

The logo for Environmental Noise Solutions Limited (ENS) is located in the top right corner. It consists of the letters 'E', 'N', and 'S' in a large, bold, black sans-serif font, set against a solid blue square background.

E N S

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**Proposed Commercial
Development
Knowsley Lane, Huyton,
Knowsley
Noise Impact Assessment**

For:

Commercial Development Projects Limited

15 June 2023

Ref: NIA-10849-23-11117-v1 Knowsley Phase 2

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1 Introduction

- 1.1.1 Environmental Noise Solutions Ltd (ENS) has been commissioned by Commercial Development Projects Limited to undertake a Noise Impact Assessment for the Phase II commercial development on land off Knowsley Lane, Huyton, Knowsley (hereafter referred to as 'the site').
- 1.1.2 This noise assessment has been prepared to assess if noise impact from the site, including 24-hour operations, will be acceptable under the conditions defined in the outline planning permission granted by Knowsley Metropolitan Council under application 20/00376/OUT.
- 1.1.3 The objectives of the noise impact assessment are to:
- Establish the ambient and background noise levels in the vicinity of the application site during representative periods of the day and night time
 - Assess the potential noise impact of the proposed development on the nearest noise sensitive receptors (surrounding residential uses) in accordance with the National Planning Policy Framework (NPPF) and other pertinent guidance
 - Provide recommendations for noise mitigation measures to avoid any unacceptable loss of amenity due to noise associated with the proposed development
- 1.1.4 This report details the methodology and results of the assessment. It has been prepared for Commercial Development Projects Limited for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult the aforementioned and ENS as to the extent to which the findings may be appropriate for their use.
- 1.1.5 A glossary of acoustic terms used in the main body of the text is contained in Appendix A.

2 Site Description

- 2.1.1 The proposed development comprises of 5 commercial units (use Class B1/B8) split across the site, with vehicle access into the site taken from Knowsley Lane along the mid-southern boundary (see Appendix B for proposed site layout).
- 2.1.2 An indication of the location of the site is given in Figure 2-1 below, the site layout is given in Appendix B.

Figure 2-1: Location Plan



- 2.1.3 The site is bound by:
- The M57 motorway to the north
 - Knowsley Lane to the south (with existing residential dwellings beyond)
 - Earlsfield Services to the east of the site
 - Ongoing residential development to the west
- 2.1.4 The nearest Noise Sensitive Receptors (NSRs) to the site are considered to be:
- Residential dwellings to the west of the site
 - Residential dwellings off Knowsley Lane to the south of the site

3 LPA Requirements (Planning Permission 20/00376/OUT)

3.1 Condition 17

'Fixed plant and machinery associated with the development shall be designed to a level that is at least 5dB(A) below the existing LA90 background noise level as measured during the relevant time period.'

Any tonal, impulsive and/or irregular noise would be addressed by imposing a penalty as per the methodology set out in BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

Noise limits for fixed plant are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.'

3.2 Condition 18

'The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13) and as measured at the following times:

- LAeq (1 hour) between 0700-2300*
- LAeq (15 mins) between 2300-0700*

Noise limits are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.'

3.3 Condition 19

'Reserved matters applications shall include a Framework Operational Management Plan and Noise Mitigation Plan for the plot(s) to which they relate which have been informed by an approved noise survey. For the avoidance of doubt, the operational management plan and noise mitigation plans shall seek to ensure that the noise levels within the living rooms, bedrooms and gardens of the adjacent new residential area and the directly facing properties on the southern side of Knowsley Lane do not exceed the relevant standards, including taking account of the impact of HGV's using the junction at the entrance to the site during the evening and night time periods. Plans may include the provision of physical measures such as acoustic barriers etc and/or restrictions for certain types of operation such as HGV servicing or other outdoor activities that cannot be mitigated by physical measures.

