PROFESSIONAL CONSULT
FUTURE ENVIRONMENTS

Noise Impact Assessment

Proposed Alterations to Extract System – The Butchers Arms, Hepworth

Client: **Georgina Royds**

Reference: **21.156.1.R2**

Issue Date: **29 July 2023**



Report Version	1	2	3	4
Prepared by	John Goodwin MIOA	John Goodwin MIOA		
Position	Acoustic Consultant	Acoustic Consultant		
Reviewed by	Martyn Parker MIOA	Martyn Parker MIOA		
Position	Senior Consultant	Senior Consultant		
Issue Date	20 December 2021	29 July 2023		
Comments	-	-		

Professional Consult Limited

hello@professionalconsult.co.uk
07704 672683
www.professionalconsult.co.uk

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EXECUTIVE SUMMARY

This Assessment has been undertaken to identify the key sources of noise associated with operation of the Extract System which may adversely impact upon existing residential amenity from a noise perspective. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

This Assessment has relied upon a background sound survey completed in a location considered to be representative of the sound climate at the closest residential dwellings to the Site. This Assessment has also relied on supplied noise level data for the extract louvre which benefits from two integrated in-line silencers, positioned between the fan unit and façade-mounted extract louvre.

The Assessment has shown that the predicted rated level of noise at the closest residential boundary falls below the typical daytime background sound level and BS4142:2014+A1:2019 provides the following advice for this outcome:

> *'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.'*

In summary, the predicted level of noise from the Extract System will be sufficiently low enough at the closest residential dwelling boundary to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

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1 INTRODUCTION

1.1 Appointment

1.1.1 Professional Consult Limited was instructed by Roger Lee Planning Limited on behalf of Georgina Royds ('the Applicant') to prepare a Noise Impact Assessment ('the Assessment') for the proposed alterations to the kitchen extract system ('the Extract System') at The Butchers Arms public house located at 38 Town Gate in Hepworth, Holmfirth HD9 1TE to be referred to hereafter as 'the Site'.

1.2 The Proposal

1.2.1 The Applicant wishes to make amendments to the extract system for the approved kitchen and a planning application has been submitted to Kirklees Council accordingly (application reference: 2021/93509). Subsequently, the environmental health department at Kirklees Council has provided the following consultation response:

> *'I have reviewed the plans submitted with this retrospective application in regards to alterations of the extraction system at the Butchers Arms in Hepworth. While there is detailed information for the siting of the new system we do require more information before the application can be determined. As the premises is in close proximity to nearby sensitive residential receptors, the applicant will need to demonstrate that there will be no negative impact of noise and odour from the premises on nearby properties.*
>
> *Noise*
>
> *A noise report is required to determine the existing noise climate of the area and the impact that the new extraction system will have. The report should include the siting of the system (as already reflected in the plans) and the make and model of the system being installed. The noise report should detail any necessary mitigation measures required to reduce noise generated from the new extraction system.*
>
> *In order to control the noise generated through contact the new system should be isolated from the structure of the premises, i.e. with anti-vibration mounts.*

1.2.2 It is understood that the Extract System will not operate outside of the food service times currently in operation at site which are:

- Wednesday & Thursday: 12:00 – 15:00 & 18:00 – 20:00;
- Friday: 12:00 – 21:00;
- Saturday: 12:00 – 21:00; and
- Sunday: 12:00 – 19:00.

1.3 Site & Locality

1.3.1 The Site is located in a predominantly residential area with the closest residential dwellings lying to the north west (Barnside) and south west of the Site (beyond Upper Gate).

1.3.2 The soundscape at the closest residential receptors is comprised predominantly of intermittent road traffic movements on the local surrounding road network.

1.4 Purpose of Assessment

1.4.1 This Assessment has been undertaken to identify the key sources of noise associated with operation of the Extract System which may adversely impact upon existing residential amenity from a noise perspective. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

1.4.2 This Assessment has relied upon a background sound survey completed in a location considered to be representative of the sound climate at the closest residential dwellings to the Site.

1.4.3 All acronyms used within this report are defined in the Glossary presented in Appendix 2.

1.5 Limitations

1.5.1 The limitations of this report are presented in Appendix 1.

1.6 Confidentiality

1.6.1 Professional Consult has prepared this report solely for the use of the Client. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from Professional Consult; a charge may be levied against such approval.

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

2.1.1 The Government updated the National Planning Policy Framework (NPPF) on 20th July 2021 and its associated National Planning Practice Guidance (NPPG) on 24th June 2021. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

2.1.2 The NPPG adds further context to the NPPF and it is intended that the two documents should be read together.

2.1.3 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.1.4 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

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

2.1.5 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.1.6 The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: this is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: this is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.1.7 Table 1 summarises the noise exposure hierarchy, based on the likely average response.

Table 1. Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.1.8 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.

2.1.9 These factors include:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day - this is because people tend to be more sensitive to noise at night as they are trying to sleep. The adverse effect can also be greater simply because there is less background noise at night;
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise;
- the spectral content of the noise and the general character of the noise. The local topology and topography should also be taken into account along with the existing and, where appropriate, the planned character of the area.

