ACOUSTICS AND AIR

843 JOHN RENSHAW DRIVE, BLACK HILL

NOISE IMPACT ASSESSMENT

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AUGUST 2020

PREPARED FOR

ENVIROKING INVESTMENTS
843 JOHN RENSHAW DRIVE
BLACK HILL NW 2322

WILKINSON MURRAY

DOCUMENT CONTROL

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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.

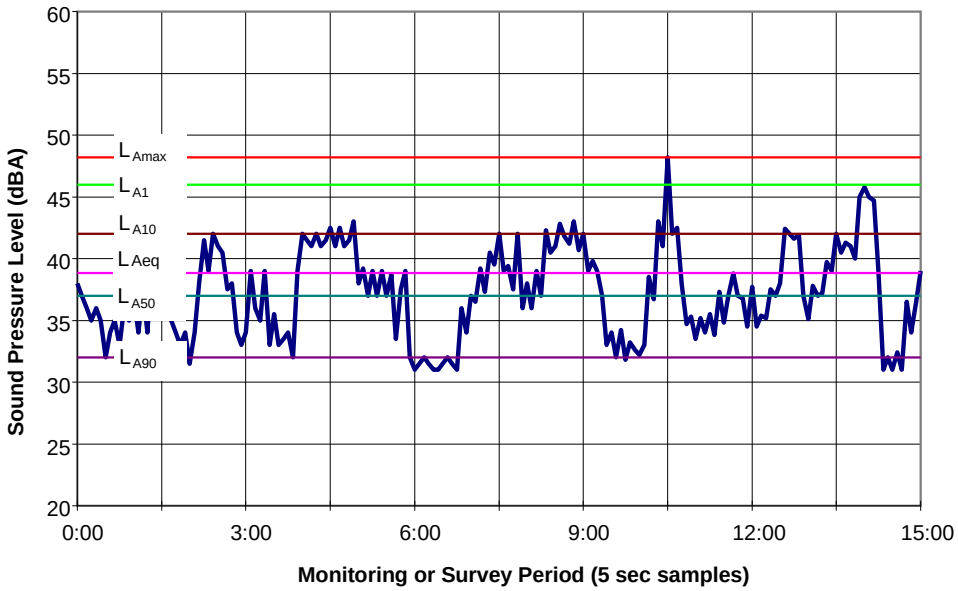
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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.

Typical Graph of Sound Pressure Level vs Time



1 INTRODUCTION

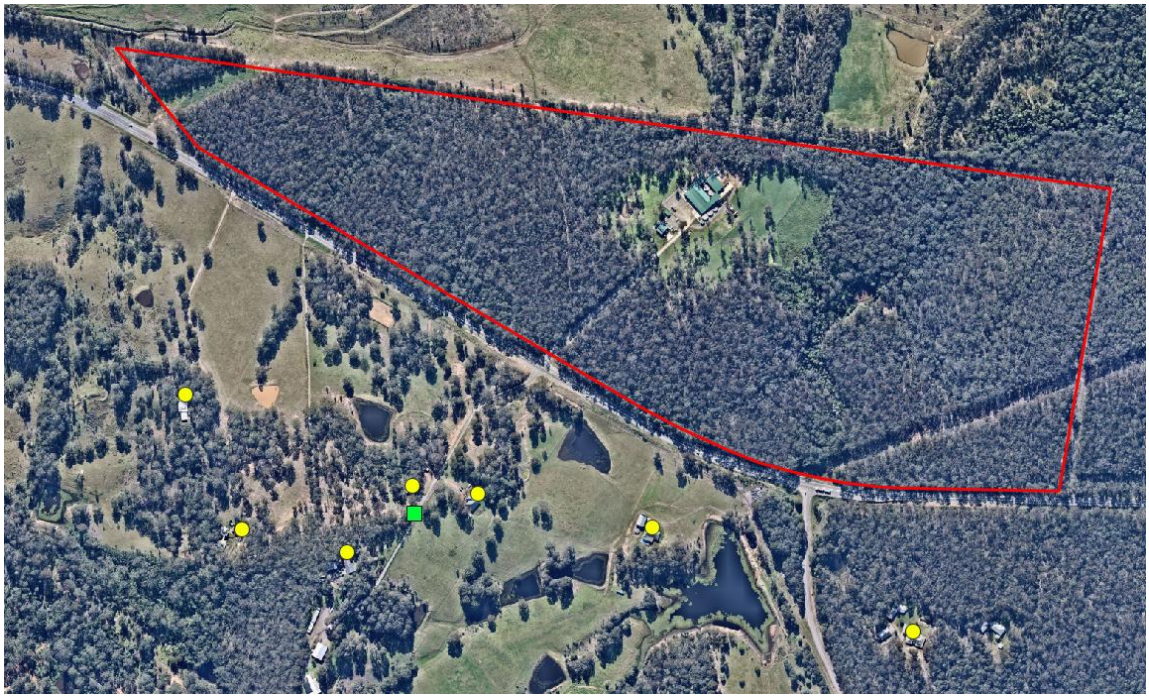
Enviroking Pty Ltd proposes to modify the approved hours of operation of the existing facility at 843 John Renshaw Drive, Black Hill. The modification is predominantly related to allowing trucks to enter the site for unloading at an earlier time. Wilkinson Murray Pty Limited has been engaged on behalf of Enviroking to prepare an Acoustic Impact Assessment to accompany the modification.

The assessment considers operation of the plant, truck movements and unloading within the site, along with traffic on the surrounding road network. The assessment has been conducted in accordance with the NSW *Noise Policy for Industry (NPfI)* (EPA, 2017) and the NSW *Road Noise Policy (RNP)* (DECCW, 2011).

2 SITE AND OPERATIONS DESCRIPTION

The site is located at Lot 931 DP 816814, known as 843 John Renshaw Drive, Black Hill. An aerial view of the site as well as the surrounding residential receivers (shown in yellow) is presented in Figure 2-1. The location of the unattended noise monitoring is also shown (green).

Figure 2-1 Aerial overview of the site & surrounding area



To the north and east of the site are coal mining operations. The land to the south and west is rural with some isolated residential properties. The nearest and potentially most affected receivers are located to the south of the site, opposite John Renshaw Drive. These receivers are presented in Table 2-1 below.

