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QUARTERLY NOISE MANAGEMENT REPORT FOR BIRKENHEAD WORKS

COMPLIANCE DATE: 15/05/2025 – Quarter 1 2025

EPA Licence 1126: Noise Management Plan (U – 1551)

Licensed site: **Adelaide Brighton Cement, Birkenhead Works**

62 Elder Road, Birkenhead, SA 5015

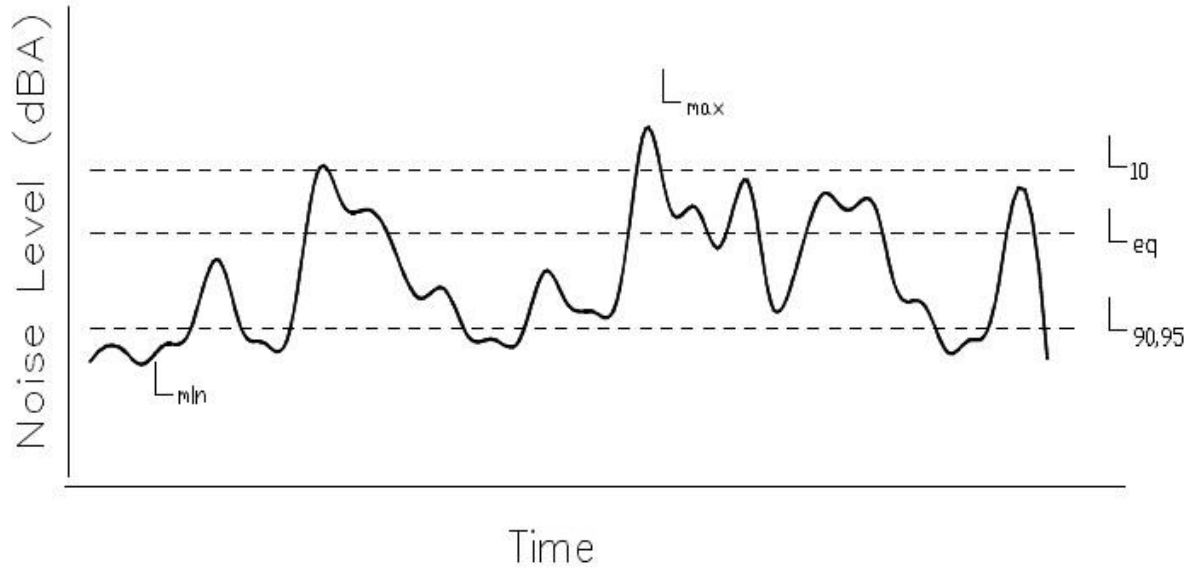
Date of Submission: **15 May 2025**

Version Number: **1**

Report Submitted by: Business Partner Environment - C&L (SA/NSW/NT)

Glossary of acoustic terminology

dB(A)	A unit of measurement, decibels(A), of sound pressure level which has its frequency characteristics modified by a filter ("A-weighted") so as to more closely approximate the frequency response of the human ear.
L_1	The noise level which is equalled or exceeded for 1% of the measurement period. L_1 is an indicator of the impulse noise level, and is used in Australia as the descriptor for intrusive noise (usually in dBA).
L_{10}	The noise level which is equalled or exceeded for 10% of the measurement period. L_{10} is an indicator of the mean maximum noise level, and is used in Australia as the descriptor for intrusive noise (usually in dBA).
L_{90}	The noise level which is equalled or exceeded for 90% of the measurement period. L_{90} is an indicator of the mean minimum noise level, and is used in Australia as the descriptor for background or ambient noise (usually in dBA).
L_{eq}	The equivalent continuous noise level for the measurement period. L_{eq} is an indicator of the average noise level (usually in dBA).
L_{max}	The maximum noise level for the measurement period (usually in dBA).



Note: *The subjective reaction or response to changes in noise levels can be summarised as follows*:

A 3 dB(A) increase in sound pressure level is required for the average human ear to notice a change; a 5 dB(A) increase is quite noticeable and a 10 dB(A) increase is typically perceived as a doubling in loudness

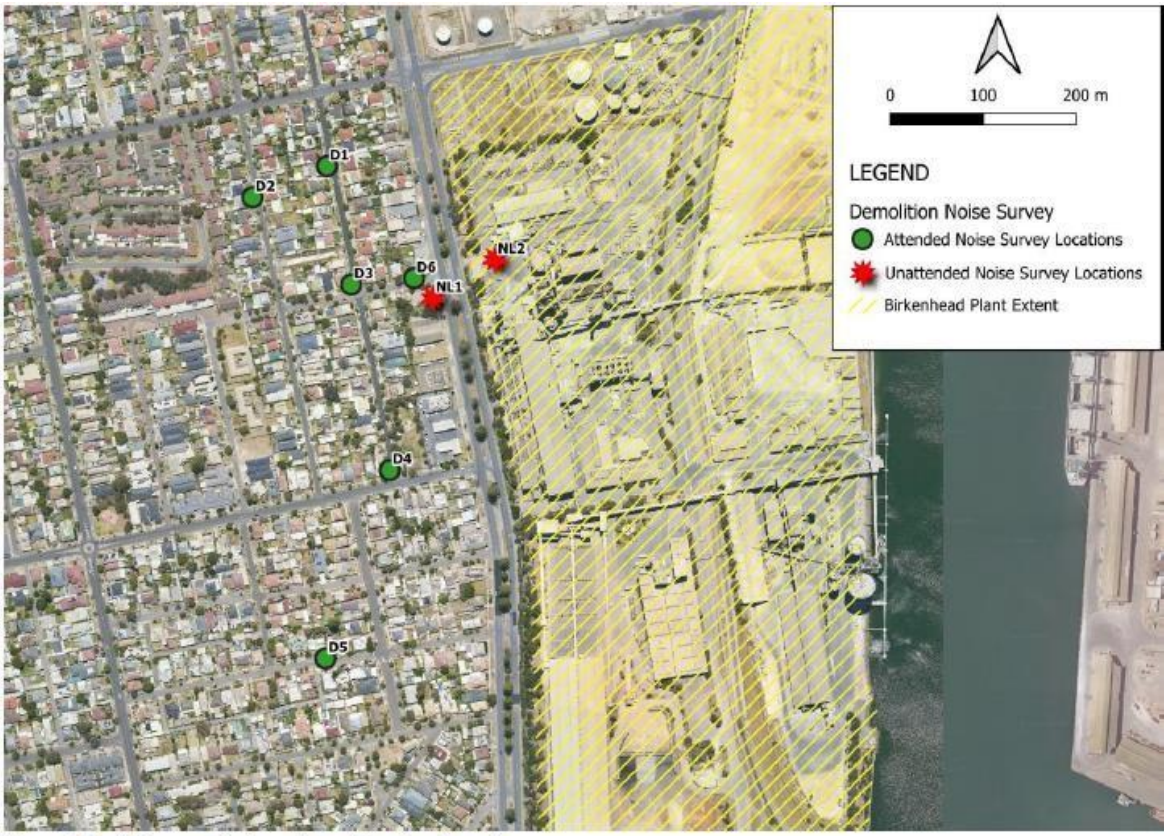
Monitoring Objective	The quarterly report will include where applicable: • Details of noise complaints (excluding complainant name and identifying address details for reasons of confidentiality), received during the quarter including the outcomes of the complaint investigation and where applicable, corrective actions implemented. • Details on the progress of noise attenuation projects including effectiveness. • Details of noise monitoring reports. • Details of noise minimisation activities.
Monitoring Plan	This monitoring report complies with the Noise Management Plan approved on 2 August 2023 by the SA EPA. The Plan is available on the ABC Birkenhead Community Website: https://adelaidebrightoncommunity.com.au/
Noise Monitoring Reports	ABC engaged Resonate to undertake noise measurements during the annual shutdown period – (10 Jan 2025 – 7 February 2025). The Annual Plant Shutdown Noise Monitoring Report A240953RP1 4 February 2025 is attached. An unattended noise survey was conducted during day time and night time period at receiver locations NL1 and NL2 and the attended noise survey was conducted during day time and night time period at all receiver locations highlighted in Table 1 and Figure 1 below:  Figure 1 Aerial image of site, adjacent land, and zoning

Table 1 Noise sensitive receiver locations

Location ID	Type	Survey Location
D1	Attended survey location	Adjacent to 33 Alfred St, Birkenhead
D2	Attended survey location	Adjacent to 39 Mary St, Peterhead
D3	Attended survey location	Adjacent to 9 Walton St, Peterhead
D4	Attended survey location	Corner of Alfred St and Hargrave St, Peterhead
D5	Attended survey location	27 Baker Street, Birkenhead
D6	Attended survey location	17 Walton Street, Peterhead
NL1	Unattended survey location	Roof of Adelaide Brighton Social Club
NL2	Unattended survey location	Western boundary of the plant

Noise Criteria

The daytime and night time noise criteria is in the table below

Location	Zone	Criteria	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
ABC Birkenhead Plant	Employment & Strategic Employment	N/A	N/A
D1, D3, D4	Suburban Neighbourhood zone	57	49
D2, D5	General Neighbourhood zone	57	49

Results of continuous day time and nighttime monitoring are graphed below:

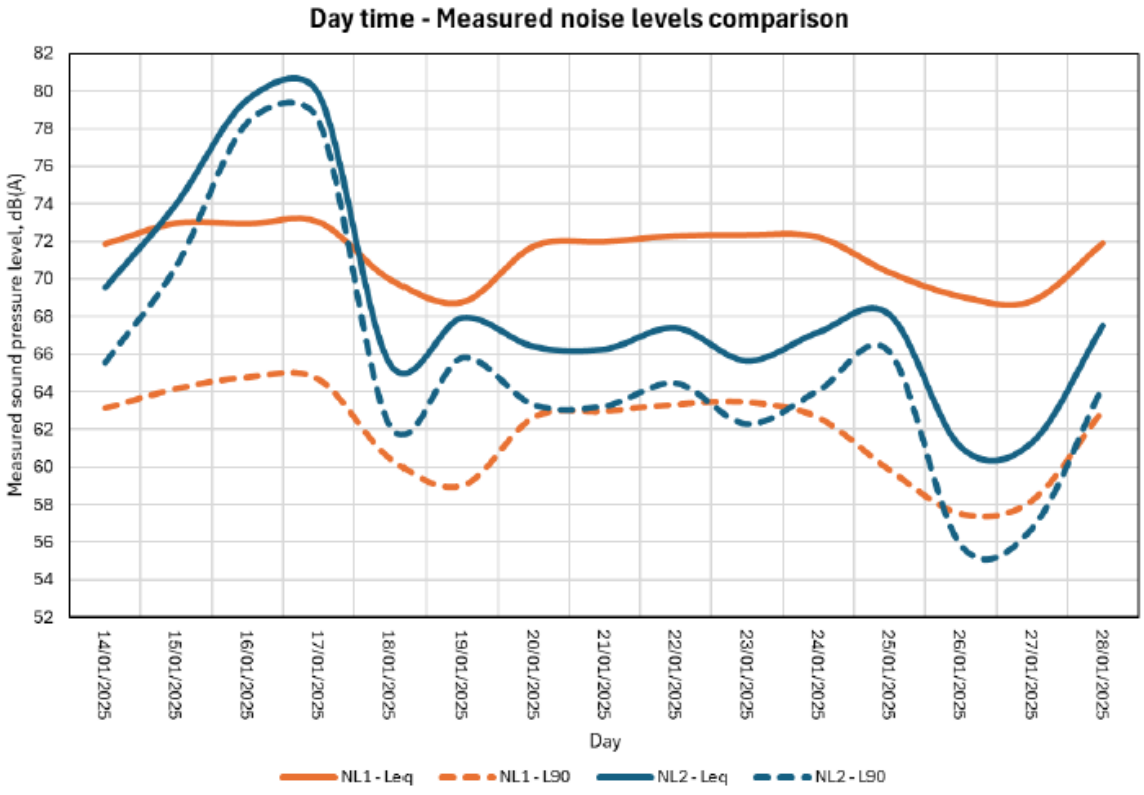


Figure 2 Day time—unattended noise survey results comparison

Based on the above, the following is noted:

- Leq levels—the measured Leq levels at position NL1 (ABC Social Club) are consistently higher than the levels measured at NL2 (ABC western boundary) location, except for a period between 15 January 2025 and 17 January 2025. This may have resulted due to activities being conducted in proximity to the logger location. This was most likely due to maintenance work on the RDF storage bunker.

- L90 levels—the measured L90 levels at NL1 location are mostly lower than or similar to levels measured at NL2 location.

- Since location NL2 is closer to the demolition works activity area and NL1 is closer to the sensitive receiver's location, the results show that the measured levels, including L90 levels, at NL1 (receiver location) are dominated by traffic noise.

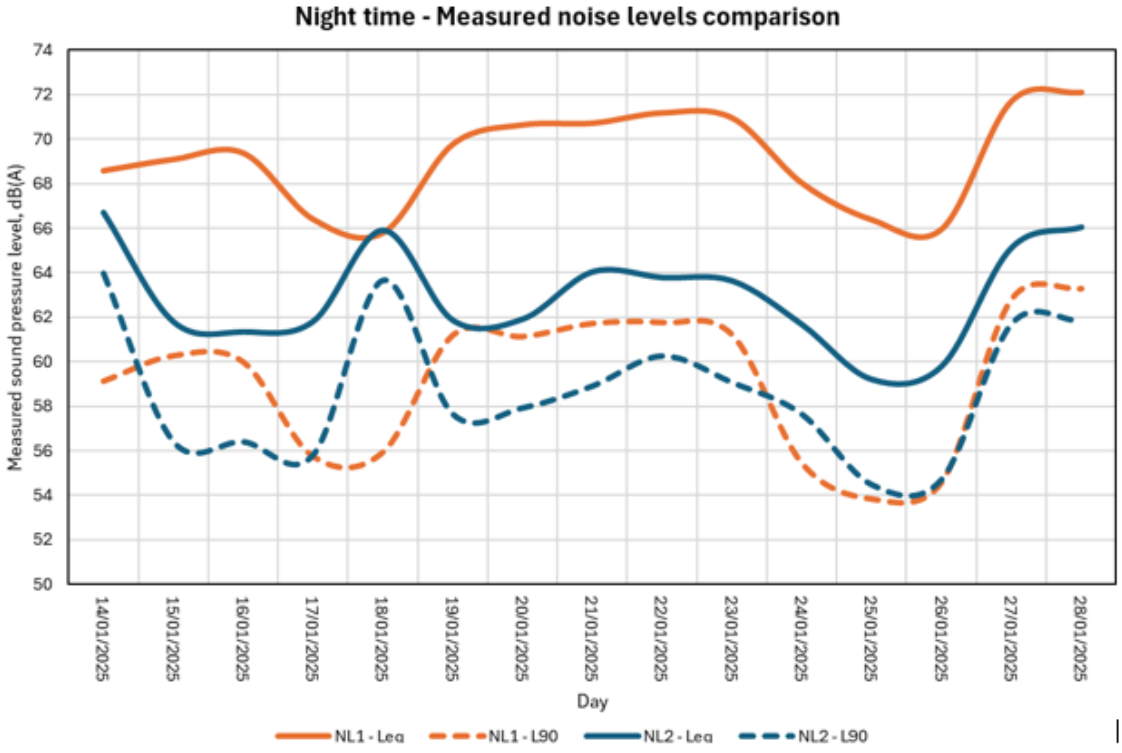


Figure 3 Night time—unattended noise survey results comparison

Based on the above, the following is noted:

- Leq levels—the measured Leq levels at position NL1 (ABC Social Club) are consistently higher than the levels measured at NL2 (ABC western boundary) location.

- L90 levels—the measured L90 levels at NL1 location are mostly higher than or similar to levels measured at NL2 location.

- Since location NL2 is closer to the demolition works activity area and NL1 is closer to the sensitive receiver's location, the results show that the measured Leq and L90 levels at NL1 (receiver location) are dominated by traffic noise.

Results of Attended Noise Measurements

Attended day time noise results (15 January 2025)

Location	Measured noise level dB(A)		Day time criteria dB(A)	Compliance	Notes/Comments
	L_{eq}	L_{90}			
D1	49	47	57	✓	1
D2	47	44	57	✓	1
D3	51	49	57	✓	1
D4	51	49	57	✓	1
D5	44	42	57	✓	1
D6	56	52	57	✓	1

1. Environmental noise criterion compliance is achieved at each location.

Attended night time noise results (15 January 2025)

Location	Measured noise level dB(A)		Night time criteria dB(A)	Compliance	Notes/Comments
	L_{eq}	L_{90}			
D1	48	46	49	✓	1
D2	45	44	49	✓	1
D3	50	47	49	×	2
D4	50	48	49	✓	1
D5	40	37	49	✓	1
D6	52	50	49	×	2

1. Environmental noise criterion compliance is achieved.
2. A minor exceedance of ~1dB(A) measured at D6. The background noise levels at this location are inherently influenced by traffic noise from Victoria Road (a designated Type A road, providing a major thoroughfare for heavy vehicles). It should be noted that the plant noise was intermittently audible at this location, however, traffic noise was observed to be the dominant source. Additionally, ~1 dB(A) change in noise levels is imperceptible to human hearing and therefore, is considered insignificant.

Comparison of noise survey results over the last two years

Community noise survey results comparison—Day time

Location	2025 Survey Measured noise level, dB(A)		2024 Survey Measured noise level, dB(A)		Day time criteria dB(A)
	L_{eq}	L_{90}	L_{eq}	L_{90}	
D1	49	47	51	49	57
D2	47	44	49	45	57
D3	51	49	54	51	57
D4	51	49	53	50	57
D5	44	42	50	47	57
D6	56	52	59	52	57

- At all survey locations, the plant was faintly audible during no traffic movements (infrequent).
- Measured noise levels at D6 were same as the levels measured during 2024 survey.
- Measured levels at all other locations were lower than the 2024 survey results.

Community noise survey results comparison—Night time

Location	2025 Survey Measured noise level, dB(A)		2024 Survey Measured noise level, dB(A)		Night time criteria dB(A)
	L_{eq}	L_{90}	L_{eq}	L_{90}	
D1	48	46	45	42	49
D2	45	44	41	40	49
D3	50	47	49	46	49
D4	50	48	48	46	49
D5	40	37	44	42	49
D6	52	50	51	50	49

- At all survey locations, the plant was faintly audible during no traffic movements (infrequent). However, the demolition works were not audible (no demolition works were conducted beyond 10 pm as per curfew/ restrictions). The audible noise included forklift/truck movements and some other operational noise.
- Measured noise levels at D1, D2 and D4 are marginally higher in comparison to 2024 survey (up to 4dB(A)). However, the levels are considered acceptable as the environmental noise criterion was not exceeded at any locations.
- Measured noise levels at D3 and D6 were 1 dB(A) higher than the 2024 results and exceed the environmental noise criterion by 1 dB(A). However, as discussed above, the results are considered acceptable, as traffic noise is the dominant source at these locations.
- At location D5, the measured levels were lower than the 2024 survey results.

Summary of results

- Day time results — compliance achieved at all survey locations.
- Night time results — minor criterion exceedance (~1 dB(A)) at D3 and D6 is noted. Due to proximity to Victoria Road, the noise levels at these locations are inherently dominated by traffic noise from Victoria Road. As such, considering this and the fact that the measured noise levels are within +/- 1 dB(A) of the 2024 noise survey results, we consider the levels at D3 and D6 acceptable.
- Subjectively, the demolition works were not observed to be the dominant source at each location. Traffic noise from nearby roads (specifically Victoria Road) was observed to be dominant, with plant being faintly audible during periods with no traffic in the vicinity.
- During the scheduled 2025 demolition works, no community noise complaints were received by ABC.
- Historically, jack hammering noise from the kiln refractory demolition has been the most dominant source and subject to community noise complaints during nighttime periods. To address the community complaints, the jack hammering works have now been limited to only day-time periods, with curfew imposed post 10pm.
- The continuous noise monitoring results provided no clear indication of noise impact due to demolition works activities. The results indicate that the background noise levels in the immediate vicinity of Victoria Road are dominated by traffic noise and noise from nearby commercial activities (petrol station, etc.)
- The survey indicated compliance against both daytime and nighttime environmental noise criteria.

Noise Barrier

ABC Installed a temporary noise barrier to reduce the noise impact to the nearby residences during the demolition works.

- The barrier spans between the blending silo and 4B Tower, with an overall height of 12 m.
- The barrier was constructed from Heavy Duty Noise Block XR Series Acoustic Sound Curtains, attached to a temporary scaffolding
- Due to the size of the barrier the sheets were not sealed to each other, this allows transmission of wind and reduce wind load on the structure. This is likely to impact the potential performance of the noise barrier but is necessary from a structural perspective

Photo of noise barrier

Noise Minimisation Activities

No noise minimisation activities in this reporting period

Noise Complaints Summary

There were two noise complaints for the reporting period.

Date / Time of ocurrence	Location	Description	Action Taken	Weather conditions at time of noise complaint			
				Temp C	Wind Direction	Wind Speed m/s	Rain fall
26/01/2025 12:18	Birkenhead	Lots of noise coming from facility. Having a barbecue - it is Australia Day	Investigated - vacuum truck cleaning plant near Victoria road. Activity stopped.	28	SSW	5.33	-
26/02/2025 03:19	Largs North	Wow tonight it was really loud! It's not good enough and is highly annoying	Normal plant operation Requested contact phone number to be able to follow up - no response	22.5	ESE	3.22	-

Noise Reports

The Annual Plant Shutdown Noise Monitoring Report A240953RP1 4 February 2025 is attached.

ABC Birkenhead Plant 2025

Annual Shutdown Period Noise Monitoring Report

A240953RP1 Revision 0

Tuesday, 4 February 2025

Document Information

Project	ABC Birkenhead Plant 2025
Client	Adelaide Brighton Cement Ltd
Report title	Annual Shutdown Period Noise Monitoring Report
Project Number	A240953

Revision Table

Report revision	Date	Description	Author	Reviewer
0	4 February 2025	First Issue	Saksham Garg	Darren Jurevicius

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to represent human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
Characteristic	Associated with a noise source, means a tonal, impulsive, low frequency or modulating characteristic of the noise that is determined in accordance with the Guidelines for the use of the Environment Protection (Noise) Policy (Noise Policy) to be fundamental to the nature and impact of the noise.
Continuous noise level	A-weighted noise level of a continuous steady sound that, for the period over which the measurement is taken using fast time weighting, has the same mean square sound pressure as the noise level which varies over time when measured in relation to a noise source and noise-affected premises in accordance with the Noise Policy
Day	Between 7 am and 10 pm as defined in the Noise Policy
dB	Decibel—a unit of measurement used to express sound level. It is based on a logarithmic scale which means a sound that is 3 dB higher has twice as much energy. We typically perceive a 10 dB increase in sound as a doubling of loudness.
dB(A)	Units of the A-weighted sound level.
Frequency (Hz)	The number of times a vibrating object oscillates (moves back and forth) in one second. Fast movements produce high frequency sound (high pitch/tone), but slow movements mean the frequency (pitch/tone) is low. 1 Hz is equal to 1 cycle per second.
Indicative noise level	Indicative noise level determined under clause 5 of the Noise Policy.
L_{90}	Noise level exceeded for 90 % of the measurement time. The L_{90} level is commonly referred to as the background noise level.
L_{eq}	Equivalent Noise Level—Energy averaged noise level over the measurement time.
L_{max}	The maximum instantaneous noise level.
Night	Between 10.00 p.m. on one day and 7.00 a.m. on the following day as defined in the Noise Policy
Noise source	Premises or a place at which an activity is undertaken, or a machine or device is operated, resulting in the emission of noise
Quiet locality	A locality is a quiet locality if the Planning & Design Code provisions that make land use rules for the locality principally promote land uses that all fall within either or both of the following land use categories: (a) Residential; (b) Rural Living;

Table of Contents

1 Introduction

Resonate Consultants have been engaged by Adelaide Brighton Cement (ABC) to conduct an environmental noise survey at their Birkenhead plant as a part of their annual plant shutdown period (January 2025—February 2025). The plant operates under the Environment Protection Authority (EPA) license number 1126.

