



## **Glenaeon Retirement Village Pumping Station**

### **Environmental Noise Assessment**

S210693RP1 Revision A

Thursday, 17 March 2022



#### Document Information

<b>Project</b>	Glenaeon Retirement Village Pumping Station
<b>Client</b>	SCP Consulting Pty Ltd
<b>Report title</b>	Environmental Noise Assessment
<b>Project Number</b>	S210693

#### Revision Table

<b>Report revision</b>	<b>Date</b>	<b>Description</b>	<b>Author</b>	<b>Reviewer</b>
0	1 March 2022	Draft – first issue	Alex Salazar	Raymond Sim
A	17 March 2022	Final – first issue	Alex Salazar	Raymond Sim

## Glossary

'A' Weighted	A spectrum adaption that is applied to measured noise levels to approximate human hearing. A-weighted levels are used as human hearing does not respond equally at all frequencies.
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 that sound level.
dB(A)	'A' Weighted sound level in dB.
Daytime	As defined in the <i>Noise Policy for Industry</i> between the hours of 7:00 am to 6:00 pm
Evening	As defined in the <i>Noise Policy for Industry</i> between the hours of 6:00 pm to 10:00 pm
Night-time	As defined in the <i>Noise Policy for Industry</i> between the hours of 10:00 pm to 7:00 am
L <sub>A10</sub>	A-weighted energy noise level present for 10% of the 15-minute interval. Commonly referred to the average maximum noise level.
L <sub>A90</sub>	A-weighted energy noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration)
L <sub>Aeq</sub>	Equivalent Noise Level— A-weighted energy averaged noise level over the measurement time.
L <sub>Aeq</sub> , (15 min)	A-weighted energy averaged noise level over a 15-minute period. Used in the EPA's <i>Noise Policy for Industry</i> .
L <sub>Amax</sub>	Maximum recorded noise level.
Rating Background Level (RBL)	The Rating Background Level for each period is the median value of the average background values for the period over all of the days measured. There is an RBL value for each period (day, evening and night).

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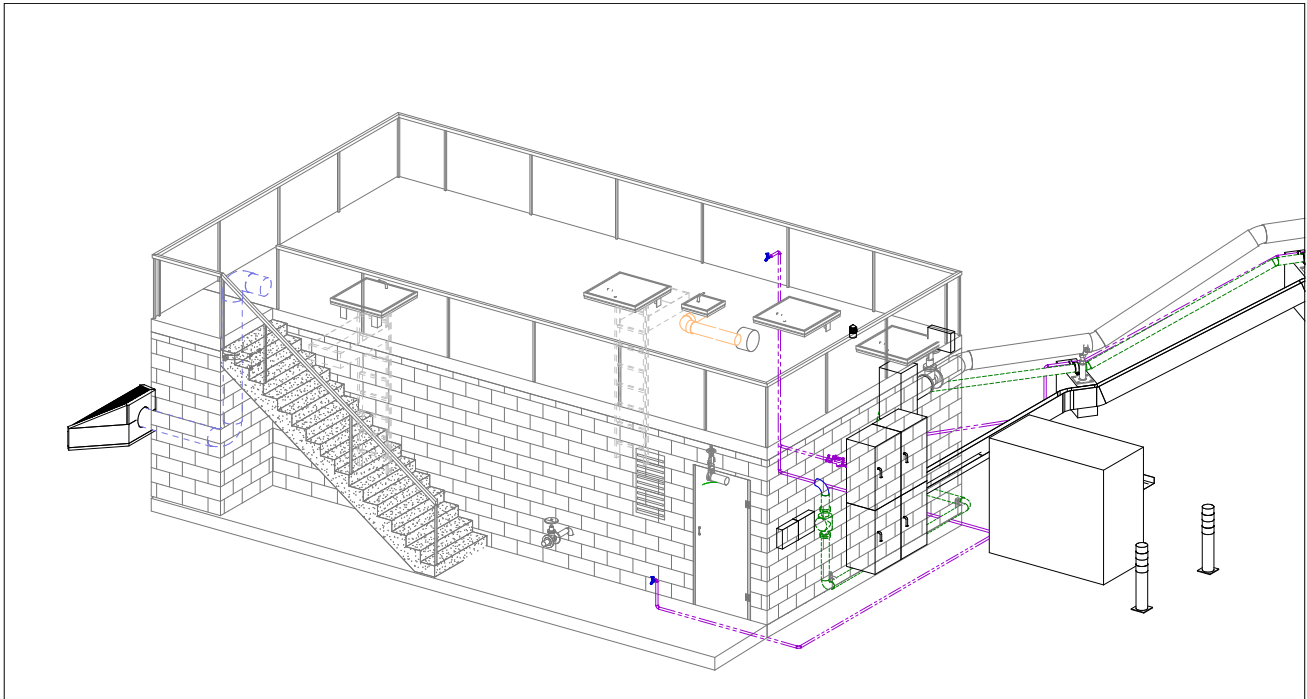
## 1 Introduction

Resonate Consultants (Resonate) has been engaged to provide a noise impact assessment for the installation of a new above ground sewer pumpstation at the Glenaeon Retirement Village. This new pump station is to replace the existing pumping station that will be decommissioned. The pump station will be servicing the approximate 300 units in the Glenaeon Retirement Village which is operated by Lend Lease.

The pump station location and layout can be seen in Figure 1 and Figure 2 below, respectively. The pump station is to be installed at ground level and will operate during the day, evening and night periods as defined in the NSW EPA *Noise Policy for Industry* (NPI).



Figure 1 - Site map and approximate pump station location



**Figure 2 - Pump station layout**

image extracted from SCP drawings (Project: S210157, Revision: B, dated 09/03/2022)

## 2 Existing Acoustic Environment

### 2.1 Unattended noise monitoring

Unattended noise monitoring was undertaken between the dates of 18 Tuesday 2022 and 31 January 2022 at the Glenaeon Retirement Village on North Avenue (at the location denoted in Figure 3 below) to characterise the background noise level at the surrounding residential receiver locations from the proposed pump station.

Noise monitoring could not be conducted closer to the proposed location of the pump station due to the noise from the existing pump station still in operation and nearby active construction works happening within the Glenaeon Retirement Village along South Avenue.

### 2.2 Instrumentation

The instrumentation of the unattended noise monitoring comprised of one Rion NL-21 environmental noise logger (serial number: 00709535) fitted with a wind shield. Calibration of the logger and sound level meter was checked prior to and following measurements using a Casella CEL-120 (serial number: 254977). Field calibration was conducted at the commencement of the conclusion of the logging period and no significant calibration drift was observed (drift in calibration did not exceed  $\pm 0.5$  dB(A)). All instrumentation carried appropriate and current NATA (or manufacturer) calibration certificates.

### 2.3 Weather conditions

It is a requirement that noise data is captured during periods of favourable weather conditions avoiding adverse impacts of wind and rain on background noise levels. To assess weather conditions for the measurement period, half-hourly weather data was obtained from the Bureau of Meteorology (BOM) weather observation station ID 066059 at Terrey Hills NSW.

Noise data has been excluded from the processed results if:

- Rain was observed during a measurement period, and/or
- Wind speed exceeded 5 m/s (18 km/h) at the measurement height of 1.5 m above ground. Wind data obtained from the BOM is presented as the value at 10 m above ground.

The BOM wind speed data obtained for this report was measured at a height of 10 m above ground level. It is therefore necessary to apply a correction factor in order to estimate the wind speed at the height of the logger (1.5 m).

The methodology to formulate a correction factor has been derived<sup>1</sup>. The correction multiplier for the measured wind speed at 10 m is derived by the following formula:

$$W_{1.5} = W_{10} \times \left( \frac{M_{1.5,cat}}{M_{10,cat}} \right)$$

where:

- $W_{1.5}$  = Wind speed at height of 1.5 m
- $W_{10}$  = Wind speed at height of 10 m
- $M_{1.5,cat}$  = AS 1170 multiplier for receiver height of 1.5 m and terrain category
- $W_{10,cat}$  = AS 1170 multiplier for receiver height of 10 m and terrain category

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<sup>1</sup> Gowen, T., Karantonis, P. & Rofail, T. (2004), *Converting Bureau of Meteorology wind speed data to local wind speeds at 1.5m above ground level*, Proceedings of ACOUSTICS 2004





Figure 3 – Site map with measurement location

## 2.4 Unattended noise monitoring results

The noise data obtained from the noise logger has been processed in accordance with the procedures contained in the NPI to establish representative noise levels at the monitoring location.

A summary of background  $L_{A90}$  results from the unattended noise survey during proposed operational hours of the playground is presented in Table 1.

The background noise levels were determined by taking the arithmetic mean noise level that was exceeded for 90%, and the arithmetic mean noise level that was exceeded for 10% of the time during the relevant assessment periods for each day, and then taking the median of all the days where monitoring took place for each assessment period. This process provides a single figure Rating Background Level (RBL) for the day, evening, and night-time period. These noise levels were used to establish the relevant noise criteria in accordance with the NPI.

Table 1 Unattended noise monitoring results summary

Location	RBL (dB L <sub>A90,15 min</sub> ) during Period		
	Daytime 7:00 am – 6:00 pm	Evening 6:00 pm – 10:00 pm	Night 10:00 pm – 7:00 am
Glenaeon Retirement Village – North Avenue (See Figure 3)	40	36	30

## 3 Noise Criteria

### 3.1 External mechanical services

Mechanical services noise impacts associated with proposed new pump station at the Glenaeon Retirement Village will be assessed against the NPI. The NPI was released in 2017 and supersedes the EPA NSW Industrial Noise Policy (INP) and sets out the EPA's requirements for the assessment and management of noise from industry in NSW.

The NPI is designed for large and complex industrial noise sources and outlines processes designed to strike a feasible and reasonable balance between the operations of industrial activities and the protection of the community from noise levels that may be intrusive or unpleasant.

The NPI measurement and evaluation methodology to quantify existing ambient and background noise levels has been adopted for this assessment.

#### 3.1.1 Trigger levels

The NPI describes 'trigger levels' which indicate the noise level at which feasible and reasonable noise management measures should be considered. Two forms of noise criteria are provided – one to account for 'intrusive' noise impacts and one to protect the 'amenity' of particular land uses.

- The intrusiveness of an industrial noise source is generally considered acceptable if the  $L_{Aeq}$  noise level of the source, measured over a period of 15 minutes, does not exceed the background noise level by more than 5 dB. Intrusive noise levels are only applied to residential receivers. For other receiver types, only the amenity levels apply.
- To limit continual increases in noise levels from the use of the intrusiveness level alone, the ambient noise level within an area from all industrial sources should remain below the recommended amenity levels specified in the NPI for that particular land use.

For this assessment, the area surrounding the proposal is considered to be 'suburban'.

#### 3.1.2 Project specific noise criteria

The project specific noise criteria for industrial noise generated by the new pump station in accordance with the NPI are determined by the Project Noise Trigger Levels (PNTL). The PNTL is the lowest value of the intrusiveness or project amenity noise level for each period and are presented below in Table 2.

Table 2 NPI noise criteria (suburban amenity area)

Receiver Type	Period <sup>(4)</sup>	Noise level – dB(A)			
		Recommended amenity noise level $L_{eq}$	Measured RBL	Project noise trigger level <sup>(5)</sup> $L_{eq}(15\text{minute})$	
			RBL <sup>(1)</sup>	Intrusiveness Noise Level	Project Amenity Noise Level <sup>(2),(3)</sup>
Residential Receivers	Day	55	40	<b>45</b>	53
	Evening	45	36	<b>41</b>	43
	Night	40	30	<b>35</b>	38
Commercial	When in use	65	-	-	<b>63</b>

(1) RBL = Rating Background Level.

(2) The recommended amenity noise level has been used to determine the project amenity noise level as there are no other industries present or likely to be introduced.

(3) The project amenity noise level is the suburban amenity noise level minus 5 dB(A) to account for existing industrial sources and plus 3 dB(A) to convert from a period to a 15-minute level.

(4) Periods of the day in accordance with the NPI

(5) The Project Noise Trigger Levels (PNTL) to be adopted are marked in bold.

### 3.1.3 Sleep disturbance noise criteria

The NPI also recommends criteria for the assessment of potential sleep disturbance, for the period between 10 pm and 7 am. The term “sleep disturbance” is considered to be both awakenings and disturbance to sleep stages.

To evaluate potential sleep disturbance or awakening issues associated with the operation of the new pump station the NPI screening method has been adapted as follows.

There is limited potential for sleep disturbance or awakening issues to occur, where:

- The predicted project night-time noise level ( $L_{eq, 15 \text{ min}}$  in dB(A)) at any residential receptor remains below 40 dB(A) (or the prevailing night-time background noise level plus 5 dB(A)), whichever is the greater.
- The predicted project night-time noise level ( $L_{max}$  in dB(A)) at any residential receptor remains below 52 dB(A) (or the prevailing night-time background noise level plus 15 dB(A)), whichever is the greater.

In accordance with the NPI, the sleep disturbance noise criteria for assessing the operations of the Project are presented in Table 3 below.

Table 3 Sleep disturbance noise criteria

Receiver Type	NPI Sleep disturbance trigger levels	
	$L_{eq, 15 \text{ min}}$ in dB(A)	$L_{max}$ dB(A)
Residential receivers	40	52

## 4 Noise Impact Assessment

Operation of the proposed new pump station may generate adverse noise impacts at nearby sensitive receivers. This section details the assessment of the potential for noise impacts from the proposed pump station. Noise impacts predicted at nearest residential receivers have been assessed against the adopted NPI noise criteria.

