

PROPOSED EXPANSION OF FAIRFIELD SUSTAINABLE RESOURCE CENTRE

NOISE & VIBRATION IMPACT ASSESSMENT

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PREPARED FOR

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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.

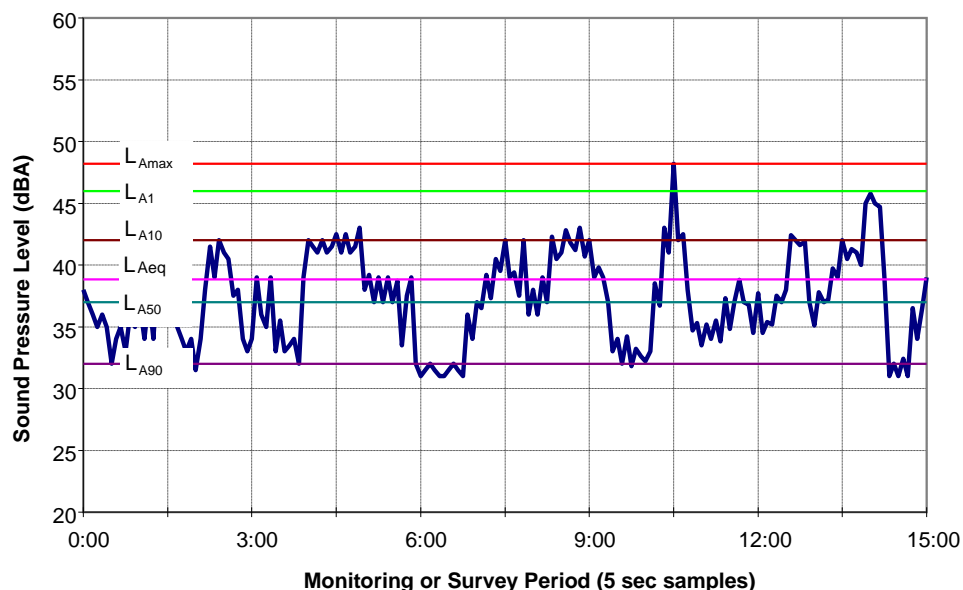
L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

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

Wilkinson Murray (WM) has been commissioned by Fairfield City Council to prepare a Noise and Vibration Impact Assessment to accompany a Development Application for the expansion of the Fairfield Sustainable Resource Centre (SRC) located on the corner of Hassall Street and Widemere Road, Wetherill Park.

The centre accepts construction and demolition waste including roof tiles, clay bricks, concrete and asphalt. The construction waste is crushed or milled to produce recycled materials such as sand, road base, cement stabilised sands and aggregates for use in civil construction, landscaping and domestic building applications.

The existing facility is approved and licenced to receive 180,000 tonnes per year. The facility is however understood to have been operating in excess of that currently licensed for some time, with approximately 520,000 tonnes being received during the 2017 calendar year.

An application has accordingly been formulated which seeks approval to licence the facility generally in accordance with current operations, whereby a capacity to 550,000 tonnes per year is being sought.

The increased SRC capacity is proposed to be facilitated through the filling of an existing gully running north-south through the centre of the site, allowing the creation of a new large temporary stockpiling area for excess material and the extension of the existing facility hours of operation. Further, an increase in the currently approved hours of operation is also being sought.

The application forms a State Significant Development and the Secretary's Environmental Assessment Requirements (SEARs) for the preparation of an Environmental Impact Statement include the following with respect to Noise and Vibration:

- *A quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant Environmental Protection Authority Guidelines;*
- *Details of specific times of operation for a phases of the development and for all noise producing activities; and,*
- *Details and justification of the proposed noise mitigation and monitoring measures.*

This assessment considers potential noise and vibration impacts from on-site operations, road transportation and construction. It has been carried out in accordance with the SEARs and the following noise and vibration guidelines and policies:

- *Noise Policy for Industrial (NPfI) (EPA, 2000);*
- *NSW Road Noise Policy (RNP) (EPA, 2011);*
- *Environmental Criteria for Road Traffic Noise (ECRTN) (EPA);*
- *NSW Interim Construction Noise Guideline (ICNG) (DEDCC, 2009); and*
- *Assessing Vibration: A Technical Guide (DEC, 2006).*

2 LOCATION & DESCRIPTION OF SITE AND SURROUNDS

2.1 The Site

The SRC is located at the corner of Hassall Street and Widemere Road, Wetherill Park, within the Wetherill Park industrial precinct, south of the Prospect Reservoir (see Figure 2-1).

Figure 2-1 Locality Plan



2.2 Surrounding Area

To the north and east the site is bounded by Prospect Creek. To the north and east of Prospect Creek is the Gipps Road Sporting Complex. To the south and west is the Wetherill Park industrial complex.

2.3 Closest Residential Receivers

The closest residential receivers are located within the suburbs of Smithfield (approximately 650 m south-east of the site) and Greystanes (approximately 800 m north-east of the site).

2.4 Existing Site Facilities

The SRC includes the following facilities and equipment:

- Single storey office building;
- Weighbridge;
- Car parking areas;
- Concrete materials storage bays;
- Materials crushing and mixing plant machinery;
- Pug mill (blending/mixing plant);
- Water retention dams;
- Trucks, utility vehicles, and earthmoving and road building equipment;
- Vehicle circulation roadways; and
- Stockpiles of crushed materials.

The site has two access points off Widemere Road, including a primary entrance for the SRC site and a secondary entrance providing access to the waste depot and recycling facility at the northern end of the site. Access off Hassel Street will be used as construction access.

The site was used for land-fill during the 1980s and as a result has a modified and raised land mass which is generally flat and drops to natural ground level to the north and northeast of the site where the land adjoins Prospect Creek.

3 PROJECT DESCRIPTION

3.1 Existing Development

In December 1996 development consent was granted for a Roads Materials Recycling Centre and the application was approved with a processing capacity of 180,000 tonnes per annum.

In December 2003, Council granted development consent for office buildings and concrete storage bins and in November 2013, Council granted development consent for site improvements including replacement of the weighbridge, associated wheel wash facility and alterations to the existing car parking facility.

In 2013, a Section 96 modification application was also approved to modify development consent No. 478/95 to replace the pug mill (blending/mixing) plant on the Site. This work has been undertaken and the new pug mill is now operational.

The SRC is a scheduled resource recovery and waste storage facility licensed by the Environmental Protection Authority under the Protection of Environment Operations Act 1997 (PoEO Act). The SRC operates under the Licence Conditions issued by the Environmental Protection Authority (EPA). Ongoing site improvements have been made to ensure the SRC operates in compliance the Environment Protection Licence (EPL).

Under the terms of EPL No. 5713, the facility can store and process the following waste for resource recovery:

- Virgin excavated natural material (VENM);
- Building and demolition waste;
- Asphalt waste (including asphalt resulting from road construction and waterproofing);
- Spoil and soils.

The EPL does not impose a limit on the volume of resource recovery material that can be received and processed nor limit waste storage. However, the EPL licence sets the height of any waste stockpile at a maximum of 8 m.

The EPL imposes noise limits on the site. These are discussed in Section 5.1.

Since commencement, the SRC has continued to grow and now processes in excess of the approved 180,000 tonnes of materials per annum. The facility is understood to have processed approximately 520,000 tonnes during the 2017 calendar year.

The SRC existing approved hours of operation are:

- Monday to Friday 7.00am – 4.00pm; and
- Saturday 7.00am – 12.00pm.

3.2 Proposed Development

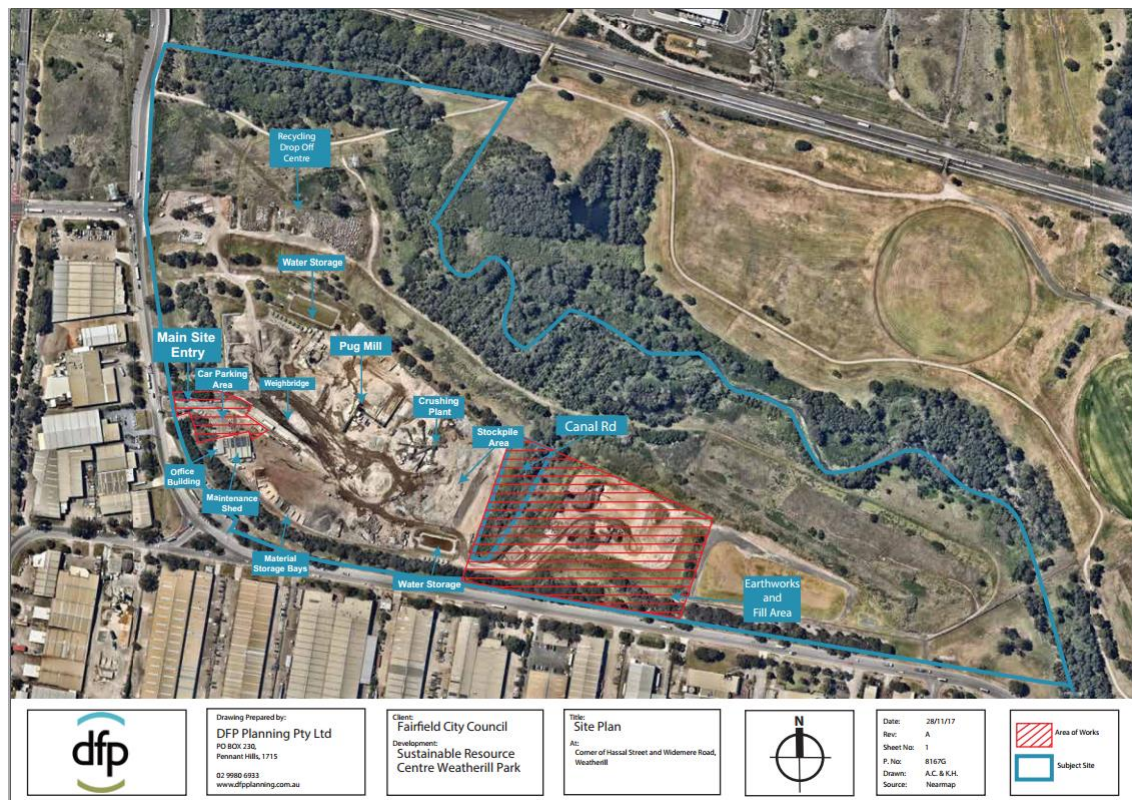
The proposed development is for an expansion of the SRC to increase its processing capacity to up to 550,000 tonnes of recycled materials per year. The concrete crushing plant has the capacity to process up to 600,000 tonnes of waste material per annum and the pug mill has the capacity to process up to 150,000 tonnes of waste material per annum.

The proposal is also seeking to fill a gully running north-south through the centre of the site, known locally as 'Canal Road'. The old reserve for Canal Road has been extinguished and the land (now Lot 100 1220637) is under the ownership of Fairfield Council. The gully will be filled with VENM and potentially stockpiled material.

The filling of the 'Canal Road' (an unmade road) will create a more level site and operational efficiencies. This will ensure that the SRC is also capable of accommodating future industrial activities on the Site.

Figure 3-1 shows the layout of the site, including the area of the proposed expansion. Some of this area has been used for temporary stockpiling of excess material. A small water retention dam is also located on this part of the site and the water used for dust suppression watering.

Figure 3-1 Proposed Expansion Area



Consistent with its current operations, the SRC proposes to receive, recycle and store the following waste:

- Virgin excavated natural material;
- Building and demolition waste including roof tiles, clay bricks, concrete;
- Asphalt waste (including asphalt resulting from road construction and waterproofing); and
- Soils.

3.3 Proposed Hours of Operation

It is proposed that the hours of operation be altered as follows:

- Receiving and loading of vehicles – 24 hours, seven days;
- Crushing operations – 5:00am – 6:00pm Monday to Friday; and
- Pug mill operations – 3:00am – 4:00pm Monday to Friday.

4 EXISTING ACOUSTIC ENVIRONMENT

4.1 Sensitive Receivers

WM undertook an inspection of the site and surrounding area on 24 July 2017, to evaluate the potential noise exposure to the closest residential and other sensitive receivers. This inspection identified two existing residential receiver groups located within approximately 1km of the site, with as well as the closest recreational and commercial/industrial receivers, as set out in Table 4-1 and shown in Figure 2-1.

Table 4-1 Existing Sensitive Receivers within Approximately 1km of the Site

Receiver	Classification	Description	Distance from Site Boundary
Greystanes Residential Area	Residential	Residential suburb, to the north-east of the subject site, with closest receivers located on the southern side of Munro Street.	>800 m (Approx)
Smithfield Residential Area	Residential	Residential suburb, to the south-east of the subject site, with the closest receivers located along Rosford Street at setback distances of typically >650 m.	>650 m (Approx)
Gipps Road Sporting Complex	Recreational	Active recreation area, including cricket ovals to the north and east of Prospect Creek.	>120 m (Approx distance to closest sensitive area)
Industrial Units Widemere Road	Commercial	Commercial units located on the southern/western side of Widemere Road.	30 m (Approx)

4.2 Noise Monitoring Locations

In order to determine the existing noise environment at surrounding receivers identified in Table 4-1 and to allow for the development of project specific noise criteria, long-term noise monitoring has been conducted at three surrounding representative receiver locations, as follows:

- 73 Munro Street, Greystanes (approximately 800 m north-east of the site);
- 60 Rosford Street, Smithfield (approximately 650 m south-east of the site); and
- 1A Widemere Road, Wetherill Park (approximately 30 m west of the site).

The noise monitoring locations are shown in Figure 4-1. These were selected after careful examination of satellite imagery and inspection of the site and surrounding area. The Greystanes and Smithfield locations were selected to determine noise levels at the two residential areas, whereas the Widemere Road location was selected to determine existing road

traffic noise levels on the principal off-site transportation route.

4.3 Noise Measurement Methodology

Noise loggers were deployed at the identified monitoring locations for a period of ten days to establish the long-term noise ambient noise levels. All measurements were undertaken in general accordance with *AS1055:1997: Acoustics – Description and Measurement of Environmental Noise* and the *NPfI*.

Figure 4-1 Noise Monitoring Locations (Green Dots)



4.3.1 Noise Monitoring Equipment

The equipment detailed in Table 4-2 was used in the noise survey. These instruments comply with *AS IEC 61672.1:2004: Electroacoustics – Sound Level Meters – Specifications* and *AS IEC 60942:2004: Electroacoustics - Sound Calibrators* as appropriate and have recent calibration certificates traceable to a NATA certified laboratory.

The loggers were set to A-Weighting and fast response and positioned in free-field conditions with their microphones at 1.2 m above ground level. Statistical noise levels were processed and stored by the instruments every 15 minutes for the whole ten-day monitoring period.

The equipment calibration was checked before and after the survey and no significant drift

occurred.

Noise loggers determine a variety of descriptors such as L_{A1} , L_{A10} , L_{A90} and L_{Aeq} used to describe the existing noise environment. The L_{A90} level is taken as the background noise level and is used to derive the Rating Background Levels (RBLs) as per the requirements of the *NPFI*.

Table 4-2 Monitoring Equipment used for Noise Survey

Location	Item	Make	Model	Type	Serial Number
73 Munro Street	Noise logger	ARL	215	Type 2	194624
60 Rosford Street	Noise logger	ARL	215	Type 2	194505
1A Widemere Road	Noise logger	ARL	215	Type 2	WM2260
All	Calibrator	B&K	4230	Type 1	584151

4.3.2 Rating Background Noise Levels

Table 4-3 provides a summary of the daytime, evening and night time RBLs derived directly from the unattended logging. As required by the *NPFI*, in deriving the RBLs, any effects due to extraneous noise sources or adverse weather (rain and wind greater than 5m/s at a height of 1.5m) have been excluded from the analysis. Meteorological data collected during the noise monitoring period at the Horsley Park met station was reviewed for this purpose and some occasions of high winds were noted and excluded.

Table 4-3 Summary of Rating Background Levels from Unattended Logging*

Location	Logging Period	Day	Evening	Night
		(7.00am – 6.00pm)	(6.00pm – 10.00pm)	(10.00pm – 7.00am)
60 Rosford Street	24/7/17 – 2/8/17	42	42	40
73 Munro Street	24/7/17 – 2/8/17	51	47	40
1A Widemere Road	24/7/17 – 2/8/17	57	42	39

*Daily noise monitoring plots are provided in Appendix A of this report.

4.3.3 Existing Traffic Noise Levels

Table 4-4 provides a summary of the measured daytime and night time road traffic noise levels derived directly from the unattended logging on Widemere Road. Similarly, to the RBLs, any effects due to extraneous noise sources or adverse weather have been excluded from the analysis.

Table 4-4 Summary of $L_{Aeq,Period}$ Traffic Noise Levels from Unattended Logging

Location	Logging Period	Day	Night
		(7.00am – 10.00pm)	(10.00pm – 7.00am)
1A Widemere Road	24/7/17 – 2/8/17	64 dBA	60 dBA

Note: The *RNP* considers daytime (7.00am-10.00pm); and night time (10.00pm-7.00am).

5 PROJECT NOISE & VIBRATION CRITERIA

5.1 Secretary's Environmental Assessment Requirements (SEARs)

With respect to noise and vibration, the SEARS pursuant to Section 78A(8A) of the Environmental Planning and Assessment Act 1979 for State Significant Development, require the noise assessment must provide:

- *A quantitative assessment of potential construction, operational and transport noise and vibration impacts in accordance with relevant Environmental Protection Authority Guidelines; and*
- *Details of the specific times of operation for all phases of the development and for all noise producing activities*
- *Details and justification of the proposed noise mitigation and monitoring measures.*

The SEARS make reference to the following policies and guidelines:

- *Noise Policy for Industrial (NPfI) (EPA, 2000);*
- *NSW Road Noise Policy (RNP) (EPA, 2011);*
- *Environmental Criteria for Road Traffic Noise (ECRTN) (EPA);*
- *NSW Interim Construction Noise Guideline (ICNG) (DEDCC, 2009); and*
- *Assessing Vibration: A Technical Guide (DEC, 2006).*

In the case of construction works it is noted that this consists of gully filling works and basin construction and is subject to Noise Management Levels consistent with the requirements of the *NSW Interim Construction Noise Guideline*. However as the gully filling and basin construction works will use the same earth moving equipment that is used during normal operations on the site, noise from this construction activity has been assessed with the more stringent trigger levels of the Noise Policy for Industry based on the rational that compliance with project trigger levels will mean compliance with the ICNG will be achieved

Therefore, no separate section on construction noise is presented as the requirement of the SEARS have been address in the manner described above.

The site development works (gully filling works and basin construction works) required for the proposed expansion would be undertaken during standard daytime hours only (between 7.00am – 6.00pm, Monday to Friday and 8.00am – 1.00pm Saturday).

5.2 Operational Noise Criteria

5.2.1 Environmental Protection Licence Limits

The current Environment Protection Licence for the subject site is EPL 5713, which was most recently reviewed on 15 October 2015. This license includes noise limits, as follows:

L3 Noise limits

L3.1 Noise from the premises must not exceed:

- a) an LA10 (15 minute) noise emission criterion of 65 dB(A) (7am to 10pm); and*
- b) at all other times, an LA10 (15 minute) noise emission criterion of 55 dB(A).*

Noise from the premises is to be measured at any point within one metre of the plant boundary to determine compliance with this condition. 5 dB(A) must be added to the measured level if the noise is substantially tonal or impulsive in character.

