ONE BATTERSEA BRIDGE

NOISE IMPACT ASSESSMENT

October 2024
Revision 02

Promontoria Battersea Limited

Noise Impact Assessment

One Battersea Bridge

October 2024

ONE BATTERSEA BRIDGE – NOISE IMPACT ASSESSMENT REVISION 2

temple

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1 Introduction

1.1.1 Temple Group has been appointed by Promontoria Battersea Limited to undertake a noise impact assessment for the Proposed Development at One Battersea Bridge Road, London, SW11 3BZ ('the Site')

1.1.2 The purpose of the assessment is to assess its suitability for noise sensitive residential development. Attended and unattended noise measurements have been completed at the Site to characterise the existing typical noise environment over the daytime and night-time.

1.1.3 The measured noise levels have been assessed in line with the local and national planning policy guidance and relevant standards. Where necessary, additional noise mitigation measures have been recommended to help protect future occupants of the Proposed Development against noise disturbance from nearby noise sources.

1.1.4 Details of the assessment methodology used, together with the results of the survey undertaken and the subsequent conclusions and recommendations drawn are presented in this report.

1.1.5 A glossary of acoustic terms and their meanings has been included in **Appendix A**.

2 Policy Standards and Guidance

2.1 Planning Policy

National Planning Policy Framework

2.1.1 The National Planning Policy Framework[1] (NPPF) sets out the government's planning policies for England and how these are expected to be applied. It was revised in 2018 following a review of the 2012 document and was updated in December 2023.

2.1.2 The recently revised NPPF comments on noise in the following ways:

2.1.3 Paragraph 174: Planning policies and decisions should contribute to and enhance the natural and local environment by:

2.1.4 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.

2.1.5 Paragraph 185: 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:

- 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; and
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason

2.1.6 A draft consultation for proposed reforms to the NPPF was released on 30th July 2024 and a version of this is expected to be adopted in November 2024. It is not considered that the proposed changes to the framework would alter the methodology set out within this assessment.

Noise Policy Statement for England

2.1.7 The Noise Policy Statement for England[2] (NPSE) seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that

[1] Department of Communities and Local Government (December 2023), The National Planning Policy Framework

[2] Defra (March 2010), The Noise Policy Statement for England

relate to noise. The statement applies to all forms of noise, including environmental noise, neighbour noise and neighbourhood noise.

2.1.8 The statement sets out the long-term vision of the government's noise policy, which is to "promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development".

2.1.9 The guidance promotes the effective management and control of noise, within the context of Government policy on sustainable development and thereby aims to:

- Avoid significant adverse impacts on health and quality of life;
- Mitigate and minimise adverse impacts on health and quality of life; and
- Where possible, contribute to the improvements of health and quality of life.

2.1.10 The statement adopts established concepts from toxicology that are currently being applied to noise impacts. The concept details noise levels, at which the effects of an exposure may be classified into a specific category. The classification categories as detailed within NPSE are as follows:

- No Observed Effect Level (NOEL) - the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;
- Lowest Observable Adverse Effect Level (LOAEL) - the level above which adverse effects on health and quality of life can be detected; and
- Significant Observed Adverse Effect Level (SOAEL) - the level above which significant adverse effects on health and quality of life occur.

2.1.11 It is recognised that SOAEL does not have a single objective noise-based level that is applicable to all sources of noise in all situations and therefore the SOAEL is likely to be different for different sources, receptors and at different times of the day.

2.1.12 No guidance has been issued at the time of writing to identify the SOAEL and LOAEL for typical noise sources and receptors.

Planning Practice Guidance – Noise

2.1.13 The National Planning Practice Guidance[3] (NPPG) expands on the use of SOAEL:

[3] Department for Communities and Local Government (DCLG) (July 2019), National Planning Practice Guidance

"If the exposure is above this level the planning process should be used to avoid this effect occurring, by use of appropriate mitigation such as by altering the design and layout. Such decisions must be made taking account of the economic and social benefit of the activity causing the noise, but it is undesirable for such exposure to be caused."

2.1.14 The NPPG also goes on to identify unacceptable noise exposure:

"At the highest extreme, noise exposure would cause extensive and sustained changes in behaviour without an ability to mitigate the effect of noise. The impacts on health and quality of life are such that regardless of the benefits of the activity causing the noise, this situation should be prevented from occurring."

2.1.15 In addition, NPPG refers to further considerations to mitigating noise on residential developments. NPPG states that the noise impact may be partially offset if the residents of those dwellings have access to:

- a relatively quiet facade (containing windows to habitable rooms) as part of their dwelling, and/or;
- a relatively quiet external amenity space for their sole use, (e.g. a garden or balcony). Although the existence of a garden or balcony is generally desirable, the intended benefits will be reduced with increasing noise exposure and could be such that significant adverse effects occur, and/or;
- a relatively quiet, protected, nearby external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings, and/or;
- a relatively quiet, protected, external publicly accessible amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance).

2.2 Regional and Local Policy

The London Plan – Spatial Development Strategy for Greater London

2.2.1 The London Plan 2021 is the spatial development strategy for Greater London. It sets out a framework for how London will develop over the next 20 to 25 years and the Mayor's vision for good growth. Published in March 2021, the document introduces Policy D13 Agent of Change, which states the following:

"A: The Agent of Change principle places the responsibility for mitigating impacts from existing noise-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.

B: Development should be designed to ensure that established noise and other nuisance- generation uses remain viable and can continue or grow without unreasonable restrictions being placed on them.

C: New noise and other nuisance-generating development proposed close to residential and other noise-sensitive uses should put in place measures to mitigate and manage any noise impacts for neighbouring residents and businesses.

D: Development proposals should manage noise and other potential nuisances by:

- *ensuring good acoustic design mitigates and minimises existing and potential nuisances generated by existing uses and activities located in the area;*
- *exploring mitigation measures early in the design stage, with necessary and appropriate provisions including ongoing and future management of mitigation measures secured through planning obligations; and*
- *separating new noise-sensitive development where possible from existing noise-generating businesses and uses through distance, screening, internal layout, sound-proofing, insulation and other acoustic design measures.*

E: Boroughs should not normally permit development proposals that have not clearly demonstrated how noise and other nuisances will be mitigated and managed."

2.2.2 Policy D14 Noise reflects the agent of change principle and expands the methods of mitigation:

"A: In order to reduce, manage and mitigate noise to improve health and quality of life, residential and other non-aviation development proposals should manage noise by:

- *avoiding significant adverse noise impacts on health and quality of life;*
- *reflecting the Agent of Change principle as set out in Policy D13 Agent of Change;*
- *mitigating and minimising the existing and potential adverse impacts of noise on, from, within, as a result of, or in the vicinity of new development without placing unreasonable restrictions on existing noise-generating uses;*
- *improving and enhancing the acoustic environment and promoting appropriate soundscapes (including Quiet Areas and spaces of relative tranquillity);*
- *separating new noise-sensitive development from major noise sources (such as road, rail, air transport and some types of industrial use) through the use of distance, screening, layout, orientation, uses and materials – in preference to sole reliance on sound insulation;*

- *where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles; and*
- *promoting new technologies and improved practices to reduce noise at source, and on the transmission path from source to receiver.*
- *B: Boroughs, and others with relevant responsibilities, should identify and nominate new Quiet Areas and protect existing Quiet Areas in line with the procedure in Defra's Noise Action Plan for Agglomerations."*

Sounder City: The Mayor's London Ambient Noise Strategy

2.2.3 The London Ambient Noise Strategy[4] (2004) aims to minimise the adverse impacts of noise on people living, working in and visiting London by using the best available practices and technologies within a sustainable development framework.

2.2.4 The Strategy aims to work towards more compact city development, while minimising noise. This requires careful consideration of the adverse impact of noise on, from, within or in proximity to a development.

Wandsworth Local Plan

2.2.5 The borough wide Local Plan 2023-2038[5] was adopted on 19th July 2023 and is the key document used in determining planning applications in Wandsworth.

2.2.6 LP14 Air Quality, Pollution and Managing Impacts of Development states:

"A. The Council will seek to ensure that the local environmental impacts of all development proposals do not lead to detrimental effects on the health, safety and amenity of existing and new users or occupiers of the development site, or the surrounding land. These impacts include, but are not limited to, air pollution, noise and vibration, light pollution, odours and fumes, solar glare and solar dazzle, and land contamination.

B. Planning applicants should have regard to any guidance provided by the Council on local environmental impacts and pollution as well as on noise generating and noise sensitive development. Where necessary, the Council will apply planning conditions to ensure that local environmental impacts on adjacent land uses are maintained to acceptable levels."

2.2.7 In relation to noise and vibration it states:

[4] Sounder City: The Mayor's Ambient Noise Strategy, Mayor of London, March 2004
[5] Wandsworth Borough Local Plan 2023-2038

"E. The Council will require the reduction, management, and / or mitigation of noise and vibration that would arise as a result of development to ensure that the health and quality of life of existing and future residents, especially within noise sensitive buildings, is protected. Development proposals should have regard to Policy D14 of the London Plan, and the following will be required to be demonstrated as part of a noise assessment:

- *The impact of any new plant and equipment upon both receptors and general background noise levels.*
- *The provision of effective mitigation measures where noise resulting from a development needs to be controlled and managed, including through the promotion of good acoustic and site design and use of new technologies.*
- *Time limits and restrictions for activities where noise cannot be sufficiently mitigated, including through the use of planning conditions.*
- *Measures to protect the occupiers of new developments from existing sources, without harming the successful continued operation of existing uses in line with the Agent of Change principle set out in the London Plan Policy D13."*

2.3 Technical Standards and Guidance

British Standard 7445 – Description and measurement of environmental noise

2.3.1 British Standard 7445 Part 1 (BS 7455-1:2003)[6] defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

2.3.2 The methods and procedures described in this British Standard are intended to be applicable to sounds from all sources, individually and in combination, which contribute to the total noise at a Site.