### 4.1 Noise assessment methodology

Potential operational noise impacts from the pump station at surrounding receptors have been modelled using the CONCAWE algorithm within SoundPLAN v8.2. This method is commonly used and accepted by regulatory agencies in NSW.

Terrain has been based on 1 metre LIDAR scans of the area sourced from NSW Spatial Services. Noise sources and receivers have been based on aerial imagery sourced from Nearmap. Building footprints and heights have been based on a combination of aerial imagery, street level photography and site inspections.

The parameters adopted in the noise modelling are presented in Table 4 below.

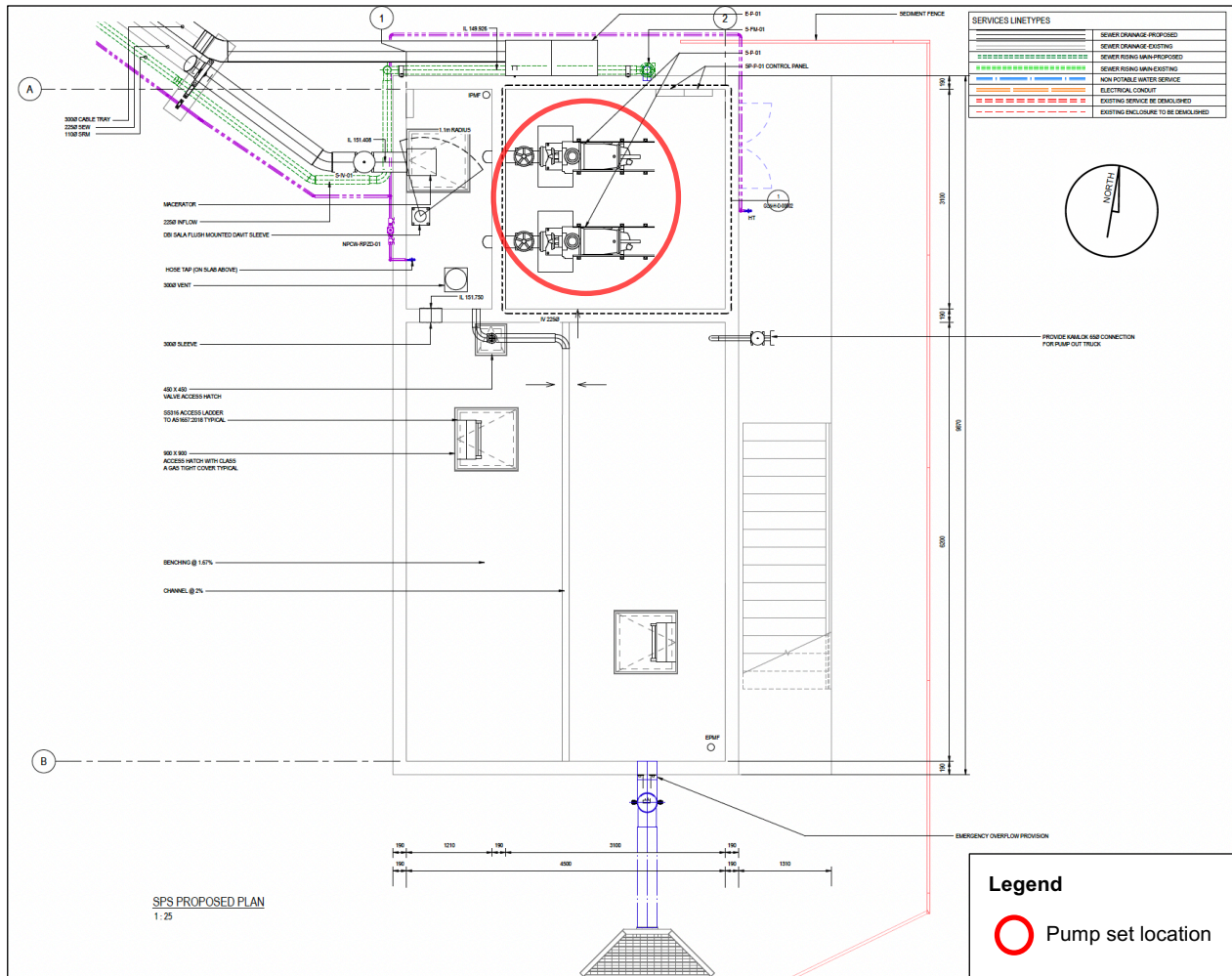
**Table 4 Operational noise modelling parameters**

Parameter	Input data
Buildings	<ul style="list-style-type: none"> <li>Footprints taken from aerial photography</li> <li>Typical building heights have been estimated from Google Street-view and site inspections as follows: per floor 3 m.</li> <li>Number of floors observed from site inspections and desktop survey.</li> <li>The buildings within the project site and the building services plant have been digitised into the model.</li> </ul>
Terrain	1 metre ground contours from NSW Spatial Services.
Ground surface / absorption	0.6
Receivers	Surrounding buildings have been digitised into the model. Ground floor receivers have been placed at 1.5 m above ground floor and first floor receivers at 4.5 m above ground.
Sources	<ul style="list-style-type: none"> <li>Noise emission scenarios and sources associated with the facility as detailed in Section 4.3</li> </ul>
SoundPLAN module	CONCAWE industrial module
Noise contours	The noise contours height has been set at 1.5 metres.
Meteorological condition	<p>Noise-enhancing meteorological conditions in accordance with the NPI:</p> <ul style="list-style-type: none"> <li>Day/evening: stability category D with wind speeds of 0.5 m/s and 3 m/s.</li> <li>Night: stability category D with wind speeds of 0.5 m/s (neutral) and stability category F with wind speed of 2 m/s (adverse).</li> <li>Windspeed (worst-case source to receiver direction).</li> <li>70% relative humidity.</li> <li>10°C temperature.</li> <li>1013.3 mbar air pressure.</li> </ul>



## 4.2 Operational noise sources

The primary noise sources for the operational of the new pump station are the two new Xylem Flygt 3171 pump sets and associated macerator motors that will all be housed within a concrete room with an entry opening only to the east (as presented in Figure 2 and Figure 4). We note that the pump sets are arranged so that only one will operate at any one time. Resonate has been advised that the macerator motor is not noise intensive and will not adversely impact on surrounding receivers.



**Figure 4 - Aerial plan view of pump station and pump set location**

image extracted from SCP drawings (Project: S210157, Revision: B, dated 09/03/2022)

Noise levels have been calculated based on assumed combined SWL dB(A) determined by the information provided by SCP Consulting from Xylem and past noise assessments of similar equipment by this office. The assumed combined sound power levels (SWL) of the pump sets and associated motors are presented in Table 5 below.

**Table 5 Operational noise sources from pump station**

Operational Source	Source type	Number of units	Combined SWL dB(A)
Xylem Flygt 3171 (including associated macerator motor)	Area Source	2 <sup>(2)</sup>	70

- (1) A +5 dB penalty has been added to the predicted noise levels to account for potential tonality of the electrical equipment. This should be reassessed at the detailed design phase when equipment selection has been finalised.
- (2) Pump sets are arranged so that only one pump set will operate at any one time. The Macerator is not noise intensive and will not adversely impact on surrounding receivers.

## 4.3 Operational noise assessment scenarios

The following operational scenarios are considered to be the most realistic worst-case and have been investigated as part of the assessment:

- Scenario 1 - New pump station with singular pump set in operation (Combined SWL in Table 5 used) with no door proposed
- Scenario 2 - New pump station with singular pump set in operation (Combined SWL in Table 5 used) with a solid core double doors. All the door openings are proposed to have acoustic louvres (Acran Acraflow Series 100 or similar) with minimum insertion losses presented in Table 6:

**Table 6 Acoustic louvre insertion loss**

Model	Octave Band Centre Frequencies (Hz)					
	125	250	500	1000	2000	4000
Acran Airflow Series 100 Acoustic Louvre	14	14	16	21	27	27

## 4.4 Predicted operational noise levels

This section presents for scenario 1 and scenario 2 an overview of predicted operational noise levels during temperature inversion conditions. The noise contours are presented in Figure 5 and Figure 6, with detailed noise results presented in Table 7 and Table 8 for each scenario.

### 4.4.1 Scenario 1

The predicted scenario 1 operational noise contours during temperature inversion conditions are presented in Figure 5, with the detailed noise level results presented in Table 7.

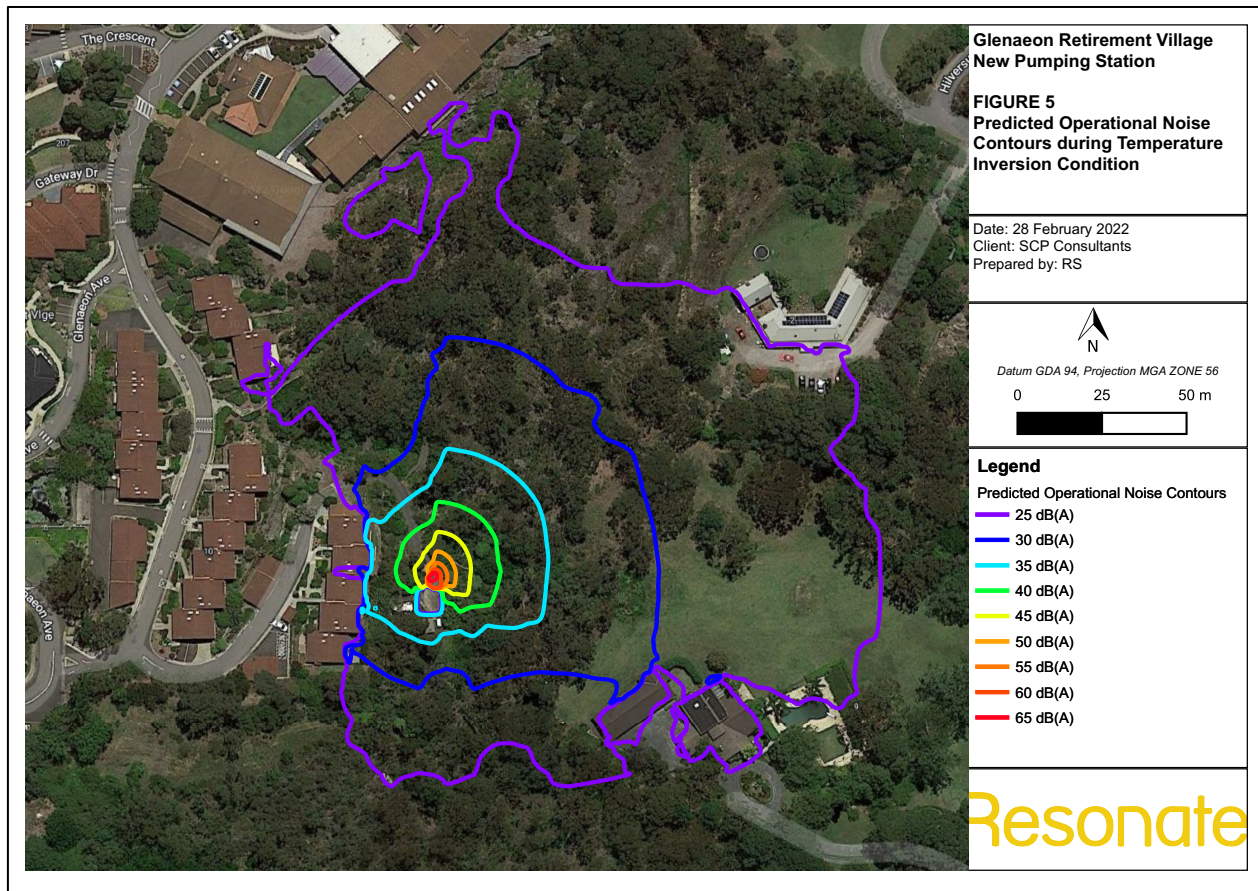


Figure 5 - Predicted operational noise levels overview (including tonality penalty at receivers) for Scenario 1

Table 7 Single point receiver noise levels from pump station noise sources for Scenario 1

Name	Floor	Receiver Type	Direction	Neutral Weather	Adverse Weather	Complies with Project Criteria
1 Morgan Rd, Belrose NSW 2085	GF	Residential	N	12	14	✓
2 Hilversum Cres, Belrose NSW 2085	GF	Residential	SW	23	24	✓
7 Morgan Rd, Belrose NSW 2085	GF	Residential	N	15	17	✓
9 Morgan Rd, Belrose NSW 2085	GF	Residential	NW	26	26	✓
11 Morgan Rd, Belrose NSW 2085	GF	Residential	W	17	19	✓
197 Forest Way, Belrose NSW 2085	GF	Residential	E	10	12	✓
31 Glenaeon Way, Belrose NSW 2085	GF	Residential	S	22	22	✓
31 Glenaeon Way, Belrose NSW 2085	F 1	Residential	S	22	22	✓

Name	Floor	Receiver Type	Direction	Neutral Weather	Adverse Weather	Complies with Project Criteria
32 Glenaeon Way, Belrose NSW 2085	GF	Residential	SE	21	23	✓
32 Glenaeon Way, Belrose NSW 2085	F 1	Residential	SE	21	23	✓
33 Glenaeon Way, Belrose NSW 2085	GF	Residential	SE	17	18	✓
33 Glenaeon Way, Belrose NSW 2085	F 1	Residential	SE	19	20	✓
Main Ave, Belrose NSW 2085	GF	Residential	SE	21	22	✓
Main Ave, Belrose NSW 2085	F 1	Residential	SE	20	22	✓
Main Ave, Belrose NSW 2085	GF	Residential	SE	20	20	✓
Main Ave, Belrose NSW 2085	GF	Residential	SE	19	20	✓
Main Ave, Belrose NSW 2085	F 1	Residential	SE	19	20	✓
Main Ave, Belrose NSW 2085	GF	Residential	SE	20	21	✓
Main Ave, Belrose NSW 2085	F 1	Residential	SE	20	21	✓
Units 1 South Ave, Belrose NSW 2085	GF	Residential	E	28	28	✓
Units 2 South Ave, Belrose NSW 2085	GF	Residential	E	31	31	✓
Units 3 South Ave, Belrose NSW 2085	F 1	Residential	E	31	31	✓
Units 4 South Ave, Belrose NSW 2085	GF	Residential	E	33	33	✓
Units 5 South Ave, Belrose NSW 2085	F 1	Residential	E	33	33	✓
Units 6 South Ave, Belrose NSW 2085	GF	Residential	E	34	34	✓
Units 7 South Ave, Belrose NSW 2085	F 1	Residential	E	34	34	✓
Units 8 South Ave, Belrose NSW 2085	GF	Residential	E	32	32	✓
Units 9 South Ave, Belrose NSW 2085	F 1	Residential	E	32	32	✓

## 4.4.2 Scenario 2

The predicted scenario 1 operational noise contours during temperature inversion conditions are presented in Figure 6, with the detailed noise level results presented in Table 8.



