

KR06778

Twickenham Express

Noise Impact Assessment...

Standard: British Standard 4142: 2014

Site: Twickenham Express

Address: 26 - 30 King Street

Twickenham

Middlesex

Postcode: TW1 3SN

Customer: Tesco Stores Ltd

Address: Shire Park

Kestrel Way

Welwyn Garden City

Hertfordshire

Postcode: AL7 1GA

Issue: Version 1.0




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KR Associates (UK) Ltd

Quietly confident...

Revisions...

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		Title	Noise Impact Assessment - Proposed Additional Plant		
		Standard	British Standard 4142: 2014		
Issue	Date	Details of Revision			
v1_0	23/12/2020	Description	Report issue for submission to Local Authority		
		Signature			
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		Position	Technical Director	Project Manager	Technical Director

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KR Associates...

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1. Executive Summary....

1.1. Instruction

KR Associates (UK) Ltd have been instructed by Tesco Stores Ltd to undertake an environmental noise survey at the vacant retail unit at 26 - 30 King Street, Twickenham, Middlesex to determine if the installation of the proposed plant will have a significant adverse impact in terms of noise on the local noise sensitive properties.

1.2. Executive Summary (Repeated at Section 7)

1.2.1 Assessment Position

The 1st floor residents over the rear of the store are located between 7 m and 8 m from the dedicated plant area at ground floor level at the rear of the store.

1.2.2 Background Noise Measurements

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,15m}	L _{Aeq,15m}	L _{A90,15m}
61 - 92 dB	52 - 71 dB	43 - 63 dB	63 - 85 dB	52 - 65 dB	39 - 52 dB	47 - 87 dB	40 - 72 dB	36 - 49 dB
Modal Background		45 dB	Modal Background		43 dB	Modal Background		37 dB

1.2.3 Criterion at Assessment Position

It would be recommended that to comply with the revised version of the National Planning Policy Framework (“NPPF”) and the guidance within the Local Plan that the resultant noise levels at the nearest residential dwellings are at least -5 dB below the underlying background noise levels when assessed in accordance with British Standard 4142: 2014 (amended 2019).

1.2.4 Mitigation Measures

It will be necessary to install absorption panels on the rear and opposing wall to control the reverberant noise build-up due to reflections to ensure compliance with the Local Authority criterion.

1.2.5 Assessment of Noise Levels

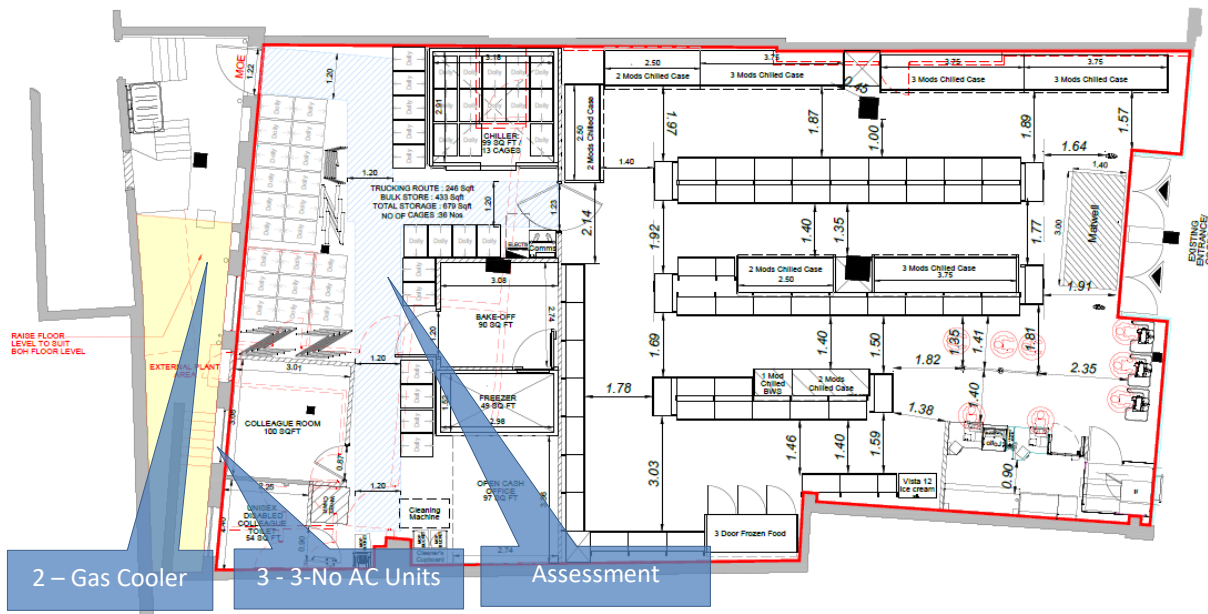
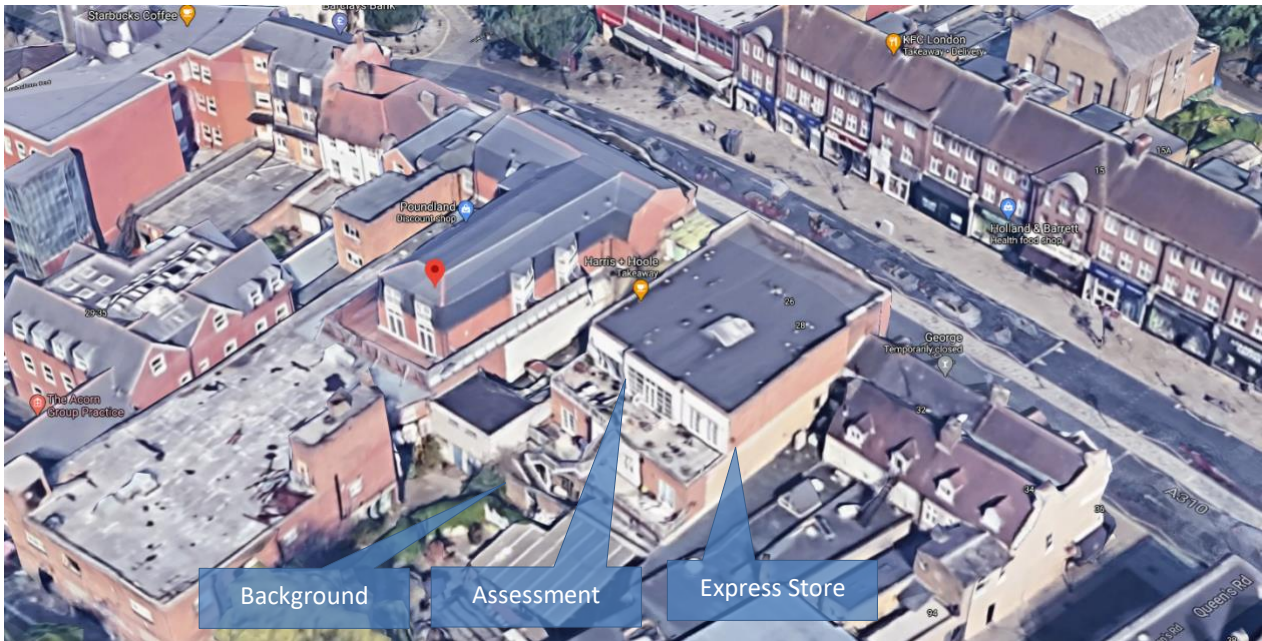
Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142
39 dB	45 dB	-6 dB	37 dB	43 dB	-6 dB	23 dB	37 dB	-14 dB

