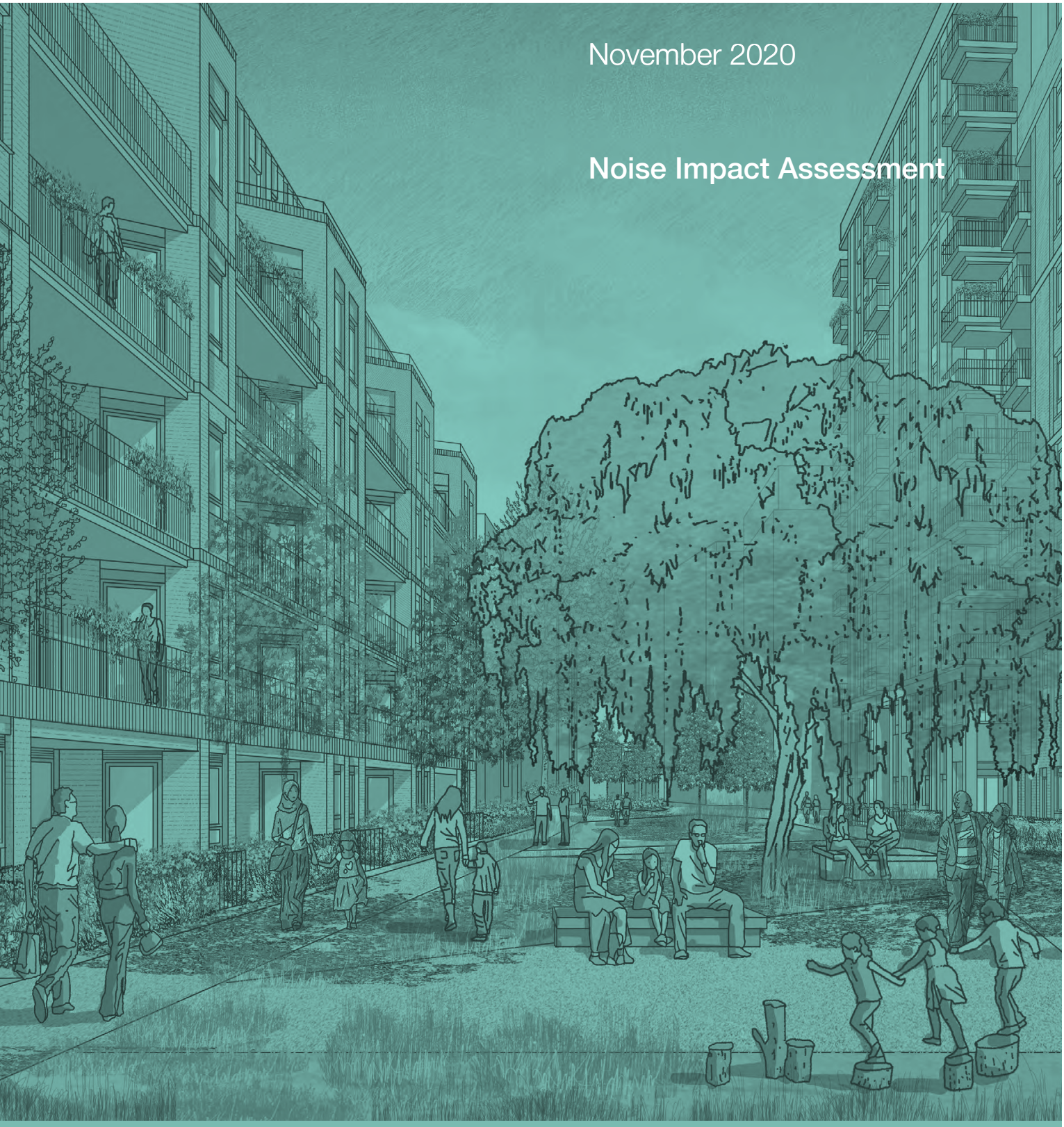
Patel Taylor

Cambridge Road Estate
Hybrid Planning Application



November 2020

Noise Impact Assessment

CRE
CAMBRIDGE ROAD ESTATE

COUNTRYSIDE
Places People Love

THE ROYAL BOROUGH OF
KINGSTON
UPON THAMES

The Applicant

Cambridge Road (Kingston) Ltd

c/o Countryside Properties
Aurora House
71-75 Uxbridge Road
Ealing
London W5 5SL

The project site

Cambridge Road Estate
Project hub

2 Tadlow
Washington Road
Kingston Upon Thames
Surrey
KT1 3JL

Application forms

Covering letter

Application Form and Notices

CIL Additional Information Form

Design proposals

Planning Statement

Design and Access Statement
- Vol.1 - The Masterplan
- Vol.2 - The Detailed Component

The Masterplan
- Parameter Plans
- Illustrative Plans
- Design Guidelines

Phase 1 Architecture and Landscape
- GA Plans, Sections and Elevations

Supporting information

Statement of Community Involvement

Rehousing Strategy

Financial Viability Appraisal

Draft Estate Management Strategy

Transport Assessment
Phase 1 Travel Plan
Car Parking Management Plan
Servicing and Delivery Management Plan

Construction Logistics Plan
Construction Method Statement and Construction Management Plan
Sustainable Design and Construction Statement (Including Circular Economy Statement)

Environmental Statement
- Non Technical Summary
- Vol.1 – Technical Reports
- Vol.2 – Technical Appendices
- Vol.3 - Townscape and Visual Impact Assessment

Energy Statement (Including Overheating Assessment and Whole Life Cycle Assessment)

Daylight and Sunlight
Internal Assessment of the Detailed Component
External Assessment of the Illustrative Masterplan

Extraction and Ventilation Strategy
Noise Impact Assessment

Arboricultural Report and Tree Conditions Survey
Arboricultural Impact Assessment & Method Statement
Preliminary Ecological and Bat Survey Report
Biodiversity Net Gain Assessment

Archaeology and Heritage Assessment
Ground Conditions Assessment

Utilities Report

Flood Risk Assessment
Phase 1 Drainage Statement

Fire Strategy Report

Accessibility Audit
Health Impact Assessment
Equalities Impact Assessment

Cambridge Road (RBK) LLP

Cambridge Road Estate,

Kingston

Noise Assessment

November 2020

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Document Control

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Issue	Date	Status
1	16th October 2020	Draft Issue
2	03rd November 2020	First Issue – Updated Layout and Minor Amendments
3	05th November 2020	Second Issue – Minor Amendments
4	09th November 2020	Third Issue – Minor Amendments
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1.0 Introduction

1.1 Purpose of this Report

This report presents the findings of a noise assessment to accompany a Hybrid planning application for a residential-led development at the Cambridge Road Estate, in Kingston. The application scope includes:

Hybrid Outline Planning Application for a mixed use development, including demolition of existing buildings and erection of up to 2,170 residential units (Use Class C3), 290sqm of flexible office floorspace (Use Class E), 1,395sqm of flexible retail/commercial floorspace (Use Class E/Sui Generis), 1,250sqm community floorspace (Use Class F2), new publicly accessible open space and associated access, servicing, landscaping and works.

Detailed permission is sought for access, layout, scale, appearance and landscaping of Phase 1 for erection of 452 residential units (Use Class C3), 1,250sqm community floorspace (Use Class F2), 290sqm of flexible office floorspace (Use Class E), 395sqm of flexible retail/commercial floorspace (Use Class E/Sui Generis), new publicly accessible open space and associated access, servicing, parking, landscaping works including tree removal, refuse/recycling and bicycle storage, energy centre and works ("the Proposed Development")."

Noise surveys have been undertaken and the results used to determine the noise exposure of future residential dwellings associated with the Development and to characterise the existing baseline at surrounding sensitive receptor locations. A description of the existing noise environment in and around the Site is provided. The noise levels from the Development have been predicted at local representative receptors using CADNA noise modelling software which incorporates ISO 9613 methodologies and calculations.

A list of acoustic terminology and abbreviations used in this report is provided in Appendix A, noise intrusion technical tables are presented within Appendix B, traffic assessment tables are presented within Appendix C and a set of location plans and noise contour plots relevant to the assessment are presented in Appendix D.

1.2 Legislative Context

This report is intended to provide information relevant to the local planning authority and their consultees in support of a planning application for the above Development. Policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF), published on 19th February 2019. With regard to noise and planning, the NPPF contains the following statement at paragraph 170:

"170. Planning policies and decisions should contribute to and enhance the natural and local environment by:

e) *preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans*

A further 2 short statements are presented at paragraph 180, which state:

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

a) *"mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life*

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."*

Furthermore, paragraphs 182 and 183 state:

> *"182. 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.*
>
> *183. The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."*

Planning Practice Guidance (PPG): Noise provides further guidance with regard to the assessment of noise within the context of Planning Policy. The overall aim of this guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England (NPSE), is to *'identify whether the*

overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the PPG and repeated as follows:

Table 1.1 Noise Exposure Hierarchy

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

The NPPF, NPSE and PPG do not, however, present absolute noise level criteria which define SOAEL, LOAEL and NOEL which is applicable to all sources of noise in all situations. Therefore, within the context of the Development, national planning policy and appropriate guidance documents including the 'World Health Organisation Community Noise Guidelines' (1999), 'BS 8233 – Guidance on Sound Insulation and Noise Reduction for Buildings' (2014) and 'BS 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound' have been referenced throughout.

The PPG: Noise also states that *neither the NPSE nor the NPPF (which reflects the Noise Policy Statement for*

England) expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the proposed development.

1.3 Other Relevant Guidance

Control of Pollution Act

Part III of the Control of Pollution Act 1974 (CoPA) is specifically concerned with the control of pollution. With regard to noise, the CoPA covers construction sites; noise in the street; noise abatement zones; codes of practice; and Best Practicable Means (BPM).

Under Part III Section 60 'Control of Noise on Construction Sites' and Section 61 'Prior Consent for Works on Construction Sites'. Discusses the requirements on how works should be undertaken and particular about the method by which they will be carried out, including the steps proposed to be taken to minimise noise resulting from the works.

Greater London Assembly (GLA) The London Plan, March 2016

The Royal Borough of Kingston upon Thames lies within the Greater London Authority (GLA) Area. The London Plan addresses noise pollution. Policy 7.15 within the London Plan specifically relates to reducing and managing noise.

"Policy 7.15: Reducing and managing noise,"

This policy states that proposals should manage noise by: avoiding significant adverse noise impacts, mitigating adverse impacts without placing restrictions on existing developments, improving the acoustic environment, effective design such as internal layout and screening from noise sources, the use of good acoustic design principles, considering the impact of aviation noise on noise sensitive development and promoting new technologies and improved practices to reduce noise at source. Boroughs should also manage the impact of noise through the spatial distribution of noise making and noise sensitive receptors and identify new Quiet Areas and protect existing Quiet Areas.

Greater London Assembly (GLA) The new London Plan, December 2019

The new London Plan addresses noise pollution. There are a number of policies highlighted below which specifically relate to noise pollution and mitigation.

"Policy D1 London's form, character and capacity for growth"

This policy states that Boroughs should undertake area assessments to define the characteristics, qualities and value of noise levels.

"Policy D3 Optimising site capacity through the design-led approach"

The policy states that when preparing Development Plans, they should help prevent or mitigate the impacts of noise levels.

"Policy D6 Housing Quality and Standards"

This policy refers to the design of dwellings which must demonstrate that all habitable rooms and the kitchen are provided with adequate passive ventilation and must demonstrate how they will avoid overheating without reliance on mechanical ventilation help reduce noise from common areas to individual dwellings.

