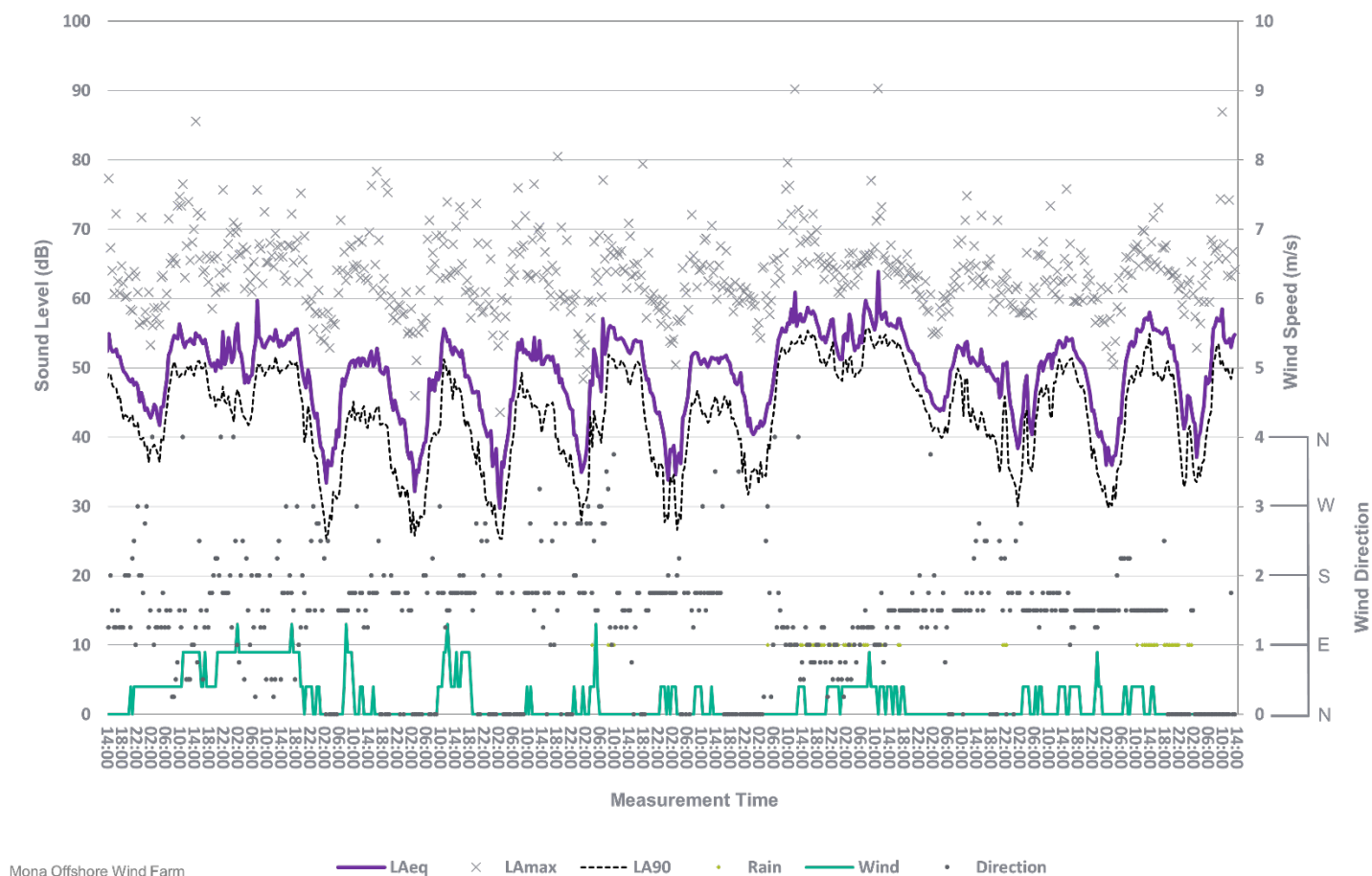
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# Appendix B: Time-History Graphs



### Appendix B1

Measured Noise Levels at LT1, 9 to 22 November 2022



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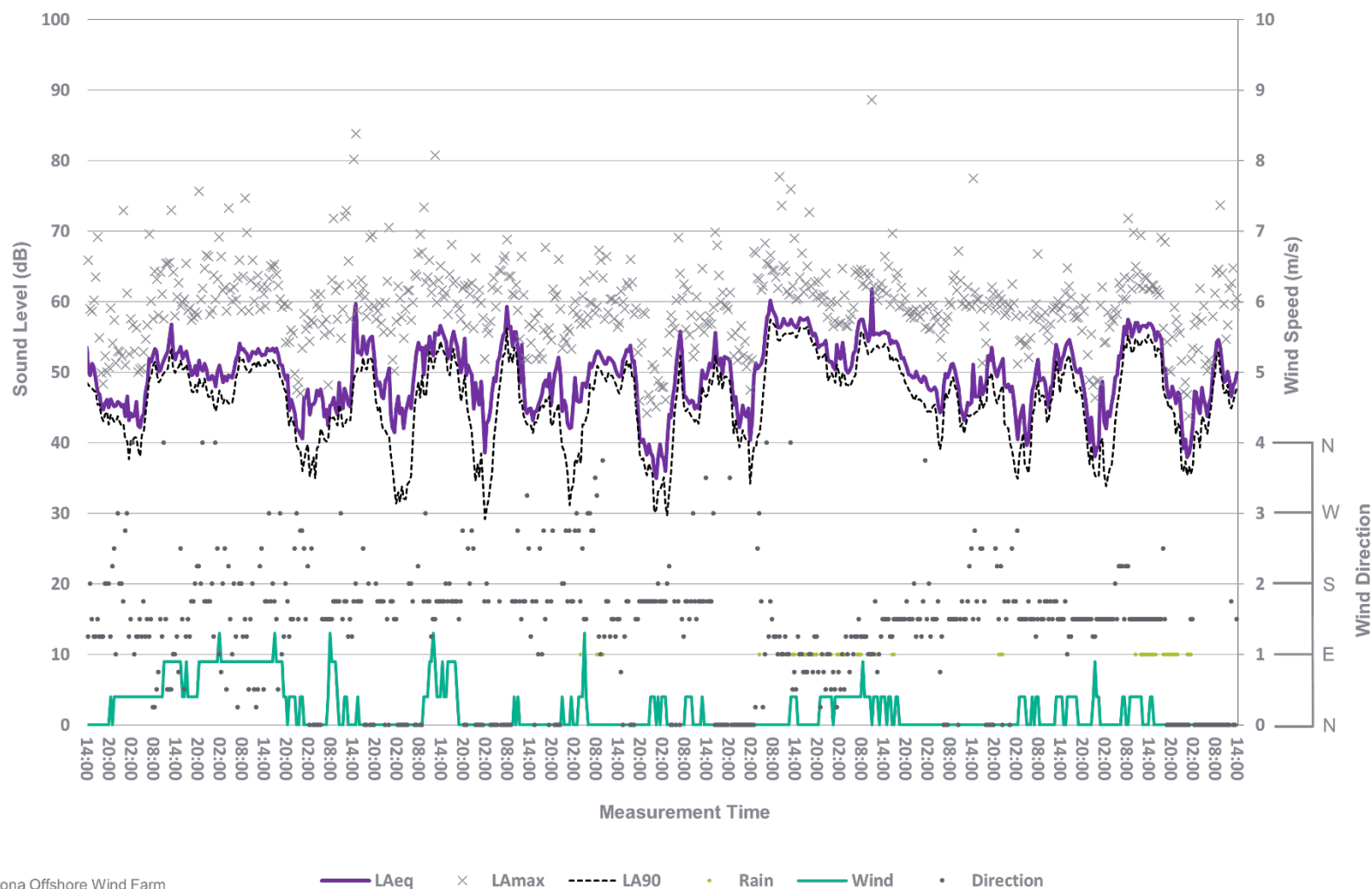


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## Appendix B2

Measured Noise Levels at LT2, 9 to 22 November 2022



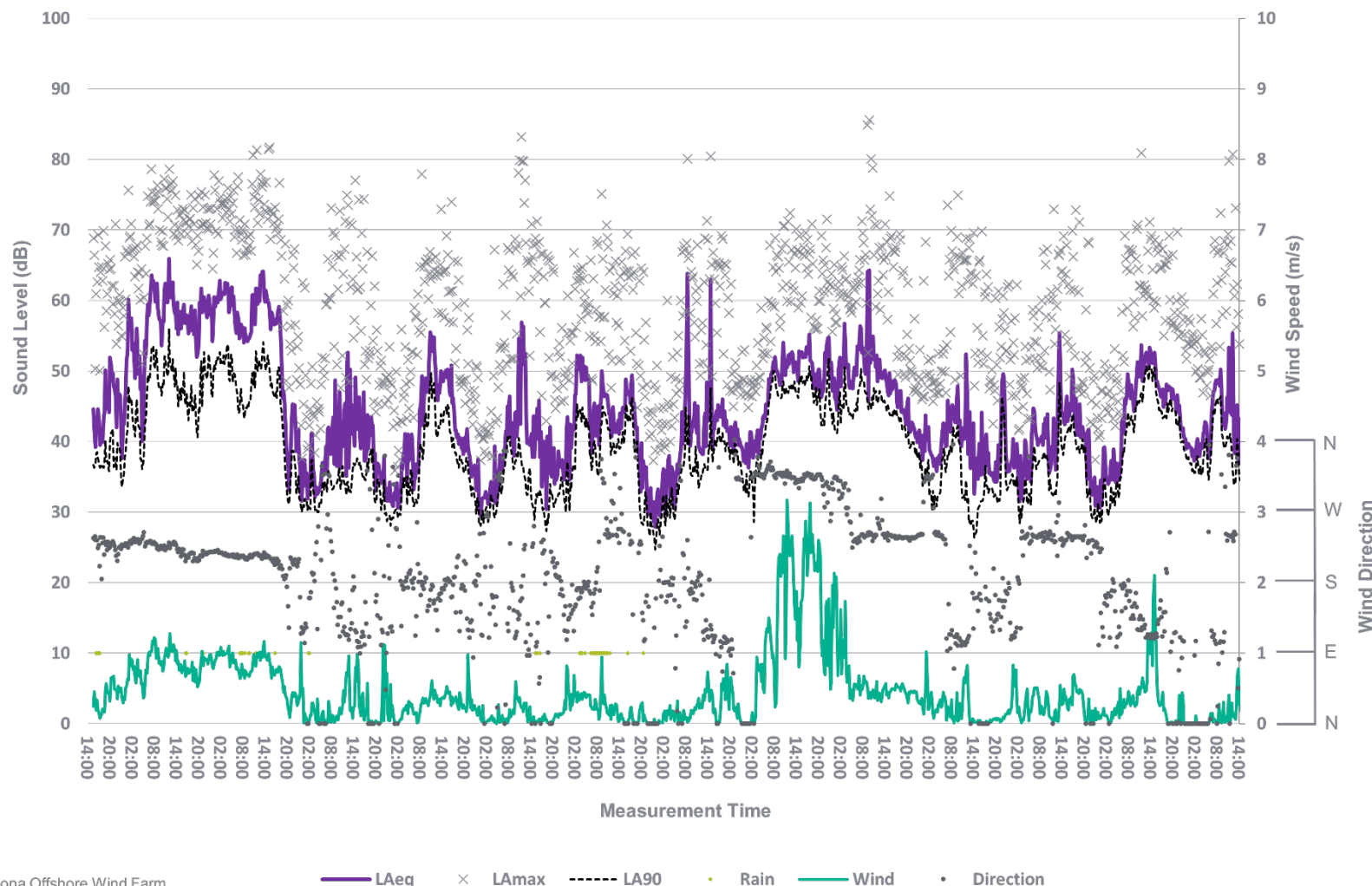
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## Appendix B3

