



# NOISE IMPACT ASSESSMENT

BARLOW MOOR - GAS GOVERNER

Cadent Gas Ltd

REPORT NO. 2061821-RSKA-RP-001(01)





## General notes

|                      |                            |
|----------------------|----------------------------|
| <b>Project Name:</b> | Barlow Moor - Gas Governer |
| <b>Title:</b>        | Noise Impact Assessment    |
| <b>Client:</b>       | Cadent Gas Ltd             |
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This work has been undertaken in accordance with the quality management system of RSK Acoustics Ltd.





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# 1 Introduction

## 1.1 Instruction

RSK Acoustics has been instructed by Cadent Gas Ltd to undertake a noise impact assessment of a proposed replacement gas governor station (GGS) at Barlow Moor Road, Chorlton-cum-Hardy, Manchester.

It is understood the proposed GGS will replace the existing GGS on site, and a will be housed within a kiosk. Due to the close proximity of residential and non-residential receptors, a noise impact assessment has been required to determine the potential noise impact and to satisfy the planning conditions imposed by Manchester City Council.

Condition 5 of the Planning Permission document pertains to the noise generated by the proposed gas governor and is stated as follows:

*"5) a) The gas governor kiosk shall be acoustically insulated and treated to limit the break-out of noise in accordance with a noise study and a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority. The scheme shall be implemented in full before the use of the associated equipment commences.*

*b) Within one month of the first use of the equipment housed within the Kiosk building a verification report shall be required to validate that the work undertaken throughout the development conforms to the recommendations and requirements in the approved acoustic consultant's report. The report shall also undertake post completion testing to confirm that acceptable criteria have been met. Any instances of non-conformity with the recommendations in the report shall be detailed along with any measures required to ensure compliance with the agreed noise criteria.*

*Reason - To safeguard the amenities of the occupiers of the building and occupiers of nearby properties pursuant to policy DM1 of the Core Strategy and saved Unitary Development Plan DC26."*

A noise assessment has been prepared to assess the noise impact from the proposed GGS from the site on the nearest noise sensitive receptors. Using manufacturer noise data of the proposed plant and noise modelling software, noise levels have predicted and assessed against the background noise levels at the receptors.

## 1.2 Objectives

The objectives of the noise impact assessment are to consider the surrounding noise sensitive receptors and establish representative baseline noise levels. Manufacturer noise data of the plant items associated with proposed GGS at Barlow Moor Road, will be predicted and assessed at the residential receptors in accordance with current guidance.



## 2 Regulatory Framework

### 2.1 National Planning Policy Framework (NPPF): 2021

The National Planning Policy Framework (NPPF) (published March 2012 & updated February 2021) is the means by which noise is considered within the planning regime. The NPPF does not contain assessment design target, instead providing a series of policies, giving local authorities the flexibility in meeting the needs of local communities. The NPPF states:

“Planning policies and decisions should contribute to and enhance the natural and local environment by [...] 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. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.”

“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 impact resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

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

“Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or ‘agent of change’) should be required to provide suitable mitigation before the development has been completed.”

### 2.2 Noise Policy Statement for England (NPSE): 2010

Environment, Food and Rural Affairs (Defra) and sets out the approach to noise within the Government’s sustainable development strategy.

The significance of impacts from noise are defined within the NPSE as follows:

“There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:

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.

Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.



SOAEL – (Significant Observed Adverse Effect Level) - This is the level above which significant adverse effects on health and quality of life occur.”

The three aims of the NPSE are to:

“Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.

Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.”

## 2.3 Planning Practice Guidance (PPG)

The Department for Communities and Local Government ‘Planning Practice Guidance’ (PPG) expands upon the NPPF and NPSE. The guidance does not include any specific noise levels but sets out further principles that should underpin a noise assessment. The PPG states:

*“Plan-making and decision making need to 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.”*

It then refers to the NPSE and states that the aim is to identify where the overall effect of the noise exposure falls in relation to SOAEL, LOAEL and NOEL and presents a table, reproduced below. The implication of the final line of the table is that only the 'noticeable and very disruptive' outcomes are unacceptable and should be prevented. All other outcomes (i.e. all other lines in the table) can be acceptable, depending upon the specific circumstances and factors such as the practicalities of mitigation.