As a part of their EPA licence condition (U-1551—Site Noise Minimisation) the plant operators are required to implement a noise management plan, which warrants the following minimum to ensure compliance with the EPA licence requirements:

- Annual Noise Survey—conduct an attended noise survey in the community area close to the plant on annual basis.
- Computer Noise Model—Develop and update the computer noise model on a regular basis to include new noise sources, remove redundant sources and update noise levels for existing sources.
- Noise Abatement—continuous identification of noise generating equipment and implementation of abatement solutions to control emissions from the plant.

However, this assessment focuses on the annual noise survey conducted during the shutdown period of the plant. It includes attended noise survey in the community area (at 6 locations primarily identified by ABC[1]) and continuous unattended noise survey at 2 locations. The survey was conducted during both day time (7 am - 10 pm) and night time (10 pm—7 am) periods while the demolition and maintenance works were being conducted on site. In addition to this a temporary noise barrier is installed on site (specification provided in Section □).

This report summarises the results of the survey, compared against the applicable environmental noise criteria and the historical noise survey data, and highlights any significant noise source where applicable.

The following guidelines, reports and standards were used in preparation of this report:

- Planning & Design Code
- *Environment Protection (Commercial & Industrial Noise) Policy* 2023 (Noise Policy)
- Environment Protection Authority Licence Number 1126 *Adelaide Brighton Cement*
- AS 1055.1-1997 *Acoustics—Description and measurement of environmental noise—Part 1: General procedures*, Standard Australian (1997).
- Resonate Report, *A230951RP1B—Annual Shutdown Period Noise Monitoring Report*, dated 19 March 2024.

[1] *The locations were selected by ABC, as representative of potential noise impact, informed by historical community complaints associated with the kiln refractory demolition activities undertaken during plant shutdown periods.*

2 Plant details

2.1 Plant operation

The Birkenhead plant operates 24 hours, 7 days a week, with scheduled shut down at the beginning of the year (January) for maintenance works.

Maintenance works within the plant varies year-to-year depending on the plant requirements. However, typical shutdown period works include the following:

- Maintenance works for fans, extractors, etc.
- Structural works
- Kiln refractory demolition works (limited to only day-time period).

2.2 Location

The subject site is located at 62 Elder Road, Birkenhead SA 5015. The closest residential receptors along the western boundary of the plant, across Victoria Road.

Figure 1 shows an aerial image of the locality in relation to site location, attended survey locations and unattended survey locations.

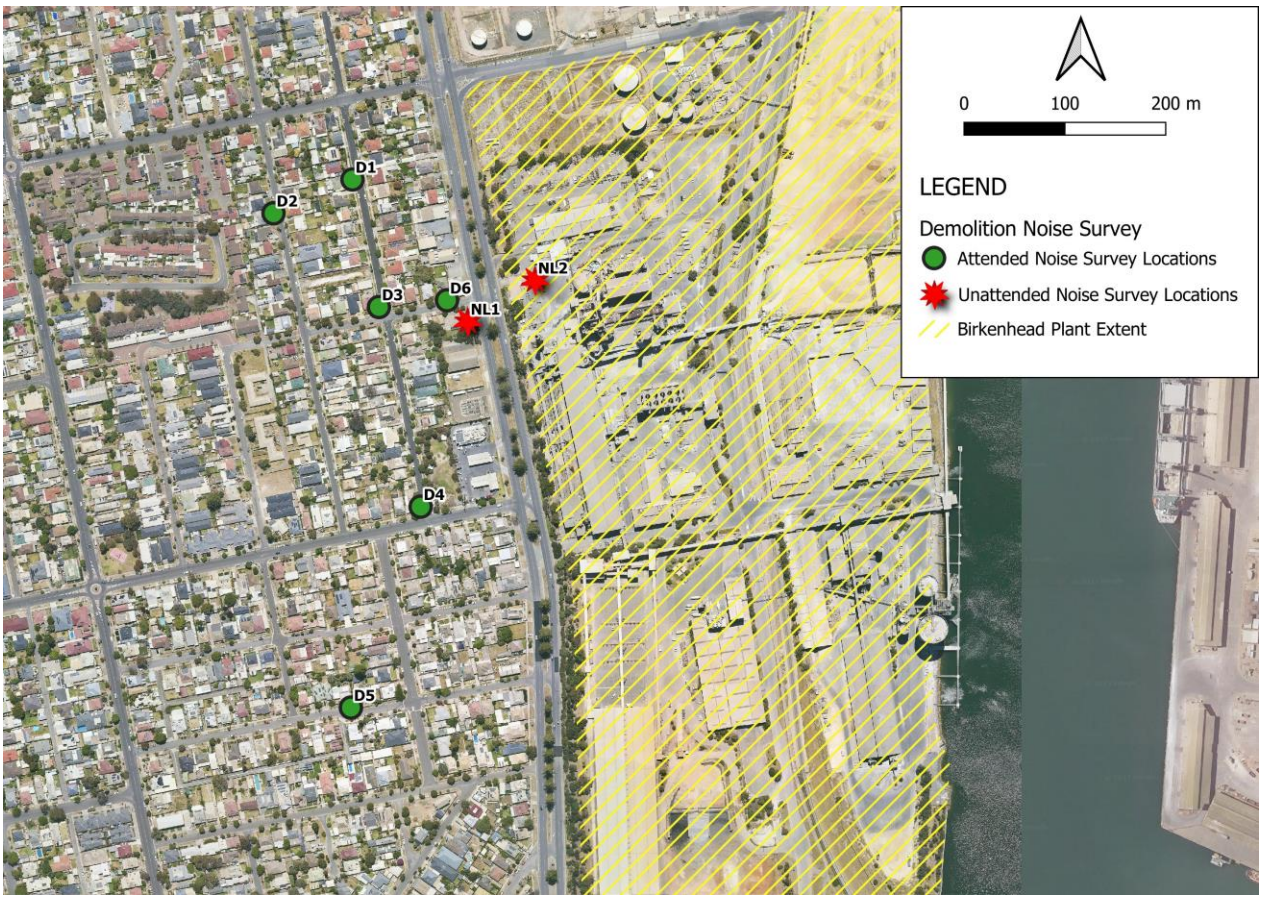


Figure 1 Aerial image of site, adjacent land, and zoning

2.3 Noise survey locations

ABC have advised six primary attended survey locations in the community and 2 unattended survey locations. The locations are provided in Table 1 and Figure 1.

Table 1 Noise sensitive receiver locations

Location ID	Type	Survey Location
D1	Attended survey location	Adjacent to 33 Alfred St, Birkenhead
D2	Attended survey location	Adjacent to 39 Mary St, Peterhead
D3	Attended survey location	Adjacent to 9 Walton St, Peterhead
D4	Attended survey location	Corner of Alfred St and Hargrave St, Peterhead
D5	Attended survey location	27 Baker Street, Birkenhead
D6	Attended survey location	17 Walton Street, Peterhead
NL1	Unattended survey location	Roof of Adelaide Brighton Social Club
NL2	Unattended survey location	Western boundary of the plant

3 Planning & Design Code

3.1 Zoning

3.1.1 Subject site

The subject site is located within Strategic Employment and Employment zone. The relevant Assessment Provisions and Desired Outcomes are outlined in Table 2.

Table 2 Relevant Desired Outcome—Strategic Employment and Employment zones

Desired Outcome	
Employment zone	
DO1	A diverse range of low-impact light industrial, commercial and business activities that complement the role of other zones accommodating significant industrial, shopping and business activities.
DO2	Distinctive building, landscape and streetscape design to achieve high visual and environmental amenity particularly along arterial roads, zone boundaries and public open spaces.
Strategic Employment zone	
DO 1	A range of industrial, logistical, warehousing, storage, research and training land uses together with compatible business activities generating wealth and employment for the state.
DO 2	Employment-generating uses are arranged to: (a) support the efficient movement of goods and materials on land in the vicinity of major transport infrastructure such as ports and intermodal freight facilities (b) maintain access to waterfront areas for uses that benefit from direct water access including harbour facilities, port related industry and warehousing, ship building and related support industries (c) create new and enhance existing business clusters (d) support opportunities for the convenient co-location of rural related industries and allied businesses that may detract from scenic rural landscapes (e) be compatible with its location and setting to manage adverse impacts on the amenity of land in adjacent zones.
DO 3	A pleasant visual amenity from adjacent arterial roads, adjoining zones and entrance ways to cities, towns and settlements.

3.1.2 Adjacent land

The closest noise-affected premises are located in Suburban Neighbourhood zone and General Neighbourhood zone. The location details of each receiver are provided in Table 1, and the relevant Desired Outcomes are provided in Table 3.

Table 3 Relevant Desired Outcomes

Desired Outcome	
Suburban Neighbourhood zone	
DO1	Low density housing is consistent with the existing local context and development pattern. Services and community facilities contribute to making the neighbourhood a convenient place to live without compromising residential amenity and character.
General Neighbourhood zone	
DO1	Low-rise, low and medium-density housing that supports a range of needs and lifestyles located within easy reach of services and facilities. Employment and community service uses contribute to making the neighbourhood a convenient place to live without compromising residential amenity.

3.2 Interface between land uses

Interface between Land Uses is a General Development Policy that is relevant to the subject site. The relevant Assessment Provisions relating to noise are outlined in Table 4.

Table 4 Relevant Assessment Provisions—Activities generating noise or vibration

Relevant Assessment Provisions	
Desired Outcome	
DO1	Development is located and designed to mitigate adverse effects on or from neighbouring and proximate land uses.
Performance Outcome	**Deemed-to-Satisfy Criteria / Designated Performance Feature**
PO 4.1 Development that emits noise (other than music) does not unreasonably impact the amenity of sensitive receivers (or lawfully approved sensitive receivers).	DTS/DPF 4.1 Noise that affects sensitive receivers achieves the relevant Environment Protection (Noise) Policy criteria.

Relevant Assessment Provisions	
PO 4.2 Areas for the on-site manoeuvring of service and delivery vehicles, plant and equipment, outdoor work spaces (and the like) are designed and sited to not unreasonably impact the amenity of adjacent sensitive receivers (or lawfully approved sensitive receivers) and zones primarily intended to accommodate sensitive receivers due to noise and vibration by adopting techniques including: a) locating openings of buildings and associated services away from the interface with the adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers b) when sited outdoors, locating such areas as far as practicable from adjacent sensitive receivers and zones primarily intended to accommodate sensitive receivers c) housing plant and equipment within an enclosed structure or acoustic enclosure d) providing a suitable acoustic barrier between the plant and / or equipment and the adjacent sensitive receiver boundary or zone.	DTS/DPF 4.2 None are applicable.

4 Noise criteria

4.1 Environmental noise policy

As noted in DTS/DPF 4.1, environmental noise emissions from the subject site should comply with the *Environment Protection (Noise) Policy* 2007. This policy has been superseded on 31 October 2023 by the *Environment Protection (Commercial & Industrial Noise) Policy* 2023 (Noise Policy). As such, noise emissions from the site should be assessed under the 2023 Noise Policy.

However, in consultation with EPA, the following criteria (Table 5) has been agreed upon for noise emanating from ABC's Birkenhead Plant.

Table 5 Summary of EPA recommended environmental noise criteria

Location	Zone	Criteria	
		Day (7 am to 10 pm)	Night (10 pm to 7 am)
ABC Birkenhead Plant	Employment & Strategic Employment	N/A	N/A
D1, D3, D4	Suburban Neighbourhood zone	57	49
D2, D5	General Neighbourhood zone	57	49

NOTE: The Environment Protection Authority (EPA) has advised that comparison of the L_{90} noise level descriptor measured within 100 metres of the centre line of Victoria Road is an acceptable method for eliminating the influence of short-term/transient noise level events (such as intermittent passing road traffic, for example) on the results. This includes measurement positions D1, D4, and D6. At distances greater than 100 metres, the use of the L_{eq} descriptor is required. As such, for measurement positions D1, D4, and D6, L_{90} descriptor has been used.

Penalties can also be applied to a noise source for a variety of characteristics, such as impulsive, low frequency, modulating or tonal characters. For a characteristic penalty to be applied to a noise source it must be fundamental to the impact of the noise and dominate the overall noise impact. The application of the characteristic penalty is discussed in the noise emission assessment.

We note that under Part 5, Clause 20(6) of the Noise Policy, exceedance of the recommended criterion does not necessarily mean action is required under the Noise Policy. Some of the following matters should be considered when considering action:

- the amount by which the criterion is exceeded (in dB(A))
- the frequency and duration for which the criterion is exceeded
- the ambient noise that has a noise level similar to the predicted noise level
- the times of occurrence of the noise source
- the number of persons likely to be adversely affected by the noise source and whether there is any special need for quiet.

5 Noise survey

5.1 Unattended noise survey

5.1.1 Location details

The unattended noise survey was conducted during day time and night time period at all receiver locations highlighted in Table 1 and Figure 1.

5.1.2 Instrumentation

Continuous noise survey measurements were conducted using the following equipment:

- Location NL1
  - Model—NTi XL2 Analyser
  - Serial Number—A2A-18364-E0
- Location NL2
  - Model—NTi XL2 Analyser
  - Serial Number—A2A-18365-E0

The units are National Association of Testing Authorities (NATA) calibrated in conformance with Australia Standard 1259 *Acoustics – Sound level meters* (AS 1259). Copies of the calibration certificates are available on request.

5.1.3 Procedure

Noise measurements were conducted in accordance with following:

- Measurements were conducted continuous 24 hours, 7 days a week between 14 January 2025 and 28 January 2025.
- The microphone of the sound level meter was at a height of approximately 1.2 metres above the ground and at least 1.5 metres away from any wall or facade.
- The axis of maximum sensitivity of the microphone of the sound level meter was directed towards the noise source.
- The noise data with wind speeds exceeding 5 m/s and rainfall were excluded from the data presented in this report.
- During the entire monitoring period, the audio files were also captured.
- Spot calibration was conducted on both units before and after installation with no drift noted.

5.1.4 Survey results

The results of the unattended noise survey results are presented below:

Table 6 Location NL1—Unattended noise survey results

Day/Date	Measured noise levels, dB(A)							
	Day time				Night time			
	L_{eq}	L_{max}	L_{10}	L_{90}	L_{eq}	L_{max}	L_{10}	L_{90}
Tuesday, 14 January 2025	72	87	75	63	69	85	72	59
Wednesday, 15 January 2025	73	92	76	64	69	83	72	60
Thursday, 16 January 2025	73	91	76	65	69	83	73	60
Friday, 17 January 2025	73	95	76	65	66	82	70	56
Saturday, 18 January 2025	70	88	73	60	66	84	69	56

Day/Date	Measured noise levels, dB(A)							
	Day time				Night time			
	L_{eq}	L_{max}	L_{10}	L_{90}	L_{eq}	L_{max}	L_{10}	L_{90}
Sunday, 19 January 2025	69	84	72	59	70	86	73	61
Monday, 20 January 2025	72	89	75	63	71	91	73	61
Tuesday, 21 January 2025	72	91	75	63	71	89	74	62
Wednesday, 22 January 2025	72	90	75	63	71	87	74	62
Thursday, 23 January 2025	72	89	75	63	71	86	74	61
Friday, 24 January 2025	72	91	75	63	68	89	71	55
Saturday, 25 January 2025	70	91	73	60	66	83	70	54
Sunday, 26 January 2025	69	92	72	58	66	81	70	55
Monday, 27 January 2025	69	87	72	58	72	88	75	63
Tuesday, 28 January 2025	72	92	75	63	72	84	75	63

Table 7 Location NL2—Unattended noise survey results

Day/Date	Measured noise levels, dB(A)							
	Day time				Night time			
	L_{eq}	L_{max}	L_{10}	L_{90}	L_{eq}	L_{max}	L_{10}	L_{90}
Tuesday, 14 January 2025	70	87	72	66	67	77	69	64
Wednesday, 15 January 2025	74	92	75	71	62	76	64	56
Thursday, 16 January 2025	80	85	81	78	61	76	64	56
Friday, 17 January 2025	80	85	81	78	62	80	65	56
Saturday, 18 January 2025	66	80	67	62	66	82	68	64
Sunday, 19 January 2025	68	79	70	66	62	78	64	58
Monday, 20 January 2025	66	81	68	63	62	75	64	58
Tuesday, 21 January 2025	66	82	68	63	64	79	66	59
Wednesday, 22 January 2025	67	80	69	64	64	81	66	60
Thursday, 23 January 2025	66	83	67	62	64	78	66	59
Friday, 24 January 2025	67	83	69	64	62	77	64	58
Saturday, 25 January 2025	68	81	70	66	59	76	61	54
Sunday, 26 January 2025	61	80	64	56	60	75	62	55
Monday, 27 January 2025	61	79	64	57	65	80	67	62
Tuesday, 28 January 2025	68	83	69	64	66	89	68	62

Detailed data has been presented in Appendix B—Unattended noise survey data.

5.1.5 Results comparison

Figure 2 provides a comparison of L_{eq} and L_{90} levels for day time survey period for each day.

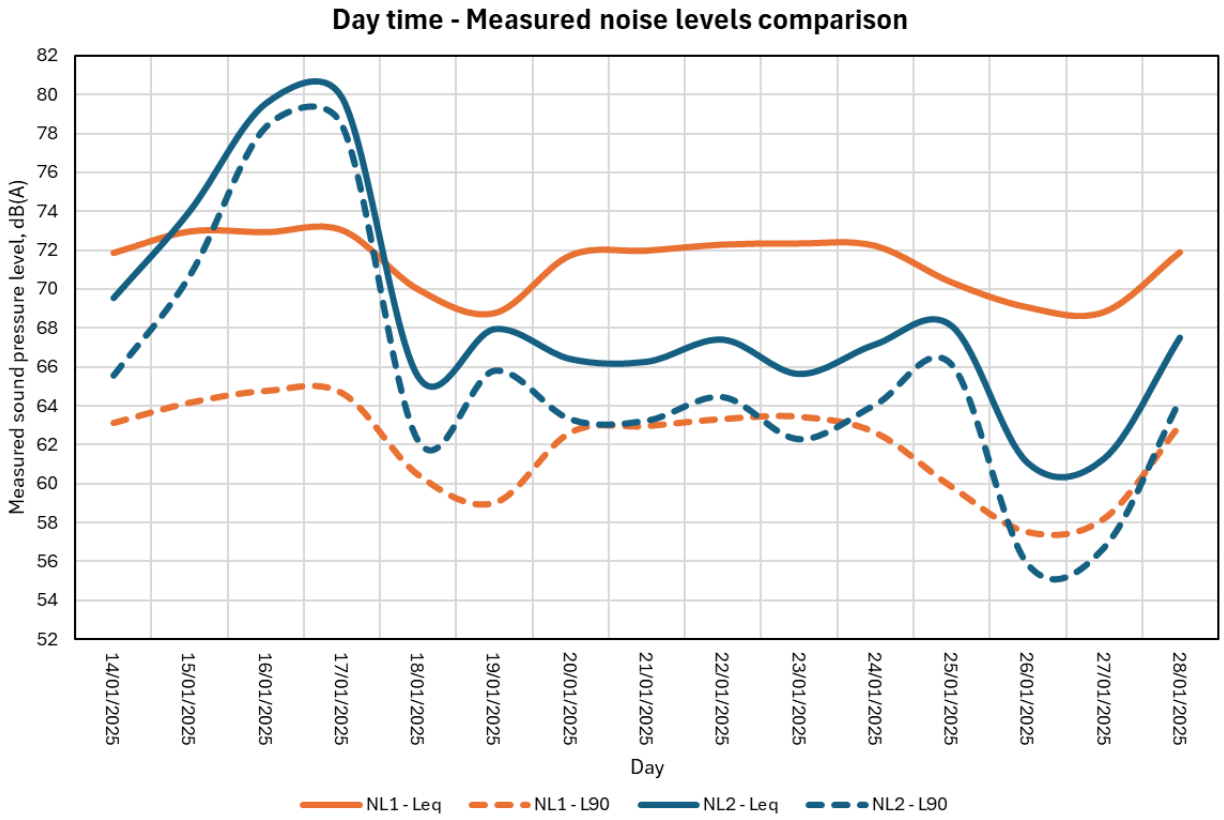


Figure 2 Day time—unattended noise survey results comparison

Based on the above, the following is noted:

- L_{eq} levels—the measured L_{eq} levels at position NL1 (ABC Social Club) are consistently higher than the levels measured at NL2 (ABC western boundary) location, except for a period between 15 January 2025 and 17 January 2025. This may have resulted due to activities being conducted in proximity to the logger location.
- L_{90} levels—the measured L_{90} levels at NL1 location are mostly lower than or similar to levels measured at NL2 location.
- Since location NL2 is closer to the demolition works activity area and NL1 is closer to the sensitive receiver's location, the results show that the measured levels, including L_{90} levels, at NL1 (receiver location) are dominated by traffic noise.

Figure 3 provides a comparison of L_{eq} and L_{90} levels for night time survey period for each day.

