

Land to the Northwest of Factory Road, Northfleet Works, The Shore, Northfleet, Gravesend, Kent

Noise Impact Assessment



Stantec UK Limited

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Bellway Homes Limited

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Land to the Northwest of Factory Road, Northfleet Works, The Shore, Northfleet, Gravesend, Kent

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Glossary

Ambient Sound Level ($L_a = L_{Aeq,T}$)	Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.
A-Weighted Decibel (dBA)	A decibel level that has been corrected for the A-Weighting curve.
A-Weighting	Octave band and 1/3 octave band filters that correlate to the response of the human hearing system to sound pressure levels at different frequencies.
Background Sound Level ($L_{A90,T}$)	A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using a fast time-weighting and quoted to the nearest whole number of decibels.
Decibel (dB)	A logarithmic unit used to describe the ratio between the measured level and a reference level of 0 dB. The ratio can be sound pressure, intensity or power. The reference value for sound pressure is 20 µPa and for sound power is 1 pW.
Equivalent Continuous A-Weighted Sound Pressure Level ($L_{Aeq,T}$)	Value of the time-averaged A-weighted sound pressure level, in decibels (dB), of a continuous steady sound for the duration of the specified time interval, T.
Façade Level	The sound pressure level at a distance of 1 metre from the façade
Fast Time Weighted	The speed at which the instrument responds to changes in amplitude of the measured signal. The response time of a fast time-weighted instrument is 0.125 seconds.
Free-Field Level	The sound pressure level measured away from any reflective surfaces.
Frequency (f)	The number of cycles of pressure fluctuations within a given period of time. Measured in Hertz.
Hertz (Hz)	The unit of frequency or pitch of a sound. One hertz is equal to one cycle per second.
Octave Band	Band of frequencies where the upper limit of the band is twice the frequency of the lower limit. E.g., the 1000 Hz band contains noise energy at all frequencies from 707 to 1414 Hz.
Percentile Level ($L_{AN,T}$)	The A-Weighted Sound Pressure Level which is exceeded for N% of the specified time interval. E.g., the $L_{A90,1\text{hour}}$ is the A-weighted sound level exceeded for 90% of 1 hour.
Reference Time Interval (T)	Specified interval over which the specific sound level is determined.
Sound Power Level (L_w)	The logarithm of the ratio of the sound power (W) to the reference sound power level (W_0). The reference value for sound power is 1 pW. Defined as: $L_w = 10 \log \left(\frac{W}{W_0} \right)$
Sound Pressure Level (L_p)	The logarithm of the ratio of a given sound pressure (p) to the reference sound pressure (p_0). The reference value for sound pressure is 20 µPa. Defined as: $L_p = 20 \log \left(\frac{p}{p_0} \right)$
Sound Reduction Index (R)	Laboratory measure of the sound insulation properties of a material or building element in a stated frequency band. Defined as: $R = L_1 - L_2 + 10 \log_{10} \left(\frac{S}{A} \right)$



1 Introduction

1.1 Background

Stantec UK Ltd (Stantec) has been commissioned by Bellway Homes Limited to undertake an acoustic survey to assess the likely noise impact associated with the operation of the workshop proposed at Land to the Northwest of Factory Road, Northfleet Works, The Shore, Northfleet, Gravesend, Kent. The extent of the application includes:

“Full planning application for the erection of a workshop (Use Class E(g)(iii)), access, parking, and associated landscaping.”

This report presents the results of the environmental sound survey, details the assessment of the potential noise impact of the future operation of the site and establishes plant noise emission limits in line with anticipated Local Authority requirements.

An explanation of the acoustic terminology used in this report is included in the **Glossary**.

1.2 Scope of Report

The scope of this report is to:

- Establish, by means of an environmental sound survey, the existing environmental sound levels at a ground level position on the proposed development site, which is selected to be representative of the lowest background noise levels experienced at the nearest noise sensitive premises.
- Undertake an assessment of the potential noise impact from future operation of the premises.
- Propose relevant plant noise emission criteria based on anticipated Local Authority requirements.

Advice and recommendations within this report will need to be integrated, coordinated and ratified with the design by the principal designer and design team to ensure that all other design interfaces, buildability, workmanship and other requirements are considered. Any sketches or drawings provided illustrate acoustic principles only.

An assessment of vibration is not included within this report due to there being no obvious vibration sources in the local vicinity and the understanding that the proposed workshop operations do not include use of equipment that generates high levels of vibration.

1.3 Site Description and Location

The proposed development site is located on Factory Road, Northfleet. The site comprises a parcel of land measuring approximately 0.053ha. A previous commercial unit / workshop was formerly located at the site. Nonetheless, at the time of survey the site did not contain any built form and comprised predominately hard standing with some low grade, self-planted vegetation located sporadically across the site.



Land to the Northwest of Factory Road, Northfleet Works, The Shore, Northfleet, Gravesend, Kent

The location of the proposed site and nearest noise sensitive receptors are detailed in **Figure 1.1**. Details of the nearest noise sensitive receptors used in the assessment, are described in **Table 1.1**.