2.1.10 More specific factors to consider when relevant:

- where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- Consideration should also be given to whether 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. 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; and

- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.2.1 This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

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

2.2.2 The procedure detailed in the standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical.'

2.2.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

2.2.4 There are a number of 'penalties' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation as follows. These penalties vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subject method):

<u>Tonality</u>

- +2dB: where the tonality is just perceptible;
- +4dB: where the tonality is clearly perceptible; and
- +6dB: where the tonality is highly perceptible.

<u>Impulsivity</u>

- +3dB: where the impulsivity is just perceptible;
- +6dB: where the impulsivity is clearly perceptible; and
- +9dB: where the impulsivity is highly perceptible.

Intermittency

- +3dB: where the intermittency is readily distinctive against the acoustic environment.

2.2.5 Where the assessment is carried out using the objective method, the tonality penalty is either 0dB or 6dB and the impulsivity penalty can range from 0dB up to 9dB in increments of 1dB, depending on the level of impulsivity identified.

2.2.6 In addition to the above acoustic features, there is a penalty for 'other sound characteristics' of +3dB where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment.

2.2.7 BS4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

2.2.8 Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact;
- A difference of around +10dB 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; and
- 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.2.9 Whilst the amended 2019 Standard does make various references to it not being intended to assess noise impacts at indoor locations, section 1.1 does state 'The methods described in this British Standard 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'. Example 6 in the Standard states 'In addition to the rating/background sound level comparison shown in Table A.6, the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

2.2.10 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts at the building façade do not give rise to internal noise level which causes sleep disturbance in bedrooms, this Assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

2.3 Local Authority Guidance and Criteria – Kirklees Council's Environmental Health Department

2.3.1 Consultation with Kirklees Council has been completed and the following correspondence was provided on 6th December 2021:

> *'We have been appointed by a client to undertake a Noise Impact Assessment for a proposed extract system at 38 Town Gate in Hepworth – please see the attached consultation response from Kirklees.*

Professional Consult will undertake a background sound survey in a location considered to be representative of the sound climate at the closest residential dwellings to the Site which will inform the Noise Impact Assessment and any required mitigation measures over a full weekday and weekend period.

Professional Consult will complete the following assessments:

Commercial Noise: An assessment of noise from the extract flue will be completed in line with the guidance contained in BS4142: 2014+A1:2019.

We understand that Kirklees require the following specific guidance to be adhered to:

'Developers should carry out an assessment in accordance with BS4142 to determine the rating level of the new development. It is recommended that during normal daytime hours (0700 to 2300 hours), the BS4142 rating level, measured over 1 hour, should be 5dB below the background (LA90). During the night-time period (2300 to 0700 hours), the BS4142 rating level, measured over 5 minutes should be 5dB below the background (LA90).'

Where exceedances of any criteria are identified Professional Consult will recommend appropriate and reasonable mitigation measures to ensure that adopted noise level criteria is not exceeded.

Professional Consult will issue a Noise Impact Assessment which will be suitable for issue with the scheme planning application.

We have been appointed by a client to complete a Noise Impact Assessment in support of a proposed hot food takeaway at 241 Bradford Road in Batley WF17 6JQ.

It is understood that the planning application has been lodged with Kirklees Council and the Environmental Health Officer has requested a Noise Impact Assessment as follows:

2.3.2 A response was received on 13th December 2021 which stated:

'Thank you for emailing our team regarding the Noise Impact Assessment for the Butchers Arms, 38 Town Gate, Hepworth.

I would ask that any and all extraction systems/flues be considered as well as the potential impact of an increase in customer numbers to the premises as a result of the intensification of use. This noise would include raised voices from a higher number of patrons visiting the premises and should consider an increase in vehicle/taxi movements late at night. Music from the premises (also covered by licensing) should be inaudible at nearby noise sensitive receptors.'

2.3.3 It is understood that there is another planning application running alongside the planning application for the Extract System which above the relates to and so this Assessment is only concerned with noise emissions from the Extract System.

3 NOISE SURVEY

3.1 Background Sound Survey

3.1.1 Professional Consult has completed a background sound survey in a location considered to be representative of the noise climate at the closest residential dwellings to the Site, as follows:

- Noise Measurement Position 1: Located 3m from the boundary of the residential dwelling known as Barnside to the north west of the Site between 11:15 on 9th December – 11:30 on 13th December 2021 thus covering a full weekday and weekend period. Noise measurements were taken in free-field conditions. Noise sources at the microphone location comprised of distant intermittent road traffic noise.