| Response                                        | Examples of outcomes                                                                                                                                                                                                         | Increasing effect level    | Action                        |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------------------------------|
| <b>NOAEL (No Observed Effect Level)</b>         |                                                                                                                                                                                                                              |                            |                               |
| Not present                                     | No effect                                                                                                                                                                                                                    | No observed effect         | No specific measures required |
| <b>NOAEL (No Observed Adverse Effect Level)</b> |                                                                                                                                                                                                                              |                            |                               |
| Present and not intrusive                       | Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life. | No observed adverse effect | No specific measures required |



| Response                                                          | Examples of outcomes                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Increasing effect level             | Action                           |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|----------------------------------|
| <b>LOAEL</b> ( <i>Lowest Observable Adverse Effect Level</i> )    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                  |
| Present and intrusive                                             | Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.                                          | Observed adverse effect             | Mitigate and reduce to a minimum |
| <b>SOAEL</b> ( <i>Significant Observed Adverse Effect Level</i> ) |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                                     |                                  |
| Present and disruptive                                            | The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area. | Significant observed adverse effect | Avoid                            |
| Present and very disruptive                                       | Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.                                                                                                                                                                                       | Unacceptable adverse effect         | Prevent                          |

**Table 1** Summary of noise exposure hierarchy

## 2.4 BS 7445-1-2-3

The three-part British Standard, BS 7445, provides the framework within which environmental noise should be quantified. Part 1 provides a guide to quantities and procedures and Part 2 provides a guide to the acquisition of data pertinent to land use. Part 3 provides a guide to the application of noise limits.

BS 7445 also refers to a further standard, BS EN 61672, which prescribes the equipment necessary for such measurements.

Whilst BS 7445 does not prescribe the meteorological conditions under which noise measurements should or should not be taken, it does (part 2, para 5.4.3.3) recommend that in order “...to facilitate the comparison of results (measurements of noise from different sources), it may be necessary to carry out measurements under selected meteorological conditions which are reproducible and correspond to quite stable propagation conditions.”

These conditions include:

- Wind speed not exceeding 5 m/s (measured at a height of 3 to 11 m above the ground);
- No strong temperature inversions near the ground; and



- No heavy precipitation.

## 2.5 BS 4142:2014+A1:2019

BS 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' (BS 4142) describes the methods for rating and assessing noise from industrial or commercial sources, including manufacturing processes, fixed mechanical and electrical plant installations, loading/unloading of goods/materials and sound from mobile plant that is an intrinsic part of the overall sound emanating from industrial and/or commercial premises or processes.

The methods described within the standard use outdoor sound levels to assess the likely effects of sound on residential areas where sound is incident. It can be used for the purpose of investigating complaints, assessing sound from existing, proposed or modified sources of sound of an industrial and/or commercial nature, and assessing sound at proposed new dwellings or premises used for residential purposes.

The specific sound level from the industrial or commercial premises is determined through measurement of the residual sound level in absence of the specific sound and correcting for the effect of the source under assessment. In cases where the difference between the ambient and residual sound level is  $\leq 3$  dB, this can be determined through a combination of measurement and calculation.

The specific sound level is corrected for the time interval during which the specific sound is on and the specific sound is off (and therefore sound pressure is nil), and determined over a time interval which reflects significant temporal and level variations.

When the industrial and/or commercial sound source contains certain acoustically distinguishing characteristics at the receptor location which will attract attention (tonal, impulsive, intermittent), a character correction is applied to the specific sound level to give a rating level that is used to inform the assessment.

The derived rating sound level is compared against the prevailing background noise level as determined from a baseline survey. Typically, the greater this difference, the greater the magnitude of the impact, as noted below:

- 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.

Adverse impacts may include but not be limited to annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.

The methodology set out within the standard is not intended to be used to assess the extent of an impact at indoor locations. However, internal sound levels may be taken into account by considering any acoustic attenuation measures such as façade treatment or screening when discussing the context of the assessment result.

The determination of noise amounting to a nuisance is beyond the scope of the standard.



## 2.6 World Health Organisation guidelines: 2000

The World Health Organisation (WHO) Guidelines for Community Noise was published in 2000 as a response to a need for action together with a generic need for improvements in legislation at a national level. Although not legislation, this document provides general guidance and guidelines which have been set for different health effects, using the lowest noise level that produces an adverse health effect in specific human environments. The guideline levels which are relevant to this assessment are set out in Table 2.

| Environment                                                                                        | Critical health effect(s)                                          | $L_{eq}$<br>dB(A) | Time base<br>(hours) | $L_{max,F}$<br>dB(A) |
|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------|-------------------|----------------------|----------------------|
| Outdoor living area                                                                                | Serious annoyance, daytime and evening                             | 55                | 16                   | -                    |
|                                                                                                    | Moderate annoyance, daytime and evening                            | 50                | 16                   | -                    |
| Dwelling indoors                                                                                   | Speech intelligibility and moderate annoyance, daytime and evening | 35                | 16                   | -                    |
| Inside bedrooms                                                                                    | Sleep disturbance, night-time                                      | 30                | 8                    | 45 <sup>[1]</sup>    |
| Outside bedrooms                                                                                   | Sleep disturbance, window open (outdoor values)                    | 45                | 8                    | 60                   |
| <b>Notes</b><br><sup>[1]</sup> Should not exceed 45 dB $L_{AFmax}$ more than 10-15 times per night |                                                                    |                   |                      |                      |

