



Noise Impact Assessment

C11045

Unit H, George Curl Way, Southampton

*Prepared for
Hampshire & Isle of Wright Air Ambulance,
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Executive Summary	
Site Address	Unit H, George Curl Way, Southampton
This Assessment has been undertaken to identify and assess any noise-generating activities which may have the potential to adversely impact the existing noise-sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance. In addition, various British Standard and guidance documents exist which are applicable to the assessment of noise impacts. This Assessment has relied upon an ambient noise survey completed in a location considered to be representative of the background sound climate at the nearest receptors to the Development over a full weekday and weekend period. This Assessment has also relied upon noise measurements completed at an existing Air Ambulance facility. This Assessment has shown that, regarding helicopter movements at the helipad, the Assessment has shown that the changes in ambient noise level is below the criteria noise level of +2.9dB at the closest receptors and so there is no requirement to consider noise mitigation measures. With regards to the impact at the existing commercial units, this assessment shows that the internal noise level at the closest office space can be achieved based on the criteria presented in BS8233. The Assessment has also shown that helicopter fly overs from our Site will not adversely impact the existing receptors given the existing noise levels produced by Southampton Airport. In summary, the predicted level of noise from the Development, is sufficiently low enough at the closest residential dwellings to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and The Air Navigation Guidance 2017 and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.	

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1 INTRODUCTION

1.1 Background

Omnia was instructed by Hampshire & Isle of Wight Air Ambulance to prepare a Noise Impact Assessment ('the Assessment') in support of a change of use from a warehouse to accommodate helicopter operations at Unit H, George Curl Way in Southampton, SO18 2RX to be referred to hereafter as 'the Development'.

It is understood that the Assessment is required in order to provide a comprehensive noise risk assessment in support of a planning application seeking a change of use from a warehouse to accommodate helicopter operations.

This Assessment has been undertaken to identify and assess any noise-generating activities from the air ambulance service which may have the potential to adversely impact the existing noise-sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance. In addition, various British Standard and guidance documents exist which are applicable to the assessment of noise impacts, and these are detailed in Section 2.

1.2 Site Location and Proposed Development

The Site is located at Unit H, George Curl Way in Southampton. The Site is situated within an industrial estate with a number of commercial units located to the west of the Site. The runway for Southampton Airport is located to the east and the M27 is situated to the south.

It is understood that there is no defined flight path due to the nature of the helicopter flights, however flights will fly out to the east towards the airport. As such, the closest noise-sensitive residential receptors to the helipad are located off Allington Lane to the east and Campbell Road to the north.

The sound climate at both receptors is dominated by road traffic sound from the M27 and existing aircraft sound from Southampton Airport. There is also a large rail terminal adjacent to the receptors off Campbell Road.

This Assessment has relied upon an ambient noise survey completed in a location considered to be representative of the background sound climate at the nearest receptors to the Development over a full weekday and weekend period. This Assessment has also relied upon noise measurements completed at an existing Air Ambulance site.

This assessment has been undertaken with due regard to the supplied planning layout shown on the following planning drawing:

- Block Plan Proposed, issued by Southern Planning Practice, dated November 2023.

The Site Layout is shown in Figure 1 of Appendix III.

1.3 Acronyms

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

1.4 Limitations

The limitations of this report are presented in Appendix I.

1.5 Confidentiality

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

2 POLICY & GUIDANCE

2.1 National Planning Policy Framework & National Planning Practice Guidance

The Government updated the National Planning Policy Framework (NPPF) and its associated National Planning Practice Guidance (NPPG) on 20th December 2023. Together, the NPPF and NPPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

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

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

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

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

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

The Observed Effect Levels are as follows:

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

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

Table 2.1 Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
Not Noticeable	No Effect	No observed effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time	Observed adverse effect	Mitigate and reduce to a minimum

	because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.		
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any particular situation.

These factors include:

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

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be taken into account along with the extent to which the source of noise is intermittent and of limited duration;
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations; and,
- If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.2 BS8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

The scope of this standard is the provision of recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in Table 2.2.

Table 2.2 BS8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30
*For a reasonable standard in bedrooms at night, individual noise events (measured with fast time weighting) should not exceed 45dB L_{max}		

BS8233 goes on to recommend noise levels for gardens as follows:

"It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted".

BS8233 goes on to say:

"In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited".

Ventilation Requirements

Where a partially open window cannot be relied upon to provide an adequate level of sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS8233 states:

"The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units (see 7.7.2 below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans."

Section 7.7.2 states:

"NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level."

2.3 World Health Organisation's (WHO) 'Guidelines for Community Noise'

The WHO 'Guidelines for Community Noise' offers advice with regard to setting noise criteria applicable to sleep disturbance. Section 4.2.3 specifies:

'If the noise is not continuous, L_{Amax} or SEL are used to indicate the probability of noise-induced awakenings. Effects have been observed at individual L_{Amax} exposures of 45 dB or less. Consequently, it is important to limit the number of noise events with a L_{Amax} exceeding 45 dB.'

The guidelines go on to state:

'At night, sound pressure levels at the outside façades of the living spaces should not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} , so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.'

The sound insulation performance value of 15dB for a façade containing a partially open window accords with the guidance offered in BS8233:2014.

The guidelines reference a study by Vallet & Vernet, 1991, which concluded that:

'For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB $L_{AF,max}$ more than 10-15 times per night.'

Accordingly, this assessment has utilised the 10th highest measured maximum noise level from the night-time period and allows for an assessment of a typical maximum noise level in determining façade sound insulation performance.

2.4 Institute of Environmental Management & Assessment 'Guideline for Environmental Noise Impact Assessment', October 2014

The guidelines address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines provide specific support on how noise impact assessment fits within the Environmental Impact Assessment (EIA) process. They cover:

- How to scope a Noise Assessment;
- Issues to be considered when defining the baseline noise environment;
- Prediction of changes in noise levels as a result of implementing development proposals; and
- Definition and evaluation of the significance of the effect of changes in noise levels (for use only where the assessment is undertaken within an EIA).

Although the guidance states that it is only applicable for use in an Environmental Impact Assessment (EIA), in the absence of any other relevant guidance for assessing changes in ambient noise levels, it is the most appropriate document for establishing significance of effect.

Table 2.3 categorises the change in noise level for a noise sensitive receptor such as a residential dwelling.

Table 2.3 Effect Description for Residential Dwellings

Effect	Change in Ambient
Very substantial	≥10.0
Substantial	5.0 – 9.9

Moderate	3.0 – 4.9
None / not significant	≤2.9

2.5 Eastleigh Borough Local Plan (2016 -2036)

The following statements make reference to aircraft noise within the Local Plan adopted April 2022:

‘6.4.54 The issues set out in Chapter 2 refer to the airport’s impacts on the local area in terms of the traffic it generates, noise and emissions from aircraft, and restrictions on development arising from the operational needs of the airport. These include height restrictions and a Public Safety Zone to the north of the airport across Eastleigh River Side and extending into parts of the town centre. There are broad consultation zones for the airport and its radar facility relating to the height of structures and developments likely to attract birds.

6.4.58 Southampton Airport is one of three gateways into south Hampshire (the other two being the ports of Southampton and Portsmouth) and has a wide catchment that covers central southern England. Whilst it is a major employer in its own right, with 1,200 employees based on site across 30 companies, it also acts as a catalyst for growing and rebalancing the economy. It will be important to ensure that the airport’s operation is not impeded by development in its vicinity. If and when expansion does occur, it should respect local environmental constraints and have an acceptable impact on the local area, including through road access, aircraft noise and impacts on the adjoining Itchen valley. The Borough Council will continue to work with Southampton Airport Ltd on these issues through the Airport Consultative Committee.’

2.6 Eastleigh Borough Council’s Environmental Health Department

The following consultation was provided to Eastleigh Borough Council:

‘We have been instructed by a client to undertake Noise Impact Assessment in support of a change of use from a warehouse to accommodate helicopter operations for the Air Ambulance Service at Unit H, George Curl Way in Southampton, SO18 2RX.

