



Miller Goodall
Environmental Services

NOISE ASSESSMENT

on behalf of

STANTON ANDREWS LTD

for the site at

**WHALLEY INDUSTRIAL PARK,
CLITHEROE RD, BARROW,
CLITHEROE BB7 2DL**

REPORT DATE: 21ST MARCH 2016

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Summary

A noise assessment was undertaken to predict the potential impact of a proposed development consisting of a small number of additional industrial units at Whalley Industrial Park, Clitheroe Rd, Barrow, Clitheroe BB7 2DL. This was requested by the Local Authority to support a planning application for the development.

Measurements were made at the boundary of the Industrial Park to identify the pre-development Background Sound Levels at night. Measurements from a previous noise survey were used to establish day time Background Sound Levels.

Based on the measurements and upon the methodology set down in BS4142:2014, day, evening and night time noise limits have been established for the proposed new units. It will be the responsibility of future tenants of the units to ensure that the noise limits are satisfied.

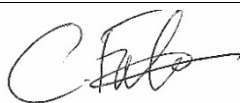
The layout and orientation of the new building to the south is such that it will provide a significant amount of shielding of noise from the existing and new units and from the associated parking area.

In conclusion, provided the noise emission limits are achieved, it is considered that a suitable and commensurate level of protection against noise from the proposed new business units will be provided to all surrounding dwellings.

Prepared By Colin Foster MIOA

Reviewed By Joanne Miller MIOA

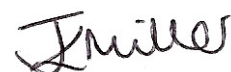
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1 Introduction

- 1.1 Miller Goodall Environmental Services Ltd (MGES) has, on behalf of Stanton Andrews Ltd, undertaken a noise assessment in respect of the impact of noise from a proposed extension to an existing industrial park.
- 1.2 Based on this assessment, noise limits have been proposed for the new industrial units and are detailed in this report.

2 Site Description

- 2.1 The site is located at Whalley Industrial Park, Clitheroe Rd, Barrow, Clitheroe BB7 2DL. The site location is shown outlined in red on Figure A1 in Appendix 1.
- 2.2 Whalley Industrial Park is a complex of small to medium sized class B1 light industrial units (approx. 2730 m²) and class B1 offices (approx. 115 m²). The site is largely flat.
- 2.3 The Industrial Park is accessed from Clitheroe Road which runs along the western boundary of the site. The site lies approximately 250 m to the northwest of the busy A59.
- 2.4 Immediately to the south of site is a new residential development which is nearing completion. These dwellings are the nearest noise sensitive receptors to the proposed development. We are also aware that a residential development has been approved on land to the north of the site, although construction has not yet commenced.
- 2.5 Immediately to the west of site is the Eagle at Barrow Public House and there are more residences located north along Clitheroe Road. There are residences located on Whitacre Lane, approximately 300 m to the north of the site.
- 2.6 A site locality plan is shown in Figures A2 in Appendix 1.

3 Proposed Development

- 3.1 The proposal is to provide additional Class B1 light industrial use accommodation at the site, arranged so as to make the site more secure and less accessible from the new housing development to the south. The proposed increase in accommodation is relatively small (approximately 375 m²) or a 14% increase.
- 3.2 The increase is to be provided by the provision of the following new buildings (See Figures A3 and A4):
 - Extension on the north of the existing industrial units to the east of site, providing 1 new unit,
 - A new industrial unit to the southern site boundary, containing 3 new units.
- 3.3 The additional accommodation is currently speculative and the future tenants are not known, beyond the assumption that they require Class B1 light industrial use accommodation.

- 3.4 It is also proposed to enhance and optimise the existing parking provision by undertaking some landscaping works and re-configuration, without increasing the total area of hardstanding or changing the access to site.

4 Policy Context

4.1 Noise Policy Statement for England

- 4.1.1 The Noise Policy Statement for England (NPSE¹), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are:

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

- avoid significant adverse effects on health and quality of life;
- mitigate and minimise adverse effects on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.”

- 4.1.2 The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and the quality of life occur.

- 4.1.3 The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the Statement). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case:

“...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development”.

- 4.1.4 Importantly, the NPSE goes on to state:

“This does not mean that such adverse effects cannot occur”.

- 4.1.5 The Statement does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that:

“Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available”

- 4.1.6 It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

¹ Noise Policy Statement for England, Defra, March 2010

4.2 National Planning Policy Framework

- 4.2.1 The National Planning Policy Framework (NPPF²) was published in March 2012. One of the documents that the NPPF replaces is Planning Policy Guidance Note 24 (PPG 24) “Planning and Noise”³.
- 4.2.2 Paragraph 109 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) “preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, water or noise pollution or land stability”.
- 4.2.3 The NPPF goes on to state in Paragraph 123 “planning policies and decisions should aim to:
- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
 - Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including thorough use of conditions;
 - Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land use since they were established, and
 - Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value”.
- 4.2.4 The NPPF document does not refer to any other documents regarding noise other than NPSE.

