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REPORT

of

SOUND MEASUREMENTS AND RECOMMENDATIONS

at

PROPOSED TYRE FITTING BAY,
BUSH TYRES,
HUMBER ROAD,
BARTON ON HUMBER
DN18 5RU

Dates of measurements: 15th to 18th July 2016

Date of report: 24th August 2016

Prepared for: BA Bush & Son Ltd.
[redacted]

North Lincolnshire Council Ref: PLU 002309

CONTENTS

1.0 **Summary and Conclusions**

It is proposed to develop a tyre fitting facility in one bay of the existing warehouse of Bush Tyres, Humber Road, Barton. The tyre bay will be located 27m from the rear elevations of existing dwellings and for this reason the LPA has called for a survey and report on the predicted sound levels from the development. The predictions of this report have been based on sound measurements at a similar existing tyre bay and are compared to the background sound levels in accordance with the method of BS 4142.

1.1 The sound level reaching the nearest dwellings caused by the proposed tyre bay is predicted at 46 dB LA_{eq}(1-hour).

1.2 The background sound levels at the location were measured at 46 dB LA_{90} during weekdays and 47 dB LA_{90} on a Saturday when the tyre bay will be operational.

1.3 After adding a penalty of 3 dB to the measured values to account for the impulsive character of the sound sources, it is rated by the method of BS 4142 at 3 dB above the typical background sound level measured during the period of our survey.

1.4 The dominant source of sound is predicted to be from the tyre fitting operations carried out inside the building. It is assumed in the predictions that the roller access door to the tyre bay that faces the dwellings will remain open throughout tyre fitting activities.

2.0 Planning Requirements on Sound Levels

A memo dated 17th May 2016 from the Environmental Health Officer dealing with this application to the Development Management Officer of the LPA has requested a survey and report on the sound levels at the proposed development in accordance with the documents summarised below.

2.1 Central Government Policies

The government's planning policies are described in the National Planning Policy Framework (NPPF) which includes consideration of potential adverse impacts of noise caused by new development. The NPPF makes reference to the Noise Policy Statement for England (NPSE) which includes an Explanatory Note describing three incremental categories of noise impact:

- No Observed Effect Level (NOEL) being the situation below which no effect caused by noise can be detected,

- Lowest Observable Adverse Effect Level (LOAEL) being the situation above which adverse effects caused by noise can be detected,

- Significant Observed Adverse Effect Level (SOAEL) being the level above which significant adverse effects caused by noise occur.

Stated objectives of the NPSE are:

1. Avoid significant adverse impacts, usually interpreted as calling for sound levels above SOAEL to be avoided.

2. Mitigate and minimise adverse impacts, usually interpreted as calling for noise mitigation to be used within the bounds of practicality for situations between LOAEL and SOAEL.

3. Where possible contribute to the improvement of health and quality of life, usually interpreted as calling for noise reductions to be made where possible for situations between NOEL and LOAEL.

Although introducing these subjective concepts for the assessment of noise impact, the NPPF and NPSE documents do not provide quantitative values against which the suitability of a site for development can be assessed in terms of sound levels.

2.2 **BS 4142: 2014**

The rating method of BS 4142 is to measure, or as in this application predict, the outdoor sound levels at noise-sensitive properties caused by sound from the commercial premises under consideration and measure the background sound level in the absence of the commercial sound. A correction factor is applied if appropriate to the commercial sound levels for some acoustic features which affect its acceptability, described as tonal, impulsive or other characteristic features which are distinctive against the residual acoustic environment.

The corrected measured level, the rating level, is compared with the background from which it is concluded that:

- If the rating level exceeds the background by around +10 dB or more then this is an indication of a significant adverse impact, depending on the context.

- A difference of around +5 dB is an indication of an adverse impact, depending on the context.

- The lower the rating level is relative to the background, the less likely it is that the commercial source will have an adverse impact.

- Where the rating level does not exceed the background, this is an indication of the commercial source having a low impact, depending on the context.

Situations where a noise impact assessment may need to be modified due to the context include those where:

- The residual sound levels in the absence of the industrial / commercial source are particularly high or low.

- The character of the residual sound has acoustic features comparable to those of the industrial / commercial sound.

- The sensitivity of the receptor is significant, and whether residential properties incorporate design measures that secure good internal or outdoor acoustic conditions.

2.3 **BS 8233: 2014**

BS 8233 provides guidance on interior sound levels inside various building interiors. It is recommended that the internal ambient sound levels in dwellings do not exceed:

Living rooms	35 dB LA_{eq}	from 07.00-23.00
Dining rooms	40 dB LA_{eq}	from 07.00-23.00
Bedrooms	35 dB LA_{eq}	from 07.00-23.00
	30 dB LA_{eq}	from 23.00-07.00

BS 8233 also advises that it is "desirable" that the external sound level in gardens and on patios should not exceed 50 dB LA_{eq} .

2.4 **World Health Organisation: 2000**

The WHO provides similar guidance on outdoor levels in gardens:

Gardens	50 dB LA_{eq}	few people are moderately annoyed
	55 dB LA_{eq}	few people are seriously annoyed

The memo from the EHO also makes reference to WHO guidelines on noise at night but we advised by the applicant that there will be no sound sources at the proposed tyre bay at night.

