

Acoustic Associates Sussex Ltd

BS4142 Assessment of Proposed Commercial Units for a Planning Application

Site: Minster Court, Courtwick Lane, Littlehampton

Client: Cordatus Property PL

Report by: Simon Barrett BSc(Hons) MSc MIOA

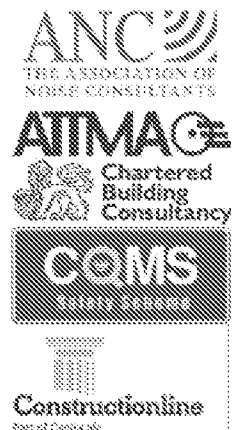
Date: 23/07/2019

Project: J2747

Issue: 1



**Acoustic Associates
Sussex Ltd.**



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Checked by: Scott Castle BSc(Hons) MCIEH CEnv PGDip.IOA MIOA

Issue No.	Date	Comments
1	23/07/2019	Initial Issue

1 Introduction

Acoustic Associates have been appointed to undertake an acoustic assessment of a proposed new 4 industrial units to be added to an existing industrial estate.

This purpose of this report is to identify and assess the sound levels in accordance with the following standards in order to support a planning application:

- Noise and Planning Policy Framework (NPPF): 2019
- ISO9613 (Attenuation of sound during propagation outdoors): 1996
- BS4142 (Method for Rating Commercial and Industrial Sound): 2014

The results of the assessment show that the existing daytime L₉₀ Background Sound Level is 45dBA

As the end users and use-types are not known, an assessment of sound levels emanating from the proposed four new commercial units have been attempted by way of producing worst-case scenarios and nominating sound levels accordingly.

The sound levels nominated and modelled are based upon measurements taken previously for similar sites.

The assessment has shown that the Rating Level at the nearest NSR is below the existing L90 Background Sound Level if Roller Shutter Doors are closed.

The assessment has shown that the Rating Level at the nearest NSR is 5dB above the existing L90 Background Sound Level if Roller Shutter Doors are opened.

The assessment has shown that the Rating Level at the nearest NSR is 1dB above the existing L90 Background Sound Level if a fork lift truck is operating in the area nearest to the nearest NSR.

Measures have been recommended as to how to mitigate against the above Rating Levels and bring them to a level below the existing L90 Background Sound Level (Please see Section 6 for these).

If the mitigation measures detailed in Section 6 are adopted, then it is considered that planning consent would not be refused due to noise issue, albeit that there may be conditions written into the consent.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Site Description and Context

Currently, an industrial estate comprising 10 identically sized units is located at Minster Court along Courtwick Lane, Littlehampton. The units have a mixture of different businesses in operation and are laid out in two rows of five units either side of a large parking court-yard area.

The site is opposite a set of *relatively* new houses which are located across the road (Courtwick Lane) from Minster Court.

It is proposed that an additional four units will be built within the grounds of Minster Court, two per row, so that there will be two rows of seven units either side of the central parking area. This will essentially extend each row of industrial units closer to the residential dwellings previously mentioned.

The entrance and exits, currently at each front corner of the site on the boundary with Courtwick Lane, will be changed to a single entrance/exit area in a more central position along this front boundary.

The plans (existing and proposed) are shown within the Appendices of this report.

It is proposed that the hours of operation of the site will not be changed or extended, but remain the same: 07:00hrs – 19:00hrs, Monday - Friday

It is proposed that the new units could have planning uses of B1, B2 or B8. None of the end users are known.

The nearest noise sensitive residential receptors are located as previously mentioned, directly opposite the front boundary of / entrance to the site, along Courtwick Lane, where the road junctions with Goldcrest Avenue, with the closest house being some 18.5 metres from the side of what is proposed to be Unit 13.

2.2 Soundscape

The existing soundscape in the area was considered during the survey setup and collection visits and it was found that the commercial vehicle sales company had some work bodywork repairs being carried out on one or two of their vans, which was occurring within the main carpark area. Otherwise, everything was very unobtrusive allowing for the road traffic noise from the nearby A259 to be the main source of sound.

2.3 National Planning Policy Framework 2019

The National Planning Policy Framework (February 2019) defines the Government's planning policies for England and how these are expected to be applied. It sets out the Government's requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so.

The following paragraphs are relevant within NPPF Section 15 (Conserving and enhancing the natural environment) states the following:

Paragraph 170(e) - preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability.

Paragraph 180-Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason; and

Paragraph 182 - Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.

2.3.1 Guidance Documents

For guidance as to a numerical definition of LOAEL, while this is not provided specifically, it is helpful to refer to the following Standards.

- BS8233: 2014: Guidance on Sound insulation and noise reduction for buildings
- World Health Organization (WHO) - Guidelines for Community Noise 1999
- BS4142: 2014: Method for rating and assessing industrial and commercial sound

2.4 BS4142: 2014: Methods for rating and assessing industrial and commercial sound

This document provides a means of assessing the impact of industrial or commercial sound upon nearby noise-sensitive receptors, including residential properties.