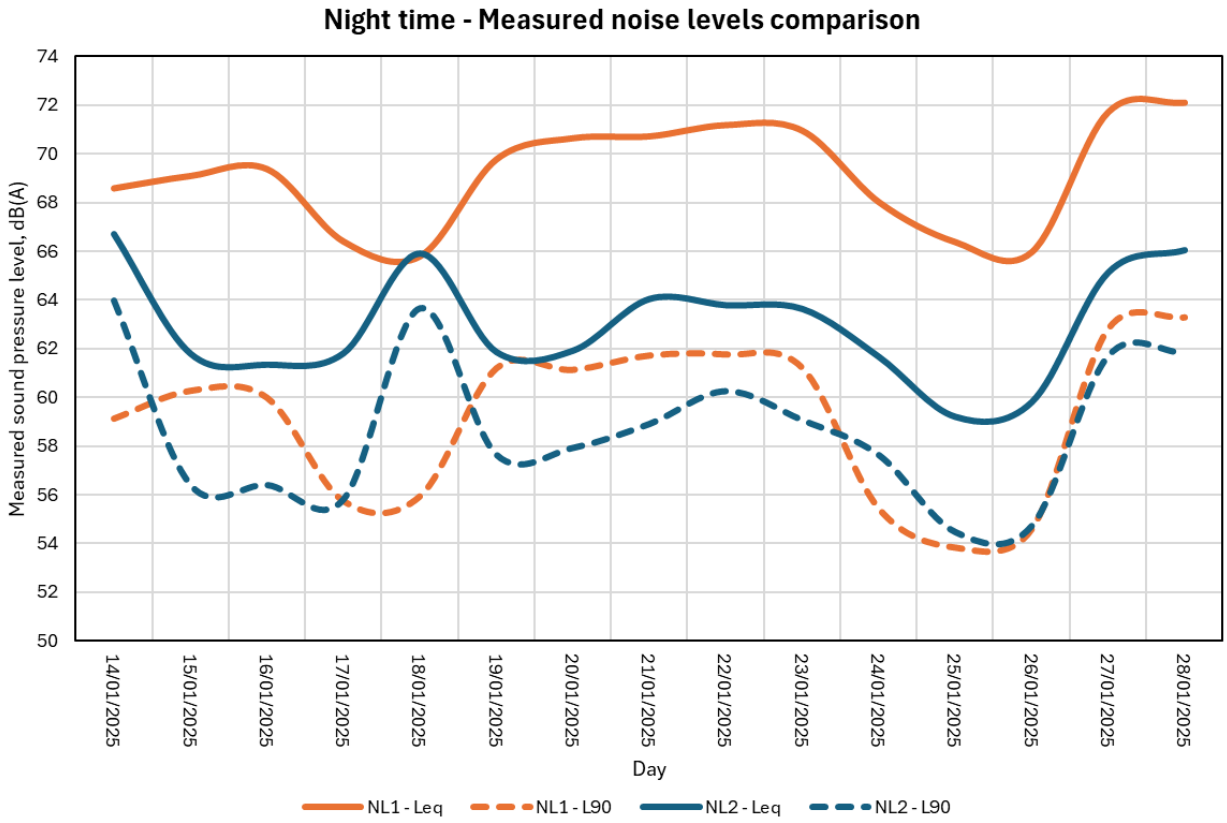


Figure 3 Night time—unattended noise survey results comparison

Based on the above, the following is noted:

- L_{eq} levels—the measured L_{eq} levels at position NL1 (ABC Social Club) are consistently higher than the levels measured at NL2 (ABC western boundary) location.
- L_{90} levels—the measured L_{90} levels at NL1 location are mostly higher than or similar to levels measured at NL2 location.
- Since location NL2 is closer to the demolition works activity area and NL1 is closer to the sensitive receiver's location, the results show that the measured L_{eq} and L_{90} levels at NL1 (receiver location) are dominated by traffic noise.

5.2 Attended noise survey

5.2.1 Location details

The attended noise survey was conducted during day time and night time period at all receiver locations highlighted in Table 1 and Figure 1.

5.2.2 Instrumentation

Noise level measurements were conducted using a Brüel & Kjær Type 2250 sound level meter (B&K 2250 SLM) calibrated with a Brüel & Kjær Type 4231 calibrator. The B&K 2250 SLM is a National Association of Testing Authorities (NATA) calibrated Class 1 SLM in conformance with Australia Standard 1259 *Acoustics – Sound level meters* (AS 1259).

Note two sets of sound level meters were used during the survey, with measurements conducted by two site engineers. The serial numbers for both units used during the survey are presented below:

- Unit 1 serial number—3001247
- Unit 2 serial number—2749881

Copies of the calibration certificates are available on request.

5.2.3 Procedure

Noise measurements were undertaken in accordance with the following:

- The survey was conducted for both daytime and night time period (as defined in the Noise Policy).
- Noise measurements were undertaken for a period of up to 15 minutes.
- The microphone of the sound level meter was at a height of approximately 1.2 metres above the ground and at least 3.5 metres away from any wall or facade.
- The axis of maximum sensitivity of the microphone of the sound level meter was directed towards the noise source.
- A windshield was used during all measurements, and the measurements were undertaken during a calm, still night (for which the wind velocity did not exceed 5 m/s). The weather data for the survey period has been attached in Appendix C—Weather data (attended survey).
- Care was taken to avoid any effect on the measurement of extraneous noise, acoustic vibration or electrical interference. To ensure this, where possible, the measurement was paused, and the ‘back-erase’ function of the B&K was used to remove any influence from extraneous noise sources during the measurements. Note that at locations with high traffic volumes (such as locations in proximity to Victoria Road and Fletcher Road), avoiding the influence of extraneous noise was not possible. In such cases, comments have been provided to reflect possible extraneous noise influence.

5.2.4 Survey results

The results of the community noise survey conducted at the locations indicated in Table 1, during day and night time periods, have been presented in Table 8 and Table 9. Note that the appropriate noise descriptor used for comparison against the criterion has been highlighted in grey.

Further to below, a full set of survey noise data, including survey notes, is provided in Appendix A—Noise survey data & notes. As such, the results and discussion provided below should be read in conjunction with the survey notes.

Table 8 Community noise survey results—day time (15 January 2025)

Location	Measured noise level dB(A)		Day time criteria dB(A)	Compliance	Notes/Comments
	L_{eq}	L_{90}			
D1	49	47	57	✓	1
D2	47	44	57	✓	1
D3	51	49	57	✓	1
D4	51	49	57	✓	1
D5	44	42	57	✓	1
D6	56	52	57	✓	1

Day time survey notes/comments:

1. Environmental noise criterion compliance is achieved at each location.

Table 9 Community noise survey results——night time (15 January 2025)

Location	Measured noise level dB(A)		Night time criteria dB(A)	Compliance	Notes/Comments
	L_{eq}	L_{90}			
D1	48	46	49	✓	1
D2	45	44	49	✓	1
D3	50	47	49	×	2
D4	50	48	49	✓	1
D5	40	37	49	✓	1
D6	52	50	49	×	2

Nighttime survey notes/comments:

1. Environmental noise criterion compliance is achieved.
2. A minor exceedance of ~1dB(A) measured at D6. The background noise levels at this location are inherently influenced by traffic noise from Victoria Road (a designated Type A road, providing a major thoroughfare for heavy vehicles). It should be noted that the plant noise was intermittently audible at this location, however, traffic noise was observed to be the dominant source. Additionally, ~1 dB(A) change in noise levels is imperceptible to human hearing and therefore, is considered insignificant.

5.2.5 Results comparison

A comparison of the noise survey results with the 2024 noise survey data has been presented in Table 10 and Table 11 below. Note that the historical data has been sourced from Resonate Report *A230951RP1B*, dated 19 March 2024.

Table 10 Community noise survey results comparison—Day time

Location	2025 Survey Measured noise level, dB(A)		2024 Survey Measured noise level, dB(A)		Day time criteria dB(A)
	L_{eq}	L_{90}	L_{eq}	L_{90}	
D1	49	47	51	49	57
D2	47	44	49	45	57
D3	51	49	54	51	57
D4	51	49	53	50	57
D5	44	42	50	47	57
D6	56	52	59	52	57

With reference to the results presented above, the following is noted:

- At all survey locations, the plant was faintly audible during no traffic movements (infrequent).
- Measured noise levels at D6 were same as the levels measured during 2024 survey.
- Measured levels at all other locations were lower than the 2024 survey results.

Table 11 Community noise survey results comparison—Night time

Location	2025 Survey Measured noise level, dB(A)		2024 Survey Measured noise level, dB(A)		Night time criteria dB(A)
	L_{eq}	L_{90}	L_{eq}	L_{90}	
D1	48	46	45	42	49
D2	45	44	41	40	49
D3	50	47	49	46	49
D4	50	48	48	46	49
D5	40	37	44	42	49
D6	52	50	51	50	49

With reference to the results presented above, the following is noted:

- At all survey locations, the plant was faintly audible during no traffic movements (infrequent). However, the demolition works were not audible (no demolition works were conducted beyond 10 pm as per curfew/ restrictions). The audible noise included forklift/truck movements and some other operational noise.
- Measured noise levels at D1, D2 and D4 are marginally higher in comparison to 2024 survey (up to 4dB(A)). However, the levels are considered acceptable as the environmental noise criterion was not exceeded at any locations.
- Measured noise levels at D3 and D6 were 1 dB(A) higher than the 2024 results and exceed the environmental noise criterion by 1 dB(A). However, as discussed above, the results are considered acceptable, as traffic noise is the dominant source at these locations.
- At location D5, the measured levels were lower than the 2024 survey results.

5.3 Discussion

Based on the results presented in this report, the following is noted:

- Day time results—compliance achieved at all survey locations.
- Night time results—minor criterion exceedance (~1 dB(A)) at D3 and D6 is noted. Due to proximity to Victoria Road, the noise levels at these locations are inherently dominated by traffic noise from Victoria Road. As such, considering this and the fact that the measured noise levels are within +/- 1 dB(A) of the 2024 noise survey results, we consider the levels at D3 and D6 acceptable.
- Subjectively, the demolition works were not observed to be the dominant source at each location. Traffic noise from nearby roads (specifically Victoria Road) was observed to be dominant, with plant being faintly audible during periods with no traffic in the vicinity.
- During the scheduled 2025 demolition works, we understand that no community noise complaints were received by ABC.
- Historically, jack hammering noise from the kiln refractory demolition has been the most dominant source and subject to community noise complaints during nighttime periods. To address the community complaints, the jack hammering works have now been limited to only day-time periods, with curfew imposed post 10pm.
- The continuous noise monitoring results provided no clear indication of noise impact due to demolition works activities. The results indicate that the background noise levels in the immediate vicinity of Victoria Road are dominated by traffic noise and noise from nearby commercial activities (petrol station, etc.). However, we recommend conducting continuous noise monitoring during the shut down period to record continuous audio and measure noise levels which can be referenced in situations where noise complaints are received. This would assist Adelaide Brighton Cement in investigating further mitigation options.

In addition to above, ABC have implemented the following as part of their Noise Management Plan to improve noise conditions and minimise impact to the community:

- Continuous community engagement to resolve noise complaints.
- Implementation of several Environment Improvement Plans (EIP Projects) to mitigate/reduce noise from major plant by undertaking comprehensive noise abatement projects.
- Undertaking annual noise survey to monitor noise conditions in the community.
- Undertaking noise survey during shut down period to monitor noise impact during maintenance works.
- Installation of a temporary noise barrier to reduce the noise impact to the nearby residences during the demolition works.
    - The barrier spans between the blending silo and 4B Tower, with an overall height of 12 m.
    - The barrier was constructed from Heavy Duty Noise Block XR Series Acoustic Sound Curtains, attached to a temporary scaffolding (as shown in Figure 4).
    - Due to the size of the barrier the sheets were not sealed to each other, this allows transmission of wind and reduce wind load on the structure. This is likely to impact the potential performance of the noise barrier but is necessary from a structural perspective.

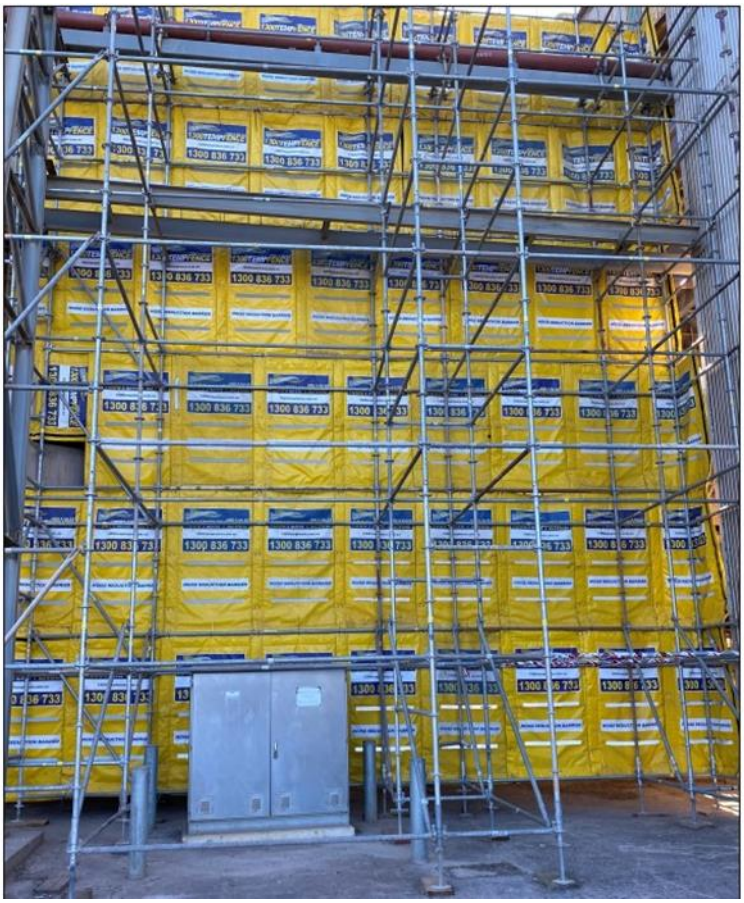


Figure 4 Temporary noise barrier installation during shut down period

Overall, we understand that Adelaide Brighton Cement has implemented all practicable and reasonable measures to reduce noise emissions from the demolition activities during their annual shutdown period and aims to maintain these efforts in the future.

6 Conclusion

Resonate Consultants have been engaged by Adelaide Brighton Cement (ABC) to conduct an environmental noise survey at their Birkenhead plant as a part of their ongoing annual noise survey. The plant operates under the Environment Protection Authority (EPA) license number 1126.

As a part of their EPA licence condition (U-1551—Site Noise Minimisation) the plant operators are required to implement a noise management plan, which warrants a noise survey during the shutdown period of the plant. The assessment includes attended noise survey in the community area (at 6 locations primarily identified by ABC and agreed upon by EPA) and an unattended continuous noise survey at two locations.

The survey indicated compliance against both daytime and nighttime environmental noise criteria.

Appendix A—Noise survey data & notes

Table 12 Day time noise survey results and notes

Location ID	Day/Time	Duration	L_{eq} dB(A)	L_{max} dB(A)	L_{90} dB(A)	Survey notes
D1	15/01/2025 21:34	12:02	49	57	47	Plant faintly audible. Traffic noise dominant.
D2	15/01/2025 21:11	12:21	47	57	44	Measurements dominated by traffic noise. Plant faintly audible during low traffic periods.
D3	15/01/2025 20:33	12:40	51	64	49	Plant faintly audible during low traffic periods.
D4	15/01/2025 20:53	14:00	51	70	49	Plant mostly inaudible, measurements dominated by traffic noise and noise from the petrol station.
D5	15/01/2025 21:25	14:00	44	53	42	Plant inaudible. Faint noise from traffic movements on nearby roads.
D6	15/01/2025 20:06	15:00	56	67	52	Plant faintly audible during low traffic periods. Measurement dominated by traffic noise

Table 13 Night time survey results and notes

Location ID	Day/Time	Duration	L_{eq} dB(A)	L_{max} dB(A)	L_{90} dB(A)	Survey notes
D1	15/01/2025 22:53	12:02	48	62	46	Plant noise audible, traffic noise dominant
D2	15/01/2025 22:55	14:01	45	54	44	Plant faintly audible, traffic noise dominant
D3	15/01/2025 22:29	14:25	50	66	47	Plant faintly audible, traffic noise dominant
D4	15/01/2025 23:19	15:01	50	75	48	Plant audible. Dominated by traffic and petrol station noise
D5	15/01/2025 23:17	15:05	40	51	37	Plant not audible, lulls of traffic noise dominant
D6	15/01/2025 22:28	15:01	52	59	50	Plant audible including forklift, metals banging, etc. Traffic noise dominant

Please note that at some locations conducting a full 15-minute measurement was not possible due to the following factors:

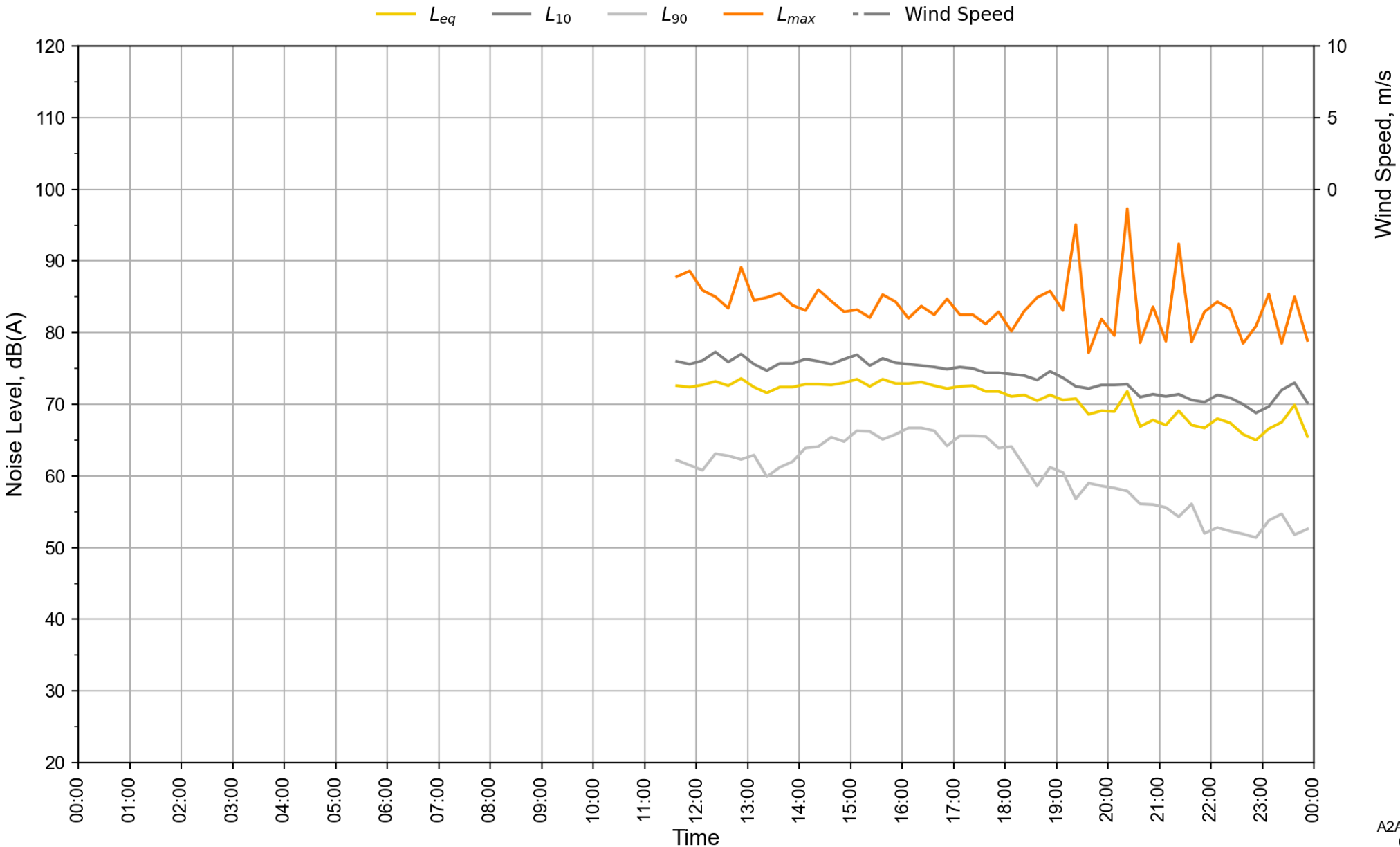
- Locations in proximity to Victoria Road—Due continuous traffic movements on Victoria Road, it was difficult to pause/stop measurements to avoid traffic noise influence. The site engineer however, measured the levels for period deemed practical and representative of the noise emissions from the plant.
- Dog barking and tool noise during day time survey.
- Noise from residential activities (music, loud talking, etc.).
- Higher traffic volumes on internal roads during day time survey.

As a practical approach, the measurement was conducted to ensure it represents the noise emissions from the plant, while considering the factors above.

