

PENRITH RESOURCE RECOVERY FACILITY

29-37 PLASSER CRES, NORTH ST MARYS

NOISE AND VIBRATION IMPACT ASSESSMENT

RWDI # 2405613

25 NOVEMBER 2024

SUBMITTED TO

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GLOSSARY OF ACOUSTIC TERMS

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph below, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

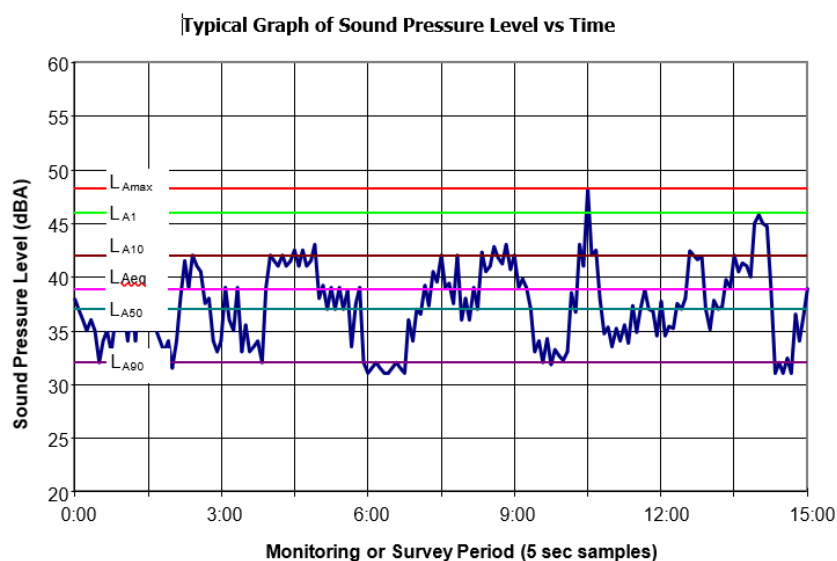




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INTRODUCTION

1

RWDI Australia Pty Ltd (RWDI) was engaged by Nassif Civil Pty Ltd c/- Jackson Environment and Planning Pty Ltd to conduct a noise and vibration impact assessment for the demolition and construction works, and operational noise emissions associated with the proposed construction and demolition (C&D) Resource Recovery facility located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353).

This noise and vibration assessment is required as part of the Environment Impact Statement (EIS) and Development Application (DA).

This assessment has been prepared in accordance with the NSW EPA's Noise Policy for Industry and other relevant guidelines and standards.

This assessment addresses the noise and vibration key issues in SEARs 1694 shown in **Table 1-1**.

Table 1-1: SEARs 1694 Noise and Vibration Requirements

SEARs 1694 Requirement	Addressed in the report
A description of all potential noise and vibration sources during construction and operation, including road traffic noise generated from additional truck movement.	Operational - Section 5.3 (Noise) - Section 10 (Road Traffic) Construction - Section 7.2 (Noise) - Section 9 (Vibration)
A noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines	Operational - Section 5 (Noise) - Section 10 (Road Traffic) Construction - Section 7.2 (Noise) - Section 9 (Vibration)
A description and appraisal of noise and vibration mitigation and monitoring measures.	Operational - Section 5.7 (Noise) Construction - Section 7.5 (Noise) - Section 9.1 (Vibration)



1.1 Objectives

The objectives to facilitate this noise and vibration assessment are as follows:

- Identify neighbouring land use, sensitive receivers, and terrain.
- Establish existing acoustic environment by conducting ambient and background noise level measurements (a minimum of 7-day unattended noise monitoring at two locations with satisfactory weather conditions).
- Establish project-specific acoustic criteria in accordance with relevant NSW guidelines, policies and Standards.
- Assess potential operational noise impacts from the development.
- Assess potential construction noise and vibration impacts.
- Conduct traffic noise assessment.
- Provide in-principal recommendations on construction and operational noise & vibration impacts, if required.

1.2 Referenced Documentation

Relevant documentation referenced in this report are:

- Scoping Report and SEARs Application for a C&D Recycling Facility completed by Jackson Environment and Planning Pty Ltd, dated 2022 (**Scoping Report**);
- NSW Noise Policy for Industry (**NPfI 2017**);
- EPA's Interim Construction Noise Guideline (**ICNG 2009**);
- Transport for NSW's Construction Noise and Vibration Strategy (**CNVS**); and
- NSW Road Noise Policy (**RNP, 2011**).

PROJECT DESCRIPTION

2.1 Project Location

The proposed development is located at 29-37 Plasser Crescent, North St Marys (Lots 15 & 16 DP 263353) shown in **Figure 2-1**, and is within the E4 General Industrial zoned area of St Marys within the Penrith City Council LGA. The site is easily accessible from Kurrajong Road to the north and Glossop Street to the west.

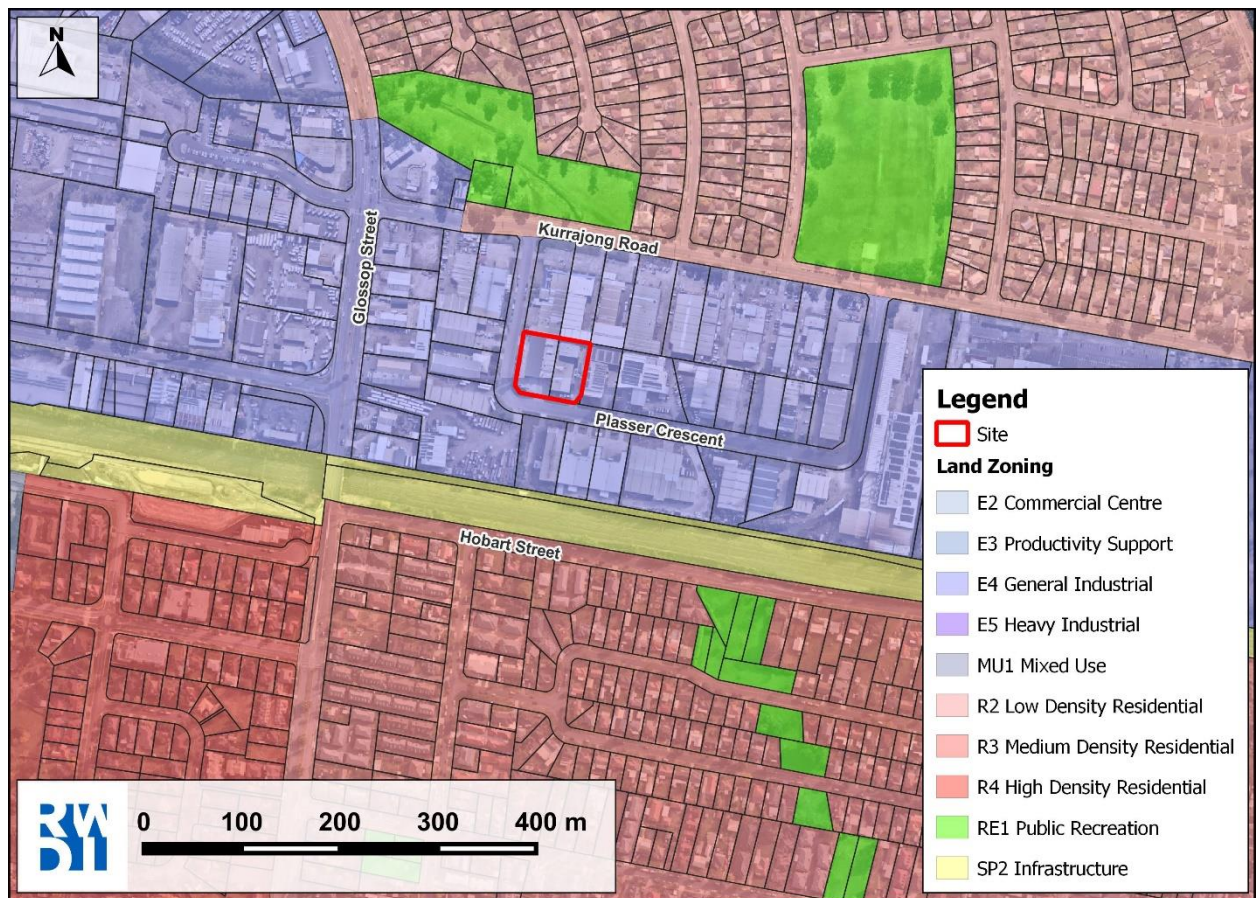


Figure 2-1: Site Location and Surrounding Land Zoning



2.2 Proposed Development

Proposed Infrastructure

To ensure that the development complies with contemporary standards for waste and transfer stations, a number of site upgrades are proposed as part of the development application. These include:

- 2.2.1**
- Partial demolition of the existing structure on Lot 15, DP263353
 - Construction of a new shed on Lot
 - Installation of an additional 20 m pit style weighbridge inside the site entrance of Lot 15
 - Installation of processing equipment, including
 - A vibratory finger screen
 - Two elevated manual picking stations
 - Density separator
 - Magnetic separator
 - Timber shredder
 - Installation of conveyor belts to transfer materials between sorting equipment and storage bays
 - Conveyor belts will traverse both indoors and outdoors, and where outdoors, conveyors will be enclosed to avoid dust generation and reduce noise levels.
 - Separate waste storage bays to separate and store waste prior to being loaded onto trucks for off-site recycling and reuse
 - Upgrades to the site office, lunchroom, and amenities for staff, truck drivers and visitors
 - Improvements to landscaping provided to the site

The proposed operational hours of the site are 6am to 11pm Monday to Friday, and 7am to 3pm Saturday. Skip bin deliveries will be scheduled throughout the day between 6am and 11pm (Monday to Friday), and 7am and 2pm on Saturdays.

The existing and proposed site layout are presented in **Figure 2-2** and **Figure 2-3**.

A 3-D view of the development is presented in **Figure 2-4**.

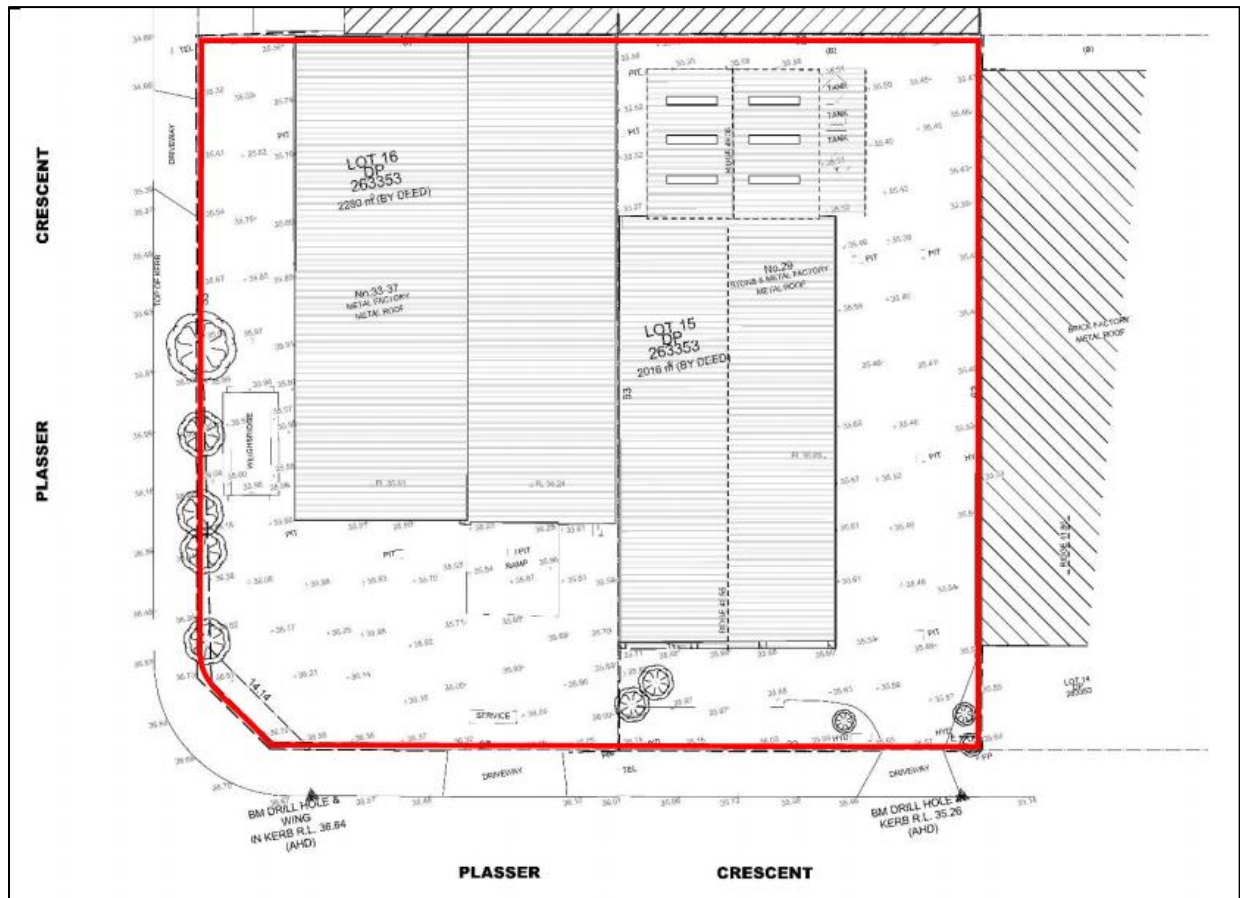


Figure 2-2: Existing Site Layout



Figure 2-4: Proposed Development 3-D View

Proposed Operational Activity

2.2.2.1 Waste Deliveries

Waste deliveries will occur via skip bins delivered on 12.5 m rigid trucks or hook lift trucks. Skip bin sizes will vary between 2 m³ and 12 m³ and hook lift bins between 15 m³ and 30 m³.

2.2.2

Vehicles will access the Site via Plasser Crescent on the western side of the existing building on Lot 16 DP263353. All trucks accessing the site do so via the traffic signal-controlled intersection of Glossop Street and Kurrajong Road. Therefore, vehicles will enter Plasser Crescent from the western intersection of Plasser Crescent and Kurrajong Road.

Vehicles will pass over the weighbridge for inspection of non-compliant waste and for assessing the net weight of materials before reversing into the warehouse via the western roller door for tipping of waste.

2.2.2.2 Waste Tipping, Spreading and Inspection

Once inside the warehouse, vehicles will be directed to the dedicated “tip and spread area” and inspected for non-compliant waste. Rejected waste will be re-loaded for off-site transport and disposal at an appropriate licensed facility.

Upon tipping of waste (or in the case of rejected load – after being re-loaded), vehicles will exit the warehouse and exit the site in a forward direction using the western driveway on the south side of the of the existing building on Lot 16 DP263353. Vehicles exiting the Site will turn right on to Plasser Crescent.

Accepted waste will be stored in the mixed waste storage bay. This bay is used for the temporary storage of waste materials requiring further sorting and to ensure the “tip and spread area” remains clear for the next waste deliveries. An excavator will load waste into a feed hopper before entering a vibratory finger screen.

The vibratory finger screen will separate the 2-dimensional wastes (flat waste) from the 3-dimensional wastes (bulky waste). Separated 2D waste will then be conveyed to a picking station elevated above designated storage bays.

3D waste from the finger screen will be conveyed to a density separator. The 3D conveyor will traverse from the existing building on Lot 16 DP263353 to the new shed on Lot 15 DP263353. The conveyor will be enclosed where it traverses externally between the buildings to mitigate noise and dust issues. The 3D waste will then be sorted by an elevated density separator with storage bays beneath. The elevated density separator will size separate materials and deposit in the corresponding storage bays.

Oversized materials (>50mm) which will predominantly include timber, masonry (concrete, brick and tile) and metals will then be conveyed to a second elevated picking station. The oversized materials conveyor will be enclosed where it traverses along the external back side of the new shed on Lot 15 DP263353 to mitigate noise and dust issues. The oversized materials conveyor will also contain a magnet to separate ferrous materials from the oversized portion.

Clean, separated timber stored in Bay 2 and 9 may be further processed into mulch using a shredder within the existing building on Lot 15 DP263353 and stored in the designated mulch bay. An articulated loader will be used



to transfer materials between the designated bays and will also be used for loading trucks with outgoing products and residual waste.

2.2.2.3 Waste Storage

Sorted waste/products will be stored in temporary bays throughout the RRF. When the bays are full, the bays will be emptied using an articulated loader. Two “large product storage bays” will be utilised for storing waste/product as required so that designated bays retaining sufficient capacity. The “large product storage bays” may also be used for temporarily storing product prior to loading out.

There are multiple storage bays located within the Facility as shown in Figure 2.3 Table 1 summarises the storage bin / bay sizes for the individually sorted waste types. Table 1 also provides a summary of the available storage for each sorted waste stream. However sorted and recoverable wastes will be collected daily to manage the quantity of waste stored on the Site.

Sorted materials and residual waste will be transported off-site daily during operational hours, with loads removed when a sufficient volume has accumulated to maximise transport efficiency.

2.2.2.4 Sorted Waste Collection

Sorted waste for further off-site processing / recovery will be collected regularly in 19m semi-trailers on a daily basis for lawful recovery / disposal at other NSW EPA licensed facilities. All waste loading will occur inside the warehouse within the “truck loading area”. Wastes that are compliant with applicable Resource Recovery Orders and Exemptions such as mulch, aggregates, and recovered fines will be transported to customers for on-sale or reuse. Retail sale of these products will not occur on the site.

Vehicles collecting sorted waste will access the Site via the eastern driveway on Plasser Crescent on the south side of the new shed on Lot 15 DP263353. All trucks accessing the site do so via the traffic signal-controlled intersection of Glossop Street and Kurrajong Road. Therefore, vehicles will enter Plasser Crescent from the western intersection of Plasser Crescent and Kurrajong Road.

Vehicles will reverse into the warehouse via the eastern roller door for loading of waste/products. After loading, vehicles will pass over the weighbridge for assessing net weight.

Upon being loaded with waste, vehicles will exit the warehouse through the eastern roller door in the forward direction and return to the weighbridge. Following weighing, vehicles will exit the Site in the forward direction and turn right onto Plasser Crescent.

EXISTING NOISE ENVIRONMENT

3.1 Representative Receivers

Representative receivers have been selected for this assessment. The receivers are presented in **Figure 3-1** and **Table 3-1** summarises the receivers and their land use.

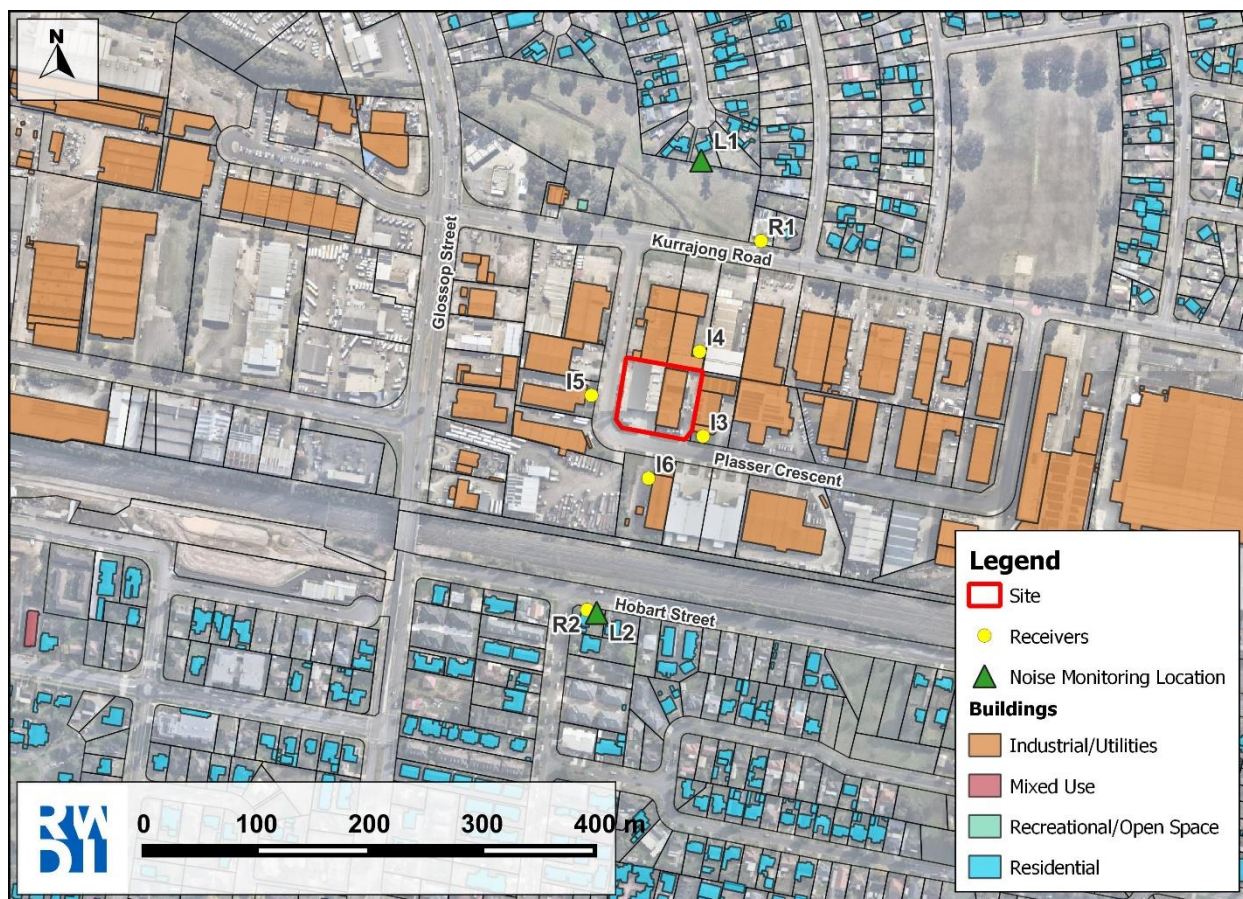


Figure 3-1: Location of Representative Receivers

Table 3-1: Summary of Representative Receivers

Receiver ID	Address	Receiver Type	Distance to Site
R1	2/7 Kurrajong Road, St Marys	Residential	125 m
R2	2 Australia Street, St Marys	Residential	165 m
I3	25 Plasser Crescent, St Marys	Industrial	East Boundary
I4	3/9 Kurrajong Road, St Marys	Industrial	North Boundary
I5	60 Plasser Crescent, St Marys	Industrial	West Boundary
I6	42 Plasser Crescent, St Marys	Industrial	South Boundary

3.2 Unattended Noise Measurements

To characterise the existing noise environment of the project location, RWDI personnel attended site to conduct long-term unattended noise measurements. Two unattended noise monitors were installed on site as shown in yellow in **Figure 2-1**. Noise monitoring was completed between 25 October 2022 and 10 November 2022.