Prior to the first occupation of each unit, a detailed operational management and noise mitigation plan based upon the framework operational management and noise mitigation plan shall be submitted to and agreed in writing with the local planning authority. The unit shall then be operated in accordance with the agreed detailed operational management and noise mitigation plan and any physical works required shall be implemented before the first use of the unit they relate to, shall be retained as such thereafter and maintained in accordance with the manufacturers specification.

Reason: To ensure that the proposed development does not have a significant adverse effect on the amenity of neighbouring residents through causing unacceptable noise and disturbance - in particular through HGVs servicing the properties causing excessive noise at the access junction into the site during the evening and night time period and to comply with Saved Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.'

4 Assessment Guidance

4.1 National Planning Policy Framework

4.1.1 The National Planning Policy Framework (NPPF)¹ was updated in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

4.1.2 Where issues of noise impact are concerned the NPPF provides brief guidance in paragraph 174 where it states that planning policies and decisions should contribute to and enhance the natural and local environment by:

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

4.1.3 Paragraph 185 advises that:

'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.....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'.

4.1.4 The NPPF also refers to the 2010 DEFRA publication, the Noise Policy Statement for England (NPSE) which reinforces and supplements the NPPF.

4.2 Noise Policy Statement for England

4.2.1 The Noise Policy Statement for England² (NPSE) sets out the long-term vision of promoting good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development. This long-term vision is supported by the following aims:

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

4.2.2 The NPSE describes the following levels at which noise impacts may be identified:

- 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

4.2.3 According to the explanatory notes in the statement, where a noise level falls between the lowest observable adverse effect level (LOAEL) and a level which represents a significant observable adverse effect level (SOAEL):

'...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life whilst also taking into consideration the guiding principles of sustainable development. This does not mean that such effects cannot occur.'

¹ National Planning Policy Framework. Ministry of Housing, Communities and Local Government (2019)

² Government Department for Environment, Food and Rural Affairs. Noise Policy Statement for England (2010)

4.3 Planning Practice Guidance on Noise

4.3.1 Planning Practice Guidance³ (PPG) is an online resource providing additional guidance and elaboration on the NPPF. It advises that:

‘Plan making and decision making need to take into account the acoustic environment and in doing so consider:

- whether or not a significant adverse effect is occurring or likely to occur;*
- whether or not an adverse effect is occurring or likely to occur; and*
- whether or not a good standard of amenity can be achieved.’*

4.3.2 In line with the Explanatory Note of the NPSE, the PPG references the LOAEL and SOAEL in relation to noise impact. It also provides examples of outcomes that could be expected for a given perception level of noise, plus actions that may be required to bring about a desired outcome. However, in line with the NPSE, no objective noise levels are provided for LOAEL or SOAEL although the PPG acknowledges that:

‘...the subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation’.

4.3.3 Table 2.1 summarises the PPG noise exposure hierarchy.

Table 4.1: PPG Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	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.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	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.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	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.	Significant Observed Adverse Effect	Avoid
Noticeable and very disruptive	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	Unacceptable Adverse Effect	Prevent

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

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

³ Planning Practice Guidance on Noise (<http://planningguidance.planningportal.gov.uk/blog/guidance/noise/>). Ministry of Housing, Communities and Local Government (2019)

4.4 British Standard BS 4142:2014+A1:2019 ‘Methods for Rating and Assessing Industrial and Commercial Sound’

4.4.1 BS 4142 presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors.

4.4.2 The Standard is appropriate for the consideration of industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment and mobile plant / vehicles that form an intrinsic part of the industrial/commercial including the loading and unloading of goods and materials at the premises.

‘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. Typically, the greater this difference, the greater the magnitude of the impact. For example:

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

Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the absolute level of sound.’

4.4.3 The background noise level is the A-weighted sound pressure level of the residual noise at the assessment position that is exceeded for 90 percent of a given time interval, T, measured using time weighting ‘F’ and quoted to the nearest whole number of decibels. BS 4142 is clear that it is the representative background, rather than the lowest background, which should be used.