2.3.3 British Standard 7445 Part 2 (BS 7455-2:1991)[7] describes methods for the acquisition of data which provide descriptors that enable:

- a description of the environmental noise in a specified area of land to be made in a uniform way;
- the compatibility of any land use activity or projected activity to be assessed with respect to existing or predicted noise; and

[6] British Standards Institute (BSI), (2003): 'BS 7445 – Description and Measurement of Environmental Noise. Part 1: Guide to Quantities and Procedures'. BSI, London.
[7] British Standards Institute (BSI), (1991): 'BS 7445 – Description and Measurement of Environmental Noise. Part 2: Guide to the Acquisition of Data Pertinent to Land Use'. BSI, London.

- Using the data as a basis, authorities may establish a system for selecting the appropriate land use, as far as levels of noise are concerned, for a specified area, or the sources of noise - existing or planned - which are acceptable with respect to land use, existing or planned.

British Standard 8233 - Guidance on sound insulation and noise reduction for buildings

2.3.4 British Standard 8233:2014[8] (BS 8233) 'Guidance on Sound Insulation and Noise Reduction for Buildings' provides criteria for the assessment of internal noise levels for various uses including dwellings and commercial properties. The standard suggests suitable internal noise levels within different types of space with examples for dwellings shown in **Table 1**.

Table 1 BS 8233 Guideline indoor noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living Room	35 dB $L_{Aeq, 16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq, 16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq, 16hour}$	30 dB $L_{Aeq, 8hour}$

2.3.5 Note 7: Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.

2.3.6 The suitability of the use of outdoor amenity spaces within the Proposed Development has been assessed using BS 8233 criteria. BS 8233 states;

"For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$ with an upper guideline value of 55 dB $L_{Aeq,T}$ 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, such as the 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 external amenity spaces but should not be prohibited."

"Other locations, such as balconies, roof gardens and terraces, are also important in residential buildings where normal external amenity space might be limited or not

[8] British Standards Institute (BSI), (2014). 'BS 8233 – Guidance on sound insulation and noise reduction for buildings. BSI, London.

available, i.e. in flats, apartment blocks, etc. In these locations, specification of noise limits is not necessarily appropriate. Small balconies may be included for uses such as drying washing or growing pot plants, and noise limits should not be necessary for these uses. However, the general guidance on noise in amenity space is still appropriate for larger balconies, roof gardens and terraces, which might be intended to be used for relaxation. In high-noise areas, consideration should be given to protecting these areas by screening or building design to achieve the lowest practicable levels. Achieving levels of 55 dB $L_{Aeq,T}$ or less might not be possible at the outer edge of these areas but should be achievable in some areas of the space."

World Health Organisation

2.3.7 The World Health Organisation (WHO) Guidelines for Community Noise[9] also sets out guidance on suitable internal and external noise levels in and around residential properties. The following internal noise levels are recommended by the WHO:

- 35 dB L_{Aeq} in living rooms over a 16-hour day;
- 30 dB L_{Aeq} in bedrooms during the 8-hour night; and
- 45 dB L_{AFmax} in bedrooms during the 8-hour night.

2.3.8 This document states that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. These indoor noise levels correspond to sound pressure levels at the outside facades of the living spaces (bedrooms) of 45 dB L_{Aeq} and 60 dB L_{Amax}. These external values have been obtained by assuming that the noise reduction of a facade from outside to inside with a window partly open is 15 dBA.

2.3.9 According to this document, to protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise.

2.3.10 Additional WHO environmental noise guidelines were published in 2018, however the 1999 document is currently considered to be the most relevant guidance given its reference in BS 8233 and ProPG.

ProPG: Planning & Noise Professional Practice Guidance on Planning & Noise New Residential Development

2.3.11 Current Government guidance on planning and noise for new residential developments is found in the National Planning Policy Framework (NPPF). One

[9] World Health Organisation (1999), WHO Guidelines for Community Noise.

of the strengths of the NPPF is that it sets clear objectives. However, the Institute of Acoustics (IOA), Association of Noise Consultants (ANC) and Chartered Institute of Environmental Health (CIEH) feel there is insufficient technical guidance to practitioners and developers on how to deliver the Government's objectives. Therefore, these professional bodies have jointly produced the ProPG[10] which aims to complement existing Government advice and provides a recommended approach that can be applied proportionately to each development site to encourage good acoustic design.

2.3.12 The ProPG seeks to promote the use of good acoustic design to:

- enable new homes to be built in areas previously considered unsuitable because of noise by appropriate evaluation and careful use of suitable mitigation.
- allow rapid identification of sites where noise is unlikely to be a constraint for new residential developments, hence saving developers time and unnecessary costs on considering the matter further.
- permit swift recognition of noisy sites that are very unlikely to be suitable for new residential developments, hence saving developers time and unnecessary costs pursuing schemes that are unlikely to be permitted; and help to reduce the harmful impact of noise on those moving into the properties and the surrounding communities.

2.3.13 The ProPG internal noise level guidelines reflect and extend current practice contained in Table 4 of BS 8233 and this is shown in **Table 2** below.

Table 2 ProPG Additions to the Guidance in Table 4 of BS 8233

Activity	Location	07:00 to 23:00	23:00 to 07:00
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq, 16\ hr}$	30 dB $L_{Aeq, 8\ hr}$ 45 dB L_{AFmax}*

* NOTE 4 For a reasonable standard in noise-sensitive rooms at night (e.g. bedrooms) individual noise events should not normally exceed 45 dB L_{AFmax} more than 10 times a night.

British Standard 4142:2014+A1:2019 – Methods for rating and assessing industrial and commercial sound

2.3.14 British Standard 4142:2014+A1:2019[11] (BS 4142) describes methods for rating and assessing sound of an industrial and/or commercial nature. The method

[10] IOA, ANC and CIEH (2017), ProPG: Planning & Noise Professional Practice Guidance on Planning &Noise New Residential Development

[11] British Standards Institution (June 2019), British Standard 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

uses outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The method is suitable for the purpose of assessing sound at proposed new dwellings or premises used for residential purposes.

2.3.15 The method of assessment requires that the existing external background noise level, L_{A90}, be subtracted from the predicted specific sound level plus any adjustment for the characteristic features of the sound.

2.3.16 Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, an acoustic character correction is required. The corrected specific sound level is the Rating Level.

2.3.17 BS 4142 contains several methods for the determination of tones and their corresponding penalties. For sound ranging from not tonal to prominently tonal, the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible and 6 dB where it is highly perceptible.

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

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

2.3.20 BS 4142 states that typically the greater the difference between the Rating Level and the background noise level, the greater the magnitude of the impact:

- A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
- The lower the rating level is, relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.

2.3.21 The consideration of context is of particular importance when assessing the effect of an existing noise source on proposed noise-sensitive dwellings. In its scope definition, BS 4142 states that it is *"not intended to be applied to the derivation of indoor sound levels arising from sound levels outside, or the assessment of indoor sound levels".* As part of the assessment of effect, BS 4142 discusses the need to consider all pertinent factors which may modify the initial assessment. In this regard it states:

"The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- facade insulation treatment;
- ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
- acoustic screening."

2.3.22 Therefore, when considering effects on residents inside their property, such as the potential for sleep disturbance, BS 4142 suggests that the guidance in BS 8233 (see above) is more applicable.

3 The Site and its Surroundings

3.1.1 The Proposed Development is located to the south of Battersea Bridge in the London Borough of Wandsworth, SW11 3BZ. The Site is bordered by Battersea Bridge Road to the west, Hester Road to the south, and the River Thames to the north. There are existing residential dwellings adjacent to the Proposed Development and to the west, on the opposite side of Battersea Bridge Road.

3.1.2 The main noise sources incident upon the Proposed Development that are expected to control the noise climate are:

- Road traffic noise from Battersea Bridge Road;
- Road traffic noise from Hester Road;
- Aircraft Noise
- Leisure noise from the River Thames; and
- Noise from pedestrians and cyclists using the Thames Path.

3.1.3 The main receptors around the Site are:

- Residences to the west, on the opposite side of Battersea Bridge Road;
- Residences as part of Thameswalk Apartments to the northeast of the Proposed Development.
- The Royal College of Art; and
- Residences as part of Albion Riverside, to the east of the Proposed Development.

3.1.4 The Proposed Development will involve the demolition of an existing building and erection of a part 10 storey, part 28 storey building (plus ground floor and basement levels) comprising residential use (Class C3), office use (Class E), community use (Class F2), and a restaurant (Class E), with associated car parking, cycle parking, public realm, landscaping and other associated works.

3.1.5 **Figure 3** in **Appendix B** shows the Site boundary.

4 Measurement Methodology

4.1 Unattended Noise Monitoring

4.1.1 An unattended environmental noise survey was carried out at two locations (U1 and U2) on the roof level of the existing building to obtain full daytime and night-time ambient noise levels during weekdays and at a weekend.

