APPENDIX 8 -

NOISE ASSESSMENT
Furtho Pit, Old Stratford

Noise Assessment

23rd October 2017
<table>
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1. **INTRODUCTION**

1.1. **Overview**

inacoustic has been commissioned to assess the potential effects of noise arising from a proposed change of Local Development Plan (LDP) land allocation from agricultural uses to mixed commercial/employment uses at a site known as Furtho Pit, on the outskirts of Old Stratford, South Northamptonshire.

The following technical noise assessment has been produced to provide information to support the change of LDP allocation to South Northamptonshire Council and is based upon environmental noise measurements undertaken at the site and a subsequent analytical exercise.

This noise assessment is necessarily technical in nature; therefore a glossary of terms is included in Appendix A to assist the reader.

1.2. **Scope and Objectives**

The scope of the noise assessment can be summarised as follows:

- A sound monitoring survey was undertaken at discrete locations around the Site;
- A detailed assessment of the suitability of the Site, in accordance with relevant standards in respect of sound from the existing sources; and
- Recommendation of mitigation measures, where necessary, to comply with the requirements of the National Planning Practice Guidance in England: Noise and BS4142:2014.

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2. **Legislation and Policy Framework**

The development proposals for the Site are guided by the following policy directives and guidance:

2.1. **National Policy**

2.1.1. **National Planning Policy Framework, 2012**

The *National Planning Policy Framework* (NPPF)\(^3\) sets out the Government’s planning policies for England. Planning policy requires that applications for planning permission must be determined in accordance with the development plan, unless material considerations indicate otherwise.

The NPPF is also a material consideration in planning decisions. It sets out the Government’s requirements for the planning system and how these are expected to be addressed.

Under Section 11; Conserving and enhancing the natural environment, the following is stated:

“The planning system should contribute to and enhance the natural and local environment by:

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

The document goes on to state:

“Planning policies and decisions should aim to:

- avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.”

As stated above, this document makes reference to avoiding noise generation from new developments that would adversely impact on health and quality of life. The NPPF supersedes the previous noise guidance provided in *Planning Policy Guidance 24* (PPG24)\(^4\), but does not set absolute criteria.

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The underlying principles and aims of existing noise policy documents, legislation and guidance are clarified in DEFRA: 2010: Noise Policy Statement for England (NPSE). The NPSE sets out the “Long Term Vision” of Government noise policy as follows:

“Promote good health and good quality of life through the effective management of noise within the context of Government policy on sustainable development”.

The NPSE outlines three aims for the effective management and control of environmental, neighbour and neighbourhood noise:

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

The guidance states that it is not possible to have a single objective noise-based measure that defines “Significant Observed Adverse Effect Level (SOAEL)” that is applicable to all sources of noise in all situations and that not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.


Further guidance in relation to the NPPF and the NPSE has been published in the National Planning Practice Guidance in England: Noise (NPPG Noise), which summarises the noise exposure hierarchy, based on the likely average response. The following three observed effect levels are identified below:

- Significant Observed Adverse Effect Level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest Observed Adverse Effect Level: This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No Observed Adverse Effect Level: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

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Criteria related to each of these levels are reproduced in Table 1.

**Table 1: Significance Criteria from NPPG in England: Noise**

<table>
<thead>
<tr>
<th>Perception</th>
<th>Examples of Outcomes</th>
<th>Increasing Effect Level</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Noticeable</td>
<td>No Effect</td>
<td>No Observed Effect</td>
<td>No specific measures required</td>
</tr>
<tr>
<td>Noticeable and Not Intrusive</td>
<td>Noise can be heard, but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.</td>
<td>No Observed Adverse Effect</td>
<td>No specific measures required</td>
</tr>
<tr>
<td>Noticeable and Intrusive</td>
<td>Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.</td>
<td>Observed Adverse Effect</td>
<td>Mitigate and reduce to a minimum</td>
</tr>
<tr>
<td>Noticeable and Disruptive</td>
<td>The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.</td>
<td>Significant Observed Adverse Effect</td>
<td>Avoid</td>
</tr>
<tr>
<td>Noticeable and Very Disruptive</td>
<td>Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory</td>
<td>Unacceptable Adverse Effect</td>
<td>Prevent</td>
</tr>
</tbody>
</table>
2.2. Local Policy

2.2.1. South Northamptonshire Local Plan (Saved Policies) 2014

The Development Plan comprises the adopted West Northamptonshire Joint Core Strategy (adopted 15 December 2014) and the ‘saved’ policies of the South Northamptonshire Local Plan (1997).