**Table 2** WHO guideline noise criteria



## 3 Site Setting

### 3.1 Site Location and Description

The proposed gas governor will be located at Barlow Moor Road, Chorlton-cum-Hardy, Manchester. The site is on the approximate National Grid Reference 382350E, 392775N. It is expected the site will be accessed using the slip road along Barlow Moor Road.

The site plan is presented in Figure 1, showing the existing and proposed replacement gas governor station location.



**Figure 1 Gas Governor Station Location**

The surrounding study area is predominantly residential in nature, with the exception of the Manchester Crematorium southwest of the site. The A536 is located to the west of the site.



## 4 Baseline Noise Survey

A baseline noise survey was undertaken from 12 May 2023 to 16 May 2023 to obtain ambient and background noise levels representative of the surrounding existing receptors.

Two unattended measurement positions (MP1 and MP2) have been selected as representative of the nearest receptors. As such, a baseline noise survey was undertaken at these positions over midweek and weekend periods at representative locations to determine background and ambient noise levels.

Positions were selected as being 'representative of the acoustic climate' by considering surrounding noise sources, such as the contribution from distant road traffic. As the monitoring was unattended, security and accessibility of the monitoring equipment was also considered, as well as site constraints.

Noise Sensitive Receptors, NSR1 and NSR2, have been identified to be the nearest existing residential receptors to the site and therefore potentially are the most impacted by changes to the local noise environment in the area. In addition, the Manchester Crematorium was also considered as a receptor (NSR3) as offices of the Crematorium might be susceptible to noise impacts.

Table 3 below lists the chosen representative measurement location for each ESR and depicts their position in the context of the properties and application site.

| Reference | Receptor Name          | Representative Measurement Location |
|-----------|------------------------|-------------------------------------|
| NSR1      | 254 Barlow Moor Road   | MP1                                 |
| NSR2      | 60 Hough End Avenue    | MP1                                 |
| NSR3      | Manchester Crematorium | MP2                                 |

**Table 3** *Representative measurement position for each NSR*



**Figure 1** *Baseline monitoring and nearest ESR locations*



For context, geo-referenced locations of each measurement position are provided in Table 4 below:

| Measurement Location | Latitude   | Longitude | WhatThreeWords         |
|----------------------|------------|-----------|------------------------|
| MP1                  | 53°25'53"N | 2°16'3"W  | ///cool.softly.bond    |
| MP2                  | 53°25'52"N | 2°16'1"W  | ///groups.scrap.itself |

**Table 4**      **Measurement Location Details**

MP1 was chosen to be representative of the rear facades and garden areas of residential receptors on the Barlow Moor Road and Houghton.

MP2 was chosen to be representative of offices at the Manchester Crematorium. The location was located on the screened side of the offices, to provide robust baseline noise levels.

Observations made during installation and collection determined that the noise environment at the monitoring positions was indeed consistent with that witnessed at the nearest receptors.

## 4.1 Survey Equipment

The noise measurements were undertaken using the following equipment:

|     | Equipment                 | Type  | Serial number | Calibration date |
|-----|---------------------------|-------|---------------|------------------|
| MP1 | Class 1 sound level meter | NL-52 | 00754130      | 04/11/2021       |
|     | Acoustic calibrator       | NC-74 | 34391437      | 21/10/2022       |
| MP2 | Class 1 sound level meter | NL-52 | 00464742      | 12/01/2023       |
|     | Acoustic calibrator       | NC-74 | 34391437      | 21/10/2022       |

**Table 5**      **Monitoring Equipment**

The sound level meters conform to the Class 1 requirements of BS EN 61672-1:2013. The calibrator used confirmed to the Class 1 requirements of BS EN IEC 60942:2018. The equipment used has a calibration history that is traceable to a certified calibration institution. Calibration certificates are available upon request. The calibration of the sound level meters was field-checked prior to commencing measurements and prior to removing the equipment from site upon completion; no significant calibration drift was observed i.e., within a +/- 0.5dB tolerance.

All measurements were undertaken in free field conditions with the microphone positioned greater than 3.5m away from reflecting surfaces and at 1.5 metres above ground height to the requirements of BS 7445.

