Refurbishment and Extension of Homebase Unit to Provide Two Retail Units

Sturlas Way
Waltham Cross
EN8 7BF

Plant and Delivery Noise Impact Assessment

On behalf of

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It should be noted that the environmental noise survey discussed in this report was undertaken in September 2020, at a time when the coronavirus pandemic was causing a disruption to typical working patterns and other activity. There is, therefore, a chance that recorded sound levels may be slightly lower than would otherwise be expected where dominated by road or air traffic. While the data should therefore be treated with an element of caution, where it has been used to establish background sound levels it is likely to understate the more-usual background sound levels and therefore result in a robust assessment.

1.0 Introduction

1.1. Noise Solutions Ltd (NSL) has been commissioned by Aldi Stores Limited to undertake a noise impact assessment in relation to a planning application for the refurbishment, extension and external alterations to an existing Use Class E non-food retail unit (Homebase) to enable it to trade as part foodstore (operated by Aldi) and part non-food retail unit (Homebase), alongside modifications to the site's existing external garden centre, car parking layout, and other associated site works. The focus of this report is the external plant and deliveries at the proposed Aldi unit, with the Homebase retail operation (including servicing and mechanical plant) already in existence.

1.2. An environmental noise survey has been undertaken to establish prevailing noise levels affecting the development site. Noise emissions from proposed plant have been predicted at the most affected noise sensitive receptors and assessed in accordance with the requirements of the local authority set out in their Local Plan. Noise emissions from delivery activities have been predicted at the nearest noise sensitive receptors and assessed in accordance with National Policy.

1.3. To assist with the understanding of this report a glossary of acoustic terms can be found in **Appendix A**. An in-depth glossary of acoustic terms can be viewed online at http://www.acoustic-glossary.co.uk.

2.0 Site layout and development proposals

2.1. The objective of the development proposals is to modify, refurbish and extend the existing Homebase non-food retail unit on Sturlas Way in order to enable joint occupation by both Aldi Stores Ltd and Homebase. This will enable Aldi to make a positive investment within Waltham Cross town centre, whilst retaining the home improvement retail offer of Homebase and the existing benefits this brings to the area. The reduced size of Homebase's unit will be more commensurate with their future business requirements and will safeguard the viability of their operation. Given its town centre location the site is both sustainably and accessibly located to the surrounding residential areas that it will serve. The introduction of Aldi at the northern end of the high street will provide an important convenience retail anchor for Waltham Cross town centre which will help drive footfall and spin-off trade for existing businesses, thereby enhancing the centre's overall vitality and viability.

2.2. New external plant, to serve the Aldi store on the eastern side of the building, will be located on the roof to the east end of the building. It is assumed that all plant will potentially operate 24 hours per day. Plant noise levels are given in **Appendix E**.

2.3. The delivery area is at the east end of the store. The Aldi delivery vehicles will approach the site from Sturlas Way, enter through the car park and reverse up to a roller shutter door, providing level access from the trailer bed. This negates the requirement for tail-lift operation and wheeling trolleys across rough external ground finishes which is a scenario that often occurs at other food stores. Trollies are only manoeuvred internally, either inside the trailer or within the store, on flat level surfaces. Up to three deliveries by articulated lorries are expected in any 24-hour period. Deliveries will be made between 06:30 and 23:00 Monday to Saturday and between 08:00 and 17:00 on Sunday.

3.0 Nearest noise sensitive receptors

3.1. The nearest noise sensitive receptors to the proposed store are the flats (Receptor R1) located opposite the site on Sturlas Way to the east and the houses (Receptor R2) to the south of the site on Ruthven Avenue. The closest flat windows are approximately 46 metres from the delivery bay and 49 metres from the proposed external plant area; the closest houses are approximately 55 metres from the delivery bay and 49 metres from the external plant area. It is proposed to include an acoustic screen for the plant located externally on the roof.

3.2. **Appendix B** contains an aerial photograph showing the site and surrounding area.

4.0 Policy context

National Planning Policy Framework

4.1. A new edition of NPPF was published in February 2019 and came into effect immediately. The original National Planning Policy Framework (NPPF[1]) was published in March 2012, with a revision in July 2018 - this document replaced the existing Planning Policy Guidance Note 24 (PPG 24) "Planning and Noise." The 2019 revised edition contains no new directions or guidance with respect to noise, and hence, all previous references remain extant. The paragraph references quoted below relate to the February 2019 edition.

4.1. Paragraph 170 of the NPPF states that the planning system should contribute to and enhance the natural and local environment by, (amongst others) *"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, water or noise pollution or land stability."*

4.2. The NPPF goes on to state in Paragraph 180:

"planning policies and decisions should ...

[1] National Planning Policy Framework, DCLG, March 2012

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 ...

4.3. The NPPF document does not refer to any other documents or British Standards regarding noise other than the Noise Policy Statement for England (NPSE[2]).

4.4. Paragraph 2 of the NPPF states that *"planning law requires that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise."*

4.5. 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".

4.6. Paragraph 117 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"*.

Noise Policy Statement for England

4.7. The Noise Policy Statement for England (NPSE3), 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."*

[2] Noise Policy Statement for England, DEFRA, March 2010
[3] Noise Policy Statement for England, Defra, March 2010

4.8. 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.

4.9. 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."*

4.10. Importantly, the NPSE goes on to state that: *"This does not mean that such adverse effects cannot occur."*

4.11. 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."*

4.12. 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.

Planning Practice Guidance – Noise

4.13. An updated Planning Practice Guidance (PPG[4]) 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:

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

4.14. 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').

4.15. 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.

4.16. The LOAEL is described in PPG[5] 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"*.

4.17. 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."*

4.18. 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 PPG[6] 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."*

4.19. The relevant guidance in the PPG in relation to the adverse effect levels is summarized below:

Table 1 Table of effects (Planning Policy Guidance)

Response	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not Present	No Effect	No Observed Effect	No specific measures required

[5] Paragraph: 005 Reference ID: 30-005-20190722
[6] Paragraph: 006 Reference ID: 30-006-20190722

Response	Examples of Outcomes	Increasing Effect Level	Action
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

4.20. The Planning Practice Guidance[7] 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."

4.21. In addition, the Guide notes that it may also be relevant to consider[8]:

"... 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".

5.0 Acoustic standards and guidance

Borough of Broxbourne Council

5.1. The Borough of Broxbourne Council's 'Local Plan 2018-2033' states:

"Policy EQ4: Noise

I. New development, and extensions or alteration to existing developments, emitting noise levels noticeably above background levels on a consistent or consistently periodic basis, should be sited away from noise sensitive land uses including residential accommodation, schools and health facilities.

