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Noise Impact Assessment

Prepared: 8th January 2018

Report No	18225A-1
Client	Wernick Buildings
Site	133-137 Queens Road London SE15 2ND

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1. Limitations

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1.1.2. The conclusions and recommendations contained in this report are based upon information provided by others and upon the assumption that all relevant information has been provided by those parties from whom it has been requested and that such information is accurate. Information obtained by Noise has not been independently verified by Noise, unless otherwise stated in the report.

1.1.3. The methodology adopted and the sources of information used by Noise in providing its services are outlined in this report. The work described in this report was undertaken between the 25th September 2017 and 8th January 2018 and is based on the conditions encountered and the information available up to the said date. The scope of this report and the services are accordingly factually limited by these circumstances.

1.1.4. Where assessments of works or costs identified in this report are made, such assessments are based upon the information available at the time and where appropriate are subject to further investigations or information which may become available.

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1.1.7.

2. Contents

3. Executive summary

3.1.1. noise.co.uk Ltd has been commissioned by Wernick Buildings to carry out an assessment of the noise impact generated by new fixed plant at proposed new office accommodation at 133-137 Queens Road, London, SE15 2ND (hereafter referred to as the "Proposed Development").

3.1.2. The purpose of the assessment has been to evaluate the typical background sound level at the site, assess the likely character of the sound and derive a sound level limit for the new fixed plant.

3.2. Measurement, assessment and evaluation

3.2.1. The survey was carried to BS7445-1:2003[1] and BS7445-2:1991[2] which are covered under our UKAS Accreditation.

3.2.2. The interpretation of the data and the specification of suitable mitigation or treatment is outside the scope of our UKAS accreditation but is covered in our 17025 Quality Management System and reporting procedure.

3.3. Results

3.3.1. In order to ensure that the resulting environmental sound will be likely to have a "low impact" on existing residents, the combined sound power of new fixed plant should be limited to the values shown in Table 1.

Quantity	Sound power level dB(A) re 1pW	
	Daytime	Night-time
Plant area 1 (Combined level of all plant in area)	84.0	74.0
Plant area 2 (Combined level of all plant in area)	76.5	66.5

Table 1 – Plant sound power level limits

[1] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: *Description of quantities and procedures"*
[2] BS7445-2:1991 "Description and measurement of environmental noise – Part 2: *Guide to the acquisition of data pertinent to land use"*

4. Background

4.1. National Planning Policy Framework

4.1.1. The National Planning Policy Framework (NPPF) was published in March 2012 and sets out the Government's planning policies for England and how these are expected to be applied. The framework states that the planning system should contribute to and enhance the natural and local environment by:

> *"preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".*

4.1.2. The express inclusion of noise in the NPPF means that it is a material planning consideration for local planning decisions. It replaces the now revoked Planning Policy Guidance (PPG) Note 24. Paragraph 123 of the NPPF document states that planning policies and decisions should aim to:

A. Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;

B. Mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;

C. Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and

D. Identify and protect areas of tranquillity, which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

4.2. Noise Policy Statement for England

4.2.1. The Noise Policy Statement for England (NPSE), published in March 2010, states the long-term vision of Government noise policy is to *"promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development"*.

4.2.2. This long-term vision is supported by the following aims; through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

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

4.2.3. The intention is that the NPSE should apply to all types of noise apart from noise in the workplace (occupational noise).

4.3. National Planning Practice Guidance

4.3.1. The National Planning Practice Guidance (PPG) is a web-based resource, launched by the Department for Communities and Local Government (DCLG) in March 2014 to support the NPPF and make it more accessible.[3]

4.3.2. It advises on how planning can manage potential noise impacts in new development. The guidance is regularly reviewed and updated and noise is listed as a specific category. The guidance is for ad hoc developments, as major infrastructure is covered by overarching National Policy Statements.

4.3.3. A summary of the effects of noise exposure (in terms of health and quality of life) associated with both noise generating developments and noise sensitive developments is presented within the PPG and reproduced in Table 2.

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

Table 2 – Noise exposure hierarchy

[3] http://www.planningguidance.planningportal.gov.uk

5. Site Description

5.1.1. The Proposed Development is located in a mixed, residential and commercial, area. The location of the Proposed Development, the new fixed plant and the nearest residential receivers have been illustrated in Figure 1.