Policy G3 states:

“Planning permission will normally be granted where the development:

E Is neither of a hazardous nature, nor likely to cause problems of pollution, noise, vibration, smell, smoke, discharge or fumes”

Policy RC3 states:

“In the restraint villages or open countryside proposals for recreation or community facilities will normally only be permitted where it involves:

(II) A new facility, which is dependent upon or especially appropriate to an open countryside location. In such a case preference will be given to a proposal, which is closely related to existing buildings. Special care will need to be exercised in respect of the siting of any proposed development that will generate high noise levels”

In essence, the Local Plan requires the Developer to ensure and demonstrate that any proposed commercial or recreational development will not unduly affect the acoustic amenity of the area.
2.3. British Standards

2.3.1. BS4142:2014

BS4142:2014 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS4142:2014 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ ‘specific sound level’, immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ ‘rating sound level’. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary.

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 of the rating sound level and the background sound level and considering the following:

- “Typically, the greater this 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 sound level, this is an indication of the specific sound source having a low impact, depending on the context.”

During the daytime, the assessment is carried out over a reference time period of 1-hour, with a referencing period of 15 minutes used during the night. The periods associated with day or night, for the purposes of the Standard, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.
2.4. Other Guidance

2.4.1. Road Traffic Noise

The impact of any changes in L_{A10,18hour} road traffic noise levels due to demolition and construction traffic movements and completed development traffic were assessed in accordance with the principles and guidance presented within the Highways Agency Design Manual for Roads and Bridges\(^7\) (DMRB).

The DMRB states that “The impact of a project at any location can be reported in terms of changes in absolute noise level. In the UK the standard index used for traffic noise is the L_{A10,18hour} level, which is quoted in decibels”.

In order to determine whether changes in traffic noise levels are likely to occur as a result of the Proposed Development, noise levels were predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise (CRTN).

The calculation method uses a number of input variables to predict the L_{A10,18hour} noise level for any receptor point at a given distance from the road. In this assessment; however, the key factors are changes in traffic flows and the composition of the traffic (i.e. percentage HGVs). Therefore, the likely increase in road traffic noise levels as a direct result of the Proposed Development has been calculated in accordance with the Basic Noise Level (BNL) prediction method detailed in CRTN. This method considers the relative change in noise level for a notional road-side receptor at a distance of 10 m from the kerb and at a height of 1.5 m (free-field).

The completed development assessment years used in this section cover a 2024 comparison between the “without development” and “with development” scenarios.

The DMRB presents a significant matrix for assessing the magnitude of changes in noise level, which is reproduced in Table 2 and has been utilised in this assessment to consider the effect of any changes in road traffic noise levels. An increase in noise level represents an adverse effect whilst a reduction in noise represents a beneficial effect.

<table>
<thead>
<tr>
<th>Change in Noise Level (dB(A))</th>
<th>Significance of Effect</th>
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</thead>
<tbody>
<tr>
<td>0.0</td>
<td>No Change - No Effect</td>
</tr>
<tr>
<td>0.1 - 0.9</td>
<td>Negligible</td>
</tr>
<tr>
<td>1.0 - 2.9</td>
<td>Minor</td>
</tr>
<tr>
<td>3.0 - 4.9</td>
<td>Moderate</td>
</tr>
<tr>
<td>&gt;5.0</td>
<td>Major</td>
</tr>
</tbody>
</table>

3. Site Description

3.1. Site and Surrounding Area

The Proposed Development site currently comprises agricultural fields (mainly grazing land), an area of brownfield land, that has been backfilled and a civil engineering yard, located to the east of the Old Stratford Roundabout, where the A5, A508, A422 and Towcester Road meet and to the north of the village of Old Stratford.

Northampton Road and Stratford Road run to the north of the site and connect the outlying residential properties of Old Stratford to the main highway network.

The approximate Proposed Development area can be seen in Figure 1.

The ambient sound environment in the area was noted to be dominated by road traffic on the surrounding roads, which audibly reduced with distance from the A5 and A508.

3.2. Proposed Development Overview

The proposal is for the change of allocation of the western and northern parts of the site from the current uses, which, as discussed are primarily agricultural grazing land to employment uses, comprising A3, A5, B2, B8 uses i.e. drive-thru/sit-in coffee shop, general light industrial and storage/distribution uses. It is also proposed to introduce some environmental space, referred to as “country park” on the eastern part of the site, adjacent to the A5.

