XLINKS' MOROCCO-UK POWER PROJECT

Environmental Statement

Volume 2, Appendix 6.1: Baseline Sound Survey

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Prepared by:

RPS

Prepared for:

Xlinks 1 Limited

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Glossary

Term	Meaning
A-weighting	A frequency weighting devised to attempt to account for the fact that human response to sound is not equally sensitive to all frequencies. It consists of an electronic filter in a sound level meter which attempts to build this variability into the indicative sound level reading so that it will correlate, approximately, with the human response.
Ambient sound level, $L_a = L_{Aeq,T}$	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.
Converter station	Part of an electrical transmission and distribution system. Converter stations convert electricity from Direct Current to Alternating Current, or vice versa.
Decibel	A unit used to measure or compare the intensity of a sound by comparing it with a given reference level on a logarithmic scale.
Environmental Impact Assessment	The process of identifying and assessing the significant effects likely to arise from a project. This requires consideration of the likely changes to the environment, where these arise as a consequence of a project, through comparison with the existing and projected future baseline conditions.
Free-field	A situation in which the radiation from a sound source is entirely unaffected by the presence of any reflective boundaries.
Landfall	The proposed area in which the offshore cables make landfall in the United Kingdom (come on shore) and the transitional area between the offshore cabling and the onshore cabling. This term applies to the entire landfall area at Cornborough Range, Devon, between Mean Low Water Springs and the transition joint bays inclusive of all construction works, including the offshore and onshore cable routes, and landfall compound(s).
Logarithmic averaging	A method by which sound levels in decibels (dB) can be averaged. This allows us to 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.
Proposed Development	The element of Xlinks' Morocco-UK Power Project within the UK. The Proposed Development covers all works required to construct and operate the offshore cables (from the UK Exclusive Economic Zone to Landfall), Landfall, onshore Direct Current and Alternating Current cables, converter stations, and highways improvements.
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.
Study area	This is an area which is defined for each environmental topic which includes the Order Limits as well as potential spatial and temporal considerations of the impacts on relevant receptors. The study area for each topic is intended to cover the area within which an impact can be reasonably expected.
Xlinks' Morocco UK Power Project	The overall scheme from Morocco to the national grid, including all onshore and offshore elements of the transmission network and the generation site in Morocco (referred to as the 'Project').

Acronyms

Acronym	Meaning
BS	British Standard
LT	Long-term
ST	Short-term
EIA	Environmental Impact Assessment
ES	Environmental Statement

Units

Units	Meaning
dB	Decibel
h	Hour
m/s	Metres per second
ms	Millisecond

1 BASELINE SOUND SURVEY

1.1 Introduction

1.1.1 This document forms Volume 2, Appendix 6.1: Baseline Sound Survey of the Environmental Statement (ES) prepared for the United Kingdom (UK) elements of the Xlinks Morocco-UK Power Project (the 'Project'). For ease of reference, the UK elements of the Project are referred to as the 'Proposed Development', which is the focus of the Environmental Statement (ES). The ES presents the findings of the Environmental Impact Assessment (EIA) process for the Proposed Development.

1.1.2 This document provides of the methodology and results of the baseline sound surveys undertaken for the Proposed Development. The report informs Volume 2, Chapter 6: Noise and Vibration, of the ES.

1.1.3 The purpose of the baseline sound survey is to quantify the existing the acoustic environment at the nearest noise-sensitive receptors within the noise and vibration study area. The measured levels inform the derivation of noise criteria against which the construction and operational noise impacts arising from the Proposed Development will be assessed.

1.2 Methodology

Study Area

1.2.1 The study area for noise and vibration assessment of the Proposed Development focuses on receptors landward of Mean Low Water Springs where potential noise impacts are likely to occur. The noise and vibration study area has been defined in line with best practice guidance and considers the regions in which potential impacts are most likely to occur at receptors sensitive to noise and vibration (DMRB LA111 – Noise and Vibration).

1.2.2 The construction and decommissioning noise and vibration study area has been defined with reference to the guidance in DMRB LA111 – Noise and Vibration. Note 1 of paragraph 3.5 of DMRB LA111 states the following regarding noise sensitive receptors:

"A study area of 300 m from the closest construction activity is normally sufficient to encompass noise sensitive receptors."

1.2.3 Similarly, Note 1 of paragraph 3.29 of DMRB LA111 states the following regarding vibration sensitive receptors:

"A study area of 100 m from the closest construction activity with the potential to generate vibration is normally sufficient to encompass vibration sensitive receptors."

1.2.4 The assessment of operation and maintenance noise impacts will be undertaken at the noise sensitive receptors most likely to affected by noise during the operation and maintenance phase of the Proposed Development. These have been identified as being situated within a study area of 500 m from the location of the operational noise sources associated with the Proposed Development.

1.2.5 In summary, the noise and vibration study areas used in the assessment have been defined as:

- the area of land temporarily or permanently occupied during the construction, operation and maintenance, and decommissioning of the Proposed Development;
- noise sensitive receptors located within 300 m of construction activities;
- vibration sensitive receptors located within 100 m of construction activities with the potential to generate vibration; and
- noise sensitive receptors located within 500 m of the operational noise sources.

Consultation

1.2.6 A summary of the key comments raised during consultation activities undertaken to date specific to noise and vibration is presented in **Table 1.1** below.

Table 1.1: Summary of key consultation matters raised during consultation activities undertaken for the Proposed Development relevant to Noise and Vibration

Date	Consultee and Type of Response	Matters Raised
November 2022	Torridge District Council	The assessment methodology for the noise and vibration chapter was discussed, with appropriate British Standards and Local and National Planning Policy agreed for inclusion within the Chapter.

Baseline Methodology

1.2.7 Baseline sound monitoring was carried out at locations representative of nearby noise sensitive receptors to establish the prevalent baseline acoustic environment.

Desktop study

1.2.8 Information on the nearest noise sensitive receptors within the noise and vibration study area was collected through a detailed desktop review of existing studies and datasets. These are summarised in **Table 1.2** below.

Table 1.2: Summary of key desktop sources

Title	Source	Year	Author
OS Raster 1:25,000	Ordnance Survey	2022	Ordnance Survey
OS Terrain 5	Ordnance Survey	2022	Ordnance Survey
OS AddressBase Plus	Ordnance Survey	2022	Ordnance Survey
Google Earth Imagery	Data SIO, NOAA, U.S Navy, NGA, GEBCO	2022	Google

1.3 Site-specific Surveys

Introduction

1.3.1 Site-specific survey has been undertaken to quantify the baseline sound climate at the nearest noise sensitive receptors to the Proposed Development. Noise surveys undertaken to establish the baseline acoustic environment have been undertaken in November 2022, March 2023, and June 2023.