Measured Noise Levels at LT3, 9 to 22 November 2022



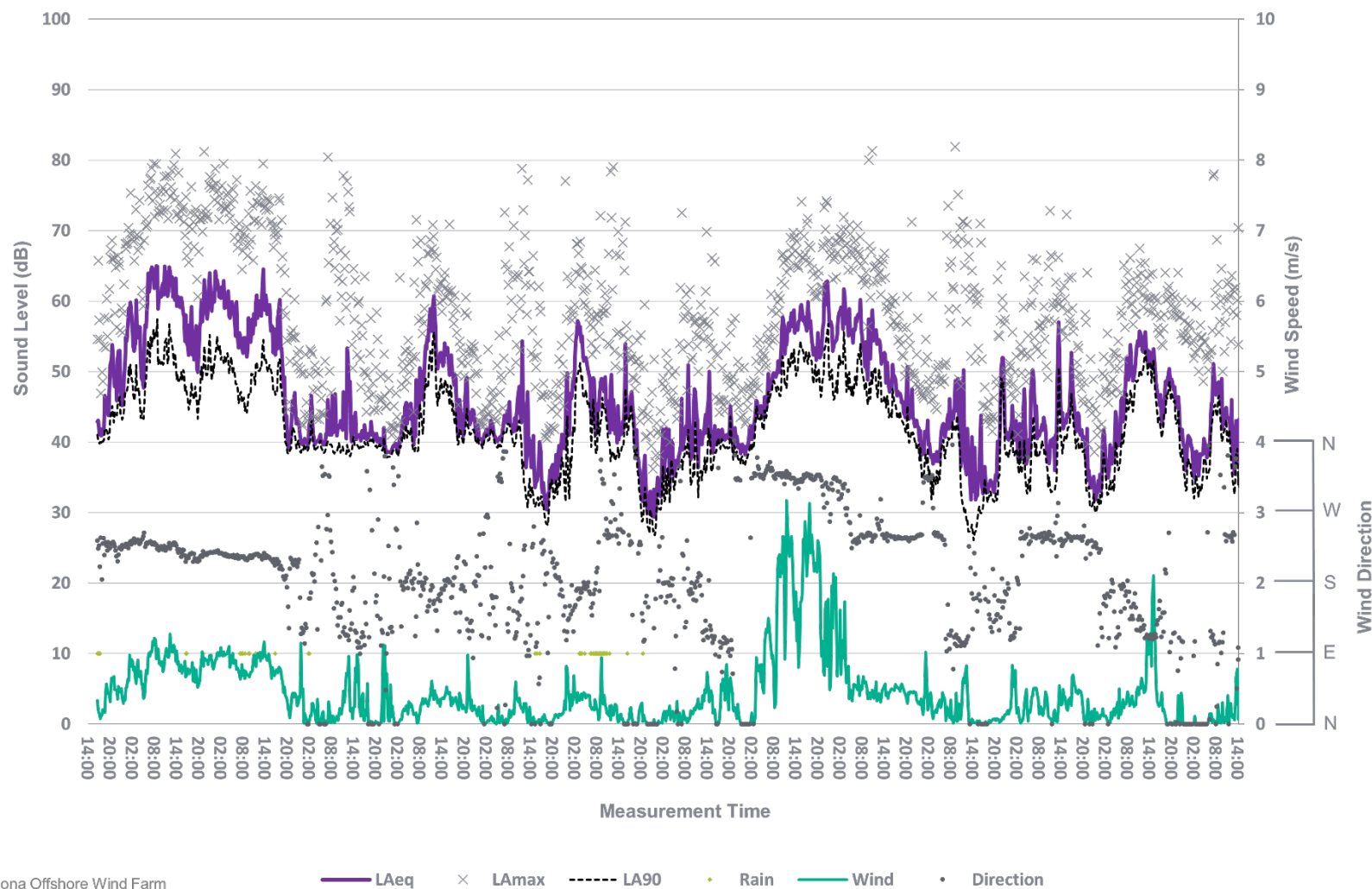
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## Appendix B4

Measured Noise Levels at LT4, 9 to 22 November 2022



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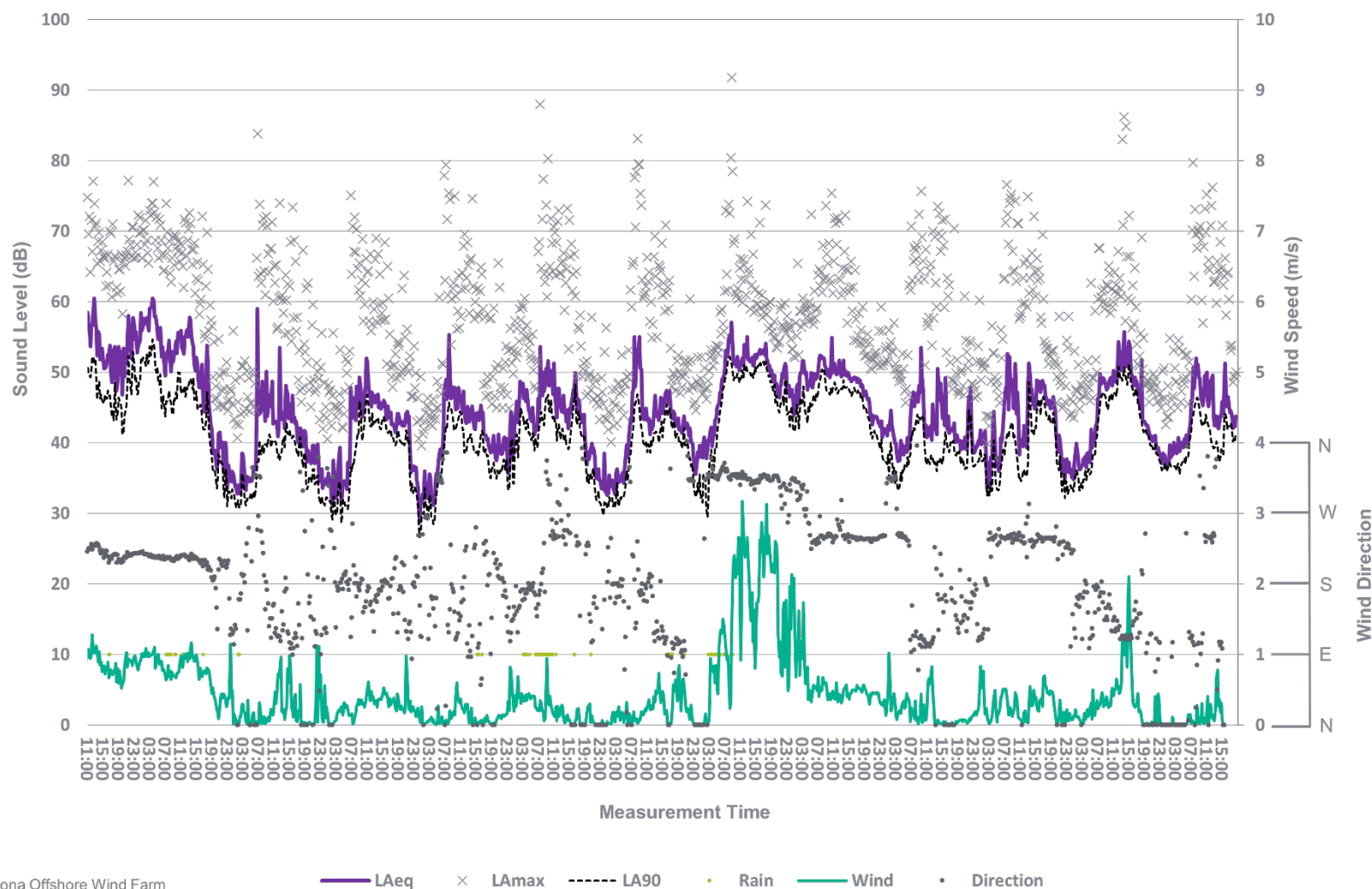