Obviously, as the proposals are at LDP allocation stage, no specific details are yet known, so the generic noise factors are discussed and considered here, with a view to steering the eventual design of any detailed proposals at the site.

The strategic proposals are shown in Figure 2.
**Figure 1: Proposed Development Site and Surrounding Area**

**Figure 2: Development Proposals**
4. **MEASUREMENT METHODOLOGY**

4.1. **General**

The prevailing noise conditions in the area have been determined by an environmental noise survey conducted between Monday 18th and Tuesday 19th September 2017.

4.2. **Measurement Details**

All noise measurements were undertaken by a consultant certified as competent in environmental noise monitoring, and, in accordance with the principles of BS 74458.

All acoustic measurement equipment used during the noise survey conformed to Type 1 specification of British Standard 616729. A full inventory of this equipment is shown in Table 3 below.

**TABLE 3: INVENTORY OF SOUND MEASUREMENT EQUIPMENT**

<table>
<thead>
<tr>
<th>Measurement Position</th>
<th>Make, Model &amp; Description</th>
<th>Serial Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1</td>
<td>Rion NL-52 Sound Level Meter</td>
<td>00965159</td>
</tr>
<tr>
<td></td>
<td>Rion NH-25 Preamplifier</td>
<td>65386</td>
</tr>
<tr>
<td></td>
<td>Rion UC-59 Microphone</td>
<td>10288</td>
</tr>
<tr>
<td>MP2</td>
<td>Rion NL-31 Sound Level Meter</td>
<td>00110027</td>
</tr>
<tr>
<td></td>
<td>Rion NH-21 Preamplifier</td>
<td>00129</td>
</tr>
<tr>
<td></td>
<td>Rion UC-53A Microphone</td>
<td>100496</td>
</tr>
<tr>
<td>MP3</td>
<td>Rion NL-52 Sound Level Meter</td>
<td>00965097</td>
</tr>
<tr>
<td></td>
<td>Rion NH-25 Preamplifier</td>
<td>65324</td>
</tr>
<tr>
<td></td>
<td>Rion UC-59 Microphone</td>
<td>10223</td>
</tr>
<tr>
<td>Both</td>
<td>Cirrus CR:515 Acoustic Calibrator</td>
<td>76798</td>
</tr>
</tbody>
</table>

The sound measurement equipment used during the survey was field calibrated at the start and end of the measurement period. A UKAS accredited calibration laboratory has calibrated the field calibrator used within the twelve months preceding the measurements. A drift of less than 0.2 dB in the field calibration was found to have occurred on all sound level meters.

The weather conditions during the survey were largely conducive with environmental noise measurement; comprising no precipitation for the majority of the measurement period and low wind speeds, below 5ms-1. Some light rain was experienced during the evening period of the 18th September, but this did not unduly influence the measurement results.

The microphones were fitted with protective windshields for the measurements, which are described in Table 4 with a plan indicating their respective locations shown in Figure 3.

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8 British Standard 7445: 2003: Description and measurement of environmental noise. BSI
### Table 4: Measurement Position Descriptions

<table>
<thead>
<tr>
<th>Measurement Position</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>MP1</td>
<td>A largely unattended measurement of sound at a distance of circa 50 metres from the northern carriageway edge of the A5, adjacent to the northern section of Cosgrove Road; at an acoustically equivalent location to the residential properties adjacent to the southern section of Cosgrove Road. The measurement was undertaken at a height of 1.5 metres above local ground level, under free-field conditions. The ambient sound environment was dominated by road traffic using the nearby A5 road.</td>
</tr>
<tr>
<td>MP2</td>
<td>A largely unattended measurement of sound at a distance of circa 70 metres from the south-eastern carriageway edge of the A508; at an acoustically equivalent location to the residential properties to the south of Northampton Road. The measurement was undertaken at a height of 1.5 metres above local ground level, under free-field conditions. The ambient sound environment was dominated by road traffic using the nearby A508 road.</td>
</tr>
<tr>
<td>MP3</td>
<td>A largely unattended measurement of sound at a distance of circa 12 metres from the southern carriageway edge of Stratford Road; at an acoustically equivalent location to the residential properties to the north of Stratford Road. The measurement was undertaken at a height of 1.5 metres above local ground level, under free-field conditions. The ambient sound environment was dominated by distant road traffic using the nearby A5 and A508 roads, with frequent contributions from passing vehicles, including HGVs on Stratford Road.</td>
</tr>
</tbody>
</table>