1.2.6 Conclusions

The resultant noise levels from the proposed mechanical equipment will result in noise levels that comply in full with the Local Plan and are at levels that are very unlikely to give rise to complaints from residents.

2. Site Location...

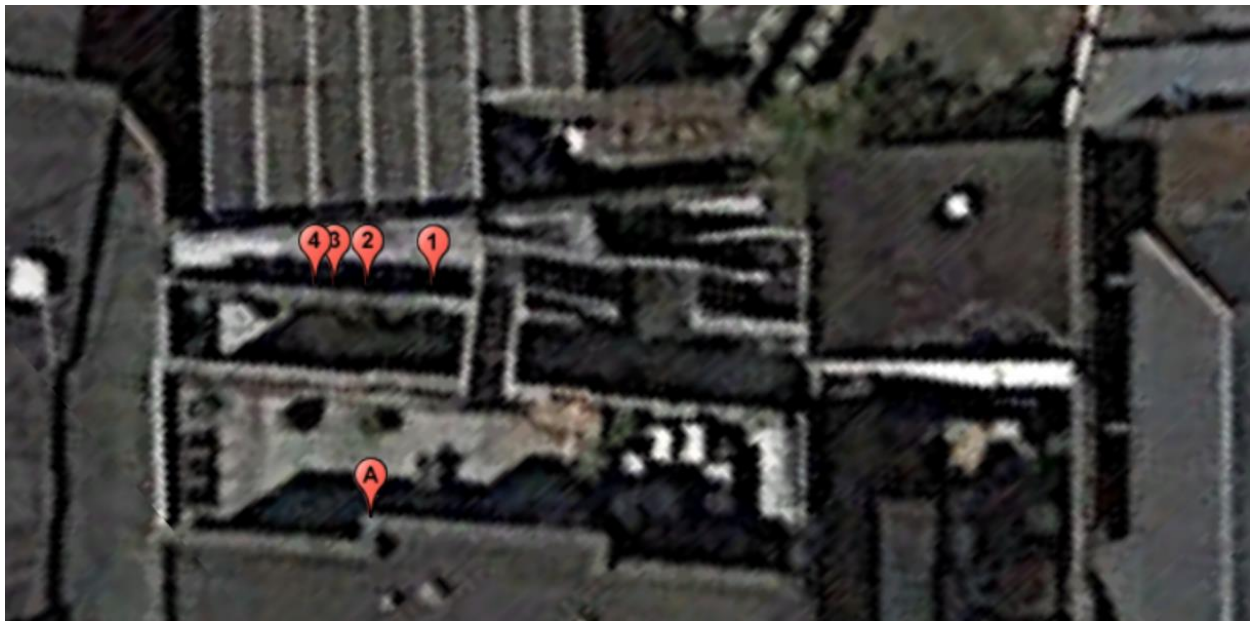
2.1. General Location of Site



Site Plan (Imagery © Google 2020)

It is proposed to convert the vacant retail unit at 26 - 30 West Street into a Tesco Express convenience store. The plant area will be at ground floor level within the small external rear area. The nearest residential dwellings are the first floor flats set back over the rear of the site.

2.2. Key Positions (Source, Assessment & Background)



Position	Description	Latitude	Longitude	Elevation
Sources	dedicated plant area at ground floor level at the rear of the store	51.446300 ^o	-0.329137 ^o	2 m
Assessment	1st floor residents over the rear of the store	51.446260 ^o	-0.329093 ^o	7 m
Background	at the rear of the vacant site	51.779047 ^o	0.912127 ^o	4 m

2.3. Free Field Source Sound Pressure Levels at 10m

Source	Description of Source	Sound Pressure at 10m – Annex C 13487: 2003		
		07:00 – 19:00	19:00 – 23:00	23:00 – 07:00
Source 1	Package CO2 Gas Cooler	L _{p(10)} 35 dB	L _{p(10)} 33 dB	L _{p(10)} 29 dB
Source 2	Daikin AZAS AC Unit	L _{p(10)} 42 dB	L _{p(10)} 40 dB	L _{p(10)} 0 dB
Source 3	Daikin AZAS AC Unit	L _{p(10)} 42 dB	L _{p(10)} 40 dB	L _{p(10)} 0 dB
Source 4	Daikin AZAS AC Unit	L _{p(10)} 22 dB	L _{p(10)} 20 dB	L _{p(10)} 0 dB
Combined Sound Pressure Level at 10m (1 Reflective Surface)		L _{p(10)} 46 dB	L _{p(10)} 43 dB	L _{p(10)} 29 dB