It does this by comparing the Rating Level of the noise from the industrial or commercial source with the pre-existent L_{90} background noise level affecting the same noise-sensitive premises. The Standard provides guidance that:

- a) Typically, the greater the difference, the greater the magnitude of the impact.
- b) A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- c) A difference of around +5dB 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 noise level, this is an indication of the specific sound source having a low impact, depending on the context.

3 Background Sound Survey Baseline Conditions and Results

A survey of the existing L90 Area Background Sound was carried out from the 4th July 2019 to the 8th July 2019.

3.1 Baseline Conditions

Survey carried out by:	Simon Barrett BSc(Hons) MSc MIOA David Kendal BA(Hons)
Equipment used:	Norsonic Nor118 – Type 1 Sound Level Meter Castle GA607 Acoustic Calibrator Weather-Proof Microphone Housing Monopod for mounting the above
Weather conditions:	Dry, Windspeeds below 5m/s, Cloud Cover = 0 Octares on setup visit and 1 Octares on collection visit. Light Rainfall during the Sunday morning but not affecting the background sound levels in any obvious way.

The Sound Level Meter was calibrated before commencing the noise measurements and again afterwards (@94dB no drift). (Calibration Certificates are shown in Appendix C of this report.)

The microphone was approximately 3m from the ground (fixed on a pole attached to the site's open fencing) and greater than 3.5m from any reflective surface. It follows from the microphone position that the sound levels recorded are "Free-Field Condition" values. The Survey Measurement Position can be found in Appendix B of this report.

3.2 Background Sound Survey Results

The survey data has been collated and statistically analysed in accordance with BS4142 in order to find the representative background sound level for the daytime period (07:00 – 23:00). Please note that night time operations are not being applied for, so whilst the data has been obtained, the assessment for the night time L90 Background Sound Level has not been considered within this report.

Description	Time Period	Representative L90 Background Sound Level (dBA)
Daytime	07:00-19:00hrs	45

Table 1: Representative L90 Background Sound Levels

Please see overleaf for the Statistical Analysis of the Background Sound Level in accordance with the methods of BS4142:2014.

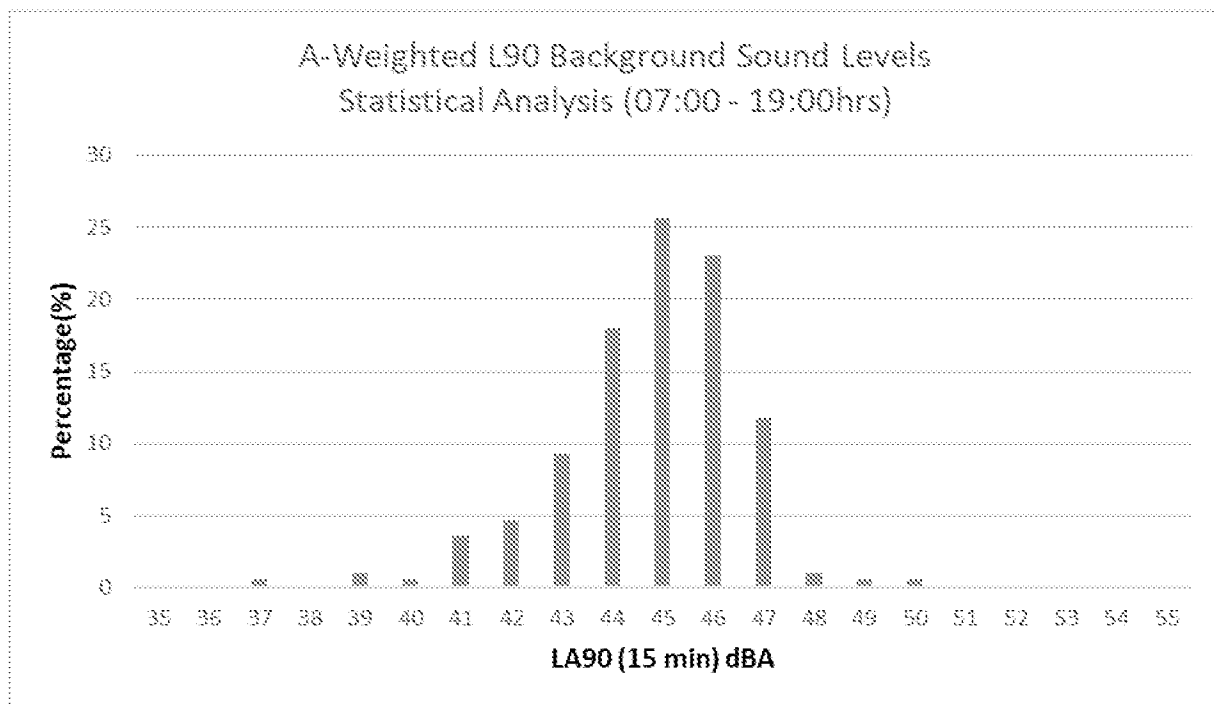


Figure 1: Modal Average to determine the representative L90 background sound level in dBA.

4 Specific Sound and Computer Modelling

At present, as this is a planning application for new mixed-use industrial units to operate on the existing site, it is important to note that there are no specific sound levels that can be measured – they can only be assumed / approximated based upon measurements taken previously during different, unconnected surveys or assumed based upon type of building use.