II. If this is unavoidable the Council will consider the following criteria when determining an application:

(a) the duration and timing of the noise;
(b) the nature of the noise;
(c) the character and context of the area in which the activities will be sited;
(d) the cumulative impact of noisy development in the area; and
(e) the acceptability of measures incorporated into development proposals to mitigate the impact of noise on noise sensitive land uses."

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

5.2. It is therefore considered appropriate that for new plant the rating noise level (as defined in BS 4142:2014) at the nearest sensitive receptor no higher than the representative background noise level will be acceptable.

BS 8233:2014 Guidance on sound insulation and noise reduction for buildings.

5.3. 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 (1999[9]). These guideline noise levels are shown in Table 2, below:

Table 2 BS 8233 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 $L_{Aeq,8h}$

5.4. 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."*

5.5. The standard also provides advice in relation to design criteria for external noise. It states that:

> *"for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable.*
>
> *In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

[9] World Health Organisation Guidelines for Community Noise, 1999

Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate.

Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation.

In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas, but should be achievable in some areas of the space."

World Health Organisation, Guidelines for Community Noise, 1999 (WHO)

5.6. The World Health Organisation (WHO) Guidelines for Community Noise (1999) recommends suitable internal and external noise levels based on dose response research. The levels recommended in this guidance could be correlated to the LOAEL. Relevant guidance from this document is presented below.

- Sleep Disturbance (Night-time internal LOAEL): If negative effects on sleep are to be avoided, the equivalent sound pressure level should not exceed 30 dB(A) indoors for continuous noise.

- Interference with Communication (Daytime internal LOAEL): Noise tends to interfere with auditory communication, in which speech is a most important signal. However, it is also vital to be able to hear alarming and informative signals such as door bells, telephone signals, alarm clocks, fire alarms etc., as well as sounds and signals involved in occupational tasks. The effects of noise on speech discrimination have been studied extensively and deal with this problem in lexical terms (mostly words but also sentences). For communication distances beyond a few metres, speech interference starts at sound pressure levels below 50 dB for octave bands centred on the main speech frequencies at 500, 1 000 and 2 000 Hz. It is usually possible to express the relationship between noise levels and speech intelligibility in a single diagram, based on the following assumptions and empirical observations, and for speaker-to-listener distance of about 1 metre:

  a) Speech in relaxed conversation is 100% intelligible in background noise levels of about 35 dB(A), and can be understood fairly well in background levels of 45 dB(A).

b) Speech with more vocal effort can be understood when the background sound pressure level is about 65 dB(A).

World Health Organisation (WHO) 2009

5.7. The introduction of the Directive on Environmental Noise, obliges Member States to assess and manage noise levels. With the support of the European Commission, the WHO Regional Office for Europe has developed night noise guidelines for Europe to help Member States develop legislation to control noise exposure.

5.8. The guidelines are based on scientific evidence on the effects of noise and the thresholds above which these effects appear to harm human health.

5.9. There is limited evidence that night noise is related to hypertension, heart attacks, depression, changes in hormone levels, fatigue and accidents.

5.10. The WHO report summarises the threshold levels of night noise above which a negative effect starts to occur or above which the impact becomes dependent on the level of exposure. For example, the threshold level for waking in the night and/or too early in the morning was 42 dB.

5.11. It also establishes that there are differences in the intensity and frequency of noise depending on the source, which lead to different impacts. Road traffic is characterised by low levels of noise per event, but as there are a high number of events, on average it has a greater effect on awakenings than air traffic, which has high levels of noise per event but fewer events.

5.12. Integrating these findings, the report proposed a guideline target limit of outdoor night noise of 40 dB (annual average defined as 'L_{night}' in the Environmental Noise Directive). There is not sufficient evidence that the biological effects observed below this level are harmful to health but adverse effects are observed above 40 dB.

BS 4142:2014 Methods for rating and assessing industrial and commercial sound

5.13. BS 4142:2014 is intended to be used to assess the likely effects of sound on people residing in nearby dwellings. The scope of BS 4142:2014 includes *"sound from fixed plant installations which comprise mechanical and electrical plant and equipment"* and *"sound from the loading and unloading of goods and materials at industrial and/or commercial premises"*.

5.14. The procedure contained in BS 4142:2014 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.

5.15. 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.

5.16. The penalty for tonal elements is between 0 dB and 6 dB, 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."*

5.17. The penalty for impulsive elements is between 0 dB and 9 dB, 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."*

5.18. The assessment outcome results from a comparison of the rating level with the background sound level. The standard states:

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *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.*

5.19. The standard does state that "*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."*

5.20. 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."*

5.21. 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."

5.22. BS 4142:2014 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.

6.0 Existing noise climate

Environmental sound levels

6.1. An environmental noise survey was undertaken to establish the typical background sound levels at a location representative of the noise climate outside the façades of the nearest noise sensitive receptor to the proposed loading bay and plant area during the quietest times at which activity will occur.

6.2. The results of the environmental sound survey are summarised in Table 3. The full set of measurement results and details of the survey methodology are presented in **Appendix D**.