Table 2-1 Closest residential receivers

Address	Lot Number	Approximate Distance
12 Black Hill Road	DP1208965	550m
45 Black Hill Road	DP1091535	750m
850 John Renshaw Drive	DP1048112	575m
836 John Renshaw Drive	DP583620	650m
836 John Renshaw Drive	DP583620	800m
800 John Renshaw Drive	DP804925	900m
786 John Renshaw Drive	DP804925	900m

The proposal seeks to modify the currently approved hours of operation to allow trucks to leave and re-enter the site and unload earlier as well as modify the hours of operation for the plant. There is no proposed change to the operation of the site during the already approved hours.

These current approved hours and proposed changes are presented in Table 2-2. The proposed changes are highlighted with italics. The current approval does not specify times for vehicle movements on the site.

Table 2-2 Current and proposed hours of operation

Activity	Day	Current hours	Proposed hours
Construction	Monday – Friday	7:00am to 6:00pm	7:00am to 6:00pm
	Saturday	8:00am to 1:00pm	8:00am to 1:00pm
	Sunday and Public Holidays	Nil	Nil
Plant operation	Monday – Friday	7:00am to 5:00pm	*5:00am* to 5:00pm
	Saturday	7:00am to 12:00pm	*6:00am* to 12:00pm
	Sunday and Public Holidays	Nil	Nil
Collection/delivery vehicles	*Monday – Friday*	N/A	*1:30am to 7:00am – (up to 13 vehicle trips) 7:00am to 6:00pm – unrestricted*
	Saturday	N/A	*1:30am to 7:00am – (up to 13 vehicle trips) 7:00am to 6:00pm – unrestricted*
	Sunday and Public Holidays	N/A	*Nil*
Emergency collection vehicle access	*Seven days per week*	N/A	*24 hours per day*

3 NOISE ASSESSMENT

3.1 Existing Noise Environment

To determine the existing noise levels in the surrounding rural area unattended noise monitoring was conducted. A noise monitor was located at 836 John Renshaw Drive, Black Hill between 30th July 2020 to 8th August 2020.

The noise monitoring equipment used for this measurement consisted of an ARL NGARA environmental noise logger set to A-weighted, fast response, continuously monitoring in 15-minute intervals. This equipment is capable of remotely monitoring and storing noise level descriptors for later detailed analysis. The equipment calibration was checked before and after the survey and no significant drift was noted.

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1}, L_{A10} and L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary of Acoustic Terms for definitions). The L_{A90} level is normally taken as the background noise level during the relevant period. From the background noise levels (L_{A90}) the Rating Background Levels (RBLs) were determined using the methodology recommended in the NSW *Noise Policy for Industry* (NPfI).

Table 3-1 Existing ambient noise levels

Monitoring Location	Time of Day	Noise Levels (dBA)	
		RBL	L_{Aeq}
836 John Renshaw Drive	Day	45	61
	Evening	40	52
	Night	35	50
	15-hour	-	55
	9-hour	-	47

Day = 7:00am – 6:00pm; Evening = 6:00pm – 10:00pm; Night = 10:00pm – 7:00am.

3.2 Operational Noise Trigger Levels

The *Noise Policy for Industry (NPfI) (EPA, 2017) provides a framework for assessing environmental noise impacts from industrial premises and industrial development proposals in New South Wales.*

The NPfI recommends the development of project noise trigger levels, which provide a benchmark for assessing a proposal or site. The project noise trigger levels should not be interpreted as mandatory noise criteria but, rather, as noise levels that, if exceeded, would indicate a potential noise impact on the community.

The project noise trigger level is the lower value of the project intrusiveness noise level and the project amenity noise level. The project intrusiveness noise level assesses the likelihood of noise being intrusive above the ambient noise level and is applied to residential receivers only. The project amenity noise level ensures the total industrial noise from all sources in the area does not rise above a maximum acceptable level.

3.2.1 NPfI Project Intrusiveness Noise Levels

The intrusiveness noise level is the noise level 5 dBA above the background noise level (RBL) for each time period (daytime, evening or night time) of interest at a residential receiver. The RBL is derived from the measured L_{A90} noise levels.

Intrusiveness noise levels for the project are calculated from the RBLs at location M1, given it is the closest monitoring location to the site, and are presented in Table 3-2.

Table 3-2 Project intrusiveness noise levels

Receiver	Time of Day	RBL	Project Intrusiveness Noise Level ($L_{Aeq,15min}$)
All	Day	45	50
	Evening	40	45
	Night	35	40

Day = 7:00am – 6:00pm; Evening = 6:00pm – 10:00pm; Night = 10:00pm – 7:00am.

3.2.2 NPfI Project Amenity Noise Levels

Project amenity noise levels aim to set a limit on continuing increases in noise levels from all industrial noise sources affecting a variety of receiver types; that is, the ambient noise level in an area from all industrial noise sources remains below recommended amenity noise levels.

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include transportation noise (when on public transport corridors), noise from motor sport, construction noise, community noise, blasting, shooting ranges, occupational workplace noise, wind farms, amplified music/patron noise.

The amenity noise level aims to limit continuing increases in noise levels which may occur if the intrusiveness level alone is applied to successive development within an area.

The recommended amenity noise level represents the objective for total industrial noise at a receiver location. The project amenity noise level represents the objective for noise from a single industrial development at a receiver location.

To prevent increases in industrial noise due to the cumulative effect of several developments, the project amenity noise level for each new source of industrial noise is set at 5 dBA below the recommended amenity noise level.

The project amenity noise levels are calculated from the recommended amenity noise levels presented in Table 3-3.

Table 3-3 Recommended amenity noise levels

Receiver	Noise Amenity Area	Time of Day	Recommended Amenity Noise Level (dBA $L_{Aeq,period}$)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45

Day = 7:00am – 6:00pm; Evening = 6:00pm – 10:00pm; Night = 10:00pm – 7:00am.

Recommended amenity noise levels presented in Table 3-3 above represent the objective for total industrial noise at a receiver location. In the case of a single new noise source being proposed, the project amenity noise level represents the objective for noise from a single industrial development at the receiver location. This is calculated as the recommended amenity noise level minus 5 dBA.