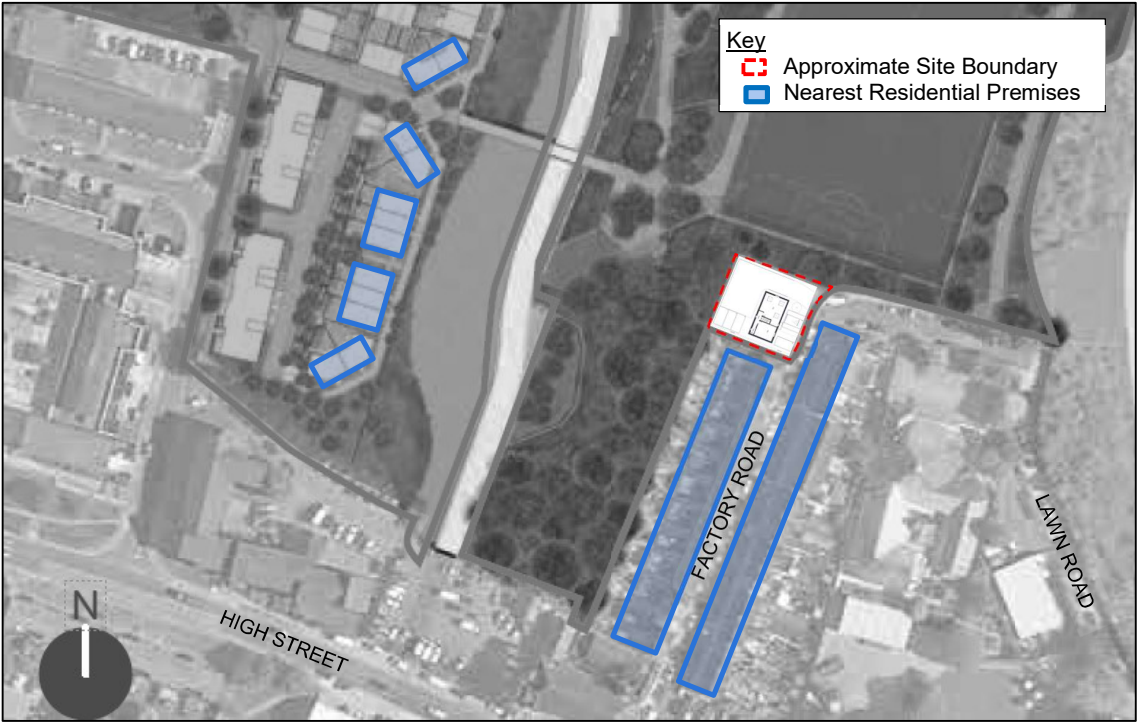


Figure 1.1: Site Location Plan

Image courtesy of BPTW Architects

Table 1.1. Noise Sensitive Receptors used in Assessment

Receptor	Description
NSR1	Residential Premises at 51 Factory Road
NSR2	Residential Premises at Harbour Village Phase 1B



2 Guidance and Standards

2.1 The National Planning Policy Framework (NPPF)

The revised National Planning Policy Framework (NPPF) was published in December 2024. In respect of noise, paragraph 187 states that in relation to conserving and enhancing the natural environment:

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

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

In relation to ground conditions and pollution, paragraph 198 states that:

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

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and 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...”*

In relation to the integration of new development with existing premises and community facilities, paragraph 200 states that:

“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.”

The NPPF indicates that the Noise Policy Statement for England (NPSE) should be used to define the “significant adverse impacts”.



2.2 Planning Practice Guidance

The Planning Practice Guide (PPG) was launched in 2014 (with the latest update being in 2019) and provides additional guidance and interpretation to the Government's strategic policies outlined within the NPPF in a regularly updated, web-based resource.

The PPG provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the no observed effect level (NOEL) and, as exposure increases, the lowest observed adverse effect level (LOAEL) and significant observed adverse effect level (SOAEL).

As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

Exposure to noise above the LOAEL is described in PPG (Paragraph: 005 Reference ID: 30-005-20190722) as:

"...noise starts to cause small changes in behaviour and/or attitude, for example, having to turn up the volume on the television or needing to speak more loudly to be heard. The noise therefore starts to have an adverse effect and consideration needs to be given to mitigating and minimising those effects (taking account of the economic and social benefits being derived from the activity causing the noise)."

Exposure to noise above SOAEL is described as:

"...noise causes a material change in behaviour such as keeping windows closed for most of the time or avoiding certain activities during periods when the noise is present. If the exposure is predicted to be above this level the planning process should be used to avoid this effect occurring, for example through the choice of sites at the plan-making stage, or by use of appropriate mitigation such as by altering the design and layout. While such decisions must be made taking account of the economic and social benefit of the activity causing or affected by the noise, it is undesirable for such exposure to be caused."

2.3 Noise Policy for England (NPSE)

The Noise Policy Statement for England (NPSE) was published in March 2010 and clarifies the underlying principles and aims of existing policy documents that relate to noise. It also sets out the long-term vision of Government noise policy which is: "to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development".

The NPSE states that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and its effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.



Paragraphs 2.20 and 2.21 define 'significant adverse' and 'adverse' impacts as applied to noise 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."

Paragraph 2.22 clarifies that:

"It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available."

The three aims of the NPSE are defined as follows:

"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." (Note: Applies when the impact lies somewhere between the LOAEL and SOAEL and does not mean that adverse effects cannot occur)."

"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."

It is necessary to define the LOAEL and SOAEL for the potential source of noise so that the potential impact can be related to the aims and requirements of the NPSE.



2.4 Local Authority Requirements

As part of the outline planning permission granted to nearby Employment Land applications, the Local Authority has imposed the following conditions:

"in respect of any phase of development comprising non-residential floorspace, include details of noise attenuation to demonstrate that the rating level of the noise emitted from the non-residential floorspace (other than noise from the exit or entry of road vehicles) shall not exceed the existing background (LA90) noise level by more than 3 dB when measured one metre from the façade of the nearest existing or proposed residential dwellings. The measurements and assessments shall be made according to BS4142:2014 or the equivalent standard. The approved noise attenuation measures shall thereafter be implemented prior to the relevant non-residential floorspace first being brought into use and thereafter maintained across the lifetime of the development"

Under Reserved Matters Applications for more recent Employment Land developments, further conditions were imposed as follows:

"No development above ground level shall take place until an updated Noise Assessment has been submitted to and approved in writing by the Local Planning Authority. The Noise Assessment shall include up to date survey data of background noise levels, day, night and weekend noise levels at sensitive receptors, noise contours for the assessed operational scenario, noise levels of plant, machinery and open storage operations, including forklift and lifting platform, and shall identify any required noise mitigation measures. Any approved noise mitigation measures shall thereafter be fully implemented prior to first use of the building or floorspace to which it relates.

Reason - To protect residential amenity in accordance with adopted Gravesham Local Plan Core Strategy Policy CS19.

