

Farmfoods
Unit 2 St Marys Gate
Rochdale
OL12 0TY

Planning Noise Assessment

On behalf of
Glenbrook Property

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1.0 Introduction

- 1.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a planning-stage noise assessment for the proposed change of use of Unit 2 at St Marys Gate, Rochdale as a Farmfoods supermarket.
- 1.2. This report presents the results of an environmental noise survey, the applicable policies and guidance, and outline noise impact assessments of plant, deliveries and car park activity to demonstrate that it is suitable for those uses without introducing adverse noise effects on the neighbouring areas.
- 1.3. To assist with the understanding of this report a brief glossary of acoustic terms can be found in **Appendix A**. A more in-depth glossary of acoustic terms can be assessed at the following web address <http://www.acoustic-glossary.co.uk/>.

2.0 Site layout and development proposals

- 2.1. The site is located north of Rochdale town centre, immediately north of St Mary's Gate (A58). The Farmfoods premises are to occupy Unit 2 of the larger subdivided building.
- 2.2. **Appendix B** contains an aerial photograph showing the site and surrounding area, with an overlay of the proposed development. A site plan is shown in **Appendix C**.

Scope of assessments

- 2.3. Assessments have been made of potential noise from services plant at the proposed unit, and from noise related to deliveries and car parking activity.
- 2.4. Plant is to comprise air conditioning (AC) units and refrigeration condensers, all of which will be wall mounted at the rear of the site overlooking the service yard area. Manufacturer noise data for the proposed equipment is given in **Appendix H**.
- 2.5. Deliveries will take place in the service yard, with vehicles approaching the yard from Union Street and manoeuvring within the yard, reversing up to a loading bay door.
- 2.6. Customers of the store will use car parking spaces at the front of the store. Around 36 of the spaces in the wider car park are likely to be used by Farmfoods customers; it is understood that a proportion of customers are likely to arrive on foot.

Nearest noise-sensitive receptors

- 2.7. Noise levels have been predicted at the following:

- Receptor R1, 21 Whitehall Street, to the northwest of the site, currently operating as a nursery;
- Receptor R2, houses to the west of the site across Union Street;
- Receptor R3, houses to the north west across Hope Street.

2.8. The receptors above are shown on the aerial view in [Appendix B](#).

3.0 Environmental sound levels

Environmental sound survey

- 3.1. An unattended environmental sound pressure level survey was undertaken between 16.30 hours on Monday 18th October and 11.00 hours on Tuesday 19th October 2023. Measurements were made on Union Street, as shown in [Appendix B](#). The survey location was chosen so as to be representative of the noise levels in the residential areas around the site.
- 3.2. Full details of the survey are provided in [Appendix D](#) with a history graph of the unattended measurements.
- 3.3. The relevant results of the survey have been summarised in Table 1 below.

Table 1 Summary of survey results

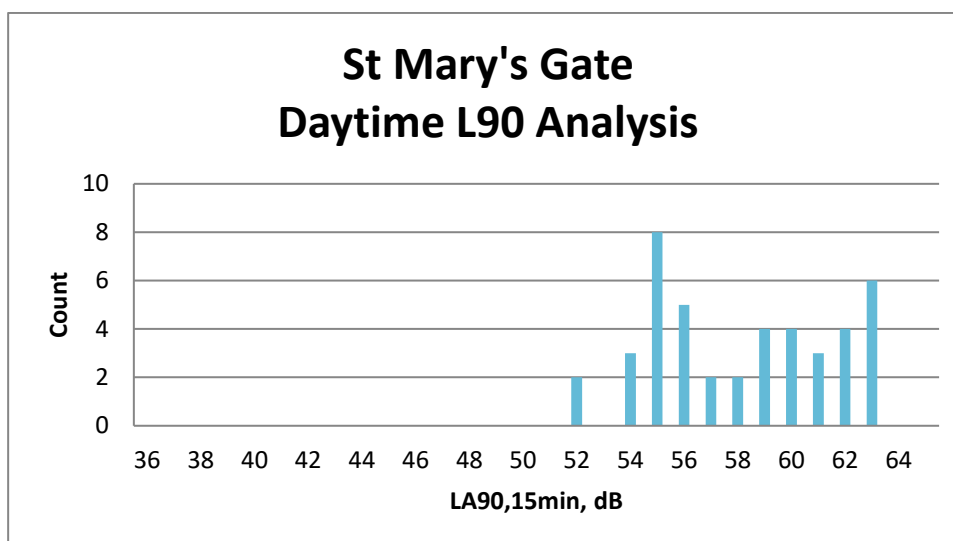
	Measurement period	Range of recorded sound pressure levels (dB)			
		L _{Aeq} (15mins)	L _{Afmax} (15mins)	L _{A10} (15mins)	L _{A90} (15mins)
L1	Daytime (07.00 – 23.00 hours)	58-68	68-90	61-69	52-63
	Night-time (23.00 – 07.00 hours)	49-63	63-77	52-66	38-60

- 3.4. The data presented above are the free-field levels recorded from the sound level meters.

Background sound levels

- 3.5. Background (L_{A90 15min}) sound levels have been analysed to determine representative values, as required by BS 4142:2014. Data has been analysed for the full day and night-time periods.

Figure 1 Histogram of L_{A90} background sound pressure levels, daytime



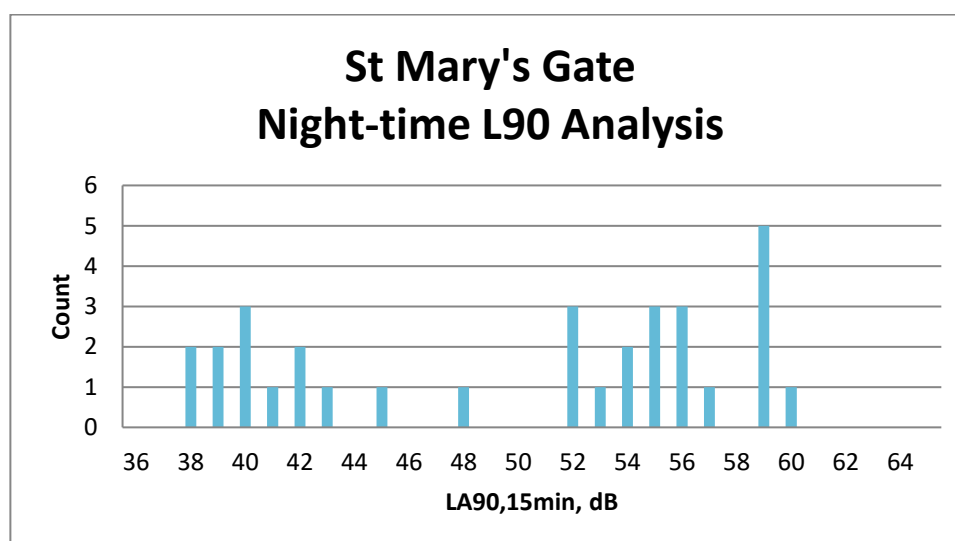
- 3.6. Additional statistical analysis has been undertaken. As shown in Table 2, the mean, median, and modal values have been calculated:

Table 2 Statistical analysis of $L_{A90,15min}$ levels during the daytime

	dB, L_{A90} Daytime - 07.00-23.00 hours
Mean	58
Mode	55
Median	58

- 3.7. From reviewing the above histograms, representative daytime background sound levels are considered to be 55dB.

Figure 2 Histogram of L_{A90} background sound pressure levels, night-time



- 3.8. Additional statistical analysis has been undertaken. As shown in Table 3, the mean, median, and modal values have been calculated:

Table 3 Statistical analysis of $L_{A90,15min}$ levels during the night-time

	dB, L_{A90} Night-time 23.00-07.00 hours
Mean	50
Mode	59
Median	53

- 3.9. From reviewing the above histograms, representative night-time background sound levels are considered to be 40dB.

