Northern Estate Programme

Norman Shaw North Standalone Noise Impact Assessment

March 2021

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HOUSE OF COMMONS
NORTHERN ESTATE PROGRAMME

Version	Date	Name	Reviewed By	Description of Changes	Sign-off
C01	29/03/2021	Lawrence Norman	Roslyn Andrews	For Planning	

Contents

1 Introduction

1.1.1 This Noise Impact Assessment has been produced to support the application for full planning permission and listed building consent for the proposed Norman Shaw North Standalone works. The assessment has been prepared by Aecom Acoustics on behalf of the Corporate Officer of the House of Commons.

1.2 Description of Norman Shaw North Proposals

1.2.1 The Norman Shaw North Standalone proposals comprise a package of internal and external refurbishment works. The description of development ('the Proposed Development') relating to the standalone works is set out below:

"Full planning consent for the refurbishment of Norman Shaw North including the installation of a glazed roof covering to the internal courtyard, to provide further accommodation for parliamentary uses (Sui Generis); installation of chillers at ground level adjacent to the northern elevation; basement piling; alterations to the courtyard eaves to create a roof access gallery; alteration of the northern elevation; alteration of north western corner stepped plinth; alteration to Laundry Road landscape and levels to provide accessibility improvements; and crane gantry screw piling located in Commissioners Yard.

Listed Building Consent for the internal and external refurbishment, including installation of new building services and rooftop repairs and reconfiguration including rooftop louvres and reconstruction of chimneys; courtyard roof fixings; secondary glazing; and interiors; alterations to existing openings and basement vaults; and associated works including temporary construction works."

1.2.2 Listed Building Consent for the internal and external refurbishment, including installation of new building services and rooftop louvres; courtyard roof fixings; secondary glazing; and interiors; alterations to existing openings and basement vaults; and associated works including temporary construction works.

1.3 Noise Impact Assessment Introduction

1.3.1 This document provides an overview of the effect that the proposed Norman Shaw North standalone refurbishment may have on the existing noise climate around the development. Noise mitigation methods are suggested, as appropriate, to minimise the influence of site-related plant noise on surrounding premises.

2 Baseline Noise Survey

2.1 Summary

2.1.1 Noise surveys were undertaken to establish the baseline noise environment around the Site. The baseline noise measurement results have been used to establish plant noise emission limits in line with Local Authority planning requirements and to calibrate a 3D acoustic model for the future scheme. The potential noise impacts associated with the Proposed Development have subsequently been identified and mitigation measures advised, as necessary.

2.1.2 The noise surveys were undertaken in 2017 prior to COVID-19 pandemic, therefore, are considered to be representative of the baseline noise levels typically present around the site. This approach has been discussed directly with Westminster City Council on 19 January 2021 and is in-line with the approach to baseline noise surveys recommended by Westminster City Council in their document, 'Baseline noise surveys in Westminster' (January 2021).

2.1.3 The use of previous noise surveys is also consistent with the approach detailed in the 'Joint Guidance on the Impact of COVID-19 on the Practicality and Reliability of Baseline Sound Level Surveying and the Provision of Sound & Noise Impact Assessments Version 6' produced by the IOA/ANC (January 2021).

2.2 Methodology

2.2.1 An unattended baseline noise survey was undertaken from 31 August to 2 September 2017 to provide noise data for a representative 'quiet' location (LT1) on the Site. This data was supplemented by short-term noise monitoring for a period of 2 hours at each location on 29 September 2017 at three locations (ST1, ST2, and ST3) to better establish the noise climate around the site and to allow for calibration of the environmental noise model. The noise monitoring locations are shown in Figure 2.1

2.2.2 The noise climate at ST1 on Parliament Street was dominated by traffic noise emitted from traffic approaching the junction with Bridge Street. Additional pedestrian noise from light foot traffic had a minor influence on the measurements.

2.2.3 ST2 was also exposed to traffic noise from the junction on the corner of Parliament Street and Bridge Street. The location was positioned opposite the Houses of Parliament, outside the Houses of Parliament shop, meaning there was extensive foot traffic/noise generated from pedestrians entering the shop and stopping to take photographs.