4.1.2 The sound level meters were set to log continuously over 15-minute periods measuring octave band and A -weighted L_{eq}, L_{Fmax}, L_{10} and L_{90} parameters. U1 was setup to log between 3rd and the 9th of October 2023 and U2 was setup to log between 10th and the 15th of October 2023.

4.1.3 Location U1 and U2 were positioned to the north and south of the roof respectively and were installed to record noise levels from the main noise source (Battersea Bridge Road) and to provide representative background levels for the Proposed Development. The environmental noise survey was undertaken in accordance with BS 7445: Part 2.

4.1.4 At both locations, the unattended sound level meter's microphone was positioned at a height of 1.2 m above the roof level, and more than 4 m away from any reflective surface and therefore are considered to have measured free-field levels. The sound level meter microphones were fitted with a windshield and appropriate corrections applied.

4.1.5 The unattended measurement positions are shown in **Figure 1**. Photos of each measurement position can be seen in **Figure 4** and **Figure 5** in **Appendix C**.

4.2 Attended Noise Monitoring

4.2.1 An attended noise survey was carried out at three locations (A1, A2 & A3) on 3rd October 2023 to support the unattended survey measurements.

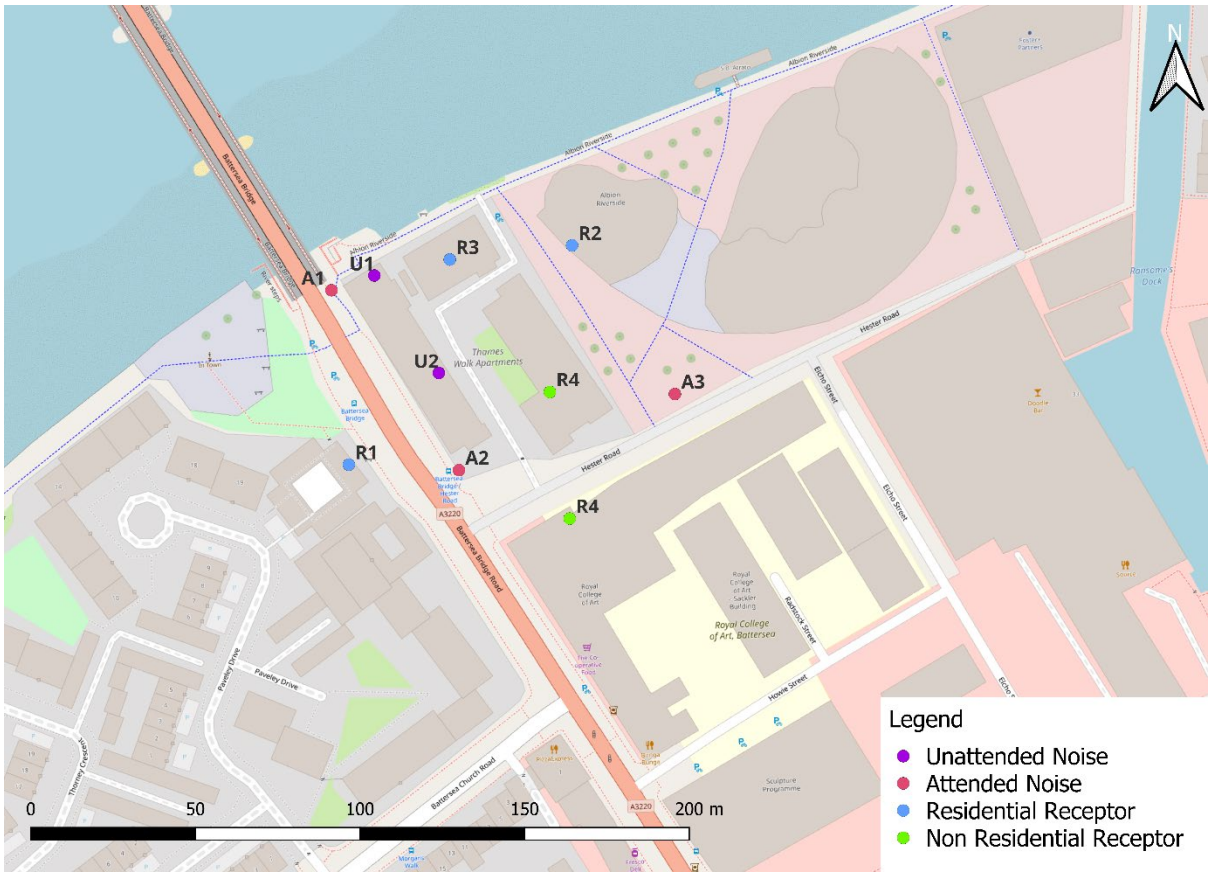
4.2.2 The sound level meter was mounted on a tripod located at a height of approximately 1.2m above local ground level at locations A1 & A3. The microphone was considered to have measured free-field levels at these locations. At location A2, the measurement microphone was on a raised section at approximately 3.5m above local ground level and was within 2m of a façade and was considered a façade measurement.

4.2.3 The meter was set to log in 15-minute periods measuring octave band and A-weighted L_{eq}, L_{Fmax}, L_{10} and L_{90}.

4.2.4 No unusual acoustic events occurred during measurements, and the data is considered to represent the typical daytime acoustic environment at the relevant measurement locations.

4.2.5 The attended measurement positions are shown in **Figure 1**. Photos of each measurement position can be seen in **Figure 6** to **Figure 8** in **Appendix C**.

Figure 1 Map showing the survey measurement locations, proposed Site boundary and nearest receptors.



4.3 Equipment

4.3.1 The equipment used is detailed in **Table 3** below. The sound level meters were field checked for calibration before and after their respective measurement periods and no significant variation in level was observed. The equipment is subject to manufacturer's certificates of periodic verification within one year for the field calibrator and two years for sound level and vibration meters. Copies of these certificates are available upon request.

Table 3 Survey Equipment

Manufacturer	Item	Type	Serial Number	Calibration Date
RION	Sound Level Meter	NA-28	00680885	07/02/22
RION	Sound Level Meter	NL-52	00410086	19/09/23

Manufacturer	Item	Type	Serial Number	Calibration Date
RION	Sound Level Meter	NL-52	00510141	19/09/23
RION	Calibrator	NC-74	34936353	08/11/22

4.4 Meteorological Conditions

4.4.1 To verify that adverse weather conditions did not significantly impact the results, the local precipitation and wind speed levels were collected using Wundermap weather data (Weather Station: ILONDO583), approx. 3.5 km from the Proposed Development.

4.4.2 **Figure 9** in **Appendix D** shows the precipitation and wind speed data for the duration of the survey. The wind speed never exceeded the recommended maximum limits of 5 m/s during the period of the survey. Periods of heavy rainfall were removed from the dataset prior to analysis.

5 Noise Survey Results

5.1 Survey Observations

5.1.1 During the daytime attended visits to Site, observations regarding perceptible noise sources influencing the baseline were noted by the surveyor at each measurement location, a summary of which is presented below.

Noise Survey

Unattended Location 1 (U1) – Located on the northern edge of the existing roof

5.1.2 The noise climate at U1 was primarily dominated by road traffic noise from Battersea Bridge Road. Aircraft passes were dominant when present. Some plant noise was just audible from a building to the south, as were pedestrians and cyclists on the footpath below to the north.

Unattended Location 2 (U2) – Located on the south eastern edge of the existing roof

5.1.3 The noise climate at U2 was dominated by road traffic noise from Battersea Bridge Road but quieter than experienced at UN1. Aircraft passes were dominant when present. Some plant noise was just audible from a building to the south.

Attended Location 1 (A1) – Located adjacent to Battersea Bridge Road northwest of the Proposed Development

5.1.4 The noise climate at A1 was primarily dominated by road traffic noise from Battersea Bridge Road.

5.1.5 **Attended Location 2 (A2) – Located adjacent to Battersea Bridge Road southwest of the Proposed Development**

5.1.6 The noise climate at A2 was primarily dominated by road traffic noise from Battersea Bridge Road.

5.1.7 **Attended Location 3 (A3) – Located between Helen Hamlyn Centre for Design and Albion Riverside**

5.1.8 The noise climate at A3 was still dominated by the road traffic noise from Battersea Bridge Road. Noise from pedestrians and cyclists were also audible.

5.2 Unattended Noise Results

5.2.1 A summary of the results of the daytime and night-time continuous noise measurements at unattended locations are presented in **Table 4**. The graphs showing the time history of the measured results for the unattended monitoring locations are given in **Figure 10** and **Figure 11** in **Appendix E**

5.2.2 The daytime and night-time $L_{Aeq,T}$ for each day has been calculated, and the typical $L_{Aeq,T}$ presented is the arithmetic average of all the daytime and night-time values.

5.2.3 The typical L_{AFmax} has been based on the tenth highest occurring L_{AFmax} from the worst-case day from the full survey.

5.2.4 The typical L_{AF90} (background sound level) has been calculated by undertaking a statistical analysis of how often the levels occur during the daytime and night-time periods in accordance with methods presented in BS 4142.