4.0 Noise policy and Acoustic Standards and Guidance

Noise Policy Statement for England

- 4.1. The Noise Policy Statement for England (NPSE¹), published in March 2010, sets out the long-term vision of Government noise policy. The Noise Policy aims, as presented in this document, are: *"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:*
- *avoid significant adverse effects on health and quality of life;*
 - *mitigate and minimise adverse effects on health and quality of life; and*
 - *where possible, contribute to the improvement of health and quality of life."*
- 4.2. The NPSE makes reference to the concepts of NOEL (No Observed Effect Level) and LOAEL (Lowest Observed Adverse Effect Level) as used in toxicology but applied to noise impacts. It also introduces the concept of SOAEL (Significant Observed Adverse Effect Level) which is described as the level above which significant adverse effects on health and quality of life occur.
- 4.3. The first aim of the NPSE is to avoid significant adverse effects, taking into account the guiding principles of sustainable development (as referenced in Section 1.8 of the NPSE). The second aim seeks to provide guidance on the situation that exists when the potential noise impact falls between the LOAEL and the SOAEL, in which case: *"...all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."*

¹ Noise Policy Statement for England, Defra, March 2010

- 4.4. Importantly, the NPSE goes on to state that: "This does not mean that such adverse effects cannot occur."
- 4.5. The NPSE does not provide a noise-based measure to define SOAEL, acknowledging that the SOAEL is likely to vary depending on the noise source, the receptor and the time in question. NPSE advises that: *"Not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."*
- 4.6. It is therefore likely that other guidance will need to be referenced when applying objective standards for the assessment of noise, particularly in reference to the SOAEL, whilst also taking into account the specific circumstances of a proposed development.

National Planning Policy Framework

- 4.7. A new edition of the NPPF was published in December 2024 and came into effect immediately, with corrections issued in February 2025. The original National Planning Policy Framework (NPPF²) was published in March 2012, with subsequent revisions made periodically - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The December 2024 revised edition contains no new directions or guidance with respect to noise. The paragraph references quoted below relate to the December 2024/February 2025 edition.
- 4.8. Paragraph 187 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability."*
- 4.9. The NPPF goes on to state in Paragraph 198:
- "planning policies and decisions should ...*
- a) Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development, - and avoid noise giving rise to significant adverse impacts on health and quality of life;*
 - b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason ...*
- 4.10. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE³).

² National Planning Policy Framework, DCLG, March 2012

³ Noise Policy Statement for England, DEFRA, March 2010

- 4.11. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission be determined in accordance with the development plan unless material considerations indicate otherwise."*
- 4.12. Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed"*.
- 4.13. Paragraph 87 of the NPF states:
- "Planning policies and decisions should recognise and address the specific locational requirements of different sectors. This includes making provision for:*
- a) clusters or networks of knowledge and data-driven, creative or high technology industries; and for new, expanded or upgraded facilities and infrastructure that are needed to support the growth of these industries (including data centres and grid connections);*
 - b) storage and distribution operations at a variety of scales and in suitably accessible locations that allow for the efficient and reliable handling of goods, especially where this is needed to support the supply chain, transport innovation and decarbonisation; and*
 - c) the expansion or modernisation of other industries of local, regional or national importance to support economic growth and resilience".*
- 4.14. Paragraph 124 states that *"Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land"*.

Planning Practice Guidance – Noise

- 4.15. An updated Planning Practice Guidance (PPG⁴) for noise was published on 22 July 2019 and provides additional guidance and elaboration on the NPPF. It advises that when plan-making and decision-taking, the Local Planning Authority should consider the acoustic environment in relation to:

⁴ Planning Practice Guidance – Noise, <https://www.gov.uk/guidance/noise--2>, 22 July 2019

- 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.
- 4.16. This guidance introduced the concepts of NOAEL (No Observed Adverse Effect Level), and UAEL (Unacceptable Adverse Effect Level). NOAEL differs from NOEL in that it represents a situation where the acoustic character of an area can be slightly affected (but not such that there is a perceived change in the quality of life). UAEL represents a situation where noise is 'very disruptive' and should be 'prevented' (as opposed to SOAEL, which represents a situation where noise is 'disruptive', and should be 'avoided').
- 4.17. As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.
- 4.18. The LOAEL is described in PPG⁵ as the level above which *"noise starts to cause small changes in behaviour and attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard"*.
- 4.19. PPG identifies the SOAEL as the level above which *"noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present."*
- 4.20. In line with the Explanatory Note of the NPSE, the PPG goes on to reference 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 PPG⁶ 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."*
- 4.21. The relevant guidance in the PPG in relation to the adverse effect levels is summarized below:

⁵ Paragraph: 005 Reference ID: 30-005-20190722

⁶ Paragraph: 006 Reference ID: 30-006-20190722

Table 4 PPG Noise effects table

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not Intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. 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			
Present and Intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and Disruptive	The noise causes a material change in behaviour, attitude or other physiological response, 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
Present and very Disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

4.22. The Planning Practice Guidance⁷ states the following in relation to mitigation measures:

⁷ Paragraph: 010 Reference ID: 30-010-20190722

"For noise sensitive developments, mitigation measures can include avoiding noisy locations in the first place; designing the development to reduce the impact of noise from adjoining activities or the local environment; incorporating noise barriers; and optimising the sound insulation provided by the building envelope."

4.23. In addition, the Guide notes that it may also be relevant to consider⁸:

"... whether any adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time (and the effect this may have on living conditions). In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations".

Rochdale Metropolitan Borough Council

4.24. The Rochdale Core Strategy was adopted in January 2016 and is still current.

4.25. Policy DM1 – *General Development Requirements* states:

All development proposals, including changes of use of land and buildings, extensions and alterations, will be expected to demonstrate that they:

- a) Are of high quality design and take the opportunity to enhance the quality of the area;*
- b) Are compatible with surrounding land uses, both in terms of its impact upon those uses and the impact of the surrounding land uses upon the amenities of future residents / users;*
- c) Do not adversely affect the amenity of residents or users through visual intrusion, overbearing impact, overshadowing or loss of privacy;*
- d) Mitigate against any impacts due to noise, air, dust, light and odour pollution, traffic generation or inadequate access, where such mitigation is identified as being necessary;*
- e) Provide satisfactory vehicular access with adequate parking, manoeuvring, and servicing arrangements taking into account of the proposed use and location;*
- f) Do not have an adverse impact on health, through its impact or the effect of existing problems e.g. land contamination, or poor air quality;*

⁸ Paragraph: 006 Reference ID: 30-006-20190722

g) Provide, or demonstrate the availability of, the service and community infrastructure necessary to meet local needs e.g. local shops, community, leisure and sport facilities and provision of open space;

h) Minimise opportunities for crime against people or property;

i) Take account of ground conditions including unstable or contaminated land - where a potential risk exists, a survey should be carried out and any necessary remedial measures identified and carried out;

j) Incorporate, where appropriate, high quality landscape schemes;

k) Have assessed whether the development may be affected by ground instability;

l) Have considered the availability of water and wastewater infrastructure, and any need for additional capacity; and

m) Do not lead to impacts detrimental to the conservation interests of European Protected Sites.

4.26. The Rochdale Borough Unitary Development Plan was adopted in June 2006 and is still current.

4.27. Policy EC/5 *Employment Developments and Extensions Outside Allocated Areas* states:

Proposals for industrial, business or warehouse development (Use Classes B1, B2 and B8), including changes of use and extensions to existing premises, will be permitted outside the allocated employment areas provided that the following criteria are satisfied:

a) In the case of new development within or adjoining primarily residential areas the development is within Use Class B1 and will, therefore, by definition have no unacceptable impact on the environment or amenity of surrounding land uses by reason of visual appearance, noise, vibration, odour, atmospheric pollution or other nuisance;

b) In the case of extensions to existing premises in Use Class B2 or B8 within or adjoining primarily residential areas the design will include measures to ensure that the impact of the development is the same as that required for a B1 development;

c) In all cases the scale and form of the development is sympathetic to the character, and protects the amenity, of surrounding land uses;

d) Satisfactory vehicular access can be provided and adequate on - site provision is made for car parking, servicing and manoeuvring;

e) The surrounding highway network is capable either as existing or as proposed to be upgraded (including by the developer as a result of a proposal), of accommodating any additional vehicular traffic generated by the proposal without damage to amenity or road safety; and

f) For new development (excluding extensions) the site is, or is capable of being, adequately served by public transport.

BS 4142:2014 Methods for Rating and Measuring Industrial and Commercial Sound

4.28. British Standard (BS) 4142:2014 describes a method for rating and assessing sound of an industrial or commercial nature, which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

4.29. The industrial or commercial sound is assessed outside a dwelling or premises used for residential purposes, upon which sound is incident.

4.30. The procedure contained in BS 4142 is to quantify the "specific sound level", which is the measured or predicted level of sound from the source in question over a one hour period for the daytime and a 15-minute period for the night-time. Daytime is defined in the standard as 07:00 to 23:00 hours, and night-time as 23:00 to 07:00 hours.