Professional Consult have undertaken a series of noise surveys on the Site which will inform the Noise Impact Assessment and any required noise mitigation measures. The survey will take place allowing for the following noise measurement position:

- *Helicopter Noise: A noise measurement will be completed at for the type of helicopters that can operate at the proposed development. This will include take-off and landing as well as a fly over at an existing Air Ambulance Site; and*
- *Background and Ambient Sound Survey: A background and ambient sound survey will be completed in a location considered to be representative of the existing baseline noise climate at the closest noise sensitive receptors located to the west of the Site at Allington Lane over a full weekday and weekend period.*

The following assessments will be completed:

- *Helicopter Noise: An assessment will be undertaken which consider the change in ambient noise level, at the existing receptor, from helicopter operations. Noise modelling software will be used to determine the noise impact from take-off and landing.*
- *Commercial Noise: The noise impact produced any mechanical and electrical plant will be assessed in accordance with BS4142:2014 +A1:2019 where the rated level of noise will be compared to the background sound level at the closest noise sensitive receptor.*

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

If you have any comments, then please do advise at your earliest convenience.'

2.7 Southampton City Council's Environmental Health Department

Since the report has been submitted a number of comment have been received from the EHO at Southampton City Council. A summary of the response can be seen below:

- *Airbus H135 T3: Any consent should be conditional upon the use of this aircraft only unless otherwise agreed. I would suggest a condition as follows:*
- *Unless otherwise agreed in writing by the local planning authority, the aircraft operating from the site shall be restricted to an Airbus H135 T3 helicopter.*
- *Impact upon Commercial Use: It is not clear who the author of this paragraph is. It does not constitute an assessment. The stated noise level of '86.6dB' (dBA?) at commercial units would not be inconsequential. How significant this would be upon the operation of current and future businesses may be dependent upon the frequency of take off and landings and the duration of these events. How this impacts the commercial units now and in the future may depend upon the nature of their business activity. Relevant context may also be the incidence of existing aircraft noise from the airport. These are all unknowns to me. EBC should expect that this potential type of impact be assessed by a consultant competent to do so.*
- *Noise from overflights: It is not clear who the author of this paragraph is. The stated level of noise from overflights is 73dB (dBA?). If correct this would probably exceed the Local Plan criterion of LAmax of 45dBA (See para 5.49) in bedrooms if residential properties are overflown and windows were open. Typically in national guidance, this criterion is used in the assessment of sleep disturbance from transportation sources. Its application in for example; ProPG Planning & Noise – New Residential Development, is qualified as a level that should not be exceeded more than 10 times per night. As such, on the evidence presented, my conclusion would probably be that helicopter overflight would likely be disturbing. However, if flight paths are variable and the number of incidents at any one residential property is low, this would probably not give rise to a significant observable adverse effect sufficient in isolation to justify refusal.*
- *Maintenance activity: The main concern would be activities requiring the operation of the helicopter on the ground. If such activities occur off site as implied, this should be satisfactory. I would recommend that any consent is conditional to this effect. I suggest:*

No maintenance activity that includes the operation of the helicopter engine on the ground shall be carried out on the site.

Therefore, I would push for an update to the noise impact assessment to cover off the above. Most notably, the impact on commercial uses so that the agent of change can be completely considered. In addition to the above, it would be useful to understand the noise comparison between the helicopter and the nearby aeroplanes.'

In response to the above an additional assessment has been undertaken in order to determine the impact of the helicopter movements at the existing commercial units.

Analysis of the ambient measurement has been undertaken to identify the existing noise level caused by aircrafts at the Southampton Airport.

Finally, an assessment of a helicopter fly over at a residential dwelling has been undertaken in order to determine the impact at the existing dwellings. An additional receptor has also been included to the south which is located within the boundary of Southampton City Council.

3 NOISE SURVEY

3.1 Ambient Sound Survey

Omnia has conducted an ambient sound survey in order to determine the existing levels of ambient sound at the closest receptors to the development over the following period:

- 08:45, Friday 2nd February to 14:15, Monday 5th February 2024.

The following location was chosen for the survey:

- Noise Measurement Position 1 (NMP1): Omnia undertook an ambient sound survey to the to the east of the airport in free-field conditions at a height of 1.5m above local ground level. The dominant noise source at this location was from road traffic M27 and aircraft movements.

A summary of the measured ambient sound levels are presented below.

Table 3.1 Summary of Measured ambient Noise Levels

Date	Period	Measured Range & Average Noise Levels
		L _{Aeq,15min}
Friday 2 nd February 2024	Daytime (08:45 – 23:00)	52.1 – 63.3 (58.6)
	Night-time (23:00 – 07:00)	46.4 – 57.2 (50.5)
Saturday 3 rd February 2024	Daytime (07:00 – 23:00)	52.6 – 62.5 (58.3)
	Night-time (23:00 – 07:00)	44.8 – 56.3 (49.9)
Sunday 4 th February 2024	Daytime (07:00 – 23:00)	50.5 – 62.8 (58.3)
	Night-time (23:00 – 07:00)	45.1 – 60.9 (53.3)
Monday 5 th February 2024	Daytime (07:00 – 14:15)	59.2 – 62.2 (60.5)

A review of the ambient sound levels has been undertaken and consistent spikes have been identified which indicate aircraft activity from Southampton Airport. Appendix V Figures 3 and 4 show the trace data for the L_{Aeq} and L_{max} respectively. The L_{Aeq} range from 65dB to 82dB and the L_{max} range from 75dB to 88dB. These noise levels were recorded at approximately 500m from the runway at Southampton Airport and as such provide an indication of the current noise climate in the area.

3.2 Helicopter Sound Survey

Omnia has conducted a sound survey at an existing Air Ambulance Site at Thruxton Aerodrome following period:

- 13:50, Thursday 25th January to 14:15, Monday 29th January 2024.

The following location was chosen for the survey:

- Noise Measurement Position 2 (NMP2): Omnia undertook a source noise survey at the Air Ambulance

Site at the Thurxton Aerodrome. The microphone was located 15m from the helicopter take off area in free-field conditions at a height of 1.5m above local ground level. The dominant noise source at this location was from intermittent helicopter movements and aircraft associated with the Aerodrome.

A summary of the measured sound levels are presented below.

Table 3.2 Summary of Measured Helicopter Noise Levels

Date	Period Start	Event	Measured Sound Pressure Level $L_{Aeq,T}$	Duration (HH:MM:SS)
Thursday 25 th January 2024	25/01/2024 15:59	Take off	77.8	00:03:20
	25/01/2024 16:44	Landing	88	00:02:00
	25/01/2024 16:44	Distant Flying	60.4	00:05:40
Friday 26 th January 2024	26/01/2024 07:00	Engine on	89.7	00:04:20
	26/01/2024 08:00	Take Off	96.6	00:05:50
	26/01/2024 10:00	Landing	89.1	00:04:20
	26/01/2024 10:00	Engine on	90	00:03:00
	26/01/2024 11:00	Engine on	83.8	00:02:00
	26/01/2024 13:00	Take off	91.4	00:06:40
	26/01/2024 16:00	Landing	89.9	00:03:50
	26/01/2024 16:00	Fueling	65.6	00:04:00
	26/01/2024 17:00	Take off	94.4	00:09:30
	26/01/2024 18:00	Landing	91.9	00:03:40
	26/01/2024 18:00	Fueling	82.6	00:09:20
	26/01/2024 22:00	Take off	93.1	00:07:20
	26/01/2024 22:00	Landing	89.8	00:05:20
	26/01/2024 22:00	Fueling	82	00:06:30
Saturday 27 th January 2024	27/01/2024 01:00	Take off	93.9	00:06:10
	27/01/2024 01:00	Landing	89.4	00:04:50

	27/01/2024 01:00	Fueling	83.8	00:05:40
	27/01/2024 09:00	Engine on	94.5	00:09:10
	27/01/2024 09:00	Take off	98	00:04:10
	27/01/2024 11:00	Landing	97.9	00:04:30
	27/01/2024 14:00	Take off	100.5	00:03:10
	27/01/2024 16:00	Landing	98.4	00:05:50
	27/01/2024 16:00	Fuelling	81.9	00:06:00
Sunday 28 th January 2024	28/01/2024 00:00	Engine on	100.6	00:07:50
	28/01/2024 08:00	Engine on	96.4	00:10:50

3.3 Noise Survey Equipment

The following equipment was used for the noise survey.

