SANDY BROWN

Consultants in Acoustics, Noise & Vibration

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Didcot Park

Environmental noise impact assessment

London, Manchester, Edinburgh, Birmingham, Belfast, Leeds

post@sandybrown.com
www.sandybrown.com

Sandy Brown Ltd
Registered in England & Wales No. 13227735

Registered Office: 55 Charterhouse Street, London EC1M 6HA

Version	Date	Comments	Author	Reviewer
A	21 Oct 22	-	Anthony Harper	Bob Albon

Summary

Sandy Brown has been appointed by Reef Estates to provide acoustic advice in relation to the proposed Land Development Order (LDO) at Didcot Park, Didcot.

An original assessment was undertaken in 2016 (Sandy Brown report *16349-R01-A Environmental noise survey report)*. Noise levels from the original survey have been adopted for this updated assessment.

The environmental noise survey was carried out to determine the existing background sound levels in the area and set appropriate plant noise limits in line with the requirements of the Vale of White Horse District Council.

The noise survey was performed between 14:00 on Thursday 18 August 2016 and 12:15 on Monday 22 August 2016.

The representative background sound levels measured during the survey were $L_{A90,15min}$ 45 dB during the daytime and $L_{A90,15min}$ 43 dB at night.

Based on the requirements of the Vale of White Horse district council and on the results of the noise survey, all plant must be designed such that the cumulative noise level at 1 m from the worst affected windows of the nearby noise sensitive premises does not exceed $L_{Aeq,15min}$ 48 dB during the daytime, and $L_{Aeq,15min}$ 46 dB during the night. These limits are cumulative, and apply with all plant operation under normal conditions. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features will be applied, and the limits will be more stringent than those set.

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1 Introduction

Sandy Brown has been appointed by Reef Estates to provide acoustic advice in relation to the proposed LDO at Didcot Park, Didcot.

A number of new units will be created, comprising B2 general industrial, Data Centre and, battery storage uses, along with access roads appending off the existing roads which pass through the site to serve the car parks outside the associated proposed building units.

As part of this, an environmental noise survey is required, the purpose of which is to establish the existing background sound levels in the vicinity of nearby noise sensitive premises and to set appropriate limits for noise egress from building services plant.

This report presents the survey method, results of the environmental noise survey, and a discussion of acceptable limits for noise emission from building services plant.

2 Site description

2.1 The site and its surrounding

The site location in relation to its surroundings is shown in Figure 1.

The proposed development area is highlighted in blue, with the existing residential premises, which is to be retained shown highlighted in red.

The land neighbouring to the west of the site is understood to be a landfill site, and to the east are farmland. The land to the north and the southeast are populated with residential premises. Commercial units, including the Didcot power station, are located to the south and southwest of the site. The site falls within the Vale of White Horse district council (VoWH) area.

The unattended noise monitoring location is indicated on Figure 1 by marker ‘L’ and the attended measurement location by marker ‘1’.

Figure 1 Site map (courtesy of Google Earth Pro)

2.2 Proposed development

It is proposed that the existing site will be developed under a land development order. The development will comprise three development zones, as indicated in Figure 2, along with access roads appending off the existing roads which pass through the site to serve the car parks outside the associated proposed building units.

Figure 2 Proposed development zones

Two residential buildings currently reside on the development site. The first is near marker 'L', and another near marker '1' as indicated on Figure 1. The residential building near marker '1' is to remain whereas the residential building near marker 'L' is to be replaced with a number of industrial units.

3 Method

Details of the equipment used, the noise indices and the weather conditions during the survey are provided in Appendix A. Further information on the specific survey method is provided in this section.

3.1 Unattended measurements

Unattended noise monitoring was undertaken at the site over 5 days to determine the existing background sound levels in the vicinity of nearby noise sensitive premises.

The unattended measurements were performed over 15 minute periods between 14:00 on Thursday 18 August 2016 and 12:15 on Monday 22 August 2016. The equipment was installed and collected by Aaron Tomlinson.

The measurement position used during the survey is indicated in Figure 1, denoted by the letter 'L'. A photograph showing the measurement location is provided Figure 3. This location was chosen to be reasonably representative of the noise levels experienced by the nearest noise sensitive premises.