3.0 **Sound Sources**

3.1 **Source Location**

It is proposed to open a vehicle tyre fitting bay in part of the existing tyre warehouse of Bush Tyres at Humber Road, Barton. The development will be located in the west bay of the existing warehouse nearest to the entrance off Humber Road. It will introduce the sound sources of:

- air-powered impact wrenches for wheel nut removal and replacement
- vehicle scissor lift
- tyre fitting machine
- air compressor
- arrivals and departures of customers' vehicles.

effective from 0800-1800 on weekdays and 0800-1600 on Saturdays.

Other sound sources associated with the tyre fitting facility such as deliveries, off-loading, handling and the storage of tyres already exist as part of the current commercial activities at the premises.

It is assumed that all of the tyre fitting activities will take place inside the existing warehouse building and that there will be no usage of tools or sound sources outdoors other than the movements of vehicles. It is assumed that the roller door to the tyre bay building will be open at most times since that is usual in facilities of this sort. The service yard and roller door of the tyre fitting bay directly faces the rear of dwellings in Dam Road. The tyre bay elevation is 15m from the boundary of the dwellings and 27m from their rear elevations.

3.2 Source Sound Levels

There are no existing sound sources associated with tyre fitting at the premises and for this reason the predictions of this report are based on sound levels measured at other premises where tyre fitting takes place (tyre fitting bay at 22 Bawtry Road, Bramley, Rotherham). Sound levels were measured during normal commercial operations in which customers' vehicles arrived, parked, were moved into the tyre bay, wheels were removed, tyres removed and replaced, then the vehicles departed. The results of sound measurements at 1m from each sound source within the workshop and at the workshop centre were:

Results in Workshop	**Sound Level dB LA_{eq}**
Workshop centre	67.1 dBA
1m from wheel nut wrench	80.2 dBA
1m from tyre fitting machine	75.2 dBA
1m from air compressor	74.7 dBA
1m from vehicle lift	76.9 dBA
10m from vehicle arrivals & departures	62 dBA for 10 seconds

The result on the tyre fitting machine included impulsive 'pops' caused as the tyres expanded into the wheel rims. Sound frequency spectra of the highest results inside the workshop were:

Sound pressure levels dB linear:

Frequency (Hz)	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Impact wrench	60.3	61.6	63.4	69.8	71.4	75.1	74.0	69.7
Tyre machine	64.7	71.1	73.5	67.8	66.0	68.3	69.0	64.5
Air compressor	69.2	82.2	80.0	69.8	60.7	54.3	51.7	46.4

4.0 Sound Levels at Dwellings

4.1 Background Sound Levels

Measurements of background and ambient sound were taken in the form of continuous sound monitoring in the service yard between the south elevation of the proposed tyre bay and the rear boundary of the dwellings on Dam Road from 12.59 hours on Friday 15th July to 08.29 hours on Monday 18th July 2016. The survey period was chosen over a weekend to correspond to the lowest background sound levels when the tyre bay may be in operation.

The results are shown in tabular and graphical form in Appendix C to this report. The graphical results represent a summary from which it is concluded that the typical background levels were:

Weekday daytime	46 dB LA_{90}
Saturday 0800-1600 hours	47 dB LA_{90}
night 23.00 to 05.00 hours	33 dB LA_{90}
night (early morning) 05.00 to 07.00 hours	38 dB LA_{90}

No sound sources are proposed at the development at night but since the results taken at night are available they are shown here for completeness.

All measurements were taken using an NTi precision sound level meter type XL2-TA for which current calibration certificates are held. Climatic conditions on the 15th July were dry with a wind speed of 2-3 m/s and temperature of 16°C. The warm, dry weather continued until the end of the survey period. There was no rainfall. The wind speed reached a maximum of 6m/s from 1000 to 1700 hours on 20th July then returned to 2-3 m/s for the rest of the survey period.

4.2 Tyre Bay Sound Predictions at Dwellings

Sources inside building

The basis of sound predictions is that the reverberant sound level within the tyre bay will be typically 67.1 dB LA_{eq} as measured at other similar premises and described in 3.2 of this report. It is assumed that the roller door facing the dwellings will be fully open. The decay of sound over the outdoor distance from the open door to the dwellings is given by the formulae:

decay = 10 log (3/2) dB

from 2m to 3m from the open door where it will act as a line source,

decay = 20 log (27/3) dB

from 3m to 27m from the open door where it will act as a point source.

The overall decay is calculated from the above formulae at 21 dBA giving a predicted outdoor sound level at the dwellings of **46 dB LA_{eq}** from sources inside the tyre bay building.

Vehicle arrivals and departures

It is proposed to designate 5 parking spaces for tyre bay customers at the elevation of the office building facing Humber Road and 2 spaces at the tyre bay elevation near the access door facing the dwellings. Vehicle parking at the 5 front spaces will be shielded from the direction of dwellings whereas the 2 spaces near the tyre bay access door will have a direct sighting to the dwellings.

Sound generated by customers' vehicle arrivals and departures was measured at other premises at 10m distance at an average of 62 dB LA_{eq} per arrival or departure with an average duration of 10 seconds. Allowing for 2 arrivals and departures per hour at the 2 spaces near the tyre bay door gives a prediction of 42.4 dB LA_{eq}(1-hour) at 10m distance. The dwellings are around 24m from the area where cars will park. There will be a decay of 7.6 dBA over this distance giving an estimated sound level at the dwellings of **35 dB LA_{eq}(1-hour)** from the source of vehicles arriving and departing (to the nearest whole decibel).