L3.2 Noise from the premises must not exceed an LA10 (15 minute) noise emission criterion of 49dB(A).

Noise from the premises is to be measured at any point within one metre of any residential boundary or other noise sensitive area to determine compliance with this condition. 5 dB(A) must be added to the measured level if the noise is substantially tonal or impulsive in character.

L3.3 The crushing, grinding and separating must not be operated on the premises:

- a) between the hours of 4:30pm and 7am, Monday to Friday;*
- b) before 7am and after 4:00pm Saturdays, and*
- c) on Sundays or Public Holidays.*

It is noted that a variation to the EPL noise conditions would be required, following approval of the proposed project.

5.2.2 NSW Noise Policy for Industry (NPfI)

The *NPfI* provides the framework for deriving noise limits for consents and licences that enables the EPA to regulate premises that are scheduled under the Protection of the Environment Operations Act 1997 (POEO Act). The policy seeks to promote environmental well-being through preventing and minimising noise.

The noise policy objectives are:

- to establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses.
- to use the criteria as the basis for deriving Project specific noise levels.
- to promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects.
- to outline a range of mitigation measures that could be used to minimise noise impacts.
- to provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise and vibration impacts with the economic, social and environmental considerations of industrial development.
- to carry out functions relating to the prevention, minimisation and control of noise from premises licenced under the POEO Act.

The policy sets out two noise criteria to assess the potential noise impacts resulting from industrial activity. The first is used to control short-term intrusive noise and its impacts on residences whilst the second is used to maintain noise level amenity for particular land uses including residences.

Intrusiveness Noise Impacts

The intrusiveness criterion is summarised as follows:

- $L_{Aeq,15 \text{ minute}} \leq \text{rating background level (RBL, } L_{A90}) + 5 \text{ dB(A)}$
 - $L_{Aeq,15 \text{ minute}}$ represents the equivalent continuous A-weighted sound pressure level of the source over 15 minutes, unless other descriptors are specified as more appropriate to characterise the source;
 - Intrusiveness noise impacts are assessed at the most affected point on or within the residential property boundary or if that is more than 30 m from the residence, then at the most affected point within 30 m of the residence.

Protecting Noise Amenity

The amenity criteria set limits on the total noise level from all industrial noise sources affecting a receiver. Different amenity criteria apply for different types of receiver (e.g. residential, commercial, industrial) and different areas (e.g. urban, suburban, rural).

Greystanes and Smithfield are recognised as urban areas, in terms of the receiver classifications identified by the *NPFI*. Notably, the *NPFI* recognises an urban area as an area with an acoustical environment that:

- is dominated by 'urban hum' or industrial source noise;
- has through traffic with characteristically heavy and continuous traffic flows during peak periods;
- is near commercial districts or industrial districts; or
- has any combination of the above.

It should be noted that an urban area in terms of this definition, may be located in either a rural, rural-residential or residential zone as defined on an LEP or other planning instrument, and also includes mixed land-use zones such as mixed commercial and residential uses.

Table 5-1 sets out the amenity noise levels recommended by the *NPFI*, applicable to residential receivers located in urban areas, recreational receivers and commercial and industrial receivers.

The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration.

Table 5-1 NPfI Amenity Noise Levels

Receptor Location	Recommended NPfI Amenity Noise Levels - $L_{Aeq,Period}$ dBA		
	Daytime (7.00am-6.00pm)	Evening (6.00pm-10.00pm)	Night time (10.00pm-7.00am)
Residential Receivers	60	50	45
Recreational Receivers	55 (When in use)	55 (When in use)	55 (When in use)
Commercial Receivers	65 (When in use)	65 (When in use)	65 (When in use)
Industrial Receivers	70 (When in use)	70 (When in use)	70 (When in use)

Notes: The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration.

In accordance with the NPfI, to ensure that industrial noise levels (existing plus new) remain within the recommended amenity noise levels, a project amenity noise level specific to the SRC, has been adopted as follows:

- Project Amenity Noise Level = Recommended Amenity Noise Level minus 5 dB.

Project Noise Trigger Levels (PNTLs)

The PNTLs reflect the most stringent noise level requirement from the criteria derived from both the intrusiveness and project amenity noise levels to ensure that intrusive noise is limited, and amenity is protected.

The L_{Aeq} descriptor is used for both the intrusiveness noise level and the amenity noise level. This descriptor represents the level of average noise energy over the relevant period of measurement and takes account of peak noise levels as well as the degree of noise fluctuation.

The L_{Aeq} is determined over a 15-minute period for the project intrusiveness noise level and over the day/evening/night period for the project amenity noise level. This leads to the situation where, because of the different averaging periods, the same numerical value does not necessarily represent the same average noise energy. To standardise the time periods for the intrusiveness and amenity noise levels, for most situations, the NPfI recommends that the $L_{Aeq,15min}$ will be taken to be equal to the $L_{Aeq,Period} + 3$ dB. This conversion factor has been adopted by this assessment.

The PNTLs applicable to the operation of the Project are identified in bold font in Table 5-2.

These criteria have additionally been considered in the assessment of noise emissions for the duration of the development of the site during the filling of the gully. Whilst the site development may be considered as a construction activity, for which less stringent criteria would apply, it has been assessed against the somewhat more onerous operational PNTLs as it would involve the use of equipment required for typical operations.

Table 5-2 Project Noise Trigger Levels (PNTLs)

Receptor Location	Intrusiveness Noise Levels			Project Amenity Noise Levels		
	L _{Aeq,15min} dB(A)			L _{Aeq,15min} dB(A)		
	Day	Evening	Night	Day	Evening	Night
Residential	47	47	45	58	48	43
Receivers (Rosford Street)	42+5=47	42+5=47	40+5=47	60-5+3=58	50-5+3=48	45-5+3=43
Residential	56	52	45	58	48	43
Receivers (Munro Street)	51+5=56	47+5=52	40+5=47	60-5+3=58	50-5+3=48	45-5+3=43
Recreational Receivers (Gipps Road Sporting Complex)	n/a	n/a	n/a	53 55-5+3=53	53 55-5+3=53	53 55-5+3=53
Commercial Receivers (Widemere Road)	n/a	n/a	n/a	63 65-5+3=63	63 65-5+3=63	63 65-5+3=63
Industrial Receivers (Widemere Road)	n/a	n/a	n/a	68 70-5+3=68	68 70-5+3=68	68 70-5+3=68

The PNTLs are relevant to the noise contribution from the operation of the Project only, i.e. excluding the contribution from the background noise level, road traffic noise and other industrial sites.

In assessing noise levels at residences or commercial/industrial receivers, the noise level is to be assessed at the most affected point on or within the property boundary, however, the commercial/industrial criteria are applicable only when such sites are in use (i.e. generally during business hours).

In assessing noise levels at recreational receivers, the noise level is to be assessed at the most affected point on or within 50 m of the area boundary, applicable only when such sites are in use (i.e. generally during daytime/evening hours).

5.3 Off-Site Traffic Noise Criteria

Criteria for off-site road traffic noise are specified in the NSW *Road Noise Policy (RNP)*. The applicable criteria are summarised in Table 5-3.

The identified criteria do not apply to vehicle movements within the Project Site. For the purpose of assessment any noise generated by on-site vehicle movements is considered as industrial noise and assessed holistically with on site fixed and mobile plant in accordance with the *NPII*.

Table 5-3: RNP Criteria for Road Traffic Noise

Type of Development	Assessment Criteria – dB(A)	
	Daytime (07:00-22:00)	Night (22:00-07:00)
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)
Existing residences affected by additional traffic on existing local roads generated by land use developments	L _{Aeq,1 hour} 55 (external)	L _{Aeq,1 hour} 50 (external)

The traffic route roads that have sensitive receivers located on them are all sub arterial / arterial roads and therefore for the purpose of assessing likely future road traffic noise arising from the Project the 60 dB(A) L_{Aeq,15hour} (daytime) and 55 dB(A) L_{Aeq,9hour} (night time) assessment goals have been considered.

Further to the *RNP* base criteria, the *Environmental Noise Management Manual* (ENMM – RTA, 2001) identifies receivers exposed to traffic noise levels greater than or equal to L_{Aeq,15hour} 65 dBA and L_{Aeq,9hour} 60 dBA as ‘acutely affected’.

Additionally, the *RNP* identifies 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 the corresponding road traffic noise levels, due to general traffic growth, that would have occurred if the project had not proceeded. A 2 dB increase is typically considered not noticeable.

5.4 Vibration Criteria

When assessing vibration there are two components that require consideration:

- human exposure to vibration; and
- the potential for building damage from vibration.

5.4.1 Human Exposure to Vibration

The DECCW’s *Assessing Vibration: A Technical Guideline* provides guidance for assessing human exposure to vibration. The publication is based on British Standard BS6472:1992. Intermittent vibration is best assessed by the Vibration Dose Value (VDV) which is based on the *weighted* root mean quartic (rmq) acceleration. However, for simplicity of assessment and monitoring, a peak particle velocity (PPV) goal is preferred.

Table 5-4 sets out PPV values for continuous and impulsive vibration as specified by *Assessing Vibration: A Technical Guideline*. The impulsive vibration goals are shown in brackets.

Table 5-4 Human Comfort Vibration Goals – PPV (mm/s)

Place	Day (7.00am-10.00pm)	
	Preferred	Maximum
Residences	0.28 (8.6)	0.56 (17.0)
Offices	0.56 (18.0)	1.1 (36.0)
Workshops	1.1 (18.0)	2.2 (36.0)

Note: Impulsive goals are shown in brackets – These are most relevant to activities that create up to 3 distinct vibration events in an assessment period, e.g. occasional dropping of heavy equipment, occasional loading and unloading.

5.4.2 Building Damage from Vibration

There are currently no Australian Standards or guidelines to provide guidance on assessing the potential for building damage from vibration. It is common practice to derive goal levels from international standards. British Standard BS7385:1993 and German Standard DIN4150:1999 both provide goal levels; below which vibration is considered insufficient to cause building damage. Of these, DIN4150 is the more stringent. Table 5-5 summarises the goal levels specified in DIN4150.

Table 5-5 Guideline Values for Vibration Velocity to be used when Evaluating the Effects of Short-Term Vibration on Structures (DIN4150-3:1999)

Type of Structure	Guideline Values for Velocity – PPV (mm/s)		
	1 Hz to 10 Hz	10 Hz to 50 Hz	50 Hz to 100 Hz
Buildings used for commercial purposes, industrial buildings, and buildings of similar design	20	20 to 40	40 to 50
Dwellings and buildings of similar design and/or occupancy	5	5 to 15	15 to 20
Structures that, because of their particular sensitivity to vibration, cannot be classified under either of the other classifications and of great intrinsic value	3	3 to 8	8 to 10

With regard to these levels DIN4150 states, *"experience has shown that if these values are complied with, damage that reduces the serviceability of the building will not occur. If damage nevertheless occurs, it is to be assumed that other causes are responsible. Exceeding [these] values does not necessarily lead to damage; should they be significantly exceeded; however, further investigations are necessary."*

For general construction vibration, the dominant frequency of vibration is typically in the range 31.5 – 100 Hz. Because the dominant frequency of vibration cannot be determined with certainty, this assessment has adopted a conservative goal of 20 mm/s for commercial and industrial buildings and 5 mm/s for residential buildings.

5.4.3 Trigger Levels for Maximum Noise Level Events

Noise sources of short duration and high level may cause disturbance to sleep if occurring during the night time and therefore need to be considered.

The approach recommended by the *NPII* is to apply the following initial screening noise levels:

- L_{Amax} 52 dBA or the prevailing RBL + 15 dB, whichever is the **greater**; and
- $L_{Aeq,15min}$ 40 dBA or the prevailing RBL + 5 dB, whichever is the **greater**.

The sleep disturbance screening noise levels apply outside bedroom windows during the night time period (10.00pm to 7.00am).

The sleep disturbance screening noise levels apply outside bedroom windows during the night time period (10.00pm to 7.00am). Where the screening noise levels cannot be met, a detailed maximum noise level event assessment should be undertaken. The L_{Amax} screening levels based on RBL + 15 dB and $L_{Aeq,15min}$ screening level based on RBL + 5 dB are below L_{Amax} 52 dBA and $L_{Aeq,15min}$ 40 dBA, respectively, when considering the RBL of the area. Therefore, the project specific maximum event screening levels at all receivers are:

- L_{Amax} 55 dBA; and
- $L_{Aeq,15min}$ 45 dBA.

The trigger levels for the maximum noise level event assessment are only applicable to the night time (10.00 pm to 7.00 am) period.

6 ASSESSMENT OF POTENTIAL NOISE IMPACTS FROM SITE CONSTRUCTION AND OPERATIONS

The assessment of potential noise impacts associated with the proposed construction and operation of the Project is set out in the following sections.

6.1 Noise Modelling Methodology

Noise levels due to the proposed construction and operation of the Project at the identified noise sensitive receiver locations have been predicted using a model created with the Cadna-A acoustic noise prediction software (Version 2017), implementing the Concawe calculation algorithm. This program is used and recognised internationally and is also recognised by the EPA as a preferred computer noise model.

Factors that are addressed in the noise modelling are:

- Equipment noise level emissions and location;
- Screening from structures;
- Receiver locations (the closest residential boundaries were considered to represent the residential receivers);
- Ground topography;
- Noise attenuation due to geometric spreading;
- Ground absorption;
- Atmospheric absorption; and
- Influence of meteorology.

6.1.1 Meteorology

Certain meteorological/weather conditions may increase noise levels by focusing soundwave propagation paths at a single point. Such refraction of sound waves will occur during temperature inversions (atmospheric conditions where temperatures increase with height above ground level), and where there is a wind gradient (that is, wind velocities increasing with height) with wind direction from the source to the receiver.

This assessment has considered the 'standard' and 'noise-enhancing' meteorological conditions identified by the *NPII*, as set out in Table 6-1.

Table 6-1 Standard and Noise-Enhancing Meteorological Conditions

Meteorological Conditions	Meteorological Parameters
Standard Meteorological Conditions	Day/Evening/Night: Stability categories A–D with wind speed up to 0.5 m/s at 10 m AGL.
Noise-Enhancing Meteorological Conditions	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 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.

6.2 Operational Noise Assessment

6.2.1 Operational Noise Model and Sources

For the purpose of assessment, a scenario has been developed, which is considered to be conservatively representative of the site operating at a typical maximum condition. This scenario assumes the operation of the noise sources identified in Table 6-2.

Table 6-2 Summary of Operational Noise Sources Applied in Model

Plant	Operational Periods for Plant			Sound Power Level per Item ($L_{Aeq,15min}$ dBA)
	Day (7.00am - 6.00pm)	Eve (6.00pm – 10.00pm)	Night (10.00pm - 7.00am)	
Pug Mill	Y	N	Y	103
Crushing Plant	Y	N	Y	117
Mobile Screen (A)	Y	N	Y	113
Mobile Screen (B)	Y	N	Y	113
Front End Loader (A)	Y	N	Y	111
Front End Loader (B)	Y	N	N	111
Front End Loader (C)	Y	N	N	111
Excavator (A)	Y	N	N	107
Excavator (B)	Y	N	N	107
Excavator (C)	Y	N	N	107
1 x Water Cart	Y	N	N	100
On-Site Heavy Vehicles	84 peak hour movements	14 peak hour movements	14 peak hour movements	107
On-Site Light Vehicles	12 peak hour movements	2 peak hour movements	2 peak hour movements	80

Notes: The identified sound power levels are based on noise measurements undertaken on-site during WM's site visit. The pug mill was not operational during WM's site visit; therefore, the applied sound power level has been based on the Acoustic Logic Consultancy Pty Ltd report (Report No 20130169.1/1803A/R1/HP); It is understood that the pug mill has since been replaced with quieter plant, estimated to be approximately 5 dB quieter. All on-site vehicle movements assumed to be at 20 km/Hr. The daytime peak hour truck movements have been based on the peak hourly distribution at the facility (as detailed in the traffic assessment prepared by Stanbury Traffic Planning Pty Ltd). The night time and evening peak hour truck movements have been based on advice from Fairfield City Council.

It has been conservatively assumed that the on-site operational plant identified in Table 6-2 would operate continuously and simultaneously. It should be noted this represents a worst-case scenario in terms of potential noise emissions from the site and typically this condition would rarely occur (under normal operational circumstances).

The daytime peak hour truck movements have been based on the peak hourly distribution at the facility (as detailed in the traffic assessment). The night time and evening peak hour truck movements have been based on advice from Fairfield City Council.

Figure 6-1 identifies the locations of the noise sources assumed. The source definitions and placements used by this assessment are considered to represent a typically worst-case condition.

Figure 6-1 Noise Source Locations in Noise Prediction Model



Note: Fixed and mobile plant indicated by red dots; on-site truck and light vehicle routes indicated by green lines.

6.2.2 Operational Noise Predictions – Proposed Operations

Based on the above assumptions, worst case $L_{Aeq,15min}$ noise levels have been predicted at the closest sensitive receivers during the daytime, evening and night time under the identified standard and noise-enhancing meteorological conditions. The results are provided in Table 6-3.

Additionally, the night-time results under noise-enhancing meteorological conditions (F-Class temperature inversion, with winds up to 2 m/s at 10 m AGL) are presented graphically as noise contours in Appendix B.

Table 6-3 Predicted $L_{Aeq,15min}$ Operational Noise Levels

Receiver	Met Condition	Predicted Noise Levels $L_{Aeq,15min}$ (dBA)			Project Noise Trigger Levels $L_{Aeq,15min}$ (dBA) Day/Eve/Night	Exceedance
		Day	Eve	Night		
Smithfield Residential Receivers (Rosford Street)	Neutral	33	<30	<30	47 / 47 / 43	Nil
	Adverse	36	<30	32	47 / 47 / 43	Nil
Greystanes Residential Receivers (Munro Street)	Neutral	41	<30	40	56 / 48 / 43	Nil
	Adverse	44	<30	43	56 / 48 / 43	Nil
Recreational Receivers (Gipps Road Sporting Complex)	Neutral	47	<30	42	53 / 53 / 53	Nil
	Adverse	50	<30	46	53 / 53 / 53	Nil
Commercial Receivers (Widemere Road)	Neutral	59	<30	59	63 / 63 / 63	Nil
	Adverse	63	<30	63	63 / 63 / 63	Nil
Industrial Receivers (Widemere Road)	Neutral	59	<30	59	68 / 68 / 68	Nil
	Adverse	63	<30	63	68 / 68 / 68	Nil

Note: The predicted $L_{Aeq,15min}$ noise levels (with consideration to a typical worst-case scenario) are shown. The levels shown for the Smithfield receivers represent the highest levels predicted on Rosford Street. The levels shown for the Greystanes receivers represent the highest levels on Munro Street. The $L_{Aeq,Period}$ noise levels are estimated to be lower than the $L_{Aeq,15min}$ levels by at least approximately 2-3 dB, due to the intermittency of operational noise (and energy averaging) over the relevant daytime, evening and night time periods. Full compliance with the *NPT* Project Noise Trigger Levels is predicted under all relevant meteorological and operational conditions.

