

# PEAK acoustics



## Noise Impact Assessment

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**Site:** Station Works, Leek, Staffordshire, ST13 8BP

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## Executive Summary

A Noise Impact Assessment has been undertaken for the proposed erection of a business unit for class B2, B8 and E use at Station Works, Station Street, Leek, Staffordshire, ST13 8BP. The future occupants of the unit are currently unknown.

The nearest or most-affected Noise Sensitive Receptors (NSRs) were identified as the residential properties that are in closest proximity or most exposed to the proposed business unit. These included No. 17 - 23 Geoffrey Avenue. Reception points in calculations included the top-floor windows of the residential properties.

Using the measured background noise survey data, a representative daytime background sound level of 46 dB  $L_{A90}$  was derived for the assessment.

Measurements of the prevailing background noise climate were undertaken from the 26<sup>th</sup> to the 27<sup>th</sup> of October 2022 at a location representative of the identified Noise Sensitive Receptors (NSRs).

Acoustic modelling software, SoundPLAN, was utilised to calculate external sound propagation from the site using ISO-9613-2 - *Attenuation of sound during propagation outdoors*.

As the future use of the unit is unknown, a worst-case scenario of a metal workshop using handheld tools was adopted to assess the potential impact on nearby receptors. It is unlikely that this type of use will be present due to the limited space within the site courtyard and internal floor space of the unit however, it is a good representation of the highest noise levels that could be expected on site.

A BS4142:2014 Initial Impact Assessment of the predicted business units' noise impact indicated the potential for a '*Significant Adverse Impact*' at all NSR locations, with Rating Levels up to 39 dB above the representative daytime background sound level.

A further Contextual Assessment was undertaken where noise levels from the site have been assessed to the existing noise climate along with other relevant factors and deemed without further information on the uses of the proposed business unit, mitigation in the form of increasing the sound reduction properties of the building facades is necessary.

Mitigation in the form of increasing the wall specifications to 56 dB  $R_w$ , the roof to 42 dB  $R_w$  and the shutter doors to 42 dB  $R_w$  as well as keeping the shutter doors closed during working hours was investigated.

With the recommended mitigation, the proposed business units' noise impact indicated the potential for a '*Low Impact*' at all NSR locations, with Rating Levels at or below the representative daytime background sound level, corresponding to achievement '*NOEL – No Observed Effect Level*' in the NPSE.

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## 1. Introduction

### Overview

A Noise Impact Assessment has been undertaken at Station Works, Station Street, Leek, Staffordshire, ST13 8BP in relation to the proposed erection of a business unit for class B2, B8 and E use.

As the future occupants of the unit are currently unknown, details of potential noise sources have not been provided for the operational assessment. Therefore, Peak Acoustics will use representative noise data of a likely usage, considering a worst-case scenario of a metal workshop whereby noise generated is high in sound pressure output due to the use of handheld machinery. The assessment will consider noise breakout from the shutter doors and the units' façade build-up.

An assessment of the unit is to be undertaken to determine whether local residents are likely to suffer a loss of amenity as a result of noise from the site. Mitigation will be given should any potential loss of amenity be indicated.

### Scope & Objectives

The scope of the noise assessment can be summarized as follow:

- Baseline sound monitoring survey to evaluate the prevailing background sound levels at the Noise Sensitive Receptor ('NSR') in accordance with BS7445 - *'Description and Measurement of Environmental Noise'*;
- Detailed sound modelling, acoustic calculations and analysis to predict sound levels at the NSR using industry-standard acoustic modelling software 'SoundPLAN'. This software uses ISO-9613-2 - *Attenuation of sound during propagation outdoors*;
- A contextual assessment for the suitability of the site, in accordance with relevant standards in respect of sound from the proposed sources; and
- Recommendation of mitigation measures where necessary, to comply with the requirements of the National Planning Policy Framework (2019), Noise Policy for England (2010) and British Standard BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound.
- Application comments provided by Staffordshire Moorlands District Council state

*"2. A site specific noise assessment should be provided to address amenity concerns. It should be completed in compliance with BS 4142 (2014 +A1:2019)(Method for Rating and assessing industrial and commercial sound)."*

- Further information on the legislation can be found in **Appendix I**.

## 2. Environmental Noise Survey

### Measurement Methodology

To establish the existing environmental noise levels on site, a noise survey was conducted from the 26<sup>th</sup> to the 27<sup>th</sup> of October 2022 between 12:30 – 12:10. Measurements of  $L_{Aeq,T}$  and  $L_{A90,T}$  were logged in 5-minute intervals in accordance with BS7445 - ‘*Description and Measurement of Environmental Noise*’.

The unattended monitoring location (M1) was positioned within the proposed site at a height of approximately 1.2 metres. The monitoring location was chosen as the best location to measure noise at the rear of the NSRs from the existing commercial/industrial buildings also in regard to the safety of the measurement equipment.

The monitoring position is deemed representative of sound levels at all NSR locations during the typical operational periods of the proposed development.

Further detail of the measurement along with site pictures are given in **Appendix A**.

Measurements were obtained using Class 1 instrumentation. Full equipment details are given in **Appendix B**.

Equipment was calibrated before and after use and no significant drift occurred during measurements. Up-to-date calibration certification can be provided upon request. Full calibration details are provided in **Appendix C**

Daytime temperatures during the survey were noted as between 14 - 15°C with wind speeds typically between 4 - 7m/s; deemed suitable for conducting environmental noise monitoring. Detailed meteorological information can be found in **Appendix D**.

The site, proposed noise source and NSR locations are shown in **Figure 1**.



Figure 1: Site, Source & NSR Locations - <https://google.co.uk/maps>

-  Site Boundary (Approx.)
-  Business Unit Location (Approx.)
-  Noise Sensitive Receptor (NSR)
-  Background Monitoring Location M1 (Approx)

## Site Description

The site is located to the southwest of Leek in a mixed residential and commercial area. The site currently has commercial properties to the west (Leek Shooting Supplies), north (WJK Electrical & British Boxers) and northeast (Falcon Motors). Further northwest of the site is Station Street, a 30mph residential street lined with residential properties and cars parked on both sides of the street. Behind the site to the southeast is Geoffrey Avenue, another residential street with St Mary's Catholic Primary School play area at the end of this street. The surrounding area continues to be residential with more industrial units to the west on Burton Street and the A53 to the southeast which is the main route out of Leek and towards Stoke-on-Trent.

