

The Hop Exchange

**Noise Impact
Assessment**

Issue 02

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1.0 INTRODUCTION

Max Fordham LLP (MFLLP) has been appointed to provide acoustics advice in relation to the Hop Exchange, Southwark. The objective of this report is to assess the impact of noise from the Proposed Development on the surrounding areas. Max Fordham LLP Acoustics Team is a member of the Association of Noise Consultants.

1.1 The Site

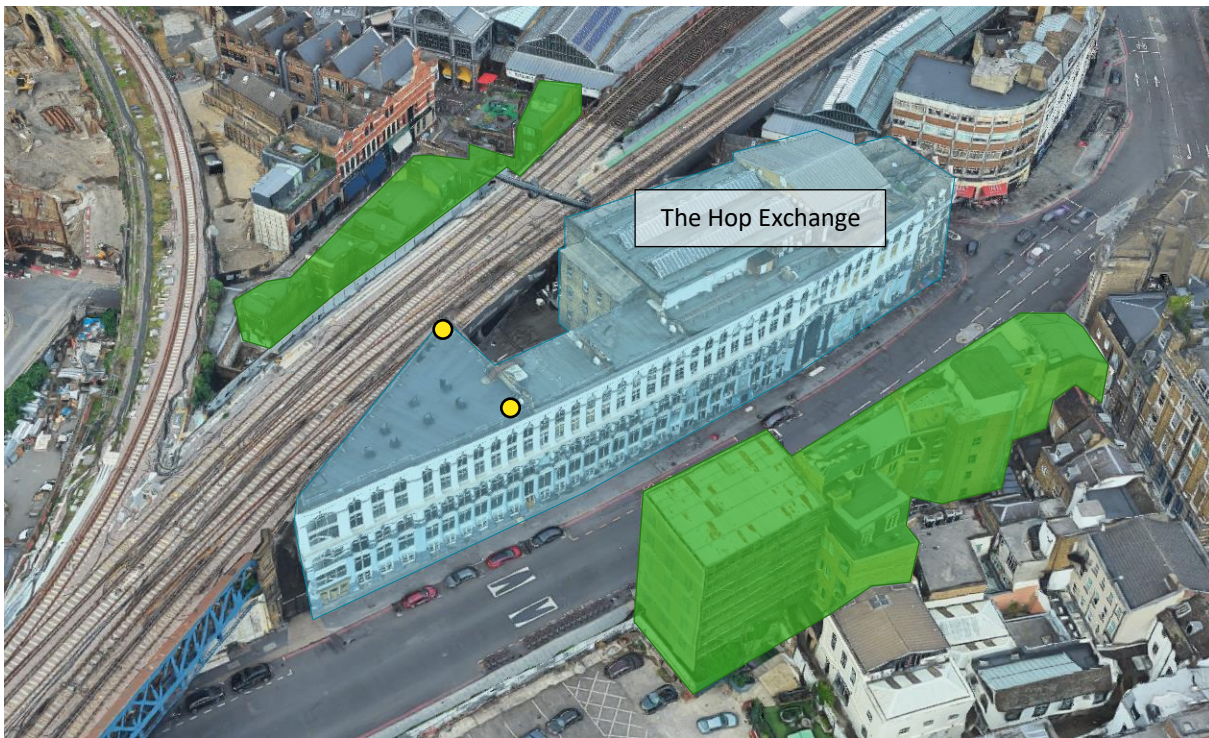


Figure 1: An overview of the site, site area shown in blue, long term noise survey locations in yellow. The nearest identified noise sensitive receptors (NSRs) are shown in green. Imagery from Google Earth

The Grade II listed site is at The Hop Exchange, 24 Southwark St, London SE1 1TY, in the London Borough of Southwark. The site is surrounded by mixed use commercial and residential buildings. The nearest of these considered to be noise sensitive receptors (NSRs) are identified on Figure 1 in green.

The NSRs are understood to be identified as:

- NSR 1: Buildings to the southern side of Southwark St.
- NSR 2: Buildings on the southern side of Park St.

1.2 The Proposed Development

The proposed development consists of a rear infill extension of 6 storeys connecting to a 2-storey roof extension on the western section of the building; a new atrium roof on the eastern section; roof terrace, landscaping and public realm works and general works of enhancement to the listed building in connection with the continued use of the building within Class E.

