

Acoustic Associates Sussex Ltd

Noise Impact Assessment.

Site: Unit T, Riverside Industrial Estate. BN17 5DF.

Client: Thompson Civil Engineering

Report by: Scott Castle BSc (Hons) CEnv, MCIEH PGDip: Acoustics MIOA

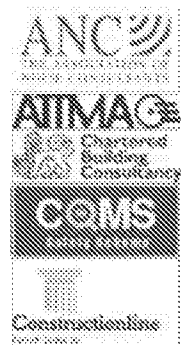
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Issue 1.



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1 Introduction

Acoustic Associates have been appointed to undertake an acoustic assessment to support a planning application for four new commercial units to be located on the Riverside Industrial Estate at Littlehampton. The Four new units would have a proposed B1/B2/B8 planning use utilising a shell and core approach where the future tenants are responsible for the fitout. The purpose of the report is to provide information on noise impact of the new units being introduced onto an established industrial estate.

Standards and guidance referenced for this assessment include:

- ISO9613 (Attenuation of sound during propagation outdoors) 1996
- National Planning Policy Framework (NPPF) 2019
- BS4142:2014-A1:2019- Methods for rating and assessing industrial and commercial sound

Measurements of background noise levels have been carried out using a class one sound level meter located at the Southern aspect of the client's land. Data was collected between 27th February 2020 and 3rd March 2020. Simultaneous measurements were also made close to the nearest residential properties to ensure an understanding of the site soundscape and how this may differ due to distance from both the application site and the proximity to the A259.

IMMI noise modelling software was used to predict the likely impact of noise break out from inside the new building, as well as the use of an external fork lift truck. To ensure a comprehensive approach, various scenarios were modelled, with the worst case being the use of all 4 units being a B2 use with a simultaneous 80dB(A) sound level applied internally with all front roller shutter doors modelled as open. Doors open and closed were considered for both B2 units using 80dB(A) internally and B1/B8 units measuring 70dB(A) internally. Only the highest outcomes were considered and used in the BS4142:2014:A1-2019 assessment.

The assessment has shown that considering a worst-case example, the operation of the new building is likely to have a Rating Level ($L_{A,r,Tr}$) between 18dB and 20dB below measured background sound levels. Accordingly, mitigation measures are not considered to be necessary.

The assessment has considered and discussed both context as well as uncertainty for the placement of the new commercial building onto an existing industrial estate. Planning permission should not therefore be withheld on noise grounds and mitigation measures are not considered to be necessary.

2 Context, Noise Criteria & Noise Assessment Methodology

2.1 Context and Proposed Uses

The proposed four new units are to be located on the applicant's land, which is currently used for the storage of plant used in connection with the civil engineering business. The application site, Unit T is shown marked with a red edge in Figure 1 below. As part of the planning application to introduce 4 new units onto an industrial estate, the local planning wish to see a noise impact assessment. The applicant's existing site is seen below in Figure 1 edged in blue.



Figure 1. Site Location Plan showing Application Area edged in Red



Figure 2. Application Site at Present (Storage Yard)

As stated, the proposed uses are B1/B2/B8. For ease of reference, the planning portal lists the B1, B2 and B8 uses as follows:

B1 Business – Uses which can be carried out in a residential area without detriment to its amenity. This class is formed of three parts:

- *B1(a) Offices - Other than a use within Class A2 (see above)*
- *B1(b) Research and development of products or processes*
- *B1(c) Industrial processes*

B2 General industrial - Use for industrial process other than one falling within class B1 (excluding incineration purposes, chemical treatment or landfill or hazardous waste)

B8 Storage or distribution - This class includes open air storage

A more detailed proposed layout is shown in Figure 3 below.

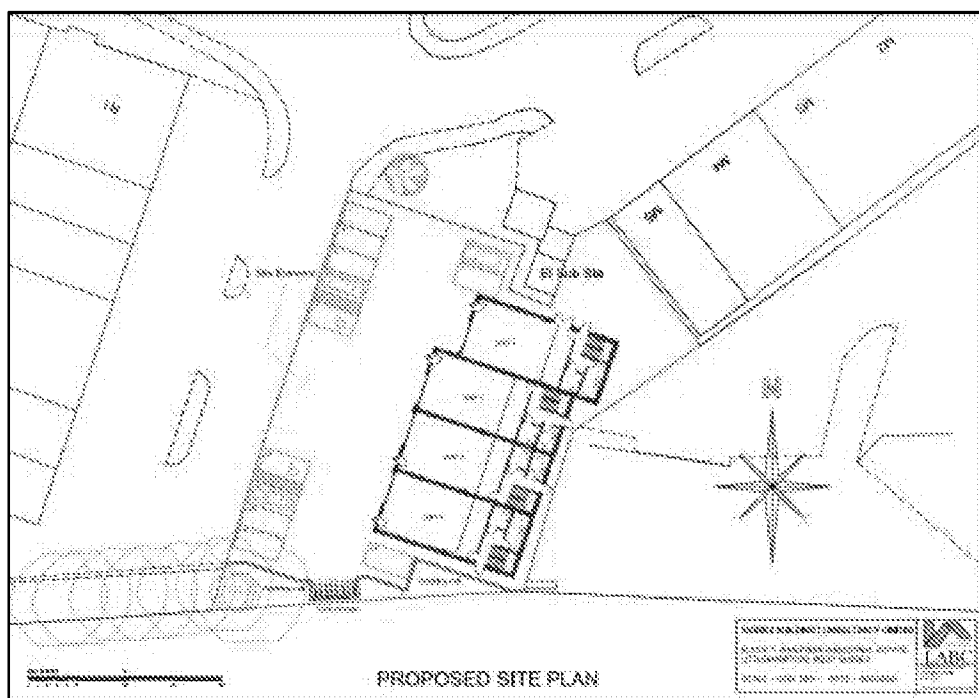


Figure 3. Proposed Site Layout

The 4 new units are terraced, which are sympathetic with other buildings located on the industrial estate. The four units each consist of a workable floor area, a mezzanine with an office, a kitchenette and a toilet. Figures 4 to 5 below show that the front of the buildings each have a metal roller shutter door as well as a pedestrian access. Each unit also has a rear/side access.