Table 3.3 Noise Measurement Equipment

Measurement Position	Equipment Description	Manufacturer & Type No	Serial No.	Calibration Due Date
NMP1 & NMP2	Sound Level Meter	01dB Fusion	12586	29 June 2024
	Pre-amplifier	01dB PRE22	2004163	
	Microphone	GRAS 40CE	367351	
	Calibrator	01dB CAL-31	92222	01 July 2024

The sound level meters were field calibrated prior to and following the noise surveys and there was no drift beyond the allowable limit of 1dB.

During the noise surveys the weather conditions were conducive to the measurement of environmental noise, i.e. wind speeds of no more than 5m/s and dry conditions.

4 NOISE IMPACT ASSESSMENT

4.1 Assessment Information & Inputs

The following noise sensitive residential dwelling has been identified and accounted for in this Assessment.

Table 4.1 Identified Residential Receptors

Identifier	Receptor	Type	Floor	Noise Model Receiver Location
R1	Allington Lane	Residential	Ground (Daytime) / First-floor Night-time	At boundary of garden area, 1.5m above ground for daytime and at 4.5m above ground level at dwelling façade for night-time
R2	Campbell Road	Residential	Ground (Daytime) / First-floor Night-time	At boundary of garden area, 1.5m above ground for daytime and at 4.5m above ground level at dwelling façade for night-time
R3	Walnut Avenue	Residential	Ground (Daytime) / First-floor Night-time	At boundary of garden area, 1.5m above ground for daytime and at 4.5m above ground level at dwelling façade for night-time

4.2 Change in Ambient Noise Level Assessment

The measured noise levels at the existing Air Ambulance Site have been used to predict the noise levels at the receptors. It is understood that there is not defined flight path due to the nature of the activities. As such, the main focus of the assessment will be to predict the impact of the helicopter during take off and landing as these are the loudest activities.

Table 4.2 calculates the sound power levels for each event measured which consisted of engine on, take off, landing and fuelling. The highest measured level and longest time period has been used in order to represent a worst-case scenario. The sound power level has been calculated based on 1-hour reference periods, this is considered worst case as most aviation criterion is based on the 16-hour daytime and 8-hour night-time reference periods.

Table 4.2 Calculated Sound Power Levels for Helicopter

Event	Measured Sound Pressure level, $L_{Aeq,T}$ (dB)	Measurement Distance (m)	On-time/hr	Calculated Sound Power Level, LWA (dB)	Height above ground in Noise Model (m)
Engine on	100.6	15	00:10:50	112.9	3
Take off	100.5	15	00:09:30	112.3	3
Landing	98.4	15	00:05:50	108.0	20
Fueling	83.8	15	00:09:20	95.5	2

A noise model has been constructed in order to calculate noise levels at the building facades. The following inputs have been included in the model:

- Proposed Scheme Layout;
- Site elevations have been taken as existing using 1m LiDar data that has been converted into 1m contours;
- Existing buildings or features that provide screening at the Receptors have been included;
- A reflection order of 2 has been used in all calculations; and
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "Acoustics – Attenuation of sound during propagation outdoors" as incorporated into CadnaA software.

Figures 2 & 3 in Appendix III details the grid noise maps for the daytime and night-time periods respectively. Analysis of the grid noise map indicates the following calculated specific sound pressure level at the closest receptor to the Site.

Table 4.3 Calculated Specific Sound Pressure Level at Receptor

Receptor	Period	Calculated Sound Pressure Level, $L_{Aeq,1hr}$ (dB)
R1	Daytime	37.9
	Night-Time	41.2
R2	Daytime	32.3
	Night-Time	33.8
R3	Daytime	43.9
	Night-Time	44.0

With regards to the helicopter, a change in ambient assessment will be undertaken at the receptors for the daytime and night-time periods.

Table 4.4 calculates the change in ambient noise level at the identified Receptors for the daytime and night-time periods. The lowest average daytime level has been used to inform the assessment.

Table 4.4 Change in Ambient Assessment

Receptor	Period	Calculated Specific Noise Level at Receptor, $L_{Aeq,T}$ (dB)	Lowest Average Measured Ambient Noise Level, $L_{Aeq,1hr}$ (dB)	Combined Noise Level, $L_{Aeq,1hr}$ (dB)	Change in Noise Level, +/- (dB)	Difference with Criteria (2.9dB) +/- (dB)
R1	Daytime	37.9	50.2	50.4	0.2	-2.6
R2		32.3	50.2	50.3	0.1	-2.7
R3		43.9	51.2	51.9	0.7	-2.1

R1	Night-Time	41.2	44.8	46.4	1.6	-1.2
R2		33.8	44.8	45.1	0.3	-2.5
R3		44.0	44.8	47.4	2.6	-0.2

Table 4.6 indicates that the predicted noise level at the closest receptors meets the permitted change of +2.9dB as such not mitigation measures are required.

4.3 Fly Over Assessment

During the source noise survey, it was not possible to undertake measurements of a helicopter fly over due to logistical and cost reasons. However, we have been provided with further information from the client regarding the noise levels produced during a fly over. For the proposed type of helicopter associated with the Site (H135) a sound pressure level of 73dB(A) will be produced at ground level, see Figure 1 of Appendix V for the information.

The noise level of 73dB was measured at a distance of 150m and the usual cruising distance for the proposed helicopters is 450m. A distance correction of 6dB per doubling of distance has been applied and the proposed noise level at a receptor during a fly over, with a resultant sound pressure level of 63.5dB (A) which would only last for seconds. This predicted noise level is lower than the existing aircraft noise measured at NMP1 which range from L_{Aeq} 65dB to 82dB and the L_{max} range from 75dB to 88dB. These noise levels were recorded at approximately 500m from the runway at Southampton Airport and as such provide an indication of the current noise climate in the area. As such it is reasonable to assume that existing receptors are already exposed to higher noise levels than what would be caused by the proposed helicopter movements.

Furthermore, the noise level contours for Southampton Airport can be seen in Figure 2 of Appendix V should also be considered as part of the context of the development. The noise level ranges from 51dB to 72dB $L_{Aeq 16hr}$. Please note that the noise levels produced in SOU Annual Noise Report 2023 are based over the average 16-hour daytime period as such individual events will be significantly louder. There is no information regarding the L_{max} level in the SOU Annual Noise Report 2023. If the noise level produced by the Air Ambulance Site were spread over a 16-hour period they would be significantly lower than the noise contours produced by Southampton Airport this is due to the number of movements, duration of the flight and the noise level produced by the individual aircraft.

In summary it is expected that helicopter fly over from our Site will not adversely impact the existing receptors given the existing noise levels produced by Southampton Airport.

4.4 Impact at Existing Commercial

The Council has also raised concerns regarding the impact of the helipad at the existing commercial units. The most noise sensitive aspect of a commercial premises is the office space. Google street view has been used to identify the closest existing off space which is located to the west on the eastern façade of HTEC Limited, which is approximately 33m from the helipad.

The noise model shows that the predicted noise level at the façade is 71dBA. The internal criteria for an open plan office as stated in BS8233 is 40dB $L_{Aeq 16hr}$. It is reasonable to assume the office will only be in use during the daytime period. In order to compare like for like the predicted façade level which is the worst-case level over a 10-minute period has been corrected for the entire 16-hour period. A -13dB correction has been applied for a partially open window.

Table 4.5 Commercial Office Assessment

Period	Calculated Specific Noise Level at Receptor, $L_{Aeq,T}$ (dB)	Measured On Time (seconds)	Corrected for the 16hr Daytime period $L_{Aeq,16hr}$ (dB)	Correction for a partially open window (-13dB)	Criteria for Open Office Space $L_{Aeq,16hr}$ (dB)	Difference, +/- (dB)
Daytime	71	650	51.5	38.5	40	-1.5

The above table shows that the internal noise level at the closest office space can be achieved based on the criteria presented in BS8233. It is also worth noting that the contours from SOU Annual Noise Report 2023 range between 57dB – 60dB $L_{Aeq,16hr}$, which are significantly higher than the proposed 16-hour noise level from the operations at the proposed helipad.