4.31. The specific sound level is converted to a rating level by adding penalties on a sliding scale to account for either potentially tonal or impulsive elements. The standard sets out objective methods for determining the presence of tones or impulsive elements, but notes that it is acceptable to subjectively determine these effects.

4.32. The penalty for tonal elements is between 0dB and 6dB, and the standard notes: "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."

- 4.33. The penalty for impulsive elements is between 0dB and 9dB, and the standard notes: "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."
- 4.34. The background sound level should be established in terms of the LA90 noise index. The standard states that the background sound level should be measured over a period of sufficient length to obtain a representative value. This should not normally be less than 15-minute intervals. The standard states that: "A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."
- 4.35. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

a) Typically, the greater this difference, the greater the magnitude of the impact.

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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."

The standard goes on to note that: "Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night."

- 4.36. In addition to the margin by which the Rating Level of the specific sound source exceeds the Background Sound Level, the 2014 edition places emphasis upon an appreciation of the context, as follows:

"An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making

assessments and arriving at decisions, therefore, it is essential to place the sound in context."

- 4.37. BS 4142 requires uncertainties in the assessment to be considered, and where the uncertainty is likely to affect the outcome of the assessment, steps should be taken to reduce the uncertainty.

Noise affecting schools

- 4.38. The applicable noise criteria for new-build and refurbished schools are set out in Building Bulletin 93 *Acoustic design of schools: performance standards* (BB93). This includes guidance on acceptable levels of intrusive noise affecting classrooms and other noise-sensitive spaces, and on acceptable levels of ambient noise in external teaching areas.
- 4.39. For new-build nurseries, the permissible indoor ambient noise level within these spaces is 35dB $L_{Aeq,30min}$ when windows are open. Assuming a 15dB reduction for a tilted or half-open window (*WHO Guidelines for Community Noise: 2018*) this will be achieved when the external ambient noise level does not exceed 50dB $L_{Aeq,30min}$ at the building façade.

BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings.

- 4.40. This Standard provides recommended guideline values for internal noise levels within dwellings which are similar in scope to guideline values contained within the World Health Organisation (WHO) document, *Guidelines for Community Noise* (1999⁹). These guideline noise levels are shown in Table 5, below:

Table 5 BS 8233:2014 Desirable Internal Ambient Noise Levels for Dwellings

Activity	Location	07:00 to 23:00 hours	23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$

- 4.41. BS 8233:2014 advises that: *"regular individual noise events...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."* While the current edition of the standard gives no specific guidance on internal night-time L_{Amax} sound levels, the previous edition¹⁰ recommended that:

⁹ World Health Organisation Guidelines for Community Noise, 1999

¹⁰ BS 8233:1999 Sound insulation and noise reduction for buildings – Code of practice

For a reasonable standard in bedrooms at night, individual noise events (measured with F time-weighting) should not normally exceed 45 dB $L_{A_{Max}}$.

Proposed plant noise criteria

- 4.42. In the absence of specific plant noise emissions criteria, it is proposed that plant should be of a "low impact" when assessed against BS 4142:2014. As such, the Rating level of plant noise should be no louder than the existing background noise level at residential premises.
- 4.43. As the daytime background noise levels are high, as a robust assessment it is proposed to limit plant to no louder than 45dBA at the nearest residential receptors during the daytime period.

5.0 Plant noise impact assessment

- 5.1. Plant noise levels at the nearest noise sensitive receptors have been predicted based on manufacturer's noise data for the proposed equipment. The assessment has taken into consideration distance attenuation and directivity.
- 5.2. The proposed plant is not anticipated to exhibit any tonal or impulsive characteristics provided it is well maintained. All proposed external plant will be inverter driven and, therefore, will gently ramp up and down depending on the demands on the various systems. To provide a robust assessment, a 3dB acoustic feature correction as described in BS 4142:2014+A1:2019 for the possible presence of "...characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment..." has been applied.
- 5.3. Table 6 summarises the results of the assessment at the most affected properties. All other nearby receptors benefit from increased distance and / or screening to the plant such that resulting noise levels will be lower than at the receptors considered. The full set of calculations can be found in [Appendix I](#).

Table 6 Predicted plant noise levels at receptors

Receptor	Period	Predicted rating level at receptor, $L_{Ar,Tr}$ (dB)	Criterion (dB $L_{Ar,Tr}$)	Difference, dB
R1 (nursery)	Daytime (07.00 – 23.00 hours)	35*	50	-15
	Night-time (23.00 – 07.00 hours)	35*	-	-
R2 (residential)	Daytime (07.00 – 23.00 hours)	33	45	-12
	Night-time (23.00 – 07.00 hours)	33	40	-7
R3 (residential)	Daytime (07.00 – 23.00 hours)	34	45	-11
	Night-time (23.00 – 07.00 hours)	34	40	-6

*Specific level, not rating level

6.0 Car park noise impact assessment

Opening hours

- 6.1. Noise from vehicles in car parks, and noise from customers, falls outside the scope of BS 4142:2014 + A1:2019. Guidance in BS 8233:2014 confirms that for sporadic sources it may not be appropriate to set specific noise limits and that bespoke limits may be set instead. Therefore, for the purposes of this assessment and in line with guidance summarised in Table 5 of this report, a level of 35dB $L_{Aeq, 1hr}$ inside the nearest noise-sensitive dwellings is proposed as a *Lowest Observed Adverse Effect Level*, with a *Significant Observed Adverse Effect Level* of 50dB¹¹ L_{Aeq} .
- 6.2. The noise from the car park will comprise the noise produced from vehicles entering and departing the car park, engines starting, car doors closing etc. The patrons of the store may also converse with each other or on the phone whilst they walk back and forth from their vehicles. Other patrons who may not drive may also be present. It is unlikely that all the car park spaces will be used in the later hours. Therefore, for the purposes of the assessment, a set of reasonably worst-case assumptions will have to be made in relation to the number of vehicles which may use the car park in any one-hour period (particularly outside the peak opening hours).
- 6.3. Table 7 below details typical source noise level used in this assessment with the data presented in terms of SEL.

¹¹ HS2 noise impact assessment which has been approved by the secretary of state implies a 15dB difference between the LOAEL and SOAEL for transportation noise.

Table 7 Reference noise data for assessment

Activity	Measurement Data			
	L _{Aeq,T}	Dist (m)	Time (s)	SEL (dB)
Car movement	58	3	15	70
A person talking	60	1	15	72

Predicted impact of opening hours

- 6.4. The information in Table 7 was used to calculate a source noise level based on the number of activity events over the assessment period.
- 6.5. Around 36 of the spaces in the wider car park are likely to be used by Farmfoods customers; it is understood that a proportion of customers are likely to arrive on foot. An estimate of the typical number of movements to each space in a peak hour has been made and used to calculate the resultant external noise level at the receptors. As a robust assessment, it has been assumed that every parking space will be used by three vehicles in a nominal peak hour. For a car park of this size, this is considered to be a conservative estimate.
- 6.6. The car park has been divided into five zones for the purposes of the assessment; these can be seen in [Appendix E](#).
- 6.7. The calculations are included in [Appendix F](#) and summarised in Table 8. As described in BS 8233:2014, the typical noise reduction provided by an open window is around 15 dBA, and this has been used to predict the resulting highest internal noise levels at the receptor.

Table 8 Predicted car park sound levels at receptor

Receptor	L _{Aeq,1hr}	
	External Noise Level, dB	Internal Noise Level, dB
R1*	38	23
R2	29	14
R3	31	16

*Nursery, non-residential receptor

- 6.8. Using the method described above, the predicted car park noise level, during the noisiest hour, is below the *Lowest Observed Adverse Effect Level* inside the nearest existing residential receptors, even with windows open.
- 6.9. During less-busy periods, the noise level will be lower than the levels predicted in Table 8.

7.0 Noise assessment of deliveries

Sound pressure levels of activities associated with store deliveries

- 7.1. The sound pressure levels associated with refrigerated lorry deliveries were established by measurement of a delivery at similar stores already in operation. The measurements included all aspects of the delivery including, but not limited to, the arrival, unloading, tail lift, movement of cages and the departure of the lorry. The sound pressure levels were normalised to a distance of 10 m from the delivery area and have been converted to Sound Exposure Levels (SEL) for ease of comparison/calculation. Typical L_{Amax} levels were also established.
- 7.2. Table 9 details typical source noise levels, used within the assessment, with the data presented in terms of SEL and maximum individual noise event levels (L_{AFmax}).