Measurements were logged in continuous 15-minute integration periods (with supplementary 100 millisecond data) and obtained using a combination of broadband indices ( $L_{Aeq}$ ,  $L_{A10}$ ,  $L_{A90}$  and  $L_{Amax}$ ) and one-third octave frequency bands.

## 4.2 Noise Environment

No noise from the existing gas governor station was identified to be audible even at close inspection during installation and collection.

The acoustic environment at the site, NSR1-3, was noted to be dominated by road traffic noise from Barlow Moor Road and the surrounding road network.



External plant was identified on the Manchester Crematorium northern boundary. However, this was continuous and would make up the typical noise environment. It should be noted that the plant was not audible at the monitoring locations during installation.

Other audible noise sources include birdsong, very short periods of construction noise from power tools and plant noise (not from the exiting gas governor station).

No other significant sources of noise were noted during times of attendance.

### 4.3 Weather Conditions

Meteorological conditions were recorded throughout the attended survey via site-based observations. Wind speeds were noted to be below 5m/s with no precipitation.

Weather conditions during the unattended measurement period were obtained from Weather underground ([www.wunderground.com](http://www.wunderground.com)), using the weather station closest to the measuring location (with available historical data), which was judged to be at Manchester Airport weather station (IMANCH154) located approximately 7km south of the site. This weather data is summarised in Table 6.

| Date       | Temperature range (°C) | Total precipitation (mm) | Average wind speed (m/s) | Prevailing wind direction |
|------------|------------------------|--------------------------|--------------------------|---------------------------|
| 12/05/2023 | 8-15                   | 0.00                     | 5                        | NE                        |
| 13/05/2023 | 5-19                   | 0.00                     | 2                        | N                         |
| 14/05/2023 | 7-18                   | 0.00                     | 3                        | E                         |
| 15/05/2023 | 8-14                   | 0.00                     | 5                        | SE                        |
| 16/05/2023 | 5-15                   | 0.00                     | 4                        | SE                        |

**Table 6** *Summary of weather data during the monitoring period*

Weather conditions are considered suitable for majority of the survey monitoring purposes in accordance with BS 7445. No significant change in noise levels was associated with changes in weather conditions.



## 5 Baseline Survey Results

A summary of the measured noise levels at the long-term, continuous measurement at locations MP1 and MP2 are provided in Table 7 and Table 8.

Background levels,  $L_{A90,T}$ , are summarised as arithmetic averages of the 15-minute measurement profiles across each assessment period; more detailed statistical analysis is shown graphically in Appendix B.

For MP1 and MP2 analysis of the dataset accounting for the standard 16-hour daytime period (07:00 – 23:00) and 8-hour night-time period (23:00 – 07:00) is provided, to quantify the noise fluctuations at selected positions. Values are rounded to the nearest whole number.

| Date                | Time        | Measured noise levels (dB) |               |             |             |
|---------------------|-------------|----------------------------|---------------|-------------|-------------|
|                     |             | $L_{Aeq,T}$                | $L_{AFmax,T}$ | $L_{A10,T}$ | $L_{A90,T}$ |
| Day 1<br>12/05/2023 | 10:45-23:00 | 51                         | 89            | 44          | 50          |
|                     | 23:00-07:00 | 44                         | 69            | 37          | 44          |
| Day 2<br>13/05/2023 | 07:00-23:00 | 47                         | 79            | 39          | 47          |
|                     | 23:00-07:00 | 44                         | 69            | 40          | 45          |
| Day 3<br>14/05/2023 | 07:00-23:00 | 46                         | 80            | 40          | 47          |
|                     | 23:00-07:00 | 42                         | 78            | 36          | 42          |
| Day 4<br>15/05/2023 | 07:00-23:00 | 47                         | 74            | 43          | 49          |
|                     | 23:00-07:00 | 42                         | 70            | 36          | 42          |
| Day 5<br>16/05/2023 | 07:00-12:30 | 48                         | 71            | 44          | 50          |