The results indicate that operational noise emissions from the SRC site would be expected to fully comply with the relevant *NPT* Project Noise Trigger Levels at all identified receivers with respect to maximum operating conditions. Full compliance is predicted under neutral and prevailing adverse meteorological conditions.

Further to this, given the existing background noise levels experienced by the closest residential receivers to the site, operational activities would be expected to be rendered inaudible at these localities.

On the basis of this assessment, no noise mitigation is required to control operational noise to

satisfactory levels.

6.2.3 Construction Noise Predictions – Site Development (Filling Gully)

The site development works required for the proposed expansion would be undertaken during standard daytime hours only (between 7.00am – 6.00pm, Monday to Friday and 8.00am – 1.00pm Saturday).

The gully will be filled with VENM material. It is estimated that 31,000 m³ of material will be required and that the filling process may take up to approximately two years to complete. During the filling of the gully, typically one truck and one FEL would operate. A vibratory roller would additionally be periodically required to provide compaction during the filling process.

Predictions indicate that the gully filling would not result in off-site noise levels beyond those set out in Table 6-3. Therefore no noise mitigation is required to control the gully works noise to satisfactory levels.

6.2.4 Cumulative (Total Industrial Noise) Operational Noise

Compliance with the *NPI* Project Noise Trigger Levels indicates that operational noise from the project would not be expected to result in any material increase in cumulative industrial noise levels experienced by the existing residents.

Future developments in the local area would be subject to the same assessment process as discussed herein. This would limit the potential for industrial noise creeping up over time and thereby limit the potential for future cumulative noise impacts.

6.2.5 Maximum Noise Level Events Assessment

As outlined above, on the basis that the night time RBL in the area is 40 dBA, the sleep disturbance screening criterion when assessed external to dwellings is 55 dBA L_{Amax}. This criterion is only applicable to night time (10.00pm to 7.00am) operations.

On-site operational activities that have potential to generate the highest (maximum) noise levels include truck activities (braking, horns, door slamming, weighbridge impacts etc).

For the purpose of assessing potential sleep disturbance impacts, the maximum L_{Amax} sound power levels, set out in Table 6-4 have been considered.

Table 6-4 Maximum Sound Power Levels applied in Sleep Disturbance Assessment

Activity	Maximum Sound Power Level per Activity (L _{Amax} dBA)
Pug Mill	120
Crushing Plant	120
Mobile Screen	120
Truck Movement	120
Reversing Alarm	110

Modelling results indicate that the sleep disturbance criterion would be met with consideration to the identified activities occurring during the night, under neutral or adverse meteorological conditions (F-class temperature inversion). Maximum noise levels of up to 39 dBA L_{Amax} are predicted at Smithfield and 45 dBA $L_{A1,1min}$ at Greystanes under adverse conditions. These levels are less than the 55 dBA screening criterion and materially lower than the existing L_{Amax} noise levels experienced by the receivers throughout the night, due to local road traffic movements. On this basis, no sleep disturbance impacts are anticipated due to on-site night time operations.

7 OFF-SITE TRANSPORTATION NOISE ASSESSMENT

7.1 Existing Traffic Volumes

The Traffic and Transport Impact Assessment prepared by Stanbury Traffic Planning (Report No. 17-030, dated July 2020) identifies relatively high existing vehicle volumes on the proposed off-site vehicle routes, as follows:

- Widemere Road accommodates directional traffic demands of between 500 – 800 vehicles during weekday peak hours immediately adjacent to the site;
- Hassall Street accommodates directional traffic demands of between 400 – 600 vehicles during weekday peak hours immediately adjacent to the site;
- The portion of Hassall Street to the south of Gipps Road (performing an arterial function) accommodates directional traffic demands of between 800 – 1,200 vehicles during weekday peak hours;
- The portion of Hassall Street to the west of Widemere Road (performing a local function) and Redfern Street accommodate directional traffic demands of between 250 – 350 vehicles during weekday peak hours;
- Frank Street accommodates directional traffic demands of between 100 – 300 vehicles during weekday peak hours, on approach to Redfern Street;
- Walter Street accommodates directional traffic demands of between 200 – 700 vehicles during weekday peak hours, on approach to Victoria Street; and
- Davis Road accommodates directional traffic demands of between 200 – 550 vehicles during weekday peak hours, on approach to Widemere Road

The traffic assessment does not report ADTs for the identified roads. For the purposes of assessment, it has been assumed that the identified weekday peak hour volumes constitute approximately 10% of the ADT and that 90% of the ADT would occur during the daytime (7.00am-10.00pm), with 10% occurring at night (10.00pm-7.00am). These assumptions have been adopted in consultation with Stanbury Traffic Planning.

7.2 Road Traffic Noise Assessment

As discussed, WM has undertaken road traffic noise monitoring on Widemere Road, in order to quantify the level of existing traffic noise exposure on this section of road. An ARL noise logger was located for a period of ten days at 1A Widemere Road for this purpose. The measured daytime and night time road traffic noise levels are compared against the *RNP* criteria in Table 7-1.

Table 7-1 Measured Road Traffic Noise Levels on Widemere Road

Address	Logging Period	Daytime Traffic Noise Level <small>L_{Aeq,15 hour}</small>	Night time Traffic Noise Level <small>L_{Aeq,9 hour}</small>	Daytime <small>L_{Aeq,15 hour}</small> Criteria	Night time <small>L_{Aeq,15 hour}</small> Criteria
				Base	Base
1A Widemere Road (Free-field location, approximately 12 m from roadside)	24/7/17 – 2/8/17	66	62	60	55

Note: The traffic noise criteria apply at residential building facades. As the monitoring was undertaken in the free-field, an adjustment of +2.5 dBA has been applied to the measured levels to account for the façade reflection. The adjusted levels are shown above. Application of this adjustment results in acute façade noise levels (at equivalent distance from the road).

As shown in Table 7-1, existing daytime and night time road traffic noise levels already exceed *RNP* criteria on Widemere Road at a setback distance of 12 m from the roadside. Existing exceedances of this order are considered likely along other sections of the proposed arterial/sub-arterial routes where residences exist. For example, several residential receivers on the portion of Hassall Street to the south of Gipps Road are setback from the roadside by approximately 12 m. Additionally, on this section traffic volumes are reported to be somewhat higher than on Widemere Road. It follows that these residents would also experience road noise levels above *RNP* criteria.

With consideration to the traffic survey undertaken by Stanbury Traffic Planning it is predicted that the site currently contributes <0.5 dB to the existing daytime and night-time traffic noise level at the Hassall Street residential receivers. These contributions are considered to be negligible.

With the proposed expansion, assuming up to an additional 6-7 truck movements per hour at night, the project's traffic would be expected to contribute up to 0.6 dB to the overall level at the Hassall Street residential receivers. This contribution and the incremental change in level is considered negligible.

Given the relatively high existing traffic volumes identified, the additional traffic that would be generated during the development of the site and during post-expansion operational phase of the Project would not be expected to result in a noticeable change in traffic noise levels on the surrounding road network. A relative increase of less than 1 dB is anticipated on the proposed off-site routes, based the information available, and therefore the potential for noise impacts associated with the additional traffic movements is considered negligible in accordance with the *NSW Road Noise Policy*.

8 VIBRATION ASSESSMENT

The greatest potential for vibration impacts would result from the use of a vibratory roller when compacting the fill in the gully.

Results from vibration monitoring trials of vibratory rollers operating on high speed and high amplitude settings, previously undertaken by WM are set out in Table 8-1. These provide a guide to the levels that may occur due to similar activities undertaken on the on the subject site. It should be noted, however, that actual levels would depend on the specific site geological conditions.

Table 8-1 Measured Vibration Levels from Vibratory Rollers

Vibratory Roller	Peak Particle Velocity, PPV (mm/s)		
	10m	20m	30m
Multipac VV2504PD Super Silenced – 25-tonne padfoot	6.177	3.311	1.558
HAMM3414 – 15-tonne smooth drum	3.552	2.000	0.906

The other construction activities have been considered and deemed to produce vibration levels that are below the levels in Table 8-1 and are not significant in terms of human comfort and building damage criteria.

8.1.1 Residential Receivers

Given the substantial setback distances to the closest residential receivers, any ground vibrations arising due to on-site activities would be unnoticeable at these locations and significantly below the relevant guideline criteria for human comfort and structural damage.

8.1.2 Commercial/Industrial Receivers

The closest existing commercial buildings on Widemere Road are setback from the gully site by at least 50 m. Any ground vibrations arising due to on-site activities would be substantially reduced by this distance from the source.

As detailed in Section 5.4.2, this assessment has adopted a conservative building damage criterion of 20 mm/s for commercial/industrial buildings. As shown in Table 8-1, as the anticipated levels are substantially below this criterion, no material risk of building damage from vibration effects is anticipated for these receivers.

In terms of the anticipated effects of vibration on the occupants of the closest commercial buildings, the expected level from vibratory rolling would not be expected to exceed the maximum human comfort criterion recommended for offices (1.1 mm/s maximum).

On this basis, no material vibration impacts are expected during the development of the site.

9 NOISE MANAGEMENT MEASURES

No noise or vibration exceedances due to the proposed expansion have been predicted and therefore no specific noise control measures are warranted. However, to ensure best practice management is maintained, FCC will continue to manage the site and the gully filling works and continue to apply best practice management strategies to minimise any potential noise impacts.

9.1 Operational Noise

The following noise best practice management strategies are recommended during operations:

- Ensuring that all on-site fleet are appropriately maintained and in correct operational order;
- Maintaining a 20 km/hr on site speed limit for all vehicles;
- Ensuring machinery engine covers are normally kept closed, equipment is well maintained, and silencers/mufflers are used as appropriate, including routine maintenance for major items of operational equipment that contribute to operational noise emissions from the site;
- Provision of awareness training for staff and contractors in environmental noise issues including:
 - Minimising the use of horn signals and maintaining a low volume. Alternative methods of communication should be considered;
 - Avoiding any unnecessary noise when carrying out manual operations and when operating plant;
 - Switching off any equipment not in use for extended periods; and
- Maintaining a suitable complaints register. Should noise complaints be received, they should be immediately investigated. Where substantiated, reasonable and feasible measures would be implemented to reduce noise impacts.

10 CONCLUSION

Fairfield City Council is proposing to expand of the existing Fairfield Sustainable Resource Centre (SRC) located on the corner of Hassall Street and Widemere Road, Wetherill Park.

Approval to licence the facility generally in accordance with current operations, whereby a capacity to 550,000 tonnes per year is being sought.

The increased SRC capacity is proposed to be facilitated through the filling of an existing gully running north-south through the centre of the site, allowing the creation of a new large temporary stockpiling area for excess material and the extension of the existing facility hours of operation. Further, an increase in the currently approved hours of operation is also being sought.

WM has undertaken an assessment of potential noise and vibration impacts on surrounding noise sensitive receivers due to the proposal. This assessment has considered noise and vibration impacts from on-site operations, road transportation and construction in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and relevant NSW noise guidelines. The findings of the assessment are as follows:

Operational Noise

Operational noise emissions from the site would be expected to fully comply with the relevant *NPfI* Project Noise Trigger Levels at all identified receivers with respect to maximum operating conditions. Full compliance is predicted under neutral and prevailing adverse meteorological conditions.

Further to this, given the existing ambient noise levels experienced by the closest residential receivers to the site, operational activities would be expected to be rendered inaudible at these localities.

Construction Noise

Predictions indicate that the gully filling would not result in off-site noise levels beyond those during operation. Therefore compliance with the Interim Construction Noise Guideline will be achieved and no specific requirement for mitigation has been identified to control the gully works noise to satisfactory levels.

Cumulative Operational Noise

Operational noise from the project would not be expected to result in any material increase in cumulative industrial noise levels experienced by the existing residents.

Maximum Noise Level Events Assessment

Predicted noise levels would be expected to be within the sleep disturbance noise trigger level established in accordance with the *NPfI*.

Off-Site Transportation Noise

During the gully filling and post-expansion operational phases, road traffic noise levels are

predicted to increase by less than 1 dB and therefore comply with the *RNP* criteria.

Vibration

No vibration impacts are expected at any residential or commercial/industrial locations. In addition, no risk of structural damage to the closest commercial/industrial buildings is anticipated.

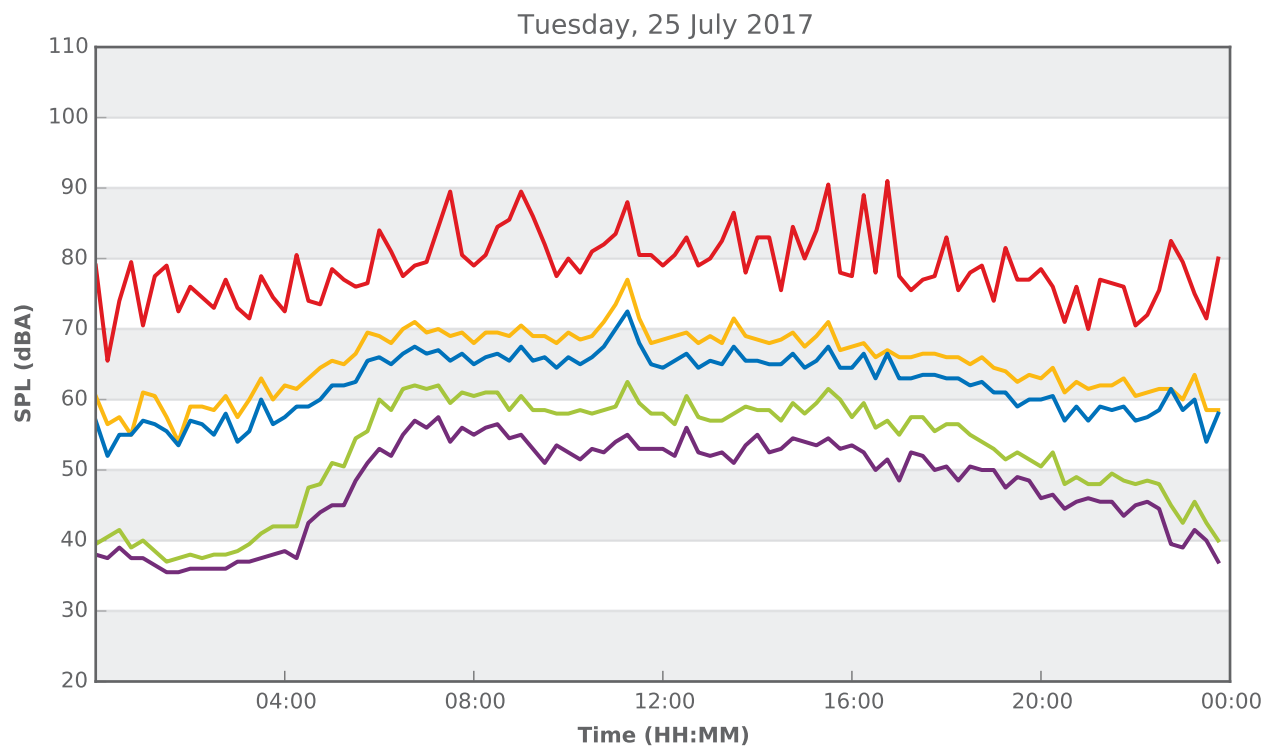
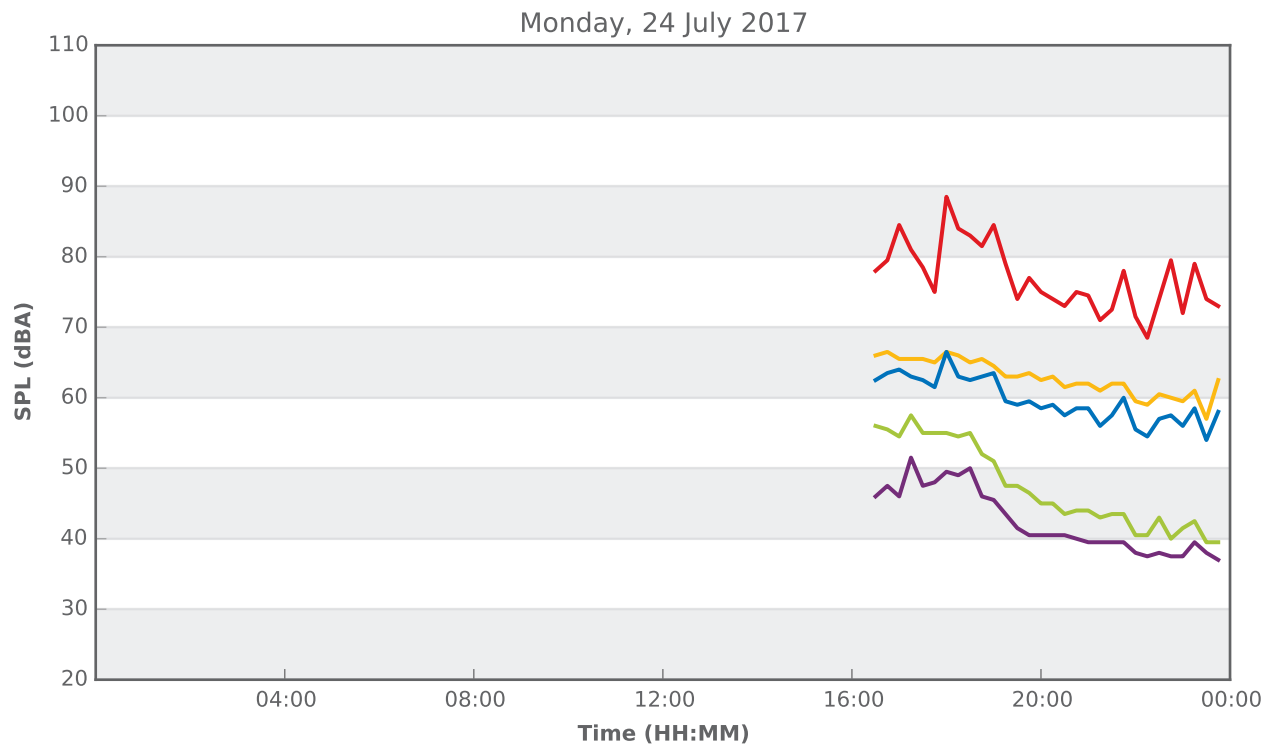
Management

Whilst no specific requirement for mitigation has been determined to be necessary to control noise or vibration emissions to meet site specific noise and vibration associated with construction or operation of the development. However best practice management strategies have been presented and are recommended to adopted on site.

