Port Macquarie Aquatic Facility

Environmental Noise Assessment

S200568RP4 Revision D

Friday, 6 September 2024

Document Information

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Client	CO.OP Studio
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Revision Table

Report revision	Date	Description	Author	Reviewer
0	28 September 2023	First issue	Sam Johnson	Cameron Heggie
A	20 October 2023	First revision	Sam Johnson	Cameron Heggie
B	1 December 2023	Second revision	Sam Johnson	Cameron Heggie
C	16 August 2024	Third revision	Sam Johnson	Raymond Sim
D	6 September 2024	Final revision	Sam Johnson	Raymond Sim

Glossary

A-weighting	A spectrum adaption that is applied to measured noise levels to approximate human hearing at lower noise levels. A-weighted levels are used as human hearing does not respond equally at all frequencies.
C-weighting	A spectrum adaption that is applied to measured noise levels to approximate human hearing at high noise levels. C-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 loudness.
dB(A)	'A' Weighted sound level in dB.
dB(C)	'C' Weighted sound level in dB.
dB(Lin)	Linear (un-weighted) sound level in dB. A measure of the absolute pressure fluctuation in the air.
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.
L_{eq}	Equivalent noise level—Energy averaged noise level over the measurement period.
$L_{eq, (15\ min)}$	A-weighted energy averaged noise level over a 15-minute period. Used in the EPA Interim Construction Noise Guideline (ICNG).
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 has been engaged by CO-OP Studio to undertake a noise impact assessment for the proposed Port Macquarie Aquatic Facility. This assessment report forms part of the Development Application (DA) documentation to be submitted to Port Macquarie-Hastings Council.

The principal purpose of this report is to:

- measure and document the ambient acoustic environment;
- determine appropriate project specific noise trigger levels and acoustic criteria for nearby noise sensitive receivers;
- predict operational noise emission from the development to nearby noise sensitive receivers; and
- assess the predicted operational noise emissions against industry standard noise criteria.

This report presents Resonate's methodology, assessment criteria and recommendations to control the operational noise from the redevelopment.

2 Project Description

The project involves the development and construction of Port Macquarie Aquatic Facility which will incorporate a 50 metre outdoor lap pool, 25 metre outdoor lap and program pool, a 24 hour gym and exercise facilities, an outdoor aqua play area including pools and water slides, external recreational spaces and café as well as dedicated pool plant and building services enclosures. The proposed general arrangement is presented in Figure 1.

Figure 1 Proposed site works

Residential receivers are located to the north of the site on Gordon Street with the potentially most affected being 43-53 Gordon Street, located approximately 40 metres north of the site boundary. A list of potentially affected receivers and their orientation relating to the development is presented in Table 1. The entire site in context and surrounding receivers are shown in Figure 2.

Table 1 List of nearby receivers

Receiver reference	Receiver address	Receiver usage
R1	43-53 Gordon Street	Residential
R2	42 Gordon Street	Commercial
R3	40 Gordon Street	Commercial
R4	Macquarie Park	Active Recreation
R5	17 Grey Street	Residential
R6	172 Lake Road	Residential

Figure 2 Site in context

3 Existing Acoustic Environment

In order to characterise the existing acoustical environment of the study area, unattended noise monitoring was conducted between the period of Wednesday 07 June to Wednesday 21 June 2023 on the project site as shown in Figure 2. The logger location was selected with consideration to other noise sources which may influence readings, security issues for noise monitoring equipment and gaining permission for access from landowners.

Instrumentation for the survey comprised of a Rion NL-42 Type 2 environmental noise loggers bearing the serial numbers 00946981, fitted with a microphone windshield. Calibration of the logger was checked prior to and following measurement. Drift in calibration did not exceed ±0.5 dB(A). All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

Measured data has been filtered to remove data measured during adverse weather conditions upon consultation with historical weather reports provided by the Bureau of Meteorology (BOM). The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1}, L_{A10}, L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary for definitions).

Table 2 below presents the Rating Background Level (RBL) and average total noise level for the surrounding environment. These noise levels were used to establish the relevant noise criteria in accordance with the NSW *Noise Policy for Industry* (NPI).

Table 2 Measured noise levels at background noise logging location

Logger location	Description	Noise level during period – dB(A)		
		Daytime 07:00 – 18:00	Evening 18:00 – 22:00	Night-time 22:00 – 07:00
Logger U1 – Northern boundary	Rating Background Level (L_{A90})	49	42	34
	Ambient Noise Level (L_{Aeq})	62	58	52

A detailed summary of the noise survey is provided in Appendix A and weekly noise logging graphs are presented in Appendix B.

4 Criteria

4.1 Noise Policy for Industry (NPI)

Noise emissions from the site when operational should comply with the requirements of the NSW *Noise Policy for Industry* (NPI).

The NPI sets two separate noise criteria to meet desirable environmental outcomes:

- Intrusiveness – steady-state noise from the site should be controlled to no more than 5 dB(A) above the background noise level in the area. In this case, the steady-state L_{eq} noise level should not exceed the background noise level measured for different time periods in the environment.
- Amenity – amenity criteria are set based on the land use of an area. It requires noise levels from new industrial noise sources to consider the existing industrial noise level such that the cumulative effect of multiple sources does not produce noise levels that would significantly exceed the amenity criteria.
- The most stringent of the intrusiveness and amenity is selected to be the limiting criterion for residential receivers.
- Non-residential receivers noise criteria are based on the amenity criteria established in Table 2.2 of the policy

Based upon an unattended noise survey summarised in Appendix A, the project specific operational noise criteria for nearby receivers are provided in Table 3.

Table 3 Operational noise emission criteria

Location	Noise emission criteria (dB L_{Aeq})		
	Daytime 07:00 – 18:00	Evening 18:00 – 22:00	Night-time 22:00 – 07:00
Nearby residential premises	53	43	38
Active recreation	55 dB(A) when in use		
Commercial receivers	65 dB(A) when in use		

Refer to Appendix A for further information on the derivation of the noise emission criteria.

4.1.1 Potential for sleep disturbance

In addition to the above, the NPI provides an assessment procedure for assessing the potential for sleep disturbances from maximum noise level events generated at the development during the night time period (i.e. between 10:00 pm and 7:00 am). The term “sleep disturbance” is considered to be both awakenings and disturbance to sleep stages.

As recommended in Section 2.5 of the NPI, to assess the potential for sleep disturbances two-stages are recommended to be carried out:

- Step 1 – Where the subject development/premises night-time noise levels at a residential location do not exceed the following then no mitigation is required to prevent sleep disturbances from the project:
  - $L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
  - L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater,

From the above the average/maximum noise trigger levels have been determined for the Project and are presented below in Table 4. If the noise trigger levels are exceeded, then ‘Step 2’ which involves a detailed maximum noise level event assessment would be required.

Table 4 Sleep disturbance noise trigger levels

Receiver	Rating background noise level (night), $L_{90, (period)}$ dB(A)(1)	Sleep disturbance noise trigger levels, dB(A)	
		$L_{eq\ 15\ minute}$	L_{Fmax}
Surrounding residences	38	43	53

- Step 2 – A detailed maximum noise level event assessment is to be undertaken when the average/maximum noise trigger levels are exceeded and should cover the maximum noise level, the extent the maximum noise levels exceed the RBL, and the number of occurrences during the night time period. As is recommended in the explanatory notes of the NPI, this more detailed sleep disturbance assessment is conducted using the current sleep disturbance research detailed in the EPA Road Noise Policy (RNP). The RNP sleep disturbance research concludes that:
  - Maximum internal noise levels below 50-55dB(A) are unlikely to awaken people from sleep

One to two noise events per night with maximum internal noise levels of 60-75dB(A) are not likely to affect health and wellbeing significantly.

4.2 Environmental Noise Control Manual (ENCM) – event operations

Sporting events are specifically excluded from the NPI. In the absence of current specific assessment criteria and methodologies for the assessment of noise from sporting events, reference is made to the superseded ENCM which includes guidance in relation the assessment of noise from sports events. .