No deliveries will be permitted between the hours of 23:00 and 07:00. No heavy goods vehicles shall be loaded or unloaded and no heavy goods vehicles shall arrive or depart the employment land hereby permitted between these hours.

Reason - To ensure that the development does not prejudice the amenities of neighbouring properties in accordance with Policy CS19 of the Gravesham Local Plan Core Strategy."

2.5 British Standard 4142:2014 + A1:2019 'Methods for Rating and Assessing Industrial and Commercial Sound'

British Standard 4142:2014 + A1:2019 "Methods for rating and assessing industrial and commercial sound" (BS 4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in the 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.

The standard is used to determine the rating levels for sources of sound of an industrial and/or commercial nature and the ambient, background and residual sound levels at outdoor locations. These levels could be used for the purposes of investigating complaints; assessing sound from proposed, new, modified or additional source(s) of sound of an industrial and/or commercial nature;



and assessing sound at proposed new dwellings or premises used for residential purposes. However, the determination of noise amounting to a nuisance is beyond the scope of the standard.

The standard should not be used to assess sound from the passage of vehicles on public roads and railway systems; recreational activities; people among other sources; and other sources falling within the scopes of other standards or guidance. The standard cannot be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels.

The procedure contained in BS 4142 assesses the significance of sound which depends upon the margin by which the rating level of the specific sound sources exceeds the background sound level and the context in which the sound occurs/will occur.

An initial estimate of the impact of the specific sound is obtained by subtracting the measured background sound level from the rating level and considering the following:

- a) Typically, the greater this difference, the greater the magnitude of the impact;
- b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context; and
- c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

Where the initial estimate of the impact needs to be modified due to the context, the following factors should be considered:

- The absolute level of sound, as BS 4142 notes that the magnitude of the overall impact might be greater where the residual sound level is high than for an acoustic environment where the residual sound level is low.
- The character and level of the residual sound compared to the character and level of the specific sound.
- The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions such as:
 - Façade insulation treatment;
 - Ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
 - Acoustic screening.



2.6 Proposed Assessment Criteria

Based on consideration of BS 4142:2014+A1:2019, planning policy guidance, and the requirements of planning conditions imposed on nearby employment land developments, the assessment criterion for the combined noise contribution from workshop activity (including deliveries) and fixed plant items is proposed below.

Table 2.1: Proposed Assessment Criteria

Location	Difference between the Rating Level ($L_{A,r,T,r}$) and the Background Sound Level ($L_{A90,T}$)	Description of Impact
1 m from the nearest noise- sensitive premises	+10	Likely to be an indication of a significant adverse impact, depending on the context. Considered to be the SOAEL.
	+5	Likely to be an indication of an adverse impact, depending on the context. Considered to be the LOAEL.



3 Environmental Sound Survey

3.1 Methodology

An unattended environmental sound survey was undertaken between 10:15 hours on Wednesday 5 March and 11:00 hours on Tuesday 11 March 2025. Data was collected to establish background sound levels at a location considered representative of nearby noise sensitive premises.

Measurements were logged in 15-minute periods of the L_{Aeq} and L_{A90} sound levels.

The sound level meter was in an environmental case, with the microphone connected to the meter via an extension cable and fitted with the manufacturer's windshield.

Field calibrations were performed before and after the measurements with no significant fluctuations recorded (< 0.5 dB). Calibration certificates are available upon request.

The instrumentation used in the survey (including calibration information) is listed in **Appendix A**.

Measurement Locations

Sound measurements were undertaken at the position shown in **Figure 3.1** and described in **Table 3.1**.

Figure 3.1: Existing Site Plan Showing Sound Measurement Locations

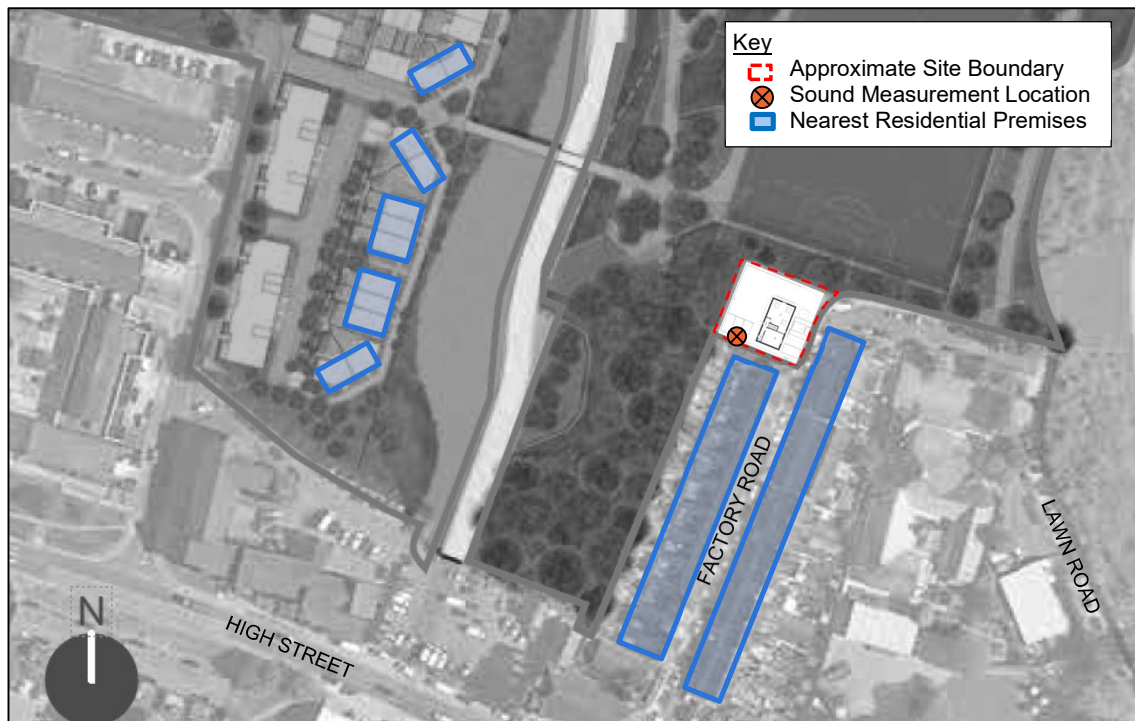


Image courtesy of BPTW Architects



Table 3.1: Description of Measurement Locations

Position	Description
LT1	The microphone was in a free field position on the southern boundary of the proposed development site, approximately 1.5 m above local ground level. This location is considered representative of the background sound levels likely to be experienced by the nearest noise sensitive residential premises at 51 Factory Road and overlooking premises at the rear of Phase 1B, Harbour Village.