1.3.2 A mixture of long-term and short-term sound measurements were undertaken at a total of 20 locations across three surveys as outlined in the Scoping Report. The noise surveys and measurement positions used are detailed in this appendix.

1.3.3 A summary of the surveys undertaken to inform the noise assessment is outlined in **Table 1.3** below.

Table 1.3: Summary of surveys undertaken to inform the noise assessment

Title	Extent of survey	Date	Overview of survey
November Noise Survey	Baseline sound levels at noise sensitive receptors	22 November 2022 – 30 November 2022	Survey of baseline sound levels at receptors represented by monitoring locations LT1-LT8 and ST1-ST8.
March Noise Survey	Baseline sound levels at noise sensitive receptors	22 March 2023 – 29 March 2023	Survey of baseline sound levels at receptors represented by monitoring locations LT9 and ST9-ST10.
June Noise Survey	Baseline sound levels at noise sensitive receptors	8 June 2023 – 16 June 2023	Survey of baseline sound levels at receptors represented by monitoring location LT10.

Survey Methodology

1.3.4 A mixture of long-term (LT) and short-term (ST) sound measurements were undertaken at locations representative of the nearest noise sensitive receptors to the various noise sources proposed as part of the Proposed Development. Three surveys were undertaken over the following periods:

- Tuesday 22 November 2022 – Wednesday 30 November 2022;
- Wednesday 22 March 2023 – Wednesday 29 March 2023; and
- Thursday 8 June 2023 – Friday 16 June 2023.

1.3.5 The surveys comprised a total of 10 long-term monitoring positions which were supplemented by short-term measurements at 10 locations to quantify any variation in the baseline sound levels between long-term positions. These survey locations are presented in **Annex A** below with a brief description of each position provided in **Table 1.4** to **Table 1.6** below.

Table 1.4: November 2022 Survey Positions

Position	Coordinates		Description	Representative Receptor
	x	y		
LT1	241411.8	127482.0	Western side of Tower House.	Noise-sensitive receptors near landfall.
LT2	242121.0	125859.4	Western boundary of Bowood Farm.	Noise-sensitive receptors to the north of Clovelly Road.
LT3	241973.6	124551.5	Northern boundary of the road southeast from Knotty Corner.	Noise-sensitive receptors southeast of Knotty Corner
LT4	243050.8	124149.7	Eastern boundary of land west of Buckland Road.	Noise-sensitive receptors along road from Littleham Cross to Jennetts Bridge.
LT5	244177.2	124255.9	Eastern boundary of land east of Dunn Lane.	Noise-sensitive receptors East of Dunn Lane.
LT6	245266.7	124704.5	Southeastern boundary of land west of Littleham Road.	Noise-sensitive receptors along Littleham Road to the west of the River Torridge.
LT7	249476.1	123605.8	Southern boundary of land north of Long Barn.	Noise-sensitive receptors near Long Barn.
LT8	249823.1	124399.4	Southeastern boundary of land west of Lower Kingdon.	Noise-sensitive receptors near Lower Kingdon.
ST1	242526.8	127513.2	Land to east of Langdon Farm.	Noise-sensitive receptors to the west of Pusehill Road.
ST2	242238.3	126721.8	Land to the east of Back Lane.	Noise-sensitive receptors along Pump Lane.
ST3	241841.2	124369.3	Southwestern boundary of the road southeast from Knotty Corner.	Noise-sensitive receptors southeast of Knotty Corner
ST4	245532.5	124478.7	Southeastern boundary of Hallsannery Farm.	Noise-sensitive receptors along lane to Hallsannery Centre.
ST5	246530.0	125040.6	Northern boundary of land south of Tennacott Lane.	Noise-sensitive receptors along Tennacott Lane.
ST6	246805.8	125733.7	Northwestern boundary of land south of Gammaton Road.	Noise-sensitive receptors south on Hillcrest Road.
ST7	247768.4	125206.5	Northeastern boundary of land south of Woodville Cottage.	Noise-sensitive receptors along Gammaton Road.
ST8	249017.6	123997.5	Eastern boundary of land west of Gammaton Cottage.	Noise-sensitive receptors near Gammaton Cross.

Table 1.5: March 2023 Survey Positions

Position	Coordinates		Description	Representative Receptor
	x	y		
LT9	249002.1	124926.4	Northern boundary of land west of Moorlands.	Noise-sensitive receptors south of Gammaton.
ST9	248785.2	124583.2	Southern boundary of car park at Tarka Swims.	Noise-sensitive receptors along Gammaton Road near Tarka Swims.
ST10	250830.0	125661.0	Northern boundary of land at Deepy Park.	Noise-sensitive receptors near Stony Cross.

Table 1.6: June 2023 Survey Positions

Position	Coordinates		Description	Representative Receptor
	x	y		
LT10	249779.7	125915.9	Northern boundary of land east of Webbery Barton.	Noise-sensitive receptors south west of Webbery.

1.3.6 At all locations, 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.

Instrumentation

1.3.7 The equipment in **Table 1.7** to **Table 1.9** below was used to undertake the baseline sound survey measurements at each position.

Table 1.7: November 2022 Survey

Position	Make/Model	Serial Number	Calibration (Ref: 94.0 decibel (dB))		Last Manufacturers' Calibration Date
			Start	End	
Calibrator	Rion NC-74	34472822	94.0	94.0	11/02/2022
LT1	Rion NL-52	164422	94.0	94.0	18/10/2021
LT2	Rion NL-52	943366	94.0	94.0	18/10/2021
LT3	Rion NL-52	998563	94.0	94.0	02/03/2022
LT4	Rion NL-52	386736	94.0	94.0	19/10/2021
LT5	Rion NL-52	998567	94.0	94.0	02/03/2022
LT6	Rion NL-52	998569	94.0	94.0	02/03/2022
LT7	Rion NL-52	998566	94.0	94.0	02/03/2022
LT8	Rion NL-52	998566	94.0	94.0	02/03/2022
ST1-ST8	Bruel & Kjaer 2270	3010761	94.0	94.0	27/03/2023

Table 1.8: March 2023 Survey

Position	Make/Model	Serial Number	Calibration (Ref: 94.0 dB)		Last Manufacturers' Calibration Date
			Start	End	
Calibrator	Rion NC-74	34472822	94.0	94.0	11/02/2022
LT9	Rion NL-52	386736	94.0	94.0	19/10/2021
ST9-ST10	Bruel & Kjaer 2270	3010761	94.0	94.0	27/03/2023

Table 1.9: June 2023 Survey

Position	Make/Model	Serial Number	Calibration (Ref: 94.0 dB)		Last Manufacturers' Calibration Date
			Start	End	
Calibrator	Rion NC-74	34472822	94.0	94.0	11/02/2022
LT10	Rion NL-52	998567	94.0	94.0	02/03/2022

1.3.8 Measurements were undertaken in the free-field approximately 1.5 m above local ground level and a minimum of 3.5 m away from any other reflective surfaces (other than the ground).