5 MITIGATION

The previous section has shown that based on the measurements undertaken at an existing Air Ambulance site there will be a none/no significant impact at the closest receptor to the development.

In addition to the change in ambient assessment the Air Navigation Guidance 2017 states in the section for Assessing the noise implication of proposed Airspace changes the following:

'For the purpose of assessing airspace changes, the government wishes the CAA to interpret this objective to mean that the total adverse effects on people as a result of aviation noise should be limited and, where possible, reduced, rather than the absolute number of people in any particular noise contour. Adverse effects are considered to be those related to health and quality of life. There is no one threshold at which all individuals are considered to be significantly adversely affected by noise. It is possible to set a Lowest Observed Adverse Effect Level (LOAEL) that is regarded as the point at which adverse effects begin to be seen on a community basis. As noise exposure increases above this level, so will the likelihood of experiencing an adverse effect. In line with this increase in risk, the proportion of the population likely to be significantly affected can be expected to grow as the noise level increases over the LOAEL. For the purposes of assessing and comparing the noise impacts of airspace changes, the government has set a LOAEL of 51dB LAeq16hr for daytime noise and 45dB LAeq8hr for night time noise and the CAA should ensure that these metrics are considered.'

The assessment has shown that this criteria can be achieved during the daytime and night-time periods based on a worst case 1 hour reference period, where the above criteria references a 16h-hour daytime and 8-hour night-time reference period. This would result in the Lowest Observed adverse Effect Level (LOAEL) being achieved.

A comparison of the measured levels at the helipad has also been compared to existing noise sources using library data.

Table 5.1 Comparison with other noise sources

Noise Source	Measured Noise Level LAeq,T (dB)	Measurement Distance (m)	Calculated Noise level a 15m LAeq,T (dB)	Measured Noise Level from Helicopter at 15m
Motorway (M25)	75.8	65	82.2	100.6
Comercail Flight Jet take off	150	15	150	100.6
Freight Train	95.7	8	93.0	100.6
Passenger Train	88.3	8	85.6	100.6

As no flight path has been specified, we would also recommend that in order to minimise any potential impact that were possible the flight path will avoid residential areas. In addition, we would recommend that a complaints procedure is put in place for the closest residential area, so that in the event of complaints future flight will be directed to avoid the complainant's property if this a viable option.

6 CONCLUSION

Omnia was instructed by Client to prepare a Noise Impact Assessment in support of a change of use from a warehouse to accommodate helicopter operations at Unit H, George Curl Way in Southampton, SO18 2RX.

It is understood that the assessment is required in order to provide a comprehensive noise risk assessment in support of a planning application seeking a change of use from a warehouse to accommodate helicopter operations.

The Site is located at Unit H, George Curl Way in Southampton. The Site is situated within an industrial estate with a number of commercial units located to the west of the Site. The runway for Southampton Airport is located to the east and the M27 is situated to the south.

It is understood that there is no defined flight path due to the nature of the operations, however flights will fly out to the east towards the airport. As such, the closest noise-sensitive residential receptors to the helipad are located off Allington Lane to the east and Campbell Road to the north.

The sound climate at both receptors is dominated by road traffic sound from the M27 and existing aircraft sound from Southampton Airport. There is also a large rail terminal adjacent to the receptors off Campbell Road.

This Assessment has relied upon an ambient noise survey completed in a location considered to be representative of the background sound climate at the nearest receptors to the Development over a full weekday and weekend period. This Assessment has also relied upon noise measurements completed at an existing Air Ambulance site.

This Assessment has been undertaken to identify and assess any noise-generating activities which may have the potential to adversely impact the existing noise-sensitive receptors. Accordingly, this Assessment has been completed with due regard to the National Planning Policy Framework and its associated National Planning Policy Guidance. In addition, various British Standard and guidance documents exist which are applicable to the assessment of noise impacts.

This Assessment has shown that regarding the helicopter movements at the helipad, the changes in ambient noise level is below the criteria noise level of +2.9dB and so there is no requirement to consider noise mitigation measures.

With regards to the impact at the existing commercial units, this assessment shows that the internal noise level at the closest office space can be achieved based on the criteria presented in BS8233.

The Assessment has also shown that helicopter fly overs from our Site will not adversely impact the existing receptors given the existing noise levels produced by Southampton Airport.

In summary, the predicted level of noise from the Development, is sufficiently low enough at the closest residential dwellings to accord with the 'No Observed Adverse Effect Level' as detailed in the PPG and The Air Navigation Guidance 2017 and as such noise should not be deemed to be a determining factor in the granting of planning permission for this Site.

END OF REPORT

APPENDIX I

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between Omnia and the Client as indicated in Section 1.3.
2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information, it has been assumed it is correct. No attempt has been made to verify the information.
3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination, which are enforced, by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.
4. During the site walkover reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.
5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.
6. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.
7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials this is for indicative purposes only and do not constitute or replace full and proper surveys.
8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.
9. Omnia cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by Omnia is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other parties by OEC in this connection without their explicit written agreement there to by Omnia.
10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II

GLOSSARY OF ACOUSTIC TERMINOLOGY

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

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

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

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

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

Table A1: Typical Sound Pressure Levels

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

Table A2: Terminology

Descriptor	Explanation
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A – weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000millisecond time constant.