It also states the design, or the layout and orientation should aim to reduce noise from common areas to individual dwellings."

"Policy D8 Public realm"

This policy states that development Plans and development proposals should include design that reduces the impact of traffic noise and encourages appropriate vehicle speeds. .

"Policy D9 Tall Buildings"

This policy states that noise created by air movements around the building(s), servicing machinery, or building uses, should not detract from the comfort and enjoyment of open spaces around the building.

"*Policy D10 Basement development*"

This policy states that boroughs should establish policies in their Development Plans to address the negative impacts of large-scale basement development beneath existing buildings and accompanying noise.

"*Policy D13 Agent of Change*"

This policy places the responsibility for mitigating impacts from existing noise and other nuisance-generating activities or uses on the proposed new noise-sensitive development. Boroughs should ensure that Development Plans and planning decisions reflect the Agent of Change principle and take account of existing noise and other nuisance-generating uses in a sensitive manner when new development is proposed nearby.

"Policy D14 Noise"

This policy refers to the same principles detailed above in Policy 7.15 of the 2016 London Plan.

1.4 ProPG Planning and Noise - New Residential Development

Professional Practice Guidance on Planning and Noise for new residential development (ProPG) was launched on 22nd June 2017 by the Chartered Institute of Environmental Health (CIEH), the Association of Noise Consultants (ANC) and the Institute of Acoustics (IOA). The guidance has been published to provide practitioners with guidance on the management of noise within the planning system in England.

The guidance is specifically for 'new residential development that would be exposed predominantly to noise from existing transport sources' and reflects the Government's overarching Noise Policy Statement for England (NPSE), the National Planning Policy Framework (NPPF), and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance.

The guidance provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims to:

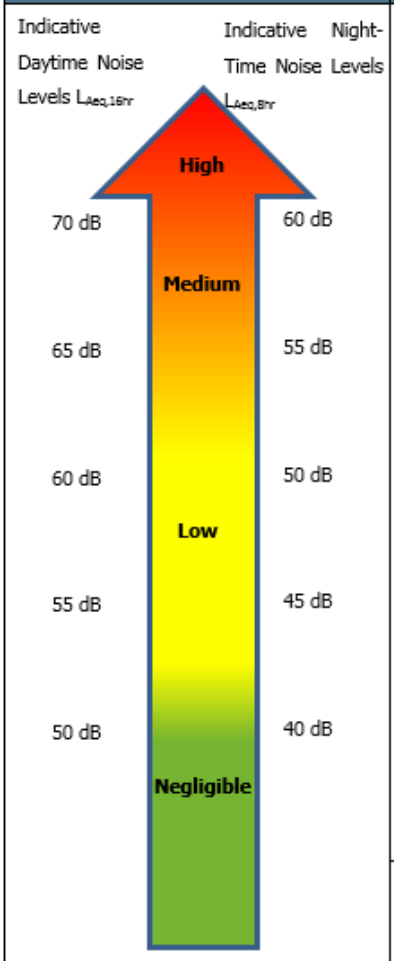
- Advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;
- Encourage the process of good acoustic design in and around new residential developments;
- Outline what should be taken into account in deciding planning applications for new noise-sensitive developments;
- Promote appropriate noise exposure standards; and
- Assist the delivery of sustainable development.

There are two stages of the overall approach outlined in the ProPG:

- Stage 1 – an initial noise risk assessment of the proposed development site; and
- Stage 2 – a systematic consideration of 4 key elements which is underpinned by an Acoustic Design Statement.

With regards to Stage 1, ProPG provides guidance to produce an initial site risk assessment, pre-mitigation, with regards to noise based on the prevailing daytime and night time noise levels across the site, from which the site (or areas thereof) can be allocated a Noise Risk as shown in Figure 1.1 below, together with their corresponding sound levels as referred to in the ProPG.

Figure 1.1 ProPG Stage 1, Noise Risk Assessment

Noise Risk Assessment	Potential Effect Without Noise Mitigation	Pre-Planning Application Advice
	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. The risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice. As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigate and minimised, and which clearly demonstrates that a significant adverse noise impact will be avoided in the finished development. At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds.

1.5 Acoustic Consultants' Qualifications, Professional Memberships

The project Acoustic Consultant is Lewis Kelter. The report has been checked by Graham Davis and verified by Nigel Mann. Relevant qualifications, membership and experience are summarised below.

Table 1.2 Acoustic Consultants' Experience

Name	Education	Institute of Acoustics Post Graduate Diploma in Acoustic and Noise Control (Pass Date)	Experience in Undertaking Noise Assessments (Start date of working in noise & acoustics)	Attained Associate Membership of the Institute of Acoustics (date)	Attained Membership of the Institute of Acoustics (date)
Lewis Kelter	BSc 2016	Dec 2018	Jun 2016	Dec 2018	-
Graham Davis	BA 2008	Nov 2013	Sept 2011	Jan 2014	-
Nigel Mann	BSc 1997 MSc 1999	Nov 2001	Nov 1998	Nov 2001	Jul 2005

2.0 Assessment Criteria

2.1 Noise Intrusion Assessment Criteria

In order to enable the assessment of the proposed Development in terms of LOAEL and SOAEL, Table 2.1 present equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from the following standards and design guidance:

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Table 2.1 Noise Level Criteria and Actions (Noise Intrusion Assessment)

Effect Level	Noise Level Criteria	Action / Justification
No Observed Adverse Effect Level	Noise levels below: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$	No Action Required Within BS8233 / WHO criteria
Lowest Observed Adverse Effect Level	Noise levels exceed: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233 / WHO Criteria
Significant Observed Adverse Effect	Noise levels exceed: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$	Mitigate to achieve: Bedrooms – 30 dB $L_{Aeq,8hours}$ Living Rooms – 35 dB $L_{Aeq,16hours}$ Within BS8233 / WHO criteria
Unacceptable Observed Adverse Effect	Noise levels with mitigation exceed: Bedrooms – 35 dB $L_{Aeq,8hours}$ Living Rooms – 40 dB $L_{Aeq,16hours}$	Prevent

3.0 Assessment Methodology

3.1 Noise Modelling Methodology

Three-dimensional noise modelling has been undertaken based on the monitoring data to predict L_{Aeq} noise levels at a large number of locations both horizontally and vertically. CadnaA noise modelling software has been used (as shown in Figure 3.1, which shows the illustrative masterplan for the site with the exception of Phase 1). This model is based on the Department of Transport Calculation of Road Traffic Noise (CRTN) and ISO 9613 noise propagation methodology and allows for detailed prediction of noise levels to be undertaken. The modelling software calculates noise levels based on the emission parameters and spatial settings that are entered. Input data, assumptions and model settings as given in the table 3.1 below have been used.

Figure 3.1 CadnaA Noise Model

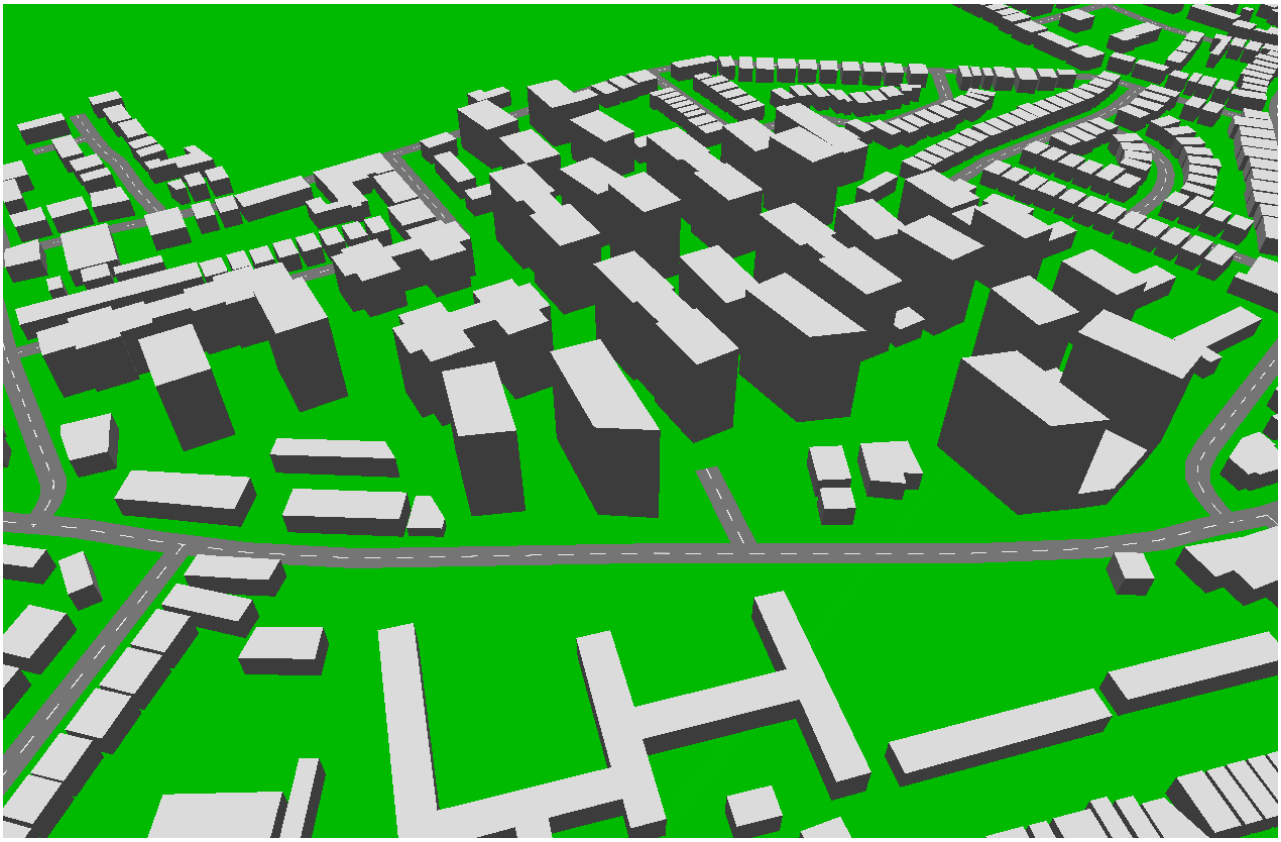


Table 3.1 Modelling Parameters Sources and Input Data

Parameter	Source	Details
Horizontal distances – around site	Ordnance Survey	Ordnance Survey
Ground levels – around site	Ordnance Survey	Ordnance Survey
Ground levels – other areas	Site Observations and Ordnance Survey	OS 1:25,000 contours and OS 1:10,000 spot heights.
Barrier heights	WYG Observations	All existing barriers at 1.8 m with the exception of hedges and trees which are considered to offer no noise protection.
Receptor positions	WYG	1 m from façade, height of 4.5 m for first floor. 1.5 m height for model grid and monitoring locations for validation.
Proposed Plans	Patel Taylor	Proposed Masterplan 503-PTA-MP-RF-DR-A-1201 Rev P24 Dated: October 2020

It is acknowledged that a number of the values of parameters chosen will affect the overall noise levels presented in this report. However, it should be noted that the values used, as identified above, are worst-case.

3.2 Model Input Data

3.2.1 Model Verification (Existing Ambient Noise Climate)

The models were verified by modelling the monitoring locations for the 'existing' scenario, including contributions from the surrounding road network, the adjacent entertainment premises and commercial units. Worst-case daytime and night-time L_{Aeq} scenarios have been verified. The comparison between the monitoring and modelling results are shown in the tables below.