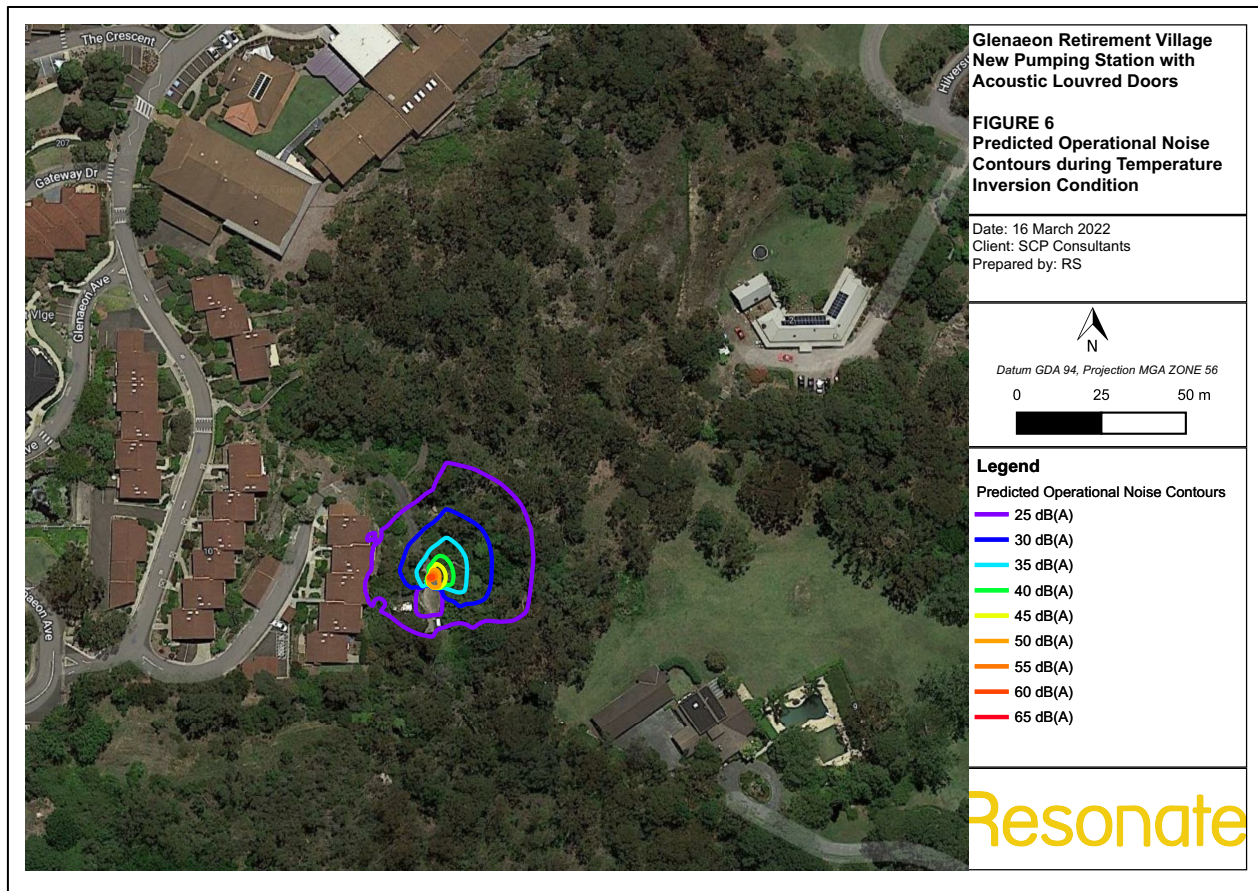


Figure 6 - Predicted operational noise levels overview (including tonality penalty at receivers) for Scenario 2

Table 8 Single point receiver noise levels from pump station noise sources for Scenario 2

Name	Floor	Receiver Type	Direction	Neutral Weather	Adverse Weather	Complies with Project Criteria
1 Morgan Rd, Belrose NSW 2085	GF	Residential	N	4	6	✓
2 Hilversum Cres, Belrose NSW 2085	GF	Residential	SW	14	15	✓
7 Morgan Rd, Belrose NSW 2085	GF	Residential	N	7	8	✓
9 Morgan Rd, Belrose NSW 2085	GF	Residential	NW	17	18	✓
11 Morgan Rd, Belrose NSW 2085	GF	Residential	W	8	10	✓
31 Glenaeon Ave, Belrose NSW 2085	GF	Residential	S	13	13	✓
31 Glenaeon Ave, Belrose NSW 2085	F 1	Residential	S	13	13	✓
197 Forest Way, Belrose NSW 2085	GF	Residential	E	2	3	✓

Name	Floor	Receiver Type	Direction	Neutral Weather	Adverse Weather	Complies with Project Criteria
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	13	14	✓
Glenaeon Ave, Belrose NSW 2085	F 1	Residential	SE	13	14	✓
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	9	10	✓
Glenaeon Ave, Belrose NSW 2085	F 1	Residential	SE	11	12	✓
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	12	13	✓
Glenaeon Ave, Belrose NSW 2085	F 1	Residential	SE	12	13	✓
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	11	12	✓
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	11	12	✓
Glenaeon Ave, Belrose NSW 2085	F 1	Residential	SE	11	12	✓
Glenaeon Ave, Belrose NSW 2085	GF	Residential	SE	11	13	✓
Glenaeon Ave, Belrose NSW 2085	F 1	Residential	SE	11	13	✓
Units 1 Glenaeon Ave	GF	Residential	E	19	19	✓
Units 2 & 3 Glenaeon Ave	GF	Residential	E	22	22	✓
Units 2 & 3 Glenaeon Ave	F 1	Residential	E	22	22	✓
Units 4 & 5 Glenaeon Ave	GF	Residential	E	25	25	✓
Units 4 & 5 Glenaeon Ave	F 1	Residential	E	24	24	✓
Units 6 & 7 Glenaeon Ave	GF	Residential	E	26	26	✓
Units 6 & 7 Glenaeon Ave	F 1	Residential	E	25	25	✓
Units 8 & 9 Glenaeon Ave	GF	Residential	E	24	24	✓
Units 8 & 9 Glenaeon Ave	F 1	Residential	E	24	24	✓

## 4.5 Discussion

As presented in Section 4.4 above the operation of the new mechanical plant for the proposed pump station is expected to comply for both scenario 1 (without a door) and scenario 2 (with solid core door + acoustic louvre) with the most stringent night-time project criteria of 35 dB(A) for residential receivers and therefore is expected to be compliant with the NPI when in operation in the day and evening periods.



It is noted that the current proposal for the pump station is to adopt scenario 2. As shown in Section 4.4.2 the noise level at the nearest residences in this scenario is expected to be 10 dB less than the most stringent night-time criterion.

In the event the current proposal for the pump station is altered then a review of the pump station noise impact should be undertaken to ensure compliance with the project specific noise criteria. This may include adjustments to the choice of equipment and/or refinements to the facility layout.

## 5 Conclusion

Resonate has conducted a noise impact assessment for the proposed new at ground pump station installation that will contain two new pump sets to service the Glenaeon Retirement Village located at 207 Forest Way, Belrose NSW 2085.

SoundPLAN noise modelling assessment has been undertaken for the operational noise from the proposed pump station to the surrounding sensitive receivers. The results of this assessment are presented in Section 4.4 of this report.

Our assessment shows that based on the proposed operational noise sources (as shown in Section 4.2) the operation of the new pump station is expected to comply with the NPI project noise criteria presented in Section 3 of this report.