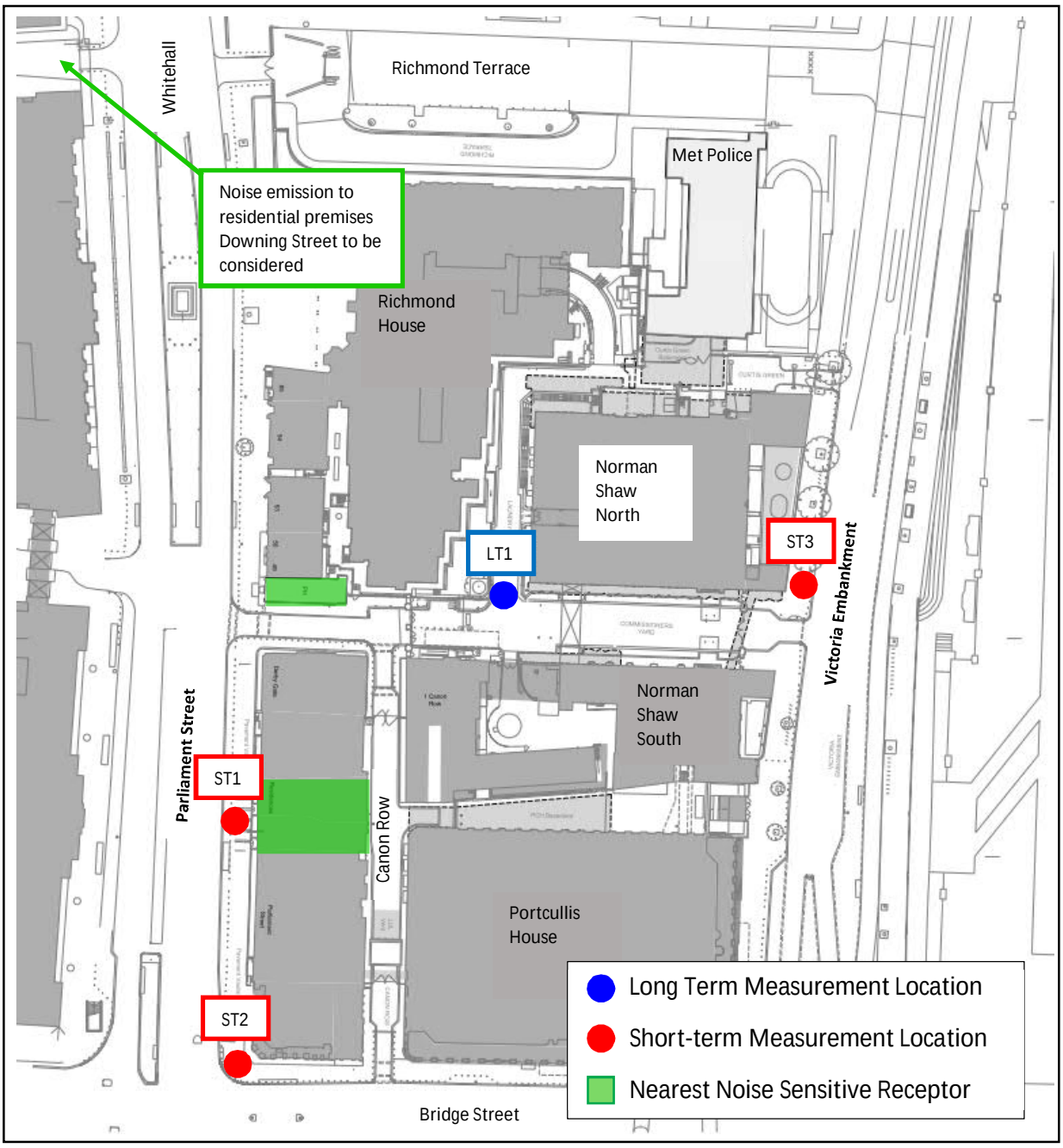
2.2.4 ST3 on Victoria Embankment had a much quieter noise climate as the traffic at this location was very slow moving and often stationary, in addition light foot traffic meant that there was some noise contribution from pedestrians.

2.2.5 LT1 was deemed to be representative of the lowest background noise levels that the existing Northern Estate Site premises experience. The levels are also deemed to be representative of the lowest background noise levels that surrounding buildings experience. It should be noted that there were a number of items of plant that appeared to be temporary installations and the measurement location was therefore chosen to minimise the influence of these items.

2.2.6 The noise climate on the day of the measurement period is considered to be representative of the typical noise climate at each location. The baseline noise surveys were undertaken in accordance with best practice as specified in BS 7445:1991 Part 2.

2.2.7 Figure 2.1 provides a site plan showing the noise level measurements locations and the nearest noise sensitive premises to the proposed development.

Figure 2.1: Site Plan Showing the Measurement Locations and Nearest Noise Sensitive Receptors



2.3 Measurement Equipment

2.3.1 The following equipment was used to undertake the noise measurements at both the unattended and attended locations.