4.4.4 The ‘rating level’ must be determined considering the need for any ‘character corrections’ to the specific industrial/commercial noise level to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. This can be done using a subjective, objective or reference methods. Where multiple features are present the corrections should be added in a linear fashion to the specific level.

4.4.5 The subjective method is based on the corrections presented in Table 4.2.

Table 4-2: Summary of BS4142 Rating Penalties

Level of Perceptibility	Tonal Correction	Impulsivity Correction	Intermittency Correction	Other
None	0 dB	0 dB	+3 dB Where intermittency is readily identifiable	+3 dB Where neither tonal nor impulsive but clearly identifiable against prevailing soundscape
Just Perceptible	+ 2 dB	+ 3 dB		
Clearly Perceptible	+ 4 dB	+ 6 dB		
Highly Perceptible	+ 6 dB	+ 9 dB		

4 British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. British Standards Institution 2019)

5 Noise Impact Assessment

5.1 Condition 18 (Noise Associated with Site Activities)

5.1.1 Condition 18 of Planning Permission ref: 20/00376/OUT requires that:

The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13) and as measured at the following times:

- - L_{Aeq} (1 hour) between 0700-2300
- - L_{Aeq} (15 mins) between 2300-0700

Noise limits are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.'

5.1.2 The lowest average background noise levels as set out within the aforementioned Noise Impact Assessment are **53 dB $L_{Aeq, T}$** during the daytime and **48 dB $L_{Aeq, T}$** at night.

5.1.3 The office spaces are not considered to be noise sources, however the noise associated with internal operations of the distribution centres are robustly modelled with a relatively high internal reverberant sound level of **70 dB L_{Aeq} (1 hour)**.

5.1.4 The proposed units include a number of dock-leveller loading bays and surface loading bays. Whilst loading at the dock-leveller bays will be carried out internally, it is assumed that loading at the remaining bays may be carried via forklift trucks (FLT).

5.1.5 ENS has previously measured the noise levels associated with FLT loading operations at up to **63 dB L_{Aeq} (15 min)** at 5 metres. For the purposes of the assessment, it is assumed that loading operations are taking place simultaneously at all surface loading areas for 50% of the assessment period.

5.1.6 In order to assess the propagation of noise from activities at the site to the nearest receptors, noise level predictions have been performed using iNoise acoustic modelling software. This is a software program specifically developed for the prediction and assessment of environmental noise.

5.1.7 The model calculates noise levels on horizontal and vertical grids with a user defined spacing of receiver points. From these levels, calculated at thousands of points, contour lines of constant noise levels are generated and printed as noise maps. All scaling was based on direct import from Google Earth, with 2nd order reflections considered and absorption coefficients based on the iNoise default for brick-built structures.

5.1.8 The following assumptions were used in the model:

- Meteorological conditions: Temp. 20 °C, Relative Humidity 60%
- Foliage/woodland areas not considered to provide any reduction
- Reflections: set to two orders of reflection permitted in the model
- Ground absorption set to $G = 0.5$ (mixed)

5.1.9 The sound reduction index (SRI) of the units is taken as 25 dB R_w based on the sound reduction performance of insulated panels.

5.1.10 A noise level contour map is contained in Appendix C. The predicted cumulative resultant noise levels at the nearest NSRs are **≤ 33 dB L_{Aeq} (15 min)**.

5.1.11 Such levels are readily compliant with both the daytime and night-time targets of Condition 18 of Planning Permission ref: 20/00376/OUT. It should also be noted that the predicted levels are extreme worst-case, as the prediction robustly includes all internal and external activities at all 5 no. units operating simultaneously.

5.2 Condition 17 (Noise Associated with Fixed Plant)

5.2.1 Condition 17 of Planning Permission ref: 20/00376/OUT states that:

'Fixed plant and machinery associated with the development shall be designed to a level that is at least 5dB(A) below the existing LA90 background noise level as measured during the relevant time period.'