2.0 ASSESSMENT CRITERIA

2.1 National Planning Policy

National Planning Policy Framework, 2019

Planning Policy Guidance Note 24 (PPG24), which was generally used for overall guidance to planners regarding environmental noise, particularly for residential sites, was replaced in March 2012 by the more general advice given in the National Planning Policy Framework (NPPF).

The NPPF (last update, February 2019) states in paragraph 170e), that planning policies and decisions should contribute to and enhance the natural and local environment by “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”. Furthermore, it states in paragraphs 180 and 182 that planning policies and decisions 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 [paragraph 180 a)]
- identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason [paragraph 180 b)]
- 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 [paragraph 182].

2.2 Noise Policy Statement for England

The Noise Policy Statement for England (2010) (NPSE) sets out the government’s long term noise policy, to “promote good health and a good quality of life through the effective management of noise within the context of policy on sustainable development”.

NPSE also states: “Excessive noise can have wide-ranging impacts on the quality of human life, health (for example owing to annoyance or sleep disturbance) and use and enjoyment of areas of value such as quiet places and areas with high landscape quality.”

In addition, NPSE cites, in the Explanatory Notes section, the following supporting aims:

- Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Governmental policy on sustainable development.
- Mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- Where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development.
- The explanatory note also introduces guidance to assist in defining the adverse impacts:
- 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 Observed Adverse Effect Level (LOAEL) – the level above which adverse effects on health and quality of life can be detected;
- Significant Observed Adverse Effect Level (SOAEL) – the level above which significant adverse effects on health and quality of life occur.

NPSE acknowledges that it is not possible to have a single objective noise-based measure that defines these criteria that is applicable in all situations and for all noise sources, receptors and times.

2.3 Planning Practice Guidance

The Planning Practice Guidance (2014) (PPG) is a web-based resource that provides planning guidance, and supports the National Planning Policy Framework.

The PPG advises that noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. It also acknowledges that neither the NPSE nor the NPPF expects noise to be considered in isolation, separately from the economic, social and other environmental dimensions of the Proposed Development.

The PPG also outlines considerations for local authorities as part of the planning process:

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

It also states: “If external amenity spaces are an intrinsic part of the overall design, the acoustic environment of those spaces should be considered so that they can be enjoyed as intended”

2.4 BS 4142:2014

BS 4142:2014+A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound” addresses the likelihood of adverse impact from noise generated by plant equipment. In the standard, a noise rating is determined and compared with the existing local background sound level, and several cumulative acoustic feature corrections to the noise rating are available to apply where appropriate. For example, if the noise includes a distinguishable tone, impulse, intermittency or other readily distinguishable sound characteristic, then additional cumulative penalties individually ranging from 0 to 9 dB may be applied depending on the type of noise.

BS 4142:2014 seeks to determine a “representative” background sound level, stating that “...the objective is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during particular time periods”.

The assessment of the impact depends upon the margin by which the rating level of the specific sound source exceeds the background sound level but also promotes a consideration of the context in which the sound occurs when making an assessment. BS 4142:2014 states that an initial estimate of the impact of the specific sound is made by subtracting the measured background sound level from the rating level, while considering the following points:

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

2.5 Local Authority Requirements

The local authority is the London Borough of Southwark (LB Southwark).

Technical Guidance for Noise (amended November 2019)

The London Borough of Southwark document “Technical Guidance for Noise” (TGN), amended November 2019, provides detailed expected acoustic standards for various types of development, as well as information on policy background.

In general, the TGN requires that good acoustic design is applied as far as is reasonably practicable. In order to do this, noise and vibration must be considered at the initial design stage. The TGN states:

“It is essential that developments use good acoustic design to achieve internal sound standards in preference to sole reliance on insulation of the building envelope. Where good acoustic design principles are not applied a development does not comply with the NPPF. In such cases a recommendation to refuse the application will be made, even where required internal sound insulation standards are achieved.”

External Noise Emissions from Plant Equipment (TGN)

The TGN compliance standard for noise from commercial and industrial plant is:

“In order for planning permission to be recommended it is required that the assessment Rating sound level does not exceed the typical minimum L_{A90} (15 minute) background sound level at any time. Furthermore in order to prevent gradually creeping background levels over time, it is required that the unrated “Specific” sound level does not exceed 10 dB below the typical minimum L_{A90} (15 minute) background sound level at any time. The ‘Specific’, ‘Rating’ and ‘Background’ sound levels shall be calculated fully in accordance with the methodology of BS 4142:2014+A1:2019.”