Table 9 Reference noise data for delivery activities (at 10 m)

Noise Source	SEL, dB(A)	L_{Amax} , dB(A)
Lorry arrival	69	61
Lorry reversing & manoeuvring into loading bay	65	58
Door open/close	60	68
Unloading cages on to lift	71	74
Unloading pallets on to lift	75	73
Lift up	73	65
Lift down	71	71
Unloading cages into BoH	78	75
Engine starts and lorry departs	74	71

Delivery noise impact assessment

- 7.3. The information contained in Table 9 is based on measurements taken during deliveries at existing stores and, as such, includes all activities which occur during a delivery. Any crashes and bangs are accounted for in the SEL and L_{eq} data used in the assessment. This was used to 'build-up' a source noise level based on the number of activity events over the required assessment period using the following equation:

7.4.
$$L_{Aeq,T} = SEL + 10 \cdot \log\left(\frac{1}{T}\right) + 10 \cdot \log(N) \quad (\text{Equation 1})$$

Where:

SEL is the L_{Aeq} over a one second period, and represents the noise energy from an event (e.g. cage movement) compressed into one second;

T is the reference time period in seconds; and

N is the number of movements in the time period, T.

- 7.5. A +6dB feature correction has been applied in the calculations for activities where impulsivity may be clearly perceptible (as per section 9.2 of BS4142:2014 +A1:2019). Other activities have a +3dB correction applied to account for characteristics "that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment".
- 7.6. The loading area is located approximately 18m from the nearest existing noise receptor (Receptor R1). The closest approach of the lorry while manoeuvring is approximately 16m from the Receptor R2. Approximate distances used in the calculations are shown in Table 10 below. The example data used is normalised to a distance of 10m. Distance corrections are then applied to determine the sound level at the receptors.

Table 10 Distances to façades of nearest receptor

Item	Distance to R1 (m)	Distance to R2 (m)	Distance to R3 (m)
Lorry arrives and turns	30	16	28
Lorry reverses and manoeuvres into loading bay	17	36	28
Door open / close	17	36	29
Unloading cages on to lift	18	48	40
Unloading pallets on to lift	18	48	40
Lift up	18	48	40
Lift down	18	48	40
Unloading cages into BoH	18	48	40
Engine starts and lorry departs	17	14	29

- 7.7. Table 11 presents the calculated cumulative L_{Aeq} and 'maximum' L_{Amax} noise levels at the receptors. Detailed BS4142 calculations have been included for daytime and night-time assessment periods, with assessments presented for all relevant proposed delivery periods. Full calculations are included within [Appendix G](#).

Table 11 Predicted delivery noise levels

Receptor	Period	Predicted noise levels at upper window of most affected residential dwelling	
		$L_{Aeq,T}$ dB	Range of $L_{A_{fmax}}$ (dB)
R1 façade	Night-time	-	-
	Daytime	51	52 - 70
R2 façade	Night-time	47	47 - 68
	Daytime	43	47 - 68
R3 facade	Night-time	47	49 - 63
	Daytime	44	49 - 63

BS 4142:2014 delivery noise assessment

- 7.8. Table 12 and Table 13 present the assessments of the likely impact at receptor R3 (the most affected residential receptor) in accordance with the BS 4142:2014 methodology.

*Table 12 **R3** Assessment of predicted external delivery noise levels using BS 4142:2014 - Daytime.*

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	$L_{A90} = 55$ dB	8.1, 8.2	Representative background sound level determined from a range of measurements (daytime)
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T} = 44$ dB	7.3.6	Calculations presented in Appendix G
Rating Level	$L_{Aeq,Tr} = 49$ dB		Refer to Appendix G
Excess of Rating Level over background sound level	$(49-55)$ dB = -6 dB		
Assessment of impact: Low impact, depending on context		11	

*Table 13 **R3** Assessment of predicted external delivery noise levels using BS 4142:2014 – Night-time.*

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	$L_{A90} = 40 \text{ dB}$	8.1, 8.2	Minimum background sound level determined from a range of measurements (night-time)
Assessment made during the night-time, so the reference interval is 15 minutes		7.2	
Specific Sound Level	$L_{Aeq,T} = 47 \text{ dB}$	7.3.6	Calculations presented in Appendix G
Rating Level	$L_{Aeq,Tr} = 52 \text{ dB}$		Refer to Appendix G
Excess of Rating Level over background sound level	$(52 - 40) \text{ dB} = +12 \text{ dB}$		
Assessment of impact: Potential significant adverse impact, depending on context		11	

7.9. Daytime and night-time Rating levels for delivery activity at receptor R3 are calculated in [Appendix G](#); note that night-time Rating levels are higher than daytime due to activity occurring in a shorter assessment period.

7.10. As the standard advises, the estimated impact must be considered within the context of the site and the surrounding acoustic environment. The following must, therefore, also be taken into consideration when determining the potential impact that may be experienced:

- The assessments are undertaken at the most affected residential windows. The impact on all other residential windows will be lower due to distance losses and noise screening provided by the building structure;
- The number of expected deliveries by large articulated lorries is low (typically three per 24-hour period);
- The assessment is undertaken at upper floor windows of the dwellings, with any screening from the boundary wall being excluded from the assessment. During the daytime period, residents are more likely to be in ground floor rooms and benefit from some screening.

7.11. Where possible uncertainty in this assessment has been minimised by taking the following steps:

- The measurement of the background sound levels was undertaken over a period including the quietest times of the day and night;

- The sound level meter and calibrator used have a traceable laboratory calibration and were field calibrated before and after the measurements;
- Uncertainty in the calculated impact has been reduced by the use of a well-established calculation method;
- Care was taken to ensure that the measurement position was not at a location where higher noise levels are present than those at the receptors.

BS 8233:2014 and WHO delivery noise assessment

- 7.12. A BS 4142:2014 assessment considers only external noise levels at the location of sensitive receptors and does not consider the attenuation offered by the building envelope.

L_{Amax} assessment

- 7.13. The predicted L_{Amax} levels resulting from delivery activities at the nearest residential windows are lower than the typical measured daytime L_{AFmax} levels during the course of the environmental noise survey. Therefore, the anticipated L_{Amax} levels resulting from delivery activities would be of negligible significance. It is noted that BS 8233:2014 gives no specific daytime guidance on the impact of L_{Amax} levels, which are predominantly associated with sleep disturbance.

L_{Aeq} assessment

- 7.14. The sound attenuation offered by a building will be governed by its weakest element, acoustically speaking. This is invariably the glazing and any natural ventilation provision. With windows open for ventilation, and assuming a 15dB attenuation (as referenced in WHO) with three deliveries per day, internal noise levels of around 22dB L_{Aeq,16 hours} would be expected within the nearest residential room to the delivery area.

Assessment at nursery

- 7.15. It can be seen from Table 11 that the delivery noise level at the nursery is predicted to be 51dBA, marginally in excess of the limit set out in Section 4.39. It should be noted, however, that the average daytime L_{Aeq,16hr} in the area is 64dB and, as such, not only are windows to the nursery likely to be kept closed when quiet conditions are required but the delivery activity will not cause an increase in the prevailing noise level at the nursery.
- 7.16. Therefore, deliveries will not cause a negative effect on the adjacent nursery.

8.0 Discussion of uncertainties

- 8.1. Where possible uncertainty in the above assessments has been minimised by taking the following steps:

- The measurement of the background sound levels was taken over a 24 hour period.
- The meter and calibrator used have a traceable laboratory calibration and was field calibrated before and after the measurements.
- Uncertainty in the calculated impacts has been reduced by the use of well-established calculation methods.