Table 4 Unattended noise survey results

Parameter	Period	U1 (dB)	U2 (dB)
Typical $L_{Aeq,T}$	Daytime	61	58
	Night-time	57	55
10th Highest $L_{AFmax,T}$	Daytime	75	72
	Night-time	72	69
Typical $L_{AF90,T}$	Daytime	54	49
	Night-time	47	44

5.2.5 Graphs of the $L_{A90,15mins}$ statistical analysis are presented in **Figure 12** to **Figure 15** in **Appendix F.**

5.3 Attended Noise Results

5.3.1 Presented in **Table 7** are the results of the attended noise monitoring.

Table 5 Attended Noise Survey Results

Date/Time	Location	$L_{Aeq,15min}$ (dB)	$L_{Amax,15min}$ (dB)	$L_{A10,15min}$ (dB)	$L_{A90,15min}$ (dB)
07/11/2023 13:39	A1	70	92	72	62
07/11/2023 14:36		69	87	72	62
07/11/2023 15:36		70	88	73	62
07/11/2023 13:21	A2	67	83	69	62
07/11/2023 14:19		68	82	71	62
07/11/2023 15:19		69	87	71	63
07/11/2023 14:01	A3	58	71	61	55
07/11/2023 15:01		61	75	64	55
07/11/2023 16:01		62	77	65	55

6 Assessment

6.1 Noise Model

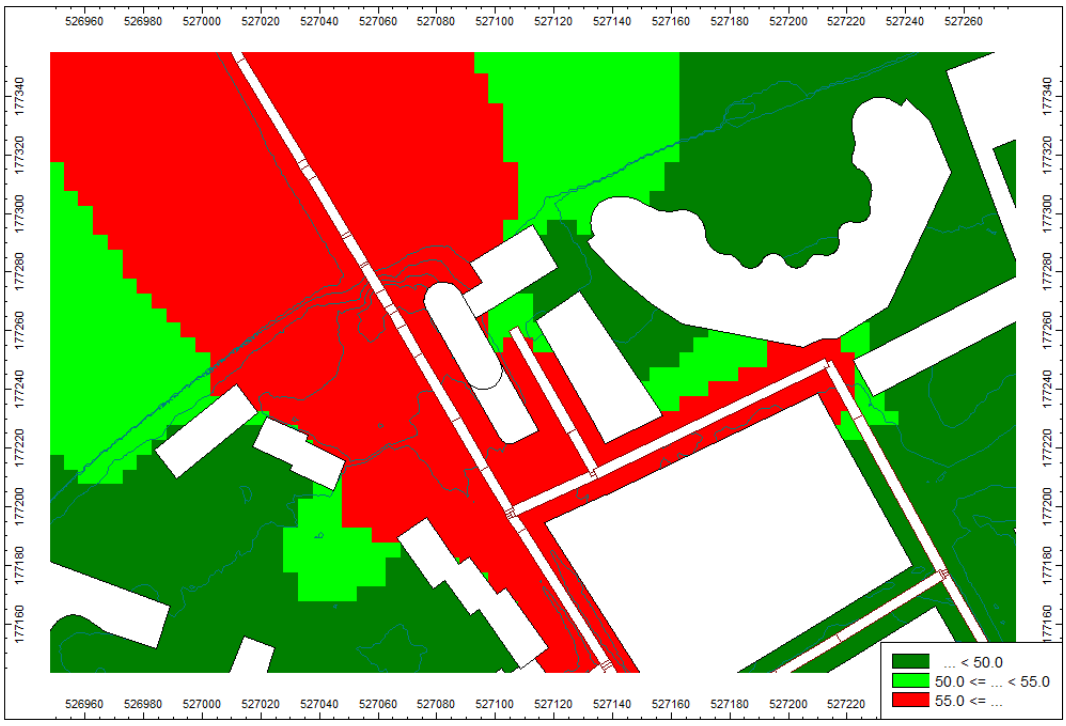
6.1.1 A 3D noise model was prepared in CadnaA prediction software. A noise input source level for the main noise source, Battersea Bridge Road was used and calibrated based on long term survey data from U1 and U2, enabling noise levels to be predicted across the application Site. A screenshot of the 3D model is presented in **Figure 16** in **Appendix G**.

6.2 External Amenity Areas

6.2.1 It is desirable that the external noise level in amenity spaces such as private gardens does not exceed 50 dB $L_{Aeq, 16hr}$, with an upper guideline value of 55 dB $L_{Aeq, 16hr}$, which would be acceptable in noisier environments.

6.2.2 The assessment of external noise levels to BS 8233 and WHO guideline levels indicates that the majority of the Site is likely to be within the BS 8233 guideline upper limit for noise levels in external amenity spaces of 55 dB $L_{Aeq, 16hr}$ **(Figure 2)**.

Figure 2 BS 8233 External daytime amenity areas assessment



6.3 Internal Noise Levels

6.3.1 Daytime internal noise levels should be controlled to allow reasonable resting conditions in living rooms and bedrooms. Night-time internal noise levels should be controlled to allow reasonable sleeping conditions in bedrooms. These can be controlled through use of appropriate mitigation measures to meet the guideline internal noise levels from BS 8233 detailed in **Table 1** and by controlling the regular L_{AFmax} during the night-time to below 45 dB.

6.3.2 **Table 9** shows the external noise levels against the required sound insulation to achieve the BS 8233 and WHO guidance criteria.

Table 6 External Noise Levels and the required sound insulation

Façade	Room Type	Worst case External Noise Levels, dB			Outline guidance on the required facade sound insulation to achieve BS 8233:2014 & WHO guidelines, $R_w + C_{tr}$, dB	
		$L_{Aeq,16hour}$, 0700-2300	$L_{Aeq,8hour}$, 2300-0700	L_{AFmax}, 2300 -0700	Day	Night
North	Living Room	64	60	71	29	N/A
	Bedroom					30
East	Living Room	58	55	60	23	N/A
	Bedroom					25
South	Living Room	64	60	71	29	N/A
	Bedroom					30
West	Living Room	65	61	73	30	N/A
	Bedroom					31

6.3.3 The practical design approach for the worst case facades of the Proposed Development may be summarised as follows:

- specific calculated assessment required of sound insulation for all elements of the building envelope;
- moderate sound insulation for non-vision areas and roof;
- moderate acoustic performance windows of minimum sound insulation with minimum sound reduction index of 31dB R_w+C_{tr} (which may typically be achieved using glazing with a 6/12/6 configuration) for the north, west and south façades;

- standard acoustic performance windows of minimum sound insulation with minimum sound reduction index of up 25dB R_w+C_{tr} (which may typically be achieved using glazing with a 4/12/4 configuration) for the east façade, and
- an alternative means of ventilation should be designed capable of performing to the same acoustic specification as associated glazing to remove the need to ventilate the building using openable windows.

6.3.4 It should be noted that the detailed prediction of noise ingress is dependent upon the precise facade make up (glazed area etc.) and the acoustic characters of the final proposed internal spaces. During detailed design stage, specific calculated assessment is required of the sound insulation of the building envelope to review whether the proposed solution is suitable to meet the guideline internal noise levels. Detailed information is not currently available; as such the above advice has been provided to demonstrate the feasibility of the mitigation. A more detailed assessment should be undertaken as the design progresses.

6.3.5 It is understood that where the noise levels are such that windows have to be kept closed (as required by Approved Document O), mechanical cooling or similar (such as MVHR and peak lopping) will be provided, therefore, an assessment for the potential noise impact during the overheating condition has not been carried out.

6.4 Plant Noise

6.4.1 At this stage, the building services plant requirements have not been finalised, and therefore, there is no plant sound emission data available.

6.4.2 For the purpose of this assessment, it is considered appropriate to propose noise limits applicable to any future plant associated with the development.

6.4.3 BS 4142 proposes an assessment based on the comparison of the Rating Level of the noise against the 'typical' background sound level. The typical background measured levels during the daytime and night-time were determined to be:

U1:

- Daytime: 54 dB L_{AF90};
- Night-time: 47 dB L_{AF90}.

U2:

- Daytime: 49 dB L_{AF90};
- Night-time: 44 dB L_{AF90}.

6.4.4 Based on the above, it is proposed that the noise from all items of plant operating simultaneously at normal design duty are designed, where practicable, not to exceed a Rating Level of 54 dB during the daytime and 47 dB during the night-time near U1 and 49 dB during the daytime and 44 dB during the night-time near U2, when assessed at 1m from the nearest noise sensitive receptor. This would equate to a low impact, depending on the context, in accordance with BS 4142.

6.4.5 It is important to recognise that the Rating Level is based on the specific sound level, i.e. the sound level of the source being assessed, with corrections made to account for acoustic features that could increase the significance of the impact, for example: tonality, impulsivity or intermittency. These corrections can lead to a much higher rating level than the specific level alone and therefore it is important that any prominent acoustic features are adequately addressed at the design stage.

6.4.6 When the plant is confirmed, a further assessment should be completed to review the practicability of keeping sound levels as low as the suggested design targets above but with the overall target of keeping the likely impact low according to the methods in BS 4142.

7 Conclusion

7.1.1 Temple Group has been appointed by Promontoria Battersea Limited to undertake a noise impact assessment for the Proposed Development at One Battersea Bridge.

7.1.2 An assessment has been undertaken to determine the location's suitability for noise sensitive residential development. Unattended and attended noise measurements have been completed at the Site to characterise the existing noise environment over daytime and night-time. A noise model has been used to predict noise levels at each facade of the Proposed Development. The predicted noise levels have then been assessed in line with the local and national noise guidance and relevant standards.

7.1.3 The assessment of external noise levels to BS 8233 and WHO guideline levels indicate that the upper guideline level of 55 dB $L_{Aeq,\ 16hr}$ would be achieved across the majority of the amenity space of the Proposed Development.