The following guideline value is provided where the site is operational and does not represent a new noise source, as is the case with the Port Macquarie Aquatic Centre:

- $L_{A10(15\ minute)}$ less than or equal to RBL + 10 dB.
- Furthermore, the ENCM states that the noise levels should be considered guidelines and that variations can be made based on local conditions.
- Where offensive noise occurs athletic sporting events should be restricted to:
  - 7 am to 6 pm any weekday.
  - 8 am to 6 pm Saturdays and Sundays.
  - 6 pm to 10 pm two nights per week excluding Sundays or Public Holidays.
  - Where no offensive noise occurs, the above restrictions would not apply.
  - In the context of the sporting event assessment, offensive noise is considered to be noise levels resulting from the operation of the event that exceeds the guideline values provided below.

Guidance from the ENCM as detailed in Table 5 has been used as a screening approach to assess the potential impacts from the identified event scenarios. In line with operational noise control management of similar events at other facilities, it is recommended that a Noise Management Plan be developed and implemented where potential exceedance of the ENCM noise levels are predicted. The Noise Management Plan would seek to balance the level of noise with the frequency of occurrence of the event.

Table 5 ENCM sports event noise level guidance

Location	Period	Rating background level (RBL) L_{A90}	Event noise emission criteria $L_{A10(15minute)}$
43-53 Gordon Street	Daytime 07:00 – 18:00	49	59
	Evening 18:00 – 22:00	42	52
	Night-time 22:00 – 07:00	34	44

5 Discussion and Recommendations

5.1 External and roof mounted plant

Noise emissions from the external plant, shown in Figure 3 below, have the potential to impact residential and commercial receivers surrounding the site. An acoustic assessment of the preliminary mechanical services documentation was undertaken to determine a noise mitigation strategy. In order to meet the noise emission requirements, the following acoustic recommendations should be adopted:

- Where possible, quiet plant items should be selected. In order to achieve compliance with the NPI a combined sound power level (SWL) of 95 dB(A) should be targeted above the pool plant room. And a combined SWL of 85 dB(A) should be targeted in all other rooftop plant enclosures.
- A solid barrier or acoustic louvre should be surrounding the plant enclosures to break direct line of sight to any receiver.
- A barrier should be a minimum 12kg/m^2, lined with weatherproof acoustic absorptive panel with a minimum NRC 0.65 and should have no penetrations or gaps. Alternatively, if an acoustic louvre is preferred, Table 6 presents the minimum insertion loss performance of the louvre to achieve compliance. A suitable product would be the 100 mm Hudson Series 100 acoustic louvre.
- The height of the barrier should be reviewed once final plant selections have been made.

Table 6 Acoustic louvre Insertion loss requirements

Description	dB(A) reduction	Minimum installed insertion loss (dB)							
		Octave band centre frequency (Hz)							
		63	125	250	500	1000	2000	4000	8000
Minimum insertion loss requirements	12	3	4	5	8	12	12	12	8

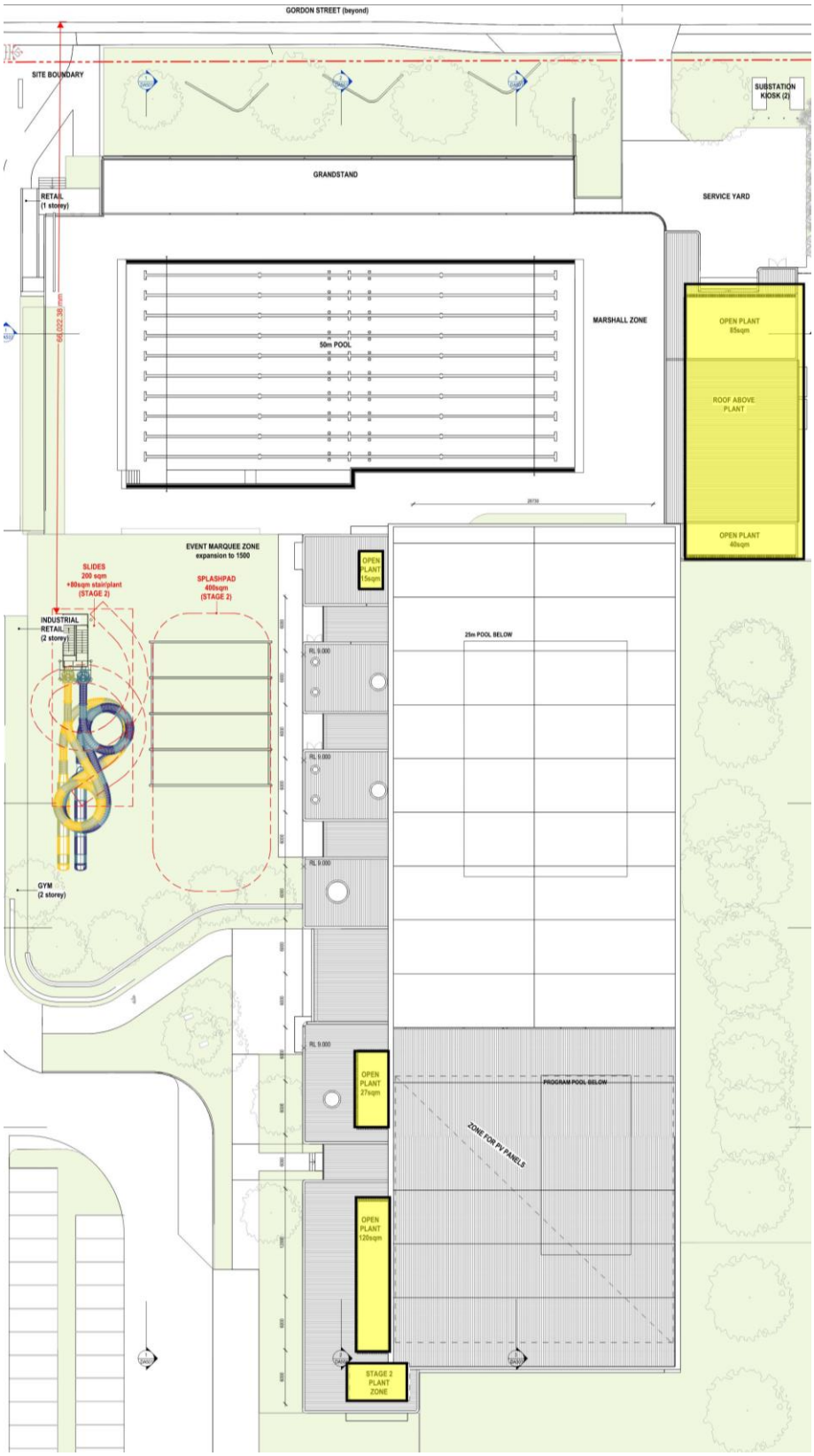


Figure 3 Proposed rooftop plant locations

5.2 Plant room

Some key noise generating plant associated with the development is to be housed in an enclosed plant room adjacent to the 50 metre pool. Initial equipment selections have been provided by the mechanical engineers in order to estimate sound power levels. The following noise mitigation measures are recommended in order to achieve acoustic compliance:

- The aquatic plant room should be entirely enclosed.
- The wall and roof build-up should comprise an acoustic performance of R_W 55.
  - Walls: 9mm Fibre Cement / 92 mm stud tracks with 64 mm staggered studs / 27kg/m^3 insulation / 13 mm sound rated plasterboard.
  - Roof: 0.6 mm steel sheet with thermal insulation on top of purlins / 24kg/m^3 insulation / 16 mm sound rated plasterboard.
  - Door to be minimum R_w 32 and oriented away from highly utilised areas on site.
  - Any ventilation penetrations to incorporate acoustic louvres or silencers to suit the open area requirements to be specified by the mechanical engineer with noise reductions selected based on final penetration dimensions as part of the detailed design. The penetrations should be oriented away from highly utilised areas on site.
  - All gaps must be acoustically sealed including at partition and roof junctions.

When pumps have poor vibration isolation it can lead to high structure-borne noise levels being transferred efficiently throughout the building, which can cause disruption and annoyance of users of affected spaces, sometimes at large distances from the plant rooms. It is therefore imperative to ensure that all pumps are correctly vibration isolated, which typically means spring isolators and flexible connections to all pipework and elements of the building structure.

5.3 Water slides and aqua play

A total cumulative sound power level of 95 dB(A) has been assumed for the water slide and aqua play areas incorporating a maximum 50 participants at any time. Water park source noise levels were determined from operator attended noise measurements conducted at similar facilities on previous occasions. It has been assumed that the operation of the aqua play areas included the following items which aligns with the operational description of the proposed development:

- Children calling out,
- Children laughing,
- The occasional scream,
- Water splashes due to water falling on the ground (continuous), and
- Large volumes of water dumping on the ground (intermittent).

