



EG on the Move Ltd
Sudden, Rochdale
Noise Impact Assessment
DC5560-NR1



Report Version Issue Log

Report Number	Issue Date	Note or Change	Author	Reviewed	Approval for Issue
DC5560-NR1	12.08.26	Report Issue	AMS	MAS	LS

This report has been prepared by Dragonfly Consulting with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client.

Copyright in this report (including the data it incorporates) is owned by Dragonfly Consulting. It is provided for the exclusive use of EG on the Move Ltd; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Dragonfly Consulting.

Dragonfly Consulting disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.

Limitations to this Report

This report entails a physical investigation of the site with a sufficient number of sample measurements to provide quantitative information concerning the type and degree of noise affecting the site. The objectives of the investigation have been limited to establishing sources of noise material to carrying out an appropriate assessment.

The number and duration of noise measurements have been chosen to give reasonably representative information on the environment within the agreed time, and the locations of measurements have been restricted to the areas unoccupied by building(s) that are easily accessible without undue risk to our staff.

As with any sampling, the number of sampling points and the methods of sampling and testing cannot preclude the existence of “hotspots” where noise levels may be significantly higher than those actually measured due to previously unknown or unrecognised noise emitters. Furthermore, noise sources may be intermittent or fluctuate in intensity and consequently may not be present or may not be present in full intensity for some or all of the survey duration.

CONTENTS

1.0	INTRODUCTION	1
1.1	Site Conditions	1
2.0	GUIDANCE	3
2.1	National Policy	3
2.2	Local Planning Guidance	4
2.3	Best Practice and Other Relevant Guidance	4
3.0	ASSESSMENT METHODOLOGY	6
3.1	Assessed Sources of Environmental Noise	6
3.2	Selection of Assessment Criteria	6
4.0	ENVIRONMENTAL NOISE SURVEY	8
4.1	Survey Methodology	8
4.2	Survey Results	8
5.0	NOISE MODELLING METHODOLOGY	11
5.1	Data Sources	11
5.2	Source Noise Assumptions	11
5.3	Uncertainty	14
6.0	ASSESSMENT	15
6.1	Fixed Plant Limits – Fixed Plant	15
6.2	Electric Vehicle Charging	15
6.3	Car Parking and Vehicle Visitations Assessment	16
6.4	Assertion of Competence	17
7.0	CONCLUSIONS	18
7.1	Recommendation to Decision Makers	18

List of Appendices

Appendix A	Glossary of Terminology
Appendix B	Monitoring Equipment
Appendix C	Sensitive Receptor and Measurement Locations

1.0 INTRODUCTION

EG on the Move Ltd has appointed Dragonfly Consulting to carry out a Noise Impact Assessment for a proposed knockdown redevelopment of the existing Petrol Filling Station at Sudden, Rochdale.

The noise assessment has been conducted with reference to the National Planning Policy Framework, the (NPPF) and *Noise Policy Statement for England* (NPSE) and to appropriate British Standards, recognised guidance and reference documents relevant to this site.

A glossary of technical terminology is included in Appendix A to support this document.

1.1 Site Conditions

1.1.1 Existing Site Conditions

The site currently operates as a Petrol Filling Station (PFS) with an associated convenience store, Starbucks Drive-thru coffee shop and car parking facilities. The site is bound by the following:

- The 'A58' Manchester Road to the north, along with a mixture of residential and commercial use buildings further afield;
- Residential and commercial premises to the east and south; and
- Rochdale Bypass to the west, with a Tesco Superstore further afield.

1.1.2 Proposed Site Conditions

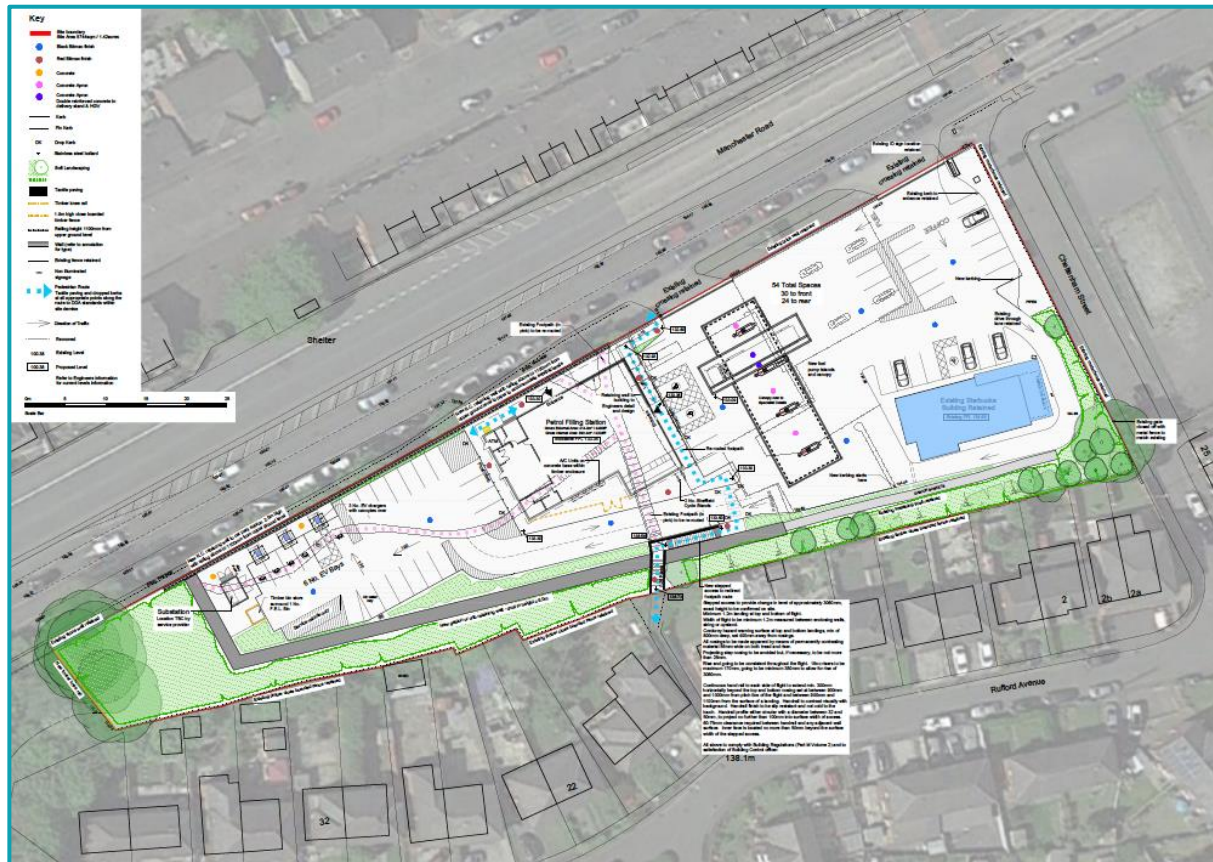
It is proposed to demolish the existing convenience store associated with the PFS on site and develop a new convenience store. Additional car parking spaces are also proposed west of the proposed development site, which includes six (6no.) Electric Vehicle (EV) car parking spaces. The existing PFS pumps, vehicle parking east of the development site and the Starbucks Drive-thru unit will be retained. Vehicle site access and egress will remain available from Manchester Road to the north of the site.