1.3.9 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.

1.3.10 Measurements were undertaken in accordance with British Standard (BS) 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'.

Meteorological Conditions

1.3.11 A Davies Instruments Vantage Vue 6250 weather station was deployed alongside the survey equipment at position LT3 to monitor the variation in meteorological conditions throughout the survey period for the November 2022 survey. This equipment was deployed at position LT10 for the June 2023 survey.

1.3.12 Due to complications regarding access and deployment, it was not possible to obtain meteorological data during the March 2023 survey. Publicly available weather data has been obtained from the closest stations to the monitoring locations[1,2].

1.3.13 The weather conditions are presented in the time-history graphs in **Annex B**. Any periods of adverse weather (precipitation events and wind speeds greater than 5 m/s) have been omitted from the analysis of the survey data. These conditions

[1] Station ID: IBARNS116 https://www.wunderground.com/dashboard/pws/IBARNS116

[2] Station ID: IBARNS106: https://www.wunderground.com/dashboard/pws/IBARNS106

can negatively impact the measured noise levels and result in unrealistic noise criteria following analysis.

Baseline Sound Climate

1.3.14 Subjectively, the existing sound climate at all measurement positions was noted to be quiet overall due to the rural nature of the surrounding area. The dominant source of noise was noted to be traffic on local roads, particularly at positions near the Landfall due to vehicular movements on the A39.

1.4 Results

1.4.1 The results of the baseline sound survey at the long-term monitoring positions are presented graphically in **Annex B**.

1.4.2 The range of measured sound levels at the long-term monitoring locations is presented in **Table 1.10** to **Table 1.12** below.

Table 1.10: November 2022 Survey

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	41-55	-	31-43	-	-	-
LT2	62-66	63-66	31-59	55-62	48-55	29-53
LT3	40-55	41-55	25-56	34-47	31-41	23-42
LT4	51-60	53-61	31-57	43-50	38-48	28-49
LT5	37-54	38-55	29-45	33-40	31-38	28-39
LT6	42-54	39-55	32-53	37-50	34-47	31-45
LT7	41-45	43-45	36-45	38-43	39-40	35-40
LT8	37-47	37-47	25-47	30-44	30-37	25-38

Table 1.11: March 2023 Survey

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	35-57	35-57	26-44	33-47	35-47	26-41

Table 1.12: June 2023 Survey

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)
LT10	48-53	48-53	26-45	43-49	48-54	25-46

1.5 Summary

1.5.1 Three separate baseline sound surveys have been carried out to inform the noise assessment, and the likelihood of potential adverse impacts occurring as part of the construction and operational phases of the Proposed Development.

1.5.2 The monitoring methodology and measured noise levels have been set out in this Appendix. The results of the sound surveys have been used to set out the impact thresholds for the construction and operational phases of the Proposed Development, and inform the assessment of impacts at nearby sensitive receptors.

1.6 References

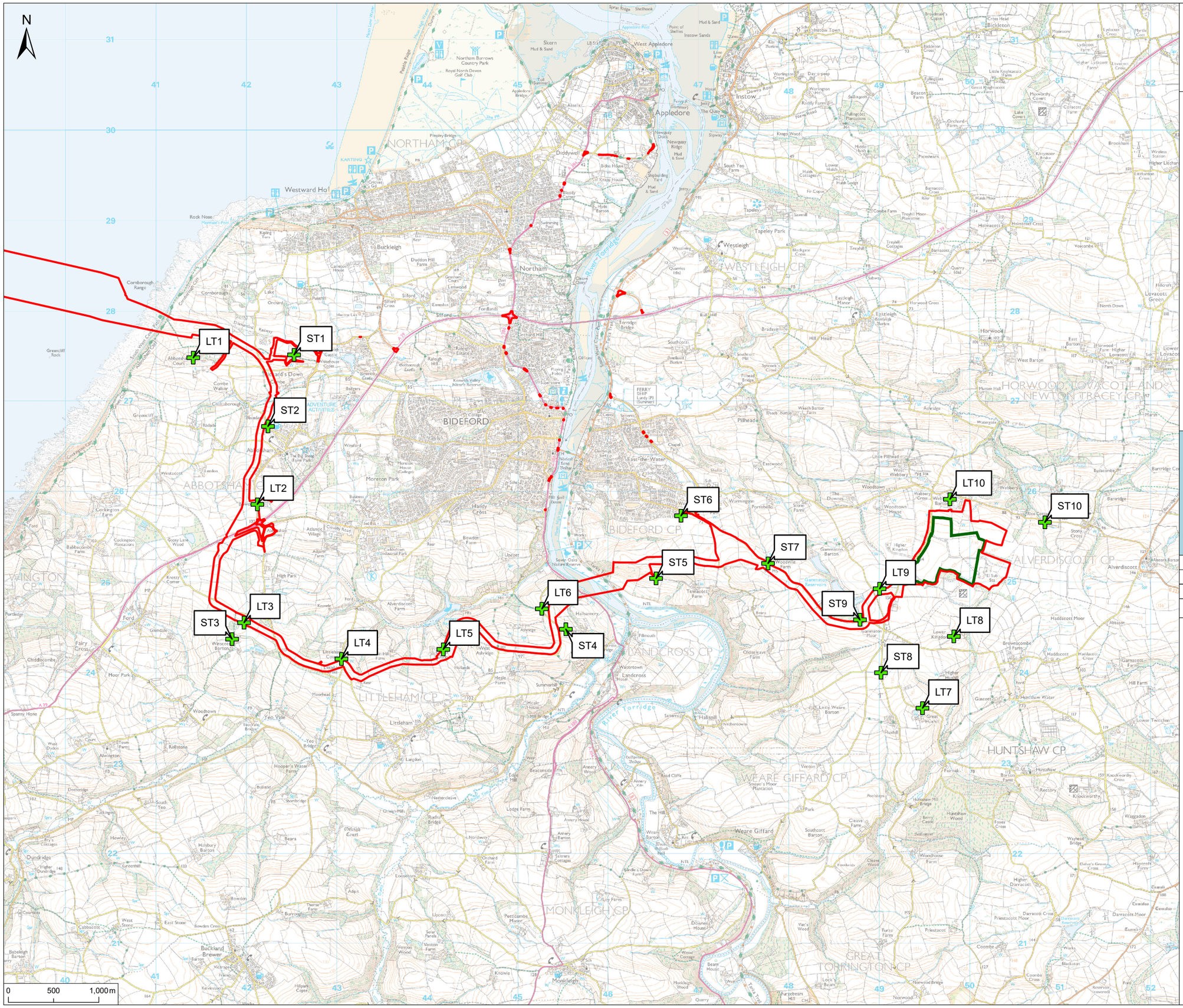
British Standards Institution (2019) 'British Standard 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.