3.1.2 Figure 1 in Appendix 3 details the noise measurement location.

3.1.3 Table 2 details the measured background sound levels during food service times.

Table 2. Measured Background Sound Levels

Noise Measurement Position	Period	Range of Measured 15min Free-field Background Noise Levels and (Typical Background Sound Level), $L_{A90,15mins}$ (dB)
1	Thursday 9th December 12:00 – 15:00	44 - 51 (45)
	Thursday 9th December 18:00 – 20:00	45 – 50 (45)
	Friday 10th December 12:00 – 21:00	44 – 47 (45)
	Saturday 11th December 12:00 – 21:00	44 – 48 (46)
	Sunday 12th December 12:00 – 19:00	45 – 47 (45)

3.1.4 Appendix 5 details the full measured ambient and background sound levels.

3.2 Noise Survey Equipment

3.2.1 The following equipment was used for the Noise Survey.

Table 3. Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
1	Sound Level Meter	01dB Fusion	11755	03 July 2022
	Pre-amplifier	01dB PRE22	1707173	
	Microphone	GRAS 40CE	291693	
	Calibrator	01dB CAL-31	84086	30 June 2022

3.2.2 The sound level meter was field calibrated prior to and following the noise survey and there was no drift beyond the allowable limit of 1dB.

3.2.3 During the background noise survey the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds of no more than 5m/s and dry conditions and Table 4 details the measured weather conditions.

Table 4. Range of Measured Wind Speeds

Period	Range of Measured Wind Speeds (m/s)	Rainfall Recorded?
Background Sound Survey	0 – 3.3	No

4 NOISE IMPACT ASSESSMENT

4.1.1 Professional Consult has been supplied with the following noise level data for the extract system:

- 36dB(A) at 5m from extract louvre.

4.1.2 It is understood that this noise level is achieved with two in-line silencers being incorporated into the extract system and details are contained within Appendix 4.

4.1.3 Table 5 calculates the specific sound pressure level at the boundary with the closest residential receptor which lies to the south west beyond Upper Gate.

Table 5. Calculated Noise Level at Boundary

Noise Level, $L_{Aeq,t}$ (dB)	Measurement Distance (m)	Distance to Boundary (m)	Calculated Noise Level at Boundary, $L_{Aeq,t}$ (dB)
36	5	4.5	36.9

4.1.4 The following has been considered in determining if any acoustic features exist in the predicted noise level at the closest residential receptors:

- Tonality: In determining if any tones exist in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- Impulsivity: In determining if any impulsiveness is evident in the measured noise levels, the methodology set out in BS4142:2014 has been followed using the subjective method;
- Intermittency: Whether or not the measured operations turn on or off during the assessment reference periods; and
- Other sound characteristics: Where no penalties are allocated for the above features, but there will be an audible noise at the closest receptor.

4.1.5 Table 6 allocates the character corrections.

Table 6. Allocation of Character Corrections

Noise Source	Tonality Correction (dB)	Impulsivity Correction (dB)	Intermittency Correction (dB)	Other Sound Characteristics Correction (dB)	Comments
Extract in roof	2	0	0	0	Just perceptible tonality may be discernible
Highest Overall Character Correction	2	0	0	0	
Total Character Correction	**+2**				

4.1.6 Table 7 completes the BS4142 Assessment.

Table 7. BS4142 Assessment

Period	Calculated Specific Noise Level at Boundary, $L_{Aeq,T}$ (dB)	Total Overall Character Correction (dB)	Calculated Rated Level, $L_{A,r}$ (dB)	Typical Background Sound Level ($L_{A90,15mins}$) (dB)	Kirklees Noise Criteria $L_{A,r} = L_{A90} – 5dB$	Difference +/- (dB)
Daytime	36.9	2	38.9	45	40	-1.1

4.1.7 A review of Table 7 indicates that for the daytime period, the rated level of noise falls below the typical background sound level and BS4142 provides the following advice for this:

> *'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 CONCLUSION

5.1.1 Professional Consult Limited was instructed by Roger Lee Planning Limited on behalf of Georgina Royds to prepare a Noise Impact Assessment for the proposed alterations to the kitchen extract system at The Butchers Arms public house located at 38 Town Gate in Hepworth, Holmfirth HD9 1TE.

5.1.2 The Applicant wishes to make amendments to the extract system for the approved kitchen and a planning application has been submitted to Kirklees Council accordingly (application reference: 2021/93509). Subsequently, the environmental health department at Kirklees Council has provided the following consultation response:

> *'I have reviewed the plans submitted with this retrospective application in regards to alterations of the extraction system at the Butchers Arms in Hepworth. While there is detailed information for the siting of the new system we do require more information before the application can be determined. As the premises is in close proximity to nearby sensitive residential receptors, the applicant will need to demonstrate that there will be no negative impact of noise and odour from the premises on nearby properties.*
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> *A noise report is required to determine the existing noise climate of the area and the impact that the new extraction system will have. The report should include the siting of the system (as already reflected in the plans) and the make and model of the system being installed. The noise report should detail any necessary mitigation measures required to reduce noise generated from the new extraction system.*
>
> *In order to control the noise generated through contact the new system should be isolated from the structure of the premises, i.e. with anti-vibration mounts.*

5.1.3 The Site is located in a predominantly residential area with the closest residential dwellings lying to the north west (Barnside) and south west of the Site (beyond Upper Gate).