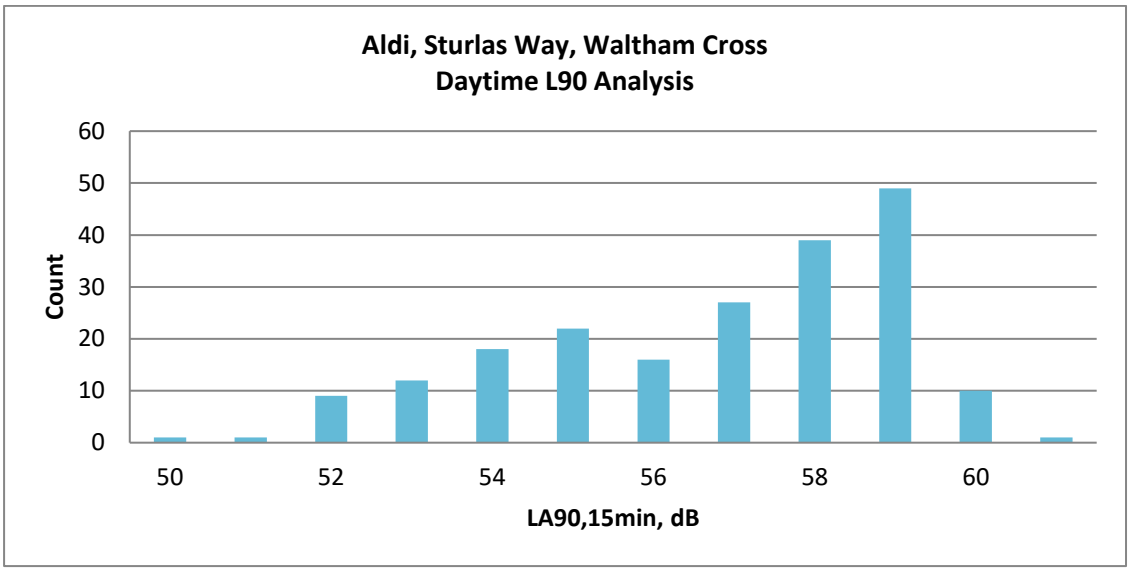
Table 3 Summary of survey results

Measurement period	Range of recorded sound pressure levels (dB)			
	$L_{Aeq(15mins)}$	$L_{Amax(15mins)}$	$L_{A10(15mins)}$	$L_{A90(15mins)}$
Daytime (07:00 – 23:00 hours)	58-67	70-95	59-68	50-61
Night-time (23:00 – 07:00 hours)	47-62	59-91	50-65	42-56
Early morning delivery period (06:30 – 07:00 hours) [not Sunday]	59-62	75-82	62-65	54-56
Daytime delivery period (07:00 – 23:00 hours) [not Sunday]	59-67	72-95	61-68	53-60
Sunday delivery period (08:00 – 17:00 hours)	59-66	74-91	62-68	51-60

6.3. The noise survey location was adjacent to Sturlas Way at a height of approximately 3 metres, at a location representative of the façade of the nearest sensitive receptor during day- and night-time periods. Noise levels at this location were dominated by local road traffic.

For plant noise assessment

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



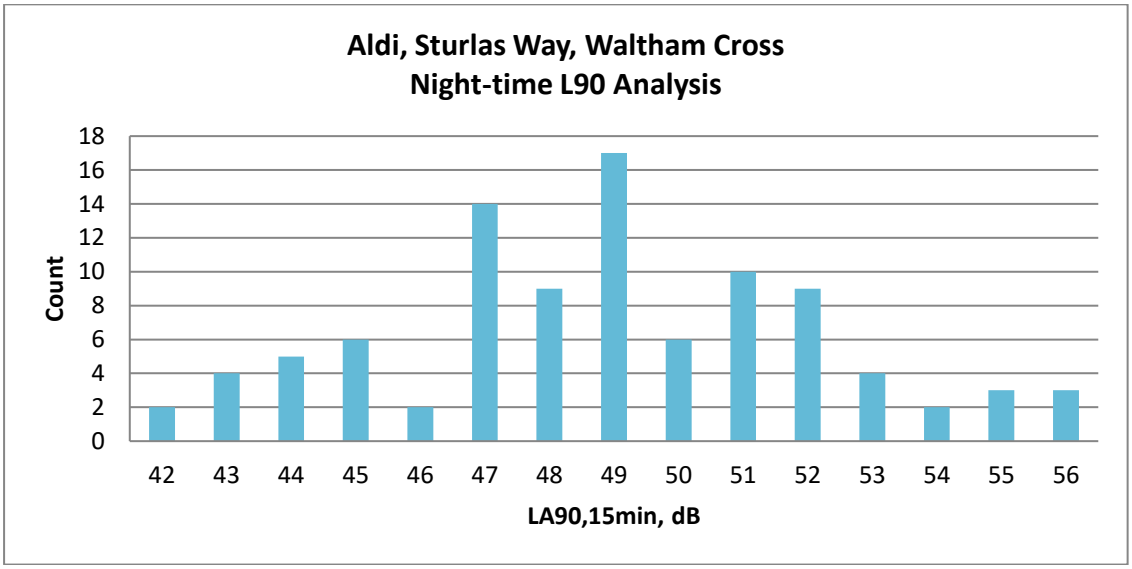
6.4. Further statistical analysis has been carried out on the data, and the mean and median values are shown in Table 4 below.

Table 4 Statistical analysis of $L_{A90,15min}$ levels during the daytime period

dB, L_{A90} daytime period	
Mean	57
Median	59
Mode	57

6.5. From the histogram analysis, 52 dB(A) has been selected to be a robust representation of the background noise level during the daytime period.

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



6.6. Further statistical analysis has been carried out on the data and the mean and median values are shown in Table 5 below.

Table 5 Statistical analysis of $L_{A90,15min}$ levels during the night-time period

dB, L_{A90} night-time period	
Mean	49
Median	49
Mode	49

6.7. Again, from the histogram analysis, 42 dB(A) has been chosen to be representative of the background sound level during the night-time period.

For delivery noise assessment

6.8. Histograms of the background sound levels measured during the daytime delivery periods are shown in Figure 3 and Figure 4.

Figure 3 Histogram of day-time L_{A90} background sound pressure levels (Monday to Saturday)