**Table 7** Noise monitoring data – MP1 (Unattended Logger Position)



| Date                | Time        | Measured noise levels (dB) |                      |                    |                    |
|---------------------|-------------|----------------------------|----------------------|--------------------|--------------------|
|                     |             | L <sub>Aeq,T</sub>         | L <sub>AFmax,T</sub> | L <sub>A10,T</sub> | L <sub>A90,T</sub> |
| Day 1<br>12/05/2023 | 10:00-23:00 | 53                         | 80                   | 47                 | 54                 |
|                     | 23:00-07:00 | 46                         | 71                   | 37                 | 49                 |
| Day 2<br>13/05/2023 | 07:00-23:00 | 51                         | 80                   | 43                 | 52                 |
|                     | 23:00-07:00 | 46                         | 69                   | 41                 | 49                 |
|                     | 07:00-23:00 | 50                         | 78                   | 43                 | 52                 |
| Day 3<br>14/05/2023 | 23:00-07:00 | 45                         | 65                   | 38                 | 47                 |
|                     | 07:00-23:00 | 56                         | 85                   | 46                 | 53                 |
|                     | 23:00-07:00 | 45                         | 71                   | 38                 | 47                 |
| Day 4<br>15/05/2023 | 07:00-23:00 | 73                         | 101                  | 49                 | 60                 |
|                     | 23:00-07:00 |                            |                      |                    |                    |
|                     | 07:00-12:45 |                            |                      |                    |                    |
| Day 5<br>16/05/2023 |             |                            |                      |                    |                    |

**Table 8** Noise monitoring data – MP2 (Unattended Logger Position)

## 5.1 Background Noise Levels

Given the potential for the GGS to operate 24 hours, background noise levels have been analysed for both daytime and night-time periods, in order to inform the selection of appropriate assessment criteria.

The methodology detailed in BS 4142: 2014+A1: 2019 provides an example of statistical analysis to determine the representative background noise level during the daytime and night-time (L<sub>A90</sub>). Figures below show the statistical analysis of the background noise levels at MP1 and MP2 during the monitoring period.