Table 3.2 Modelled vs. Monitored Results $L_{Aeq;\ daytime\ 07:00 – 23:00}$

Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
ST1	73.5	73.5	0.0
ST2	72.6	72.6	0.0
ST3	63.1	63.1	0.0
ST4	60.7	60.7	0.0
ST5	52.3	52.3	0.0
ST6	53.9	53.9	0.0
ST7	56.0	56.0	0.0
ST8	58.0	58.0	0.0
ST9	60.5	60.5	0.0
ST10	69.1	69.1	0.0
ST11	68.9	69.9	1.0

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

Table 3.3 Modelled vs. Monitored Results $L_{Aeq;\ night\text{-}time\ 23:00–07:00}$

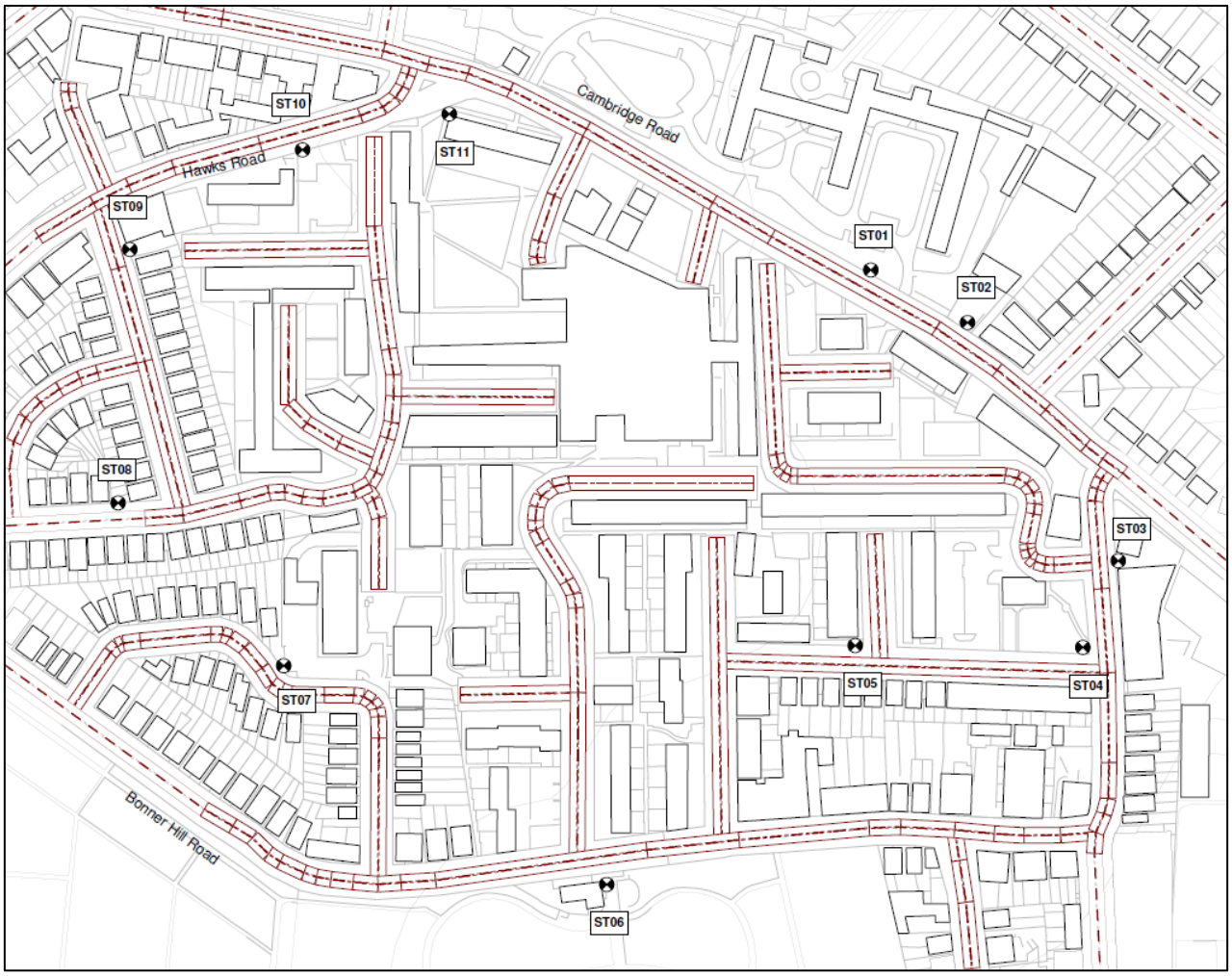
Location	Monitored L_{Aeq}	Modelled L_{Aeq}	Difference between Monitored and Modelled Results
ST1	68.3	68.6	0.3
ST2	71.2	68.5	-2.7
ST3	55.2	55.9	0.7
ST4	56.3	53.8	-2.5
ST5	50.5	53.0	2.5
ST6	52.1	52.8	0.7
ST7	47.3	47.2	-0.1
ST8	51.8	54.7	2.9
ST9	57.0	58.7	1.7
ST10	68.0	68.4	0.4
ST11	68.7	66.3	-2.4

All values are sound pressure levels in dB re: $2x\ 10^{-5}$ Pa

There is a maximum divergence at all verification points of no more than 2.9 dB between monitored and modelled results, within the daytime and night-time L_{Aeq} verification. Therefore, the models are considered to be suitably verified to the monitored noise levels.

For reference the monitoring locations are shown illustratively on Figure 3.2 below.

Figure 3.2 Noise Monitoring Locations



3.2.2 Additional Specific Noise Sources Included within the Noise Model and Assessment

It should be noted that the due to COVID-19, measurements of existing hospitality premises at full occupancy were unable to be undertaken. Therefore, worst-case assumptions have been used from measurements of similar premises operating at full capacity to act as surrogate data for this assessment.

Entertainment Premises

A number of entertainment noise sources were identified during the noise survey, though due to current restrictions to the hospitality industry, were not fully operational. However, for the purposes of this worst-case assessment, surrogate data from a 'Slug and Lettuce' bar in Croydon has been included at the surrounding locations below. The source as measured is presented as octave bands, however the 1/3rd octave noise levels have been used within the model and full details are available upon request. The source

was measured during an attended noise survey are included in the model as vertical area sources across the width of the respective venues.

Workshop Source Noise

To represent noise from activities associated with the use of the workshop and servicing bays at AutoQuick, Cambridge MOT Centre and K&P Motors, a worst-case noise level of an angle grinder being used internally has been used and is sourced from BS 5228. Noise breakout from the proposed workshops

Table 3.3 Surrogate Entertainment & Workshop Noise Data

Description	Frequency (Hz)								Total L_{Aeq} dB(A)
	63	125	250	500	1k	2k	4k	8k	
Slug and Lettuce @ 15m	68.8	65.6	62.3	61.3	62.7	56.8	49.3	43.2	65.6
Workshop internal reverberant sound pressure level during angle grinding	80	72	75	73	78	83	83	82	88.5

To create a worst-case scenario, vertical areas sources have been included for the following premises:

- 'The Park Brewery'
- 'The Bricklayers Arms'
- 'AutoQuick', 'Cambridge MOT Centre & 'K&P Motors'

3.2.3 Proposed MUGA Noise Data

The proposed development includes a new MUGA to the south-east of plot C. Which has been included within the assessment.

Noise levels during a football match at a similar site have been monitored and includes noise from participating players, spectators and use of the whistle by the referee. A noise level of $L_{Aeq,10mins}$ 63 dB(A) were measured at 5 metres from the touchline and this data has been used to verify an area source in the model to represent noise from the proposed MUGA.

3.2.4 Building Services Plant (BSP)

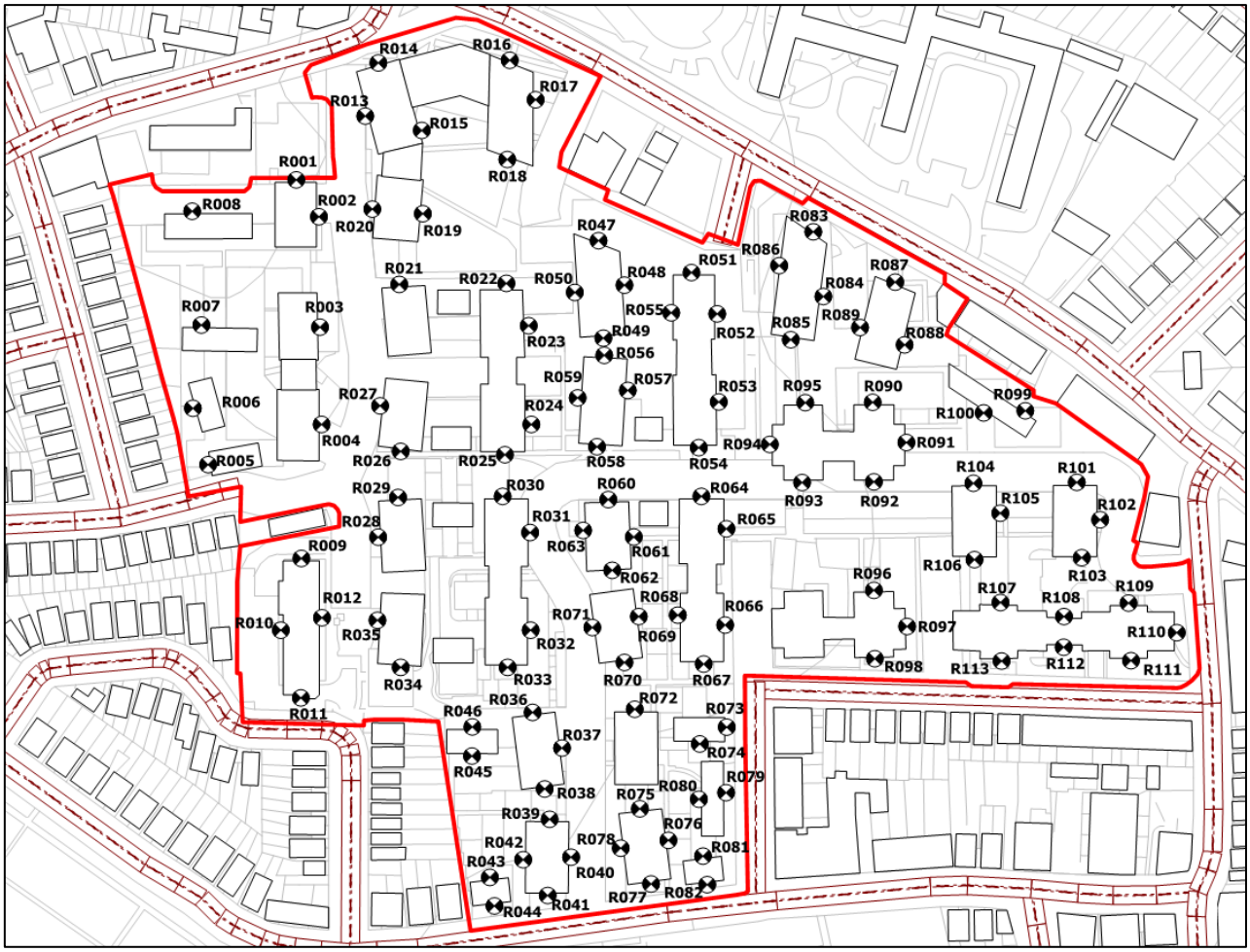
Point sources have been used in the model to represent potential roof-mounted building services plant associated with the new development. The maximum sound pressure levels of the point sources at 1 and 3 metres were estimated in the model as a conditional maximum level that the noise levels at nearby receptors in accordance within BS 4142: 2014 + A1:2019 'Methods for rating and assessing industrial sound'. Noise emission limits have been specified to ensure that plant noise rating levels (including a + 3 dB correction for

potential intermittent characteristics of the noise source) are at least 10 dB below existing daytime and night-time background noise levels.