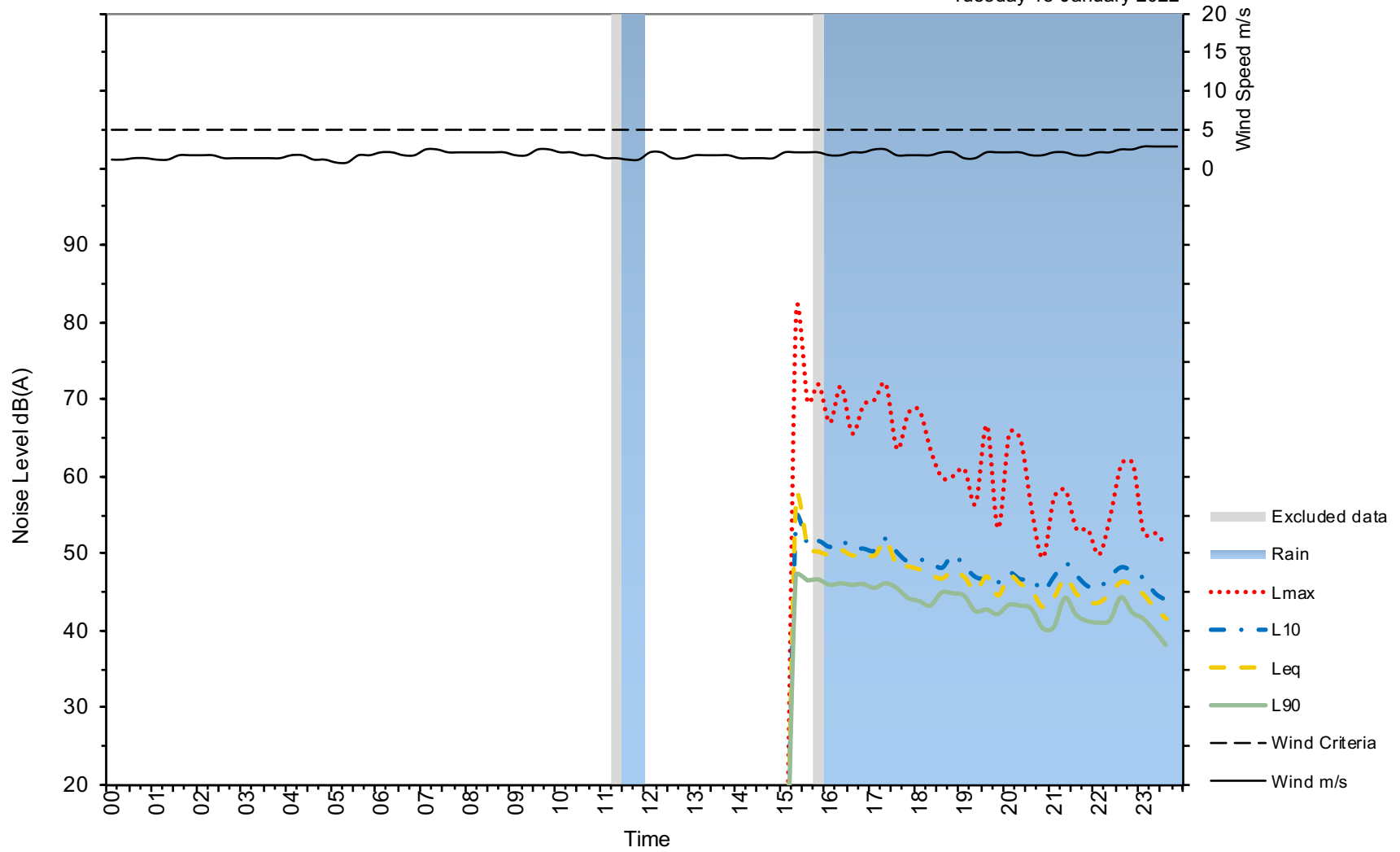




## **Appendix A - Unattended Noise Monitoring Data**

Glenaeon Retirement Village Pumping Station

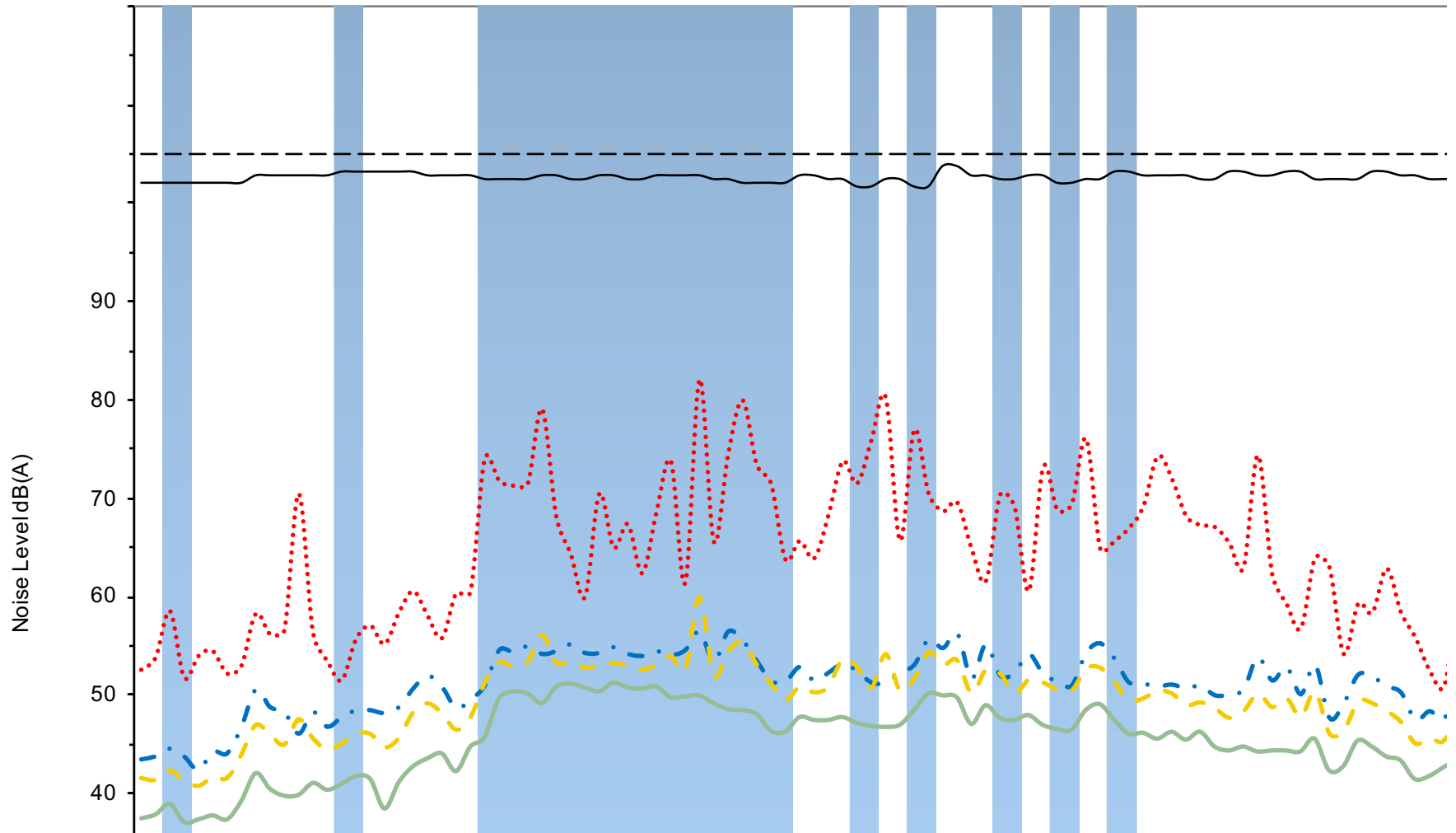
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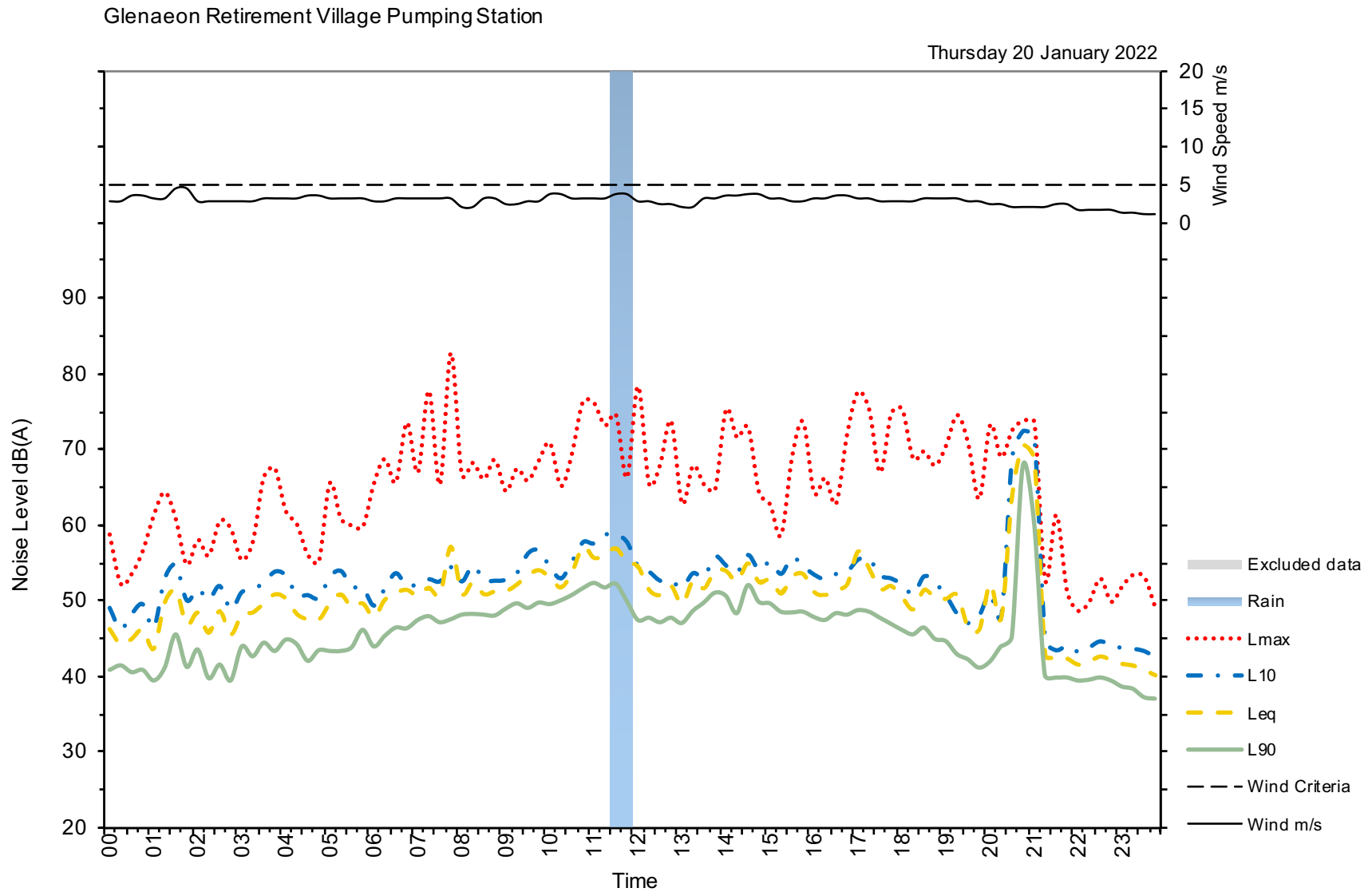