The microphone was positioned approximately 1.5 m above the ground and at least 10 m from any other significant reflective surface.

Figure 3 Photograph showing unattended noise monitoring location

The measurements at this location are considered free-field.

3.2 Attended measurements

Attended sample measurements were performed by Aaron Tomlinson at one location at the site. The attended measurement location is indicated in Figure 1 as position '1'. The attended measurements were carried out on Monday 22 August 2016, over 15 minute periods, with the purpose of determining the existing noise levels from road traffic, and other significant noise sources in the area.

During each measurement, the microphone was mounted on a tripod approximately 1.5 m above the ground level and at least 3 m from any other reflective surface.

The attended measurements are considered free-field.

3.3 Discussion of validity of original survey data

The original noise survey was undertaken in 2016, there is therefore potential for changes in local and regional noise climate to result in changes to the ambient and background noise levels.

The following comments have been received from the VoWH Environmental Protection team:

> *While the acoustic report does date from 2016 it is still relevant for two reasons.*
>
> *First, a major contributor to the ambient soundscape here is road noise. There was a dramatic fall in road traffic during the Covid 19 pandemic, which has only recently returned to pre-pandemic levels. This has resulted in a reduced growth in road traffic since the survey was carried out.*
>
> *Second, if the report does underestimate noise form (sic) road traffic by a small margin, then this will effectively make condition B9 marginally more restrictive than it would otherwise be. In other words it would not have a negative impact on amenity.*

As stated by VoWH Environmental Protection team, the measured noise levels are likely to be slightly conservative as a result of slightly increased road traffic noise levels that will be affecting the site both currently and in the future.

The survey data is therefore considered to be appropriate for the purpose of setting limiting plant noise levels.

4 Measurement results

4.1 Observations

The dominant noise sources observed at the site during the survey consisted of road traffic noise along the A4130, activity noise from the nearby commercial premises and air traffic.

Less significant noise sources included occasionally audible demolition works at the Didcot power station.

4.2 Unattended measurement results

The results of the unattended noise measurements are summarised in the following tables. A graph showing the results of the unattended measurements is provided in Appendix B.

The day and night time ambient noise levels measured during the unattended survey are presented in Table 1.

Table 1 Ambient noise levels measured during the survey

Date	Daytime (07:00 – 23:00) $L_{Aeq,16h}$ (dB)	Night (23:00 – 07:00) $L_{Aeq,8h}$ (dB)
Thursday 18 August 2016	-	52
Friday 19 August 2016	54	50
Saturday 20 August 2016	54	47
Sunday 21 August 2016	51	49
Average	53	50

The minimum background sound levels measured during the unattended survey are given in Table 2.

Table 2 Minimum background sound levels measured during the survey

Date	Daytime (07:00 – 23:00) $L_{A90,15min}$ (dB)	Night (23:00 – 07:00) $L_{A90,15min}$ (dB)
Thursday 18 August 2016	42*	38
Friday 19 August 2016	43	42
Saturday 20 August 2016	45	42
Sunday 21 August 2016	43	43
Monday 22 August 2016	49*	-

* Measurement not made over full period due to monitoring start and end time

The lowest background sound levels measured during the survey were $L_{A90,15min}$ 40 dB during the daytime and $L_{A90,15min}$ 38 dB at night.

In line with BS 4142:2014, for the purpose of analysis and establishing representative background sound levels, day and night time typical levels have been quantified using statistical analysis from the continuous logging measurements.

Daytime and night time statistical analysis of representative values for the site are given in Figure 4 and Figure 5.

From this analysis, the representative background sound levels measured during the survey were $L_{A90,15min}$ 45 dB during the daytime and $L_{A90,15min}$ 43 dB at night.