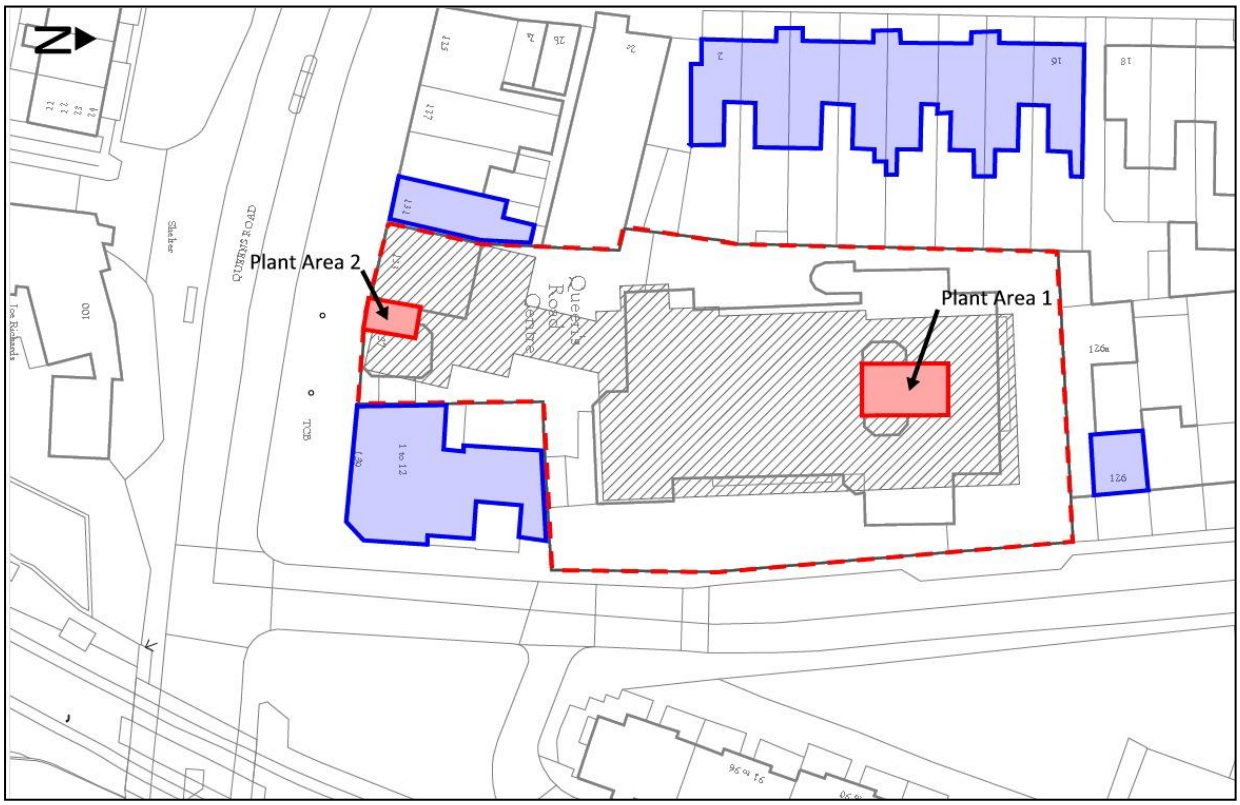


Figure 1 – Plan showing the location of the Proposed Development, the locations of the new fixed plant (red) and the nearest residential receiver (blue)

5.1.2. The new fixed plant is to be located in two separate rooftop plant areas.

5.2. Nearest residential receiver

5.2.1. The nearest residential receivers have been identified as the residential houses and flats surrounding the Proposed Development, these have been highlighted in Figure 1.

6. Assessment Criteria

6.1. Local planning authority criteria

6.1.1. The local planning authority, the London Borough of Southbank ("LBS"), publishes standard guidance on assessing new specific sound sources in supplementary planning documentation.[4] This guidance has been reproduced in Figure 2.

Noise generating development

- Noise generating development, such as industrial uses, entertainment venues and commercial kitchens, should not result in an increase in background noise levels Applicants are encouraged to use the methodology set out in BS 4142:1997 to assess their site.
- Applications will need to provide information on the noise that will be generated and the times and duration that it will occur. This includes information on noise from plant, machinery and deliveries. The application will need to explain how this noise may impact upon nearby sensitive uses and demonstrate how this noise has been contained so that the British Standard levels are met.

Figure 2 – LBS guidance on noise from new specific sound sources

6.1.2. Subsequent to this guidance being published, BS4142:1997 has been superseded. The assessment has been carried out to the latest standard.

6.2. BS4142:2014

6.2.1. BS4142:2014 provides methods for rating and assessing sound of an industrial and/or commercial nature, which includes sound from industrial and manufacturing processes, fixed services plant, sound generated by the loading/unloading of goods and sound from mobile plant / vehicles associated with industrial/commercial premises (e.g. fork-lift trucks).

6.2.2. The standard utilises various descriptors to assess complaints, the impact of sound associated with proposed industrial/commercial activities on existing noise-sensitive receivers, or the impact and likely suitability of siting new noise-sensitive receivers in the vicinity of existing industrial / commercial noise sources.

6.2.3. The standard is specifically precluded from being used to determine likely internal sound levels arising from external noise, or from the assessment of various sound sources for which other (more relevant) guidance exists, including music/entertainment noise, person noise and construction noise.

6.2.4. The magnitude of impact is assessed by subtracting the measured background sound level at a location representative of the nearest noise-sensitive receiver, from the 'rating level' (the specific sound source to be introduced into the locality, corrected for acoustically distinguishing characteristics which may make it more subjectively prominent).

6.2.5. Typically, the greater the difference between the background and rating level, the greater the magnitude of impact, although BS 4142 emphasises that this is highly context-specific.

[4] Sustainable design and construction, Supplementary Planning Document, LBS, 2009

6.2.6. As a guideline, BS4142 states that:

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

6.2.7. It should be noted that BS4142:2014 draws a clear distinction between the detailed and flexible assessment methods contained within, and the more limited versions contained in the previous (1997) edition.

6.2.8. Above all, BS4142:2014 requires qualified engineering consultants and technical planning professionals (e.g. Environmental Health Officers) to use a combination of quantitative assessment techniques and rational qualitative judgments to come to a sensible and reasonable conclusion.

i. Definitions

6.2.9. BS 4142 uses several specific terms to define the various levels used in assessments, as follows:

- Specific sound – the commercial / industrial noise source under consideration
- Residual sound – the sound level at the noise-sensitive receivers in the absence of the specific sound
- Ambient sound – the sound level at the noise-sensitive receivers in the presence of the specific sound (i.e. ambient = residual + specific)
- Background level - the sound pressure level which is exceeded by the residual sound for 90% of the measurement period
- Rating level – the specific sound, corrected for acoustically distinguishing characteristics

ii. Background level

6.2.10. BS4142 emphasises that the background level ($L_{A90,T}$) is in fact a range of levels, not one absolute value. Whilst stating that the measurements of background sound should be normally not less than 15 minutes, the focus is on obtaining a level for use in assessment that is representative of typical conditions at the noise-sensitive receivers.

6.2.11. An example methodology by which this typical value may be obtained is given in the document. In this example, monitoring of $L_{A90,15mins}$ is undertaken during periods which represent when the specific noise will be operational. After obtaining a sequence of representative contiguous or disaggregated results, it is then proposed that the modal value is representative of the 'typical' background level.

iii. Specific sound

6.2.12. BS4142 requires that the specific sound ($L_{Aeq,T}$) is obtained over a reference period of 1 hour (daytime) and 15 mins (at night). Ideally, measurements would be taken of the ambient sound and residual sound at the assessment location, with these measurements used to accurately calculate the specific sound (ambient – residual = specific).

6.2.13. Where the source (specific sound) is not yet operational, it is permissible to measure the specific sound elsewhere (or to use known manufacturers' or library data) and then model the impact of this against the known background level.

iv. Rating level

6.2.14. Once the specific sound level has been determined, this must be corrected in terms of the need to consider the subjective prominence of the impact of the sound at noise-sensitive receivers, and the extent to which acoustically distinctive characteristics will attract attention.