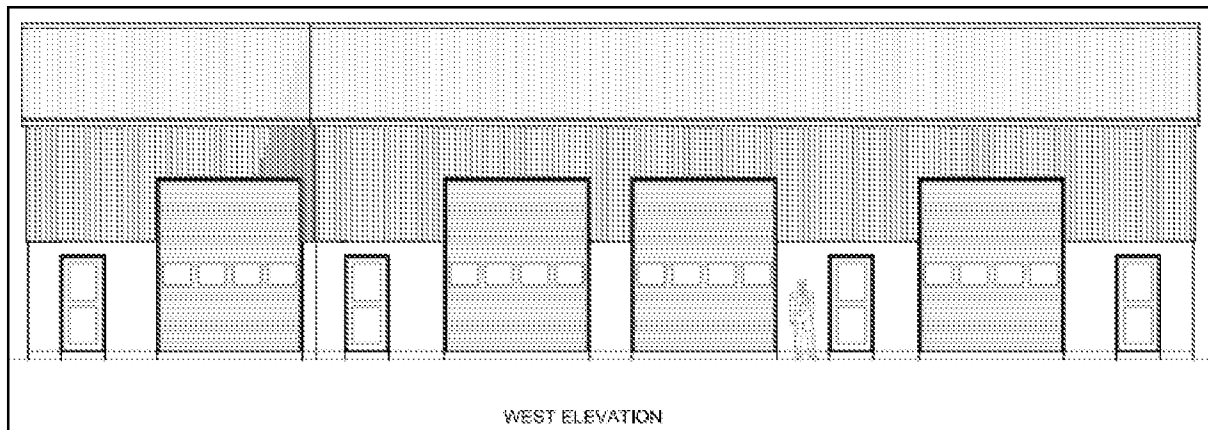


Figure 4. West Elevation detailing the 4 roller shutter doors

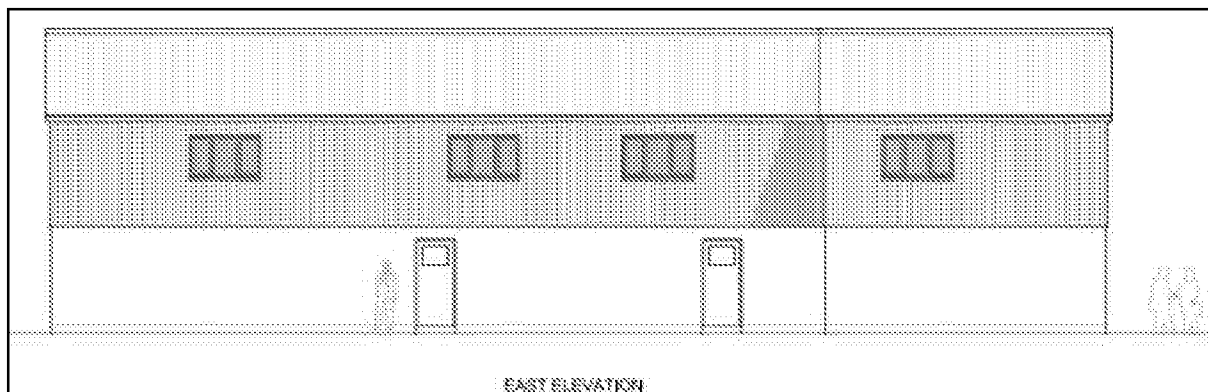


Figure 5. Rear Elevation from East.

2.2 Surrounding Units and Soundscape

2.2.1 Commercial Setting

It is relevant to note that the 4 new units are to be built on an already established industrial estate with limited residential receptors.

The application site is currently a storage yard for highways and civil engineering plant which belongs to the client. To the South is the River Arun and an area of land owned by the harbour authority, where aggregates and sand are stored by the riverside.

The closest commercial units are located to the North East and are used for car parts, electrical and lighting suppliers (ADR). To the West is a further commercial industrial building, in which the client has their existing unit (see Figure 1 above), as well as Phoenix frozen foods and Riverside precision instruments.

To the immediate East, separated by a metallic security fence is a tarmac site, which was noted to have a number of heavy goods vehicles and mobile plant, as well as likely batching plant/tar manufacture and a chimney.

2.2.2 Soundscape

At the time of installing and decommissioning the survey equipment in the client's yard area, the soundscape was comprised of gull noise and reverse beepers noted from the tarmac yard. Reverse beepers were also noted from the boat yard to the South of the River Arun.

Reverse systems using a white noise (hush hush) were also noted from the Tarmac site. Jet-washing was also noted to be carried out in front of the applicant's yard, which is not out of keeping for such an industrial area and a diesel forklift idling within the corner of the client's yard.

An area of static homes located to the South West (175m) of the site was also visited to observe the soundscape, which was noted to consist predominantly of road traffic noise from the A259 as it crosses the River Arun. Road traffic noise was not as obvious on the application site and accordingly, attended simultaneous readings were useful in identifying a difference in measured background sound levels.

During attended readings (16:15-18:00 hours) carried out at the static homes site on 3rd March 2020, the soundscape consisted of gull noise, birdsong, road traffic noise (including the acceleration of motorbikes), aviation noise and passing vehicles to access the residential element of the site.

2.3 Proposed Hours of Operation

The proposed hours of operation will be 08:00 to 18:00 Monday through to Saturday without any Sunday working or operations. All works will be carried out internally.

2.4 Nearest Residential Receptor Location

Whilst there are boats noted to be moored to the South in the River Arun, these are likely to be pleasure craft as opposed to houseboats which are lived in/on. The nearest receptors would therefore appear to be the static homes located approximately 175m South West seen in Figure 6 below.



Figure 6. Residential Receptors to South West

2.5 Methodology and Approach

To ensure that sufficient information is presented to accompany the planning application, the following approach was applied:

1. Measure background sound levels as close as possible to the nearest residential receptor.
2. Extract information from the measured dataset which shows the background sound levels for the intended operating hours and specifically, the most representative and frequently occurring background sound pressure levels – $L_{A90,15\text{minutes}}$.
3. Construct a model showing the four new units within the noise modelling software, representing those as shown on the building elevations including roller shutter doors and specific façade treatments such as Kingspan Panels and brickwork.
4. Within the noise modelling software, internal sound levels will be generated for both B1 and B2 uses, both with roller shutter doors open and closed to represent real life conditions.
5. Fork lift truck movements are also considered as part of the assessment in providing any loading or unloading activities.

2.6 National Planning Policy Framework 2019

The National Planning Policy Framework (Feb 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.