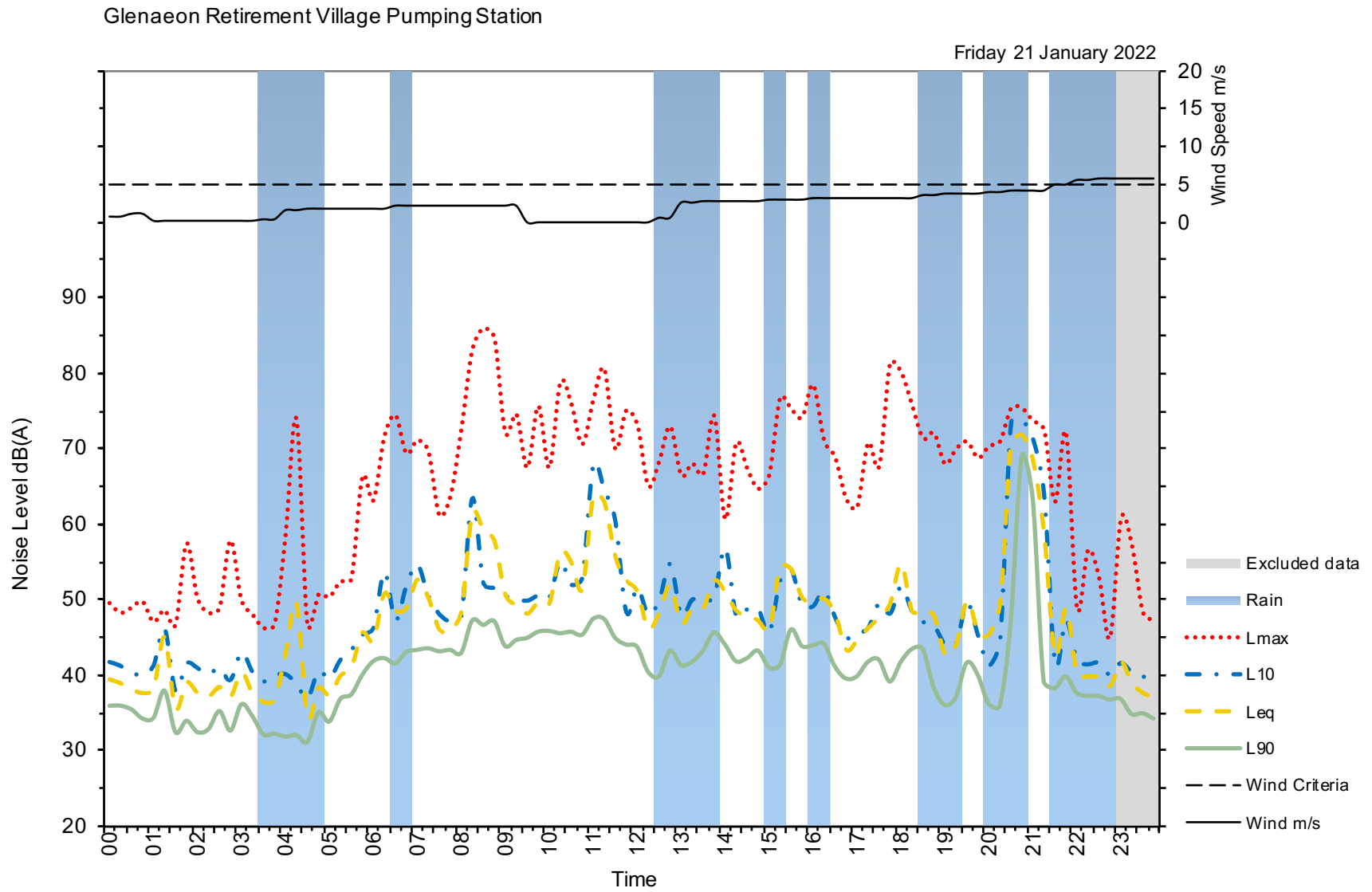
Day 2

Glenaeon Retirement Village Pumping Station

Wednesday 19 Januar

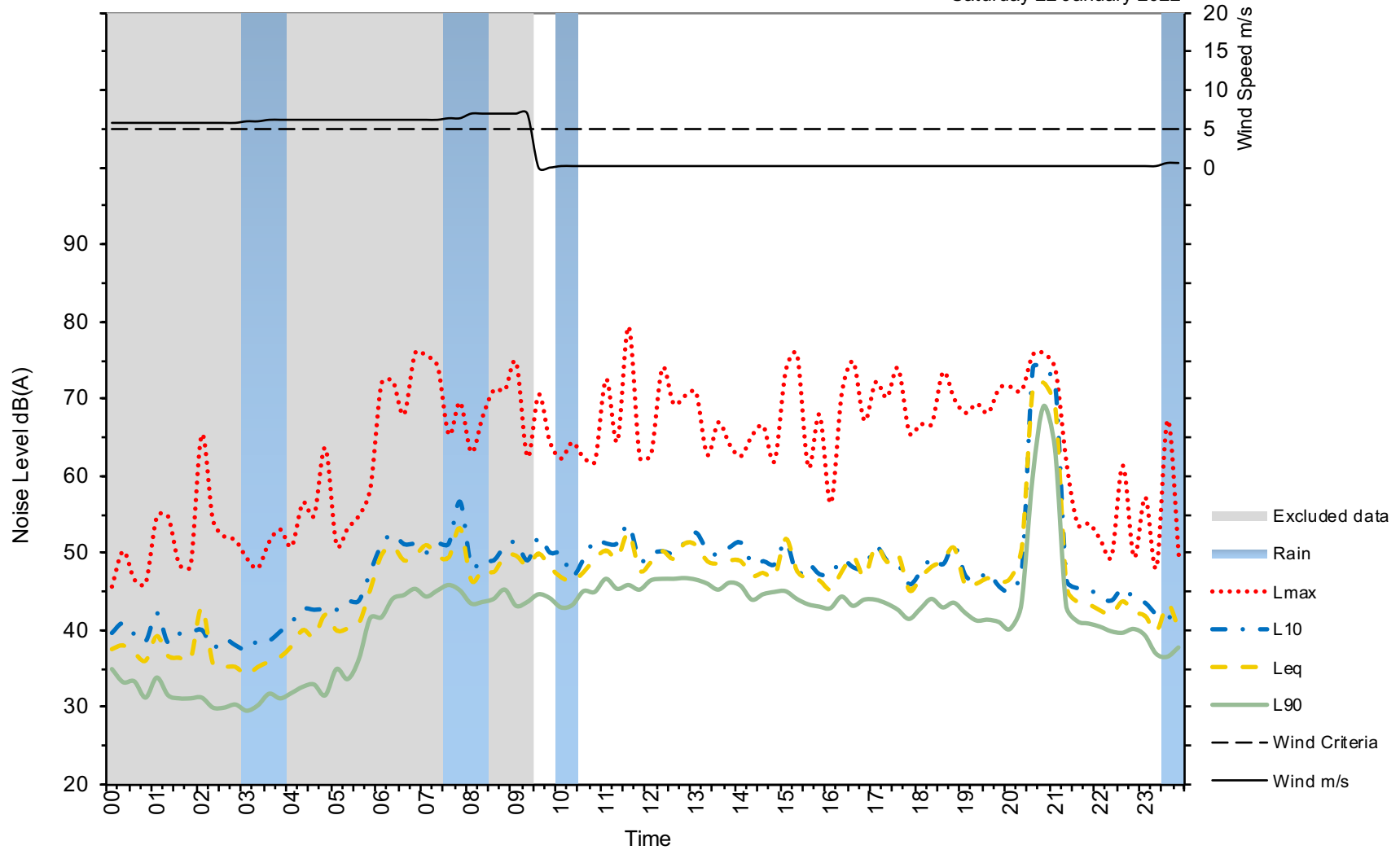


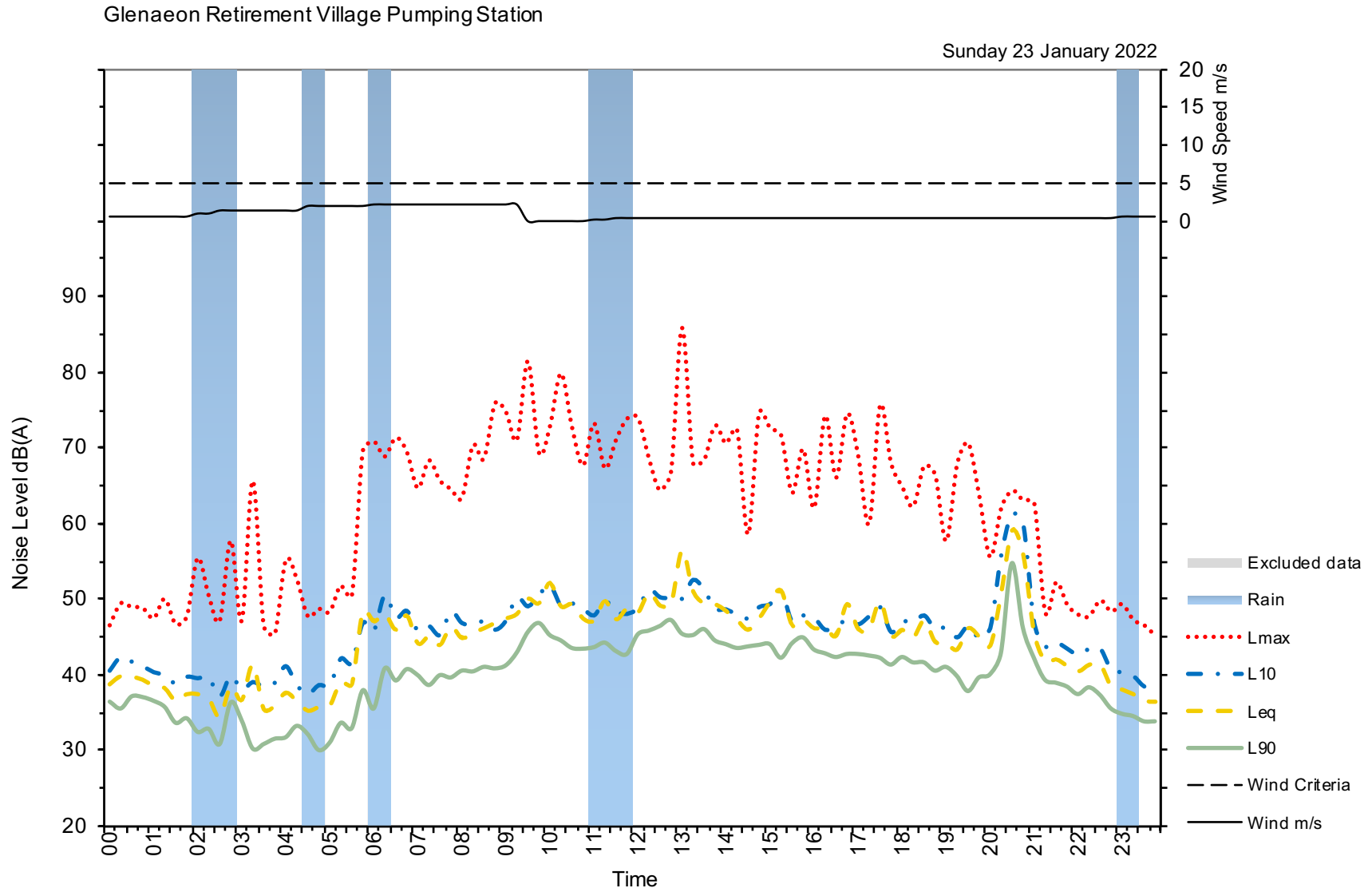


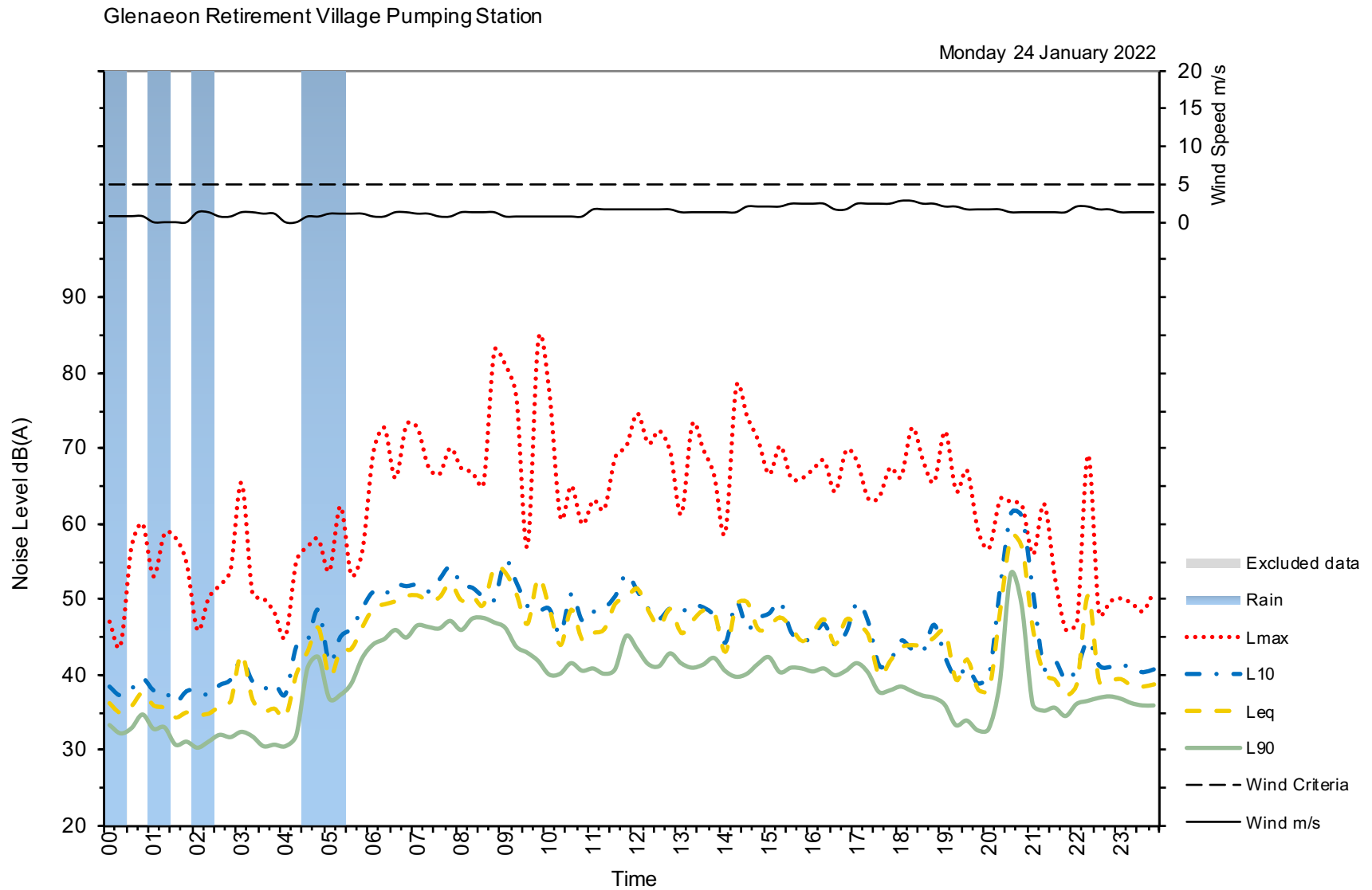


Glenaeon Retirement Village Pumping Station

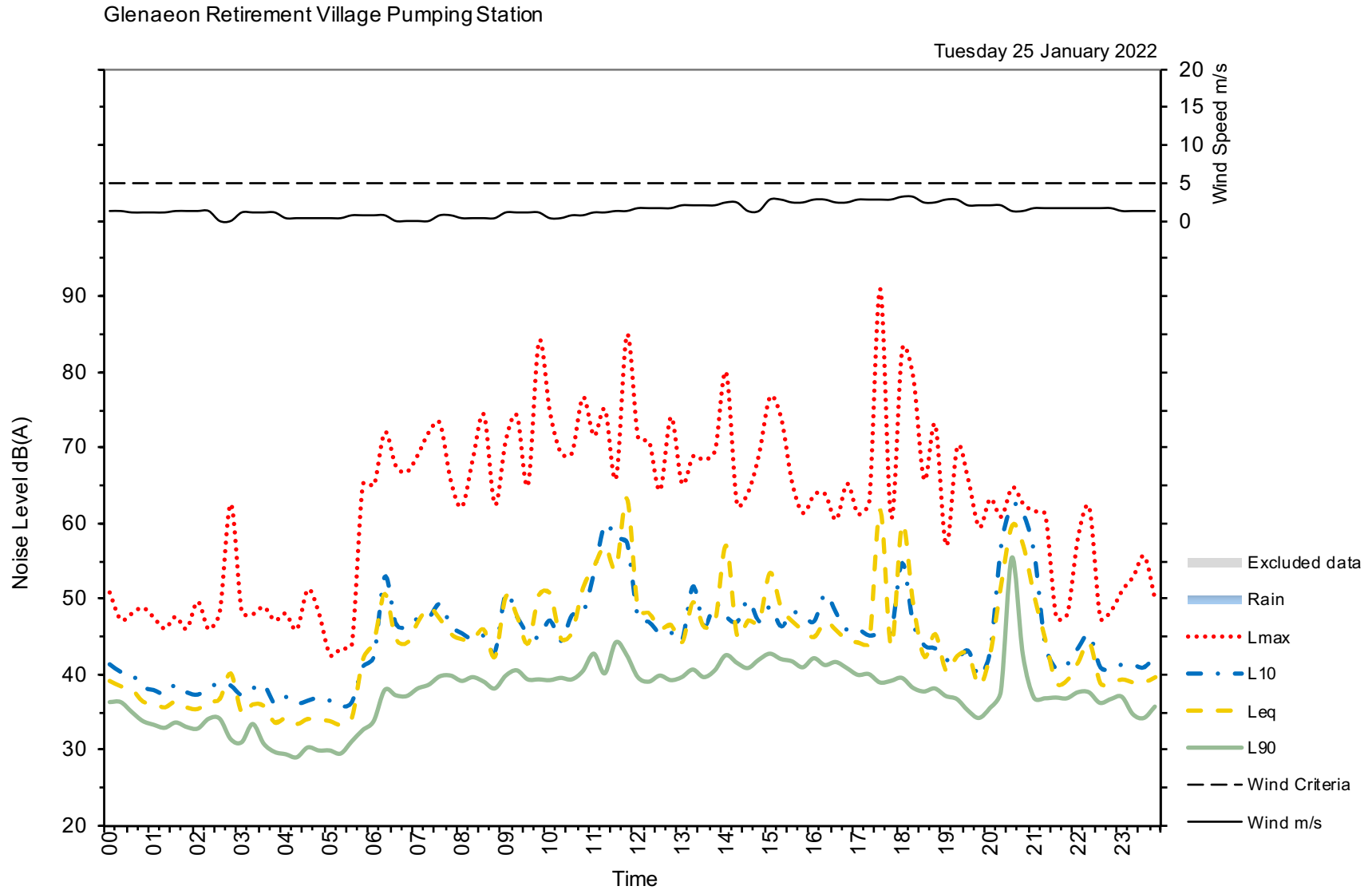
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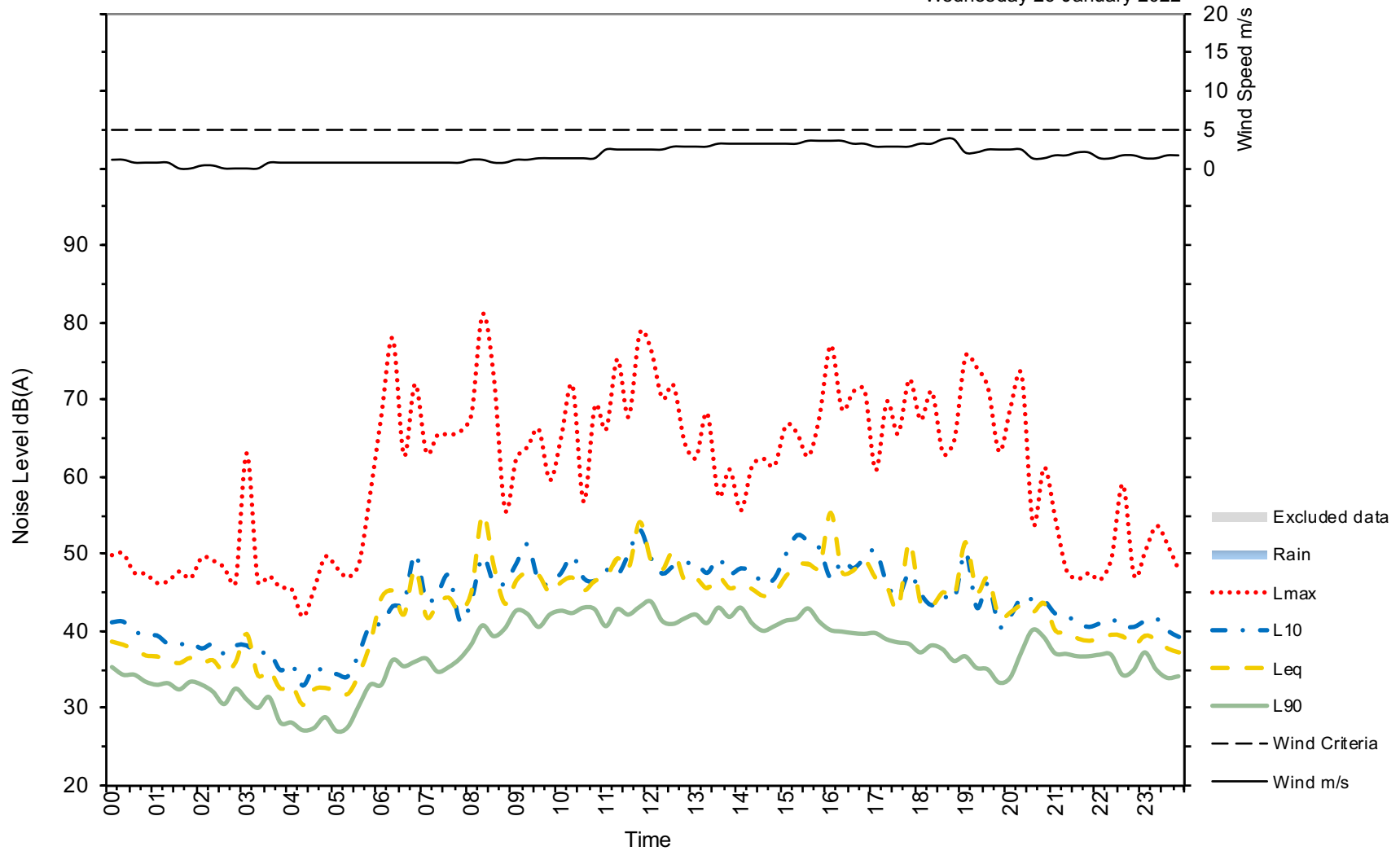