Table 2.1: Measurement Equipment Details			
Equipment Item	Serial Number	Measurement Equipment Used	
		Attended	Unattended
Norsonic 118 Integrating Average Sound Level Meter	30667	✓	✓
Norsonic 118 Integrating Average Sound Level Meter	28136	✓	
Norsonic 1212 Weatherproof Microphone Enclosure	N/A	✓	✓
Norsonic 1251 Calibrator	31431	✓	✓

2.3.2 All sound level meters and their associated microphones were checked against the calibrator at the beginning and end of each measurement period, in accordance with recommended practice. No significant drift in calibration was observed. The accuracy of the calibrator and sound level meter can be traced to the National Physical Laboratory Standards.

2.3.3 At the long-term measurement location, the noise logging equipment was set to continuously monitor noise levels in 15-minute sample periods. At the short-term attended noise logging locations, a shorter 5-minute sample period was chosen as it was anticipated that there was potential for noise from pedestrians to affect the results. For each measurement period the overall dB L_{A90} (typically used to assess background noise), octave band dB L_{eq} and L_{max} values were recorded (typically used to assess noise ingress).

2.3.4 Weather conditions at each location during the measurement period are presented in the table below. The weather conditions were considered suitable for external noise measurements.

Table 2.2: Weather Conditions			
Date	Temperature (°C)	Wind Speed (m/s)	Weather Conditions
31/08/2017	16	1.1	Dry and Sunny
02/09/2017	18	-	Cloudy with intermittent rain
29/07/2017	20-21	0.5-2.3	Cloudy with intermittent rain

2.4 Measurement Results

2.4.1 The noise climate across the site is dominated by noise from traffic on the surrounding roads, namely Victoria Embankment, Bridge Street and Parliament Street. Within the enclosed area formed between the buildings, noise levels are generally quieter, but still experiences some distant traffic noise from the aforementioned roads. Items of plant associated with Richmond House and current plant installations associated with Norman Shaw North and Norman Shaw South, are also audible in this area.

2.4.2 The following table presents the typical background noise levels measured during the unattended measurements. The values selected have been based on of the lowest noise levels measured for the daytime (7:00-19:00 hrs), evening (19:00-23:00 hrs) and night-time (23:00-7:00 hrs) periods.

Table 2.3: Noise Monitoring Results

Monitoring Location	Ambient $L_{Aeq,T}$ (dB)	Typical Daytime (07:00-19:00) Background, $L_{A90,15min}$ (dB)	Typical Evening (19:00-23:00) Background, $L_{A90,15min}$ (dB)	Typical Night-time (23:00-07:00) Background, $L_{A90,15min}$ (dB)
LT1	60 (T=10 hours)	54	55	53
ST1	71 (T=3 hours)	65	-	-
ST2	72 (T=3 hours)	68	-	-
ST3	72 (T=3 hours)	63	-	-

3 Plant Noise Emission

3.1 Criteria

3.1.1 The proposals have been developed and must be assessed with regard to the statutory development plan which comprises:

- Saved Westminster Unitary Development Plan (UDP) Policies (January 2007); and

- Westminster's City Plan ('WCP') (November 2016).

3.1.2 The proposals have also been developed and must be assessed with regard to emerging planning policy, afforded weight according to its current progress through the adoption process.

The City Council is currently working on a complete review of its City Plan. Formal consultation on Westminster's City Plan 2019-2040 was carried out under Regulation 19 of the Town and Country Planning Act (Local Planning) (England) Regulations 2012 between Wednesday 19 June 2019 and Wednesday 31 July 2019 and on the 19 November 2019 the plan was submitted to the Secretary of State for independent examination. The Plan has now been found sound and the Inspector's final report was published on 19 March 2021. In the case of a draft local plan that has been submitted to the Secretary of State and found to be sound following an Examination, having regard to the tests set out in paragraph 48 of the NPPF, the WCP attracts significant weight.

<u>Westminster's City Plan (2016)</u>

3.1.3 Westminster's City Plan (2016) provides both strategic and more detailed policies to manage the city and deliver Westminster's future sustainable development.

3.1.4 The specific guidance relating to noise is provided below, for reference:

Policy S32: Noise

The council will work to reduce noise pollution and its impacts and protect Noise Sensitive Receptors from noise by:

- Requiring development to minimise and contain noise and vibration;
- Ensuring development provides an acceptable noise and vibration climate for occupants and is designed to minimise exposure to vibration and external noise sources; and

<u>Westminster City Council Unitary Development Plan: Environmental Policy</u>

3.1.1 The City of Westminster Unitary Development Plan includes Planning Policy guidance to minimise the impact of future developments on the surrounding environment. Policies ENV 6 & ENV 7 relate specifically to noise pollution and control of noise from plant machinery and internal activity, respectively.

