
Hough End Leisure Centre, Manchester

Plant Noise Assessment Report

Doc No: P3001965/(REP)U006
Issue: Final
Rev: -
Date: October 2021

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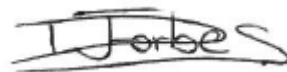


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1 Introduction

BDP Acoustics has been commissioned by Ameresco to assess proposed noise levels emanating from new mechanical plant equipment (1no. battery and associated equipment) being installed at Hough End Leisure Centre, Manchester (referred to as “the site” throughout this report) to accompany the planning submission for the project.

Based on battery location details provided to BDP Acoustics by Ameresco on 04/10/2021, we understand that it is proposed for the battery and associated equipment to be located within a container towards the north-west corner of the Hough End Leisure Centre building, at Ground Floor level, within the south-west corner of the existing gravel section of car park, as shown in Figure 1 and Figure 2.

This report details the acoustic assessment undertaken, and in summary includes the following:

- Review of the Local Planning Authority (LPA) requirements alongside other relevant guidance and acoustic standards;
- A summary of relevant survey data extracted from a previous noise impact assessment carried out for the Hough End Leisure Centre site in May 2021 by Waterman Infrastructure & Environment Limited (Planning Application reference 129948/VO/2021);
- Proposed acoustic design criteria for noise relating to the proposed new equipment, based on LPA requirements;
- Determination of the noise levels generated by the proposed battery equipment, compared to the proposed criteria;

- Where necessary, comments have been provided relating to proposed noise mitigation measures (namely acoustic barriers) surrounding the new equipment at the site, in order to achieve the proposed acoustic design criteria;
- Confirmation of compliance with relevant criteria when adopting the proposed mitigation measures.

A glossary of acoustic terms is presented in Appendix I – Glossary of Acoustic Terms.

Figure 1: Image of approximate proposed battery container location, provided to BDP Acoustics by Ameresco on 04/10/2021 (battery container indicated in green).



Figure 2: BDP Acoustics markup interpretation showing approximate proposed battery container location in context of wider surroundings (battery container indicated by red square).



2 Relevant Guidance and Standards

2.1 Noise Policy Statement for England

The NPSE provides guidance on the management of noise from sustainable development. The statement sets out three key aims in paragraph 1.7:

“Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impact on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life; and*
- *Where possible, contribute to the improvement of health and quality of life.”*

2.2 National Planning Policy Framework

The NPPF sets out the Government’s planning policies for England and how these are expected to be applied. It provides a framework within which locally-prepared plans for housing and other development can be produced.

It advises that planning decisions should prevent new and existing developments from being put at unacceptable risks from, amongst other things, noise pollution. It goes on to advise that new development should be appropriate to its location and should mitigate and reduce to a minimum potential adverse impacts resulting from noise new development and avoid noise giving rise to significant adverse effects on health and quality of life.

2.3 BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

BS 4142:2014+A1:2019 (BS 4142) provides a method for rating industrial and commercial sound and a method for assessing resulting impacts upon people. The impact assessment procedure described in BS 4142 is based on the comparison of rating sound level with the background sound level prevailing at the assessment locations.

2.4 Local Planning Authority (LPA)

Advice has been sought from Manchester City Council in regards to suitable noise level criteria and assessment methodology for noise egress from the proposed new BATTERY equipment on the site. The following requirements are provided within Manchester City Council’s Planning & Noise Technical Guidance:

- *“The noise assessment should be based on BS 4142: 2014 and any application for fixed plant, equipment or machinery must demonstrate that: ‘Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location’.”*

3 Proposed Criteria

The following section details the proposed noise limit criteria at the nearest noise sensitive receptor properties to the battery and associated equipment proposed to be installed at the site, based on LPA requirements.

3.1 Noise Sensitive Receptor (NSR) Properties

The nearest / most exposed NSR properties to the proposed equipment location at the site are identified to be residential properties on Princess Road approximately 69 metres to the east / south-east of the battery container location, as shown in Figure 3.