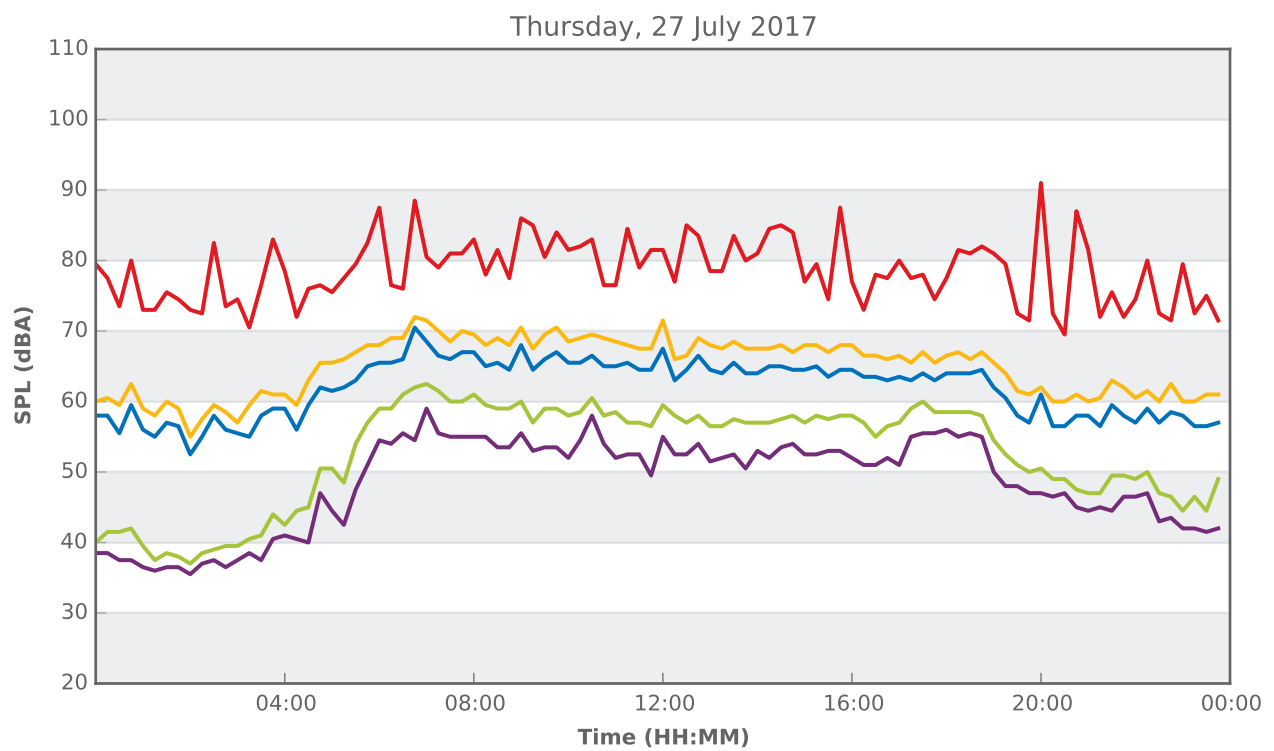
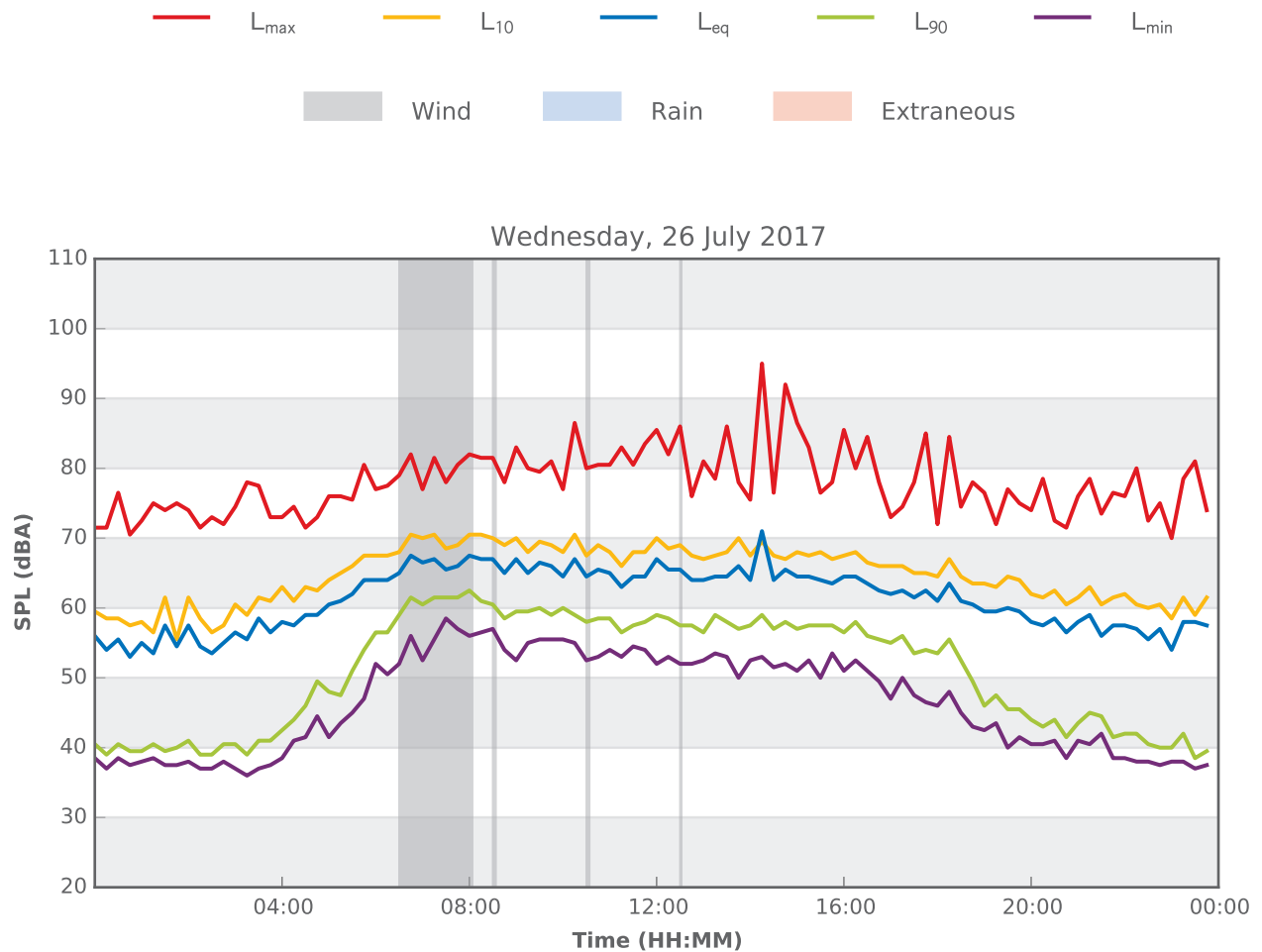
APPENDIX A

NOISE MEASUREMENT RESULTS

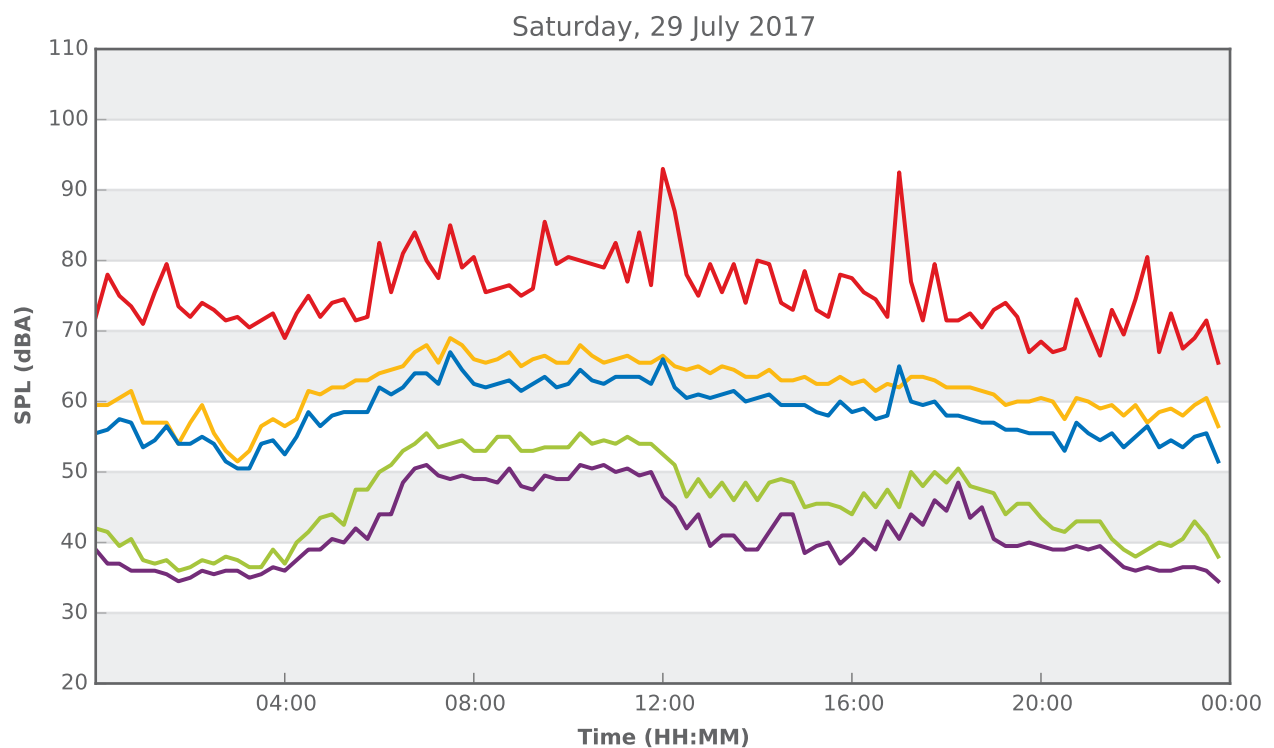
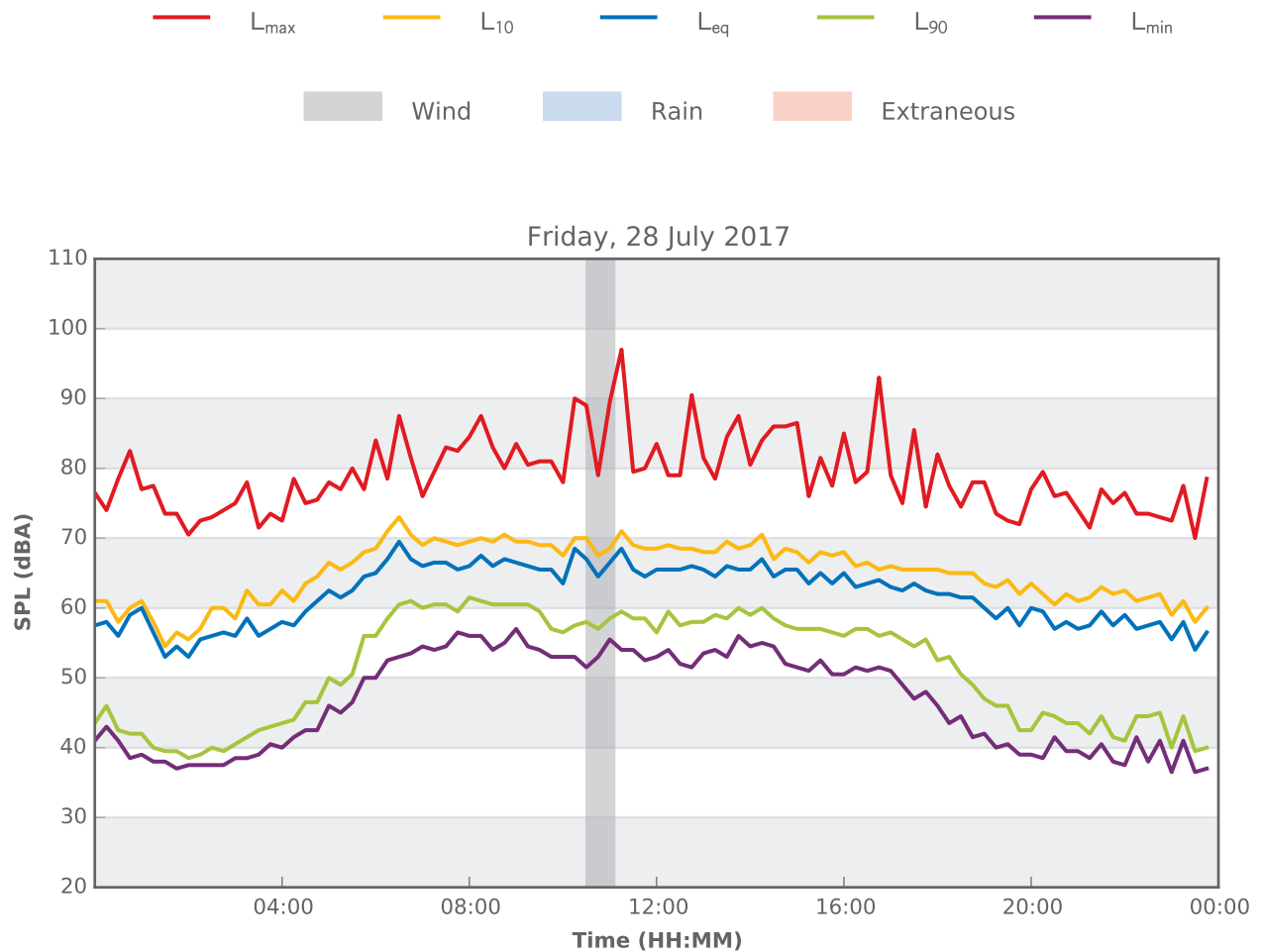
1A Widemere Road, Wetherill Park