Appendix B—Unattended noise survey data

Resonate

Social Club NL1 - Tuesday, 14 January 2025



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Calibration:
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Resonate

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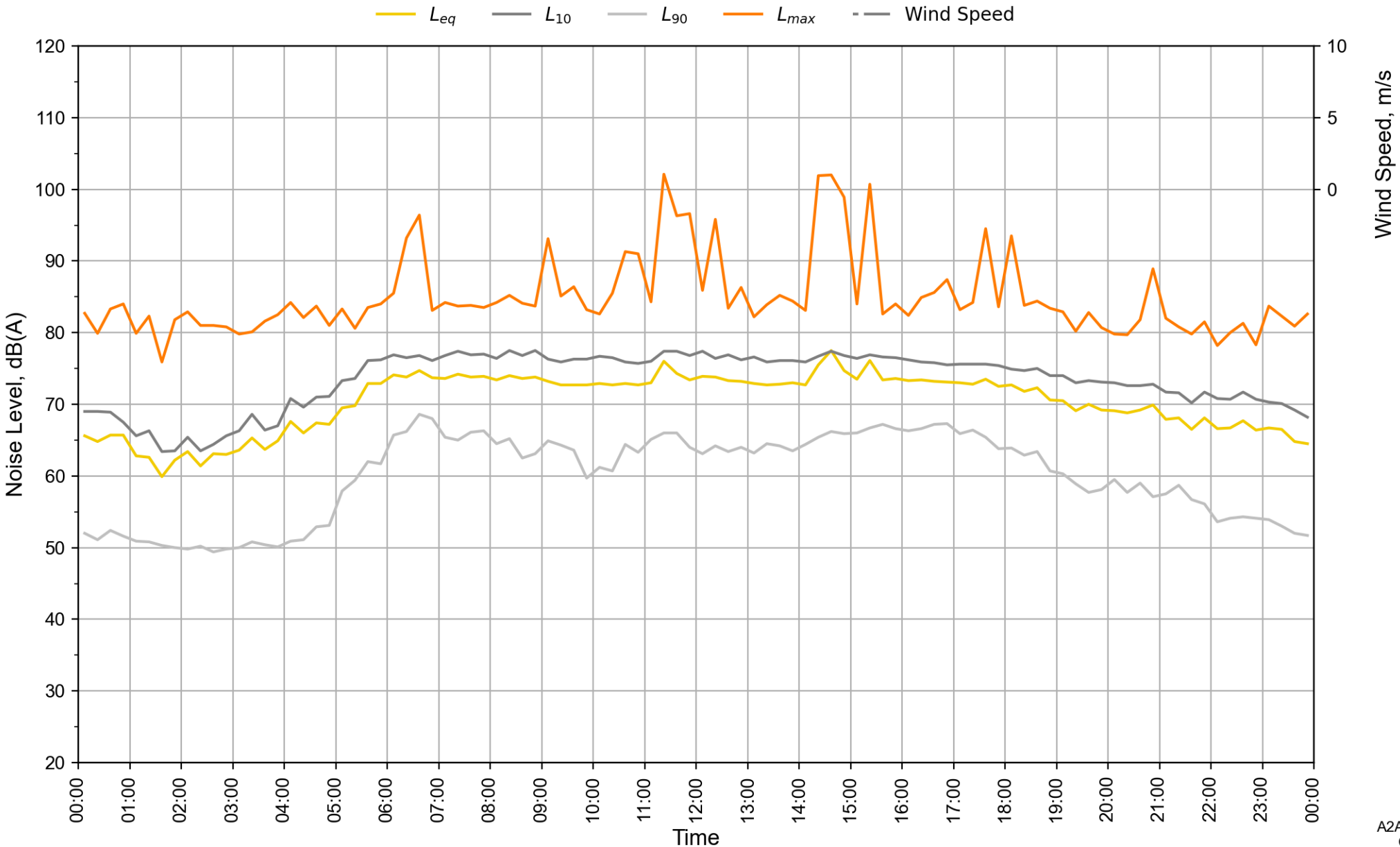

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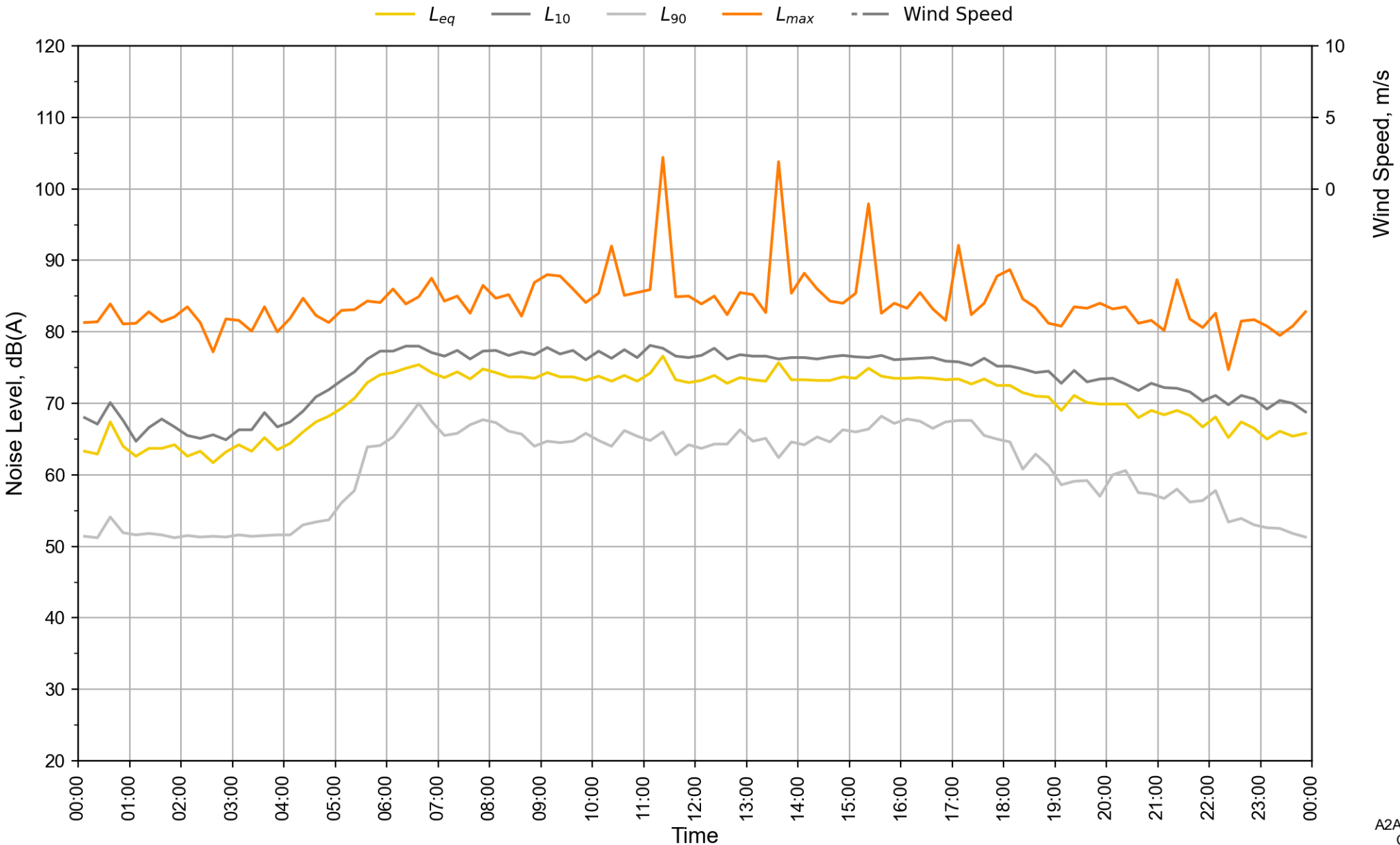
Resonate

Social Club NL1 - Thursday, 16 January 2025



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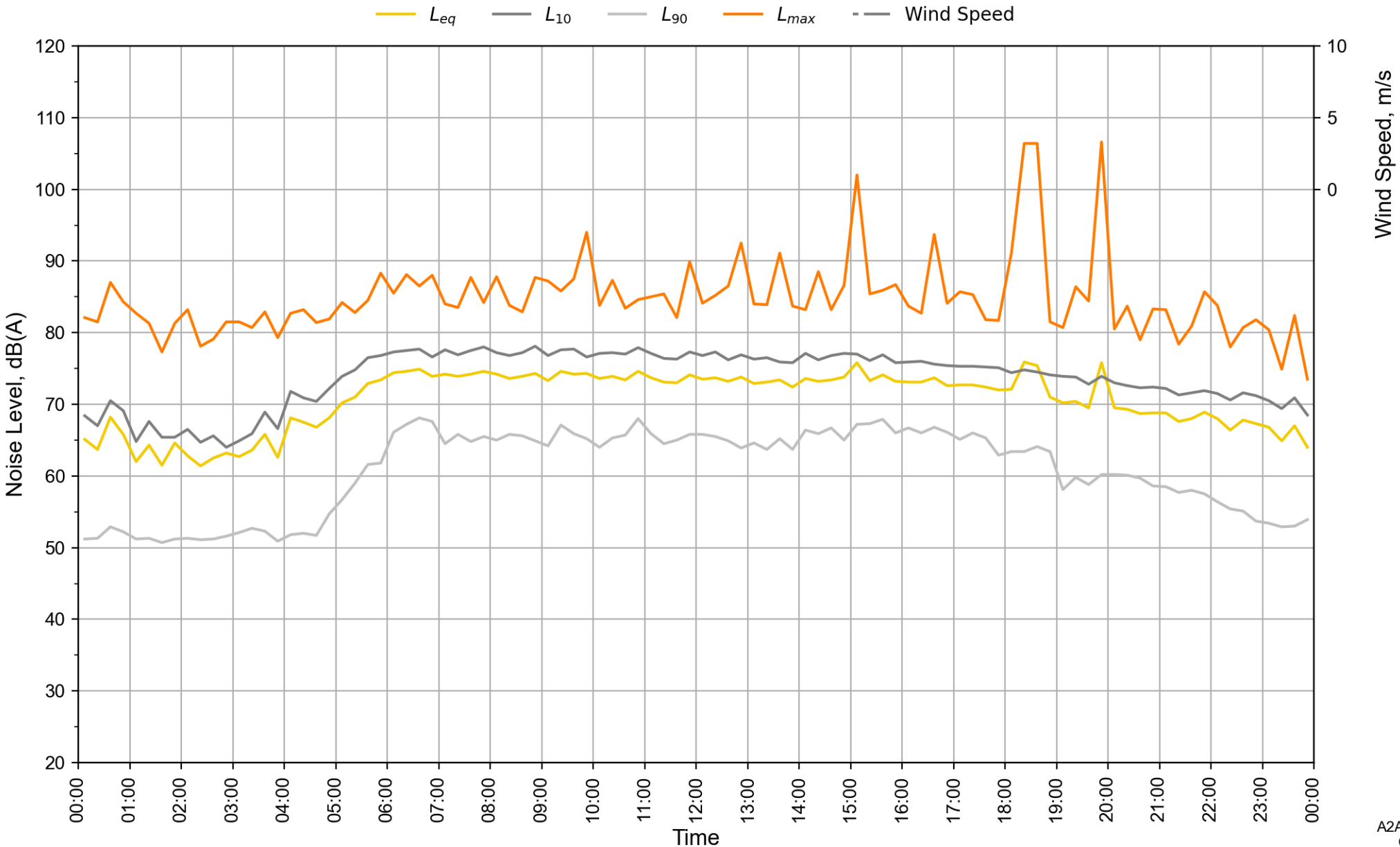
Resonate

Social Club NL1 - Friday, 17 January 2025



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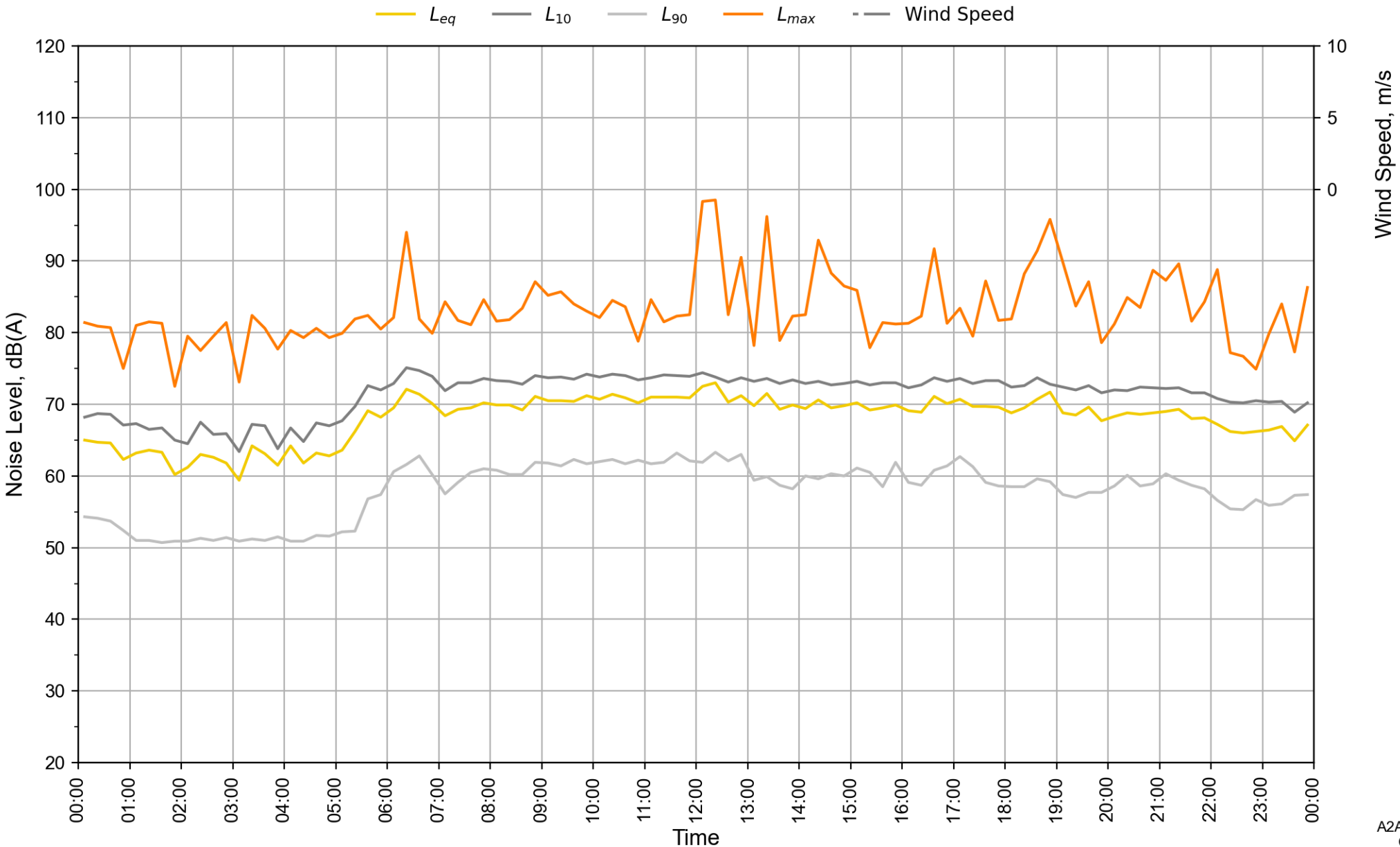
Resonate

Social Club NL1 - Saturday, 18 January 2025



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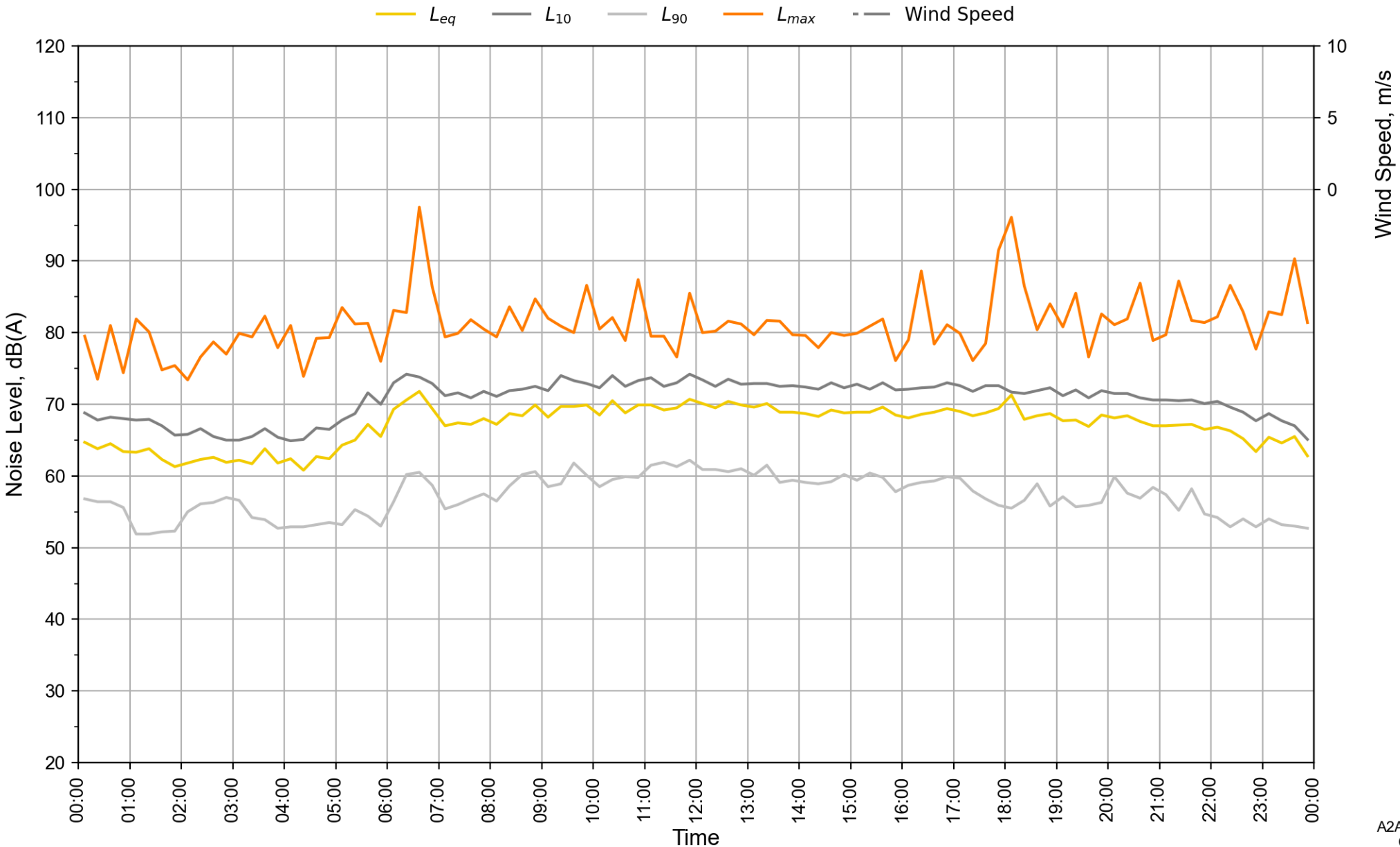

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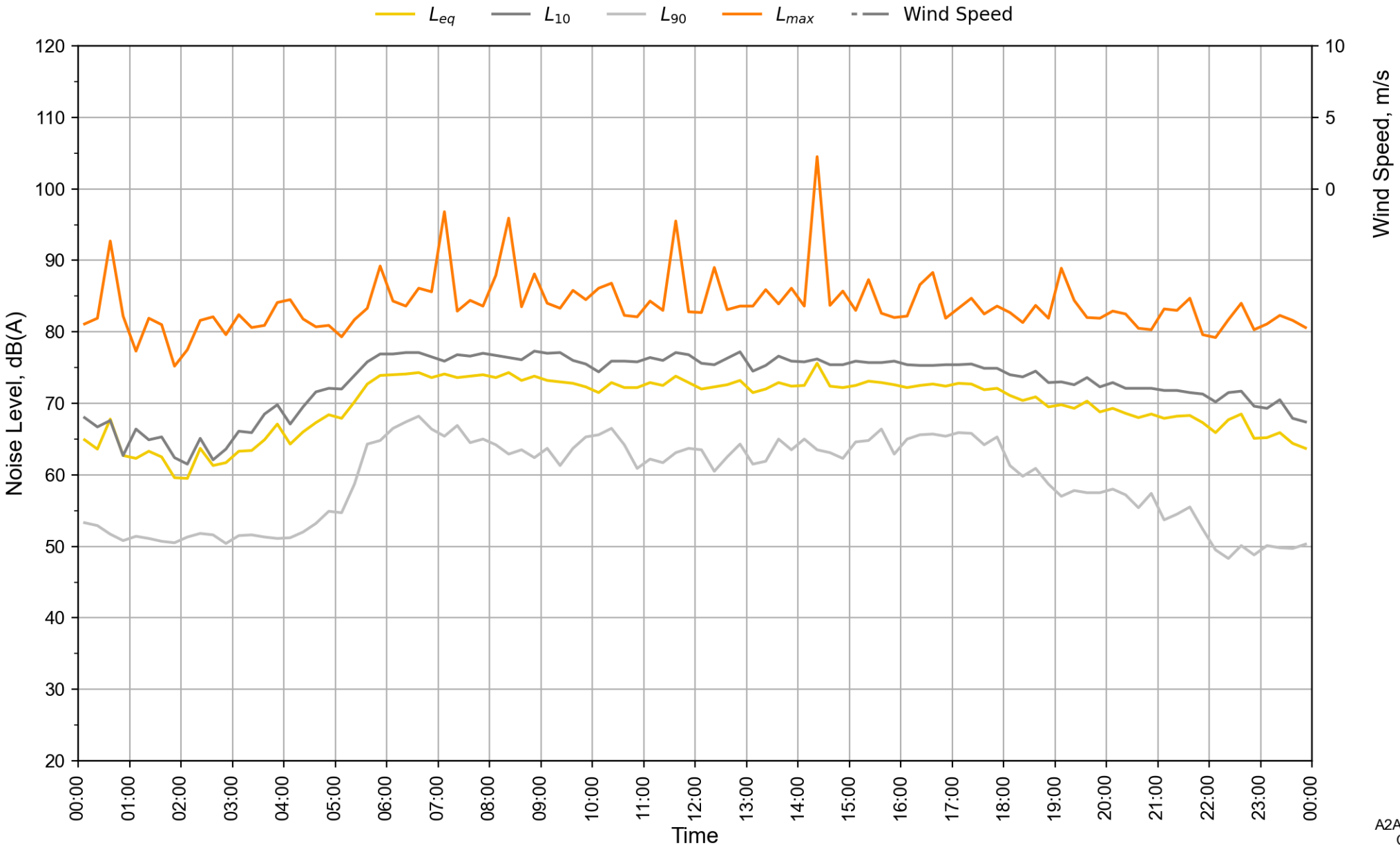

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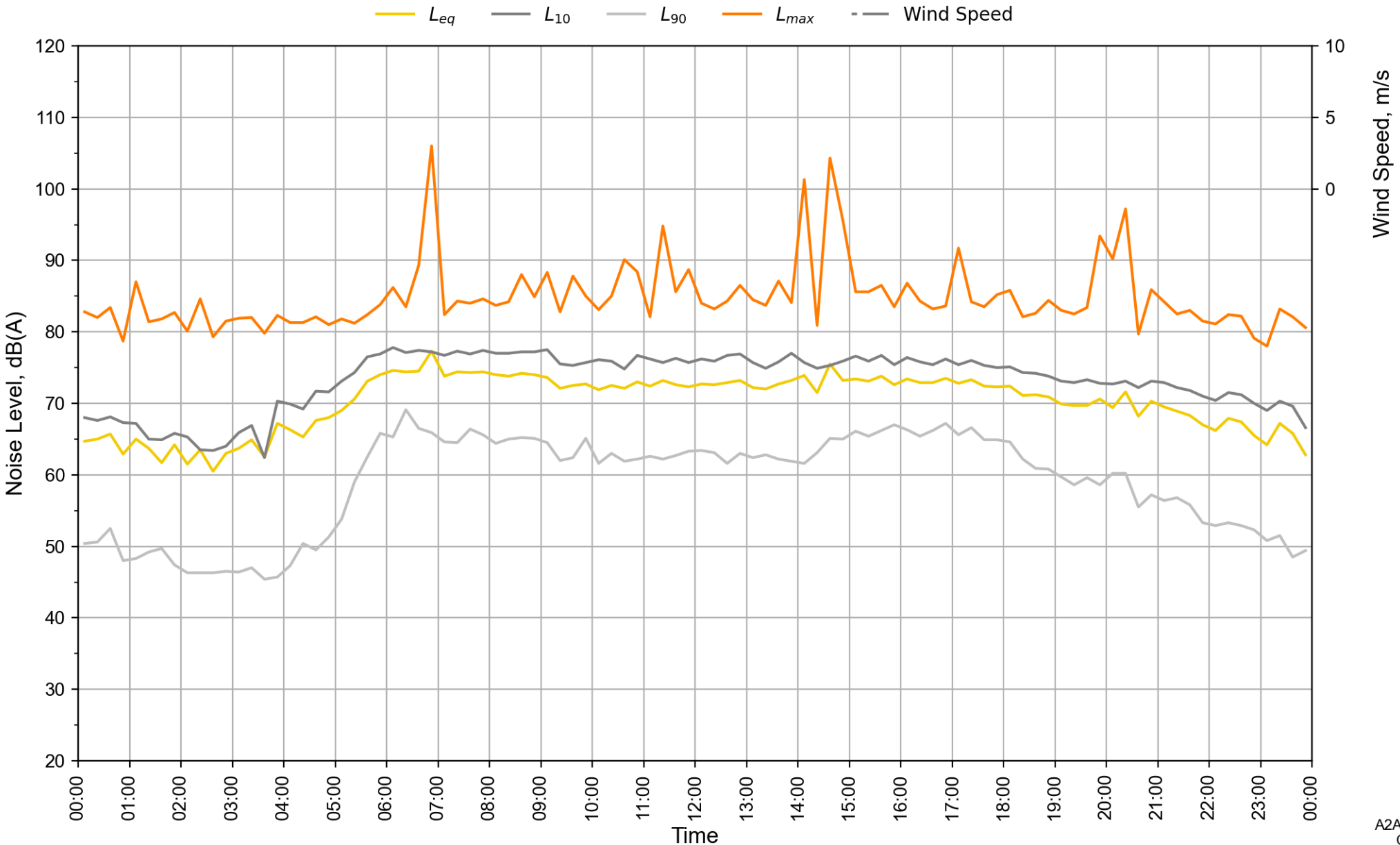