5.1.4 This Assessment has been undertaken to identify the key sources of noise associated with operation of the Extract System which may adversely impact upon existing residential amenity from a noise perspective. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance in addition to appropriate British Standards and guidance documents relevant to the assessment of noise impacts.

5.1.5 This Assessment has relied upon a background sound survey completed in a location considered to be representative of the sound climate at the closest residential dwellings to the Site. This Assessment has also relied on supplied noise level data for the extract louvre which benefits from two integrated in-line silencers, positioned between the fan unit and façade-mounted extract louvre.

5.1.6 The Assessment has shown that the predicted rated level of noise at the closest residential boundary falls below the typical daytime background sound level and BS4142:2014+A1:2019 provides the following advice for this outcome:

> *'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.'*

5.1.7 In summary, the predicted level of noise from the Extract System will be sufficiently low enough at the closest residential dwelling boundary to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

APPENDIX 1: LIMITATIONS

This report and its findings should be considered in relation to the terms of reference and objectives agreed between Professional Consult Limited and the Client.

The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

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APPENDIX 2: GLOSSARY OF ACOUSTIC TERMINOLOGY

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table 1: Typical Sound Pressure Levels

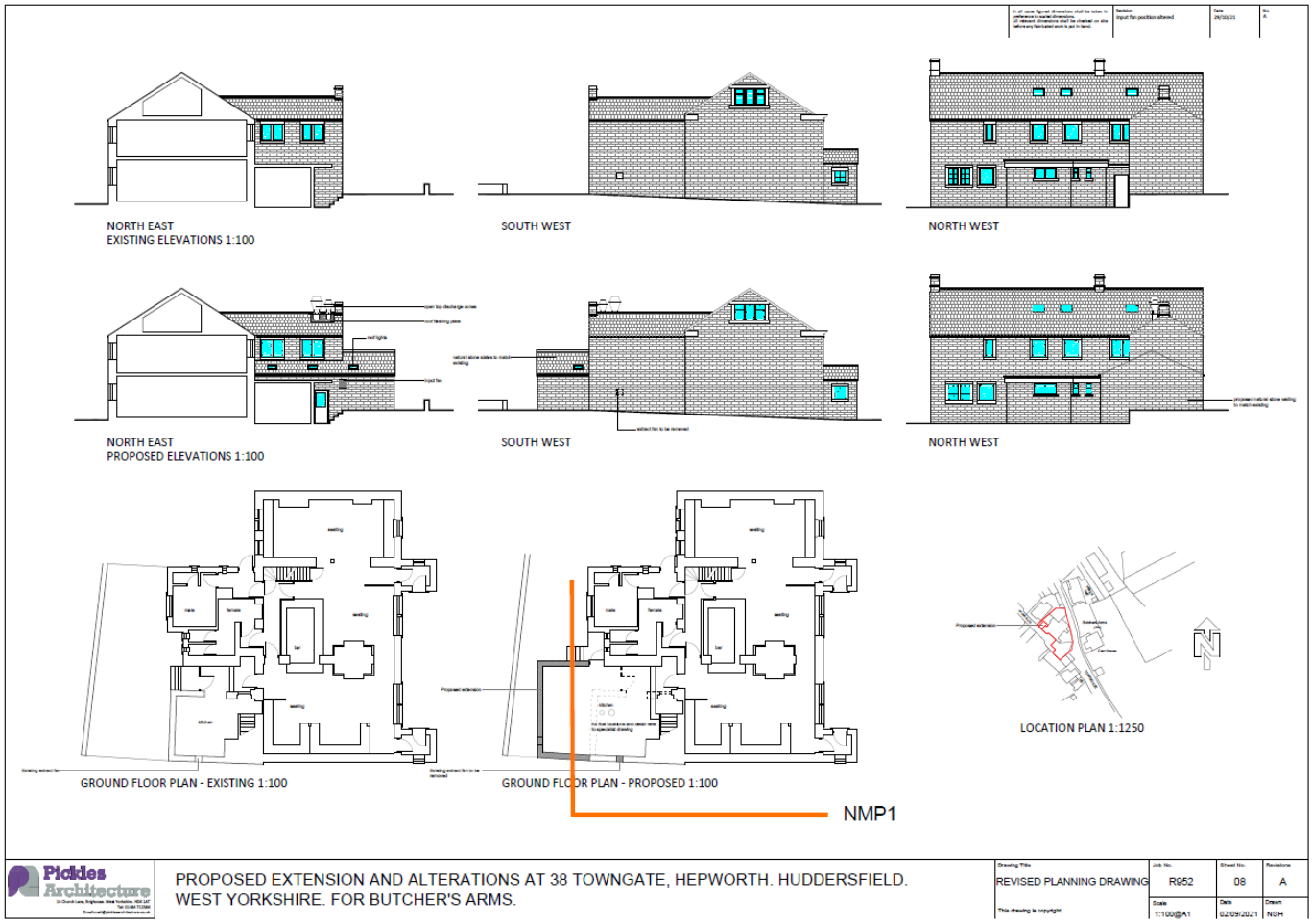
Sound Pressure Level (dB)	Location/Example
0	Threshold of hearing
20 - 30	Quiet bedroom at night
30 - 40	Living room during the day
40 - 50	Typical office
50 - 60	Inside a car
60 - 70	Typical high street
70 - 90	Inside factory
100 - 110	Burglar alarm at 1m away
110 - 130	Jet aircraft on take off
140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