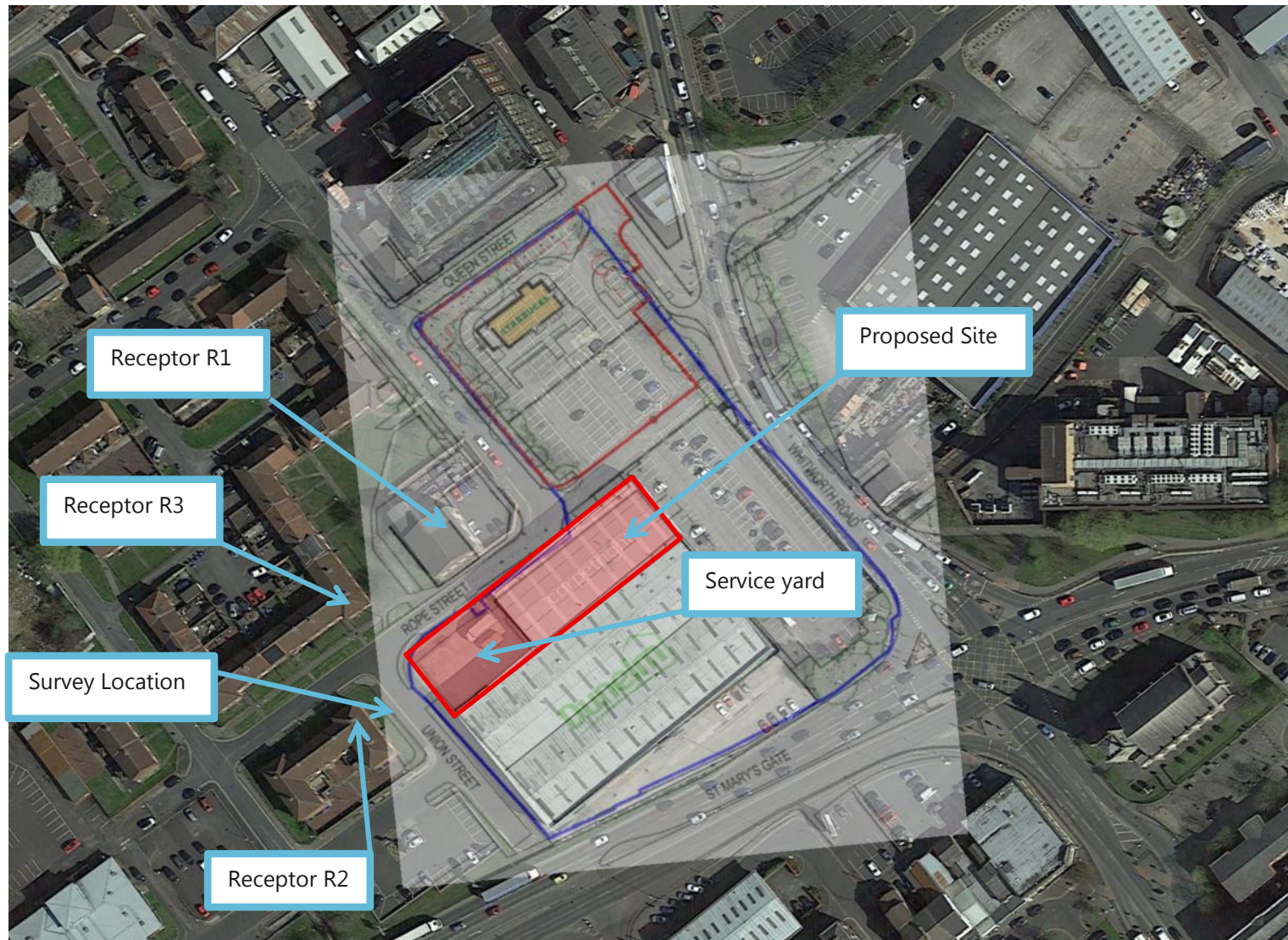
9.0 Summary

- 9.1. Noise Solutions Ltd (NSL) has been commissioned to undertake a noise impact assessment for the proposed Farmfoods unit at St Marys Gate, Rochdale.
- 9.2. In support of these assessment works, a baseline noise survey was undertaken to determine the prevailing environmental noise levels at the nearest noise sensitive receptors to the store during representative periods. Reference noise measurements of delivery activity at similar operating stores were used in the assessment.
- 9.3. The results of the survey were used to undertake an assessment of the likely noise impact from deliveries at the store. For the purposes of the assessment, the methodology used in BS 4142:2014 was utilised. Further assessments were undertaken taking into consideration guidance from the World Health Organisation and BS 8233:2014.
- 9.4. The results of the assessments were analysed and reviewed in line with the aims and advice contained within the National Policy Statement for England, the National Planning Policy Framework, and the Planning Practice Guidance.
- 9.5. Noise from deliveries during the night-time are likely to result in an adverse noise impact on the occupants of the nearest houses.
- 9.6. During the daytime, noise from and deliveries at the site are likely to result in no worse than a low impact, according to the methodology set out in BS 4142:2014+A1:2019.
- 9.7. Noise from plant is likely to result in no worse than a low impact according to the methodology set out in BS 4142:2014+A1:2019 even running throughout the daytime and night-time periods.
- 9.1. An assessment of the noise impact of customer visits shows that noise from the car park is below the *Lowest Observed Adverse Effect* level inside the nearest noise-sensitive receptors, even during the busiest one-hour periods and with the receptor windows open.

Appendix A Acoustic terminology

Parameter	Description
Ambient Noise Level	The totally encompassing sound in a given situation at a given time, usually composed of a sound from many sources both distant and near ($L_{Aeq,T}$).
Decibel (dB)	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 $20 \mu\text{Pa}$. The threshold of normal hearing is in the region of 0 dB and 140 dB is the threshold of pain. A change of 1 dB is only perceptible under controlled conditions.
dB(A), L_{Ax}	Decibels measured on a sound level meter incorporating a frequency weighting (A weighting) which differentiates between sounds of different frequency (pitch) in a similar way to the human ear. Measurements in dB(A) broadly agree with people's assessment of loudness. A change of 3 dB(A) is the minimum perceptible under normal conditions, and a change of 10 dB(A) corresponds roughly to halving or doubling the loudness of a sound. The background noise in a living room may be about 30 dB(A); normal conversation about 60 dB(A) at 1 metre; heavy road traffic about 80 dB(A) at 10 metres; the level near a pneumatic drill about 100 dB(A).
Fast Time Weighting	Setting on sound level meter, denoted by a subscript F, that determines the speed at which the instrument responds to changes in the amplitude of any measured signal. The fast time weighting can lead to higher values than the slow time weighting when rapidly changing signals are measured. The average time constant for the fast response setting is 0.125 (1/8) seconds.
Free-field	Sound pressure level measured outside, far away from reflecting surfaces (except the ground), usually taken to mean at least 3.5 metres
Façade	Sound pressure level measured at a distance of 1 metre in front of a large sound reflecting object such as a building façade.
$L_{Aeq,T}$	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.
$L_{max,T}$	A noise level index defined as the maximum noise level recorded during a noise event with a 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.
$L_{10,T}$	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 "average maximum" noise level. Generally used to describe road traffic noise. $L_{A10,18h}$ is the A –weighted arithmetic average of the 18 hourly $L_{A10,1h}$ values from 06:00-24:00.
$L_{90,T}$	A noise level index. The noise level that is exceeded for 90% of the measurement time interval, T. It gives an indication of the lower levels of fluctuating noise. It is often used to describe the background noise level and can be considered to be the "average minimum" noise level and is a term used to describe the level to which non-specific noise falls during quiet spells, when there is lull in passing traffic for example.