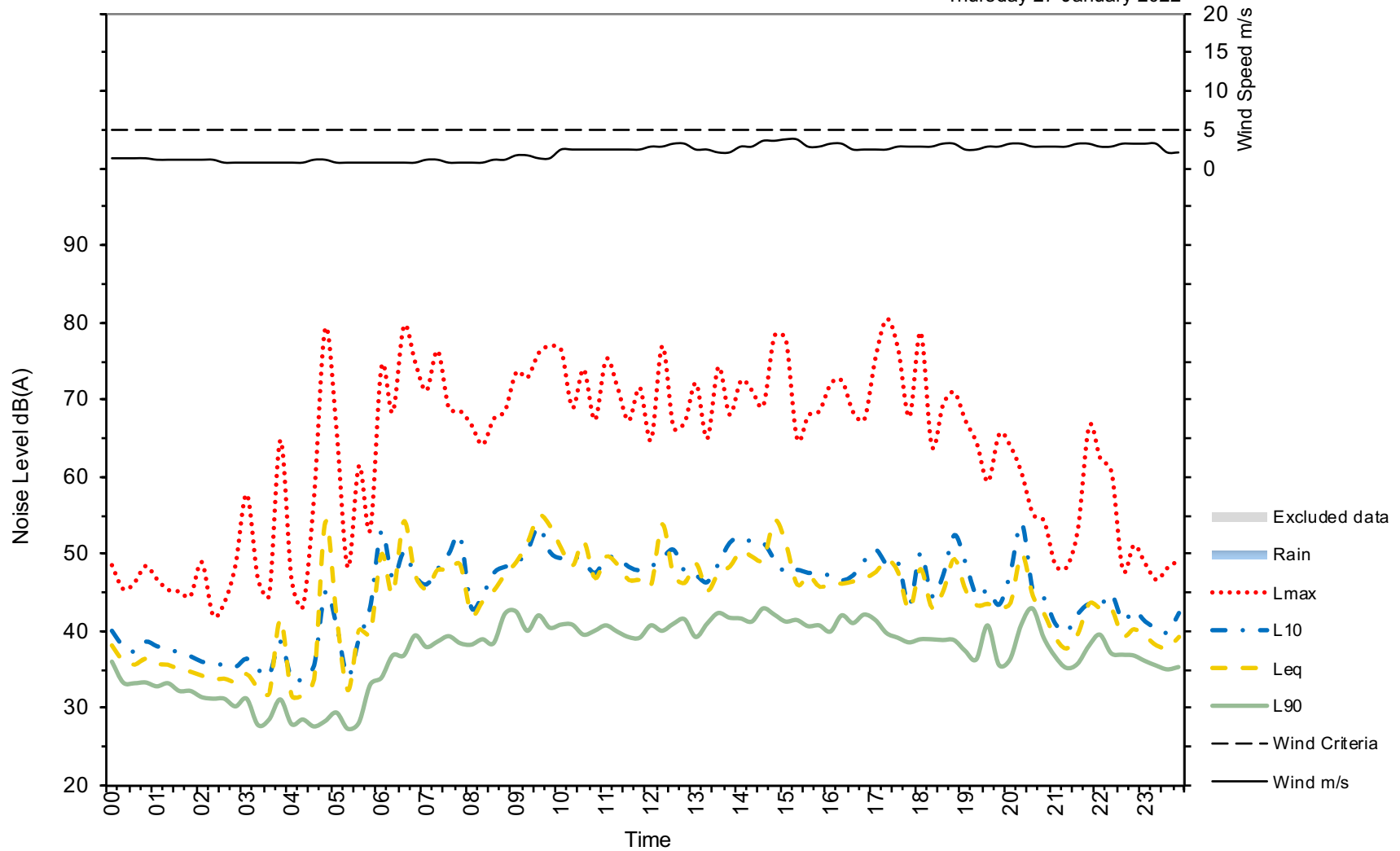
Glenaeon Retirement Village Pumping Station

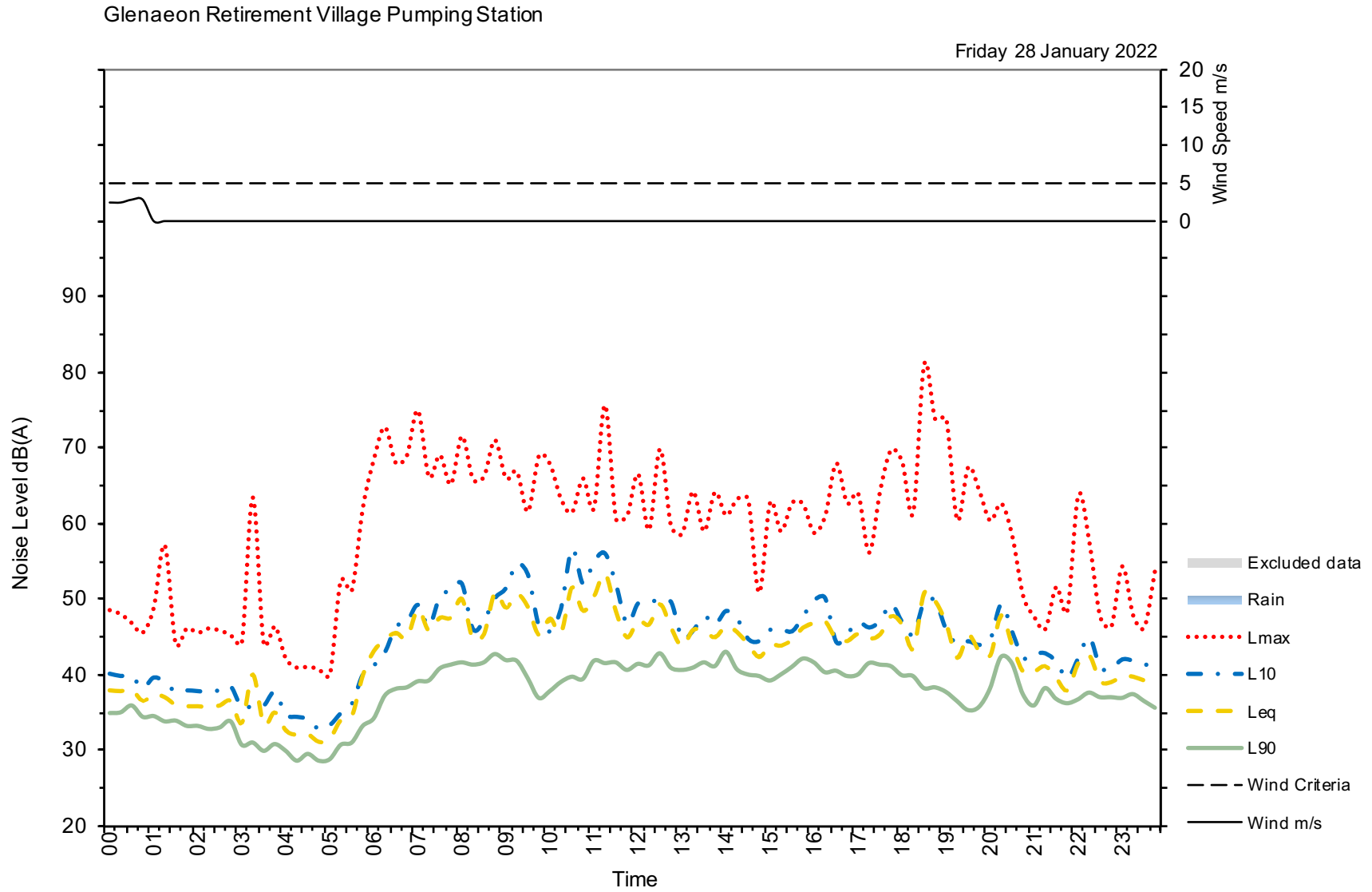
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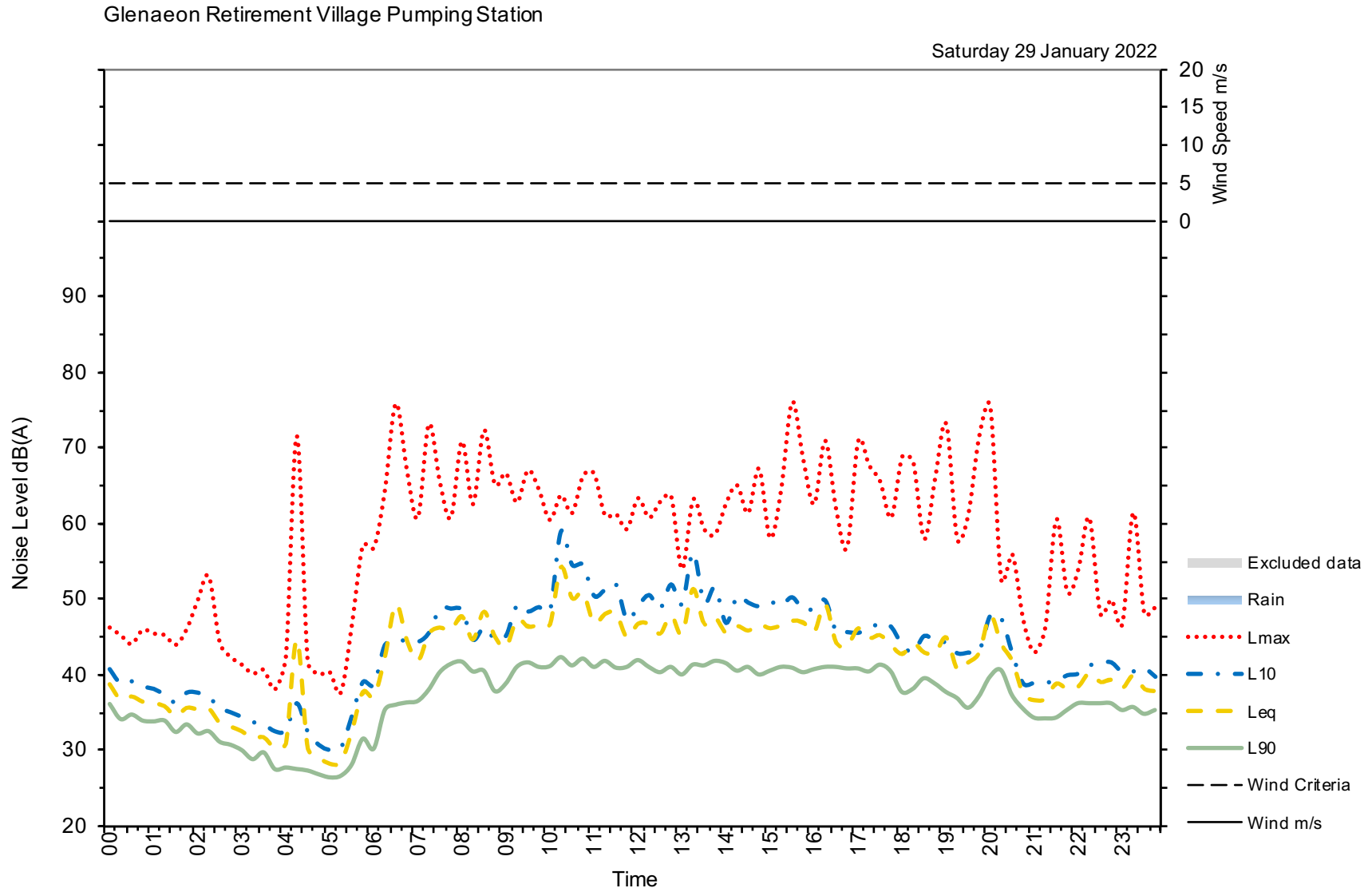