3.3 Sensitive Receptors

Existing noise levels have been assessed at the proposed development. The noise levels have been used to provide a glazing and ventilation strategy. The assessment includes all buildings once the development is fully complete. The locations of proposed receptors are illustrated on Figure 3.3 below. For the purposes of this worst-case assessment, noise levels have been predicted at a worst-case first-floor level for all blocks and noise levels extrapolated to the upper floors.

Figure 3.3 Proposed Sensitive Receptor Locations

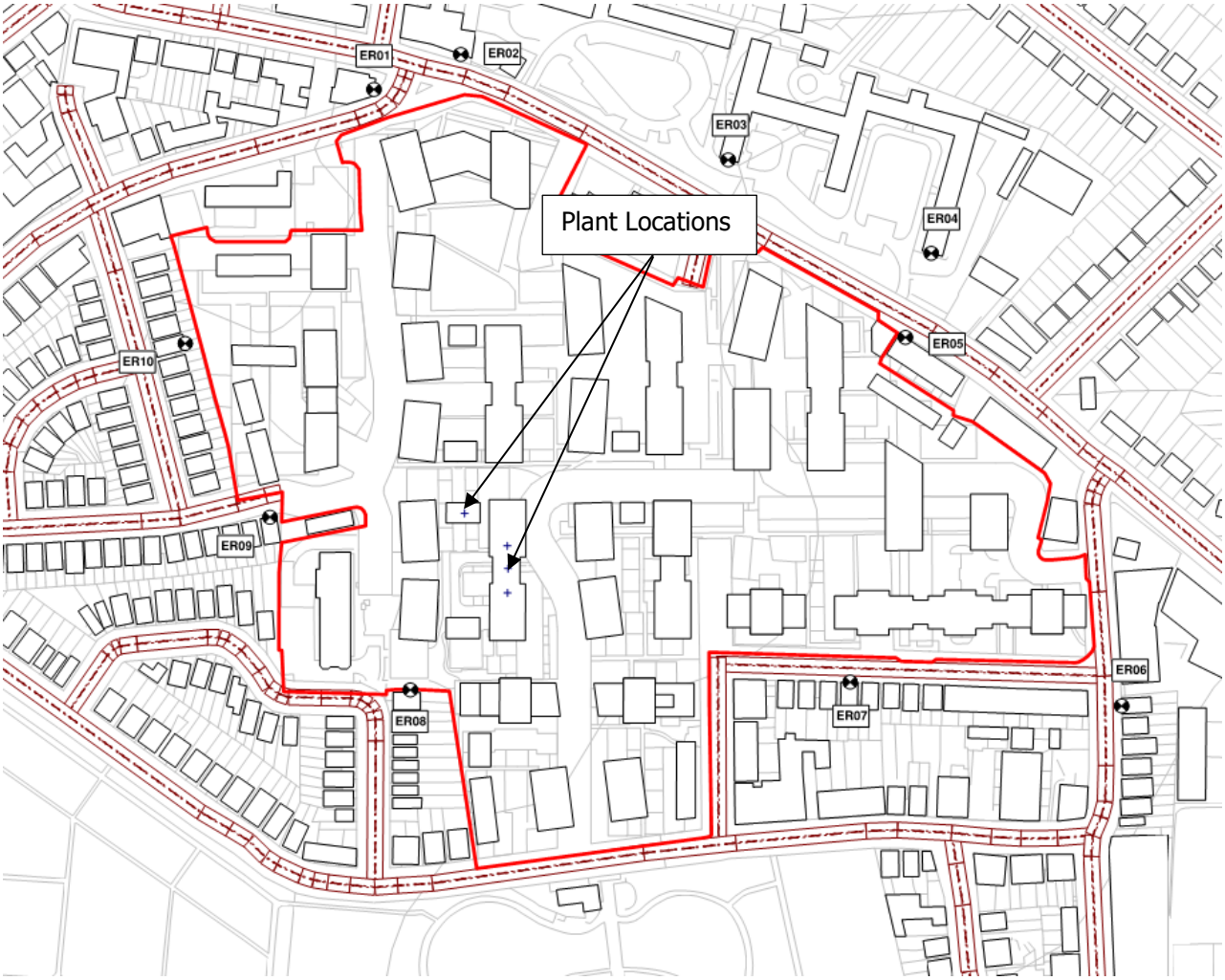


The tables below summarises receptor locations that have been selected to represent worst-case residential receptors with respect to potential building services plant noise from the site. Worst-case facades of nearest properties have been represented. The locations of the receptors are shown on Figure 3.4 below.

Table 3.4 Sensitive Receptor Locations (Plant Noise Assessment)

Ref.	Description	Height (m)
ER01	Pyramid Court, Hawks Road	4.0
ER02	37 Cambridge Road	4.0
ER03	104 Cambridge Gardens	4.0
ER04	45-47 Cambridge Road	4.0
ER05	134 Cambridge Road	4.0
ER06	33 Hampden Road	4.0
ER07	16 Vincent Road	4.0
ER08	11 Piper Road	4.0
ER09	2 Somerset Road	4.0
ER10	19 Portman Road	4.0

Figure 3.4 Existing Sensitive Receptor Locations (Plant Noise Assessment) and Indicative Plant Locations



3.4 Tranquillity Rating

An assessment of the existing tranquillity level of the site has been based on the mapping data published by Campaign to Protect Rural England (CPRE). This uses a colour coded system and a 500m assessment grid for the whole of England, and a tranquillity rating of between 1 and 10 is assigned (1 being least tranquil and 10 being most). By reference to these maps the development is assessed as falling into Zone 1.

4.0 Noise Survey

4.1 Noise Survey Methodology

A monitoring survey was undertaken to characterise baseline ambient noise levels currently experienced on the site and to establish the relative local background and traffic noise levels. Equipment used during the survey included:

Rion NL-52	Environmental Noise Analyser	s/n	1021331
Rion NL-52	Environmental Noise Analyser	s/n	1176464
Rion NC-75	Sound Calibrator	s/n	35480543
Rion NC-75	Sound Calibrator	s/n	35270131

The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice, a drift of 0.0 dB was observed. The accuracy of the calibrators can be traced to National Physical Laboratory Standards, calibration certificates for which are available on request.

A baseline monitoring survey was undertaken at eleven locations (as specified in the following table and shown in SK01 of Appendix B) from Wednesday 26th August 2020 to Thursday 27th August 2020. Attended short-term measurements were undertaken at eleven locations during day, evening and night-time periods, as well as a single spot being measured over 3 hours for the day period (ST1). The baseline survey was undertaken during the summer school holidays with additional restrictions in place due to COVID-19. The nearest school is not considered to be within a close enough proximity to have an effect of traffic numbers within the area. During the attended monitoring, all major roads were observed to have continuous, free-flowing traffic and was considered to be 'normal'. Additionally, although some restrictions were in place, these were not as extensive as the full lockdown measures during the months of March - June 2020 and therefore, the baseline data is considered to be representative.

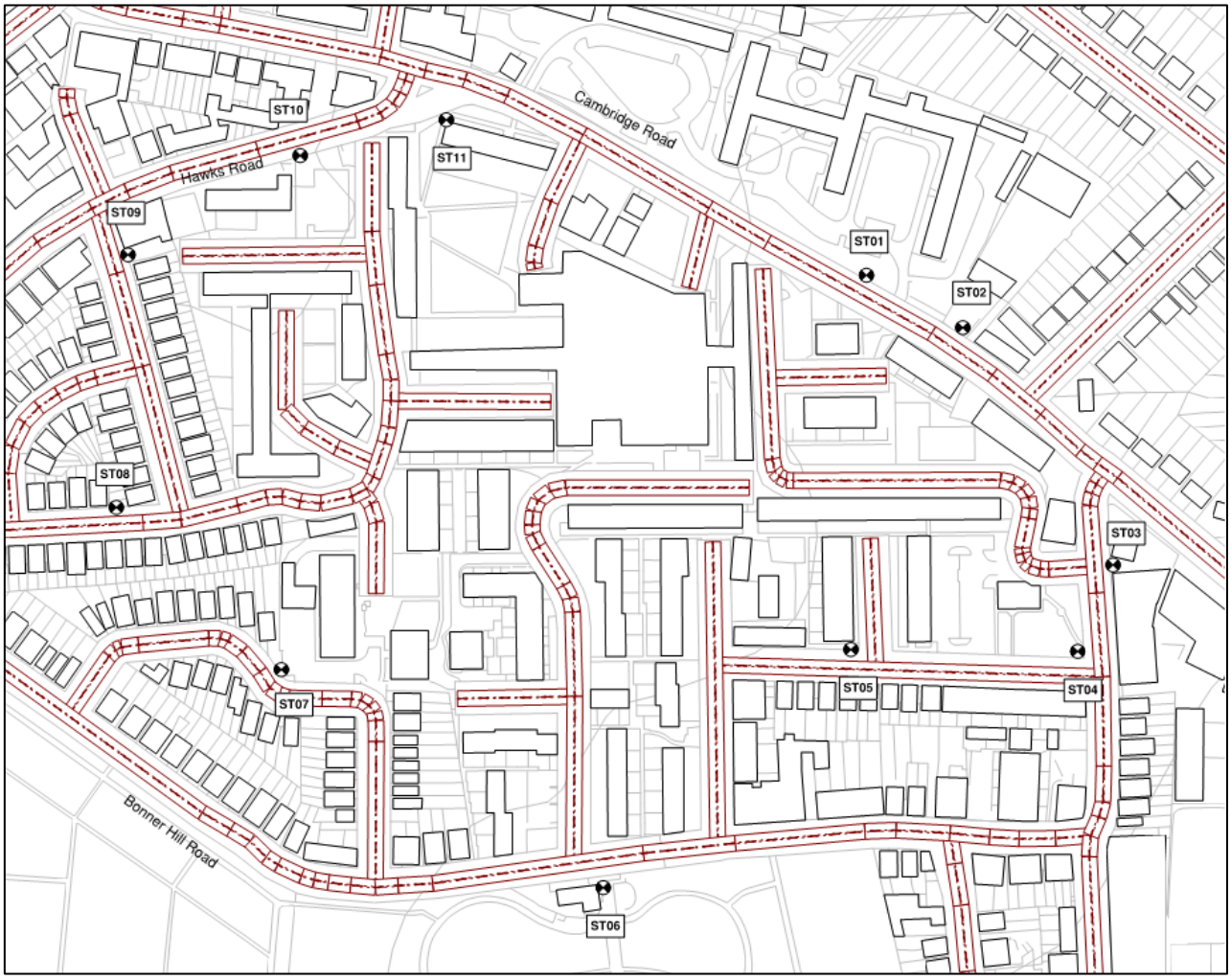
Measurements were taken in general accordance with BS 7445-1:2003 *The Description and Measurement of Environmental Noise: Guide to quantities and procedures*. Weather conditions during the survey period were observed as being overcast with some isolated showers. Anemometer readings confirmed that wind speeds were less than 5 ms^{-1} at all times during the survey, with a predominant south-easterly wind direction.