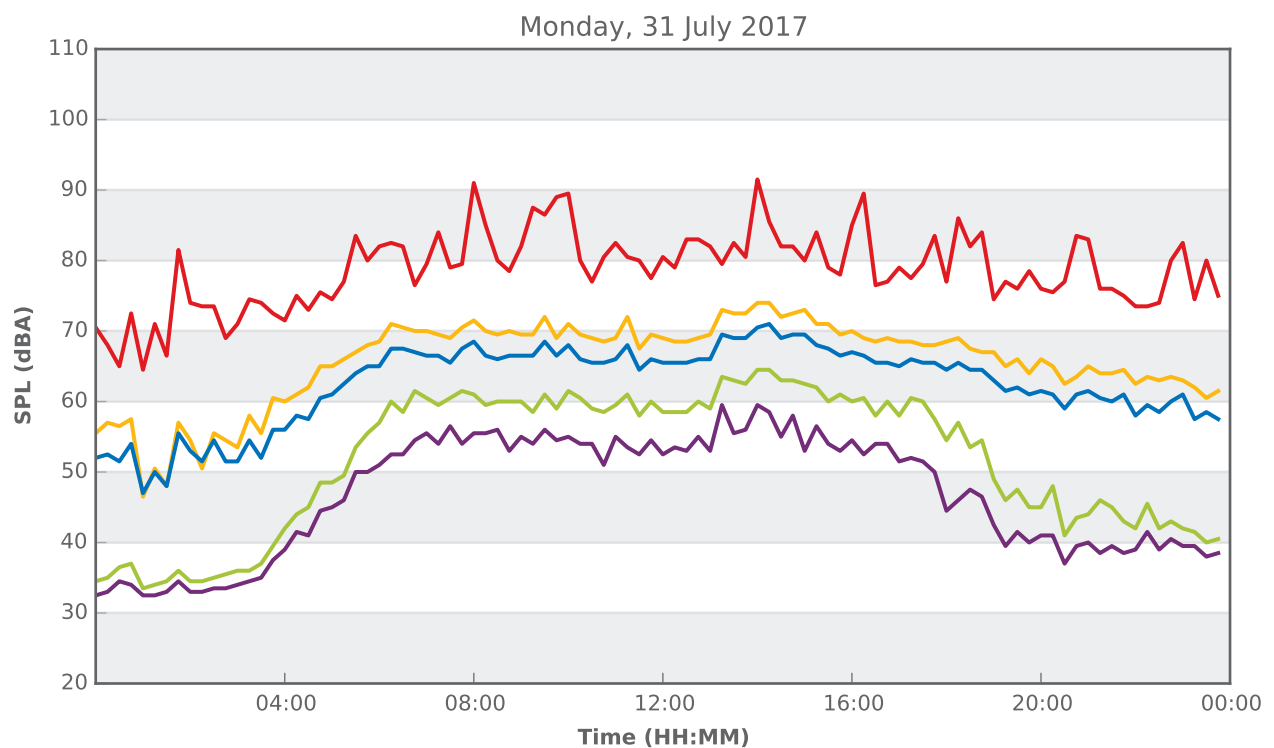
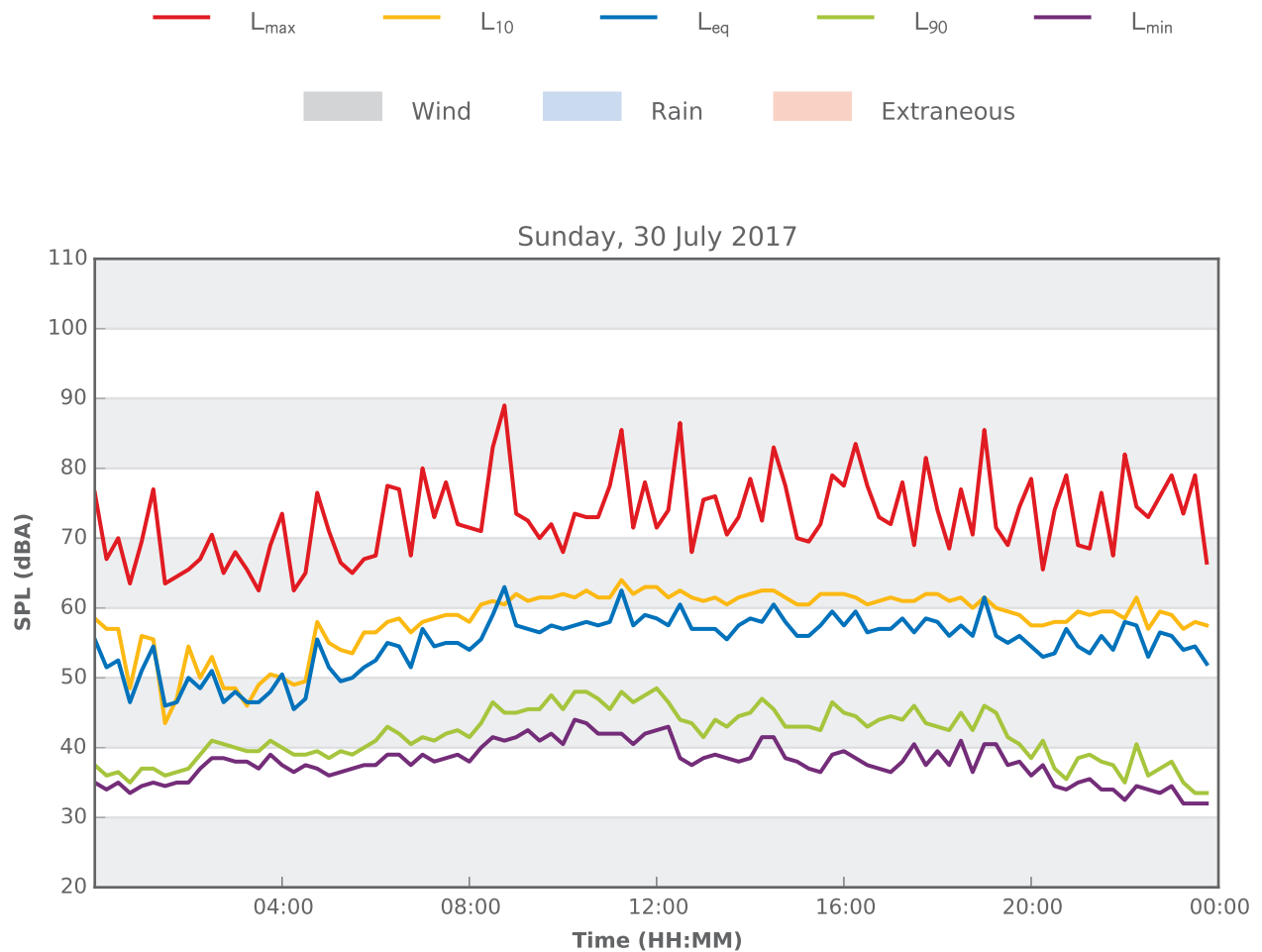
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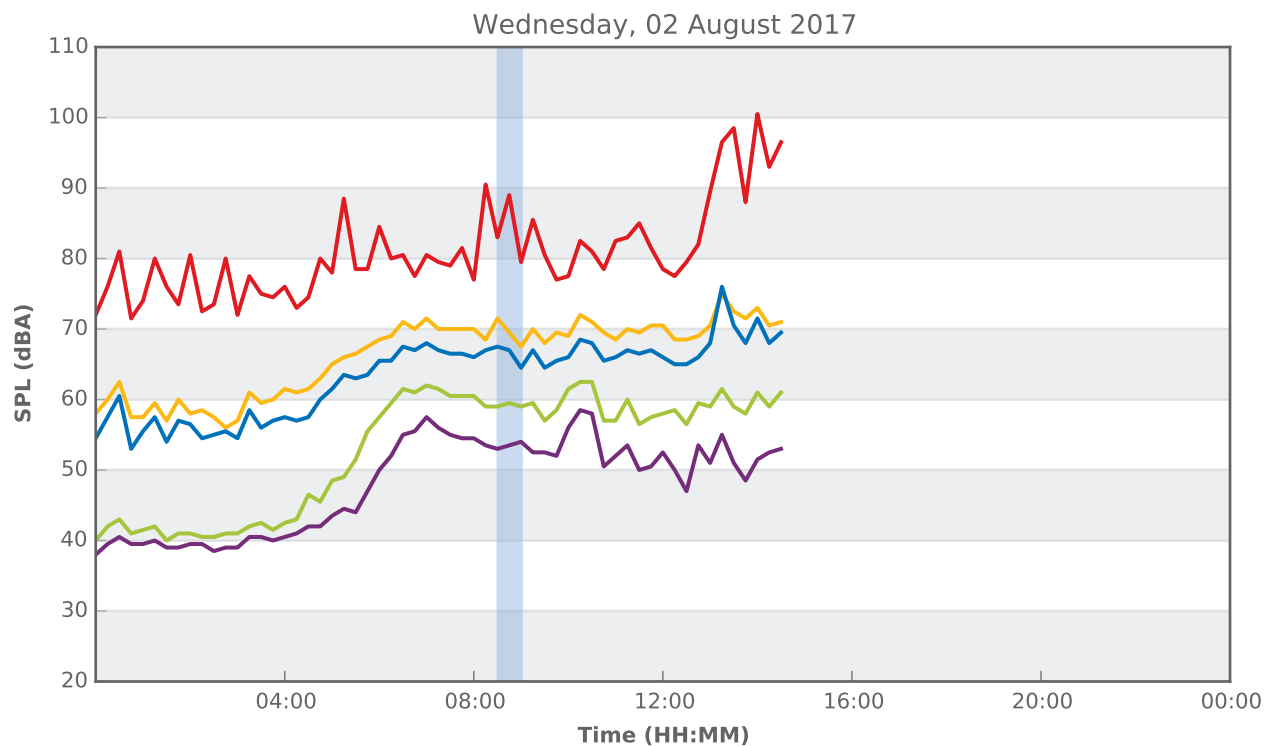
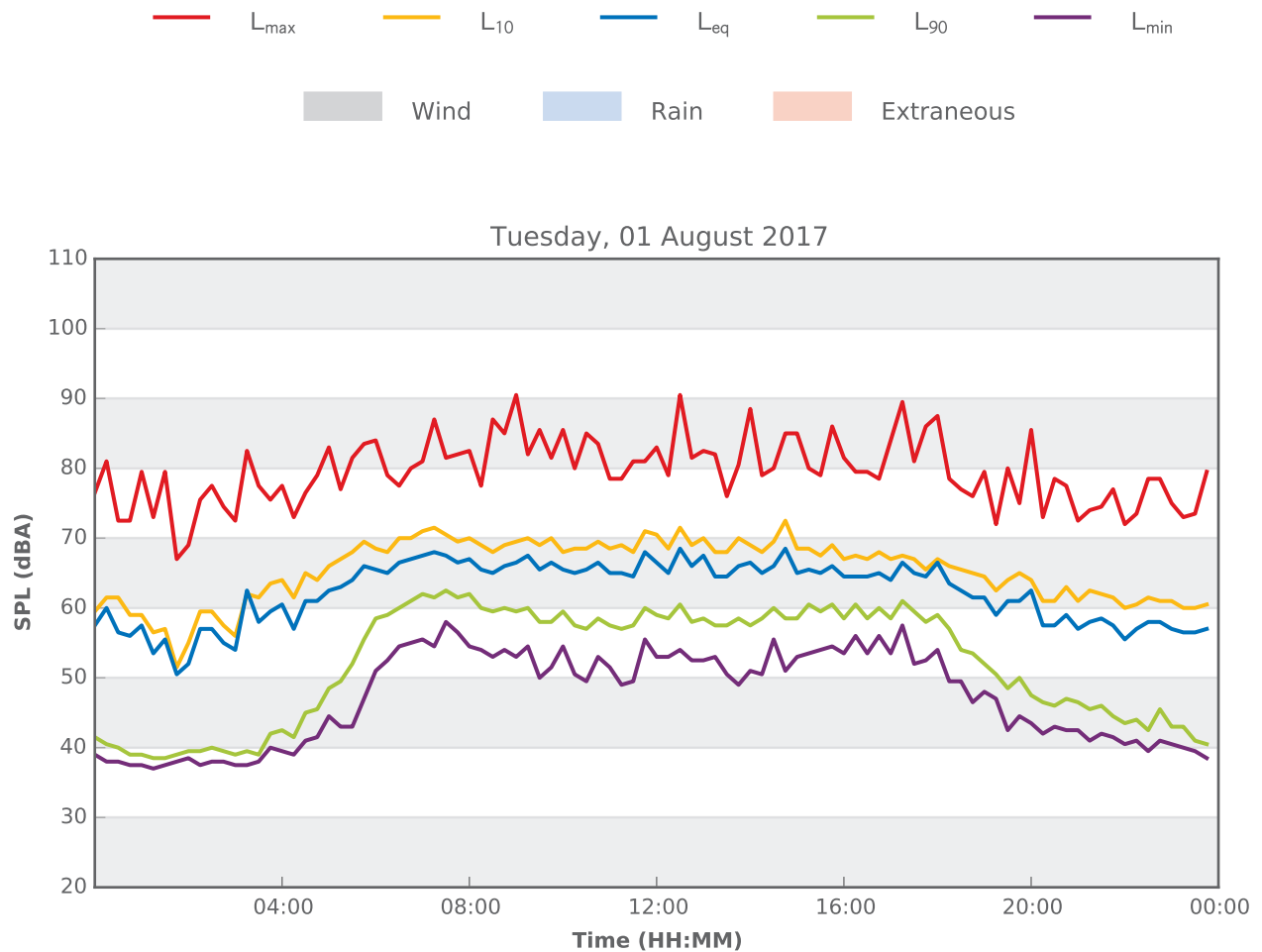
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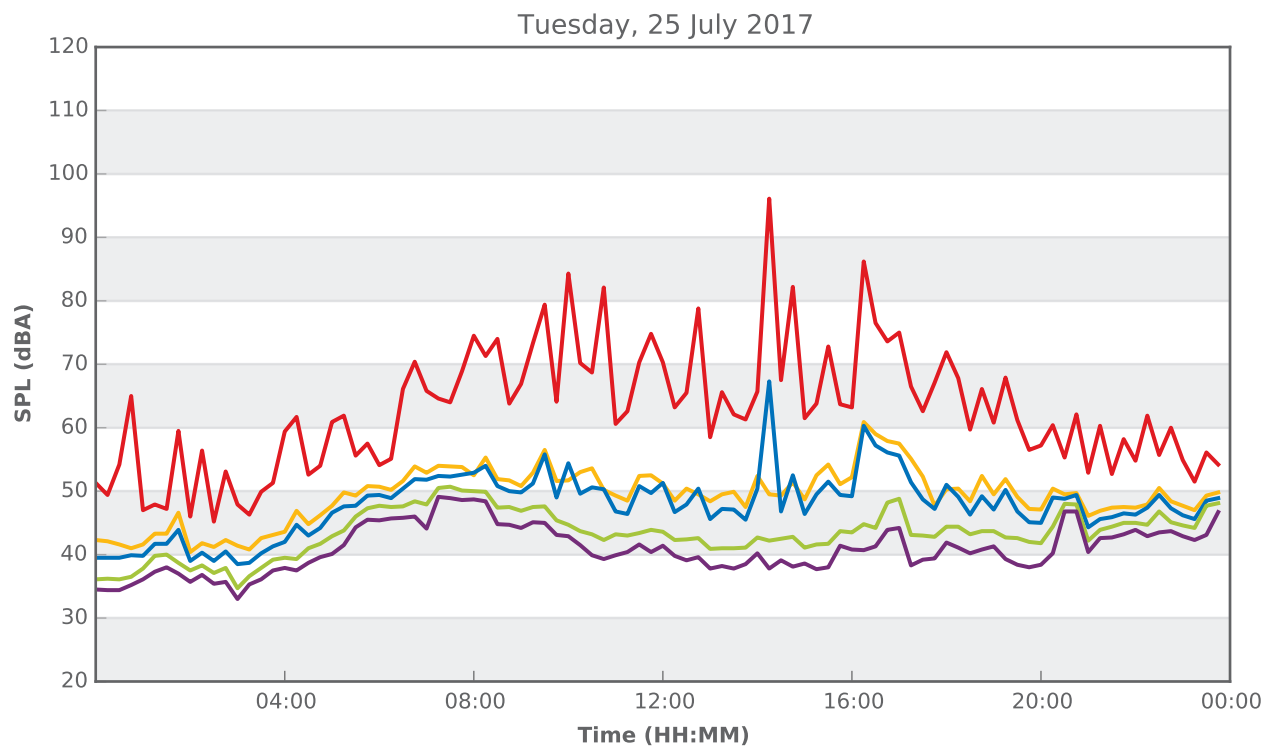
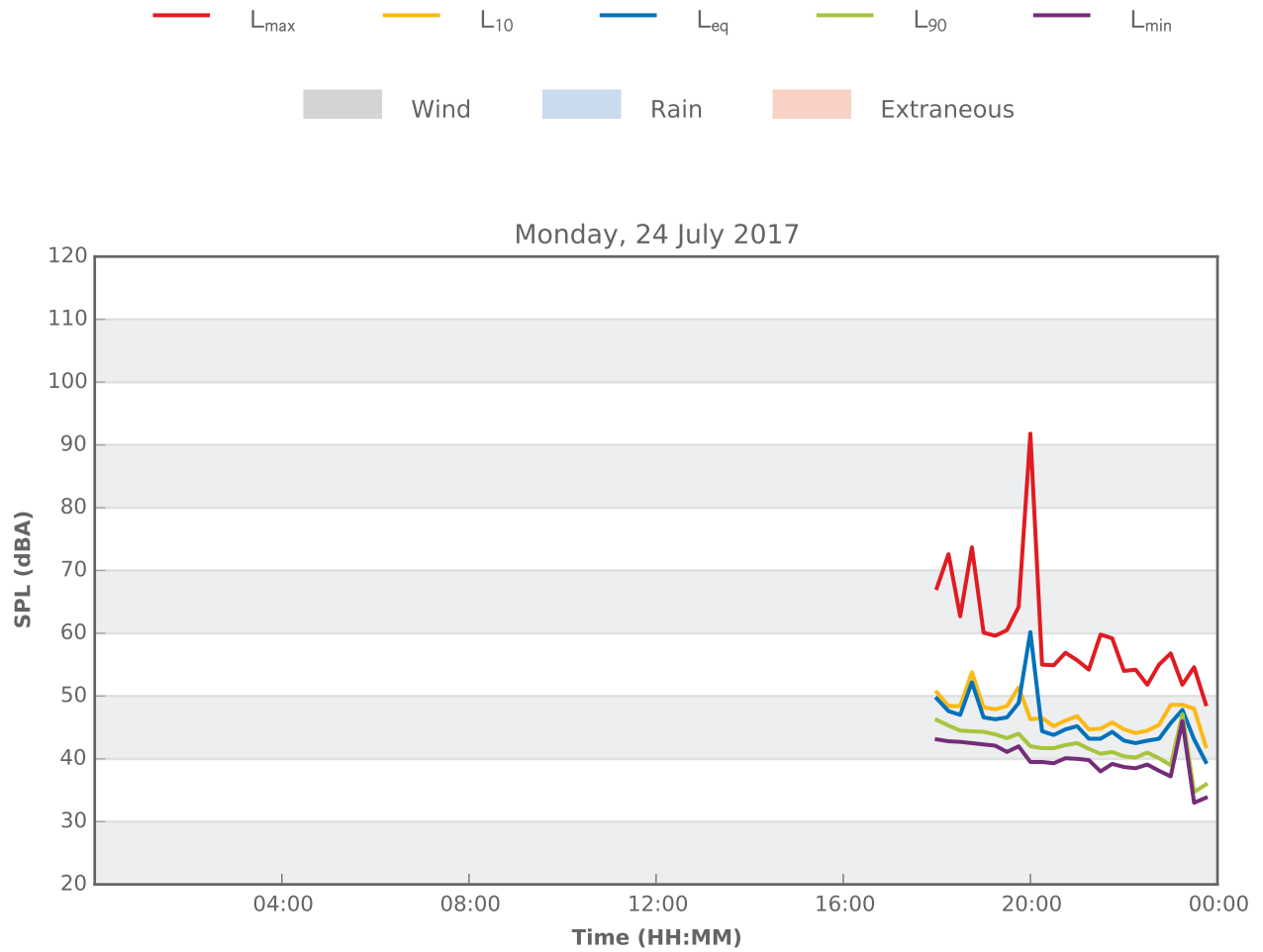
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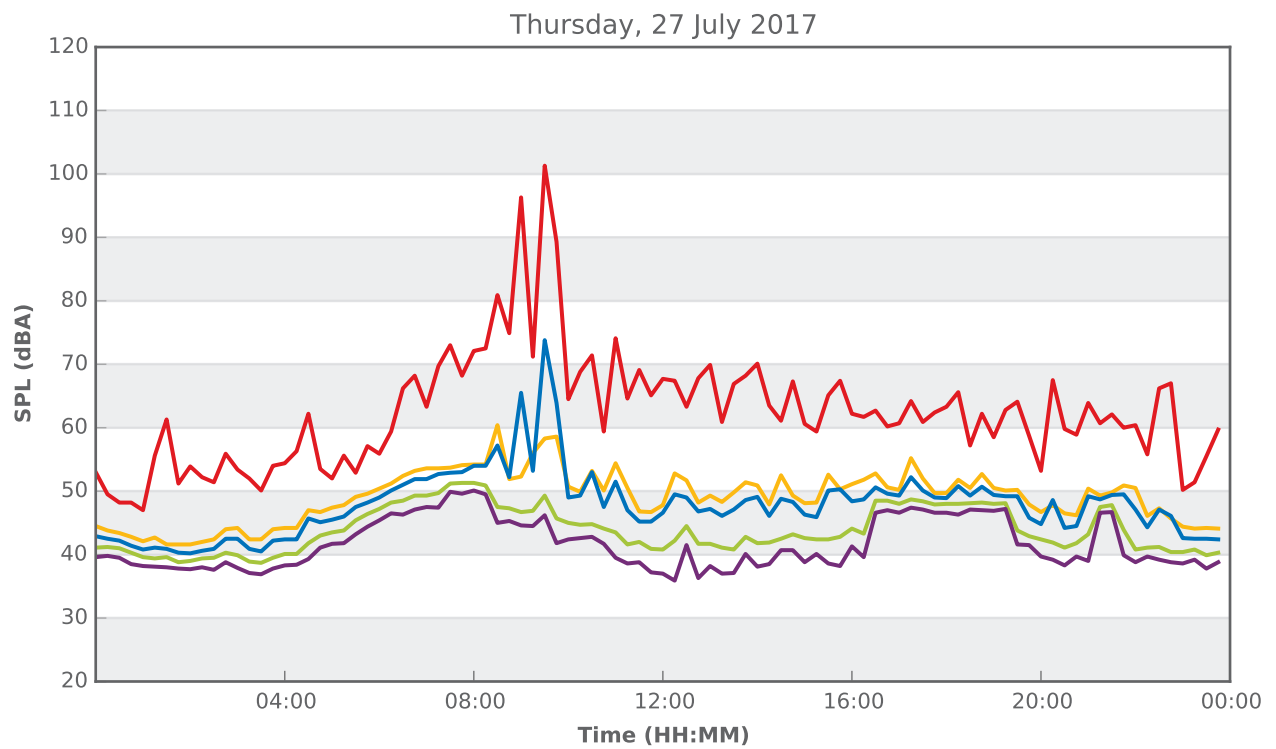
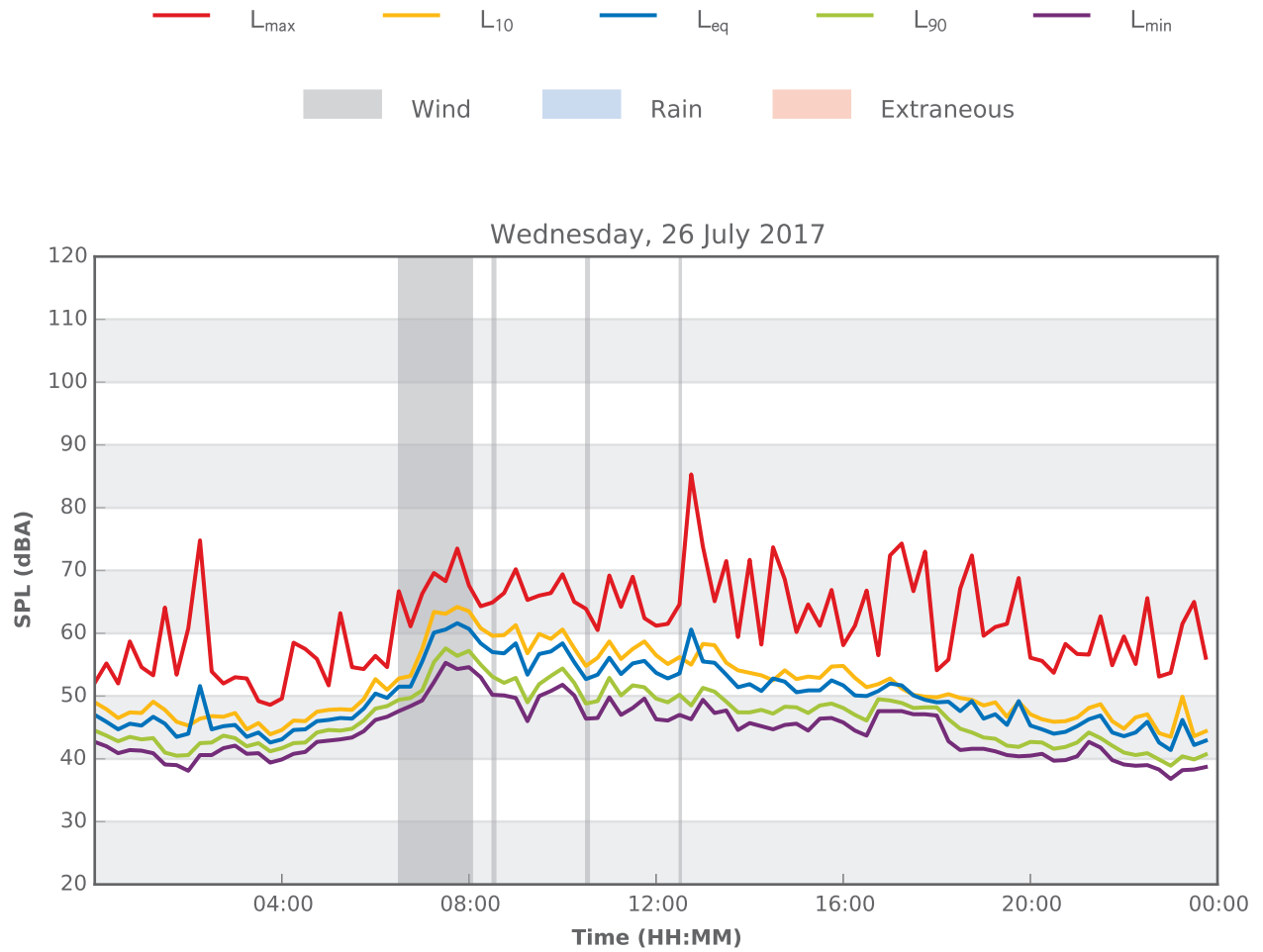
1A Widemere Road, Wetherill Park