APPENDIX III

FIGURES

Figure 1 – Site Layout and Noise Measurement Positions

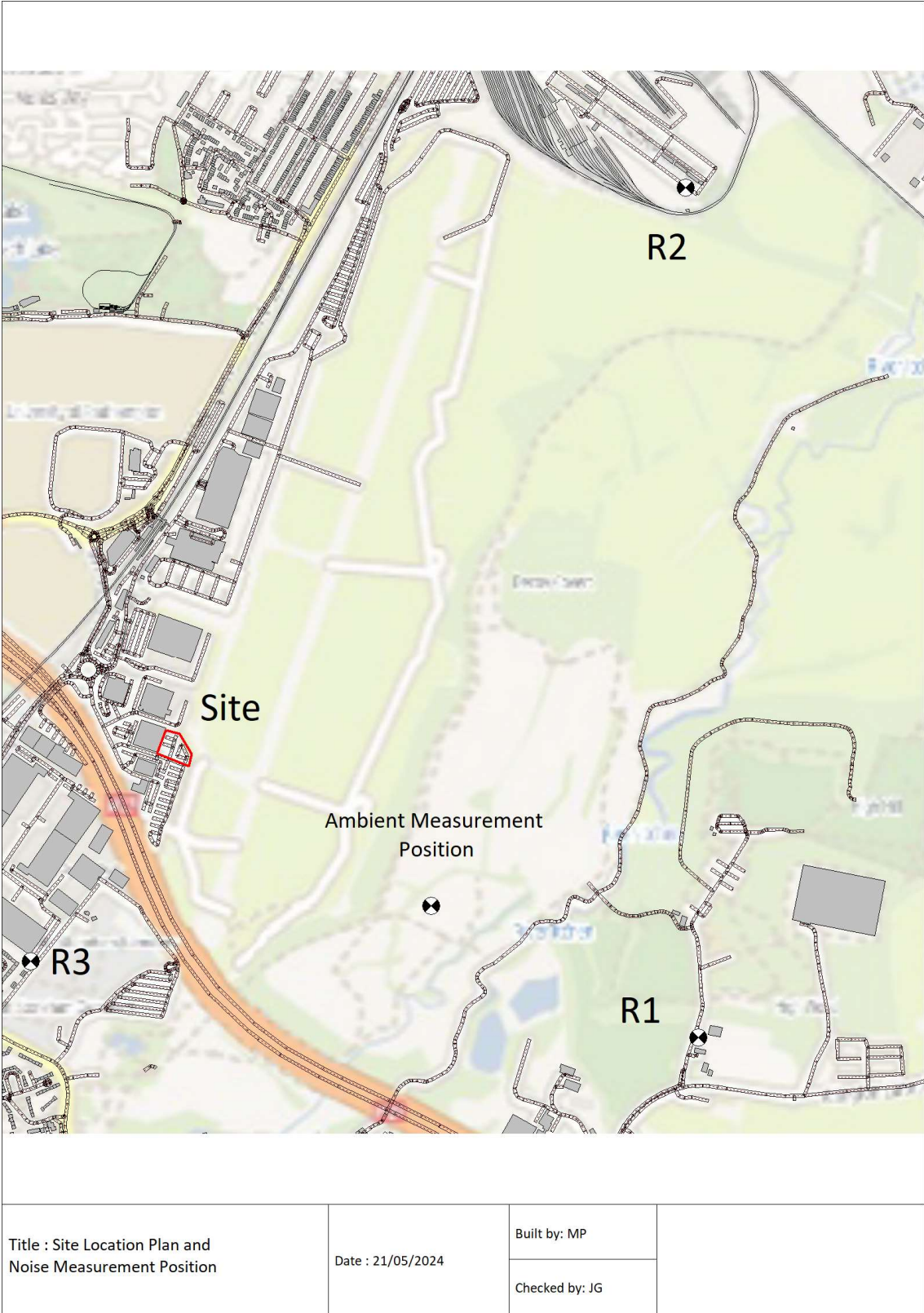


Figure 2 – Daytime Grid Noise Map

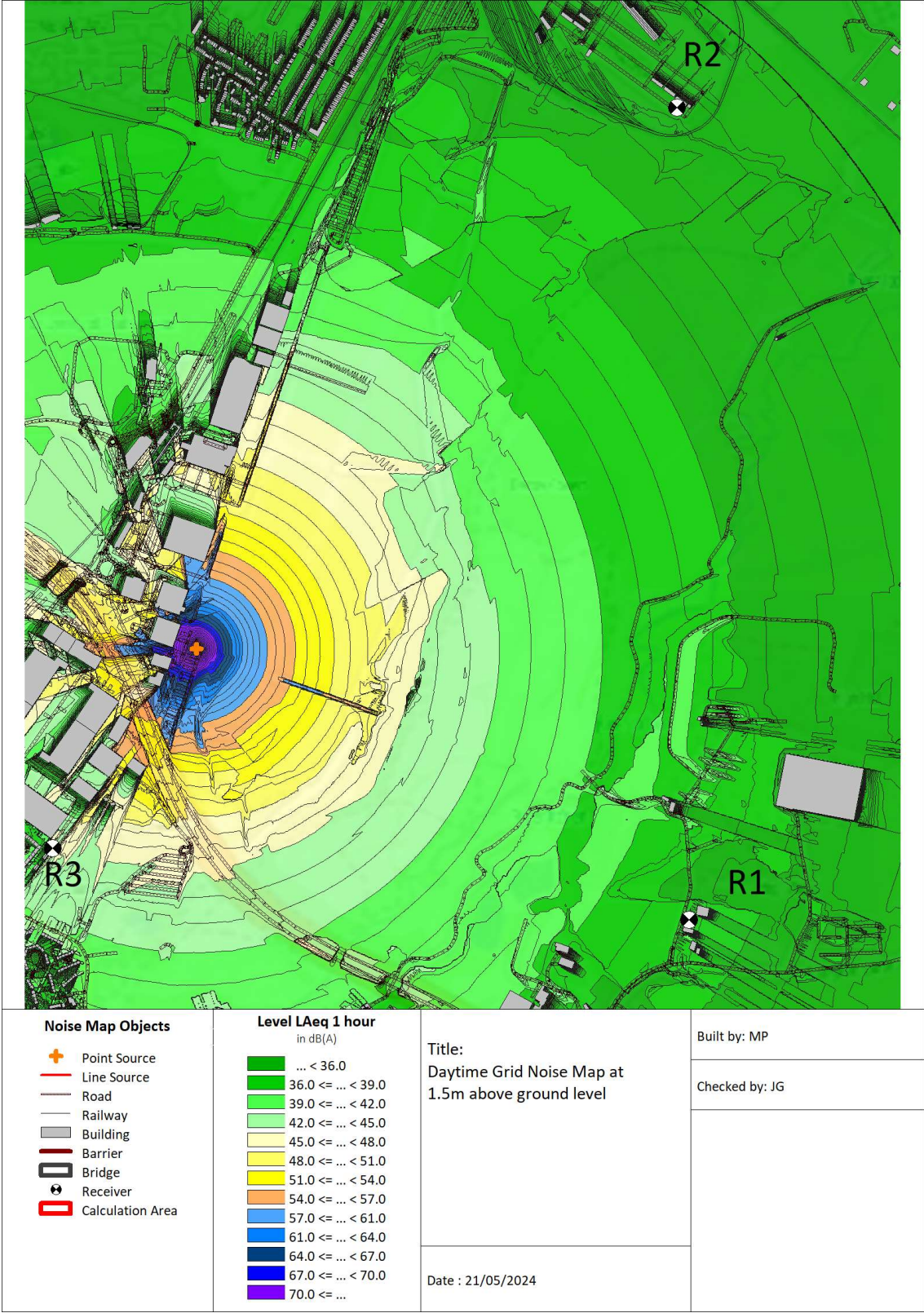
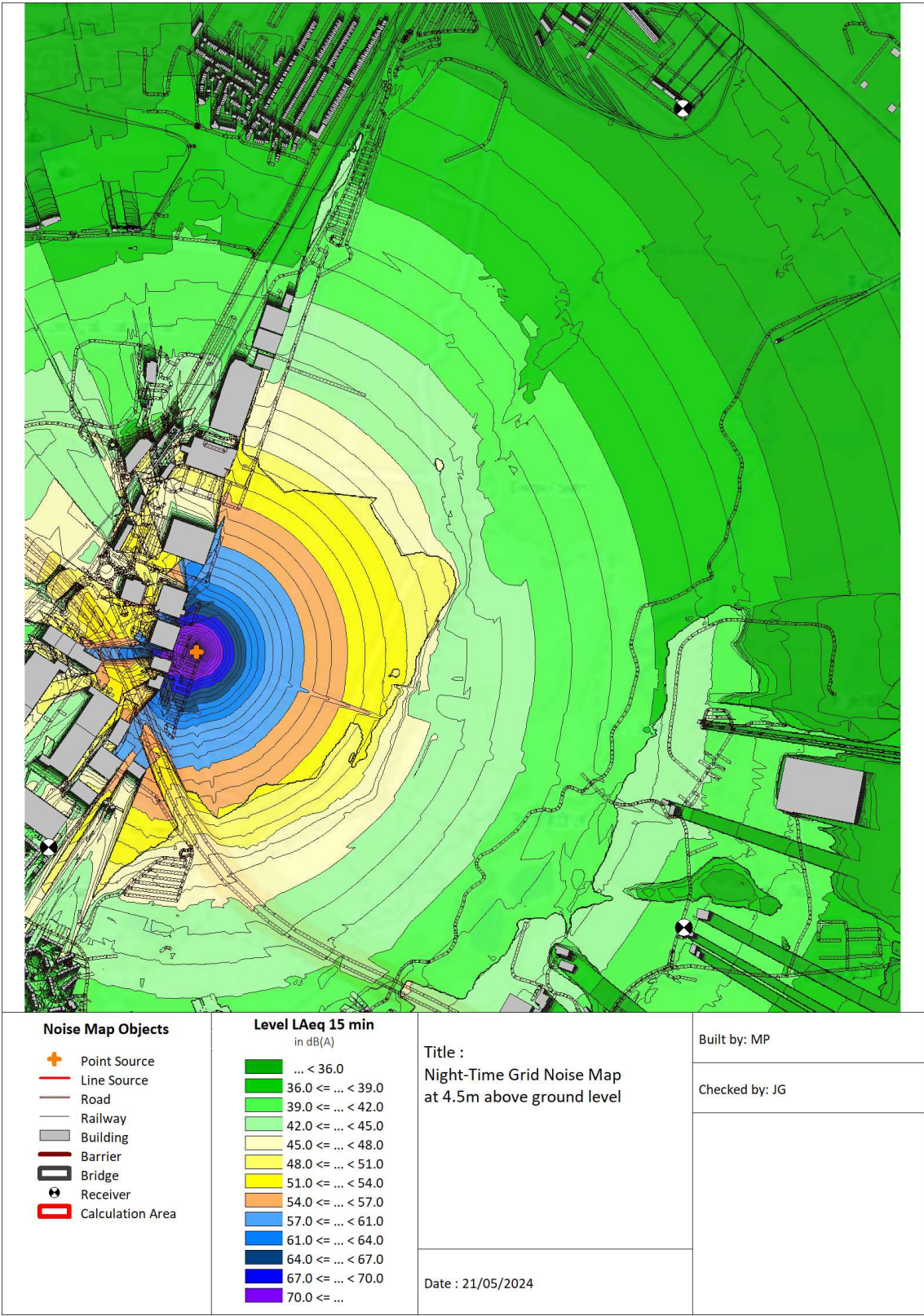