Emergency Plant Equipment

The LB Southwark TGN requires that the same standard is applied for all fixed plant, “including permanent backup generators and other systems which may only run for part of the time.”

3.0 NOISE SURVEY

3.1 Procedure

Covid-19 Considerations

Due to the extended nature of the project (MFLP first involved in 2015), an updated noise survey would usually be undertaken pre-planning to verify noise levels had not changed significantly from initial survey work. A more recent noise survey has not been undertaken at the time of this report due to the local noise environment being considered non-representative during Covid-19 related restrictions; during the time of assessment London has been operating under UK Gov 'Tier 4' and moved to 'Tier 5 National Lockdown', resulting in significant potential reductions in transport and general activity noise.

Therefore following advice from the Association of Noise Consultants, previous noise survey data has been used to determine local background noise levels. We consider these noise levels a conservative representation of the local noise levels under normal circumstances. We view this as a conservative approach due to the trend of background noise level increase (creep) generally observed over time, which is not accounted for in the determined plant noise limits. Noise survey work following the lifting or reduction of Covid restrictions may be considered necessary to verify this approach.

Procedure

In order to establish the existing noise environment at the site location, unattended (long term) noise measurements were undertaken by Max Fordham LLP. Between 24th and 26th November 2015, two 24-hour noise surveys were undertaken from the roof of the Hop Exchange, on the side nearest the road (south) and on the side nearest the railway (north) respectively. An overview of results is detailed in Table 1, the survey locations are shown on Figure 1.

For long term measurement, a Class 1 sound level meter was used to make consecutive 15-minute noise measurements over the two 24 hour periods. The microphone of the sound level meter was mounted on a tripod externally, located on the roof of the existing building. These positions are considered to be free-field, and in accordance with the principles of BS7445. An in-situ calibration check was undertaken at the beginning and the end of the measurement period, and no significant drift was observed. Details on measurement equipment can be found in the appendices.

Meteorological conditions over the survey period comprised low-moderate wind and low precipitation levels, generally with a mean wind speed $<5\text{m s}^{-1}$. Due to the use of a microphone windshield, these conditions are not expected to have significantly impacted the accuracy of survey results.

3.2 Survey Results

A time history of Average (L_{Aeq}), Maximum (L_{AFmax}) and Background ($L_{AF90,30min}$) noise levels measured at both survey positions is shown in Figures 2, 3.

A summary of recorded levels for both survey positions is shown below in Table 4, most significantly showing a lower measured minimum background level on the rail side (north) of the site. Average noise levels for both day and night time periods are similar across the site.

