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Snr. Pre-Con. Tech. Co-Ord.
Hill Partnerships
The Power House
Gunpowder Mill
Powdermill Lane
Waltham Abbey
Essex
EN9 1BN

Ref: LR01-22301-R0
Date: 27 October 2023

Dear Mr Green,

RE: NORTHOLT GRANGE, LONDON – SUBSTATION NOISE ASSESSMENT

Cass Allen are instructed by Hill Partnerships to assess the noise impact of a substation to be constructed at the above site. The noise-generating item inside the substation will be a transformer. The substation is 11m to the west of the North Building and 16m to the west of the Mews Housing building. The nearest noise-sensitive receptor (NSR) to the substation has been identified as Duplex ref. NB-00-01, located on the ground floor of the North Building. A drawing showing the location of the substation and the NSR is provided in Attachment 1 to this letter.

Assessment Criteria

Noise levels in the residential dwellings across the development have been designed to achieve the internal noise level criteria given in BS8233:2014 '*Guidance on sound insulation and noise reduction for buildings*'. Relevant BS8233 design criteria are summarised in Table 1 below.

Table 1 BS8233:2014 Internal Noise Criteria

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB LAeq,16hour	-
Dining	Dining room/area	40 dB LAeq,16hour	-
Sleeping (daytime resting)	Bedroom	35 dB LAeq,16hour	30 dB LAeq,8hour

In our view, it would be appropriate for noise levels associated with the substation to not be audible inside the nearest residential dwellings. Therefore, a noise limit of 20 dB LAeq,T inside the nearest residential dwellings has been adopted for this assessment, as this is 10 dB below the lowest BS8233 internal noise level criterion for habitable rooms. This is discussed further below.

Furthermore, it is noted that balconies will be included within several apartments. The closest balcony to the proposed substation is at a distance of appx. 13m, and is located within Plot NB-02-04, at second floor level of the North Building. In our view, it would be appropriate for noise emissions from the proposed substation to not exceed the measured existing background noise levels at the balconies, as per the assessment methodology given in BS4142:2014+A1:2019.

A noise survey was carried out at the site between 13th & 19th June 2023 (refer Attachment 2). The measured background noise levels at the site were taken to be 38 dB LA90,T during daytime hours (07:00-23:00) and 35 dB LA90,T during daytime hours (23:00-07:00). This is discussed further below.

Noise Breakout from the Substation

The project team have confirmed that sound power level of the transformer will be 61 dB(A), based on guidance provided in the Scottish & Southern Electricity Networks document *Secondary Distribution Substations; Common Clauses – Design and Installation Standard: TG-NET-SST-005 (dated February 2020)*. An excerpt of the relevant text from this document is provided in Attachment 3 to this letter. The assessment has been carried out on this basis.

A distance-correction calculation¹ has been carried out to determine the sound pressure level from the transformer at the position of the NSR. It has been calculated that the sound pressure level at this position will be 32 dB(A). However, this calculation does not account for the noise mitigation that would be provided by the substation enclosure itself; therefore, it is expected that the sound pressure level from the transformer at the position of the NSR will be lower than 32 dB(A).

All residential dwellings across the development will be designed to include glazing with a minimum acoustic performance of 27 dB Rw + Ctr. Based on the above, it is our view that the acoustic performance of the building fabric of the residential dwellings, including the glazing, will sufficiently reduce noise levels from the transformer to be well below the target internal noise level criterion of 20 dB LAeq,T.

Using the same distance-correction calculation¹ discussed above, it has been determined that the sound pressure level from the transformer at the position of the nearest balcony will be 31 dBA (without accounting for noise mitigation that would be provided by the enclosure of the substation itself). This is lower than the measured background noise levels during the site noise survey; both during daytime hours (07:00-23:00, with a measured background noise level of 38 dB LA90,T) and during night-time hours (23:00-07:00, with a measured background noise level of 35 dB LA90,T). In our view, this is acceptable.

¹ $L_p = L_w - 20\log(r) - 8$, whereby:

$L_w = 61$, $r = 11$ for the nearest NSR and $r = 13$ for the nearest balcony

Conclusion

It is our view that noise emissions from the proposed substation will be negligible, and are expected to readily comply with nominated noise criteria.

Yours sincerely,



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Quality Assurance

CHECKED BY

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Attachment 1 – Substation Location



Attachment 2 – Noise Survey Results

Survey Summary:

The survey comprised longer-term unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads.