The noise monitoring was completed in accordance with Australian Standard AS 1055-2018 "*Acoustics – Description and measurement of environmental noise*". All acoustic instrumentation utilised complies with AS IEC 61672.1-2004 "*Electroacoustics – Sound level meters – Specifications*". Monitoring was also conducted with reference to Fact Sheet A of the *NPfI* and EPA's *Approved methods for measurement and analysis of environmental noise in NSW* (NSW EPA, 2022).

Measured background levels are presented in **Table 3-2**. Refer to **Appendix A** for graphs of the full data set.

The locations of the noise monitors were as follows:

- L1 in the rear yard of 35 Cedar Crescent. This noise monitor is representative of the noise environment for NCA01;
- L2 in the rear yard of 2 Australia Street. This noise monitor is representative of the noise environment for NCA02.

All noise monitors were located in free field conditions, whereby they are not located adjacent to sound reflective surfaces other than the ground below the noise monitors.

Table 3-2: Unattended Noise Measurements – Background (L_{A90}) Noise Levels

Noise Monitor Location	Time of Day ¹	Rating Background Level (RBL) L_{A90} , period dBA
L1 35 Cedar Crescent (Northern residential receivers)	Day	42
	Evening	38
	Night	34
	AM shoulder (5am to 7am)	41
	PM Shoulder (10pm to 12am)	35
L2 2 Australia Street (Southern residential receivers)	Day	44
	Evening	41
	Night	34
	AM shoulder (5am to 7am)	42
	PM Shoulder (10pm to 12am)	37

Note 1: Day = 7am – 6pm; Evening = 6pm – 10pm; Night = 10pm – 7am

OPERATIONAL NOISE EMISSION CRITERIA

4.1 NSW EPA Noise Policy for Industry 2017

4

The EPA's Noise Policy for Industry (NPfI) 2017 provides guidance for the assessment and control of noise emissions from industrial sources and activities. The policy nominates the project noise trigger level should be satisfied, namely the project intrusiveness noise level and project amenity noise level. These are described in detail in the following sub-sections.

Project Intrusiveness Noise Levels

4.1.1 The intrusiveness noise criterion aims to protect residential receivers against significant changes in the noise environment due to new development. The project intrusiveness noise criterion states that noise emissions from new development should be no more than 5 dB(A) above the rated background noise level. Based on the rated background noise levels measured on site, the project intrusiveness noise levels are summarised in **Table 4-1**.

Table 4-1: Project Intrusiveness Noise Levels

Noise Catchment Area	Time of Day	Rating Background Level (RBL) LA90, period dBA	Project Intrusiveness Noise Level LAeq, 15min dBA
NCA1 (Northern Residential Receivers)	Day (7am – 6pm)	42	47
	Evening (6pm – 10pm)	38	43
	Night (10pm – 7am)	34	39
	AM Shoulder (5am – 6am)	41	46
	PM Shoulder (10pm – 11pm)	35	40
NCA2 (Southern Residential Receivers)	Day (7am – 6pm)	44	49
	Evening (6pm – 10pm)	41	46
	Night (10pm – 7am)	34	39
	AM Shoulder (5am – 6am)	42	47
	PM Shoulder (10pm – 11pm)	37	42

Project Amenity Noise Levels

The project amenity noise criterion is intended to protect receivers against continuing increases in cumulative noise levels from all “industrial” noise sources. The project amenity criterion for any specific receiver is dependent on the land use of the receiver (e.g., residential, commercial, industrial etc.). Residential receivers also need to be classified as rural, suburban or urban depending on the existing noise environment of the residences, with guidance for determining the residential classification provided in Table 2.3 of the *NPfI*.

To standardise the noise emission levels to account for the effect of short-term noise events that may skew the noise levels measured over a 15-minute period, the *NPfI* nominates that an additional 3dBA must be added to the amenity LAeq, period noise levels (applicable only to residential noise amenity areas).

The *NPfI* aims to limit continuing increases in noise levels from progressive developments with the application of the amenity criteria. To account for cumulative noise from the development with existing and future industrial premises in the area, the recommended amenity noise level is reduced by 5 dBA (applicable only to residential noise amenity areas) to give the project amenity noise level.

The project amenity noise levels are summarised in **Table 4-2**.

Table 4-2: NPfI Project Amenity Noise Levels

Receiver	Time of Day	Recommended Amenity Noise Level LAeq,period dBA	Project Amenity Noise Level Criteria dB(A) LAeq, 15-min	Adopted Project Amenity Noise Level Criteria dB(A) LAeq, 15-min
Residential (Suburban)	Day (7 am – 6 pm)	55	58	53 ¹
	Evening (6pm – 10 pm)	45	48	43 ¹
	Night (10 pm – 7 am)	40	43	38 ¹
Place of worship	When in use	40 (Internal) 50 ² (External)	-	50
Commercial premises	When in use	70	-	70
Industrial premises	When in use	70	-	70

Note 1: Minus 5 dB applied to account for the cumulative noise from the development with existing and future industrial premises in the area

Note 2: For internal noise criteria typical best practice is to convert the internal noise level to an outside level assuming windows are open. A 10 dB façade loss has been used to convert from internal to external noise levels, based on Development Near Rail Corridors And Busy Roads– Interim Guideline NSW Department of Planning 2008

Project Noise Trigger Levels

The project noise trigger levels (PNTLs) are defined as the lower of the project intrusiveness and the project amenity noise levels. These overall project noise trigger levels are summarised in **Table 4-3** below.

Table 4-3: NPfl Overall Project Trigger Noise Level Criteria

4.1.3

Receivers	Time of Day ¹	Intrusiveness Criteria L _{Aeq,15min} dBA	Amenity Criteria L _{Aeq,15min} dBA	PNTL L _{Aeq,15min} dBA
Residential (NCA01)	Day	47	53	47
	Evening	43	43	43
	Night	39	38	38
	AM shoulder	46	-	46
	PM shoulder	40	-	40
Residential (NCA02)	Day	49	53	49
	Evening	46	43	43
	Night	39	38	38
	AM shoulder	47	-	47
	PM shoulder	42	-	42
Industrial premises (NCA03)	When in use	-	70	70
Place of worship (R7)	When in use	-	50	50
Commercial premises (R8)	When in use	-	70	70

Note 1: Day = 7am – 6pm; Evening = 6pm – 10pm; Night = 10pm – 7am

Maximum Noise Level Criteria (Sleep Disturbance)

The maximum noise level screening criteria aim to protect residential receivers against sleep disturbances from maximum noise level events from premises during the night-time period. This assessment is applicable to NCA1 and NCA2 only.

- 4.1.4** The maximum noise level criteria are defined as L_{AFmax} 52 dBA or the prevailing RBL plus 15 dB, whichever is greater.

The maximum noise level criteria are summarised in **Table 4-4**.

Table 4-4: NPfl Maximum Noise Level Criteria

Receiver	Time of Day	RBL dB(A) $L_{90,15-min}$	RBL plus 15 dB(A) dB(A) L_{AFmax}	Maximum Noise Level Criteria dB(A) L_{AFmax}
NCA1	Night (10 pm – 7 am)	34	49	52
NCA2				

L_{AFmax} 52 dBA has been adopted as the maximum noise level criteria for all the residential receivers.

Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. It may also be appropriate to consider other guidelines including the NSW *Road Noise Policy* (RNP) which contains additional guidance relating to potential sleep disturbance impacts.

4.1.5

Significance of Residual Noise Impacts

Section 4.2 of the NPfl specifies the following regarding the significance of residual noise impacts:

- If the predicted noise level minus the project noise trigger level is ≤ 2 dBA, the significance of the residual noise is negligible, and the exceedance would not be discernible by the average listener and therefore would not warrant receiver-based treatments or controls.

Noise predictions presented in the noise assessment that are ≤ 2 dBA above the PNTL will not be highlighted as an exceedance.



OPERATIONAL NOISE ASSESSMENT

5.1 Noise Modelling Methodology

5

Site related noise emissions were modelled using the CadnaA Ver2023 noise prediction software. To complete this, a representative 3-D model within the software was constructed of the site and surrounding receivers. Factors that are addressed in the modelling are:

- equipment sound level emissions (in octave bands) and locations;
- screening effects from buildings and barriers;
- receiver locations;
- ground topography;
- meteorological effects;
- noise attenuation due to geometric spreading; and
- ground absorption and atmospheric absorption.

5.2 Meteorological Conditions

At relatively large distances from a source, the resultant noise levels at receivers can be influenced by meteorological conditions, particularly temperature inversions and gradient winds. Where these factors are a feature of an area their effect on resultant noise levels should be considered.

The *NPfl* defines standard meteorological conditions and noise-enhancing meteorological conditions to be considered for noise assessments. The definition of those conditions is provided in Table D1 of Fact Sheet D, which is reproduced in **Table 5-1** below.

Table 5-1: Standard and Noise-Enhancing Meteorological Conditions

Meteorological Conditions	Meteorological Parameters
Standard	Day/evening/night: stability categories A-D with wind speed up to 0.5 m/s at 10 m AGL.
Adverse	Daytime/evening: stability categories A-D with light winds (up to 3 m/s at 10 m AGL). Night time: stability categories A-D with light winds (up to 3 m/s at 10 m AGL) and/or stability category F with winds up to 2 m/s at 10 m AGL.

Notes: m/s = metres per second; m = metres; AGL = above ground level; where a range of conditions is nominated, the meteorological condition delivering the highest predicted noise level should be adopted for assessment purposes. However, feasible and reasonable noise limits in consents and licences derived from this process would apply under the full range of meteorological conditions nominated under standard or noise-enhancing conditions as relevant. All wind speeds are referenced to 10 m AGL. Stability categories are based on the Pasquill-Gifford stability classification scheme.

The *NPfl* provides two options when considering meteorological effects. The first option has been adopted for this assessment:

1. Conservatively adopt noise-enhancing meteorological conditions without processing meteorological data local to the site; or

2. Determine the significance of noise-enhancing meteorological conditions based on meteorological data local to the site and adopt significant noise-enhancing conditions for the assessment. Where noise-enhancing meteorological conditions are deemed non-significant, standard meteorological conditions may be adopted.

The first option has conservatively been selected for this assessment. Predictions will be presented for adverse meteorological conditions.

5.3 Operational Noise Sound Power Levels

Table 5-2 presents the primary noise sources of generation for the proposed development, as advised by the client. It has been assumed that this operating configuration would occur throughout the proposed operating hours, i.e., 6am to 11pm Monday to Friday, and 7am to 3pm Saturday.

Table 5-2: Schedule of Operating Equipment

Location	Item	Sound Power Level dBA	Operation
Receival Warehouse Area	Feeder	105	Internal, operating continuously
	Magnet	83	
	Screen	88	
	Density Separator	98	
	Ballistics Separator	93	
	Excavator(15-20t)	99	Internal, operating 33% of the time
	Shredder/Mulcher	115	Internal, operating 33% of the time
Product Warehouse Area	Front end loader (Volvo L90H)	105	Internal, operating 33% of the time
External	Truck on site at 10km/h	107	2 waste receival, 1 sorted waste collection entering and exiting in 15 minutes
	Truck Reversing	111	1 waste receival, 1 sorted waste collection entering and exiting in 15 minutes

Note: negligible noise impacts are anticipated from the following internal noise sources: material bays, conveyors, and picking stations.

The roller doors located along the southern boundary fronting Plasser Crescent are assumed open in the assessment. As a result, indoor to outdoor breakout noise is considered. Preliminary room breakout calculations were conducted to estimate the breakout noise emissions out of the warehouse through the open roller doors. It has also been assumed that all trucks would switch off engines during loading/unloading while inside.

5.4 Operational Noise Predicted Levels

Table 5-3 presents the predicted noise levels for the proposed operations. Levels predicted are for adverse meteorological conditions. Where the predicted noise level exceeds a PNTL, the PNTL is presented in **BOLD**. Predictions indicate that the received noise level at receiver R02 may exceed the PNTL during the evening and PM shoulder period. These exceedances are in predominantly due to noise breakout from the open roller door of the Reveal Warehouse Area.

Table 5-3: Predicted Operational Noise Levels at Representative Receivers, $L_{Aeq,15min}$ (dBA)

Receiver	Predicted Noise Level (dBA)	PNTL			
		Day	Evening	AM Shoulder	PM Shoulder
R1	20	47	43	46	40
R2	47	49	43	47	42
I3	55	70	70	70	70
I4	25	70	70	70	70
I5	54	70	70	70	70
I6	56	70	70	70	70

5.5 Sleep Disturbance Assessment

As the Project proposes to operate into the night period, noise emissions during the night time period require an assessment for potential sleep disturbance at the nearest noise sensitive receivers. A summary of the L_{Amax} sound power levels of typical activities that may occur at the facility with the potential to cause sleep disturbance is presented in **Table 5-4**.

Table 5-4: Sleep Disturbance Noise Events

Noise Source	LW L_{Amax}	Source Height
Truck Engine Starting	100	2 m
Reversing Alarm	111	1 m
Roller Door	94	4 m



Review of **Table 5-4** indicates that reversing alarms could have the greatest impact on sleep disturbance at surrounding residential receivers. The predicted night time L_{Amax} noise levels at the nearest receivers due to reversing alarms is presented in **Table 5-5**. Night time period calculations include noise enhancing metrological conditions as described in Section 5.2. Predictions indicate maximum noise levels do not exceed the screening level. As such, no further detailed analysis is required.

Table 5-5: Predicted Night Time L_{Amax} Levels

Receiver	Predicted Level	Screening Level	Exceedance
R01	21	52	0
R02	48	52	0

5.6 Modifying Factors

The NPfl correction factors include tonal noise, low-frequency noise, intermittent noise, and duration. Where two or more modifying factors are present, the maximum adjustment to a noise source level is 10 dBA (excluding duration correction). RWDI believes that noise emissions from Project would not be considered annoying nor is a modifying factor correction is warranted at this stage. Furthermore, the predicted noise level for receiver R01 is more than 10 dB below the night time PNTL. Therefore, there is no risk of exceeding the PNTL with the maximum 10 dB of penalties for modifying factors.

Table 5-6 presents the predicted octave band noise levels at receiver R2. Factsheet C of the NPfl proposes one-third octave band analysis to determine the presence of tonality. However, the octave band values in **Table 5-6** does not show any signs of tonality. As such, there is little risk of tonal noise impacts.

Table 5-6: Predicted Octave Band Noise Levels

Period	dBC	dBA	Octave Band								
			31.5	63	125	250	500	1000	2000	4000	8000
All periods	46	45	36	36	36	33	34	38	41	36	26

Regarding receiver R02, the night time noise level was predicted to be 45 dBA and 46 dBC. This is less than a 15 dB difference between C- and A-weighted noise levels, as such there is little risk of low frequency noise impacts.

RWDI would normally apply an intermittent modifying factor to $L_{Aeq,15min}$ noise levels where all noise being assessed suddenly increases or reduces where the difference between the total $L_{Aeq,15min}$ (including all other non-industrial sources) at the receiver with the source present and not present results in a difference in L_{Aeq} of 5 dB or more during a 15-minute period. It should also be noted that operations during the night period are proposed to be constant with the trommel screen and infeed conveyor operating continuously.

5.7 Operational Noise Mitigation

RWDI has completed analysis of the source contributions to determine operational controls to mitigate the exceedances of the evening and PM shoulder period. From the analysis RWDI recommends that for the hours of 6pm-11pm Monday to Friday:

- No timber mulching after 6pm.
- No truck movements after 10pm.
- Where possible, keep roller shutter doors closed except for egress and ingress.
- Installation of fast acting roller doors.

Table 5-7 presents the predicted noise levels applying the mitigation measures recommended above.

Table 5-7: Predicted Operational Noise Levels with Mitigation at Representative Receivers, $L_{Aeq,15min}$ (dBA)

Receiver	Predicted Noise Level (dBA)	PNTL			
		Day	Evening	AM Shoulder	PM Shoulder
R1	16	47	43	46	40
R2	42	49	43	47	42
I3	50	70	70	70	70
I4	22	70	70	70	70
I5	28	70	70	70	70
I6	52	70	70	70	70



CONSTRUCTION NOISE GOALS

6.1 Interim Construction Noise Guideline

6

The NSW EPA released the “Interim Construction Noise Guideline” (ICNG) in July 2009 for the management of construction works noise. The guideline promotes a best practicable means approach to the management of noise emissions from construction in order to allow works to proceed during recommended standard hours. Additional constraints apply to minimise potential impacts upon sensitive receivers where works are proposed outside these standard hours.

The ICNG recommends the following approaches to mitigating adverse noise impacts from construction sites.

Construction Work Periods

6.1.1 Where possible, the ICNG recommends confining work times to those outlined in **Table 6-1**.

Table 6-1: ICG Standard Hours of Construction

Day	Preferred Construction Hours
Monday to Friday	7.00 am to 6.00 pm
Saturdays	8.00 am to 1.00 pm
Sundays /Public Holidays	No construction

6.1.2 The proposed construction hours are unknown at this stage as advised by the client, however are anticipated to occur during standard construction hours, Monday to Friday 7am to 6pm in alignment with the ICNG.

Construction Noise Assessment Method

The ICNG recognises that people are usually annoyed more by noise from longer-term works than by the same type of works occurring for only a few days. For this reason, the guideline identifies two methods of assessing noise from construction:

- The **quantitative assessment method** which applies to long-term duration work such as: new public infrastructure, major commercial or industrial development.
- The **qualitative assessment** method which applies to short-term duration work such as: repair and maintenance of public powerlines, maintenance or repair of a public road or railway.

The quantitative assessment method is relevant in this assessment. The proposed development is industrial development.

6.1.2.1 Quantitative Assessment Method

The ICNG recommends that the $L_{Aeq,15min}$ noise levels arising from a construction project, measured within the curtilage of an occupied noise-sensitive premises (i.e. at boundary or within 30 m of the residence, whichever is the lesser), should not exceed the levels indicated in **Table 6-2** and **Table 6-3**.

Table 6-2: Noise Management Levels - Residences

Time of day	Noise Management Level (NML) $L_{Aeq}(15 \text{ min})$
Recommended standard hours: Monday to Friday: 7 am to 6 pm Saturdays: 8 am to 1 pm No work on Sundays or public holidays	Noise affected ¹ $RBL^2 + 10 \text{ dBA}$ Highly noise affected ³ 75 dBA
Outside recommended standard hours	Noise affected ¹ $RBL + 5 \text{ dBA}$

Notes:

1. The noise affected level represents the point above which there may be some community reaction to noise.
2. Refer to Glossary Acoustic Terms
3. The highly noise affected level represents the point above which there may be strong community reaction to noise.

Table 6-3: Noise Management Levels - Other Land Uses

Land use	Noise Management Level (NML) $L_{Aeq}(15 \text{ min})$
Industrial	75 dBA
Place of Worship	45 dBA (Internal) 55 dBA (External)

Where predicted or measured levels exceed the Noise Management Levels, the ICNG recommends that the proponent apply all “feasible and reasonable” work practices in order to minimise noise.

Where $L_{Aeq,15min}$ construction noise levels are predicted to exceed the “highly noise affected” level (i.e., 75 dBA) the relevant authority (consent, determining or regulatory) may require respite periods or other specific noise mitigation measures to be observed. This may include restricting the hours that the noise-generating activities can occur, taking into account:

- times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences); and
- if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.

The implementation of an effective community consultation and liaison programme is emphasised as being a critical tool in successfully handling adverse noise impacts from construction works.