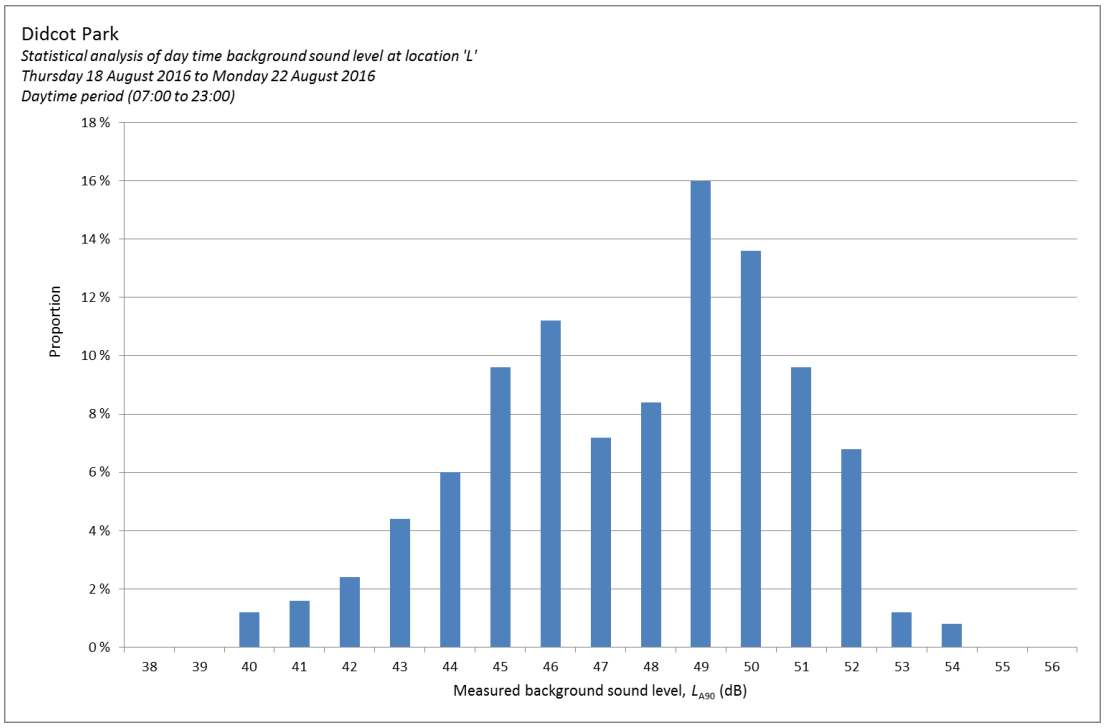


Figure 4 Statistical analysis of background sound levels during the daytime – Unattended measurements