Glenaeon Retirement Village Pumping Station

Thursday 27 January 2022

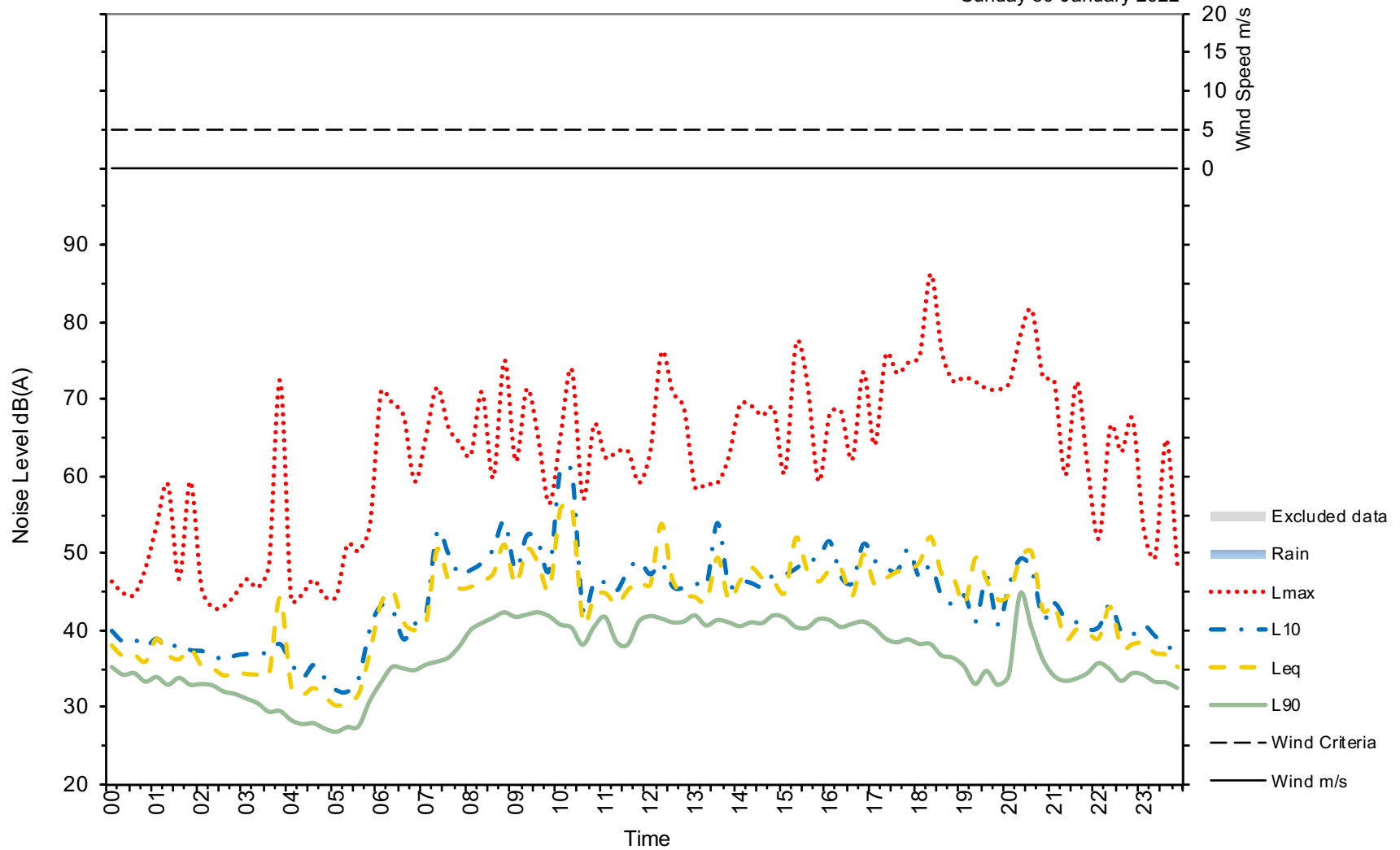


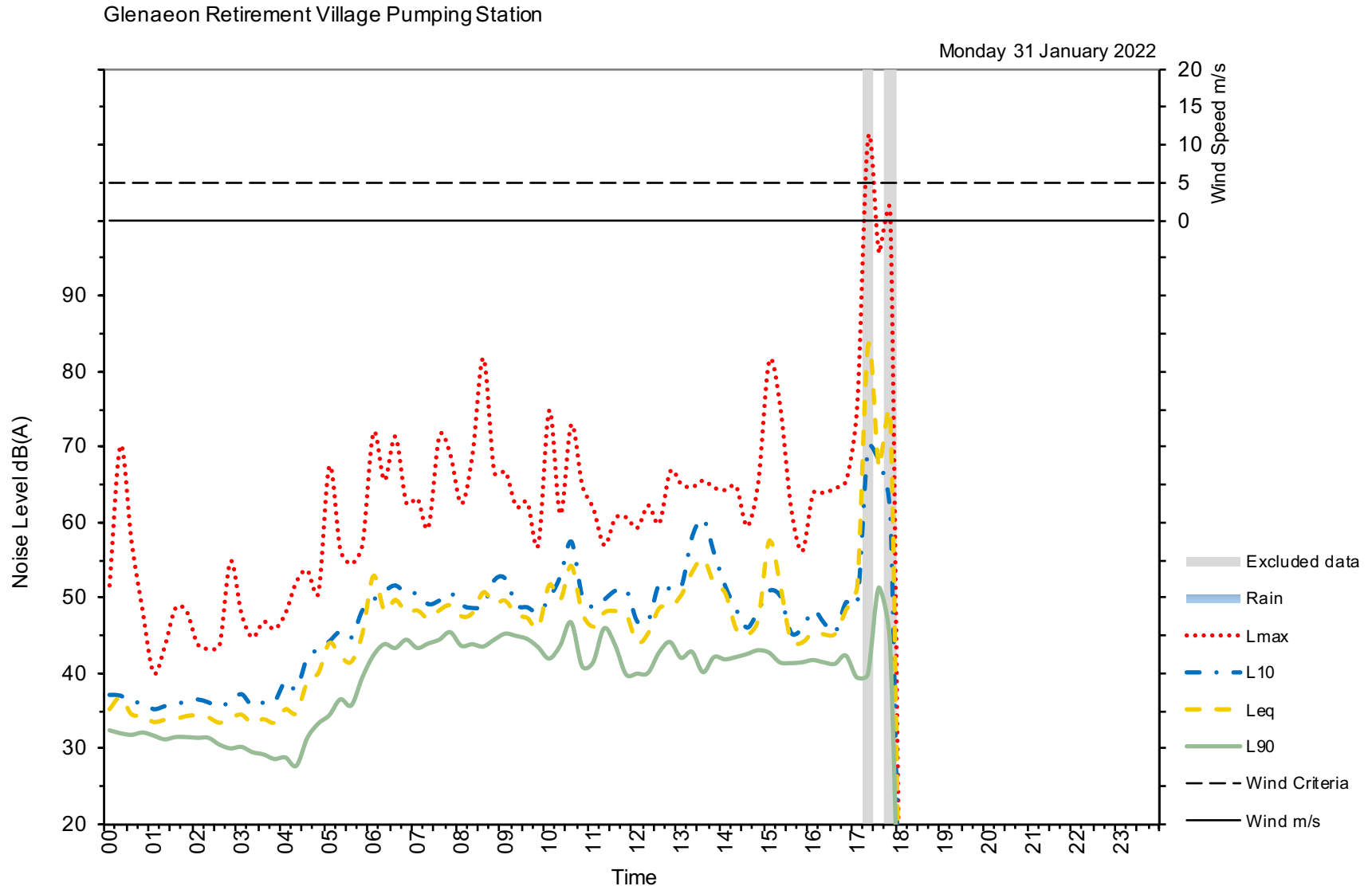




Glenaeon Retirement Village Pumping Station

Sunday 30 January 2022





## Appendix B BCA / NCC Review





Certis (NSW) Pty Ltd

PO Box 1415 North Sydney NSW 2059

Ph: 1300 702 085

ABN: 14 128 682 557

22-Mar-2022

NSW 7587 Glenaeon Retirement Living - SPS Upgrade

## **General Assessment – NCC Compliance**

Dear Hayden Waeger,

On your instruction, we have assessed the proposal to the SPS Sewerage Plant located at, 207 Forest Way, BELROSE 2085

The focus of this report will be on the requirements of the National Construction Code (2019 Vol 1 Amdt. 1) and associated Standards as relevant to the proposal.

Development of this nature will be subject to Statutory Authority requirements – specifically, Sydney Water development controls and regulations, Local Government (Northern Beaches Council) Development Control Plans predicated on the established Local Environmental Plans and the relevant Electricity Authority.

The NCC (2019 Vol 1 Amdt 1) will hereafter be referred to as the “BCA” (Building Code of Australia)

## **Executive Summary**

Certis have not been commissioned to analyse and pass comment on compliance with any statutory requirements other than the NCC (2019 Vol 1 Amdt 1). The design, construction, and commissioning of the SPS infrastructure must be in accordance with other statutory requirements not listed in this report.

The proposal involves the construction of a pump/pump house structure and associated pipework and other infrastructure to facilitate the processing and pumping of effluent and sewerage.

**The structure has a BCA classification of 10A and after completion of the assessment, we can confirm that the structure is deemed generally able to comply with the relevant parts of the BCA.**

NOTE: Despite being classified as a 10A structure, the structure is associated with a development ancillary to an aged care and retirement facility. Therefore, the assessment has considered both volume 1 and volume 2 of the NCC (2019 Vol 1 Amdt 1).

The relevant clauses have been assessed and summarised in the below appended table.