The ICNG provides comprehensive guidance for work practices which aim to achieve “desired environmental outcomes - there are no prescribed noise controls for construction works.”



Applied Construction Noise Management Levels

A summary of the Noise Management Levels applied for construction activities at the receivers are presented in **Table 6-4**.

Table 6-4: Applied Construction Noise Management Levels

6.1.3

Receiver	Time of Day	Rating Background Noise Level dBA L _{90,15-min}	Construction Noise Management Level L _{Aeq(15 min)} dBA	Highly Affected Noise Level dBA L _{Aeq(15 min)}
Residential NCA1	Day (7 am – 6 pm)	42	52	75
Residential NCA2		44	54	
Industrial	When in use	-	75	-



CONSTRUCTION NOISE ASSESSMENT

7.1 Noise Modelling Methodology

7

Cadna/A noise prediction software – to predict construction noise emissions from the site to the surrounding sensitive receivers. Cadna/A is a commercially available software implementation of the ISO 9613 outdoor noise propagation algorithms. Factors addressed in the noise modelling are:

- Equipment noise level emissions and locations;
- Shielding from ground topography and structures;
- Noise attenuation due to geometric spreading;
- Ground absorption; and
- Atmospheric absorption.

Topographical data for the site and nearby surrounding area has been sourced from NSW Spatial Services as 5m contours and has been incorporated in the model.

7.2 Construction Works Methodology

The construction methodology associated with the proposed development is unknown at this stage, as advised by the client. On this basis, assumptions have been made on the proposed construction scenarios based on a similar proposed warehouse development assessment completed by RWDI (Ref#2202558). The proposed construction works are presented in **Table 7-1**.

It is assumed the proposed construction hours will occur within standard construction hours Monday to Friday 7am to 6pm, Saturday 8am to 1pm. No works will occur on Sunday.

Table 7-1: Proposed Construction Works

Construction Activity	Description	Construction Equipment
Civil works	• Demolition of some existing structures/buildings occupying the site • Cutting levels to suit required heights • Installation of fill to suit required heights • Compaction of subgrade to engineers' requirements	• 30t Excavator x 3 • Truck and dog x 2 • 18t Drum Roller x 1
Concrete & Structure works	• Installation of concrete for the substructure and flooring required for the new warehouse/shed • Installation of structural steel portal frames • Installation of sheeting to walls & roof of warehouses • Installation of windows • Painting of external walls	• 40t-50t Mobile Crane x 1 • Line and boom pump x 1 • Concrete truck x 2 • Boom lift/scissor lift x 2 (installation of windows and painting of wall sheeting)

It should be noted the construction noise assessment will need to be revised and updated once the client has finalised the construction methodology consisting of construction phases and associated construction equipment and plant.

7.3 Construction Noise Scenarios and Sound Power Levels

Table 7-2 presents the constructions scenarios and the associated sound power levels. The noise data presented consist of site measurements carried out and/or collected by RWDI, and TfNSW CNVS Appendix C.

Table 7-2: Construction Noise Scenario and Sound Power Levels

Scenario	Construction Plant and Equipment	Operating mins in a 15-min period	Quantity	Sound Power Level dBA (Quasi Steady)		
				Individual Item (SWL)	L _{Aeq} Activity	L _{Aeq} Activity Total
Civil Works with Demolition¹	30t excavator (no hydraulic hammer used)	7.5	2	110	110	115²
	Truck and dog	7.5	1	109	106	
Civil Works¹	30t excavator	7.5	3	110	112	114
	Truck and dog	7.5	2	109	109	
	18t drum roller	7.5	1	109	106	
Concrete & Structure Works¹	Crane mobile	7.5	1	113	110	113
	Line and boom pump	7.5	1	108	105	
	Concrete truck	7.5	2	109	109	
	Elevated Working Platform	7.5	1	98	95	

Note 1: Construction scenarios utilised from a similar proposed development completed by RWDI (Ref# 2202558)

Note 2: Noise level manually increased to account for impacts from the excavator shovel contact with existing concrete.

7.4 Construction Noise Predicted Levels

The noisiest construction scenario, Civil Works with demolition, was assessed. Compliance with this scenario assumes compliance with all other constructions scenarios. Predicted noise levels are presented in **Table 7-3**.

Compliances are highlighted in green.

Table 7-3: Predicted Construction Noise Levels and Exceedances

Receiver	Predicted Noise Level dBA	Construction Noise Management Level L _{Aeq} (15 min) dBA	Highly Affected Noise Level L _{Aeq} (15 min) dBA
R1	32	52	75
R2	51	54	75
I3	69	75	-
I4	41	75	-
I5	56	75	-
I6	67	75	-

7.5 Construction Noise Mitigation

No construction noise mitigation is required given the anticipated noise impacts associated with the construction works are compliant with the noise limits at the nearest receivers. However, noise monitoring should be conducted at the commencement of construction works to ensure the noise levels are in alignment with the predictions. In addition, noise monitoring should be conducted in response to any legitimate complaints.



CONSTRUCTION VIBRATION LIMITS

Impacts from vibration can be considered both in terms of both the effect on building occupants (human comfort) and the effects on the building structure (building damage). Of these considerations, the human comfort limits are the most stringent. Therefore, for occupied buildings, if compliance with human comfort limits is achieved, the building damage objectives will also be achieved.

8

8.1 Human Comfort - Assessing Vibration: A Technical Guideline 2006

The NSW Assessing Vibration: a technical guideline (2006) is applicable for this project and is based on the guidelines contained in British Standard BS 6472-1992 Evaluation of Human Exposure to Vibration in Buildings (1 Hz to 80 Hz). The guideline refers only to human comfort considerations and nominates preferred and maximum vibration goals for critical areas, residences and other sensitive receivers.

The criteria in the guideline are non-mandatory: “they are goals that should be sought to be achieved through the application of all feasible and reasonable mitigation measures. Where all feasible and reasonable measures have been applied and vibration values are still beyond the maximum value, the operator would need to negotiate directly with the affected community”.

Construction vibration can be continuous, intermittent or impulsive and the NSW vibration guideline provides different goals for each category. The continuous vibration goals are most stringent and higher vibration levels are acceptable for intermittent and impulsive vibration on the basis of the shorter exposure times. Examples of typical vibration sources are provided in **Table 8-1**.

Vibration emitting equipment anticipated in the proposed works are considered continuous vibration. The continuous vibration criteria (as shown in Appendix C - Assessing Vibration: A Technical Guideline) are presented in **Table 8-2**.

Table 8-1: Types of Vibration (NSW Vibration Guideline)

Continuous Vibration	Impulsive Vibration	Intermittent Vibration
Machinery, steady road traffic, continuous construction activity.	Infrequent: Activities that create up to 3 distinct vibration events in an assessment period, e.g., occasional dropping of heavy equipment, occasional loading and unloading. Blasting is assessed using ANZECC (1990).	Trains, nearby intermittent construction activity, passing heavy vehicles, forging machines, impact pile driving, jack hammers. Where the number of vibration events in an assessment period is three or fewer this would be assessed against impulsive vibration criteria.

Table 8-2: Preferred and Maximum Vibration Levels for Continuous Vibration (Human Comfort)

Building Type	Peak Particle Velocity, PPV (mm/s)	
	Preferred	Maximum
Residences - Daytime	0.28	0.56
Residences - Night time	0.20	0.40

8.2 Building Damage - British Standard BS 7385: Part 2 – 1993 Guidelines

BS 7385-2 The Standard sets guide values for building vibration based on the lowest vibration levels above which damage has been credibly demonstrated. These levels are judged to give a minimal risk of vibration-induced damage, where minimal risk for a named effect is usually taken as a 95% probability of no effect.

Sources of vibration that are considered in the Standard include demolition, blasting (carried out during mineral extraction or construction excavation), piling, ground treatments (e.g., compaction), construction equipment, tunnelling, road and rail traffic and industrial machinery.

The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential and industrial buildings are presented in **Table 8-3**.

Table 8-3: Transient Vibration Guide Values (Building Damage)

Type of Building	PPV in Frequency Range of Predominant Pulse (mm/s)	
	4 Hz to 15 Hz	15 Hz >
Reinforced or framed structures Industrial and heavy commercial buildings	50 mm/s at 4 Hz and above	
Unreinforced or light frames structures Residential or light commercial type buildings	15 at 4 Hz increasing to 20 at 15 Hz	20 at 15 Hz increasing to 50 at 40 Hz and above

8.3 Applied Construction Vibration Limits

Table 8-4 presents construction vibration limits for human comfort and building damage relevant to this project.

Table 8-4: Construction Vibration Limits

Building	Protection	Period	Criteria PPV, mm/s		Metric / Notes
			Preferred	Maximum	
Residences	Human comfort	Standard hours	0.28	0.56	Resultant PPV, mm/s
Offices		While in use	0.56	1.1	(Assessing Vibration – A Technical Guideline 2006)
Reinforced or framed structures Industrial and heavy commercial buildings	Building Damage	All	50 at 4 Hz and above		Component PPV, mm/s (BS 7385-2:1993)
Unreinforced or light frames structures Residential or light commercial type buildings			15 at 4 Hz increasing to 20 at 15 Hz 20 at 15 Hz increasing to 50 at 40 Hz and above		



CONSTRUCTION VIBRATION ASSESSMENT

The drum roller is the only vibration intensive equipment to be used during construction works.

The minimum working distance to avoid cosmetic damage during the use of the 18t drum roller is 20 m, presented in **Table 9-1** (as shown in Table 20 – Appendix D TfNSW Construction Noise and Vibration Strategy).

Use of the drum roller is not anticipated to occur within 20 m of the nearest sensitive receiver. As a result, compliance with the cosmetic damage criteria and human response criteria will be achieved. No mitigation is required.

Table 9-1: Minimum Working Distances from Vibration Intensive Plant

Plant Item	Approx. Size/Weight/Model	Minimum Distance – Cosmetic Damage (BS 7385)	Minimum Distance – Human Response (OE&H Vibration Guideline)
Drum roller	13-18 tonne	20 m	100 m

9.1 Construction Vibration Mitigation

No construction vibration mitigation is required given there are no anticipated vibration impacts.



ROAD TRAFFIC NOISE CRITERIA AND ASSESSMENT

Additional traffic movements will result from both the construction and the operational phases of the Project.

10 The *RNP* is considered by RWDI to be the most suitable guideline to assess potential impacts at residences from both construction and operational traffic noise.

Considering all the variety of development categories within the *RNP*, the relevant criteria are summarised in **Table 10-1**.

Table 10-1: Road Traffic Noise Criteria – Residences

Type of Development	Assessment Criteria	
	Day (7am–10pm)	Night (10pm–7am)
Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use developments	L _{Aeq,15 hour} 60 (external)	L _{Aeq,9 hour} 55 (external)

In addition, for existing residences and other sensitive land uses affected by additional traffic on existing roads and where the criterion is exceeded, any increase in the total traffic noise level should preferably be limited to 2 dB. The *RNP* considers that a 2 dB increase is typically not noticeable.

It is worthy to note that the EPA defines periods for on-site noise differently to that defined for road traffic (along the road network). For road traffic noise along the road network, the daytime period is defined as the time between 7.00am and 10.00pm and night time is between 10.00pm and 7.00am.

It is proposed that all traffic to the site would be via Glossop St/Kurrajong Road before turning onto Plasser Crescent. All traffic leaving the site would turn right onto Plasser Crescent, travelling west, before returning to Glossop St/Kurrajong Road. There are no residential receivers on this proposed route. As such, there would be no noise impact on residences due to additional traffic from the operation of the Project. No further assessment has been completed.



CONCLUSION

RWDI Australia Pty Ltd (RWDI) was engaged by Nassif Civil Pty Ltd c/- Jackson Environment and Planning Pty Ltd to conduct a noise and vibration impact assessment for: the demolition and construction works, and operational noise emissions associated with the proposed construction and demolition (C&D) waste processing facility located over two lots at 29-37 Plasser Crescent, North St Marys (Lot 15 & 16 DP 263353).

Operational noise emissions were assessed and predicted to comply at all the nearest sensitive receivers assessed. No operational mitigation is required given the compliance.

Construction noise and vibration emissions were assessed and predicted to comply at the nearest sensitive receivers assessed. No specific construction noise or vibration mitigation is required; however, noise monitoring should be conducted at the commencement of construction works to ensure the noise levels are in alignment with the predictions. In addition, noise monitoring should be conducted in response to any legitimate complaints.

It should be noted the construction assessment may need to be updated once the client has confirmed the construction scenarios and associated equipment from the construction contractor.

Noise impacts from the generated operation and construction road traffic to the surrounding road network are anticipated to be minimal.



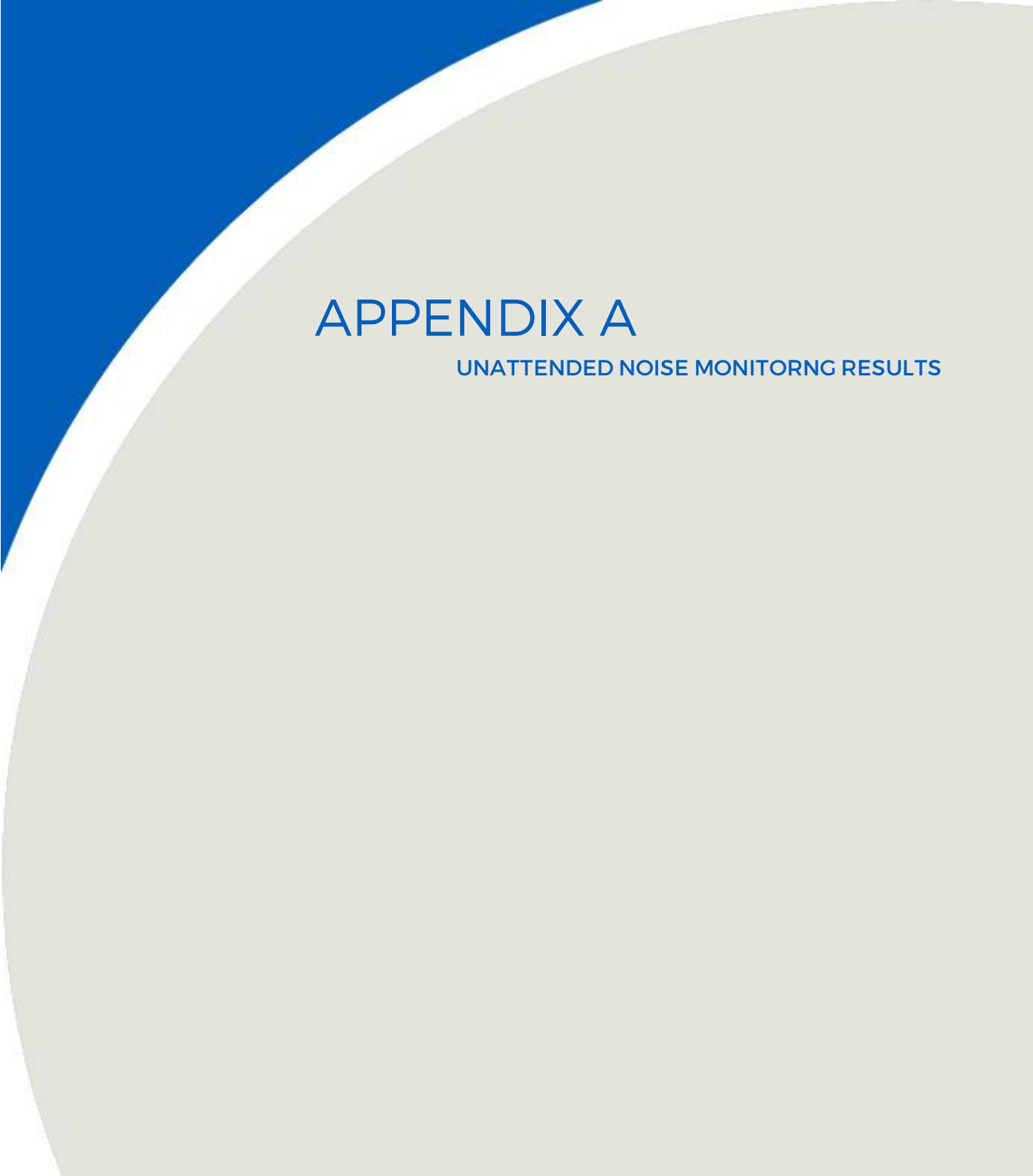
STATEMENT OF LIMITATIONS

12

This report entitled NVIA Acoustic Penrith RRF dated 25 November 2024 was prepared by RWDI Australia Pty Ltd ("RWDI") for Nassif Civil Pty Ltd c/- Jackson Environment ("Client"). The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.

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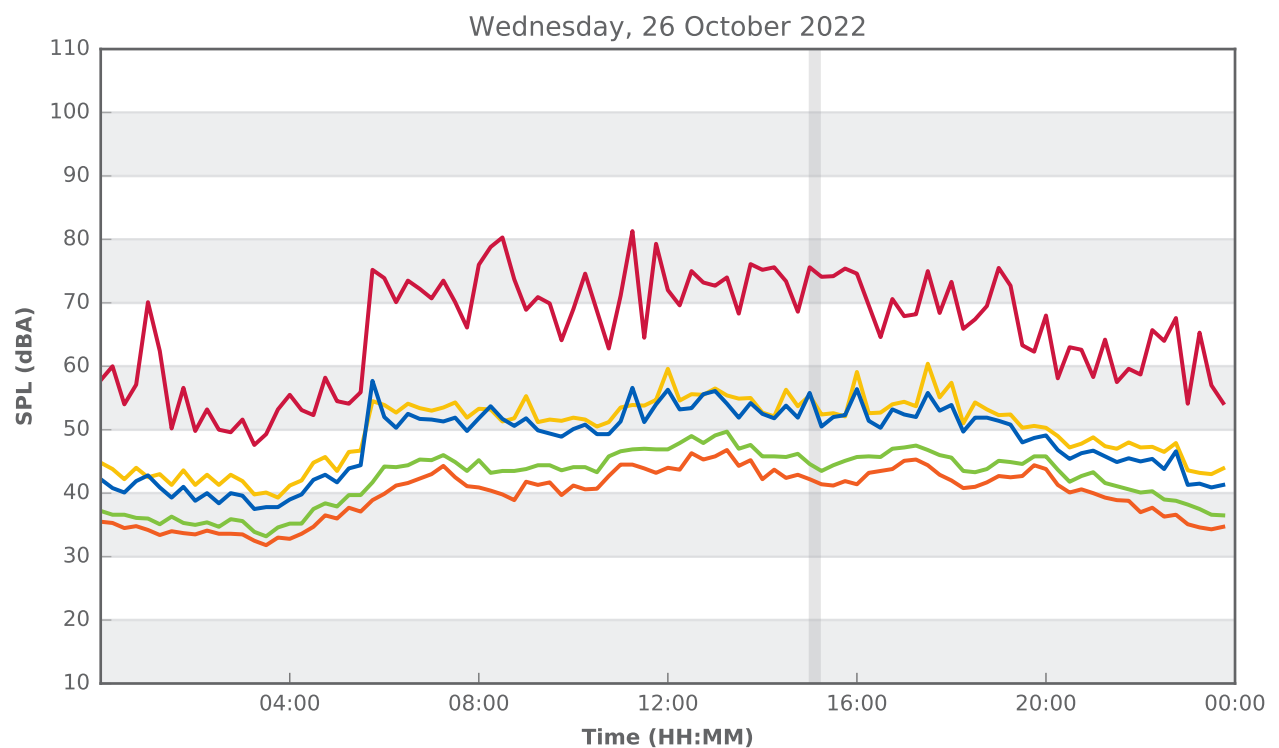
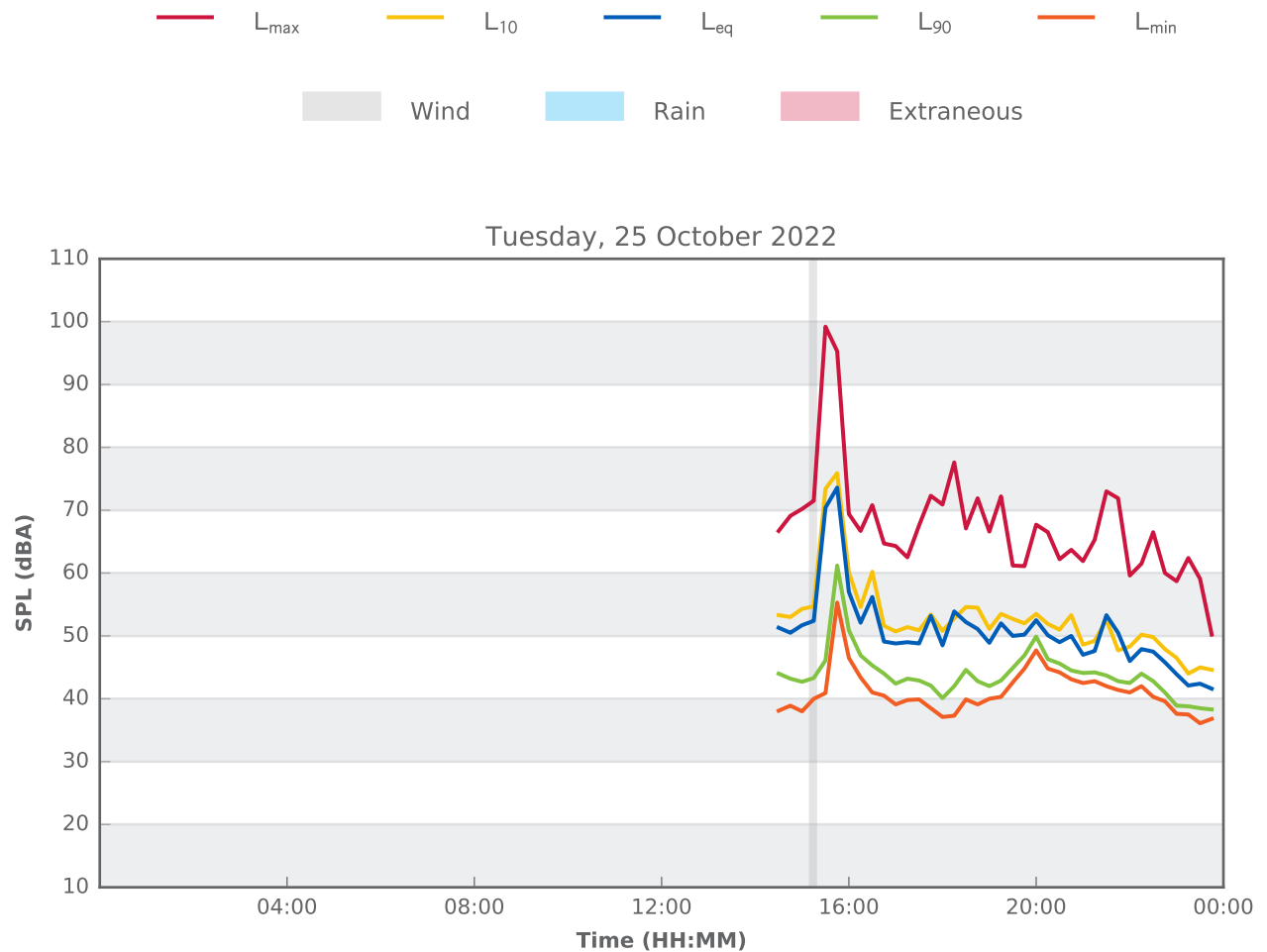
APPENDIX A