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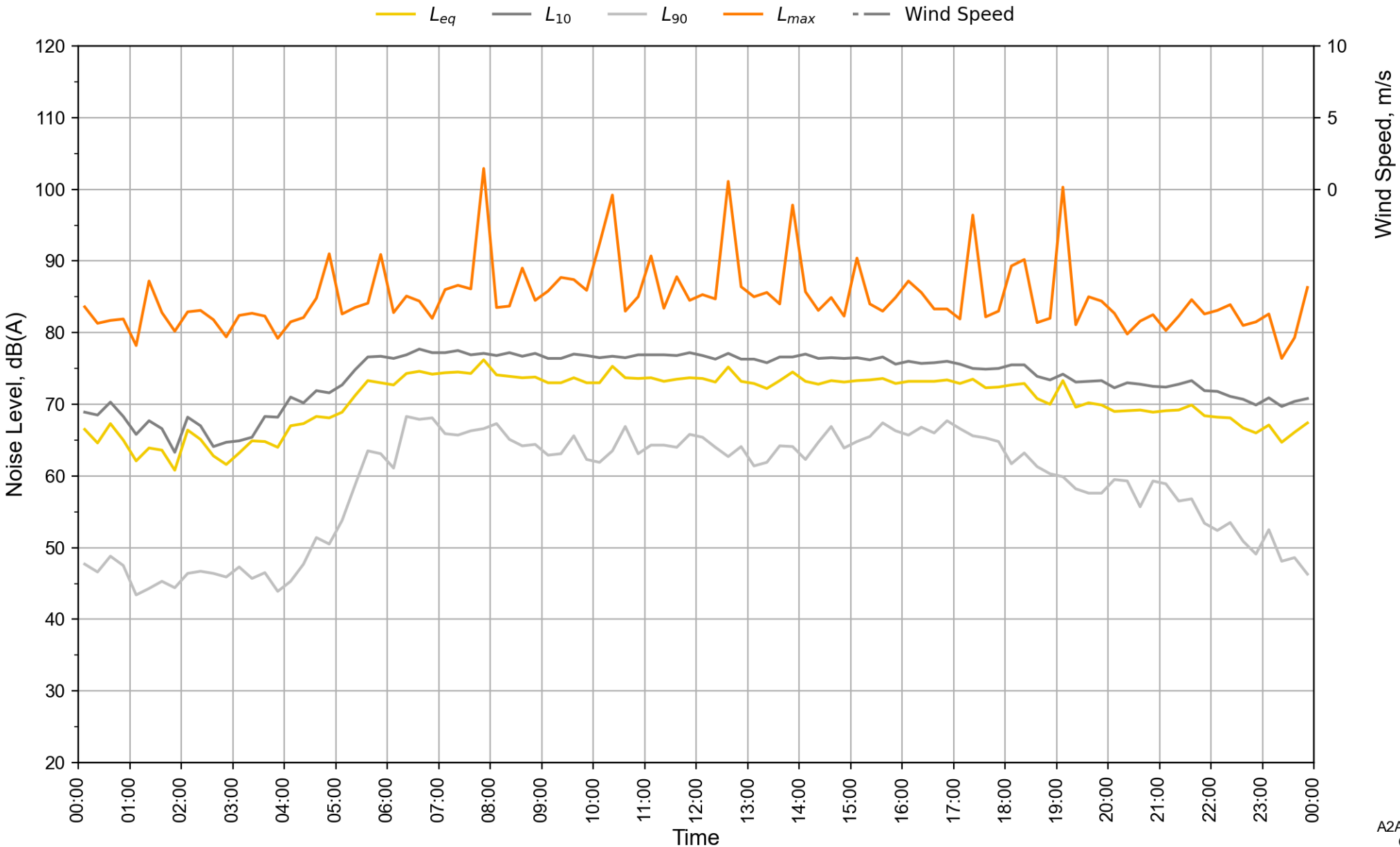

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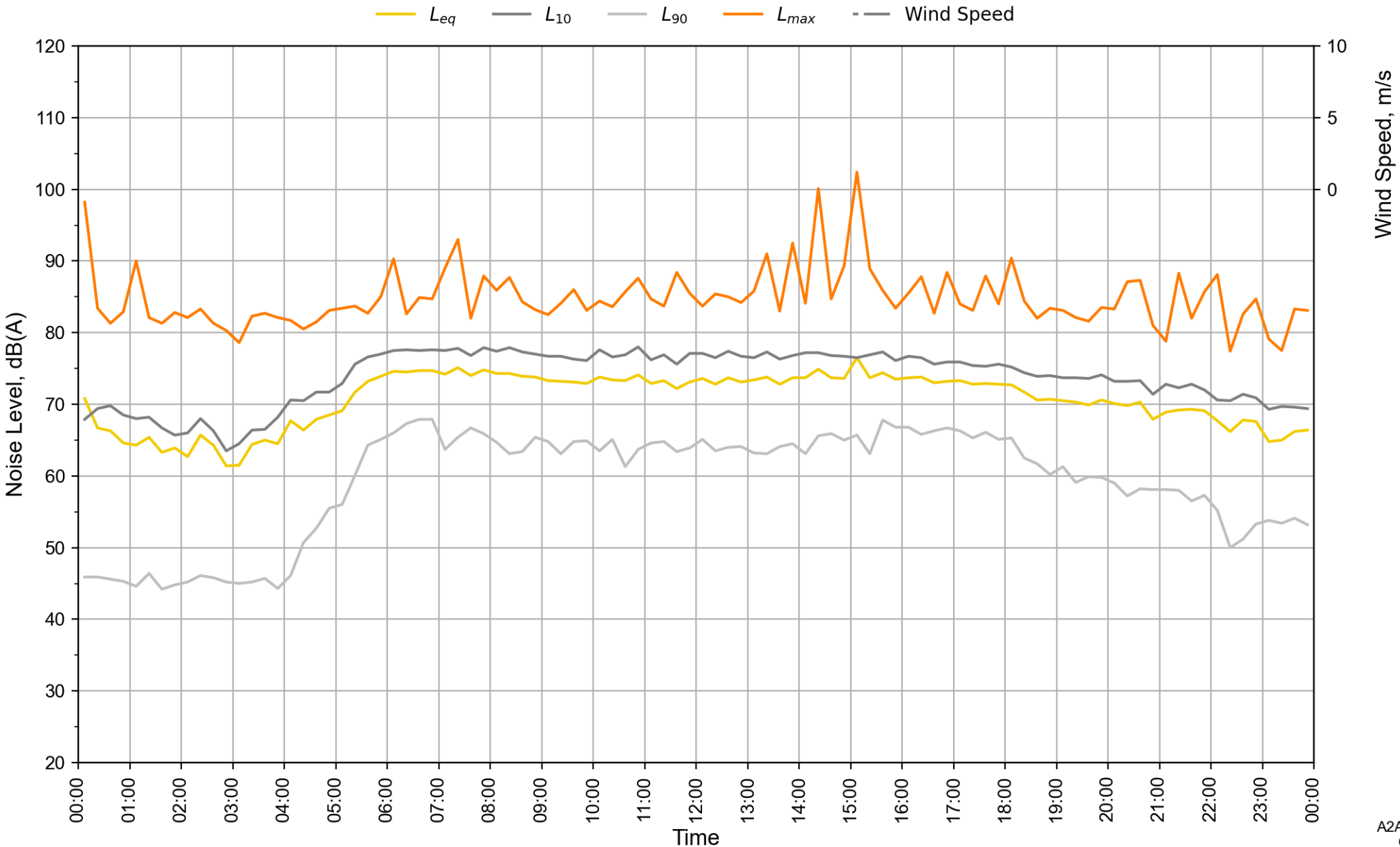

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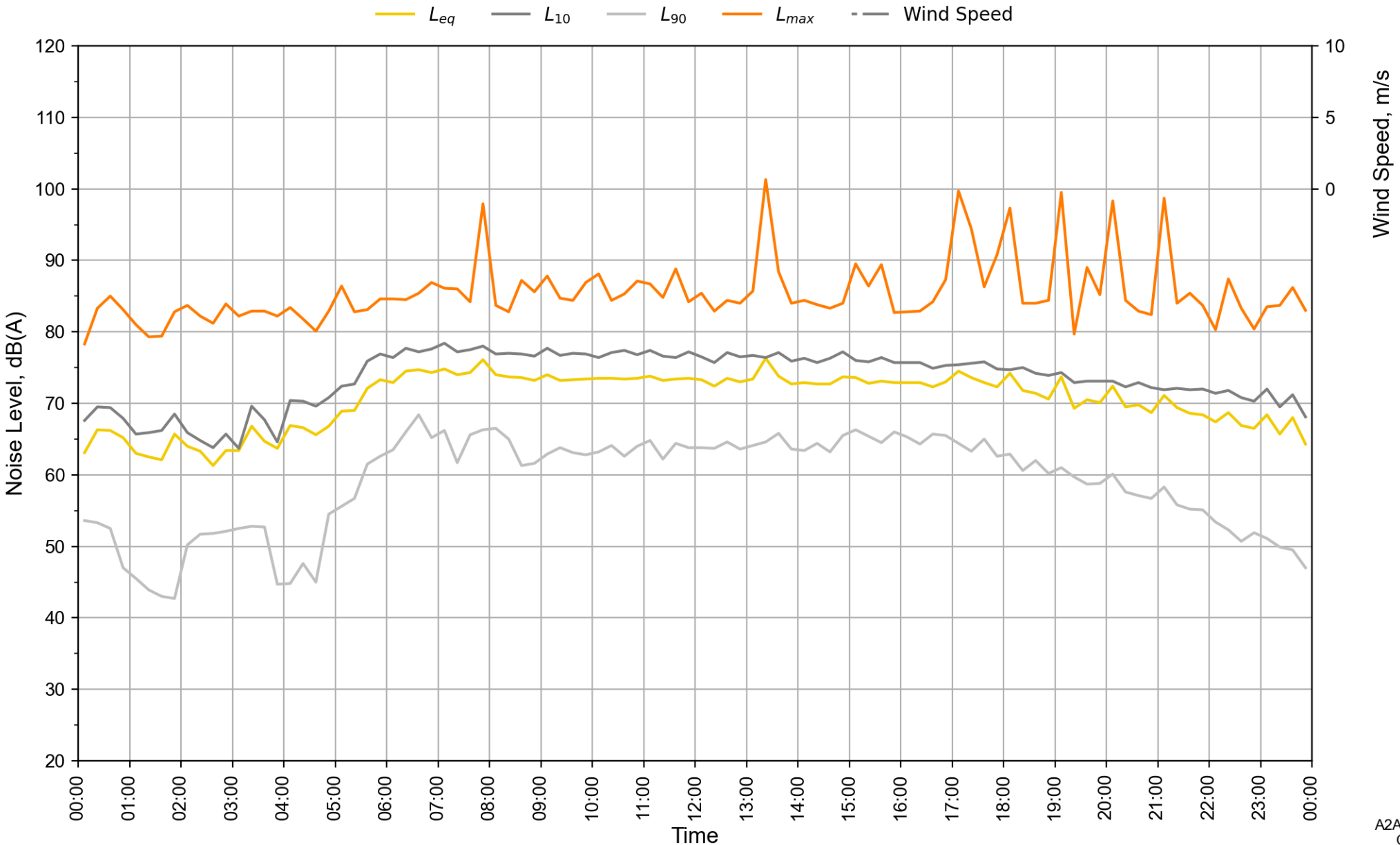

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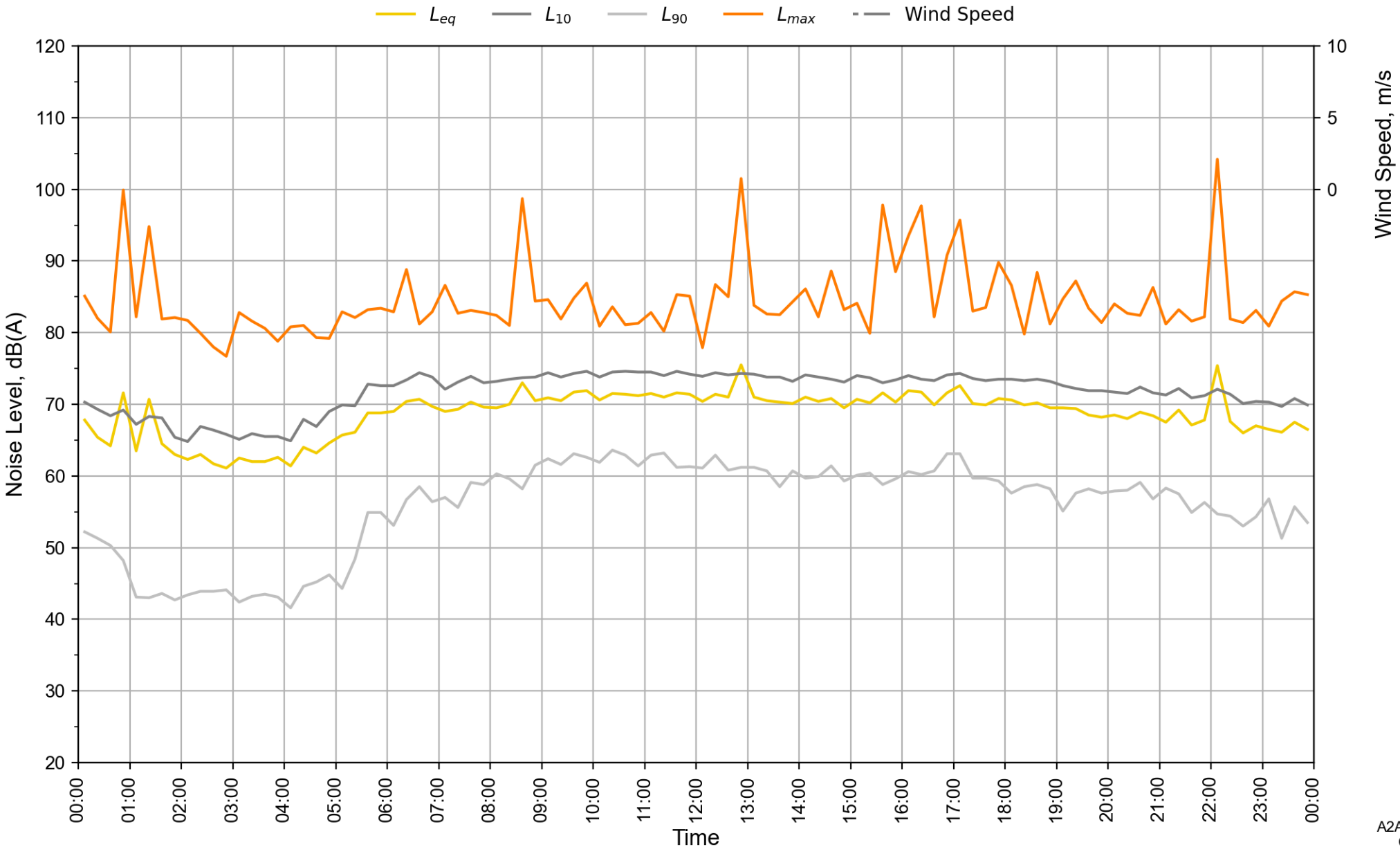
Social Club NL1 - Saturday, 25 January 2025



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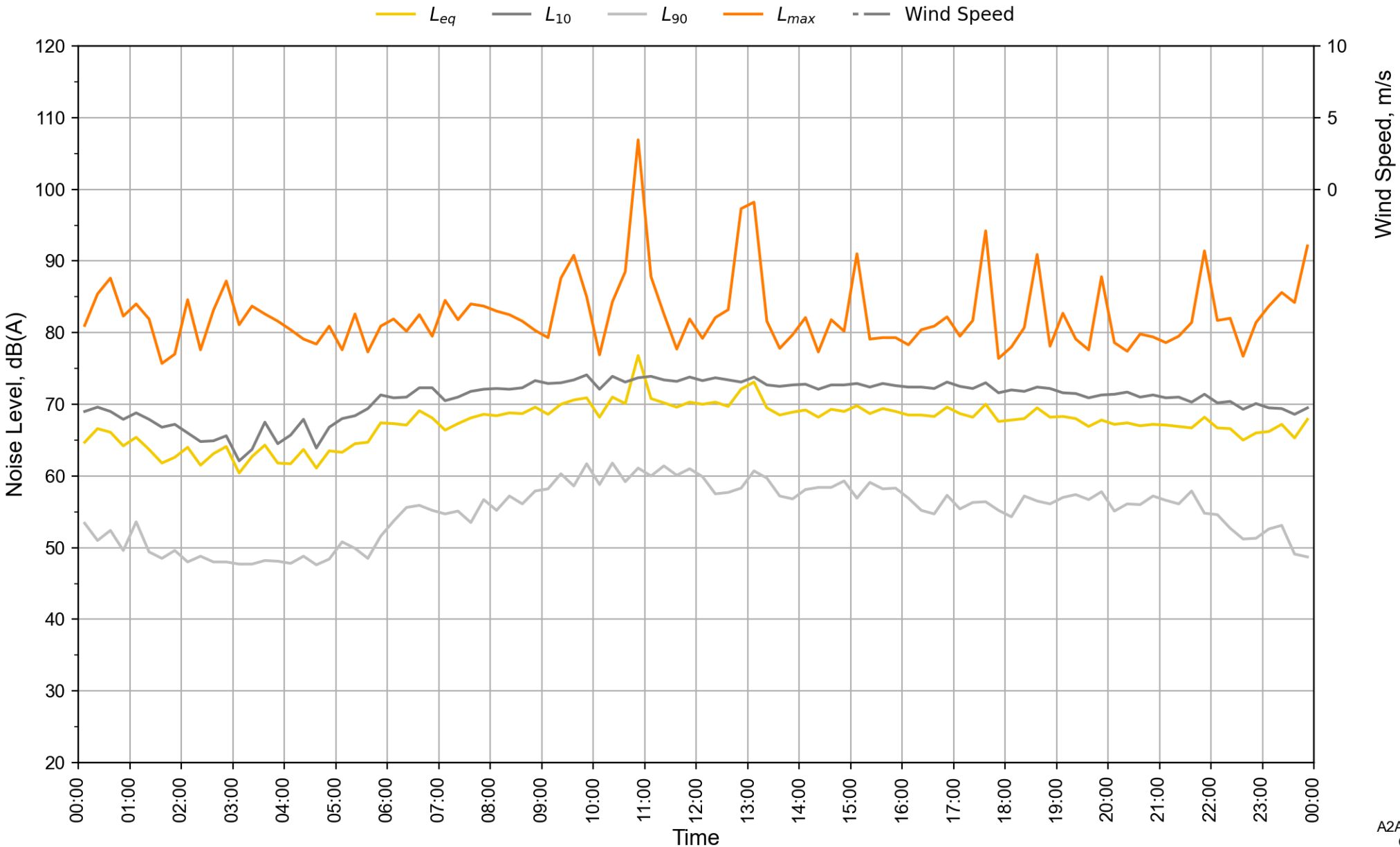

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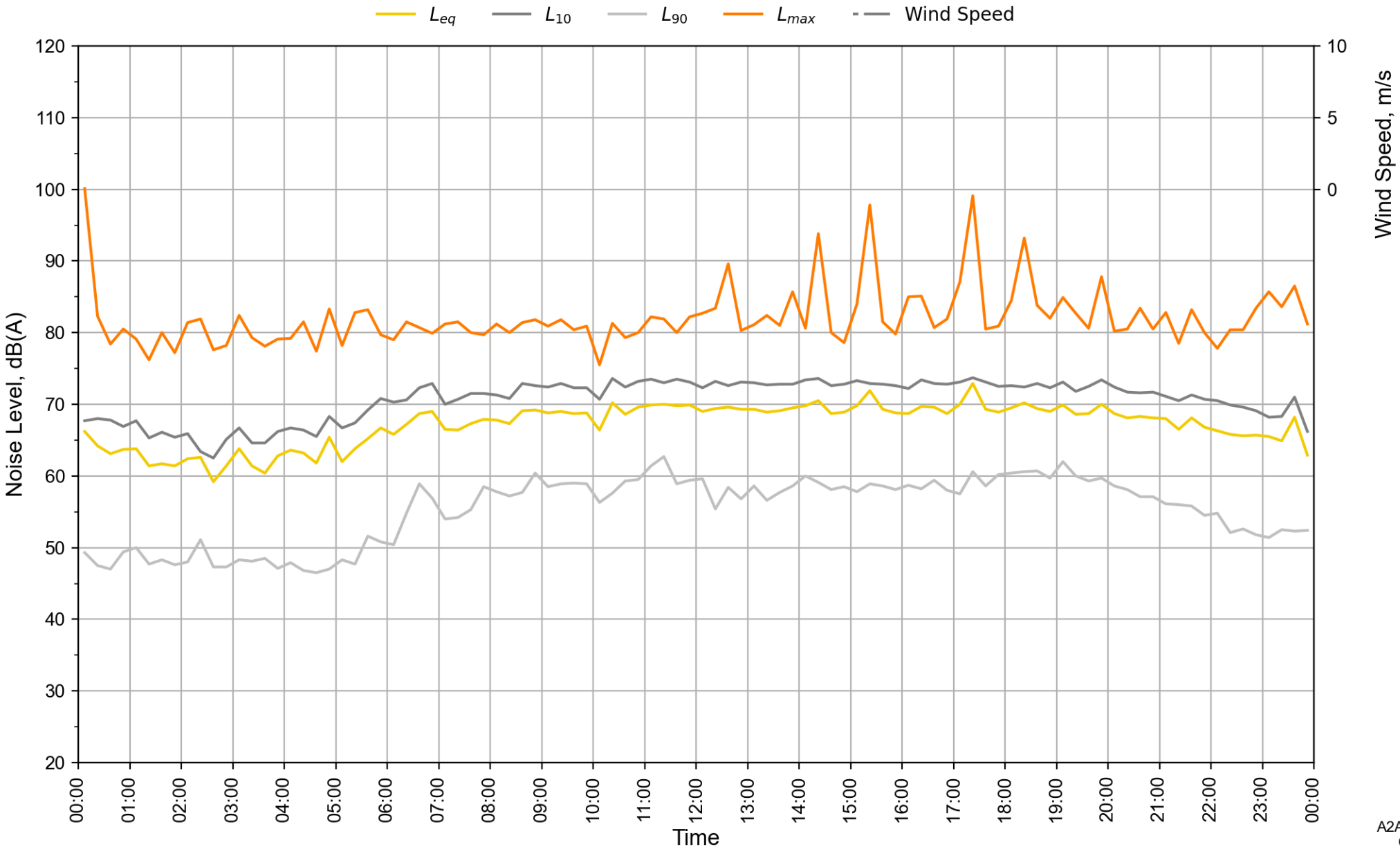