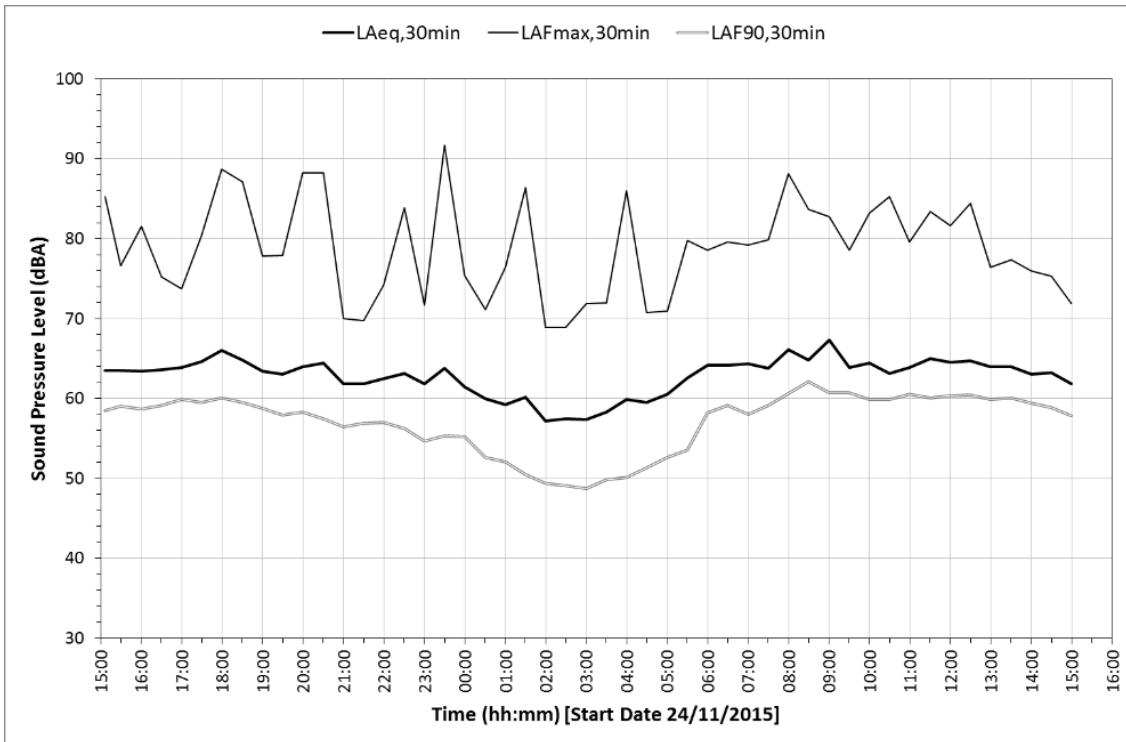


Figure 2: Roadside Measurement (South) - Summary of Results

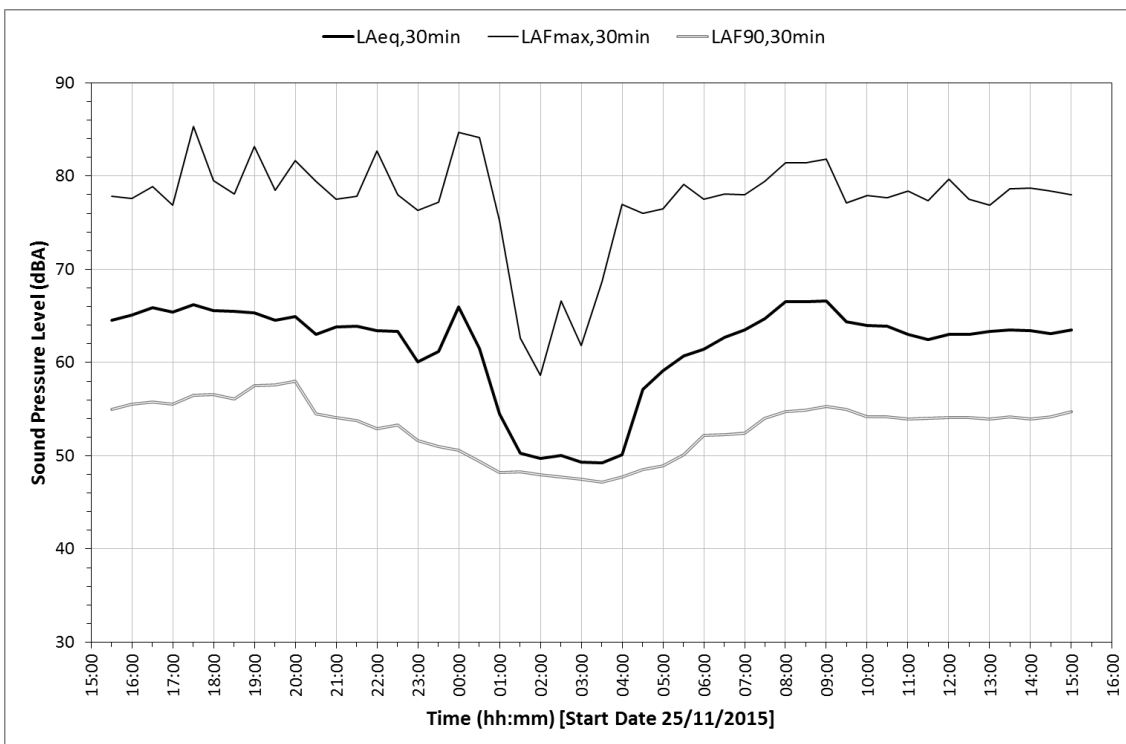


Figure 3: RAILSIDE Measurement (North) - Summary of Results

	Daytime Mean	Daytime Background	Night-time Mean	Night-time Background
	dB LAeq, 30min	dB LA90 15min, minimum	dB LAeq, 30min	dB LA90 15min, minimum
Roadside (South)	64	56	61	49
Railside (North)	65	52	60	47

Table 1: Summary of measured day and night time environmental noise levels

As would be expected from the site's location the northern, rail facing side of the existing building receives high levels of noise throughout the daytime period, with a significant reduction in average noise from 1200-0500, likely due to reduction in rail traffic and good acoustic shielding of the northern façade from overnight road and activity noise generated on Southwark St. Full night time average noise levels remain high due to higher noise levels at the beginning and end of the night period. Average noise levels on the southern road side of site are similar to that of the northern façade, but see only a minor reduction in noise levels over the night time period.