3.1.2 The specific guidance is provided below, for reference:

<u>Policy ENV 6: Noise Pollution</u>

"The City Council will:

1. require design features and operational measures to minimise and contain noise from developments, to protect noise sensitive properties

2. where development adjoin other buildings or structures, require applicants to demonstrate that as far as is reasonably practicable developments will be designed and operated to prevent transmission of audible noise or perceptible vibration through the fabric of the building or structure to adjoining properties

3. require a noise and vibration assessment report where development or change of use could affect noise sensitive properties

4. require residential developments to provide adequate protection from existing background noise

5. not permit development that would cause noise disturbance in tranquil areas

6. apply conditions when granting planning permission to restrict noise emissions, transmission of noise or perceptible vibration and hours of operation, to require incorporation of acoustic measures to meet these conditions and to require, where appropriate, such conditions to be complied with before new plant or the development is used

7. require all mechanical, ventilation and ducting equipment to be contained within the building envelope of new developments

8. encourage developers to ensure servicing of plant and machinery so that the noise conditions are met at all times

9. require developers, when carrying out construction work, to keep to a minimum disturbance to surrounding areas, and to adhere to hours of working agreed with the City Council prior to start on site

10. seek measures to minimise and reduce noise from traffic."

Policy ENV 7: Controlling noise from Plant, Machinery and Internal Activity

(A) "Where development is proposed, the City Council will require the applicant to demonstrate that this will be designed and operated so that any noise emitted by plant and machinery and from internal activities, including noise from amplified or unamplified music and human voices, will achieve the following standards in relation to the existing external noise level at the nearest noise sensitive properties at the quietest time during which the plant operates or when there is internal activity at the development.

1. Where the existing external noise level exceeds WHO Guideline levels of $L_{Aeq,12hrs}$ 55dB daytime (07:00-19:00); $L_{Aeq,4hrs}$ 50dB evening (19:00-23;00); $L_{Aeq.8hrs}$ 45dB night-time (23:00-07:00):

either

a) where noise from the proposed development will not contain tones or be intermittent sufficient to attract attention, the maximum emission level ($L_{Aeq15min}$) should not exceed 10dB below the minimum external background noise at the nearest noise sensitive properties. The background noise level should be expressed in terms of $L_{A90,15min}$.

or

b) where noise emitted from the proposed development will contain tones, or will be intermittent, the maximum emission level ($L_{Aeq15min}$_ should not exceed 15dB below the minimum external background noise at the nearest noise sensitive

properties. The background noise level should be expressed in terms of $L_{A90,15min}$.

2. Where the existing external noise level does not exceed the above WHO Guideline levels, policy ENV 7(A)(1)(a) and (b) will apply except where the applicant is able to demonstrate to the City Council that the application of slightly reduced criteria of no more than 5dB will provide sufficient protection to noise sensitive properties:

   either

   a) where noise emitted from the proposed development will not contain tones or be intermittent sufficient to attract attention, the maximum emission level ($L_{Aeq15min}$) should not exceed 5dB below the minimum external background noise at the nearest noise sensitive properties. The background noise level should be expressed in terms of $L_{A90,15min}$.

   or

   b) where noise emitted from the proposed development will contain tones, or will be intermittent sufficient to attract attention, the maximum emission level ($L_{Aeq15min}$_ should not exceed 10dB below the minimum external background noise at the nearest noise sensitive properties. The background noise level should be expressed in terms of $L_{A90,15min}$.

(B) Noise from emergency generators

Where emergency generation plant is installed and requires testing, the City Council will permit noise emitted from this plant to increase the minimum assessed background noise levels by no more than 10dB for the purpose of testing. This testing period is for up to one hour per month between 09.00 and 17.00 Monday to Friday only and not on public holidays."

Draft Westminster City Plan 2019 – 2040

3.1.3 Policy 34 (Local Environmental Impacts)

"A. The council will make sure that quality of life and health and wellbeing of existing and future occupiers, and the natural environment, are not adversely affected by harmful pollutants and other negative impacts on the local environment.

Noise and Vibration – C. Development should prevent adverse effects of noise and vibration and improve the noise environment in compliance with the council's Noise Thresholds, with particular attention to:

1. minimising noise impacts and preventing noise intrusion to residential developments and sensitive uses;
2. minimising noise from plant machinery and internal activities;
3. minimising noise from servicing and deliveries; and
4. protecting the relative tranquillity in and around open spaces."