2.4. Locations and Distances of Individual Source Positions

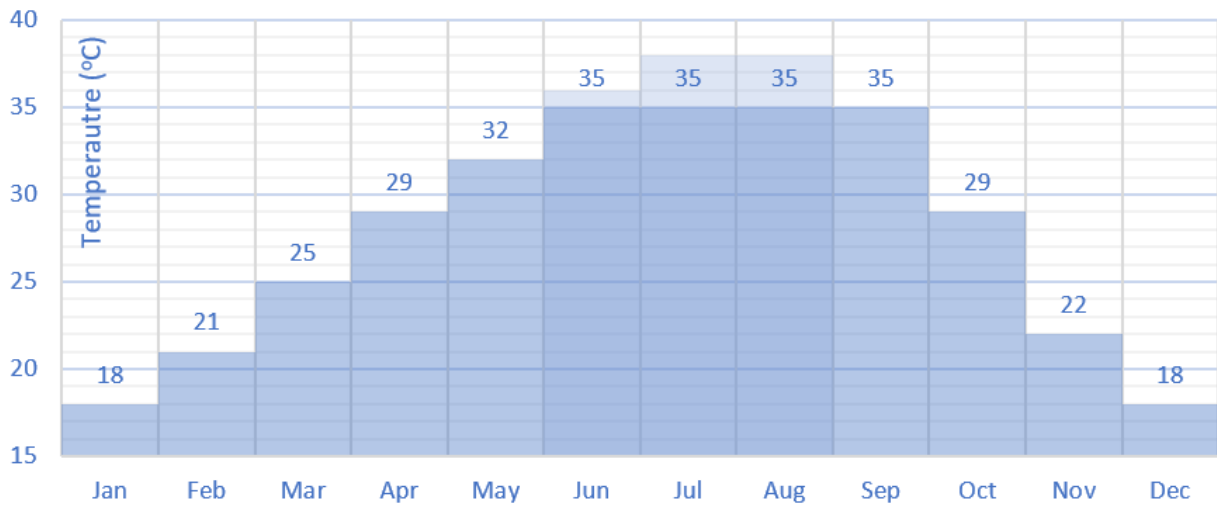
Position	Relative Distance	Latitude	Longitude	Elevation
Source 1	7 m to assessment position	51.446300 ^o	-0.329137 ^o	2 m
Source 2	8 m to assessment position	51.446290 ^o	-0.329151 ^o	1 m
Source 3	8 m to assessment position	51.446285 ^o	-0.329158 ^o	1 m
Source 4	8 m to assessment position	51.446282 ^o	-0.329162 ^o	1 m

2.5. Maximum Ambient Temperature in the UK

The proposed refrigeration unit and air conditioning units will produce higher noise levels when the ambient temperature is higher as they must work harder to reject the same amount of heat energy.

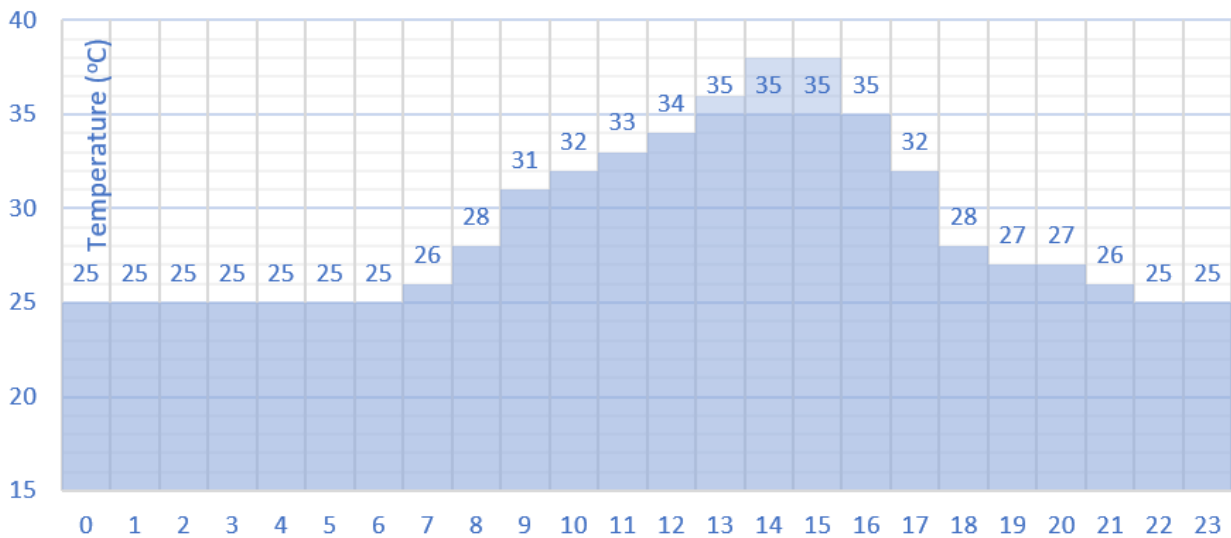
2.5.1 Maximum Monthly Temperature

The following graph shows the maximum 1-hour ambient temperatures recorded anywhere in the UK on a month-by-month basis.