Survey Period:

13/06/2023 to 19/06/2023

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period.

Equipment Used:

Type	Manufacturer	Model	Serial Number
Sound level meter ¹ (noise logger)	Rion	NL-32	01213688
Calibrator	Rion	NC-74	34551703

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

Weather Conditions:

The observed weather conditions were acceptable for acoustic measurement throughout the attended survey periods (low-medium wind speeds and no rain). Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions:

Position (refer plan below)	Description
L1	Unattended noise logging position. 3m above ground level. Free-field. Direct line of sight to nearby roads

Site Plan showing Measurement Positions:

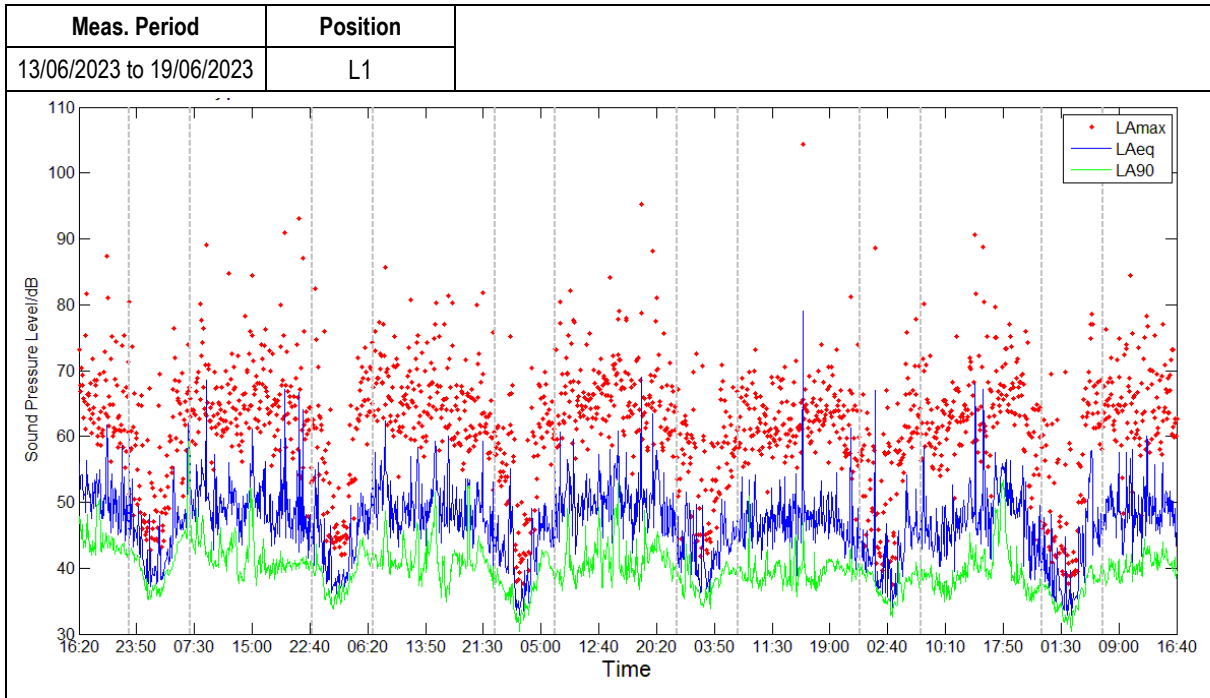


Unattended Noise Monitoring Results:

Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB ¹	LAeq,8hr, dB	LA90,5mins, dB ¹	LAm _{ax} , dB ²
13/06/2023 to 19/06/2023	L1	53	38	47	35	67

Note 1: Typical lowest measured during the period shown.

Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).



Attachment 3 – Excerpt from SSE Document TG-NET-SST-005

25 Sound Output of Transformers and Noise

- 25.1 The sound power level of the transformer shall be assumed to be 61dBA per transformer unless otherwise specified. TG-NET-SST-014 contains noise levels for specific transformers.
- 25.2 The fundamental frequency is 100Hz. For guidance the second and third harmonics are -10dB and -12dB below the fundamental.
- 25.3 On sites with multiple transformers in a common enclosure the effects of beating may need to be taken into consideration.
- 25.4 Transformer noise can also be transmitted, by vibration, through foundations. This can be mitigated by use of rubber, anti-vibration pads or other such measures.