### Figure 3: Measurement Positions

The summarised results of the environmental noise measurements are presented in Table 5, with time histories and statistical analyses presented under Appendix B.
### Table 5: Summary of Noise Measurement Results

<table>
<thead>
<tr>
<th>Measurement Position</th>
<th>Period</th>
<th>Noise Level, dB</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$L_{Aeq,T}$</td>
<td>$L_{A90}$</td>
</tr>
<tr>
<td><strong>MP1</strong></td>
<td>Day</td>
<td>60.8</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Night</td>
<td>56.0</td>
<td>32.0</td>
</tr>
<tr>
<td><strong>MP2</strong></td>
<td>Day</td>
<td>60.5</td>
<td>46.0</td>
</tr>
<tr>
<td></td>
<td>Night</td>
<td>54.7</td>
<td>30.0</td>
</tr>
<tr>
<td><strong>MP3</strong></td>
<td>Day</td>
<td>57.4</td>
<td>40.0</td>
</tr>
<tr>
<td></td>
<td>Night</td>
<td>47.9</td>
<td>31.0</td>
</tr>
</tbody>
</table>
5. **Noise Assessment**

5.1. **Plant and Processes**

5.1.1. **General**

As stated earlier in this report, the exact details of any static plant to be installed or processes to be carried out as part of the Proposed Development are not currently known, as such, for the purposes of this noise assessment, it is considered appropriate to determine cumulative noise emission limits for static plant or processes, in accordance with South Northamptonshire Council’s standard BS4142:2014-led requirements.

5.1.2. **Operational Limits**

On the above basis, any future static plant or processes should be designed to achieve the following rating noise level, at the residential receptors in the vicinity of the locations described, during the day and night-time periods, as shown in Table 6:

<table>
<thead>
<tr>
<th>Location</th>
<th>Proposed Plant Rating Level at Noise Sensitive Receptor dB(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Position 1 – Cosgrove Road (Residential Area South of Site)</td>
<td>50 Daytime</td>
</tr>
<tr>
<td>Position 2 – Northampton Road (Residential Area North-West of Site)</td>
<td>46 Daytime</td>
</tr>
<tr>
<td>Position 3 – Stratford Road (Residential Area North-East of Site)</td>
<td>40 Daytime</td>
</tr>
</tbody>
</table>

The above limits would apply to the total noise emission level from all static plant and processes within the proposed development. Individual plant items may need to be designed to a lower limit such that the overall total achieves the stated criteria above.

Given the type of operations associated with this type of development, the above limiting criteria are not considered unreasonable and can be achieved via good design and operational noise management strategies.

5.2. **Traffic Noise Effects**

This assessment has been based on a comparison of the following scenarios:

- 2024 Future Baseline; and
The traffic data used in the assessment has been provided by The Applicant’s transport consultant and is contained in Table 7. The data includes details of 18-hour (06:00 to 00:00) annual average weekday traffic flows (AAWT), percentage HGV and link speed statistics for the assessment year considered.

**Table 7: Traffic Data Used in the Assessment**

<table>
<thead>
<tr>
<th>Road Link</th>
<th>18 hr AAWT</th>
<th>%HGV</th>
<th>Speed kmh&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2024 Future Baseline</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A508</td>
<td>21,911</td>
<td>5.4%</td>
<td>97</td>
</tr>
<tr>
<td>A5 East</td>
<td>39,568</td>
<td>4.1%</td>
<td>97</td>
</tr>
<tr>
<td>Towcester Road/London Road</td>
<td>13,114</td>
<td>3.9%</td>
<td>48</td>
</tr>
<tr>
<td>Deanshanger Road</td>
<td>20,047</td>
<td>3.6%</td>
<td>97</td>
</tr>
<tr>
<td>A5 Watling Street NW</td>
<td>18,624</td>
<td>3.6%</td>
<td>97</td>
</tr>
<tr>
<td><strong>2024 Future Baseline + Proposed Development Traffic</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A508</td>
<td>24,368</td>
<td>5.4%</td>
<td>97</td>
</tr>
<tr>
<td>A5 East</td>
<td>40,771</td>
<td>4.3%</td>
<td>97</td>
</tr>
<tr>
<td>Towcester Road/London Road</td>
<td>13,271</td>
<td>3.9%</td>
<td>48</td>
</tr>
<tr>
<td>Deanshanger Road</td>
<td>20,547</td>
<td>3.7%</td>
<td>97</td>
</tr>
<tr>
<td>A5 Watling Street NW</td>
<td>19,220</td>
<td>3.9%</td>
<td>97</td>
</tr>
</tbody>
</table>

Development scenario, with the 2024 with the Proposed Development scenario. The calculations reflect the predicted change in traffic flows on the assessed routes.