4.3 Planning Practice Guidance – Noise

- 4.3.1 As of March 2014, a Planning Practice Guidance⁴ for noise was issued which provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:
- Whether or not a significant adverse effect is occurring or likely to occur;
 - Whether or not an adverse effect is occurring or likely to occur; and
 - Whether or not a good standard of amenity can be achieved.
- 4.3.2 In line with the Explanatory Note of the NPSE, the PPG goes on to reference the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:
- “...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation”.

² National Planning Policy Framework, DCLG, March 2012

³ Planning Policy Guidance 24: Planning and Noise, DCLG, September 1994

⁴ Planning Practice Guidance – Noise, <http://planningguidance.planningportal.gov.uk/blog/guidance/noise/>, 06 March 2014

4.3.3 Examples of these factors include:

- The source and absolute noise level of the source along with the time of day that it occurs;
- Where the noise is non-continuous, the number of noise events and pattern of occurrence;
- The frequency content and acoustic characteristics of the noise;
- The effect of noise on wildlife;
- The acoustic environment of external amenity areas provided as an intrinsic part of the overall design;
- The impact of noise from certain commercial developments such as night clubs and pubs where activities are often at their peak during the evening and night.

4.3.4 The PPG also provides general advice on the typical options available for mitigating noise. It goes on to suggest that Local Plans may include noise standards applicable to proposed developments within the Local Authority's administrative boundary, although it states that:

“Care should be taken, however, to avoid these being implemented as fixed thresholds as specific circumstances may justify some variation being allowed”.

4.3.5 The PPG was amended in December 2014 to clarify guidance on the potential effect of noise from existing businesses on proposed new residential accommodation. Even if existing noise levels are intermittent (for example, from a live music venue), noise will need to be carefully considered and appropriate mitigation measures employed to control noise at the proposed accommodation.

5 Acoustic Standards and Guidance

5.1 BS 4142: 2014 'Methods for rating and assessing industrial and commercial sound'

5.1.1 BS 4142: 2014⁵ provides guidance on the assessment of the likelihood of complaints relating to noise from industrial sources. It replaced the 1997 edition of the Standard in October 2014. The key aspects of the Standard are summarised below.

5.1.2 The standard presents a method of assessing potential noise impact by comparing the noise level due to industrial sources (the Rating Level) with that of the existing background noise level at the nearest noise sensitive receiver in the absence of the source (the Background Sound Level).

5.1.3 The Specific Noise Level - the noise level produced by the source in question at the assessment location - is determined and a correction applied for certain undesirable acoustic features such as tonality, impulsivity or intermittency. The corrected Specific Noise Level is referred to as the Rating Level.

⁵ BS 4142:2014 Methods for rating and assessing industrial and commercial sound

5.1.4 In order to assess the noise impact, the Background Sound Level is arithmetically subtracted from the Rating Level. The standard states the following:

- *Typically, the greater this difference, the greater the magnitude of the impact,*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context,*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context,*
- *The lower the Rating Level is relative to the measured Background Sound Level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the Rating Level does not exceed the Background Sound Level, this is an indication of the specific sound source having a low impact, depending on the context.*

5.1.5 In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context.

5.1.6 The 2014 edition of BS 4142 also introduces a requirement to consider and report the uncertainty in the data and associated calculations and to take reasonably practicable steps to reduce the level of uncertainty.

6 Noise Survey

6.1 Measurements of Existing Night Time Noise Sources

6.1.1 Measurements of night time noise levels were undertaken at a location consistent with the nearest noise sensitive receptors in accordance with BS 7445-1: 2003⁶ by Jack Caton of Miller Goodall Environmental Services Ltd. The measurement location is shown as N1 in Figure A2 of Appendix 1.

6.1.2 The night time measurements were taken at times considered to be representative of the periods during which the nearest noise sensitive receptors would be subject to the lowest Background Sound Levels. Measurements were made under free-field conditions at a height of 1.5 m above the ground.

6.1.3 The noise sources in the vicinity of the measurement location included infrequent road traffic movements, occasional noise from passing pedestrians and constant low level noise from an extract fan associated with the Eagle Public House. Additionally, measurements between approximately 00:45 and 01:10 were influenced by noise from a car engine which was idling nearby.

⁶ BS 7445-1: 2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures

6.1.4 Details of the equipment used are shown in Table 1, below. The calibration of the sound level meter was checked before and after measurements with negligible deviation (<0.1 dB).

Table 1: Noise monitoring equipment











| Equipment Description | Type Number | Manufacturer | Serial No. | Date Calibrated | Calibration Certification Number |
|------------------------|---------------|--------------|------------|-----------------|----------------------------------|
| Class 1 Sound Analyser | Type NOR 140 | Norsonic | 1406017 | 22/05/15 | U18820 |
| Microphone | Type NOR 1225 | Norsonic | 151206 | 22/05/15 | 18658 |
| Calibrator | Type NOR 1251 | Norsonic | 34123 | 03/07/15 | 02352/1 |

6.1.5 Specific, background and ambient noise monitoring was undertaken at the times specified in Table 2, below. Weather conditions were determined both at the start and on completion of the survey. It is considered that meteorological conditions were appropriate for environmental noise measurements.