Any tonal, impulsive and/or irregular noise would be addressed by imposing a penalty as per the methodology set out in BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

Noise limits for fixed plant are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.'

5.2.2 It is anticipated that the proposed development may include fixed installations (mechanical and electrical plant and equipment) that could have the potential to generate noise. However, detailed information regarding item(s) of fixed external plant required was not available at the time of writing and therefore this report should be used to aid in the specification of any external plant.

5.2.3 The daytime and night-time background sound levels in the vicinity of the site have been measured at **53 dB LA90, T** and **48 dB LA90, T** respectively.

5.2.4 Therefore, based upon the principles of BS 4142, and the requirements of Condition 17 of Planning Permission ref: 20/00376/OUT, sound rating levels from fixed installations should not exceed **48 dB LA_r (1 hour)** during the daytime and **43 dB LA_r (15 min)** during the night-time, at the nearest noise sensitive receptors.

5.2.5 Compliance with Condition 17 of Planning Permission ref: 20/00376/OUT can be determined once the final occupants of the units are known, but it is considered that appropriate noise control can be achieved by the judicious selection and siting of plant and/or standard noise mitigation techniques.

5.3 Condition 19 (Noise Mitigation Plan)

5.3.1 Condition 19 of Planning Permission ref: 20/00376/OUT requires a noise mitigation plan to ensure that noise levels from HGV movements do not lead to a loss of residential amenity at the nearest noise sensitive receptors, particularly those opposite the junction into the site.

5.3.2 The officer's report for the planning application further states:

'Environmental Health did not agree with the report's conclusion that HGV movements would not cause harm if they were allowed 24 hours a day due to them breaking and accelerating at the proposed junction which would be close to residential properties. Notwithstanding this, following discussions with Environmental Health and the applicant, it was established that subject to the nature of the proposed use, some development may be able to operate over a 24 hour period without causing undue harm to residential amenity either due to the nature of the vehicles that would be likely to service the unit, or by restricting activities within the unit to certain times.'

5.3.3 The report went on to note that as the final occupiers were unknown, it would be feasible to produce individual noise mitigation plans prior to the occupation of each unit, which may restrict certain activities (e.g. HGV movements) during noise-sensitive hours, whilst potentially allowing other activities or vehicle movements to occur on a 24-hour basis.

5.3.4 It is therefore evident that individual noise management plans will be required for each unit once the final occupiers, and their operations and vehicle types, are known.

6 Summary and Conclusions

- 6.1.1 A Noise Impact Assessment has been performed for the proposed Phase II commercial development on land off Knowsley Lane, Huyton, Knowsley.
- 6.1.2 Noise associated with internal and external activities at the site are readily compliant with the requirements of Condition 18 of Planning Permission ref: 20/00376/OUT, with no specific mitigation measures required.
- 6.1.3 The control of noise associated with any fixed external plant can be achieved with the judicious selection of refrigeration plant and/or standard noise mitigation techniques, to establish compliance with the requirements of Condition 17 of Planning Permission ref: 20/00376/OUT.
- 6.1.4 With regards to Condition 19, it is evident that individual noise management plans will be required for each unit once the final occupiers, and their operations and vehicle types, are known.

Appendix A – Abbreviations and Definitions

Sound Pressure Level (L_p)

The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μ Pa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$$L_p = 20 \log_{10}(p/p_0)$$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_0 = reference sound pressure (20 μ Pa).

A-weighting

A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq, T}$

The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, T , has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq, 16h}$ (07:00 to 23:00 hours) and $L_{Aeq, 8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10, T}$

The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T . $L_{A10, 18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

$L_{A90, T}$

The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T . L_{A90} is typically taken as representative of background noise.