The traffic noise predictions have been undertaken in accordance with the BNL principles detailed within CRTN. These predictions consider the relative change in noise level that is likely as a result of the Proposed Development at a notional roadside receptor for each considered road link.

The predicted changes in noise level are presented in Table 8.

**Table 8: Predicted Changes in Road Traffic Noise**

<table>
<thead>
<tr>
<th>Road Link</th>
<th>Predicted Change in L&lt;sub&gt;A10&lt;/sub&gt;, 18 hour dB (2024)</th>
<th>Significance of Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>A508</td>
<td>+0.5</td>
<td>Negligible</td>
</tr>
<tr>
<td>A5 East</td>
<td>+0.1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Towcester Road/London Road</td>
<td>+0.1</td>
<td>Negligible</td>
</tr>
<tr>
<td>Deanshanger Road</td>
<td>+0.1</td>
<td>Negligible</td>
</tr>
<tr>
<td>A5 Watling Street NW</td>
<td>+0.1</td>
<td>Negligible</td>
</tr>
</tbody>
</table>

It can be seen from the results in Table 8, that off-site road traffic noise impacts will not exceed negligible significance, with changes in noise exposure being at imperceptible levels on all affected links.
6. **Mitigation By Design**

6.1. Discussion

6.1.1. Potential Development Profile

As discussed earlier in this report, the proposal strategy comprises A3, A5, B2, B8 uses on the northern and western parts of the site, including a drive-thru/sit-in coffee shop adjacent to the A5 and general light industrial and storage/distribution uses across the rest of that area. It is also proposed to introduce some environmental space, referred to as “country park” on the eastern part of the site, adjacent to the A5.

6.1.2. Potential Development in Current Acoustic Context

Those areas of the site lying adjacent to the A5 and A508 corridors are significantly affected by moderate to high levels of road traffic noise, which substantially elevate the ambient sound environment. Consequently, any development in these areas will have the benefit of acoustic masking, created by the high numbers of vehicles using those roads.

There is, however, a 10 to 15 dB differential between the $L_{Aeq}$ and $L_{A90}$ statistics in these areas, illustrating that although these routes are regularly trafficked, that lulls do occur in the traffic flow, allowing the noise level to drop. Consequently, any commercial development, particularly any development that possesses a steady state acoustic character, requires careful design to not become audibly significant, even on the noisier parts of the site, where existing noise-sensitive receptors may be present.

Developments that are primarily associated with traffic movements, such as a drive-thru food/coffee business, or storage and distribution type business, are likely to be acoustically masked by the varying road traffic noise, by possessing very similar acoustic characteristics.

The northern area of the site, adjacent to Stratford Road is audibly quieter and would be well suited to developments of a smaller scale, with less potential for environmental noise generation. This part of the site, would in fact, be acoustically appropriate for residential development, if acceptable in a planning context, or live to work units.

Consequently, it is suggested that should this area of the site, which also lies at a higher topographical elevation, be brought forward for employment uses, that a focus on start-up uses and small-scale units, with much less ostensible, external activity, which would preserve the amenity of the existing dwellings along the Stratford Road corridor.
6.2. Design Strategy

6.2.1. General Principles

The fundamental strategy behind the formulation of the Proposed Development will incorporate the following principles, which also take account of other influencing factors, such as highways, visual impact and commercial viability:

- Locating any uses with a higher noise generation potential in areas of the site where the ambient/background sound levels are at their highest, so as to reduce the levels of acoustic engineering required in bringing that development into commission;
- Locating any uses with a higher noise generation potential in areas of the site that are, as physically far as possible from noise-sensitive uses, such as off-site residential, healthcare, religious or educational uses, so as to reduce the levels of acoustic engineering required in bringing that development into commission;
- Locating any uses with a higher traffic generation potential (such as drive-thru food/coffee facilities) in areas of the site adjacent to principal transport routes, so as to minimise travelling distance and associated noise generation potential, in addition to using the existing noise climate to add acoustic anonymity to the proposed development;
- Use of the built form of the development to screen any noise-generating plant or activities, such as building services or loading bays, from noise-sensitive uses;
- An inward-looking development layout, that effectively creates courtyard areas, to assist in maximising the screening offered by the built form of the proposed development, by accommodating plant, loading bays, parking areas and primary circulation areas within the heart of the commercial area;
- Use of acoustically attenuating building materials and silenced plant, where the prevailing acoustic environment and proximity to noise-sensitive uses dictates;
- An internal transport layout that avoids adding significant additional traffic to existing, less-trafficked routes adjacent to noise-sensitive areas, or avoids locating new transport routes and associated noise generation potential in areas of the site adjacent to noise-sensitive areas, particularly where prevailing noise levels are lower;
- Use of highway design to avoid the necessity for traffic calming measures, such as speed humps/cushions and priority gateways, so as to minimise noise generation by excessive engine loading and vehicle-road surface interaction; and
- Close liaison with the Local Planning Authority throughout the design iteration process, in order to respond adequately to the needs of the Council and concerns of the local community, to bring forward a design that works for all concerned, with a robust and reasonable set of associated planning conditions.

It is understood that the current access proposal comprises a new roundabout onto the A508, connecting to a new spine road through the centre of the site, which will achieve the goal of locating as much of the proposed development traffic from the noise-sensitive locations within the area.

The masterplan for the site will be drawn up on the basis of the recommendations of this report; taking account of the good practice design principles and findings of the on-site noise survey.
6.3. Construction Effects

6.3.1. Construction Best Practice

Due to the early stage of the process, the precise construction method and phasing have not yet been determined; however, a Construction Environmental Management Plan (CEMP) will be prepared and submitted in due course to the Local Planning Authority for approval, which will be steered by the criteria set out in BS 5228: 2009+A: 2014.10

With regard to vibration, the document sets a ground vibration limit, in terms of Peak Particle Velocity (PPV) of 1 mm per second at any occupied residential property and 3 mm per second at any other property in any orthogonal direction.

It is anticipated that construction hours will be limited to 08:00 to 18:00 Monday to Friday; 08:00 to 13:00 on Saturdays; with no working on Sundays or bank holidays. Any working outside of these times will be subject to written, prior approval from the Local Planning Authority.

With respect to the minimisation of acoustic disruption arising from construction activity, the following techniques will be employed:

- effective co-ordination and time management of construction operations would be important in avoiding noise and vibration nuisance to surrounding uses. Early and helpful communications with the surrounding receptors would assist reducing potential for and in managing any complaints arising during the demolition and construction works of the Proposed Development; and
- contractors would be required to ensure that works are carried out in accordance with Best Practice Measures (BPM) as stipulated in the Control of Pollution Act 1974. A full explanation of measures to control construction noise would be incorporated within the CEMP and detailed in all construction method statements.

The Proposed Development in regards to general noise mitigation would be in accordance with Best Practicable Means (BPM) as specified in BS 5228 and would comprise the following, where possible:

- use of continuous flight auger piling, at locations where noise-sensitive receptors are within 20 metres;
- using ‘silenced’ plant and equipment;
- switching off engines where vehicles are standing for a significant period of time;
- fitting of acoustic enclosures to suppress noisy equipment;
- operating plant at low speeds and incorporating of automatic low speed idling;
- selecting electrically driven equipment in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- properly maintaining all plant (greased, blown silencers replaced, saws kept sharpened, teeth set and blades flat, worn bearings replaced, etc.);
- considering the use of temporary screening or enclosures for static noisy plant to reduce noise emissions;
- certifying plant to meet any relevant EC Directive standards; and
- undertaking awareness training of all contractors in regards to BS5228 (Parts 1 and 2) which would form a prerequisite of their appointment.

Typically, adopting BPM would reduce overall construction noise levels by approximately 5 dB.

Should any non-routine activities be identified that would make it impracticable to work to the adopted target criterion, provisions would be set out in advance and with the agreement of the Local Planning Authority, to reduce and control the effect. It is recommended that noise monitoring is carried out during particularly noisy phases of work close to the site boundary so that such situations can be actively managed in accordance with the CEMP.