6.2.15. BS 4142 states that this is normally possible to carry out a subjective assessment of characteristics, based on the following correction guidelines:

- Tonality: +2 dB for a 'just perceptible' tone, +4 dB for 'clearly perceptible', and rising to +6 dB for 'highly perceptible' tones.
- Impulsivity (rapidity of change and overall chance in level): +3 dB for 'just perceptible' impulsivity, +6 dB for 'clearly perceptible', rising to +9 dB for 'highly perceptible' impulsivity.
- Intermittency: if the on/off-time of the specific sound is readily distinctive at the noise- sensitive receivers, +3 dB.

6.2.16. It should be noted that where one feature is clearly perceived as dominant, it may be applicable to correct for that feature only. Where multiple features are likely to affect perception and response, each should be added arithmetically.

7. Background sound level survey

7.1. Measurement instrumentation

7.1.1. The measurement instrumentation used during the survey is detailed in the appendix. The acoustic equipment was calibrated to comply with Section 4.2 of BS7445-1:2003[5] before and after the surveys. The calibration details are also detailed in the appendix.

7.2. Measurement and timescale

7.2.1. Unattended noise monitoring took place between Monday 25th September 2017 and Tuesday 26th September 2017. The following quantities were measured:

$$L_{A90,15\text{-}min}$$

7.2.2. The acoustic measurements and their interpretation have been in accordance with BS 7445: Parts 1, and 2. All sound pressure levels are in dB (referenced to 20μPa).

7.3. Monitoring location

7.3.1. The equipment was mounted 1.5m from the ground at least 3m from the next nearest reflecting surface. The monitoring location is illustrated in Figure 3.

Figure 3 – The monitoring location used to measure the background sound levels

[5] BS7445-1:2003 "Description and measurement of environmental noise – Part 1: *Description of quantities and procedures"*

7.4. Meteorology

7.4.1. During the survey visits the weather information was noted. This is shown in Table 3.

	Monday 25th September 2017	Tuesday 26th September 2017
Roads	Dry	Dry
Wind Speed (ms^{-1}/ Direction)	2 E	7 N

Table 3 - Meteorological data noted during the survey

7.5. Background sound level results

7.5.1. Data analysis has been performed on the background sound levels in order to determine the typical value required for a BS4142 assessment. Figure 4 shows the results of the data analysis in terms of the frequency of occurrence of each data value. The data shows a typical bi-modal distribution that would be expected from an urban area.

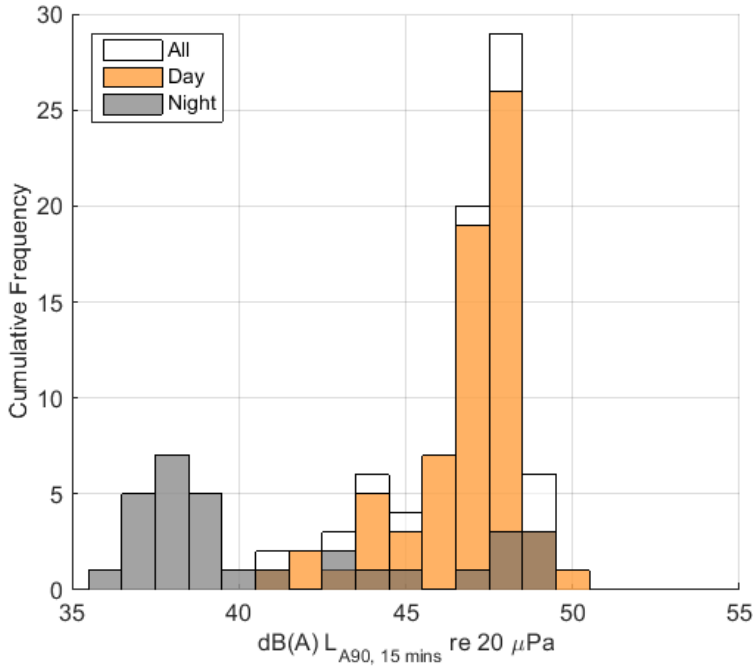


Figure 4– Data analysis of the background sound levels

7.5.2. As can be seen in Figure 4, the night-time background sound level ranged between 36dB $L_{A90,15\text{-}min}$ and 49dB $L_{A90,15\text{-}min}$. 38dB $L_{A90,15\text{-}min}$ has been taken to be the typical background sound level at the nearest residential receiver during the night-time.

7.5.3. As can be seen in Figure 4, the daytime background sound level ranged between 43dB $L_{A90,15\text{-}min}$ and 50dB $L_{A90,15\text{-}min}$. 48dB $L_{A90,15\text{-}min}$ has been taken to be the typical background sound level at the nearest residential receiver during the daytime.

8. Assessment

8.1.1. The type of fixed plant has not yet been specified; therefore, sound power level limits have been derived. These should be passed to the mechanical services engineer and the architect for future reference.

8.2. Rating level

8.2.1. As discussed in section 6, the character of the specific sound should be taken into account. However, because the new fixed plant has not yet been installed it is not possible to make objective measurements. Therefore, character corrections have been made based on experience of similar projects.

Tonality

8.2.2. Heating, ventilation and air-conditioning equipment contains rotating components that are likely to produce modest tones. At distances greater than 5m these tones are likely to only be just perceivable. Therefore, a -2dB character correction has been made for tonality.

Impulsivity

8.2.3. Impulses are associated with the sudden onset of sound such as that from quarry blasts and sonic booms. Heating, ventilation and air-conditioning equipment produces continuous sound and, on this basis, no correction for impulsivity has been applied.

Intermittency

8.2.4. Whilst the fixed plant may not operate 100% of the time, in any 1-hour daytime or 15-minute night-time reference period, the fixed plant would not be expected to turn on and off more than once. Therefore, no correction has been applied for intermittency.

8.3. Assessment

8.3.1. The BS4142 assessment is detailed in Table 4. The assessment procedure has been carried out in reverse to derive sound level limits for the proposed new fixed plant.