7.1.4 The noise assessment based on the results of the noise survey indicates that the proposed internal noise levels in accordance with BS 8233, ProPG and WHO's noise guidelines can be achieved with good acoustic design. To provide internal noise levels which consistently meet the guideline noise levels in the most exposed areas of the Site, the practical design approach may be summarised as follows:

7.1.5 The practical design approach for the north, east, south and west façades of the Proposed Development may be summarised as follows:

- specific calculated assessment required of sound insulation for all elements of the building envelope;
- moderate sound insulation for non-vision areas and roof;
- moderate acoustic performance windows of minimum sound insulation with minimum sound reduction index of up 31dB R_w+C_{tr} (which may typically be achieved using glazing with a 6/12/6 configuration) for the north, west and south façades;
- standard acoustic performance windows of minimum sound insulation with minimum sound reduction index of up 25dB R_w+C_{tr} (which may typically be achieved using glazing with a 4/12/4 configuration) for the east façade, and
- an alternative means of ventilation should be designed capable of performing to the same acoustic specification as associated glazing to remove the need to ventilate the building using openable windows.

7.1.6 Noise limits for any mechanical plant associated with the Proposed Development have been outlined based on guidance in BS 4142. It is proposed

that the noise from all items of plant operating simultaneously at normal design duty are duty are designed, where practicable, not to exceed a Rating Level of 54 dB during the daytime and 49 dB during the night-time near U1 and 47 dB during the daytime and 44 dB during the night-time near U2, when assessed at 1m from the nearest noise sensitive receptor. This would equate to a low impact, depending on the context, in accordance with BS 4142. It is likely to be reasonable and still lead to a low impact if the rating level is higher than the design Rating levels given above at night as long the absolute noise levels are reasonable. Further BS 4142 assessment should be completed where mechanical plant is likely to exceed these design Rating levels.

Appendix A - Acoustic Glossary

Noise/Sound

Noise and sound need to be carefully distinguished. Sound is a term used to describe wave-like variations in air pressure that occur at frequencies that can stimulate receptors in the inner ear and, if sufficiently powerful, be appreciated at a conscious level. Noise implies the presence of sound but also implies a response to sound: noise is often defined as unwanted sound.

Decibel, dB

The unit used to describe the magnitude of sound is the decibel (dB) and the quantity measured is the sound pressure level. The decibel scale is logarithmic, and it ascribes equal values to proportional changes in sound pressure, which is a characteristic of the ear. Use of a logarithmic scale has the added advantage that it compresses the very wide range of sound pressures to which the ear may typically be exposed to a more manageable range of numbers. The threshold of hearing occurs at approximately 0dB (which corresponds to a reference sound pressure of 20 μPa) and the threshold of pain is around 120dB.

Frequency, Hz

Frequency is the number of occurrences of a repeating event per unit second or Hertz (Hz). The human ear is sensitive to sound in the range 20 Hz to 20,000 Hz (20 kHz). For acoustic engineering purposes, the frequency range is usually divided up into octave bands, in which the upper limiting frequency for any band is twice the lower limiting frequency. The bands are described by their centre frequency value. In environmental acoustics the ranges typically used are from 63 Hz to 8 kHz.

A-weighting

The sensitivity of the ear is frequency dependent. Sound level meters are fitted with a weighting network which approximates to this response and allows sound levels to be expressed as an overall single figure value, in dB(A).

Ambient sound

Totally encompassing sound in a given situation at a given time, usually composed of sound from many sources near and far.

Ambient sound level ($L_{Aeq,T}$)

Equivalent continuous A-weighted sound pressure level of the totally encompassing sound in a given situation at a given time, usually from many sources near and far, at the assessment location over a given time interval, T.

Background sound level ($L_{A90,T}$)

A-weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90 % of a given time interval, T, measured using time weighting F and quoted to the nearest whole number of decibels.

Rating level

Specific sound level plus any adjustment for the characteristic features of the sound.

Reference time interval

Specified interval over which the specific sound level is determined. This is 1 h during the day from 07:00 h to 23:00 h and a shorter period of 15 min at night from 23:00 h to 07:00 h.

Residual sound

Ambient sound remaining at the assessment location when the specific sound source is suppressed to such a degree that it does not contribute to the ambient sound.

Residual sound level ($L_{Aeq,T}$)

Equivalent continuous A-weighted sound pressure level of the residual sound at the assessment location over a given time interval, T.

Specific sound level

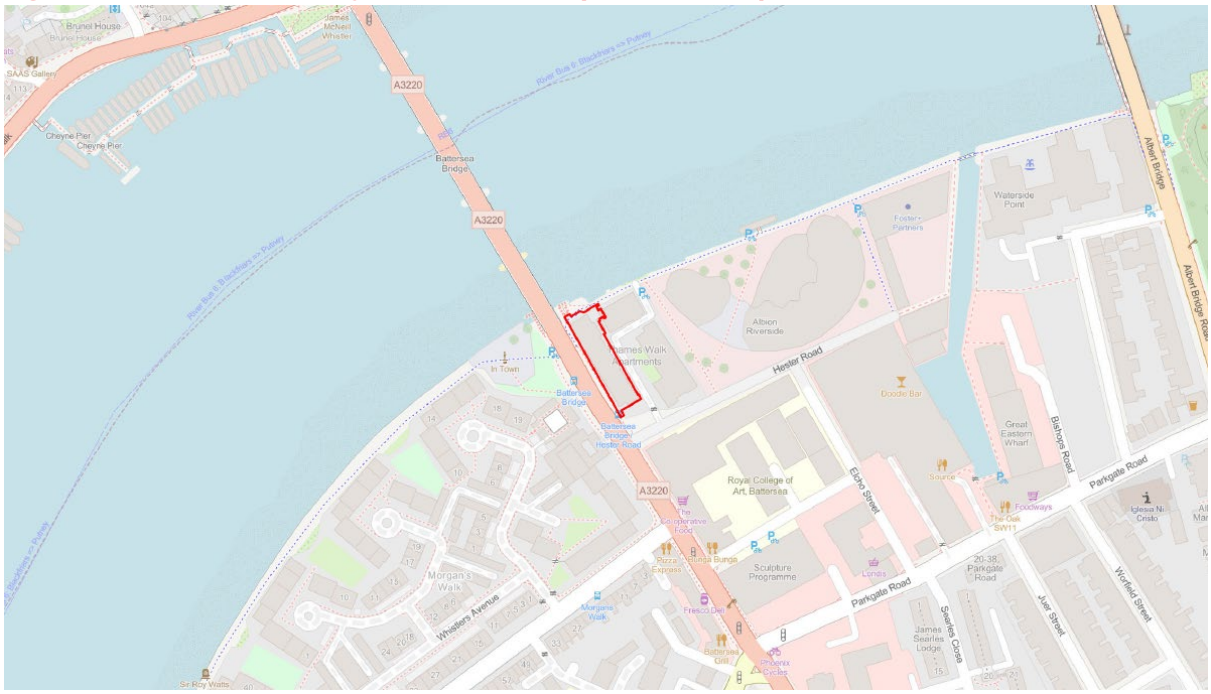
Equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval.

Specific sound source

Sound source being assessed.

Appendix B - Red Line Boundary of the Proposed Site

Figure 3 Red Line Boundary (RLB) of the Proposed Development



Appendix C – Survey Photos

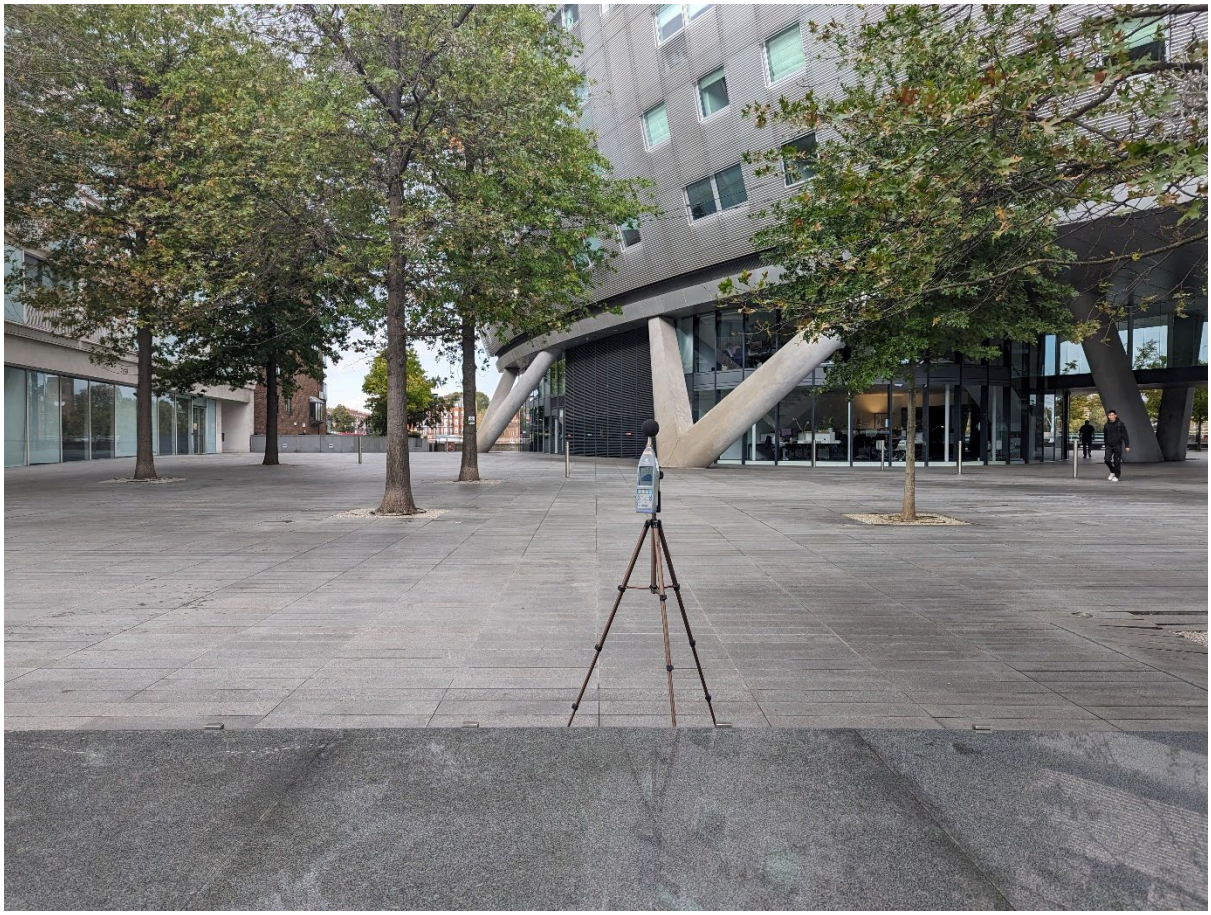
Figure 4 Unattended Monitoring Location 1 (U1)