It is known, however, that there will be no external plant to consider.

As the proposed uses are B1, B2 or B8 - all very different use types - with no particular end user known, it is not possible to know the sound levels being produced by each of or all of the new units.

In similar previous assessments, for B2 uses, a Specific Sound level of $Leq,1hr = 80dBA$ was chosen as an internal sound pressure level and for B8, a Specific Sound level of $Leq,1hr = 70dB$ was chosen as an internal sound pressure level. Based on use-type, B1 would become $Leq,1hr = 75dB$ internally.

As all 4 of the new units could be any of these three use types, the worst-case situation must be chosen to assess any potential nuisance posed to the existing residences, thus all four units operating with an internal sound pressure level of $Leq,1hr = 80dBA$.

This information will be fed in to a computer noise model for the site to show how sound propagates out to the nearby residences.

The computer model will be modelled with roller shutter doors open and closed.

4.1 Computer Noise Model

IMMI (Wolfel) noise modelling and prediction software has been used to plot the proposed 4 new units as well as the remaining buildings on the industrial estate. Care has been taken to ensure that the buildings are constructed as accurately as possible and with their facades representative and any barriers replicated.

4.1.1 Modelling Inputs

All four new units have the same construction of brickwork base and Kingspan panelling sides and a Kingspan roof. A composite façade calculator was used to determine the appropriate sound insulation value of the walls for the three units with appropriate ratios of Kingspan to Brickwork. The sound reduction index for the walls of the buildings will be $Rw 25dB$.

The building roofs are also Kingspan and will have a sound reduction index of $Rw 25dB$.

Roller shutter doors have previously been measured to show a D_w of 22 dB applied which was recently measured on a B8 site, however with brand-new doors being procured as part of a new build, it is reasonable to expect increased performance.

Receptor positions were placed at the houses along Courtwick Lane and New Courtwick Lane to determine how the sounds from the specific buildings are likely to impact area.

As mentioned previously in Section 4.1, due to the unknown future occupiers of the proposed four new units, all four units will be set to run at $L_{eq,1hr} = 80\text{dBA}$ internally.

The model has also been set to daytime only to reflect the proposed daytime uses.

Two main scenarios have been allowed for in this computer model:

- Roller Shutter Doors Closed
- Roller Shutter Doors Open

In all scenarios, it is assumed that the general doors at the rear of the building will be closed and are there for means of escape only.

4.2 Computer Model Output Results

4.2.1 Scenario 1: Roller Shutter Doors Closed

In this case, as can be seen by the figure below, the worst-case sound level due to activities inside the four new units, but with the roller shutter doors closed, is 38.7dBA , which is at Reception Point RP3.