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## Appendix B5

Measured Noise Levels at LT5, 10 to 22 November 2022



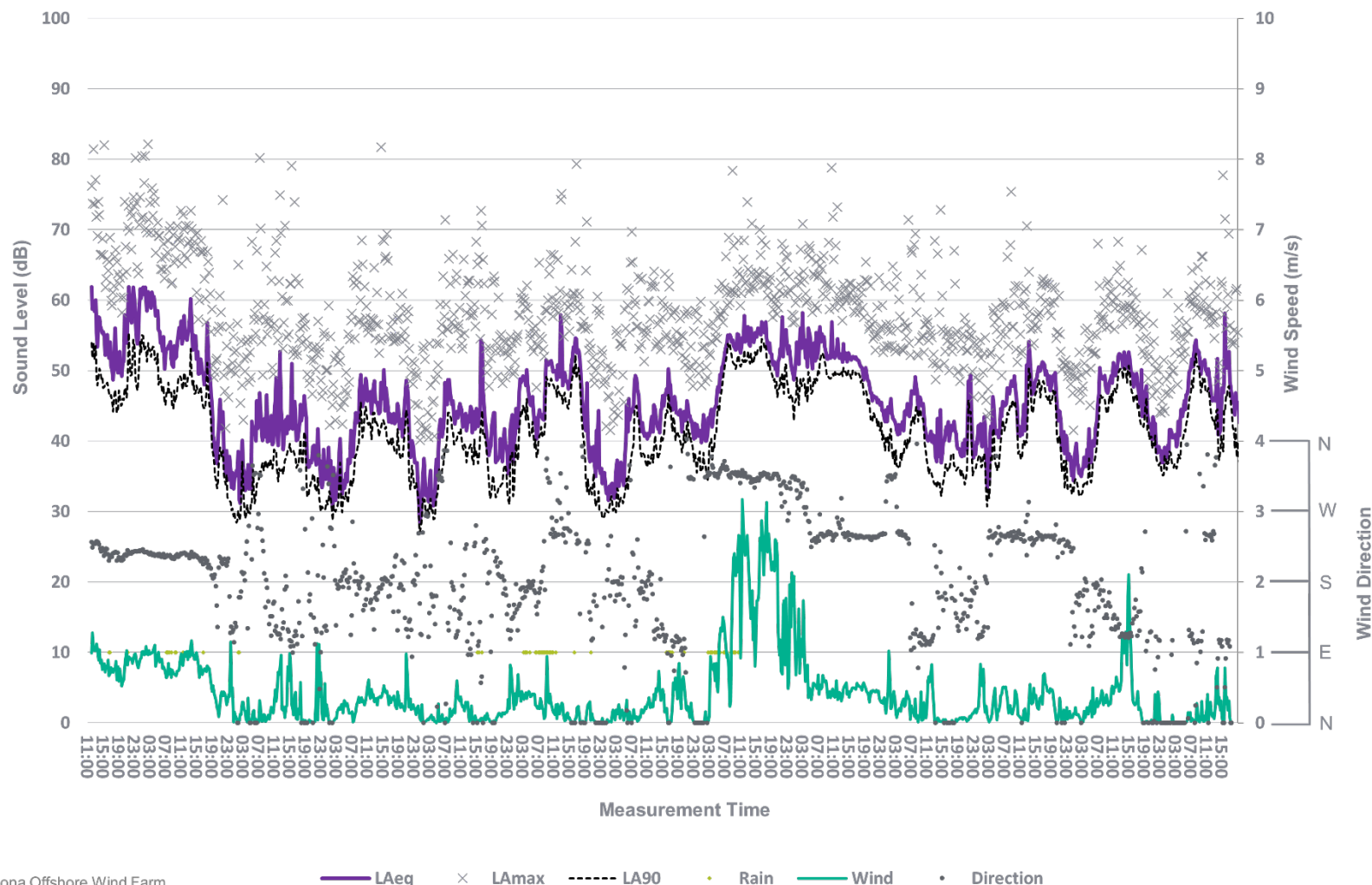
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## Appendix B6

Measured Noise Levels at LT6, 10 to 22 November 2022



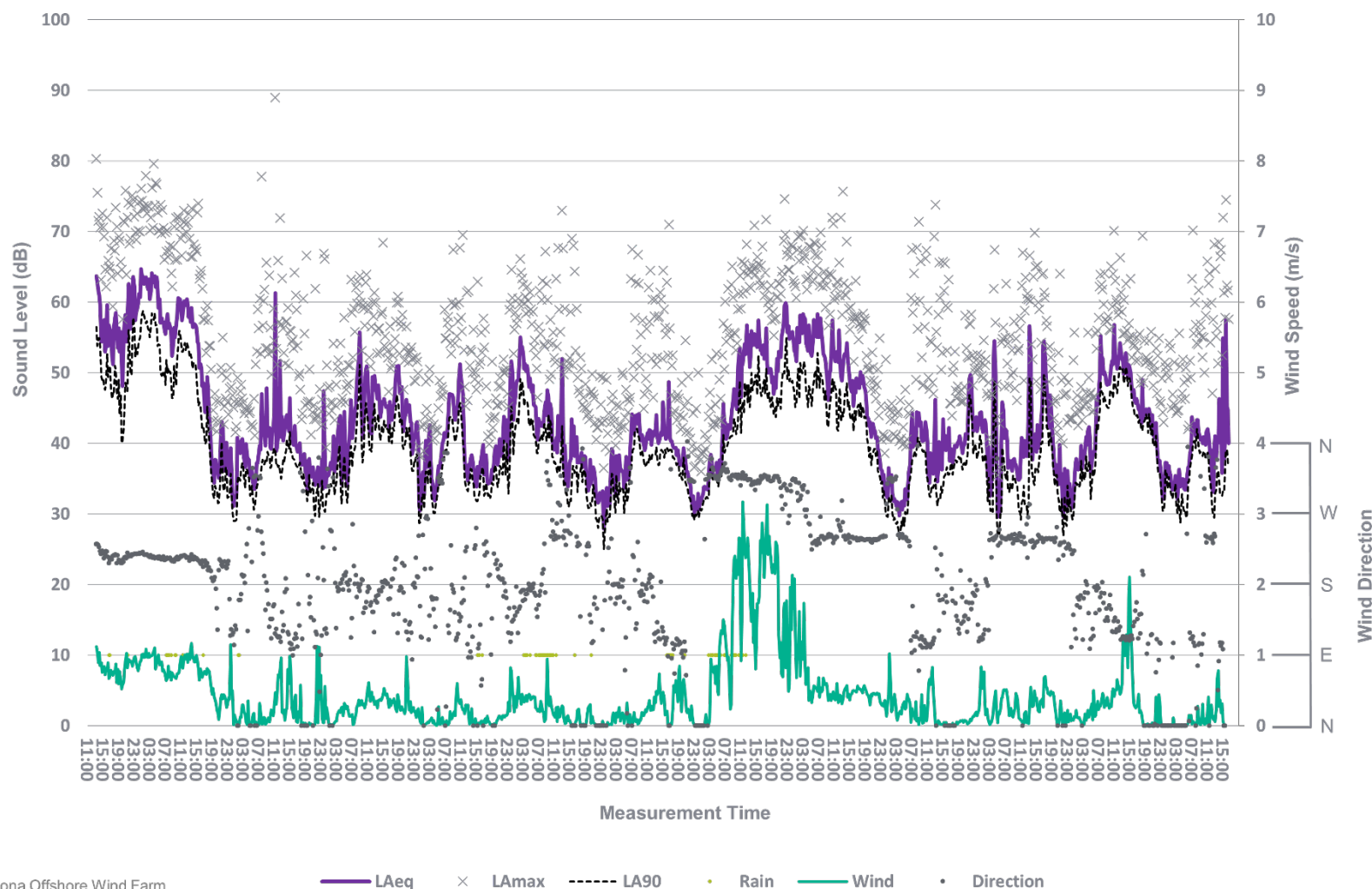
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## Appendix B7

Measured Noise Levels at LT7, 10 to 22 November 2022



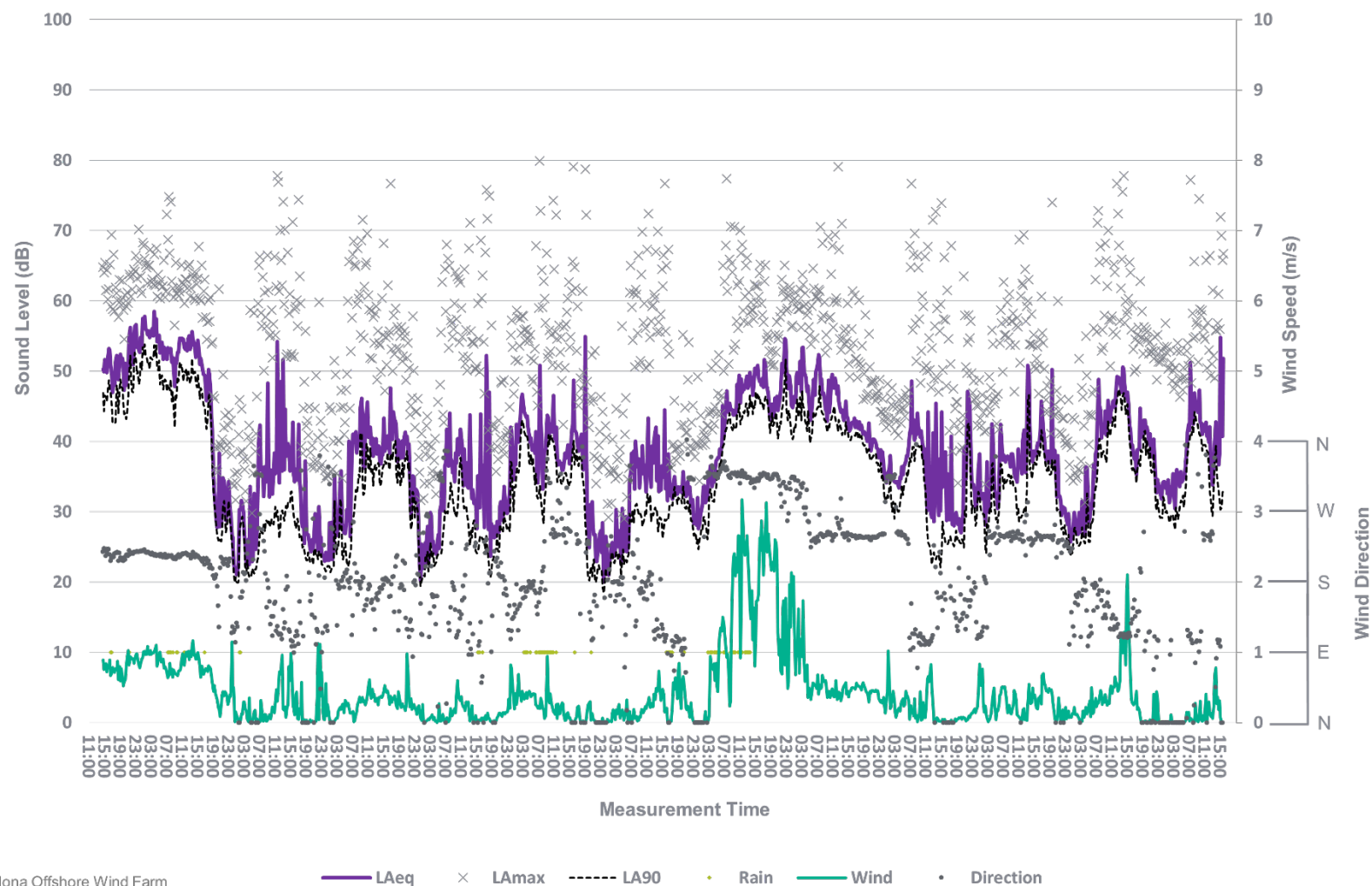
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## Appendix B8