There is an imperforate fence along the boundary between the service yard of the tyre bay and the dwellings but the top part of the roller door is sufficiently high to be visible from the dwellings over the fence. Reverberant sound from the tyre bay interior will not be measurably reduced by shielding from the fence. Sound from vehicles in the service yard will be reflected off the tyre bay building towards the dwellings and for this reason no shielding attenuation is applied to this sound source.

Specific Sound Level

After adding the sound levels from the tyre bay interior and customers' vehicles the specific sound level from the proposed development as affecting the dwellings is predicted at **46 dB LA_{eq}** (1-hour).

5.0 Assessments of Sound Impact

5.1 BS 4142

Rating Level
Sound from the tyre bay is expected to include some impulsive sounds (wheel nut gun, car door slams, etc.) The rating method of BS 4142 adds penalties of 3 dB, 6 dB and 9 dB to the actual sound levels at dwellings if tonal characteristics are “just”, “clearly” or “highly” perceptible (respectively) at dwellings. Against the measured background sound levels of 46-47 dB LA_{90} the impulsive nature of sound with an overall level of 46 dB LA_{eq} will be barely perceptible. For this reason a correction penalty of 3 dB is added to the predicted specific sound level giving a sound rating level of **49 dB.**

Background Comparison
Comparison between the sound rating level of 49 dB and the typical daytime background level of 46 dB LA_{90} gives a prediction of overall sound from the tyre bay being rated at 3 dB above the background.

BS 4142 Conclusion
The conclusion of the BS 4142 method is that this is an indication of sound impact at the dwellings that is lower than (ie. better than) “adverse impact” but greater than “no impact”.

5.2 National Planning Policy Framework

The conclusion of this survey is that there will some sound impact at the dwellings from the proposed tyre bay but it will be less than “adverse”. In terms of the guidelines of the National Planning Policy Framework summarised in 2.1 of this report it is predicted that the development will be between No Observed Effect Level (NOEL) and the Lowest Observable Adverse Effect Level (LOAEL).

5.3 BS 8233

In order to provide an assessment of the tyre bay sound levels with reference to the guidance of BS 8233 it is necessary to interpret the predicted outdoor sound levels into indoor sound levels inside the

nearby dwellings. There will be a large difference in indoor sound levels if the dwelling windows are open for ventilation, and the memo from the EHO does not state whether the indoor predictions are required with dwellings windows open or closed. We do not have details of the window specifications of the dwellings but it would be usual for conventional dwelling constructions to expect outdoor-to-indoor sound level differences of around 12 dBA if the dwellings windows are open for ventilation and around 30 dBA if closed. on this basis the predicted outdoor sound level of 46 dB LA_{eq} (1-hour) from the tyre bay gives indoor predictions inside the dwellings of 34 dB LA_{eq} with windows open and 16 dB LA_{eq} with windows closed.

It is predicted that the outdoor sound level of 50 dB LA_{eq} that BS 8233 advises should not be exceeded on patios and in gardens will be complied with by the proposed development.

It is concluded that the sound levels inside the nearby dwellings, caused by sources at the proposed tyre bay, are within the guidelines of BS 8233 for gardens and for daytime use of living rooms, dining rooms, and bedrooms with windows open or closed. This assessment of commercial sound to the guidelines of BS 8233 is unusual in our experience and is specifically excluded in the "Scope" of BS 8233: 2014 which states that it "*does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building*." The assessment is provided in this report since it was called for by the LPA.

5.4 **World Health Organisation**

The guidance of the WHO on sound levels in gardens can be applied to this application. The predicted outdoor sound level of 46 dB LA_{eq} at the dwellings is lower than (ie. better than) the value of 50 dB LA_{eq} at which the WHO advises that "few people are moderately annoyed".

APPENDIX A

EQUIPMENT AND QUALIFICATIONS

S & D Garritt Ltd are members of the Association of Noise Consultants (ANC). All work related to this report was undertaken by Stephen Garritt and David Garritt.

Stephen Garritt has been a member of the Institute of Acoustics (MIOA) since 1977 and holds an honours degree in Electrical Engineering. David Garritt has been a member of the Institute of Acoustics since 2005 and holds an honours degree in Electronic and Computer Systems Engineering. Both Stephen and David Garritt teach acoustics at post graduate level on a part time basis.

Stephen and David have extensive experience in the preparation of surveys involving industrial sound sources directly comparable to the subject of this report.

The equipment used during the site visits is shown in the table below. The sound level meter was calibrated before and after use; no drift was apparent.

Equipment Description	Type number	Manufacturer	Date of expiration of Calibration	Calibration Certificate Number
Sound Level Meter	2260 s/n 2409281	Bruel & Kjaer	04.10.2017	27618
Microphone	4189 s/n 2395266	Bruel & Kjaer	04.10.2017	27619
Calibrator	4231 s/n 2402706	Bruel & Kjaer	22.09.2016	27468U

APPENDIX B

UNCERTAINTIES

It is a requirement of BS 4142: 2014 that the level of uncertainty in data and calculations should be considered. These uncertainties and how they have been minimised are considered in this section.