Figure 5 Unattended Monitoring Location 2 (U2)

Figure 6 Attended Monitoring Location 1 (A1)

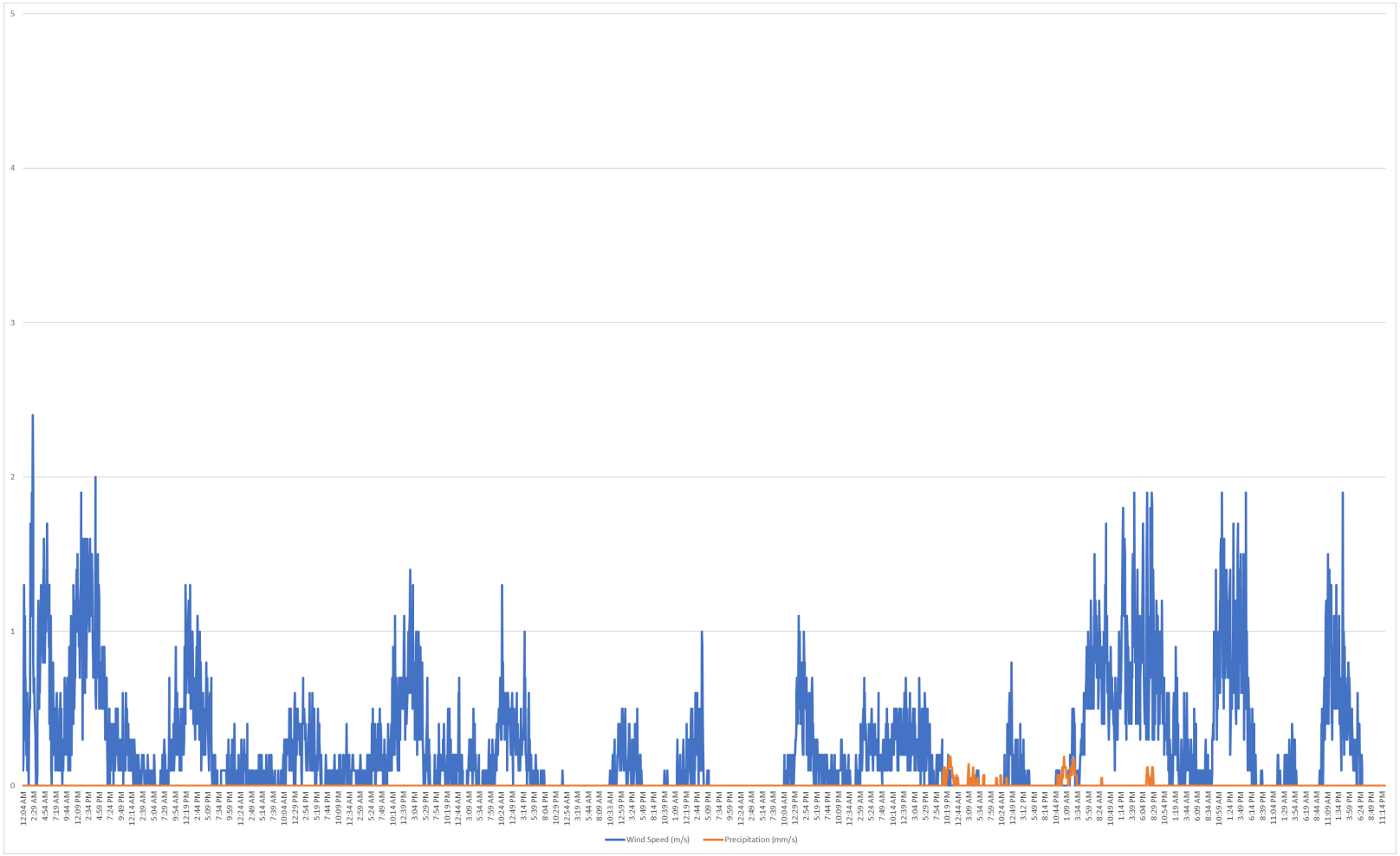
Figure 7 Attended Monitoring Location 2 (A2)

Figure 8 Attended Monitoring Location 3 (A3)



Appendix D – Weather Data

Figure 9 Meteorological data for the survey period (3rd October 2023 – 15th October 2023)