Table 4.1 Noise Monitoring Locations

Ref	Description
ST1	Cambridge Road
ST2	Cambridge Road
ST3	Hampton Road junction with Cambridge Road
ST4	Junction of Vincent Road and Hampton Road
ST5	Vincent Road at the junction of Stapleford Close

Ref	Description
ST6	Cemetery entrance on Bonner Hill Road
ST7	Rowlls Road
ST8	Somerset Road
ST9	Portman Road junction of Hawks Road
ST10	Hawks Road
ST11	Cambridge Road

Figure 4.1 Noise Monitoring Locations



4.2 Noise Survey Results

The existing noise climate is characterised by road traffic noise from Cambridge Road which runs along the northern boundary of the site. Road traffic noise was also audible from Hawks road to the west of the site. Less frequently audible was road traffic noise from Bonner Hill Road to the south of the site and also more

localised residential roads contained within the Cambridge Road Estate. Commercial activity was noted along Cambridge Road and Hawks Road. Entertainment premises were also noted, however were not operational at full capacity given the existing COVID-19 restrictions.

Ambient and background noise levels are usually described using the L_{Aeq} index (a form of energy average) and the L_{A90} index (i.e. the level exceeded for 90% of the measurement period) respectively. Road traffic noise is generally described using the L_{A10} index (i.e. the level exceeded for 10% of the measurement period).

Table 4.2 Meteorological Conditions during the Survey

Survey Location	Date & Time	Temperature (°C)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Daytime ST1	27/08/2020 13:27	18	0-1	S	5	Road traffic noise on Cambridge road
Daytime ST2	27/08/2020 14:16	18	0-1	S	5	Road traffic noise on Cambridge road
Daytime ST3	27/08/2020 13:59	18	0-1	S	4	Road traffic noise on Cambridge road as well as Hampton Road
Daytime ST4	27/08/2020 13:43	18	0-1	S	4	Traffic on Hampton Road and background traffic on Cambridge Road some minor traffic on Vincent Road
Daytime ST5	27/08/2020 13:27	18	0-1	S	5	Traffic on Hampton Road and background traffic on Cambridge Road some minor traffic on Vincent Road
Daytime ST6	27/08/2020 13:10	18	0-1	S	5	Traffic on Bonner Hill Road
Daytime ST7	27/08/2020 15:45	18	0-1	S	4	Minor traffic Rowlls Road, background traffic
Daytime ST8	27/08/2020 15:26	18	0-1	S	5	Minor traffic Somerset Road, background traffic
Daytime ST9	27/08/2020 15:09	18	0-1	S	5	Traffic on Portman Road and Hawk Road
Daytime ST10	27/08/2020 14:51	18	0-1	S	5	Traffic on Hawk road and Cambridge Road
Daytime ST11	27/08/2020 14:35	18	0-1	S	5	Traffic on Cambridge Road
Evening ST1	27/08/2020 20:55	15	0-1	SW	8	Traffic on Cambridge Road
Evening ST2	27/08/2020 20:38	15	0-1	SW	8	Traffic on Cambridge Road
Evening ST3	27/08/2020 20:17	15	0-1	SW	8	Traffic on Cambridge Road as well as Hampton Road
Evening ST4	27/08/2020 19:42	16	0-1	SW	8	Rainfall, Cambridge Road as well as Hampton Road
Evening ST5	27/08/2020 19:27	15	0-1	SW	8	Traffic on Hampton Road and background traffic on Cambridge Road some minor traffic on Vincent Road
Evening ST6	27/08/2020 19:11	16	0-1	SW	8	Traffic on Bonner Hill Road
Evening ST7	27/08/2020 19:14	16	0-1	SW	8	Minor traffic on Rowlls Road
Evening ST8	27/08/2020 19:33	16	0-1	SW	8	Minor traffic on Somerset Road

Survey Location	Date & Time	Temperature (ºC)	Wind Speed (m/s)	Wind Direction	Cloud Cover (Oktas)	Dominant Noise Source
Evening ST9	27/08/2020 20:14	15	0-1	SW	8	Traffic on Hawks Road
Evening ST10	27/08/2020 20:30	15	0-1	SW	8	Traffic on Hawks Road and Cambridge Road
Evening ST11	27/08/2020 20:48	15	0-1	SW	8	Traffic on Cambridge Road
Night-time ST1	28/08/2020 00:21	13	0-1	SW	8	Traffic on Cambridge Road
Night-time ST2	28/08/2020 00:04	14	0-1	SW	8	Traffic on Cambridge Road
Night-time ST3	27/08/2020 23:48	14	0-1	SW	8	Traffic on Cambridge Road and Hampton Road
Night-time ST4	27/08/2020 23:32	14	0-1	SW	8	Traffic on Hampton Road and Cambridge road
Night-time ST5	27/08/2020 23:17	14	0-1	SW	8	Background traffic from Cambridge Road, Aircraft noise
Night-time ST6	27/08/2020 23:01	14	0-1	SW	8	Minor traffic on Bonner Hill Road and background traffic
Night-time ST7	27/08/2020 23:20	14	0-1	SW	8	Minor traffic on Rowlls road and background traffic
Night-time ST8	27/08/2020 23:37	14	0-1	SW	8	Minor traffic on Somerset road and background traffic
Night-time ST9	27/08/2020 23:55	14	0-1	SW	8	Traffic on Hawks Road and background traffic
Night-time ST10	28/08/2020 00:11	13	0-1	SW	8	Traffic on Hawks Road and Cambridge Road
Night-time ST11	28/08/2020 00:28	13	0-1	SW	8	Traffic on Cambridge Road

The results of the statistical measurements and frequency measurements conducted during the survey are summarised in the following table. All values are sound pressure levels in dB (re: 2 x 10^{-5} Pa).

Table 4.3 Results of Baseline Noise Monitoring Survey (Average Levels)

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
Daytime 07:00 - 19:00	1 Hour	27/08/2020 13:27	ST1	73.5	102.3	50.3	76.0	62.4
	15 Mins	27/08/2020 14:16	ST2	72.6	100.1	50.3	71.8	62.0
	15 Mins	27/08/2020 13:59	ST3	63.1	82.8	45.4	64.2	53.1
	15 Mins	27/08/2020 13:43	ST4	60.7	80.7	45.3	61.1	48.2
	15 Mins	27/08/2020 13:27	ST5	52.3	75.4	40.6	53.2	43.0
	15 Mins	27/08/2020 13:10	ST6	53.9	75.6	39.3	56.8	43.4
	15 Mins	27/08/2020 15:45	ST7	56.0	77.6	37.6	58.8	43.9
	15 Mins	27/08/2020 15:26	ST8	58.0	80.9	34.6	59.3	39.6
	15 Mins	27/08/2020 15:09	ST9	60.5	85.8	42.8	62.9	50.2
	15 Mins	27/08/2020 14:51	ST10	69.1	84.2	53.6	73.0	58.3
	15 Mins	27/08/2020 14:35	ST11	68.9	91.3	52.8	71.0	58.6
Evening 19:00 - 23:00	15 Mins	27/08/2020 20:55	ST1	74.8	99.1	51.0	76.7	65.5
	15 Mins	27/08/2020 20:38	ST2	73.8	91.7	53.5	77.2	62.5
	15 Mins	27/08/2020 20:17	ST3	52.5	70.2	43.5	54.8	46.9

Period	Duration (T)	Monitoring Date and Times	Location	$L_{Aeq,T}$ (dB)	$L_{Amax,T}$ (dB)	$L_{Amin,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
	15 Mins	27/08/2020 19:42	ST4	68.5	86.4	53.7	68.5	57.4
	15 Mins	27/08/2020 19:27	ST5	68.5	93.5	53.7	71.4	57.5
	15 Mins	27/08/2020 19:11	ST6	58.0	79.0	47.6	60.5	51.6
	15 Mins	27/08/2020 19:14	ST7	53.0	70.7	43.0	54.0	45.6
	15 Mins	27/08/2020 19:33	ST8	72.7	96.0	55.6	75.8	60.6
	15 Mins	27/08/2020 20:14	ST9	57.4	80.1	43.3	60.6	48.2
	15 Mins	27/08/2020 20:30	ST10	52.3	74.0	43.5	55.4	46.8
	15 Mins	27/08/2020 20:48	ST11	73.8	93.2	52.6	76.7	64.6
Night-time 23:00 - 07:00	15 Mins	28/08/2020 00:21	ST1	68.3	89.4	48.5	71.9	56.6
	15 Mins	28/08/2020 00:04	ST2	71.2	96.1	50.2	74.1	63.1
	15 Mins	27/08/2020 23:48	ST3	55.2	73.8	38.6	57.3	44.8
	15 Mins	27/08/2020 23:32	ST4	56.3	82.7	40.2	58.6	46.3
	15 Mins	27/08/2020 23:17	ST5	50.5	81.1	38.3	50.4	40.7
	15 Mins	27/08/2020 23:01	ST6	58.6	88.5	40.4	56.4	42.7
	15 Mins	27/08/2020 23:20	ST7	47.3	72.1	36.2	46.3	38.6
	15 Mins	27/08/2020 23:37	ST8	51.8	75.4	36.4	53.9	39.9
	15 Mins	27/08/2020 23:55	ST9	57.0	80.9	40.5	56.2	44.0
	15 Mins	28/08/2020 00:11	ST10	68.0	82.4	46.1	72.2	52.2
	15 Mins	28/08/2020 00:28	ST11	68.7	82.7	48.6	72.5	56.6

All values are sound pressure levels in dB re: 2x 10^{-5} Pa

5.0 Assessment of Key Effects

5.1 ProPG Stage 1 Assessment

As measured during the noise survey, daytime $L_{Aeq,\ 16hour}$ noise levels range between 59 – 75 dB and night-time $L_{Aeq,\ 8hour}$ noise levels range between 54 – 70 dB, therefore, in accordance with the guidance presented within *ProPG: Planning & Noise* the site falls within High Noise Risk Category and as such requires a good acoustic design process to be followed. Daytime and night-time noise contour plots are presented in Figure 5.1 and 5.2 below and SK04 and SK05 of Appendix C.