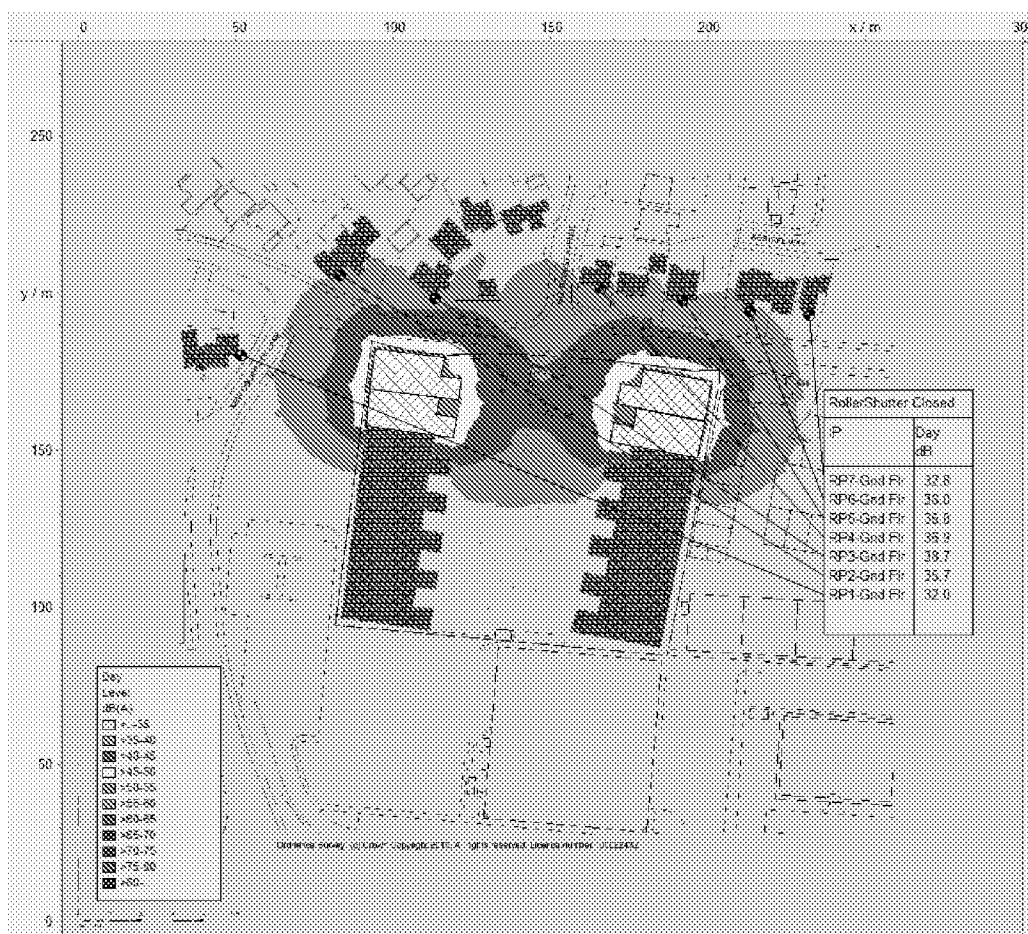


Figure 2: Computer Model Output - Scenario 1

4.2.2 Scenario 2: Roller Shutter Doors Open

In this case, as can be seen by the figure below, the worst-case sound level due to activities inside the four new units, with the roller shutter doors open, is 49.7dBA, which is at Reception Point RP3.

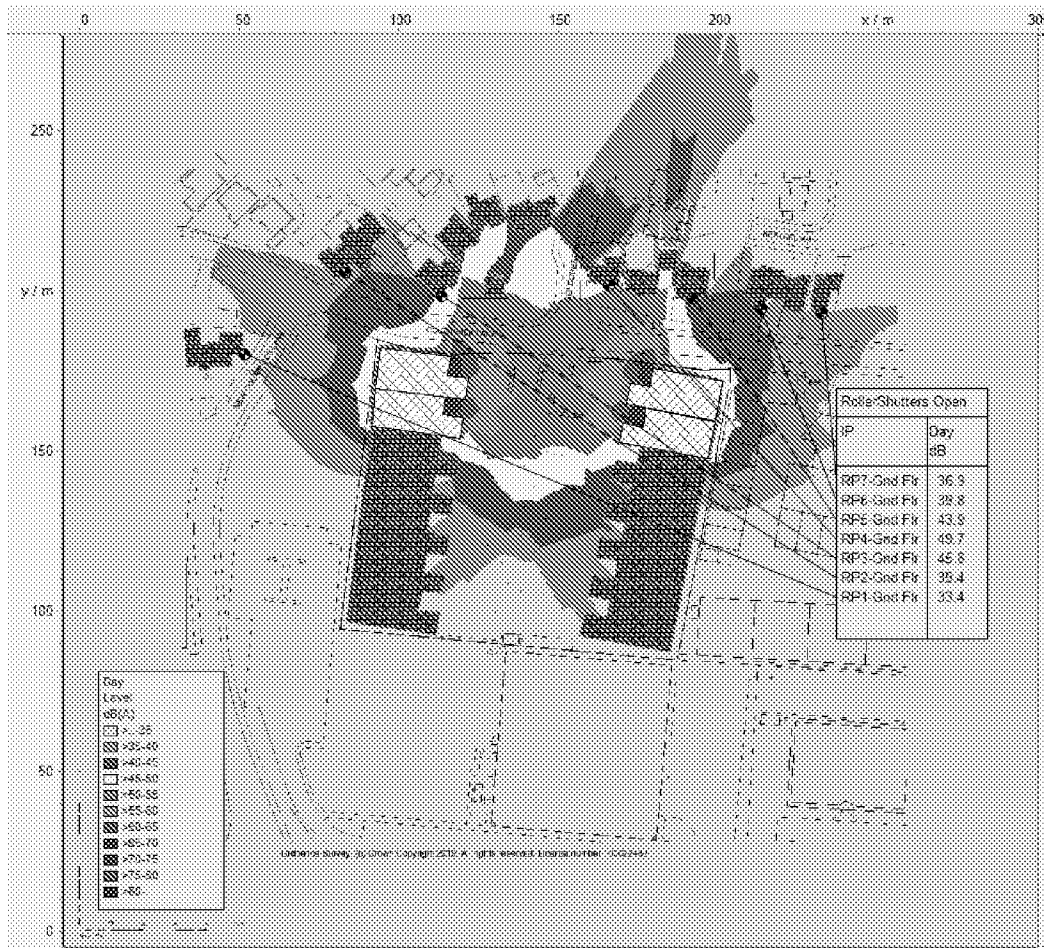


Figure 3: Computer Model Output - Scenario 2

4.3 Vehicle Movements

With B8 use, whilst the sound level from internal activities is designated to have an internal sound level of $Leq,1hr = 70dB$ in a worst-case hour, as previously discussed in Section 4.1, there is a high likelihood of vehicular movement in the area immediately outside the roller shutter doors. Vehicles such as Fork Lift Trucks operating must therefore be assessed. This is dubbed “Scenario 3”.

Previous measurements of Fork Lift Trucks reversing with a tonal alarm have shown that at a distance of 4m, the sound level is $Leq,1min = 81dBA$. Converting this to a Rating Level, it could be assumed that over an hour, as the daytime BS4142 reference period, the on-time is 5 minutes in an hour, worst case, giving a reduction of $10 \cdot \log(5/60) = -10.8dB$, but with clear tonality correction, an increase of 4dB will also be applied. Thus, a sound level of 74.8dBA will be (converted to a sound power level with hemi-spherical radiation) input to computer model as a point source for a further scenario.