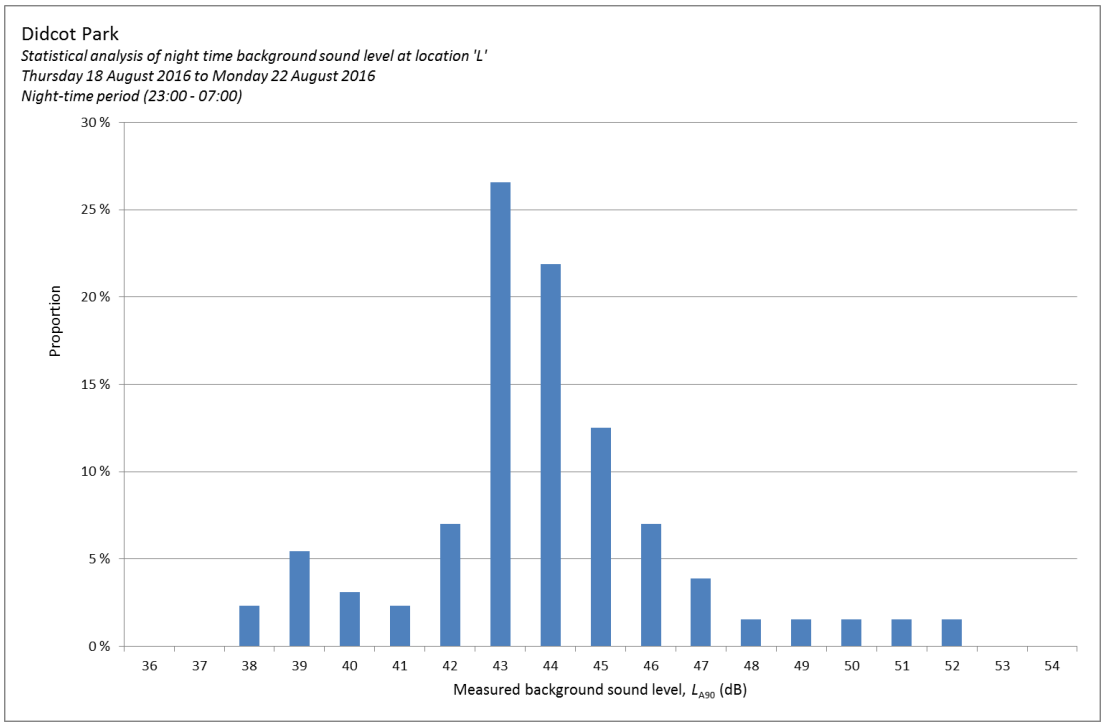


Figure 5 Statistical analysis of background sound levels during the night time – Unattended measurements

4.3 Attended measurement results

The sound pressure levels recorded during the attended measurements are summarised in Table 3. The dominant noise sources noted during the measurements are also described in Table 3. All the attended measurements were performed over 15 minute periods.

Table 3 Sound pressure levels from attended measurements

Position	Start time	Sound pressure levels (dB)			Noise sources
		$L_{Aeq,15min}$	$L_{AFmax,15min}$	$L_{A90,15min}$	
1	12:48	53	69	48	Road traffic along A4130 Air traffic Activity noise from nearby commercial plant
1	13:04	53	64	48	Road traffic along A4130 Air traffic Activity noise from nearby commercial plant

5 Building services noise egress limits

5.1 Local Authority criteria

The VoWH do not have any quantitative criteria in relation to noise egress due to building services noise from new developments. However, their design guide supplementary planning document indicates that noise which may affect residents, including external sources such as railway lines and busy roads, should be '*reduced through careful design*'.

The proposed conditions for the previous LDO at the site made direct reference to the noise limits presented in our original report, which were based on a BS 4142:2014 assessment.

5.2 BS 4142:2014+A1:2019

Guidance for noise emission from proposed new items of building services plant is given in BS 4142: 2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*'.

BS 4142 provides a method for assessing noise from items such as building services plant against the existing background sound levels at the nearest noise sensitive.

BS 4142 suggests that if the noise level is 10 dB or more higher than the existing background sound level, it is likely to be an indication of a significant adverse impact. If the level is 5 dB above the existing background sound level, it is likely to be an indication of an adverse impact. If the level does not exceed the background level, it is an indication of having a low impact.

If the noise contains 'attention catching features' such as tones, bangs etc, a penalty, based on the type and impact of those features, is applied.

5.3 Limits

5.3.1 Basic limits

Based on the above criteria and the measurement results, the cumulative noise level resulting from the operation of all new plant associated with the redevelopment of the site at 1 m from the worst affected windows of the nearest noise sensitive premises should not exceed the limits set out in Table 4. The limits include a 3 dB correction to account for the present of a building facade as will be present at the assessment location.

Table 4 Plant noise limits at 1 m from the nearest noise sensitive premises

Time of day	Maximum sound pressure level at 1 m from noise sensitive premises ($L_{Aeq,15min}$ dB)
Daytime (07:00-23:00)	48
Night-time (23:00-07:00)	46

The limits set out in Table 4 do not include any attention catching features. The penalties for attention catching features may be significant, and will need to be considered as the building services design progresses. This is discussed further in Section 5.3.2.

5.3.2 Attention catching features

If the proposed plant noise contains attention catching features (such as tonal elements, whines, whistles, bangs etc), the plant should be designed to achieve a limit below those set out above, based on the type and impact of the features.

If appropriate, a subjective assessment of the plant features can be adopted. Where the plant noise contains tonal elements, the following corrections can be made depending on how perceptible the tone is at the noise receptor:

- 0 dB where the tone is not perceptible
- 2 dB where the tone is just perceptible
- 4 dB where the tone is clearly perceptible
- 6 dB where the tone is highly perceptible

Where the plant noise is impulsive, the following corrections can be made depending on how perceptible the impulsivity is at the noise receptor:

- 0 dB where the impulse is not perceptible
- 3 dB where the impulse is just perceptible
- 6 dB where the impulse is clearly perceptible
- 9 dB where the impulse is highly perceptible

For noise which is equally both impulsive and tonal, then both features can be taken into account by linearly summing the corrections for both characteristics.