Measured Noise Levels at LT8, 10 to 22 November 2022



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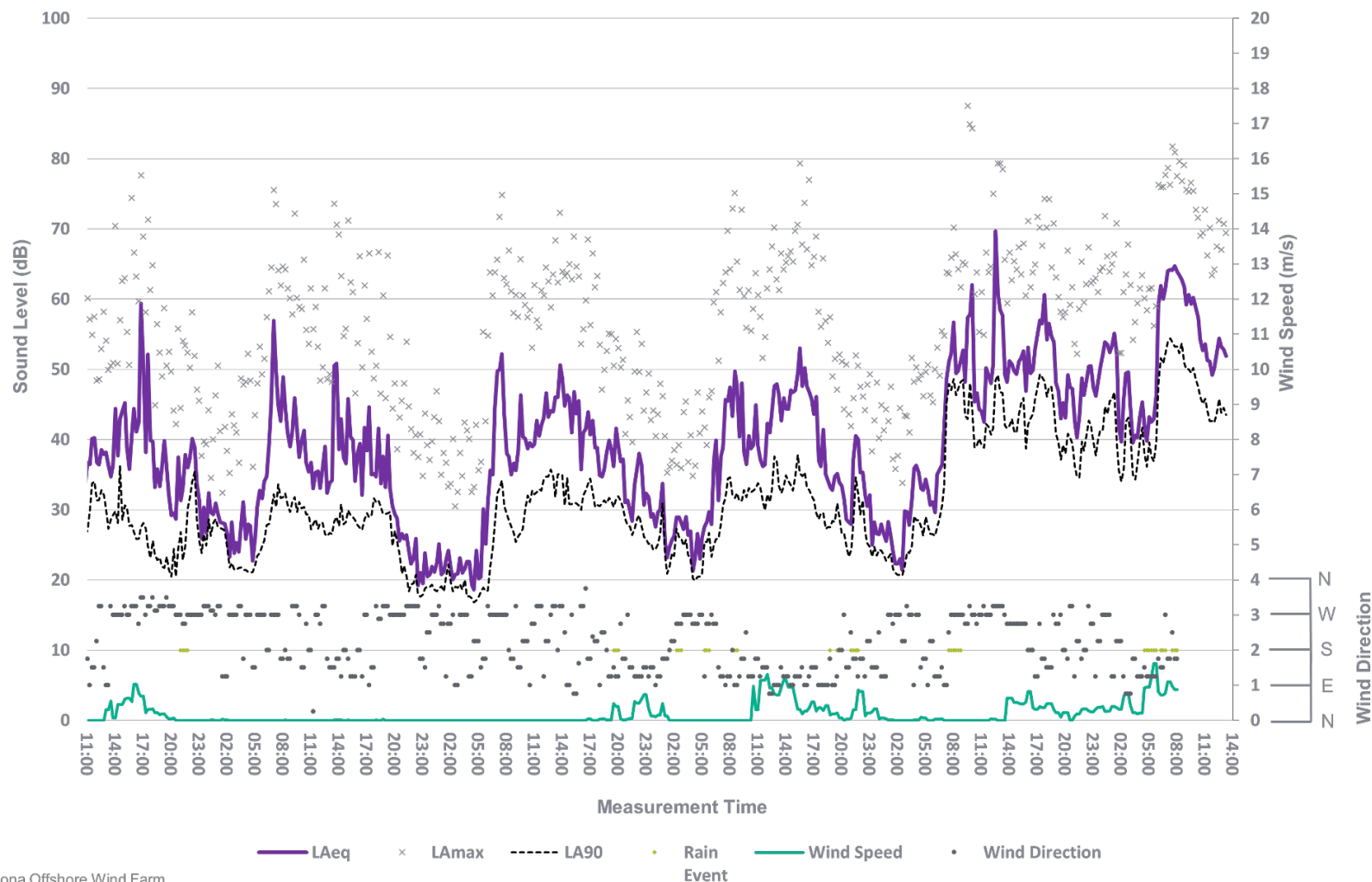


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## Appendix B9

Measured Noise Levels at LT9, 14 to 19 September 2023



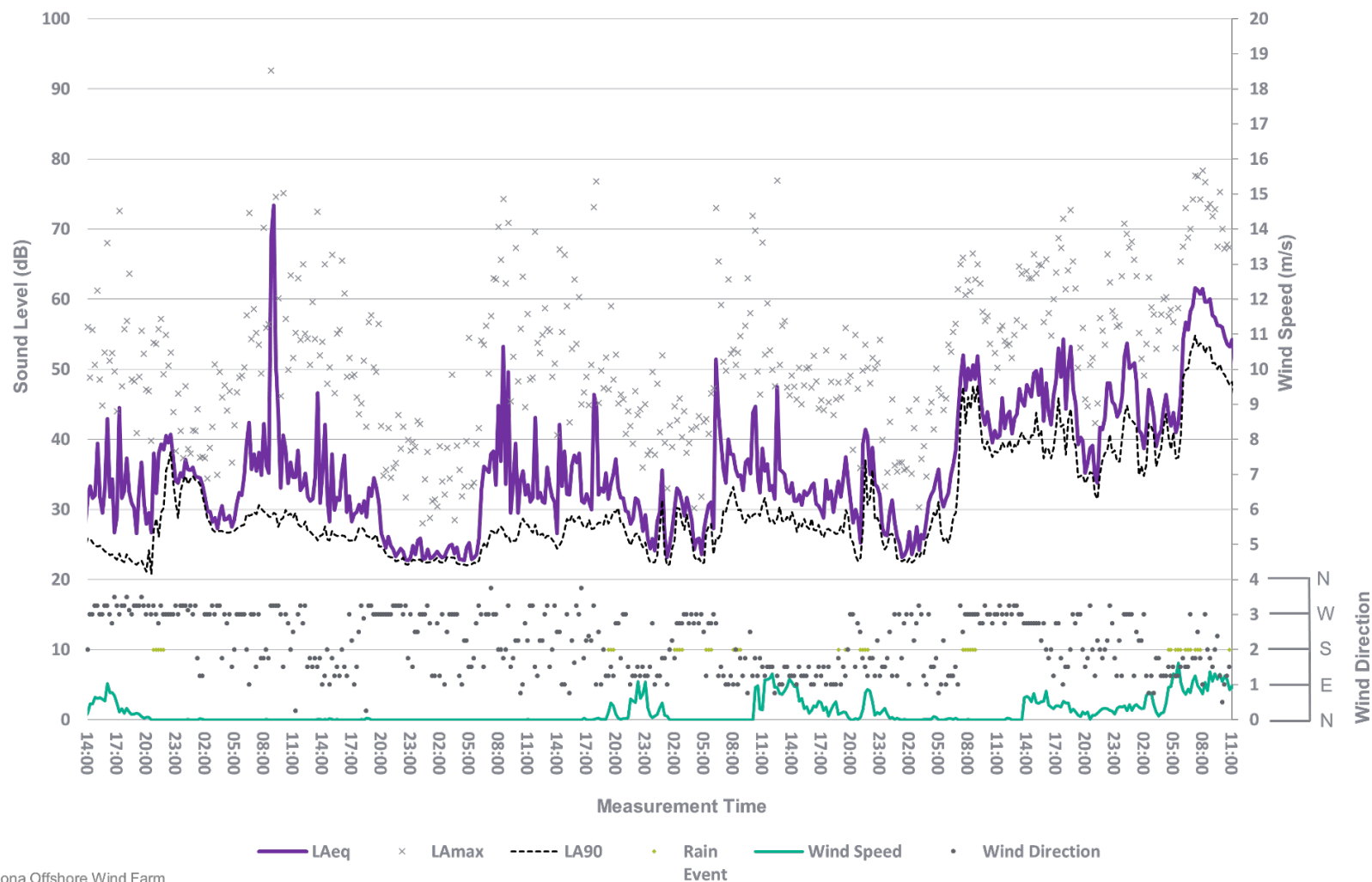
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## Appendix B10