2.7 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:

- Typically, the greater the difference, the greater the magnitude of the impact.
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- 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 & Results

A background noise survey was carried out between the 27th February 2020 to 3rd March 2020 to assess the background sound levels at the application site. To ensure a robust approach, 15-minute attended measurements were also made at a position further South of the site on 3rd March 2020. The sound level meters were synchronised to allow a like to like comparison of time periods.

3.1 Background and Existing Noise Survey Details

Survey(s) carried out by	Scott Castle BSc(Hons) Env Health, MCIEH CEnvH PGDip Acoustics MIOA
Equipment Used	Norsonic 118 Class 1 Sound Level Meter – Norsonic C (Unattended) Norsonic 118 Class 1 Sound Level Meter – Norsonic B (Attended)
Equipment Used	01dB Acoustic Calibrator. Serial Number. 50241778
Location	TQ01829/02352 (unattended), mounted on a monopole, freefield at 2.4m above ground level TQ01684/02236 Tripod Mounted at 1.5m - Freefield. (3 rd March 2020)
Duration	27 th February 2020 to 21:45 3 rd March 2020. 3 rd March 2020 16:15-18:00 hours

Table 1. Survey Equipment

The sound level meters were calibrated before and after commencing the noise measurements (@94dB with no drift). All measurements were taken with the time base set to 15-minute interval periods. All measurements were taken with the microphones located in freefield conditions.

The unattended sound level meter and co located weather station can be seen below in Figure 7.

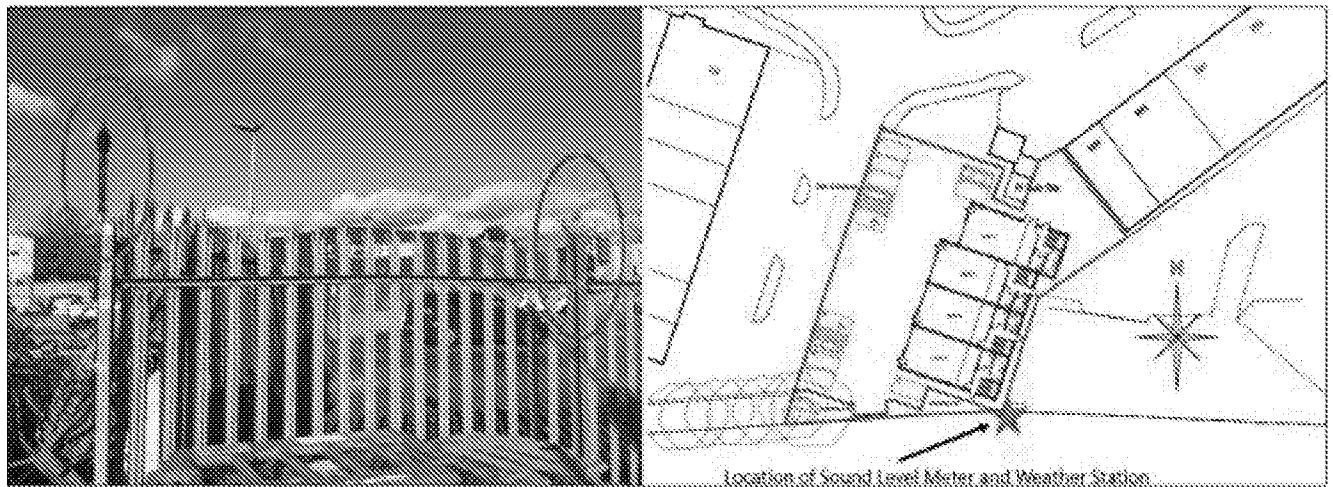


Figure 7. Sound Level Meter and Weather Station Installation

3.2 Weather Conditions

As required by BS4142:2014, a co-located weather station was also installed on site to ensure that any recorded data was measured in conditions suitable for environmental monitoring.

As shown below in Figure 8 there were high winds during the survey period with elements of heavy rain also consistent with storm Jorge. Accordingly, a decision was made to only review the data from the Monday and Tuesday of the survey (2nd and 3rd March 2020) due to improved weather conditions and low wind speeds without any precipitation.

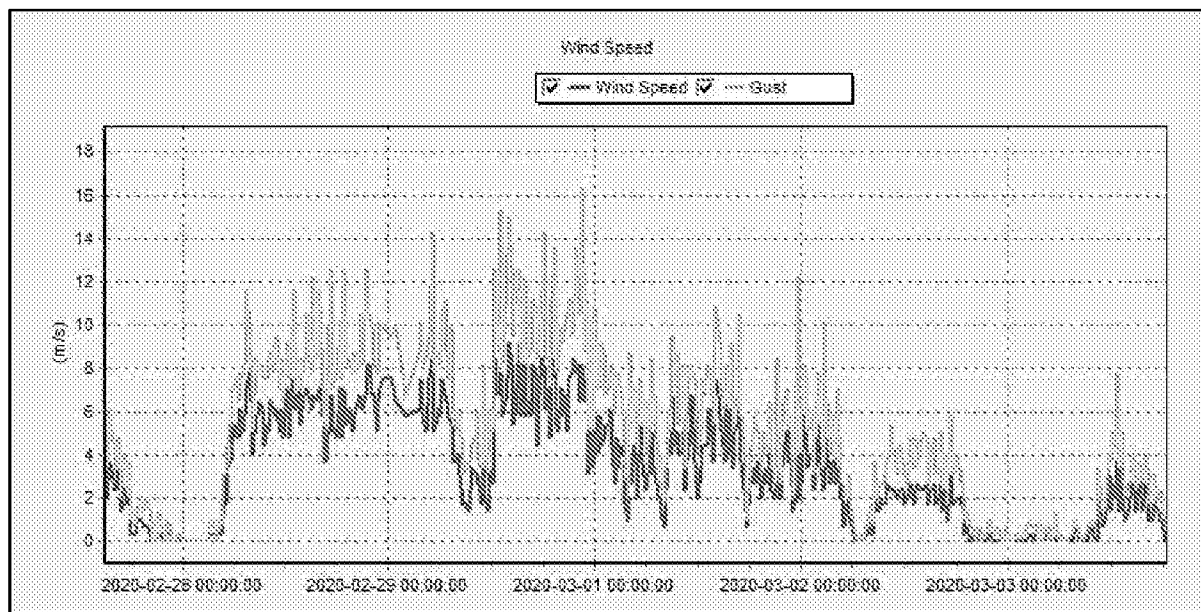


Figure 8. Wind Speed Conditions for duration of survey

3.3 Representative Background Sound Levels

The survey monitoring position was chosen to represent an “area” background sound level representative to the site. BS4142 states the following on page 11 (Note 1):

To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum/modal value.