UNATTENDED NOISE MONITORING RESULTS

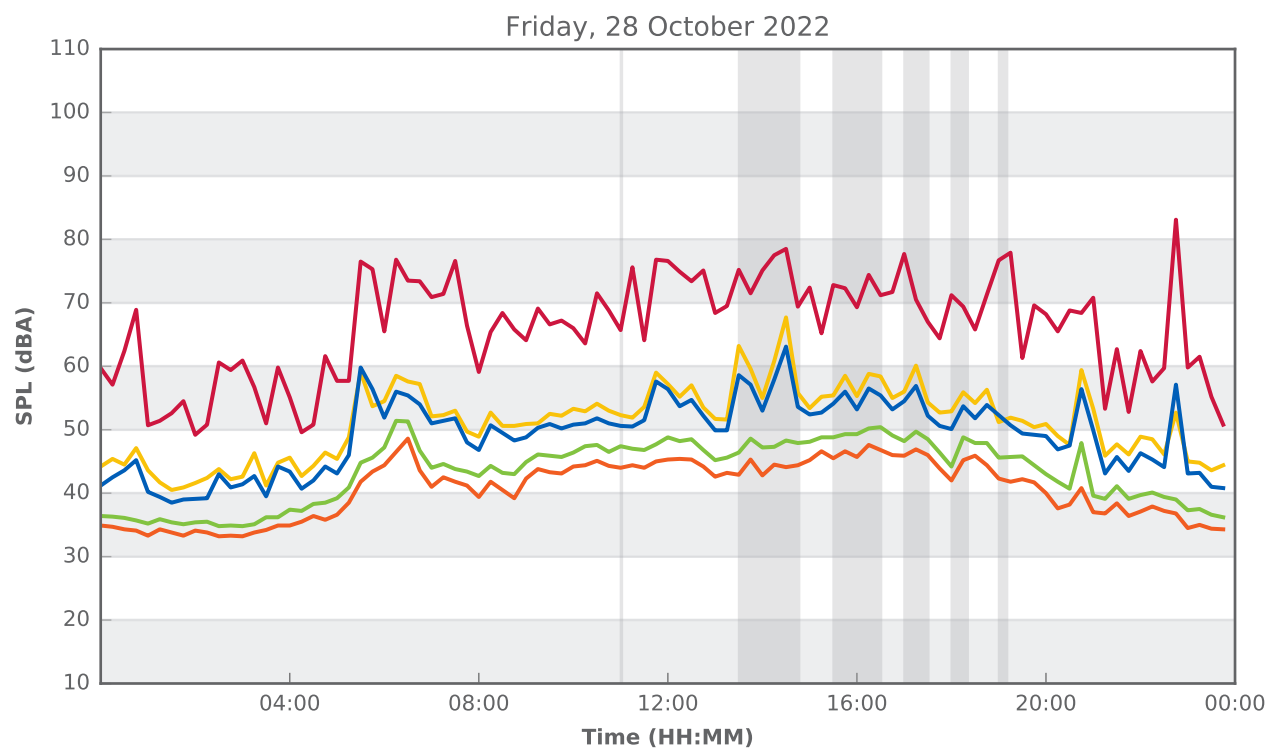
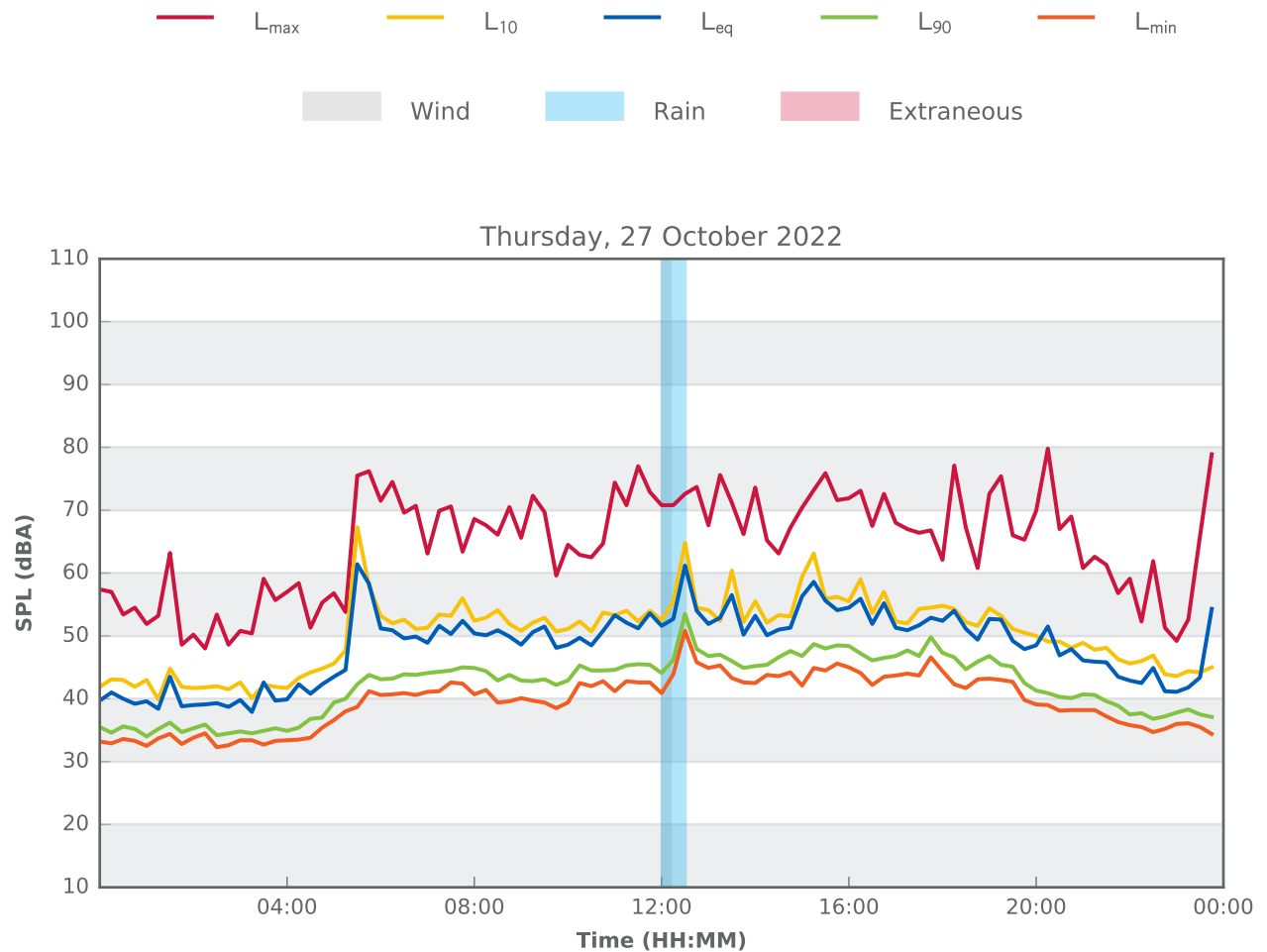
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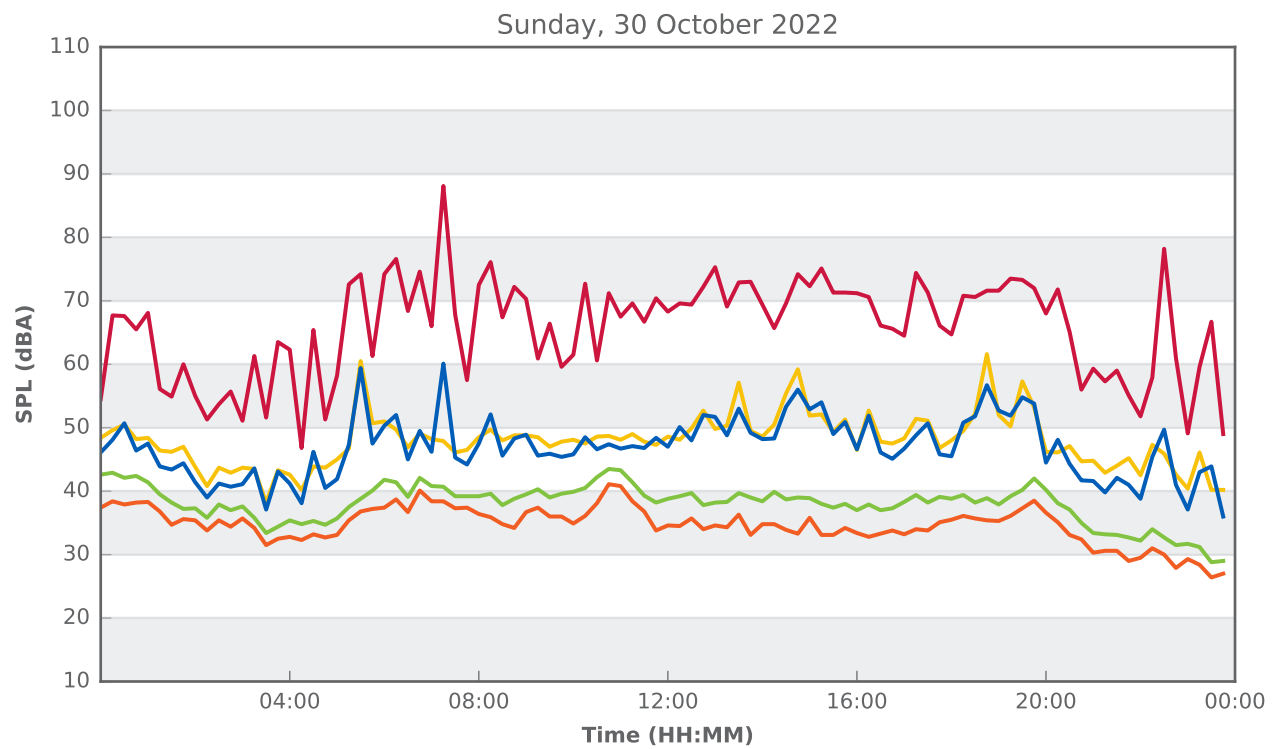
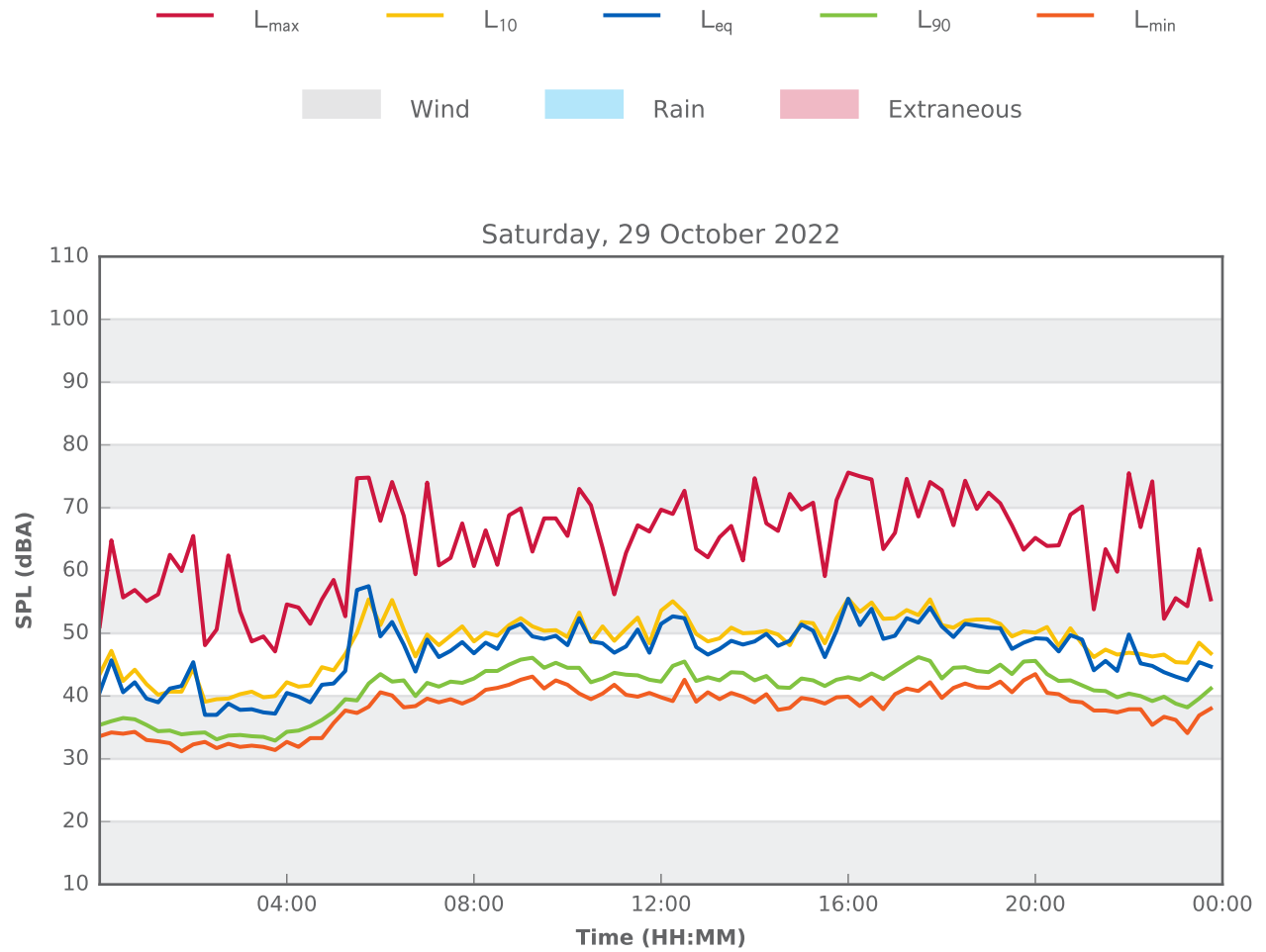
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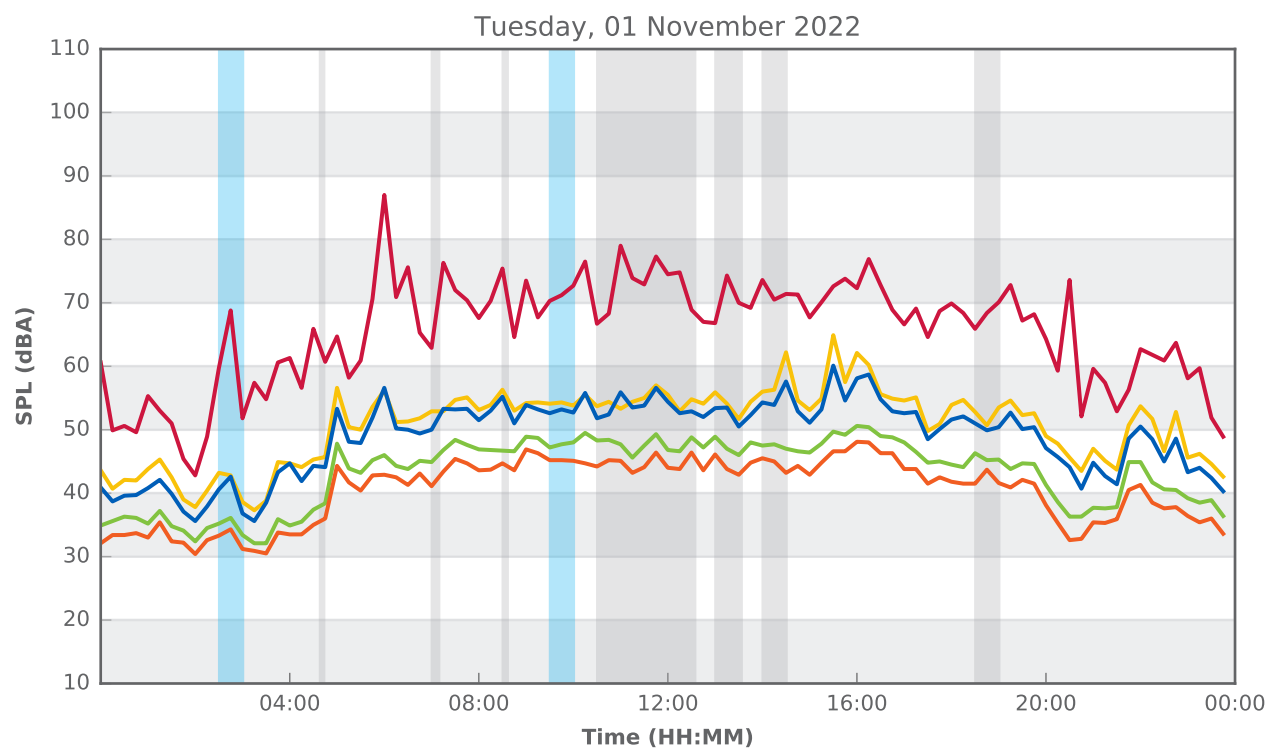
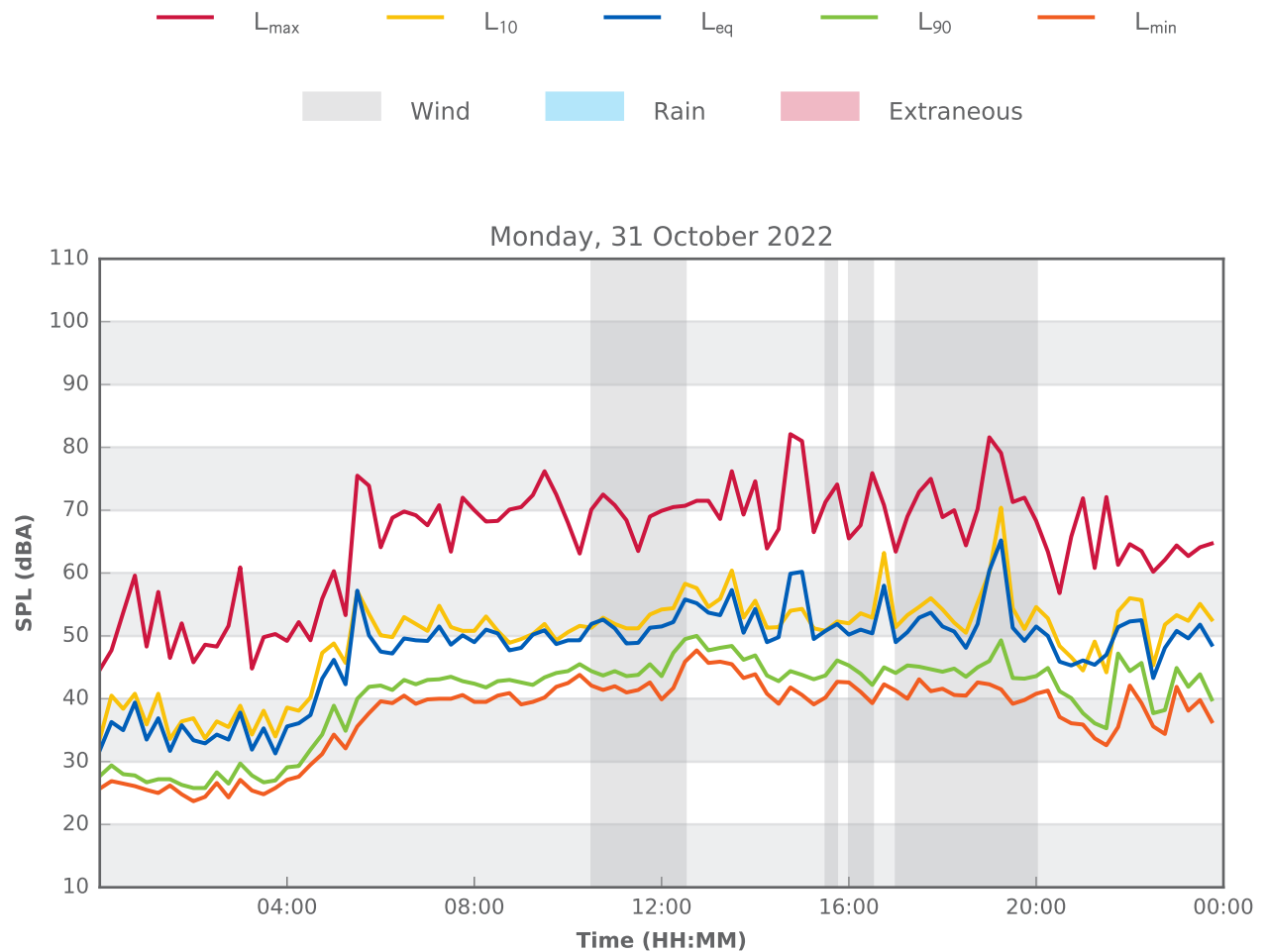
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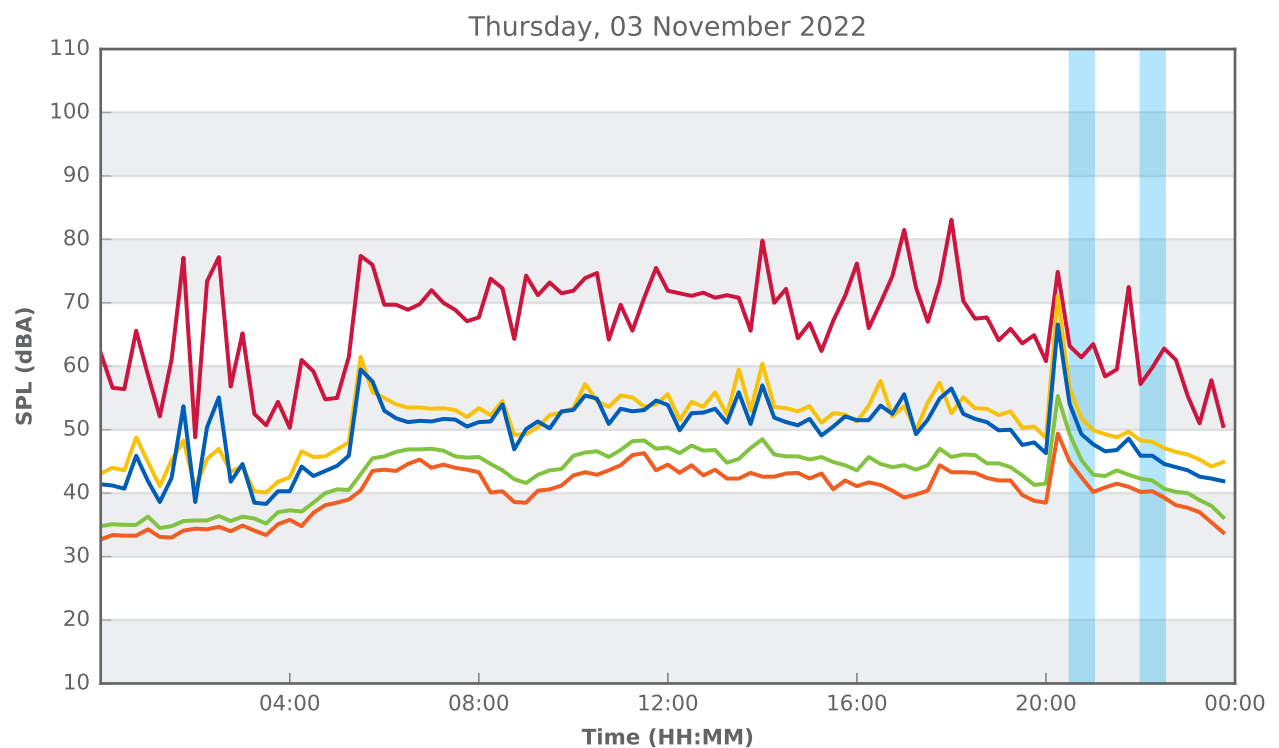
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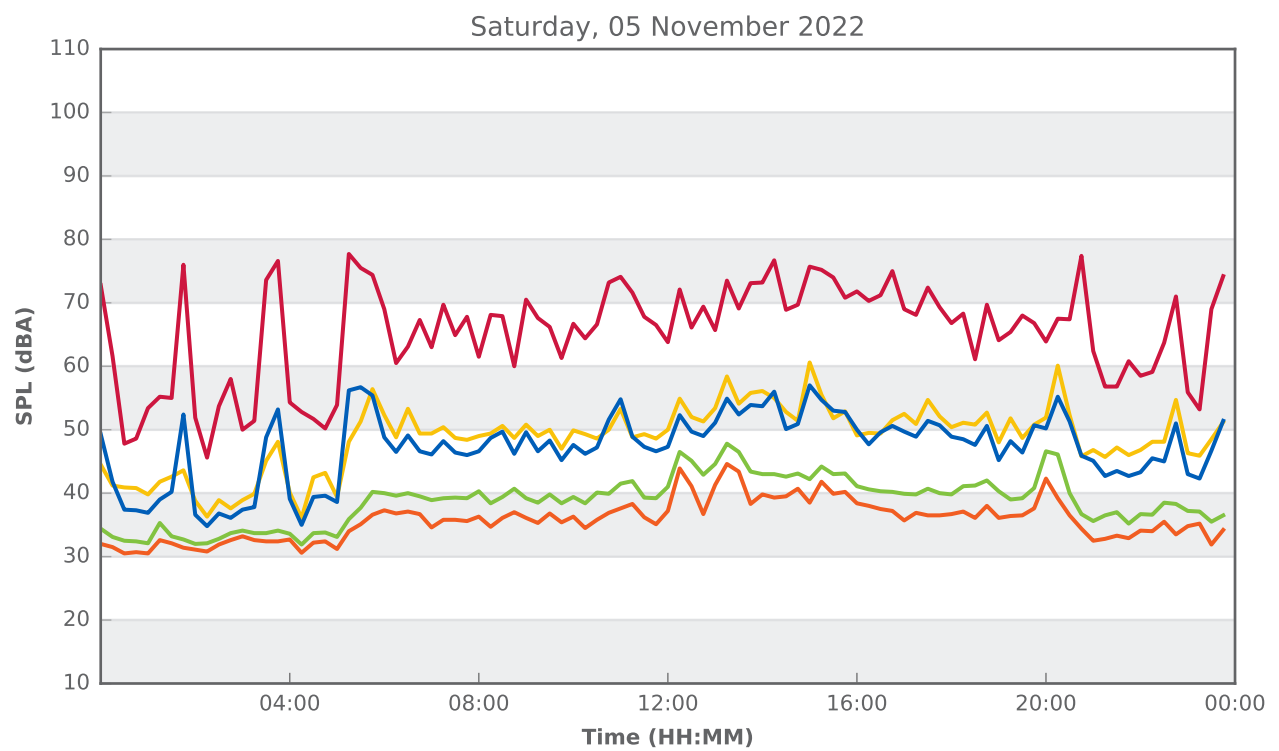
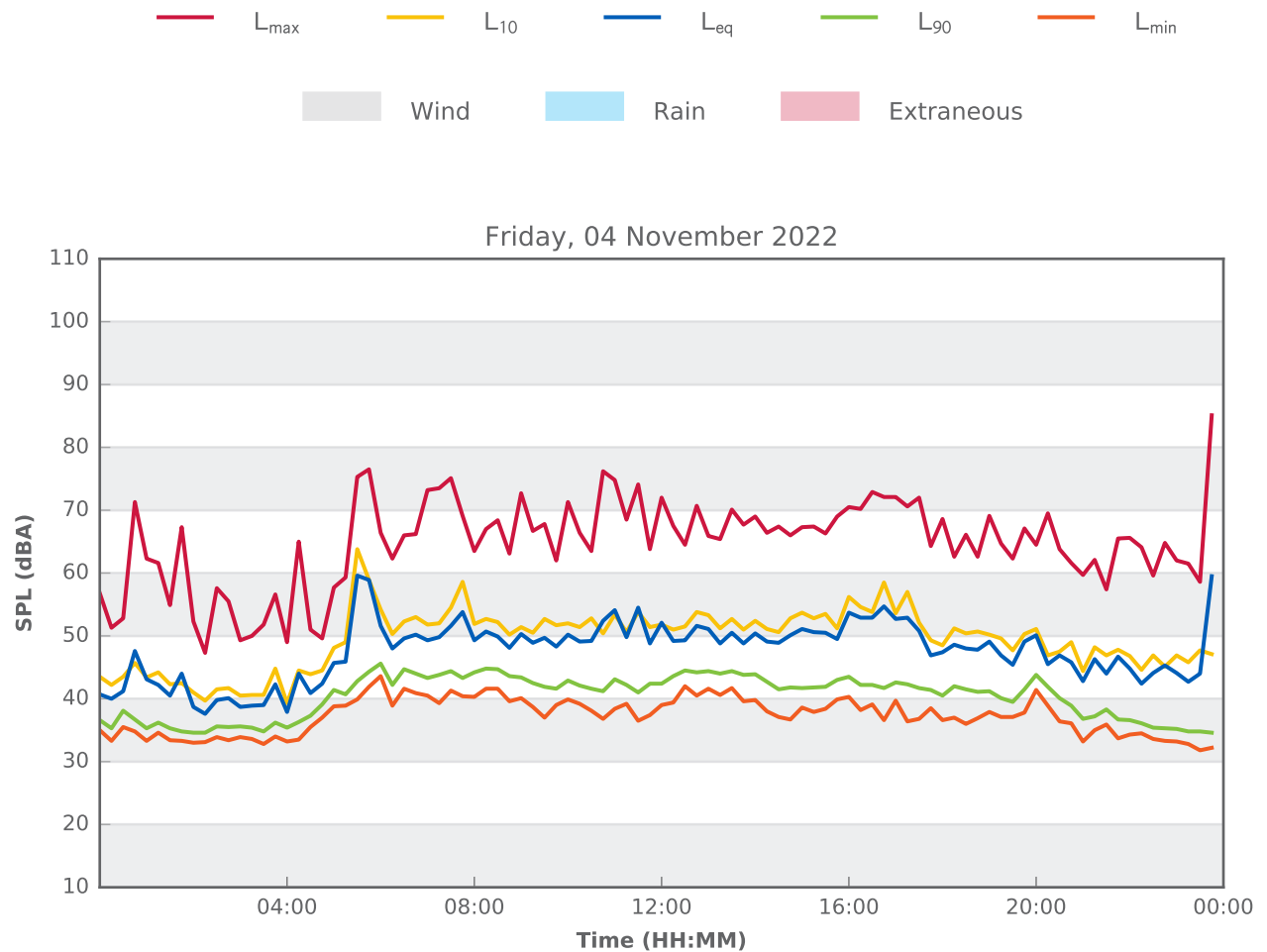
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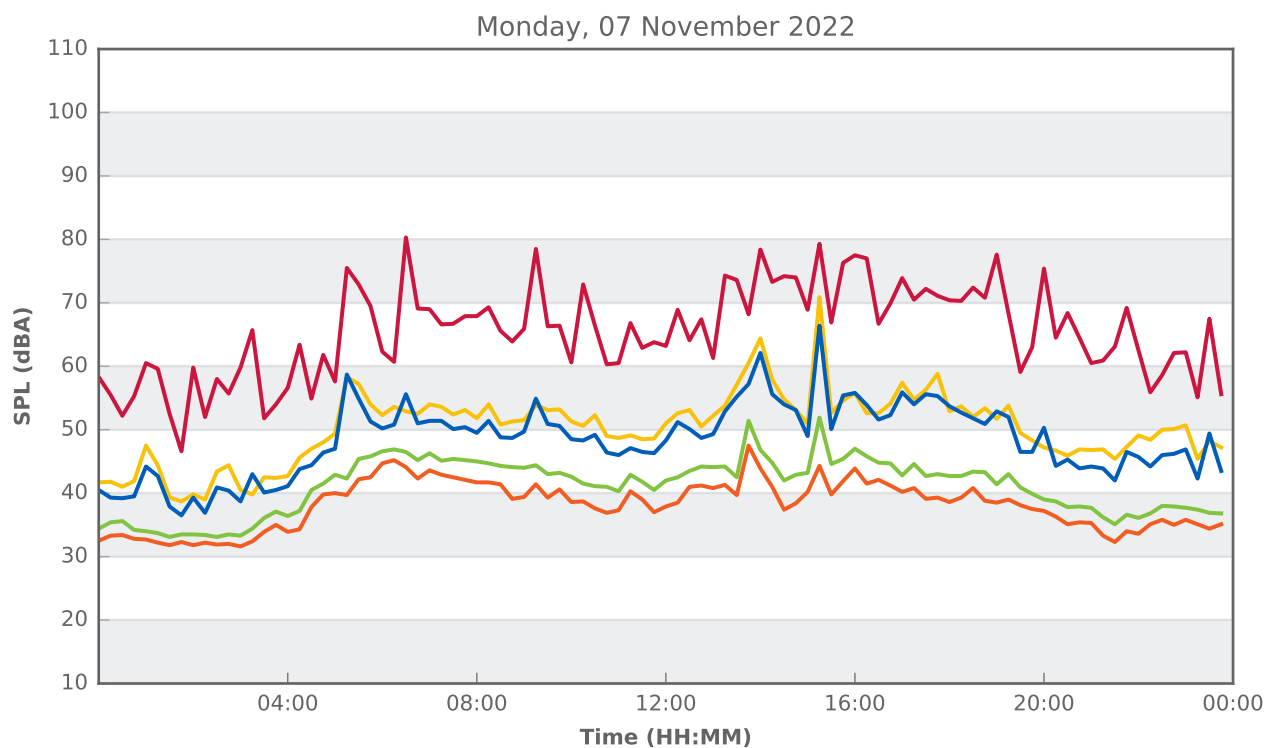