Table 2: Dates, times and weather conditions during noise measurements

| Measurement Locations | Date/Time | Weather conditions | | |
|-----------------------|---------------------------------------|---|--------------------|---------------|
| | | Description | At Start of Survey | On Completion |
| P1 | 10/03/16, 23:40 to 11/03/16, 01:40 | Temperature: | 2 °C | 1 °C |
| | | Precipitation: | Dry | Dry |
| | | Cloud cover (oktas – see opposite): | 3 | 3 |
| | | Any fog/snow/ice? | No | No |
| | | Any damp roads/wet ground? | No | No |
| | | Wind speed: | None | None |
| | | Wind direction: | n/a | |
| | | Any conditions that may cause temp. inversion (e.g. calm nights with no cloud): | No | No |

Cloud Cover

| Symbol | Scale in oktas (eighths) |
|---|------------------------------|
|  | 0 Sky completely clear |
|  | 1 |
|  | 2 |
|  | 3 |
|  | 4 Sky half cloudy |
|  | 5 |
|  | 6 |
|  | 7 |
|  | 8 Sky completely cloudy |
|  | (9) Sky obstructed from view |

6.2 Measurements of Existing Day Time Noise Sources

- 6.2.1 Due to noises from ongoing construction activities in and around the new houses immediately to the south of the Industrial Park, It was not possible to obtain reliable measurements of daytime noise levels. Therefore, this assessment has used noise measurements undertaken by Miller Goodall in 2014 on land to the immediate north of the Industrial Park.
- 6.2.2 The measurements were taken between 06:00 and 09:45 on 23rd April 2014.
- 6.2.3 The measurements of day time noise levels were undertaken in accordance with BS 7445-1: 2003⁷ by Simon Faircloth, formerly of Miller Goodall Environmental Services Ltd. Three different measurement locations were used during this survey and they are shown as P1 - P3 in Figure A2 of Appendix 1.
- 6.2.4 Specific, background and ambient noise monitoring was undertaken at the times specified in Table 3, below. Weather conditions were determined both at the start and on completion of the survey. It is considered that meteorological conditions were appropriate for environmental noise measurements.

Table 3: Dates, times and weather conditions during noise measurements

| Measurement Locations | Date/Time | Weather conditions | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---------------------------------------|--------------------|--------------------------|---------------|------------------------|---|---|---|---|---|---|---|-------------------|---|---|---|---|---|---|---|-------------------------|---|------------------------------|----------------|-----|-----|
| | | Description | At Start of Survey | On Completion | | | | | | | | | | | | | | | | | | | | | | |
| P1 | 23/04/16, 06:00 to 23/04/16, 09:45 | Temperature: | 10 °C | 10 °C | | | | | | | | | | | | | | | | | | | | | | |
| <div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Cloud Cover</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Symbol</th> <th style="text-align: left;">Scale in oktas (eighths)</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">○</td> <td>0 Sky completely clear</td> </tr> <tr> <td style="text-align: center;">◐</td> <td>1</td> </tr> <tr> <td style="text-align: center;">◑</td> <td>2</td> </tr> <tr> <td style="text-align: center;">◒</td> <td>3</td> </tr> <tr> <td style="text-align: center;">◓</td> <td>4 Sky half cloudy</td> </tr> <tr> <td style="text-align: center;">◔</td> <td>5</td> </tr> <tr> <td style="text-align: center;">◕</td> <td>6</td> </tr> <tr> <td style="text-align: center;">◖</td> <td>7</td> </tr> <tr> <td style="text-align: center;">◗</td> <td>8 Sky completely cloudy</td> </tr> <tr> <td style="text-align: center;">⊗</td> <td>(9) Sky obstructed from view</td> </tr> </tbody> </table> </div> | | Symbol | Scale in oktas (eighths) | ○ | 0 Sky completely clear | ◐ | 1 | ◑ | 2 | ◒ | 3 | ◓ | 4 Sky half cloudy | ◔ | 5 | ◕ | 6 | ◖ | 7 | ◗ | 8 Sky completely cloudy | ⊗ | (9) Sky obstructed from view | Precipitation: | Dry | Dry |
| | | Symbol | Scale in oktas (eighths) | | | | | | | | | | | | | | | | | | | | | | | |
| | | ○ | 0 Sky completely clear | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◐ | 1 | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◑ | 2 | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◒ | 3 | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◓ | 4 Sky half cloudy | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◔ | 5 | | | | | | | | | | | | | | | | | | | | | | | |
| | | ◕ | 6 | | | | | | | | | | | | | | | | | | | | | | | |
| ◖ | 7 | | | | | | | | | | | | | | | | | | | | | | | | | |
| ◗ | 8 Sky completely cloudy | | | | | | | | | | | | | | | | | | | | | | | | | |
| ⊗ | (9) Sky obstructed from view | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cloud cover (oktas – see opposite): | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | |
| Any fog/snow/ice? | No | No | | | | | | | | | | | | | | | | | | | | | | | | |
| Any damp roads/wet ground? | No | No | | | | | | | | | | | | | | | | | | | | | | | | |
| Wind speed: | None | 1 – 2 m/s | | | | | | | | | | | | | | | | | | | | | | | | |
| Wind direction: | easterly | | | | | | | | | | | | | | | | | | | | | | | | | |
| Any conditions that may cause temp. inversion (e.g. calm nights with no cloud): | No | No | | | | | | | | | | | | | | | | | | | | | | | | |

⁷ BS 7445-1: 2003 Description and measurement of environmental noise - Part 1: Guide to quantities and procedures

6.2.5 Details of the equipment used are shown in Table 4, below, together with the calibration status at the time of the survey. The calibration of the sound level meter was checked before and after measurements with negligible deviation (<0.1 dB).