Table 2: Terminology

Descriptor	Explanation
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 (2x10-5Pa).
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.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} 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 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} & 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 Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	2A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX 3: BACKGROUND SOUND MEASUREMENT LOCATION + PROPOSED LAYOUT

Figure 1 **Plan**



APPENDIX 4: DETAILS FOR EXAMPLE IN-LINE EXTRACT SILENCER

CLIENT: Butchers Arms
CONTACT: Tom Murphy
PROJECT: Butchers Arms
OUR REF: Q00706r1 - Technical Submittal
DATE: 28-Jul-23

FREDSHAW&CO.
specialists in sheetmetal fabrication

ITEM	DESCRIPTION	DIMENSIONS W	H	L	TYPE	VOL m³/s	Pd Pa	QTY	APPROX UNIT WEIGHT	NOISE LEVEL	END FLANGE / CONNECTIONS	NOTES
Att.01	Circular silencer	500 i.dia	700 o.dia	1000	SCAP 2D	1.300	25	2	45 kg	35 dBA @ 5m	Male Spigots	

NOTES
1 Above quotation based upon the information provided.
2 All items shall be manufactured from pre-galvanised sheet steel to DW144 class B specification.
3 The pressure loss data shall generally comply with duct to duct air flow conditions.
4 Acoustic infill to be 45kg/m3 Rockwool, retained behind a perforated pre-galv sheet.

APPENDIX 5: MEASURED BACKGROUND SOUND LEVELS

Start Date & Time		Measured Sound Pressure Level, dB	
		$L_{Aeq,T}$	$L_{A90,T}$
09/12/2021	11:15	47.9	41
09/12/2021	11:30	49.4	41.1
09/12/2021	11:45	46.2	44
09/12/2021	12:00	49	44.5
09/12/2021	12:15	49.4	44.6
09/12/2021	12:30	47	44.4
09/12/2021	12:45	46.9	45
09/12/2021	13:00	46.5	44.9
09/12/2021	13:15	48.9	44.6
09/12/2021	13:30	48.1	45
09/12/2021	13:45	50.9	44.7
09/12/2021	14:00	54.8	51.4
09/12/2021	14:15	51.6	50.8
09/12/2021	14:30	46.8	44.5
09/12/2021	14:45	46.9	44.9
09/12/2021	15:00	47.2	44.9
09/12/2021	15:15	49.3	44.6
09/12/2021	15:30	47.7	44.9
09/12/2021	15:45	45.6	43.8
09/12/2021	16:00	47.7	44
09/12/2021	16:15	48.2	44.7
09/12/2021	16:30	47.8	44.9
09/12/2021	16:45	48.3	44.8
09/12/2021	17:00	47.5	44.7
09/12/2021	17:15	51.8	44.7
09/12/2021	17:30	51	46.6
09/12/2021	17:45	53.8	48.4
09/12/2021	18:00	54.1	50
09/12/2021	18:15	56.3	50.1
09/12/2021	18:30	46.9	44.7
09/12/2021	18:45	51.7	44.5
09/12/2021	19:00	50	44.8
09/12/2021	19:15	56.2	45.8
09/12/2021	19:30	49.8	45.5
09/12/2021	19:45	48.8	45.2
09/12/2021	20:00	49	45.2
09/12/2021	20:15	47.7	45.9
09/12/2021	20:30	51.5	45.4
09/12/2021	20:45	46.4	45.7
09/12/2021	21:00	47.4	45.4
09/12/2021	21:15	45.5	34.2
09/12/2021	21:30	38.7	34
09/12/2021	21:45	37.4	34.5
09/12/2021	22:00	39.7	34