For any proposed construction works to be undertaken outside of the permitted working day, particularly at night, prior consent would be sought from the Local Planning Authority. Dispensation procedures for works would be agreed in advance and included within Construction Method Statements and a CEMP.

Deliveries and removal of material off-site, would be subject to the following controls;

- planning all mass concreting operations for weekends whenever possible;
- ensuring that construction traffic is parked off the public highway;
- controlling the discharge of trucks from Site to avoid congestion; and
- implementing traffic management systems at the entrance to the site at all times to control the traffic into the site.

By implementing the aforementioned measures, it is anticipated that any noise impacts to nearby sensitive receptors during the demolition and construction works will be minimised.
7. **CONCLUSION**

*inacoustic* has been commissioned to assess the potential effects of noise arising from a proposed change of Local Development Plan (LDP) land allocation from agricultural uses to mixed commercial/employment uses at a site known as Furtho Pit, on the outskirts of Old Stratford, South Northamptonshire.

The technical noise assessment has been produced to provide information to support the change of LDP allocation to South Northamptonshire Council and is based upon environmental noise measurements undertaken at the site and a subsequent analytical exercise.

Accordingly, the assessment is based upon environmental noise measurements undertaken at the location of the closest noise-sensitive receptors in the vicinity of the site. The assessment has been undertaken for both daytime and night-time periods.

Noise emission limits have been set for both fixed plant and processes associated with the Proposed Development, which will be adopted as design targets and ensure no significant impact upon the amenity of neighbouring receptors.

A strategic design approach has been recommended, which has steered the masterplanning principles to-date and will continue to steer the formation of the eventual masterplan; incorporating features that will ensure that any off-site noise effects are reduced to negligible levels.

The assessment considers the potential noise emissions arising from off-site traffic increases associated with the Proposed Development, which are predicted to comprise no worse than a negligible effect.

Consequently, the assessment is considered to demonstrate that the Proposed Development can be brought forward with a low impact in the context of BS4142 guidance and that its effects would be within the range of the NOEL category of the NPPG England guidance.

Since the Proposed Development is considered to feasibly comply with British Standard, National Planning Policy and Local Policy requirements; it is recommended that noise should not be a considered a constraint to the change of allocation of the Site to commercial uses within the Local Development Plan.
8. APPENDICES
### 8.1. Appendix A – Definition of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td><strong>Sound Pressure</strong></td>
<td>Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.</td>
</tr>
<tr>
<td><strong>Sound Pressure Level (Sound Level)</strong></td>
<td>The sound level is the sound pressure relative to a standard reference pressure of 20(\mu)Pa (20(\times)10(^{-6}) Pascals) on a decibel scale.</td>
</tr>
<tr>
<td><strong>Decibel (dB)</strong></td>
<td>A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds (s_1) and (s_2) is given by 20 log(_{10}) ( (s_1) / (s_2) ). The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20(\mu)Pa.</td>
</tr>
<tr>
<td><strong>A-weighting, dB(A)</strong></td>
<td>The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.</td>
</tr>
<tr>
<td><strong>Noise Level Indices</strong></td>
<td>Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.</td>
</tr>
<tr>
<td>(L_{eq,T})</td>
<td>A noise level index called the equivalent continuous noise level over the time period (T). This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.</td>
</tr>
<tr>
<td>(L_{max,T})</td>
<td>A noise level index defined as the maximum noise level during the period (T). (L_{max}) is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall (L_{eq}) noise level but will still affect the noise environment. Unless described otherwise, it is measured using the ‘fast’ sound level meter response.</td>
</tr>
<tr>
<td>(L_{90,T})</td>
<td>A noise level index. The noise level exceeded for 90% of the time over the period (T). (L_{90}) can be considered to be the &quot;average minimum&quot; noise level and is often used to describe the background noise.</td>
</tr>
<tr>
<td>(L_{10,T})</td>
<td>A noise level index. The noise level exceeded for 10% of the time over the period (T). (L_{10}) can be considered to be the &quot;average maximum&quot; noise level. Generally used to describe road traffic noise.</td>
</tr>
<tr>
<td>Free-Field</td>
<td>Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m</td>
</tr>
<tr>
<td>Facade</td>
<td>At a distance of 1m in front of a large sound reflecting object such as a building façade.</td>
</tr>
<tr>
<td>Fast Time Weighting</td>
<td>An averaging time used in sound level meters. Defined in BS 5969.</td>
</tr>
</tbody>
</table>
In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0 dB (the threshold of hearing) to over 120 dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