The background sound levels were measured at the nearest dwellings during periods when there were no sound sources at those premises other than normal background sources.

Measurements of the specific sound levels were taken by attended individual source readings during normal operations at similar premises to the proposed development. In every case the measurement period was sufficient for the visual display on the measurement equipment to stabilise and represent a true value. Environmental conditions were suitable in accordance with the requirements of BS 4142: 2014. The survey periods represented typical operating times for the premises under investigation.

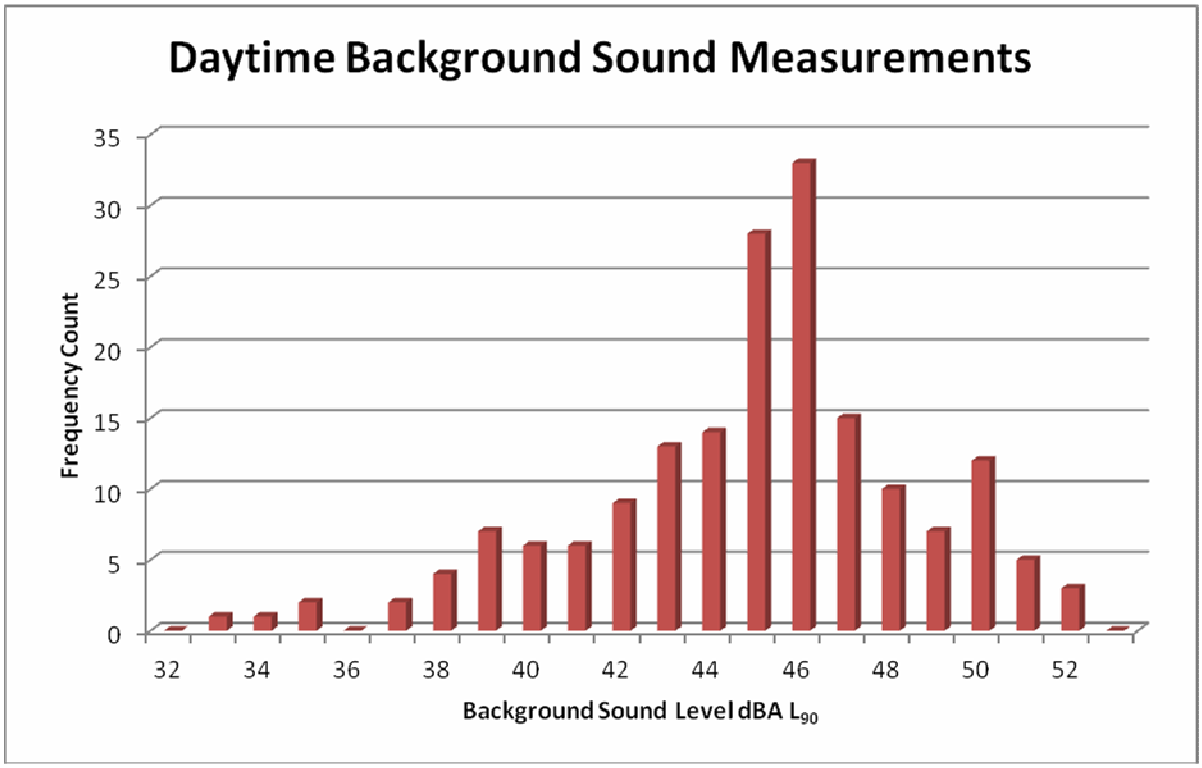
The procedures used for the calculation of specific sound level at the dwellings are based on basic, fundamental principles of acoustics. The addition and subtraction of sound levels was done logarithmically on an energy basis, which is the correct method for decibel calculations. It is anticipated that this method would be considered by other suitably qualified acousticians to be relevant, correct and appropriate for this survey and is a method examined by the Institute of Acoustics on their post graduate diploma course.