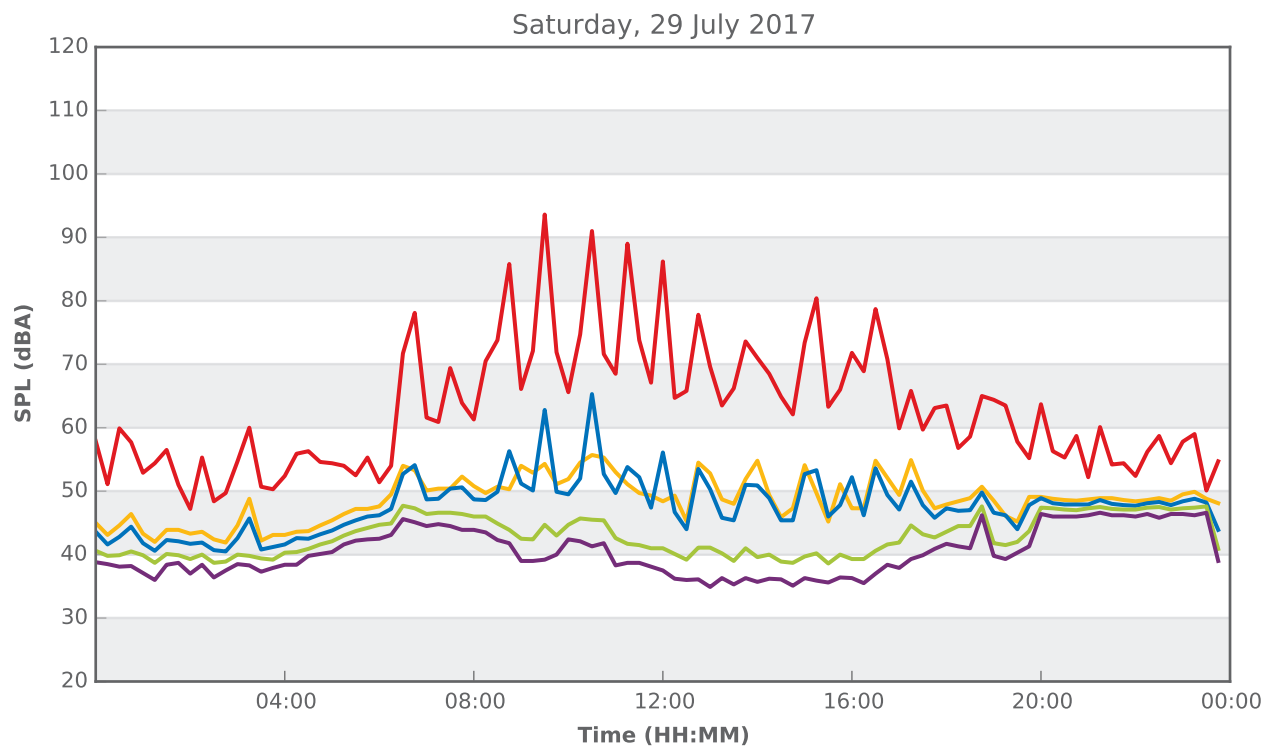
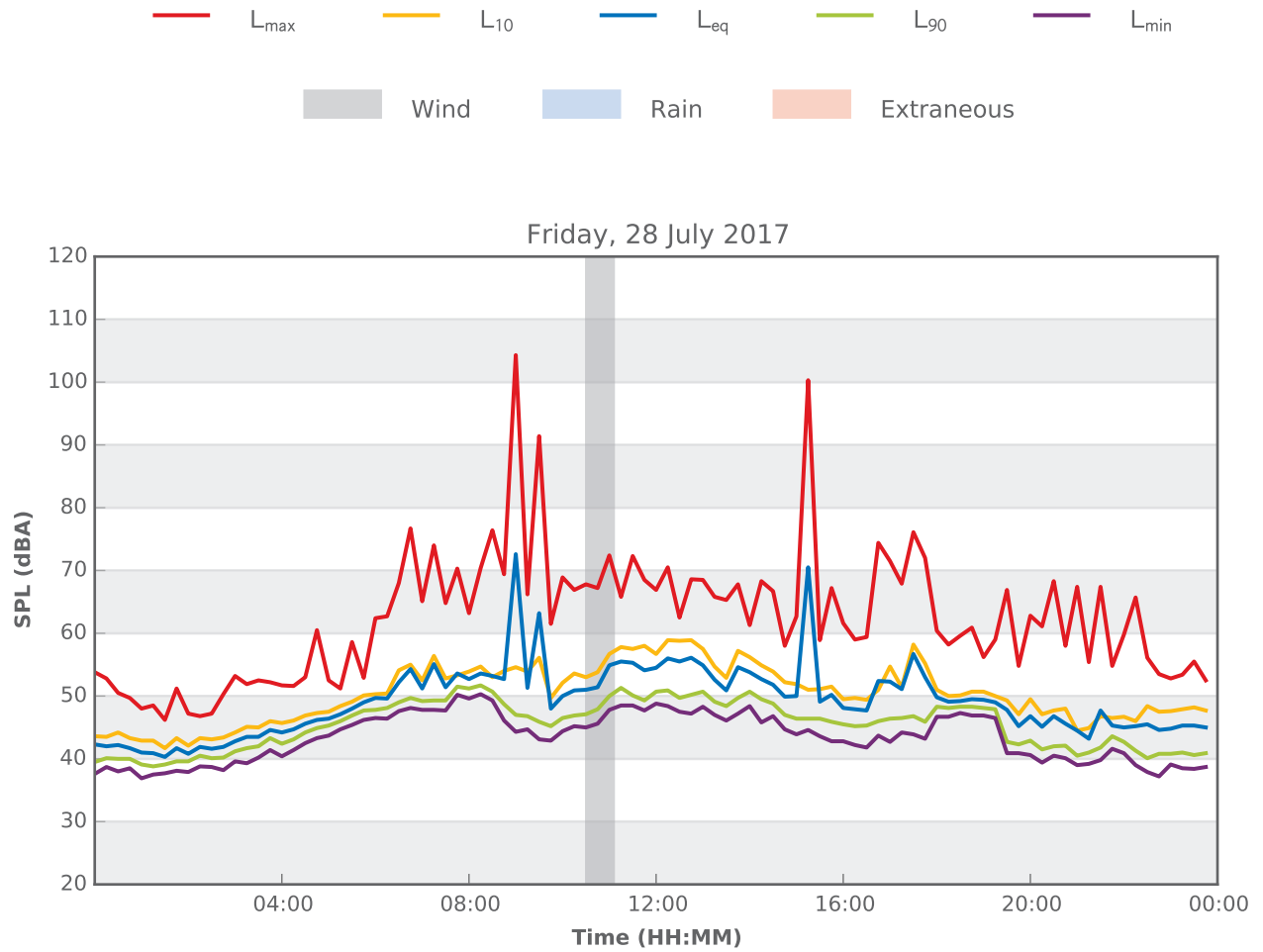
60 Rosford Street, Smithfield