Measured Noise Levels at LT10, 14 to 19 September 2023



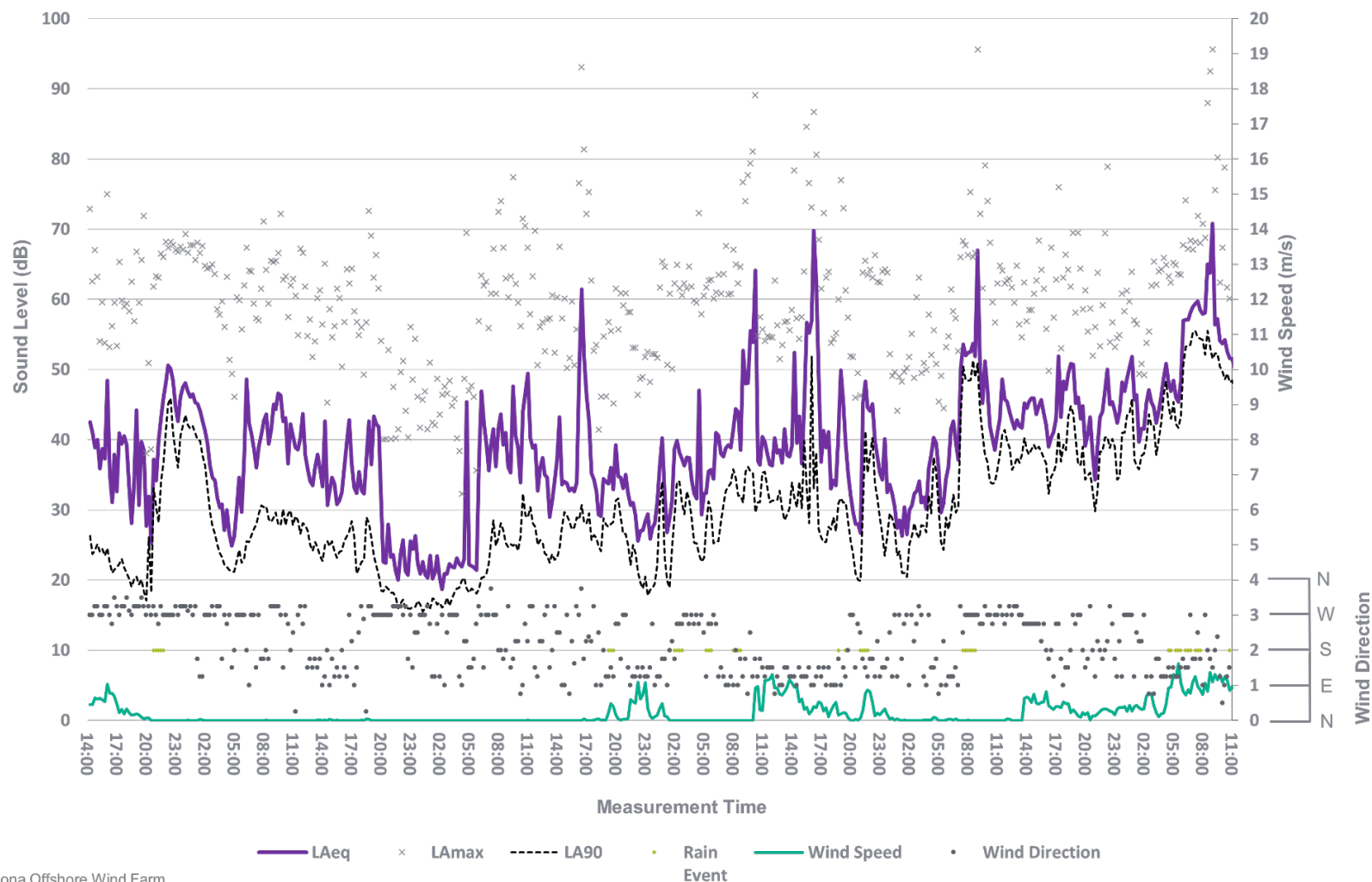
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## Appendix B11

Measured Noise Levels at LT11, 14 to 19 September 2023



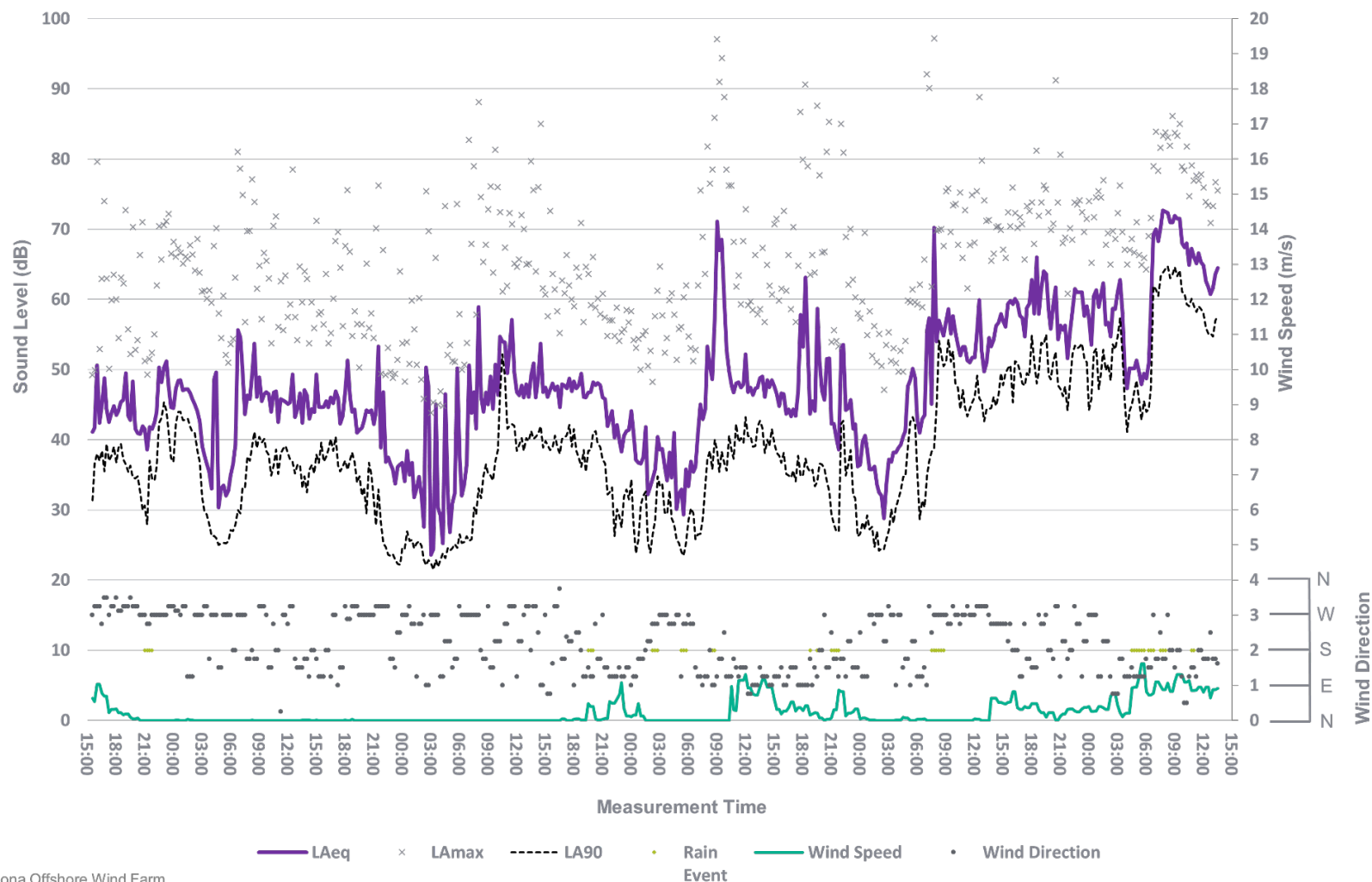
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## Appendix B12

Measured Noise Levels at LT12, 14 to 19 September 2023



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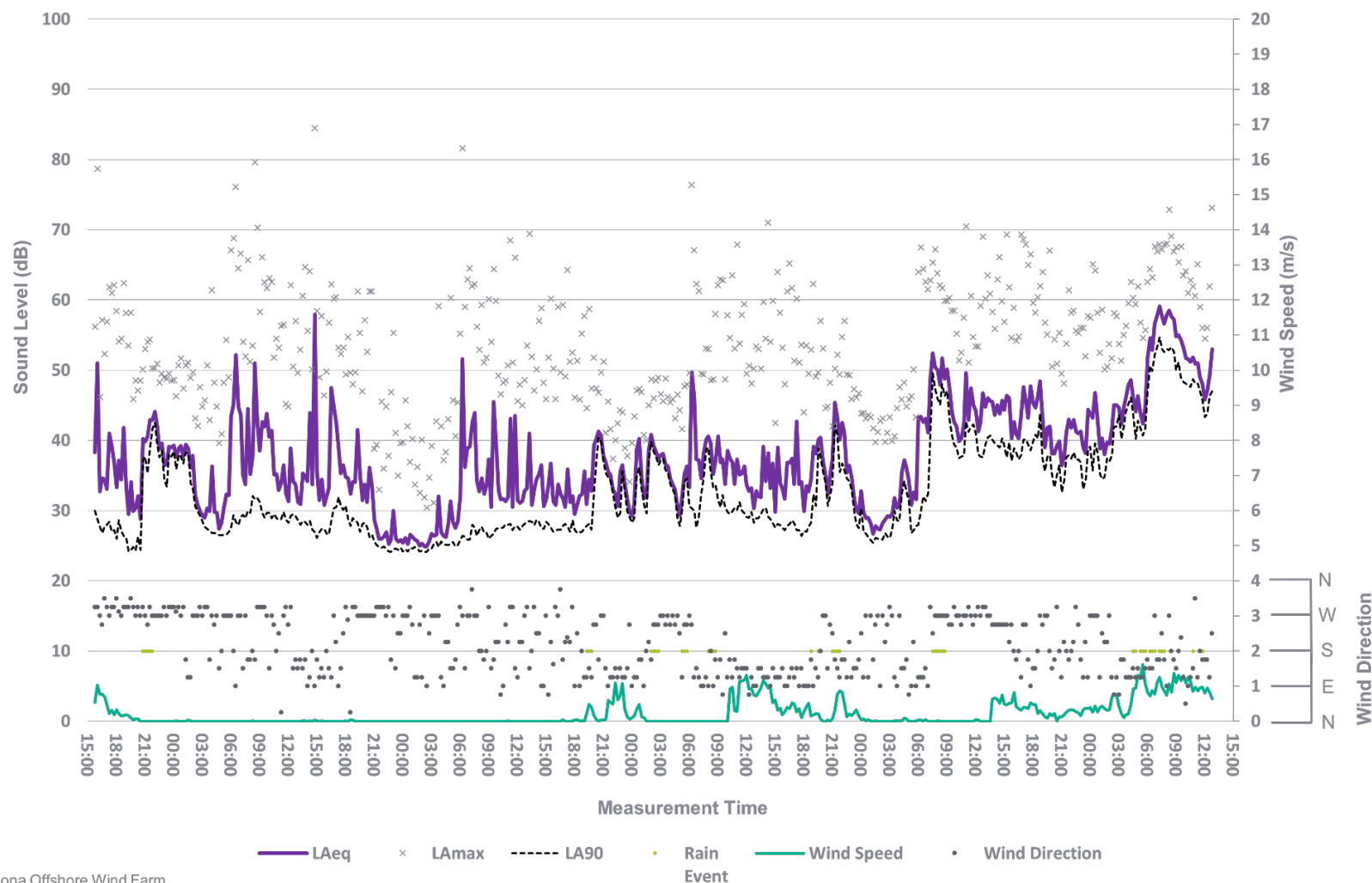