Due to different averaging periods for the $L_{Aeq,15min}$ and $L_{Aeq,period}$ noise descriptors, the values of project intrusiveness and amenity noise levels cannot be compared directly when identifying noise trigger levels i.e.; the most stringent values of each category. In order to make a comparison between descriptors, the *NPfI* assumes that the $L_{Aeq,15min}$ equivalent of an $L_{Aeq,period}$ noise level is equal to the $L_{Aeq,15min}$ level plus 3 dBA.

Based on the methodology for determining residential receiver category in the *NPfI*, the area surrounding the site can be classified as 'Rural'. These amenity noise levels have been adopted and are presented in Table 3-4.

Table 3-4 Project amenity noise levels

Noise Amenity Area	Time of Day	Recommended Amenity Noise Level ($L_{Aeq,period}$)	Project Amenity Noise Level ($L_{Aeq,15min}$ dBA)
Suburban	Day	50	48
	Evening	45	43
	Night	40	38

Day = 7:00am – 6:00pm; Evening = 6:00pm – 10:00pm; Night = 10:00pm – 7:00am.

3.2.3 NPfI Project Noise Trigger Levels

Table 3-5 below shows the project noise trigger levels for sensitive receivers, with the controlling project noise trigger levels shown in **bold**.

Table 3-5 Project noise trigger levels

Receiver	Time of Day	Project Intrusiveness Noise Levels ($L_{Aeq,15min}$ dBA)	Project Amenity Noise Levels ($L_{Aeq,15min}$ dBA)
All	Day	50	**48**
	Evening	45	**43**
	Night	40	**38**

Day = 7:00am – 6:00pm; Evening = 6:00pm – 10:00pm; Night = 10:00pm – 7:00am.

3.2.4 NPfI Maximum Noise Trigger Levels

Noise sources at night occurring over a short duration have the potential to cause sleep disturbance despite complying with project noise trigger levels. The site intends to operate within the night period, therefore maximum noise level events need to be considered for potential sleep disturbance.

The *NPfI* recommends that, where the night time L_{Amax} receiver noise levels from a development exceeds 52 dBA or the RBL plus 15 dBA, whichever is the greater, then a more detailed assessment of potential sleep disturbance impacts is warranted. Table 3-6 presents the maximum noise trigger levels for the receivers identified in this assessment. These noise levels are typically addressed at the facade of potentially affected dwellings.

Table 3-6 Maximum noise trigger levels

Receiver	Night RBL (dBA)	RBL + 15 dBA	Maximum Noise Trigger Level (dBA)
All	35	**50**	52

Additionally, in instances where night time $L_{Aeq,15min}$ noise levels exceed 40 dBA or the prevailing RBL plus 5 dBA, whichever is the greater, then a detailed assessment of potential sleep disturbance impacts is warranted.

3.3 Road Traffic Noise Criteria

The EPA's NSW *Road Noise Policy* (RNP) provides criteria for managing noise levels associated with a development that will increase traffic on a particular road.

The proposed change in hours for trucks accessing the site will result in an increase number of movements on John Renshaw Drive during the night period.

The *RNP* assessment criteria for residential land uses are presented in Table 3-7. John Renshaw Drive is classified as an arterial or sub-arterial road.

Table 3-7 Road traffic noise assessment criteria for residential receivers

Road Category	Type of Proposal / Land Use	Noise Criteria (dBA)	
		Day (7am-10pm) (dBA)	Night (10pm-7am) (dBA)
Freeway / arterial / sub-arterial roads	Existing residences affected by additional traffic on existing freeways / arterial / sub-arterial roads generated by land use development	$L_{Aeq,15hr}$ 60 (external)	$L_{Aeq,9hr}$ 55 (external)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use development	$L_{Aeq,1hr}$ 55 (external)	$L_{Aeq,1hr}$ 50 (external)

The *RNP* also offers the relative increase criteria to manage the permissible increase in road traffic noise from a land use development. This criteria states that:

> "*For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.*"

4 NOISE ASSESSMENT

4.1 Noise Modelling Methodology

4.1.1 Computer Noise Model

Operational noise emissions associated with the Project were modelled using the CadnaA acoustic noise prediction software. 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.

4.1.2 Ground Topography

Topographical data for the site and nearby surrounding area has been sourced from NSW Spatial Services as 2m contours and has been incorporated in the model.

4.1.3 Ground Absorption

A ground absorption factor of 0.5 has been applied to the entire model. This global ground absorption value conservatively represents the mix of hard ground (absorption = 0) and soft ground (absorption = 1) on and around the site.

4.2 Operational Noise Sources

Two separate scenarios have been considered for assessing noise emissions from the site. The first is for the early morning period when only truck movements occur. The second consists of truck movements plus operation of the plant from 5 am.

In each scenario it has been assumed that there are two trucks accessing the site which is considered at "worst case" scenario where most of the time less trucks would access the site.

These scenarios are:

- 1:30am to 5:00am – Two trucks (in and out) and two trucks unloading within a 15-minute period; and
- 5:00am to 7:00am – Two trucks (in and out) and two trucks unloading within a 15-minute period with plant operating throughout.

These two scenarios capture the worst-case noise scenario for each of the different periods within the new proposed hours. Wilkinson Murray attended the Enviroking site on 30 July 2020 to conduct noise measurements of the site plant, trucks unloading and truck movements on the site. Results from these noise measurements have been used in the noise modelling.

The predicted noise levels at the nearest southern surrounding receivers for each scenario are presented in Table 4-1 and Table 4-2.

Table 4-1 Predicted noise levels – 1:30am to 5:00am

Receiver	Predicted level (dBA)	Night period criteria (dBA)	Compliance?
12 Black Hill Road	31	38	Yes
45 Black Hill Road	19	38	Yes
850 John Renshaw Drive	31	38	Yes
836 John Renshaw Drive	25	38	Yes
836 John Renshaw Drive	22	38	Yes
800 John Renshaw Drive	24	38	Yes
786 John Renshaw Drive	24	38	Yes

Table 4-2 Predicted noise levels – 5:00am to 7:00am

Receiver	Predicted level (dBA)	Night period criteria (dBA)	Compliance?
12 Black Hill Road	32	38	Yes
45 Black Hill Road	21	38	Yes
850 John Renshaw Drive	32	38	Yes
836 John Renshaw Drive	26	38	Yes
836 John Renshaw Drive	23	38	Yes
800 John Renshaw Drive	25	38	Yes
786 John Renshaw Drive	26	38	Yes

The predicted operational noise levels all comply with the relevant noise criteria.