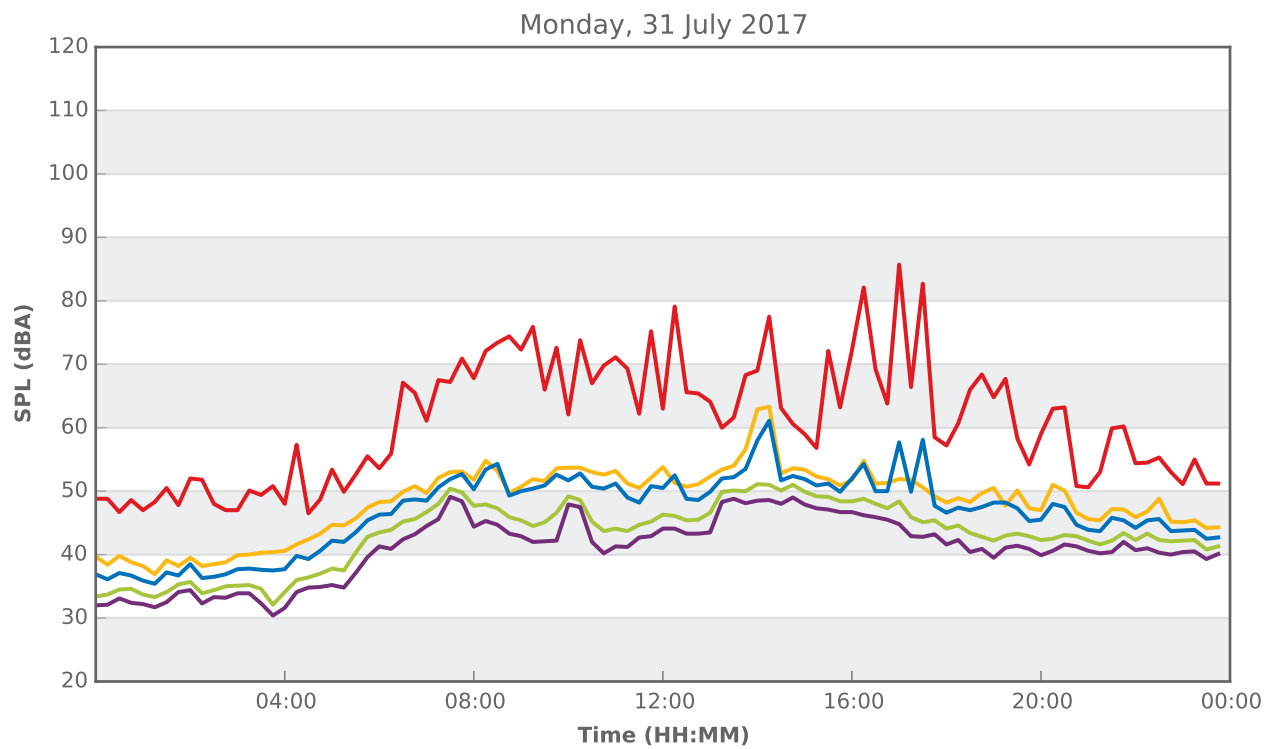
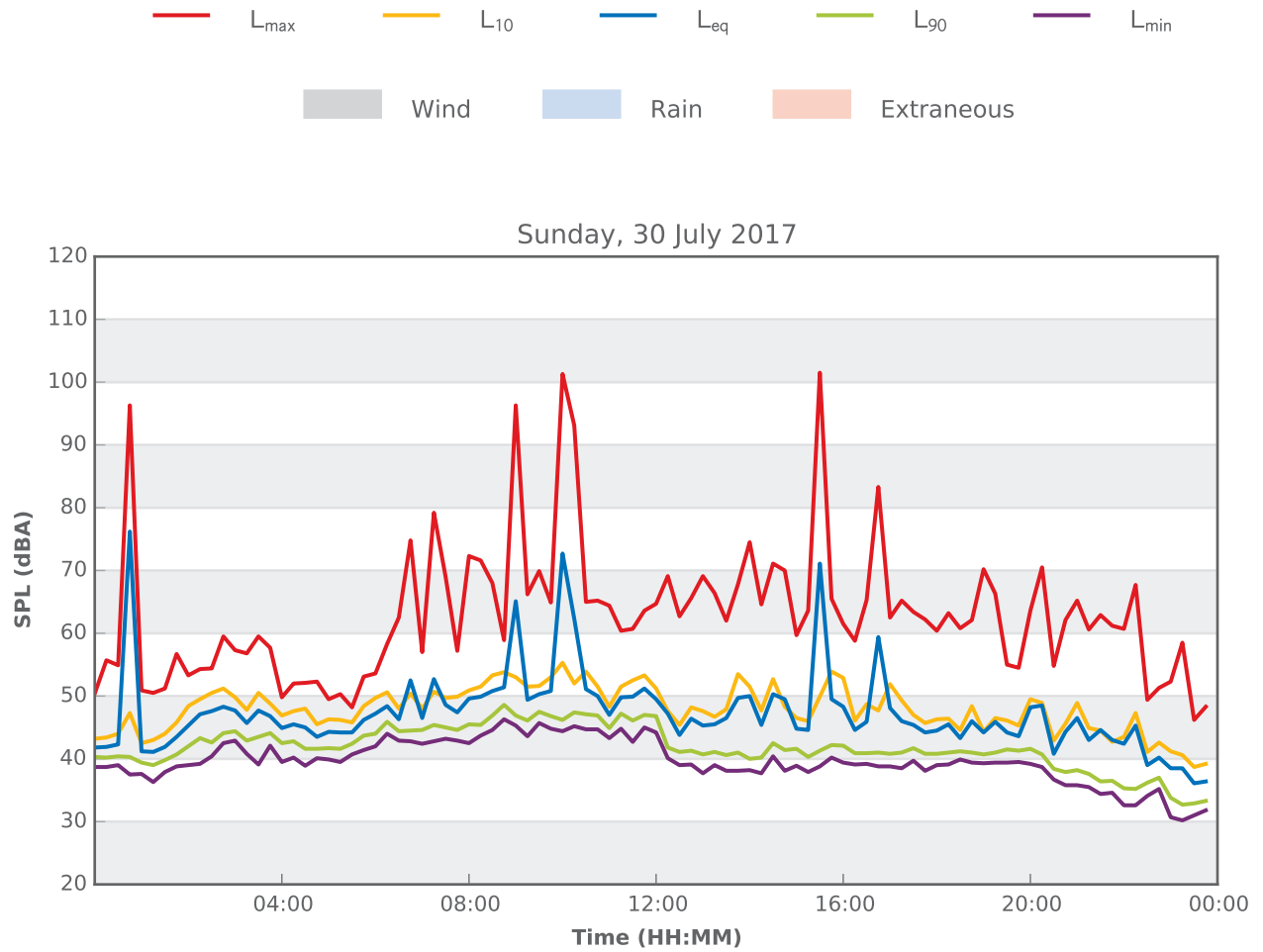
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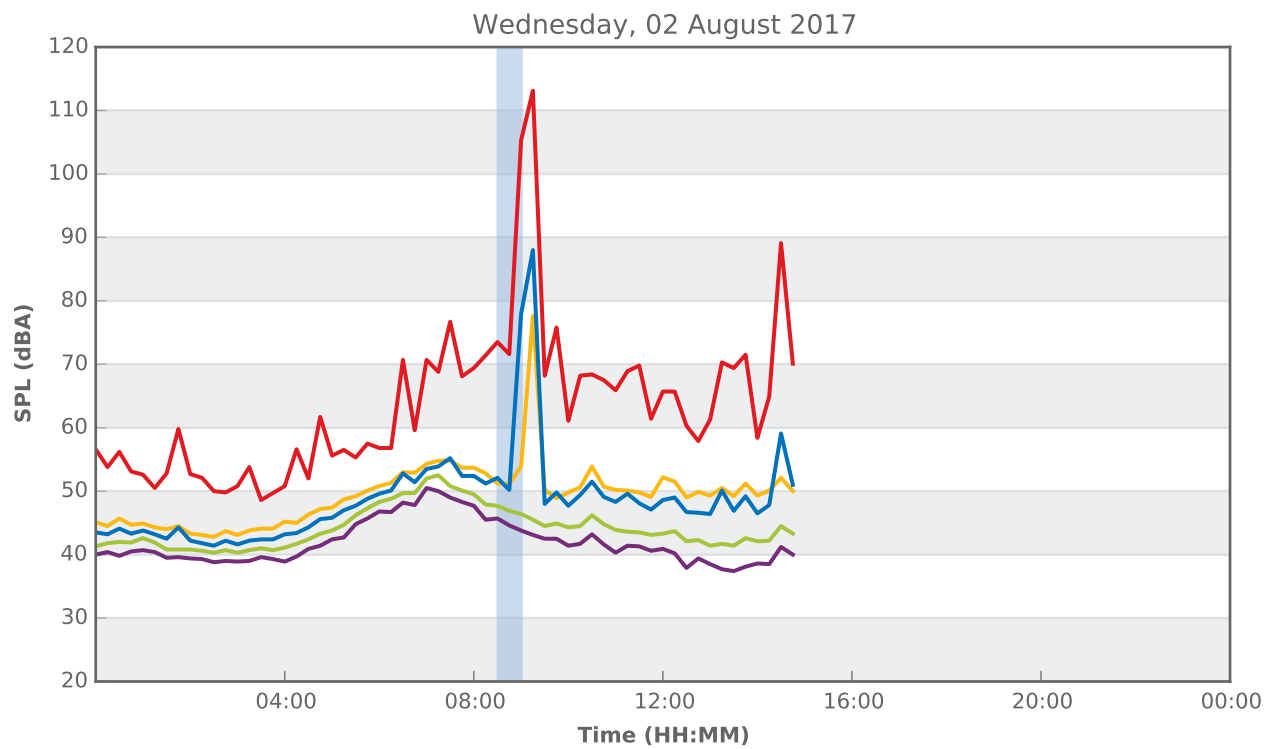
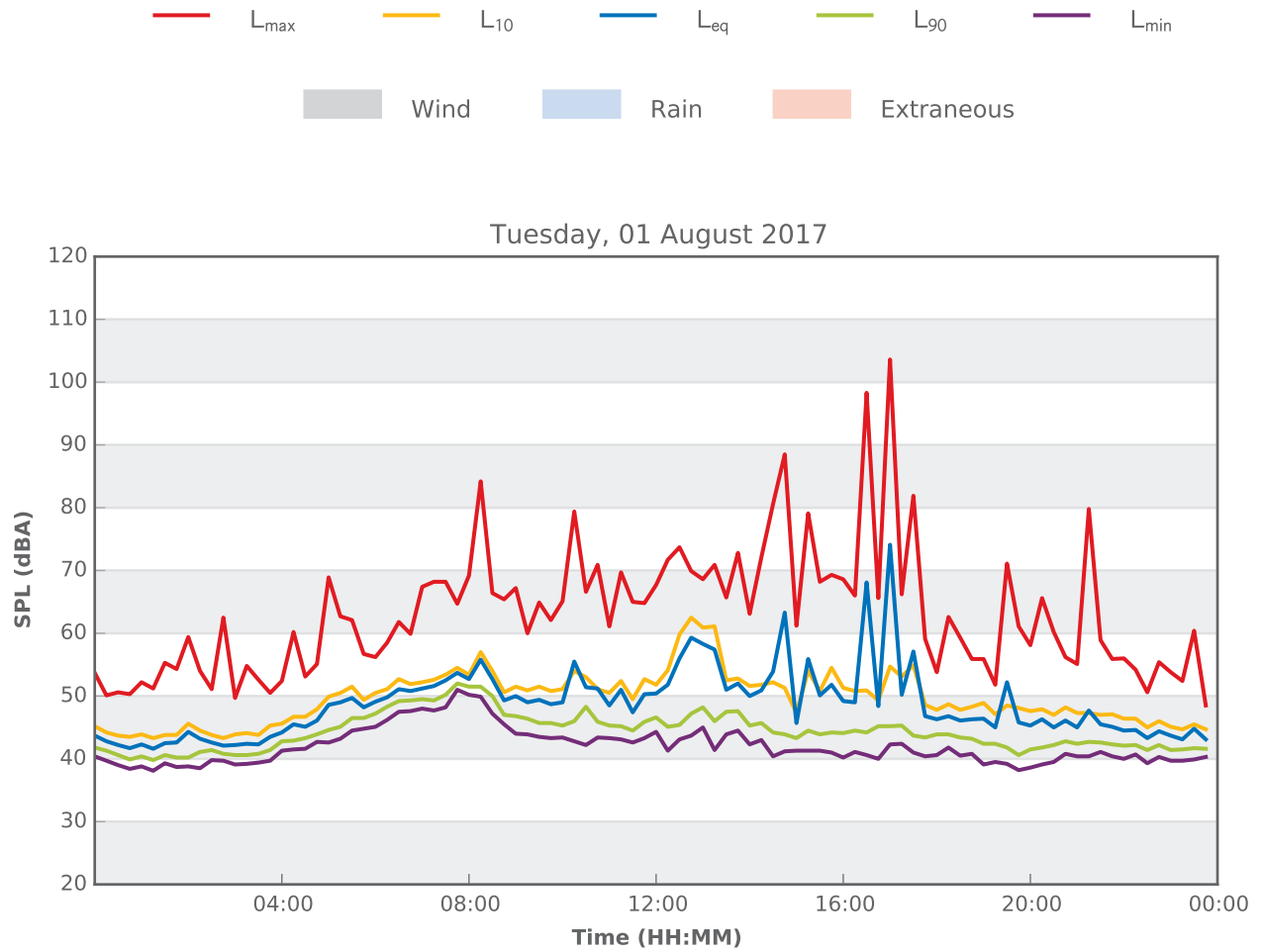
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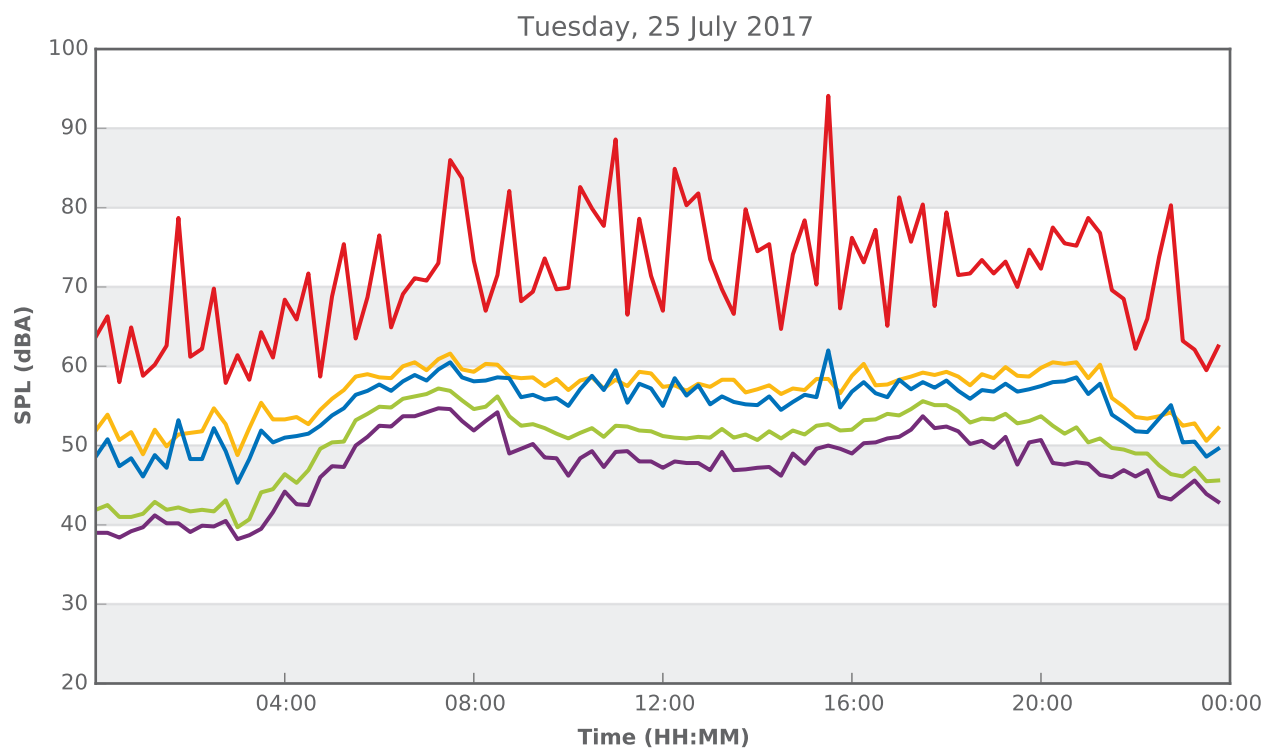
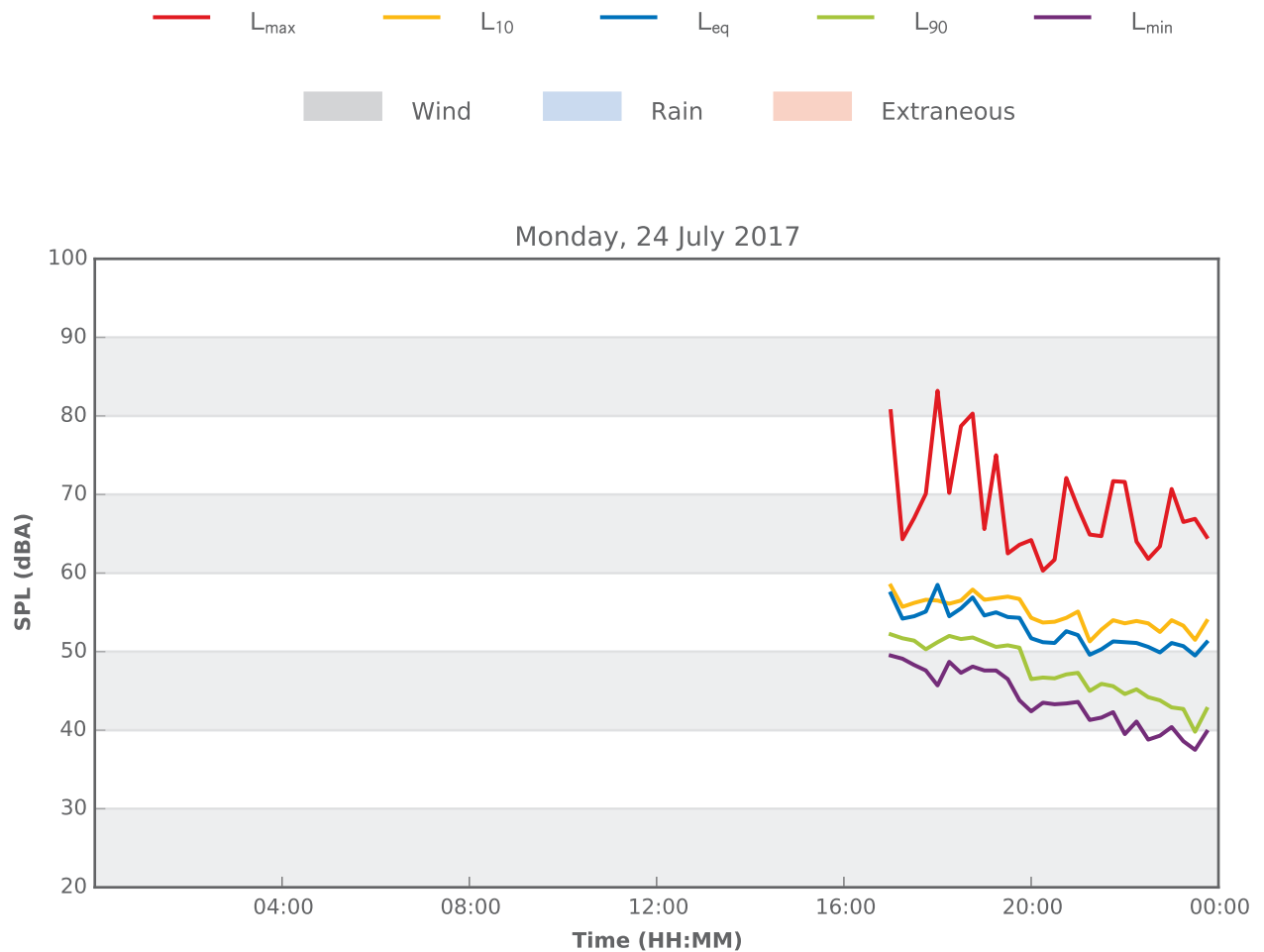
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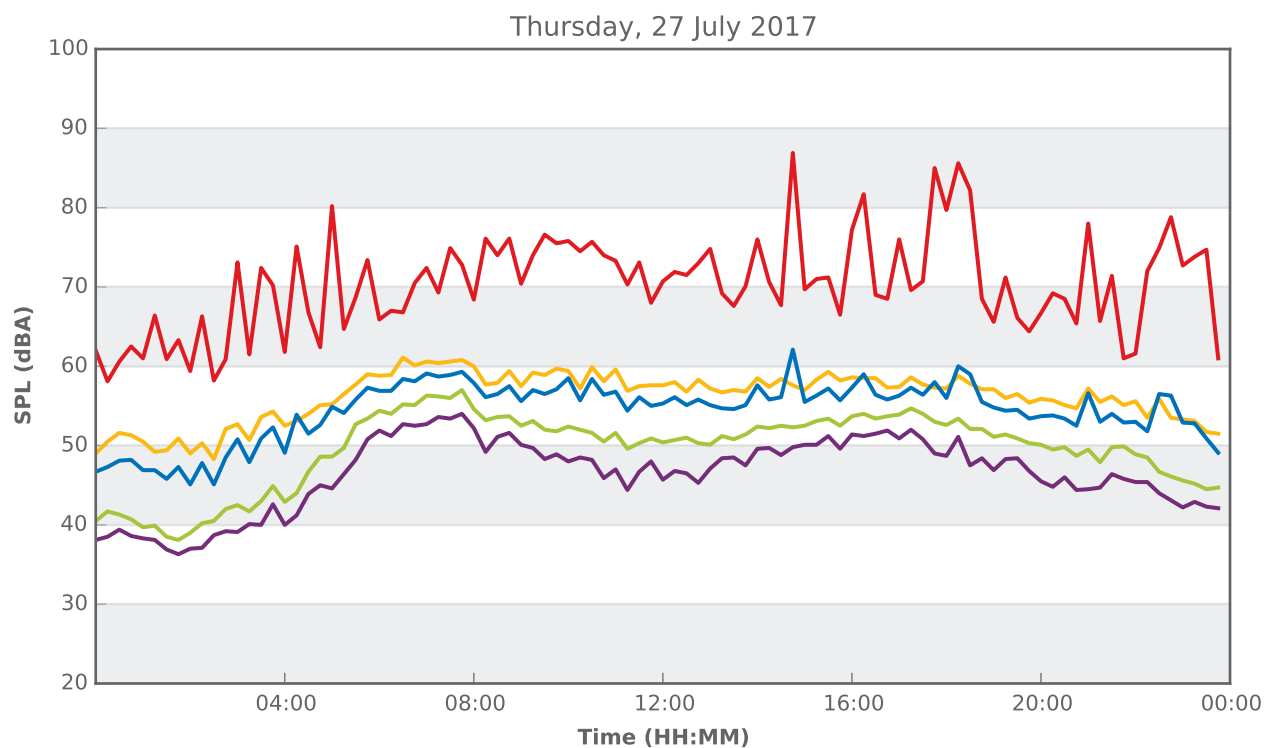
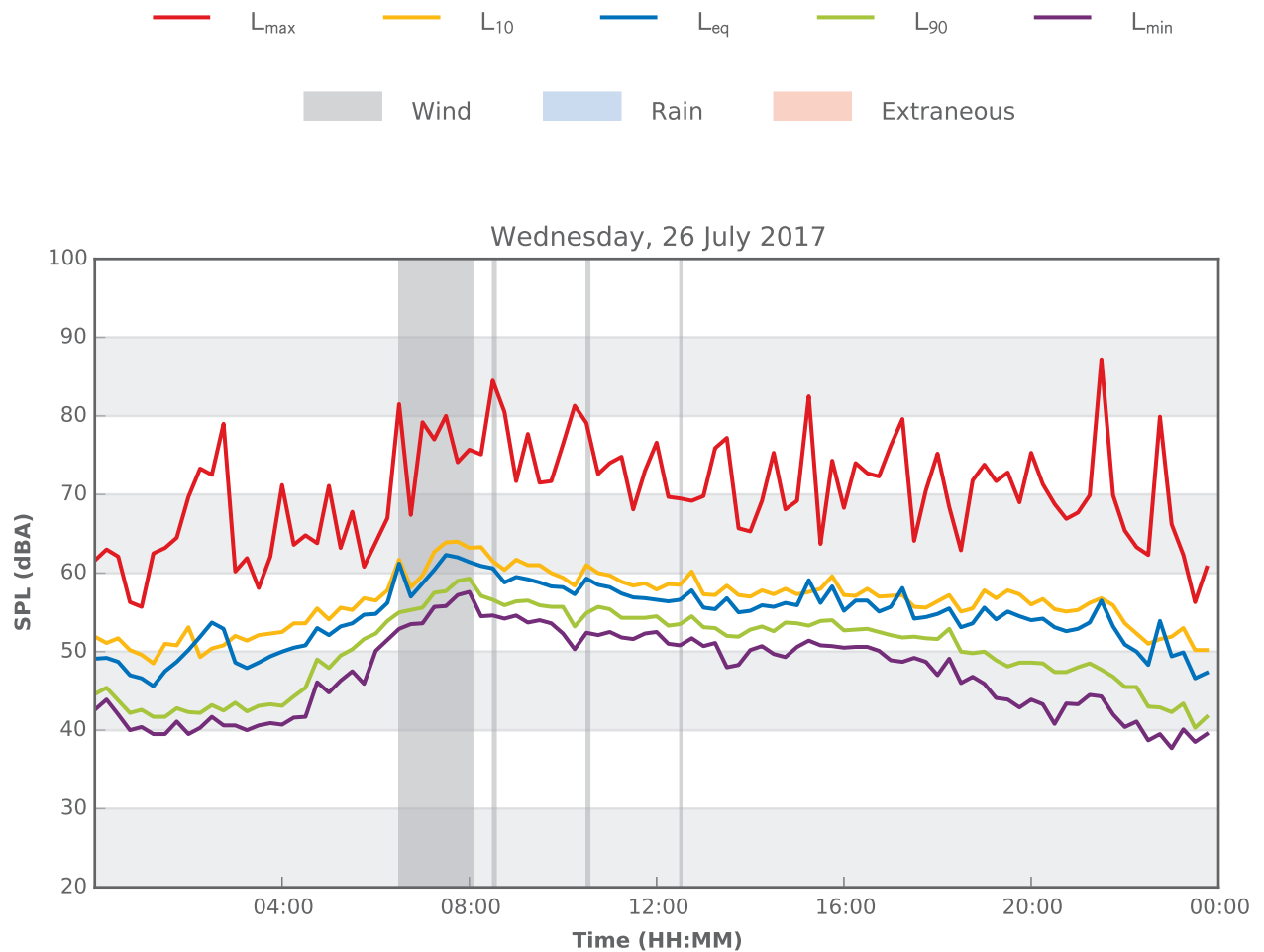
60 Rosford Street, Smithfield