Meteorological Conditions

Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the meteorological conditions throughout the entire survey period. However, the weather conditions at the beginning and end of the survey period are detailed in **Table 3.2**. **Appendix C** provides a summary of conditions during the intervening period, based on publicly available weather records.

Table 3.2: Meteorological Conditions

Date	Temperature (°C)	Precipitation (mm)	Cloud Cover (%)	Wind Speed (m/s)	Wind Direction
05/03/2025	7	0	0	2.2	SW
11/03/2025	8	0	80	4.7	NNE

These conditions are considered suitable for obtaining representative sound level measurements.

A period of rain was noted to have occurred on Monday between 6:00 and 12:00 hours and this period has been excluded from the subsequent analysis. Wind speeds exceeded 5 m/s on the afternoon of Sunday 9 March, so this period has also been excluded from the analysis.

3.2 Sound Climate

Due to the nature of the survey (i.e. unattended), it is not possible to accurately comment on the dominant noise sources or specific noise events throughout the entire survey period. However, at the beginning of the survey period, it was noted that the sound climate was dominated by distant road traffic noise and noise from very occasional road traffic on Factory Road. Construction activity was also being undertaken on the future Bevan's Park site, which sits to the south of the proposed development site, but there were few noise events that were audible at the measurement location during the attended periods.

Construction noise from works at Phase 2 of the Harbour Village site was not audible at the proposed development site during the attended survey periods.

This report refers, within the limitations stated, to the environment of the site in the context of the surrounding area at the time of the inspections. Environmental conditions can vary. No warranty is given as to the possibility of changes in the environment of the site and surrounding area at differing times.



3.3 Environmental Sound Survey Results

A summary of the unattended sound survey results is presented in **Table 3.3**. A time history graph detailing the full results is contained in **Appendix B**.

Table 3.3: Summary of Measured Environmental Sound Survey Results

Date	Period, T	Measured Sound Level (dB)			
		$L_{Aeq,15mins}$	$L_{A90,15mins}$		
			Range	Mean	Median
05/03/2025	Daytime (11:00-19:00 hrs)	50	40-52	44	43
	Evening (19:00-23:00 hrs)	45	42-44	43	44
	Night-time (23:00-07:00 hrs)	46	40-50	43	42
06/03/2025	Daytime (07:00-19:00 hrs)	52	42-55	46	46
	Evening (19:00-23:00 hrs)	47	44-47	45	46
	Night-time (23:00-07:00 hrs)	48	40-49	44	43
07/03/2025	Daytime (07:00-19:00 hrs)	49	38-50	44	44
	Evening (19:00-23:00 hrs)	46	41-45	43	43
	Night-time (23:00-07:00 hrs)	47	40-46	43	43
08/03/2025	Daytime (07:00-19:00 hrs)	46	39-46	41	41
	Evening (19:00-23:00 hrs)	44	41-43	42	42
	Night-time (23:00-07:00 hrs)	45	40-45	42	42
09/03/2025	Daytime (07:00-19:00 hrs)	46	41-44	42	42
	Evening (19:00-23:00 hrs)	44	39-41	40	40
	Night-time (23:00-07:00 hrs)	46	39-45	42	42
10/03/2025	Daytime (07:00-19:00 hrs)	53	43-56	46	46
	Evening (19:00-23:00 hrs)	46	42-45	43	43
	Night-time (23:00-07:00 hrs)	47	40-47	42	41
11/03/2025	Daytime (07:00-11:30 hrs)	60	46-56	49	48



4 Operational Noise Impact Assessment

4.1 Purpose of Assessment

Sound associated with the proposed workshop and associated deliveries, is likely to be generated by operational processes related to workshop activities and deliveries.

At the time of this assessment, it is not proposed that any fixed items of noise generating equipment be installed to service the building. Plant noise emission limits have therefore been proposed so that the limit in **Table 3.1** is met when combined with the anticipated noise contribution from operational processes, to guide plant selections and locations.

4.2 Noise Sensitive Receptors

The assessment has been undertaken at the nearest noise-sensitive receptors to the proposed scheme which are identified in **Figure 1.2** and **Table 1.1**.

4.3 Background Sound Levels

Background sound levels during the operational periods are derived from the results of the environmental sound survey and are summarised in **Table 4.1**. These are considered to be representative of existing background noise levels experienced at the nearest noise sensitive receptors located at 51 Factory Road and at the rear of Phase 1B, Harbour Village. A +3 dB correction has been applied to convert the free-field measurement data to equivalent levels at 1 m from a façade to allow a like-for-like comparison with the calculated sound levels.

Table 4.1: Typical Background Sound Levels the Identified Nearest Noise Sensitive Receptors

Day	Time Period (hrs)	Typical Measured Background Sound Level (dB $L_{A90,T}$)	
		Free-field	1m from Façade
Weekday	08:00 – 16:30	44	47
Saturday	08:00 – 12:00	41	44

4.4 Calculation Parameters

Noise propagation calculations have been undertaken to assess the likely impact of the new workshop operation. Based on discussions with the operator, the following parameters have been used in the assessment:

- The future unit will operate during daytime hours typically between 08:00 and 16:30 hours on weekdays. Very occasionally the workshop may operate on a Saturday morning, to suit overflow demand.