The $L_{Aeq,15minutes}$ and $L_{A90,15minutes}$ have been plotted for both the Monday 2nd March and Tuesday 3rd March 2020 for the site location. Figure 9 relates to the two days selected without adverse weather impacts and the L_{A90} is seen to be relatively stable.

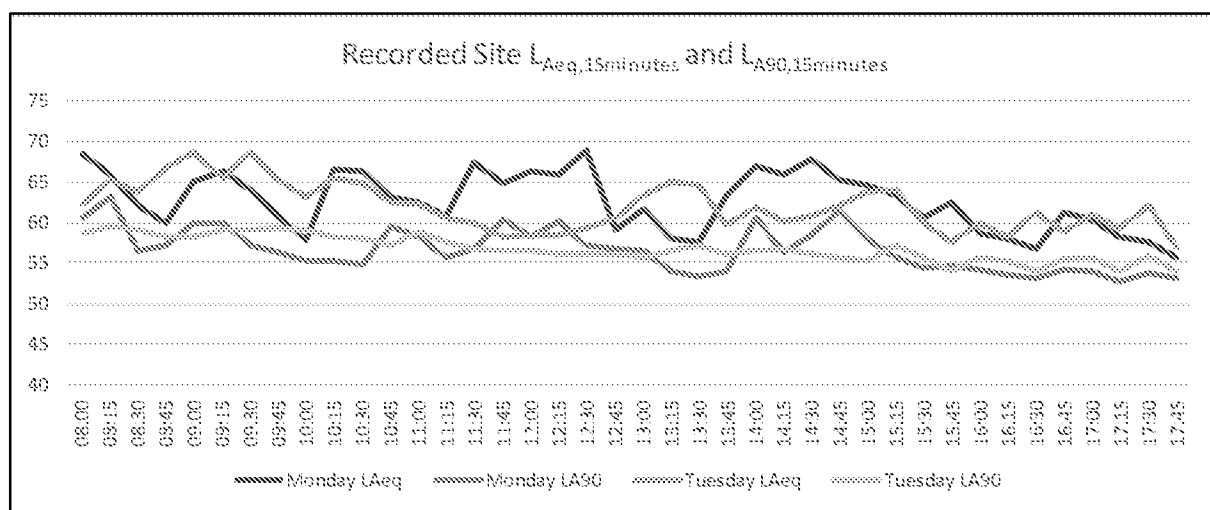


Figure 9. Site $L_{Aeq,15min}$ and $L_{A90,15min}$

Modal occurrences for background sound levels have been used for the $L_{A90, 15minute}$ periods for the consented hours that the building may operate, which are 08:00-18:00 hours Monday through to Saturday. The most frequently occurring background sound levels for the Monday and Tuesday periods for the working day are shown in Figure 10 below. It is noted that where there were periods where the wind speed or gusts exceeded 5m/s, these were removed from the dataset to ensure that the information was as accurate as possible.

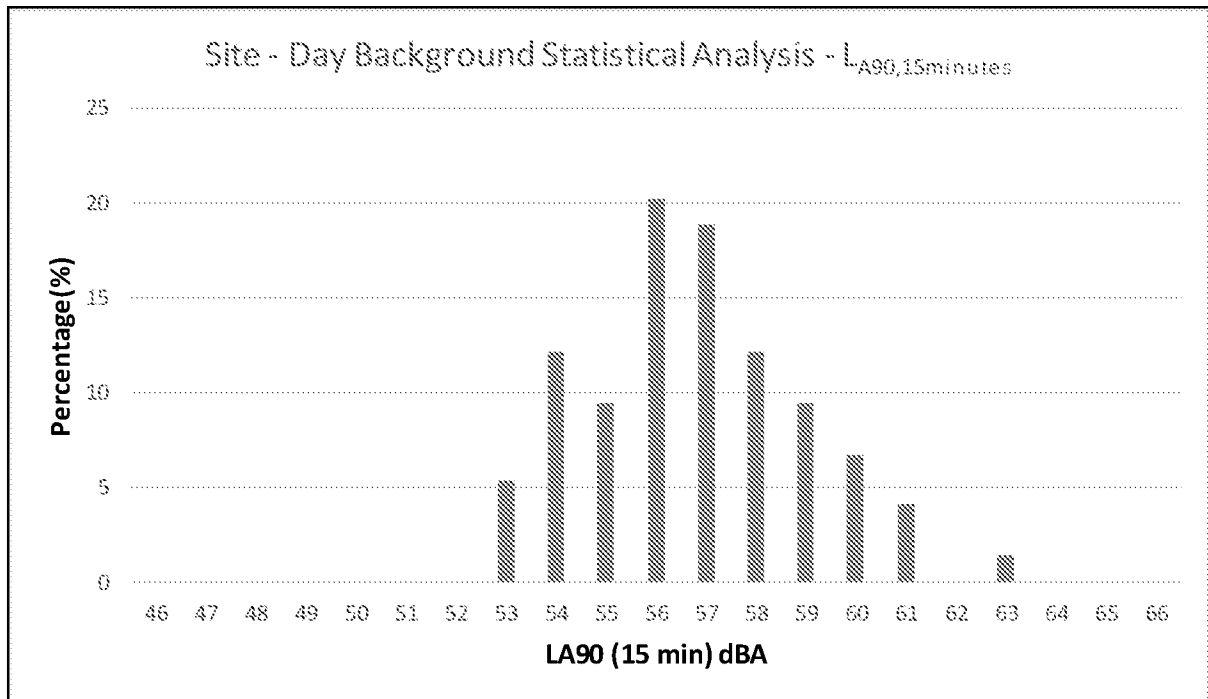


Figure 10. Measured Background Sound Levels at site- $L_{A90,15\text{minutes}}$

3.4 Attended Measurements

To ensure a robust report, a period of time was also spent taking simultaneous attended readings at the nearest residential receptors to the South West of the application site, South of the river Arun. Care was taken to ensure that the clocks on both sound level meters had been synchronised and that the 15 minute measurement periods were capable of being compared against one another. The data compares the same time periods which were measured simultaneously. Figure 11 shows the site and its proximity to the application site.