4.3 L_{Amax} Operational Noise Levels

A typical L_{Amax} sound power level can range from 3-7 dBA above the operational L_{Aeq} sound power level. As detailed above, the predicted $L_{Aeq,15min}$ noise levels during the night period are well below the project specific criterion at each receiver as detailed in Table 3-4.

Table 4-3 Predicted Maximum noise levels

Receiver	Predicted level (dBA)	Maximum noise trigger level (dBA)	Compliance?
12 Black Hill Road	35-39	50	Yes
45 Black Hill Road	24-28	50	Yes
850 John Renshaw Drive	35-39	50	Yes
836 John Renshaw Drive	29-33	50	Yes
836 John Renshaw Drive	26-30	50	Yes
800 John Renshaw Drive	28-32	50	Yes
786 John Renshaw Drive	29-33	50	Yes

Based on a review of the above predictions no further assessment of maximum noise levels is therefore warranted.

4.4 Road traffic noise assessment

Traffic generation for the Project during the night period is proposed to be capped at 13 truck movements. This applies to both weekdays and Saturdays, with no truck movements on Sunday. Conservatively, this assessment has considered all trucks accessing and leaving the site from the same direction past the closest receiver. The assessment has used the CORTN calculation method to determine the increase in traffic noise.

Hourly traffic volumes for the period between 1:00am and 7:00am have been sourced from the associated traffic report prepared by ttpa and used to determine a relative increase in traffic noise. The traffic report indicates that a maximum of 4-5 vehicle trips (return) per hour within the night period. Assuming that these trips occur during the hour of least existing traffic on John Renshaw Drive will result in an increase of up to 0.9dB, which complies with the 2 dB above that of the corresponding 'no build option' traffic noise criteria.

5 CONCLUSION

Wilkinson Murray Pty Limited has undertaken an acoustic impact assessment for the Enviroking Pty Ltd site located at 843 john Renshaw Drive, Black Hill. The site proposes a modification to hours of operation to allow truck movements from 1:30am and plant operation from 5:00am.

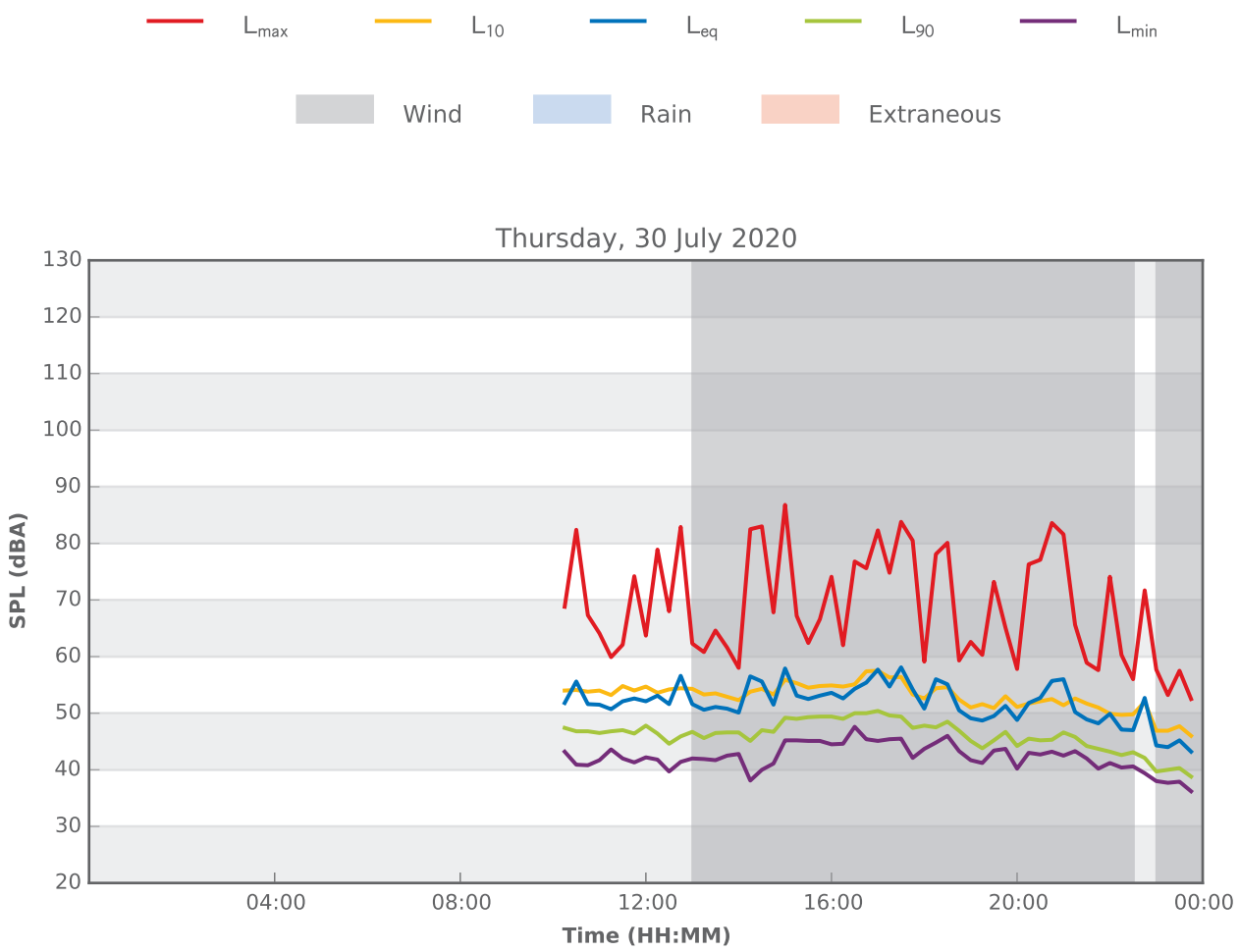
Unattended noise monitoring was conducted to determine the existing ambient noise levels at the most potentially affected residential receivers in the area surrounding the site.