Planning Policy Guidance

3.1.4 The City of Westminster Planning Policy proposes the following condition R46AB on future noise emission levels:

1. "Where noise emitted from the proposed plant and machinery will not contain tones or will not be intermittent, the 'A' weighted sound pressure level from the plant and machinery (including non-emergency auxiliary plant and generators) hereby permitted, when operating at its noisiest, shall not at any time exceed a value of 10 dB below the minimum external background noise, at a point 1 metre outside any window of any residential and other noise sensitive property, unless and until a fixed maximum noise level is approved by the City Council. The background level should be expressed in terms of the lowest $L_{A90,\ 15\ mins}$ during the proposed hours of operation. The plant-specific noise level should be expressed as L_{AeqTm}, and shall be representative of the plant operating at its maximum.
2. Where noise emitted from the proposed plant and machinery will contain tones or will be intermittent, the 'A' weighted sound pressure level from the plant and machinery (including non-emergency auxiliary plant and generators) hereby permitted, when operating at its noisiest, shall not at any time exceed a value of 15 dB below the minimum external background noise, at a point 1 metre outside any window of any residential and other noise sensitive property, unless and until a fixed maximum noise level is approved by the City Council. The background level should be expressed in terms of the lowest $L_{A90,\ 15\ mins}$ during the proposed hours of operation. The plant-specific noise level should be expressed as L_{AeqTm}, and shall be representative of the plant operating at its maximum.
3. Following installation of the plant and equipment, you may apply in writing to the City Council for a fixed maximum noise level to be approved. This is to be done by submitting a further noise report confirming previous details and subsequent measurement data of the installed plant, including a proposed fixed noise level for approval by the City Council. Your submission of a noise report must include:
    a) A schedule of all plant and equipment that formed part of this application;
    b) Locations of the plant and machinery and associated: ducting; attenuation and damping equipment;
    c) Manufacturer specifications of sound emissions in octave or third octave detail;
    d) The location of most affected noise sensitive receptor location and the most affected window of it;
    e) Distances between plant & equipment and receptor location/s and any mitigating features that may attenuate the sound level received at the most affected receptor location;
    f) Measurements of existing $L_{A90,\ 15\ mins}$ levels recorded one metre outside and in front of the window referred to in (d) above (or a suitable representative position), at times when background noise is at its lowest during hours when the plant and equipment will operate. This acoustic survey to be conducted in conformity to BS 7445 in respect of measurement methodology and procedures;
    g) The lowest existing $L_{A90,\ 15\ mins}$ measurement recorded under (f) above;
    h) Measurement evidence and any calculations demonstrating that plant and equipment complies with the planning condition;
    i) The proposed maximum noise level to be emitted by the plant and equipment."

British Standard BS 4142:2014+A1:2019

3.1.5 British Standard BS 4142: 2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' provides a methodology for assessing whether noise from industrial and

commercial activities is likely to give rise to complaints from nearby noise-sensitive premises. This method compares the sound level from the source in question (called the 'specific sound level') with the background sound level in the absence of the noise source, taking into account the character and type of noise. Where acoustic features, such as tonality, impulsivity, intermittency or other sound characteristics are present then corrections to the specific sound level should be applied as per BS 4142. The corrected specific sound level is called the 'rating level'.

3.1.6 The Standard notes that the lower the rating level relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact.

3.1.7 Where the rating level does not exceed the background sound level, this is an indication that the specific sound source will have a low impact. A difference of around +5 dB is likely to be an indication of an adverse impact whilst a difference of around +10 dB is likely to be an indication of a significant adverse impact.

Environmental Protection Act 1990

3.1.8 Under the provisions of the Environmental Protection Act, occupants of neighbouring properties could take direct action if they believe they have been subjected to a noise nuisance.

3.1.9 Achievement of a BS 4142 rating level of between 5 and 10 dB below the lowest background sound level at the façade of the nearest neighbouring noise sensitive premises is considered a robust approach to minimising the risk of such action being upheld.