Department of Transport Welsh Office (1988) Calculation of Road Traffic Noise

Highways England, Transport Scotland, Welsh Government, Department for Infrastructure (2020) Design Manual for Roads and Bridges (DMRB) LA 104, Environmental assessment and monitoring, Revision 1, Available at: https://www.standardsforhighways.co.uk/prod/attachments/0f6e0b6a-d08e-4673-8691-cab564d4a60a?inline=true

Highways England, Transport Scotland, Welsh Government, Department for Infrastructure Northern Ireland (2020) Design Manual for Roads and Bridges – LA 111: Noise and vibration, Revision 2.

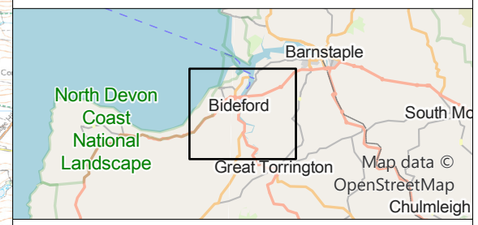
Annex A: Baseline Survey Locations



Notes
1. This plan is scaled at paper size A3. If received electronically it is the recipients responsibility to print to the correct scale. Only written dimensions should be used.

Legend

- Order Limits
- Converter Site
- Baseline Survey Position



Rev	Description	By	CB	Date
P01	FINAL	MP	PK	12.11.24

Client: Xlinks 1 Limited

Project: Xlinks' Morocco-UK Power Project

Title: Baseline Sound Survey Locations

Status: FINAL

Scale @ A3: 1:40,000

Date Created: Nov 2024

Figure Number: **1**

Rev: **P01**

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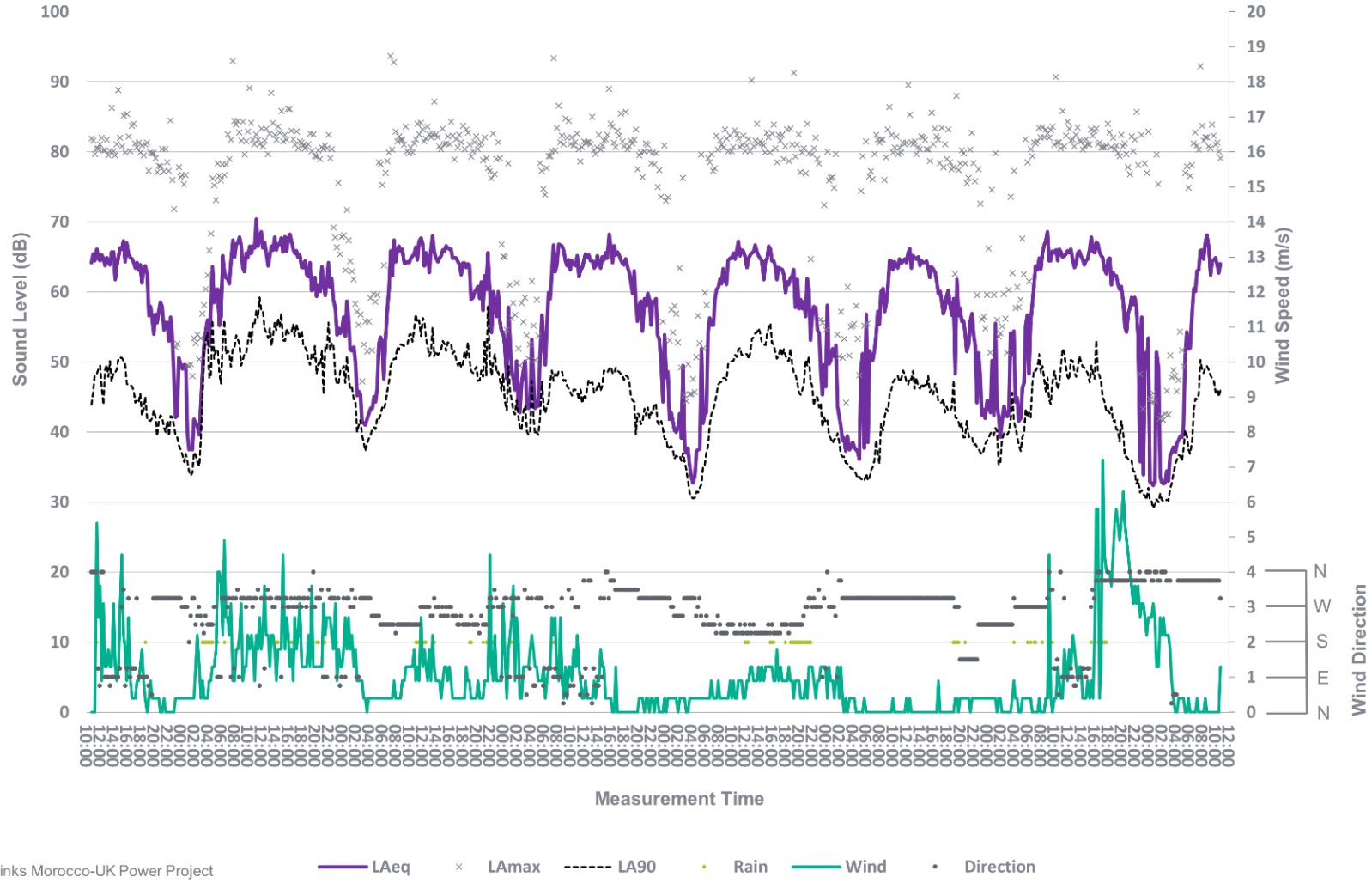
Annex B: Time History Graphs