Quantity	**Sound level dB(A)**	
	Daytime	**Night-time**
Typical background sound level, dB L_{A90} Typical level determined in section 7	48	38
"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 context."		
LBS criteria	-10	
Target rating level @ nearest residential receiver Background sound level - character corrections	38	28
Character corrections Tonality Impulsivity Intermittency	 -2 0 0	
Specific sound level limit @ nearest residential receiver Background sound level + character corrections	**36**	**26**

Table 4 – BS4142 Assessment

8.4. Context

8.4.1. In this situation, the new specific sound sources are being introduced close to existing residential receivers. This is likely to result in less tolerance from nearby residential receivers when compared to the situation where new residential receivers are brought close to existing specific sound sources. Therefore, we would recommend a conservative approach.

8.4.2. The specific sound level limits have been set 10dB below the existing background sound level, taking into account the character of the sound. This represents a highly conservative approach.

8.5. 3D noise model

8.5.1. A 3D noise model has been constructed in SoundPLAN™ to calculate the maximum sound power level of new fixed plant serving the proposed development. The model uses the calculation method from ISO9613-1:1996[6] to account for the distance between the source and receiver and any screening or reflections provided by the surrounding buildings.

8.5.2. The spectral content of the sources has been set to that of an axial fan[7] and point sources representing the combined sources have been located in each of the two external roof plant areas. Each plant area has been assumed to be surrounded by a solid barrier. Both the daytime and night-time situations have been considered.

8.5.3. Noise contour plots illustrating the propagation of sound from source to receiver are given in Figure 5 and Figure 6.

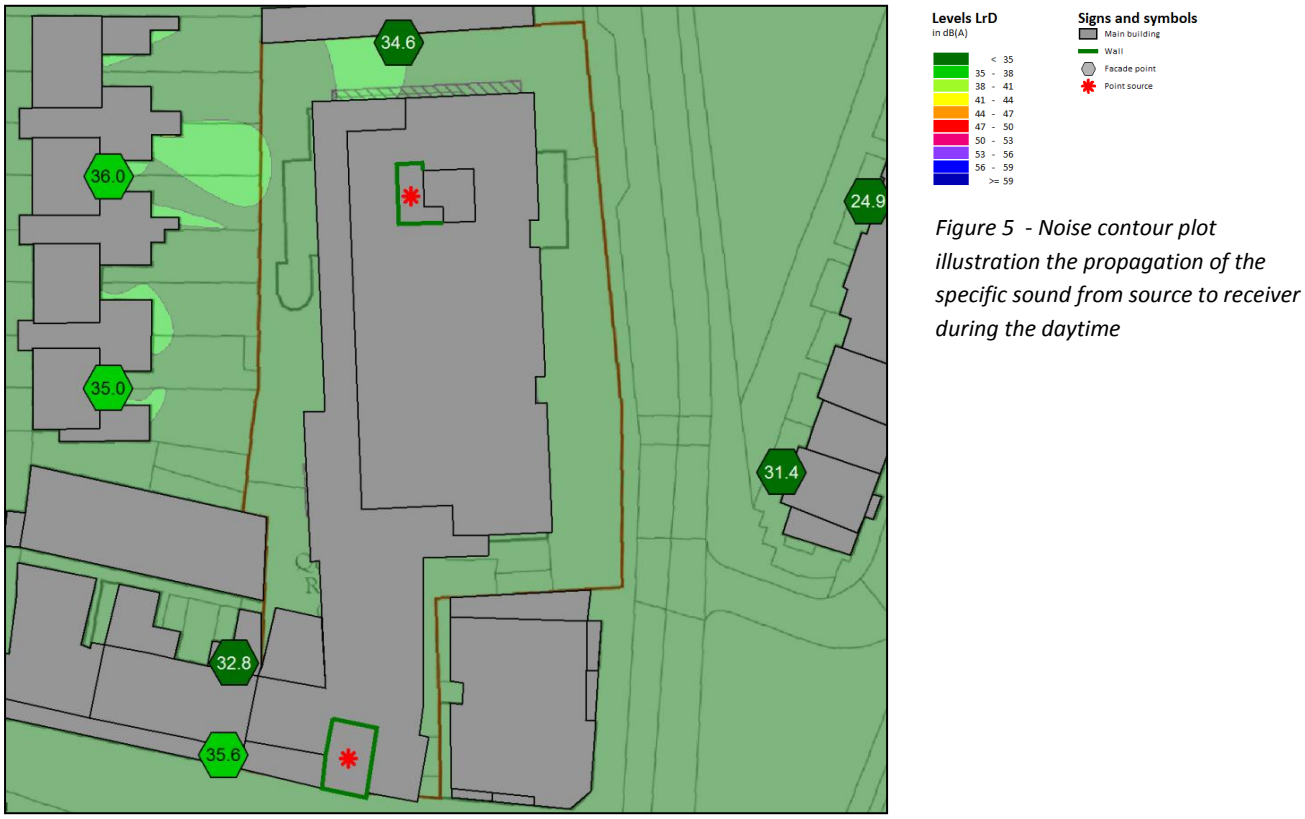


Figure 5 - Noise contour plot illustration the propagation of the specific sound from source to receiver during the daytime

[6] ISO9613-1:1996 "Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation"
[7] SoundPLAN Library data, Axial flow fan

Figure 6 - Noise contour plot illustration the propagation of the specific sound from source to receiver during the night-time

8.6. Sound power level limits

8.6.1. In order that the levels from Figure 5 and Figure 6 are achieved, the sound power level limits from Table 5 should be adhered to.

Quantity	Sound power level dB(A) re 1pW	
	Daytime	Night-time
Plant area 1 (Combined level of all plant in area)	84.0	74.0
Plant area 2 (Combined level of all plant in area)	76.5	66.5

Table 5 – Plant sound power level limits

8.6.2. These should be passed to the mechanical services engineer and the architect for future reference.

9. Uncertainty

9.1.1. BS4142 requires that uncertainty is reported and minimised wherever possible. The document acknowledges that all calculation-based modelling practices are ultimately an approximation. However, rather than ignore this fact or consider the results absolute, it is considered good practice to honestly report factors which can affect the robustness of any assessment.