2.5.2 Maximum 24-hour Temperature

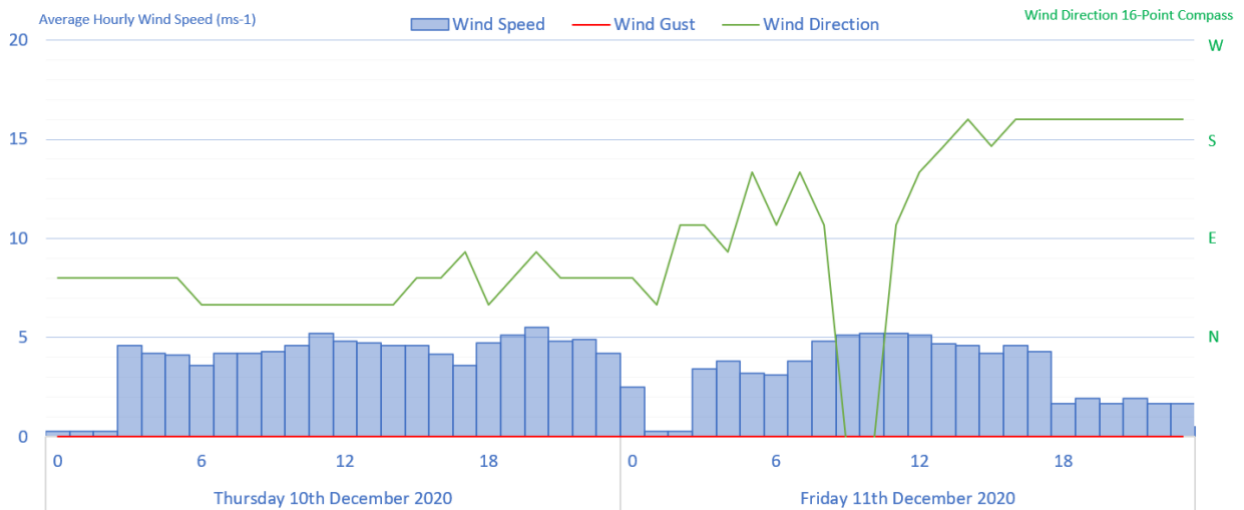
The following graph shows the maximum 1-hour ambient temperatures recorded anywhere in the UK over the worst-case day.



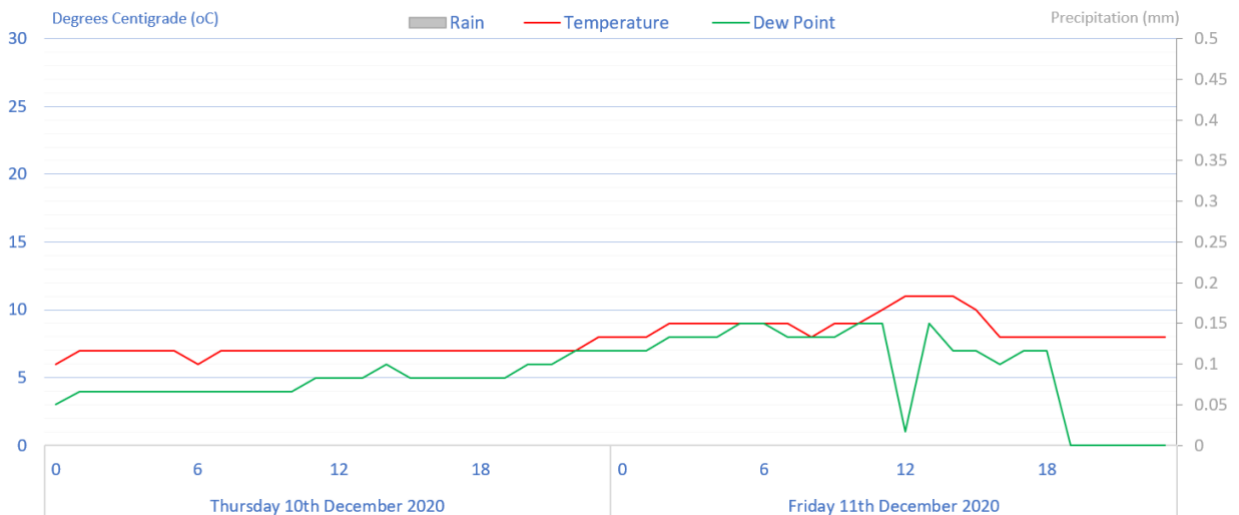
3. Background Noise Levels...

3.1. Weather During Survey

3.1.1 Wind Speed, Gust and Direction



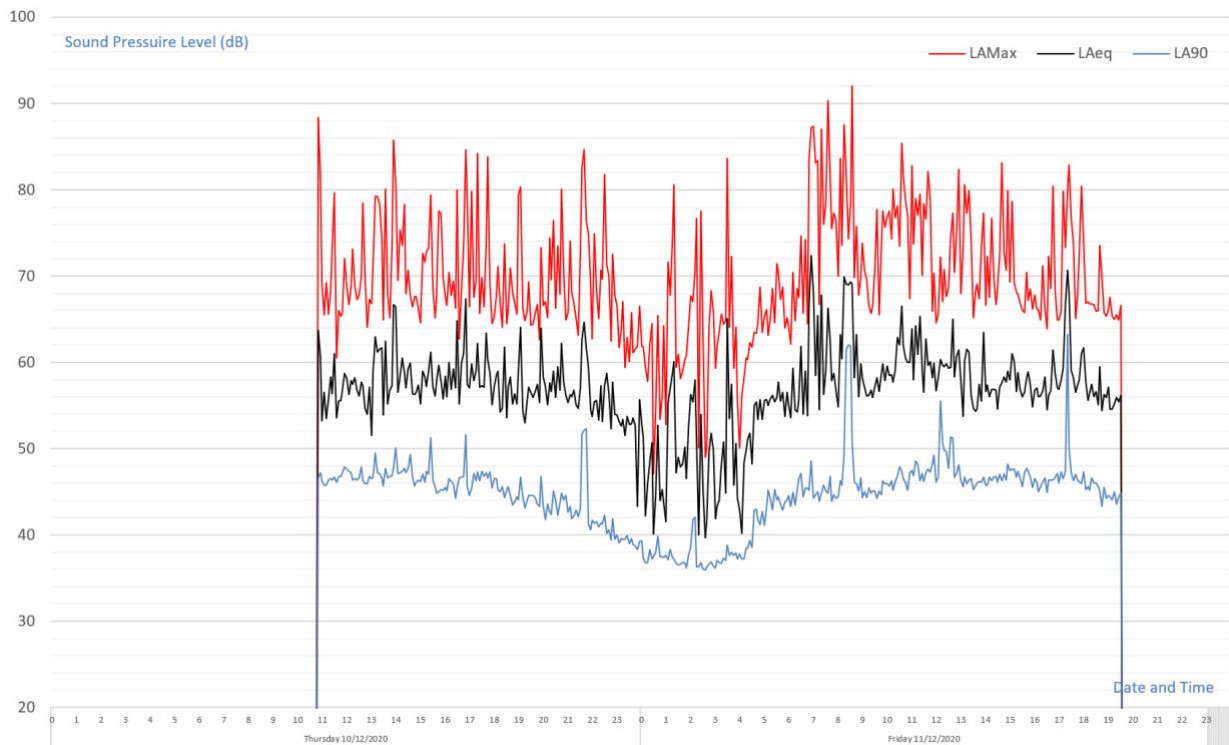
3.1.2 Rainfall, Temperature and Dew Point