$L_{AF \max}$

The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

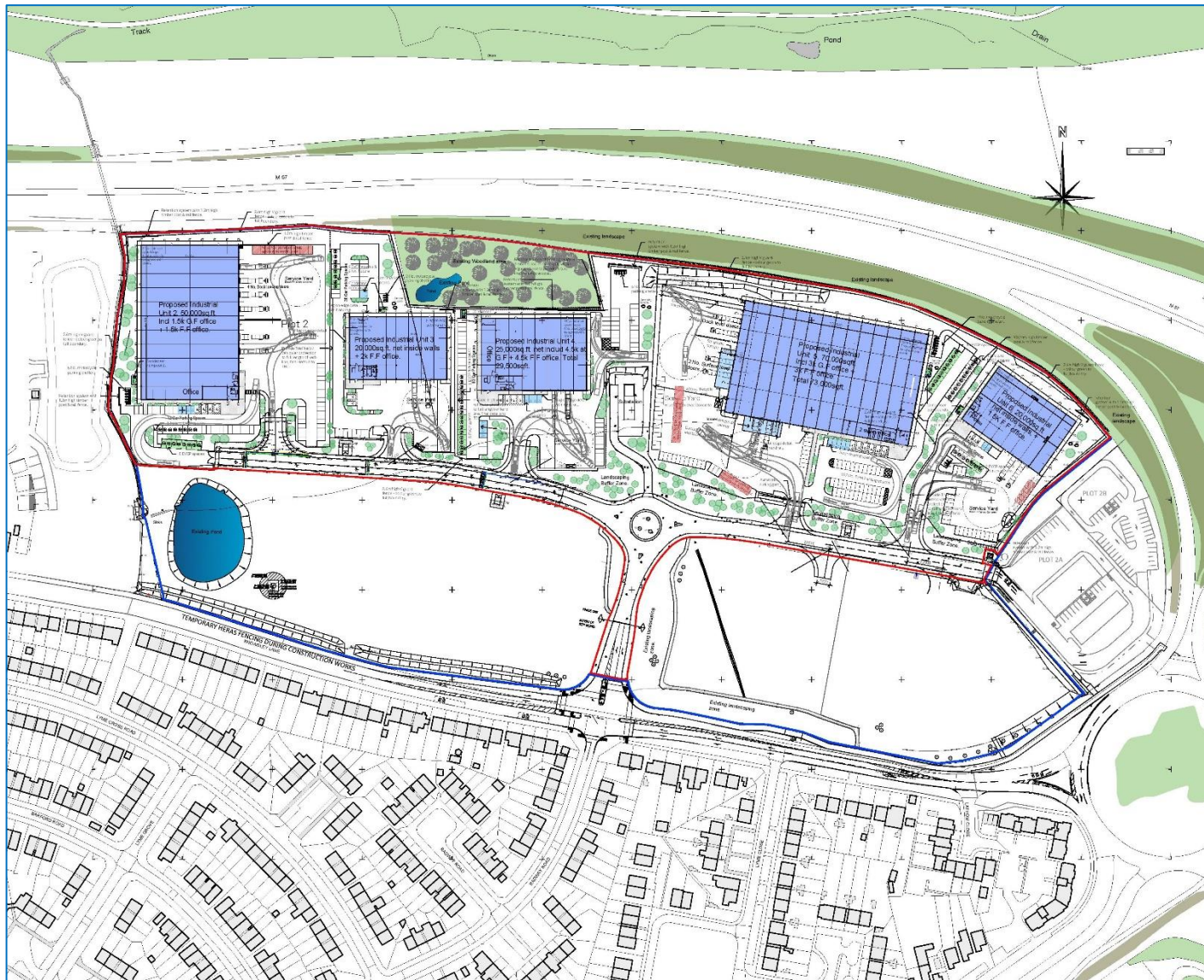
Single Event Level / Sound Exposure Level (SEL or L_{AE})

The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_w)

Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_w is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix B – Proposed Site Layout



Appendix C – Site Activities Noise Contour Plot