**Table 9: Typical Sound Levels found in the Environment**

<table>
<thead>
<tr>
<th>Sound Level</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>0dB(A)</td>
<td>Threshold of hearing</td>
</tr>
<tr>
<td>20 to 30dB(A)</td>
<td>Quiet bedroom at night</td>
</tr>
<tr>
<td>30 to 40dB(A)</td>
<td>Living room during the day</td>
</tr>
<tr>
<td>40 to 50dB(A)</td>
<td>Typical office</td>
</tr>
<tr>
<td>50 to 60dB(A)</td>
<td>Inside a car</td>
</tr>
<tr>
<td>60 to 70dB(A)</td>
<td>Typical high street</td>
</tr>
<tr>
<td>70 to 90dB(A)</td>
<td>Inside factory</td>
</tr>
<tr>
<td>100 to 110dB(A)</td>
<td>Burglar alarm at 1m away</td>
</tr>
<tr>
<td>110 to 130dB(A)</td>
<td>Jet aircraft on take off</td>
</tr>
<tr>
<td>140dB(A)</td>
<td>Threshold of Pain</td>
</tr>
</tbody>
</table>

The ear is less sensitive to some frequencies than to others. The A-weighting scale is used to approximate the frequency response of the ear. Levels weighted using this scale are commonly identified by the notation dB(A).

In accordance with logarithmic addition, combining two sources with equal noise levels would result in an increase of 3 dB(A) in the noise level from a single source.

A change of 3 dB(A) is generally regarded as the smallest change in broadband continuous noise which the human ear can detect (although in certain controlled circumstances a change of 1 dB(A) is just perceptible). Therefore, a 2 dB(A) increase would not be normally be perceptible. A 10 dB(A) increase in noise represents a subjective doubling of loudness.

A noise impact on a community is deemed to occur when a new noise is introduced that is out of character with the area, or when a significant increase above the pre-existing ambient noise level occurs.

For levels of noise that vary with time, it is necessary to employ a statistical index that allows for this variation. These statistical indices are expressed as the sound level that is exceeded for a percentage of the time period of interest. In the UK, traffic noise is measured as the L_{A10}, the noise level exceeded for 10% of the measurement period. The L_{A90} is the level exceeded for 90% of the time and has been adopted to represent the background noise level in the absence of discrete events. An alternative way of assessing the time varying noise levels is to use the equivalent continuous sound level, L_{Aeq}. 
This is a notional steady level that would, over a given period of time, deliver the same sound energy as the actual fluctuating sound.

To put these quantities into context, where a receiver is predominantly affected by continuous flows of road traffic, a doubling or halving of the flows would result in a just perceptible change of 3 dB, while an increase of more than 25%, or a decrease of more than 20%, in traffic flows represent changes of 1 dB in traffic noise levels (assuming no alteration in the mix of traffic or flow speeds).

Note that the time constant and the period of the noise measurement should be specified. For example, BS 4142 specifies background noise measurement periods of 1 hour during the day and 15 minutes during the night. The noise levels are commonly symbolised as $L_{A90,1\text{hour}}$ dB and $L_{A90,15\text{mins}}$ dB. The noise measurement should be recorded using a ‘FAST’ time response equivalent to 0.125 ms.
8.2. Appendix B – Measurement Results

**Figure 4: Daytime Measured Time History – MP1**

![Graph showing measured time history for MP1](image)

**Figure 5: Statistical Analysis of Daytime $L_{A90}$ Background – MP1**

![Bar graph showing statistical analysis](image)
**Figure 6: Statistical Analysis of Night-Time L_{A90 Background} – MP1**

![Graph showing statistical analysis of Night-Time L_{A90 Background} for MP1](image)

**Figure 7: Daytime Measured Time History – MP2**

![Graph showing measured time history for MP2](image)
FIGURE 8: STATISTICAL ANALYSIS OF DAYTIME $L_{A90}$ BACKGROUND – MP2

FIGURE 9: STATISTICAL ANALYSIS OF NIGHT-TIME $L_{A90}$ BACKGROUND – MP2
Figure 10: Daytime Measured Time History – MP3

![Daytime Measured Time History](image1)

Figure 11: Statistical Analysis of Daytime LA90 Background – MP3

![Statistical Analysis of Daytime LA90 Background](image2)
Figure 12: Statistical Analysis of Night-Time L_{A,90} Background - MP3