Figure 3: Identified nearest / most exposed NSR properties to the proposed new battery container location on the site



3.2 Existing Background Noise Levels at NSR Properties

A noise impact assessment was undertaken by Waterman Infrastructure & Environment Limited in May 2021 in support of the construction of an extension to the existing Hough End Leisure Centre (Planning Application reference 129948/VO/2021).

Within the Waterman report, it is stated that the noise levels presented in Table 1 below are representative of the existing background noise levels at the nearest NSR properties to the site on Princess Road.

Table 1: Summary of existing background noise levels at the nearest noise sensitive receptor properties to the site, stated within the Waterman Noise Impact Assessment report (Planning Application reference 129948/VO/2021)

Location of NSR properties	Period	Existing background noise levels at the nearest noise sensitive receptor properties to the site (dB L _{A90,T})
Residential properties on Princess Road	Daytime	54
	Night-time	45

3.3 Proposed Assessment Criteria

LPA criteria relating to the proposed battery container states that the following requirements must be achieved:

- *“Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location”.*

Based on the above requirements and guidance documents referenced in Section 2, as well as the existing background noise levels at NSR properties identified within the Waterman report, proposed external noise limit criteria for noise from the proposed battery container at the NSR properties identified in Section 3.1 are presented within Table 2.

It is understood by BDP Acoustics that the battery equipment proposed to be installed at the site could be operational during the night-time. Therefore, the proposed criteria presented below has been based on the night-time background noise level.

Table 2: Proposed noise limit criteria at the nearest noise sensitive receptor properties for the battery equipment proposed to be installed at the site, based on Local Planning Authority requirements

Identified NSR properties	Existing night-time background noise level at the nearest NSR properties (dB $L_{A90,T}$)	Proposed external noise limit criteria at the NSR façades location for the proposed new battery container (dB $L_{A,T}$)
Residential properties on Princess Road	45	40

4 Assessment

The following section provides an assessment of noise levels from the proposed battery container at the nearest / most exposed NSR properties against the proposed noise level criteria detailed in Section 3.

4.1 Manufacturer Noise Data

Manufacturer acoustic data and unit location details for the proposed 1no. battery container at the site have been provided to BDP Acoustics by Ameresco on 04/10/2021. This information identifies that the sound pressure level at 1m from the proposed battery container is 75 dBA.

Based on the information provided, initial calculations have been undertaken and indicate that noise from the proposed battery container would exceed the proposed noise criteria at the NSR properties when no noise mitigation measures are in place.

Considering this, it is advised that noise mitigation measures are put in place, namely in the form of acoustic barriers along the north-east and south-east side of the battery container.

In order to effectively attenuate noise emanating from the proposed battery container, the acoustic barriers at the site must be of sufficient construction and height to “block” sound from the unit. In order to achieve this the proposed barriers must have a minimum construction as follows:

- Close-boarded timber fence without gaps (or equivalent construction) with a minimum surface mass of 20 kg/m²;
- Sufficient height to block line of sight between the battery container and first floor windows at the residential NSR properties on Princess Road.

4.2 Noise Level Assessment at NSR Properties

Based on the information provided, and the required barrier constructions detailed above, a BS4142 Rating Noise Level due to the proposed battery container at the identified NSR properties has been calculated. These noise levels have been presented and compared against the proposed external noise limit criteria at the NSR properties within Table 3.

Table 3: Comparison of the calculated BS4142 Rating Noise Level at the nearest / most exposed NSR properties due to the proposed battery container against the proposed external noise limit criteria based on Local Planning Authority (LPA) requirements

Identified NSR properties	Existing night-time background noise level at the nearest NSR properties (dB L_{A90,T})	Proposed external noise limit criteria at the NSR façades location for the proposed new battery container (dB L_{Ar,Tf})	Calculated Rating Noise Level at the NSR façade location due to the proposed new battery container (dB L_{Ar,Tf})	Difference between Rating Level and proposed external noise limit criteria at NSR
Residential properties on Princess Road	45	40	31	-9

As can be seen from Table 3 above, the calculated Rating Noise Levels at the nearest / most exposed noise sensitive receptor properties due to the proposed battery equipment achieve the proposed noise level criteria, when the recommended acoustic barriers are installed. This assessment therefore indicates that the proposals relating to the proposed battery equipment at the site will comply with Local Planning Authority requirements.