Table 4: Noise monitoring equipment

| Equipment Description | Type Number | Manufacturer | Serial No. | Date Calibrated | Calibration Certification Number |
|---|-------------|--------------|------------|-----------------|----------------------------------|
| Class 1 Integrating Real Time 1/3 Octave Sound Analyzer | Type 2260 | Brüel & Kjær | 2467009 | 03/09/13 | U14377 |
| Microphone | Type 4189 | Brüel & Kjær | 2508884 | 03/09/13 | U14377 |
| Calibrator | Type 4231 | Brüel & Kjær | 2478249 | 03/09/13 | U14375 |

6.2.6 The measurements were taken at times considered to be representative of the periods during which road traffic noise and noise from the Industrial Park would be at typical daytime levels. Measurements were made under free-field conditions at a height of 1.5 m above the ground.

6.2.7 The noise sources within the vicinity of the measurement locations are summarised in Table 5, below:

Table 5: Description of noise sources affecting the site

| Measurement Locations | Noise Sources |
|-----------------------|--|
| P1 | Noise from Clitheroe Road, including cars, occasional buses and LGV and 1 delivery vehicle to the Eagle at Barrow restaurant. Birdsong. Some light activity on the Industrial Park from 07:00 hours. |
| P2 | Noise from Clitheroe Road as above. Some noise from a vehicle carwash on the Industrial Park garage units for a few minutes. No noise from Dick Leigh Chainsaws noted. |
| P3 | Noise from Clitheroe Road, as for P1. |

6.3 Monitoring Results

6.3.1 The night time measurement results are summarised in Table 6 below. All data are sound pressure levels in dB re 20 μ Pa.

Table 6: Summary of night time noise measurements; March 2016

| Measurement Location | Start Time | Elapsed Time (hr:min:sec) | $L_{Aeq,T}$ (dB) | $L_{AF90,T}$ (dB) | $L_{AFmax,T}$ (dB) |
|----------------------|------------|---------------------------|------------------|-------------------|--------------------|
| N1 | 23:41 | 00:15:00 | 46.3 | 34.2 | 71.8 |
| N1 | 23:56 | 00:15:00 | 47.5 | 34.0 | 67.8 |
| N1 | 00:11 | 00:15:00 | 48.9 | 33.2 | 69.0 |
| N1 | 00:26 | 00:15:00 | 39.0 | 27.9 | 57.1 |
| N1 | 00:41 | 00:15:00 | 44.1 | 36.2 | 64.9 |
| N1 | 00:56 | 00:15:00 | 44.3 | 39.7 | 69.0 |
| N1 | 01:11 | 00:15:00 | 38.8 | 28.1 | 59.1 |
| N1 | 01:26 | 00:15:00 | 39.7 | 28.1 | 62.3 |

6.3.2 The day time measurement results are summarised in Table 7 below. All data are sound pressure levels in dB re 20 μ Pa.

Table 7: Summary of daytime noise measurements; April 2014

| Measurement Location | Start Time | Elapsed Time (hr:min:sec) | $L_{Aeq,T}$ (dB) | $L_{AF90,T}$ (dB) | $L_{AFmax,T}$ (dB) |
|----------------------|------------|---------------------------|------------------|-------------------|--------------------|
| P1 | 06:02 | 0:30:00 | 56.9 | 45.6 | 79.1 |
| P1 | 06:34 | 0:30:00 | 59.5 | 47.1 | 77.5 |
| P2 | 07:06 | 0:30:00 | 54.2 | 46.6 | 69.2 |
| P3 | 07:39 | 0:30:00 | 52.8 | 48.9 | 66.5 |
| P1 | 08:12 | 0:30:00 | 63.2 | 52.2 | 78.9 |
| P1 | 08:42 | 0:30:00 | 62.5 | 53.1 | 75.1 |
| P2 | 09:14 | 0:30:00 | 53.5 | 49.0 | 68.0 |

6.4 Derivation of Background Sound Levels

6.4.1 It is necessary to analyse the noise survey data to establish representative Background Sound Levels at the assessment location (the new houses being built to the immediate south of site). These levels are then used in the BS 4142 noise impact assessment (see Section 7).

6.4.2 In terms of night time noise levels, it may be assumed that the measurement location which was used is equivalent to the noise levels at the assessment location. Based on the measurement results given in Table 6, a Background Sound Level of 28 dB L_{A90} is proposed for the night time (23:00 to 07:00).

6.4.3 In terms of daytime noise levels, it may be assumed that measurement position P2 best represents the noise levels at the assessment location. Based on the measurement results given in Table 7, a Background Sound Level of 47 dB L_{A90} is proposed for the day time (07:00 to 19:00).