## Context and Subjective Noise Climate

| Noise Source         | Description                                                                                          | Time of Observation                        | Photo                                                                               |
|----------------------|------------------------------------------------------------------------------------------------------|--------------------------------------------|-------------------------------------------------------------------------------------|
| Station Street       | Occasional passing traffic on Station Street.                                                        | Intermittent throughout the site visit     |  |
| WJK Electrical       | Electrical workshop with the use of hand power tools.                                                | Electrical grinder operating during setup. |  |
| Falcon Motor Repairs | Car repair workshop with the use of hand tools, air compression tools, welders, metal grinders, etc. | No noise was observed during site visits.  |  |

**Table 1: Subjective Summary of Noise Sources**

## Non-Representative Noise Sources

During the survey, no noise events occurred which would be deemed as atypical of the site location.

## Noise Sensitive Receptors

The nearest or most-affected Noise Sensitive Receptor (NSR) was identified as No. 17 (NSR 1) to No. 23 (NSR 4) Geoffrey Avenue. The closest habitable room windows of these residential properties will be considered as specific reception points in calculations.

### 3. Environmental Noise Survey Results

#### Measurement Results

At the time of writing, the use of the business unit was not known although comments from Staffordshire Moorlands Council stipulate that all 'noisy' activities are restricted to daytime hours.

The day and night-time background sound levels from measurement M1 are summarised below.

| Measurement | Date(s)                                          | Period                                        | $L_{Aeq,T}$ | $L_{A90,T}$ |
|-------------|--------------------------------------------------|-----------------------------------------------|-------------|-------------|
| M1          | 26 <sup>th</sup> – 27 <sup>th</sup> October 2022 | Daytime (07:00 – 23:00)<br>(Aggregate period) | 50          | 46          |
|             | 26 <sup>th</sup> – 27 <sup>th</sup> October 2022 | Night-time (23:00 – 07:00)                    | 41          | 29          |

Table 2: M1 Background Noise Survey Results

A full-time history of the survey data is shown in **Appendix E**.

For the derivation of a representative daytime background sound level the background sound level data from the whole daytime period (07:00 – 23:00) has been statistically analysed.

A graph of the statistical analysis for M1 daytime data is given below.

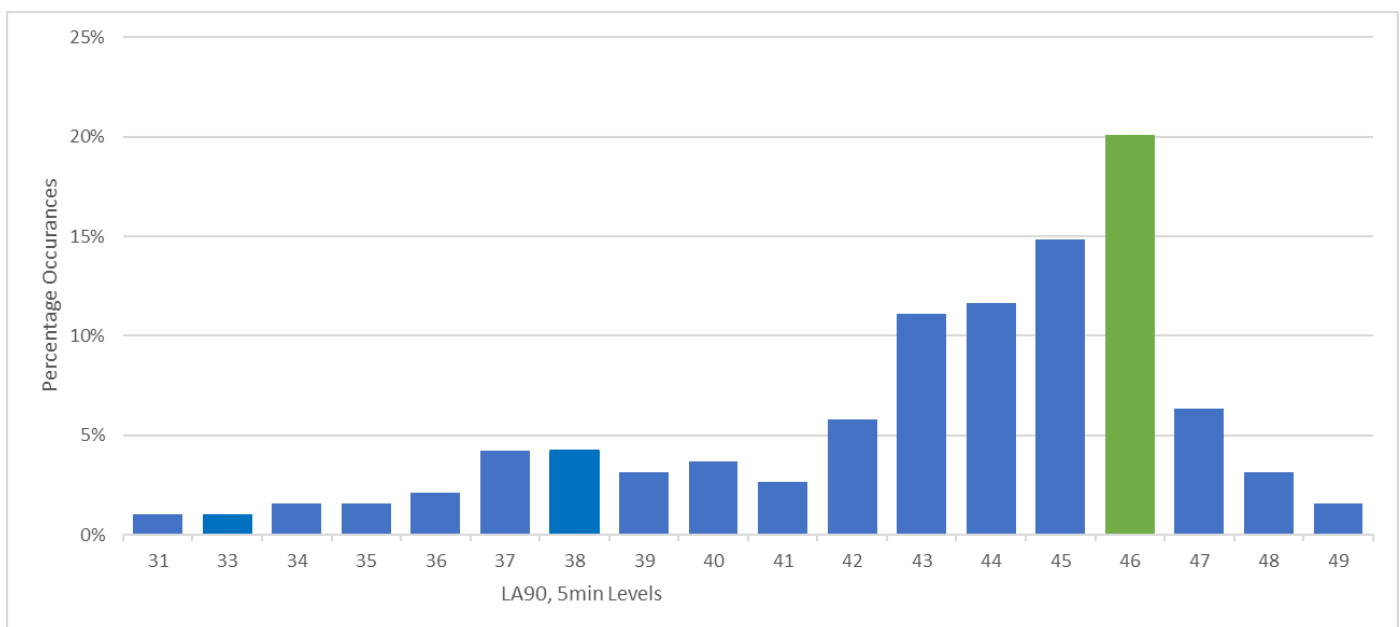


Figure 2: M1 Background Statistical Analysis

From the statistical analysis of the M1 measurement, **46 dB  $L_{A90}$**  has been selected as the representative background sound level for the BS4142:2014 assessment at the NSR locations.

## 4. BS4142:2014 Initial Impact Assessment

### Noise Modelling

External sound propagation from the site has been calculated using industry-standard acoustic modelling software 'SoundPLAN'. This software uses ISO-9613-2 - *Attenuation of sound during propagation outdoors* and the model takes into account the following key factors:

- *Aerial Imagery & Terrain Data sourced from Google Maps/Elevations*
- *Geometric divergence of sound*
- *Atmospheric absorption of sound*
- *Ground absorption*
- *A light downwind correction toward the NSRs*
- *Surrounding structures and objects which may reflect or block sound toward the NSRs*
- *The height of the NSRs (i.e., First/second-floor reception point)*

The following input parameters were used in the noise model:

| Parameter         | Input                 |
|-------------------|-----------------------|
| Reflection Order  | 3                     |
| Ground Absorption | G = 0.2 (Hard Ground) |
| Air pressure      | 1013.3 mbar           |
| Relative Humidity | 70.0 %                |
| Temperature       | 10.0°C                |

Table 3: Calculation Input Parameters

### Source Noise Levels

The future use or business of the unit is not yet known, therefore representative noise levels could not be measured. Instead, library noise data for a high sound pressure level output has been used to best represent a worst-case scenario. In practice, levels are likely to be much lower than that used within the report.

From onsite observation as well as measured site plans, it is assumed that very light use is proposed for the unit. Peak Acoustics uses 'SoundPLAN' library noise data of a Metal Workshop whereby the use of hand tools and equipment are present.