3.1.3 Impact of Weather

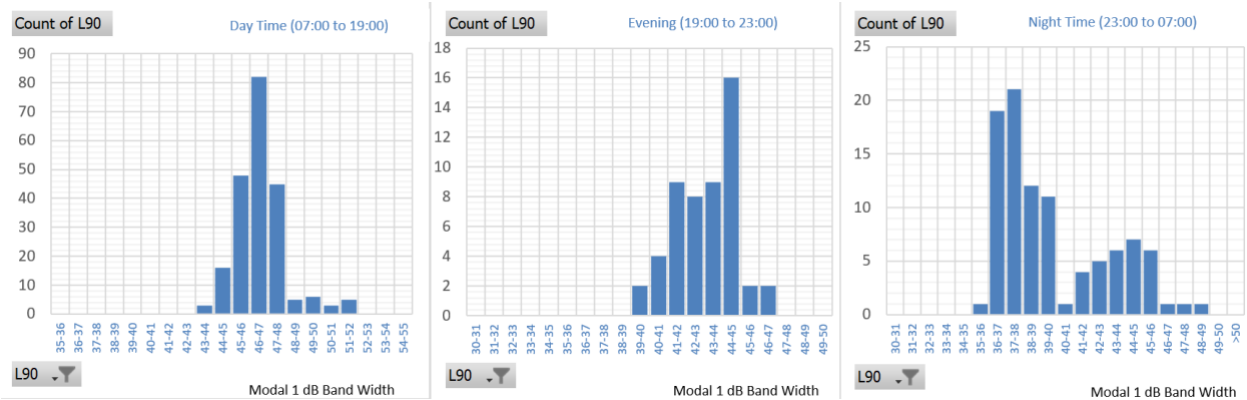
An analysis of the background data recorded on site indicates that the prevailing weather did not adversely impact the results. In particular the wind speed was on average below 5.0ms⁻¹ and there was no precipitation during the survey period.

3.2. 24-hour Background Measurements



Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,15m}	L _{Aeq,15m}	L _{A90,15m}
61 - 92 dB	52 - 71 dB	43 - 63 dB	63 - 85 dB	52 - 65 dB	39 - 52 dB	47 - 87 dB	40 - 72 dB	36 - 49 dB

3.3. Modal Analysis of Background Data



Day Time (07:00 to 19:00)		Evening (19:00 to 23:00)		Night Time (23:00 to 07:00)	
Standard Deviation (σ)	2.49	Standard Deviation (σ)	2.59	Standard Deviation (σ)	3.23
Geometric Average	47 dB	Geometric Average	44 dB	Geometric Average	40 dB
Modal Value	45 dB	Modal Value	43 dB	Modal Value	37 dB

4. Criterion...

4.1. National Planning Policy Framework 2019

4.1.1 Scope of Standard

The revised National Planning Policy Framework published in 2019 provides an assumption in favour of sustainable development that meets the three overarching objectives: economic, social, and environmental. Paragraph 11 provides guidance for decision makers:

“For decision-taking this means:...

c) approving development proposals that accord with an up-to-date development plan without delay; or

d) ...granting permission unless...

i) the application of policies in this Framework... provides a clear reason for refusing development proposed; or

ii) any adverse impacts of doing so would significantly and demonstrably outweigh the benefits.”

4.1.2 Conserving and Enhancing the Natural Environment

Paragraph 170 of the NPPF provides the following guidance on noise:

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

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

4.1.3 Appropriate Development

Paragraph 180 of the NPPF requires the development to be appropriate for its location:

“Planning... decisions should also ensure that new development is appropriate for its location...

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 life⁶⁰

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for the recreational and amenity value...

60 See Explanatory Note to the Noise Policy Statement for England: 2010”

4.2. Noise Policy Statement for England: 2010

4.2.1 Scope of Standard

The Noise Policy Statement for England was published in 2010 defines three aims:

“Avoid significant adverse impact on health and the quality of life.

Mitigate and minimise adverse impacts on health and quality of life; and

Contribute to the improvement of health and the quality of life.”

4.2.2 Criterion

The NPSE defines significant adverse and adverse impact in terms of noise:

“LOAEL – Lowest Observed Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

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

4.3. Night Noise Guidelines (“NNG”)

The European Union and the World Health Organisation published the document *“Night Noise Guidelines for Europe”* in 2009.

4.3.1 Recommendation for Health Protection

“Below the level of 30 dB $L_{night, outside}$ no effects on sleep are observed except for a slight increase in the frequency of body movements during sleep due to night noise.

.... 40 dB $L_{night, outside}$ is equivalent to the lowest observed adverse effect level (LOAEL) for night noise.

Above 55 dB the cardiovascular effects become the major public health concern.”

For reference the $L_{night, outside}$ is the average outside noise level calculated over an 8-hour period (EU: 2002/49/EC).

4.3.2 Description of Effect of Change in Noise Level

Noise Level Change (dB)	Subjective Response	Significance
0.1 – 2.9	Barely perceptible	Minor Impact
3.0 – 5.9	Noticeable	Moderate Impact
6.0 – 9.9	Up to a doubling of loudness	Substantial Impact
10.0 or more	More than a doubling of loudness	Major Impact

4.4. British Standard 4142: 2014...

4.4.1 Testing Standard...

British Standard 4142: 2014 provides a method for assessing the likely effects of sound from industrial or commercial nature on *“people who might be inside or outside a dwelling used for residential purposes”*.

4.4.2 Criterion

The standard provides 3-levels of impact based on the calculated Rating Levels:

“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 +5dB is likely to be an indication of an adverse impact, depending on the context.

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.”

4.4.3 British Standard 4142: 2014 Feature Correction

It is appropriate to add a character correction where there is a new source that cannot be measured in line with BS4142:2014. The 3 methods for approaching this are the subjective, objective, and reference methods. In this report the subjective method is used.