NCC Part / Clause	Assessment	Comment
GEN.1	<p>Approval Pathway – Assumed to be a Local Authority Consent application (DA). Conditions may be imposed for further design requirements and referral to the relevant statutory authorities for approval. The development is not deemed to be a Crown or State approval.</p> <p>NOTE – This is not a Town Planning assessment and the advice provided is predicated on previous discussions with SCP consulting. Certis understand that the approval pathway has been determined</p>	NOTE
GEN.2	<p>The stakeholders may consider the development standards contained within the relevant SEPP's – specifically the State Environmental Planning Policy (Transport and Infrastructure) 2021 for general guidance prior to any submission (As applicable to this development):</p> <ol style="list-style-type: none"> <li>1. Part 2.2 – Division 1 Consultation,</li> <li>2. Division 4 – Exempt Development (potentially to part of the development),</li> <li>3. Part 2.3, Div. 6 Emergency services facilities and bush fire hazard reduction,</li> <li>4. Part 2.3, Div. 12A Pipelines and pipeline corridors</li> <li>5. Part 2.3, Div. 17 Road and traffic,</li> <li>6. Part 2.1 Div.18 Sewerage Systems.</li> </ol> <p><a href="https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732">https://legislation.nsw.gov.au/view/html/inforce/current/epi-2021-0732</a></p>	<p>NOTE</p> <p>Refer Town Planning consultant</p>
GEN.3	<p>Environmental factors to consider:</p> <ol style="list-style-type: none"> <li>1. Environmental protection works,</li> <li>2. Bush fire affected land,</li> <li>3. Flood and flood mitigation,</li> <li>4. Tree and natural bushland removal and management,</li> <li>5. Riparian zones,</li> <li>6. Environmental protection zones</li> <li>7. Natural water courses</li> <li>8. Any other planning matters identified in the properties S10.7 Planning certificate</li> </ol>	<p>NOTE</p> <p>Refer Town Planning consultant</p>

GEN.4	Plans assessed:				NOTE
	AR	GLN-H-D-90001	HYDRAULIC SCHEMATIC	01	
	AR	GLN-H-D-90000	PERSPECTIVE VIEW	01	
	AR	GLN-H-D-70001	DETAILS 01	01	
	AR	GLN-H-D-50002	SECTIONS 02	01	
	AR	GLN-H-D-50001	SECTIONS 01	01	
	AR	GLN-H-D-20002	SPS PROPOSED PLAN	01	
	AR	GLN-H-D-20001	SPS DEMOLITION AND STAGING P...	01	
	AR	GLN-H-D-00002	DESIGN DATA AND PUMP CURVES	01	
	AR	GLN-H-D-00001	HYDRAULIC SERVICES LEGEND AN...	01	
	AR	GLN-H-D-00000	COVER SHEET AND DRAWING IND...	01	
	AR	GLN-E-D-90000	ELECTRICAL AND ICT SERVICES SC...	01	
	AR	GLN-E-D-20002	SPS ELECTRICAL PROPOSED PLAN	01	
	AR	GLN-E-D-20001	SPS ELECTRICAL DEMOLITION AN...	01	
A2.0 and A2.1	Compliance with the NCC and associated Performance requirements is achieved by:  1. Meeting the governing requirements of the code (Deemed to Satisfy provisions) or: 2. The adoption of a Performance Based Solution or: 3. A combination of (1) (2)				NOTE
A4	Referenced Documents: All applicable standards and as referenced by this version of the BCA are to be adopted into the design unless varied on instruction by the consulting engineer or designer.				NOTE
A6	The structure is classified as a Class 10 A structure: A non-habitable structure to facilitate localised sewerage processing and pumping operations.				NOTE
A6.11	Multiple Classifications: The SPS structure is considered ancillary and separate to the building/s that it serves and therefore there is no requirement to consider multiple building classifications in this assessment.				
BP1.1 (PR)	Structural Reliability – the structure must be designed by an appropriately qualified and registered Structural Engineer to:  1. perform adequately under all reasonably expected design actions; and 2. withstand extreme or frequently repeated design actions; and 3. be designed to sustain local damage, with the structural system remaining stable and not being; 4. damaged to an extent disproportionate to the original local damage.				ABLE TO COMPLY

BP1.2 (PR)	Structural Resistance: Specifically, site characteristics, types of materials used in design and foundations.	ABLE TO COMPLY
B1	Structural Provisions: <ul style="list-style-type: none"> <li>1. Resistance to actions,</li> <li>2. Determination of individual actions,</li> <li>3. Determination of structural resistance of materials and forms of construction,</li> </ul>	ABLE TO COMPLY – <i>Design certification required</i>
C1.1	Type of construction required - For purposes of fire resisting requirements of building elements:  This clause is not applicable to 10A structures	N/A
C1.8	Lightweight Construction:  This is not a BCA requirement for this classification of building however if the design requires fire separation - using lightweight construction materials - to a part for any specific purpose, then the requirements of Spec C1.8 are to be incorporated into that design. This may relate to a scenario where electrical or pumping equipment is required to be fire separated from other equipment or the structure itself.	NOTE
C2	Compartmentation and Separation: <ul style="list-style-type: none"> <li>1. Not applicable to class 10A structures,</li> <li>2. Despite this, the structure is separated from the buildings it serves by more than 6 m</li> </ul>	NOTE
C3	Protection of Openings: <ul style="list-style-type: none"> <li>1. Not applicable to class 10A structures,</li> <li>2. Despite this, the building is not exposed to another fire source feature that would require protection of openings under C3.4</li> </ul>	NOTE
DP2 (PR)	The structure is not required to comply with Part D of the BCA however the access and egress features of the building should be designed in accordance with the following Performance Requirements given that the building will be accessed by site and maintenance personnel:  DP2 - Safe movement to and within a building:  (a) walking surfaces with safe gradients; and (b) any doors installed to avoid the risk of occupants— (i) having their egress impeded; or (ii) being trapped in the building; and (c) any stairways and ramps with— (i) slip-resistant walking surfaces on— (A) ramps; and	ABLE TO COMPLY

	<p>(B) stairway treads or near the edge of the nosing; and</p> <p>(ii) suitable handrails where necessary to assist and provide stability to people using the stairway or ramp; and</p> <p>(iii) suitable landings to avoid undue fatigue; and</p> <p>(iv) landings where a door opens from or onto the stairway or ramp so that the door does not create an obstruction,</p> <p>(v) in the case of a stairway, suitable safe passage in relation to the nature, volume and frequency of likely usage.</p>	
DP3 (PR)	<p>DP3 - Fall Prevention Barriers:</p> <p>Applicable to falls that are:</p> <p>(a) 1 m or more—</p> <p>(i) from a floor or roof or through an opening (other than through an openable window) in the external wall of a building; or</p> <p>(ii) due to a sudden change of level within or associated with a building.</p> <p>(b) 2 m or more from a floor through an openable window—</p> <p>(i) in a bedroom in a Class 2 or 3 building or a Class 4 part of a building.</p> <p>(ii) in a Class 9b early childhood centre; or</p> <p>(c) 4 m or more from a floor through an openable window not covered by (b),</p> <p>A barrier must be provided which must be:</p> <p>(d) continuous and extend for the full extent of the hazard; and</p> <p>(e) of a height to protect people from accidentally falling from the floor or roof or through the opening or openable window.</p> <p>(f) constructed to prevent people from falling through the barrier; and</p> <p>(g) capable of restricting the passage of children; and</p> <p>(h) of strength and rigidity to withstand—</p> <p>(i) the foreseeable impact of people; and</p> <p>(ii) where appropriate, the static pressure of people pressing against it – design actions and outward forces to be considered</p>	ABLE TO COMPLY

DP4 (PR)	<p>DP4 Exits</p> <p>Note – Exits and points of egress noted as provided per drawings assessed.</p> <p>Exits must be provided from a building to allow occupants to evacuate safely, with their number, location and dimensions being appropriate to—</p> <ul style="list-style-type: none"> <li>(a) the travel distance; and</li> <li>(b) the number, mobility and other characteristics of occupants; and</li> <li>(c) the function or use of the building; and</li> <li>(d) the height of the building.</li> <li>(e) whether the exit is from above or below ground level.</li> </ul>	ABLE TO COMPLY
D2.16	<p>Barriers to Prevent Falls:</p> <p>Note – this structure is not governed by the BCA however the design should consider:</p> <ul style="list-style-type: none"> <li>a) Construction of continuous barriers where falls are greater than 1m from any part of the structure,</li> <li>b) Barrier heights at: <ul style="list-style-type: none"> <li>I. 1 m minimum height from FFL</li> <li>II. For stair construction, 865mm minimum height measured from the top of the stair nosing to the rail,</li> </ul> </li> <li>c) Barrier openings: A 300 mm sphere must not be able to pass through any opening; or where rails are used, (i) a 150 mm sphere must not be able to pass through the opening between the nosing line of the stair treads and the rail or between the rail and the floor of the landing, balcony or the like; and(ii)the opening between rails must not be more than 460 mm</li> </ul>	ABLE TO COMPLY
D2.13	<p>Goings and Risers (Stair Construction)</p> <p>Refer to clause D2.18</p> <p>All stair surfaces to meet slip resistance requirements.</p>	N/a NOTE

D2.18	<p>Fixed platforms, walkways, stairs and ladders:</p> <p>Note – this clause is applicable to the development</p> <p>A fixed platform, walkway, stairway, ladder and any going, and riser, landing, handrail or barrier attached thereto may</p> <p>comply with AS 1657 in lieu of D2.13, D2.14, D2.16 and D2.17 if it only serves:</p> <p>(a) machinery rooms, boiler houses, lift-machine rooms, plant-rooms, and the like (this development).</p> <p>(b) non-habitable rooms, such as attics, storerooms and the like that are not used on a frequent or daily basis in the internal parts of a sole-occupancy unit in a Class 2 building or Class 4 part of a building.</p>	ABLE TO COMPLY
D3	<p>Access for persons with a disability:</p> <p>a) This structure is not required to be accessible per D3.0, D3.1 and D3.2 of the BCA,</p> <p>b) A building of this nature and function, were it not separately classified (that is, were it incorporated into another building and was less than 10% of the gross floor area of that building) it would be deemed exempt from this clause under D3.4 based on its use and function.</p>	COMPLIES
E1.3	<p>Hydrant Coverage:</p> <p>This building does not require fire hydrant protection in accordance with the BCA based on it being &lt;500 square metres and based on its intended use.</p> <p>Hydrant coverage could be included as an optional design/safety inclusion. Any such construction of hydrant coverage must be in accordance with AS 2419.1</p>	COMPLIES/ NOTE
E1.4	<p>Hose Reels:</p> <p>This building does not require hose reel installations in accordance with the BCA based on it being &lt;500 square metres and based on its intended use.</p> <p>Hose reel coverage could be included as an optional design/safety inclusion. Any such construction of hydrant coverage must be in accordance with AS 2441</p>	COMPLIES/ NOTE

E1.5	<p>Fire suppression systems – Sprinklers</p> <p>Not a BCA requirement applicable to this structure.</p>	COMPLIES
E1.6	<p>Portable Fire Extinguishers</p> <p>Not a BCA requirement however may be a requirement specific to the use of this structure.</p> <p>PFE's must consider the installations within the structure (electrical) and if installed are to be of CO<sub>2</sub> and ABE types as appropriate to the parts of the structure served and fire risks addressed.</p>	DEEMED ABLE TO COMPLY
E2.2	<p>Smoke Hazard Management</p> <p>Not a BCA requirement for this structure. If required as a design/safety inclusion, then any detection and alarm system must be wired back to the main buildings FDCIE (BCA E2.2 and AS1670). Localised alarm systems may be a design/safety requirement for times that the building is under occupation in which case an AS3786 system may be installed as a <i>non-required system</i>.</p>	COMPLIES/ NOTE
E3	<p>Lift Installations</p> <p>Non shown on plans</p>	COMPLIES
E4	<p>Exit Signs and Emergency Lighting</p> <p>Not a BCA requirement however in the event of a power cut and or an emergency, Exit signs in accordance with AS1905 should be installed above egress points from the structure.</p> <p>It is assumed that the structure will have safety protocols and emergency plans in place (e.g.: torches and back up lamps) and therefore emergency lighting is not considered a viable requirement.</p> <p>Given the size of the structure and that the occupants are expected to be familiar with the structure, directional signage is considered superfluous to requirements.</p>	NOTE



Part F (General)	<p>There are no BCA requirements for this structure. The design should consider the following BCA requirements for the purposes of general safety, health and amenity and ongoing use of the structure:</p> <ul style="list-style-type: none"> <li>a) F1 – Damp and weatherproofing</li> <li>b) F3 – Heights within the useable spaces should be a minimum of 2100mm on a comparable basis to a corridor space within a commercial building,</li> <li>c) F4 – Light and ventilation. It is assumed that this is not a conditioned space and therefore natural ventilation must be supplied to the structure. In addition to any ventilation requirements specific to the use (combustion engines specifically – but not noted to plans), the design must consider Performance requirement FV4.1 - Maximum contaminant limits for acceptable indoor air quality and AS1668 in general.</li> <li>d) F6 – Condensation management – not a habitable structure but best practices for construction to be considered,</li> </ul>	<p>ABLE TO COMPLY</p> <p>Note: Further information must be supplied to the designer to ensure that the ventilation requirement for occupant safety meet and exceed PR FV4.1</p>
F2	<p>Sanitary Facilities</p> <p>No BCA requirement</p>	COMPLIES
G5	<p>Construction in bushfire areas:</p> <p>Not a BCA requirement however a Bushfire Attack Level (BAL) report should be commissioned to determine the extent of the BAL applicable to the land.</p> <p>The design should consider the BAL level (Kw/m<sup>2</sup> – 12/19/29/40/FZ) and the design must consider any design requirements contained within AS3959 as if the building was not a 10A structure</p>	NOTE

H3	<p>Farm Buildings and Farm Sheds</p> <p>This structure is not a farm building however the stakeholders and may wish to consider a comparative analysis to Part H3 of the BCA as it applies to farm buildings. This statement is based on the similarity of the subject structure to a farm building – i.e. remote to other buildings on the site which may require compliance with the BCA. Specifically:</p> <ul style="list-style-type: none"> <li>a) Application of part,</li> <li>b) Fire resistance and separation,</li> <li>c) Provision for escape – does the structure articulate to an access road? Is this a design requirement of a statutory authority,</li> <li>d) Construction of exits,</li> <li>e) Fixed platforms, stairs, ladders, and the like (see D2.18),</li> <li>f) Thresholds – n/a</li> <li>g) Swinging doors – non noted on plans,</li> <li>h) Firefighting equipment – see part E,</li> <li>i) Fire Hydrants and water supplies – see part E,</li> <li>j) Emergency warning systems (H2.14) – see part E,</li> <li>k) Controls – n/a (other than those relating to internally installed equipment and to manufacturers specifications),</li> <li>l) Artificial lighting – see part F</li> </ul>	NOTE
Part J	<p>Energy Efficiency</p> <ul style="list-style-type: none"> <li>a) Not applicable to class 10A structures,</li> <li>b) Not a conditioned space and therefore no additional design requirements</li> </ul>	