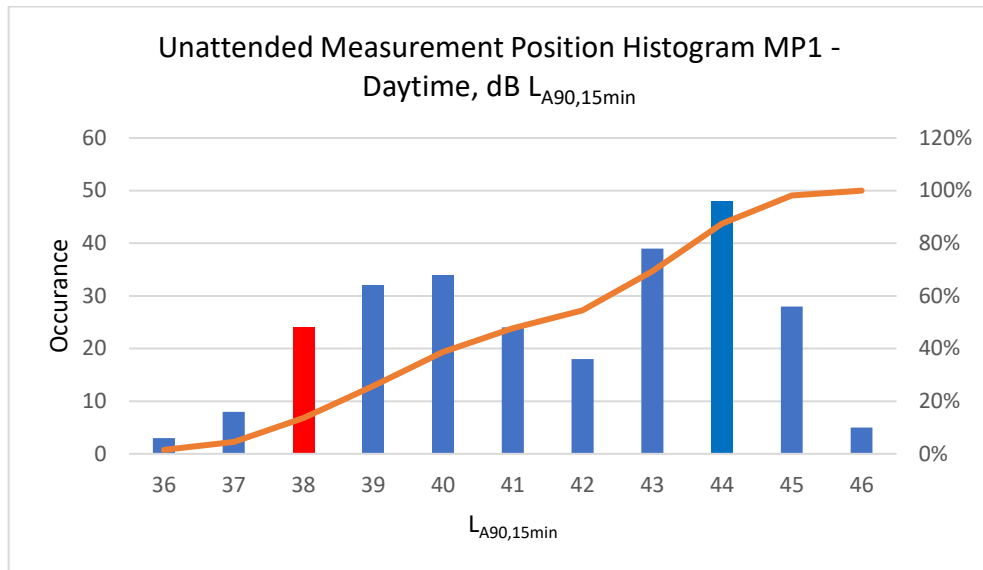


**Figure 2 Statistical Analysis of Daytime Background Noise Levels – MP1 (12/05/23 to 16/05/23)**

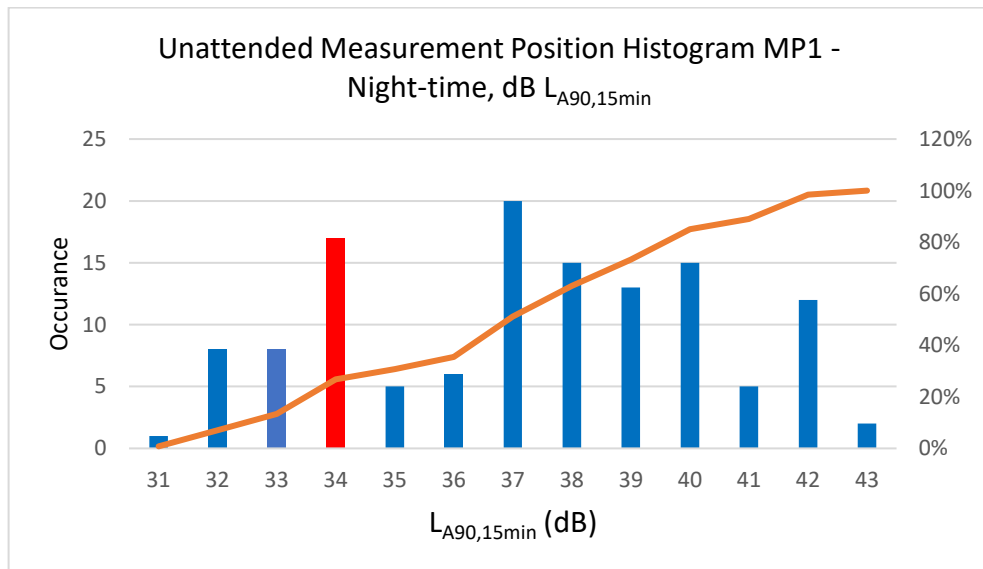


**Figure 3 Statistical Analysis of Night-time Background Noise Levels – MP1 (12/05/23 to 16/05/23)**

From the statistical analysis of noise levels presented in Figure 2 and Figure 3 the following values are considered representative of the background noise levels at MP1:

- 38dB during the daytime period (07:00-23:00 hours), and;
- 34dB during the night-time period (23:00-07:00 hours).



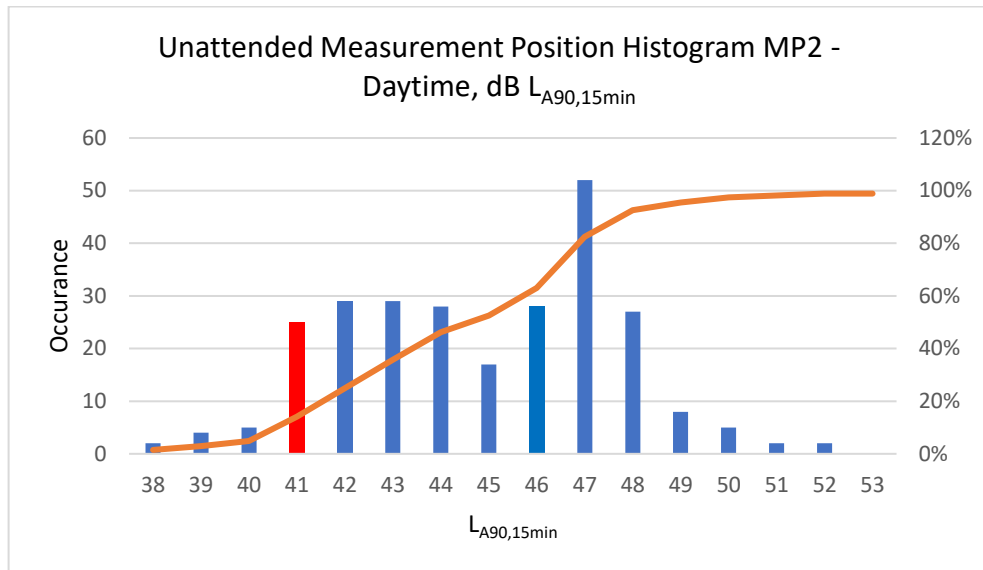


*Figure 4 Statistical Analysis of Daytime Background Noise Levels – MP2 (12/05/23 to 16/05/23)*

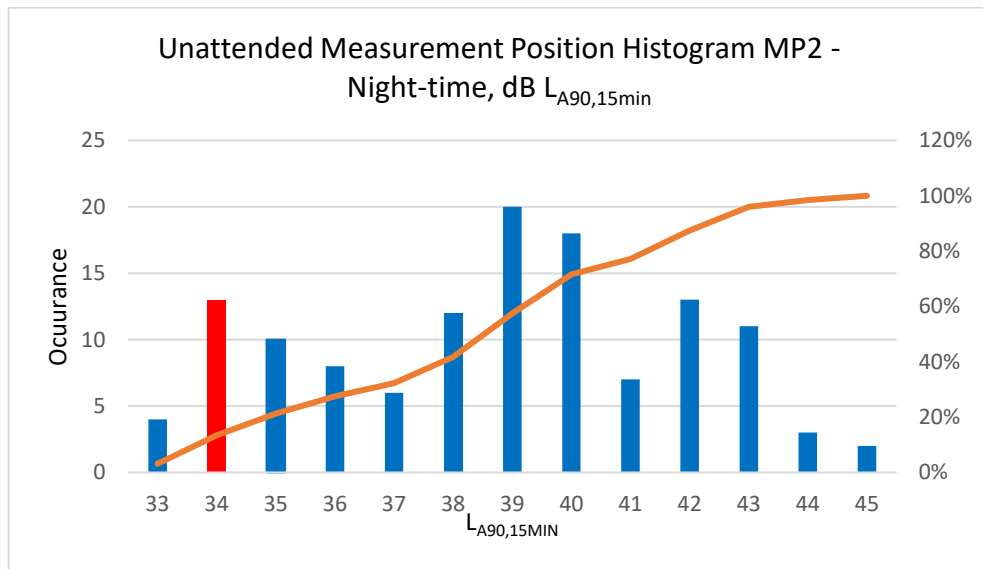


*Figure 5 Statistical Analysis of Night-time Background Noise Levels – MP2 (12/05/23 to 16/05/23)*