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- Regular deliveries are made via small transit van for most supplies, with a flat-bed lorry attending site up to two times per month to deliver steel pipes. Deliveries are made during the typical working hours of 08:00-16:30 hours on weekdays only. The assessment assumes that both activities occur on the same 8.5-hour weekday.
- A mechanical chain lift is used to offload the steel pipes, with the entire unloading activity taking approximately 5 minutes. The mechanical chain lift is also used to move materials within the workshop, occasionally.
- Scrap metal is collected by a flat-bed lorry a maximum of once a month during the typical working hours of 08:00-16:30.
- There are occasional visitors to the site, but most products are posted to customers via Royal Mail delivery service or delivered locally by the operator in his transit van.
- Within the workshop, several noise generating activities are undertaken. These include the use of lathes (typically on low-speed setting for approximately 10-minutes each time) and a pillar drill, with very occasional use of an angle grinder (typically for around 5-minutes once every 3-6 months). Small hand tools are also used, but their use is limited. Noise data for typical activities was obtained by attended measurements undertaken at the current workshop. This data is summarised in the section below and has been used to inform the assessment of workshop operational noise.
- The lathe and pillar drill are contained within a separate workshop to where angle grinding activities occur. It is understood that the intention is for the same arrangement to be adopted in the new facility, and it is assumed that the lathe and pillar drill are housed in the nearest workshop to the premises at 51 Factory Road ("small workshop") and the angle grinder will only be used in the large workshop.
- When lorry deliveries occur, it is understood that use of machinery stops whilst staff help to unload the steel pipes. Windows and roller shutter doors remain closed, with the exception being during lorry delivery times when the roller shutters will be opened for access. It is understood that the intention is for all loading and unloading activities to happen inside the units.
- The current workshop is not mechanically ventilated, and it is understood that the future premises will not have any requirement for extract fans or ventilation systems to be installed.
- The assessment is based on the proposed layout plan and elevation drawings provided by BPTW Architects (drawing numbers MRT-BPTW-S01-00-DR-A-1001 rev P02, MRT-BPTW-S01-00-DR-A-1002 rev P01 and MTW-BPTW-H01-ZZ-DR-A-2001 rev P01 dated 19 March 2025).
- The noise sources for the assessment have been located in the worst-case locations within the service yards (i.e. closest to the nearest noise-sensitive receptor or with the least amount of shielding).

The following operational scenarios have been assessed based on the operational parameters and discussions with the site operators.



Table 4.2: Assessment Scenarios

Scenario	Assessed Sound Sources				Assessed Time Period	Comment
	Flat Bed Lorry Delivery	Transit Van Delivery	Lathe & Pillar Drill Use	Angle Grinder Use		
1	✗	✓	✓	✗	Weekday	Representative of typical operating conditions
2	✓	✗	✓	✗	Weekday	Expected to occur once a fortnight
3	✗	✓	✓	✗	Saturday	Expected to occur once a month as a worst case
4	✗	✓	✓	✓	Weekday	Expected to occur once every 3 months

4.5 Calculation Procedure

The specific sound level associated with each operational scenario has been calculated by combining the specific sound levels for each assessed sound source/activity.

Calculation of the specific sound levels for the flat bed and transit deliveries consider the component parts of a delivery as individual sound events. These are then combined to obtain the specific sound level associated with a delivery type.

The calculation of the specific sound level from the workshop activities is based on reverberant noise break-out calculations.

Table 4.3 details the activities associated with the delivery operations of the site, the associated noise level and assuming that a steel pipe delivery and a transit van delivery occurs once during the same daytime period. Unless otherwise stated, sound levels are based on measurements from our in-house database.

Table 4.3: Noise Levels Associated with Delivery Activities

Measurement Description	Sound Pressure Level SEL (dB)	Source Level Measurement Distance (metres)
Lorry Arriving (arrival)	90	1
Reversing Alarm (arrival)	94	1
Lorry Door Slam (arrival)	83	1
Chain Lift Operation *	66	10
Lorry Door Slam (departure)	83	1
Lorry Starting (departure)	89	1
Lorry Pulling Away (departure)	90	1
Light Goods Vehicle (arrival)	89	3
Light Goods Vehicle Door Slam (arrival)	75	3



Measurement Description	Sound Pressure Level SEL (dB)	Source Level Measurement Distance (metres)
Light Goods Vehicle Door Slam (departure)	75	3
Light Goods Vehicle (departure)	89	3

* Taken from British Standard BS5228–1:2009 for a site worker's lift.

Table 4.4 provides a summary of measured sound levels associated with typical activities undertaken in the current workshop.

Table 4.4: Summary of Measured Noise Levels Associated with Typical Workshop Activities

Typical Workshop Operation Activity	Sound Pressure Level SEL (dB)	Approximate Source Level Measurement Distance (metres)
Lathe (190 rpm)	117	1
Pillar drill (low speed mode)	100	1
Angle grinder	115	1

Note: Measurements were taken at approximately 1 m from the noise generating element of the machine in each case, deemed to be within the direct field. Measurements were undertaken in the existing workshop which had acoustically hard finishes and was therefore highly reverberant.

The following reverberant sound pressure levels are predicted for periods when equipment is operating.

Table 4.5: Workshop Activity Reverberant Sound Pressure Levels

Workshop	Reverberant Sound Pressure Level (dB $L_{eq,T}$) at each Octave Band Frequency (Hz)							
	63	125	250	500	1000	2000	4000	8000
Small	80	77	70	76	83	87	86	82
Large	79	77	65	73	81	88	85	80

The above predictions are based on the assumption that the lathe and pillar drill will be housed in the smaller workshop nearest to the 51 Factory Road premises and may be used simultaneously in a worst-case situation. It is assumed that the angle grinding activity will take place at a work bench in the larger workshop and given the rarity of use of this item of equipment, it is assumed that the angle grinder will not be used on Saturdays. The reverberant noise levels predicted for each workshop are short-term levels and would not be expected for large portions of the day.