Figure 11. Attended Measurement Location

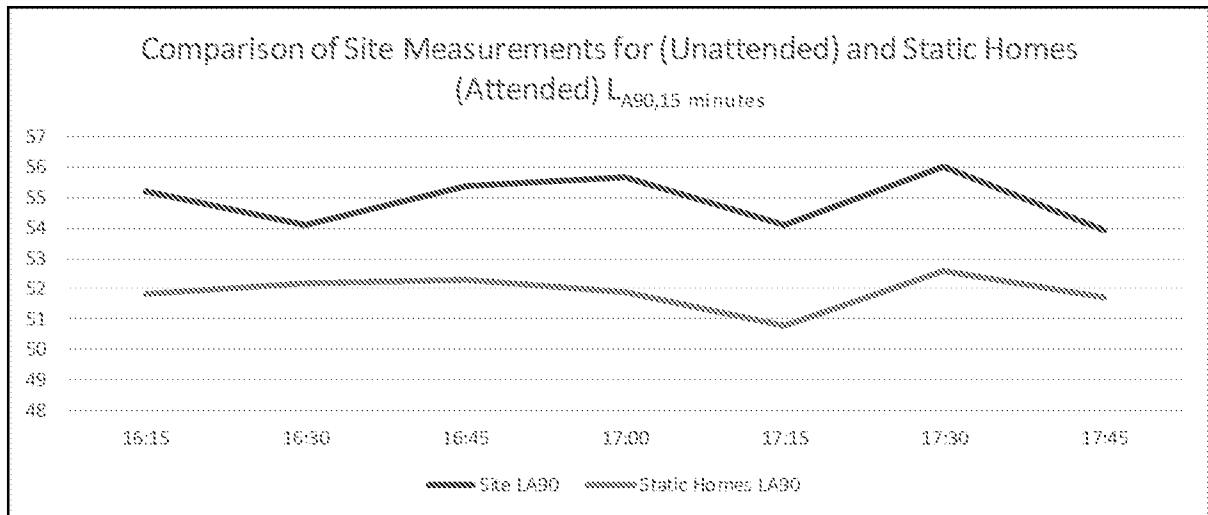


Figure 12. Comparison of Simultaneous Data from Site and the closest residential sites

A review of the level difference between the simultaneous 15-minute measurements between the application site and the static homes (as per Figure 12 above) to the South provided an average of 3dB less measured at the static homes site.

It would therefore be appropriate to deduct 3dB from the measured background sound pressure levels ($L_{A90,15\text{minutes}}$) referenced in Figure 10 above.

3.5 Summary of Measured Background Levels

The measured background sound levels applicable to this assessment are 53dB $L_{A90,15\text{minutes}}$ for the 08:00 to 18:00 proposed working day, which seeks to protect the amenity of the properties located to the South West of the application site.

4 Noise Modelling Software

IMMI (Wolfel) noise modelling and prediction software has been used to plot the newly constructed building 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. For example, the 2.2m fence-line around the site, as well as the electricity substation were both included within the modelling.

4.1 Modelling Inputs

All four units have the same construction of a 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. Brickwork has an R_w of 40dB, whereas Kingspan profiled sheets are 25dB R_w .

Using the composite calculator, the R_w value for walls of the buildings will be 26.9 dB.

The building rooves are also Kingspan and will have a 25dB R_w without any translucent panels.

The roller shutter doors have had an D_w of 22 dB applied which was recently measured on a similar B8 site, however with new doors being procured, it is reasonable to expect increased performance.

To ensure a conservative assessment, the noise modelling inputs have assumed internal sound levels of 70dB(A) for both B1 and B8 and 80dB as the noisier of the uses for B2. The model input also assumes that the noise level is consistent throughout the 10 hour working day.

Four scenarios were run to accommodate the different uses with both roller shutter doors open and closed. It is noted that no external works will occur, aside from likely fork lift truck movements, which are discussed later in section 5. The model therefore represents a worst-case scenario.

1. Scenario 1 – B1/B8 uses, all roller shutter doors open
2. Scenario 2 – B1/B8 uses, all roller shutter doors closed
3. Scenario 3 – B2 uses, all roller shutter doors open
4. Scenario 4 – B2 uses, all roller shutter doors closed

The model has been set to daytime only and the modelling grid squares for the noise model were set to 1metre to demonstrate as accurately as possible the noise change provided by the contours.

Clearly, the location of the River Arun to the South is a feature which for the purposes of the model has been set to hard ground, along with all other areas and minimal absorption of sound.

Receptor positions have been set at 1.5m to represent the closest windows of the residential static homes.

4.2 Modelling Outputs

As stated above four scenarios were run using the IMMI noise modelling software. The noise modelling software predicts freefield values. Whilst values reported in the model are sound pressure levels, these are A weighted.

4.2.1 B1/B8 Roller Shutter Doors Open



Figure 13. B1/B8 Uses (70dB(A) Internally) - Roller Shutter Doors Open

The highest predicted specific sound level from the internal operations alone, with all 4 doors open is 21.9 dB(A).

4.2.2 B1/B8 Roller Shutter Doors Closed

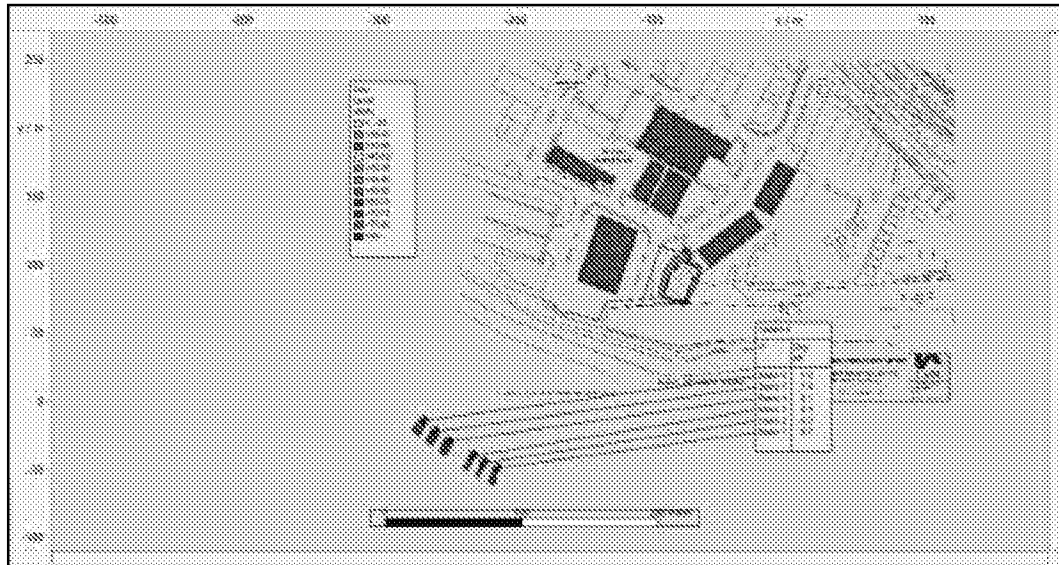


Figure 14. B1/B8 Uses (70dB(A) Internally) - Roller Shutter Doors Closed

The highest predicted specific sound level from the internal operations alone, with all 4 doors closed is 8.7dB(A).