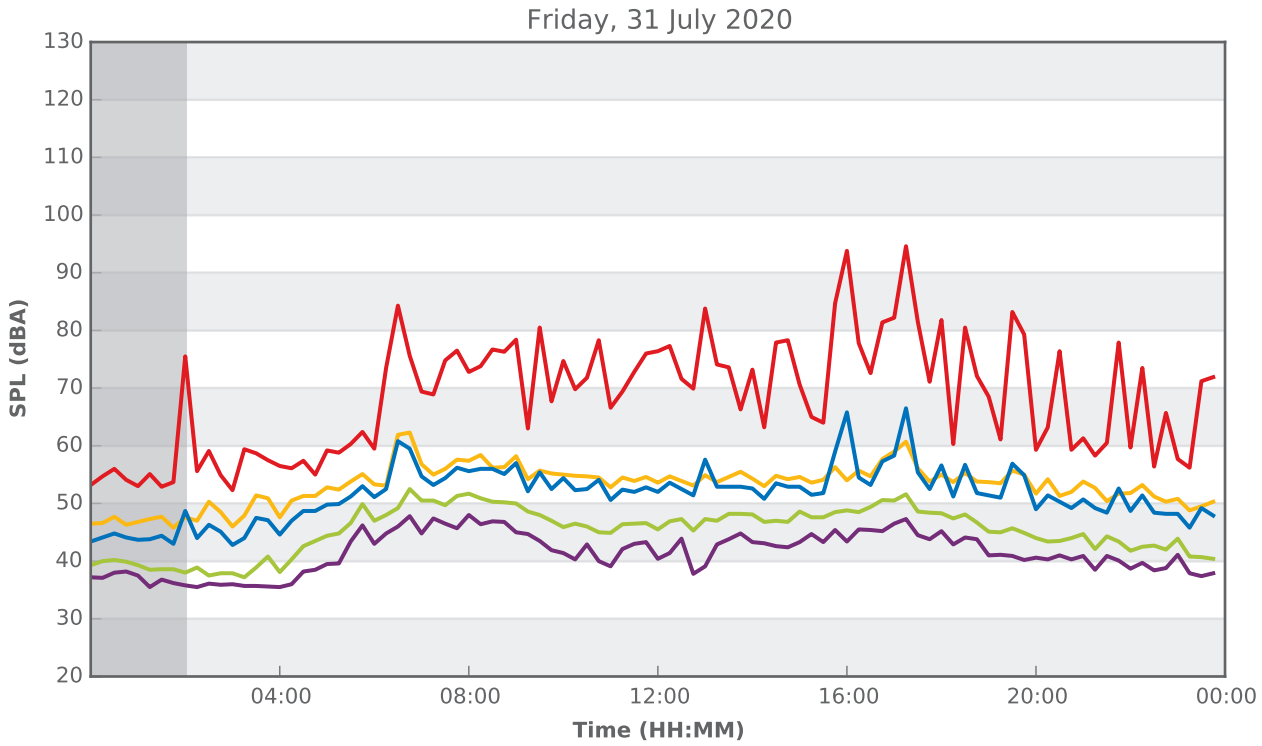
The acoustic assessment has considered noise from plant operation, truck movements on site and traffic noise on John Renshaw Drive. The assessment has been conducted in accordance with the *Noise Policy for Industry* (NPfI) and *Road Noise Policy (RNP).* The predicted noise levels comply with all relevant criteria and no adverse impact on surrounding residential receivers is expected.

APPENDIX A

NOISE MEASUREMENT RESULTS

843 John Renshaw Drive Black Hill





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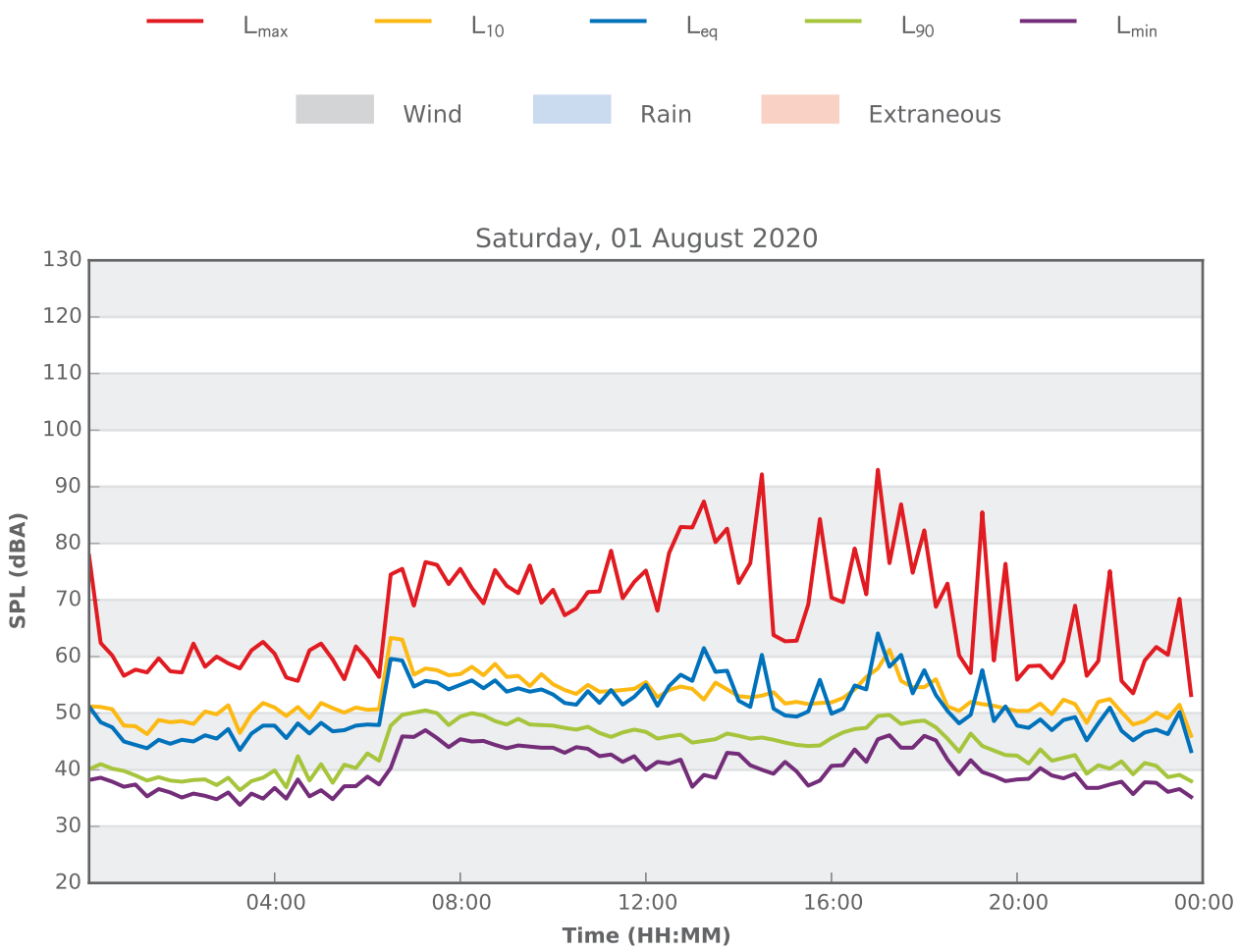