From the statistical analysis presented in Figure 4 and Figure 5 the following values are considered representative of the background noise levels at MP2:

- 41dB during the daytime period (07:00-23:00 hours), and;
- 34dB during the night-time period (23:00-07:00 hours).

The lowest background level with a significant number of occurrences were selected from Figure 2 to Figure 5. Therefore, the selected background noise levels for MP1 and MP2 are considered robust for this assessment.



## 5.2 Derivation of Criteria

Operational noise effects at the nearest noise sensitive receptors have been assessed according to BS 4142: 2014+ A1: 2019 and the guidance within NPSE (specifically to avoid significant adverse impacts on health and quality of life).

It should be noted that based upon the plant's potential operational hours of 24 hours a day, an assessment of both daytime and night-time has been carried out.

The representative noise at each receptor, based on the relevant graphs in Section 5.1 have been provided below in Table 9.

| Ref. | Receptor Name          | Baseline Measurement Location | Representative Daytime Level at Receptor | Representative Night-time Level at Receptor |
|------|------------------------|-------------------------------|------------------------------------------|---------------------------------------------|
| NSR1 | House Barlow Moor Road | MP1                           | 38                                       | 34                                          |
| NSR2 | House Hough End Avenue | MP1                           | 38                                       | 34                                          |
| NSR3 | Manchester Crematorium | MP2                           | 41                                       | 34                                          |

**Table 9**      **Background Level Criteria**



## 6 Noise Impact Assessment

### 6.1 Assessment Methodology

Plant noise levels due to the proposed GGS have been predicted at the nearest existing noise sensitive receptors. The assessment has considered distance losses, and corrections for reflections, directivity and screening if present.

The noise data provided by the design engineers states that the predicted levels provided are 'Max working levels' making the noise levels robust for this assessment.

Noise predictions have been based on the noise data presented in Table 10 for the proposed gas governor.

| Item                               | Octave band centre frequency (Hz) |      |      |      |      | dB(A)           |
|------------------------------------|-----------------------------------|------|------|------|------|-----------------|
|                                    | 500                               | 1k   | 2k   | 4k   | 8k   | L <sub>WA</sub> |
| Proposed Gas Governor Station Unit | 63.8                              | 76.8 | 81.4 | 81.5 | 79.5 | <b>86</b>       |

**Table 10** Octave band data (dB) for the proposed gas governor

It is understood the proposed unit will be installed within an acoustic kiosk providing a minimum 30dB attenuation in noise levels.

The acoustic performance of the kiosk, specified by the manufacturers for this specific application has been quoted below for reference.

*"Noise Attenuation*

*This construction will provide a noise attenuation of 30 dB(A) over an octave band centre frequency range of 31.5Hz to 8KHz measured at 1.0 m distance from the enclosure wall. This value is an estimate and is governed by other factors specific for each application."*

It is suggested that noise emissions due to the proposed plant rating levels should not exceed the background levels stated in Table 9 at the receptors in order to be considered a 'Low Impact' in accordance with BS 4142.

### 6.2 BS 4142:2014+A1:2019 Assessment

Based on the methodology above, the specific levels predicted at the nearest noise sensitive receptors are compared against the existing ambient sound level to determine the noise impact from the proposed plant, in accordance with the guidelines of BS 4142.

The assessment has been undertaken on the basis that all plant items associated with the development will be in continuous use at their normal operating duty over a 24-hour period. This represents a robust assessment, as certain the gas governor may not be in continual use.

Where specific noise levels are predicted to be at least 10dB lower than the measured representative background levels, it is assumed no audible characteristics would be audible. Therefore, no acoustic penalties in accordance with BS4142 would be applied in these instances.