Figure 3 – Night-Time Grid Noise Map



APPENDIX IV

Measured Ambient Sound Levels

Period start	Measured Noise Level (dB)	
	L _{Aeq,T}	L _{A90,T}
02/02/2024 08:45	60.6	57.6
02/02/2024 09:00	58.9	57.2
02/02/2024 09:15	60.6	58.2
02/02/2024 09:30	63.3	57.6
02/02/2024 09:45	59.2	57.9
02/02/2024 10:00	59.5	57.6
02/02/2024 10:15	59.9	57.2
02/02/2024 10:30	59.5	56.8
02/02/2024 10:45	58	56.9
02/02/2024 11:00	57.8	56.6
02/02/2024 11:15	58.7	56.6
02/02/2024 11:30	58	56.5
02/02/2024 11:45	57.6	56.4
02/02/2024 12:00	57.1	55.5
02/02/2024 12:15	57.5	56
02/02/2024 12:30	57.6	56.1
02/02/2024 12:45	60.4	55.8
02/02/2024 13:00	58.5	57.2
02/02/2024 13:15	57.3	55.7
02/02/2024 13:30	59.3	57.9
02/02/2024 13:45	57.8	56.5
02/02/2024 14:00	60.5	57.2
02/02/2024 14:15	59.3	57.1
02/02/2024 14:30	59.3	57.2
02/02/2024 14:45	58.5	57.1
02/02/2024 15:00	59.7	56.6
02/02/2024 15:15	59.8	58.2
02/02/2024 15:30	59.7	58
02/02/2024 15:45	59.4	57.9
02/02/2024 16:00	60.4	58
02/02/2024 16:15	60.7	58.4
02/02/2024 16:30	59.9	58.9
02/02/2024 16:45	59.7	58.5
02/02/2024 17:00	59.5	58.2
02/02/2024 17:15	59.1	57.7
02/02/2024 17:30	60.3	57.4
02/02/2024 17:45	58	56.7
02/02/2024 18:00	58	56.7
02/02/2024 18:15	57.9	56.8
02/02/2024 18:30	57.7	56.4
02/02/2024 18:45	57.2	55.7
02/02/2024 19:00	56.6	55.1
02/02/2024 19:15	58.9	55.3

02/02/2024 19:30	59.1	56.2
02/02/2024 19:45	58.3	54.9
02/02/2024 20:00	59.1	55
02/02/2024 20:15	55.7	53.1
02/02/2024 20:30	55.5	52.2
02/02/2024 20:45	55.4	52.2
02/02/2024 21:00	53.3	50.7
02/02/2024 21:15	54.4	52.4
02/02/2024 21:30	53.5	51.3
02/02/2024 21:45	53.4	51.5
02/02/2024 22:00	53.5	50.7
02/02/2024 22:15	53	50.9
02/02/2024 22:30	52.5	50.5
02/02/2024 22:45	52.1	49.9
02/02/2024 23:00	51.4	48.6
02/02/2024 23:15	50.8	48.4
02/02/2024 23:30	51.3	48
02/02/2024 23:45	49.9	47.8
03/02/2024 00:00	50.1	47.9
03/02/2024 00:15	49.9	46.7
03/02/2024 00:30	48.8	44.3
03/02/2024 00:45	48.7	44.3
03/02/2024 01:00	48.9	44.5
03/02/2024 01:15	47.1	43.4
03/02/2024 01:30	47.5	44.1
03/02/2024 01:45	47.3	43.4
03/02/2024 02:00	47.6	43.5
03/02/2024 02:15	46.4	42.9
03/02/2024 02:30	47.7	43.5
03/02/2024 02:45	48.3	43.2
03/02/2024 03:00	47.5	42.7
03/02/2024 03:15	47.3	42.7
03/02/2024 03:30	48	42.4
03/02/2024 03:45	49	45.4
03/02/2024 04:00	48	44.4
03/02/2024 04:15	47.6	43.9
03/02/2024 04:30	49.9	47.2
03/02/2024 04:45	49.7	46.6
03/02/2024 05:00	50.2	46.4
03/02/2024 05:15	50.8	48.1
03/02/2024 05:30	51.6	48.6
03/02/2024 05:45	52	49.9
03/02/2024 06:00	52.3	50.2
03/02/2024 06:15	53.2	50.9
03/02/2024 06:30	54.6	52.3
03/02/2024 06:45	57.2	53.4

03/02/2024 07:00	56.9	54.5
03/02/2024 07:15	55.8	54.3
03/02/2024 07:30	57.4	55.3
03/02/2024 07:45	62.5	55.3
03/02/2024 08:00	57.1	55.7
03/02/2024 08:15	58.6	55.9
03/02/2024 08:30	61.1	56
03/02/2024 08:45	58.4	56.7
03/02/2024 09:00	57.7	56.4
03/02/2024 09:15	60.4	57.7
03/02/2024 09:30	59.9	57.8
03/02/2024 09:45	61.3	57.9
03/02/2024 10:00	59.1	58
03/02/2024 10:15	59.2	57.4
03/02/2024 10:30	59.1	58
03/02/2024 10:45	57.5	55.6
03/02/2024 11:00	58.3	56.4
03/02/2024 11:15	60.1	57.2
03/02/2024 11:30	59.2	58
03/02/2024 11:45	58.9	57.7
03/02/2024 12:00	59.1	58
03/02/2024 12:15	59.3	57.7
03/02/2024 12:30	58.5	57
03/02/2024 12:45	58.9	57.6
03/02/2024 13:00	59.5	58.3
03/02/2024 13:15	58.8	57.5
03/02/2024 13:30	58.5	57.1
03/02/2024 13:45	58.6	57.3
03/02/2024 14:00	58.9	57.2
03/02/2024 14:15	59.5	58.1
03/02/2024 14:30	59.1	57.9
03/02/2024 14:45	58.8	57.5
03/02/2024 15:00	58.4	57.1
03/02/2024 15:15	58.8	57.6
03/02/2024 15:30	59.8	57.3
03/02/2024 15:45	59.4	57.5
03/02/2024 16:00	58.3	57.1
03/02/2024 16:15	57.8	56.3
03/02/2024 16:30	58	56.8
03/02/2024 16:45	57.4	54.6
03/02/2024 17:00	58.7	57
03/02/2024 17:15	61.6	56.9
03/02/2024 17:30	60.4	56.9
03/02/2024 17:45	58	56.9
03/02/2024 18:00	58	56.8
03/02/2024 18:15	58.2	56.9