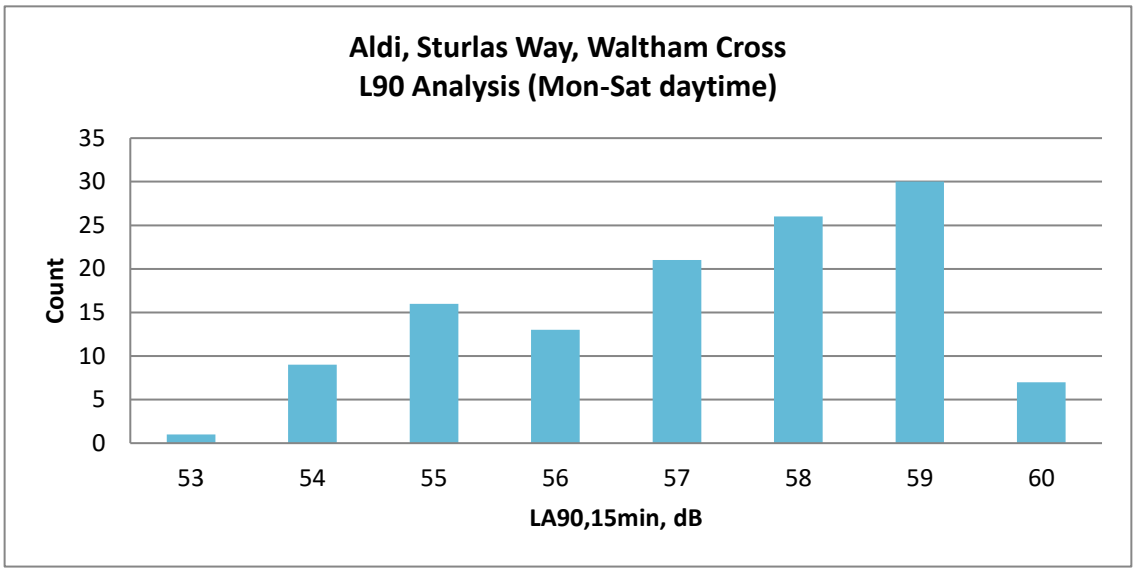
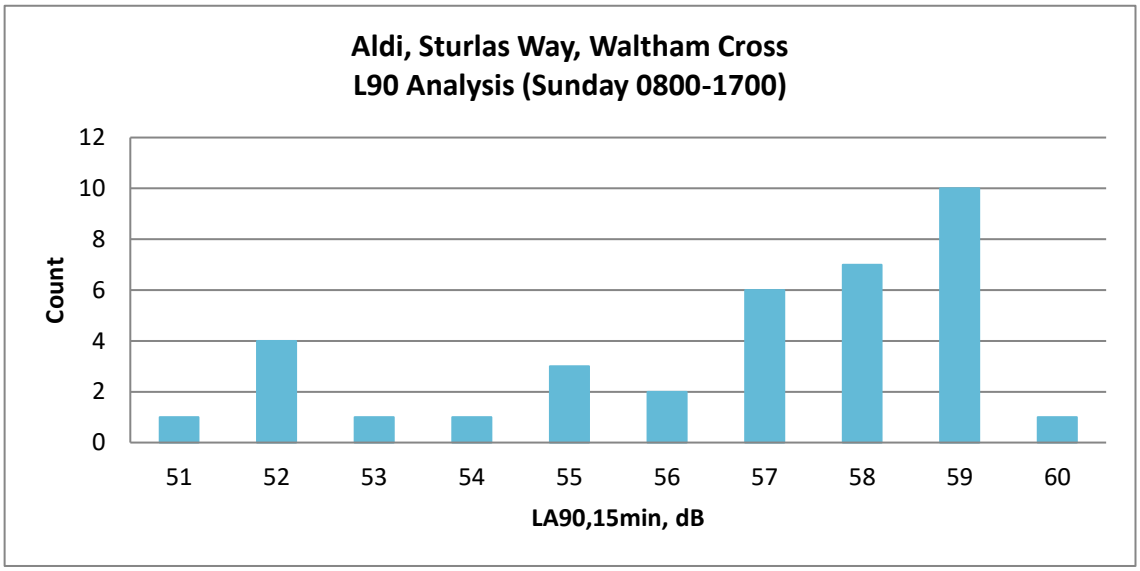


Figure 4 Histogram of day-time delivery period LA90 background sound pressure levels (Sunday)



6.9. From the histograms above, representative background sound levels are considered to be 54 dB L_{A90} during the daytime Monday to Friday and 52 dB L_{A90} during the Sunday daytime delivery period.

6.10. The lowest measured background noise level during the proposed early morning delivery period is 54 dB $L_{A90,15min}$. In order to give a robust assessment this is considered to be the representative background sound level during this period.

Summary

6.11. Therefore, the following values are considered representative of the existing background sound pressure levels at nearby noise sensitive premises:

- 52 dB L_{A90} during the daytime period (7 days);
- 42 dB L_{A90} during the night-time period (7 days);
- 54 dB L_{A90} during the daytime delivery period (Monday to Saturday);
- 54 dB L_{A90} during the early morning delivery period (06:30 – 07:00 hours Monday to Saturday);
- 52 dB L_{A90} during the Sunday delivery period (08:00 – 17:00 hours).

6.12. As the daytime background noise level measured, representative of Receptor R1, was dominated by local road traffic noise, the concurrent background noise level at Receptor R2 may be marginally lower. It is considered that, for the purposes of the assessment, using representative background noise levels 5 dB below those above at Receptor R2 during the daytime and early morning delivery periods would ensure a robust assessment.

7.0 Assessment of delivery noise

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 a similar Aldi store already in operation. The measurements included all aspects of the delivery including, but not limited to, the arrival, unloading, 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. It should be noted that the example delivery represented a standard operation; the refrigeration unit was switched off as standard.

7.3. Table 6 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 6 Reference noise data for delivery activities (at 10 m)

Noise Source	SEL, dB(A)	L_{Afmax}, dB(A)
Lorry arrival	69	61
Lorry reversing & manoeuvring into loading bay	65	58
Door open/close	60	68
Cage and pallet movement	51	59
Engine starts and lorry departs	74	71

Delivery noise impact assessment

7.4. The information contained in Table 6 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:

7.5. $L_{Aeq,T} = SEL + 10.\log\left(\frac{1}{T}\right) + 10.log(N)$ (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.

7.6. The loading area is located approximately 46 m from the nearest existing noise sensitive receptor (Receptor R1). The closest approach of the lorry while manoeuvring is approximately 30m from the houses (Receptor R2). Approximate distances used in the calculations are shown in Table 7 below.

Table 7 Distances to façades of nearest receptor

Item	Distance to R1	Distance to R2
Lorry arrives and turns	35	30
Lorry reverses and manoeuvres into loading bay	40	90
Door open / close	45	78
Cage/pallet movement (internally, central location within trailer assumed)	46	62
Engine starts and lorry departs	46	78

7.7. Aldi requires drivers to switch off refrigeration units when making store deliveries. In addition, reversing warning signals are disabled when headlights are switched on, so there are no audible warnings at night; vehicles are fitted with "traditional" beepers (rather than white noise or voice alarms).

7.8. Table 8 presents the calculated cumulative L_{Aeq} and 'maximum' L_{Amax} noise levels at the receptor. Full calculations are included within **Appendix C**.

Table 8 Predicted delivery noise levels

Receptor	Period	Predicted noise levels at upper window of most affected residential dwelling	
		$L_{Aeq,T}$, dB	Range of L_{Afmax} (dB)
R1 façade	06:30 – 07:00	30	45 - 54
	Daytime	28	45 - 57
R2 façade	06:30 – 07:00	31	39 - 52
	Daytime	26	39 - 53
R2 garden	Daytime, 16 hr*	24	n/a

**Based on three deliveries between 07:00 and 23:00 hours*

BS 4142:2014 delivery noise assessment

7.9. Table 9, Table 10, Table 11 and Table 12 present the assessments of the likely impact during Sunday daytime and Monday to Saturday early morning periods at Receptor R1 and Receptor R2 in accordance with the BS 4142:2014 methodology. As noted in Paragraphs 6.11 and 6.12 the representative background sound levels at Receptor R1 are considered to 52 dB L_{A90} for deliveries made during the daytime on Sunday and 54 dB L_{A90} for deliveries between 06:30 and 07:00 hours on Monday to Saturday and 5 dB below these values at Receptor R2 during the same periods.

Table 9 R1 Assessment of predicted external delivery noise levels using BS 4142:2014 during Sunday daytime.