Section 9.2 Subjective Method	Perceptibility to noise sensitive façades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just impulsive	+3
	Clearly impulsive	+6
	Highly impulsive	+9
Readily Distinctive Characteristic is neither tonal nor impulsive	Is not present	+0
	Is present	+3
Intermittency Identifiable “on/off” conditions	Is not present	+0
	Is present	+3

4.5. Local Authority Requirements

4.5.1 Local Plan

The London Borough of Richmond upon Thames Local Plan was fully adopted in July 2018 including Policy LP10 entitled *“Local Environmental Impacts, Pollution and Land Contamination.”*

“A. The Council will seek to ensure that local environmental impacts of all development proposals do not lead to detrimental effects on the health, safety and the amenity of existing and new users or occupiers of the development site, or the surrounding land. These potential impacts can include, but are not limited to, air pollution, noise and vibration, light pollution, odours and fumes, solar glare and solar dazzle as well as land contamination.

Developers should follow any guidance provided by the Council on local environmental impacts and pollution as well as on noise generating and noise sensitive development. Where necessary, the Council will set planning conditions to reduce local environmental impacts on adjacent land uses to acceptable levels.....

Noise and Vibration

C. The Council encourages good acoustic design to ensure occupiers of new and existing noise sensitive buildings are protected. The following will be required, where necessary:

- 1. a noise assessment of any new plant and equipment and its impact upon both receptors and the general background noise levels;*
- 2. mitigation measures where noise needs to be controlled and managed;*
- 3. time limits and restrictions for activities where noise cannot be sufficiently mitigated;*
- 4. promotion of good acoustic design and use of new technologies;*
- 5. measures to protect the occupiers of new developments from existing sources. ”*

4.5.2 Proposed Criterion

The Local Authority will require the plant to be at least 5 dB(A) below the background noise level to comply with the Local Plan and ensure complaints are not received from the local residents.

5. Calculations of Noise Levels...

5.1. ISO 9613 – Part 2:1996

The International Standards Organisation (“ISO”) published ISO 9613 – Part 2: 1996 entitled “*Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculations*” which details the corrections that are required to establish the resultant noise levels of the existing and proposed plant at the assessment position.

5.1.1 Source Directivity (D_c)

A correction is made to account for the location of the source and the effect of additional reflective surfaces excluding the ground and is contained within section 6 of ISO 9613 - Part 2:1996.

Number of Surfaces	Correction in dB (D_c)
1 Reflective Surface	+3 dB
2 Reflective Surfaces	+6 dB
3 Reflective Surfaces	+9 dB

5.1.2 Geometric Divergence (A_{div})

A correction is made for the distance between the source and assessment position using the following formula defined in section 7.1 of ISO 9613-Part 2:1996.

Formula	Symbols
$A_{div} = 20 \cdot \log_{10} (d/d_0) + 11$	A_{div} = Reduction due to Geometric Divergence (dB) d = Distance from source to receiver (m) d_0 = reference distance (1m)

5.1.3 Ground Absorption (A_{gr})

A correction is made for the effect of the ground between the source and receiver depending on whether it is considered hard or soft ground.

Type of ground	Correction in dB (A_{gr})
Hard Ground	+ 3 dB
Soft Ground	+ 0 dB

5.1.4 Atmospheric Absorption (A_{atm})

As the source was less than 100m from the receiver position (assessment position) no correction was made for atmospheric absorption.

5.1.5 Barrier Effect (A_{bar})

A correction is made for any barrier in the direct line of sight between the source and the assessment position and is detailed in section 7.4 of ISO 9613-Part 2:1996. For clarity, the K_{met} meteorological correction has been ignored and C_2 equals 40 and C_3 equals 1.

Formula	Symbols
$A_{bar} = 10 \cdot \text{Log}_{10} [3 + (40 \cdot \delta / \lambda) - A_g]$ <p>*Note 1</p> <p>where $\delta = a + b - r$ and $\lambda = c / f$</p>	<p>A_{bar} = Effective barrier attenuation (dB)</p> <p>A_g = Total Ground Absorption (dB)</p> <p>*Note 1: Only apply the A_g correction if $A_g > 0$</p> <p>δ = Path difference (m)</p> <p>a = Distance from source to barrier head (m)</p> <p>b = Distance from barrier head to assessment position (m)</p> <p>r = Distance from source to assessment position (m)</p> <p>λ = Wavelength of sound (m)</p> <p>c = Speed of sound – Assumed to be 342 ms^{-1}</p> <p>f = Octave band centre frequency (Hz)</p>

5.2. British Standard 4142: 2014 (Amended 2019) Feature Correction

It is appropriate to add a feature correction where there is a new source that cannot be measured in line with BS4142:2014. The 3 methods for approaching this are the subjective, objective, and reference methods. In this report the subjective method is used.

Section 9.2 Subjective Method	Perceptibility to noise sensitive façades	Correction
Tonality Ranging from not tonal to prominently tonal	Not tonal	+0
	Just perceptible	+2
	Clearly perceptible	+4
	Highly perceptible	+6
Impulsivity Considering both the rapidity and any overall change in sound levels	Not impulsive	+0
	Just impulsive	+3
	Clearly impulsive	+6
	Highly impulsive	+9
Readily Distinctive Characteristic is neither tonal nor impulsive	Is not present	+0
	Is present	+3
Intermittency Identifiable “on/off” conditions	Is not present	+0
	Is present	+3

5.3. Calculation of Plant Noise Levels

5.3.1 Day Time (07:00 to 19:00)

		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L _w	D _c	A _{div}	A _{gr}	A _{atm}	A _{bar}	L _p
1	Package CO2 Gas Cooler	63 dB	+3 dB	-28 dB	+3 dB	-0 dB	-12 dB	29 dB
2	Daikin AZAS AC Unit	70 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	36 dB
3	Daikin AZAS AC Unit	70 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	35 dB
4	Daikin AZAS AC Unit	50 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	15 dB
TOT	Total Noise Levels	74 dB	-35 dB					39 dB