6.4.4 During the evening time (19:00 – 23:00), it may be inferred that the Background Sound Level falls between the levels of day and night. We therefore propose that a Background Sound Level of 38 dB L_{A90} is assumed for the evening (19:00 to 23:00).

7 Proposed Noise Limits based on BS 4142: 2014 Methodology

7.1 Due to the speculative nature of the new business units, the future tenants and their potential hours of operation are not known at this stage. It is therefore not possible to predict the operational noise levels which will be generated by the occupants or to assess the noise impact.

7.2 A series of BS 4142 noise impact assessments have therefore been undertaken in order to establish the maximum allowable noise levels resulting from the combination of building services plant and occupancy noise. In order to account for the variation in Background Sound Levels across the 24 hour period, noise limits have been derived for daytime (07:00 - 19:00 hrs), evening (19:00 – 23:00) and night time operation (between 23:00 and 07:00 hrs).

7.3 The assessments assume the following:

- During the daytime and evening, the maximum allowable Rating Level is no more than the Background Sound Level. BS 4142 states that “*where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*”
- During the night time, the maximum allowable Rating Level is 5 dB above the Background Sound Level.
- Noise generated by the new units does not have undesirable acoustic features such as impulsivity, tonality or intermittency. If these features are present, lower noise limits may be required.
- The assessment location is assumed to be the nearest of the new residences located immediately to the south of the Industrial Park.
- The noise limits relate to the combined noise from all new sources operating simultaneously.

7.4 Based on the above assumptions, the derived noise limits for daytime, evening and night are shown in Tables 8 - 10 below:

Table 8: BS 4142:2014 Noise Impact Assessment: Night Time (23:00 – 07:00)

| Results | | Relevant Clauses of BS 4142:2014 | Commentary |
|--|---------------------------|----------------------------------|--|
| Assessment made during the night-time, so the reference interval is 15 min | | 7.2 | |
| Background Sound Level | $L_{AF90,15mins} = 28$ dB | 8.1.2 8.3 | See 7.4 of this report |
| Maximum allowable Rating Level | 33 dB | | 5 dB above Background Sound Level |
| Assumed acoustic feature correction | 0 dB | 9 | Assumed that the noise has no 'annoying' characteristics |
| Maximum allowable Specific Sound Level | $L_{Aeq,15mins} = 33$ dB | | |
| Context | | 11 8.5 | The assessment relates to new noise sources in an area where noise from the business park is an established part of the existing acoustic environment. |
| Uncertainty of the assessment | | 10 | The background sound levels are considered to be accurate and applicable, with low uncertainty. |

Table 9: BS 4142:2014 Noise Impact Assessment: Evening Time (19:00 – 23:00)

| Results | | Relevant Clauses of BS 4142:2014 | Commentary |
|--|--------------------------|----------------------------------|--|
| Assessment made during the day-time, so the reference interval is 1 hour | | 7.2 | |
| Background Sound Level | $L_{AF90,1hour} = 38$ dB | 8.1.2 8.3 | See 7.4 of this report |
| Maximum allowable Rating Level | 38 dB | | "low impact" criterion |
| Assumed acoustic feature correction | 0 dB | 9 | Assumed that the noise has no 'annoying' characteristics |
| Maximum allowable Specific Sound Level | $L_{Aeq,1hour} = 38$ dB | | |
| Context | | 11 8.5 | The assessment relates to new noise sources in an area where noise from the business park is an established part of the existing acoustic environment. |
| Uncertainty of the assessment | | 10 | The background sound level for evening has been inferred and has uncertainty of approximately ± 5 dB. |

Table 10: BS 4142:2014 Noise Impact Assessment: Day Time (07:00 – 19:00)

| Results | | Relevant Clauses of BS 4142:2014 | Commentary |
|--|---------------------------|----------------------------------|---|
| Assessment made during the day-time, so the reference interval is 1 hour | | 7.2 | |
| Background Sound Level | $L_{AF90,30mins} = 47$ dB | 8.1.2 8.3 | See 7.4 of this report |
| Maximum allowable Rating Level | 47 dB | | "low impact" criterion |
| Assumed acoustic feature correction | 0 dB | 9 | Assumed that the noise has no 'annoying' characteristics |
| Maximum allowable Specific Sound Level | $L_{Aeq,1hour} = 47$ dB | | |
| Context | | 11 8.5 | The assessment relates to new noise sources in an area where noise from the business park is an established part of the existing acoustic environment. |
| Uncertainty of the assessment | | 10 | The background sound level for daytime was measured at a different (but comparable) location and over 30 mins instead of 1 hour. Uncertainty of approximately ± 5 dB. |

7.5 It can be seen from the above tables that the noise limits are as follows:

- Daytime (07:00 – 19:00) $L_{Aeq,1hour} = 47$ dB
- Evening (19:00 – 23:00) $L_{Aeq,1hour} = 38$ dB
- Night time (23:00 – 07:00) $L_{Aeq,15min} = 33$ dB

7.6 These proposed limits apply externally at the location of the nearest noise sensitive receptors and are the maximum allowable combined noise from all sources associated with the proposed new units (excluding existing noise sources). If the noise sources have any undesirable acoustic features such as impulsivity, tonality or intermittency, then lower noise limits may apply, depending upon the type of noise.