The outcome of the computer noise model shows that the sound level at the nearest residential receptor as a result of a Fork Lift Truck operating in the area directly outside of the roller shutter doors to Unit 13 (deemed the worst-case position) is 46dBA. This occurs at reception point RP3 as can be seen in the figure below:

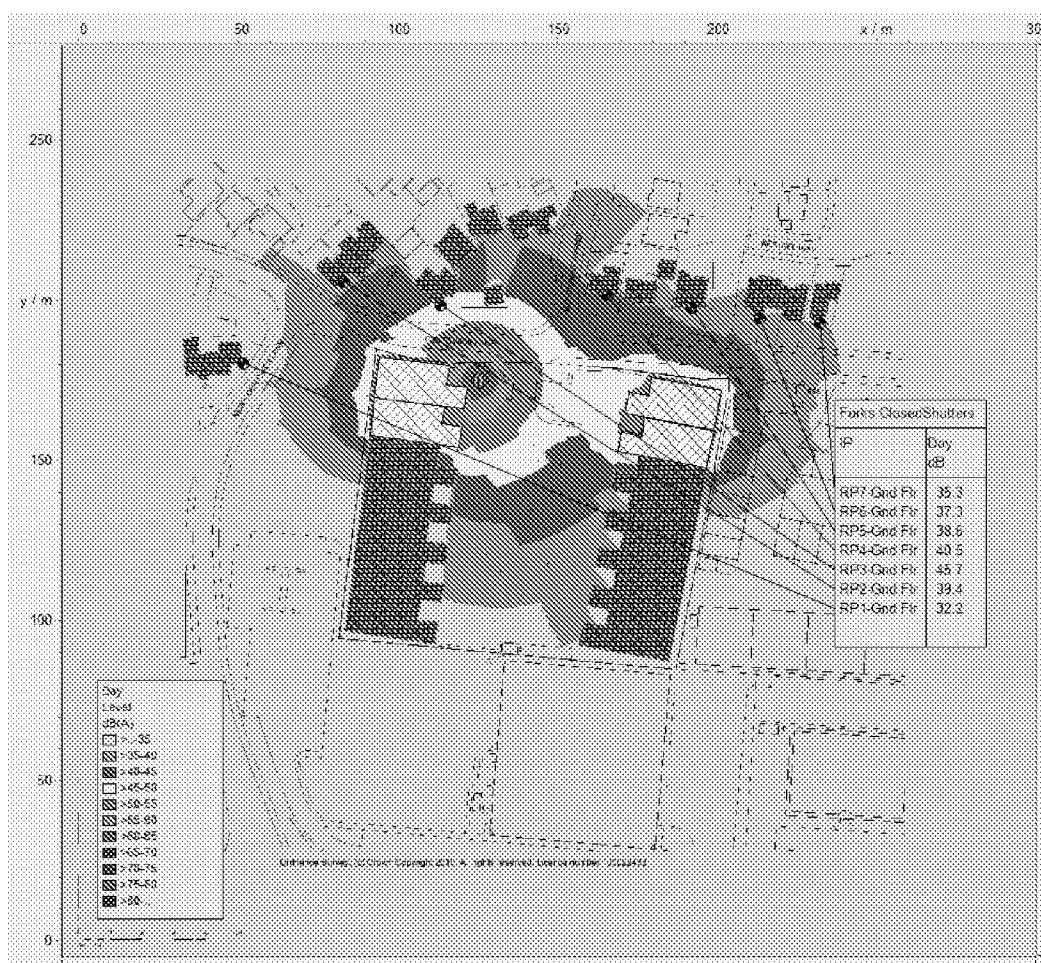


Figure 4: Vehicle Movement in Worst-Case location – Scenario 3

5 BS4142 Assessment of Results

The computer model outputs in the previous section have shown the sound levels around the site due to different scenarios, during daytime operation only with a specific time period of 07:00 – 19:00hrs.

These sound levels have been assessed against the existing L90 Background Sound Levels and these comparisons are shown in the tables below for the worst-case reception point(s).

5.1 Scenario 1

Description	Sound Level (dBA) at nearest NSR
All Roller Shutters Closed (Internal Sound Level of 80dBA in each unit allowing for character penalties and on-time corrections, thus this is the Rating Level).	38.7
Existing L90 Background Sound	45
Rating Level minus Background Sound	-6.3
BS4142 Assessment	Impact Unlikely
Uncertainty?	Discussed (see Section 5.4)

5.2 Scenario 2 – All Roller Shutters Open (Internal Sound Level of 80dBA)

Description	Sound Level (dBA) at nearest NSR
All Roller Shutters Open (Internal Sound Level of 80dBA in each unit allowing for character penalties and on-time corrections, thus this is the Rating Level).	49.7
Existing L90 Background Sound	45
Rating Level minus Background Sound	-4.7
BS4142 Assessment	Adverse Impact Likely (Consider Mitigation Measures)
Uncertainty?	Discussed (see Section 5.4)