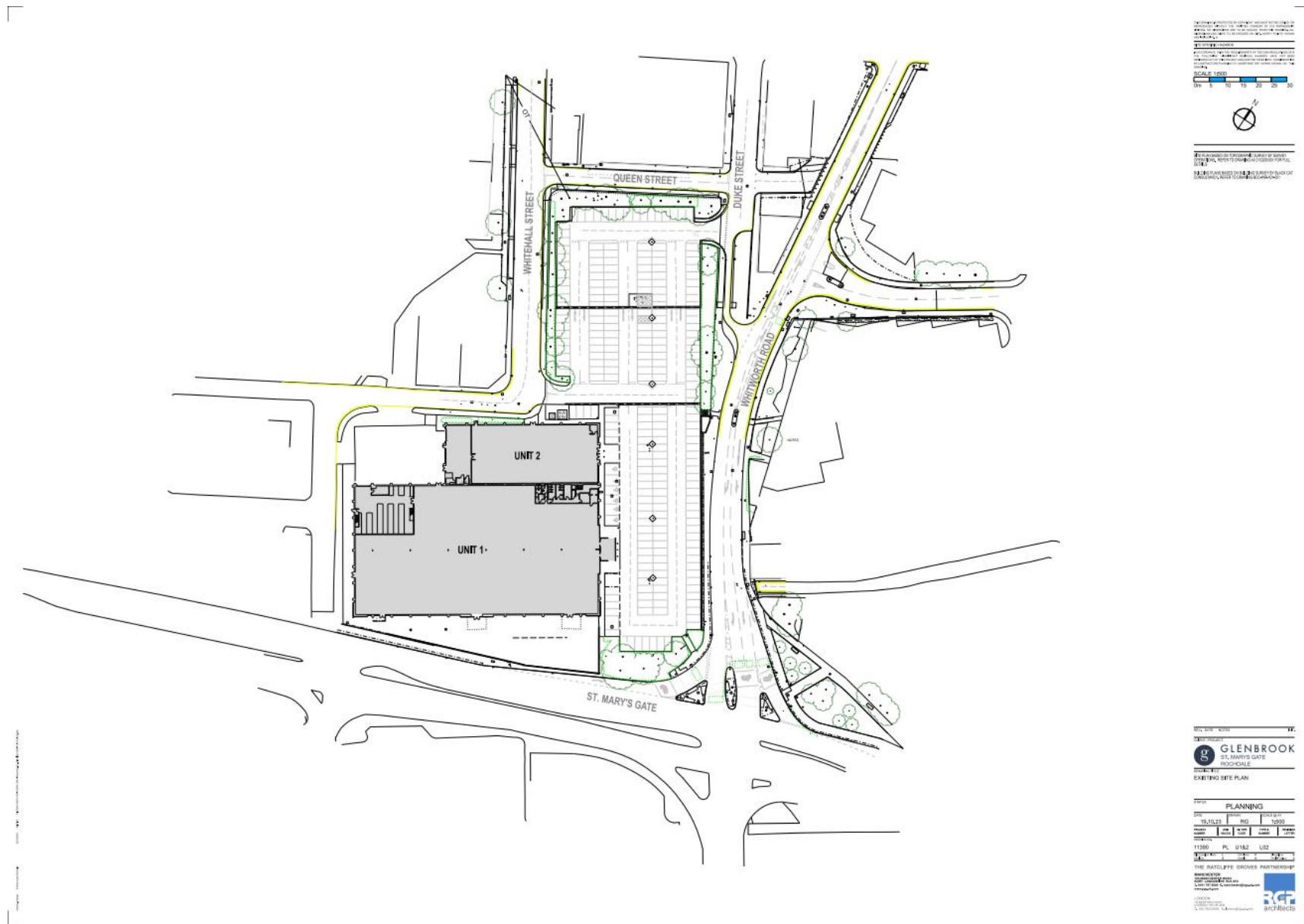
Appendix B Aerial photograph of site with overlaid development plan



Appendix C

Development plan





Appendix D Environmental sound survey

Details of environmental sound survey

- D.1 Measurements of the sound pressure levels affecting the nearest residential premises were undertaken between 16.30 hours on Monday 18th September and 11.00 hours on Tuesday 19th September 2023.
- D.2 The sound level meters were programmed to record the A-weighted L_{eq} , L_{90} , L_{10} and L_{max} noise indices for consecutive 15-minute sample periods for the duration of the survey.

Measurement position

- D.3 Unattended measurements were made on Union Street shown in [Appendix B](#). The meters were secured to lamp columns with the microphone approximately 3m above the ground.
- D.4 In accordance with BS 7445-2:1991 '*Description and measurement of environmental noise – Part 2: Guide to the acquisition of data pertinent to land use*', the measurements were undertaken under free-field conditions.

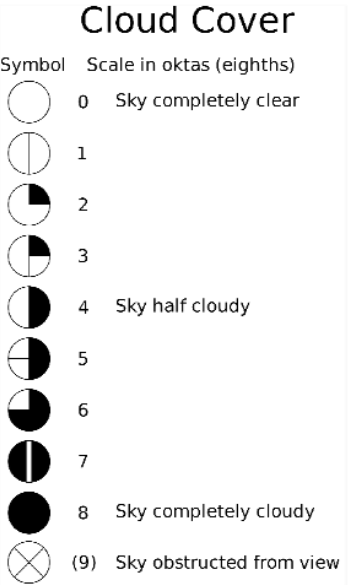
Equipment

- D.5 Details of the equipment used during the survey are provided in the table below. The sound level meter was calibrated before and after the survey; no significant change (+/-0.2 dB) in the calibration level was noted.

Description	Model / serial no.	Calibration date	Calibration certificate no.
Class 1 Sound level meter	Rion NL-52 / 00654035	30/08/2022	TCRT22/1544
Condenser microphone	Rion UC-59 / 14826		
Preamplifier	Rion NH-25 / 87474		
Calibrator	Rion NC-74 /34235932	04/10/2022	1503480-1

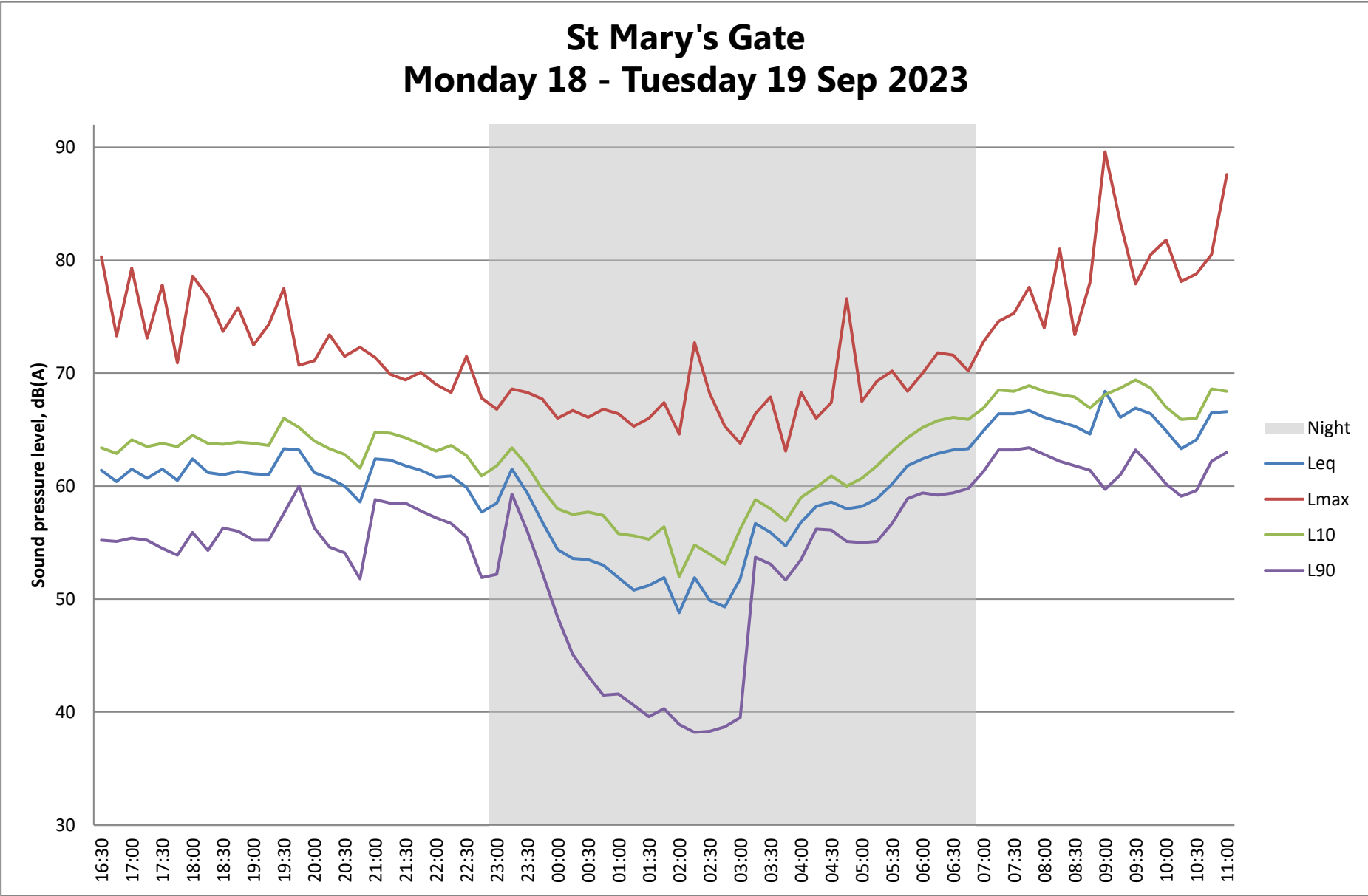
Weather Conditions

- D.6 Weather conditions were determined both at the start and on completion of the survey. It is considered that the meteorological conditions were appropriate for environmental noise measurements. The table below presents the weather conditions recorded on site at the beginning and end of the survey.