Figure 5.1 Daytime ProPG Noise Risk Categories (Daytime $L_{Aeq,16\ hour}$)

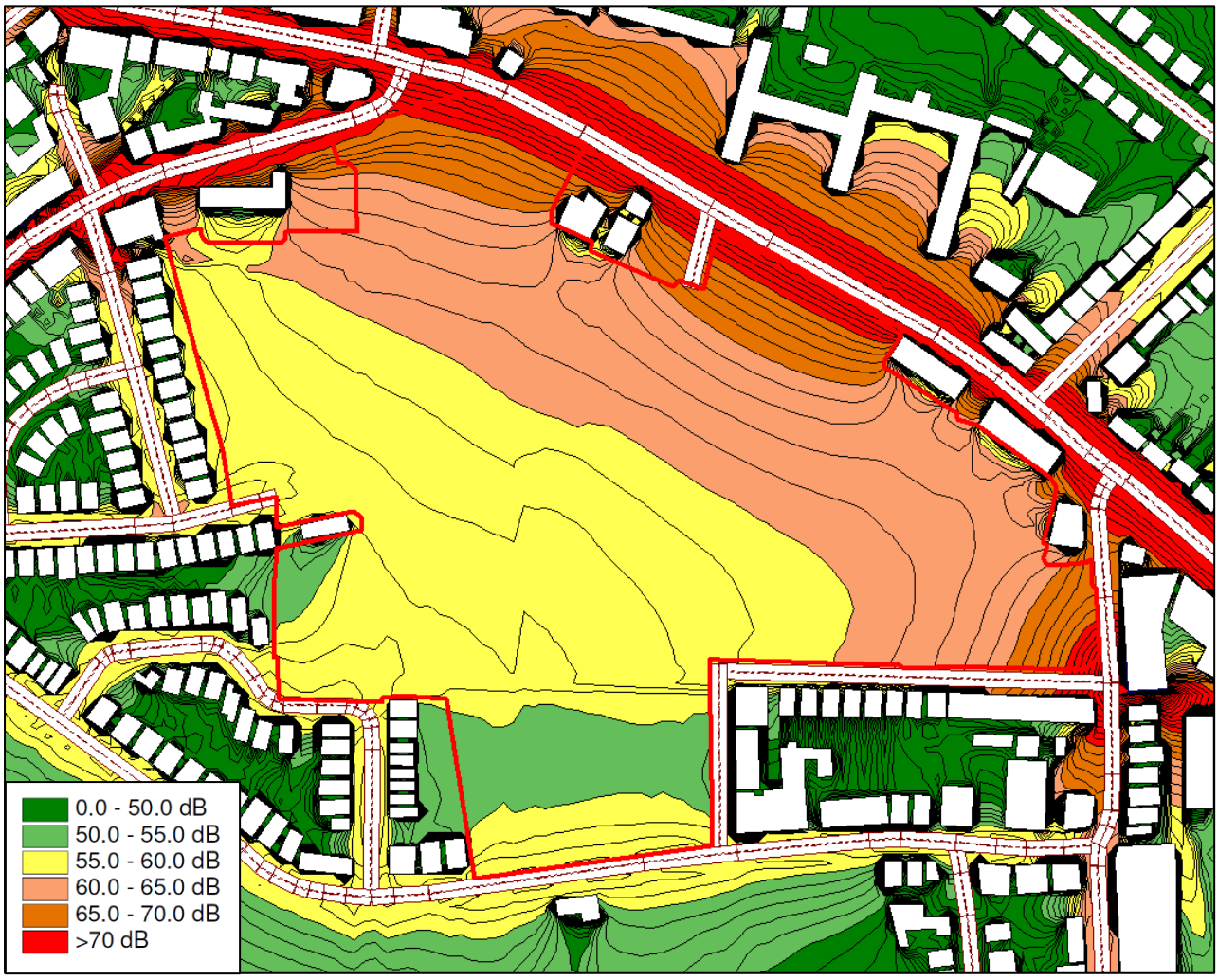
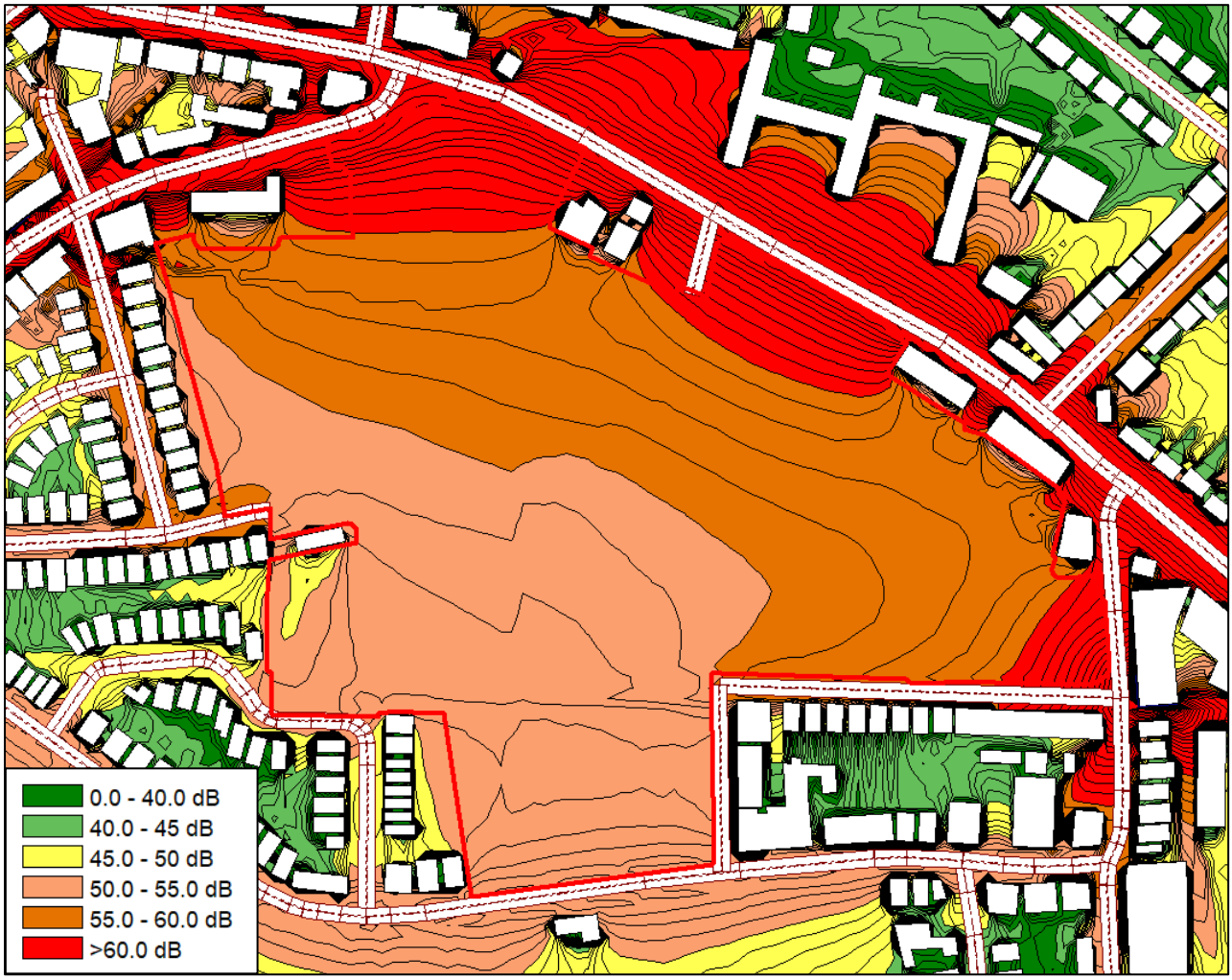


Figure 5.2 Night-time ProPG Noise Risk Categories (Night-time $L_{Aeq,8\ hour}$)



5.2 ProPG Stage 2 Assessment – Element 2 Internal Noise Levels

Internal noise levels, based on the existing ambient noise climate, have been assessed both with windows open, where a reduction from a partially open window of 10 dB has been used, and with windows closed, where an assumption of glazing with a sound reduction of 32 dB has been used unless stated otherwise.

Where the relevant internal ambient noise level criteria are not met with standard double-glazing (with a minimum sound reduction R_w + C_{tr} 32 dB) then the requirement for higher glazing specifications have been established. The glazing and ventilation strategy has been designed to achieve WHO/BS 8233 internal L_{Aeq} daytime noise level criteria of 35 dB and internal night-time L_{Aeq} of 30 dB noise level criteria with windows closed within residential spaces.

The full assessment table, with all locations and glazing levels are detailed in Table B1, Appendix B. Receptor location plans are shown in SK02 of Appendix C.

Table B1 shows that the daytime and night-time internal noise level criteria is generally met with windows closed across the site. This is except for facades overlooking Cambridge Road and Hawks Road to the North of the Development. Therefore, for habitable rooms (living rooms and bedrooms) on these affected facades, enhanced glazing will be provided.

The tables also show that the noise level criteria are exceeded within all areas of the development, assuming a windows open scenario, therefore an alternative means of ventilation will be provided for all habitable rooms within the development.

This noise attenuating mitigation is described furthermore within the acoustic design statement within Section 6.0 of this report.

5.3 ProPG Stage 2 Assessment – Element 3 External Amenity Spaces

Daytime noise levels within private external spaces (balconies) of the proposed development are likely to exceed the BS 8233:2014 upper guidelines value of 55 dB on exposed facades overlooking Cambridge Road and Hawks Road. However, given that noise levels around the Development are typical for city centre locations, the noise levels are not considered likely to prohibit the use of these spaces.

Indeed, section 7.7.3.2 of BS 8233:2014 recognises that achieving 55 dB $L_{Aeq,16hours}$ is *not achievable in all circumstances where development may 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. Such as convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these amenity spaces, but should not be prohibited'*. Therefore, given the proximity of the development to the strategic transport network and the references presented within BS 8233 specified above, exceedances of the 55 dB $L_{Aeq,16hours}$ target noise level on proposed balconies should not prohibit development at this site.

Furthermore, ProPG recognises that '*these guideline values may not be achievable in all circumstances where development might be desirable. In such a situation, development should be designed to achieve the lowest practicable noise levels in these external amenity spaces… Where, despite following a good acoustic design process, significant adverse impacts remain on any private amenity space (e.g garden or balcony) then that impact may be partially off-set if the residents are provided, through the design of the development or the planning process , with access to: a relatively quiet, protected, publicly accessible, external amenity space*

(e.g. public park or a local green space designated because of its tranquillity that is nearby (within 5 minutes walking distance)…'.

Directly to the east of the development, lies 'Fairfield Park' which is a designated publicly accessible external amenity space. Additionally, the masterplan includes a proposed open space which future occupants can utilise. Therefore, development should not be prohibited.

Furthermore, to reduce noise levels within balconies as far as reasonably practicable, a range of additional mitigation options will be implemented on balconies, as outlined within the acoustic design statement within Section 6.0.

5.4 Proposed Building Services Plant Noise Assessment

This assessment has been undertaken in order to establish the maximum external noise levels from the proposed building services plant. The assessment compares the predicted worst-case breakout noise levels from proposed plant with the existing measured average background noise L_{A90} at the closest proposed and existing residential receptors. In accordance with BS 4142:2014+A1:2019 section 9.2, a +2 dB correction has been added to create the Plant 'Rating Level at Receptor' to account for any tonality and uncertainty within the noise levels.

A series of predictions were made by defining different sound power levels at point sources. When the sound pressure levels are set as shown in Table 5.3 (which are considered to be readily achievable), the noise rating levels at all the existing receptors are predicted to be at least 10 dB below existing background levels during the worst-case night-time as shown in Table 5.4. All predicted rating noise levels fall within the No Observed Adverse Effect Level.

Table 5.3 Proposed Emission Limits for BSP as Modelled

BSP Location	Noise Emission Limit - Sound Pressure Level (Per Unit)
Roof Mounted Unit on commercial Area x 4	80.6 dB(A) at 1m OR 71.0 dB(A) at 3m

Table 5.4 BS 4142 Assessment for Proposed Roof Mounted Plant

Ref	Existing Measured Average Background L_{A90}	Noise rating level from plant (with +2 dB Correction)	BS 4142 Score
ER01	57	45	-12
ER02	57	46	-12
ER03	57	36	-21
ER04	57	43	-14
ER05	57	47	-10
ER06	46	16	-30
ER07	40	22	-18
ER08	39	21	-19
ER09	40	18	-22
ER10	44	22	-22

5.5 Proposed Commercial Ground Floor Use

With regard to proposed commercial use on the ground floor of Block C, community floorspace in Block C, non-residential floorspace in Block G and Block K, the separating floor construction will be constructed to meet airborne sound insulation requirements of the Building Regulations and the internal ambient noise levels recommended in BS 8233. Therefore, there will be no adverse impact associated with noise transfer into the upper storey sensitive spaces. To avoid structure-borne noise transmission, isolation joints will need to be incorporated into the structure, however this is considered to be readily achievable.