7.7 The daytime and evening limits are equal to the Background Sound Level and therefore in line with the "low impact" criterion set down in BS 4142.

7.8 The night time limit is 5 dB above the Background Sound Level. We feel that this is justified given the context of the development (a new noise source in an area where the ambient sound is already characterized by industrial type noise) and also that the proposed limit is at a low absolute level ($L_{Aeq,15min} = 33$ dB).

7.9 The proposed night time limits are approximately 6 dB below the measured pre-development night time ambient noise levels detailed in section 6.3 of this report. Therefore, the proposed limits will result in a 1 dB L_{Aeq} increase in ambient noise during the night time. The internal noise level within the dwellings, with windows open, as caused by noise from from the existing and proposed units, is likely to be below 30 dB L_{Aeq} and is therefore around 5 dB L_A below the internal noise criteria set down in BS 8233:2014.

7.10 The proposed daytime limits are approximately 7 dB below the measured pre-development daytime ambient noise levels measured at P2, as detailed in section 6.3 of this report. Therefore, the proposed limits will result in a 1 dB L_{Aeq} increase in ambient noise during the day time.

8 Achieving the Noise Limits

8.1 We understand the new units will be designated as Class B1 and we would therefore expect the buildings to be used for all or any of the following purposes:

- (a) as an office other than a use within class A2 (financial and professional services),
- (b) for research and development of products or processes, or
- (c) for any industrial process, being a use which can be carried out in any residential area without detriment to the amenity of that area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit.

8.2 The possible noise sources associated with operation of each of the proposed new units are likely to be as follows:

- Occupancy noise resulting from industrial processes and associated machinery,
- Noise from external items of building services equipment (e.g. fan extracts, externally mounted condensers etc)
- Noise resulting from traffic movements, including goods deliveries

8.3 It is to be appreciated that the noise sources are dependent upon the tenants of the business accommodation and that many tenants will generate little or no noise (e.g. office premises)

8.4 The proposed new building to the south of the Industrial Park (see Figures A3 and A4) is to be positioned and orientated so as to provide maximum shielding of sound propagation to the south. The south facing wall is to be a solid construction and the main access to the units is to be from the North. The proposed location and orientation will therefore help to direct occupancy noise away from the new dwellings to the south.

8.5 The new dwellings to the south will also be shielded from noise associated with vehicle movements and deliveries, due to the position of the proposed new building to the south.

8.6 We would recommend that external items of building services plant such as extract fans, condensers and the like are not allowed to be fixed to the south facing wall of the proposed new units (closest to the dwellings to the south). The location of such plant items, if required by future tenants, must be carefully considered as must the noise levels they generate and their hours of operation. Future tenants will be required to undertake their own noise assessments in relation to noise from building services plant items.

8.7 If any future tenants of the new industrial units wish to undertake processes or activities which generate high noise levels then they may need to undertake additional sound insulation measures to the buildings, such as the provision of internal acoustic enclosures or uprating the sound insulation performance of the building envelope (external walls and roof). Future tenants will be required to

undertake their own noise assessments in relation to occupancy noise and to provide effective noise control, as necessary to meet the proposed noise limits.

9 Conclusions

- 9.1 A noise assessment was undertaken at Whalley Industrial Park, Clitheroe Rd, Barrow, Clitheroe BB7 2DL. The assessment sought to assess the potential impact of noise emitted from the proposed additional Class B1 units at the site.
- 9.2 Measurements were taken to determine the existing night time Background Sound Levels affecting the nearest dwellings to the site. Due to ongoing construction works next to the site, it was not possible to measure representative daytime noise levels and instead, noise levels from a survey conducted next to the site in 2014 were referenced.
- 9.3 Due to the speculative nature of the new business units, the future business occupants and their potential hours of operation are not known at this stage. It is not therefore possible to predict the operational noise levels which will be generated by the occupants. Noise emission limits have therefore been recommended for the new occupants, based on achieving a Rating Level which is not higher than the Background Sound Level at the most affected dwellings.
- 9.4 The proposed noise limits at the location of the dwellings to the south are as follows:
- Daytime (07:00 – 19:00) $L_{Aeq,1hour} = 47$ dB
 - Evening (19:00 – 23:00) $L_{Aeq,1hour} = 38$ dB
 - Night time (23:00 – 07:00) $L_{Aeq,1hour} = 28$ dB
- 9.5 These proposed limits are the maximum allowable combined noise from all sources associated with the proposed new units (excluding existing noise sources). If the noise sources have any undesirable acoustic features such as impulsivity, tonality or intermittency, then lower noise limits may apply, depending upon the type and character of the new noise.
- 9.6 The proposed location and orientation of the new industrial unit building to the south will help to shield the new dwellings to the south from noise sources associated with the proposed and existing development, including occupancy noise and traffic movements.
- 9.7 Future tenants of the proposed new units will be required to undertake their own noise assessments if they wish to undertake any noisy activities within the units or to utilise external building services plant items. It will be the responsibility of the future tenants to ensure their operations do not exceed the stated noise limits and to provide all necessary noise control measures, as may be required.
- 9.8 In conclusion, provided the noise emission limits are achieved, it is considered that a suitable and commensurate level of protection against noise from the proposed new business units will be provided to all surrounding dwellings.