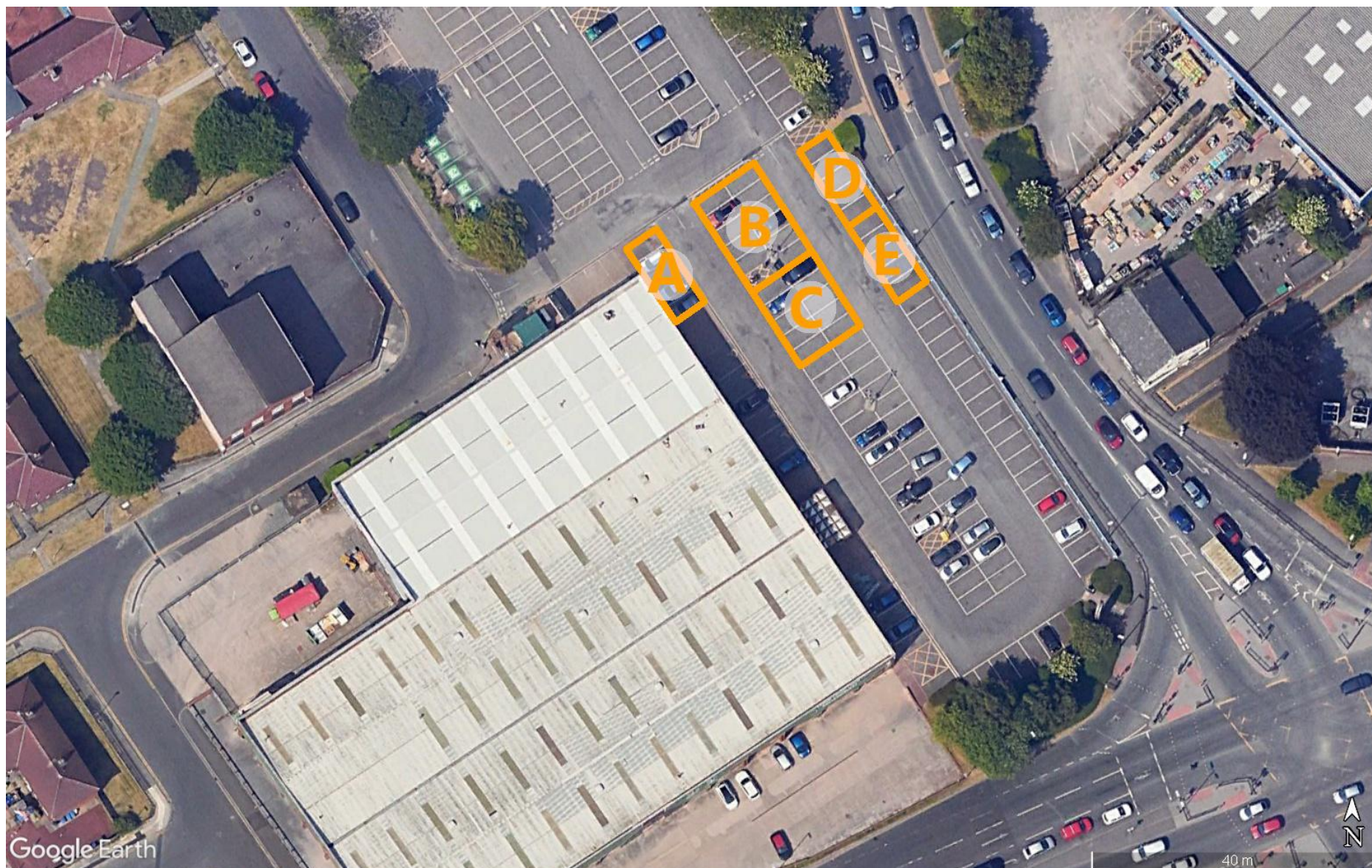
Weather Conditions				
Measurement Location	Date/Time	Description	Start of Survey	End of Survey
As indicated on Appendix B	16.30 18 Sep - 11.00 19 Sep 2023	Temperature (°C)	14	15
 Cloud Cover Symbol Scale in oktas (eighths) 0 Sky completely clear 1 2 3 4 Sky half cloudy 5 6 7 8 Sky completely cloudy (9) Sky obstructed from view		Precipitation:	No	Yes
		Cloud cover (oktas - see guide)	6	8
		Presence of fog/snow/ice	No	No
		Presence of damp roads/wet ground	No	Yes
		Wind Speed (m/s)	6	2
		Wind Direction	SE	SE
		Conditions that may cause temperature inversion (i.e. calm nights with no cloud)	No	No

Results and observations

- D.7 The results of the environmental survey are considered to be representative of the background sound pressure levels at the façades of the nearest noise sensitive receptors during the quietest times at which the plant may operate in the future. The noise climate during the survey period was dominated by local road traffic with occasional noise from aircraft, birdsong and wind. There were also significant noise from rain at pick-up. The results of the survey are presented in a time history graph overleaf.
- D.8 The results of the unattended survey are presented in time history graphs overleaf.



Appendix E Car park zones



Appendix F Car park activity noise assessment

Receptor R1 – Nursery

Activity	Measurement Data				Normalised at 10m	No. Events / Hour	L _{Aeq, 1hr} @ 10m	Receptor dist. m	Distance corr'n, dB	Screening corr'n, dB	Resultant at R1, dB(A)
	L _{Aeq,T}	Dist. (m)	Time (s)	SEL	SEL, 10m						
ZONE A (Spaces 1-5)											
Car Passby	58	3	15	70	60	30*	39	30	-10	0	29
People talking	60	1	15	72	52	30*	31	52	-14	0	17
ZONE B (Spaces 6 to 16)											
Car Passby	58	3	15	70	60	66	42	30	-10	0	32
People talking	60	1	15	72	52	66	35	65	-16	0	19
ZONE C (Spaces 17 to 26)											
Car Passby	58	3	15	70	60	60	42	30	-10	0	32
People talking	60	1	15	72	52	60	34	69	-17	-5	12
ZONE D (Spaces 27 to 31)											
Car Passby	58	3	15	70	60	30	39	30	-10	0	29
People talking	60	1	15	72	52	30	31	77	-18	0	13
ZONE E (Spaces 32 to 36)											
Car Passby	58	3	15	70	60	30	39	30	-10	0	29
People talking	60	1	15	72	52	30	31	80	-18	-5	8

Total dB L_{Aeq,1hr}

38

*5no. spaces, each used 3 times, with each car entering and exiting the car park. 5x3x2=30 movements.

Receptor R2 – Houses to west across Union Street

Activity	Measurement Data				Normalised at 10m	No. Events / Hour	L _{Aeq, 1hr} @ 10m	Receptor dist. m	Distance corr'n, dB	Screening corr'n, dB	Resultant at R1, dB(A)
	L _{Aeq,T}	Dist. (m)	Time (s)	SEL	SEL, 10m						
ZONE A (Spaces 1-5)											
Car Passby	58	3	15	70	60	30*	39	85	-19	0	20
People talking	60	1	15	72	52	30*	31	102	-20	-5	6
ZONE B (Spaces 6 to 16)											
Car Passby	58	3	15	70	60	66	42	85	-19	0	23
People talking	60	1	15	72	52	66	35	116	-21	-5	9
ZONE C (Spaces 17 to 26)											
Car Passby	58	3	15	70	60	60	42	85	-19	0	23
People talking	60	1	15	72	52	60	34	116	-21	-5	8
ZONE D (Spaces 27 to 31)											
Car Passby	58	3	15	70	60	30	39	85	-19	0	20
People talking	60	1	15	72	52	30	31	120	-22	-5	4
ZONE E (Spaces 32 to 36)											
Car Passby	58	3	15	70	60	30	39	85	-19	0	20
People talking	60	1	15	72	52	30	31	120	-22	-5	4

Total dB L_{Aeq,1hr}

29

**5no. spaces, each used 3 times, with each car entering and exiting the car park. 5x3x2=30 movements.*

Receptor R3 – Houses to north west across Hope Street

Activity	Measurement Data				Normalised at 10m	No. Events / Hour	L _{Aeq, 1hr} @ 10m	Receptor dist. m	Distance corr'n, dB	Screening corr'n, dB	Resultant at R1, dB(A)
	L _{Aeq,T}	Dist. (m)	Time (s)	SEL	SEL, 10m						
ZONE A (Spaces 1-5)											
Car Passby	58	3	15	70	60	30*	39	67	-17	0	22
People talking	60	1	15	72	52	30*	31	86	-19	0	12
ZONE B (Spaces 6 to 16)											
Car Passby	58	3	15	70	60	66	42	67	-17	0	25
People talking	60	1	15	72	52	66	35	99	-20	0	15
ZONE C (Spaces 17 to 26)											
Car Passby	58	3	15	70	60	60	42	67	-17	0	25
People talking	60	1	15	72	52	60	34	102	-20	0	14
ZONE D (Spaces 27 to 31)											
Car Passby	58	3	15	70	60	30	39	67	-17	0	22
People talking	60	1	15	72	52	30	31	111	-21	0	10
ZONE E (Spaces 32 to 36)											
Car Passby	58	3	15	70	60	30	39	67	-17	0	22
People talking	60	1	15	72	52	30	31	114	-21	0	10