5.6 Tranquillity Rating

The development is situated in a CPRE Zone 1 area of tranquillity (Zone 1 being the least tranquil and Zone 10 being the most tranquil). Furthermore the area is currently already used for residential use and is bounded by residential use on all boundaries of the development. Therefore, it is not considered to be an area of particularly high tranquillity value therefore it is considered that any effect on tranquillity of the area would be negligible.

6.0 Acoustic Design Statement (Mitigation)

6.1 Glazing and Ventilation Strategy

Enhanced glazing will be provided as follows:

Block C

- Enhanced glazing with a minimum sound reduction of $R_w + C_{tr}$ 36 dB for habitable rooms (bedrooms and living rooms) overlooking Cambridge Road.

Block K

- Enhanced glazing with a minimum sound reduction of $R_w + C_{tr}$ 34 dB for habitable rooms (bedrooms and living rooms) overlooking Cambridge Road.

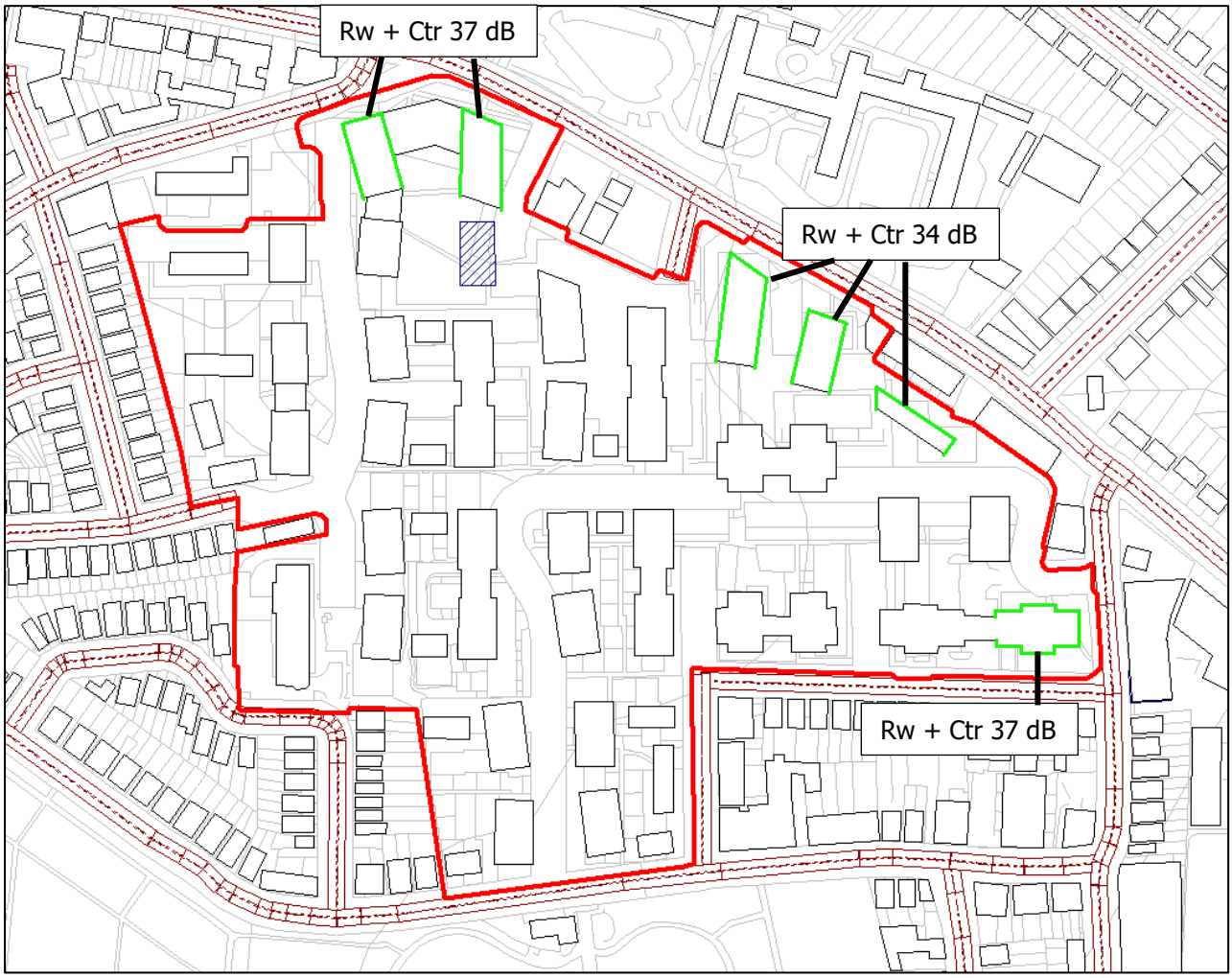
Block N

- Enhanced glazing with a minimum sound reduction of $R_w + C_{tr}$ 37 dB for habitable rooms (bedrooms and living rooms) overlooking Cambridge Road and The Park Brewery.

For all other habitable rooms, standard double glazing with a minimum sound reduction of $R_w + C_{tr}$ 32 dB will be provided in all blocks.

Alternative ventilation will be provided for all habitable areas of the proposed development, which can be provided in several ways from acoustic trickle vents (which need to have a minimum sound reduction equal to or greater than the glazing), to other passive ventilation systems or mechanical ventilations systems. These are shown illustratively on Figure 6.1 below

Figure 6.1 Glazing and Ventilation Strategy



6.2 External Amenity Spaces

Balconies will be constructed to maximise the attenuation benefit of the balcony itself including the following design elements:

- The bottom of each balcony will consist of solid and imperforate construction; and
- Private outside space should be practical in terms of its shape and utility, and care should be taken to ensure the space offers good amenity.

7.0 Conclusions

In considering paragraphs 170 and 180, the Development is not expected to have an 'adverse impact' on health or quality of life. Similarly, it is considered that all 'adverse impacts' on health and quality of life' (relating to noise) are mitigated by the use of the following mitigation:

A glazing and ventilation strategy has been provided which achieves both ventilation and internal ambient noise level requirements in all habitable areas of the Development. Habitable rooms on facades overlooking Cambridge Road and Hawks Road to the north, as well as selective facades overlooking to the east will feature enhanced glazing with a sound reduction up to $R_w + C_{tr}$ 37 dB. At all other locations and facades will feature a standard double glazing with a minimum sound reduction of $R_w + C_{tr}$ 32 dB. All habitable rooms of the proposed Development will feature an alternative means of ventilation which matches the performance of the glazing in that habitable space.

Maximum noise level limits have been set for proposed building services plant. Noise Levels are predicted to result in the plant noise rating levels being at least 10 dB below the existing background noise levels during both the night-time. Accordingly, the proposed plant is predicted to have a low impact at the closest sensitive receptors.

An assessment of the existing tranquillity level of the site has been undertaken and identified that the site is not highly prized for its tranquillity and recreational value in terms of noise and it is considered that the mitigation measures outlined within this report are suitable to reduce any noticeable and intrusive noise from the surrounding environment within proposed dwellings and therefore it is considered that existing businesses would not be restricted by the Development.

Appendices

Appendix A – Acoustic Terminology and Abbreviations

Acoustic Terminology

dB Sound levels from any source can be measured in frequency bands in order to provide detailed information about the spectral content of the noise, i.e. whether it is high-pitched, low-pitched, or with no distinct tonal character. These measurements are usually undertaken in octave or third octave frequency bands. If these values are summed logarithmically, a single dB figure is obtained. This is usually not very helpful as it simply describes the total amount of acoustic energy measured and does not take any account of the ear's ability to hear certain frequencies more readily than others.

dB(A) Instead, the dBA figure is used, as this is found to relate better to the loudness of the sound heard. The dBA figure is obtained by subtracting an appropriate correction, which represents the variation in the ear's ability to hear different frequencies, from the individual octave or third octave band values, before summing them logarithmically. As a result the single dBA value provides a good representation of how loud a sound is.

L_{Aeq} Since almost all sounds vary or fluctuate with time it is helpful, instead of having an instantaneous value to describe the noise event, to have an average of the total acoustic energy experienced over its duration. The $L_{Aeq,\ 07:00 - 23:00}$ for example, describes the equivalent continuous noise level over the 12 hour period between 7 am and 11 pm. During this time period the L_{pA} at any particular time is likely to have been either greater or lower that the $L_{Aeq,\ 07:00 - 23:00}$.

L_{Amin} The L_{Amin} is the quietest instantaneous noise level. This is usually the quietest 125 milliseconds measured during any given period of time.

L_{Amax} The L_{Amax} is the loudest instantaneous noise level. This is usually the loudest 125 milliseconds measured during any given period of time.

L_n Another method of describing, with a single value, a noise level which varies over a given time period is, instead of considering the average amount of acoustic energy, to consider the length of time for which a particular noise level is exceeded. If a level of x dBA is exceeded for say. 6 minutes within one hour, then that level can be described as being exceeded for 10% of the total measurement period. This is denoted as the $L_{A10,\ 1\ hr}$ = x dB.

The L_{A10} index is often used in the description of road traffic noise, whilst the L_{A90}, the noise level exceeded for 90% of the measurement period, is the usual descriptor for underlying background noise. L_{A1} and L_{Amax} are common descriptors of construction noise.

R_w The *weighted sound reduction index* determined using the above *measurement* procedure, but weighted in accordance with the procedures set down in BS EN ISO 717-1. Partitioning and building board manufacturers commonly use this index to describe the inherent sound insulation performance of their products.

Abbreviations

CADNA – Computer Aided Noise Abatement

DMRB – Design Manual for Roads and Bridges

HGV – Heavy Goods Vehicle

PPG – Planning Practice Guidance

UDP – Unitary Development Plan

UKAS – United Kingdom Accreditation Service

Appendix B – Noise Intrusion Assessment Tables

Table B1 Daytime and Night-time L_{Aeq} Noise Levels & Glazing and Ventilation specifications