Background noise levels measured are typical of a central London location where transport, construction, plant and activity noise give little reduction in background noise levels over the night time period. The north side of the site sees lower background noise levels in both day and night time periods, likely due to its more shielded position from ambient noise sources and Southwark St.

4.0 PLANT NOISE ASSESSMENT

4.1 Proposed Plant Noise Limits

Plant noise limits have been determined in Table 2 from the long term noise survey data, in accordance with the required standards of the LB Southwark TGN at the nearest noise sensitive receptors.

These limits have been determined separately for NSRs to the North and South of the site, to allow usage of the most relevant limit when plant items will be significantly closer (or less shielded) to one NSR direction, as is the case with the majority of noise producing plant in the scheme. Any items of plant not clearly shielded from either NSR direction are to be designed to meet the most onerous requirement when assessed from the specific item's location.

Period	NSR Location	Minimum Measured Background Noise Level (dB L _{A90})	Plant Noise Rating Level Upper Limit (dB L _{Ar,Tr})	Specific Sound Level Upper Limit at NSR (dB L _{Aeq,Tr})
Daytime (0700-2300)	North	52	52	42
Night time (2300-0700)	North	47	47	37
Daytime (0700-2300)	South	56	56	46
Night time (2300-0700)	South	49	49	39

Table 2: Plant noise limits at nearest existing noise sensitive receptors

4.2 Proposed Noise Producing Plant

Table 3 shows a summary of new significant noise producing items of plant currently associated with the project.

Location	Plant Item(s)	Impact Assessment
4F Plant Area North	13 no. new condensers within new rooftop barrier (Daikin VRV Type IV)	Impact assessed in Section 4.3
4F Plant Area South	Emergency generator	Impact assessed in Section 4.4

Table 3: Significant new noise producing items of plant

The project also encompasses a significant consolidation of existing plant units, reducing overall numbers of units and relocating a number of those which are retained. In general this activity is expected to reduce plant noise emissions due to a reduction in older, likely less efficient plant. Where retained plant items are relocated, items are maintaining a similar distance to NSRs as current locations and therefore are not expected to significantly impact local plant noise levels. A summary of relocated items is shown in Table 4.

Location	Plant Item(s)	Impact Assessment
0F/1F North	Basement bar plant relocation, existing plant on 1F deck (north), relocated to 0F (north).	Items maintaining a similar distance to NSRs as current location, therefore not expected to significantly impact local plant noise levels.
4F Plant Area South	Relocated condensers consolidated from existing south rooftop edge.	

Table 4: Summary of most significant relocated noise producing items of plant

4.3 Plant Noise Assessment

An assessment of new significant plant items is shown below. This is made for the most affected NSR (to the North of the site, as shown in Figure 1). A single assessment is made for the night time period as this is considered the more onerous condition.

The Southwark TGN sets out two methods (criteria) of assessing noise from new plant items; specific sound level and BS4142 noise rating level. Specific sound levels are considered the most onerous assessment method and are therefore used below. Noise rating levels are considered less onerous as BS4142 noise rating penalties are not anticipated to exceed the 10dB difference in noise limits set out in the TGN (0 dB below minimum background for noise rating, 10 dB below minimum background for specific sound level, Section 2.5).

Plant items shown are the current indicative selection; should proposed plant items change, the 'Total Radiated Sound Power Limit for Substitute Units' determined in Table 5 should be used to ensure expected planning targets are met. For alternate plant units this may entail the use of appropriately sized bespoke attenuation packs, louvered enclosures or other noise mitigation measures.