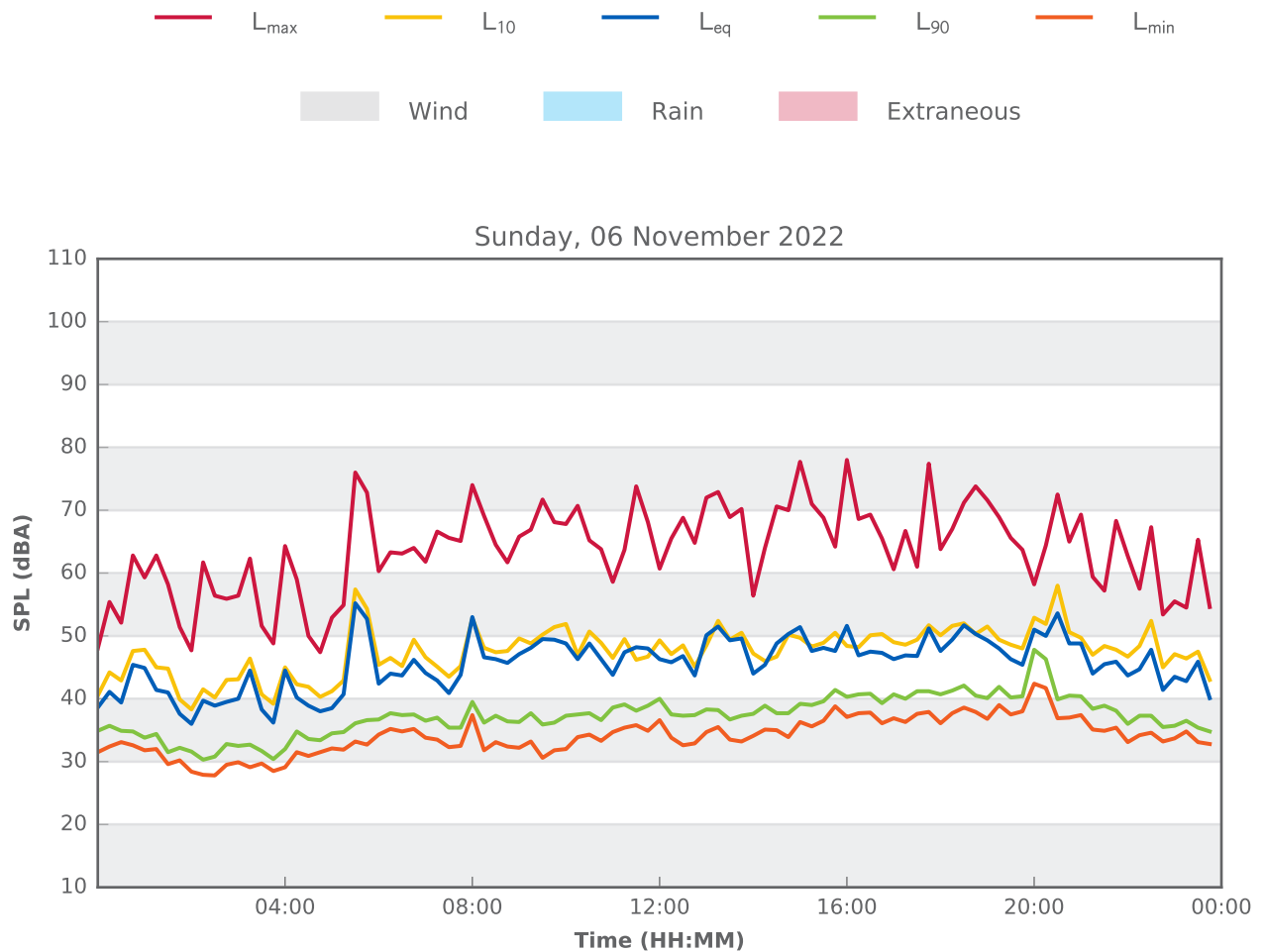
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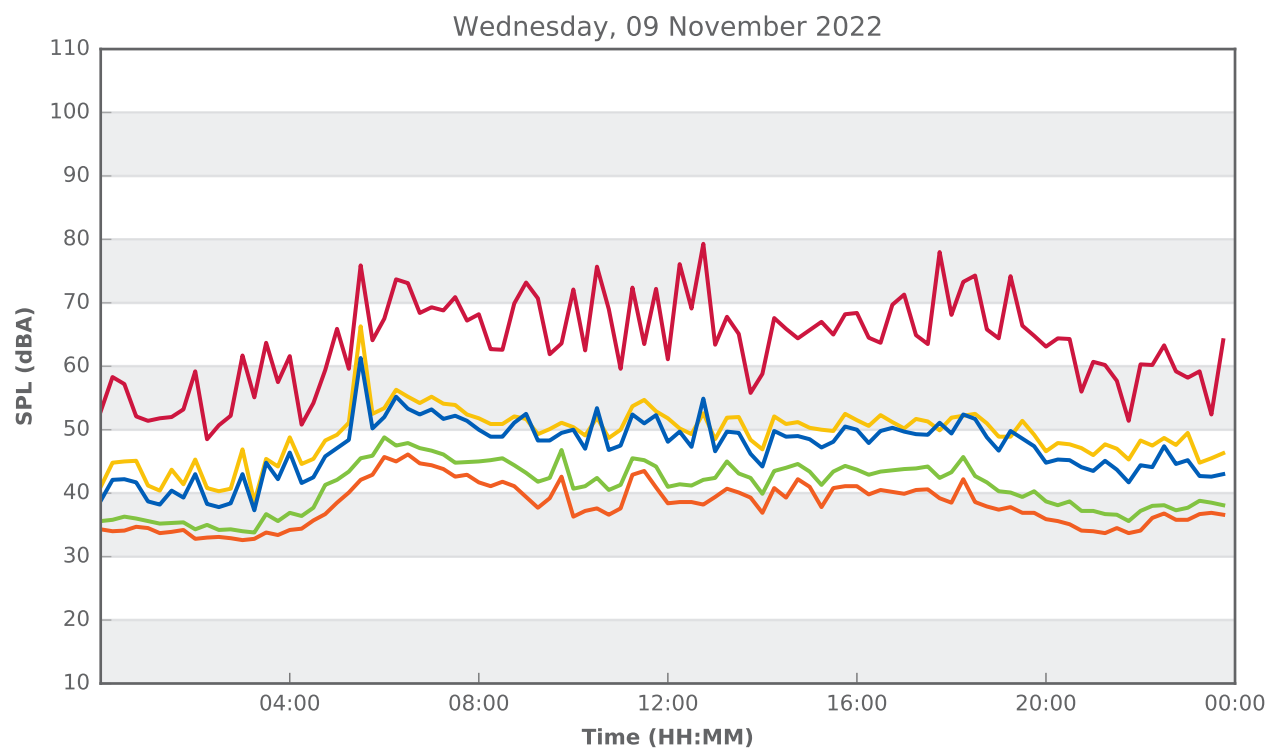
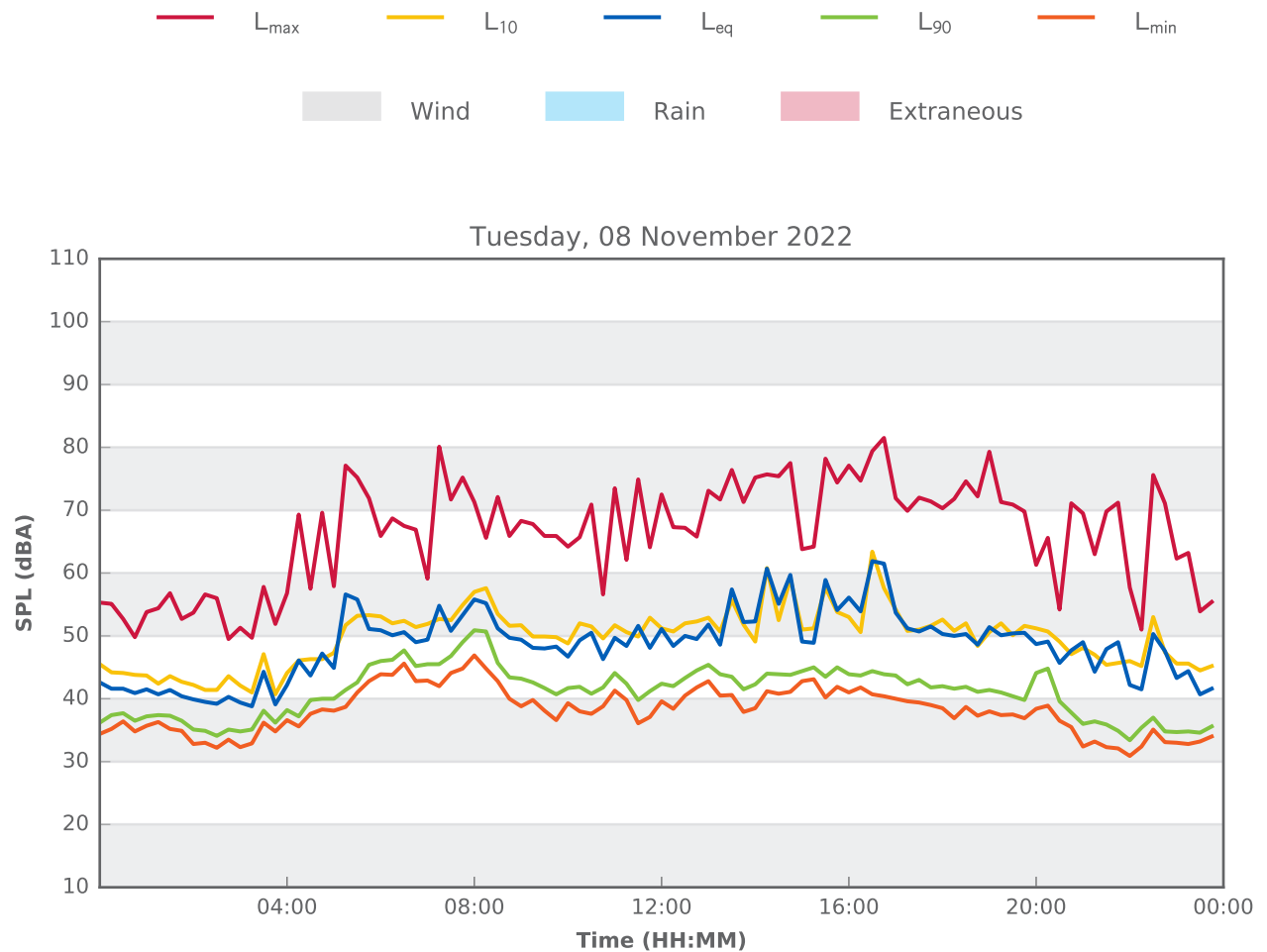
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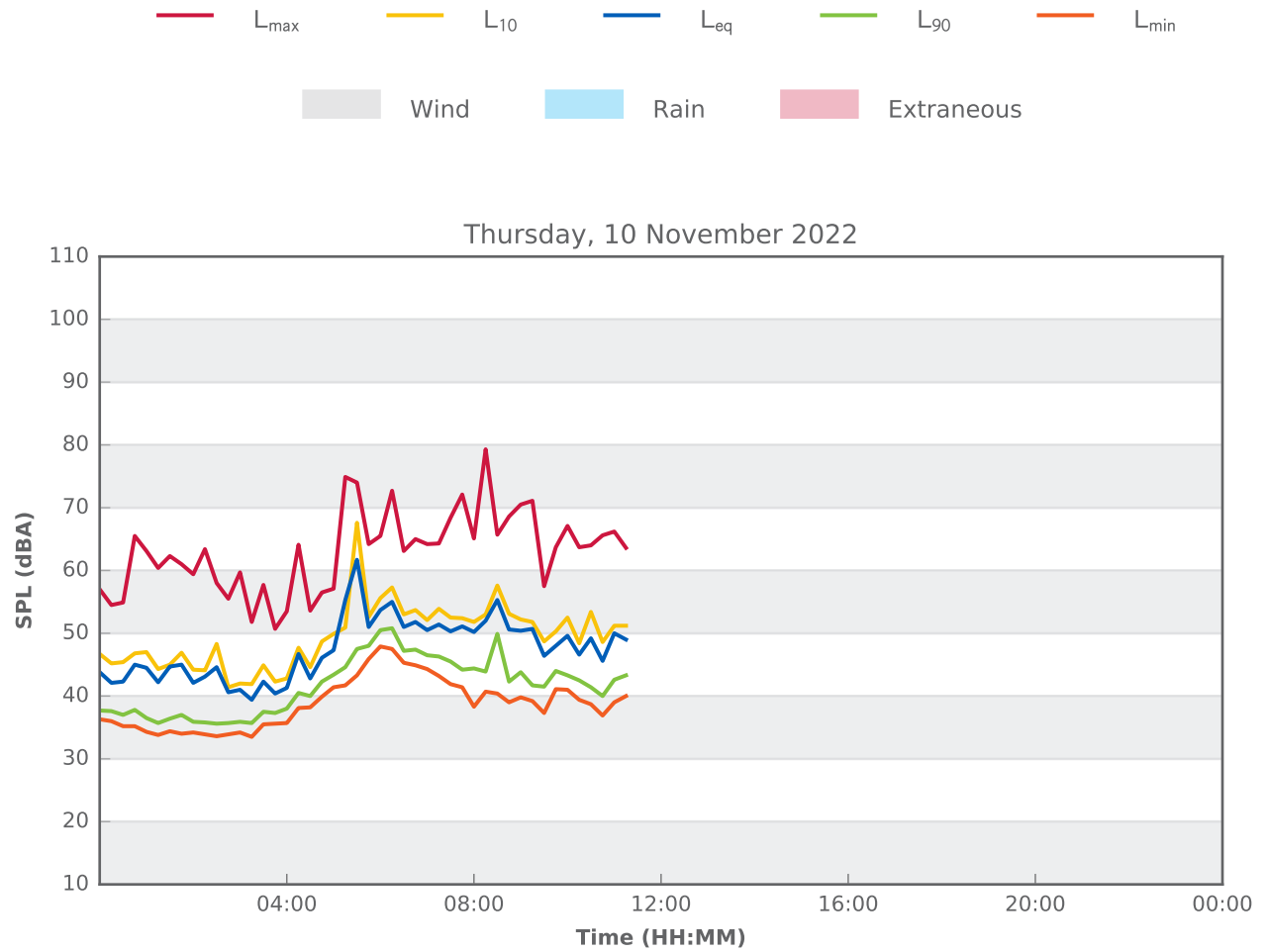
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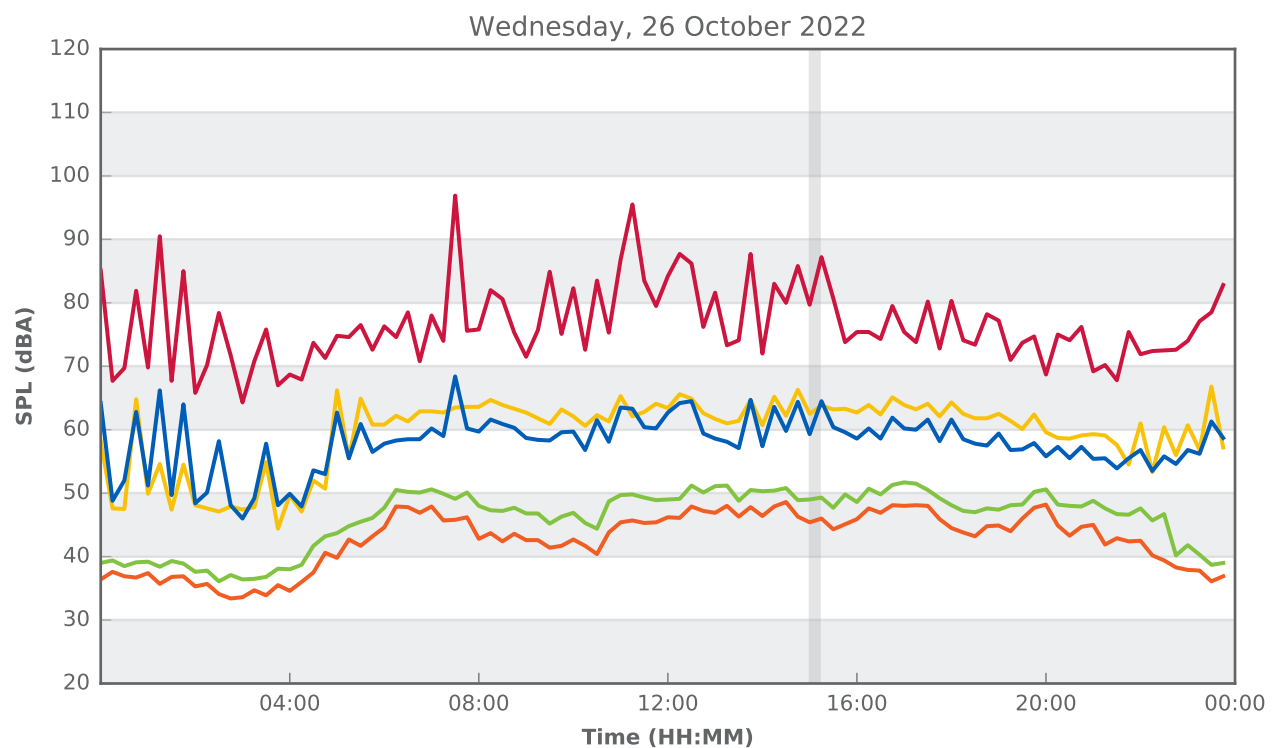
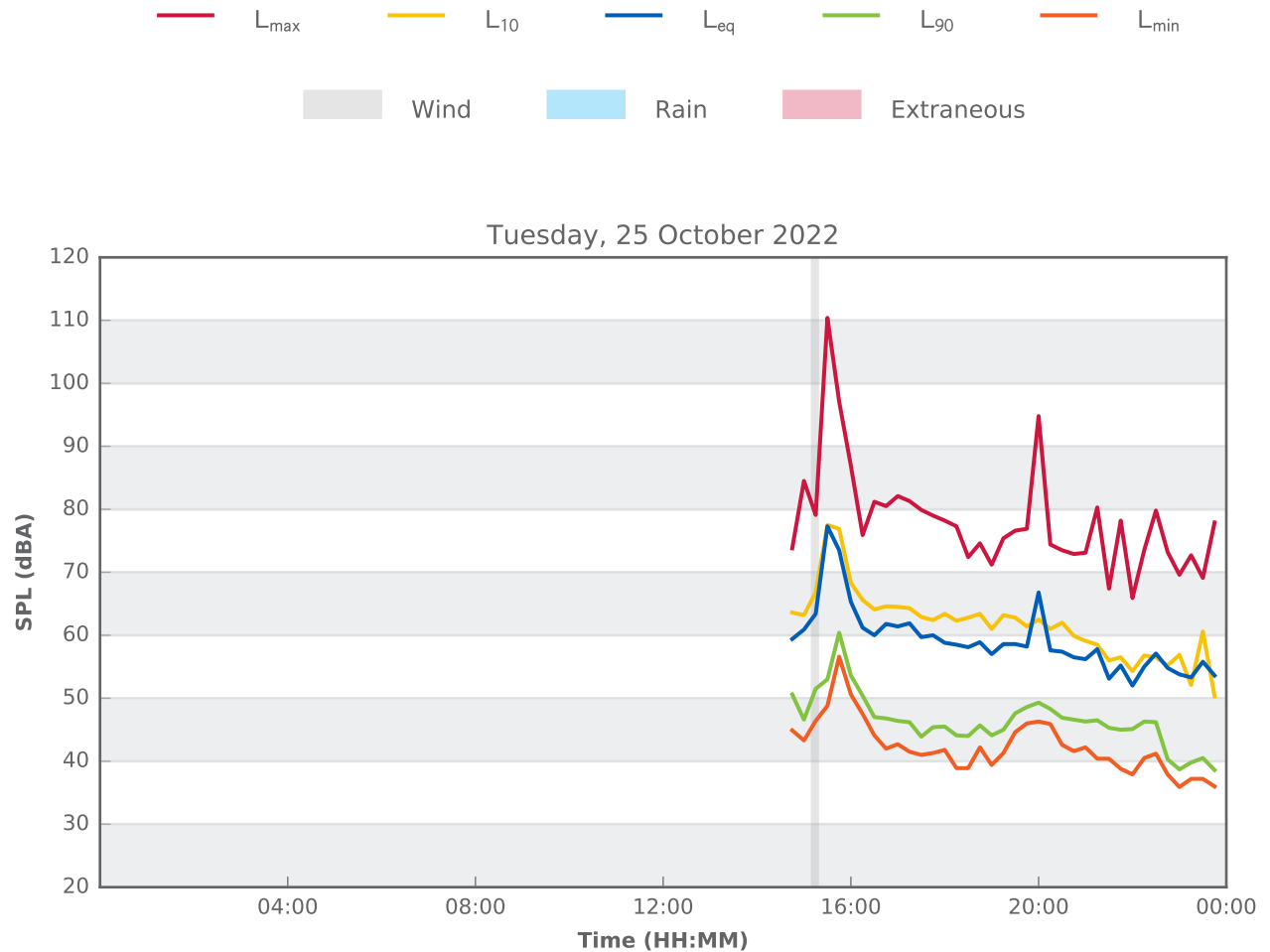
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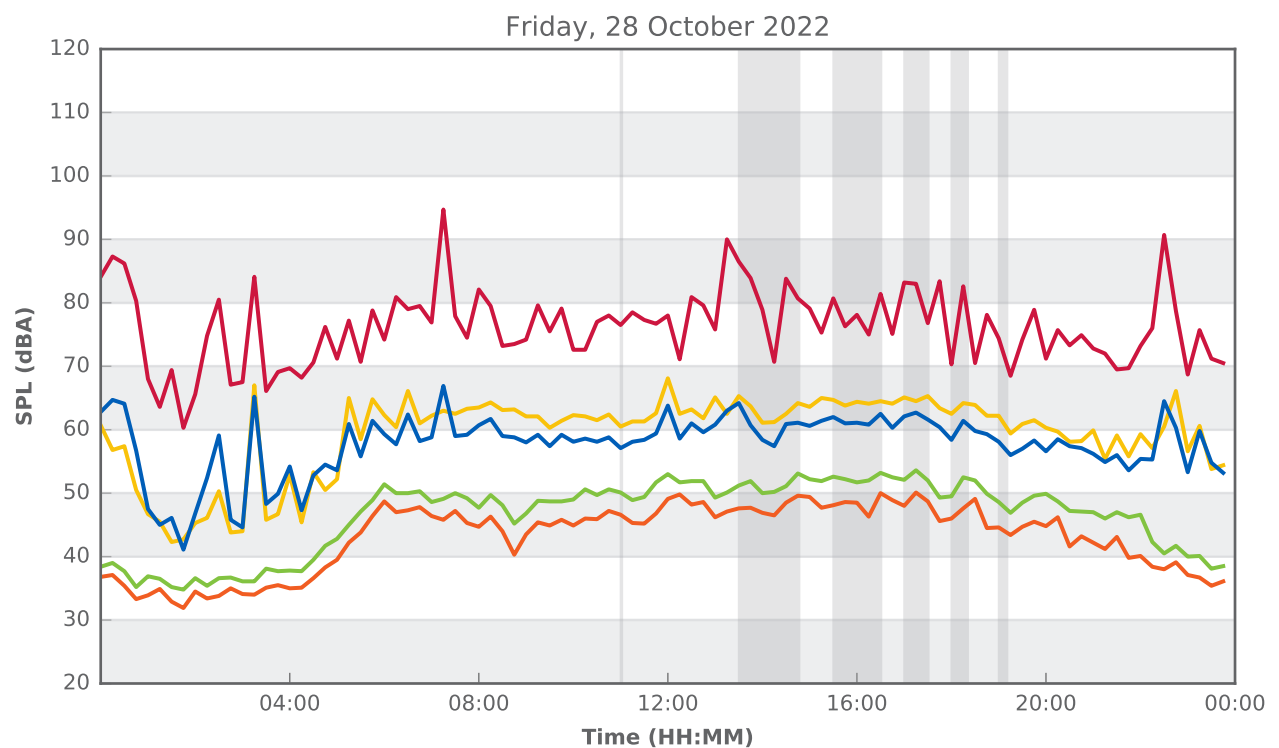
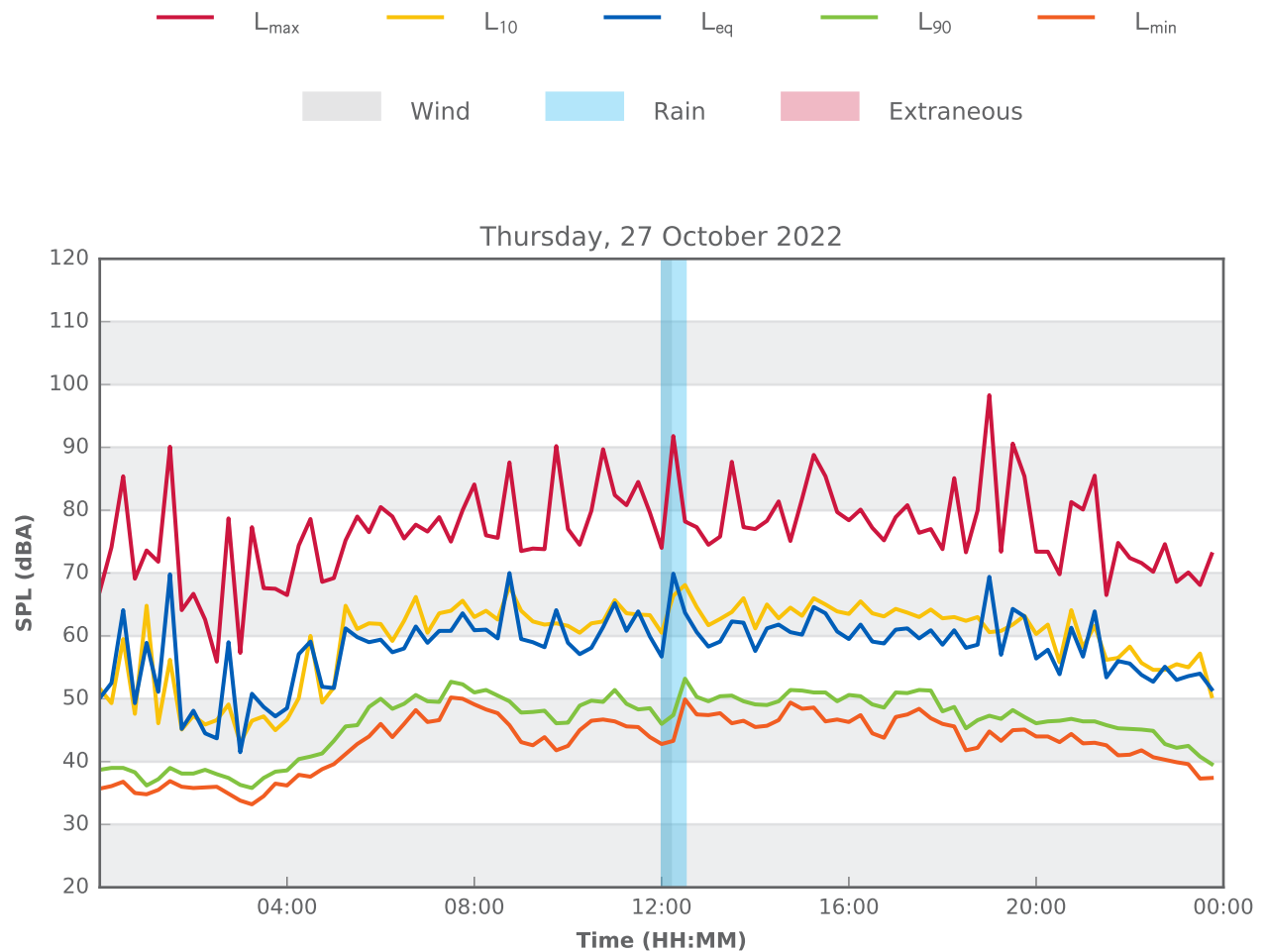
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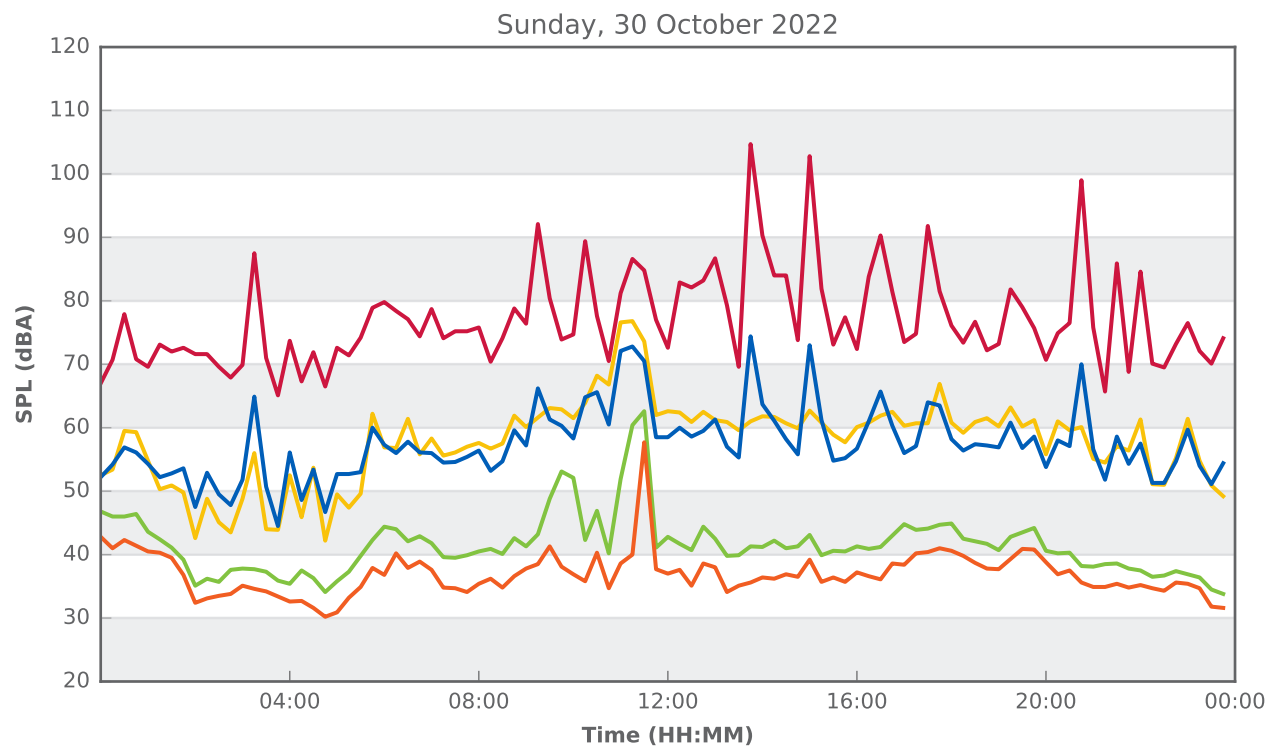
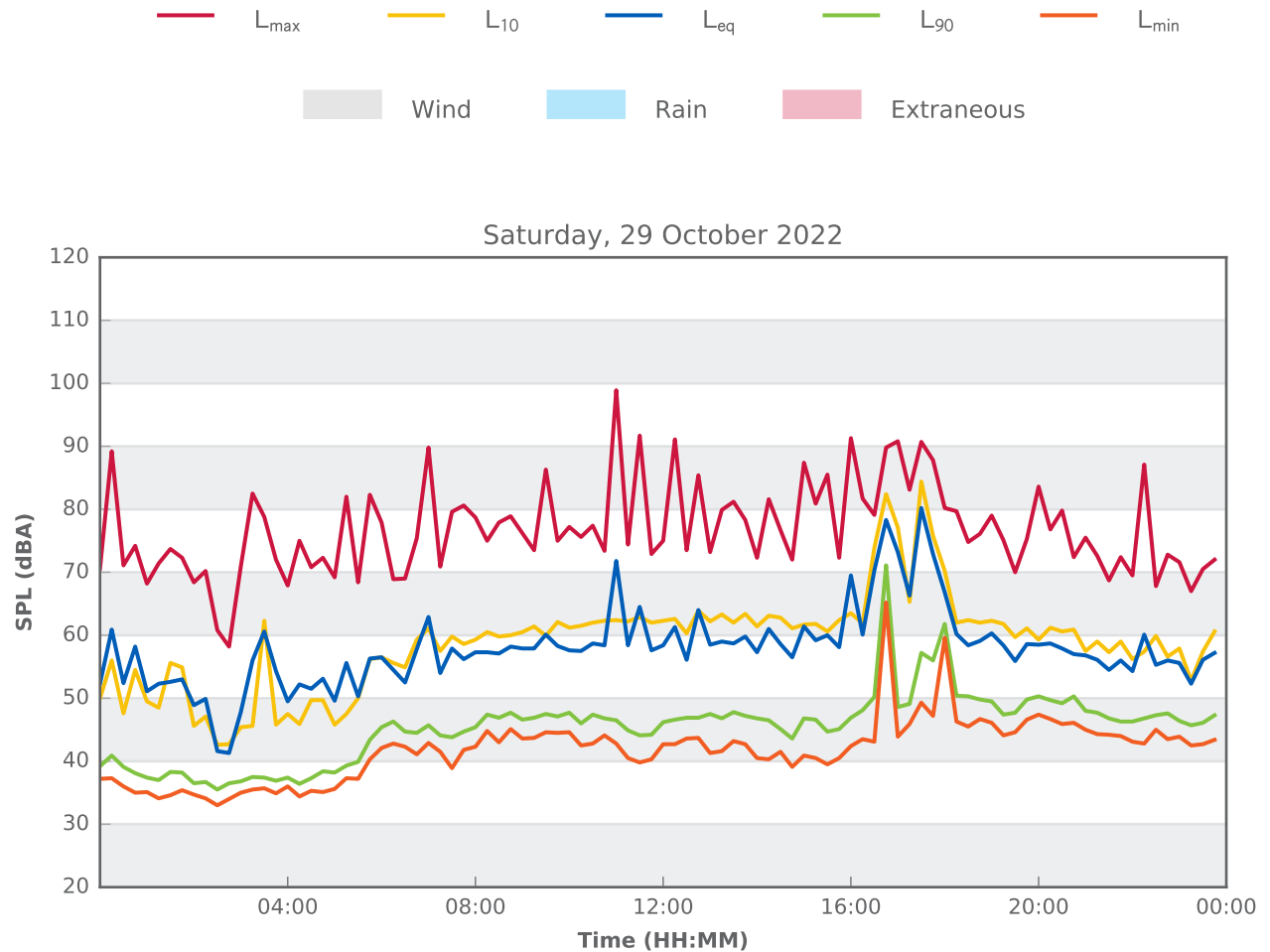
L2 - 2 Australia Street, St Marys NSW