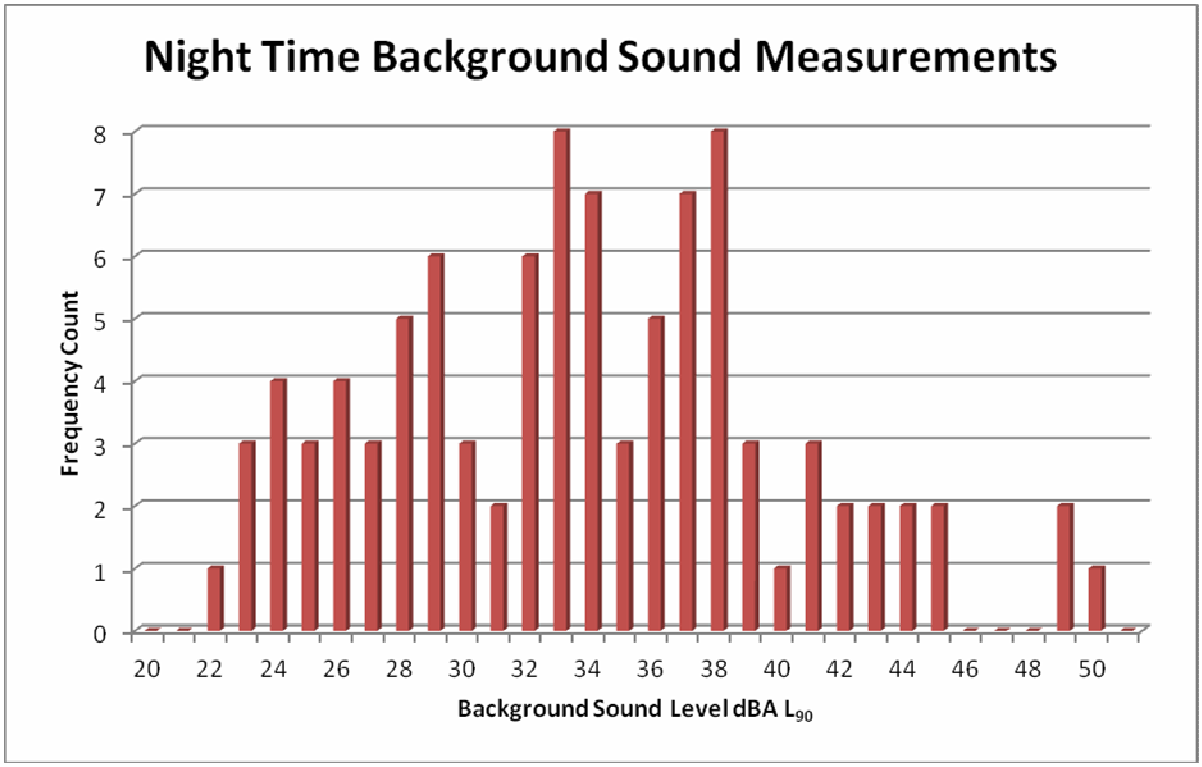
All sound level measurements were taken with a calibrated type 1 sound level meter, which represents the most accurate type of SLM available. Sound levels were measured to the nearest 0.1 dB, time periods were measured and recorded to the nearest second. No rounding was done in any calculations, the only rounding being done on final results, in compliance with BS 4142 : 2014. The sound level meter was calibrated before and after each survey period with no drift.

It is concluded that the uncertainty in this survey has been minimised as far as possible and is believed to be below the level at which it would have an impact on the assessment conclusions of this report.

APPENDIX C

BACKGROUND SOUND DATA





Daytime Background Measurements

Start Date	Time	Stop Date	Time	LAF90% [dB]
15/07/2016	12:59:48	15/07/2016	13:14:48	51.2
15/07/2016	13:14:48	15/07/2016	13:29:48	52.4
15/07/2016	13:29:48	15/07/2016	13:44:48	51.1
15/07/2016	13:44:48	15/07/2016	13:59:48	48.9
15/07/2016	13:59:48	15/07/2016	14:14:48	48.2
15/07/2016	14:14:48	15/07/2016	14:29:48	49.1
15/07/2016	14:29:48	15/07/2016	14:44:48	49.3
15/07/2016	14:44:48	15/07/2016	14:59:48	49.8
15/07/2016	14:59:48	15/07/2016	15:14:48	50
15/07/2016	15:14:48	15/07/2016	15:29:48	49.7
15/07/2016	15:29:48	15/07/2016	15:44:48	49.8
15/07/2016	15:44:48	15/07/2016	15:59:48	49.5
15/07/2016	15:59:48	15/07/2016	16:14:48	49
15/07/2016	16:14:48	15/07/2016	16:29:48	49.9
15/07/2016	16:29:48	15/07/2016	16:44:48	49.5
15/07/2016	16:44:48	15/07/2016	16:59:48	50.2
15/07/2016	16:59:48	15/07/2016	17:14:48	51.5
15/07/2016	17:14:48	15/07/2016	17:29:48	51.3
15/07/2016	17:29:48	15/07/2016	17:44:48	49.3

15/07/2016	17:44:48	15/07/2016	17:59:48	48.3
15/07/2016	17:59:48	15/07/2016	18:14:48	49.2
15/07/2016	18:14:48	15/07/2016	18:29:48	47.6
15/07/2016	18:29:48	15/07/2016	18:44:48	46.5
15/07/2016	18:44:48	15/07/2016	18:59:48	47
15/07/2016	18:59:48	15/07/2016	19:14:48	46.7
15/07/2016	19:14:48	15/07/2016	19:29:48	46.1
15/07/2016	19:29:48	15/07/2016	19:44:48	44.6
15/07/2016	19:44:48	15/07/2016	19:59:48	44.1
15/07/2016	19:59:48	15/07/2016	20:14:48	45.4
15/07/2016	20:14:48	15/07/2016	20:29:48	43.2
15/07/2016	20:29:48	15/07/2016	20:44:48	42.5
15/07/2016	20:44:48	15/07/2016	20:59:48	42.1
15/07/2016	20:59:48	15/07/2016	21:14:48	41.6
15/07/2016	21:14:48	15/07/2016	21:29:48	39.7
15/07/2016	21:29:48	15/07/2016	21:44:48	38.8
15/07/2016	21:44:48	15/07/2016	21:59:48	42.2
15/07/2016	21:59:48	15/07/2016	22:14:48	43
15/07/2016	22:14:48	15/07/2016	22:29:48	42.9
15/07/2016	22:29:48	15/07/2016	22:44:48	40
15/07/2016	22:44:48	15/07/2016	22:59:48	39
15/07/2016	22:59:48	15/07/2016	23:14:48	37.4
16/07/2016	06:59:48	16/07/2016	07:14:48	41.5
16/07/2016	07:14:48	16/07/2016	07:29:48	40.9
16/07/2016	07:29:48	16/07/2016	07:44:48	43.1
16/07/2016	07:44:48	16/07/2016	07:59:48	43.6
16/07/2016	07:59:48	16/07/2016	08:14:48	46.3
16/07/2016	08:14:48	16/07/2016	08:29:48	47.6
16/07/2016	08:29:48	16/07/2016	08:44:48	46.3
16/07/2016	08:44:48	16/07/2016	08:59:48	48.7
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16/07/2016	10:14:48	16/07/2016	10:29:48	46.3
16/07/2016	10:29:48	16/07/2016	10:44:48	46.8
16/07/2016	10:44:48	16/07/2016	10:59:48	47.2
16/07/2016	10:59:48	16/07/2016	11:14:48	47.9
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16/07/2016	11:29:48	16/07/2016	11:44:48	47
16/07/2016	11:44:48	16/07/2016	11:59:48	47.2
16/07/2016	11:59:48	16/07/2016	12:14:48	47.5