Daikin VRV Type IV	Frequency Band (Hz)							
	63	125	250	500	1000	2000	4000	8000
Source Sound Power (dB)	80	78	78	77	71	67	69	58
Adjusting for 13 no. Units	+11	+11	+11	+11	+11	+11	+11	+11
Total Radiated Sound Power (dB)	91	89	89	88	82	78	80	69

Radiated Sound Power (dBA)	89
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Attenuating Elements								
Noise Screen Attenuation (dBA) (Relative barrier height 1.8m)	11	13	16	18	21	24	27	30

Distance to NSR (m)	23							
Sound Pressure Level at NSR (dB)	45	41	38	34	25	18	17	3

Resultant Sound Pressure Level at NSR (dBA)	35
Night Time Specific Sound Limit at NSR (dBA $L_{Aeq,Tr}$)	37
Pass Margin (dBA)	2

Total Radiated Sound Power Limit for Substitute Units (dBA)	91
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Table 5: Night time plant noise calculation

4.4 Emergency Plant Items

Emergency plant item sound power limits have been determined in accordance with the LB Southwark TGN. This sound power limit is shown in Table 6. Emergency plant items may require plant noise screens or the use of manufacturers acoustic enclosures to meet this limit.

Emergency plant noise limits have been determined for the daytime period in anticipation of usual emergency plant testing times.

Period	NSR Location	Minimum Measured Background Noise Level (dB L _{A90})	Plant Noise Rating Level Upper Limit (dB L _{Ar,Tr})	Specific Sound Level Upper Limit at NSR (dB L _{Aeq,Tr})
Daytime (0700-2300)	South	52	52	42

Distance to NSR (m)	22
Daytime Specific Plant Noise Limit at NSR (dBA L _{Aeq})	42
Maximum Permissible Emitted Sound Power (SWL)	77

Table 6: Permissible emergency plant sound power levels to meet plant noise limits at NSR

5.0 SUMMARY

Noise Survey

Two environmental noise surveys were undertaken at the site of the proposed development. The L_{Aeq} , L_{Amax} and L_{A90} parameters were measured. The noise surveys comprised long term (unattended) measurements on both the north and south of the existing building, due to observed differences in environmental noise sources on each facade.

The noise surveys suggest that the noise environment is mainly composed of transport noise; predominantly rail and road traffic to the north and south of the site respectively. Background noise levels measured are typical of a central London location where transport, construction, plant and activity noise give little reduction in background noise levels over the night time period. The rail side of the site sees slightly lower background noise levels in both day and night time periods, likely due to its more shielded position from ambient noise sources and Southwark St.

Average noise levels measured to the north of the building were 65 dB $L_{Aeq,T}$ during the day (0700-2300) and 60 dB $L_{Aeq,T}$ during the night (2300-0700). The minimum background noise level measured was 52 dB $L_{A90,T}$ during the day and 47 dB $L_{A90,T}$ during the night.

To the south of the building average noise levels were 64 dB $L_{Aeq,T}$ during the day (0700-2300) and 61 dB $L_{Aeq,T}$ during the night (2300-0700). The minimum background noise level measured was 56 dB $L_{A90,T}$ during the day and 49 dB $L_{A90,T}$ during the night.

Upper limits for noise from plant equipment

The minimum measured background noise level has been used to determine plant noise limits, in accordance with London Borough of Southwark's Technical Guidance for Noise document. Limits have been determined separately for NSRs to the North and South of the site.

The adopted specific sound level upper limits for noise from plant equipment are 42 dB $L_{Aeq,Tr}$ (day), 37 dB $L_{Aeq,Tr}$ (night) for NSRs to the north of the site and 46 dB $L_{Aeq,Tr}$ (day), 39 dB $L_{Aeq,Tr}$ (night) for NSRs to the south.

An assessment of the significant noise producing plant items proposed shows that the plant noise emissions are expected to meet the determined specific noise limits at the nearest noise sensitive receiver at all times. Additionally, accounting for a 2 dB tonality correction, an assessment under BS4142:2014 would result in a significant 10 dB noise rating level pass margin. This would be considered 'low impact' under BS4142.

Therefore, the proposed plant is deemed acceptable and in line with relevant planning policy and guidance. A maximum permissible sound power level for alternative plant has also been defined, to ensure noise limits are met if a plant strategy other than the current selection shown above is used.