4.2.3 B2 All Roller Shutters Open

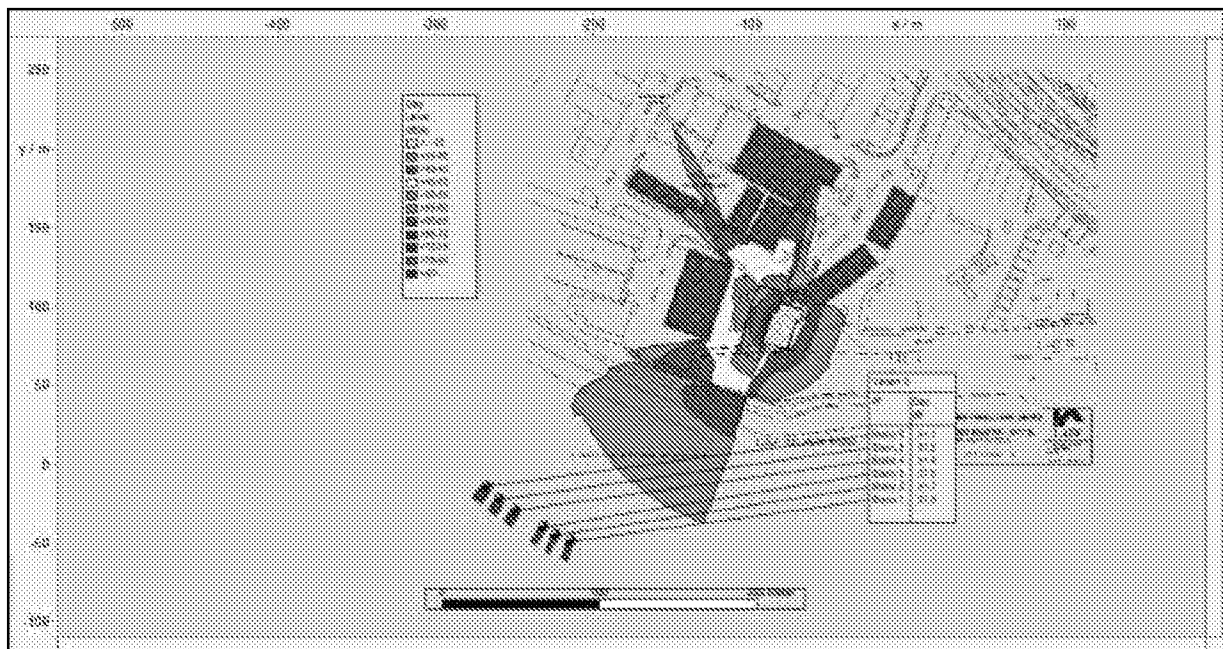


Figure 15. B2 Uses (80 dB(A) Internally) - Roller Shutter Doors Open

The highest predicted specific sound level from the internal operations alone, with all 4 doors open is 31.9 dB(A).

4.2.4 B2 All Roller Shutters Closed

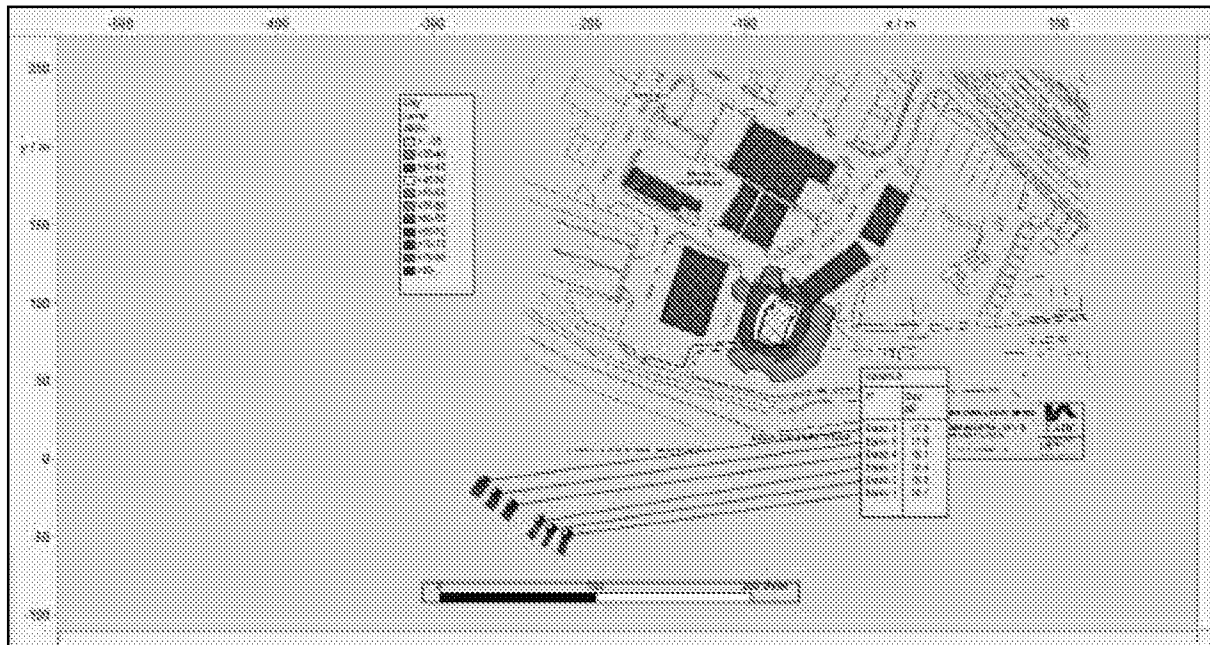


Figure 16. B2 Uses (80dB(A) Internally) - Roller Shutter Doors Closed

The highest predicted specific sound level from the internal operations alone, with all 4 doors closed is 18.7 dB(A).