Total dB L_{Aeq,1hr}

31

**5no. spaces, each used 3 times, with each car entering and exiting the car park. 5x3x2=30 movements.*

Appendix G Delivery noise impact calculations

R1 (nursery) façade - Daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	BS4142 Feature (dB)	SEL + Feature (dB)	Resultant L _{Amax} at receptor (dB)
	SEL @ 10m	L _{Amax} @10m	No. of occurrences	Correction (dB)	Distance (m)	Correction (dB)					
Lorry Arrives and turns all forwards	69	61	1	0	30	-10	0	60	-	-	52
Lorry reverses and manoeuvres into loading bay	65	58	1	0	17	-5	0	60	-	-	53
Door open close	60	68	2	3	17	-5	0	59	-	-	63
Unloading cages on to lift	71	74	10	10	18	-5	0	76	-	-	69
Unloading pallets on to lift	75	73	10	10	18	-5	0	80	-	-	68
Lift up	73	65	10	10	18	-5	0	78	-	-	60
Lift down	71	71	10	10	18	-5	0	76	-	-	66
Unloading cages into BoH	78	75	10	10	18	-5	0	83	-	-	70
Engine starts and lorry leaves	74	71	1	0	17	-5	0	69	-	-	66
Cumulative SEL								86			
L _{Aeq,1hr}								51			
Range of L _{Amax}											52 - 70

R2 façade – daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	BS4142 Feature (dB)	SEL + Feature (dB)	Resultant L _{Amax} at receptor (dB)
	SEL @ 10m	L _{Amax} @10m	No. of occurrences	Correction (dB)	Distance (m)	Correction (dB)					
Lorry Arrives and turns all forwards	69	61	1	0	16	-4	0	65	0	65	57
Lorry reverses and manoeuvres into loading bay	65	58	1	0	36	-11	0	54	3	57	47
Door open close	60	68	2	3	36	-11	0	52	0	52	56
Unloading cages on to lift	71	74	10	10	48	-14	0	68	6	74	60
Unloading pallets on to lift	75	73	10	10	48	-14	0	71	6	77	60
Lift up	73	65	10	10	48	-14	0	69	3	72	52
Lift down	71	71	10	10	48	-14	0	68	3	71	58
Unloading cages into BoH	78	75	10	10	48	-14	0	74	6	80	62
Engine starts and lorry leaves	74	71	1	0	14	-3	0	71	0	71	68
Cumulative SEL								79		83	
L _{Aeq,1hr}								43		48	
Range of L _{Amax}											47 - 68

R2 façade – Night-time (second half of delivery)

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	BS4142 Feature (dB)	SEL + Feature (dB)	Resultant L _{Amax} at receptor (dB)
	SEL @ 10m	L _{Amax} @10m	No. of occurrences	Correction (dB)	Distance (m)	Correction (dB)					
Lorry Arrives and turns all forwards	69	61	0	n/a	16	-4	0	0	0	0	0
Lorry reverses and manoeuvres into loading bay	65	58	0	n/a	36	-11	0	0	3	3	0
Door open close	60	68	1	0	36	-11	0	49	0	49	56
Unloading cages on to lift	71	74	5	7	48	-14	0	65	6	71	60
Unloading pallets on to lift	75	73	5	7	48	-14	0	68	6	74	60
Lift up	73	65	5	7	48	-14	0	66	3	69	52
Lift down	71	71	5	7	48	-14	0	65	3	68	58
Unloading cages into BoH	78	75	5	7	48	-14	0	71	6	77	62
Engine starts and lorry leaves	74	71	1	0	14	-3	0	71	0	71	68
Cumulative SEL								76		80	
L _{Aeq,1hr}								47		51	
Range of L _{Amax}											47 - 68

R3 façade – Daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	BS4142 Feature (dB)	SEL + Feature (dB)	Resultant L _{Amax} at receptor (dB)
	SEL @ 10m	L _{Amax} @10m	No. of occurrences	Correction (dB)	Distance (m)	Correction (dB)					
Lorry Arrives and turns all forwards	69	61	1	0	28	-9	0	60	0	60	52
Lorry reverses and manoeuvres into loading bay	65	58	1	0	28	-9	0	56	3	59	49
Door open close	60	68	2	3	29	-9	0	54	0	54	58
Unloading cages on to lift	71	74	10	10	40	-12	0	69	6	75	62
Unloading pallets on to lift	75	73	10	10	40	-12	0	73	6	79	61
Lift up	73	65	10	10	40	-12	0	71	3	74	53
Lift down	71	71	10	10	40	-12	0	69	3	72	59
Unloading cages into BoH	78	75	10	10	40	-12	0	76	6	82	63
Engine starts and lorry leaves	74	71	1	0	29	-9	0	64	0	64	61
Cumulative SEL								80		85	
L _{Aeq,1hr}								44		49	
Range of L _{Amax}											49 - 63

R3 façade – Night-time, second half of delivery

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (dB)	BS4142 Feature (dB)	SEL + Feature (dB)	Resultant L _{Amax} at receptor (dB)
	SEL @ 10m	L _{Amax} @10m	No. of occurrences	Correction (dB)	Distance (m)	Correction (dB)					
Lorry Arrives and turns all forwards	69	61	0	n/a	28	-9	0	0	0	0	0
Lorry reverses and manoeuvres into loading bay	65	58	0	n/a	28	-9	0	0	3	3	0
Door open close	60	68	1	0	29	-9	0	51	0	51	58
Unloading cages on to lift	71	74	5	7	40	-12	0	66	6	72	62
Unloading pallets on to lift	75	73	5	7	40	-12	0	70	6	76	61
Lift up	73	65	5	7	40	-12	0	68	3	71	53
Lift down	71	71	5	7	40	-12	0	66	3	69	59
Unloading cages into BoH	78	75	5	7	40	-12	0	73	6	79	63
Engine starts and lorry leaves	74	71	1	0	29	-9	0	64	0	64	61
Cumulative SEL								77		85	
L _{Aeq,1hr}								47		82	
Range of L _{Amax}											49 - 63

Appendix H Plant noise data

Plant Item	Make/Model	Quantity	Operating period	Sound pressure level (dBA)
AC1-5	Mitsubishi PUZ-ZM125VDA	5	24hr	50dBA at 1m
Condenser 1-2	J&E Hall Fusion JEHS-0300-B2-M-1	2	24hr	56dBA at 1m

Appendix I Plant noise calculations

Receptor R1

Plant	Plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS 4142:2014 feature correction	Plant rating noise level at receptor (dBA)
	L _p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
AC1	50	1	21	-26	0	0	0	24
AC2	50	1	22.5	-27	0	0	0	23
AC3	50	1	24	-28	0	0	0	22
AC4	50	1	25.5	-28	3	0	0	25
AC5	50	1	27	-29	3	0	0	24
Condenser 1	56	1	28.5	-29	3	0	0	30
Condenser 2	56	1	30	-30	3	0	0	29
							Cumulative	35

Receptor R2

Plant	Plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS 4142:2014 feature correction	Plant rating noise level at receptor (dBA)
	L _p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
AC1	50	1	49	-34	3	0	3	22
AC2	50	1	49	-34	3	0	3	22
AC3	50	1	49	-34	3	0	3	22
AC4	50	1	49	-34	3	0	3	22
AC5	50	1	49	-34	3	0	3	22
Condenser 1	56	1	49	-34	3	0	3	28
Condenser 2	56	1	49	-34	3	0	3	28
							Cumulative	33

Receptor R3

Plant	Plant noise level at source		DISTANCE		Directivity (dB)	Screening (dB)	BS 4142:2014 feature correction	Plant rating noise level at receptor (dBA)
	L _p (dBA)	Distance (m)	Distance (m)	Correction (dB)				
AC1	50	1	41	-32	3	0	3	24
AC2	50	1	42	-32	3	0	3	24
AC3	50	1	43	-33	3	0	3	23
AC4	50	1	44	-33	3	0	3	23
AC5	50	1	45	-33	3	0	3	23
Condenser 1	56	1	46	-33	3	0	3	29
Condenser 2	56	1	47	-33	3	0	3	29
							Cumulative	34