The assumed number of patrons is considered a reasonable estimate for a noise assessment purpose as a worst case scenario.

5.4 24 hour gym and fitness centre

The gym and fitness facilities are being proposed to operate 24 hours. It is reasonable to assume an Leq (15 minute) internal noise level 75 dB(A) which would include background music, the use of machines, and
It is recommended operational noise mitigation solutions are employed: These should include but not be limited to:
Discussions with members about entering and leaving the premises during the night time period.
The use of signage to remind people to consider the nearby residents.
Limiting background music to a level of 65 dB(A) during the night time period
Limiting the use of amplified speech to the day and evening periods only
Keeping the entrance door closed during operation.

6 Acoustic Assessment

6.1 Operational noise impact

Operational noise emissions from the development have been predicted to the potentially most affected receivers identified in Table 1. Operational noise emissions were predicted using Resonate's proprietary acoustic calculation software Sound.Sufer, which implements acoustic principles and formulas. The results of the predictions are presented in Table 7 below.

The prediction includes the following assumptions:

- The assumptions and recommendations discussed in Section 5 above are adopted into the design.
- Sound power to sound pressure level to the distances determined by the source location of each noise generating plant or activity on the site to each noise sensitive receiver.
- It is understood that the Port Macquarie Aquatic Facility Centre will operate during the nighttime period between 5am and 7am. Typical lap swimming (diving, splashing and swimming) has been included in the acoustic assessment during the nighttime period however noisy activities such as the operation of the water slides and the splashpad, which includes elevated patron noise levels, had not been included in the assessment during the nighttime period. Operational noise management controls such as not operating the waterslides and splash pads, should be implemented in the operational noise management plan to control excessive noise exceedances during this period.
- Water slides and splash pads will not be operational during the nighttime period. Pool pumps and building services have been assumed to be operational at all times.
- The carpark is in use 24 hours for the facility. It has been assumed that 6 car movements will happen in a 15-minute period during the daytime and evening period, and 3 car movements will happen in a 15 minute period during the night-time period.
- The PA system (music and amplified speech) for the external pool should have a noise limiter which limits music and amplified speech at the grandstand and periphery of the external pool to 78 dB(A) during the daytime period only. Directing the PA speakers away from the receivers would reduce direct source noise levels. By having a higher number of smaller localised speakers, noise levels can be controlled to reduce noise emissions to nearby receivers.
- The PA system (music and amplified speech) for the external pool should not be used during the evening and night-time period.

Table 7 Calculated operational noise levels at nearby residential receivers

Receiver location	Period	Noise criteria – dB(A)	Predicted noise level $L_{eq(15\ minute)}$ – dB(A)	Compliance
R1 - 43-53 Gordon Street	Daytime 7am – 6pm	53	47	✓
	Evening 6pm – 10pm	43	44(1)	✓
	Night-time 10pm – 7am	38	36(2)	✓
R2 - 42 Gordon Street	When in use	65	65	✓
R3 - 40 Gordon Street	When in use	65	49	✓
R4 - Macquarie Park	When in use	55	48	✓

Receiver location	Period	Noise criteria – dB(A)	Predicted noise level $L_{eq(15\ minute)}$ – dB(A)	Compliance
R5 - 17 Grey Street	Daytime 7am – 6pm	53	39	✓
	Evening 6pm – 10pm	43	38	✓
	Night-time 10pm – 7am	38	30	✓
R6 - 172 Lake Road	Daytime 7am – 6pm	53	44	✓
	Evening 6pm – 10pm	43	43	✓
	Night-time 10pm – 7am	38	32	✓

(1) A 1 dB exceedance of the criteria is expected at 28 Lower Fort Street. A 1-2 dB difference in noise levels is generally imperceptible by the human ear in the environment. Therefore, this can be considered as a marginal compliance in accordance with the Noise Policy for Industry.

(2) It is assumed that the waterslides and aqua play are not operational between 10pm and 7am.

6.2 Sleep disturbance impact

The potential for sleep disturbances during the night period (i.e. between 10:00 pm and 7:00 am) from the operational noise level events generated at the development have been assessed in this section. The maximum noise level events from the proposed development are due to the use of the carpark (i.e. car door closing and car engine starting). In accordance with the NPI the relevant predicted noise levels have been first assessed against the average/maximum noise trigger levels to determine whether a detailed maximum noise level event assessment would be required, the results are presented in Table 8.

Table 8 Sleep disturbance noise trigger levels

Receiver	Predicted operational noise level, dB(A)(1) $L_{eq,\ 15\ minute}$ / L_{Fmax}	Sleep disturbance noise trigger levels, dB(A) $L_{eq,\ 15\ minute}$ / L_{Fmax}	Above screening level (Yes/No) $L_{eq,\ 15\ minute}$ / L_{Fmax}
R1 - 43-53 Gordon Street	36 / 39	43 / 53	No / No
R5 - 17 Grey Street	30 / 41	43 / 53	No / No
R6 - 172 Lake Road	32 / 50	43 / 53	No / No

(1) Predicted noise levels have been rounded off to the nearest 1 dB(A)

The operational noise levels are expected to be controlled by an expected 3 car movements in a 15 minute period (engine start, drive and door slams) as well as operational noise levels from the building services. The maximum noise levels result from a car engine starting, and a car door being closed loudly. As shown above in Table 8 the predicted operational noise levels are not expected to trigger levels for sleep disturbance at surrounding residential receivers.

Furthermore, operational noise controls for the gym have been recommended in Section 0 to reduce impacts from these noise sources impacting surrounding residence.

6.3 Sporting events noise impact

It is understood that sporting events will take place at the facility with an expected maximum patronage of approximately 365 school aged children during carnivals. The results of the predictions are presented in Table 9 below.

The prediction includes the following assumptions:

- A total of 365 children in attendance all situated on or around the grandstand seating.
- An average $L_{A10(15\text{-minute})}$ sound power level per person of 77 dB(A) has been used. This factors the rise and fall of spectator noise levels over a typical 15-minute period. This acknowledges that there will be a continuous level of underlying spectator noise with short-term increases in noise due to spectator cheering and that not all people would be vocal at the same time.
- Sound power to sound pressure level to the distances determined by the source location on the site to each noise sensitive receiver.
- It is understood that the Port Macquarie Aquatic Facility Centre will not operate during the nighttime. Sporting activities have not been considered during this period.

Table 9 Calculated event noise levels at nearby residential receivers

Receiver location	Period	Noise criteria – dB(A)	Predicted noise level $L_{eq(15\ minute)}$ – dB(A)	Compliance
R1 - 43-53 Gordon Street	Daytime 7am – 6pm	59	62	X
	Evening 6pm – 10pm	52	62	X
	Night-time 10pm – 7am	-	-	-
R5 - 17 Grey Street	Daytime 7am – 6pm	59	38	✓
	Evening 6pm – 10pm	52	38	✓
	Night-time 10pm – 7am	-	-	-
R6 - 172 Lake Road	Daytime 7am – 6pm	59	39	✓
	Evening 6pm – 10pm	52	39	✓
	Night-time 10pm – 7am	-	-	-

6.3.1 Discussion and operational management systems

Table 9 indicates that noise levels may exceed the ENCM noise criteria at residents on Gordon Street. The prediction is based on a typical worst-case scenario. While it does not necessarily mean that events should not proceed, it highlights the need to implement noise management measures to minimise potential impacts where reasonable and feasible to do so. These events are to be subject to the Plan of Management as developed in consultation with and approved by the Port Macquarie Hastings Council. Noise management measures may include the following which could be incorporated into the overall plan of management for the site:

- Reduce the number of expected higher noise events. Limit these events to daytime periods only.
- Providing marshalling to usher visitors onto the site encouraging quiet arrival and departure noting the proximity of the adjacent residential area.
- Provide forewarning of large events to the surrounding residential receivers to help manage expectations and provide sufficient time to allow alternate planning.
- Ensuring supervision of children who have raised voices facing towards the residential receivers and not seated in the grandstand.
- Ensuring noise levels from a portable amplified PA system are kept to a reasonable level and are facing away from residential receivers.