Table 11 and Table 12 present the operational phase assessment of the plant noise emissions for the daytime and night-time periods respectively.



| Results                                                 | Noise sensitive receptor location |            |            |
|---------------------------------------------------------|-----------------------------------|------------|------------|
|                                                         | NSR1                              | NSR2       | NSR3       |
| Predicted specific sound level, $L_{Aeq,1hr}$ (dB)      | 24                                | 17         | 18         |
| Existing background sound level, $L_{A90,1hr}$ (dB)     | 38                                | 38         | 41         |
| Character corrections                                   | 0                                 | 0          | 0          |
| Predicted rating sound level, $L_{Ar,1hr}$ (dB)         | 24                                | 17         | 18         |
| Existing lowest ambient sound level, $L_{Aeq,1hr}$ (dB) | 42                                | 42         | 47         |
| <b>Excess of rating over background level (dB)</b>      | <b>-14</b>                        | <b>-21</b> | <b>-23</b> |

**Table 11** Operational phase assessment - daytime

| Results                                                   | Noise sensitive receptor location |            |            |
|-----------------------------------------------------------|-----------------------------------|------------|------------|
|                                                           | NSR1                              | NSR2       | NSR3       |
| Predicted specific sound level, $L_{Aeq,15min}$ (dB)      | 24                                | 17         | 18         |
| Existing background sound level, $L_{A90,15min}$ (dB)     | 34                                | 34         | 34         |
| Character corrections                                     | 0                                 | 0          | 0          |
| Predicted rating sound level, $L_{Ar,15min}$ (dB)         | 24                                | 17         | 18         |
| Existing lowest ambient sound level, $L_{Aeq,15min}$ (dB) | 34                                | 34         | 38         |
| <b>Excess of rating over background level (dB)</b>        | <b>-10</b>                        | <b>-17</b> | <b>-20</b> |

**Table 12** Operational phase assessment – night

Based on the above results in Table 11 and 12, there is a clear indication that with the rating level 10dB or lower below the background noise level is an indication of a low/ negligible impact.

Therefore, the results of this assessment indicate the proposed replacement gas governor station will have little to no impact at the nearest receptors and therefore, will not be considered further.



## 7 Summary

RSK Acoustics has been instructed by Cadent Gas Ltd to undertake a noise impact assessment of a proposed replacement gas governor station (GGS) at Barlow Moor Road, Chorlton-cum-Hardy, Manchester. The noise assessment has considered the noise impact at the nearest receptors using spectral data of the source and kiosk mitigation performance provided by the design engineer.

This report has provided details of a noise survey conducted at the site and has set background levels for receptors for the assessment the proposed plant items in line with BS4142, to satisfy condition 5a of the planning permission.

Noise from proposed gas governor station has been assessed and it has been determined that the noise emissions will have a low/ negligible, with the kiosk specified by the design engineers.

Therefore, the requirements of the planning condition 5a will be achieved.



## Glossary

| Term                                            | Definition                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Ambient sound</b>                            | The total sound at a given place, usually a composite of sounds from many sources near and far.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Background sound, <math>L_{A90,T}</math></b> | A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>dB</b>                                       | Decibel. Scale for expressing sound pressure level. 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 i.e. $2 \times 10^{-5}$ Pascal.                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>dB(A)</b>                                    | A-weighted decibel. This provides a measure of the overall level of sound across the audible spectrum with a frequency weighting to compensate for the varying sensitivity of the human ear to sound at different frequencies. Example sound levels include: <ul style="list-style-type: none"> <li>140 dB(A) Threshold of pain</li> <li>120 dB(A) Threshold of feeling</li> <li>100 dB(A) Loud nightclub</li> <li>80 dB(A) Traffic at busy roadside</li> <li>60 dB(A) Normal speech level at 1m</li> <li>40 dB(A) Quiet office</li> <li>20 dB(A) Broadcasting studio</li> <li>0 dB(A) Median hearing threshold (1000 Hz)</li> </ul> |
| <b>Frequency</b>                                | The repetition rate of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted as kHz, e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20kHz.                                                                                                                                                                                                                                                                                                                                          |
| <b><math>L_{Aeq,T}</math></b>                   | This is defined as the notional steady sound level 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.                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>NR</b>                                       | Noise rating. A set of curves based on the sensitivity of the human ear. They are used to give a single-figure rating for a range of frequencies.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Rating level</b>                             | Specific sound level of a source plus any adjustment for the characteristic features of the sound.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Residual sound</b>                           | Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Sound absorption</b>                         | Process whereby sound energy is converted in to heat. Sound absorption properties is expressed as the sound absorption coefficient $\alpha$ or the sound absorption class (A-E).                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Sound insulation</b>                         | The reduction or attenuation of airborne sound by a solid element between source and receiver.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>Specific sound</b>                           | Sound pressure level produced by the source being assessed at the assessment location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |