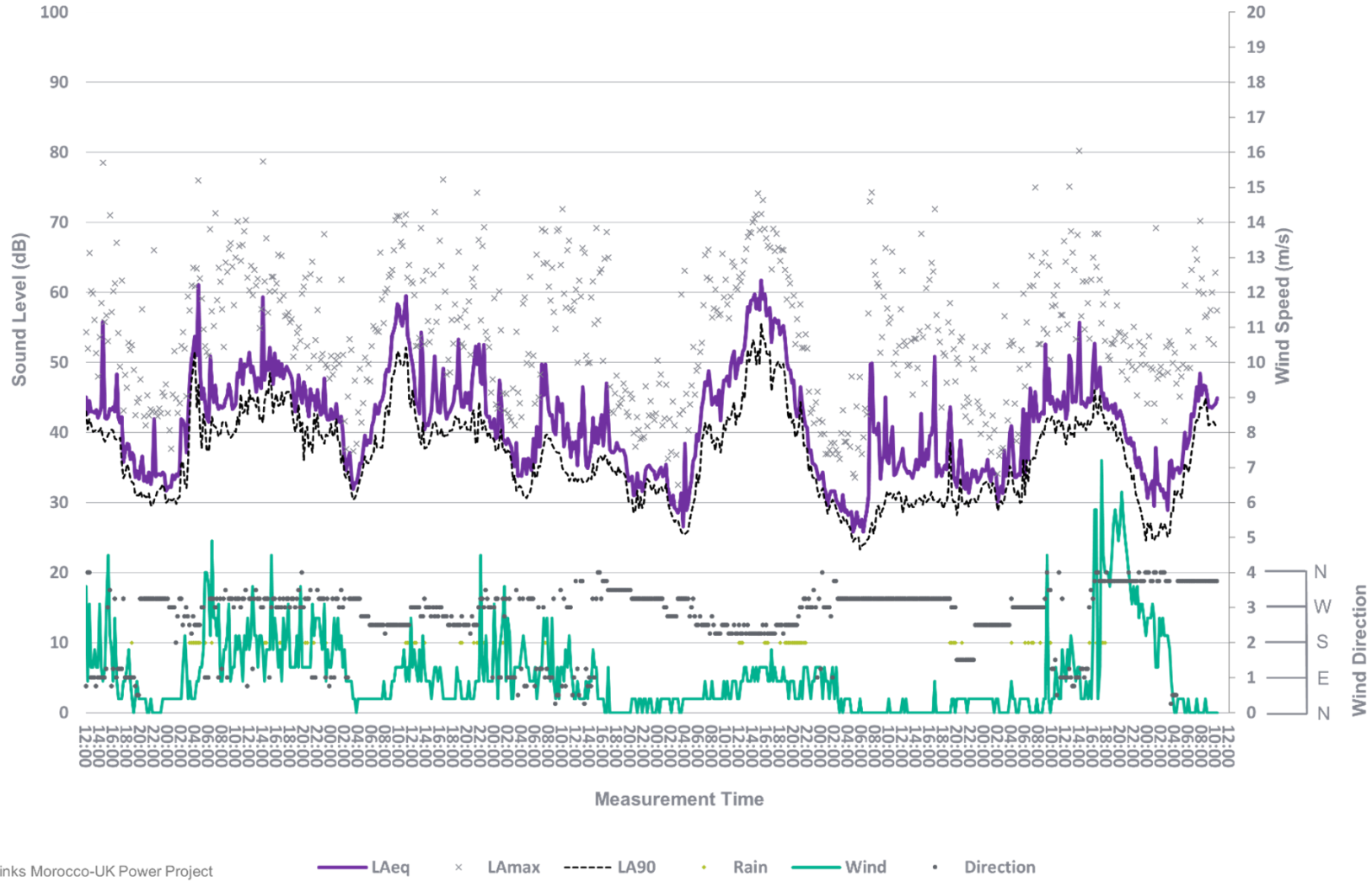
Annex B

Measured Noise Levels at LT2, 22 to 29 November 2022



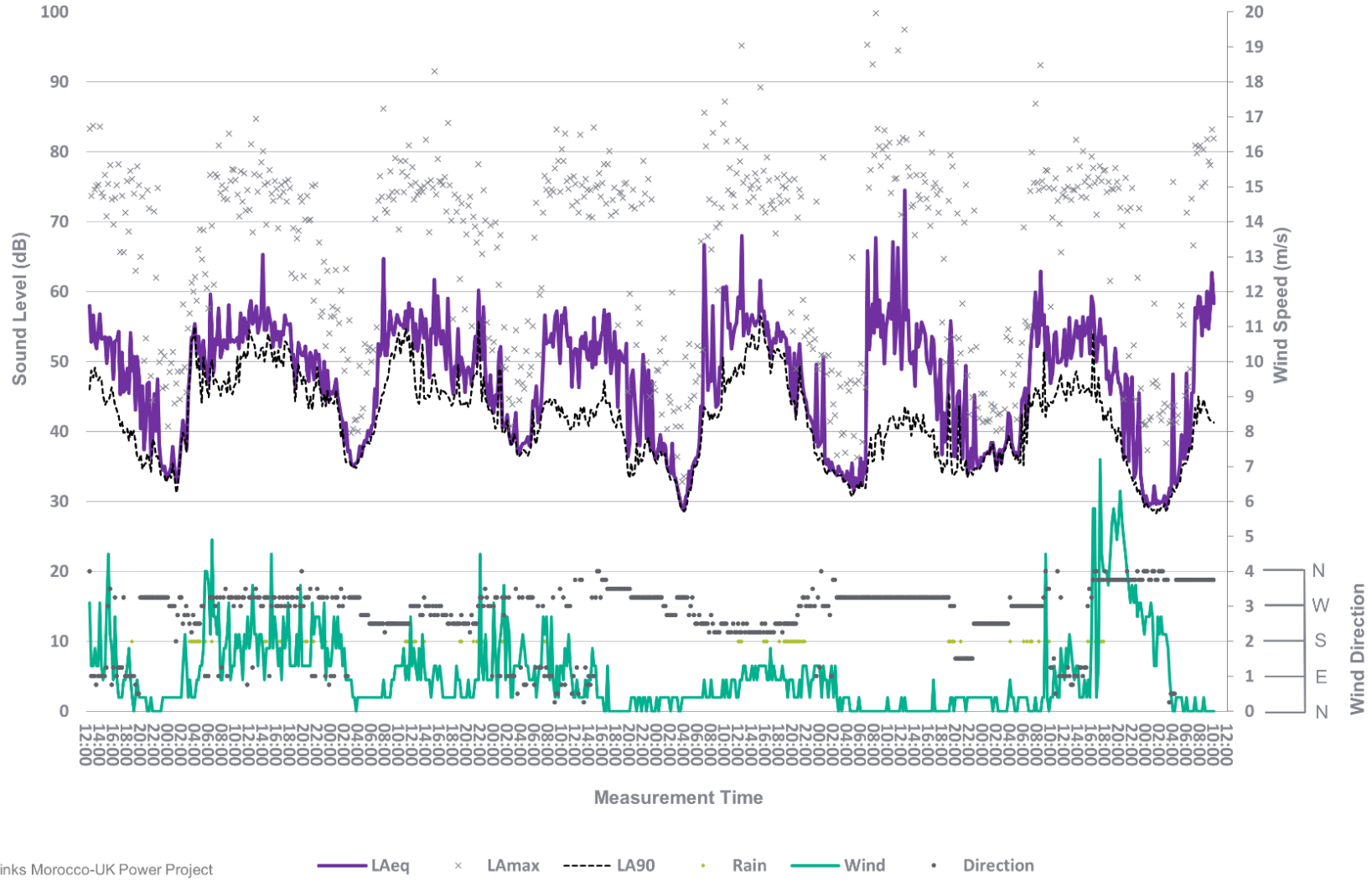
Annex B

Measured Noise Levels at LT3, 22 to 29 November 2022