Based on the understanding that the new workshop will be a cavity brick wall construction and office premises will be located above the workshops, **Table 4.6** details the minimum sound reduction indices expected to be achieved by the proposed building fabric around the workshop areas. These specifications have informed the assessment.



Table 4.6: Assumed External Building Fabric Performance Specifications

Building Element	Description	Sound Reduction Index (R) at Octave Band Centre Frequency (Hz)								R _w
		63	125	250	500	1k	2k	4k	8k	
Wall	Two leaves of brickwork, 100 mm cavity with 50 mm insulation	36	42	45	38	47	57	67	67	50
Roller Shutter	Roller Shutter	9	12	15	15	16	20	23	23	18

4.6 Acoustic Feature Corrections

Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound levels and the background sound level. The calculated specific sound level should therefore be modified in accordance with the following guidance as outlined in BS 4142:2014+A1 2019. Due to the type of assessment, the subjective method has been used to determine the type and level of acoustic feature corrections applied to each source.

BS 4142 offers the following guidance on the subjective assessment of acoustic feature corrections.

“Tonality

For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0 dB and + 6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

Impulsivity

A correction of up to + 9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible and 9 dB where it is highly perceptible.

Intermittency

When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time... If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

Other Sound Characteristics

Where the specific sound features characteristics that are neither tonal nor impulsive, nor intermittent, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.”

Door slams have the potential to be impulsive at source and a 6 dB correction has been applied to these sources at Receptor A and 3 dB at Receptor B. Reversing alarms have had a 6 dB tonality penalty applied at Receptor A and a 3 dB tonality is applied to Receptor B for this source. Based on the measured data, the other noise sources are not considered to be intermittent or have other sound characteristics which are likely to be readily distinguishable at the identified receptors.



4.7 Preliminary Assessment Results

Table 4.6 presents the preliminary results of the BS 4142:2014 assessment for Receptor A, as identified in **Figure 1.1** and **Table 1.1**.

Table 4.7: BS 4142:2014 Preliminary Assessment Results – Receptor A

Description	Scenario			
	1	2	3	4
Calculated Rating Level at Receptor (dB $L_{Ar,1hr}$)	48	51	48	48
Background Sound Level (dB $L_{A90,15mins}$)	47	47	44	47
Excess of Rating over Background Sound Level (dB)	+1	+4	+4	+1
Assessment of Impact	Indication of a less than adverse impact , depending on the context	Indication of a less than adverse impact , depending on the context	Indication of a less than adverse impact , depending on the context	Indication of a less than adverse impact , depending on the context

Table 4.7 presents the preliminary results of the BS 4142:2014 assessment for Receptor B.

Table 4.8: BS 4142:2014 Preliminary Assessment Results – Receptor B

Description	Scenario			
	1	2	3	4
Calculated Rating Level at Receptor (dB $L_{Ar,1hr}$)	37	37	37	39
Background Sound Level (dB $L_{A90,15mins}$)	47	47	44	47
Excess of Rating over Background Sound Level (dB)	-10	-10	-7	-8
Assessment of Impact	Indication of a low impact , depending on the context	Indication of a low impact , depending on the context	Indication of a low impact , depending on the context	Indication of a low impact , depending on the context

Calculations indicate that the rating level associated with deliveries and use of the workshops is likely to have a low or less than adverse impact on all receptors during weekdays and Saturday mornings, falling below the LOAEL.



The calculated impact under Scenario 2 and 3 is marginally (+1dB) above the Local Authority criteria applied to nearby Employment Land applications, an exceedance not considered to be significant, particularly as the calculated rating level falls below the LOAEL.

4.8 Context and Mitigating Factors

The above assessment details the results of the initial numerical assessment of sound levels at the nearest noise-sensitive receptor. It is important to recognise the context in the assessment of the likely noise impact on the proposed development site arising from the operation of the proposed development.

The following factors should be taken into consideration:

- The absolute sound level;
- The character and level of the residual and specific sound levels; and
- The sensitivity of the receptor.

Absolute Sound Levels

The calculated specific sound level at the worst affected façade of existing noise-sensitive receptors falls below the relevant criteria in World Health Organisation and BS8233 guidelines with respect to noise levels in external amenity areas.

Predicted specific sound levels are also similar to the typical ambient noise levels experienced during the daytime by existing residential premises on Factory Road.

Character and Level of Residual and Specific Sound Levels

The proposed development site has been undeveloped for several years and is part of a wider industrial area, with an existing Tarmac site to the north of the proposed units and Triangle Pit to the east, where dredged material arriving at the nearby wharves, is processed. The activities proposed at the new workshop reflect existing permitted activities which take place within the wider area. The character and level associated with the proposed activities are therefore considered to be similar to the character and level of existing activities.

Workshop activity is unlikely to be continuous and noise levels at receptors are expected to be significantly lower than assessed above, when the machinery is not being used. The impact in such scenarios is likely to be lower than suggested by the numerical assessment above.

The Sensitivity of the Receptor

The site is bounded by a residential property along the southern edge and by residential premises on the opposite side of Factory Road. There are also more distant residential premises that are located within the Harbour Village development to the west.

The main operating hours of the future workshop are between 08:00 and 16:30 hours on weekdays. It is expected that the surrounding premises have reduced sensitivity to noise during this time period.



Whilst the unit may also operate on Saturday mornings, this is understood to be a rare occasion (once a month as a worst case), but sensitivity is likely to be higher during this time period.

The site layout has been optimised so that areas with the greatest potential for noise generation are located at the rear of the building, as far away from existing residential premises as possible. The building edge will extend slightly past the line of the adjacent residential property, so that there is no direct line of sight from the first-floor bedroom windows of 51 Factory Road to the roller shutters or loading areas (i.e. the new building essentially shields the existing premises on Factory Road).

Properties in Harbour Village may have a direct line of sight to the roller shutters and loading areas, but if the shutters and windows remain closed during operation of noisy equipment, there is a low likelihood of adverse impact on these premises.