5.3.2 Evening (19:00 to 23:00)

		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L _w	D _c	A _{div}	A _{gr}	A _{atm}	A _{bar}	L _p
1	Package CO2 Gas Cooler	61 dB	+3 dB	-28 dB	+3 dB	-0 dB	-12 dB	27 dB
2	Daikin AZAS AC Unit	68 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	34 dB
3	Daikin AZAS AC Unit	68 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	33 dB
4	Daikin AZAS AC Unit	48 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	13 dB
TOT	Total Noise Levels	71 dB	-34 dB					37 dB

5.3.3 Night Time (23:00 to 07:00)

		Source	ISO 9613 – Part 2: 1996 Corrections					Assessment
Ref	Description	L _w	D _c	A _{div}	A _{gr}	A _{atm}	A _{bar}	L _p
1	Package CO2 Gas Cooler	57 dB	+3 dB	-28 dB	+3 dB	-0 dB	-12 dB	23 dB
2	Daikin AZAS AC Unit	28 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	-7 dB
3	Daikin AZAS AC Unit	28 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	-7 dB
4	Daikin AZAS AC Unit	28 dB	+3 dB	-29 dB	+3 dB	-0 dB	-12 dB	-7 dB
TOT	Total Noise Levels	57 dB	-34 dB					23 dB

6. Assessment of Noise Levels...

6.1. Night Noise Guidelines

Night Noise Guidelines	Day Time - 07:00 to 19:00	Evening – 19:00 to 23:00	Night Time – 23:00 to 07:00
Specific Sound	L _{Aeq,1 hour} 39 dB	L _{Aeq,1 hours} 37 dB	L _{Aeq,15 minutes} 23 dB
NPPF – Improve Quality of Life	Less than L _{Aeq,1 hour} 40 dB	Less than L _{Aeq,1 hour} 40 dB	Less than L _{Aeq,1 hour} 40 dB
NPPF – Paragraph 123	Complies	Complies	Complies

6.2. ISO 1996 Part 1: 2016

ISO 1996 – Part 1: 2016	Day Time - 07:00 to 19:00	Evening – 19:00 to 23:00	Night Time – 23:00 to 07:00
Specific Sound	L _{Aeq,1 hour} 39 dB	L _{Aeq,1 hours} 37 dB	L _{Aeq,15 minutes} 23 dB
Adjustment - Regular Impulsive	+0 dB	+0 dB	+3 dB
Adjustment – Tonal	+0 dB	+ 0 dB	+ 5 dB
Adjustment - Time Period	+0 dB (Day Time)	+5 dB (Evening)	+10 dB (Night Time)
Rating Levels	L _{Aeq,1 hour} 39 dB	L _{Aeq,1 hours} 37 dB	L _{Aeq,15 minutes} 31 dB
Residual Sound Levels	L _{Aeq,1 hour} 59 dB	L _{Aeq,1 hours} 57 dB	L _{Aeq,15 minutes} 52 dB
Rating + Residual	L _{Aeq,1 hour} 59.0 dB	L _{Aeq,1 hours} 57.0 dB	L _{Aeq,15 minutes} 52.0 dB
Increase in Residual Noise	+ 0.0 dB	+ 0.0 dB	+ 0.0 dB
IEMA Significance	+2 dB (No Impact)	2 dB (No Impact)	2 dB (No Impact)
NPPF – Paragraph 123	Complies	Complies	Complies

6.3. Assessment of Average Noise Levels (BS 4142: 2014)

BS 4142: 2014	Day Time - 07:00 to 19:00	Evening – 19:00 to 23:00	Night Time – 23:00 to 07:00
Residual Noise Levels	L _{Aeq,1 hours} 59 dB	L _{Aeq,1 hours} 57 dB	L _{Aeq,15 minutes} 52 dB
Specific Noise Levels	L _{Aeq,1 hours} 39 dB	L _{Aeq,1 hours} 37 dB	L _{Aeq, 15 minutes} 23 dB
Impulsivity Feature	+0 dB	+0 dB	+0 dB
Tonality Feature	+0 dB	+0 dB	+0 dB
Rating Noise Levels	L _{Aeq,1 hours} 39 dB	L _{Aeq,1 hours} 37 dB	L _{Aeq, 15 minutes} 23 dB
Background Noise Levels	L _{A90,1 hours} 45 dB	L _{A90,1 hours} 43 dB	L _{A90, 15 minutes} 37 dB
BS 4142 Assessment	-6 dB	-6 dB (Low Impact)	-14 dB (Low Impact)
NPPF – Paragraph 123	-0 dB (Low Impact)	-0 dB (Low Impact)	-0 dB (Low Impact)
Uncertainty (95% Confidence, k=2)	+/- 1.85 dB	+/- 1.86 dB	+/- 1.92 dB

7. Conclusions...

7.1. Assessment Position

The 1st floor residents over the rear of the store are located between 7 m and 8 m from the dedicated plant area at ground floor level at the rear of the store.

7.2. Background Noise Measurements

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,1h}	L _{Aeq,1h}	L _{A90,1h}	L _{Amax,15m}	L _{Aeq,15m}	L _{A90,15m}
61 - 92 dB	52 - 71 dB	43 - 63 dB	63 - 85 dB	52 - 65 dB	39 - 52 dB	47 - 87 dB	40 - 72 dB	36 - 49 dB
Modal Background		45 dB	Modal Background		43 dB	Modal Background		37 dB

7.3. Criterion at Assessment Position

It would be recommended that to comply with the revised version of the National Planning Policy Framework (“NPPF”) and the guidance within the Local Plan that the resultant noise levels at the nearest residential dwellings are at least -5 dB below the underlying background noise levels when assessed in accordance with British Standard 4142: 2014 (amended 2019).

7.4. Mitigation Measures

It will be necessary to install absorption panels on the rear and opposing wall to control the reverberant noise build-up due to reflections to ensure compliance with the Local Authority criterion.