Appendix E – Unattended Measurement Data

Figure 10 Unattended Monitoring Location 1 (U1) data

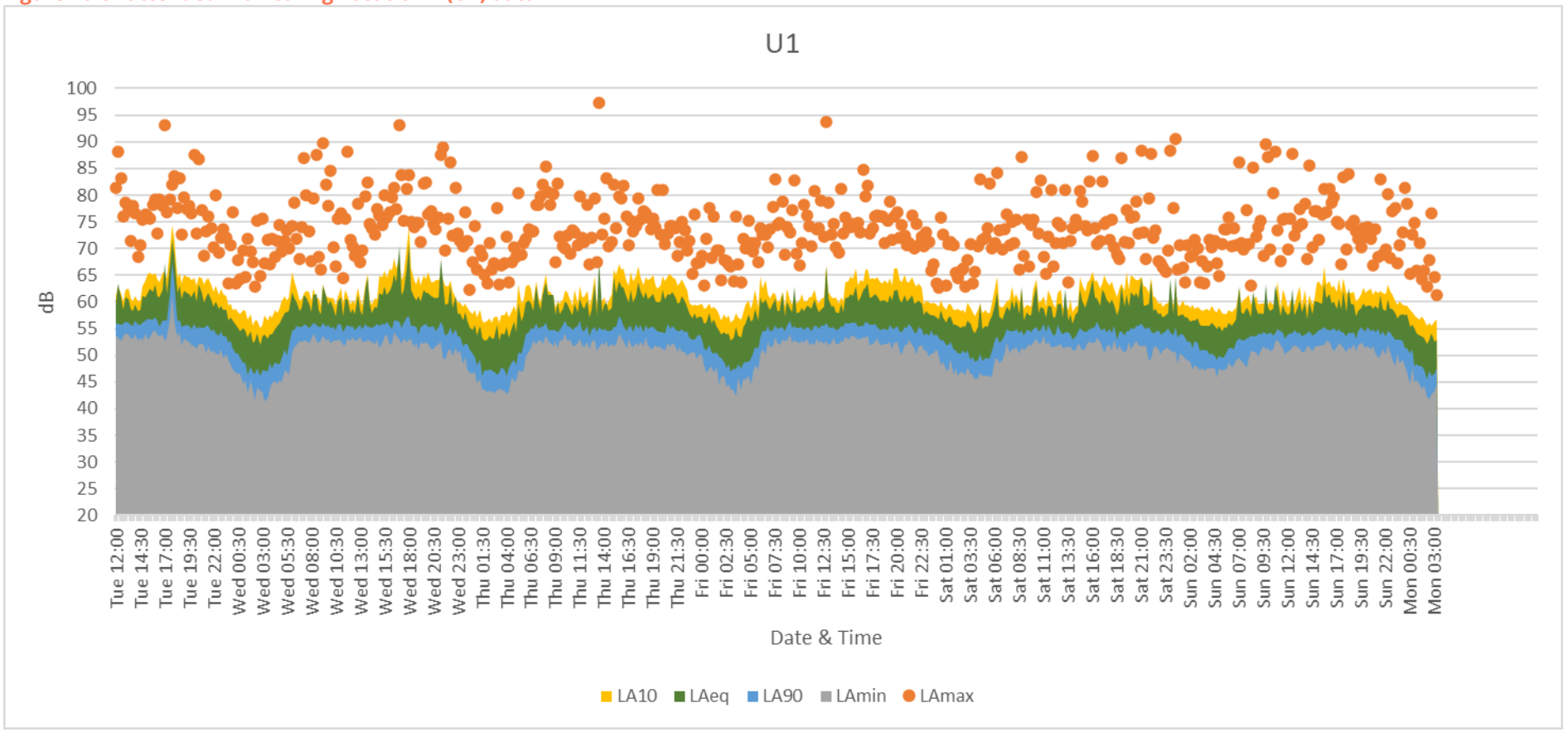
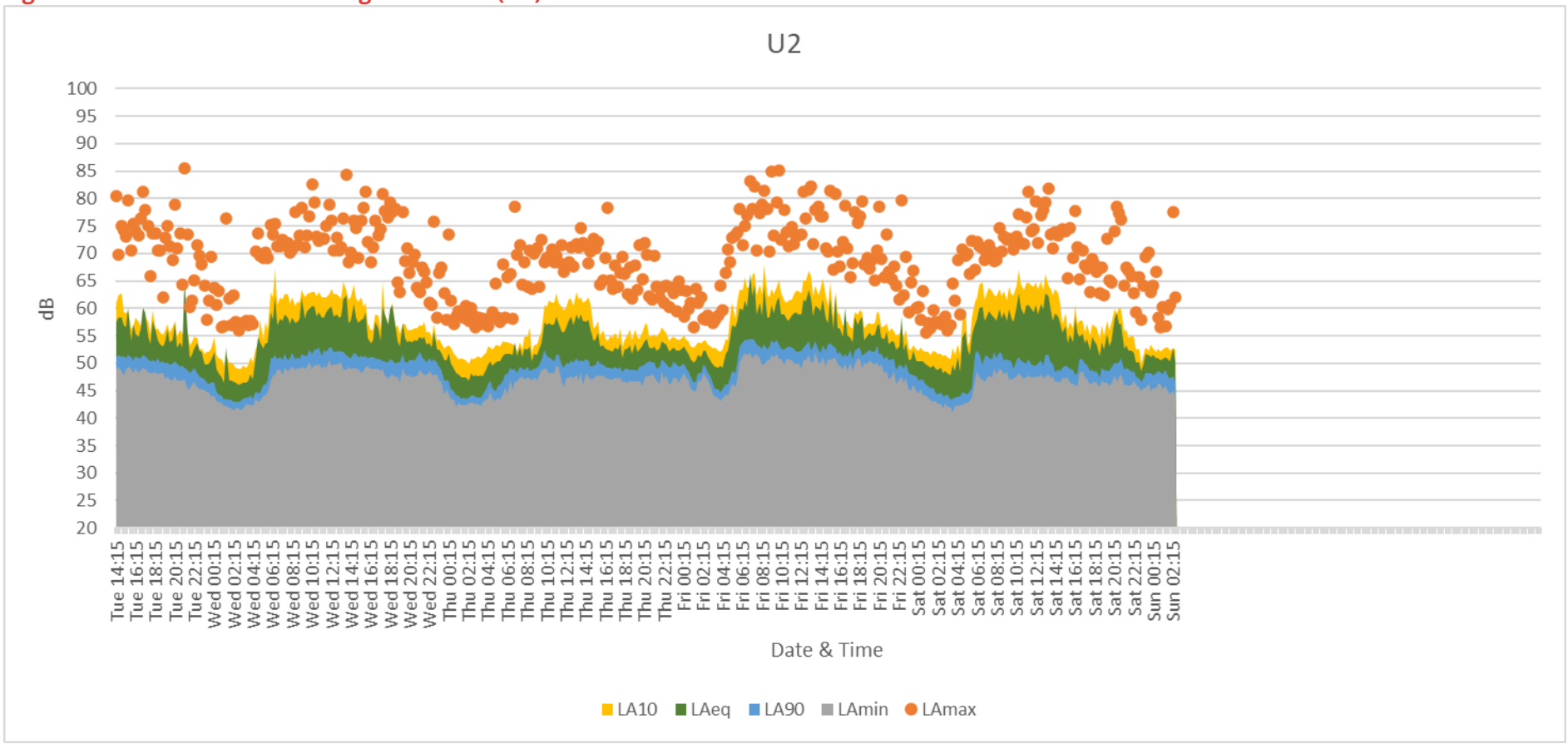


Figure 11 Unattended Monitoring Location 2 (U2) data



Appendix F – $L_{A90,\ 15mins}$ Statistical Analysis

Figure 12 Statistical analysis of the daytime (07:00-23:00) $L_{A90,\ 15mins}$ measurements to determine background sound level at U1

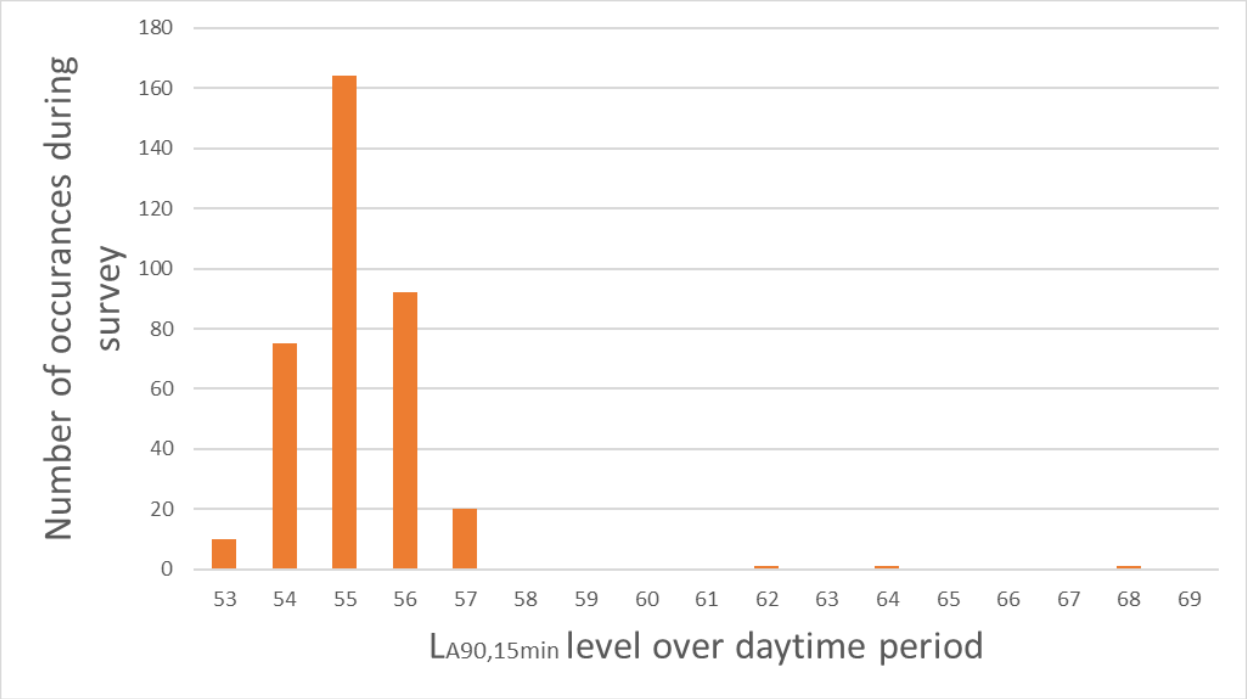


Figure 13 Statistical analysis of the night-time (23:00-07:00) $L_{A90,\ 15mins}$ measurements to determine background sound level at U1

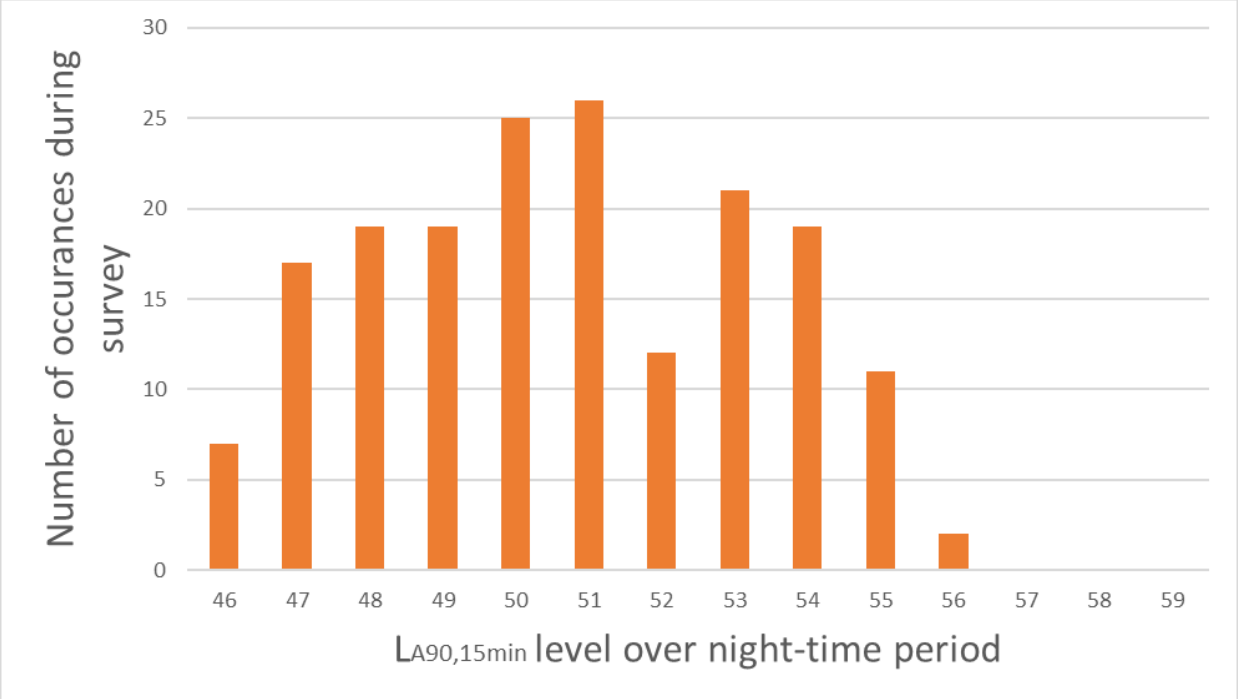


Figure 14 Statistical analysis of the daytime (07:00-23:00) $L_{A90,\ 15mins}$ measurements to determine background sound level at U2