16/07/2016	12:14:48	16/07/2016	12:29:48	46.8
16/07/2016	12:29:48	16/07/2016	12:44:48	47.5
16/07/2016	12:44:48	16/07/2016	12:59:48	46
16/07/2016	12:59:48	16/07/2016	13:14:48	46.3
16/07/2016	13:14:48	16/07/2016	13:29:48	46.5
16/07/2016	13:29:48	16/07/2016	13:44:48	47.6
16/07/2016	13:44:48	16/07/2016	13:59:48	47.5
16/07/2016	13:59:48	16/07/2016	14:14:48	46.4
16/07/2016	14:14:48	16/07/2016	14:29:48	47
16/07/2016	14:29:48	16/07/2016	14:44:48	46
16/07/2016	14:44:48	16/07/2016	14:59:48	46.7
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16/07/2016	16:14:48	16/07/2016	16:29:48	45.9
16/07/2016	16:29:48	16/07/2016	16:44:48	45.6
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16/07/2016	17:14:48	16/07/2016	17:29:48	45.1
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16/07/2016	17:44:48	16/07/2016	17:59:48	46.1
16/07/2016	17:59:48	16/07/2016	18:14:48	46.1
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16/07/2016	20:29:48	16/07/2016	20:44:48	42.7
16/07/2016	20:44:48	16/07/2016	20:59:48	41.7
16/07/2016	20:59:48	16/07/2016	21:14:48	40.8
16/07/2016	21:14:48	16/07/2016	21:29:48	40.7
16/07/2016	21:29:48	16/07/2016	21:44:48	39.4
16/07/2016	21:44:48	16/07/2016	21:59:48	38.6
16/07/2016	21:59:48	16/07/2016	22:14:48	39.6
16/07/2016	22:14:48	16/07/2016	22:29:48	39.8
16/07/2016	22:29:48	16/07/2016	22:44:48	38.1
16/07/2016	22:44:48	16/07/2016	22:59:48	37.5

16/07/2016	22:59:48	16/07/2016	23:14:48	35
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17/07/2016	07:14:48	17/07/2016	07:29:48	39.7
17/07/2016	07:29:48	17/07/2016	07:44:48	40.1
17/07/2016	07:44:48	17/07/2016	07:59:48	40.7
17/07/2016	07:59:48	17/07/2016	08:14:48	41.3
17/07/2016	08:14:48	17/07/2016	08:29:48	42.2
17/07/2016	08:29:48	17/07/2016	08:44:48	42.8
17/07/2016	08:44:48	17/07/2016	08:59:48	42.7
17/07/2016	08:59:48	17/07/2016	09:14:48	44.5
17/07/2016	09:14:48	17/07/2016	09:29:48	44.6
17/07/2016	09:29:48	17/07/2016	09:44:48	46
17/07/2016	09:44:48	17/07/2016	09:59:48	46.3
17/07/2016	09:59:48	17/07/2016	10:14:48	46.4
17/07/2016	10:14:48	17/07/2016	10:29:48	46.1
17/07/2016	10:29:48	17/07/2016	10:44:48	44.9
17/07/2016	10:44:48	17/07/2016	10:59:48	46.3
17/07/2016	10:59:48	17/07/2016	11:14:48	46
17/07/2016	11:14:48	17/07/2016	11:29:48	45.8
17/07/2016	11:29:48	17/07/2016	11:44:48	45.6
17/07/2016	11:44:48	17/07/2016	11:59:48	46
17/07/2016	11:59:48	17/07/2016	12:14:48	45
17/07/2016	12:14:48	17/07/2016	12:29:48	44.7
17/07/2016	12:29:48	17/07/2016	12:44:48	45.2
17/07/2016	12:44:48	17/07/2016	12:59:48	45.8
17/07/2016	12:59:48	17/07/2016	13:14:48	45.2
17/07/2016	13:14:48	17/07/2016	13:29:48	45
17/07/2016	13:29:48	17/07/2016	13:44:48	44.9
17/07/2016	13:44:48	17/07/2016	13:59:48	44.6
17/07/2016	13:59:48	17/07/2016	14:14:48	44.1
17/07/2016	14:14:48	17/07/2016	14:29:48	43.6
17/07/2016	14:29:48	17/07/2016	14:44:48	43.7
17/07/2016	14:44:48	17/07/2016	14:59:48	44.6
17/07/2016	14:59:48	17/07/2016	15:14:48	44.5
17/07/2016	15:14:48	17/07/2016	15:29:48	45.1
17/07/2016	15:29:48	17/07/2016	15:44:48	44.4
17/07/2016	15:44:48	17/07/2016	15:59:48	45.3
17/07/2016	15:59:48	17/07/2016	16:14:48	43.3
17/07/2016	16:14:48	17/07/2016	16:29:48	44.5
17/07/2016	16:29:48	17/07/2016	16:44:48	43.2
17/07/2016	16:44:48	17/07/2016	16:59:48	44.6
17/07/2016	16:59:48	17/07/2016	17:14:48	43.7
17/07/2016	17:14:48	17/07/2016	17:29:48	44.9