03/02/2024 18:30	57.9	56.5
03/02/2024 18:45	57.3	55.5
03/02/2024 19:00	56.2	54.6
03/02/2024 19:15	56.6	55.1
03/02/2024 19:30	57	54.6
03/02/2024 19:45	56.3	54.5
03/02/2024 20:00	55.8	53.9
03/02/2024 20:15	58	53.2
03/02/2024 20:30	54.1	52.3
03/02/2024 20:45	53.6	50.8
03/02/2024 21:00	54.8	51.8
03/02/2024 21:15	55.1	51.9
03/02/2024 21:30	53.3	50.9
03/02/2024 21:45	52.8	50.7
03/02/2024 22:00	52.6	50.5
03/02/2024 22:15	53.6	51.5
03/02/2024 22:30	53.8	51.7
03/02/2024 22:45	53.1	51
03/02/2024 23:00	52.9	50.4
03/02/2024 23:15	51.1	49
03/02/2024 23:30	50.8	48
03/02/2024 23:45	52	49.4
04/02/2024 00:00	51	48.4
04/02/2024 00:15	50.5	47.4
04/02/2024 00:30	49.9	46.6
04/02/2024 00:45	48.8	44.6
04/02/2024 01:00	47.9	43.8
04/02/2024 01:15	48	43.5
04/02/2024 01:30	47.1	43.3
04/02/2024 01:45	46.9	42.3
04/02/2024 02:00	46.9	40.7
04/02/2024 02:15	46.7	40.8
04/02/2024 02:30	47.1	41.6
04/02/2024 02:45	46.9	39.8
04/02/2024 03:00	44.9	38.9
04/02/2024 03:15	44.8	39.3
04/02/2024 03:30	46.2	41.1
04/02/2024 03:45	45.7	41.1
04/02/2024 04:00	46.3	39.5
04/02/2024 04:15	47.3	41.4
04/02/2024 04:30	47.4	41.7
04/02/2024 04:45	48.7	44
04/02/2024 05:00	50.4	45.1
04/02/2024 05:15	49.2	45.3
04/02/2024 05:30	50	46.6
04/02/2024 05:45	49.8	45.8

04/02/2024 06:00	51.6	48.6
04/02/2024 06:15	52.4	49.9
04/02/2024 06:30	53	50.8
04/02/2024 06:45	56.3	52.2
04/02/2024 07:00	56	52.7
04/02/2024 07:15	55	53.2
04/02/2024 07:30	58	53.8
04/02/2024 07:45	55.8	53.6
04/02/2024 08:00	56	53.2
04/02/2024 08:15	56.2	54.5
04/02/2024 08:30	57.7	55.1
04/02/2024 08:45	56.2	54.7
04/02/2024 09:00	57.7	56.2
04/02/2024 09:15	60.1	57
04/02/2024 09:30	58.9	57.2
04/02/2024 09:45	59	57.6
04/02/2024 10:00	57.9	56.5
04/02/2024 10:15	59.3	57.7
04/02/2024 10:30	57.8	56.5
04/02/2024 10:45	59.8	57.1
04/02/2024 11:00	59.5	58.2
04/02/2024 11:15	59.9	58.1
04/02/2024 11:30	62.8	57.6
04/02/2024 11:45	59.3	58.2
04/02/2024 12:00	59.3	58.1
04/02/2024 12:15	60.2	57.6
04/02/2024 12:30	59.2	57.9
04/02/2024 12:45	59.1	57.9
04/02/2024 13:00	59.9	57.7
04/02/2024 13:15	59.9	58.3
04/02/2024 13:30	60.2	58.6
04/02/2024 13:45	59.4	58.4
04/02/2024 14:00	59	57.8
04/02/2024 14:15	59.1	58
04/02/2024 14:30	59.2	57.9
04/02/2024 14:45	59.3	58.2
04/02/2024 15:00	59.7	58.2
04/02/2024 15:15	59.4	57.8
04/02/2024 15:30	60.6	58.3
04/02/2024 15:45	61.1	57.4
04/02/2024 16:00	58.6	57
04/02/2024 16:15	58.7	56.5
04/02/2024 16:30	59.3	58
04/02/2024 16:45	59.1	57.4
04/02/2024 17:00	58.8	57.1
04/02/2024 17:15	58.9	57.4

04/02/2024 17:30	58.6	56.8
04/02/2024 17:45	61.4	56.1
04/02/2024 18:00	58.4	56.2
04/02/2024 18:15	57.5	56
04/02/2024 18:30	57.4	56
04/02/2024 18:45	57.4	55.9
04/02/2024 19:00	57.1	55.8
04/02/2024 19:15	58.3	55.5
04/02/2024 19:30	55.4	54.1
04/02/2024 19:45	56	53
04/02/2024 20:00	56.9	54
04/02/2024 20:15	56.4	53.6
04/02/2024 20:30	55.4	53
04/02/2024 20:45	54.3	52.6
04/02/2024 21:00	55.3	52.2
04/02/2024 21:15	54	52
04/02/2024 21:30	53	50.8
04/02/2024 21:45	52.1	50.1
04/02/2024 22:00	52.8	50.7
04/02/2024 22:15	52.7	50.4
04/02/2024 22:30	52	49.4
04/02/2024 22:45	50.5	48.2
04/02/2024 23:00	50.2	47.5
04/02/2024 23:15	49.5	45.7
04/02/2024 23:30	49.1	46.1
04/02/2024 23:45	48.7	45.2
05/02/2024 00:00	48.4	44
05/02/2024 00:15	46.6	42
05/02/2024 00:30	47	42.7
05/02/2024 00:45	45.3	40.2
05/02/2024 01:00	46.6	41.8
05/02/2024 01:15	47	42.9
05/02/2024 01:30	46.1	40.4
05/02/2024 01:45	46.1	41.7
05/02/2024 02:00	46.5	40.6
05/02/2024 02:15	46.6	40.6
05/02/2024 02:30	45.1	38.8
05/02/2024 02:45	48.3	42.6
05/02/2024 03:00	45.6	39.3
05/02/2024 03:15	48.1	43
05/02/2024 03:30	47.8	42.8
05/02/2024 03:45	47.5	43.7
05/02/2024 04:00	49.5	45.7
05/02/2024 04:15	50.7	45.7
05/02/2024 04:30	52.3	49.6
05/02/2024 04:45	52.3	49.3

05/02/2024 05:00	54	51.8
05/02/2024 05:15	55	52.3
05/02/2024 05:30	56.2	54.1
05/02/2024 05:45	56.6	54.9
05/02/2024 06:00	57.7	55.8
05/02/2024 06:15	59.7	57.6
05/02/2024 06:30	60.2	58.7
05/02/2024 06:45	60.9	59.2
05/02/2024 07:00	60.2	59.1
05/02/2024 07:15	60.5	59.2
05/02/2024 07:30	61.8	59.9
05/02/2024 07:45	61.4	60.2
05/02/2024 08:00	61.7	60.1
05/02/2024 08:15	62	60.6
05/02/2024 08:30	62.2	60
05/02/2024 08:45	62.2	60.1
05/02/2024 09:00	61.1	59.6
05/02/2024 09:15	60.2	58.7
05/02/2024 09:30	60	58.4
05/02/2024 09:45	60.9	58.5
05/02/2024 10:00	60	58.6
05/02/2024 10:15	60.1	58.6
05/02/2024 10:30	59.9	58.8
05/02/2024 10:45	59.6	58.3
05/02/2024 11:00	59.2	57.8
05/02/2024 11:15	59.7	58.3
05/02/2024 11:30	59.9	58.6
05/02/2024 11:45	59.5	58
05/02/2024 12:00	60.1	58.7
05/02/2024 12:15	60.2	58.9
05/02/2024 12:30	60.1	58.8
05/02/2024 12:45	60.3	58.6
05/02/2024 13:00	59.7	58.4
05/02/2024 13:15	59.9	58.5
05/02/2024 13:30	60.2	59
05/02/2024 13:45	59.7	58.2
05/02/2024 14:00	59.9	58.5