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	L_{A90} = 52 dB	8.1, 8.2	Representative typical background sound level determined from a range of measurements (Monday to Saturday)
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T}$ = 28 dB	7.3.6	Calculations presented in Appendix C
Acoustic Feature Correction	6 dB	9.2	Impulsivity (bangs and clatters) could be perceptible
Rating Level	(28+6) dB =34 dB		
Excess of Rating Level over background sound level	(34-52) dB = -18 dB		
Assessment of impact: Negligible impact		11	

Table 10 R1 Assessment of predicted external delivery noise levels using BS 4142:2014 between 06:30 and 07:00 hours Monday to Saturday.

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	L_{A90} = 54 dB	8.1, 8.2	Lowest measured level used to give robust assessment
Assessment made during the night-time, so the reference interval is 15 minutes		7.2	
Specific Sound Level	$L_{Aeq,T}$ = 31 dB	7.3.6	Calculations presented in Appendix C
Acoustic Feature Correction	6 dB	9.2	Impulsivity (bangs and clatters) could be perceptible
Rating Level	(31+6) dB =37 dB		
Excess of Rating Level over background sound level	(37-52) dB = -17 dB		
Assessment of impact: Negligible impact		11	

Table 11 R2 Assessment of predicted external delivery noise levels using BS 4142:2014 during Sunday daytime.

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	L_{A90} = 47 dB	8.1, 8.2	Representative typical background sound level determined from a range of measurements (Monday to Saturday)
Assessment made during the daytime, so the reference interval is one hour		7.2	
Specific Sound Level	$L_{Aeq,T}$ = 28 dB	7.3.6	Calculations presented in Appendix C
Acoustic Feature Correction	6 dB	9.2	Impulsivity (bangs and clatters) could be perceptible
Rating Level	(28+6) dB =34 dB		
Excess of Rating Level over background sound level	(34-47) dB = -13 dB		
Assessment of impact: Negligible impact		11	

Table 12 R2 Assessment of predicted external delivery noise levels using BS 4142:2014 between 06:30 and 07:00 hours Monday to Saturday.

Results		Relevant Clauses of BS4142:2014	Commentary
Background Sound level	L_{A90} = 48 dB	8.1, 8.2	Lowest measured level used to give robust assessment
Assessment made during the night-time, so the reference interval is 15 minutes		7.2	
Specific Sound Level	$L_{Aeq,T}$ = 31 dB	7.3.6	Calculations presented in Appendix C
Acoustic Feature Correction	6 dB	9.2	Impulsivity (bangs and clatters) could be perceptible
Rating Level	(31+6) dB =37 dB		
Excess of Rating Level over background sound level	(37-48) dB = -11 dB		
Assessment of impact: Negligible impact		11	

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 a single residential window. 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 site already experiences delivery noise which does not from part of this assessment from the existing Homebase store.

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 representative of the noise climate outside the nearby residential dwellings and not at a position where higher noise levels are present.

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 overlooking residential windows are lower than the measured daytime and night-time 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.

7.14. Within bedrooms with open windows, at worst L_{Amax} noise levels between 06:30 and 07:00 hours are expected to be no higher than 39 dB, below the 42 dB threshold described in WHO 2009 guidance "for waking in the night and/or too early in the morning".

External amenity

7.15. BS 8233:2014 gives the following guidance for external areas:

> *For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited.*

7.16. As shown in section 7.8, the 16-hour daytime L_{Aeq} level within the most-affected garden at Receptor R2, based on four deliveries during the day-time period would be 24 dB(A), comfortably within the guidance level of 50 dB(A).

8.0 Plant noise assessment

Proposed criteria

8.1. Based on the results of the background sound survey, the following plant noise limits will meet the Borough of Broxbourne Council's usual requirement for the plant rating noise level at the nearest receptor to be at or around the existing representative background sound level:

Table 13 Proposed plant noise emissions level limits at residences

Receptor	Period	Cumulative plant rating noise limit, dB(A)
R1 – Flats to east	Daytime (07:00 – 23:00 hours)	52
	Night-time (23:00 – 07:00 hours)	42
R2 – Houses to south	Daytime (07:00 – 23:00 hours)	47
	Night-time (23:00 – 07:00 hours)	42

Plant noise impact assessment

8.2. The cumulative plant noise level at the most affected noise sensitive receptors has been predicted. The assessment has taken into consideration distance attenuation and directivity corrections. Any

possible screening between the plant and the nearest receptors has been excluded in order to give a robust assessment.

8.3. It should be noted that 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. In order to be robust, however, a +3 dB feature correction has been applied to the noise level predictions as advised in BS 4142:2014.

8.4. Table 14 summarises the results of the assessment at the most affected residential properties. All other nearby receptors benefit from increased distance/screening to the plant. The full set of calculations can be found in **Appendix F**.

Table 14 Assessment of predicted noise levels at nearest receptor

Receptor	Period	Predicted rating level at receptor, L_{Aeq} (dB)	Proposed design criterion (dB)	Difference (dB)
R1 – Flats to east	Daytime (07:00 – 23:00 hours)	34	52	-18
	Night-time (23:00 – 07:00 hours)	34	42	-8
R2 – Houses to south	Daytime (07:00 – 23:00 hours)	34	47	-13
	Night-time (23:00 – 07:00 hours)	34	42	-8

8.5. The above assessment demonstrates that the proposed plant will result in no more than a 'low impact' when assessed in accordance with BS 4142:2014.

9.0 Discussion of results

Deliveries

9.1. The results of the assessment have demonstrated that the rating noise level associated with deliveries to the store, during the proposed delivery periods, will be below the representative background noise levels during those periods when assessed in accordance with BS 4142:2014, taking into account the context of the site. Noise from deliveries should, therefore, be considered acceptable to the Borough of Broxbourne Council.

External plant noise

9.2. It is considered that noise generated from the typical plant will be compliant with the criterion set out in the Borough of Broxbourne Council's Local Plan. Therefore, plant noise should not be a reason for refusal of planning permission.

10.0 Conclusions

10.1. The focus of this report is the external plant and deliveries at the proposed Aldi unit, with the Homebase retail operation (including servicing and mechanical plant) already in existence. Noise Solutions Limited has been commissioned by Aldi Stores Limited to undertake an assessment of the noise impact from the external plant and delivery operations for the proposed reconfigured Aldi store on Sturlas Way, Waltham Cross.

10.2. 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 a similar operating Aldi store were used in the assessment.

10.3. 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.

10.4. 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.

10.5. Deliveries are proposed between 06:30 and 23:00 Monday to Saturday and between 08:00 and 17:00 on Sunday. The assessment has concluded that deliveries within these periods would have at worst a negligible noise impact, assessed using the method in BS 4142:2014.