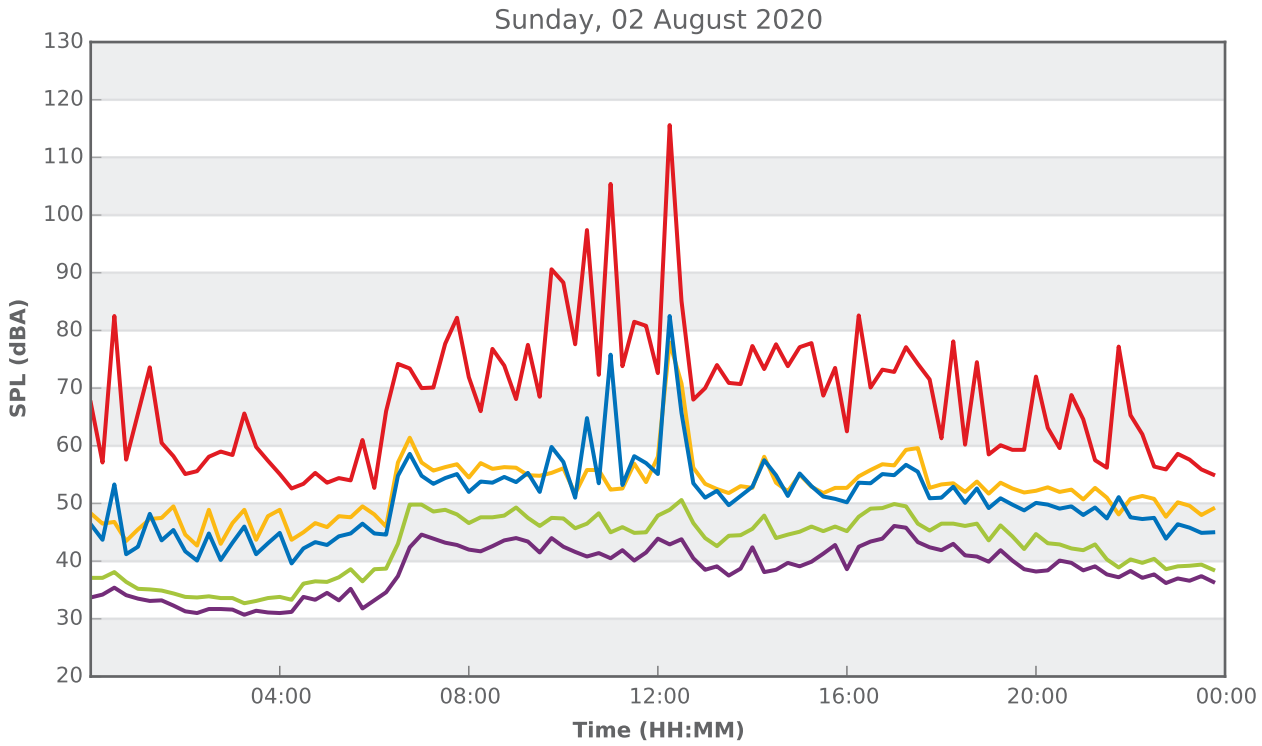

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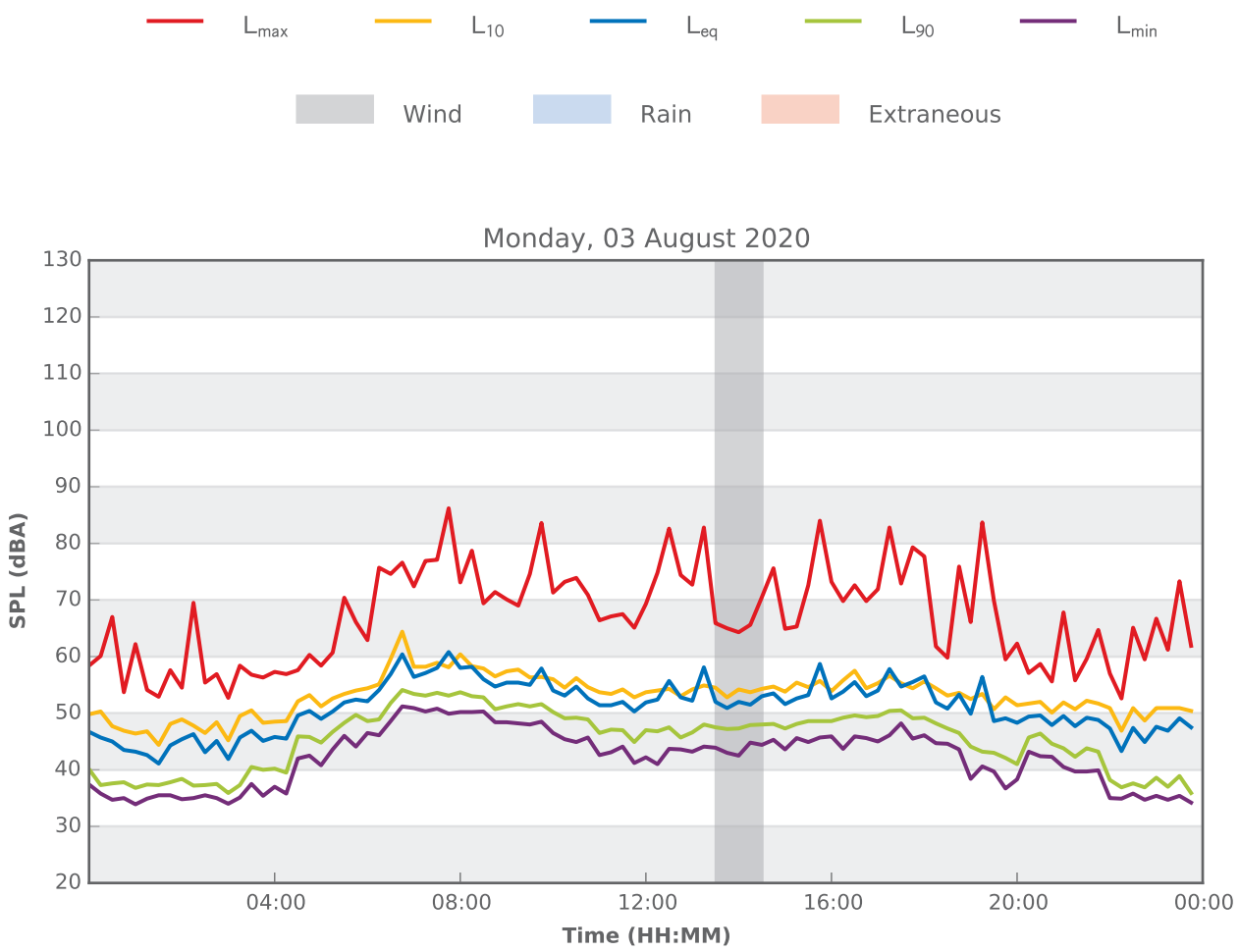