If the above is implemented, compliance with the ENCM is expected to be achieved during the daytime period.

7 Conclusion

A noise impact assessment of operational noise from the proposed Port Macquarie Aquatic Facility Development has been conducted. Project specific noise criteria have been established in accordance with the NSW EPA's *Noise Policy for Industry* guidelines based on unattended and attended noise monitoring conducted for this project.

Operational noise emissions from the proposed redevelopment were predicted at potentially affected noise sensitive receivers. The predicted operational noise levels have been assessed to comply with the noise criteria during the day, evening and nighttime periods provided that the recommendations presented in Section 5 are implemented into the design.

Appendix A – Noise Survey

Unattended noise logging

An unattended noise survey was conducted during the period of Wednesday 07 June to Wednesday 21 June 2023. The unattended measurement location is presented above in Figure 3.

Equipment and set-up

A Rion NL-42 sound level meter was used bearing the serial number 00946981. Field calibration was conducted at the commencement and conclusion of the logging period and no significant calibration drift was observed.

The noise logger was configured to record all relevant noise indices, including background noise level (L_{A90}) and equivalent continuous noise levels (L_{Aeq}). Samples were accumulated at 15-minute intervals. The time response of the logger was set to 'fast'.

The noise measurements were taken in general accordance with AS1055.1[1]

Weather conditions

In order to provide an indication that noise data was obtained during suitable meteorological conditions, half-hourly weather data was obtained from the Bureau of Meteorology (BOM) Automatic Weather Station (AWS) 066194 at Canterbury Racecourse.

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 the noise logger. Wind data obtained from the BOM is presented as the value at 10 m above ground and adjusted to the measurement height of the noise logger.

Noise Policy for Industry

In order to determine mechanical services noise emission criteria, data from the unattended noise monitoring outlined in above was processed according to the procedures and time periods in the NSW Noise Policy for Industry (NPI) time periods as follows:

- Daytime: 7 am to 6 pm
- Evening: 6 pm to 10 pm
- Night-time: 10 pm to 7 am

It is necessary to establish a representative noise level for each of these time periods. The procedure set out in the NSW NPI has been used to derive a representative background noise level (Rating Background Level or RBL) for the daytime, evening and night-time periods. An RBL is the median of the lowest 10th percentile of the background L_{A90} samples for each daytime, evening and night-time measurement period.

Noise levels during the defined times are presented in Table 10.

[1] Australian Standard AS1055.1 1997: Description and measurement of environmental noise – Part 1: General Procedures

Table 10 Measured noise levels at background noise logging locations

Logger	Description	Noise Level during Period – dB(A)		
		Daytime 07:00 – 18:00	Evening 18:00 – 22:00	Night-time 22:00 – 07:00
Logger 1	Rating background level (L_{A90})	49	42	34
	Ambient noise level (L_{Aeq})	62	58	52

Derivation of noise emission criteria

Both intrusiveness and amenity criteria are derived from the ambient noise survey and the NPI. They are then compared with each other and the lowest and most stringent noise level is adopted to represent the project specific noise criterion for the relevant time period, day, evening and night time.

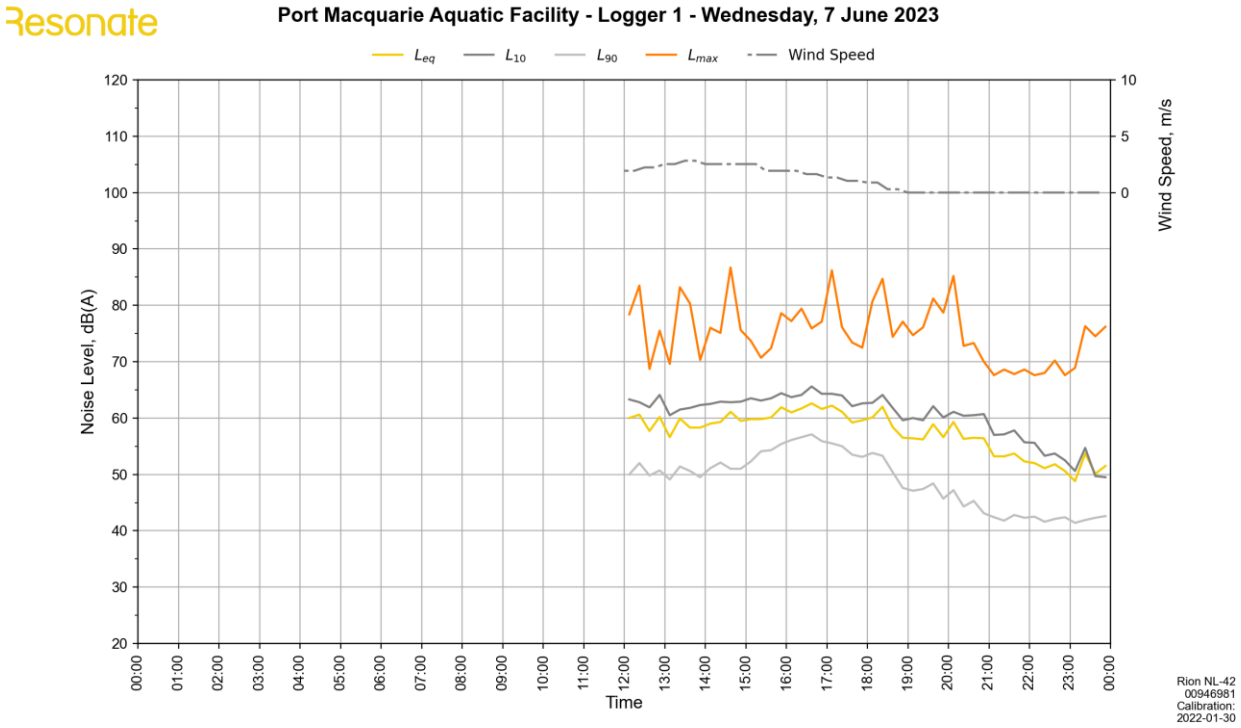
Table 11 NPI noise emission criteria

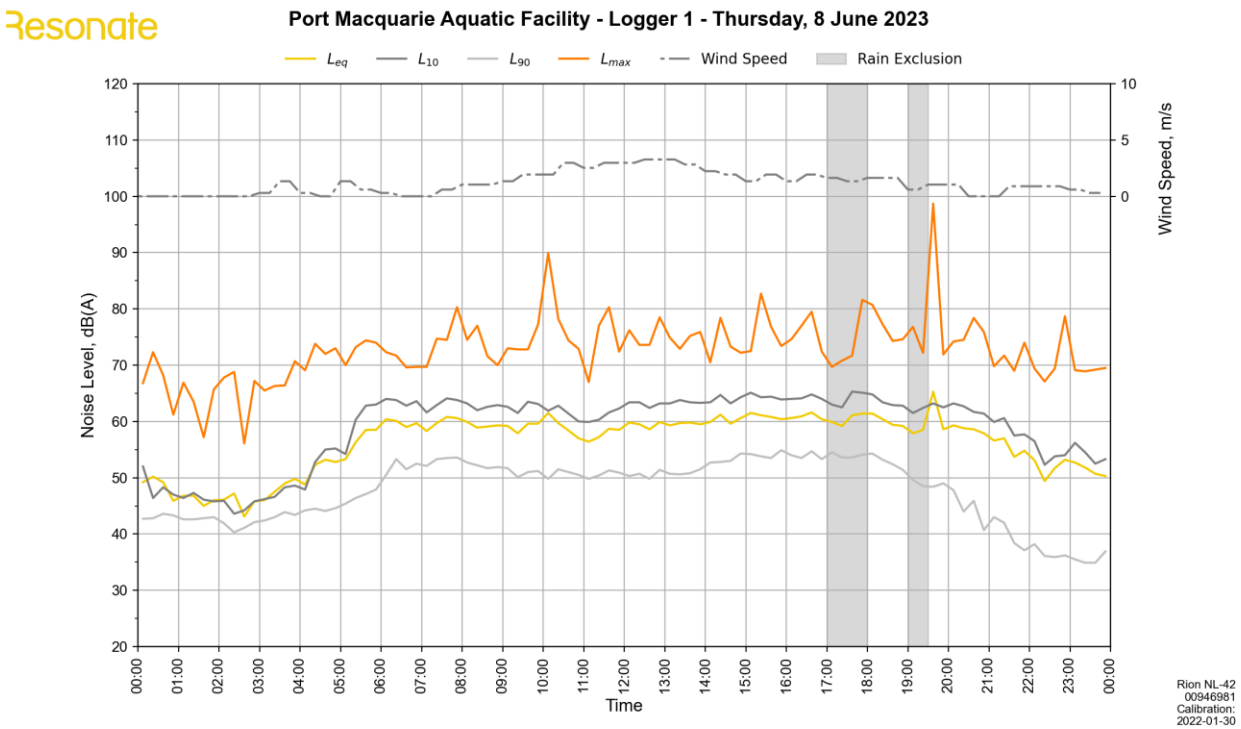
Location	NPI Noise Level (dB re 20 µPa) during period		
Residential receivers	**Daytime 07:00 – 18:00**	**Evening 18:00 – 22:00**	**Night-time 22:00 – 07:00**
Rating background level (RBL)	49	42	34
Intrusive criterion (RBL + 5 dB)	54	47	39
NPI amenity Level (suburban[1])	55	45	40
Amenity criterion (NPI amenity level – 5 dB + 3 dB)	53	43	38
NPI Project specific criteria for residential land uses[2]	**53**	**43**	**38**