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Resonate

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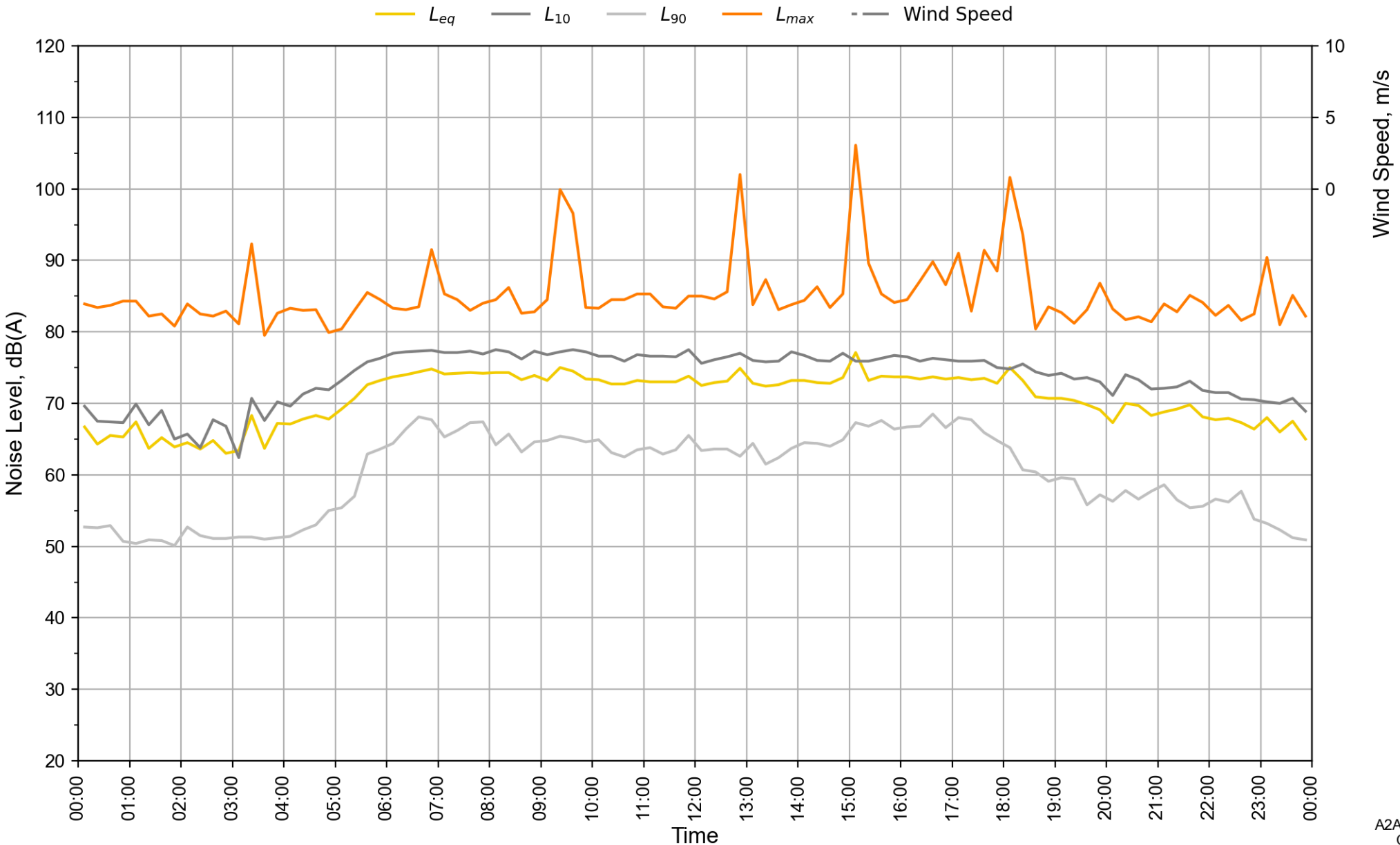

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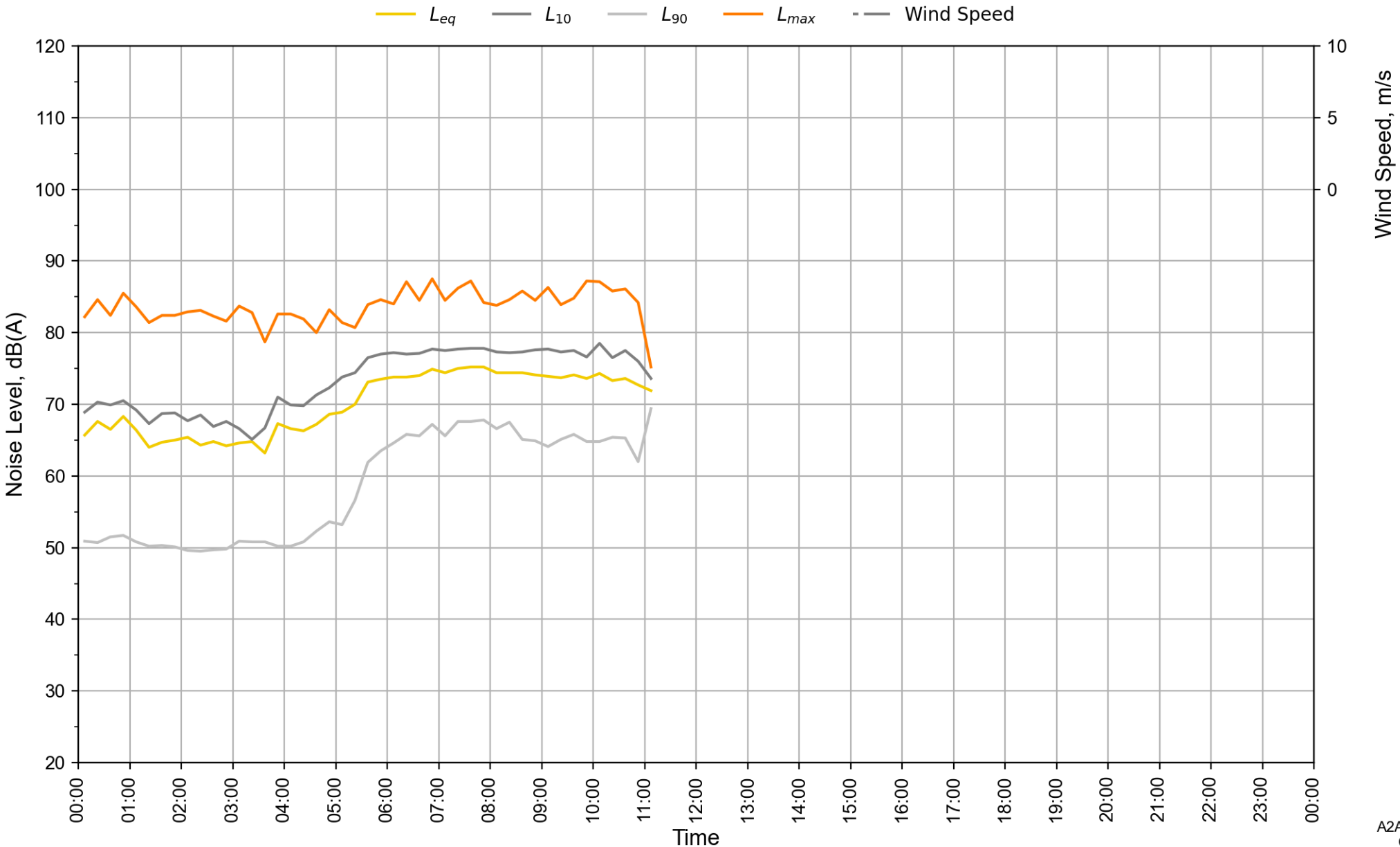

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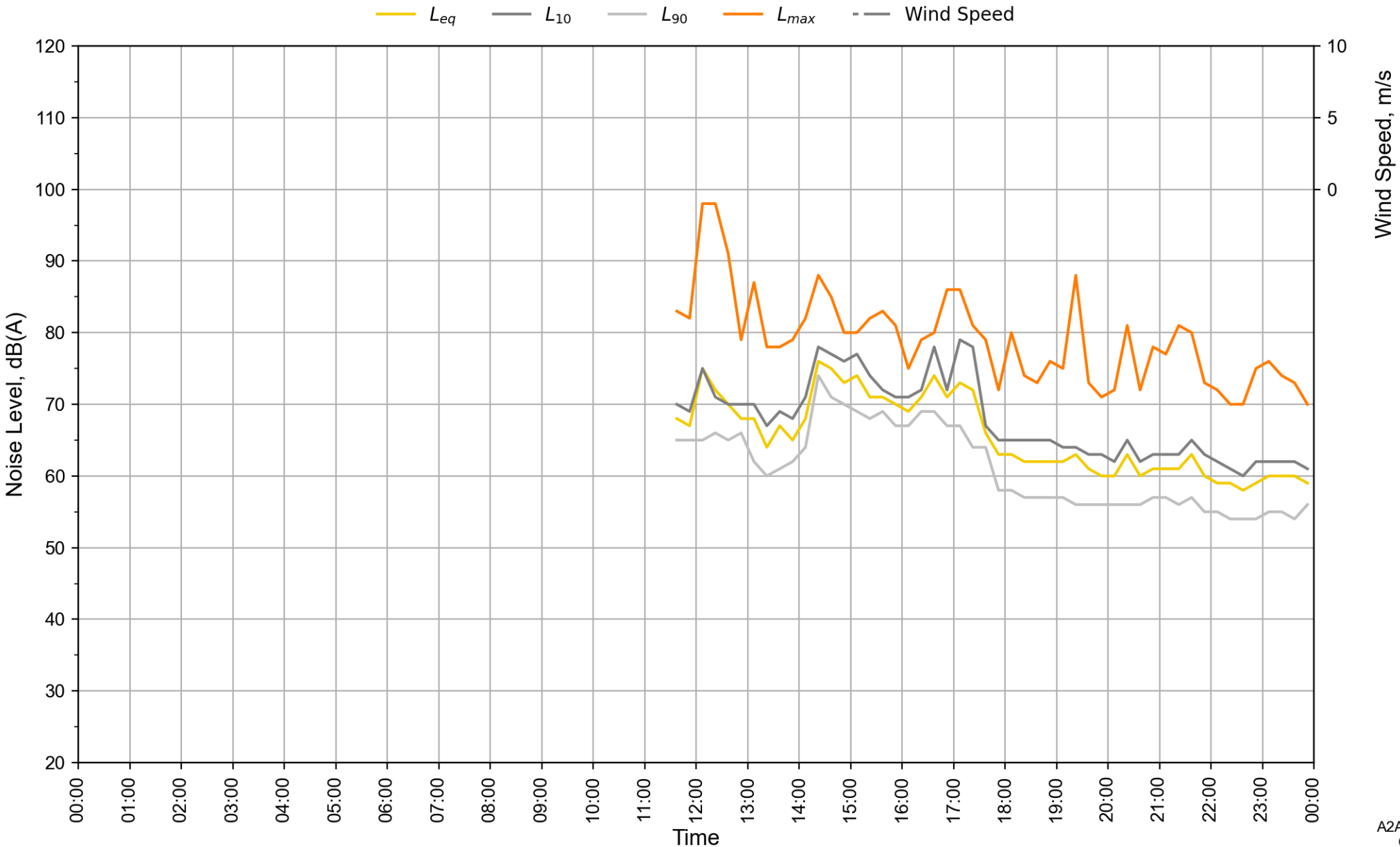
Resonate

ABC NL2 - Tuesday, 14 January 2025



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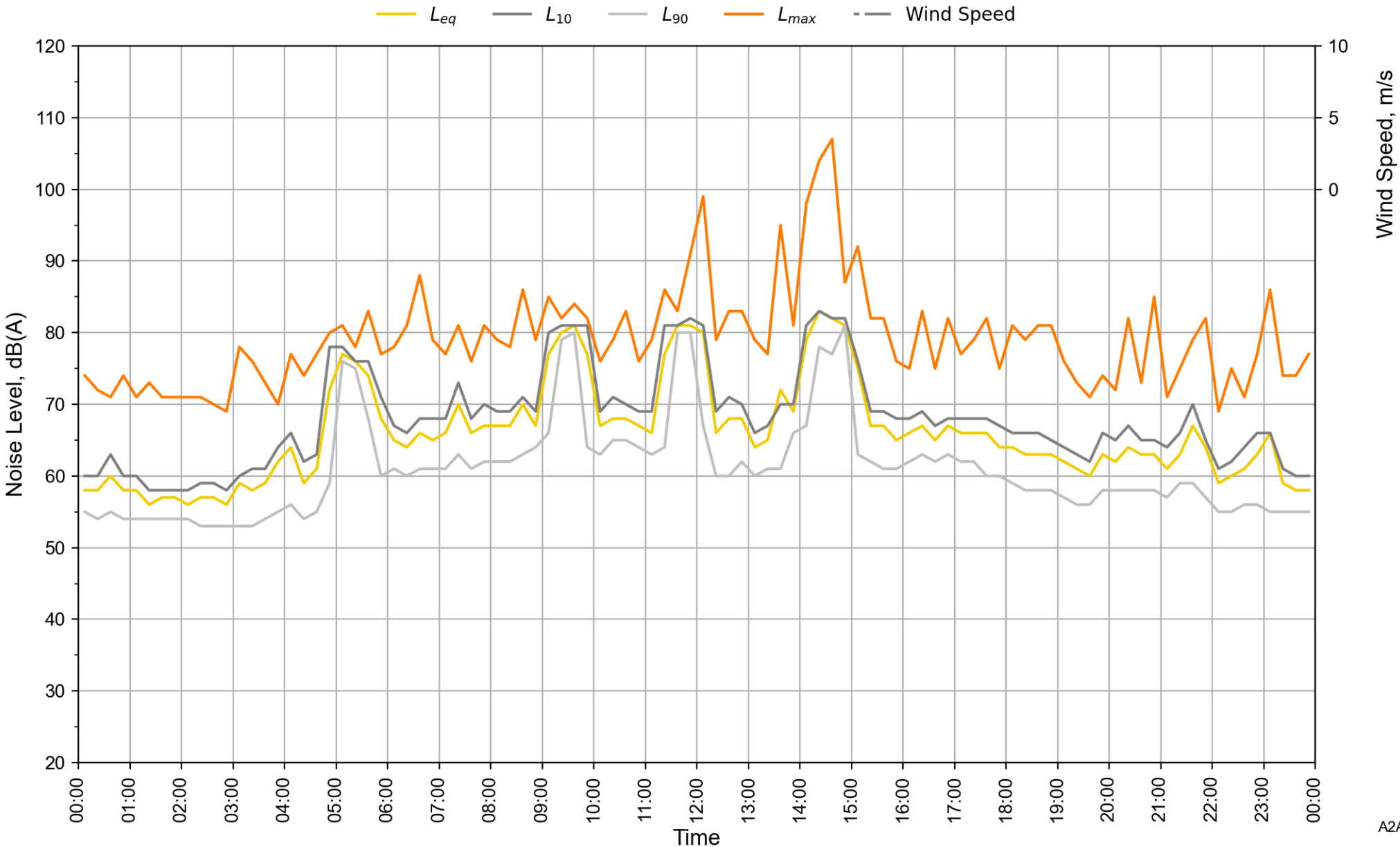

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Resonate

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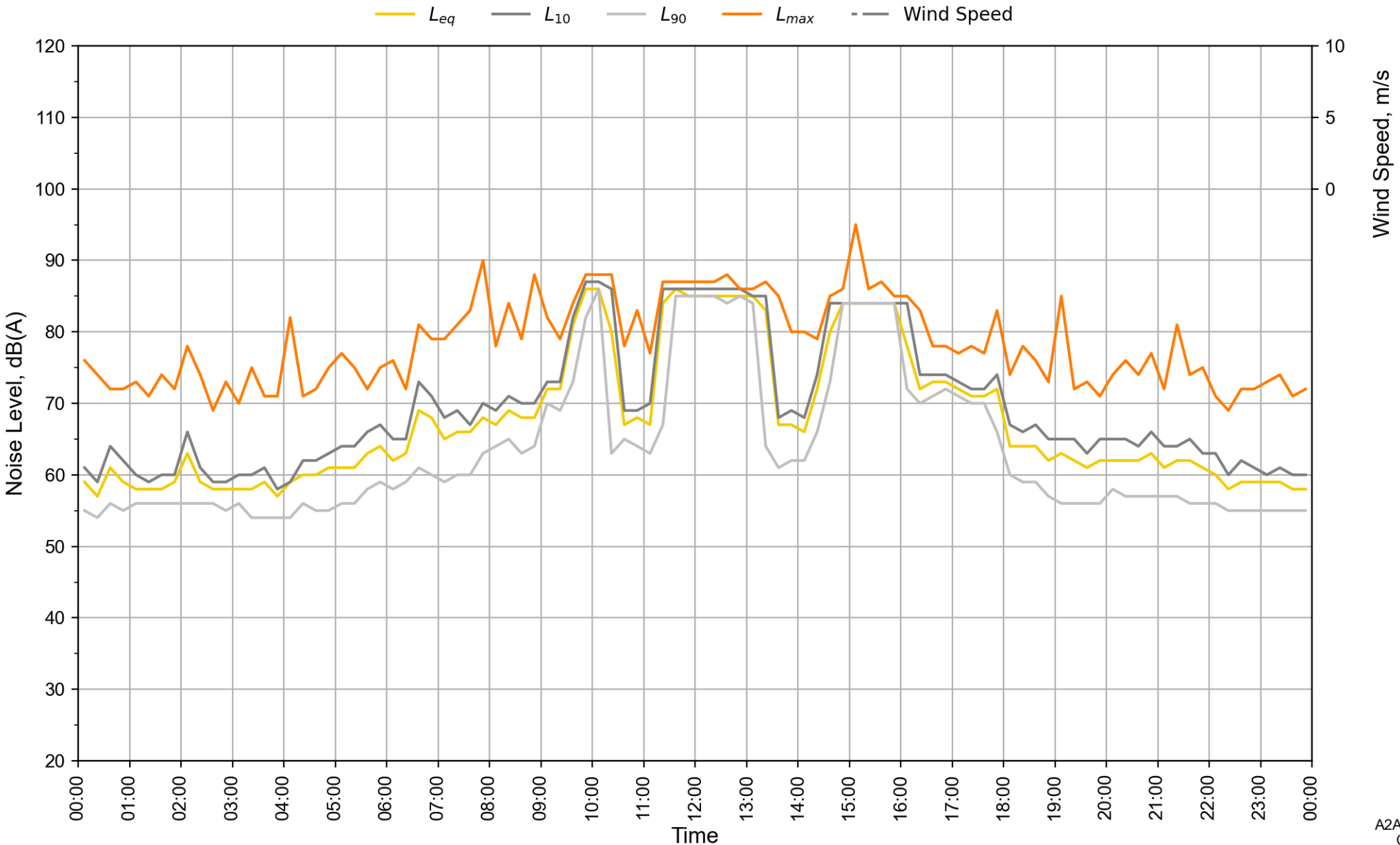

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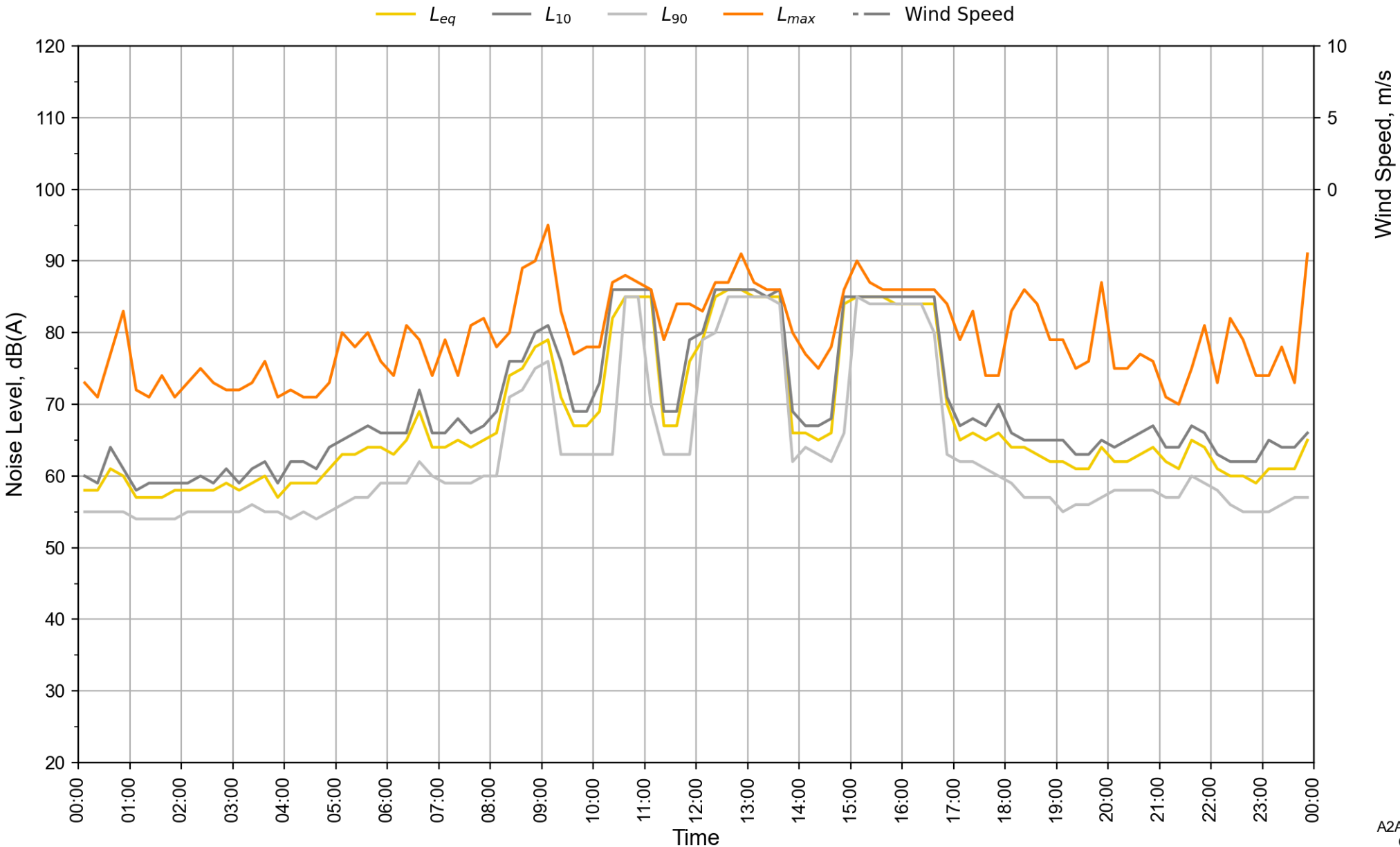
Resonate