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## Appendix B13

Measured Noise Levels at LT13, 14 to 19 September 2023



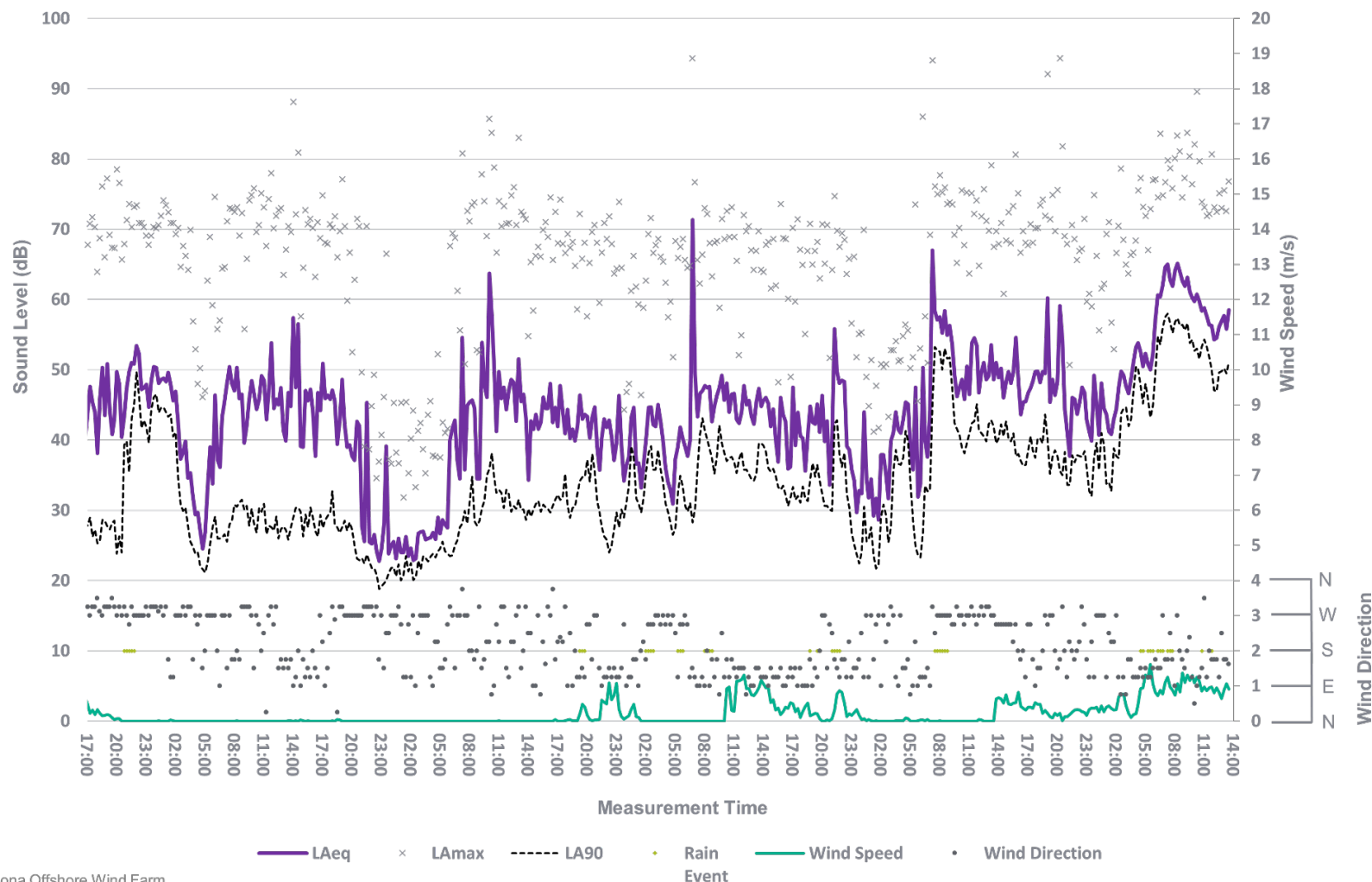
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## Appendix B14

Measured Noise Levels at LT14, 14 to 19 September 2023



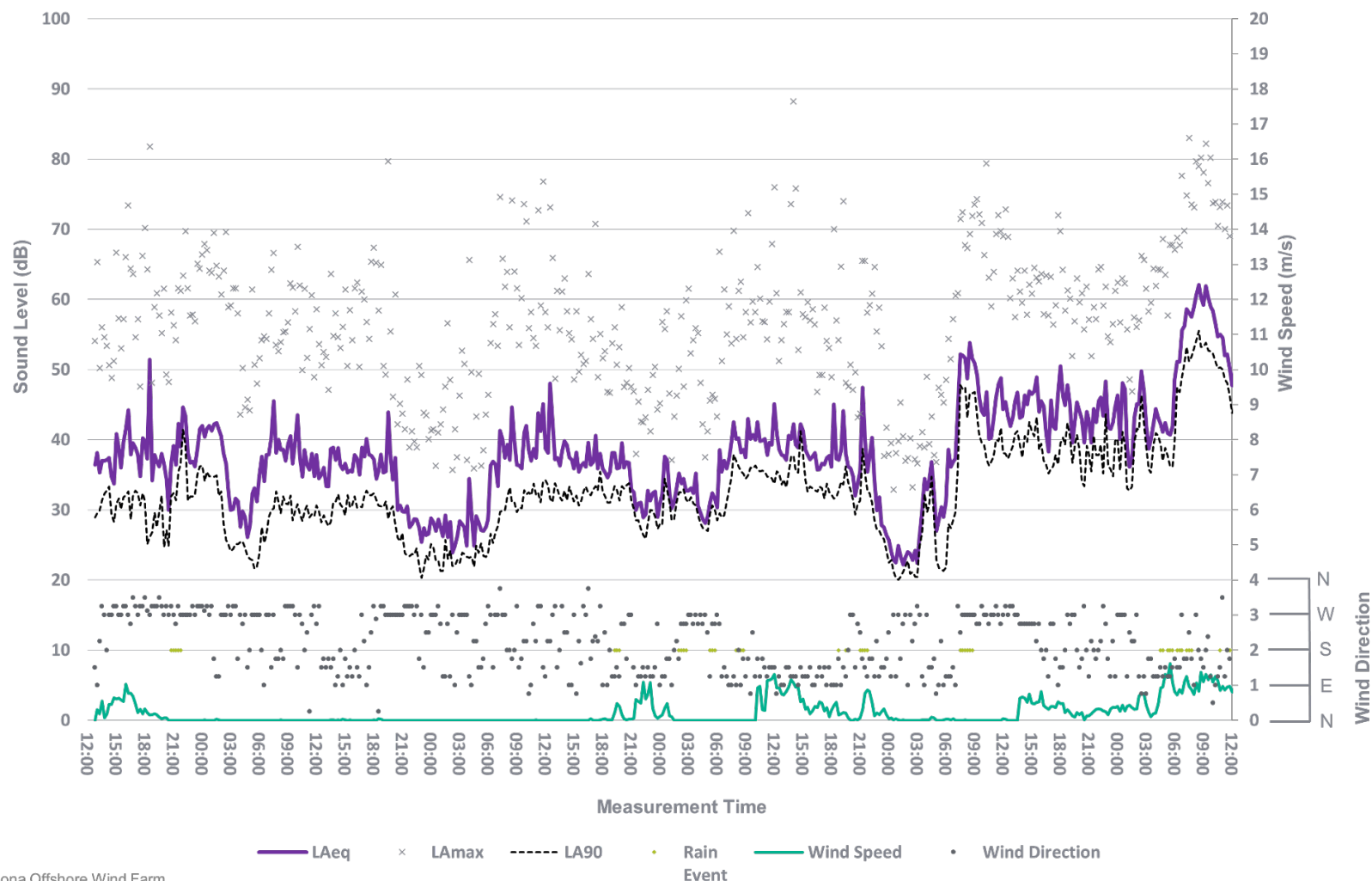
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## Appendix B15

Measured Noise Levels at LT15, 14 to 19 September 2023



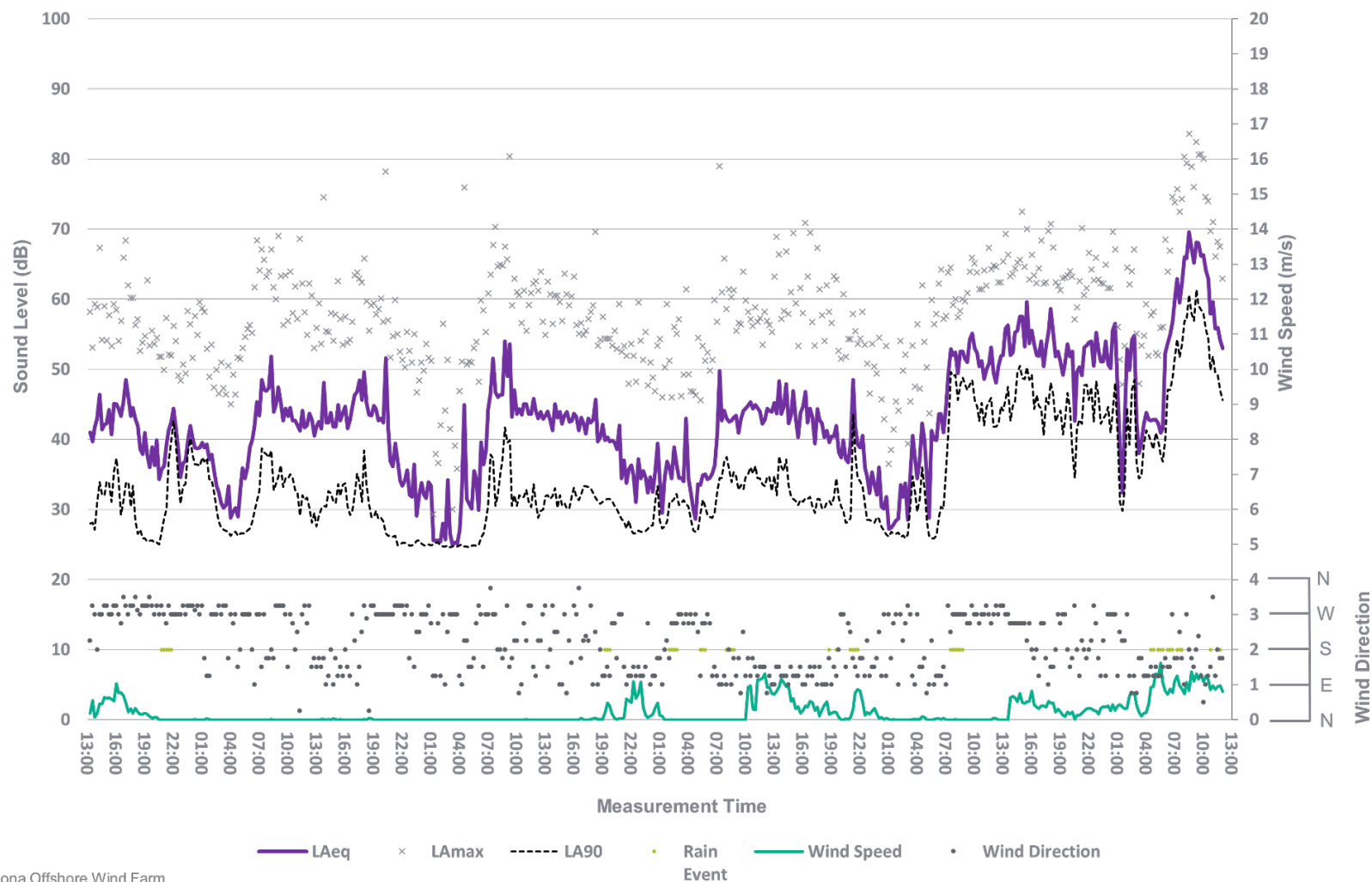
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## Appendix B16