The sound pressure levels are given below.

| Unit       | Para.          | 63 | 125 | 250 | 500 | 1k  | 2k  | 4k | 8k | dBA | Height above Terrain |
|------------|----------------|----|-----|-----|-----|-----|-----|----|----|-----|----------------------|
| Metal Shop | L <sub>p</sub> | 80 | 85  | 90  | 100 | 100 | 100 | 95 | 85 | 105 | N/A                  |

Table 4: Metal Shop Noise Levels

The given Sound Pressure Level was then used to calculate the Sound Power Level through the facades of the proposed unit using a 'SoundPLAN Industrial Building' noise source. The facades of the proposed unit including the roof were assumed at a sound reduction value of 25 dB Rw.

The Sound Power Level through the facades, taking into account the reduction value stated above, is provided in the table below.

| Source No. | Source                                 | Parameter | Noise Level, dBA | Height above Ground (m) |
|------------|----------------------------------------|-----------|------------------|-------------------------|
| 1          | Metal Shop through façade of 25 dB Rw. | LwA       | 77               | N/A                     |

Table 5: Modelled Source Noise Levels

The noise emissions of the proposed unit have been modelled to propagate across the entirety of each façade and roof. In practice this is very unlikely to occur as noise from single sources within the unit would not cause the entire façade to emit noise, however, it does provide a worst-case scenario.

The noise model does not account for any small walls or fences that surround the site and could shield noise from the NSR locations.

### Specific Sound Levels Shutter Doors Open

The Specific Sound Level is denoted  $L_{A5}$  and is the A-weighted, equivalent noise level at the NSR locations. Specific Sound Levels have been calculated from the noise model and the levels at the worst affected floors of receptors with the shutter doors of the unit open are given below.

| Location   | Specific Sound Level, dB $L_{A5}$ |
|------------|-----------------------------------|
| NSR 1 (2F) | 72                                |
| NSR 2 (2F) | 72                                |
| NSR 3 (2F) | 76                                |
| NSR 4 (2F) | 79                                |

Table 6: Specific Sound Levels

### Rating Levels

In accordance with BS4142, the Specific Sound Levels may be corrected for characteristics that make the sound more noticeable at the NSR location such as tonality, impulsivity and intermittency. Section 9.2 of BS4142:2014 gives commentary on these characteristics and appropriate penalties:

#### **“Tonality**

*For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.*

### **Impulsivity**

A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

### **Other sound characteristics**

Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

**NOTE 2** Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

### **Intermittency**

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied."

It is unclear as to what type of penalty may be applied for the type of noise emitted. However, to provide a robust assessment of operations, a precautionary +6 dB penalty has been applied to account for potential noise characteristics.

The resultant Rating Levels are summarised below:

| Location   | Specific Sound Level, dB<br>$L_{As}$ | Total BS4142 Character<br>Corrections | Rating Level, dB $L_{Ar}$ |
|------------|--------------------------------------|---------------------------------------|---------------------------|
| NSR 1 (2F) | 72                                   | + 6                                   | 78                        |
| NSR 2 (2F) | 72                                   |                                       | 78                        |
| NSR 3 (2F) | 76                                   |                                       | 82                        |
| NSR 4 (2F) | 79                                   |                                       | 85                        |

**Table 7: Rating Levels**

### **Rating Levels Vs Background**

The Rating Levels are to be compared to the representative background sound level to determine the noise impact in accordance with BS4142.

*A Sound Rating Level at or below the background noise level is indicative of Low Impact;*

*A Sound Rating Level that exceeds the background noise level by around +5dB is likely an indication of Adverse Impact, depending on the context;*

*A Sound Rating Level that exceeds the background noise level by around +10dB is likely an indication of Significant Adverse Impact, depending on the context;*

The indicated noise impact at the identified Noise Sensitive Receptors is summarised below:

| Location   | Rating Level, dB L <sub>ar</sub> | Background Sound Level, dB L <sub>A90</sub> | Difference, dB | Noise Impact        |
|------------|----------------------------------|---------------------------------------------|----------------|---------------------|
| NSR 1 (2F) | 78                               | 46                                          | + 32           | Significant Adverse |
| NSR 2 (2F) | 78                               |                                             | + 32           | Significant Adverse |
| NSR 3 (2F) | 82                               |                                             | + 36           | Significant Adverse |
| NSR 4 (2F) | 85                               |                                             | + 39           | Significant Adverse |

**Table 8: Noise Impact Shutter Doors Open**

The noise impact with the shutter doors open, at all receptor positions, is indicative of a ‘*Significant Adverse Impact*’ in accordance with BS4142:2014. A grid noise map of external noise propagation is provided in **Appendix F**.

#### Rating Levels Shutter Doors Closed

Rating Levels have been calculated from the noise model and the levels at the worst affected floors of receptors with the shutter doors of the unit closed with the additional +6 penalty added as discussed in the section above.

The indicated noise impact at the identified Noise Sensitive Receptors is summarised below.

| Location   | Rating Level, dB L <sub>ar</sub> | Background Sound Level, dB L <sub>A90</sub> | Difference, dB | Noise Impact        |
|------------|----------------------------------|---------------------------------------------|----------------|---------------------|
| NSR 1 (2F) | 75                               | 46                                          | + 29           | Significant Adverse |
| NSR 2 (2F) | 75                               |                                             | + 29           | Significant Adverse |
| NSR 3 (2F) | 75                               |                                             | + 29           | Significant Adverse |
| NSR 4 (2F) | 74                               |                                             | + 28           | Significant Adverse |

**Table 9: Noise Impact with Shutter Doors Closed**

The noise impact with all shutter doors closed, at all receptor positions, is indicative of a ‘*Significant Adverse Impact*’ in accordance with BS4142:2014. A grid noise map of external noise propagation is provided in **Appendix F**.

## 5. BS4142:2014 Contextual Assessment

### Aspects of absolute level

As the future use or business is not yet known for the unit, absolute levels on site are therefore impossible to determine. The use of a 'metal shop' source in the Initial Impact Assessment provides a robust, yet unrealistic assessment as levels are likely to be much lower than modelled. If the proposed unit follows the practices of the surrounding industrial/commercial units, the absolute levels on site could be assumed, unchanged.

### Aspects of character

As stated above, the future use or business is not yet known for the unit but as there are other existing industrial/commercial units surrounding the site, the character of noise is assumed to blend in with these other sources.

The use of a +6 dB penalty in the Initial Impact Assessment is deemed excessive but does provide a worst-case scenario where noise from the site would have high tonality, impulsivity, or intermittency.

### Aspects of the receptor

All Noise Sensitive Receptors surrounding the site are residential properties that are assumed to be accustomed to the noise generated by the existing commercial/industrial uses that surround them.