ABC NL2 - Friday, 17 January 2025



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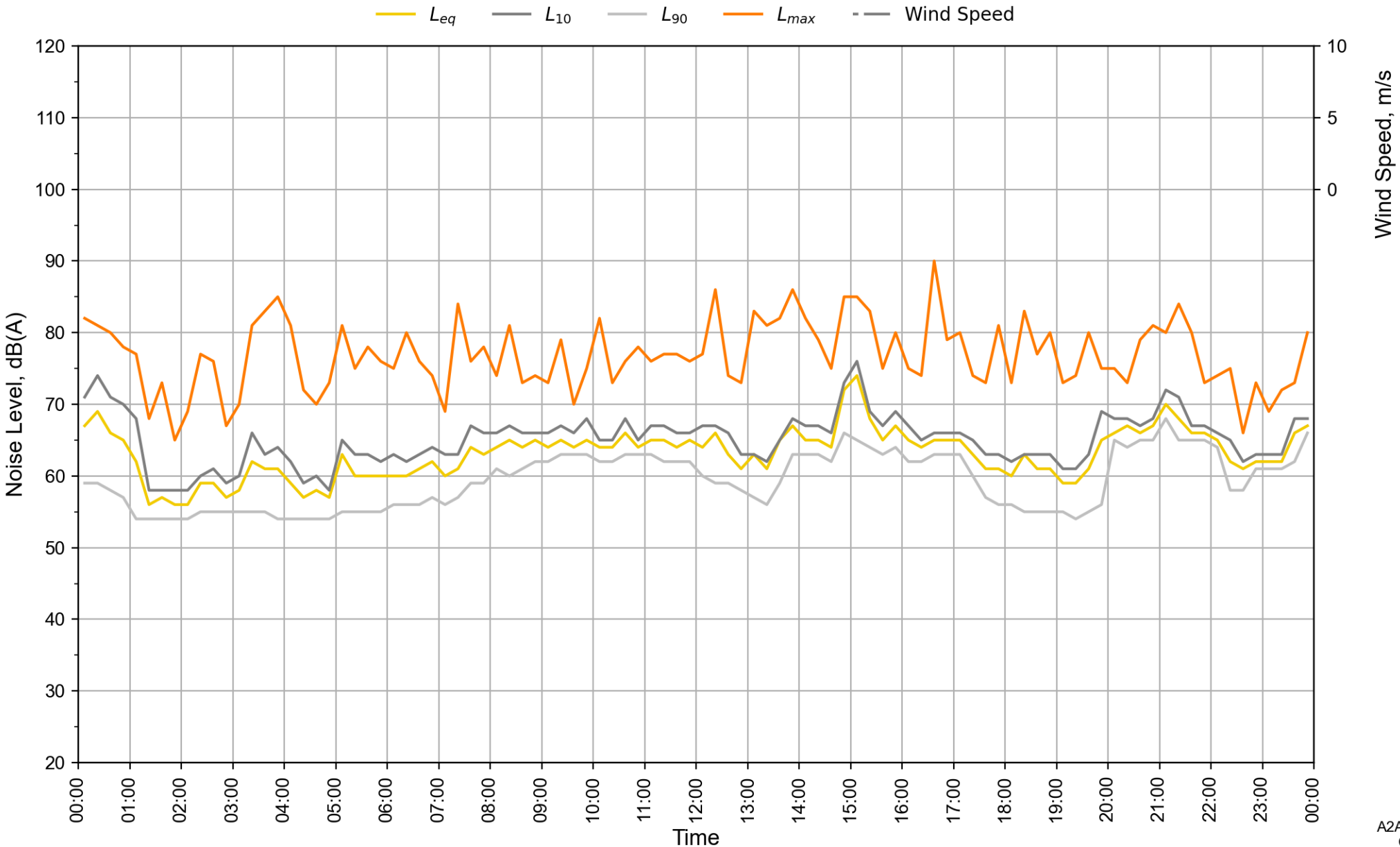
Resonate

ABC NL2 - Saturday, 18 January 2025



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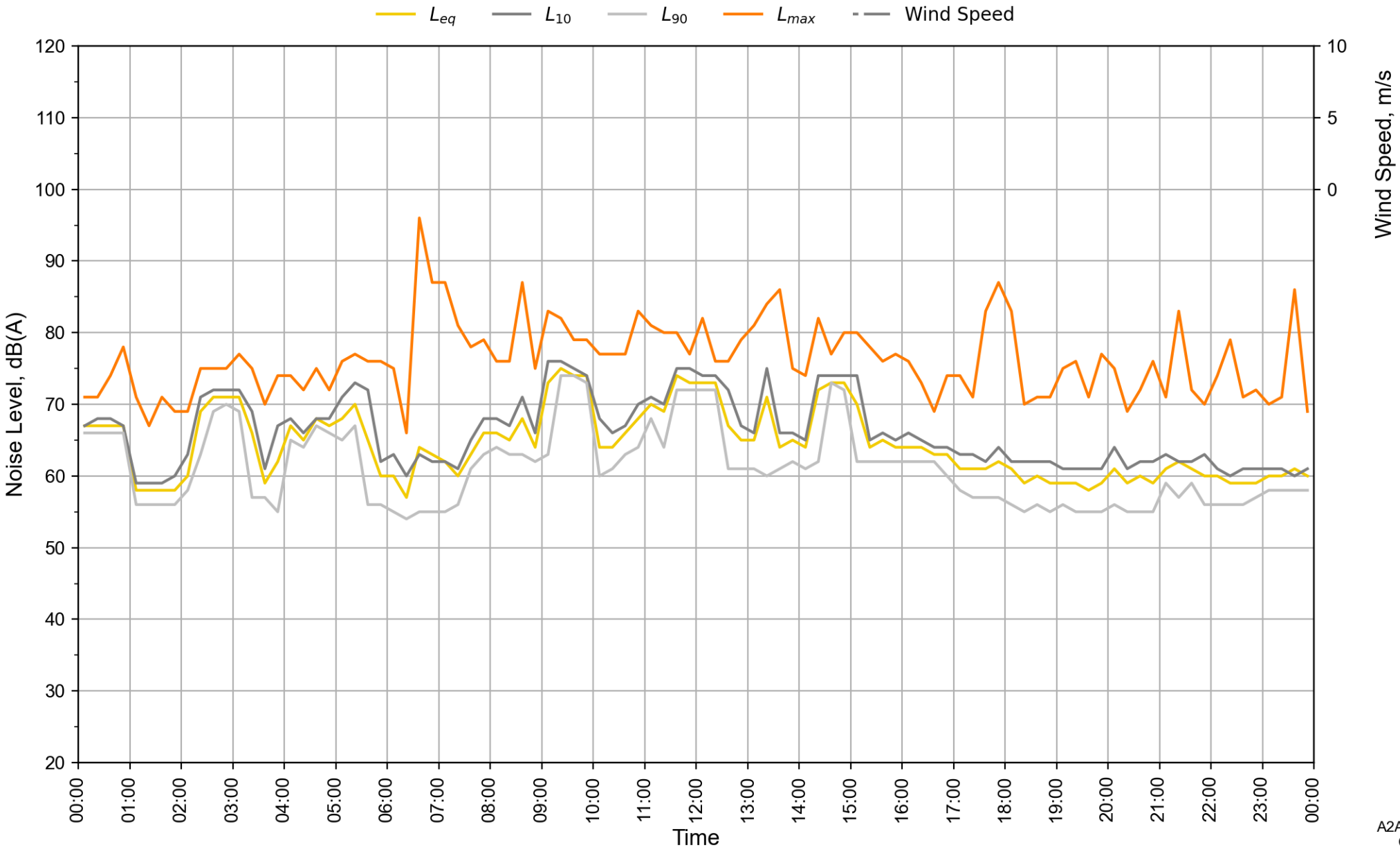
Resonate

ABC NL2 - Sunday, 19 January 2025



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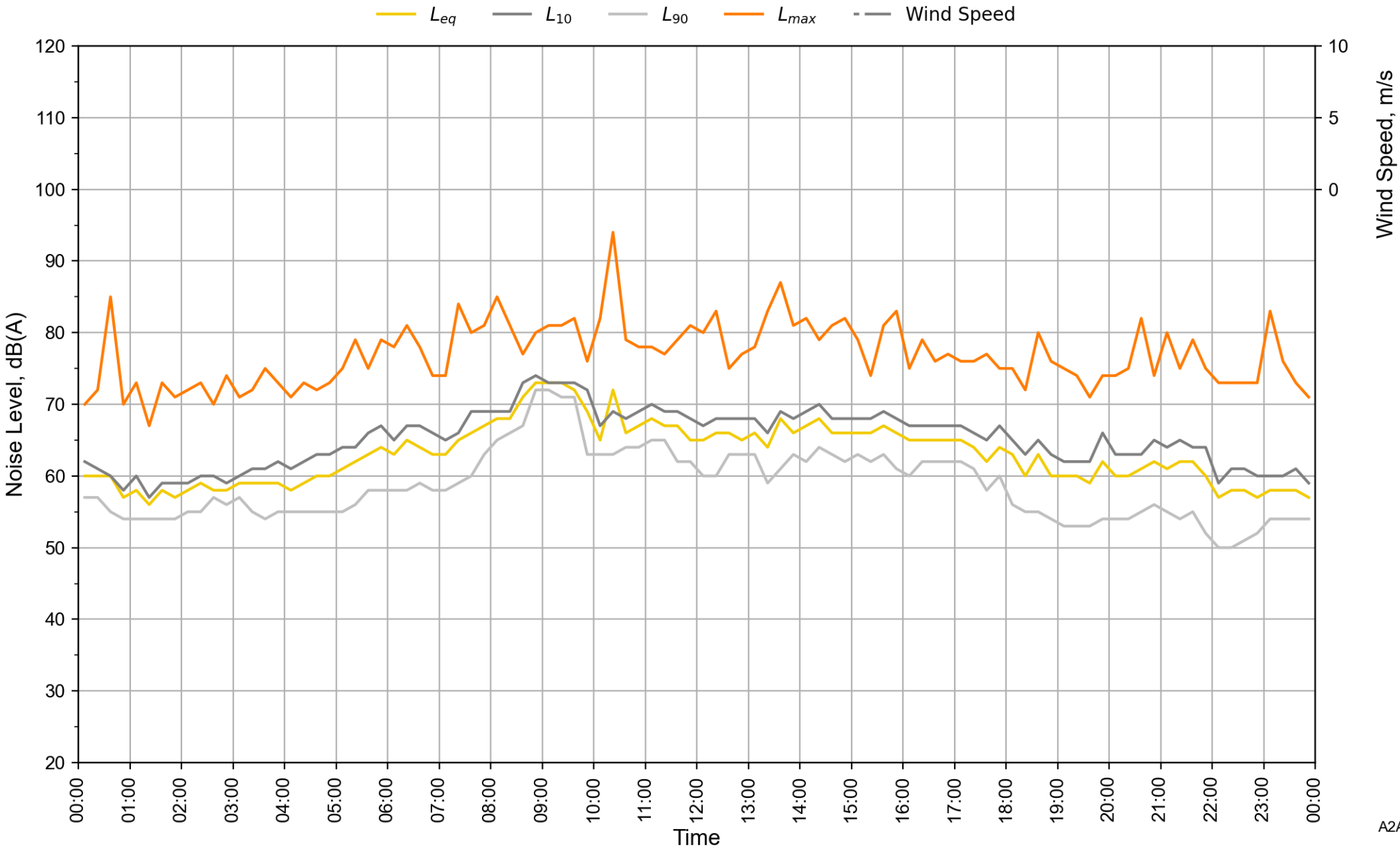

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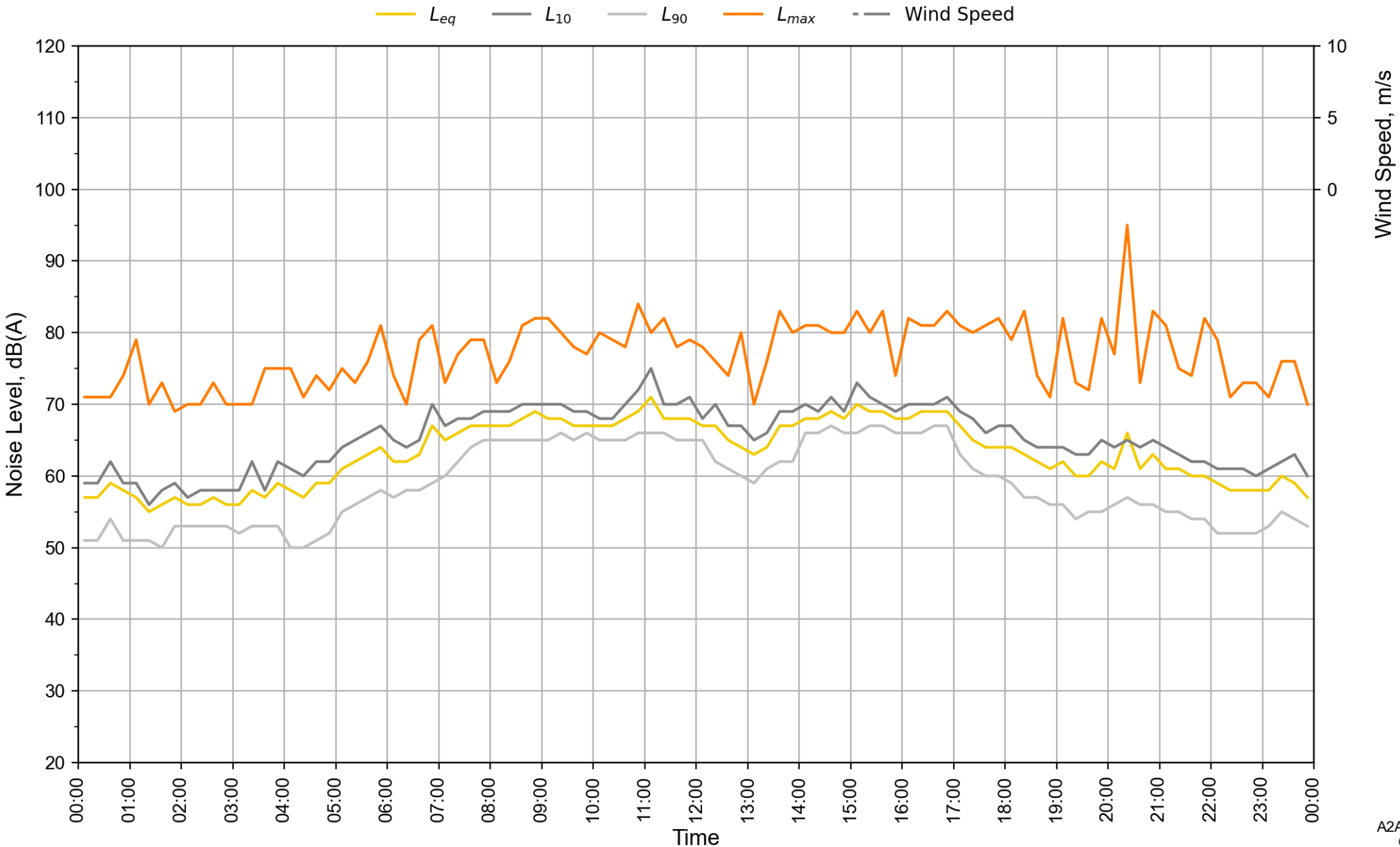
Resonate

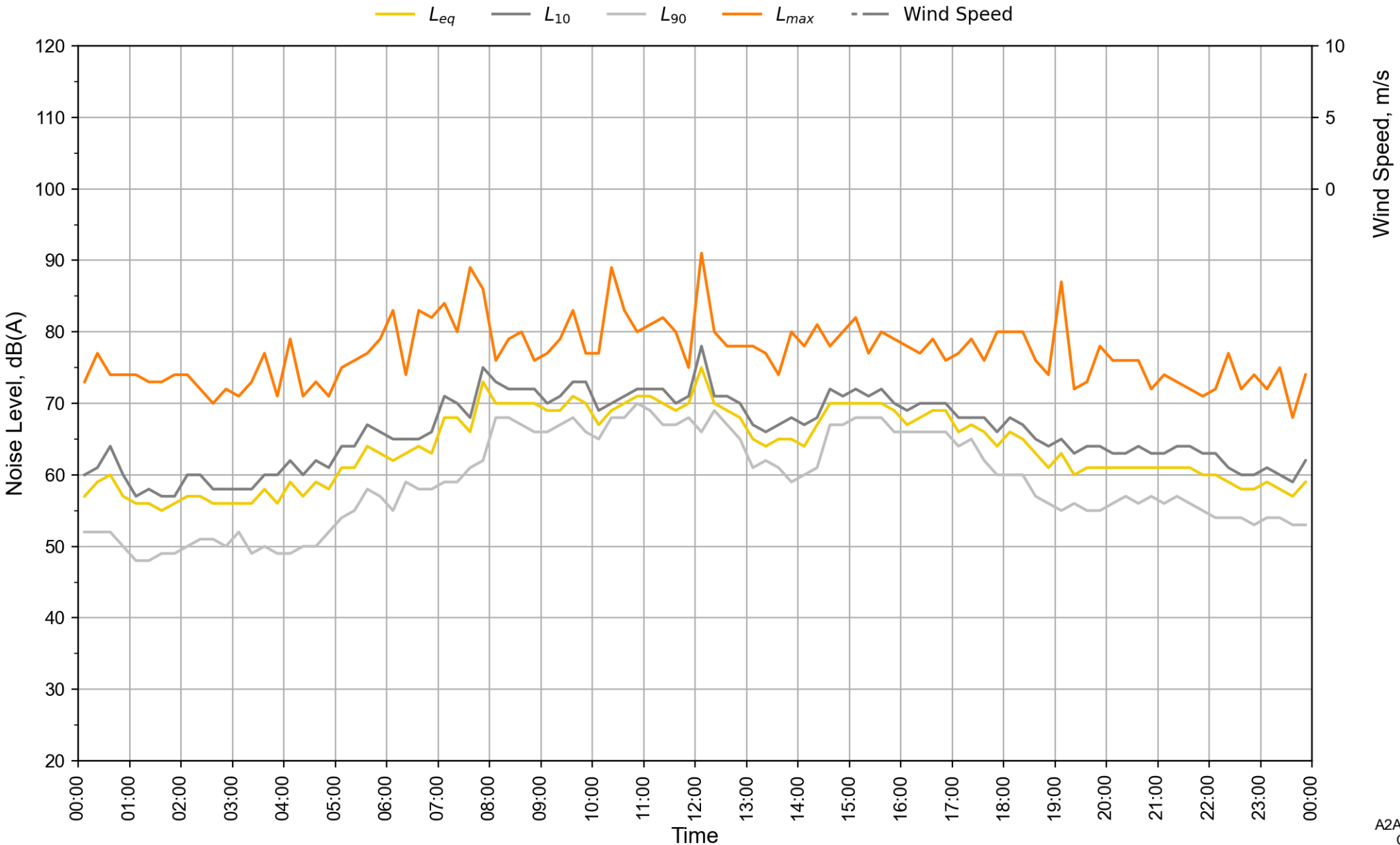
ABC NL2 - Tuesday, 21 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

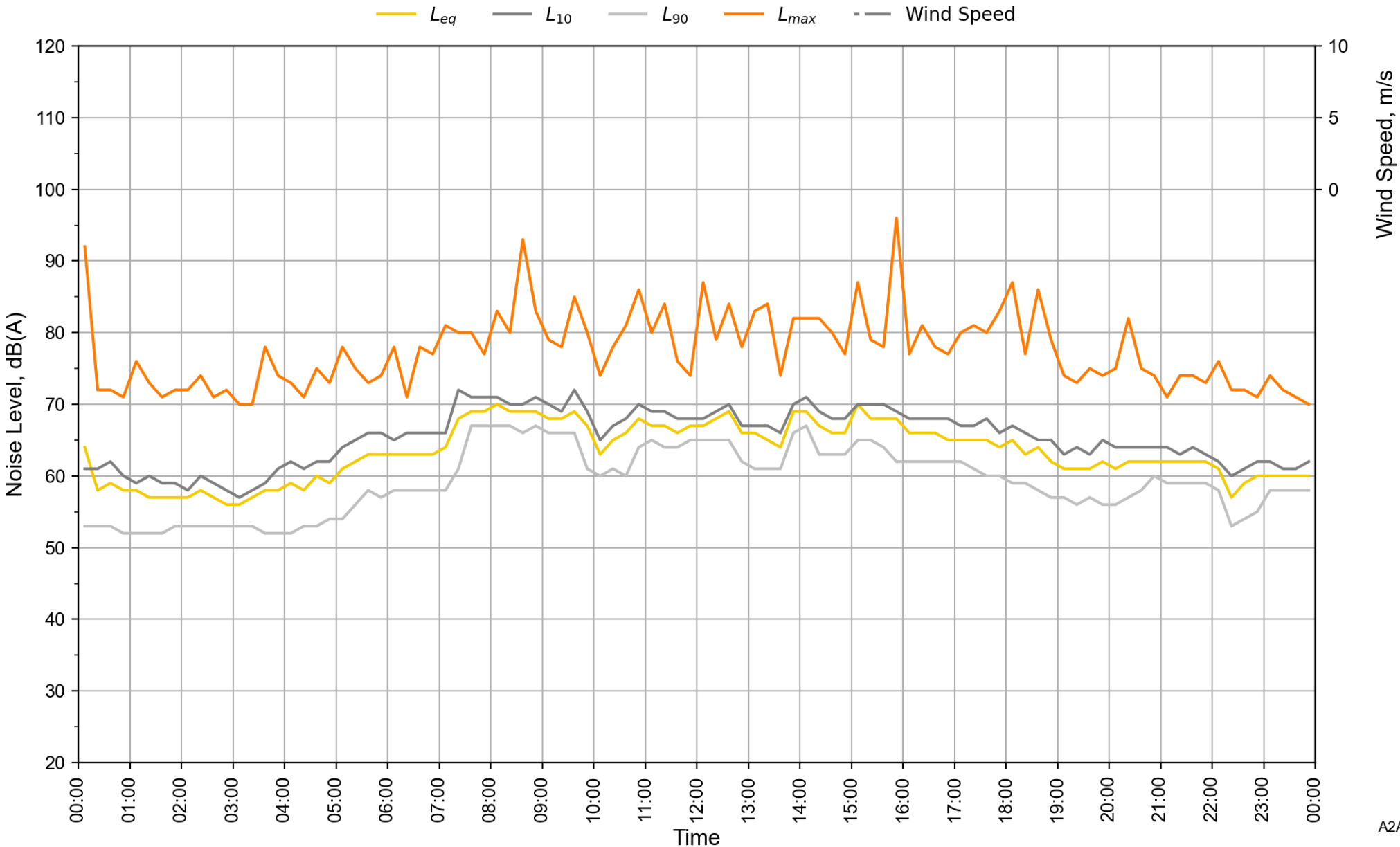
ABC NL2 - Wednesday, 22 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