9.2. Background sound complexity and variability

9.2.1. The ambient noise climate at the assessment site is reasonably simple and the background sounds levels measured (which include busier and quieter periods) are considered typical for an urban area. Wind speeds during the survey visits were typically under 5ms^{-1} and the effect of wind generated noise is not considered to have been significant.

9.2.2. There will inevitably be times when the background level at nearby residential receivers is higher or lower than that used in assessment; however, using the typical level (see Section 7) is considered to represent the most pragmatic and reasonable solution.

9.3. 3D noise model

9.3.1. The attenuation of sound propagating outdoors between fixed source and receivers fluctuates due to variations in the meteorological conditions along the propagation path. ISO9613:1996 restricts the prediction to moderately downwind conditions of propagation. There is an expected uncertainty of ±3dB in the predicted sound pressure levels.

9.3.2. Ultimately, algorithms used to calculate distance attenuation are approximations. However, within all calculations, ground absorption and diffusion (which can be helpful in terms of attenuating sound with distance) have been set to pessimistic levels. In this way, a worst-case scenario can be modelled, increasing the robustness of the assessment.

9.4. Instrumentation

9.4.1. The instrumentation used in noise.co.uk's surveys has been calibrated by UKAS-approved laboratories. It is, however, noted that the degree of measurement tolerance of most Type 1 sound level analysers is approximately 1-2 dB, meaning that two independently-verified meters could measure the same sound level and report marginally differing values.

10. Conclusions

10.1.1. The impact of environmental sound from new fixed plant has been assessed for proposed new office accommodation at 133-137 Queens Road, London, SE15 2ND.

10.1.2. Sound power level limits have been set for the combined fixed plant in each of the two rooftop plant areas in order to ensure that the resulting environmental sound will be likely to have a “low impact” on existing residents.

10.1.3. We strongly recommend submitting this report to the local planning authority for approval, prior to undertaking any works.

Bill Whitfield BA, MSc, PhD, MIOA
Noise and Vibration Consultant

APPENDIX

APPENDIX A: Technical Appendix

Required ISO Test Report Information (cross referenced where required)			
		Measurements carried out to:	Analysed to:
A	Standards	BS 7445-1: 2003 BS 7445-2: 1991	BS 4142:2014
B	Organisation who performed the measurements	noise.co.uk Ltd, The Haybarn, Newnham Grounds, Kings Newnham Lane, Bretford, Coventry, CV23 0JU.	
C	Name of Client	London Borough of Southwark	
D	Full site address	133-137 Queens Road London SE15 2ND	
E	Date of surveys	Background sound level survey: 25th – 26th September 2017	
F	Description & identification of proposed development	Assessment of the impact of the sound from new fixed plant at proposed new office accomodation	

Table 6 – Survey summary information.

10.2. Equipment

10.2.1. Measurements were made using the following equipment:

Monitoring	Sound Level Meter (Serial Number)	Calibrator (Serial Number)
Background sound level	Norsonic 140 (1405560)	Norsonic 1251 (33824)

Table 7 – The measurement equipment used during the survey.