Taking guidance from BS8233:2014 for external amenity spaces, a desirable guideline of 50 dB  $L_{Aeq,16hr}$  and an acceptable guideline of 55 dB  $L_{Aeq,16hr}$  for noisier environments is deemed appropriate.

With the use of event recording on the device, all NSR locations are already slightly affected by noise from the existing commercial/industrial units, but with data from measurement M1 displaying external noise levels as 50 dB  $L_{Aeq,16hr}$ , the NSR amenity spaces are currently within the desirable guidelines of BS8233:2014.

With the proposed additional unit, noise levels in the external amenity spaces of the NSRs have been modelled in the Initial Impact Assessment to be up to 78 dBA. This is an increase of 28 dB over the current external noise levels and 23 dB above the acceptable guidelines of BS8233:2014.

### Contextual recommendations

After analysis of the existing site use in conjunction with this proposal, mitigation of the proposed unit is deemed necessary. An increase in the sound reduction properties of the facades will be investigated in the next section.

Other recommendations would be to undertake an additional assessment once the future use or business of the proposed unit has been confirmed.

## 6. Mitigation

Mitigation in the form of increasing the sound reduction properties of the proposed unit has been investigated. An increase in all wall specifications from 25 Rw to 56 Rw has been proposed as well as an increase from 25 Rw to 42 Rw for the roof specification.

It is also recommended that the shutter door specification be increased from 25 Rw to 42 Rw and remain closed when any work is occurring inside the unit.

Rating Levels have been calculated from the noise model and the levels at the worst affected floors of receptors with the shutter doors of the unit closed with the additional +6 penalty added as discussed in the Initial Impact Assessment.

The indicated noise impact at the identified Noise Sensitive Receptors is summarised below.

| Location   | Rating Level, dB L <sub>ar</sub> | Background Sound Level, dB L <sub>A90</sub> | Difference, dB | Noise Impact |
|------------|----------------------------------|---------------------------------------------|----------------|--------------|
| NSR 1 (2F) | 46                               | 46                                          | 0              | Low Impact   |
| NSR 2 (2F) | 45                               |                                             | - 1            | Low Impact   |
| NSR 3 (2F) | 46                               |                                             | 0              | Low Impact   |
| NSR 4 (2F) | 46                               |                                             | 0              | Low Impact   |

Table 10: Noise Impact with recommended Mitigation

The noise impact at all receptor positions with the recommended mitigation is indicative of a 'Low Impact' in accordance with BS4142:2014. A grid noise map of external noise propagation is provided in **Appendix F**.

## 7. Conclusion

A Noise Impact Assessment has been undertaken for the proposed erection of a business unit for class B2, B8 and E use at Station Works, Station Street, Leek, Staffordshire, ST13 8BP. The future occupants of the unit are currently unknown.

Measurements of the prevailing background noise climate were undertaken from the 26<sup>th</sup> to the 27<sup>th</sup> of October 2022 at a location representative of the identified Noise Sensitive Receptors (NSRs).

The nearest or most-affected Noise Sensitive Receptors were identified as the residential properties that are in closest proximity or most exposed to the proposed business unit. These included No. 17 - 23 Geoffrey Avenue.

A BS4142:2014 Initial Impact Assessment of the predicted business units' noise impact indicated the potential for a 'Significant Adverse Impact' at all NSR locations, with Rating Levels up to 39 dB above the representative daytime background sound level.

A further Contextual Assessment was undertaken where noise levels from the site have been assessed to the existing noise climate along with other relevant factors and deemed without further information on the uses of the proposed business unit, mitigation in the form of increasing the sound reduction properties of the building facades is necessary.

Mitigation in the form of increasing the wall specifications to 56 dB Rw, the roof to 42 dB Rw and the shutter doors to 42 dB Rw as well as keeping the shutter doors closed during working hours was investigated.

With the recommended mitigation, the proposed business units' noise impact indicated the potential for a '*Low Impact*' at all NSR locations, with Rating Levels at or below the representative daytime background sound level, corresponding to achievement '*NOEL – No Observed Effect Level*' in the NPSE.

## 8. Uncertainty

The background monitoring equipment is subject to a 1dB error margin, however, calibration before and after measurements allows the drift within the margin to be monitored and thus demonstrates that minimal drift occurred throughout the measurements.

Uncertainty can arise in the prediction of noise propagation from and around flat reflective surfaces, such as the surrounding structures present on site. This has been reduced to a minimum by utilising an acoustic modelling software that uses the validated method, ISO-9613-2, as described in BS4142.

## APPENDIX A - Measurement Details

| Measurement | Kit | Start Date | Start Time | End Date   | End Time |
|-------------|-----|------------|------------|------------|----------|
| <b>M1</b>   | A5  | 26/10/2022 | 12:30      | 27/10/2022 | 12:10    |

Table 11: Measurement Dates



Figure 3: Site Location Measurement Pictures

## APPENDIX B - Equipment Details

| Kit       | Equipment   | Make | Model | Class | Serial Number |
|-----------|-------------|------|-------|-------|---------------|
| <b>A5</b> | Sound Meter | RION | NL-52 | 1     | 00219828      |
| <b>A5</b> | Pre-Amp     | RION | NH-25 | 1     | 00344         |
| <b>A5</b> | Microphone  | RION | UC-59 | 1     | 18806         |
| <b>A5</b> | Calibrator  | RION | NL-75 | 1     | 34212936      |

Table 12: Measurement Equipment Details

## APPENDIX C - Calibration Details

| Measurement | Calibrator Ref Level (dB) | Deviation Before (dB) | Deviation After (dB) |
|-------------|---------------------------|-----------------------|----------------------|
| <b>M1</b>   | 94.00                     | 0.0                   | 0.0                  |