6.0 APPENDICES

6.1 Background Sound Level Histograms, North of Building

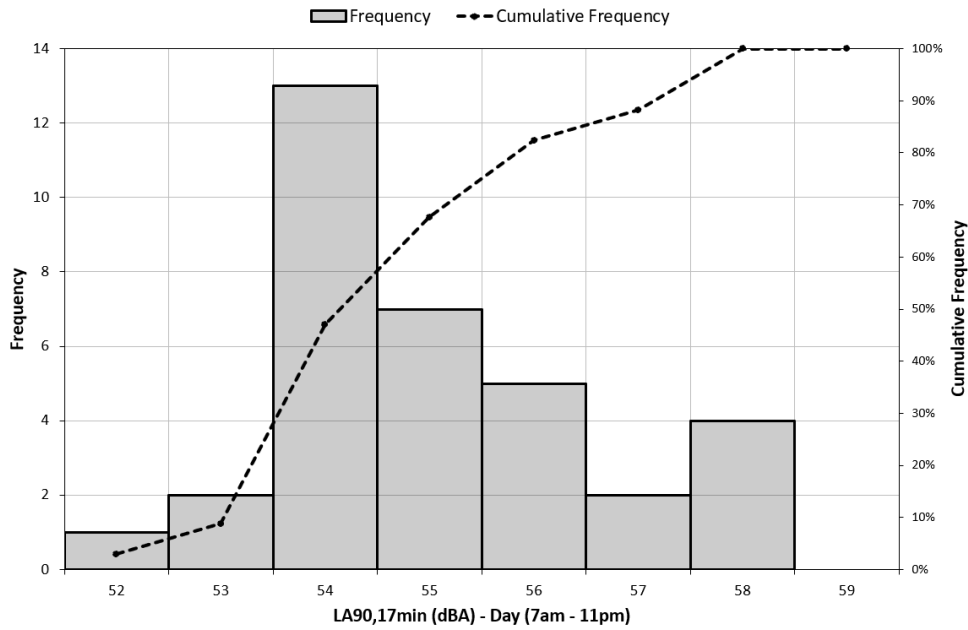


Figure: Daytime background sound level histogram (LA90,15min, 7am-11pm)

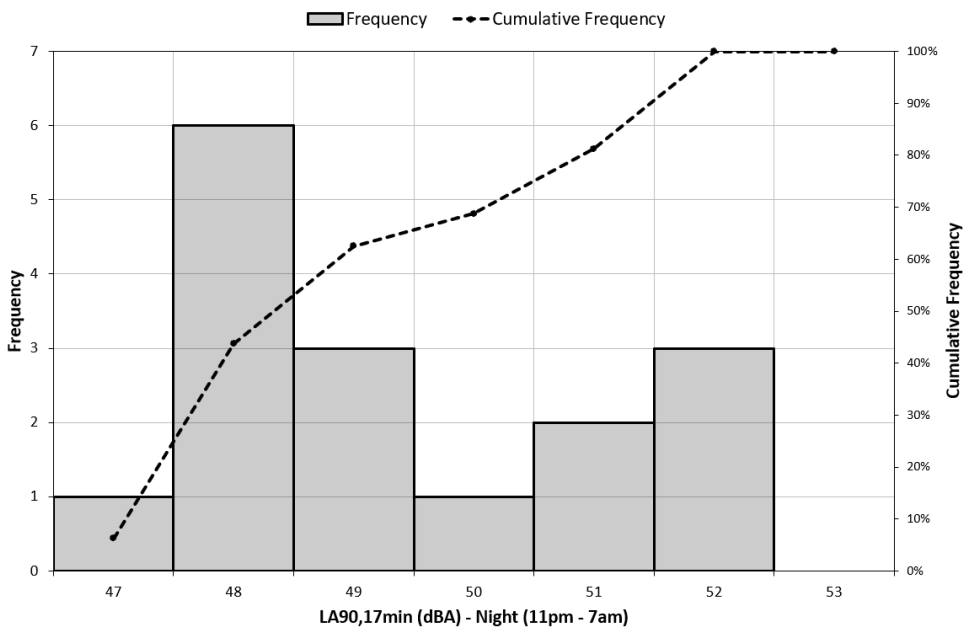


Figure: Night-time background sound level histogram (LA90,15min, 11pm-7am)