(1) A suburban classification has been adopted for the site.

(2) The project-specific criteria are the lowest of the Intrusive criterion and the Amenity criterion for new sources for each time period.

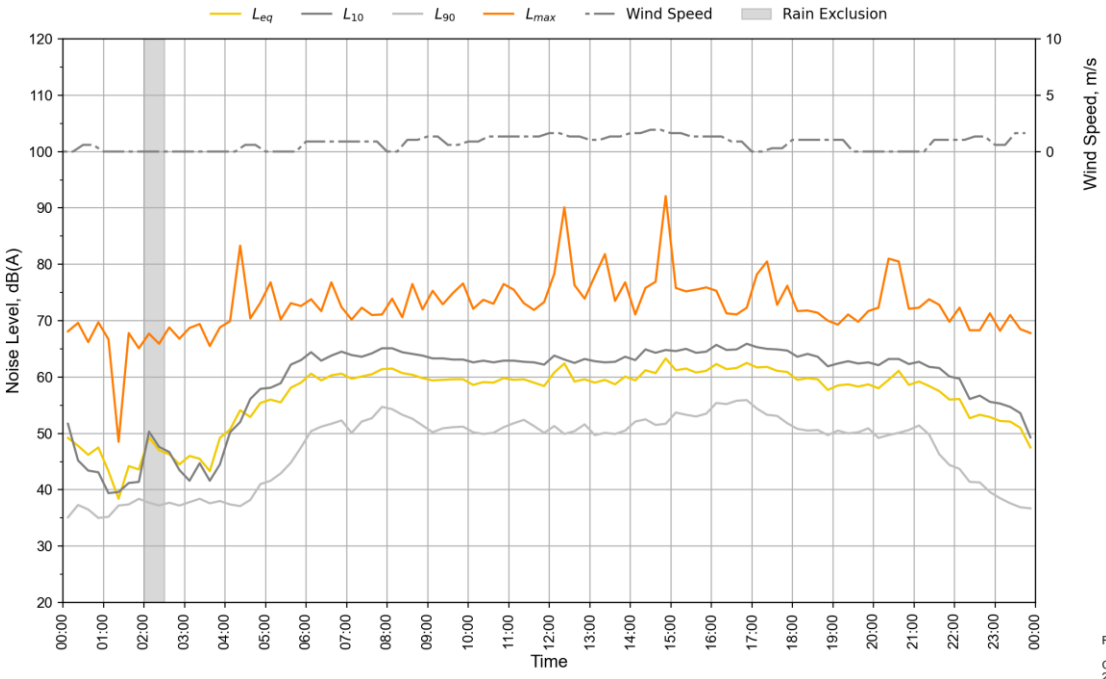
Appendix B – Weekly Noise Graphs





Resonate

Port Macquarie Aquatic Facility - Logger 1 - Friday, 9 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

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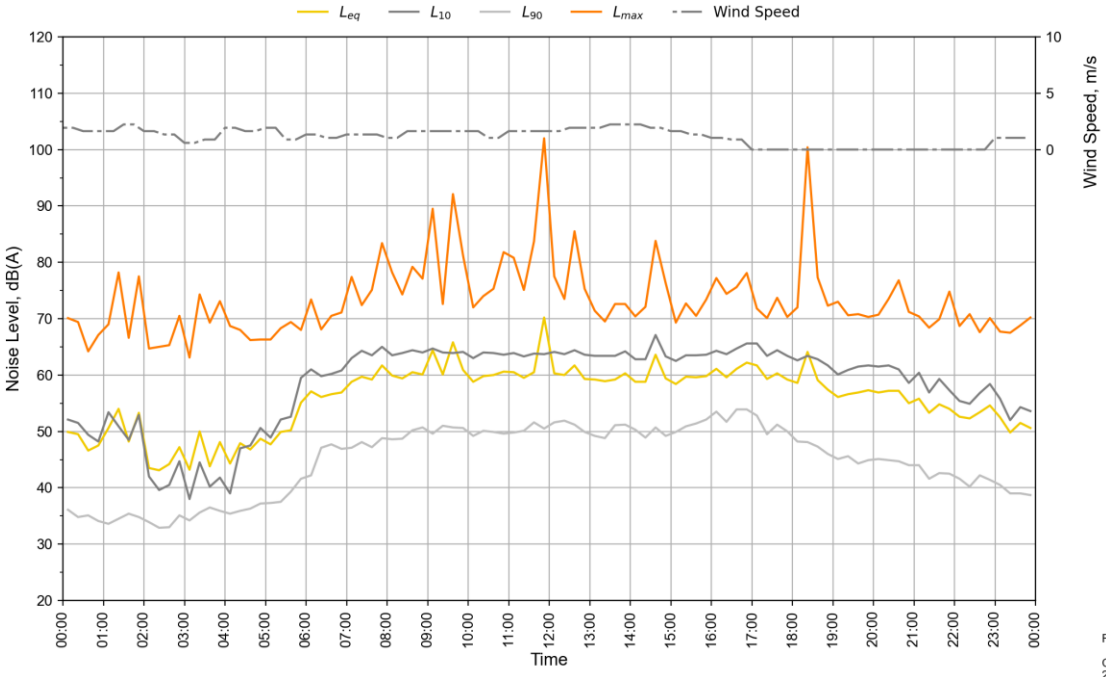

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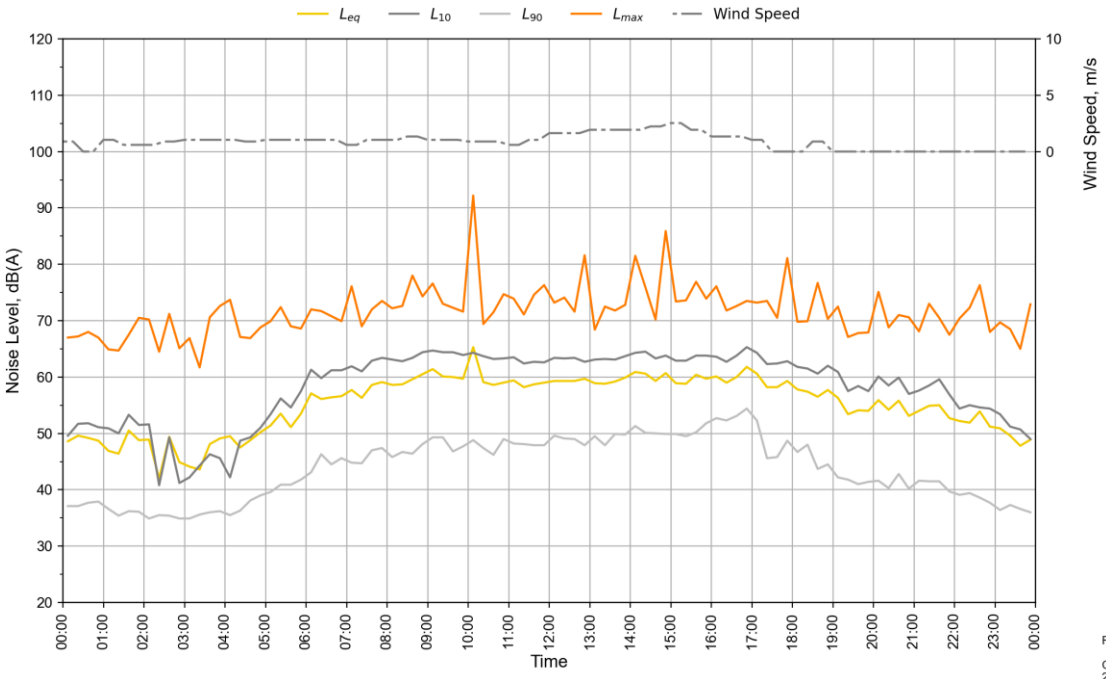