Table 13: Calibration Details

## APPENDIX D - Meteorology Details

### Past Weather in Leek — Graph

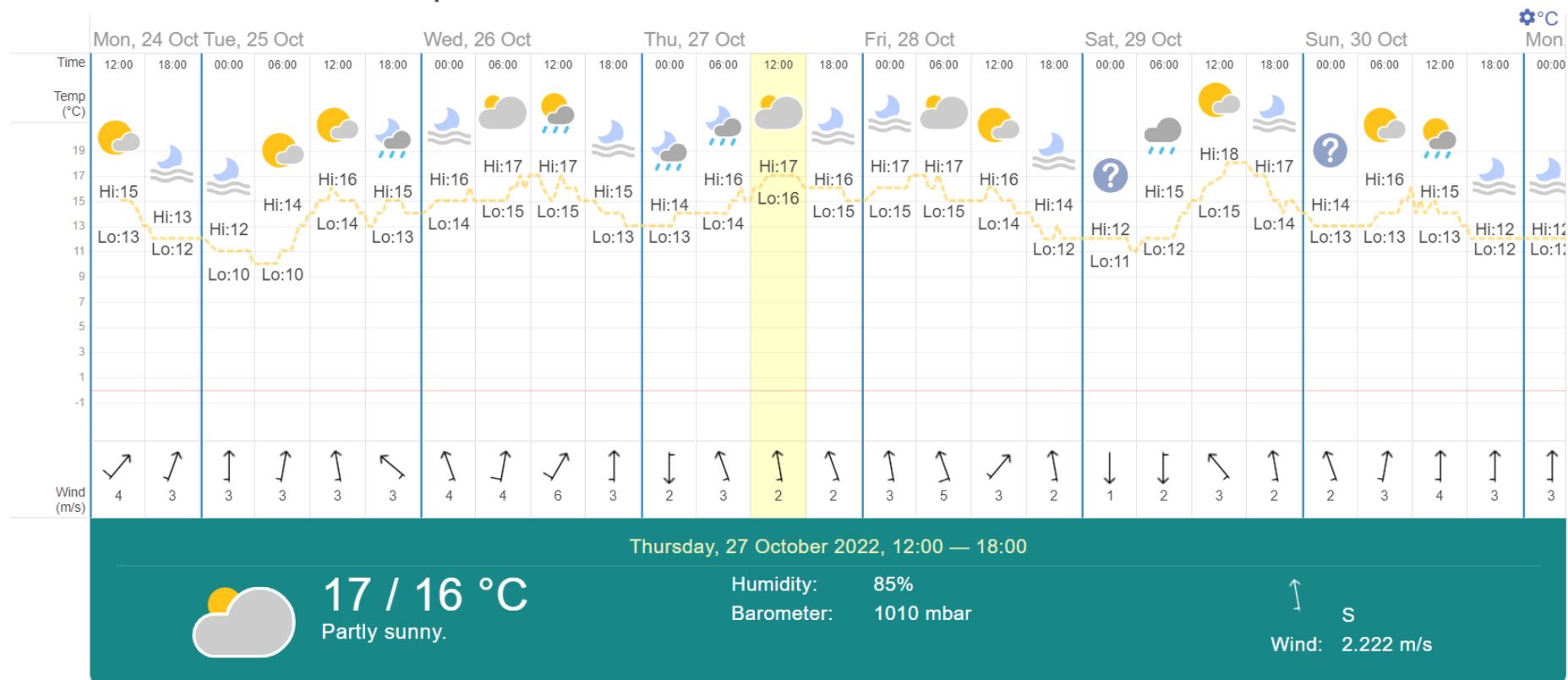


Figure 4: Meteorology Data - <https://www.timeanddate.com/weather>

## APPENDIX E - Noise Survey Results

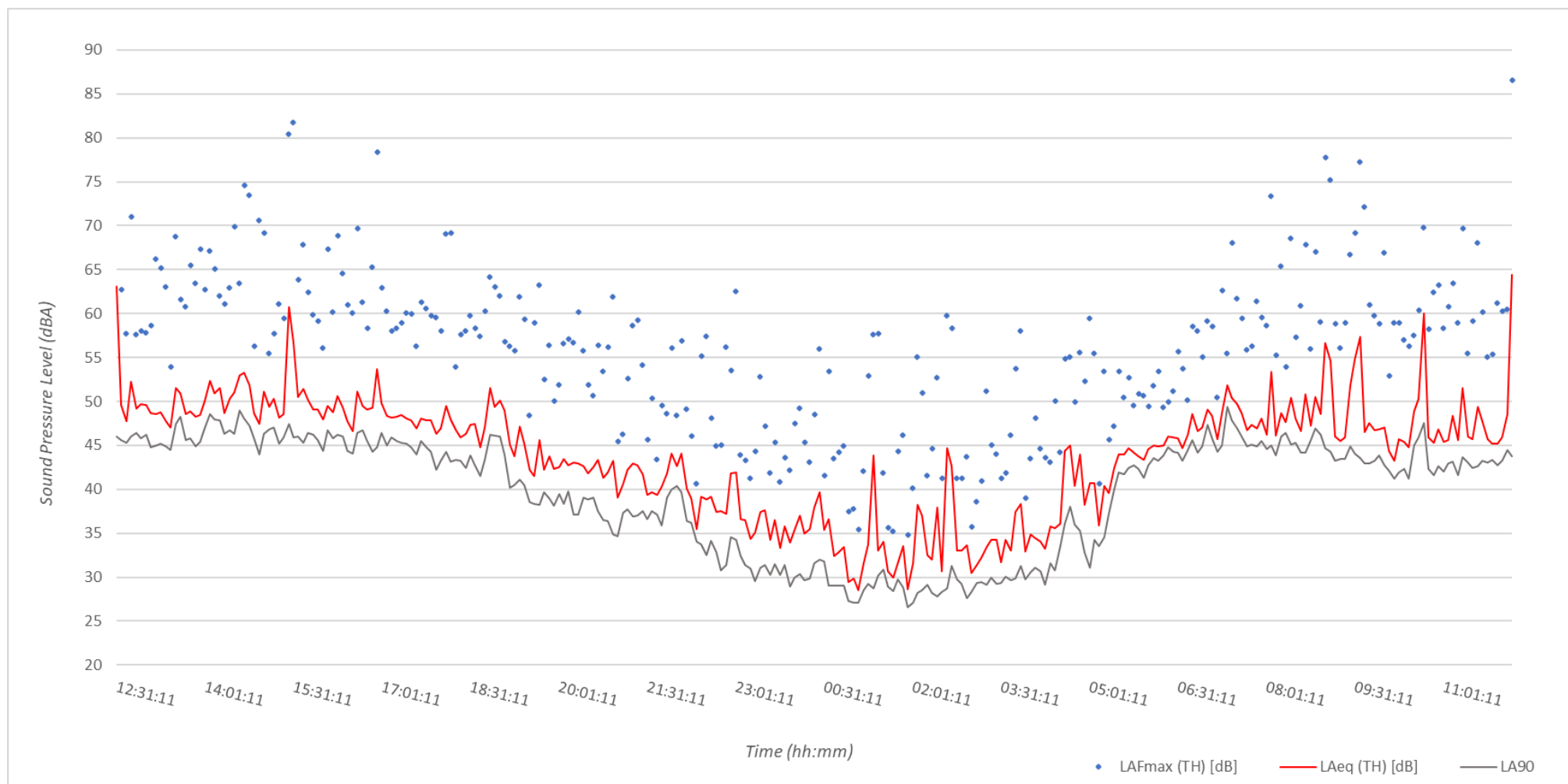


Figure 5: Measured Background Sound Levels Time History (M1): 26<sup>th</sup> – 27<sup>th</sup> October 2022