Glossary of Terms

Decibel (dB) The unit used to quantify sound pressure levels; it is derived from the logarithm of the ratio between the value of a quantity and a reference value. It is used to describe the level of many different quantities. For sound pressure level the reference quantity is 20 μPa , the threshold of normal hearing is in the region of 0 dB, and 140 dB is the threshold of pain. A change of 1 dB is usually only perceptible under controlled conditions.

dB L_A Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB L_A broadly agree with an individual's assessment of loudness. A change of 3 dB L_A is the minimum perceptible under normal conditions, and a change of 10 dB L_A corresponds roughly to halving or doubling the loudness of a sound. The background noise level in a living room may be about 30 dB L_A ; normal conversation about 60 dB L_A at 1 meter; heavy road traffic about 80 dB L_A at 10 meters; the level near a pneumatic drill about 100 dB L_A .

$L_{A90,T}$ The A weighted noise level exceeded for 90% of the specified measurement period (T). In BS 4142: 1997 it is used to define background noise level.

$L_{Aeq,T}$ The equivalent continuous sound level. The sound level of a notionally steady sound having the same energy as a fluctuating sound over a specified measurement period (T). $L_{Aeq,T}$ is used to describe many types of noise and can be measured directly with an integrating sound level meter.

L_{Amax} The highest A weighted noise level recorded during the time period. It is usually used to describe the highest noise level that occurred during the event.

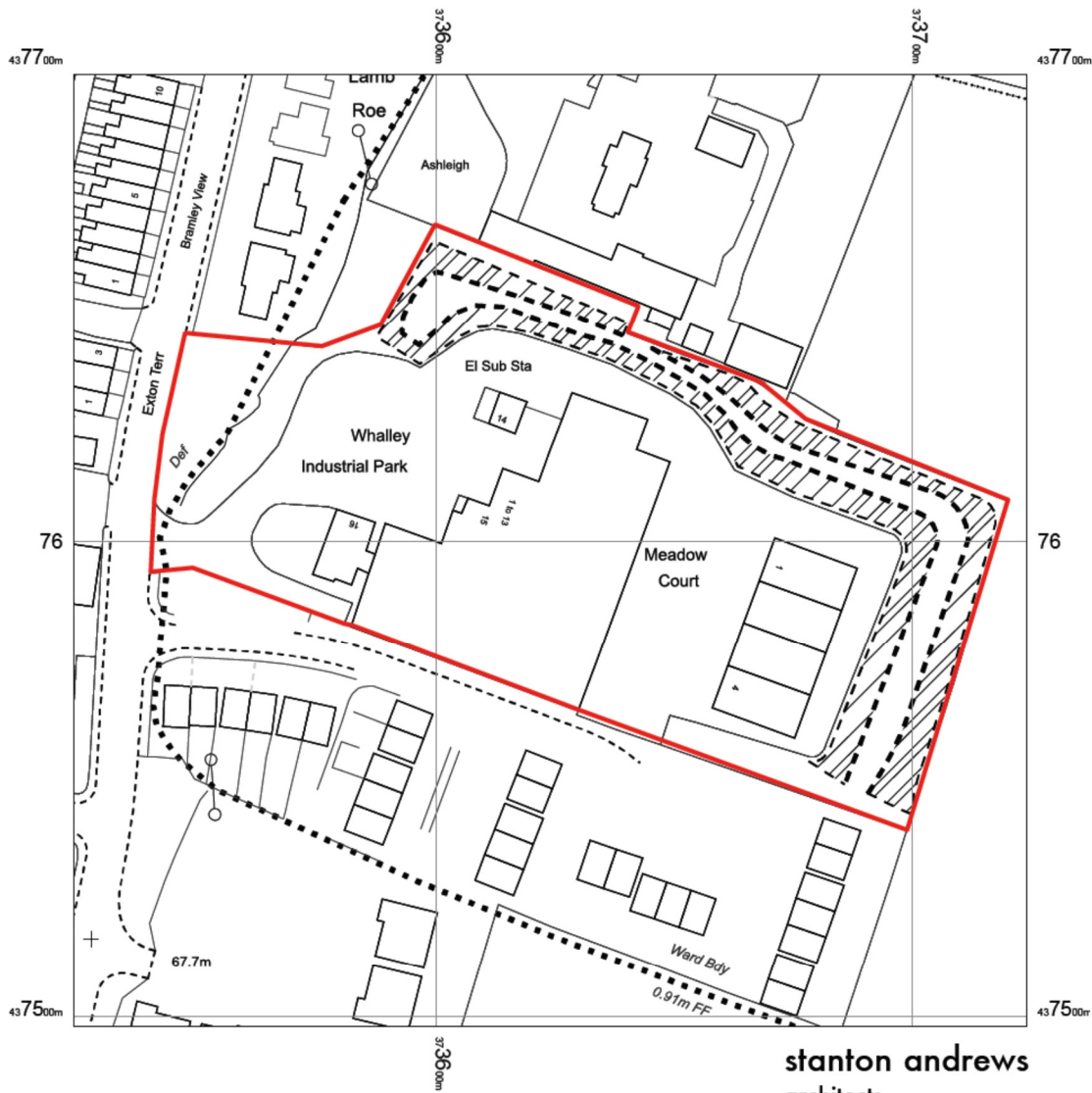
NOEL No observed effect level: the level of noise exposure below which no effect at all on health or quality of life can be detected.