5.3 Scenario 3 – External Fork Lift Operation Only

Description	Sound Level (dBA) at nearest NSR
All Roller Shutters Closed (Sound Power Level of 83dBA, having first been corrected for on-time and tonality).	45.7
Existing L90 Background Sound	45
Rating Level minus Background Sound	+0.7
BS4142 Assessment	Adverse Impact Possible (Consider Mitigation Measures)
Uncertainty?	Discussed (see Section 5.4)

5.4 Context

It is important to note that as this site is already operating with 10 commercial/industrial units, some of whom will have deliveries and or use fork-lift trucks, it is likely that sounds such as those depicted within Section 5.3 (forklift truck reversing alarms etc) will already be present and the additional use by 4 new units, albeit closer, will not add significantly, if at all, to the overall soundscape throughout the operating hours.

It is also important to note that new operating times will not be required, with the 4 new units being assimilated into the existing working structure of the overall site.

5.5 Uncertainty

As with all assessments, there is a degree of uncertainty and this will be discussed in this section.

The sound level meter was calibrated before and after the survey in situ, without any drift having occurred, to ensure that the information and data being obtained was representative and that the sound level meter was operating correctly.

A co-located weather station was used to record and check for suitable weather conditions during the entire length of the survey to ensure that the sound level data was valid.

With any calculations made, including the determination of background sound levels, there has not been any additional rounding of numbers to prevent double handling, this has only occurred once at the final part of the sum and is presented to the reader with an easy to understand reference level or single figure.

It is important to note that, in measuring the applicable background sound levels, only the existing operating hours of the site (07:00 – 19:00hrs) have been used. By considering only the hours of

operation of the existing site, the background sound levels will not be influenced by later hours (those up until 23:00 hours or into the night time period) which could well affect the sound levels.

With end users of the units not necessarily known, it has not been possible to predict what exactly the sound levels will be as this is a new application to the local planning authority. However, 3 different scenarios have been run using worst-case considered sound levels internally, with roller shutter doors opened and closed and the use of a forklift truck, to provide a concept of the impact on the residential receptors.

The assessment has used measured data of the performance of a roller shutter door from a previously assessed unit (22 Dw), and this presents a worst-case scenario, as newer roller shutter doors are likely to provide much greater attenuation for sound, ie up to 31 Rw.

When calculating the likely impact of the fork lift trucks, a character correction was applied for tonality but this was countered by the assumed 10-minute “on-time” use of the vehicle during a 1-hour period daytime reference period (as depicted in BS4142:2014) as a worse-case.

6 Mitigation Measures

6.1 Scenario 1 – Roller Shutter Doors Closed

The Assessment in Section 5.1 has shown that with 4 new units and internal sound being generated with a sound level of 80dBA in each building, so long as the roller shutter doors are closed, no mitigation measures will be required to satisfy the requirements of BS4142 and keep adverse impact unlikely.

6.2 Scenario 2 – Roller Shutter Doors Open

The Assessment in Section 5.2 has shown that with 4 new units and internal sound being generated with a sound level of 80dBA in each building but with all the roller shutter doors open, adverse impact is likely as the Rating Level will be approximately 5dB above the existing L90 Background Sound Levels.

Mitigation measures for such a situation could involve the following:

Re-arranging the front so that the roller shutter doors are obstructed from view by the entrance foyers would allow the foyer areas to act as a barrier to sound escaping the open roller shutter doors and reduce the sound level significantly enough such that the worst-case resultant sound level (RP3) is 42.4dBA and thus below the existing L90 Background Sound Level. This is seen in the figure below:

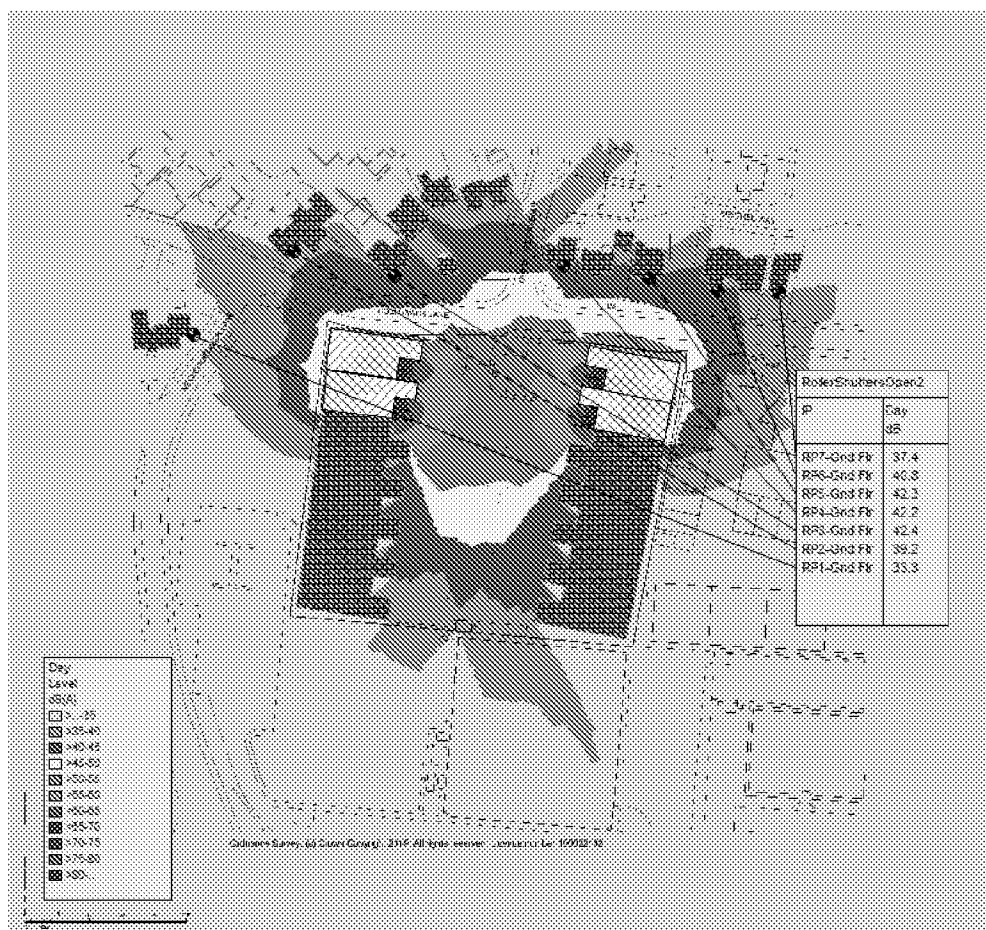


Figure 5: Mitigation for Scenario 2 (Roller Shutter Doors Open)

6.3 Scenario 3 – Forklift Truck Operation

With Roller Shutter Doors Closed (with internal sound levels operating as per Scenario 1) but with a fork lift truck operating in the vicinity of Unit 13, the sound level reaching the nearest NSR (depicted by reception point RP3) will be just above the existing L90 Background Sound Level and thus adverse impact is possible.

In order to mitigate the sound from fork lift truck operations, if the existing metal fencing posts were changed to a solid fence of 2m high, the fence would act as an acoustic barrier and reduce the sound level to 42.4dBA at reception point RP3 (the nearest NSR), which is nearly 3dB below the existing L90 Background Sound Level. The figure below shows the modelled noise contours of this mitigation measure.

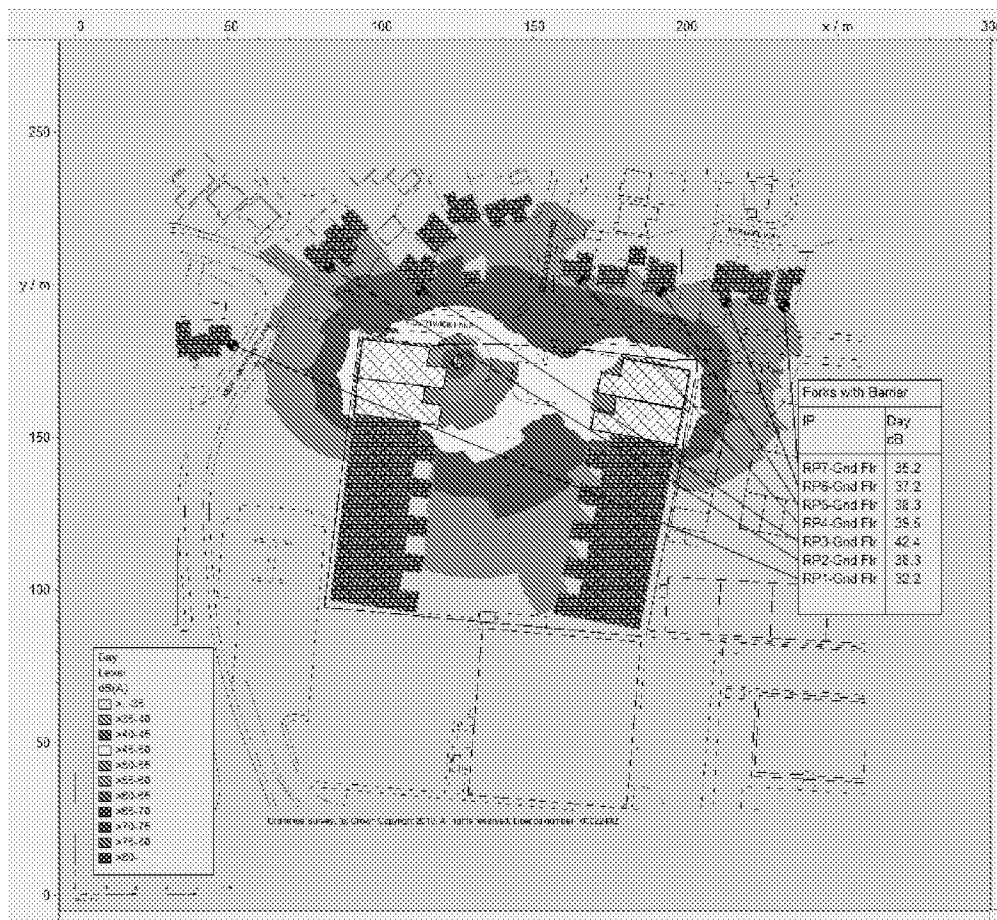


Figure 6: Mitigation for Scenario 3 (Fork Lift Operation)

6.4 Other

Other mitigation measures possible are that the end user of each unit produces their own noise management plan, to indicate how they will control their sound levels. Additionally, the regular maintenance / service of forklift trucks would ensure that they would remain in optimal operation.