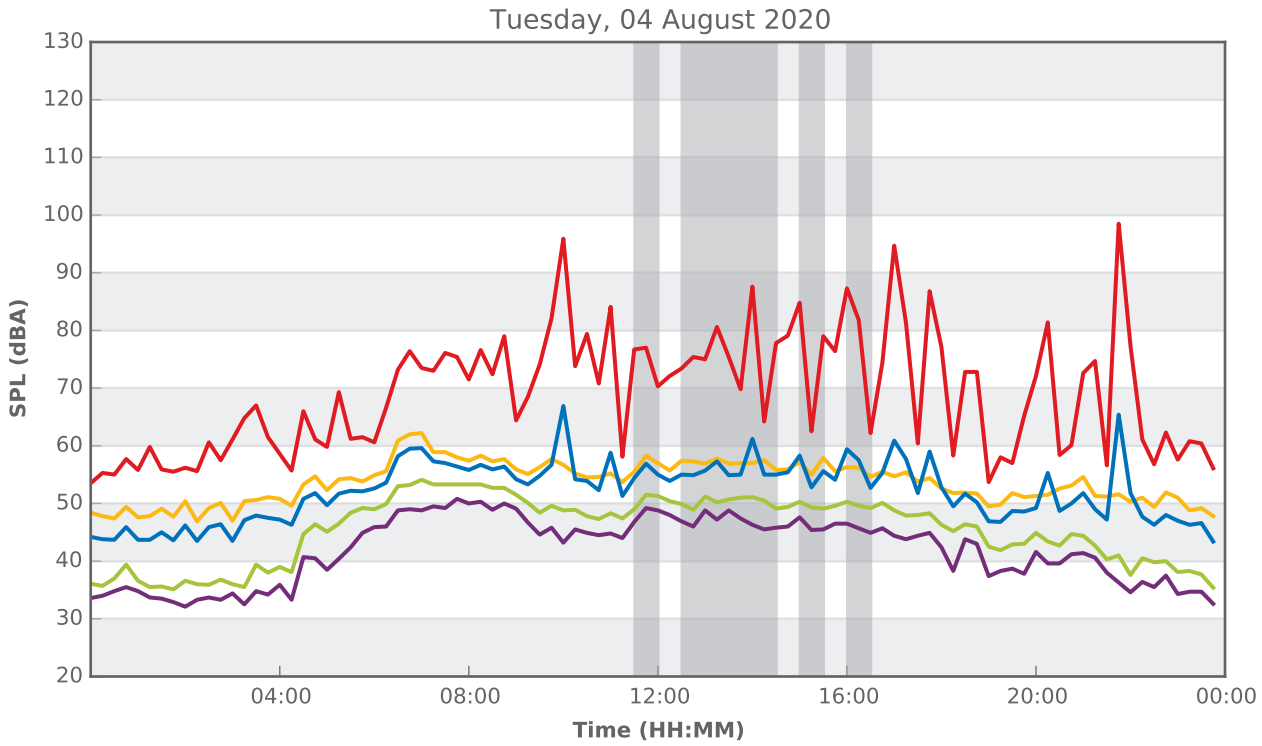

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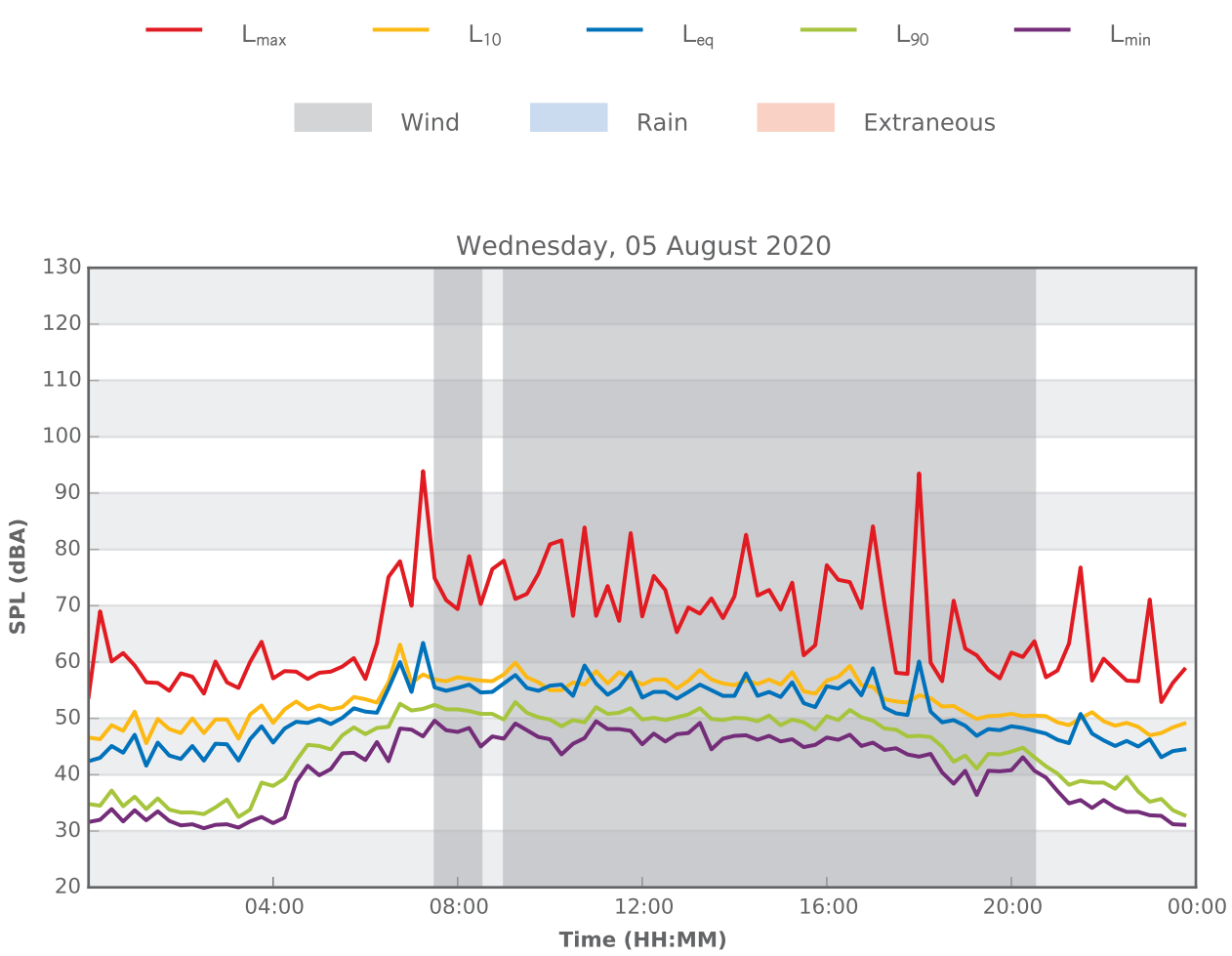