4.9 Uncertainty

Care has been taken to reduce uncertainty as far as reasonably possible. However, it should be recognised that uncertainty exists in any environmental sound survey and assessment process.

The environmental survey was undertaken over a 6-day period to capture typical variations in the acoustic climate that occurs in the vicinity of the proposed site.

The subsequent assessment has been undertaken based on information provided by the current operator and acoustic measurements taken for items of existing equipment operating under typical conditions. Whilst it should be recognised that there is a degree of uncertainty associated with the exact operating conditions, if different from those assumed, it is considered that the assessment undertaken is suitably robust in determining the likely noise impact of the development.

4.10 Assessment Summary

The results of the preliminary assessment indicate that the sound associated with the operation of the proposed development during both weekdays and Saturday mornings is likely to have a low or less than adverse impact if roller shutters remain closed during equipment operation.

Considering the results of the assessment and the contextual factors detailed above, the noise impact associated with the operation of the proposed facility is considered to be low, based on the LOAEL and SOAEL values and associated planning policy guidance.



5 Plant Noise Emission Criteria

Currently no fixed items of mechanical building services equipment are proposed to be installed at the new workshop facility.

As a significant adverse noise impact is anticipated if the roller shutter remains open during operation of workshop equipment, opening of the roller shutter should not be relied on as a means of preventing overheating at the hottest times of the year.

Where a mechanical ventilation or cooling system is later adopted, the system should be designed to meet the following noise emission limits, so that when combined with the operational noise, the criterion in **Table 3.1** is complied with. These would be subject to review if alternative conditions are imposed on the development.

Table 5.1: Proposed Cumulative Fixed Plant Noise Limits

Receptor	Time Period	Proposed Limit (dB $L_{A,T}$)
A – Factory Road Premises	Weekday (08:00 – 16:30 hours)	36
	Saturday (08:00 – 12:00 hours)	25
B – Harbour Village Premises	Weekday (08:00 – 16:30 hours)	46
	Saturday (08:00 – 12:00 hours)	43

The above limits should be met with all plant operating simultaneously. In line with guidance within BS 4142, all sources should be controlled such that they do not produce any “distinguishable, discrete or continuous note (whine, hiss, screech, hum, etc.) or distinct impulses (bangs, clicks, clatters or thumps)” at any noise sensitive façade. Where they do contain such features, appropriate corrections should be applied as defined in BS 4142.

Plant selections, installation locations and noise mitigation measures will need to be developed to comply with the above limits if mechanical ventilation or cooling systems are proposed at later design stages.



6 Conclusion

Stantec UK Ltd (Stantec) has been commissioned by Bellway Homes Limited to undertake an acoustic survey and identify plant noise emission limits for the proposed workshop at Land to the Northwest of Factory Road, Northfleet Works, The Shore, Northfleet, Gravesend, Kent.

An environmental sound survey has been undertaken by Stantec, to establish the existing environmental sound levels at positions considered representative of the nearest noise sensitive receptors to the proposed development site.

An assessment of noise associated with the proposed workshop operation and its associated deliveries, indicates that the development is likely to have a **low or less than adverse impact** on the identified noise-sensitive receptors. The development should therefore be considered as acceptable in noise terms.

Currently no plant items are proposed to be installed at the new workshops. Plant selections, installation locations and noise mitigation measures will need to be developed to comply with the plant noise emission limits, if such systems are proposed to be incorporated during later design stages.

Considering the results of the assessment and the contextual factors detailed above, the noise impact associated with the operation of the proposed facility is considered to be low, based on the LOAEL and SOAEL values and associated planning policy guidance.



Appendix A Equipment Calibration Information

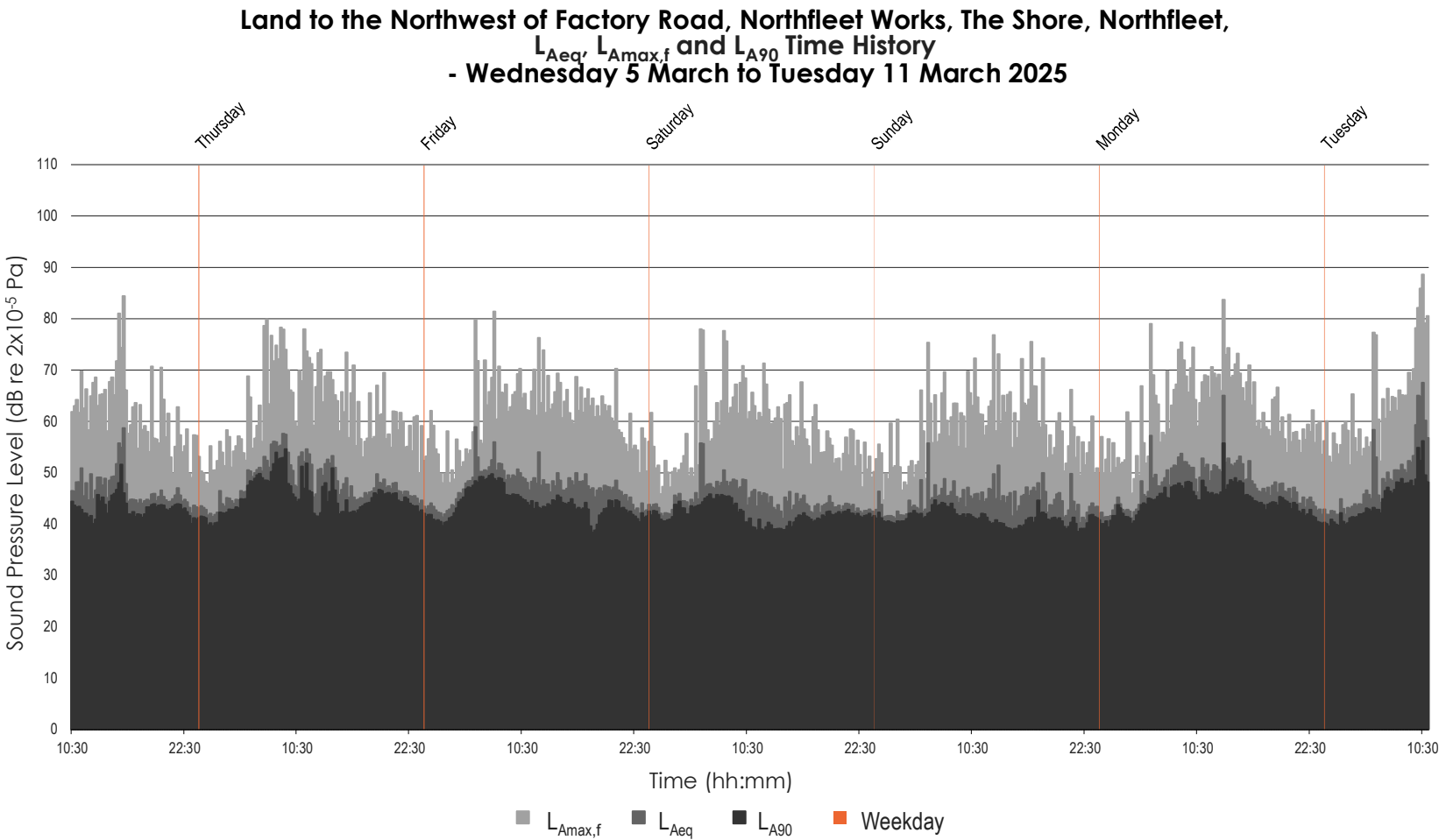
The instrumentation used in the environmental sound survey is listed in **Table A.1**.