Measured Noise Levels at LT16, 14 to 19 September 2023



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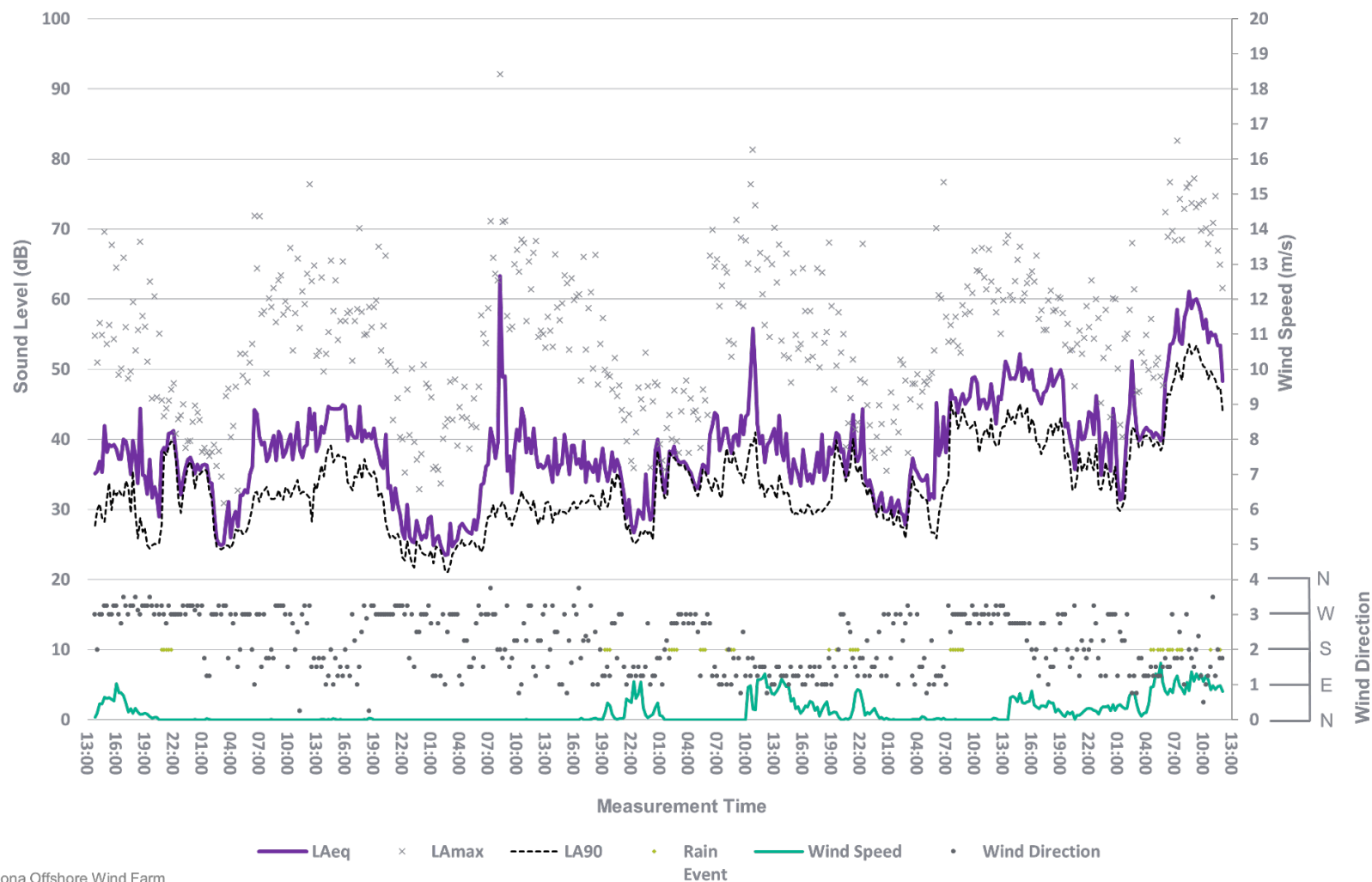


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## Appendix B17

Measured Noise Levels at LT17, 14 to 19 September 2023



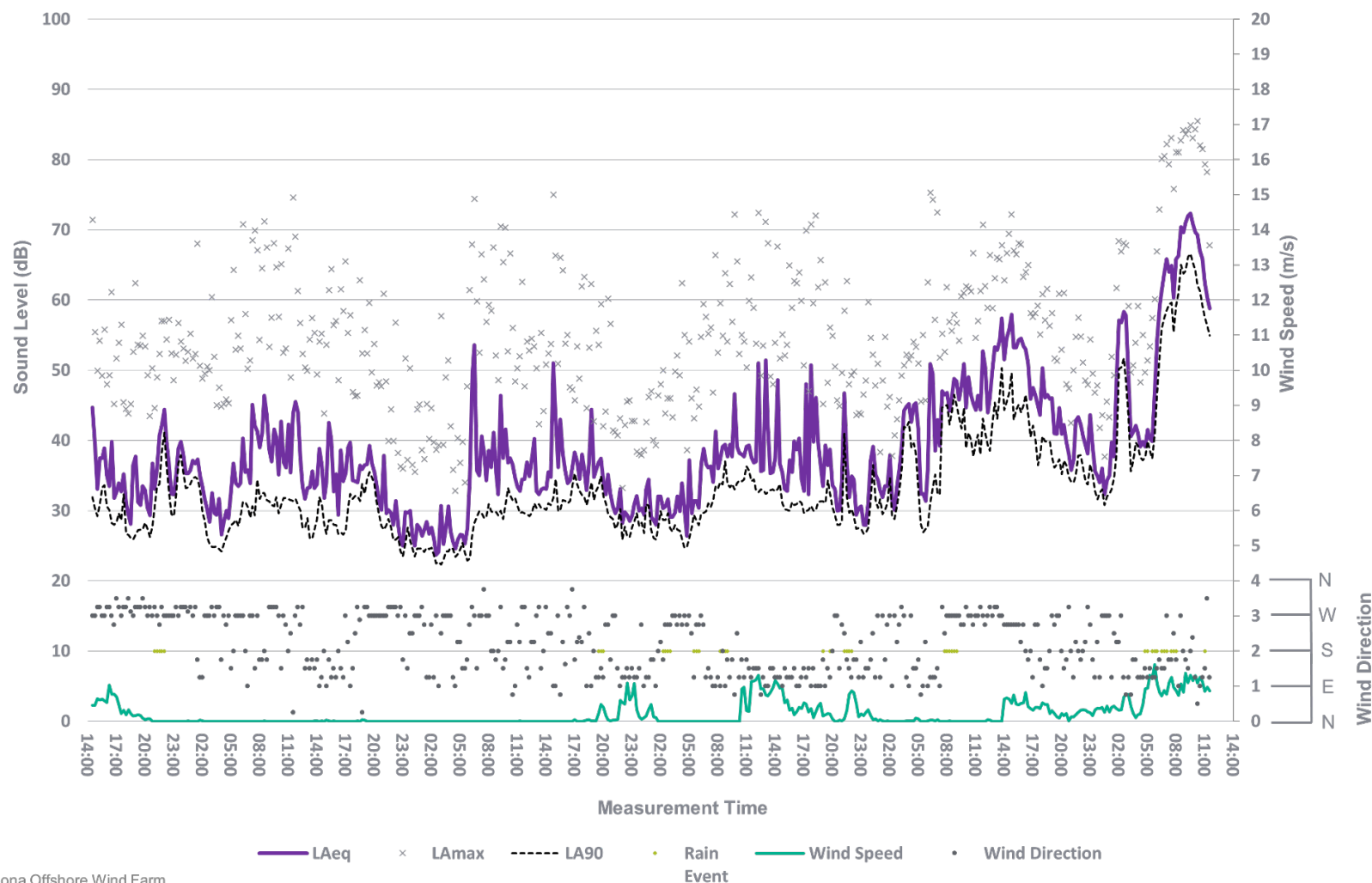
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### Appendix B18