## APPENDIX F - Grid Noise Maps

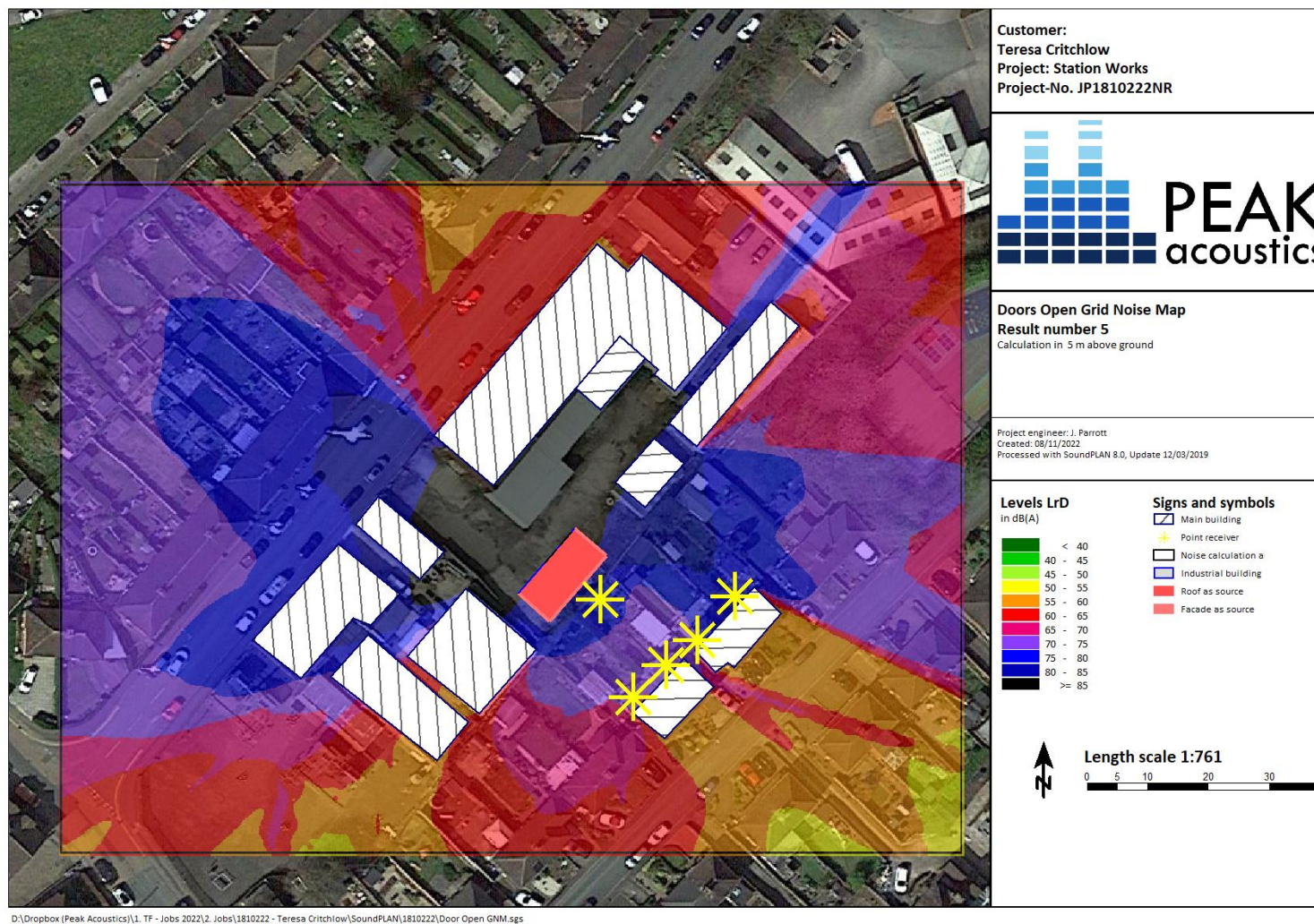
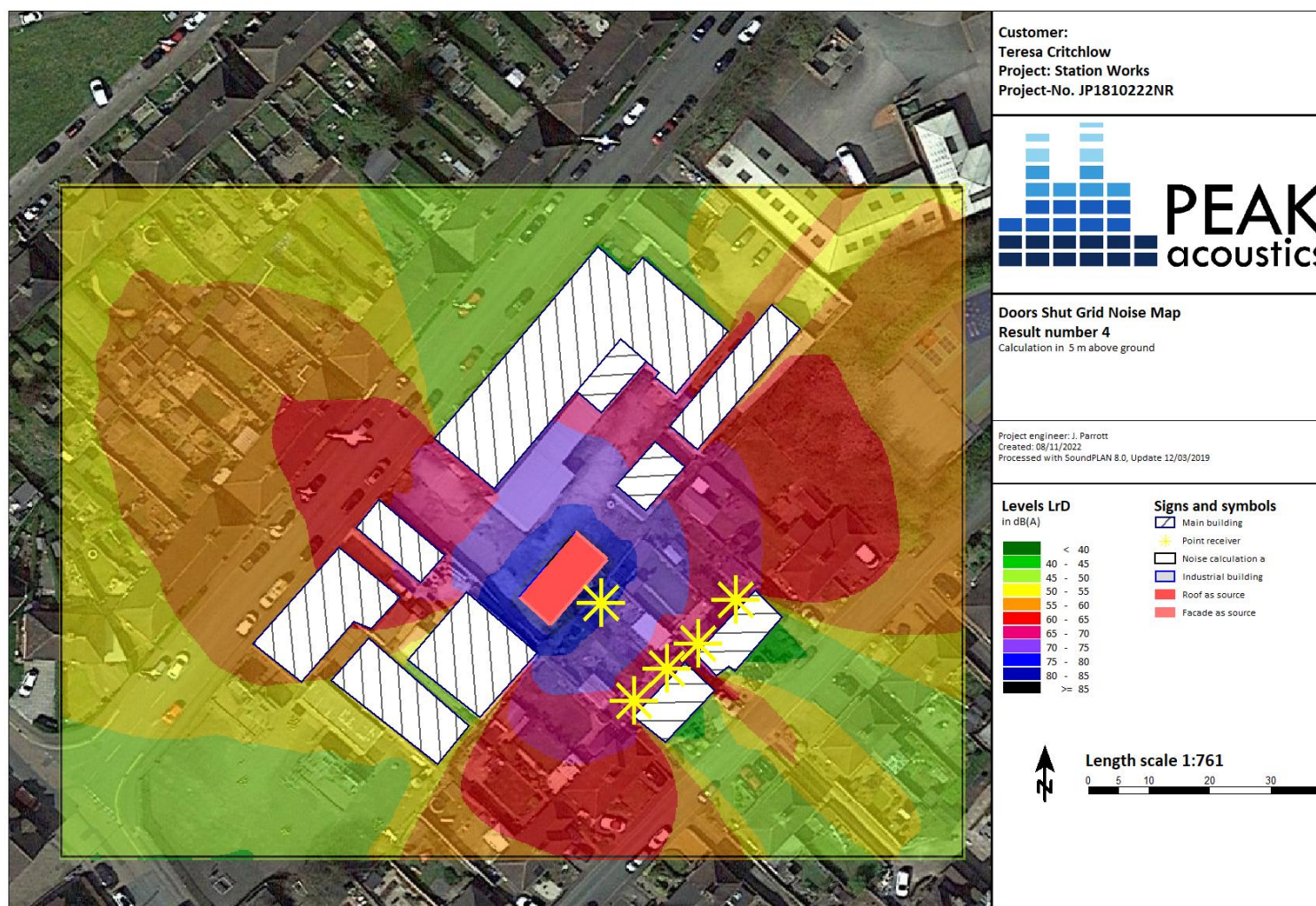
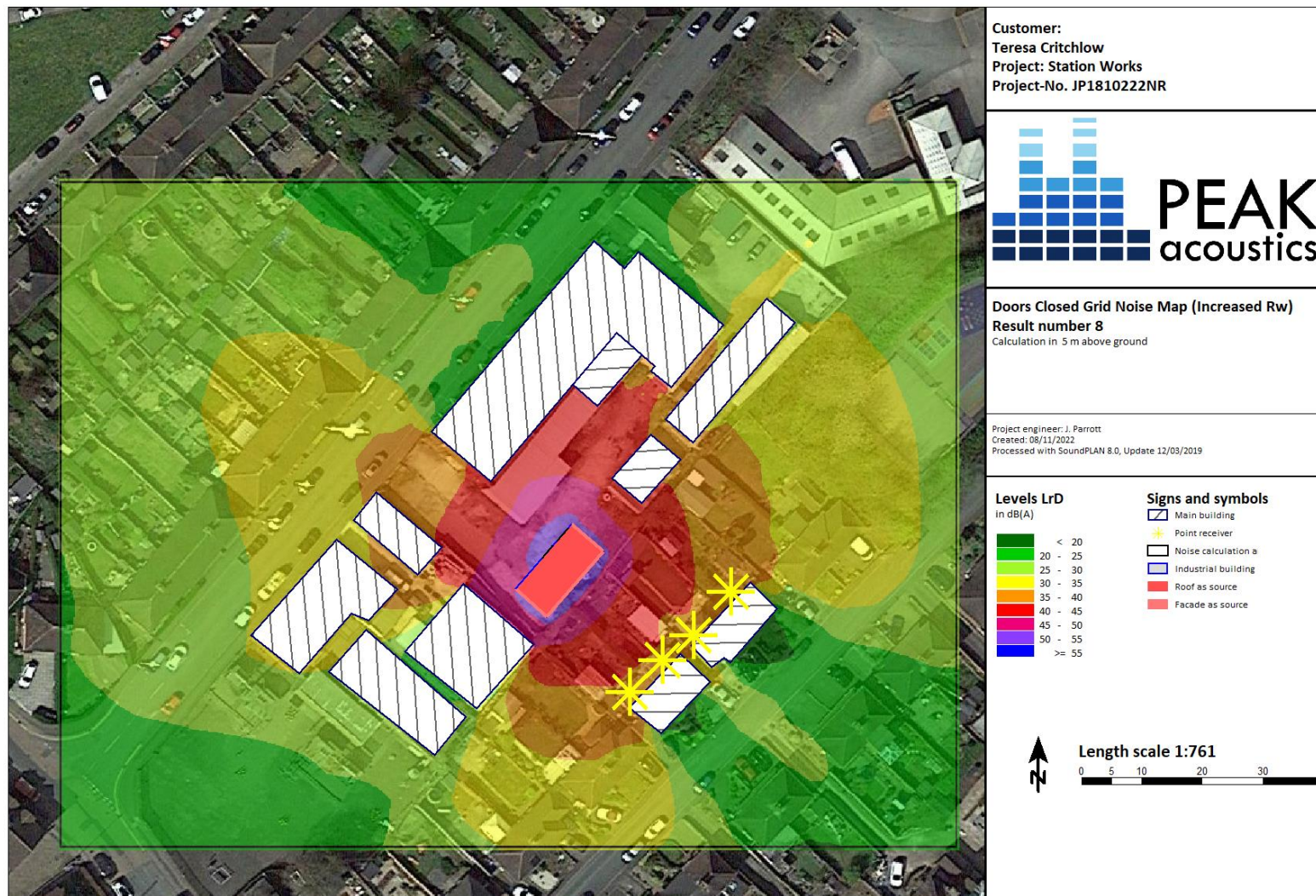