If the plant has other distinctive characteristics, such as intermittency, then a 3 dB correction can be made.

If a subjective assessment is not appropriate then an objective assessment can be made. A noise source is deemed to be tonal if the time averaged sound pressure level in a one-third octave band exceeds the level in adjacent one-third octave bands by the level differences given below:

- 15 dB in the low frequency one-third octave bands (25 Hz to 125 Hz)
- 8 dB in the mid frequency one-third octave bands (160 Hz to 400 Hz)
- 5 dB in the high frequency one-third octave bands (500 Hz to 10000 Hz)

If an objective assessment identifies the plant noise to be tonal then a 6 dB correction must be made.

5.4 Assessment

As the proposals for the site develop, the noise limits should be apportioned between the new buildings based on their location and proximity to the existing residential dwellings such that the total noise from all plant associated with the development can be designed to achieve the total noise limits determined.

6 Conclusion

A noise survey was previously carried out at the site, in 2016, to determine the existing background sound levels in the vicinity of the site and surrounding noise sensitive premises. The representative background sound levels were $L_{A90,15min}$ 45 dB during the day, and $L_{A90,15min}$ 43 dB during the night.

Following consultation with the VoWH Environmental Protection team, it has been concluded that the survey data remains appropriate for use.

On the basis of the requirements of the Local Authority, the relevant plant noise limits at the worst affected existing noise sensitive premises would be L_{Aeq} 48 dB during the day, and L_{Aeq} 46 dB during the night.

These limits are cumulative, and apply with all plant operating under normal conditions. If plant items contain tonal or attention catching features, the limits will be more stringent than those set out above. If plant items contain tonal or attention catching features, a penalty based on the type and impact of those features indicated in Section 5.3.2 will be applied, and the limits will be more stringent than those set out above.

Appendix A

Survey details

Equipment

A Rion NL-52 sound level meter was used to undertake the unattended measurements. The attended measurements were carried out using a Rion NL-52 sound level meter. The calibration details for the equipment used during the survey are provided in Table A1.

Table A1 Equipment calibration data

Equipment description	Type/serial number	Manufacturer	Calibration expiry	Calibration certification number
Sound level meter	NL-52/00320633	Rion	11 May 18	1605234
Microphone	UC-59/03382	Rion	11 May 18	1605234
Pre-amp	NH-25/10641	Rion	11 May 18	1605234
Calibrator	N7-74/34125430	Rion	11 May 18	1605223

Calibration of the sound level meters used for the tests is traceable to national standards. The calibration certificates for the sound level meter used in this survey are available upon request.

The sound level meters and microphones were calibrated at the beginning and end of the measurements using their respective sound level calibrators. No significant deviation in calibration occurred.

Noise indices

The equipment was set to record a continuous series of broadband sound pressure levels. Noise indices recorded included the following:

- $L_{Aeq,T}$ The A-weighted equivalent continuous sound pressure level over a period of time, T.
- $L_{AFmax,T}$ The A-weighted maximum sound pressure level that occurred during a given period with a fast time weighting.
- $L_{A90,T}$ The A-weighted sound pressure level exceeded for 90% of the measurement period. Indicative of the background sound level.

The L_{A90} is considered most representative of the background sound level for the purposes of complying with any local authority requirements.

Sound pressure level measurements are normally taken with an A-weighting (denoted by a subscript 'A', eg L_{A90}) to approximate the frequency response of the human ear.

A more detailed explanation of these quantities can be found in BS7445: Part 1: 2003 *Description and measurement of environmental noise, Part 1. Guide to quantities and procedures.*