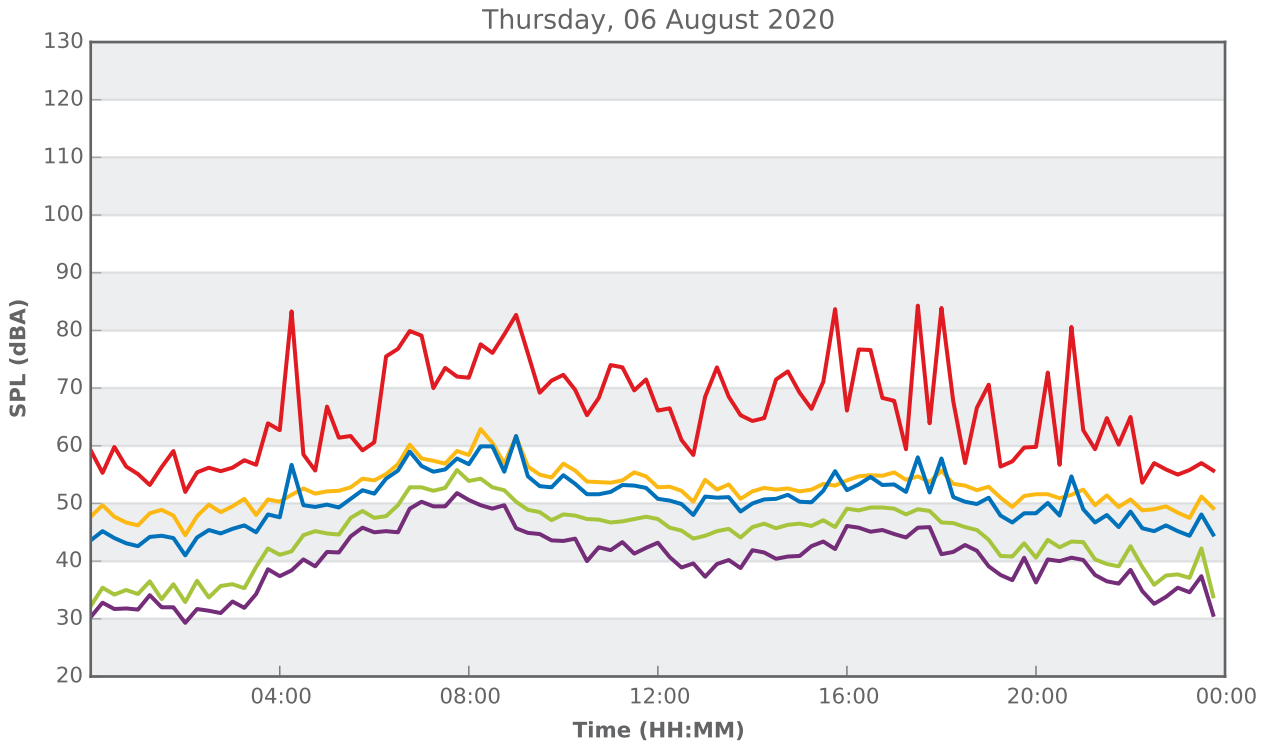

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