Figure 6: 2D Grid Noise Map of daytime (doors open) Initial Impact Assessment



D:\Dropbox (Peak Acoustics)\1. TF - Jobs 2022\2. Jobs\1810222 - Teresa Critchlow\SoundPLAN\1810222\Door Closed GNM.sgs

Figure 7: 2D Grid Noise Map of daytime (doors closed) Initial Impact Assessment



D:\Dropbox (Peak Acoustics)\1. TF - Jobs 2022\2. Jobs\1810222 - Teresa Critchlow\SoundPLAN\1810222\Doors Closed Increased Rw.sgs

Figure 8: 2D Grid Noise Map of daytime (doors closed) Mitigation Assessment

## APPENDIX G - Site Plans



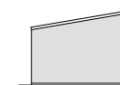
First Floor Plan



Ground Floor / Site Plan



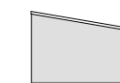
North West Elevation



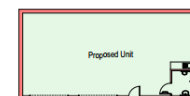
North East Elevation



South East Elevation

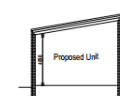


South West Elevation



Ground Floor Plan

PROPOSED UNIT



Cross Section

**EXISTING SITE**  
The existing building was used as various small commercial units accessed via the private side lane.  
**PROPOSED UNIT**  
In the new unit a new commercial unit is to be created, extending the new building and a small new building part area from the existing building structure.  
**ACCESS AND EGRESS**  
Access to the unit is to be via an existing parking area to the east of the unit, and a new access ramp 2.0m x 1.2m.  
**CONSTRUCTION AND EXISTING PROPOSED**  
Roof  
Only, to be replaced and profiled existing level to profile and add support where.  
Rampwork Slabs  
Only, to be replaced and profiled existing level to profile and add support where.  
Walls  
Only, to be replaced and profiled existing level to profile and add support where.  
Doors  
Only, to be replaced and profiled existing level to profile and add support where.