The development site currently accommodates delivery and petrol filling operations from HGV use, which are established and permitted uses under the existing planning approvals. As such, these activities have not been included within the noise impact assessment. The Report therefore focuses on assessing potential noise impacts associated with the site layout changes and noise impacts introduced as part of the redevelopment.

The existing permitted opening hours for the PFS is 24-hour use; it is understood that existing permitted site use will remain unchanged.

The proposed layout of the site, provided by ADS Design (ref: Planning 1809-9) can be seen in Figure 1.1 overleaf.

Figure 1.1
Proposed Site Layout



1.1.3 Noise Sensitive Receptor (NSR) Locations

Noise contributions have been considered at the following noise sensitive receptors (NSRs) based on their proximity to the site:

Table 1.1
Noise Sensitive Receptor (NSR) Locations

Reference	Address	Cardinal/Ordinal Direction	Description
NSR1	Residential dwellings on Manchester Road, Rochdale OL11 3PQ	North	2 storey residential dwellings
NSR2	Residential dwellings on Rufford Avenue, Rochdale OL11 3QN	South	2 storey residential dwellings
NSR3	Residential dwellings on Long Hill, Rochdale OL11 3QL	South-west	2 storey residential dwellings

Where applicable, the assessment has been undertaken based on predicted noise contributions at ground floor (1.5m) and first floor (4.0m) level.

NSR locations are shown in Appendix C.

2.0 GUIDANCE

2.1 National Policy

2.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to 'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'

Paragraph 187 of the NPPF states:

"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 soil, air, water or noise pollution or land instability."

Additionally, Paragraph 198 of the NPPF states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

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 the quality of life..."

2.1.2 Noise Policy Statement for England

The 'Noise Policy Statement for England' sets out the following vision for ongoing noise policy:

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

This vision should be achieved through the following Noise Policy Aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*

- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life.”*

To achieve this vision, the Noise Policy Statement sets 3 noise levels to be defined by the assessor:

NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms: below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

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

SOAEL – Significant Observed Adverse Effect Level

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

The Noise Policy Statement considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable. Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the Policy Statement requires that:

“...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... This does not mean that such adverse effects cannot occur.”

Where noise levels are below the LOAEL, it is considered there will be no adverse effect. Once noise levels are below the NOEL, there will be no observable change.

2.2 Local Planning Guidance

2.2.1 Rochdale: Adopted Core Strategy (October 2016)

For noise impacts from developments, the following policy within the Rochdale Borough Council Local Plan is deemed most relevant for the proposed development.

“Policy G9 – Reducing the impact of pollution, contamination and land instability

We will reduce all forms of pollution, contamination and land instability in the borough, by:

b. Requiring that development does not have impacts that lead to an unacceptable increase in air, water, noise, light or other pollution;”

2.3 Best Practice and Other Relevant Guidance

2.3.1 British Standard (BS) 7445-1:2003 – Description and Measurement of Environmental Noise – Part 1: Guide to Quantities and Procedures

This document defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

The methods and procedures described in this British Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a site. This British Standard does not specify limits for environmental noise.

2.3.2 BS 4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound

BS 4142:2014+A1:2019 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

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

BS 8233:2014 provides a methodology to calculate the noise levels entering a building through facades and façade elements and provides details of appropriate measures for sound insulation between dwellings. It includes recommended internal noise levels which are provided for a variety of situations.

2.3.4 ISO 9613-2:2024 Attenuation of Sound during Propagation Outdoors

ISO 9613-2:2024 presents a calculation methodology for the determination of the attenuation of sound outdoors. The methodology enables the prediction the levels of environmental noise at a distance from a variety of sources.

2.3.5 Bayerisches landesamt für Umwelt (BayLfU) 2007 Parking Area Noise. Recommendations for the Calculation of Sound Emissions of Parking Areas, Motorcar Centers and Bus Stations as well as of Multi-Story Car Parks and Underground Car Parks (Bayerisches Landesamt für Umwelt) ISBN: 3-936385-26-2

BayLfU presents the recommended calculation method for determining noise emissions from parking areas serving a variety of uses. It provides details of the input quantities and the relevant calculation methodologies. Application of this standard is considered appropriate in lieu of there being a recognised and reliable British standard.

3.0 ASSESSMENT METHODOLOGY

3.1 Assessed Sources of Environmental Noise

With reference to the guidance detailed within Section 2.0, Table 3.1 presents the specific methodology adopted for the assessment of noise arising from the development proposals.

Table 3.1
Assessed Sources of Environmental Noise

Potential Noise Source	Relevant Assessment Methodology
Fixed Plant and Electric Vehicle Charging	BS 4142:2014+A1:2019
Car Parking and Petrol Station Visitation	BS 8233:2014

3.2 Selection of Assessment Criteria

The following criteria have been selected to determine the threshold of effect levels in the context of the National Planning Policy Framework and Noise Policy Statement for England.