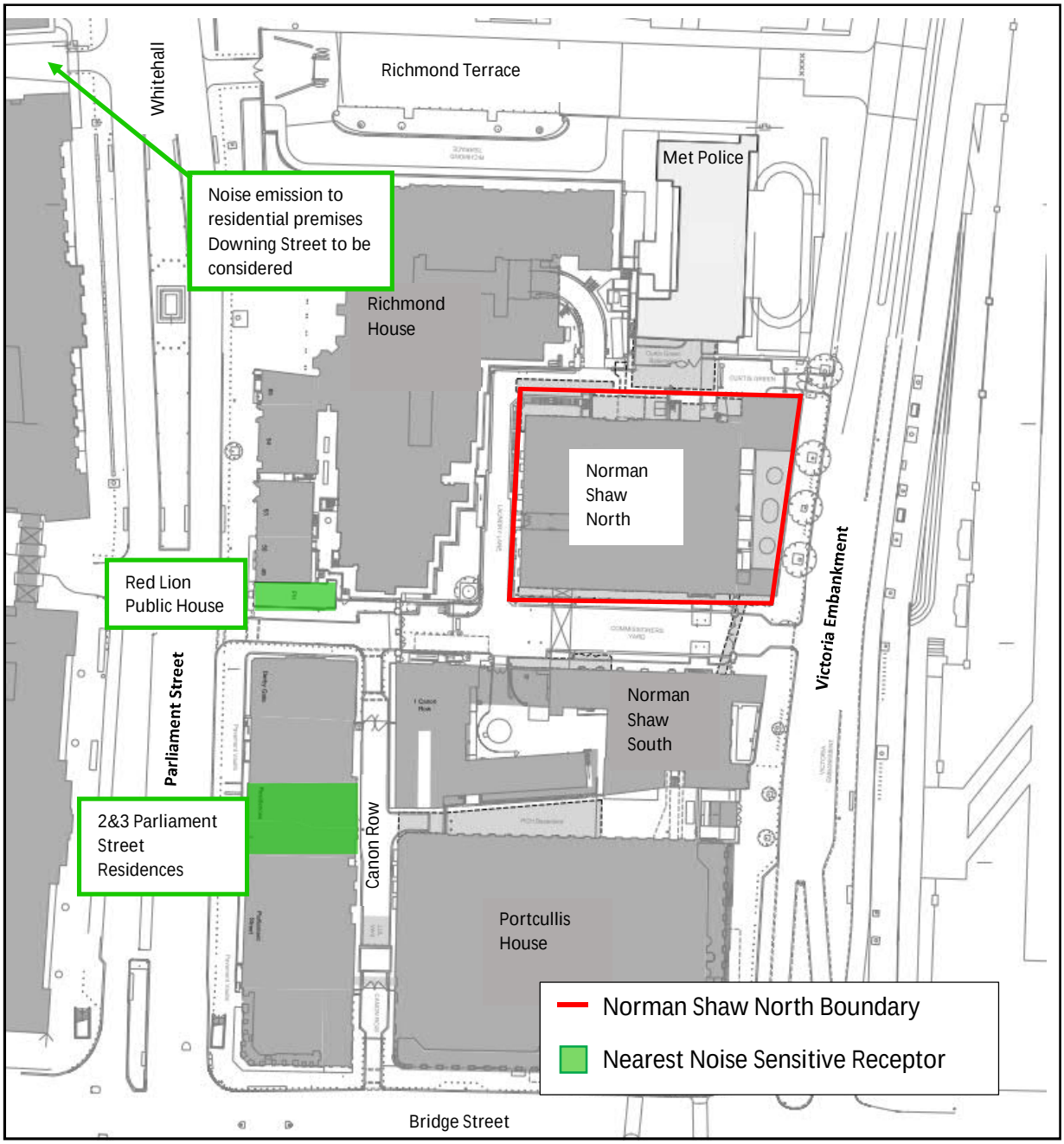
3.2 Nearest Noise Sensitive Receptors

3.2.1 The term noise sensitive receptors refers to premises that have the potential to be adversely affected by noise. Residential premises are classed as such, however, commercial offices would not normally be considered under this category.

3.2.2 Noise from items of plant associated with Norman Shaw North must be suitably controlled so that total noise levels at the nearest noise sensitive receptors do not exceed the plant noise emission limits as set out in section 3.1. The plant noise emission limits are understood to apply to the nearest noise sensitive receptors to Norman Shaw North, which are highlighted in Figure 3.1.

3.2.3 Consideration is also given to plant noise emission levels at noise sensitive premises on Downing Street, however, as the other receptors are closer to the proposed plant installation locations, any measures that are incorporated to mitigate noise to these locations, are expected to also provide sufficient control of noise emission to the Downing Street premises.

Figure 3.1: Site Plan Showing the Norman Shaw North Site Application Boundary and Nearest Noise Sensitive Receivers



3.2.4 The following table provides the direct distances from the closest proposed plant item associated with Norman Shaw North to a location that is 1m from the nearest facade of the noise sensitive receptor.

Table 3.1: Plant Noise Emission Limits	
Noise Sensitive Receptor	Distance to a location 1m from Noise Sensitive Façade (m)
Red Lion Public House Residential Unit	40
Parliament Street Residencies	54
Downing Street	170

3.3 Results

3.3.1 The following table shows the lowest background noise levels measured during the acoustic survey in August/September 2017.