Scale 1:100  
HSPL  
Proposed Commercial Unit,  
Station Works,  
Station Street,  
Leek, Staffordshire,  
ST13 8BP  
Planning Proposal  
Floor Plans - Elevations  
April 2022 AD 13/100  
2022-2023-2024 1:100  
2022-2023-2024 1:100  
**SAMMONS**  
Architectural  
100% Satisfaction Guarantee  
100% Satisfaction Guarantee  
100% Satisfaction Guarantee

Figure 9: Site Plans Provided by 'Sammons Architectural'

## APPENDIX H - Legislation, Policy & Guidance

Guidance for the assessment of noise affecting new residential development is given in the National Policy Framework (NPPF). Section 15 of the NPPF states:

*“174. Planning policies and decisions should contribute to and enhance the natural and local environment by:*

*E) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of...noise pollution.”*

Section 185 further states:

*“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:*

- 1. Mitigate and reduce to a minimum potential adverse impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
- 2. Identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”*

Section 187 states:

*“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.”*

To avoid and mitigate adverse noise effects on health arising from and impacting new development, the NPPF makes reference to NPSE. The Noise Policy Statement for England (NPSE) was published in March 2010 and covers all forms of noise other than occupational noise.

The Noise Policy Statement for England (NPSE) states the following aims in paragraph 2.2.

**NOEL – No Observed Effect Level.**

*This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

**LOAEL – Lowest Observed Adverse Effect Level.**

*This is the level above which adverse effects on health and quality of life can be detected.*

**SOAEL – Significant Observed Adverse Effect Level.**

*This is the level above which significant adverse effects on health and quality of life occur.*

The NPSE does not define the SOAEL numerically, stating in paragraph 2.22:

*"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the "NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*

There is no local or national guidance on how the three terms should be defined numerically, it is for the assessor to collate and interpret appropriate guidance on noise, such as may be found in British Standards, and correlate the guidance with the concepts of NOEL, LOAEL and SOAEL.

## BS4142:2014+A1:2019

The common standard for the assessment of industrial and commercial sound is '**BS4142 – Methods for rating and assessing industrial and commercial sound**'. The industrial noise assessment method in BS4142 is based on the difference between the measured 'background sound level' ( $L_{A90}$ ), and the 'Rating Level' of the industrial source, at a noise-sensitive location (NSR). BS4142:2014 states:

*"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 estimation of the impact of the specific sound can be obtained by the difference between the rating sound level and the background sound level whilst considering the following:

*"A Sound Rating Level at or below the background noise level is indicative of Low Impact;*

*A Sound Rating Level that exceeds the background noise level by around +5dB is likely an indication of Adverse Impact, depending on the context;*

*A Sound Rating Level that exceeds the background noise level by around +10dB is likely an indication of Significant Adverse Impact, depending on the context;"*

BS4142 further states:

*"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 negligible impact, depending on the context."*

Achievement of a *Low Impact* in accordance with BS4142 along with a contextual assessment can be deemed to correspond to '**NOEL – No Observed Effect Level**' in the NPSE, as detailed above in Paragraph 2.3.

## BS8233:2014

BS8233:2014 - *Guidance on sound insulation and noise reduction for buildings* suggests indoor ambient noise levels for dwellings in Table 4, Section 7.7.2. These are summarised below.

| Activity | Location         | 07:00 to 23:00         | 23:00 to 07:00        |
|----------|------------------|------------------------|-----------------------|
| Resting  | Living Room      | 35 dB $L_{Aeq,16hour}$ | -                     |
| Dining   | Dining room/area | 40 dB $L_{Aeq,16hour}$ | -                     |
| Sleeping | Bedroom          | 35 dB $L_{Aeq,16hour}$ | 30 dB $L_{Aeq,8hour}$ |

BS8233 states that the guideline values given above are for 'noise without character', further stating:

*"Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate."*

Table 4 of BS8233 also has accompanying notes that were subject to additions in ProPG. The relevant notes with the additions of ProPG are given below.

*"NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or  $L_{Amax,F}$ , depending on the character and number of events per night. Sporadic noise events could require separate values. In most circumstances in noise sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB  $L_{Amax,F}$  more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events."*

*"NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal  $L_{Aeq}$  target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved."*

## APPENDIX I - Acoustic Terminology

To aid the understanding of acoustic terminology and the relative difference between noise levels the following background information is provided.

We perceive sound when the ear detects fluctuations in air pressure (sound waves), which are then processed by the brain and perceived as sound. Humans can hear an incredibly wide range of sound intensities ranging from jet engines to fingertips lightly brushing against each other. This range is quantified using a logarithmic scale called the decibel scale (dB). The comfortable range of the decibel scale typically ranges from 0dB (the threshold of hearing) to around 140dB. Here are some examples of common environments and their typical noise levels.

| Noise Level      | Environment                |
|------------------|----------------------------|
| 0 dB(A)          | Threshold of hearing       |
| 20 to 30 dB(A)   | Quiet bedroom at night     |
| 30 to 40 dB(A)   | Living room during the day |
| 40 to 50 dB(A)   | Typical office             |
| 50 to 60 dB(A)   | Inside a moving car        |
| 60 to 70 dB(A)   | Typical high street        |
| 100 to 110 dB(A) | Fire alarm at 1 metre away |
| 140 dB(A)        | Threshold of pain          |

### Terminology

**dB (decibel)** – A unit used to quantify the pressure level of sound. Defined as 20 times the logarithm of the ratio between the root-mean-square pressure of a given sound field and a reference pressure level ( $2 \times 10^{-5}$  Pa – threshold of hearing).

**$L_{Aeq, T}$**  – The equivalent continuous sound pressure level over a stated period. It quantifies a fluctuating sound level over a given period as the equivalent continuous sound level over which the same amount of acoustic energy is contained over. This is A-weighted in order to assess human perception.

**$L_{A90}$**  – The sound level exceeded 90% of the time. Typically used to describe background noise the  $L_{90}$  is regarded as the ‘average minimum level’ and quantifies the common sound level of a fluctuating sound field i.e. the sound level that occurs 90% of the time. Alternatively,  $L_{10}$  describes the sound level exceeded 10% of the time and therefore quantifies the ‘average maximum level’ of sound which is often used during the calculation of road traffic noise.

**A-Weighting** – A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.

**$R_w$**  – The Weighted Sound Reduction Index ( $R_w$ ) is a number used to rate the effectiveness of a soundproofing system or material.