Weather conditions

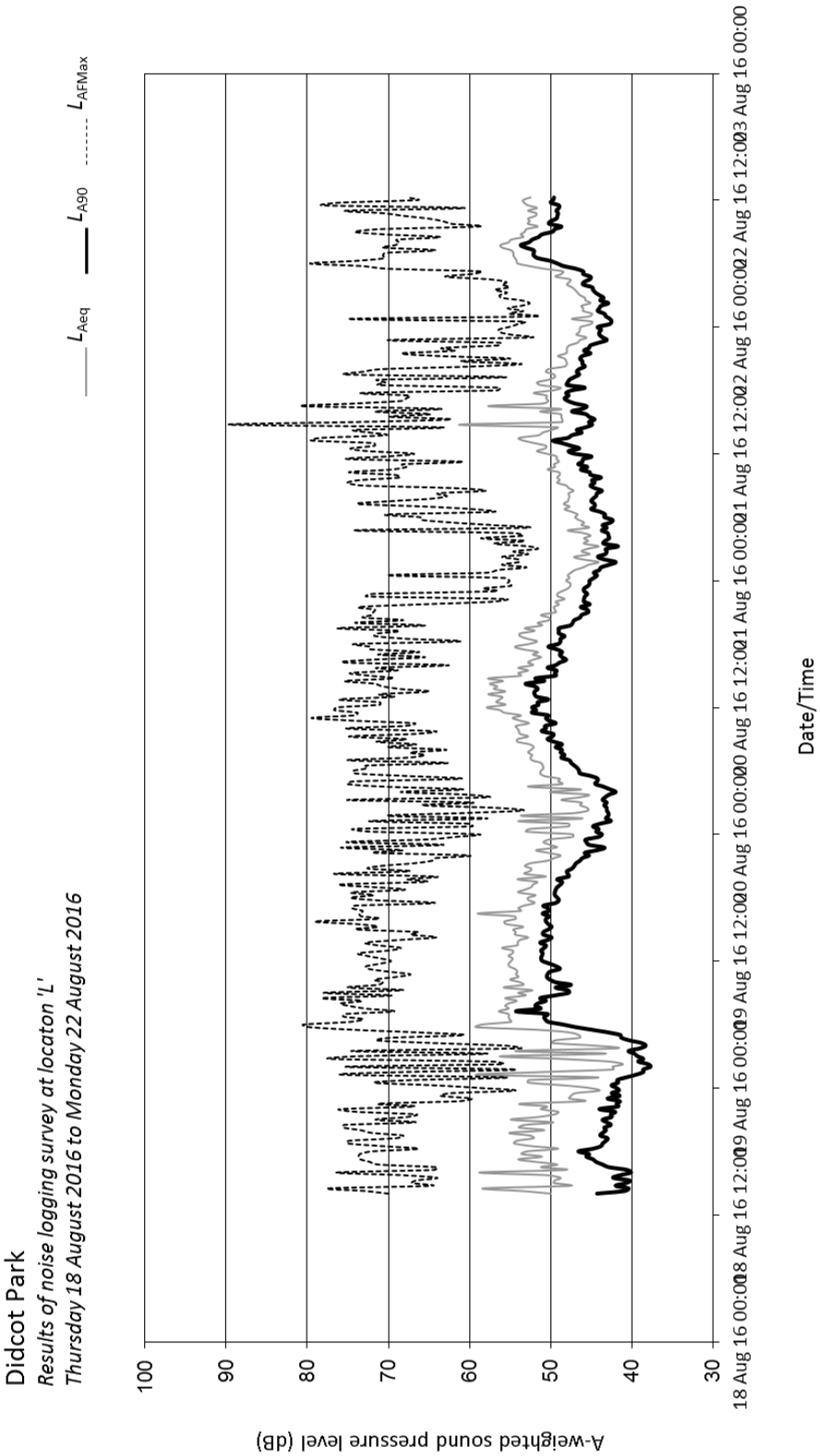
During the attended measurements carried out on Monday 22 August 2016, the weather was clear and dry however and no rain occurred. Wind speeds were low.

During the unattended noise measurements between Thursday 18 August 2016 and Monday 22 August 2016, weather reports for the area indicated that temperatures varied between 13°C at night and 24°C during the day, and the wind speed was less than 7 m/s.

These weather conditions are considered suitable for obtaining representative measurements.

Appendix B

Results of unattended measurements at Location 'L'


Didcot Park
Results of noise logging survey at locaton 'L'
Thursday 18 August 2016 to Monday 22 August 2016
L_{Aeq}
L_{A90}
L_{AFMax}
A-weighted sound pressure level (dB)
100
90
80
70
60
50
40
30
18 Aug 16 00:00
18 Aug 16 12:00
19 Aug 16 00:00
19 Aug 16 12:00
20 Aug 16 00:00
20 Aug 16 12:00
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