Receptor No	Block	Daytime External L_{Aeq} Noise Levels	Internal Daytime L_{Aeq} Noise Level with Windows Open	Internal Daytime L_{Aeq} Noise Level with Windows Closed	Night-Time External L_{Aeq}	Internal Night-time L_{Aeq} Noise Level with Windows Open	Internal Night-time L_{Aeq} Noise Level with Windows Closed	Glazing Specification (R_w + C_{tr} dB) to Achieve BS 8233 Target Levels	Ventilation Specification ($D_{n,e,w}$ + C_{tr} dB)
R001	A	**58.7**	48.7	26.7	**58.1**	48.1	26.1	32	32
R002	A	**52.4**	42.4	20.4	**52.0**	42.0	20.0	32	32
R003	A	**48.9**	38.9	16.9	**47.6**	37.6	15.6	32	32
R004	A	**45.9**	35.9	13.9	**44.9**	34.9	12.9	32	32
R005	A	**54.2**	44.2	22.2	**51.3**	41.3	19.3	32	32
R006	A	**49.8**	39.8	17.8	**48.3**	38.3	16.3	32	32
R007	A	**48.8**	38.8	16.8	**48.2**	38.2	16.2	32	32
R008	A	**57.2**	47.2	25.2	**56.6**	46.6	24.6	32	32
R009	B	**41.6**	31.6	9.6	**40.0**	30.0	8.0	32	32
R010	B	**48.1**	38.1	16.1	**42.6**	32.6	10.6	32	32
R011	B	**55.1**	45.1	23.1	**45.9**	35.9	13.9	32	32
R012	B	**46.4**	36.4	14.4	**40.8**	30.8	8.8	32	32
R013	C	**59.7**	49.7	27.7	**59.8**	49.8	27.8	32	32
R014	C	**68.4**	58.4	36.4	**67.9**	57.9	35.9	**36**	**36**
R015	C	**49.6**	39.6	17.6	**40.9**	30.9	8.9	32	32
R016	C	**71.2**	61.2	39.2	**66.3**	56.3	34.3	**35**	**35**
R017	C	**67.1**	57.1	35.1	**62.2**	52.2	30.2	**31**	**31**
R018	C	**56.4**	46.4	24.4	**41.9**	31.9	9.9	32	32
R019	C	**52.5**	42.5	20.5	**42.7**	32.7	10.7	32	32
R020	C	**54.1**	44.1	22.1	**54.0**	44.0	22.0	32	32
R021	D	**51.9**	41.9	19.9	**48.2**	38.2	16.2	32	32
R022	D	**56.4**	46.4	24.4	**48.1**	38.1	16.1	32	32
R023	D	**52.7**	42.7	20.7	**46.9**	36.9	14.9	32	32
R024	D	**48.9**	38.9	16.9	**43.8**	33.8	11.8	32	32
R025	D	**42.9**	32.9	10.9	**39.8**	29.8	7.8	32	32
R026	D	**44.4**	34.4	12.4	**41.3**	31.3	9.3	32	32
R027	D	**47.1**	37.1	15.1	**46.2**	36.2	14.2	32	32
R028	E	**46.0**	36.0	14.0	**43.8**	33.8	11.8	32	32
R029	E	**45.7**	35.7	13.7	**42.5**	32.5	10.5	32	32
R030	E	**41.9**	31.9	9.9	**38.3**	28.3	6.3	32	32
R031	E	**46.4**	36.4	14.4	**41.6**	31.6	9.6	32	32
R032	E	**45.4**	35.4	13.4	**40.1**	30.1	8.1	32	32
R033	E	**55.6**	45.6	23.6	**46.4**	36.4	14.4	32	32
R034	E	**55.1**	45.1	23.1	**45.8**	35.8	13.8	32	32
R035	E	**47.8**	37.8	15.8	**43.9**	33.9	11.9	32	32
R036	F	**53.7**	43.7	21.7	**45.4**	35.4	13.4	32	32
R037	F	**44.6**	34.6	12.6	**40.2**	30.2	8.2	32	32
R038	F	**39.1**	29.1	7.1	**35.0**	25.0	3.0	32	32
R039	F	**40.8**	30.8	8.8	**34.4**	24.4	2.4	32	32
R040	F	**49.4**	39.4	17.4	**46.4**	36.4	14.4	32	32
R041	F	**54.7**	44.7	22.7	**51.9**	41.9	19.9	32	32
R042	F	**44.9**	34.9	12.9	**41.7**	31.7	9.7	32	32

Receptor No	Block	Daytime External L_{Aeq} Noise Levels	Internal Daytime L_{Aeq} Noise Level with Windows Open	Internal Daytime L_{Aeq} Noise Level with Windows Closed	Night-Time External L_{Aeq}	Internal Night-time L_{Aeq} Noise Level with Windows Open	Internal Night-time L_{Aeq} Noise Level with Windows Closed	Glazing Specification ($R_w + C_{tr}$ dB) to Achieve BS 8233 Target Levels	Ventilation Specification ($D_{n,e,w} + C_{tr}$ dB)
R043	F	**41.5**	31.5	9.5	**36.4**	26.4	4.4	32	32
R044	F	**54.8**	44.8	22.8	**52.0**	42.0	20.0	32	32
R045	F	**38.5**	28.5	6.5	**35.5**	25.5	3.5	32	32
R046	F	**41.7**	31.7	9.7	**35.0**	25.0	3.0	32	32
R047	G	**59.0**	49.0	27.0	**53.8**	43.8	21.8	32	32
R048	G	**58.9**	48.9	26.9	**53.9**	43.9	21.9	32	32
R049	G	**37.4**	27.4	5.4	**33.3**	23.3	1.3	32	32
R050	G	**53.0**	43.0	21.0	**45.8**	35.8	13.8	32	32
R051	G	**61.6**	51.6	29.6	**56.6**	46.6	24.6	32	32
R052	G	**58.7**	48.7	26.7	**53.7**	43.7	21.7	32	32
R053	G	**54.5**	44.5	22.5	**49.6**	39.6	17.6	32	32
R054	G	**40.6**	30.6	8.6	**37.1**	27.1	5.1	32	32
R055	G	**44.3**	34.3	12.3	**39.5**	29.5	7.5	32	32
R056	G	**38.5**	28.5	6.5	**33.2**	23.2	1.2	32	32
R057	G	**50.6**	40.6	18.6	**45.7**	35.7	13.7	32	32
R058	G	**41.6**	31.6	9.6	**38.3**	28.3	6.3	32	32
R059	G	**48.9**	38.9	16.9	**42.9**	32.9	10.9	32	32
R060	H	**45.1**	35.1	13.1	**40.3**	30.3	8.3	32	32
R061	H	**37.7**	27.7	5.7	**33.4**	23.4	1.4	32	32
R062	H	**35.2**	25.2	3.2	**31.6**	21.6	0.0	32	32
R063	H	**45.2**	35.2	13.2	**39.9**	29.9	7.9	32	32
R064	H	**47.0**	37.0	15.0	**42.1**	32.1	10.1	32	32
R065	H	**51.1**	41.1	19.1	**46.3**	36.3	14.3	32	32
R066	H	**49.9**	39.9	17.9	**46.7**	36.7	14.7	32	32
R067	H	**57.7**	47.7	25.7	**49.8**	39.8	17.8	32	32
R068	H	**37.3**	27.3	5.3	**32.4**	22.4	0.4	32	32
R069	H	**38.2**	28.2	6.2	**32.9**	22.9	0.9	32	32
R070	H	**56.6**	46.6	24.6	**47.8**	37.8	15.8	32	32
R071	H	**41.1**	31.1	9.1	**36.1**	26.1	4.1	32	32
R072	J	**55.0**	45.0	23.0	**46.7**	36.7	14.7	32	32
R073	J	**49.8**	39.8	17.8	**47.0**	37.0	15.0	32	32
R074	J	**42.6**	32.6	10.6	**36.1**	26.1	4.1	32	32
R075	J	**40.0**	30.0	8.0	**34.2**	24.2	2.2	32	32
R076	J	**44.4**	34.4	12.4	**40.9**	30.9	8.9	32	32
R077	J	**54.9**	44.9	22.9	**52.2**	42.2	20.2	32	32
R078	J	**48.3**	38.3	16.3	**45.4**	35.4	13.4	32	32
R079	J	**48.4**	38.4	16.4	**44.7**	34.7	12.7	32	32
R080	J	**38.9**	28.9	6.9	**35.0**	25.0	3.0	32	32
R081	J	**41.3**	31.3	9.3	**34.9**	24.9	2.9	32	32
R082	J	**55.8**	45.8	23.8	**53.0**	43.0	21.0	32	32
R083	K	**71.0**	61.0	39.0	**66.0**	56.0	34.0	**34**	**34**
R084	K	**63.3**	53.3	31.3	**58.3**	48.3	26.3	32	32
R085	K	**39.9**	29.9	7.9	**34.9**	24.9	2.9	32	32
R086	K	**62.4**	52.4	30.4	**57.3**	47.3	25.3	32	32
R087	K	**70.1**	60.1	38.1	**65.1**	55.1	33.1	**34**	**34**
R088	K	**58.5**	48.5	26.5	**53.5**	43.5	21.5	32	32
R089	K	**60.6**	50.6	28.6	**55.6**	45.6	23.6	32	32
R090	K	**43.5**	33.5	11.5	**38.6**	28.6	6.6	32	32
R091	K	**54.4**	44.4	22.4	**49.4**	39.4	17.4	32	32

Receptor No	Block	Daytime External L_{Aeq} Noise Levels	Internal Daytime L_{Aeq} Noise Level with Windows Open	Internal Daytime L_{Aeq} Noise Level with Windows Closed	Night-Time External L_{Aeq}	Internal Night-time L_{Aeq} Noise Level with Windows Open	Internal Night-time L_{Aeq} Noise Level with Windows Closed	Glazing Specification ($R_w + C_{tr}$ dB) to Achieve BS 8233 Target Levels	Ventilation Specification ($D_{n,e,w} + C_{tr}$ dB)
R092	K	**49.1**	39.1	17.1	**44.3**	34.3	12.3	32	32
R093	K	**44.7**	34.7	12.7	**40.1**	30.1	8.1	32	32
R094	K	**53.5**	43.5	21.5	**48.7**	38.7	16.7	32	32
R095	K	**55.2**	45.2	23.2	**50.3**	40.3	18.3	32	32
R096	L	**44.9**	34.9	12.9	**39.4**	29.4	7.4	32	32
R097	L	**49.8**	39.8	17.8	**47.8**	37.8	15.8	32	32
R098	L	**61.2**	51.2	29.2	**57.2**	47.2	25.2	32	32
R099	M	**61.8**	51.8	29.8	**56.8**	46.8	24.8	32	32
R100	M	**44.8**	34.8	12.8	**40.0**	30.0	8.0	32	32
R101	M	**59.4**	49.4	27.4	**54.3**	44.3	22.3	32	32
R102	M	**61.4**	51.4	29.4	**56.3**	46.3	24.3	32	32
R103	M	**51.4**	41.4	19.4	**44.9**	34.9	12.9	32	32
R104	M	**53.8**	43.8	21.8	**48.7**	38.7	16.7	32	32
R105	M	**50.7**	40.7	18.7	**45.7**	35.7	13.7	32	32
R106	M	**47.0**	37.0	15.0	**42.1**	32.1	10.1	32	32
R107	N	**51.5**	41.5	19.5	**46.2**	36.2	14.2	32	32
R108	N	**53.3**	43.3	21.3	**47.9**	37.9	15.9	32	32
R109	N	**57.3**	47.3	25.3	**51.4**	41.4	19.4	32	32
R110	N	**73.5**	63.5	41.5	**68.3**	58.3	36.3	**37**	**37**
R111	N	**71.2**	61.2	39.2	**66.3**	56.3	34.3	**35**	**35**
R112	N	**66.0**	56.0	34.0	**61.2**	51.2	29.2	**34**	**34**
R113	N	**64.8**	54.8	32.8	**60.2**	50.2	28.2	**33**	**33**

Appendix C – Report Conditions

This Report has been prepared using reasonable skill and care for the sole benefit of Cambridge Road (Kingston) LLP ("the Client") for the proposed uses stated in the report by WYG Environment Planning Transport Limited ("WYG"). WYG exclude all liability for any other uses and to any other party. The report must not be relied on or reproduced in whole or in part by any other party without the copyright holder's permission.

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The whole of the report must be read as other sections of the report may contain information which puts into context the findings in any executive summary.

The performance of environmental protection measures and of buildings and other structures in relation to acoustics, vibration, noise mitigation and other environmental issues is influenced to a large extent by the degree to which the relevant environmental considerations are incorporated into the final design and specifications and the quality of workmanship and compliance with the specifications on site during construction. WYG accept no liability for issues with performance arising from such factors.

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