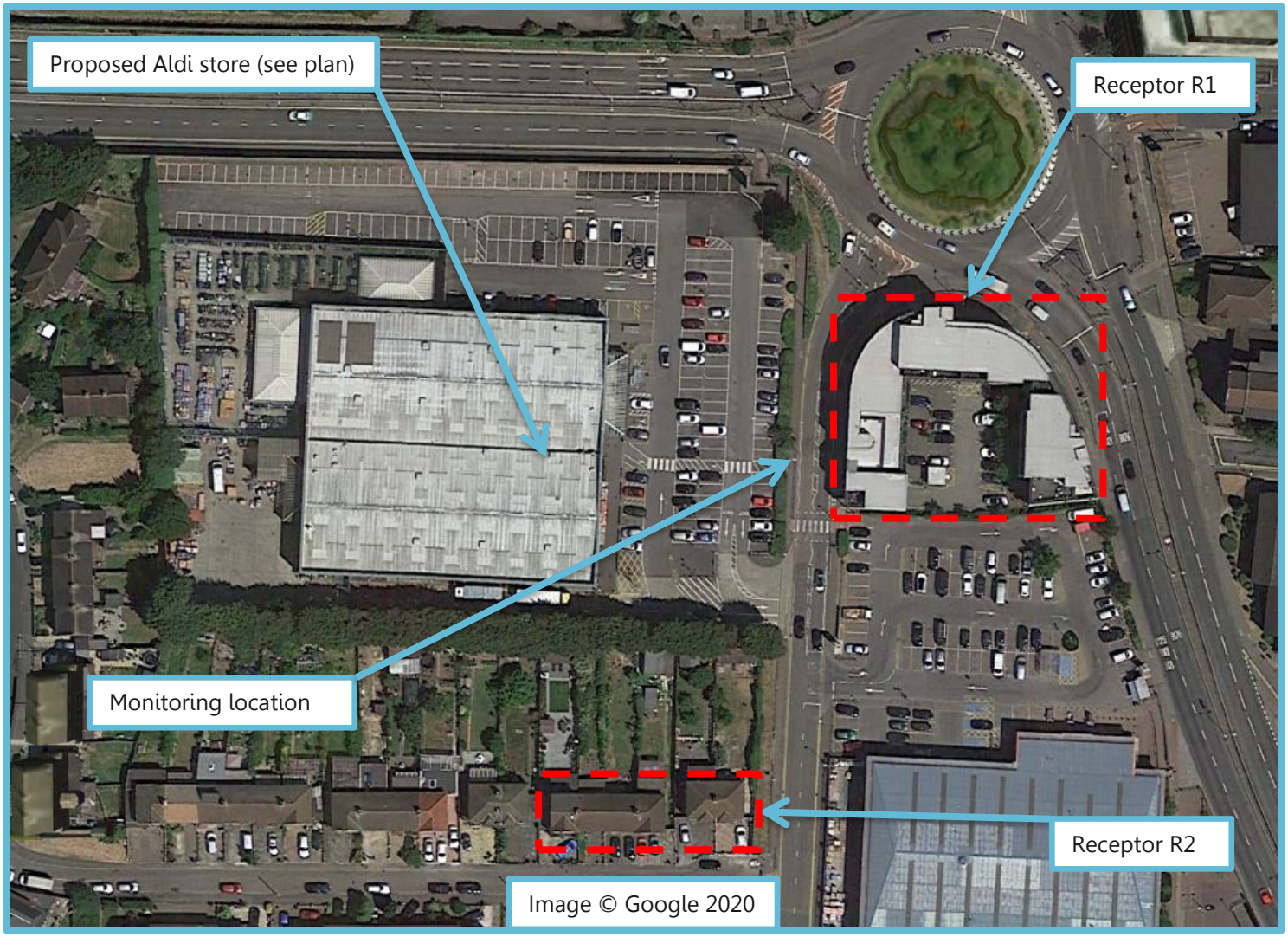
10.6. Noise from the proposed external plant will comply with the criterion set out in the Borough of Broxbourne Council's Local Plan.

10.7. Based on the findings of this assessment, noise from external plant and delivery activities should not be a reason for refusal of planning permission.