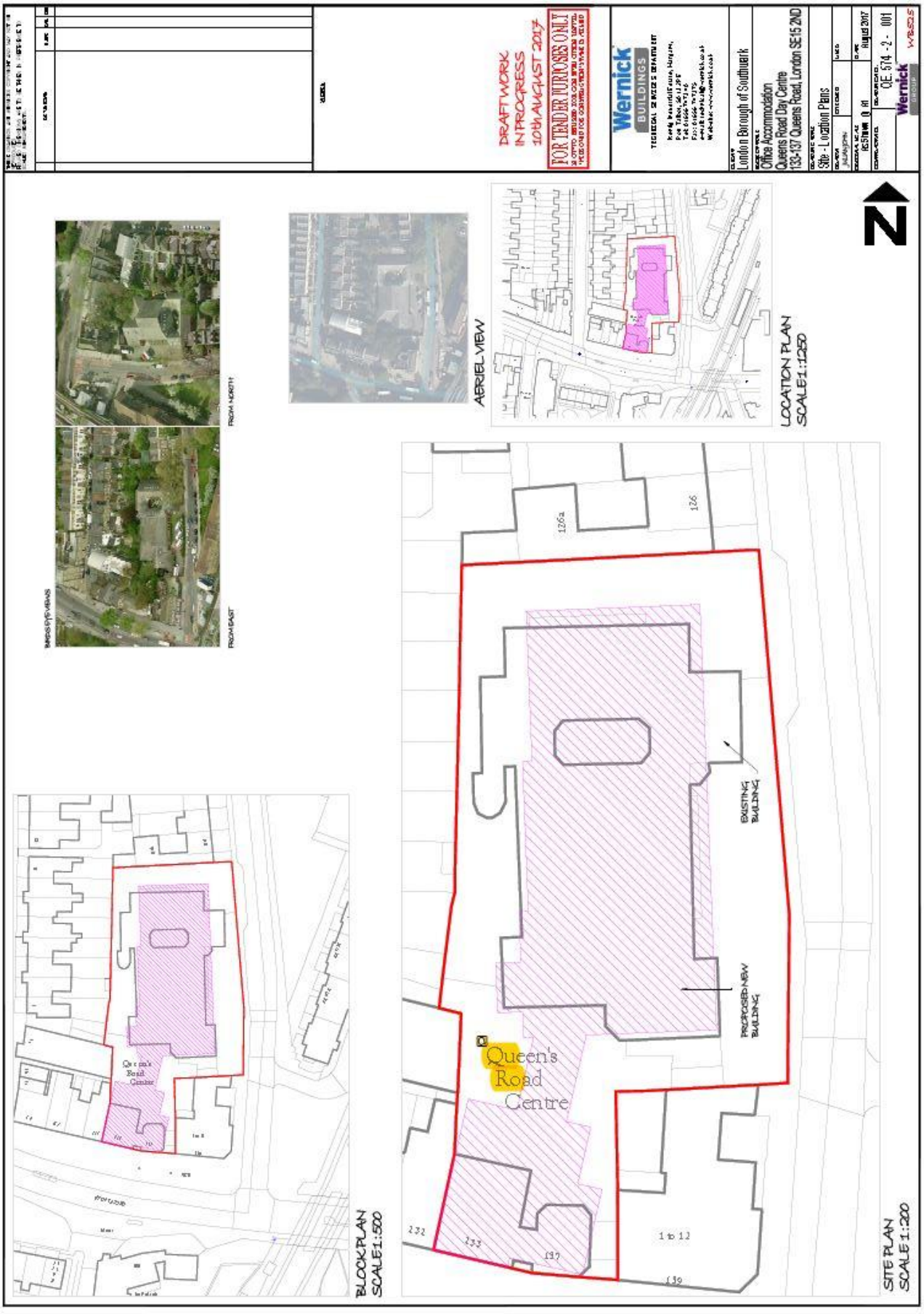
APPENDIX B: Background Sound Level Data

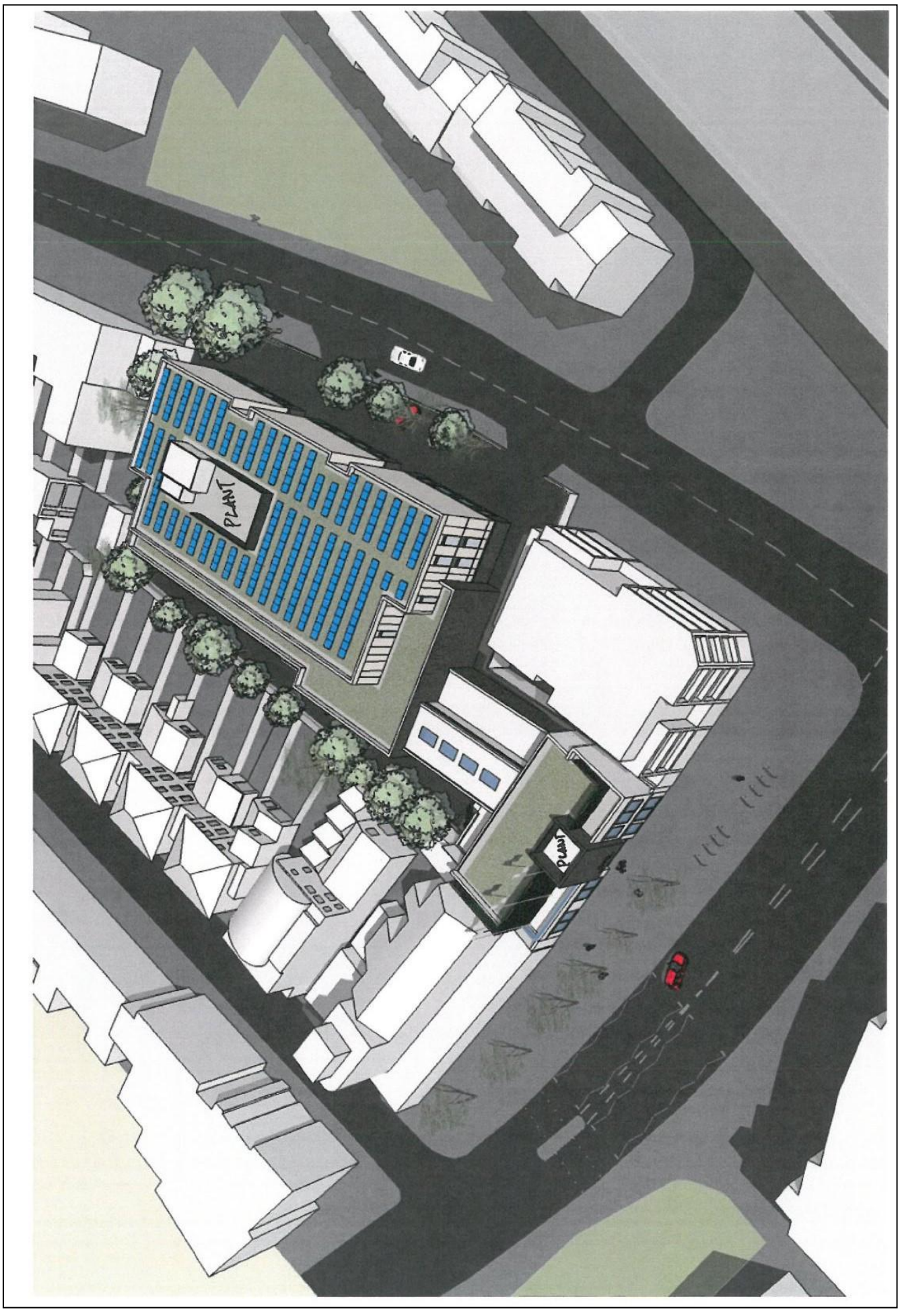
Period Starting		Sound Pressure Level, dB $L_{A90,15\text{-}min}$ ref 20µPa
25/09/2017	12:30:00	48.5
25/09/2017	12:45:00	48.5
25/09/2017	13:00:00	49.0
25/09/2017	13:15:00	48.0
25/09/2017	13:30:00	48.0
25/09/2017	13:45:00	48.0
25/09/2017	14:00:00	47.0
25/09/2017	14:15:00	48.0
25/09/2017	14:30:00	47.5
25/09/2017	14:45:00	48.5
25/09/2017	15:00:00	48.5
25/09/2017	15:15:00	48.5
25/09/2017	15:30:00	48.5
25/09/2017	15:45:00	48.5
25/09/2017	16:00:00	48.0
25/09/2017	16:15:00	48.5
25/09/2017	16:30:00	47.5
25/09/2017	16:45:00	47.0
25/09/2017	17:00:00	47.5
25/09/2017	17:15:00	48.0
25/09/2017	17:30:00	48.0
25/09/2017	17:45:00	47.5
25/09/2017	18:00:00	47.5
25/09/2017	18:15:00	48.5
25/09/2017	18:30:00	47.0
25/09/2017	18:45:00	47.5
25/09/2017	19:00:00	46.0
25/09/2017	19:15:00	46.5
25/09/2017	19:30:00	46.0
25/09/2017	19:45:00	46.5
25/09/2017	20:00:00	45.5
25/09/2017	20:15:00	47.0
25/09/2017	20:30:00	46.0
25/09/2017	20:45:00	47.5
25/09/2017	21:00:00	45.5
25/09/2017	21:15:00	46.0