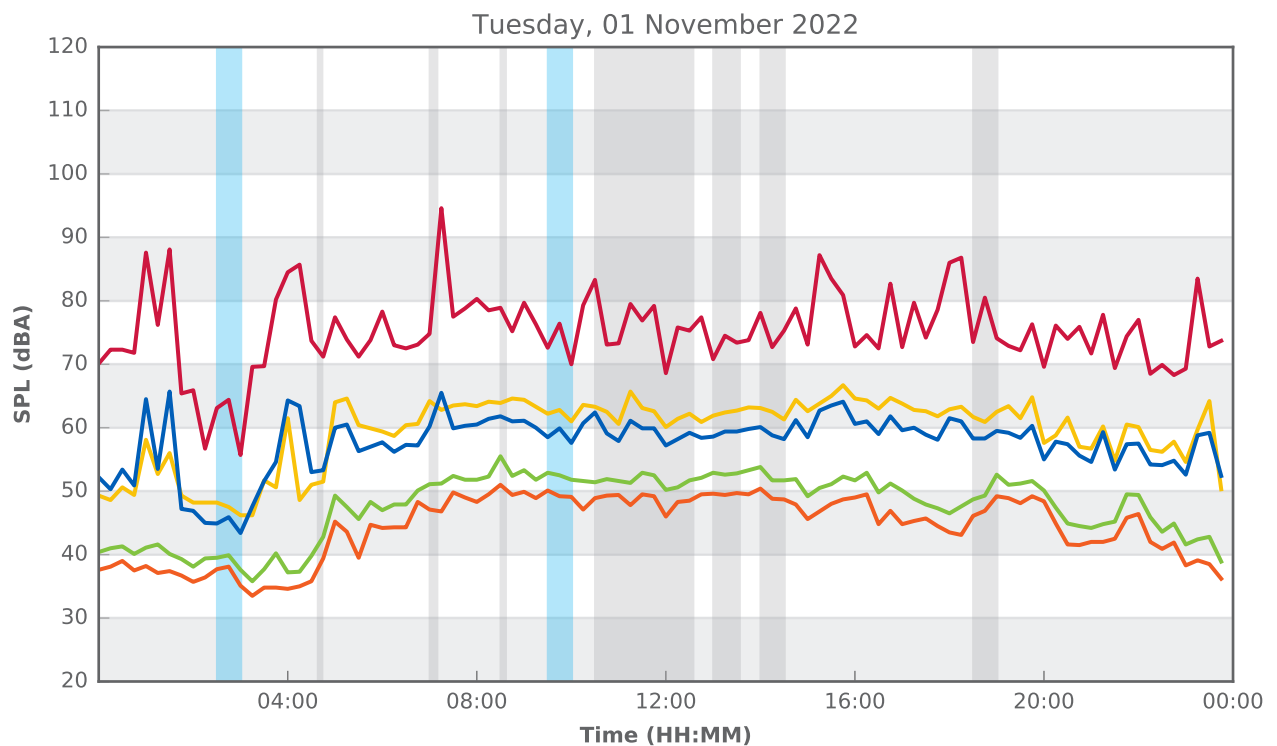
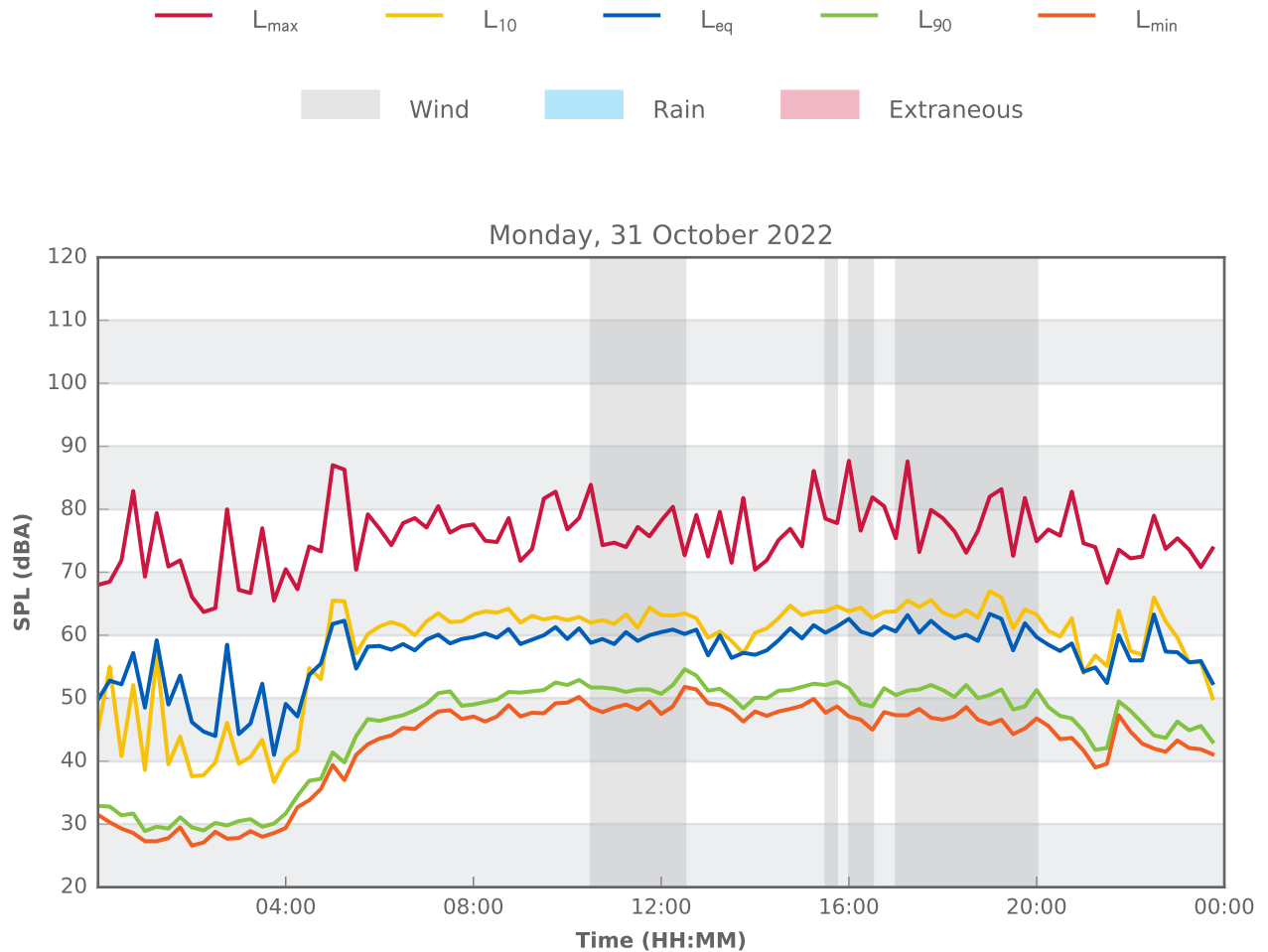
L2 - 2 Australia Street, St Marys NSW