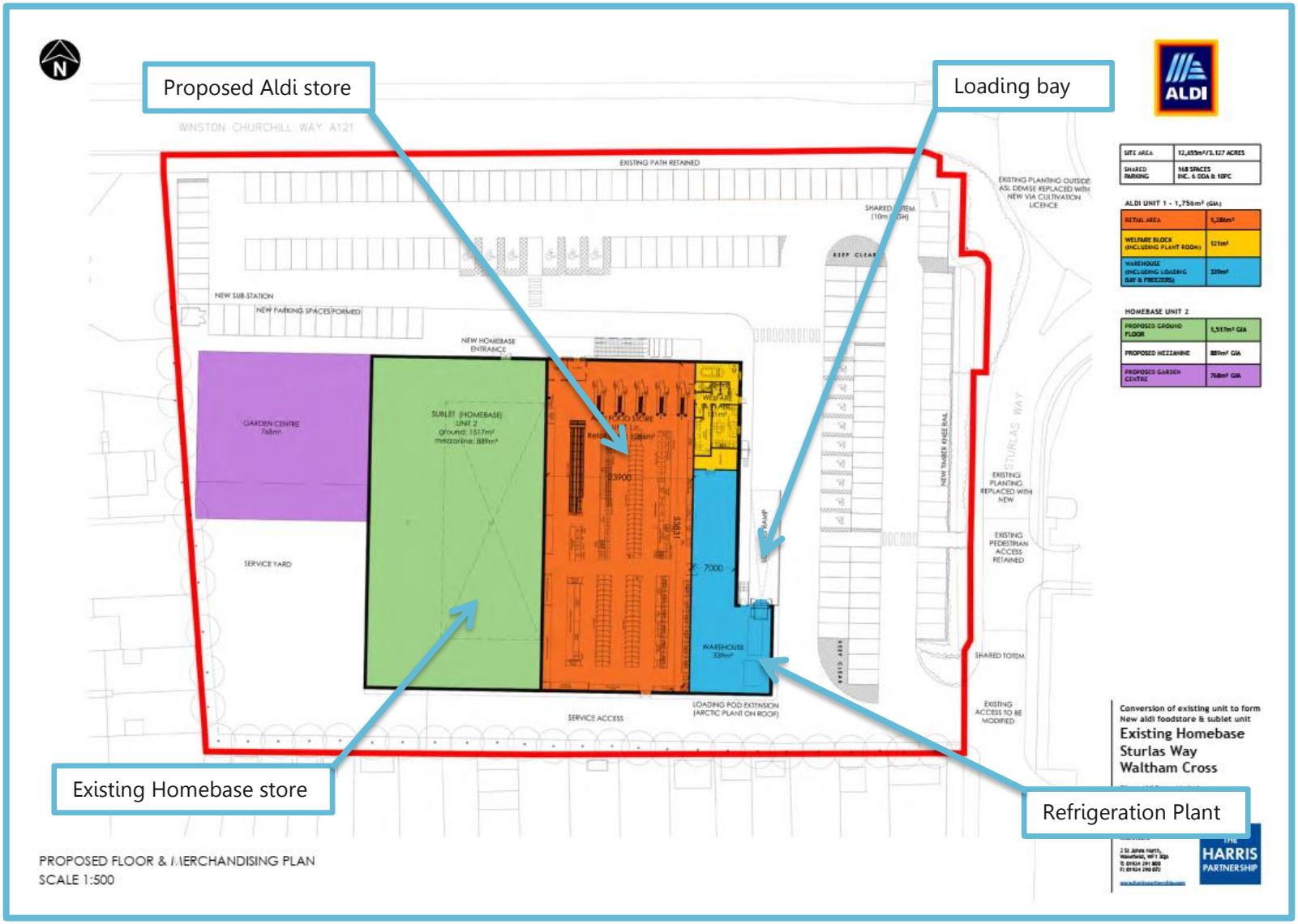
Appendix A Acoustic terminology

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 s1 and s2 is given by 20 $\log_{10}$ (s1/s2). 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 20μPa. 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 Leq 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 exceeded for 90% of the time over the period T. Generally used to describe background noise level.

Appendix B Aerial photograph of site and plan



Store plan


Proposed Aldi store
Loading bay
Existing Homebase store
Refrigeration Plant
WINSTON CHURCHILL WAY A121
EXISTING PATH RETAINED
NEW SUB-STATION
NEW PARKING SPACES FORMED
NEW HOMEBASE ENTRANCE
GARDEN CENTRE
SUBLET (HOMEBASE) UNIT 2
SERVICE YARD
SERVICE ACCESS
LOADING POD EXTENSION (ARCTIC PLANT ON ROOF)
WAREHOUSE
SHARED TOTEM
EXISTING PEDESTRIAN ACCESS RETAINED
EXISTING ACCESS TO BE MODIFIED
STURLAS WAY
ALDI
Conversion of existing unit to form New aldi foodstore & sublet unit
Existing Homebase
Sturlas Way
Waltham Cross
HARRIS PARTNERSHIP
PROPOSED FLOOR & MERCHANDISING PLAN
SCALE 1:500

Appendix C Delivery noise impact calculations

R1 façade - daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (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	35	-11	0	59	50
Lorry reverses and manoeuvres into loading bay	65	58	1	0	40	-12	0	53	46
Door open close	60	68	2	3	45	-13	0	50	54
Cage/pallet movement	51	59	10	10	46	-13	0	48	45
Engine starts and lorry leaves	74	71	1	0	46	-13	0	60	57
							Cumulative SEL	63	
							$L_{Aeq,1hr}$	28	
							Range of L_{Amax}		45 - 57

R1 façade - 06:30 – 07:00

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (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	35	-11	0	59	50
Lorry reverses and manoeuvres into loading bay	65	58	1	0	40	-12	0	53	46
Door open close	60	68	1	0	45	-13	0	47	54
Cage/pallet movement	51	59	5	7	46	-13	0	45	45
Engine starts and lorry leaves	74	71	0*	n/a	-	-	-	-	-
						Cumulative SEL		60	
						$L_{Aeq,15min}$		30	
						Range of L_{Amax}			45 - 54

**For an arrival at 06:30 or later, some unloading and the departure will be after 07:00 hours.*

R2 façade - daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (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	90	-19	0	46	39
Door open close	60	68	2	3	78	-18	0	45	50
Cage/pallet movement	51	59	10	10	62	-16	0	45	43
Engine starts and lorry leaves	74	71	1	0	78	-18	0	56	53
						Cumulative SEL		62	
						$L_{Aeq,1hr}$		26	
						Range of L_{Amax}			39 - 53

R2 façade - 06:30 – 07:00

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL at receptor (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	90	-19	0	46	39
Door open close	60	68	1	0	78	-18	0	42	50
Cage/pallet movement	51	59	5	7	62	-16	0	42	43
Engine starts and lorry leaves	74	71	0*	n/a	-	-	-	-	-
						Cumulative SEL		60	
						$L_{Aeq,15min}$		31	
						Range of L_{Amax}			39 - 52

**For an arrival at 06:30 or later, some unloading and the departure will be after 07:00 hour*

R2 garden - daytime

Activity	Measured noise levels		Correction for no. of occurrences		Distance correction		Screening correction (dB)	Resultant SEL 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	15	-4	0	66
Lorry reverses and manoeuvres into loading bay	65	58	1	0	75	-18	0	47
Door open close	60	68	2	3	53	-14	0	49
Cage/pallet movement	51	59	10	10	47	-13	0	47
Engine starts and lorry leaves	74	71	1	0	53	-14	0	59
						Cumulative SEL each delivery		67
						Correction for 3 deliveries		+5
						$L_{Aeq,16hr}$		24

Appendix D Environmental sound survey

Details of environmental sound survey

D.1 Measurements of the existing background sound levels were undertaken between 14:00 hours on Friday 4th September and 17:15 hours on Monday 7th September 2020.

D.2 The sound level meter was 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 noise survey.

Measurement position

D.3 The representative measurement position was located on a lamp-post on Sturlas Way (location indicated on the site plan in **Appendix B**). 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. The survey location was chosen to avoid the possible influence of existing plant in the area.

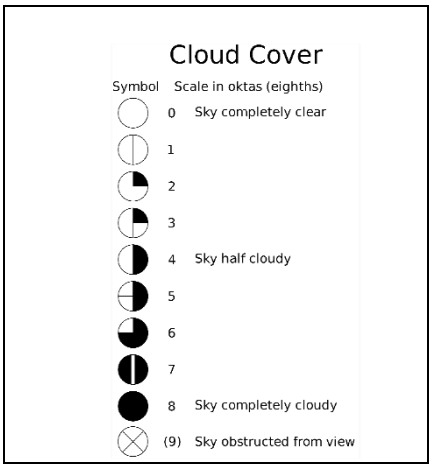
Equipment

D.4 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	29/05/2019	UCRT19/1634
Condenser microphone	Rion UC-59 /08290		
Preamplifier	Rion NH-25 / 54080		
Calibrator	Rion NC-74 /34235932	20/08/2020	TCRT20/1469