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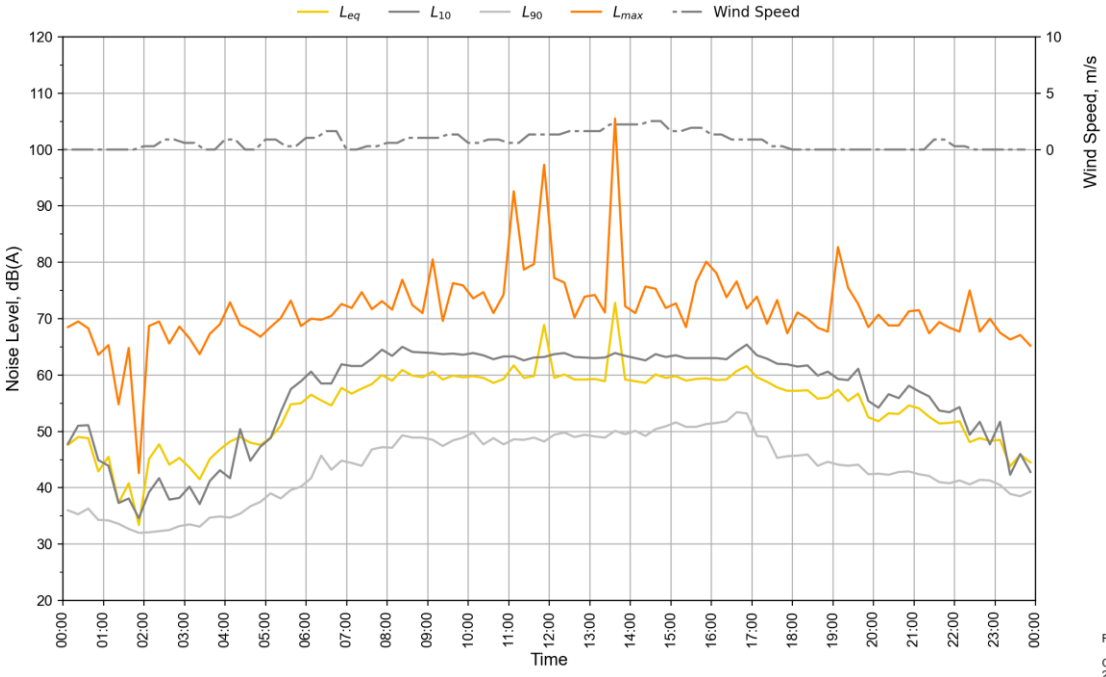
Port Macquarie Aquatic Facility - Logger 1 - Monday, 12 June 2023



Rion NL-42
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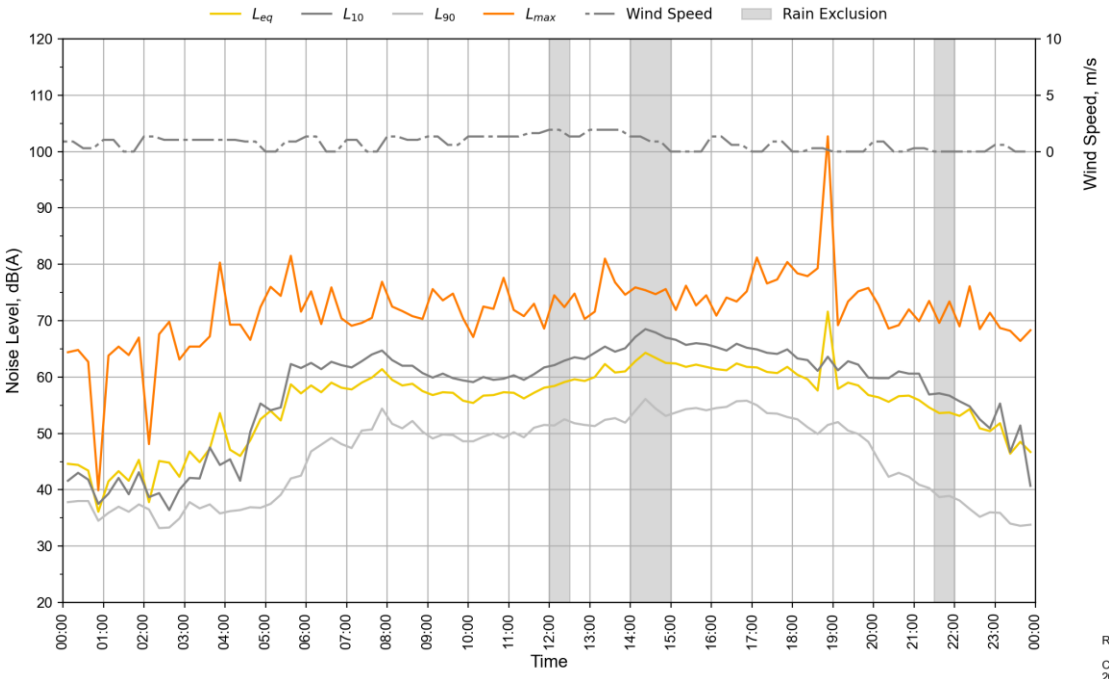
Calibration:
2022-01-30

Resonate

Resonate

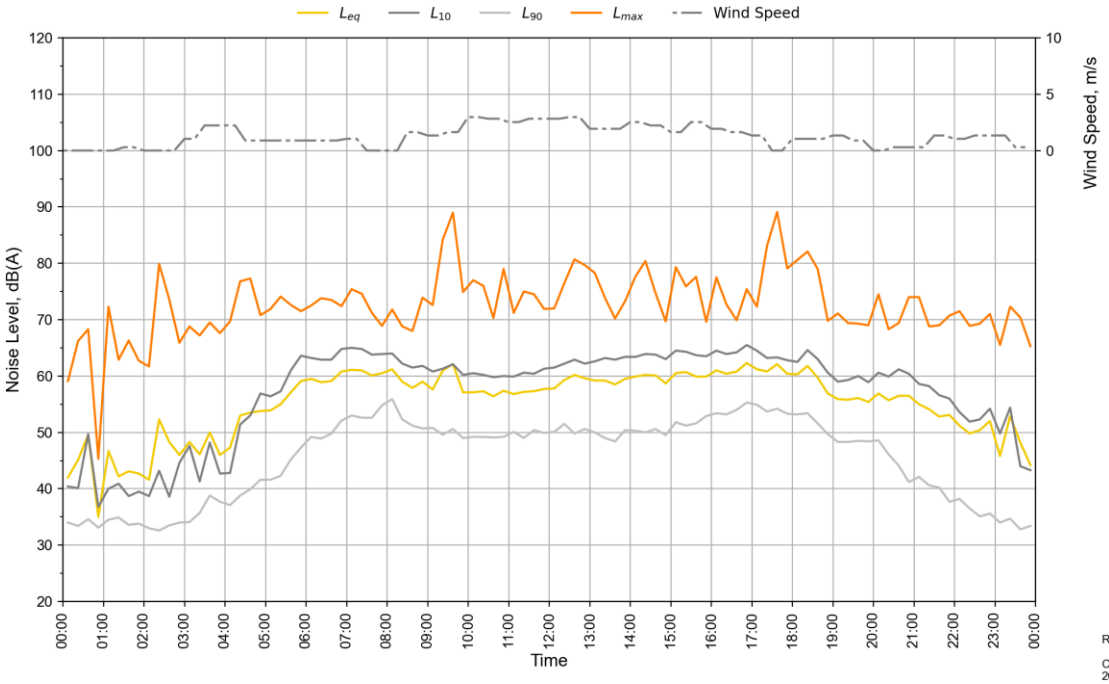
Port Macquarie Aquatic Facility - Logger 1 - Tuesday, 13 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