Table 3.2
Assessment Criteria: BS 4142:2014+A1:2019

Effect Level	Criteria	Justification
Lowest Observed Adverse Effect Level (LOAEL)	Free-field external noise levels at adjacent sensitive receptor locations within +5 dB of representative background noise level	Noise levels + 5 dB above background are considered an indication of where adverse noise impacts may occur in the context of BS 4142. Noise levels below this level are an indication that it is less likely that the specific sound source will have an adverse impact
Significant Observed Adverse Effect Level (SOAEL)	Free-field external noise levels at receptor above +10 dB of representative background noise level	None – Planning guidance requires that impacts must be reduced below the SOAEL through mitigation, with adverse impacts above the Lowest Observable Adverse Impact Level (LOAEL) but below the SOAEL being mitigated as far as is reasonable

Table 3.3
Assessment Criteria: BS 8233:2014

Effect Level	Criteria	Justification
Lowest Observed Adverse Effect Level (LOAEL)	Internal Noise Levels at adjacent sensitive receptor locations below 35 dB $L_{Aeq, 16hr}$ / 30 dB $L_{Aeq, 8hr}$ / 45 dB $L_{A_{fMax}}$	Noise Levels within BS 8233:2014 target criteria
Significant Observed Adverse Effect Level (SOAEL)	Internal Noise Levels at adjacent sensitive receptor locations exceed 40 dB $L_{Aeq, 16hr}$ / 35 dB $L_{Aeq, 8hr}$ / 50 dB $L_{A_{fMax}}$	None – Planning guidance requires that impacts must be reduced below the SOAEL through mitigation, with adverse impacts above the Lowest Observable Adverse Impact Level (LOAEL) but below the SOAEL being mitigated as far as is reasonable

4.0 ENVIRONMENTAL NOISE SURVEY

4.1 Survey Methodology

Daytime and night-time measurements were undertaken at two (2no.) measurement locations from the 16th to the 20th of July 2026. The noise measurements established typical external ambient and background noise levels at the site. The measurement locations are hereby referred to in this report as follows:

- ‘Location 1’ – sound level meter positioned approximately 2.7m from the ground, in the north-east corner of the site, adjacent to Manchester Road; and
- ‘Location 2’ – sound level meter positioned approximately 2.7m from the ground to the south of the site, adjacent to the residential properties of Rufford Avenue.

The equipment used during the survey is detailed in Appendix B. The sound level meters were calibrated before and after the measurements and no significant calibration drifts were found to have occurred (>0.2dB). The noise monitoring equipment had been calibrated to a traceable standard within the twenty-four months preceding the survey. Calibration certificates are available on request.

The measurement locations are shown in Appendix C.

4.2 Survey Results

Weather conditions were collated throughout the duration of the survey, and all measured periods were considered to be suitable, that being of low wind speeds (<5 m/s) and no rainfall. Summaries of the measured noise levels are given in Table 4.1 below. Full survey data is available upon request.

Table 4.1
Summary of Measured Noise Levels – 16/07/26 to 20/07/26 – Free Field, dB

Location	Date	Period	Time (h)	L _{Aeq, T}	L _{A10}	L _{A90}	L _{AFMax}
1	15/05/2026	Daytime	1500h-2300h	65.6	67.8	55.6	95.0
	15/05/2026 - 16/05/2026	Night-time	2300h-0700h	63.3	66.2	43.8	92.3
	16/05/2026	Daytime	0700h-1200h	67.6	68.0	56.9	109.6
	16/05/2026 - 17/05/2026	Night-time	2300h-0700h	65.6	66.7	44.4	108.4
	17/05/2026	Daytime	0700h-2300h	65.6	68.3	55.2	96.9
	17/05/2026 - 18/05/2026	Night-time	2300h-0700h	63.6	66.8	43.9	92.8
	18/05/2026	Daytime	0700h-2300h	65.8	68.5	53.6	97.7
	18/05/2026 - 19/05/2026	Night-time	2300h-0700h	63.5	66.7	44.9	91.3
	19/05/2026	Daytime	0700h-1100h	67.6	69.6	57.2	92.1
2	15/05/2026	Daytime	1500h-2300h	57.6	60.0	49.3	83.3
	15/05/2026 - 16/05/2026	Night-time	2300h-0700h	55.2	57.9	40.2	79.6
	16/05/2026	Daytime	0700h-1200h	58.8	60.4	50.5	94.2
	16/05/2026 - 17/05/2026	Night-time	2300h-0700h	55.9	58.2	41.6	95.3
	17/05/2026	Daytime	0700h-2300h	58.0	60.6	50.1	84.5
	17/05/2026 - 18/05/2026	Night-time	2300h-0700h	55.6	58.4	40.8	85.8
	18/05/2026	Daytime	0700h-2300h	58.2	60.5	48.8	94.0
	18/05/2026 - 19/05/2026	Night-time	2300h-1330h	55.9	59.1	41.6	78.6

4.2.1 Observations and Comments

The noise environment at the measurement location was dominated by road traffic noise from the surrounding road network, predominantly Manchester Road to the north, and commercial noise from the existing PFS.

For the assessment, it is considered that the levels measured are representative of the typical acoustic environment at the survey locations.

4.2.2 BS 4142:2014+A1:2019 Background (L_{A90}) Statistical Analysis

In accordance with the methodology detailed in Section 8 of BS 4142:2014+A1:2019, representative background noise levels have been determined through statistical analysis of all 15-minute samples and are expressed as integers (with 0.5 dB being rounded up).

The results of the statistical analysis of measured background noise levels during the daytime and night-time are presented in a graphical format in Figures 4.1 to 4.4. The records highlighted in teal in each figure denote the representative background levels used within this assessment.

Figure 4.1
'Location 1' – Daytime Background ($L_{A90,15min}$) Analysis

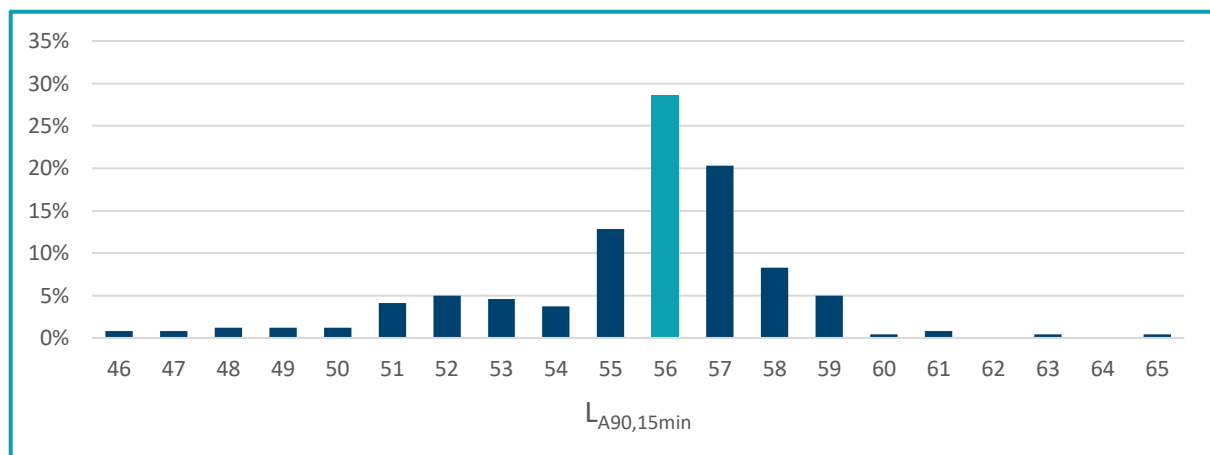


Figure 4.2
'Location 1' – Night-time Background ($L_{A90,15min}$) Analysis

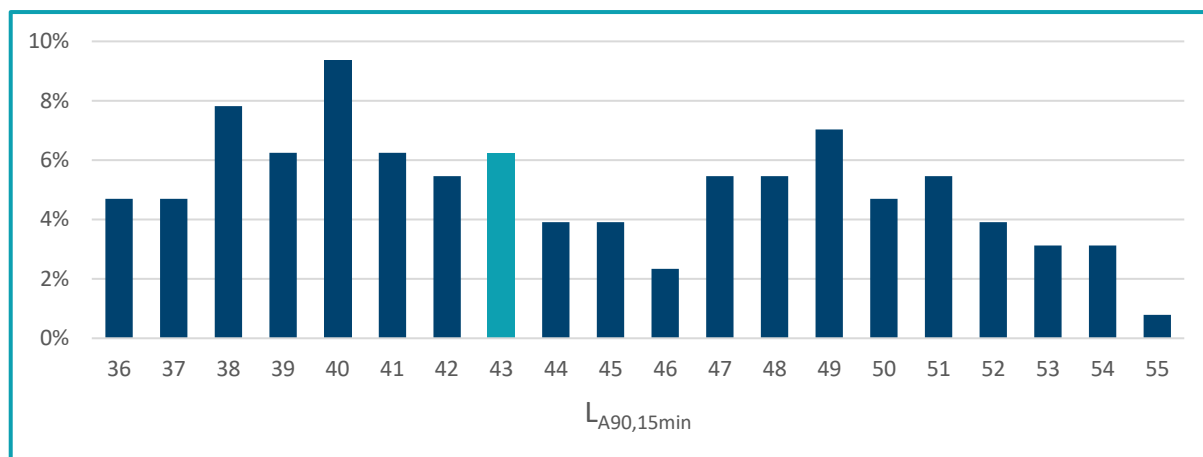


Figure 4.3
'Location 2' – Daytime Background ($L_{A90,15min}$) Analysis

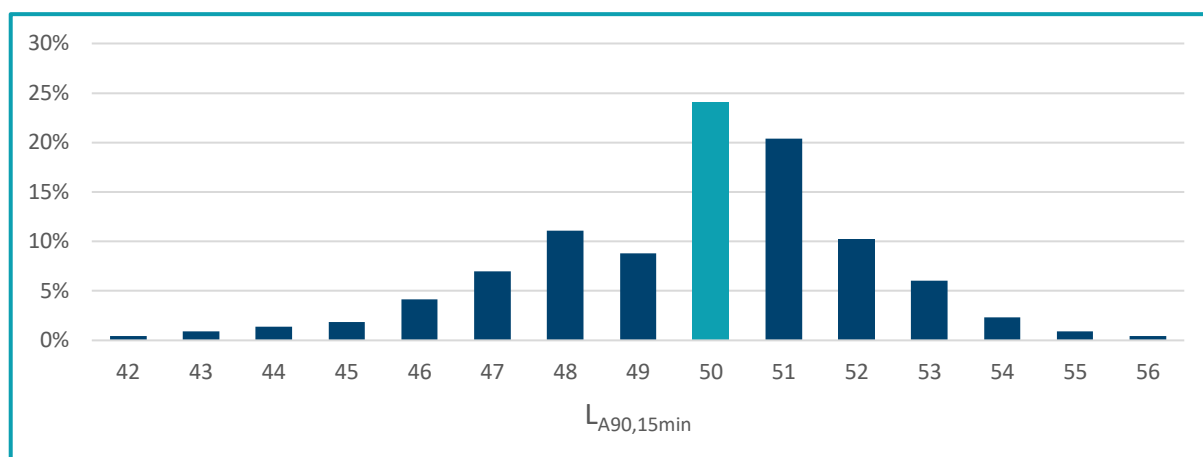
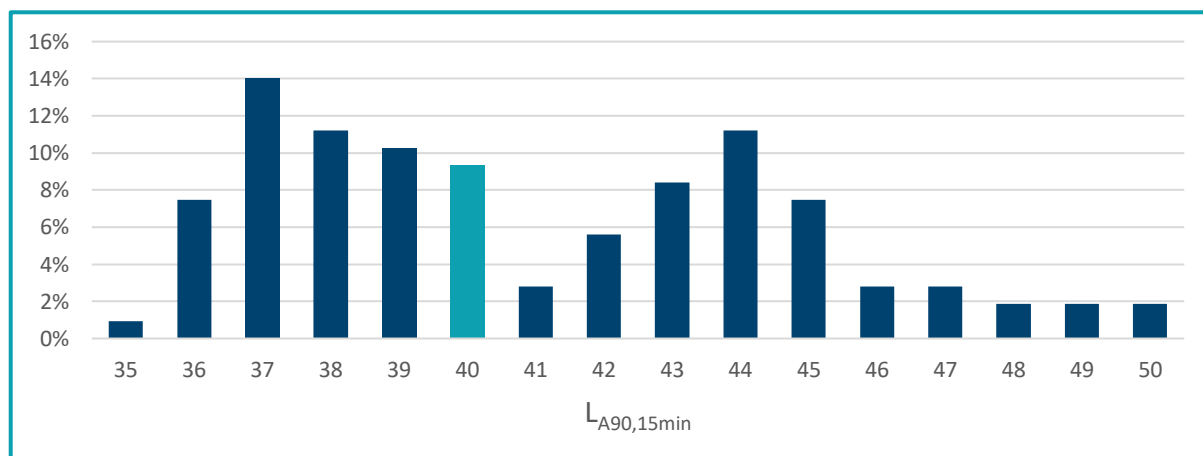


Figure 4.4
'Location 2' – Night-time Background ($L_{A90,15min}$) Analysis



5.0 NOISE MODELLING METHODOLOGY

5.1 Data Sources

Modelling calculations have been undertaken based on the spatial settings and data sources identified in the Table below.

Table 5.1
Noise Model Input Data

Parameter	Scenario	Data Source	Assumptions
Site Plans	Existing	<i>OS Mastermap Data</i>	Existing building heights modelled as 8.5m AGL (typical 2-storey building height) unless otherwise stated through global mapping software
	Proposed (Site Layout)	<i>Planning 1809-9</i> <i>ADS Design 27.04.23</i>	None
Ground Heights	All	Environment Agency Open Data LiDAR Digital Terrain Model (2.0m resolution)	None
Ground Absorption	All	<i>n/a</i>	Hard ground conditions on and off-site (G=0.0)
Reflections	All	<i>n/a</i>	3 rd order reflections have been accounted for within the noise model

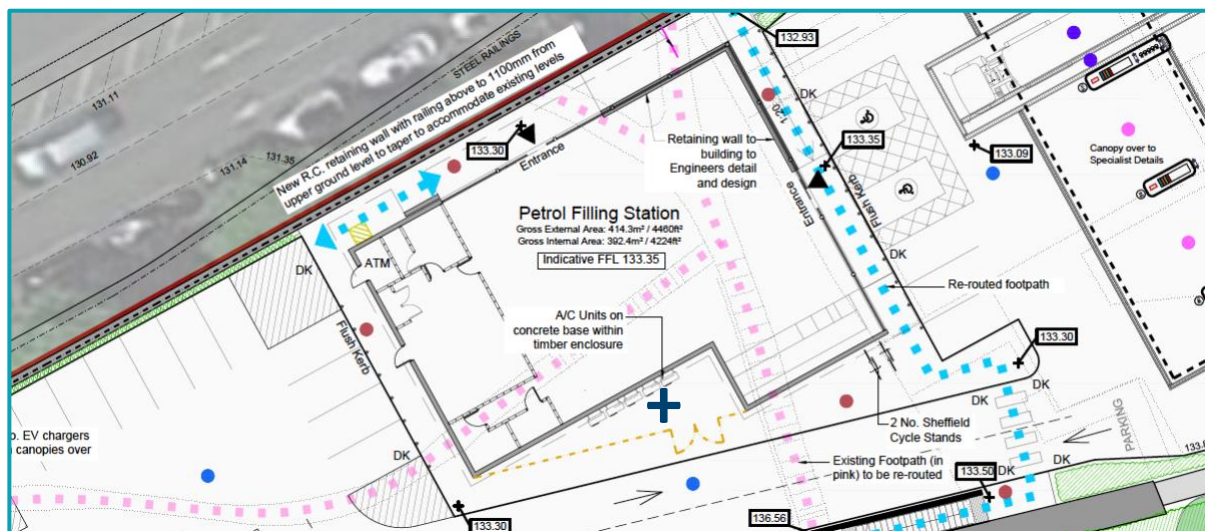
5.2 Source Noise Assumptions

5.2.1 Fixed Plant

At the current design stage, there is no fixed M&E strategy for the PFS Store. However, for the purposes of presenting a robust assessment and to give an indication of the development's potential operational noise output, indicative plant limits have been determined for the development operating. Once details of the confirmed M&E strategy become available, further assessment should be undertaken to ensure plant noise contributions are adequately controlled.

As location plans for the fixed plant item associated with the PFS Store have not yet been finalised, the fixed plant items have been modelled as a point source, located south of the PFS Unit at a height of 1.0m. An indicative plant location is represented in Figure 5.1 overleaf.

Figure 5.1
Indicative Fixed Plant Location



Indicative plant limits associated with the PFS Unit are presented in Table 5.2:

Table 5.2
Fixed Plant Noise Limits

Time Period	Operational Noise Output L_{WA} dB (per unit)
Daytime	83.9
Night-time	73.9

N.B. In accordance with ISO 9613-1, where spectral content of assessed noise sources is not available, such as indicative fixed plant limits, the attenuation terms for 500Hz are applied to determine noise contributions at adjacent sensitive receptor locations.

It is considered that the above operational noise output values are consistent with or greater than the expected sound power output of the typical plant installations associated with similar sized PFS units. It is therefore considered that the indicative plant limit demonstrates that the use of typical fixed plant associated with such developments is viable for this site.

5.2.2 Electric Vehicle Charging

As part of the development, it is proposed to install electric vehicle charging bays. A summary of the assessed noise source is presented in Table 5.3. The site may consider alternative units to the assessed EVC used for the assessment, however the data provided below gives an indication on limits and potential operational output.

Table 5.3
Electric Vehicle Charging Data Summary

Noise Source	Assessed Metric	Parameter	Data Source(s)
Electric Vehicle Charger	L_{Aeq}	Broadband Noise	Source noise measurements taken at 1m adjacent to a 150kW Hypercharger Station
		Output	
		Spectral Data	

Source noise level data utilised in the assessment of ambient noise (L_{Aeq}) contributions are presented in the Table 5.4.

Table 5.4
Electric Vehicle Charging: Assessed Noise Source Sound Power Levels
(Ambient Noise Level L_{Aeq} Assessment)

Noise Source	Octave Band Sound Power Level (L_w), Hz (dB(Z))								Sum dB(A)
	63	125	250	500	1000	2000	4000	8000	
Electric Vehicle Charger	73.2	70.0	70.9	74.0	72.1	65.3	63.4	51.9	75.7

Table 5.5 presents a summary of the operational assumptions accounted for within the noise model to determine ambient noise contributions at adjacent sensitive receptor locations.

Table 5.5
Operational Assumptions (Electric Vehicle Charging)

Noise Source	Source Type	Height Above Ground Level (AGL)	Operational Assumptions
Electric Vehicle Charger	Point Source	1.5m	Assumed 100% on-time throughout 1hr daytime and 15-minute night-time reference periods

5.2.3 Car Parking and Petrol Station Visitations

Operational Assumptions

Noise emissions from car parking and petrol filling station visitations have been modelled in accordance with 'BayLfU Parking Area Noise'.

Table 5.6
BayLfU Modelling Input Data – Car Parking

Parameter	Input
PFS Parking	
Emissions Calculation	LfU-Study-2007
No. Parking Spaces	Varies per car park (47no total)
Events per space (1hr – Day)	3.5 (per space)
Events per space (1hr – Night)	0.7 (per space)
EV Parking	
Emissions Calculation	LfU-Study-2007
No. Parking Spaces	6
Events per space (1hr – Day)	1.0 (per space)
Events per space (1hr – Night)	0.03 (per space)
Petrol Station Visitations	
Emissions Calculation	LfU-Study-2007
Visitations (Car) (1hr – Day)	40
Visitations (Car) (1hr – Night)	15

The noise model input data for the assessment of car parking maximum noise events is presented in Table 5.7 overleaf.

Table 5.7
Car Parking: Assessed Noise Source Sound Power Levels
(Maximum Noise Level L_{Amax} Assessment)

Noise Source	Octave Band Sound Power Level (L_{WA}), Hz (dB(A))								Sum dB(A)
	63	125	250	500	1000	2000	4000	8000	
Car Parking L_{Amax} Event	101.2	95.1	95.6	93.5	96.1	92.3	88.4	85.8	99.6

5.3 Uncertainty

5.3.1 Survey

Given the duration of the survey and the use of the highest measured daytime and night-time noise levels to ascertain noise propagation across the site, it is considered that the limits of Class 1 sound level meters are the only limiting factor when considering survey uncertainty.

Standard equipment uncertainties have been considered by applying allowable tolerances minus the maximum allowable test laboratory uncertainties given in IEC 61672-1, as defined by Narang and Bell (Narang, P. and Bell, T., 2008. *New IEC standards and periodic testing of sound level meters. Proceedings of the Internoise, Shanghai, China*, pp.26-29).

The following table provides an overview of standard equipment uncertainties relevant to the SLM class utilised within the survey.

Table 5.8
Standard uncertainties using allowable tolerances minus test laboratory tolerances given in IEC 61672-1 (source: Narang and Bell, Table 14)

SLM Class	Frequency Weighting	Directional Response	Level Linearity	Toneburst Response	Calibrator (IEC 61672)	Supply Voltage	Combined Standard Uncertainty +/- dB
Class 1	0.5	0.5	0.4	0.25	0.125	0.05	0.9

5.3.2 Modelling

CadnaA noise modelling software has been utilised to ascertain how noise propagates throughout the proposed development. The software directly incorporates the ISO 9613 calculation procedure which has an uncertainty rating of +/- 3dB.

5.3.3 Combined Uncertainty

Based on the information provided above, the combined Root Sum Squared (RSS) uncertainty for the assessment has been calculated as +/- 3.1dB.

6.0 ASSESSMENT

6.1 Fixed Plant Limits – Fixed Plant

The assessment of ambient noise contributions (L_{Aeq}) from fixed plant item associated with the PFS Unit has been undertaken following the guidance within BS 4142:2014+A1:2019, and operational assumptions detailed in in Section 5.2.1.

As the operational noise characteristics of the plant associated with the PFS Unit are not yet known, to account for any potentially adverse acoustic characteristics, a correction of +4dB has been applied to determine the rating level (L_{ArTr}) in accordance with BS 4142:2014+A1:2019. This is based on fixed plant potentially having clearly perceptible tonality which is often attributed to such noise sources.

The results of the assessment are shown in Table 6.1. In accordance with BS 4142:2014+A1:2019 Paragraph 8.6, the background levels are expressed as integers (with 0.5 dB being rounded up):

Table 6.1
BS 4142 Assessment of Fixed Plant Noise Impact Daytime / Night-time, L_{ArTr} dB

NSR	Existing Measured Background (L_{A90})		Predicted Rating Level (L_{ArTr})		Difference, dB	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
1	56	43	27.0	17.0	-29.0	-26.0
2	50	40	47.9	37.9	-2.1	-2.1
3			50.0	40.0	0.0	0.0

As shown in Table 6.1, providing the cumulative noise output of all external fixed plant is kept within the previously determined limits (presented in Table 5.2), noise contributions will be at parity with the existing background noise levels during both the daytime and night-time, inclusive of a +4dB character correction for uncertainty.

Noise impacts arising from the operation of fixed plant items is therefore predicted to be below the LOAEL, as defined in Section 3.0.

6.2 Electric Vehicle Charging

The assessment of ambient noise contributions (L_{Aeq}) from Electric Vehicle Chargers (EVC) has been undertaken following the guidance within BS 4142:2014+A1:2019, and operational assumptions detailed in in Section 5.2.2.

It has been determined that no character corrections are necessary to be applied when determining the noise rating level for the electric vehicle chargers. The noise output is not considered to be impulsive in nature, and remains continuous throughout the measurement period, removing any intermittent penalties. Spectral analysis also confirms the absence of any tonal components and therefore, in accordance with BS 4142:2014+A1:2019, no acoustic penalties are warranted.

The results of the assessment are shown in Table 6.2. In accordance with BS 4142:2014+A1:2019 Paragraph 8.6, the background levels are expressed as integers (with 0.5 dB being rounded up):

Table 6.2
BS 4142 Assessment of EVC Noise Impact Daytime / Night-time, $L_{A_{rTr}}$ dB

NSR	Existing Measured Background (L_{A90})		Predicted Rating Level ($L_{A_{rTr}}$)		Difference, dB	
	Daytime	Night-time	Daytime	Night-time	Daytime	Night-time
1	56	43	41.2	41.2	-14.8	-1.8
2	50	40	34.5	34.5	-15.5	-5.5
3			37.4	37.4	-12.6	-2.6

As shown in Table 6.2, noise contributions will be at least 12.6dB below the existing background noise levels during the daytime period, and at least 1.8dB below the existing background during the night-time.

Noise impacts arising from EVC are therefore predicted to be below the LOAEL, as defined in Section 3.0.

6.3 Car Parking and Vehicle Visitations Assessment

Ambient noise contributions from car parking events and petrol station visitations have been assessed with windows open at the nearest sensitive receptors, using the specified parameters set out in Section 5.2.3. To present a worst-case, a nominal reduction of 15dB has been applied to account for attenuation through a partially open window.

The results of the assessment are presented in Table 6.3.

Table 6.3
BS 8233:2014 Assessment of Car Parking and Petrol Station Visitations Noise Impact, (Daytime/Night-time) $L_{Aeq,T}$

NSR	External Noise Levels ($L_{Aeq,T}$)		Internal Noise Levels ($L_{Aeq,T}$)		BS 8233:2014 Internal Target Criteria Daytime/Night-time $L_{Aeq,T}$	Within Criteria
	Daytime	Night-time	Daytime	Night-time		
1	47.4	42.3	32.4	27.3	35 / 30	✓
2	48.9	43.9	33.9	28.9		✓
3	46.2	40.6	31.2	25.6		✓

As shown in Table 6.3, predicted noise contributions fall below BS 8233:2014 target internal noise criteria for both daytime (35 dB $L_{Aeq,T}$) and night-time (30dB $L_{Aeq,T}$) at all NSRs.

It is worthy of note that the predicted external noise contributions fall below the BS 8233 target external amenity criteria (50dB/55dB $L_{Aeq,T}$).

6.3.1 Night-time Maximum Noise Level Assessment – BS 8233:2014

An assessment of maximum noise level events associated with car parking during the night-time period is presented in Table 6.4. To account for the attenuation afforded by a partially open window, a nominal reduction of 15 dB has been applied to determine the predicted internal noise levels.

Table 6.4
BS 8233 Assessment of Car Parking Noise Impact Night-time, L_{Amax} dB

NSR	External Noise Levels, L_{Amax}	Internal Noise Levels, L_{Amax}	Internal Criteria, L_{Aeq} (Night-time)	Within Criteria
1	60.5	45.5	45	✗
2	60.5	45.5		✗
3	57.7	42.7		✓

The results of the assessment presented in Table 6.4 demonstrate that maximum noise level events from car parking exceed the recommended internal limits of 45 dB L_{Amax} at NSRs 1 and 2.

6.3.2 Night-time Maximum Noise Level Assessment – BS 8233:2014 – Comparison

Existing maximum noise events measured at Locations 1 and 2 have been compared against the maximum noise level events from car parking events. The absolute maximum event during the night-time period ($L_{Amax,1min}$) and typical maximum values, chosen by taking the 10th highest maximum level over the course of the night, have been used for comparison.

Table 6.5 shows the results of the comparison utilising the predicted result from NSRs 1 and 2.

Table 6.5
Maximum Noise Events Comparison – Car Parking

NSR	Maximum Predicted External Noise Level Event	Maximum Measured External Noise Level Event	Typical Measured External Noise Level Event	Difference, dB	
				Maximum	Typical
1	60.5	91.3	81.2	-30.8	-20.7
2	60.5	79.6	75.1	-19.1	-14.6

As shown in Table 6.5, the existing measured maximum noise levels and typical maximum noise levels (10th highest) already experienced in the area exceed the predicted maximum noise levels from car parking events, as outlined in this assessment. Therefore, any predicted exceedance is unlikely to be significant, especially as these events are isolated. Within the context of the existing noise environment, they would not be discernible from other sporadic maximum noise level events, given that similar exceedances already occur. On this basis, the predicted noise levels are considered acceptable within the existing environment at the NSRs.

Noise impacts arising from maximum car parking events and petrol station visitations are therefore predicted to be below the LOAEL for the assessment, as defined in Section 3.0.

6.4 Assertion of Competence

This assessment has been completed by Adam Shaw, Senior Acoustic Consultant with responsibilities for completing acoustic reports on behalf of Dragonfly Consulting. I am a Corporate Member of the Institute of Acoustics and an Associate Member of the British Occupational Hygiene Society.

I hold a Bachelor of Science in Sound Engineering, with Honours, from Birmingham City University.

7.0 CONCLUSIONS

EG on the Move Ltd has appointed Dragonfly Consulting to carry out a Noise Impact Assessment for a proposed knockdown redevelopment of the existing Petrol Filling Station at Sudden, Rochdale.

The noise assessment has been conducted with reference to the National Planning Policy Framework, the (NPPF) and *Noise Policy Statement for England* (NPSE) and to appropriate British Standards, recognised guidance and reference documents relevant to this site.

This report describes a noise survey of the site and the subsequent analysis to determine the noise environment of the proposed development. It then compares the results with the adopted criteria and, where applicable, recommendations are made with respect to the design of the development.

The assessment indicates that noise from all operations, including site layout changes and the addition of EVC, is predicted to fall below the LOAEL during both daytime and night-time reference periods.

Therefore, it is considered that noise impacts from the site proposals are predicted to below the LOAEL.

The NPPF defines the LOAEL as:

LOAEL – Lowest Observed Adverse Effect Level

The level above which adverse effects on health and quality of life can be detected.

7.1 Recommendation to Decision Makers

Based on the assessment detailed within this report, it is not considered that noise should be a barrier to the development. It is recommended that the site be granted planning consent with the addition of a suitable condition to address the following item:

- Fixed Plant – at the current design stage no fixed M&E details are available. It is therefore recommended that a pre-occupation condition be included to facilitate the assessment of site fixed plant requirements as and when these become available.

Appendix A – Glossary of Terminology

In order to assist the understanding of acoustic terminology and the relative change in noise, the following background information is provided.

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

Table A-1
Sound Levels Commonly Found in the Environment

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

Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure ($2 \times 10^{-5} \text{Pa}$).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

L_{Aeq} This is defined as the notional steady sound level which, over a stated period of time, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

L_{10} & L_{90} If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. L_{10} is the level exceeded for 10% of the time and is often used as a descriptor for road traffic noise. Similarly, L_{90} is the level exceeded for 90% of the time and is often used to describe the background level. It is common practice to use the L_{10} index to describe traffic noise.

L_{AMax} This is the maximum A-weighted sound pressure level recorded over the period stated. L_{AMax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment.

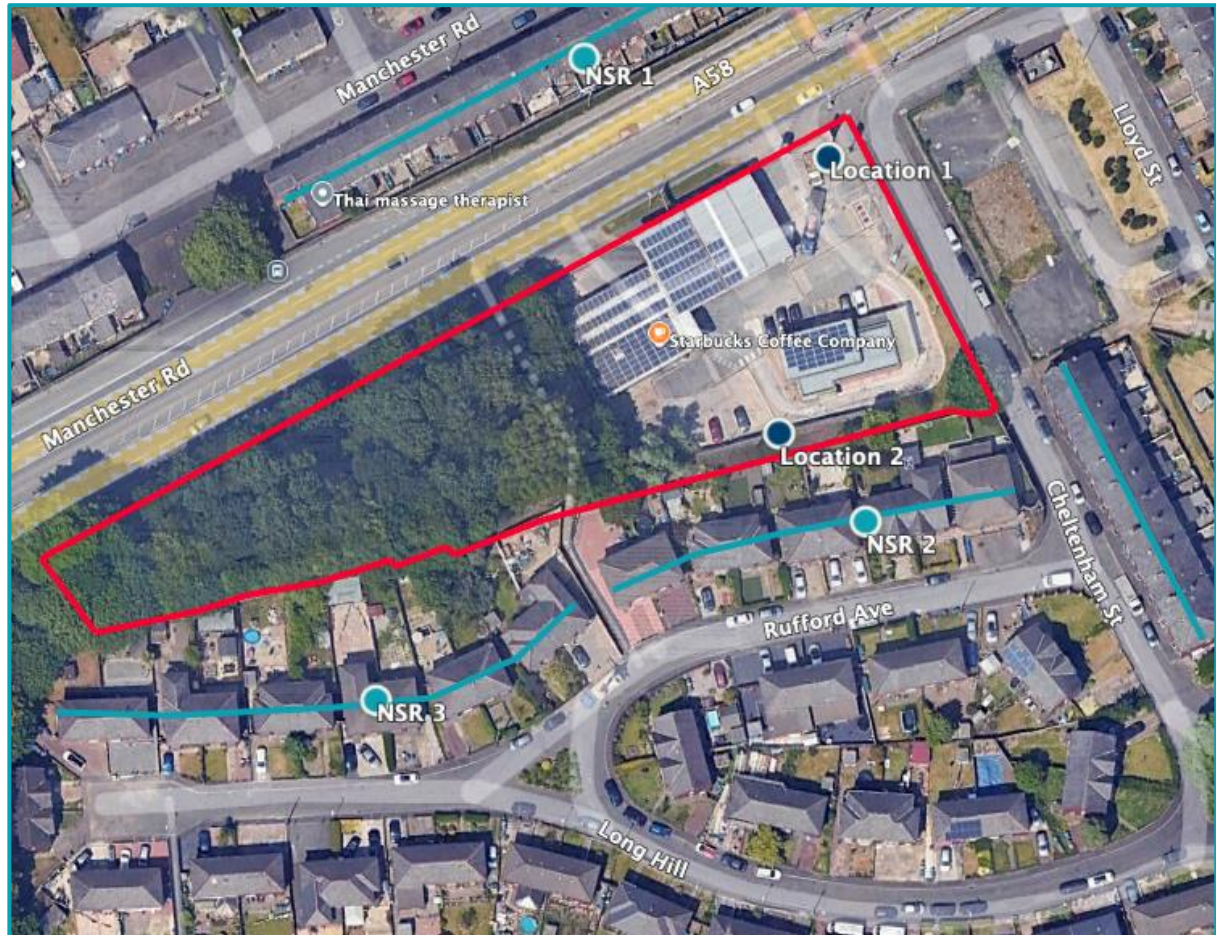
Appendix B – Monitoring Equipment

Table B-1
Noise Monitoring Equipment

Equipment	Serial Number
Svantek SV307 Noise Monitoring Station	180747
Svantek ST30A Microphone	178389
Svantek SV307 Noise Monitoring Station	87849
Svantek ST30A Microphone	123393
Cirrus CR:515 Acoustic Calibrator	103147

Appendix C – Sensitive Receptor & Measurement Locations

Figure C-1
Measurement Location



-  Measurement Locations
-  Noise Sensitive Receptors
-  Development Site