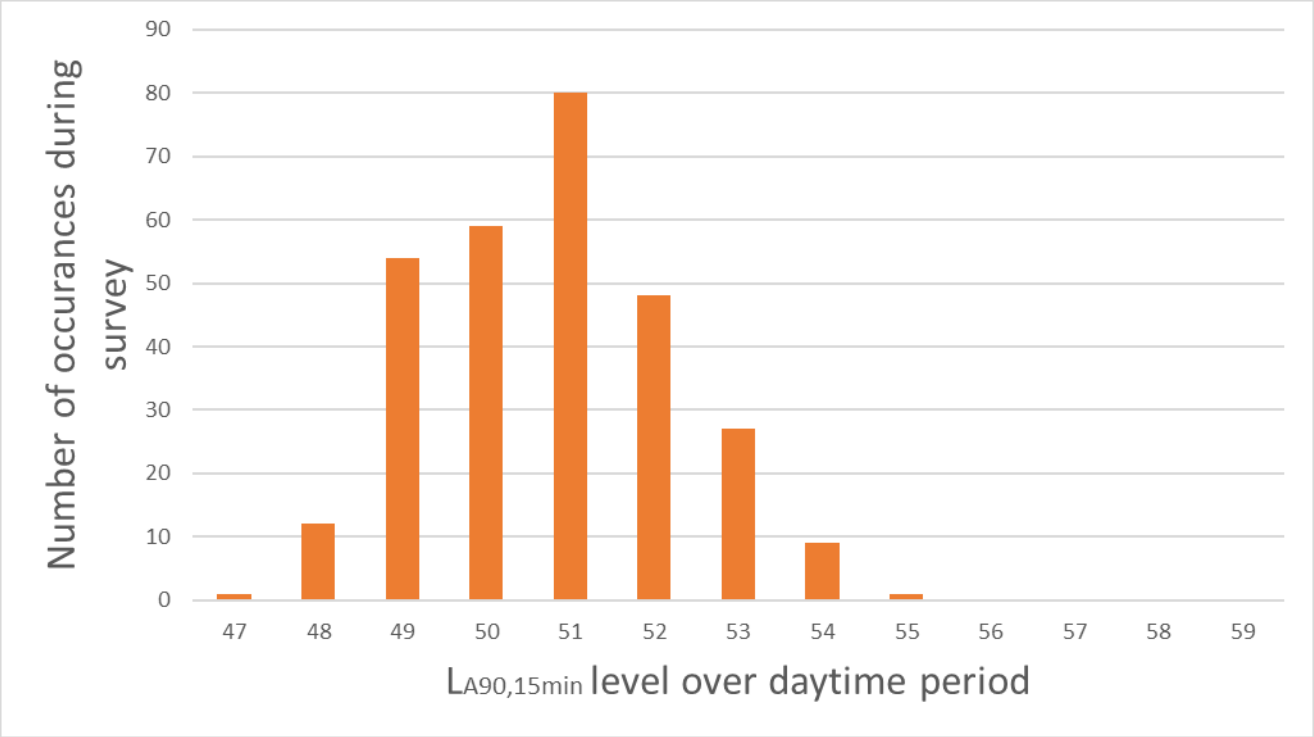
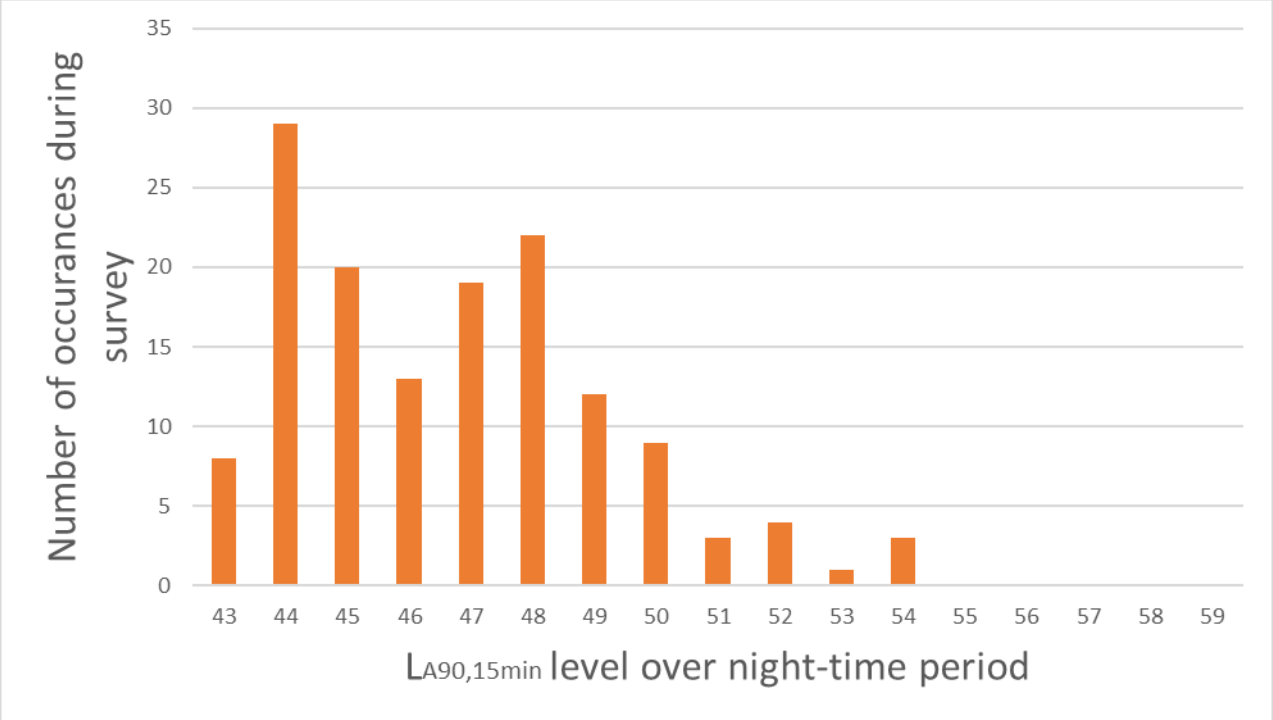
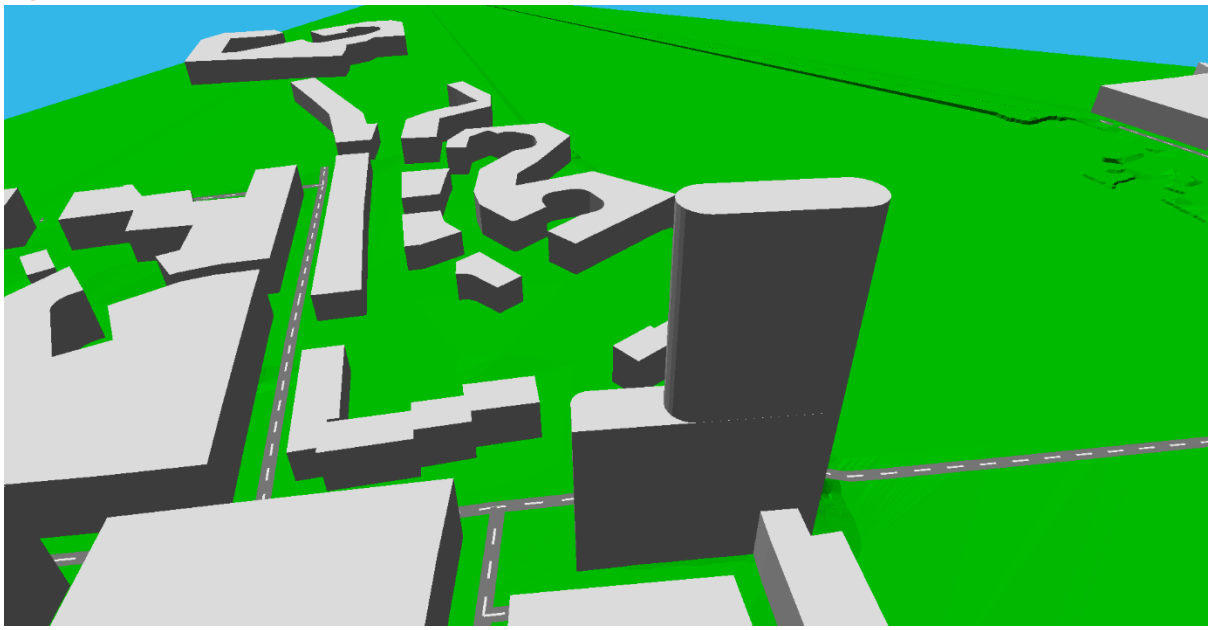


Figure 15 Statistical analysis of the night-time (23:00-07:00) $L_{A90,\ 15mins}$ measurements to determine background sound level at U2



Appendix G – 3d CadnaA Model

Figure 16 3D CadnaA Model



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