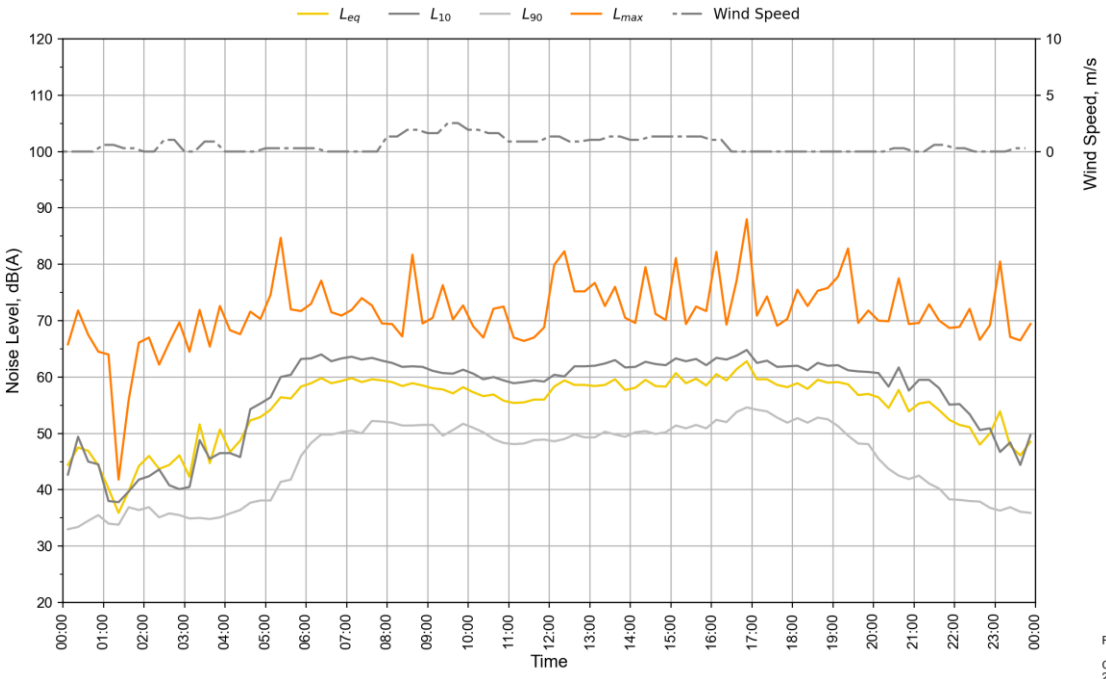
Port Macquarie Aquatic Facility - Logger 1 - Wednesday, 14 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

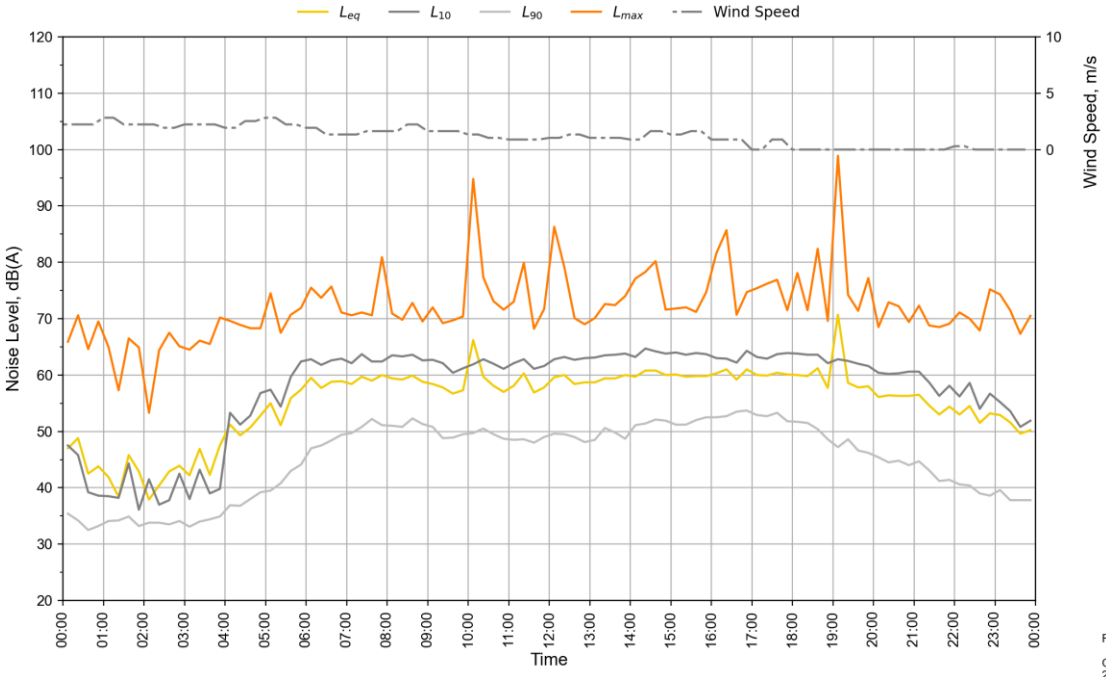
Port Macquarie Aquatic Facility - Logger 1 - Thursday, 15 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

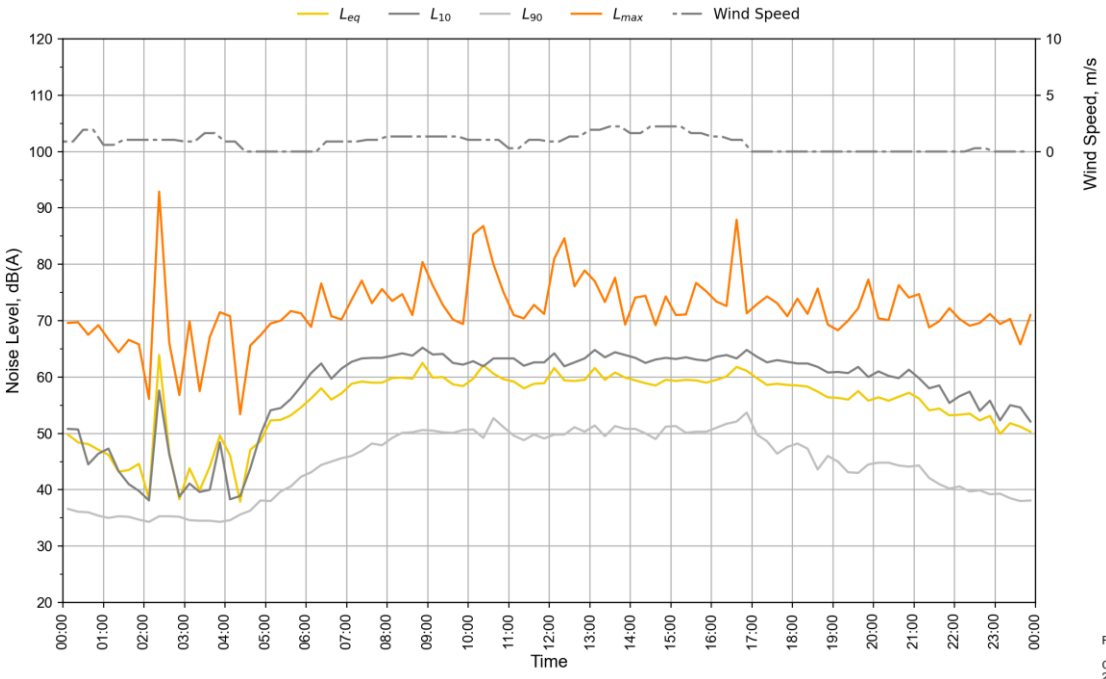
Port Macquarie Aquatic Facility - Logger 1 - Friday, 16 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

Port Macquarie Aquatic Facility - Logger 1 - Saturday, 17 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30