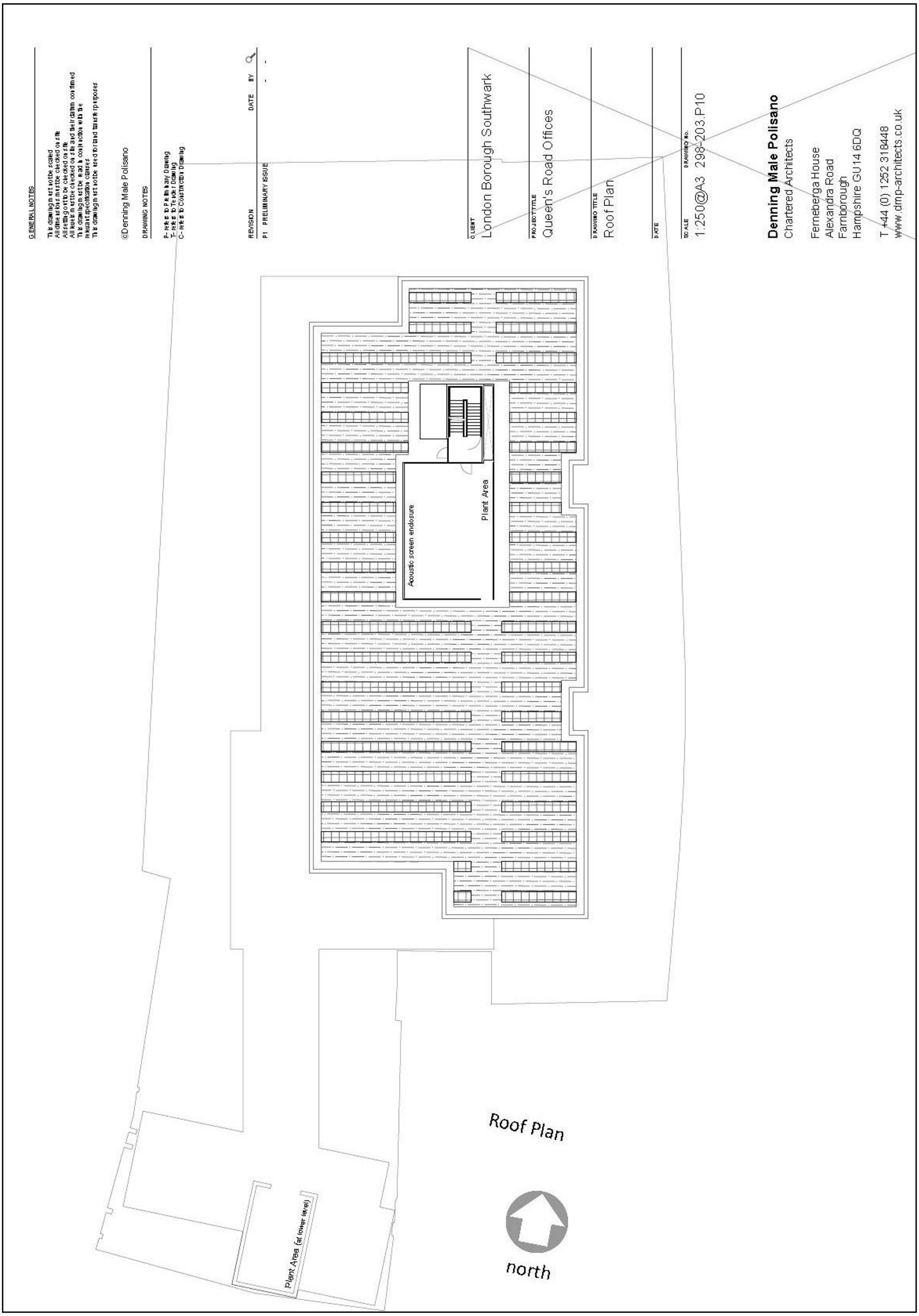
Period Starting		Sound Pressure Level, dB $L_{A90,15\text{-}min}$ ref 20µPa
25/09/2017	21:30:00	46.0
25/09/2017	21:45:00	44.0
25/09/2017	22:00:00	45.5
25/09/2017	22:15:00	44.5
25/09/2017	22:30:00	44.5
25/09/2017	22:45:00	43.5
25/09/2017	23:00:00	44.0
25/09/2017	23:15:00	44.0
25/09/2017	23:30:00	42.5
25/09/2017	23:45:00	42.5
25/09/2017	00:00:00	41.0
25/09/2017	00:15:00	41.5
25/09/2017	00:30:00	39.0
25/09/2017	00:45:00	39.5
26/09/2017	01:00:00	39.5
26/09/2017	01:15:00	38.5
26/09/2017	01:30:00	39.0
26/09/2017	01:45:00	36.5
26/09/2017	02:00:00	37.5
26/09/2017	02:15:00	37.5
26/09/2017	02:30:00	38.5
26/09/2017	02:45:00	37.0
26/09/2017	03:00:00	37.5
26/09/2017	03:15:00	37.0
26/09/2017	03:30:00	38.0
26/09/2017	03:45:00	38.0
26/09/2017	04:00:00	38.0
26/09/2017	04:15:00	38.0
26/09/2017	04:30:00	38.0
26/09/2017	04:45:00	39.5
26/09/2017	05:00:00	43.5
26/09/2017	05:15:00	40.5
26/09/2017	05:30:00	44.5
26/09/2017	05:45:00	43.5
26/09/2017	06:00:00	45.5
26/09/2017	06:15:00	49.0
26/09/2017	06:30:00	48.0
26/09/2017	06:45:00	48.5