5 Fork Lift Truck Movements

As commercial buildings with mixed planning uses, it is reasonable to anticipate the use of fork lift trucks on such an industrial estate

Accordingly, to present a robust report, an audible reverse bleeper from a fork lift truck was measured on a previous assessment and entered into the model as a point source at 4m from the building façade to determine the impact of a fork lift truck being used.

An Aisle Master fork lift truck was placed into reverse and measured at 1m over a minute with the audible bleep bleep warning signal playing providing a sound pressure level of 81dB $L_{Aeq, 1\text{minute}}$. Accordingly, a point source was introduced into the noise modelling software in front of closest unit to the South at 4m from the roller shutter door.

However, it is unlikely to have a fork lift truck warning signal operating continuously all day long. The BS4142:2014 applicable reference standard for the daytime period would be a single hour, so an assumption would be made of the reverse bleeper being operational for three full minutes in any one hour. It is noted that the bleeper would only operate when in reverse, providing up to six minutes of travel time as a conservative assessment. The correction is calculated as $10\log(3/60) = -13\text{dB}$. The point source sound power level (L_{WA}) entered for the model was therefore 76dB(A).

To present a robust assessment, it was assumed that a delivery occurring, using the southernmost door and the unit was set to a B2 use with 80dB inside and with the door open allowing sound energy to propagate externally. The highest predicted sound pressure level at the closest static property with a fork lift in operation, with the door to a B2 use open has been predicted as 28.2dB(A).

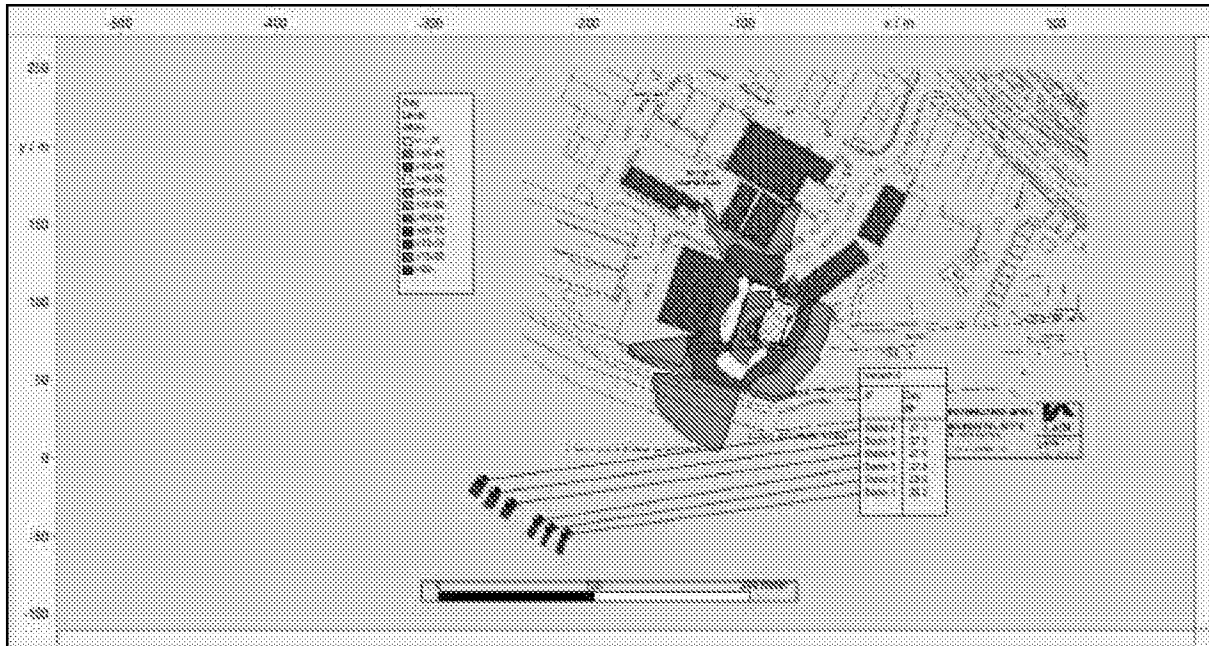


Figure 17. Impact of Fork Lift Truck Movements Externally with Door 4 open and a B2 use

6 Noise Modelling Discussion

The noise modelling software predictions may be used with the measured background sound levels to provide an indication of the impact that the new building may have. Figure 18 below indicates that the predicted sound levels from the modelling software are significantly below those sound levels already experienced on site.

Note that both the modelling software and the collection of background sound level data at both locations were all in free field conditions. A correction to façade conditions has not been made.

As a worst case, with each of the 4 units operating at 80dB inside, with all 4 roller shutter doors open, the specific impact is still 18-19dB below measured background sound levels.

Assessment of Noise Impact of Unit T New Building			
80dB - All Doors Closed			
Location	Predicted Sound Pressure Level - L_{Aeq}	Measured Background Sound Level - $L_{A90,15\text{minute}}$	Difference between Predicted Impact and Measured Background Sound Level - $L_{A90,15\text{minute}}$
Static 1	18.7	53	-34.3
Static 2	18.5	53	-34.5
Static 3	18.4	53	-34.6
Static 4	18.1	53	-34.9
Static 5	17.9	53	-35.1
Static 6	17.8	53	-35.2
80 dB doors all open			
Static 1	31.9	53	-21.1
Static 2	31.7	53	-21.3
Static 3	31.6	53	-21.4
Static 4	31.4	53	-21.6
Static 5	31.2	53	-21.8
Static 6	31.1	53	-21.9
70dB all doors closed			
Static 1	8.7	53	-44.3
Static 2	8.5	53	-44.5
Static 3	8.4	53	-44.6
Static 4	8.1	53	-44.9
Static 5	7.9	53	-45.1
Static 6	7.8	53	-45.2
70dB all doors open			
Static 1	21.9	53	-31.1
Static 2	21.7	53	-31.3
Static 3	21.6	53	-31.4
Static 4	21.4	53	-31.6
Static 5	21.2	53	-31.8
Static 6	21.1	53	-31.9
Use of FLT with door 4 open			
Static 1	28.2	53	-24.8
Static 2	28	53	-25
Static 3	27.8	53	-25.2
Static 4	27.5	53	-25.5
Static 5	27.3	53	-25.7
Static 6	27.1	53	-25.9

Figure 18. Modelled Predicted Sound Levels Assessed Against Measured Background Sound Levels

7 BS4142:2014 Assessment

The following has been copied from section 11 of BS4142:

The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. 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.