Table 3.2: Lowest Background Noise Levels	
Time Period	Lowest Background Noise Level, L_{A90} (dB)
Daytime (07:00-19:00)	54
Evening (19:00-23:00)	55
Night-time (23:00-07:00)	53

3.3.2 On the basis of the results of the external noise survey and the above requirements, the following overall plant noise emission limits are proposed for Norman Shaw North to be achieved at 1m from the façade of the noise sensitive receptors:

Table 3.3: Plant Noise Emission Limits	
Time Period	Plant Noise Emission Limit, L_{Ar} * (dB)
Daytime (07:00-19:00)	44
Evening (19:00-23:00)	45
Night-time (23:00-07:00)	43

* Plant noise emission limit to be met at a location of 1m from the nearest noise sensitive facade.

3.3.3 The above limits should be met when all items of non-emergency plant associated with the Norman Shaw North operate simultaneously at design load. In line with the guidance in BS 4142:2014, if sources produce any unusual acoustic features associated with tonality, impulsivity, intermittency, or other sound characteristics at any noise sensitive façade, the above limits should have a rating penalty applied.

3.3.4 As the above limits have been based on controlling plant noise emission to levels that are at least 10dB below the underlying background noise levels at the nearest noise sensitive receivers, it is anticipated that the impact on the existing noise climate will be minimal with a low probability of adverse comment from existing residences.

3.3.5 Where plant items are proposed for emergency use only, for example smoke extract fans, a relaxed limit is proposed. Typically, emergency plant noise emission limits are set as no more

than 10dB above the existing background noise levels. The emergency plant noise emission limits would therefore be as follows:

Table 3.4: Norman Shaw North Emergency Plant Noise Emission Limits	
Time Period	Emergency Plant Noise Emission Limit, L_{Ar} * (dB)
Daytime (07:00-19:00)	64
Evening (19:00-23:00)	65
Night-time (23:00-07:00)	63

* Plant noise emission limit to be met at a location of 1m from the nearest noise sensitive facade.

3.4 Proposals

3.4.1 The current proposal is to serve the building via air handling units (AHU's) and supply and extract fans located in the basement and attic spaces, which exhaust at roof level and ground level, via existing light wells around the perimeter of Norman Shaw North.

3.4.2 In addition, air-cooled chillers are proposed to be located within an external plant compound at ground level on the north side of Norman Shaw North, between Norman Shaw North and New Scotland Yard. The chillers and associated ductwork will be surrounded by a plant screen to conceal the equipment. Acoustic mitigation will be included in the chiller design to provide the necessary acoustic attenuation to meet the plant noise emission limits at the NNSR's.

4 Traffic Assessment

4.1.1 Consideration of the impact of future traffic projections - both for the surrounding public roads and within the estate itself - have been included as part of this assessment.