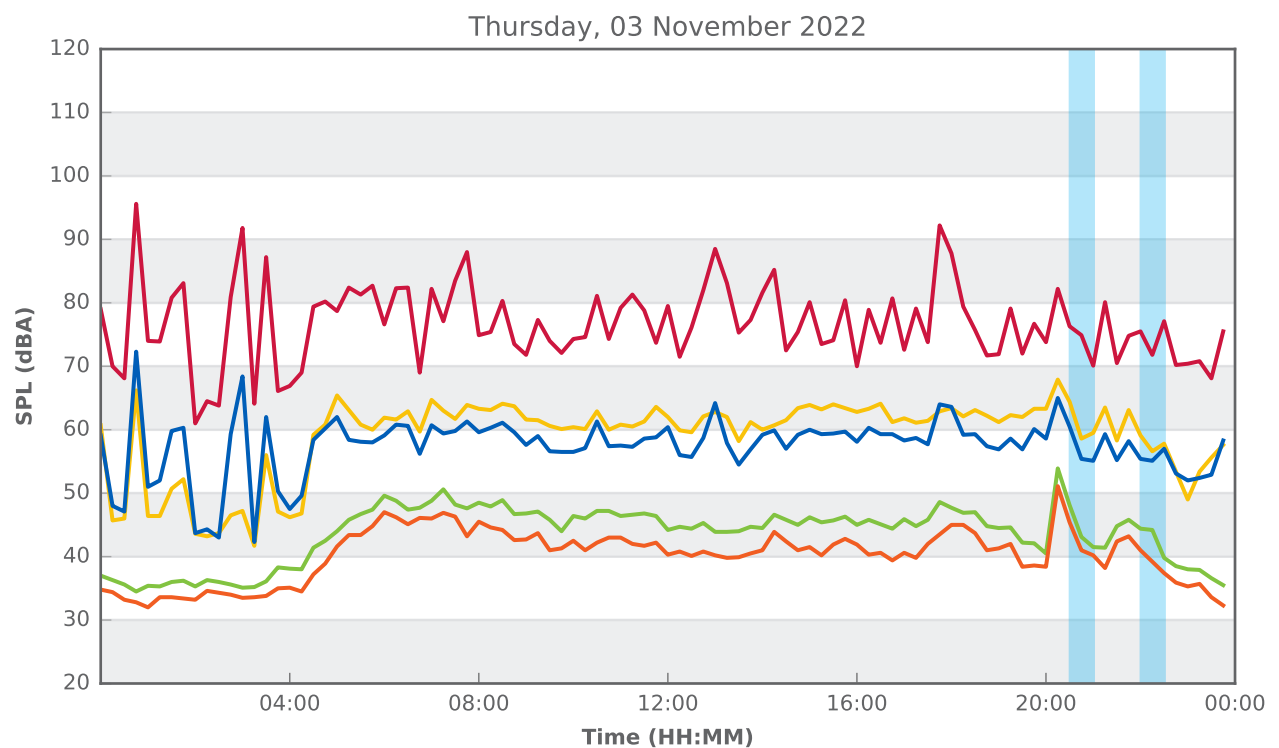
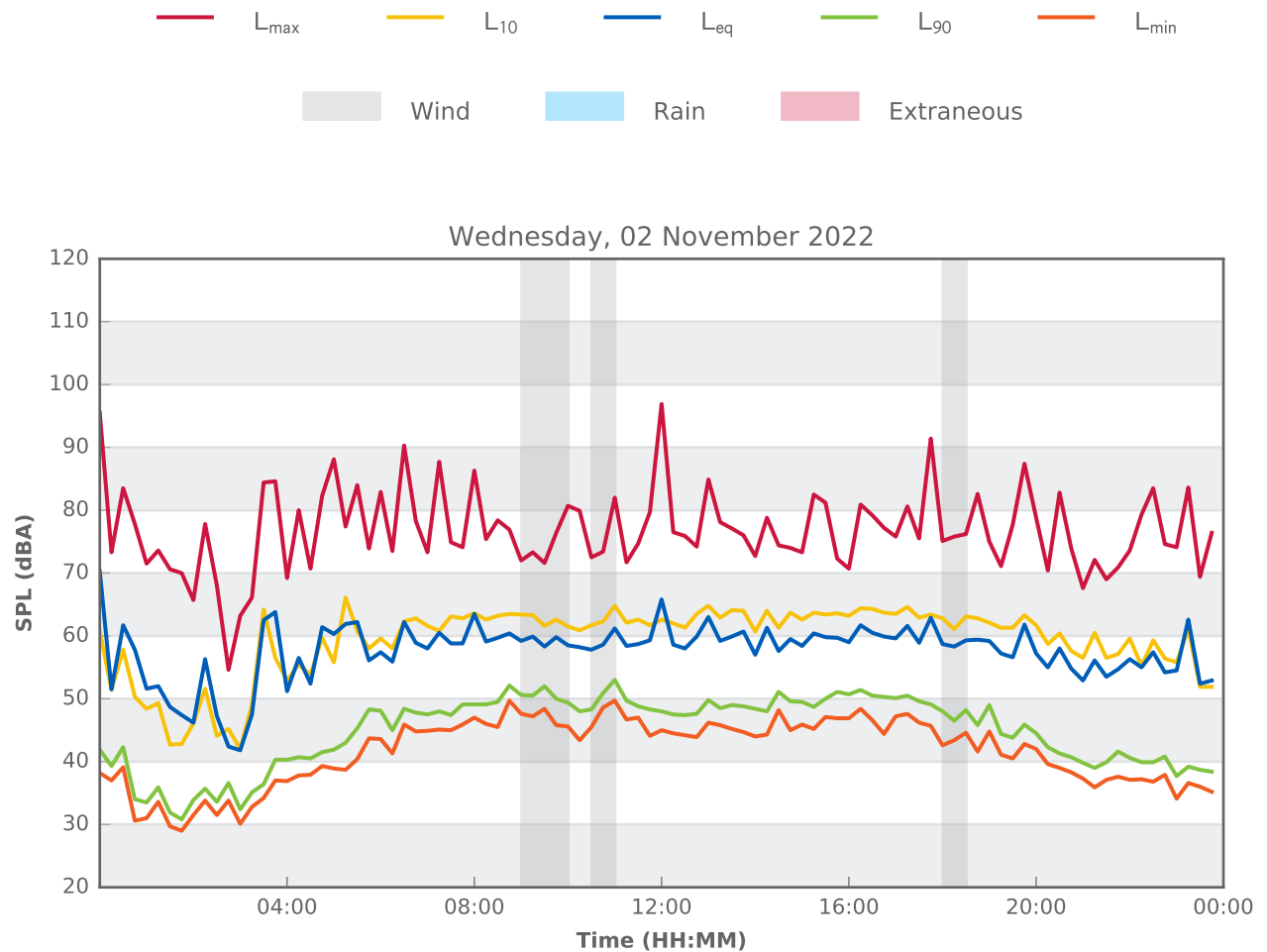
L2 - 2 Australia Street, St Marys NSW