The following contextual information is considered relevant in completing the noise assessment:

- The construction of a single new commercial building with 4 internal units is located on an already busy industrial estate.
- The residential receptors are located at distance to the South with limited line of sight to the new building.
- The residential receptors to the South West already experience levels of road traffic noise from the A259 bridge across the River Arun.
- The consented use for the new buildings is during the daytime only
- With the build being shell and core, the assessment has not considered external plant, but noise break out of the buildings and worst-case scenarios have been presented with all roller shutter doors being open, when in reality, these are likely to remain closed.
- To present a robust scenario, fork lift trucks have also been considered as operating at the closest door to the residents with a B2 operation internally.
- Whilst the modelling inputs have assumed 70dB(A) and 80 dB(A) internally for B8/B1 and B2 respectively, it is possible that the internal sound levels may be lower, especially for B8 uses.

When considering context with regards to BS4142:2014, the following is stated:

"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."

7.1 BS4142:2014 Assessment Summary

Figure 18 above indicates that for all four scenarios run, the predicted sound pressure levels at the nearest residential properties are significantly below measured background sound levels.

Notwithstanding this, a BS4142:2014 assessment has been carried out which sees the predicted specific sound levels from the modelling software having a character correction applied to become a rating level or $L_{Ar,Tr}$. The corrections applied include intermittency for the B2 operations internally, and tonality and intermittency for the use of the forklift. Whilst these have been applied to ensure an accurate and worst-case assessment, it is arguable that with the rating level being so far below measured background levels, whether an intermittency correction is relevant due to the sounds being unlikely to be heard.

Daytime- Operation of Units- B2 All Doors Open			
Results	Measurement Parameter		Relevant Clause
Specific sound level	$L_{Aeq(T)}$	31.9	7.3.4
Acoustic feature correction	Potential Intermittency (3dB applied)	3	9.2
Rating level	$L_{Ar,Tr}$	34.9	9.2
Background sound level	$L_{A90(T)}$	53	8
Excess of rating level over background sound level		18.1	11
Assessment indicates a	Significant Below Measured Background Sound Levels		11
Uncertainty of the assessment	Discussed		10

Figure 19. All 4 units with B2 use and all doors open

Daytime- Fork Lift Truck Operation with B2 Use and Door Open			
Results	Measurement Parameter		Relevant Clause
Specific sound level	$L_{Aeq(T)}$	28.2	7.3.4
Acoustic feature correction	Tonality (+2) Intermittency (+3)	5	9.2
Rating level	$L_{Ar,Tr}$	33.2	9.2
Background sound level	$L_{A90(T)}$	53	8
Excess of rating level over background sound level		19.8	11
Assessment indicates a	Significant Below Measured Background Sound Levels		11
Uncertainty of the assessment	Discussed		10

Figure 20. External Fork Lift Operation and B2 use with closest door open

The BS4142:2014:A1-2019 assessment considers that the impact of the new commercial building on Unit T is likely to operate at levels significantly below measured background, with specifically the worst case scenarios being -18 to -20 below measured background levels.

8 Noise Mitigation Measures

The assessment has demonstrated that the erection of a new building containing 4 new units on an existing industrial estate is not likely to have any acoustic impact on the nearest residential receptors located to the South West. Accordingly, mitigation measures are not considered necessary.

The assessment has presented a worst case, when in reality, the local planning authority and indeed the end operators would not wish to carry out day to day operations either externally or with doors wide open.

9 Uncertainty

The sound level meters were 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.

In line with the requirements of BS4142:2014, a co-located weather station was also installed on site. Data was removed from the dataset to ensure that the influence of wind and rain on the microphone were removed as a source of uncertainty.

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.

In calculating the representative background sound levels, care was taken to remove gusts or wind speeds above 5m/s to ensure an accurate assessment.

It is important to note that, in measuring the applicable background sound levels, only the proposed operating hours of the new building have been used, ie 08:00-18:00 hours. If operations were to be considered either side of these hours, a re-assessment of the applicable background sound levels would need to be carried out.

In evaluating background sound levels, to ensure that these were representative of the nearest receptors, attended monitoring was carried out during known good weather periods using a simultaneous assessment both at site, and at the receptor location to the South West. The data was compared to provide a sensible deduction to protect residential amenity.

With end users of the units not necessarily known, it has not been possible to predict what, if any external plant may be used or operational, however, new plant would likely form a new application to the local planning authority.

Whilst it is difficult to model individual units within the building, four different scenarios have been run with the use classes changed between B1/B8 and B2 and with roller shutter doors opened and closed 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 D_w), 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 R_w .

Whilst character corrections in the BS4142:2014-A1:2019 assessment have been applied for intermittency to present a worst case, it is arguable that the predicted levels being suggested are significantly below the backgrounds, that intermittency is not likely to be a problem, especially given the distances concerned to the nearest residential receptors.

10 Conclusion

Measurements of background noise levels have been carried out using a class one sound level meter located at the Southern aspect of the client's land. Data was collected between 27th February 2020 and 3rd March 2020. Simultaneous measurements were also made close to the nearest residential properties to ensure an understanding of the site soundscape and how this may differ due to distance from both the application site and the proximity to the A259.

IMMI noise modelling software was used to predict the likely impact of noise break out from inside the new building, as well as the use of an external fork lift truck. To ensure a comprehensive approach, various scenarios were modelled, with the worst case being the use of all 4 units being a B2 use with a simultaneous 80dB(A) sound level applied internally with all front roller shutter doors modelled as open. Doors open and closed were considered for both B2 units using 80dB(A) internally and B1/B8 units measuring 70dB(A) internally. Only the highest outcomes were considered and used in the BS4142:2014:A1-2019 assessment.

The assessment has shown that considering a worst-case example, the operation of the new building is likely to have a Rating Level ($L_{A,T,r}$) between 18dB and 20dB below measured background sound levels. Accordingly, mitigation measures are not considered to be necessary.

The assessment has considered and discussed both context as well as uncertainty for the placement of the new commercial building onto an existing industrial estate. Planning permission should not therefore be withheld on noise grounds and mitigation measures are not considered to be necessary.