LOAEL Lowest observed adverse effect level: the level of noise exposure above which adverse effects on health or quality of life can be detected.

SOAEL Significant observed adverse effect level: the level of noise exposure above which significant adverse effects on health or quality of life can be detected.

Appendix 1: Drawings

Figure A1: Site Location Plan



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Whalley Industrial Park

location plan

1560 / 00 rev. -

drawn. jb date. jan 16 scale. 1 to 1250 @ A4



0m 10m 20m 30m 40m 50m scale

Figure A2: Site Locality; Aerial Photograph



Figure A3: Proposed Development – New buildings shown in grey

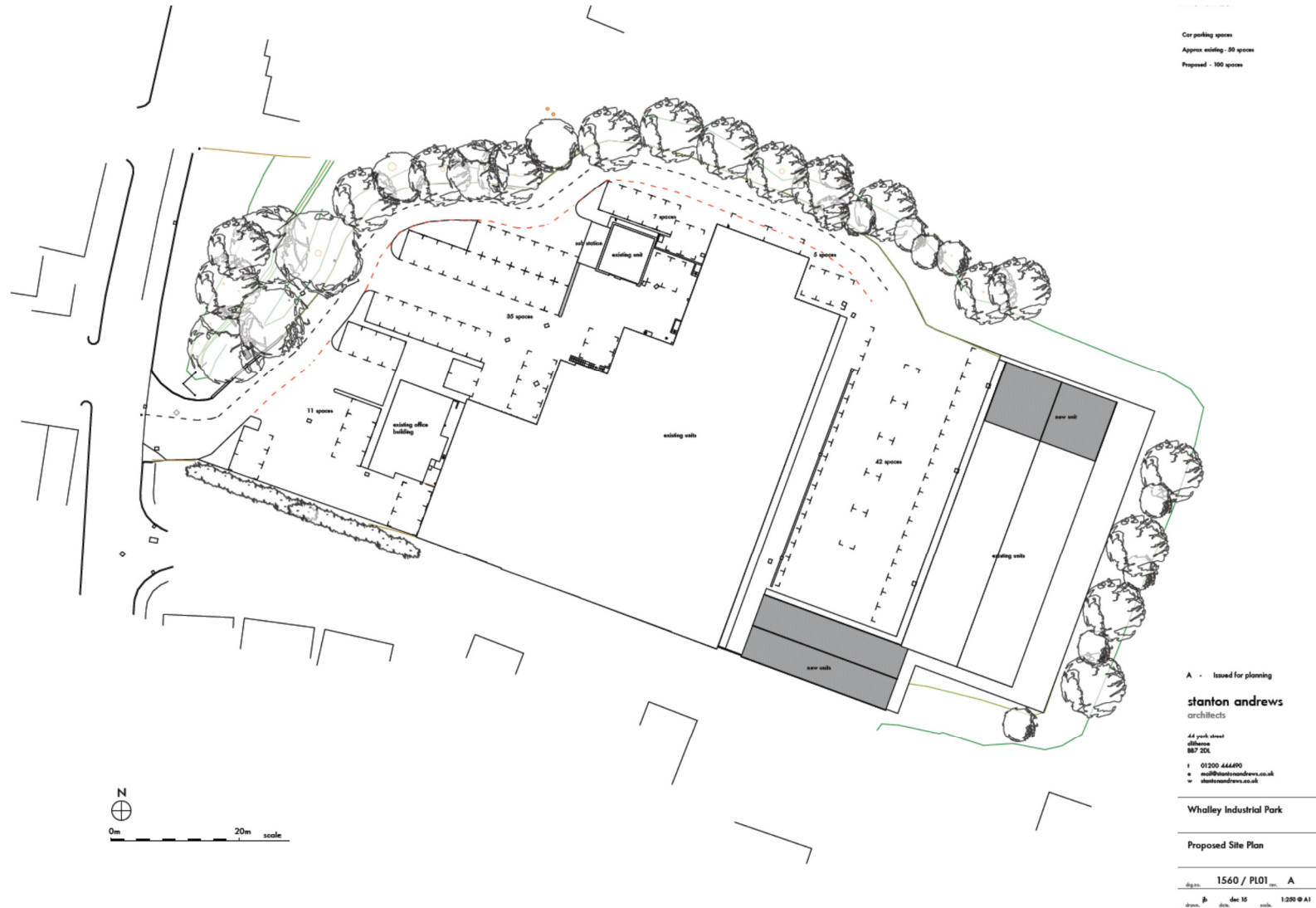


Figure A4: Proposed Development – New buildings shown with red outline