7 Conclusion

Measurements of Existing L90 Background Sound Levels have been carried out on site for a period of a few days (including a weekend).

The representative L90 background sound level was found to be 45dBA during the time period of 07:00 – 19:00 hrs.

As the end users and use-types are not known, an assessment of sound levels emanating from the proposed four new commercial units have been attempted by way of producing worst-case scenarios and nominating sound levels accordingly.

The sound levels nominated and modelled are based upon measurements taken previously for similar sites.

The assessment has shown that the Rating Level at the nearest NSR is below the existing L90 Background Sound Level if Roller Shutter Doors are closed.

The assessment has shown that the Rating Level at the nearest NSR is 5dB above the existing L90 Background Sound Level if Roller Shutter Doors are opened.

The assessment has shown that the Rating Level at the nearest NSR is 1dB above the existing L90 Background Sound Level if a fork lift truck is operating in the area nearest to the nearest NSR.

Measures have been recommended as to how to mitigate against the above Rating Levels and bring them to a level below the existing L90 Background Sound Level (Please see Section 6 for these).

If the mitigation measures detailed in Section 6 are adopted, then it is considered that planning consent would not be refused due to noise issue, albeit that there may be conditions written into the consent.

Appendix A – Existing and Proposed Location Plans

Existing Site Layout



Proposed Site Layout



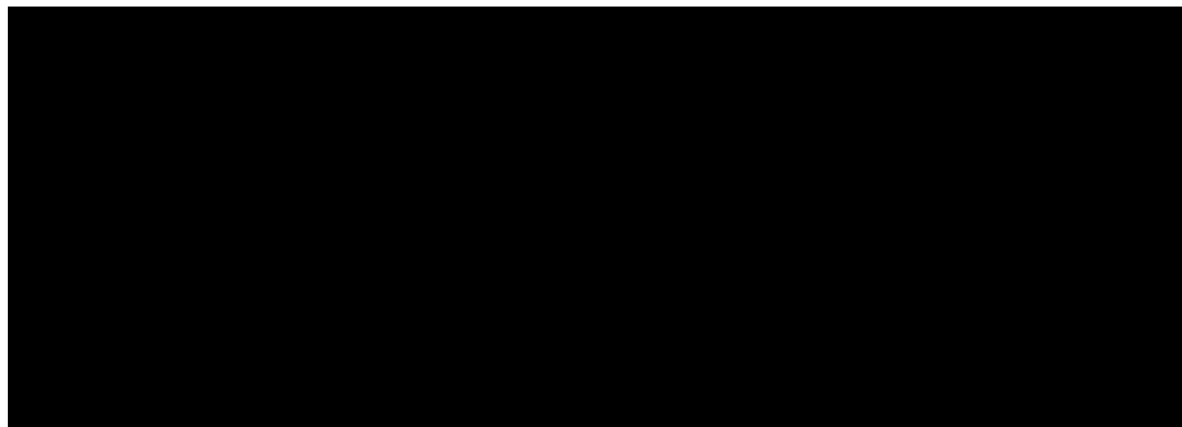
Appendix B – Background Sound Survey Location



Appendix C – Calibration Certificate

CERTIFICATE OF CALIBRATION		BS EN ISO 9001:2015 APPROVED BY LRQA CERT No 10045223
ISSUED BY: CALIBRATION MAINTENANCE & REPAIR LTD		
DATE OF ISSUE: 17 July 2018	CERTIFICATE NUMBER: 178736	

	Home Farm Industrial Park Norwich Road Marsham Norfolk NR10 5PQ Tel: +44 1603 279557 Fax: +44 1603 278008	Page 1 of 14 Approved Signatory Electronically Authorised Document ☐ P K CLARK ☐ R J WADE ☐ M A FROST ☒ M S PARDOE
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Date Of Calibration **17 JULY 2018**

INSTRUMENT CONDITION

Adjustments Made **NO**

Repairs Made **NO**

ENVIRONMENT

The instrument was placed in the laboratory environment for a minimum period of 4 hours and was operated prior to calibration.

Measurements were made in ambient conditions of 22°C ± 3°C and 45% ± 15% RH.

PROCEDURE

Measurements were performed in accordance with the in house laboratory procedure 1335
All equipment used has been calibrated/verified against measurement standards or reference equipment traceable to International or National Measurement Standards as specified in our control procedure W164

The results attached to this certificate refer to measurements made at the time of test and not to the instrument's ability to maintain calibration.

The attached results are a true record of the levels required to return the instrument to the original stated manufacturer's specification and accuracy where known.