17/07/2016	17:29:48	17/07/2016	17:44:48	44.6
17/07/2016	17:44:48	17/07/2016	17:59:48	44.3
17/07/2016	17:59:48	17/07/2016	18:14:48	44.6
17/07/2016	18:14:48	17/07/2016	18:29:48	45.3
17/07/2016	18:29:48	17/07/2016	18:44:48	45.5
17/07/2016	18:44:48	17/07/2016	18:59:48	44.8
17/07/2016	18:59:48	17/07/2016	19:14:48	44.5
17/07/2016	19:14:48	17/07/2016	19:29:48	43
17/07/2016	19:29:48	17/07/2016	19:44:48	42
17/07/2016	19:44:48	17/07/2016	19:59:48	42.8
17/07/2016	19:59:48	17/07/2016	20:14:48	44
17/07/2016	20:14:48	17/07/2016	20:29:48	43.6
17/07/2016	20:29:48	17/07/2016	20:44:48	42.3
17/07/2016	20:44:48	17/07/2016	20:59:48	41.4
17/07/2016	20:59:48	17/07/2016	21:14:48	42.2
17/07/2016	21:14:48	17/07/2016	21:29:48	39.4
17/07/2016	21:29:48	17/07/2016	21:44:48	38.3
17/07/2016	21:44:48	17/07/2016	21:59:48	37.8
17/07/2016	21:59:48	17/07/2016	22:14:48	38.8
17/07/2016	22:14:48	17/07/2016	22:29:48	37.4
17/07/2016	22:29:48	17/07/2016	22:44:48	33.7
17/07/2016	22:44:48	17/07/2016	22:59:48	35.4
17/07/2016	22:59:48	17/07/2016	23:14:48	32.8
18/07/2016	06:59:48	18/07/2016	07:14:48	49.6
18/07/2016	07:14:48	18/07/2016	07:29:48	50.2
18/07/2016	07:29:48	18/07/2016	07:44:48	49.8
18/07/2016	07:44:48	18/07/2016	07:59:48	51.8
18/07/2016	07:59:48	18/07/2016	08:14:48	50.6
18/07/2016	08:14:48	18/07/2016	08:29:48	50.1
18/07/2016	08:29:48	18/07/2016	08:30:43	51.1

Night Time Background Measurements

Start Date	Time	Stop Date	Time	LAF90% [dB]
15/07/2016	22:59:48	15/07/2016	23:14:48	37.4
15/07/2016	23:14:48	15/07/2016	23:29:48	36.9
15/07/2016	23:29:48	15/07/2016	23:44:48	36.5
15/07/2016	23:44:48	15/07/2016	23:59:48	37.6