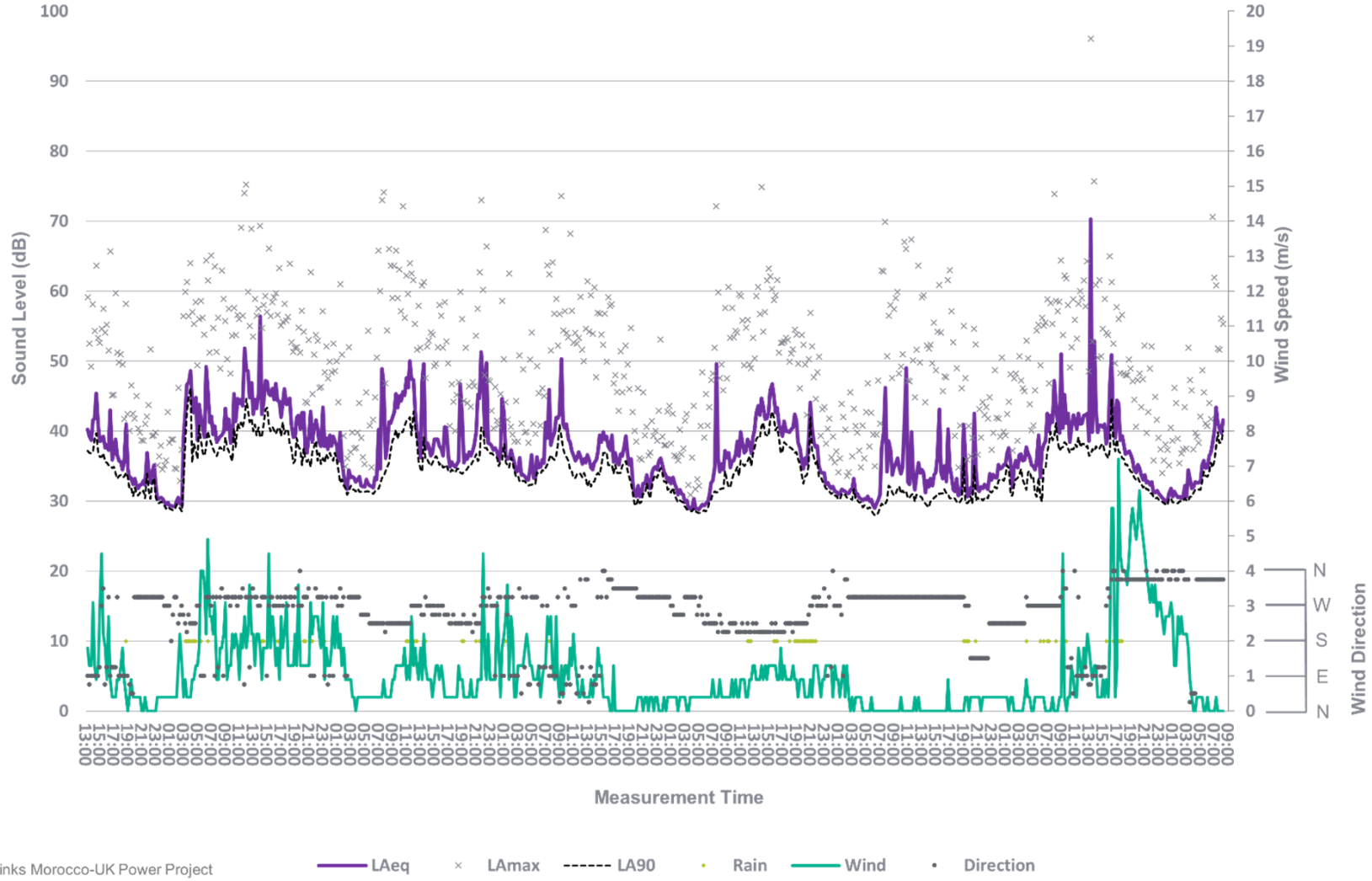
Annex B

Measured Noise Levels at LT4, 22 to 29 November 2022



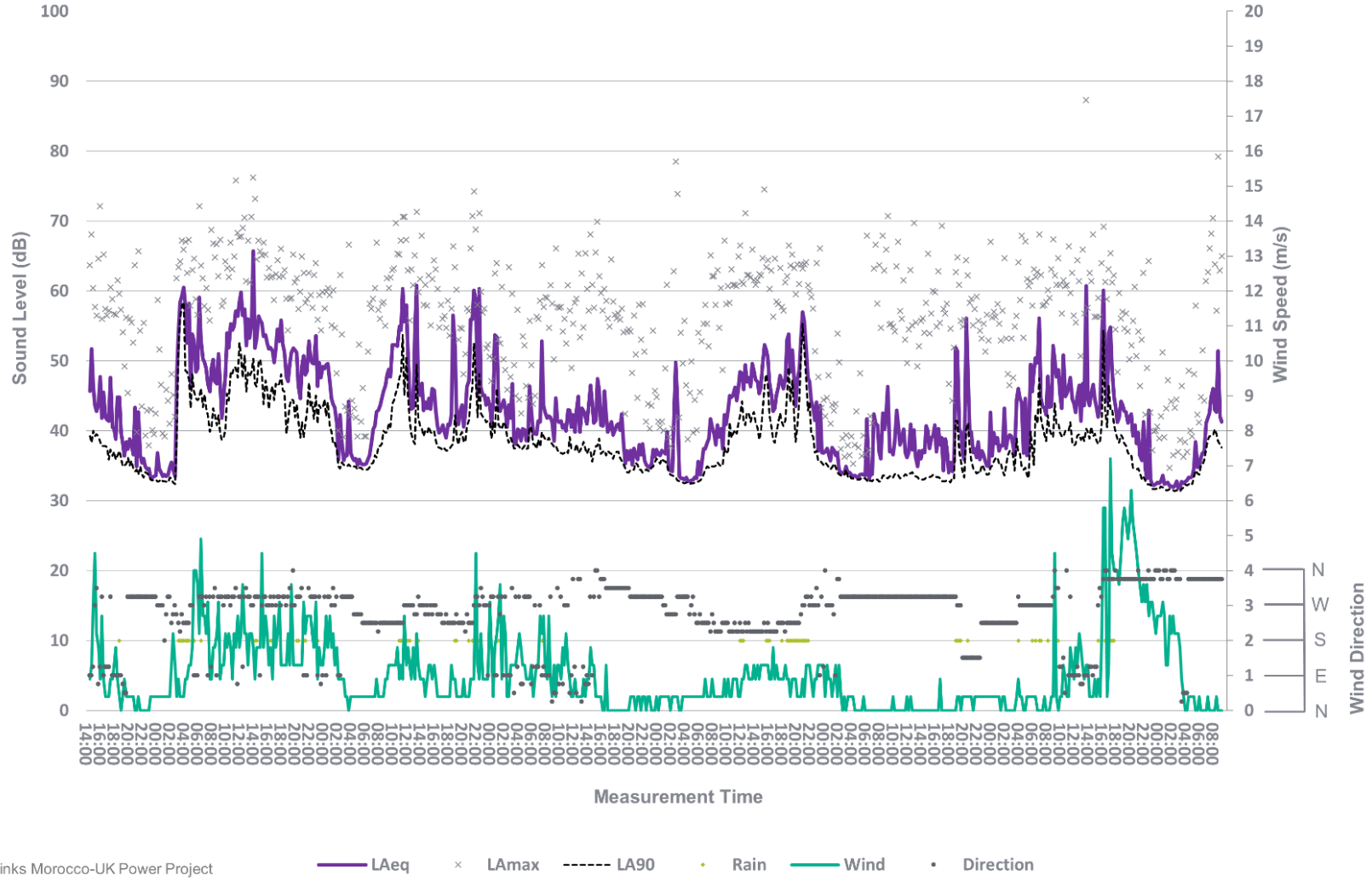
Annex B

Measured Noise Levels at LT5, 22 to 29 November 2022