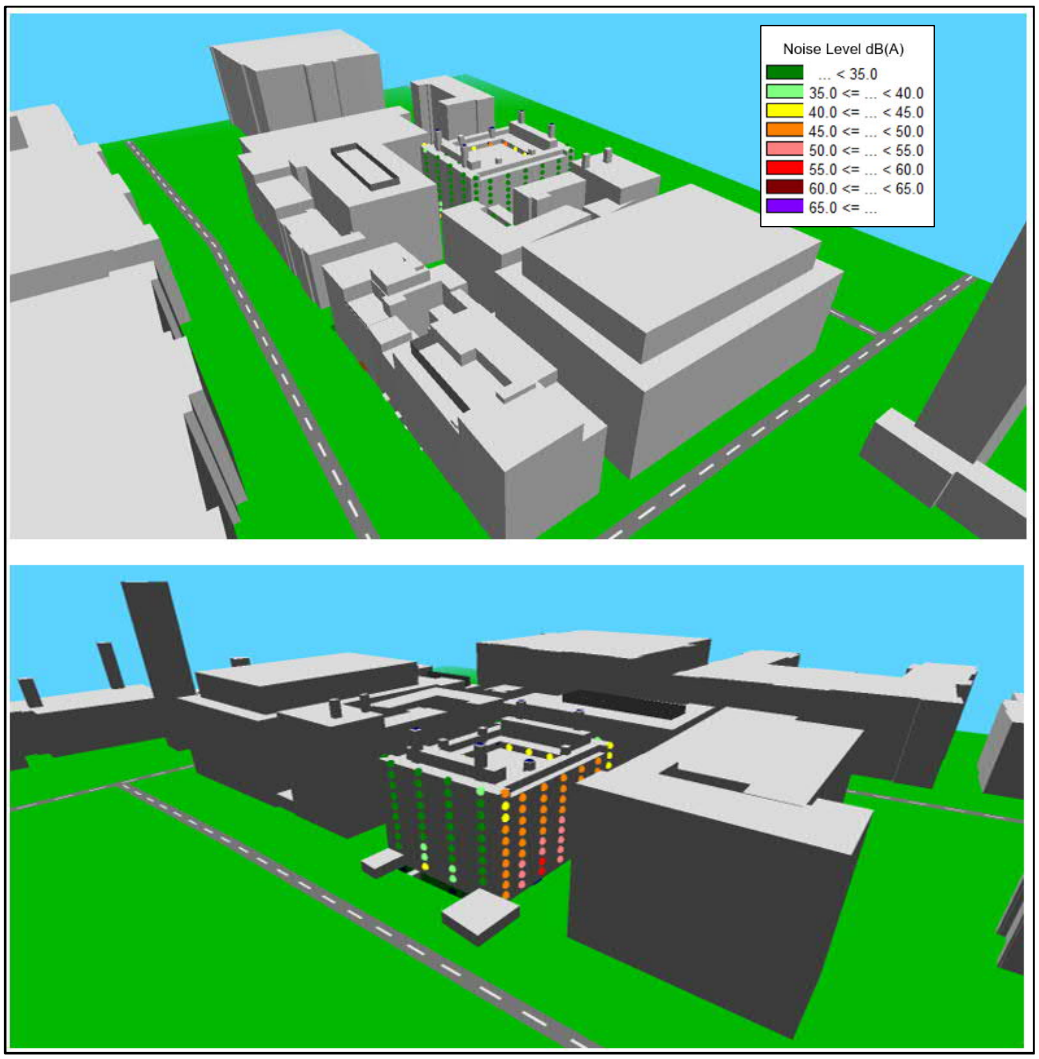
4.1.2 The proposed development is predicted to result in negligible change to vehicle movements, as such there is expected to be little change to ambient noise levels as a result of traffic associated with the development.

5 Mitigation

5.1.1 In order to achieve the plant noise emission limits specified in Table 3.3 at the nearest noise sensitive receivers, acoustic mitigation measures, such as plant screens and silencers, will be provided to the plant items within Norman Shaw North, as necessary.

5.1.2 In order to allow for the calculation of the cumulative noise levels as a result of the proposed plant items associated with the Norman Shaw North development, a 3D noise model has been developed using industry standard acoustic modelling software, CadnaA®, as shown in Figure 5.1

Figure 5.1: 3D Noise Model of the Norman Shaw North Development and Surrounding Area



5.1.3 The environmental noise sources within the model have been calibrated based on the noise levels measured as part of the noise survey detailed above to allow for calculation of the noise levels across the northern estate and surrounding area.

6 Conclusion

6.1.1 The proposed plant noise emission limits have been set in order to minimise the potential for a negative impact on the noise environment in the vicinity of the Norman Shaw North.

6.1.2 Plant noise emission limits have been established in line with the Westminster City Council Planning Policy Guidance and British Standard BS4142:2014+A1:2019. Based on the proposed plant items, distances to the noise sensitive receptors and acoustic screening provided by existing buildings, it is anticipated that the plant noise emission limits are readily achievable with the inclusion of appropriate noise mitigation measures.

Appendix A – Glossary of Acoustic Terminology

$L_{Aeq,T}$

The A-weighted equivalent continuous sound pressure level over period, T.

This is the equivalent continuous A-weighted sound pressure level in decibels (dB) of a continuous, steady sound that, within a specified time interval, T, has the same mean-squared pressure as the sound under consideration that varies with time.

eg. $L_{Aeq,30min}$ where T = 30 mins

L_{Ar}

This is the specific sound level generated by the plant items inclusive of any adjustment for the characteristic features of the source.

L_{max} L_{Amax}

The (A-weighted) maximum instantaneous sound pressure level (L_{Amax}) is the maximum level during a measurement period or noise event.

L_p L_{pA} (or L_A)

The instantaneous sound pressure level (L_p).

The A-weighted instantaneous sound pressure level (L_{pA} or L_A).

The instantaneous sound pressure level is the difference between the pressure existing at the considered instant and the ambient pressure.

This level can fluctuate wildly even for seemingly steady sounds. To make sound level meters easier to read the values on the display are smoothed or damped out. This is effectively done by taking a rolling average of the previous 0.125 s (FAST time constant) or the previous 1 s (SLOW time constant).