5 Summary

- BDP Acoustics has been commissioned by Ameresco to assess proposed noise levels emanating from new mechanical plant equipment (1no. battery and associated equipment) being installed within a container at Hough End Leisure Centre, Manchester.
- A summary of relevant survey data extracted from a previous noise impact assessment carried out for the Hough End Leisure Centre site in May 2021 (Planning Application reference 129948/VO/2021) has been referenced and presented for the purposes of determination of plant noise emission criteria, in line with LPA requirements.
- Manufacturer acoustic data and unit location details for the proposed 1no. battery container at the site have been provided to BDP Acoustics by Ameresco on 04/10/2021, and are presented in Section 4.1.
- Based on information provided to BDP Acoustics, and required barrier constructions detailed within Section 4.2, calculated Rating Noise Levels at the nearest / most exposed noise sensitive receptor properties due to the proposed battery equipment have been found to achieve the proposed noise level criteria, when the recommended acoustic barriers are installed. This assessment therefore indicates that the proposals relating to the proposed battery equipment at the site will comply with Local Planning Authority requirements.

Appendix I – Glossary of Acoustic Terms

A-Weighting

Normal hearing covers the frequency range from approximately 20Hz to 20kHz but sensitivity is greatest between about 500Hz and 8kHz. The "A-Weighting" is an electronic filters network incorporated in sound level meters which approximately corresponds to the frequency response of the ear. The unit of measurement of A-weighted sound level is dBA or dB(A).

Break-in

Noise transmission into a structure from the outside.

Break-out

Noise transmission from inside a structure to the outside.

Decibel, dB

This is a relative unit of measurement which in acoustics is the unit to measure sound. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). The dB is a logarithmic unit used to describe a ratio between the measured level and a reference or threshold level of 0dB (re. 20 micro-Pascals). We therefore use a logarithmic scale to describe sound pressure level, intensities and sound power levels. Subjectively, an increase of 10dB corresponds to a doubling in the perceived loudness of sound.

Equivalent Continuous Sound Level, L_{eq} or L_{Aeq}

The equivalent continuous sound level, L_{eq} is a notional sound level. It is the sound level, which, if maintained for a given length of time, would produce the same acoustic energy as a fluctuating noise over the same time period. (The formula for the above is implemented electronically in all good sound level meters and it is customary to measure rather than calculate the equivalent continuous sound level.) L_{Aeq} (A-weighted L_{eq}) is widely used to measure any environmental noise which varies considerably with time.

Free Field

A sound field region with no adjacent reflecting surfaces.

Octave and Third Octave Bands

The human ear is sensitive to sound over a range of approximately 20Hz to 20kHz, and is generally more sensitive to medium and high frequencies than to low frequencies. In order to define the frequency content of a noise, the spectrum is divided into frequency bands (continuous range of frequencies between two limiting frequencies), and the sound pressure level is measured in each band. The most commonly used frequency bands are octave bands, in which the mid-frequency of each band is twice that of the band below it. (For instance the octave bands above and below the 500Hz octave band are 1kHz and 250Hz respectively). For finer analysis, each octave band may be split into three one-third octave bands or in some cases, fine frequency bands.

Rating Level, $L_{Ar,Tf}$

The specific sound level plus any adjustment for the characteristic features of the sound, as described in BS 4142:2014+A1:2019.

Sound Insulation

Airborne sound insulation refers to the process of separating, by a physical barrier, a space to be protected from a noise source or space containing a noise source.

Statistical Level: L_{90} or L_{A90}

Sound pressure level that is exceeded for 90% of the measurement time. Consequently it is indicative of the general background noise level in the absence of any higher level short duration events that occur during the period.

Statistical Level: $L_{\max,T}$ or $L_{A\max}$

A noise level index defined as the maximum RMS sound pressure level measured during the measurement period, T. $L_{\max}$ is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Time Weighting

One of the standard averaging times (Fast (F), Slow (S)) used for the measurement of RMS sound pressure level in sound level meters, specified in BS 5969.

Z-Weighting

Z-weighting or "zero weighting" is where no frequency weighting has been applied to the measured values.