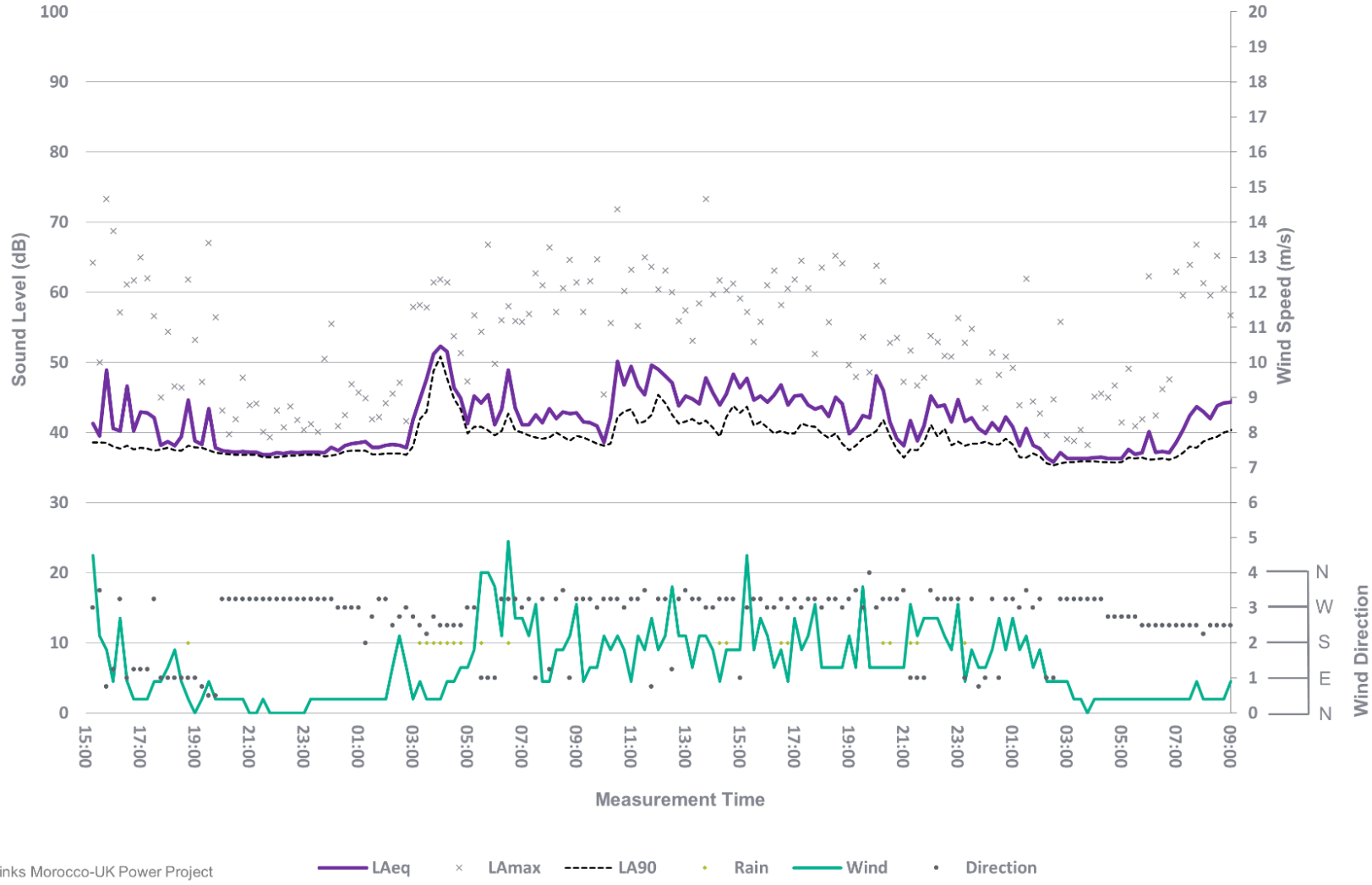
Annex B

Measured Noise Levels at LT6, 22 to 29 November 2022



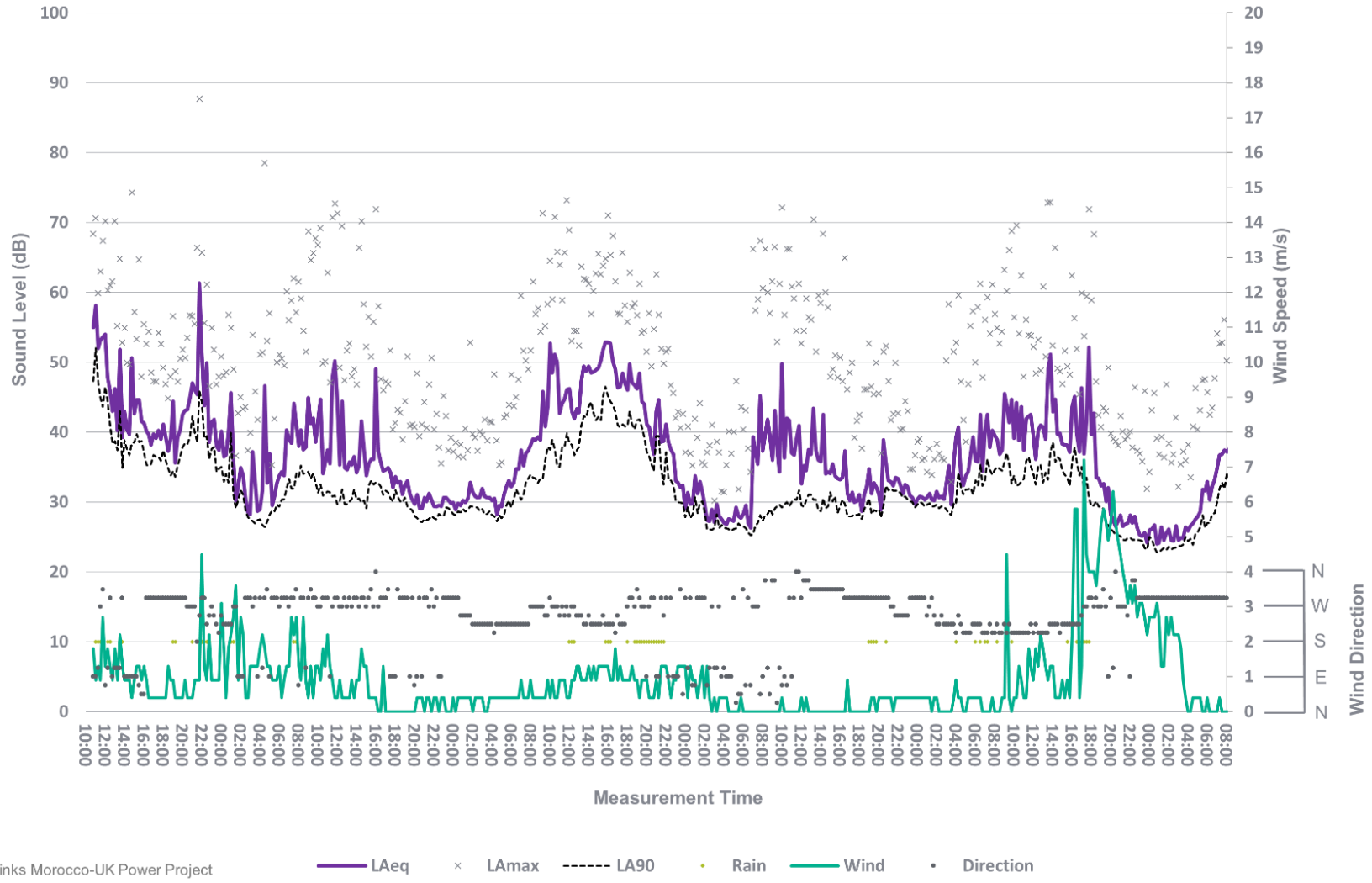
Annex B

Measured Noise Levels at LT7, 22 to 24 November 2022