15/07/2016	23:59:48	16/07/2016	00:14:48	37.6
16/07/2016	00:14:48	16/07/2016	00:29:48	35.8
16/07/2016	00:29:48	16/07/2016	00:44:48	34.2
16/07/2016	00:44:48	16/07/2016	00:59:48	33.9
16/07/2016	00:59:48	16/07/2016	01:14:48	34.5
16/07/2016	01:14:48	16/07/2016	01:29:48	32.6
16/07/2016	01:29:48	16/07/2016	01:44:48	32.2
16/07/2016	01:44:48	16/07/2016	01:59:48	31.3
16/07/2016	01:59:48	16/07/2016	02:14:48	33
16/07/2016	02:14:48	16/07/2016	02:29:48	31.5
16/07/2016	02:29:48	16/07/2016	02:44:48	33.3
16/07/2016	02:44:48	16/07/2016	02:59:48	34
16/07/2016	02:59:48	16/07/2016	03:14:48	32.9
16/07/2016	03:14:48	16/07/2016	03:29:48	32.8
16/07/2016	03:29:48	16/07/2016	03:44:48	33.7
16/07/2016	03:44:48	16/07/2016	03:59:48	33.5
16/07/2016	03:59:48	16/07/2016	04:14:48	35.6
16/07/2016	04:14:48	16/07/2016	04:29:48	36.2
16/07/2016	04:29:48	16/07/2016	04:44:48	34.8
16/07/2016	04:44:48	16/07/2016	04:59:48	37.9
16/07/2016	04:59:48	16/07/2016	05:14:48	37.4
16/07/2016	05:14:48	16/07/2016	05:29:48	40.2
16/07/2016	05:29:48	16/07/2016	05:44:48	38.8
16/07/2016	05:44:48	16/07/2016	05:59:48	39.3
16/07/2016	05:59:48	16/07/2016	06:14:48	41.1
16/07/2016	06:14:48	16/07/2016	06:29:48	42.2
16/07/2016	06:29:48	16/07/2016	06:44:48	42.3
16/07/2016	06:44:48	16/07/2016	06:59:48	41.1
16/07/2016	22:59:48	16/07/2016	23:14:48	35
16/07/2016	23:14:48	16/07/2016	23:29:48	37.9
16/07/2016	23:29:48	16/07/2016	23:44:48	37.9
16/07/2016	23:44:48	16/07/2016	23:59:48	36.4
16/07/2016	23:59:48	17/07/2016	00:14:48	32
17/07/2016	00:14:48	17/07/2016	00:29:48	33.3
17/07/2016	00:29:48	17/07/2016	00:44:48	29.3
17/07/2016	00:44:48	17/07/2016	00:59:48	31.9
17/07/2016	00:59:48	17/07/2016	01:14:48	31.6
17/07/2016	01:14:48	17/07/2016	01:29:48	28.6
17/07/2016	01:29:48	17/07/2016	01:44:48	31.6
17/07/2016	01:44:48	17/07/2016	01:59:48	27.1
17/07/2016	01:59:48	17/07/2016	02:14:48	29.3
17/07/2016	02:14:48	17/07/2016	02:29:48	27.9
17/07/2016	02:29:48	17/07/2016	02:44:48	24.7

17/07/2016	02:44:48	17/07/2016	02:59:48	26.1
17/07/2016	02:59:48	17/07/2016	03:14:48	26.7
17/07/2016	03:14:48	17/07/2016	03:29:48	29
17/07/2016	03:29:48	17/07/2016	03:44:48	25.2
17/07/2016	03:44:48	17/07/2016	03:59:48	26.2
17/07/2016	03:59:48	17/07/2016	04:14:48	25.4
17/07/2016	04:14:48	17/07/2016	04:29:48	27.5
17/07/2016	04:29:48	17/07/2016	04:44:48	30.6
17/07/2016	04:44:48	17/07/2016	04:59:48	32.6
17/07/2016	04:59:48	17/07/2016	05:14:48	36.4
17/07/2016	05:14:48	17/07/2016	05:29:48	38
17/07/2016	05:29:48	17/07/2016	05:44:48	37.2
17/07/2016	05:44:48	17/07/2016	05:59:48	37.5
17/07/2016	05:59:48	17/07/2016	06:14:48	36.5
17/07/2016	06:14:48	17/07/2016	06:29:48	38.3
17/07/2016	06:29:48	17/07/2016	06:44:48	43.5
17/07/2016	06:44:48	17/07/2016	06:59:48	39.1
17/07/2016	22:59:48	17/07/2016	23:14:48	32.8
17/07/2016	23:14:48	17/07/2016	23:29:48	33.8
17/07/2016	23:29:48	17/07/2016	23:44:48	30.2
17/07/2016	23:44:48	17/07/2016	23:59:48	27.8
17/07/2016	23:59:48	18/07/2016	00:14:48	27
18/07/2016	00:14:48	18/07/2016	00:29:48	25.7
18/07/2016	00:29:48	18/07/2016	00:44:48	28.6
18/07/2016	00:44:48	18/07/2016	00:59:48	28.2
18/07/2016	00:59:48	18/07/2016	01:14:48	25.6
18/07/2016	01:14:48	18/07/2016	01:29:48	24
18/07/2016	01:29:48	18/07/2016	01:44:48	21.7
18/07/2016	01:44:48	18/07/2016	01:59:48	23.6
18/07/2016	01:59:48	18/07/2016	02:14:48	23.3
18/07/2016	02:14:48	18/07/2016	02:29:48	23.3
18/07/2016	02:29:48	18/07/2016	02:44:48	24.4
18/07/2016	02:44:48	18/07/2016	02:59:48	22.7
18/07/2016	02:59:48	18/07/2016	03:14:48	24.2
18/07/2016	03:14:48	18/07/2016	03:29:48	28.6
18/07/2016	03:29:48	18/07/2016	03:44:48	28.1
18/07/2016	03:44:48	18/07/2016	03:59:48	30
18/07/2016	03:59:48	18/07/2016	04:14:48	29.9
18/07/2016	04:14:48	18/07/2016	04:29:48	33.5
18/07/2016	04:29:48	18/07/2016	04:44:48	37.1
18/07/2016	04:44:48	18/07/2016	04:59:48	40.8
18/07/2016	04:59:48	18/07/2016	05:14:48	43
18/07/2016	05:14:48	18/07/2016	05:29:48	45.4

18/07/2016	05:29:48	18/07/2016	05:44:48	44.1
18/07/2016	05:44:48	18/07/2016	05:59:48	43.4
18/07/2016	05:59:48	18/07/2016	06:14:48	45.1
18/07/2016	06:14:48	18/07/2016	06:29:48	49.2
18/07/2016	06:29:48	18/07/2016	06:44:48	49.5
18/07/2016	06:44:48	18/07/2016	06:59:48	48.5