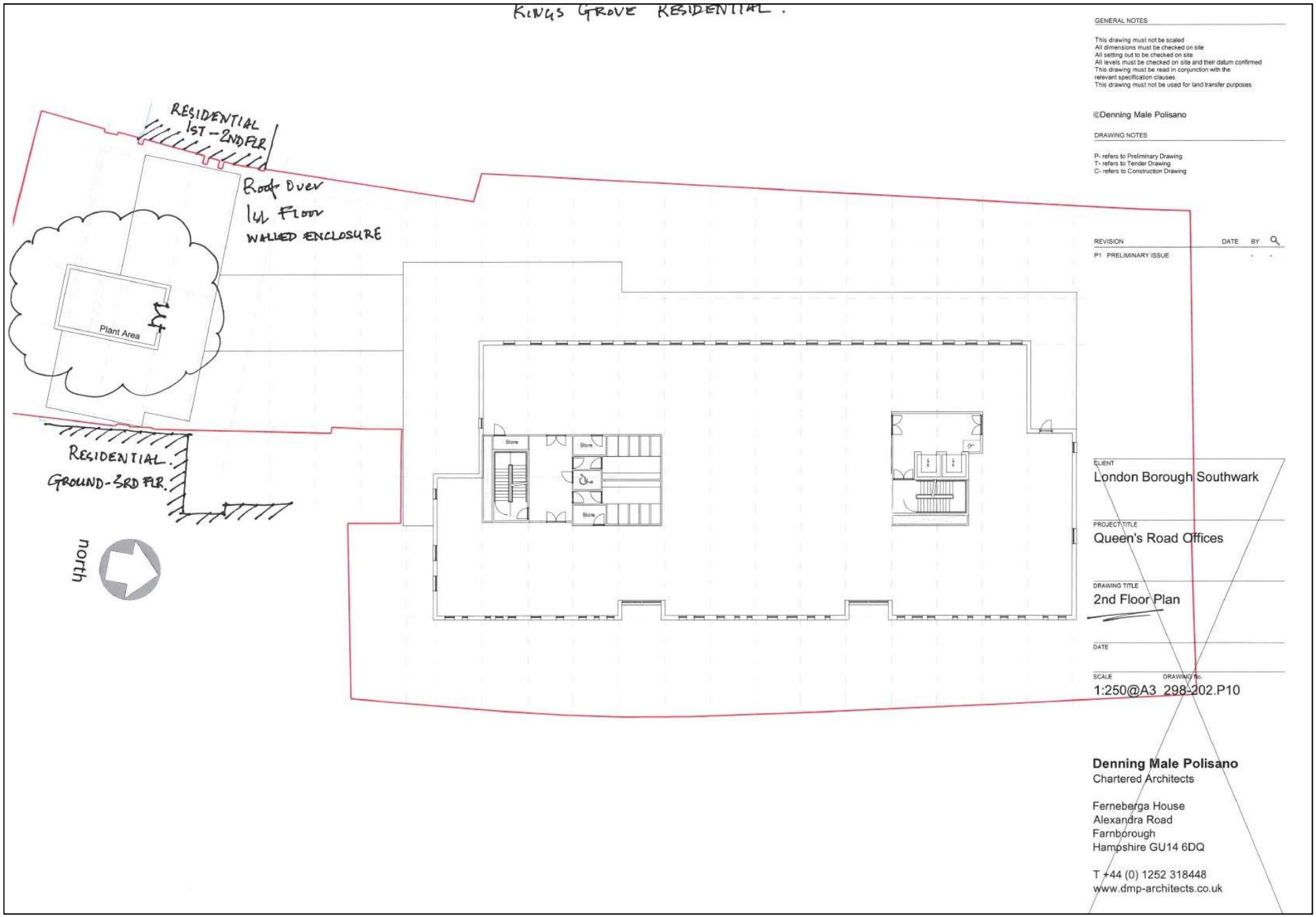
Period Starting		Sound Pressure Level, dB $L_{A90,15\text{-}min}$ ref 20µPa
26/09/2017	07:00:00	47.5
26/09/2017	07:15:00	49.0
26/09/2017	07:30:00	49.5
26/09/2017	07:45:00	48.5
26/09/2017	08:00:00	47.5
26/09/2017	08:15:00	47.0
26/09/2017	08:30:00	48.5
26/09/2017	08:45:00	47.0
26/09/2017	09:00:00	47.5
26/09/2017	09:15:00	47.0
26/09/2017	09:30:00	48.5
26/09/2017	09:45:00	48.0
26/09/2017	10:00:00	47.5
26/09/2017	10:15:00	50.0
26/09/2017	10:30:00	49.0
26/09/2017	10:45:00	48.0
26/09/2017	11:00:00	47.5
26/09/2017	11:15:00	47.5
26/09/2017	11:30:00	48.5
26/09/2017	11:45:00	48.0
26/09/2017	12:00:00	48.5
26/09/2017	12:15:00	48.5
26/09/2017	12:30:00	49.0

APPENDIX C: Client Drawings




PLANT
PLANT


GENERAL NOTES
©Denning Male Polisano
DRAWING NOTES
REVISION
DATE
BY
P1 PRELIMINARY ISSUE
CLIENT
London Borough Southwark
PROJECT TITLE
Queen's Road Offices
DRAWING TITLE
Roof Plan
DATE
SCALE
1:250@A3
DRAWING No.
298-203.P10
Denning Male Polisano
Chartered Architects
Ferneberga House
Alexandra Road
Farnborough
Hampshire GU14 6DQ
T +44 (0) 1252 318448
www.dmp-architects.co.uk
Plant Area
Acoustic screen enclosure
Plant Area (at lower level)
Roof Plan
north


KINGS GROVE RESIDENTIAL.
RESIDENTIAL 1ST - 2ND FLR
Roof over 1st Floor
WALLED ENCLOSURE
Plant Area
RESIDENTIAL. GROUND - 3RD FLR.
north
Store
Store
Store
GENERAL NOTES
This drawing must not be scaled
All dimensions must be checked on site
All setting out to be checked on site
All levels must be checked on site and their datum confirmed
This drawing must be read in conjunction with the relevant specification clauses
This drawing must not be used for land transfer purposes
©Denning Male Polisano
DRAWING NOTES
P- refers to Preliminary Drawing
T- refers to Tender Drawing
C- refers to Construction Drawing
REVISION DATE BY
P1 PRELIMINARY ISSUE - -
CLIENT
London Borough Southwark
PROJECT TITLE
Queen's Road Offices
DRAWING TITLE
2nd Floor Plan
DATE
SCALE DRAWING No.
1:250@A3 298-202.P10
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