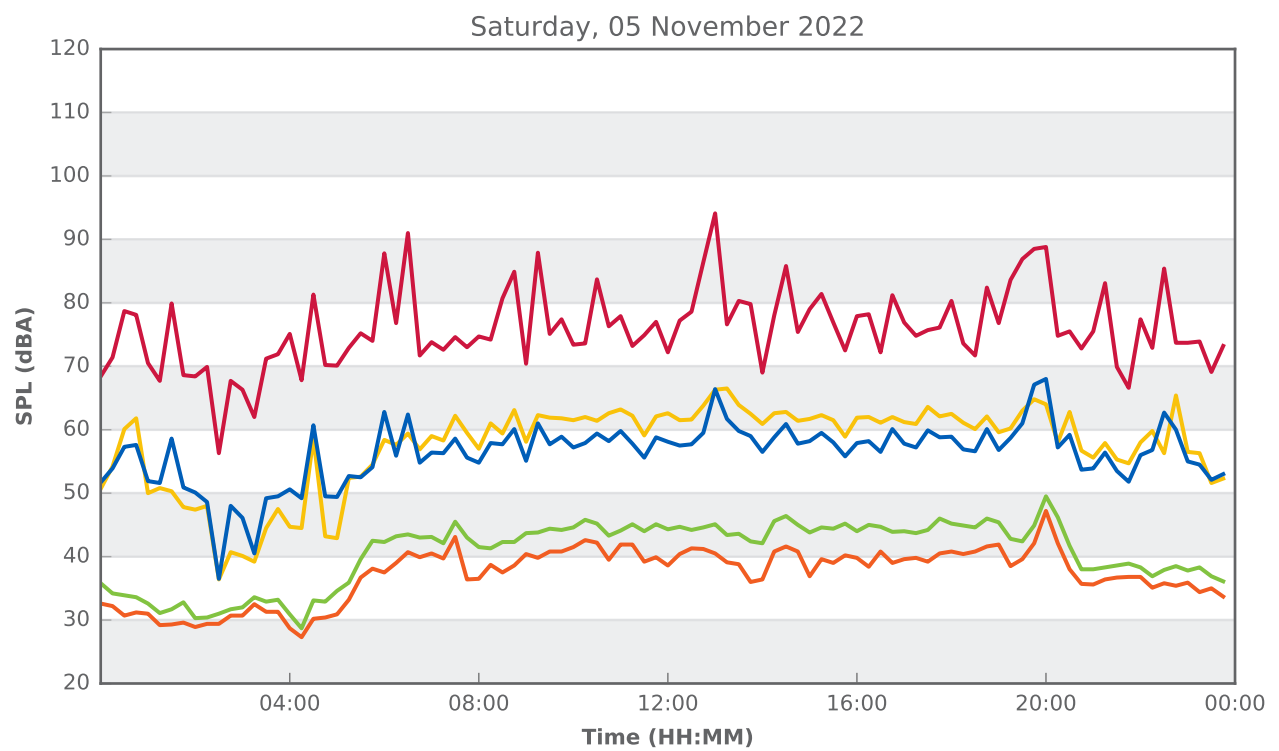
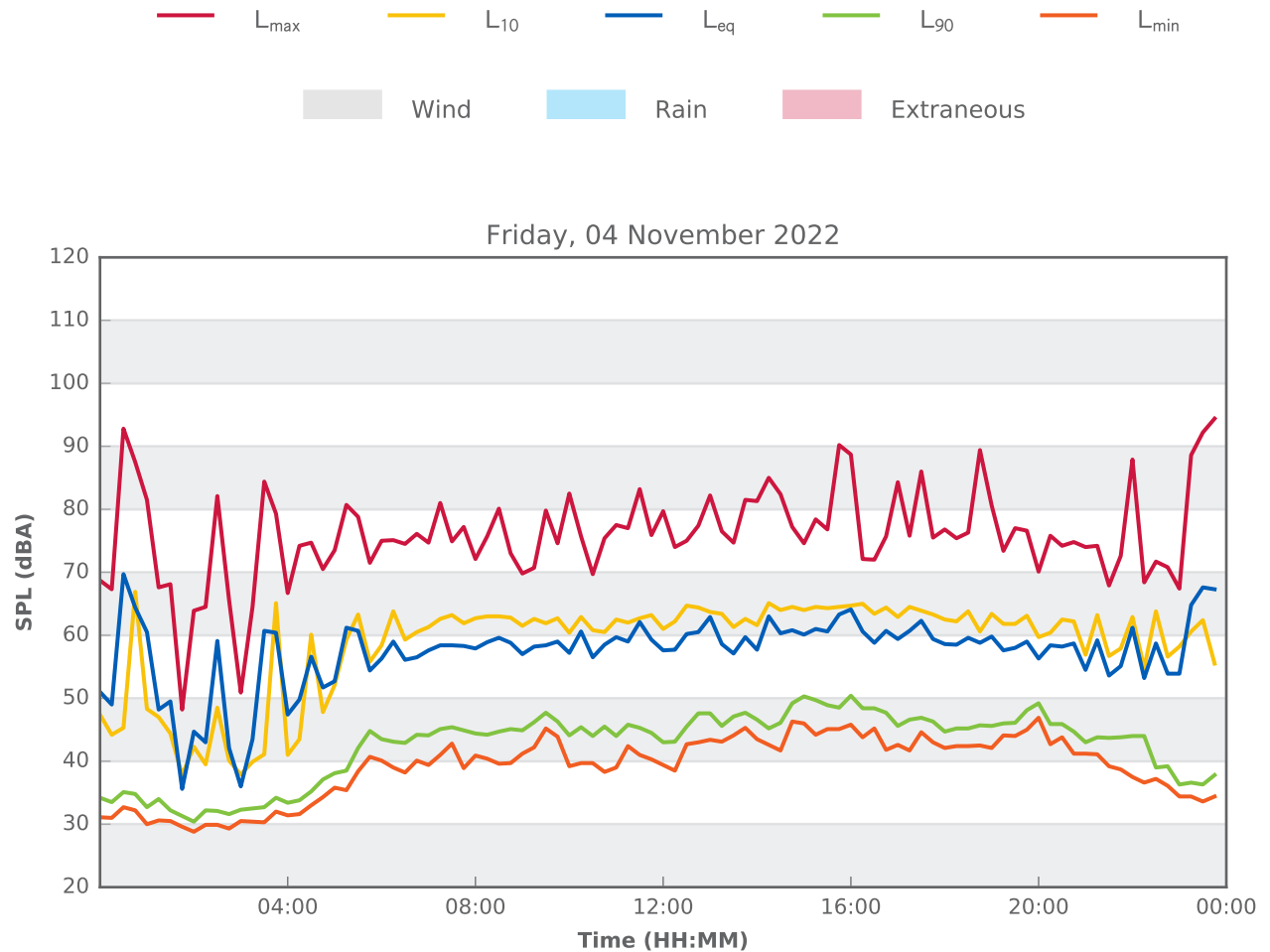
L2 - 2 Australia Street, St Marys NSW



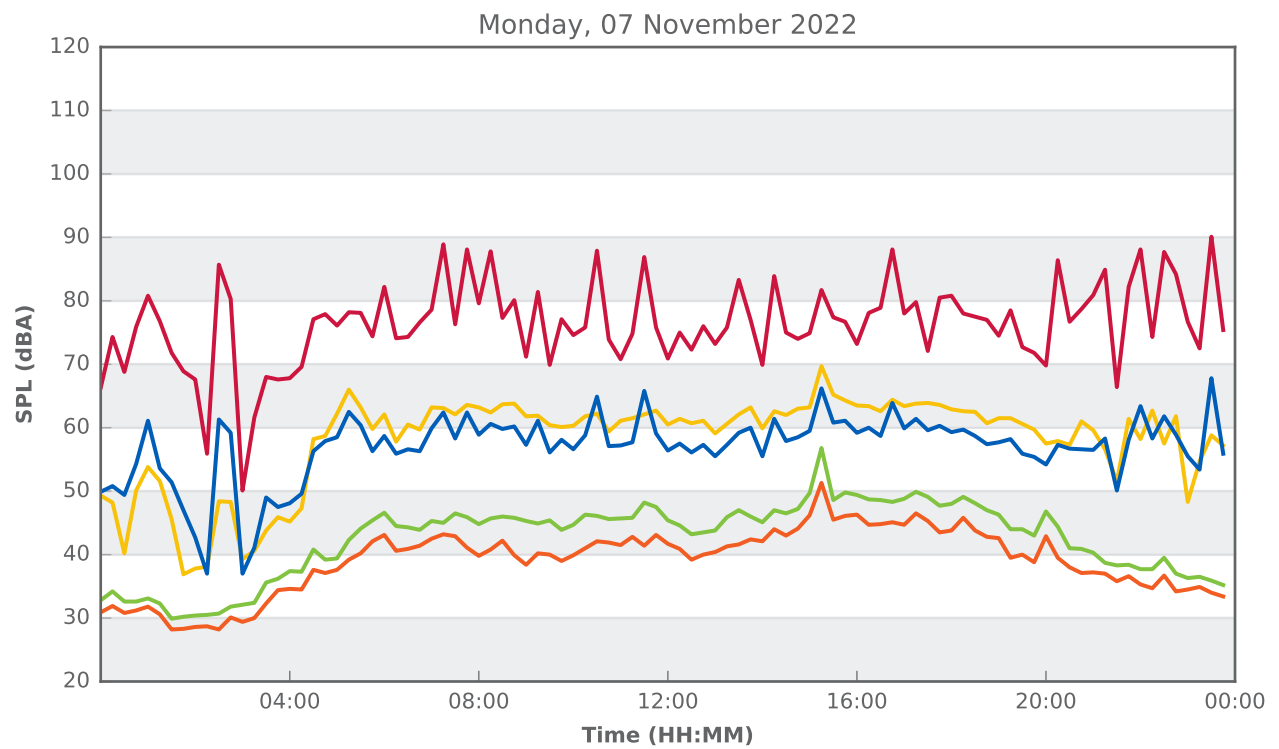
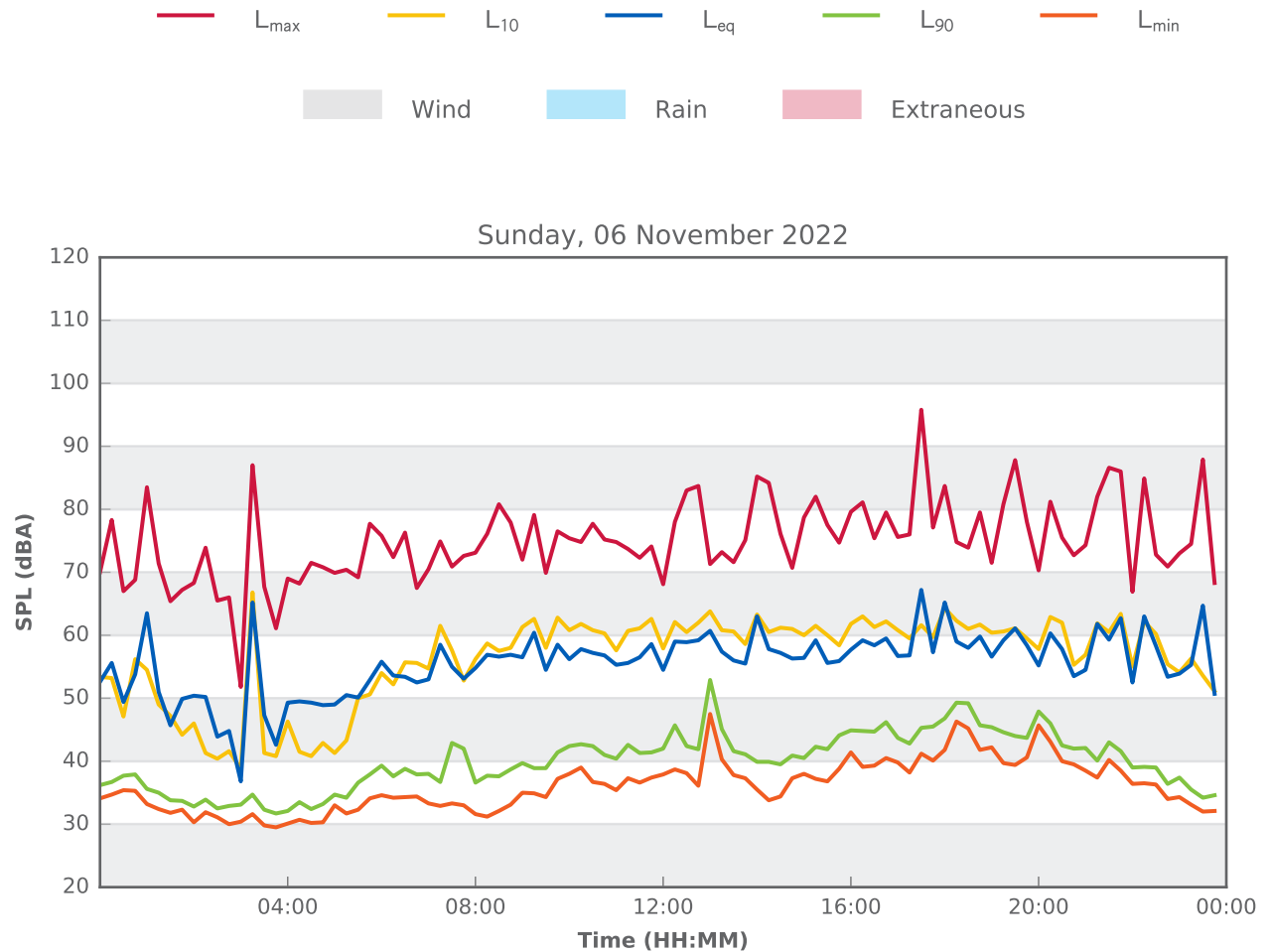
L2 - 2 Australia Street, St Marys NSW



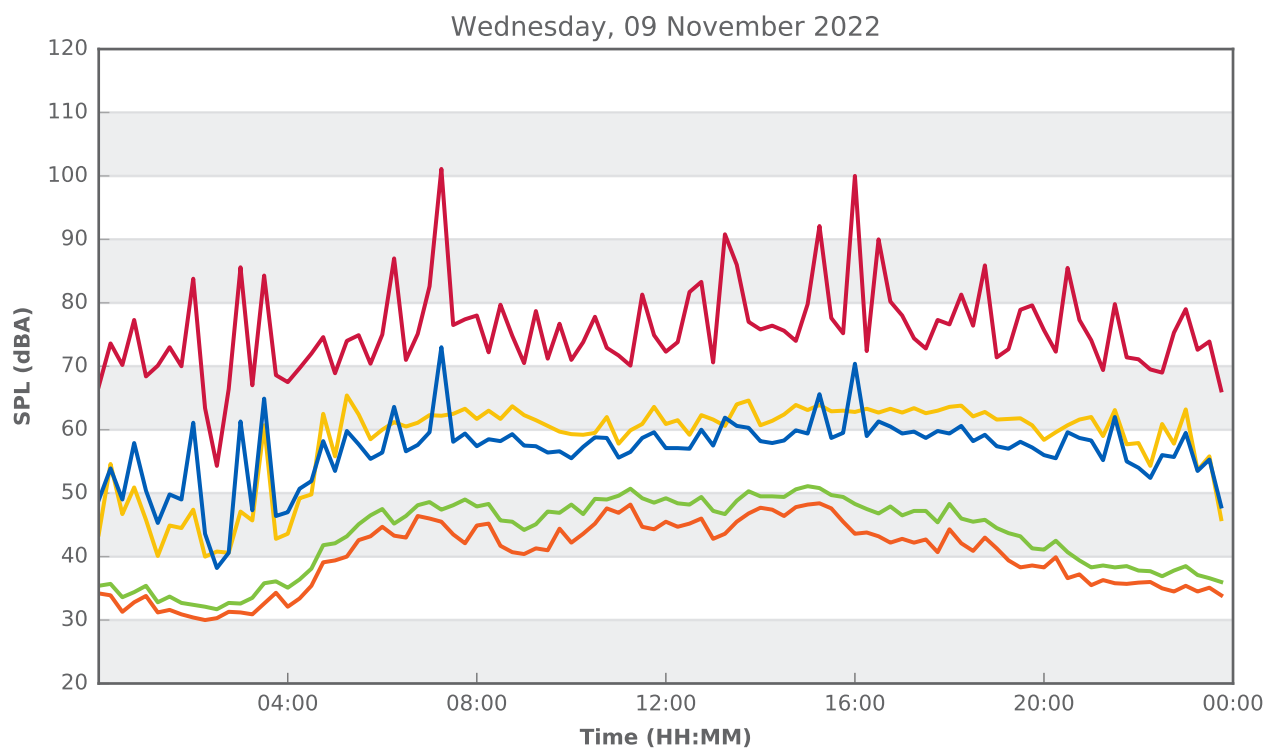
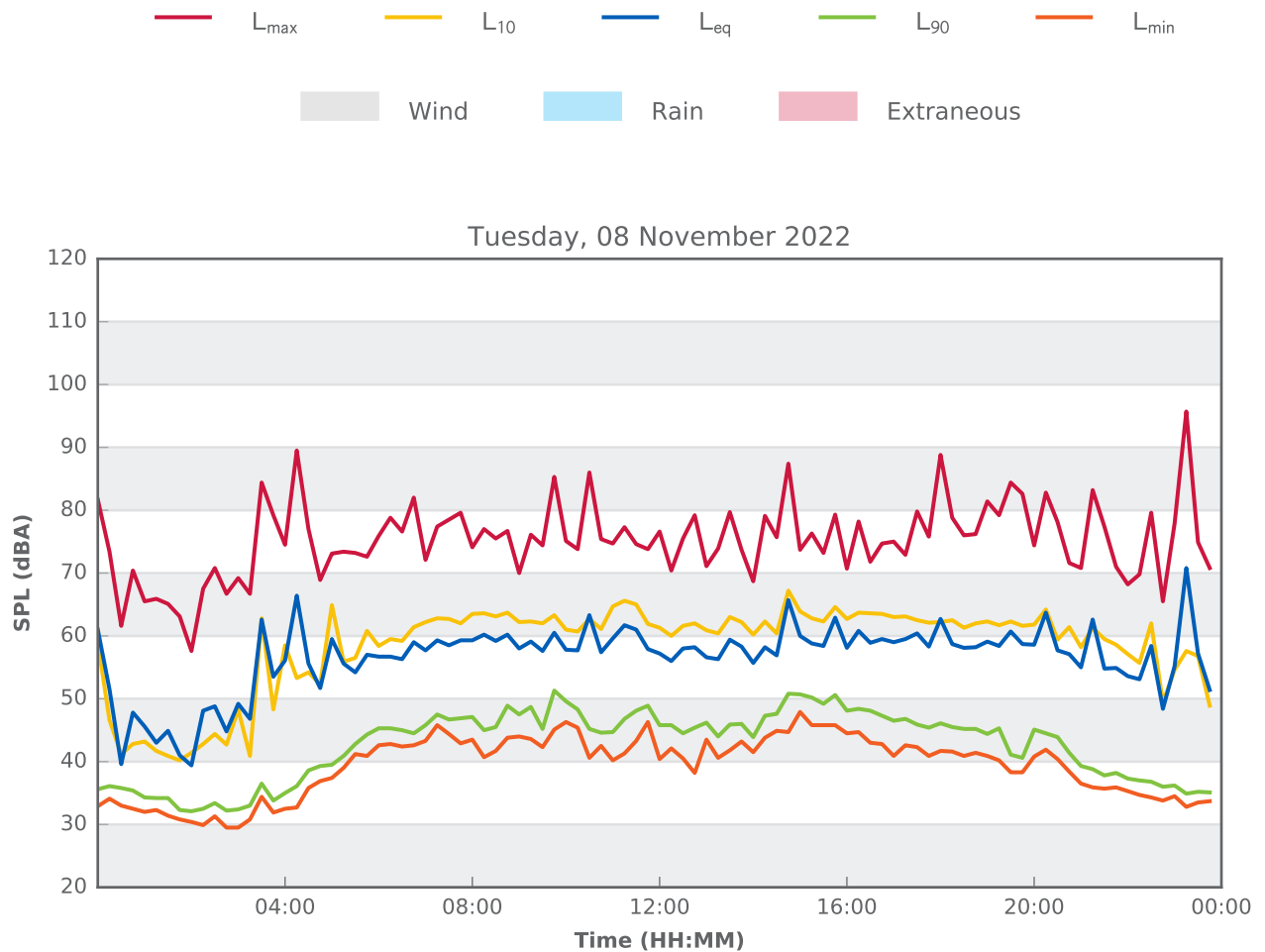
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