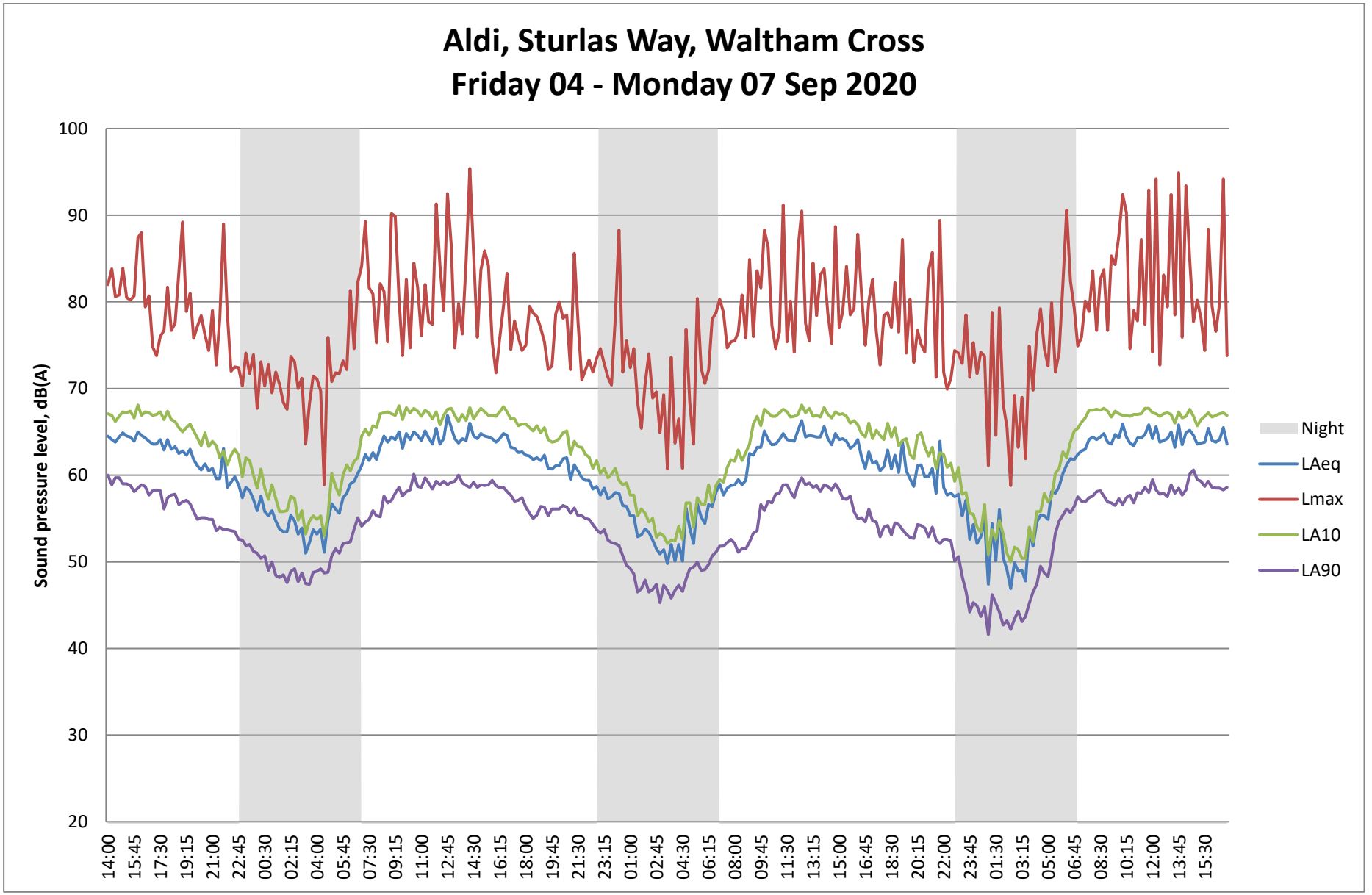
Weather conditions

D.5 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.

<table>
<tr><th colspan="5">Weather Conditions</th></tr>
<tr><th>Measurement Location</th><th>Date/Time</th><th>Description</th><th>Beginning of Survey</th><th>End of Survey</th></tr>
<tr><td>As indicated on Appendix B</td><td>14:00 4 Sept – 17:15 7 Sept 2020</td><td>Temperature (°C)</td><td>20</td><td>19.5</td></tr>
<tr><td colspan="2" rowspan="8"> 
</td><td>Precipitation:</td><td>No</td><td>No</td></tr>
<tr><td>Cloud cover (oktas - see guide)</td><td>7</td><td>8</td></tr>
<tr><td>Presence of fog/snow/ice</td><td>No</td><td>No</td></tr>
<tr><td>Presence of damp roads/wet ground</td><td>No</td><td>No</td></tr>
<tr><td>Wind Speed (m/s)</td><td><1</td><td>1</td></tr>
<tr><td>Wind Direction</td><td>S</td><td>NW</td></tr>
<tr><td>Conditions that may cause temperature inversion (i.e. calm nights with no cloud)</td><td>No</td><td>No</td></tr>
</table>

Results

D.6 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 will operate and deliveries will be made. The noise climate during the survey period was dominated by local road traffic. The results of the survey are presented in a time history graph overleaf.


Aldi, Sturlas Way, Waltham Cross
Friday 04 - Monday 07 Sep 2020
Sound pressure level, dB(A)
100
90
80
70
60
50
40
30
20
14:00
15:45
17:30
19:15
21:00
22:45
00:30
02:15
04:00
05:45
07:30
09:15
11:00
12:45
14:30
16:15
18:00
19:45
21:30
23:15
01:00
02:45
04:30
06:15
08:00
09:45
11:30
13:15
15:00
16:45
18:30
20:15
22:00
23:45
01:30
03:15
05:00
06:45
08:30
10:15
12:00
13:45
15:30
Night
LAeq
Lmax
LA10
LA90

Appendix E Plant noise data

Plant	Make/model	Operating period	Source sound pressure level	
			dB(A)	at (m)
Combined plant	Compressor pack and gas cooler	Day and night	45	10

Appendix F Plant noise calculations

Receptor R1 façade

Plant	Source sound pressure level		Distance (m)	Correction (dB)	Directivity (dB)	Screening (dB)	BS4142 Feature (dB)	Rating level at receptor
	dB(A)	at (m)						
Combined plant	45	10	49	-14	0	0	3	34

Receptor R2 façade

Plant	Source sound pressure level		Distance (m)	Correction (dB)	Directivity (dB)	Screening (dB)	BS4142 Feature (dB)	Rating level at receptor
	dB(A)	at (m)						
Combined plant	45	10	49	-14	0	0	3	34

As noted in Paragraph 8.2, any screening has been excluded from these calculations to give a robust assessment.