APPENDIX V

Aircraft Noise Level Data

Figure 1 – Typical Aircraft Noise Level Data

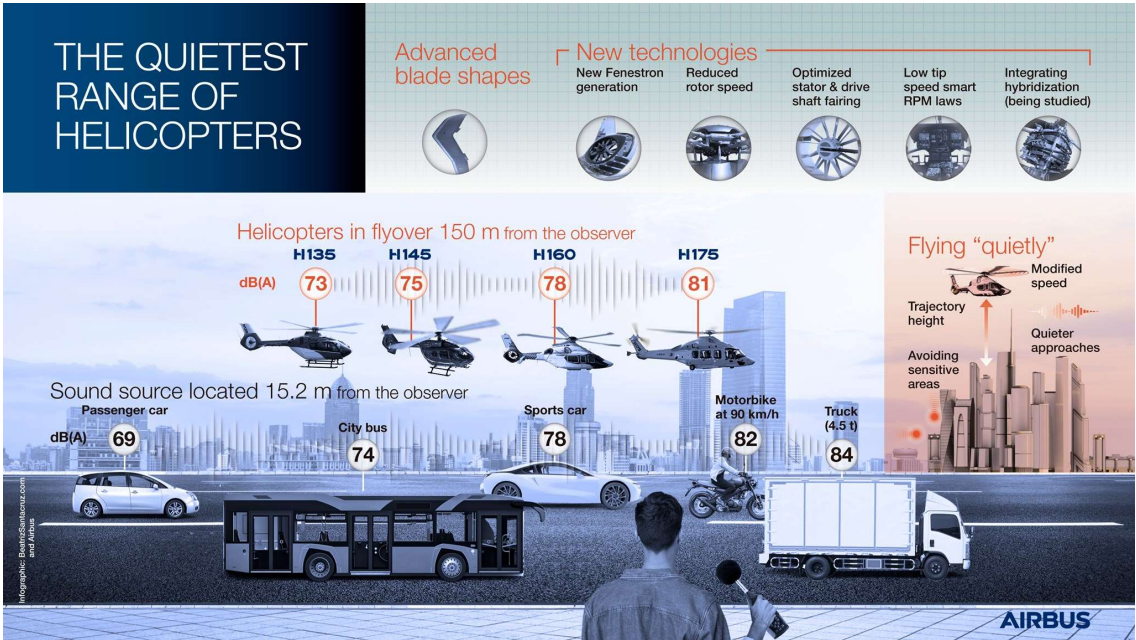
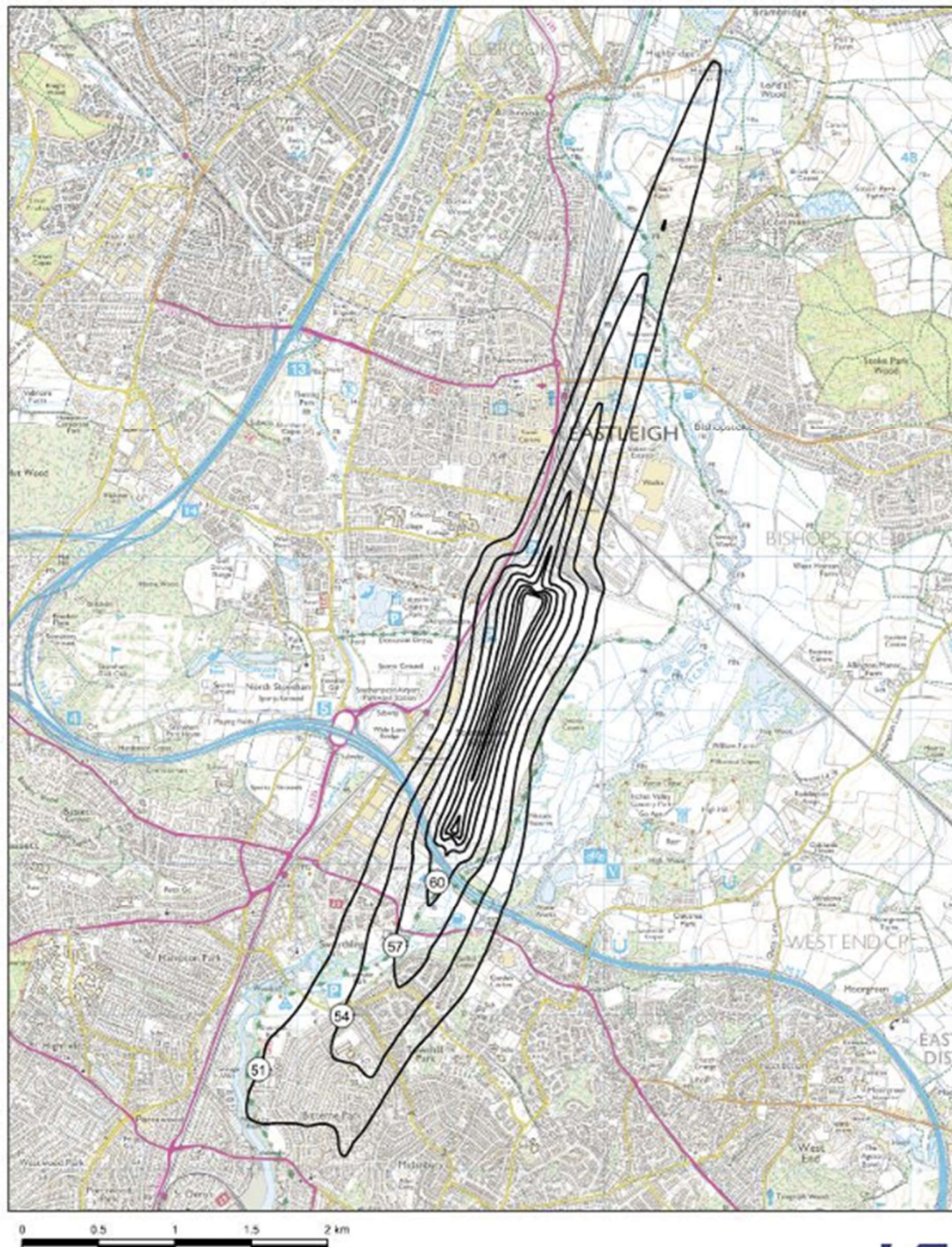


Figure 2 – Noise Contours from Southampton Airport

Appendix A: 2023 Average Summer Day Noise Contours



SOUTHAMPTON AIRPORT
2023 average summer day 51-72 dB $L_{Aeq,16h}$ contours
Actual runway modal split 81% RWY 20 / 19% RWY 02

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Figure 3 – Measured LAeq at NMP1

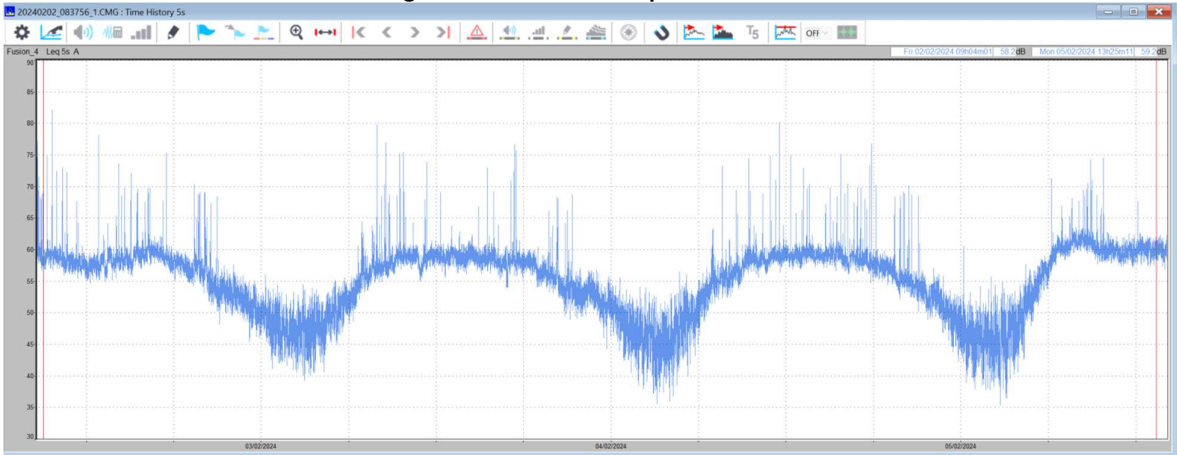


Figure 4 – Measured LAmix at NMP1