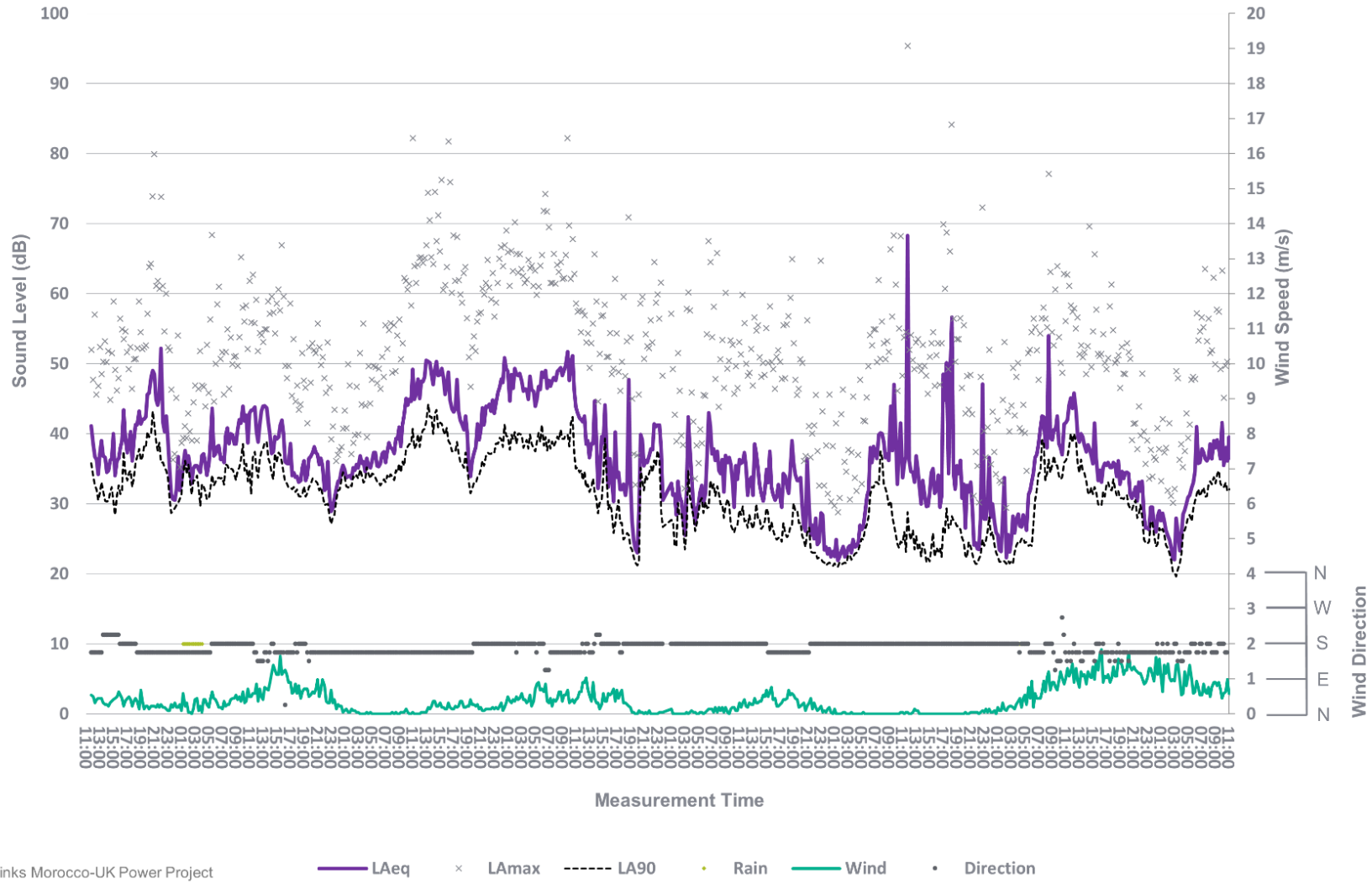
Annex B

Measured Noise Levels at LT8, 24 to 29 November 2022



Annex B

Measured Noise Levels at LT9, 22 to 29 March 2023



Annex B

Measured Noise Levels at LT10, 8 to 16 June 2023