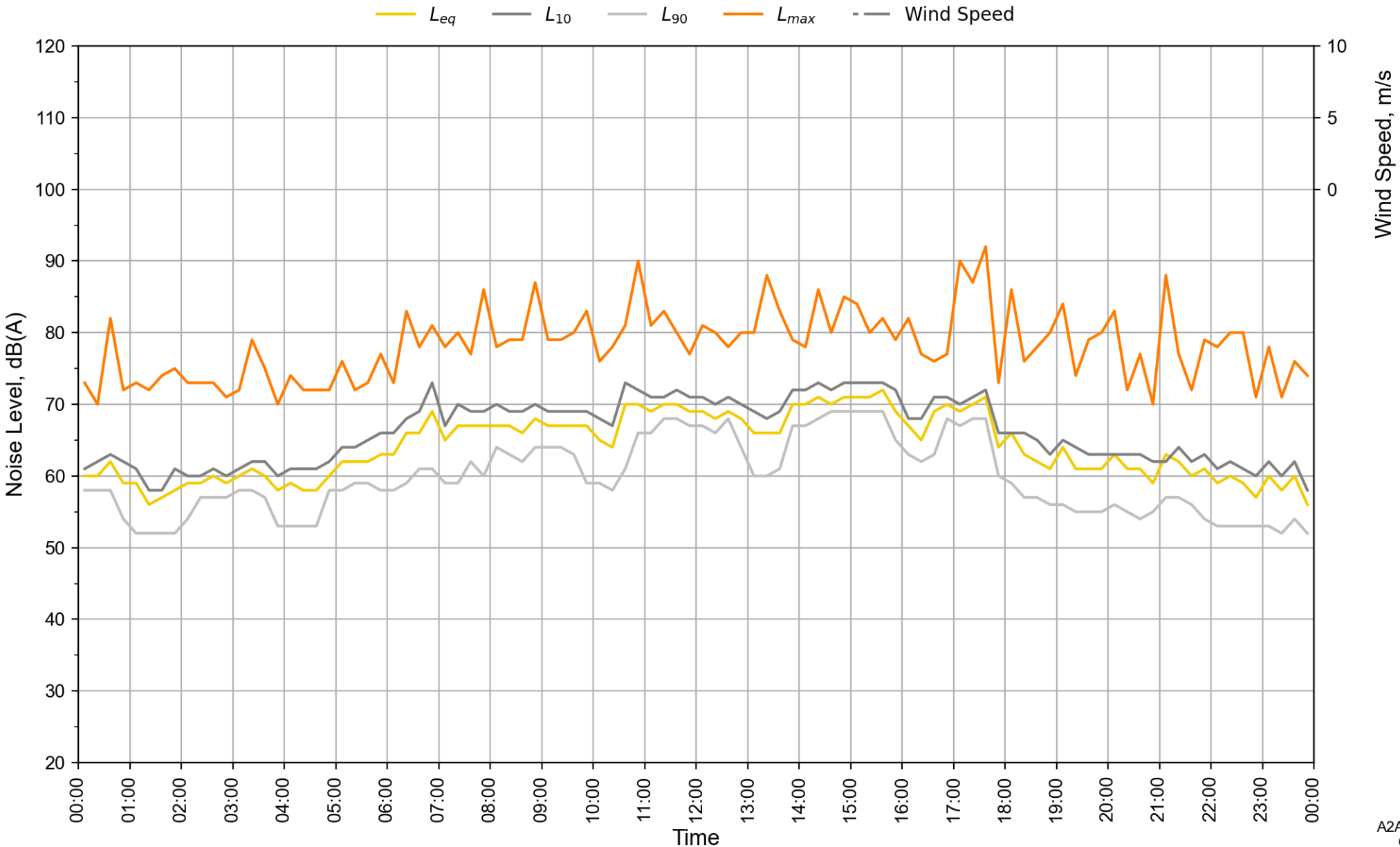
ABC NL2 - Thursday, 23 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

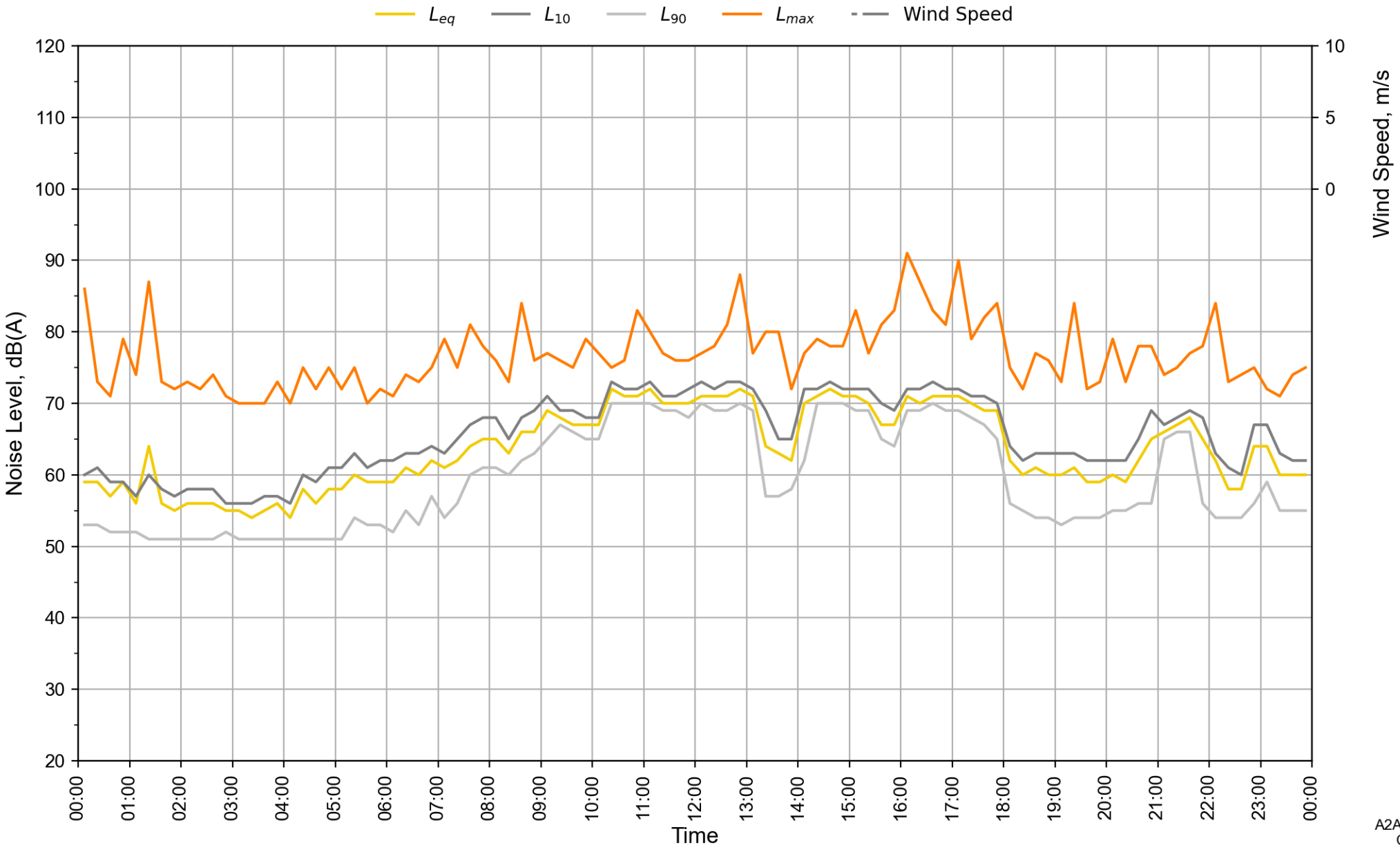
ABC NL2 - Friday, 24 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

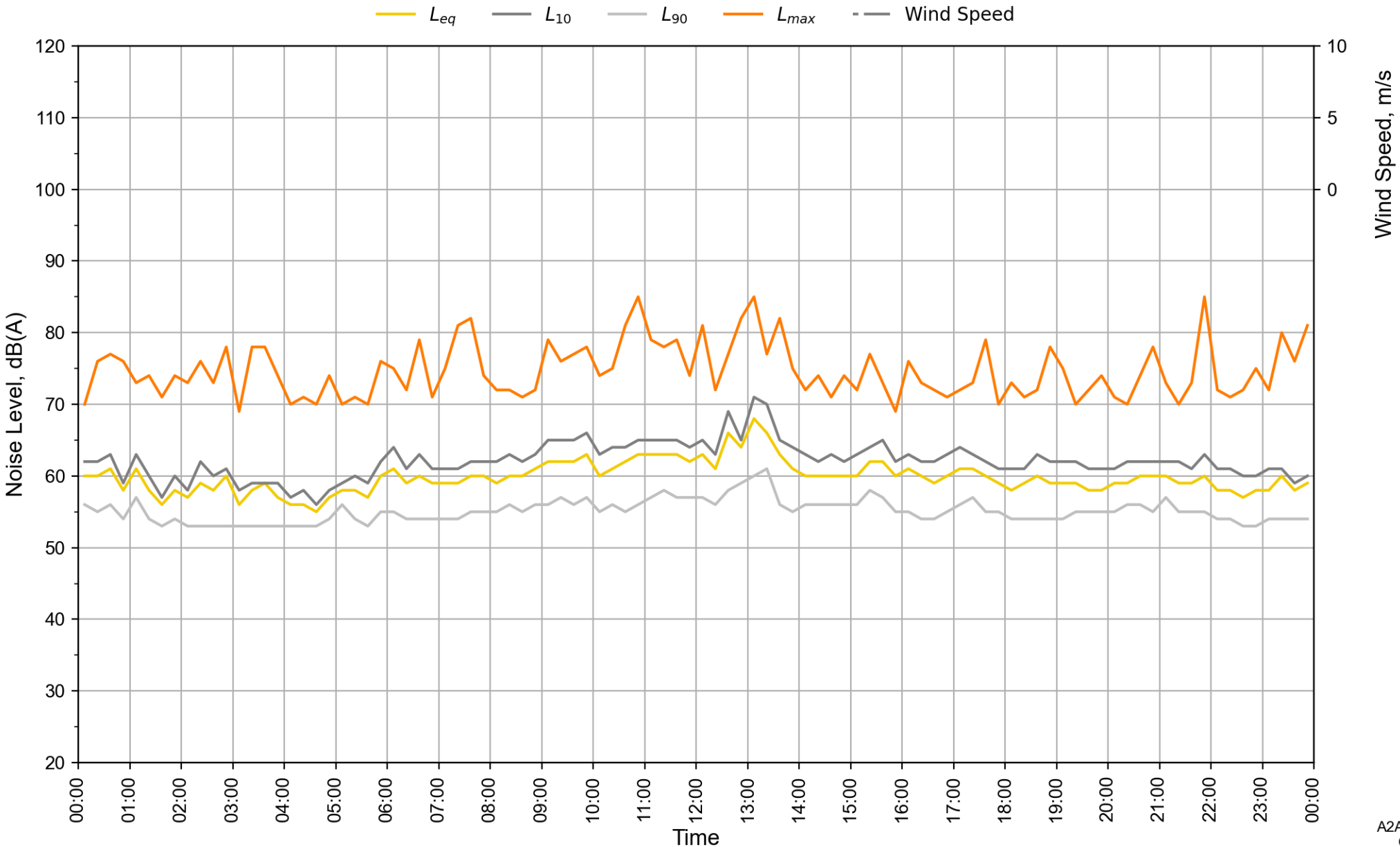
ABC NL2 - Saturday, 25 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

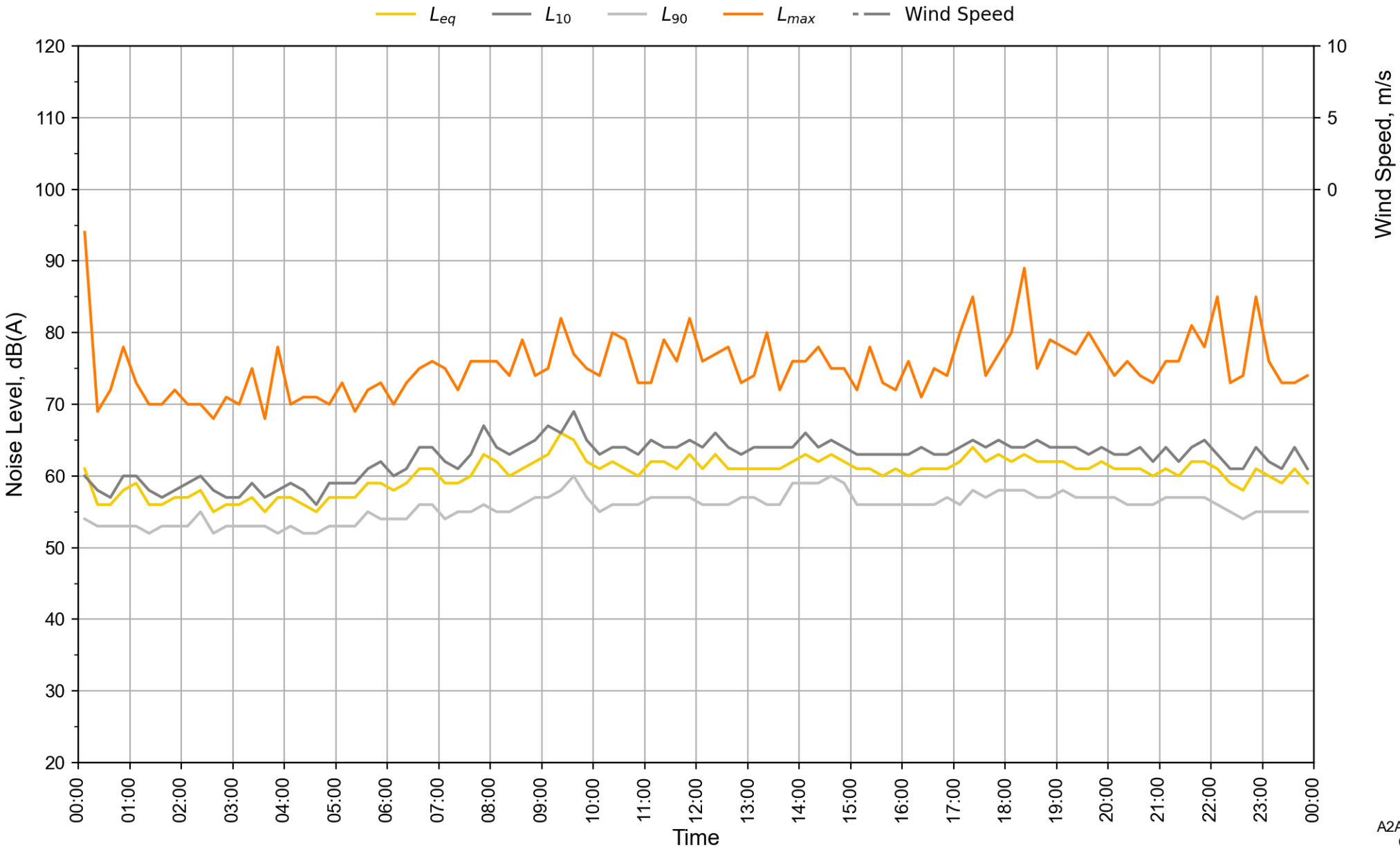
ABC NL2 - Sunday, 26 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

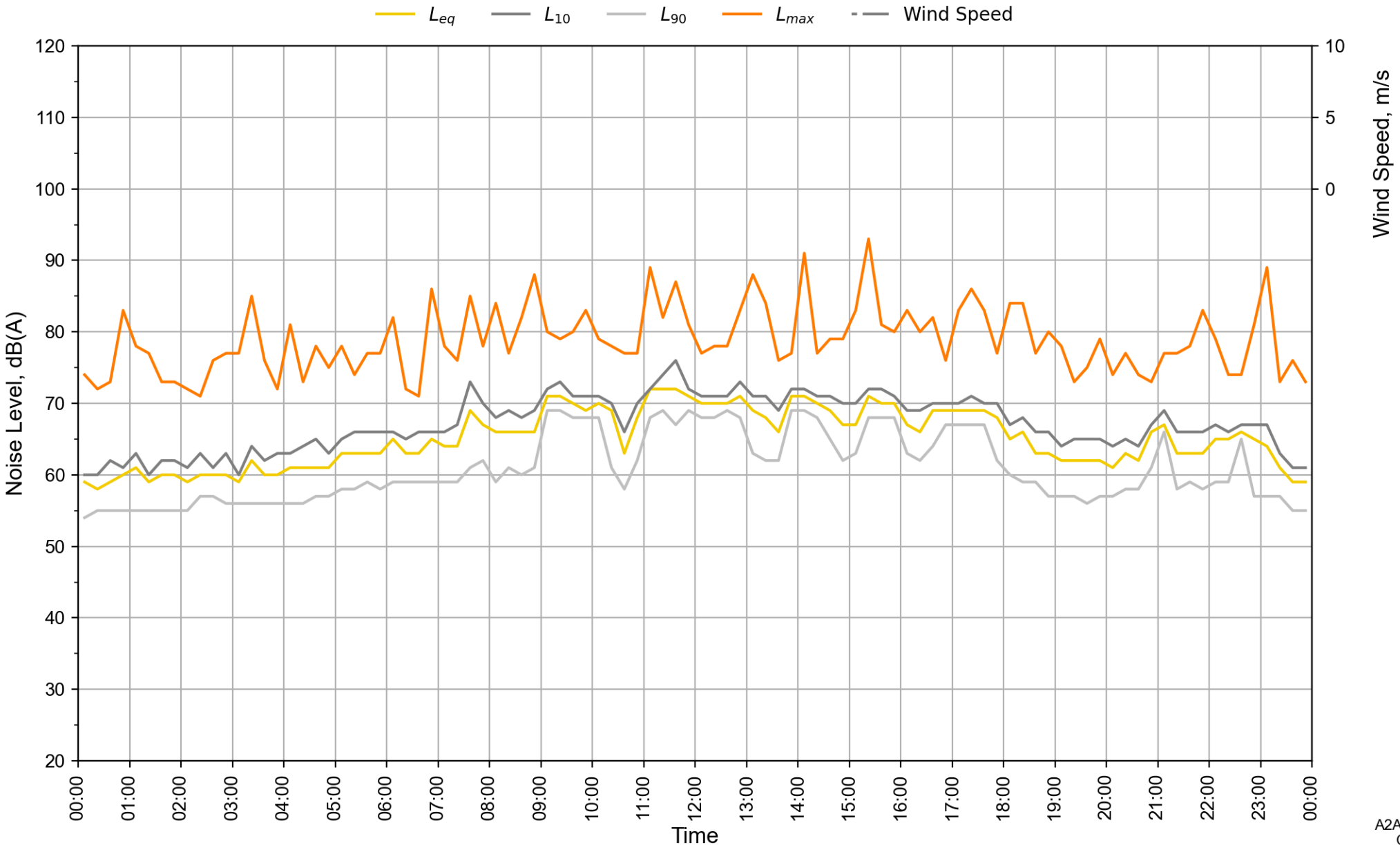
ABC NL2 - Monday, 27 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

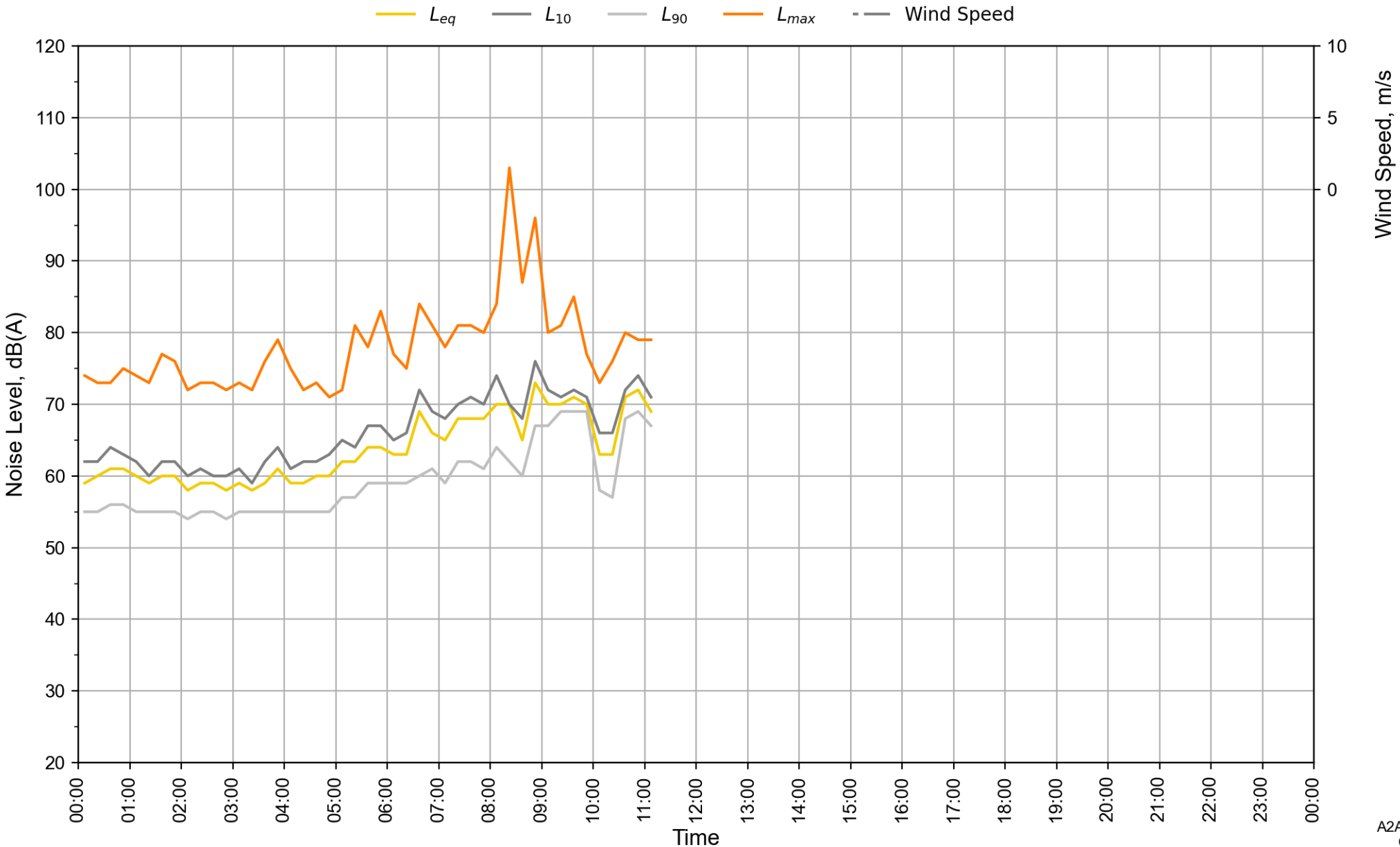
ABC NL2 - Tuesday, 28 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Resonate

ABC NL2 - Wednesday, 29 January 2025



A2A-18364-E0
Calibration:
2025-01-30

Appendix C—Weather data (attended survey)

Day/ Time	Wind gusts (km/h)	Air Temp	Rain (mm)	Wind direction	Wind speed (km/h)
15/01/2025 20:30 PM	17	-	0	SSW	15
15/01/2025 21:00 PM	22	-	0	S	17
15/01/2025 21:30 PM	6	-	0	SSW	4
15/01/2025 22:00 PM	11	-	0	S	7
15/01/2025 22:30 PM	13	-	0	SSE	11
15/01/2025 23:00 PM	9	-	0	SSE	7

temperature data was not available for the survey period.