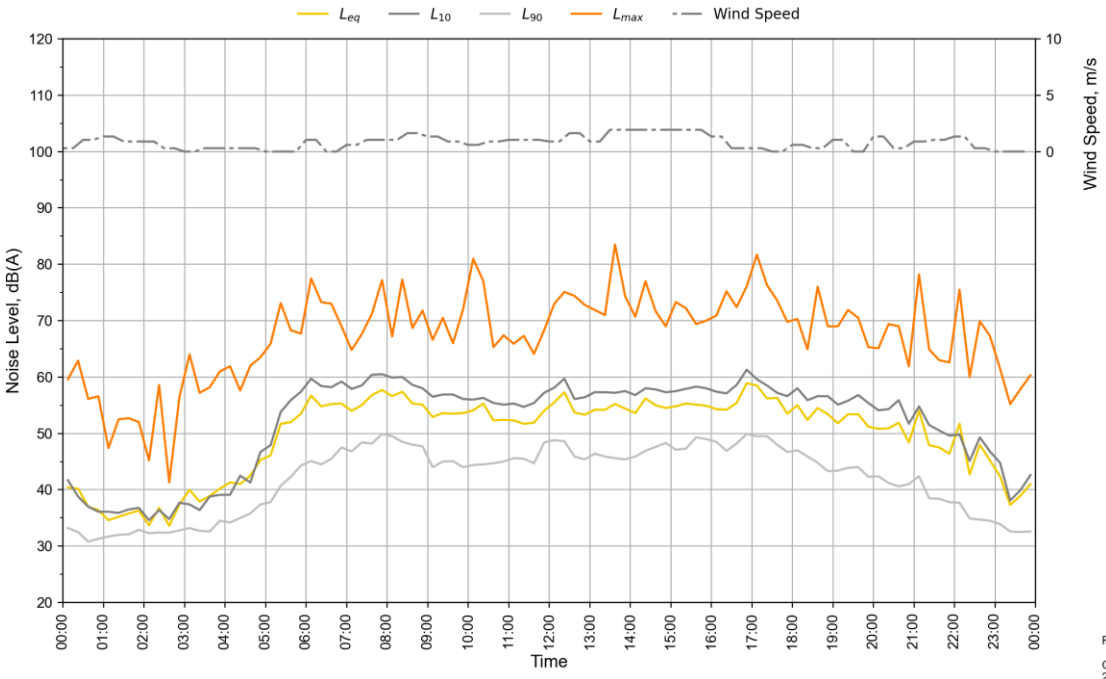
Resonate

Port Macquarie Aquatic Facility - Logger 1 - Sunday, 18 June 2023

Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

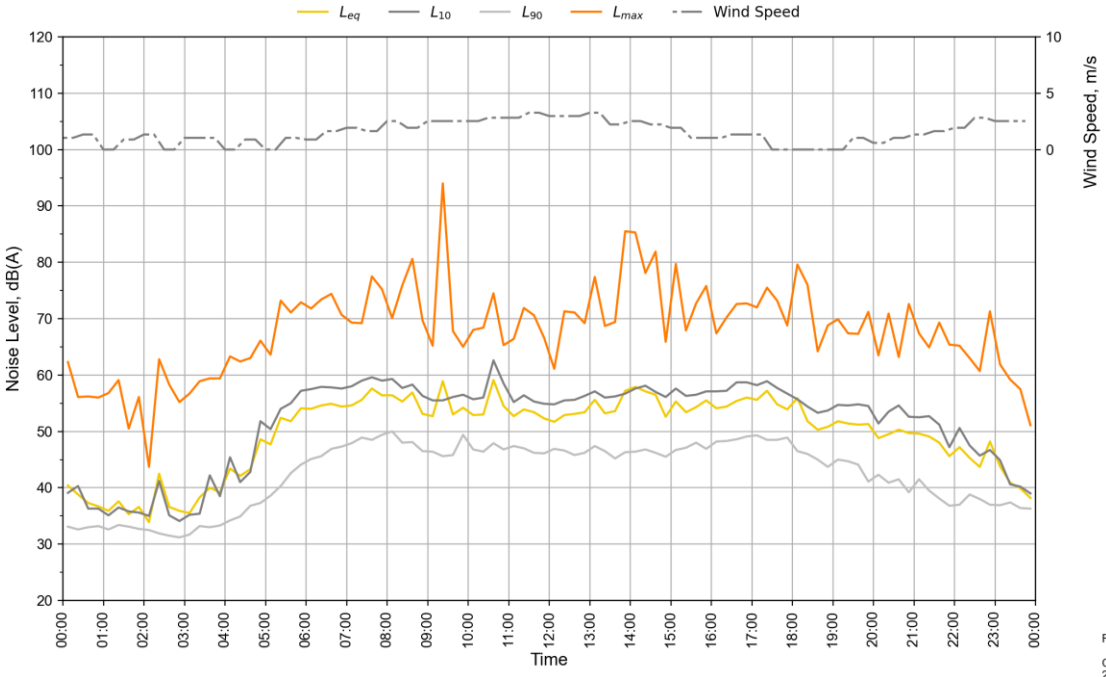
Port Macquarie Aquatic Facility - Logger 1 - Monday, 19 June 2023



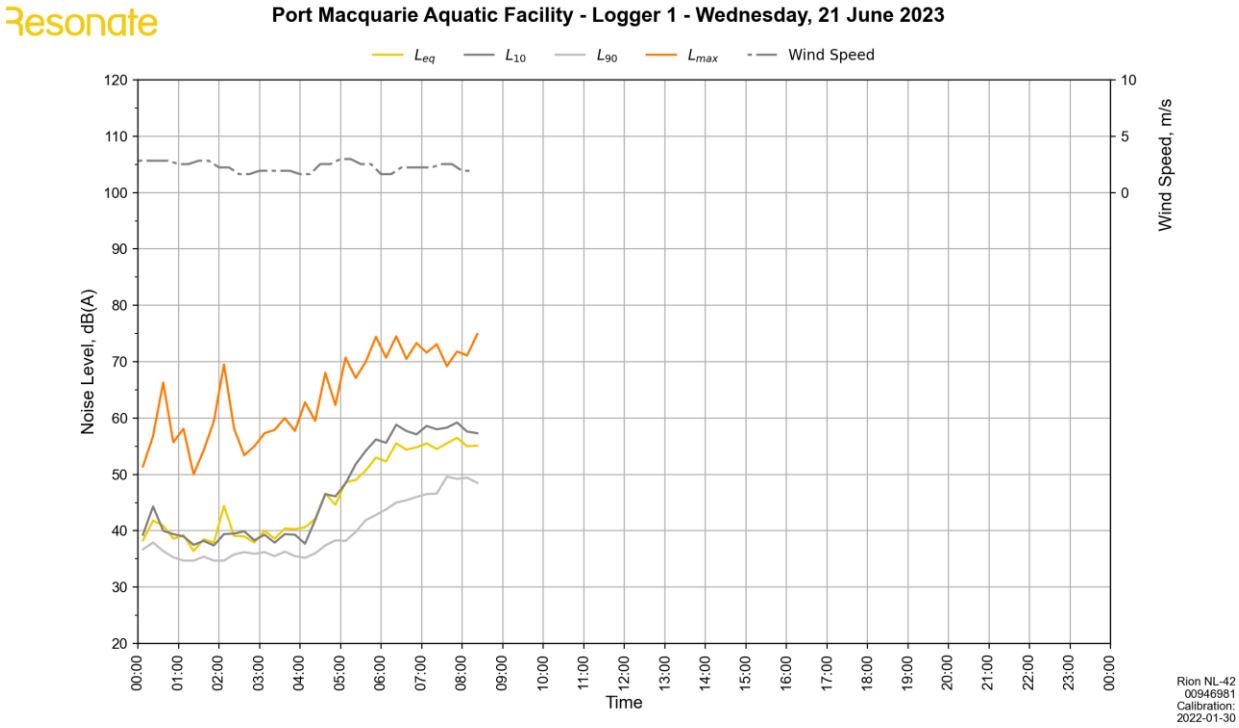
Rion NL-42
00946981
Calibration:
2022-01-30

Resonate

Port Macquarie Aquatic Facility - Logger 1 - Tuesday, 20 June 2023



Rion NL-42
00946981
Calibration:
2022-01-30


Resonate
Port Macquarie Aquatic Facility - Logger 1 - Wednesday, 21 June 2023
L_{eq}
L_{10}
L_{90}
L_{max}
Wind Speed
Noise Level, dB(A)
Wind Speed, m/s
Time
Rion NL-42
00946981
Calibration:
2022-01-30