Table A.1: Environmental Sound Survey Instrumentation

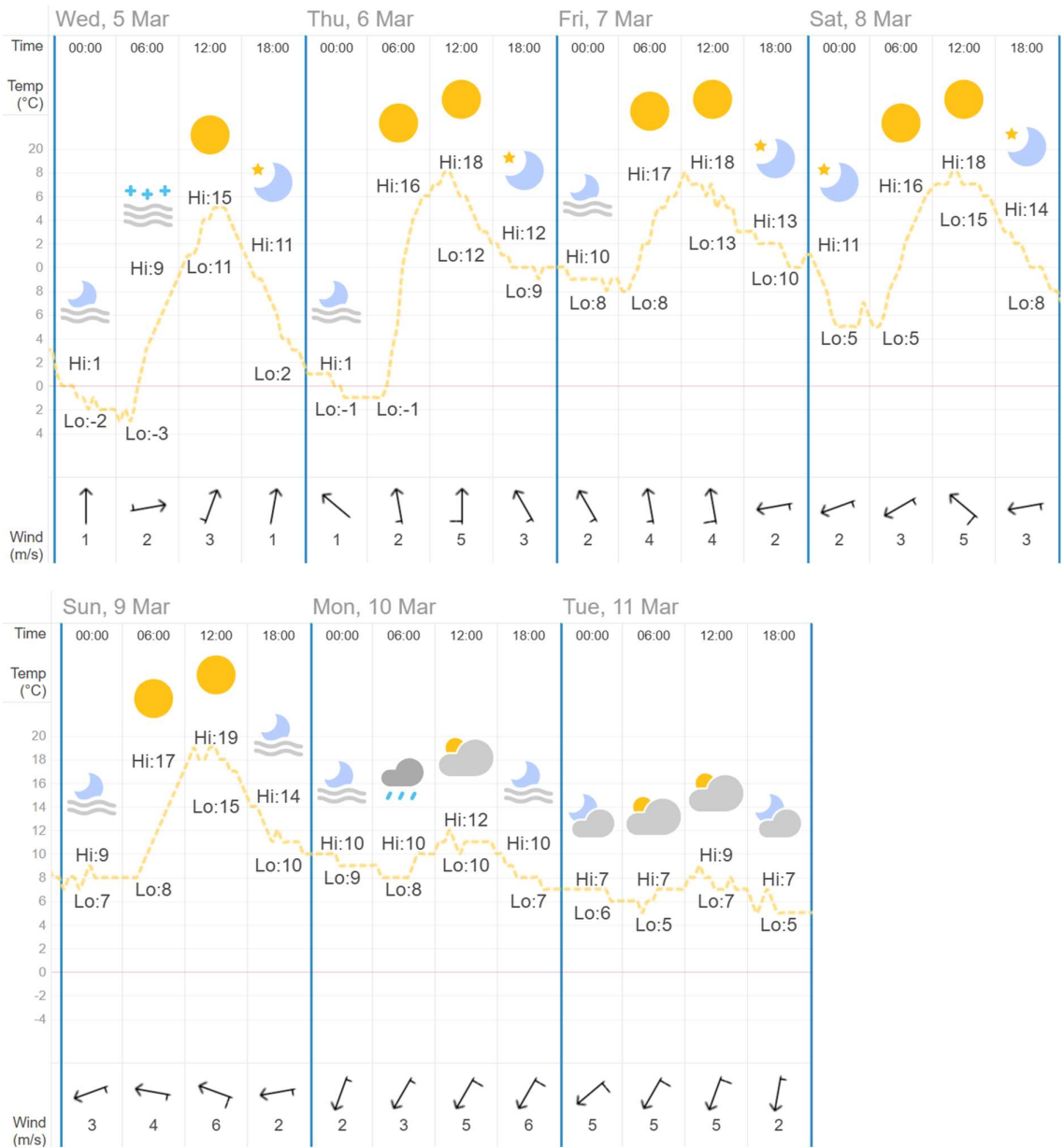
Location	Description	Manufacturer	Type	Serial Number	Laboratory Calibration Date
LT1	Sound Level Meter	RION	NL-52	1043456	10/01/2025
	½" Pre-polarised microphone		UC-59	7231	
	Pre-amplifier		NH-25	43485	
	Sound Calibrator	Brüel & Kjær	B&K 4231	2619373	07/01/2025



Appendix B Time History Graph



Appendix C Unattended Weather Conditions



Images courtesy of TimeandDate.com



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Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.



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