09/12/2021	22:15	44.2	33.5
09/12/2021	22:30	39.9	31.9
09/12/2021	22:45	37.4	35.6
09/12/2021	23:00	42.5	36.4
09/12/2021	23:15	37.1	35.5
09/12/2021	23:30	40.5	35.9
09/12/2021	23:45	40.4	36.8
09/12/2021	00:00	38.8	34.2
10/12/2021	00:15	45.9	36.7
10/12/2021	00:30	44.5	38.8
10/12/2021	00:45	41.9	34.4
10/12/2021	01:00	42.3	32.6
10/12/2021	01:15	40.5	36
10/12/2021	01:30	37.4	34.3
10/12/2021	01:45	38.3	34.2
10/12/2021	02:00	40.6	34.8
10/12/2021	02:15	36.3	34.4
10/12/2021	02:30	35.7	33.2
10/12/2021	02:45	50.6	35.5
10/12/2021	03:00	46.1	36.8
10/12/2021	03:15	40.4	35.3
10/12/2021	03:30	38.4	34.6
10/12/2021	03:45	35.4	32.9
10/12/2021	04:00	35.8	33.9
10/12/2021	04:15	39.3	34.6
10/12/2021	04:30	40	36.8
10/12/2021	04:45	38.3	35.5
10/12/2021	05:00	38.9	35.9
10/12/2021	05:15	38.7	36.9
10/12/2021	05:30	40.8	38
10/12/2021	05:45	42.5	38.7
10/12/2021	06:00	45.4	39.9
10/12/2021	06:15	41.7	38.1
10/12/2021	06:30	39.1	37
10/12/2021	06:45	39.1	37
10/12/2021	07:00	41.8	37.4
10/12/2021	07:15	41.4	37.7
10/12/2021	07:30	44.3	38.3
10/12/2021	07:45	47.7	42
10/12/2021	08:00	45.9	41.8
10/12/2021	08:15	44.4	40.2
10/12/2021	08:30	47.3	40.5
10/12/2021	08:45	49.8	44.5
10/12/2021	09:00	50.3	44.8
10/12/2021	09:15	46.8	40.9
10/12/2021	09:30	47.3	39.3
10/12/2021	09:45	48.2	44.9

10/12/2021	10:00	47.7	45.6
10/12/2021	10:15	48.1	46.2
10/12/2021	10:30	47.7	46
10/12/2021	10:45	51.4	46.9
10/12/2021	11:00	48.1	46
10/12/2021	11:15	49.8	47
10/12/2021	11:30	49.4	47.3
10/12/2021	11:45	48.7	46.6
10/12/2021	12:00	47.7	46.2
10/12/2021	12:15	47.3	45.8
10/12/2021	12:30	47.6	45.8
10/12/2021	12:45	47	45.8
10/12/2021	13:00	48	45.5
10/12/2021	13:15	47.4	45.7
10/12/2021	13:30	47.6	45.4
10/12/2021	13:45	47.7	45.3
10/12/2021	14:00	49.3	45.5
10/12/2021	14:15	48.2	45.4
10/12/2021	14:30	47.7	45.6
10/12/2021	14:45	47.5	45.4
10/12/2021	15:00	48.6	45.5
10/12/2021	15:15	48.2	45.6
10/12/2021	15:30	47	45.2
10/12/2021	15:45	47.7	45.1
10/12/2021	16:00	49.6	44.8
10/12/2021	16:15	47.6	44.8
10/12/2021	16:30	46.5	45.2
10/12/2021	16:45	46.8	45.4
10/12/2021	17:00	46.4	45.3
10/12/2021	17:15	46.6	45.2
10/12/2021	17:30	46.7	45.3
10/12/2021	17:45	46.2	45.1
10/12/2021	18:00	47.9	44.9
10/12/2021	18:15	51.9	46.9
10/12/2021	18:30	51.5	44.7
10/12/2021	18:45	47.2	44.8
10/12/2021	19:00	49.7	44.2
10/12/2021	19:15	48.9	44.3
10/12/2021	19:30	47	44.3
10/12/2021	19:45	48.8	44.4
10/12/2021	20:00	46.6	44.4
10/12/2021	20:15	50.3	44.5
10/12/2021	20:30	45.3	44.7
10/12/2021	20:45	45.1	44.4
10/12/2021	21:00	49.3	44.6
10/12/2021	21:15	45.4	44.5
10/12/2021	21:30	48.5	44.6

10/12/2021	21:45	46.6	44.7
10/12/2021	22:00	49.1	44.7
10/12/2021	22:15	47.3	44.6
10/12/2021	22:30	45.6	44.7
10/12/2021	22:45	46.5	44.7
10/12/2021	23:00	47.3	44.9
10/12/2021	23:15	48.5	46.8
10/12/2021	23:30	46.1	45.1
10/12/2021	23:45	46.3	45.3
10/12/2021	00:00	48.5	33.4
11/12/2021	00:15	31.7	29.7
11/12/2021	00:30	30.8	28.9
11/12/2021	00:45	35.3	29.4
11/12/2021	01:00	30.5	28.4
11/12/2021	01:15	31.9	29
11/12/2021	01:30	31.7	28.7
11/12/2021	01:45	29.9	28.2
11/12/2021	02:00	30.3	27.7
11/12/2021	02:15	29.6	27.3
11/12/2021	02:30	33.2	27.6
11/12/2021	02:45	32.1	27.5
11/12/2021	03:00	32.5	27.9
11/12/2021	03:15	31	28.7
11/12/2021	03:30	30.5	28.2
11/12/2021	03:45	29.7	27.5
11/12/2021	04:00	29.3	26.9
11/12/2021	04:15	29.2	26.9
11/12/2021	04:30	29.3	27.2
11/12/2021	04:45	29.1	26.9
11/12/2021	05:00	31.4	27.1
11/12/2021	05:15	35.6	27.9
11/12/2021	05:30	30.6	28.1
11/12/2021	05:45	38.4	28.1
11/12/2021	06:00	37.7	27.7
11/12/2021	06:15	30.7	28.5
11/12/2021	06:30	34.5	28.3
11/12/2021	06:45	31.9	29.5
11/12/2021	07:00	35.1	30.9
11/12/2021	07:15	37.2	31.6
11/12/2021	07:30	40.4	33.8
11/12/2021	07:45	45.1	34.5
11/12/2021	08:00	47.6	40.7
11/12/2021	08:15	45.4	38
11/12/2021	08:30	47.4	36.2
11/12/2021	08:45	44.2	36.8
11/12/2021	09:00	43	36
11/12/2021	09:15	43.5	34.4

11/12/2021	09:30	44.1	35.5
11/12/2021	09:45	47.3	40.9
11/12/2021	10:00	47.4	45.5
11/12/2021	10:15	48.9	46.5
11/12/2021	10:30	48.7	46.4
11/12/2021	10:45	48.5	46.8
11/12/2021	11:00	48.2	46.2
11/12/2021	11:15	48.7	45.8
11/12/2021	11:30	48.5	45.7
11/12/2021	11:45	48	45.6
11/12/2021	12:00	47.5	45.9
11/12/2021	12:15	51.2	46.1
11/12/2021	12:30	54.2	46.1
11/12/2021	12:45	49.1	44.5
11/12/2021	13:00	48.1	44.2
11/12/2021	13:15	46.3	44
11/12/2021	13:30	46.5	44.5
11/12/2021	13:45	46.9	44.6
11/12/2021	14:00	46	44.4
11/12/2021	14:15	46.9	44.5
11/12/2021	14:30	48.6	46
11/12/2021	14:45	49.6	46.5
11/12/2021	15:00	49.9	46.5
11/12/2021	15:15	47.8	45.3
11/12/2021	15:30	47.6	45.5
11/12/2021	15:45	48.1	46.1
11/12/2021	16:00	51	46.4
11/12/2021	16:15	50.3	47.1
11/12/2021	16:30	49.3	46.7
11/12/2021	16:45	50.5	47.7
11/12/2021	17:00	50.8	47.3
11/12/2021	17:15	49.4	46
11/12/2021	17:30	48.8	45.6
11/12/2021	17:45	48.5	45.4
11/12/2021	18:00	49.9	46.1
11/12/2021	18:15	51.9	45.7
11/12/2021	18:30	49.8	46.1
11/12/2021	18:45	49.3	45.9
11/12/2021	19:00	46.8	45.2
11/12/2021	19:15	46.8	44.5
11/12/2021	19:30	47.5	44.5
11/12/2021	19:45	47	44.6
11/12/2021	20:00	46.7	44.7
11/12/2021	20:15	46.6	44.5
11/12/2021	20:30	45.6	44.3
11/12/2021	20:45	45.5	44.1
11/12/2021	21:00	46.1	44.1

11/12/2021	21:15	48.4	45.1
11/12/2021	21:30	48.4	46
11/12/2021	21:45	48.6	46
11/12/2021	22:00	47.4	44.4
11/12/2021	22:15	45.6	44.2
11/12/2021	22:30	45.6	44.2
11/12/2021	22:45	45.7	44.6
11/12/2021	23:00	46.1	45.1
11/12/2021	23:15	46	45.4
11/12/2021	23:30	41.8	33.9
11/12/2021	23:45	39.5	33.7
11/12/2021	00:00	37.1	32.6
12/12/2021	00:15	36	32.8
12/12/2021	00:30	33.2	31.5
12/12/2021	00:45	32.3	30.4
12/12/2021	01:00	31.9	29.6
12/12/2021	01:15	33.8	29
12/12/2021	01:30	31.8	29.8
12/12/2021	01:45	34.7	29.1
12/12/2021	02:00	32.3	29.9
12/12/2021	02:15	31.2	29.7
12/12/2021	02:30	33.5	30.7
12/12/2021	02:45	35.2	30.6
12/12/2021	03:00	33.2	30.7
12/12/2021	03:15	33.1	28.3
12/12/2021	03:30	33	28.4
12/12/2021	03:45	32.3	30.3
12/12/2021	04:00	34.7	33
12/12/2021	04:15	33.9	29.4
12/12/2021	04:30	33.4	29.6
12/12/2021	04:45	30.5	28.9
12/12/2021	05:00	31.5	29.2
12/12/2021	05:15	30.3	28.5
12/12/2021	05:30	30.5	28
12/12/2021	05:45	30.1	27.6
12/12/2021	06:00	30.7	27.9
12/12/2021	06:15	31	28.2
12/12/2021	06:30	34.2	28.2
12/12/2021	06:45	32.2	27.4
12/12/2021	07:00	41.6	29.3
12/12/2021	07:15	34.5	28.7
12/12/2021	07:30	33.4	29.8
12/12/2021	07:45	47.9	33.7
12/12/2021	08:00	43.6	32.5
12/12/2021	08:15	42.2	32
12/12/2021	08:30	41.9	33.4
12/12/2021	08:45	36.3	31.5

12/12/2021	09:00	42.3	33.4
12/12/2021	09:15	41.3	33.4
12/12/2021	09:30	44.1	34.1
12/12/2021	09:45	44.4	38.5
12/12/2021	10:00	48.1	46.1
12/12/2021	10:15	46.6	45.7
12/12/2021	10:30	47.5	46.2
12/12/2021	10:45	49.1	46.9
12/12/2021	11:00	49.6	47.5
12/12/2021	11:15	48.8	46.2
12/12/2021	11:30	47.6	45.6
12/12/2021	11:45	47.4	45.7
12/12/2021	12:00	46.8	44.8
12/12/2021	12:15	46.2	44.9
12/12/2021	12:30	47.9	45.2
12/12/2021	12:45	46.8	45.2
12/12/2021	13:00	48.1	45.2
12/12/2021	13:15	46.8	45.4
12/12/2021	13:30	46.6	45.2
12/12/2021	13:45	47.2	45.2
12/12/2021	14:00	47.9	44.9
12/12/2021	14:15	47.4	45.2
12/12/2021	14:30	49.2	46.6
12/12/2021	14:45	47.4	46.4
12/12/2021	15:00	48.5	45.9
12/12/2021	15:15	57.7	46.6
12/12/2021	15:30	50.1	46.6
12/12/2021	15:45	50.7	45.7
12/12/2021	16:00	46.5	45.1
12/12/2021	16:15	48	45.1
12/12/2021	16:30	47.3	45.6
12/12/2021	16:45	48	46.5
12/12/2021	17:00	52.1	46.2
12/12/2021	17:15	51.8	45.5
12/12/2021	17:30	49.6	45.1
12/12/2021	17:45	49.3	45.6
12/12/2021	18:00	52.4	46
12/12/2021	18:15	51.2	45.6
12/12/2021	18:30	53.3	46.6
12/12/2021	18:45	48.9	45.2
12/12/2021	19:00	48.3	44.8
12/12/2021	19:15	48.5	45.1
12/12/2021	19:30	51.4	46.5
12/12/2021	19:45	53.4	47.6
12/12/2021	20:00	53.3	46.7
12/12/2021	20:15	53.2	47.6
12/12/2021	20:30	55.8	48.4

12/12/2021	20:45	51.9	48
12/12/2021	21:00	52	46.7
12/12/2021	21:15	48.1	43.2
12/12/2021	21:30	50.3	44.7
12/12/2021	21:45	48.3	41.1
12/12/2021	22:00	45.3	38.8
12/12/2021	22:15	47.3	42.1
12/12/2021	22:30	48.5	42
12/12/2021	22:45	46.4	39.7
12/12/2021	23:00	48	40.1
12/12/2021	23:15	48	40.9
12/12/2021	23:30	50.3	42
12/12/2021	23:45	48.6	41.6
12/12/2021	00:00	46.7	40.9
13/12/2021	00:15	45.4	37
13/12/2021	00:30	46	36.6
13/12/2021	00:45	37.4	34
13/12/2021	01:00	40.4	33.7
13/12/2021	01:15	40.7	33.4
13/12/2021	01:30	43.6	33.9
13/12/2021	01:45	42.2	32.9
13/12/2021	02:00	37	30.2
13/12/2021	02:15	39.7	31.9
13/12/2021	02:30	38.7	33
13/12/2021	02:45	42	31.7
13/12/2021	03:00	35.7	31.2
13/12/2021	03:15	35.8	29.7
13/12/2021	03:30	35.1	29.3
13/12/2021	03:45	37.2	29.7
13/12/2021	04:00	31.4	28
13/12/2021	04:15	34.9	26.6
13/12/2021	04:30	31.3	27.5
13/12/2021	04:45	30.1	26.8
13/12/2021	05:00	30.4	26.9
13/12/2021	05:15	33.5	26.9
13/12/2021	05:30	32.4	26.9
13/12/2021	05:45	30	26.6
13/12/2021	06:00	33.3	26.6
13/12/2021	06:15	38.2	26.9
13/12/2021	06:30	34.8	27.5
13/12/2021	06:45	37.3	30.2
13/12/2021	07:00	38.2	31.2
13/12/2021	07:15	39.2	32.1
13/12/2021	07:30	40	32.9
13/12/2021	07:45	45.1	40.6
13/12/2021	08:00	48	38.6
13/12/2021	08:15	42.9	36.3

13/12/2021	08:30	48.1	39.8
13/12/2021	08:45	46	37.8
13/12/2021	09:00	44.7	36.3
13/12/2021	09:15	43	36
13/12/2021	09:30	45.9	38.3
13/12/2021	09:45	45	35.1
13/12/2021	10:00	46.5	34.6
13/12/2021	10:15	47.9	38.6
13/12/2021	10:30	43.4	33.7
13/12/2021	10:45	45.3	34.2
13/12/2021	11:00	45.7	34.6
13/12/2021	11:15	41.2	30.3
13/12/2021	11:30	47.8	40.4