7.5. Assessment of Noise Levels

Day Time (07:00 – 19:00)			Evening (19:00 – 23:00)			Night Time (23:00 – 07:00)		
L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142	L _{Aeq,1h}	L _{A90,1h}	BS4142
39 dB	45 dB	-6 dB	37 dB	43 dB	-6 dB	23 dB	37 dB	-14 dB

7.5.1 Conclusions

The resultant noise levels from the proposed mechanical equipment will result in noise levels that comply in full with the Local Plan and are at levels that are very unlikely to give rise to complaints from residents.

7.6. Uncertainty

Day Time (07:00 – 19:00)	Evening (19:00 – 23:00)	Night Time (23:00 – 07:00)
+1.85 dB (k=2, 95% Confidence)	+1.86 dB (k=2, 95% Confidence)	+1.92 dB (k=2, 95% Confidence)

8. Appendix A - BS 4142:2014 Information to Be Reported...

8.1. a) Competency

	Name	Role	Competency
1)	Mr. R. Scrivener	Director	Master of Science Degree in Acoustics and Noise Control (MSc) Member of the Institute of Acoustics (MIOA)

8.2. b) Source Under Investigation

	Source Number	Description		
1)	Source 1	Package CO2 Gas Cooler		
	Source 2	Daikin AZAS AC Unit		
	Source 3	Daikin AZAS AC Unit		
	Source 4	Daikin AZAS AC Unit		
	Description of Source	Source Location	Hours of Operation	Mode of Operation
2)	Source 1	dedicated plant area at ground floor level at the rear of the store	24-hour	Continuously on Demand
	Source 2		07:00 - 23:00	
	Source 3		07:00 - 23:00	
	Source 4		07:00 - 23:00	
3)	Description of Operation	Period	Conditions	Load
4)	All Sources	Day Time (07:00 to 19:00)	Ambient Temp 32°C	Maximum Load (100%)
5)		Evening (19:00 to 23:00)	Ambient Temp 28°C	Part Load (60%)
		Night Time (23:00 to 07:00)	Ambient Temp 24°C	Part Load (40%)
	Description of Premises	It is proposed to convert the vacant retail unit at 26 - 30 West Street into a Tesco Express convenience store. The plant area will be at ground floor level within the small external rear area. The nearest residential dwellings are the first floor flats set back over the rear of the site.		

8.3. c) Subjective Impression of Source at Assessment Position

1)	Dominance	Source will not be dominant at residential facade
	Audibility	Source will not be audible at residential facade
2)	Residual Noise Sources	Residual noise due to local road traffic

8.4. d) Existing Contexts

	Type of Receptor	Period	Sensitivity	Description
1)	Residential	Day Time (07:00 to 19:00)	Low	Noise can disturb outside amenity space and internal living space
		Evening (19:00 to 23:00)	Moderate	Noise can interrupt people trying to get to sleep
		Night Time (23:00 to 07:00)	High	Noise can disturb sleeping

8.5. e) Relative Positions

1)	Assessment Position	1st floor residents over the rear of the store		
		BS 4142:2014 Criteria	Details	Compliance with Criteria
		Section 6	1.0m from façade (external)	Position is valid
2)	Source Measurement	The source sound power levels were supplied by the client. It is believed the sound power levels were established in accordance with BS EN 13487:2003.		
	Justification	The client supplied the noise levels for the proposed plant.		
3)	Background Position	at the rear of the vacant site		
	Justification	BS 4142:2014 Criteria	Details	Compliance with Criteria
		Section 6.2	3.5m to any reflecting surface	Complies
		Section 6.2	Height 1.2m to 1.5m	Complies
		Section 6.2	1 st floor 1m to facade	Not applicable
		Section 6.2	Measurement Height	3.5m
			Distance to Reflecting Surface	1.0m
To record remote background levels, the noise meter had to be left in a secure position. The position represented the assessment position with the constraints of the site.				
4)	Topography, surfaces etc.	Hard and Flat		
5)	Relative Distances	The plant is located approximately 7.4 m to 7.6 m from the assessment position.		
6)	Dimensioned sketch	See maps and images.		

8.6. f) Noise Measurement Equipment Calibration

1)	Type	Sound Level Meter	Microphone	Calibrator
		KRE/05/01 - 633.C1	KRE/05/03 - 251	KRE/05/04 - 120/1
2)	Manufacturer	Casella	Casella	Casella
3)	Serial Number	2145360	00709	5231002
4)	Certificate Number	Certificate: U30501	Certificate: 30500	Certificate: U33740
	Calibration Date=	4th January 2019	4th January 2019	7th January 2020

8.7. g) Noise Measurement Equipment Operation Test

1)	Ref. Level of Calibrator	94 dB
2)	Meter Reading Before	94 dB – Meter operation checked. Meter in good working order.
	Meter Reading After	94 dB - Meter operation checked. Meter in good working order.

8.8. h) Weather Conditions

1)	Wind Speed	See weather information
	Wind Direction	
2)	Temperature Inversion	Unlikely to have occurred
3)	Precipitation	None – See Appendix B
4)	Fog	None
5)	Wet Ground	Not within the measurement period – See Appendix B
6)	Frozen Ground or Snow	Not within the measurement period – See Appendix B
7)	Temperature	See Appendix B
8)	Cloud Cover	Partly Cloudy

8.9. i) Date of Measurements

1)	Source Measurements	Unknown
	Background Measurements	10/12/2020

8.10. j) Measurement Time Interval

1)	Source Measurements	$T_m = 15$ minutes	
	Background Measurements	Day Time (07:00 to 19:00)	$T_m = 12$ hours
		Evening (19:00 to 23:00)	$T_m = 4$ hours
		Night Time (23:00 to 07:00)	$T_m = 8$ hours

8.11. k) Reference Time Interval

1)	Reference Time Interval	Day Time (07:00 to 19:00)	$T_r = 1$ hour
		Evening (19:00 to 23:00)	$T_r = 1$ hour
		Night Time (23:00 to 07:00)	$T_r = 15$ minutes

8.12. l) Specific Noise / m) Background Noise / n) Rating / o) Assessment / p) Conclusions

These details are all included within the body of the report and are not replicated within this section.

END OF REPORT (1st and last page not numbered)

KR Associates (UK) Ltd
Quietly confident...