6.2 Background Sound Level Histograms, South of Building

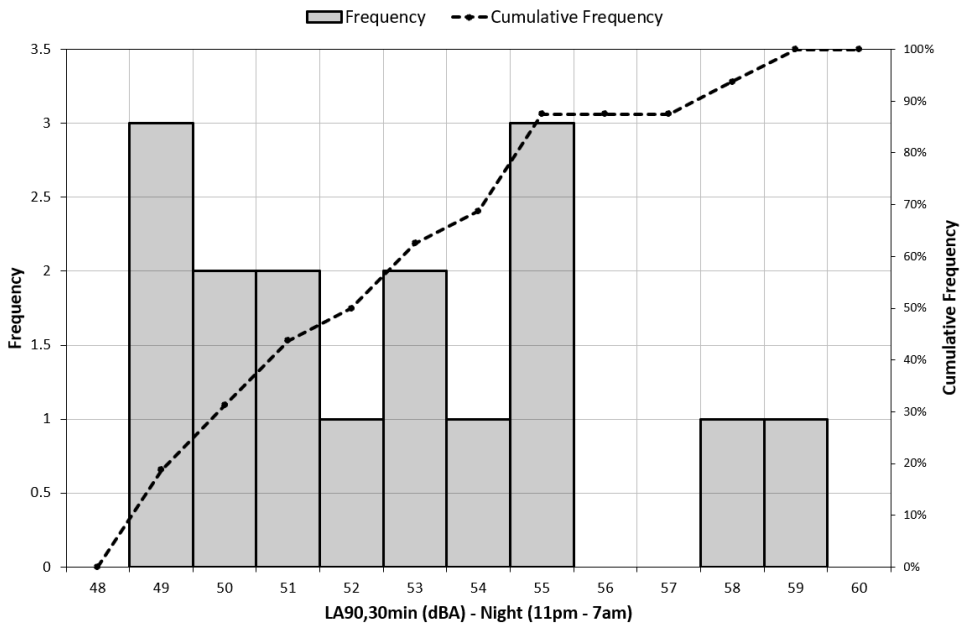


Figure: Daytime background sound level histogram (LA90,15min, 7am-11pm)

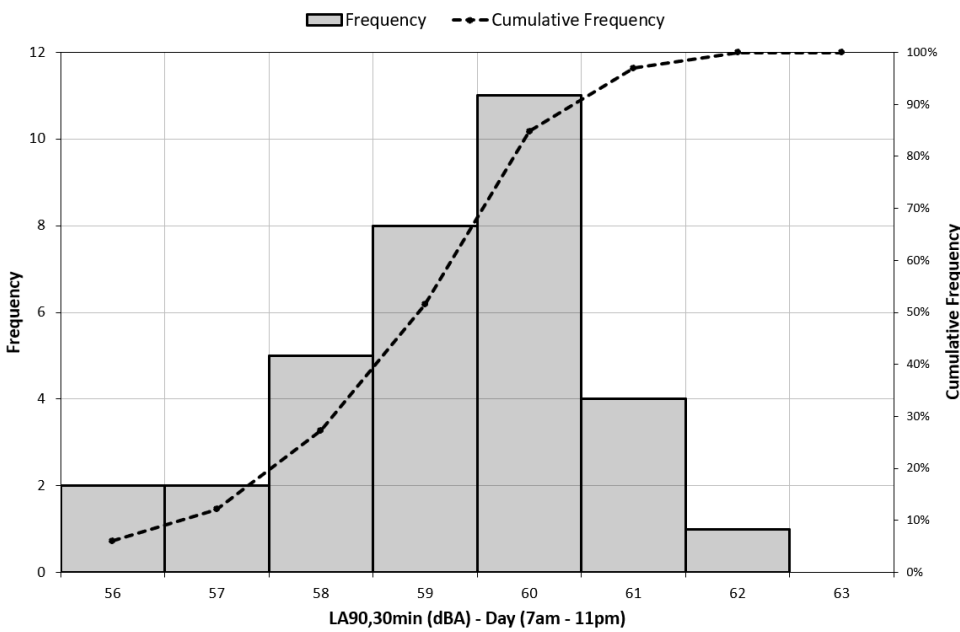


Figure: Night-time background sound level histogram (LA90,15min, 11pm-7am)

6.3 Noise Monitoring Equipment Details

The equipment summarised below was calibrated by a UKAS accredited laboratory in accordance with the laboratory requirements of the United Kingdom Accreditation Service (UKAS) on the dates indicated. UKAS calibration data sheets and certificates are available upon request. Information in the tables is correct as at the time of the surveys (November 2015) conducted for this noise impact assessment.

Item	Make	Type	Serial no.	Calibration Intervals	Last Calibrated	Next Due Calibration	Calibration Certificate Number
Class 1 sound level meter	Norsonic	140	1405942	2 years	20/03/2014	20/03/2016	473706412
Microphone	Norsonic	1225	208215	2 years	20/03/2014	20/03/2016	473706412
Microphone preamplifier	Norsonic	1209	15804	2 years	20/03/2014	20/03/2016	473706412
Calibrator	Norsonic	1251	34059	1 year	14/04/2015	14/04/2016	U18539