Measured Noise Levels at LT18, 14 to 19 September 2023



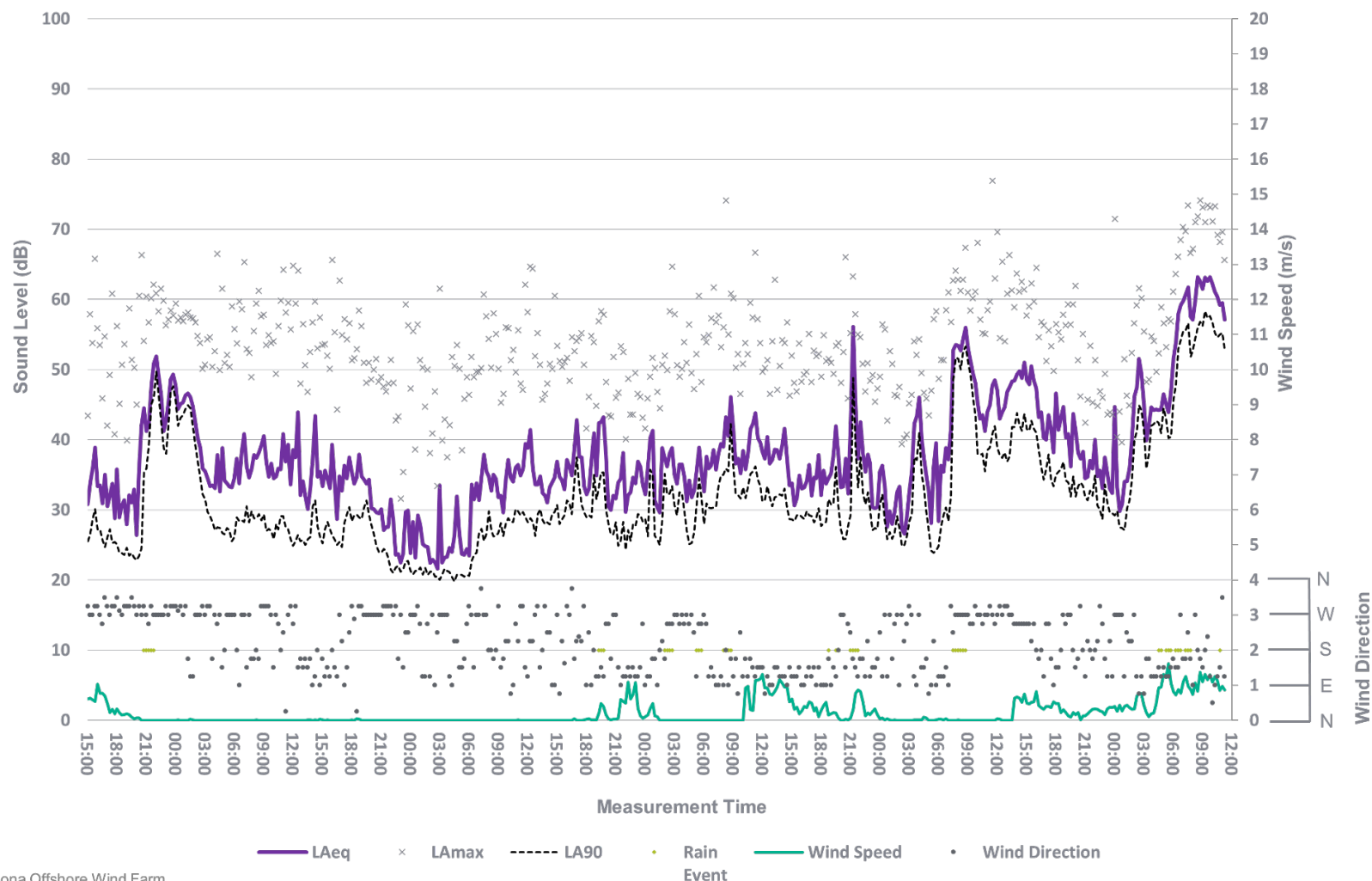
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## Appendix B19

Measured Noise Levels at LT19, 14 to 19 September 2023



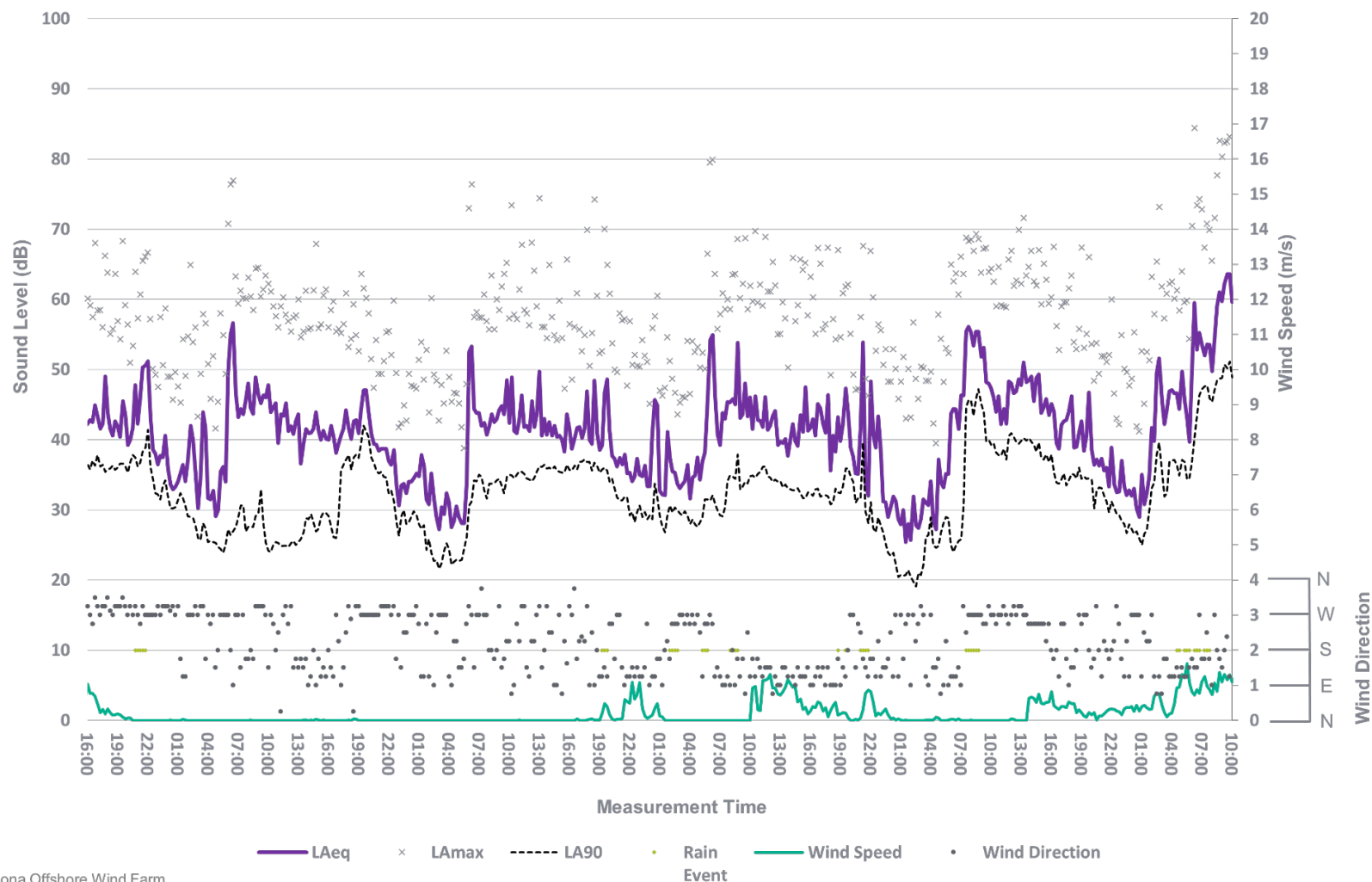
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## Appendix B20

Measured Noise Levels at LT20, 14 to 19 September 2023



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## Appendix C: Short-Term Survey Results

### ST1 – Castle Cove Caravan Park

#### Measured Sound Level (dB)

Start Time	$L_{Aeq}$	$L_{AF,max}$	$L_{A90}$
09/11/2022 11:00	63	92.2	81
09/11/2022 11:15	62	91.8	71
09/11/2022 11:30	64	93.4	94
09/11/2022 11:45	62	92	78
09/11/2022 12:00	63	92.8	77
09/11/2022 12:15	63	93	85
09/11/2022 12:30	64	93.3	83
09/11/2022 12:45	62	91.9	80
09/11/2022 13:00	64	93.2	83
09/11/2022 13:15	62	91.8	70
09/11/2022 13:30	63	92.4	86
09/11/2022 13:45	64	93.6	91
09/11/2022 14:00	64	93.1	93
09/11/2022 14:15	67	96.1	94
09/11/2022 14:30	64	93.6	90
09/11/2022 14:45	62	91.5	91
09/11/2022 15:00	62	91.7	74
09/11/2022 15:15	62	91.5	80
09/11/2022 15:30	61	90.3	87
09/11/2022 15:45	61	90.2	74
09/11/2022 16:00	62	91.9	79
09/11/2022 16:15	62	92	89

### ST2 – Tan yr Ogof Caravan Park

#### Measured Sound Level (dB)

Start Time	$L_{Aeq}$	$L_{AF,max}$	$L_{A90}$
09/11/2022 11:45	63	92.2	81
09/11/2022 12:00	62	91.8	71
09/11/2022 12:15	64	93.4	94

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### ST2 – Tan yr Ogof Caravan Park Measured Sound Level (dB)

09/11/2022 12:30	62	92	78
09/11/2022 12:45	63	92.8	77
09/11/2022 13:00	63	93	85
09/11/2022 13:15	64	93.3	83
09/11/2022 13:30	62	91.9	80
09/11/2022 13:45	64	93.2	83
09/11/2022 14:00	62	91.8	70
09/11/2022 14:15	63	92.4	86
09/11/2022 14:30	64	93.6	91
09/11/2022 14:45	64	93.1	93
09/11/2022 15:00	67	96.1	94
09/11/2022 15:15	64	93.6	90
09/11/2022 15:30	62	91.5	91
09/11/2022 15:45	62	91.7	74
09/11/2022 16:00	62	91.5	80
09/11/2022 16:15	61	90.3	87
09/11/2022 16:30	61	90.2	74
09/11/2022 16:45	62	91.9	79

### ST3 – Coed yr Esgob Measured Sound Level (dB)

Start Time	L <sub>Aeq</sub>	L <sub>AF,max</sub>	L <sub>A90</sub>
22/11/2022 10:15	50	81	46
22/11/2022 10:30	49	69	46
22/11/2022 10:45	48	59	46
22/11/2022 11:00	49	68	46
22/11/2022 11:15	48	58	45
22/11/2022 11:30	48	58	46
22/11/2022 11:45	46	59	44
22/11/2022 12:00	45	53	43
22/11/2022 12:15	45	78	42
22/11/2022 12:30	43	59	40

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### ST4 – Coed yr Esgob

#### Measured Sound Level (dB)

Start Time	$L_{Aeq}$	$L_{AF,max}$	$L_{A90}$
22/11/2022 13:15	38	46	36
22/11/2022 13:30	42	50	40
22/11/2022 13:45	45	56	42
22/11/2022 14:00	39	46	36
22/11/2022 14:15	38	50	35
22/11/2022 14:30	37	57	35
22/11/2022 14:45	37	56	33
22/11/2022 15:00	58	78	33
22/11/2022 15:15	55	76	32
22/11/2022 15:30	36	49	33
22/11/2022 15:45	53	67	37
22/11/2022 16:00	39	48	37
22/11/2022 16:15	40	67	37