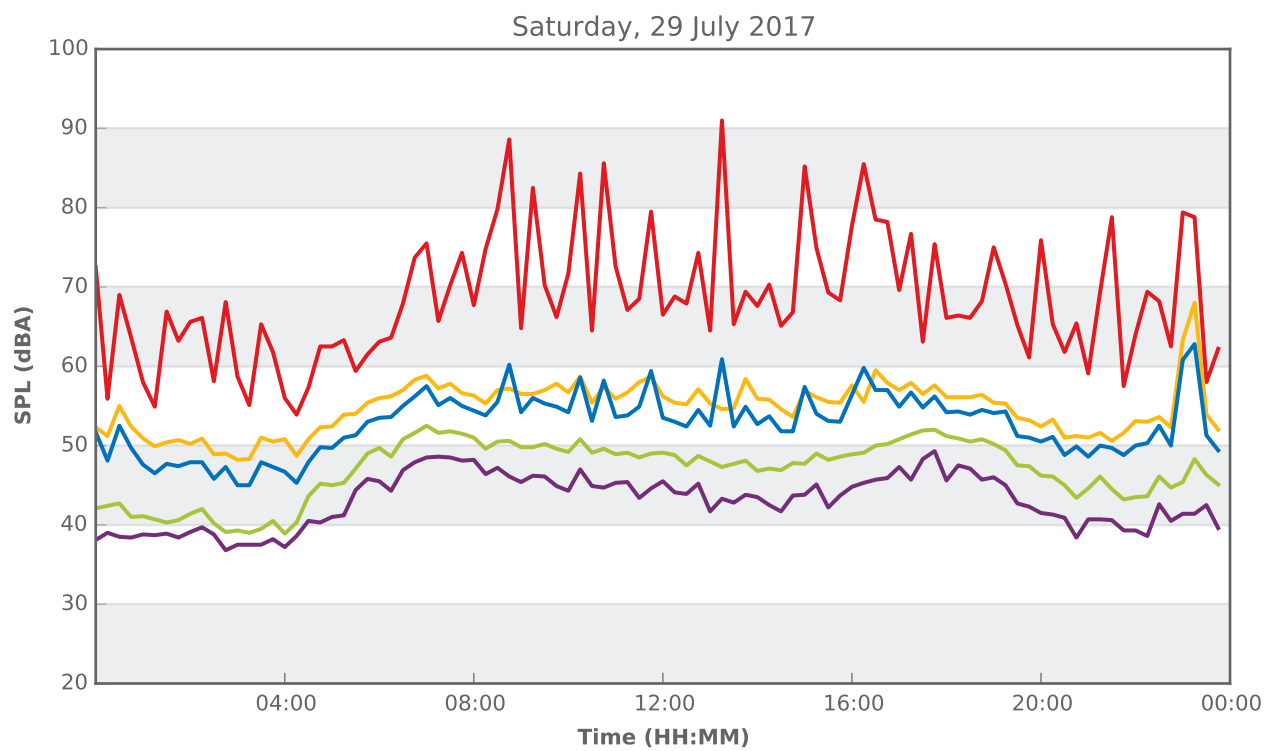
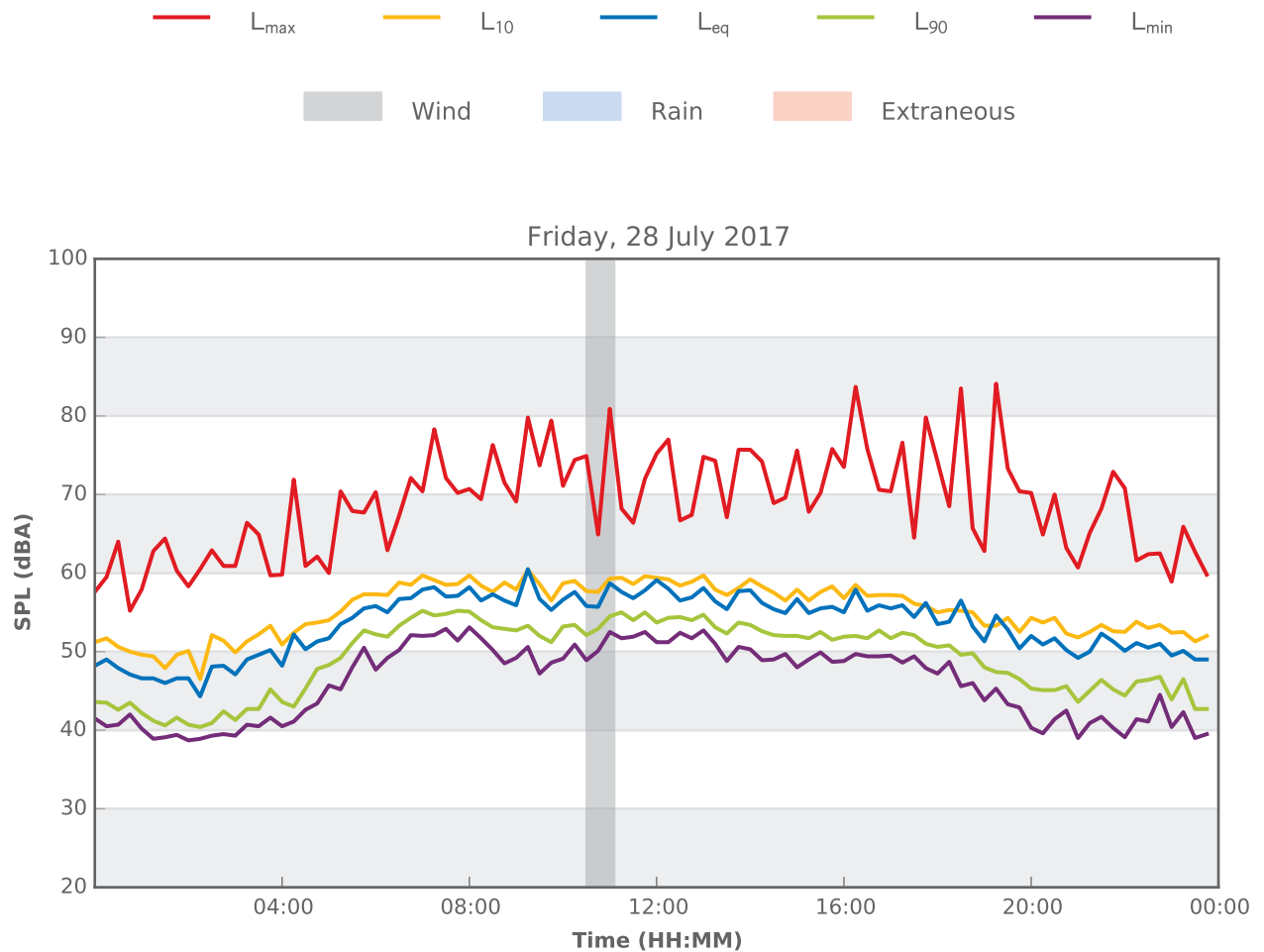
73 Munro Street, Greystanes



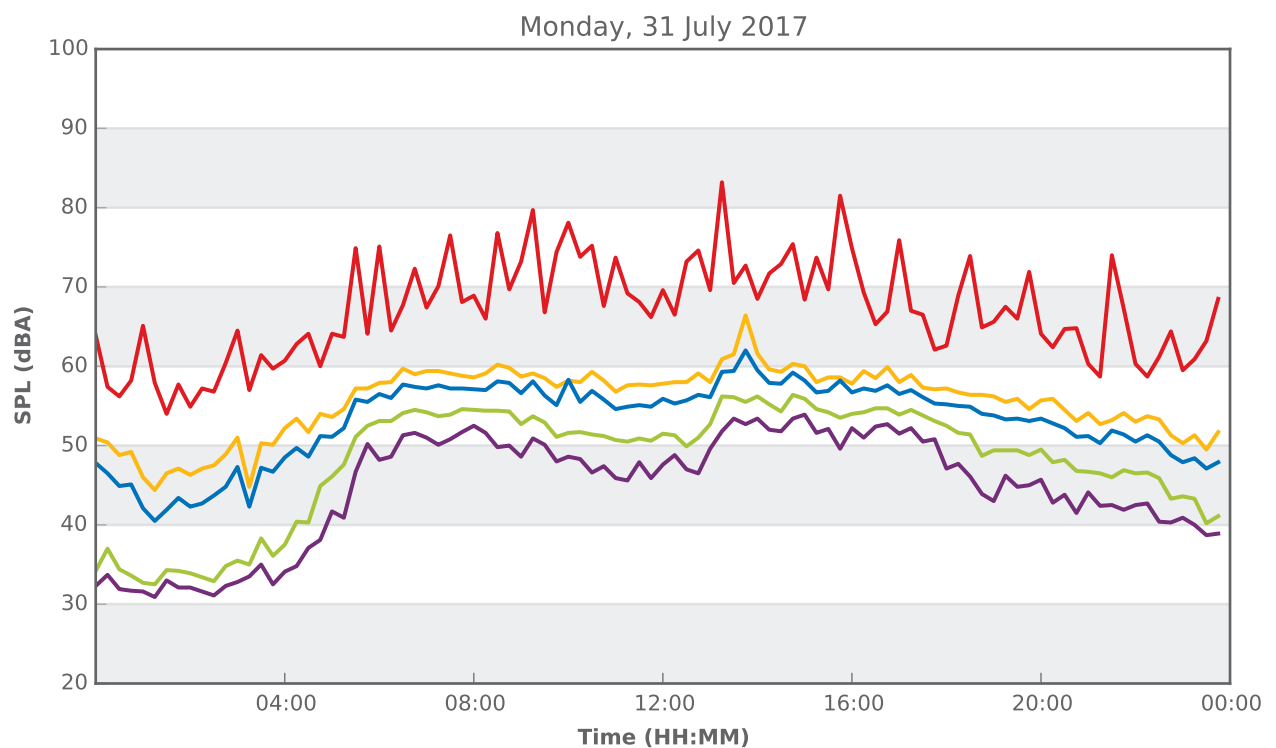
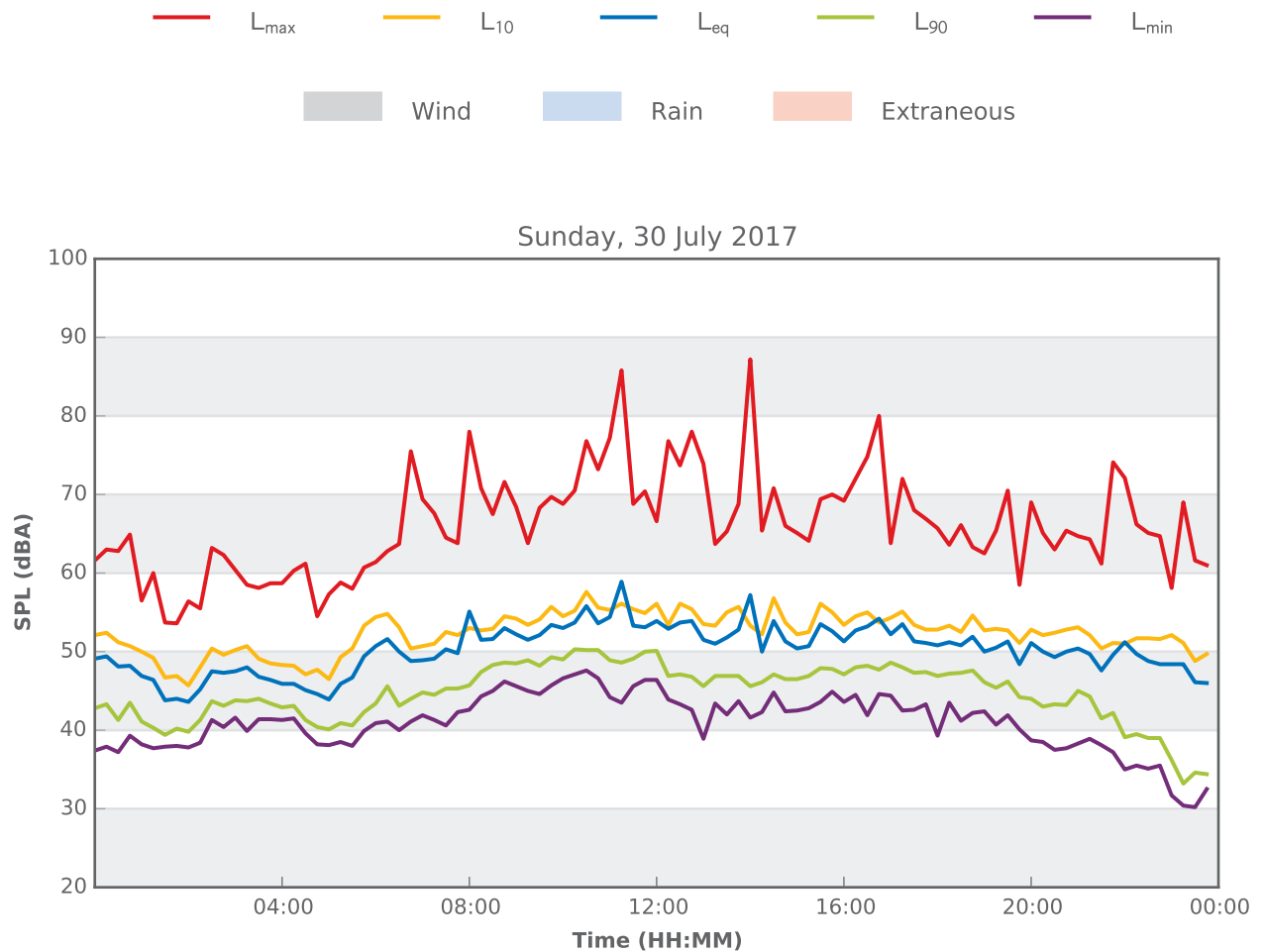
73 Munro Street, Greystanes



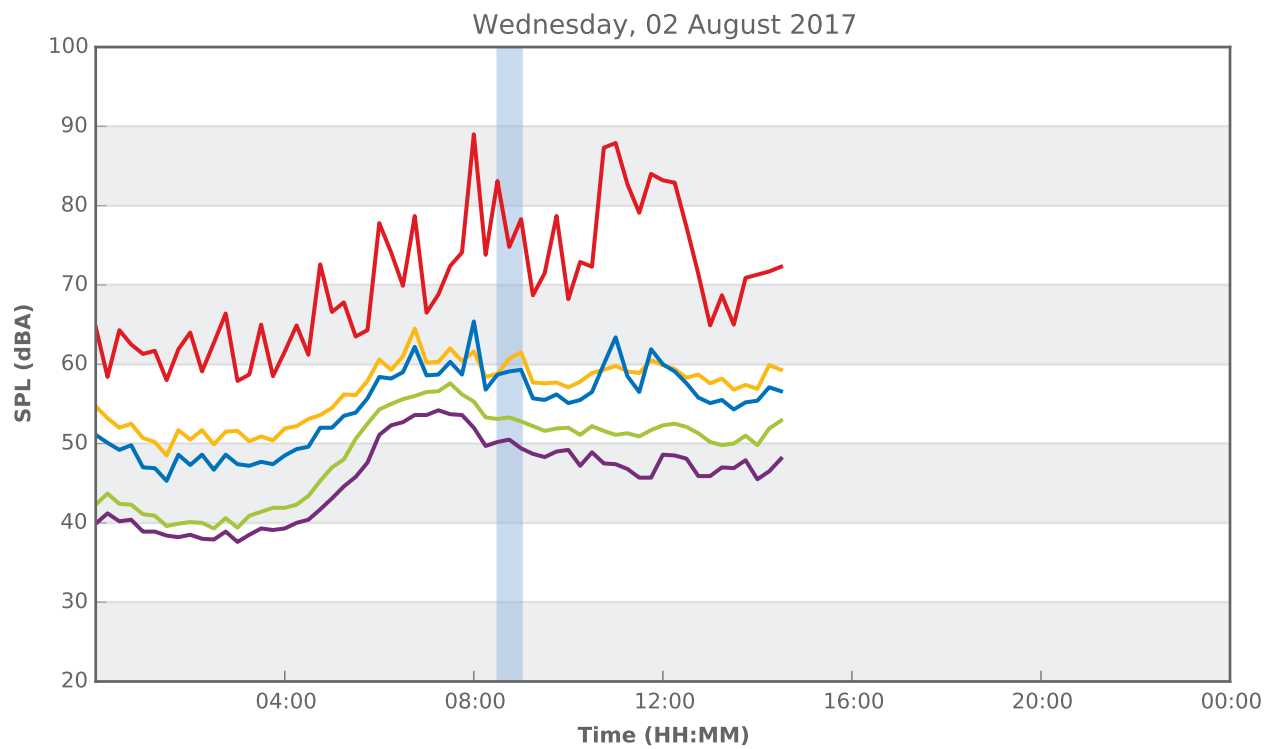
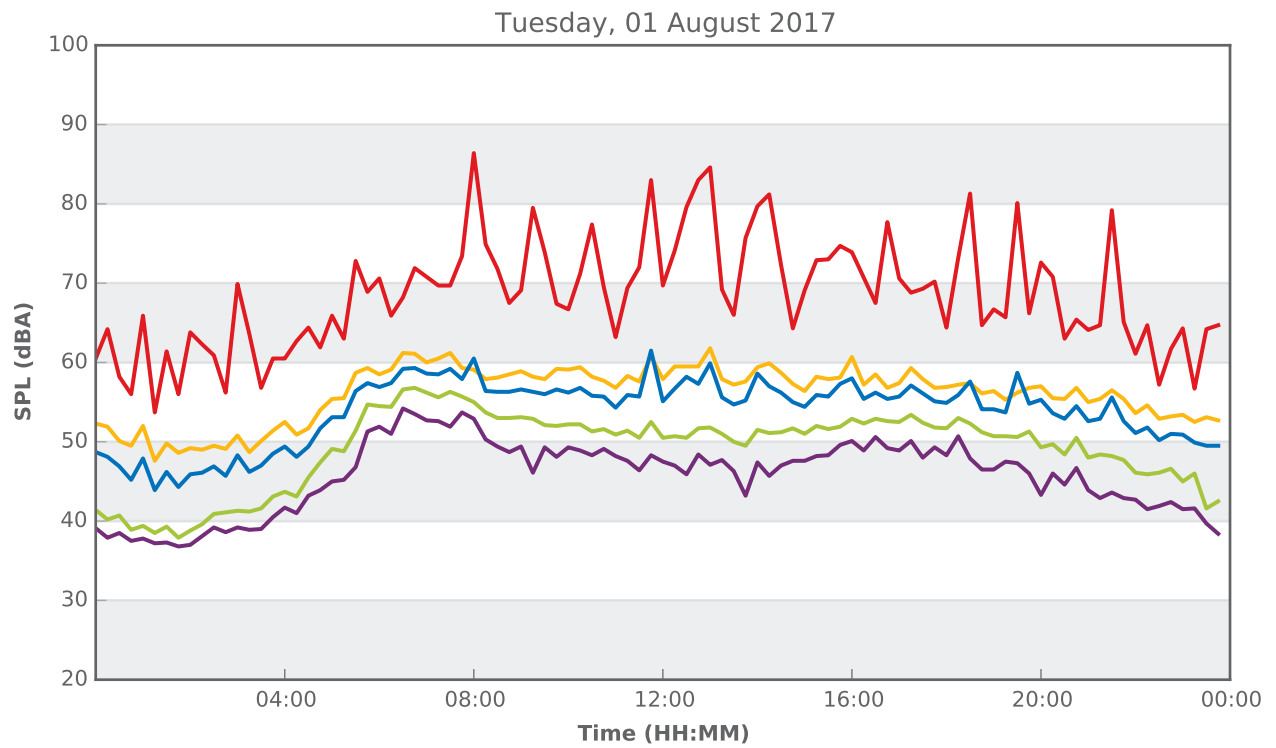
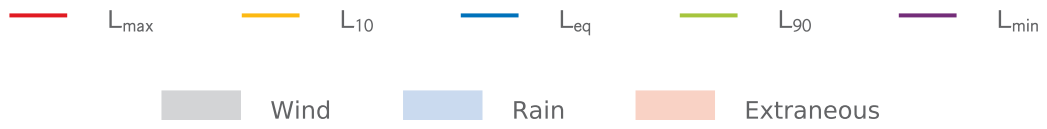
73 Munro Street, Greystanes



73 Munro Street, Greystanes



73 Munro Street, Greystanes



APPENDIX B

OPERATIONAL NOISE CONTOURS

Predicted Night Time $L_{Aeq,15min}$ dBA
(Adverse Meteorological Conditions)

