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REPORT No. 2301061-4 Rev A

**Utopia Village
Chalcot Road
Primrose Hill
London
NW1 8LH**

ENVIRONMENTAL NOISE SURVEY & PLANT NOISE ASSESSMENT REPORT

PREPARED: 19TH March 2024

Presented by:

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1.0 Introduction

1.1 Following the original noise survey report dated 10th February 2023, and the subsequent plant noise assessment report dated 3rd November 2023, Noico Limited has been commissioned to undertake additional acoustic consultancy work on the phase 2 Utopia Village project in Chalcot Road, London NW1 8LH as detailed below. This follows comments made by residents in relation to the initial reports and mechanical plant design referred to above.

1.2 To summarise, the following items have been addressed within this report:

1.2.1 A new environmental noise survey was carried out at a location that more closely resembles the background noise likely to be experienced at the residential properties closest to, and most likely to be affected by noise transmission from the proposed mechanical plant installations.

1.2.2 Furthermore, we have considered the results of the background noise survey carried out by the acoustic consultancy company employed by local resident(s), which was based on a noise monitoring position within one of the neighbouring residential garden areas.

1.2.3 We have also considered the subsequent 'minimum' design noise criteria confirmed by Camden Council's Environmental Health officer.

1.2.3 The noise assessment and methodology has been amended to include the following:

- A separate assessment of noise levels within the neighbouring gardens and terraces as required within Camden Council's planning noise policy
- Cumulative effect from both the plant discharge and inlet air noise paths now detailed.
- Distances from plant noise sources to neighbouring receptor locations confirmed against detailed site plans and latest plantroom designs/layouts.
- An allowance for plant tonal content. Note the plant noise data does not exhibit any tonal content however we have included at this stage a +5dB correction factor for safety.
- Change of mechanical plant selections and design which operate at lower noise levels than previous plant selections.
- The plantroom previously situated along the west boundary of the site (previously referenced as Plantroom 2 within our earlier report) now omitted from design as revised plant selection requires less plant room space.

1.3 The site comprises of a part two/part three storey office building, currently undergoing general refurbishment to facilitate its ongoing use as office space. As part of the refurbishment plans, new items of mechanical plant are to be installed internally within a plantroom in the south west corner of the site, with plant intake and discharge air ventilation ducted to atmosphere through one of the external walls and roof of the plantroom.

1.4 The site is surrounded by residential properties (primarily three and four storey Victorian terraced town houses) with the rear elevations facing onto the development site. The closest residential properties to the plantroom (and hence noise sensitive) being as follows:

No's 8 to 13 Chalcot Road to the south west
No's 1 to 13 Egbert Street to the west

2.0 Supplementary Environmental Noise Survey

2.1 Instrumentation:

The noise monitoring equipment used for the survey was a precision grade Norsonic 140 'Type 1' Integrating Sound Level Meter. This was equipped with a Norsonic outdoor microphone protection kit Nor-1212 and LEMO extension cable. The instrument was powered by an external battery and stored in a weatherproof case.

The instruments were calibrated prior, and after use, with no calibration drift recorded.

Equipment serial numbers and calibration certification can be found in the table below.

Equipment reference	Equipment type	Serial number	Calibration Certificate ref.	Calibration Date
140 Orange (SD3)	Norsonic Type 140 Sound Level Meter	1402996	STD179944	Tested: 25/07/2022
	GRAS Type 40AF Microphone	190436	STD179944	
	Norsonic Type 1209 Preamplifier	12265	STD179944	
Field calibrator	Norsonic Type 1251 Calibrator	28311	STD179950	Tested: 25/07/2022

2.2 Measurement location:

The environmental noise analyser microphone was located externally at 1st floor level on a small recessed section of flat roof on the building in the south west corner of the site (adjacent to the proposed new plantroom), predominantly shielded from the surrounding ambient noise by the presence of the Utopia site buildings themselves. The microphone was attached to a tripod, raised 1.5 metres above roof level, and positioned approximately 3 metres from the façade of the building and any reflecting surfaces. This location was chosen as it was considered to be representative of the background noise environment that exists at the nearest noise-affected properties and gardens/terraces in Chalcot Road and Egbert Street, and is shown in Figure A1 at the end of this report.

2.3 Survey Period:

Noise monitoring was carried out continuously from approximately 12.30 hrs on 10th January 2024 through to 20.15hrs on 15th January 2024. The instrument was set up to monitor noise levels continuously and store data in fifteen-minute intervals.

2.4 Weather:

The prevailing weather condition throughout the majority of the entire survey period was satisfactory for noise monitoring, being dry, reasonably cold and with little to moderate breeze. Windspeed, although not recorded, was considered to be less than 5 m/s throughout the survey period.

2.5 Site Noise Characteristics:

Although the survey was un-manned it is expected that the ambient noise level was characterised by distant road traffic noise, in particular along Chalcot Road, and Gloucester Road. No other significant sources of noise were identified during the site visits, and the data is considered a true representation of the area's background noise level. It should be noted that the noise monitoring location was shielded to a reasonable extent from the ambient background noise by the Utopia buildings, and as such we would expect the background noise levels on the upper levels of the surrounding houses to be higher.

It should be noted that during the survey there were short periods (typically between 10.00am and 1.00pm) where a small standby generator set was in operation within one of the neighbouring properties. Although this would have influenced the background noise levels measured during these periods, it would not have affected the critical data used in setting the design noise levels, i.e. when the daytime background levels are at their minimum during, i.e. typically early morning and late evening.

3.0 Survey Results

- 3.1 The results of the environmental survey are presented in graphical format in the attached appendix 2, showing the recorded values of L_{Aeq} and L_{A90} .
- 3.2 See Appendix 1 for a glossary of terms.
- 3.3 To determine a representative (typical) background noise level at the noise monitoring position, the $L_{A90,15min}$ recorded values are rounded to the nearest decibel and plotted against percentage occurrence for daytime, evening, and night-time periods, shown in figure 1 below. This statistical analysis methodology is in line with BS 4142 *Methods for rating and assessing industrial and commercial sound*.
- 3.4 With reference to the measured data and background noise level statistical analysis in figure-1, the environmental noise levels are summarised in table-2 below. For reference purposes we have also summarised the data from the previous noise survey in February 2023, and the survey carried out by the neighbouring resident's own acoustic consultant (Messrs Syntegra Consulting) within the rear garden of No. 8 Chalcot Road.

Monitoring period	Equivalent noise level L_{AeqT} (dB)			Typical background noise level $L_{A90,15min}$ (dB)			Minimum background noise level $L_{A90,15min}$ (dB)		
	Noico survey 1	Noico survey 2	Syntegra survey	Noico survey 1	Noico survey 2	Syntegra survey	Noico survey 1	Noico survey 2	Syntegra survey
Daytime (07:00 - 19:00 hours)	49	46	44	44	39	38	36	35	36
Evening (19:00 - 23:00 hours)	47	43	43	40	38	38	33	33	35
Night-time (23:00 - 07:00 hours)	44	38	38	35	32	31	30	30	31

Table-2: Summary of noise monitoring data.

Note; we have considered the slightly lower background noise levels recorded by the resident's acoustic consultant (highlighted above) as the basis of the design noise criteria, both for noise transmission to the nearest noise affected residential windows as well as the noise levels in the gardens/terraces. In practice the upper floors of the residential premises (typically 1st floor and above which are most directly affected by the plantroom discharge air noise path) will experience higher levels of background noise, and as such there would normally be justification for using a higher design level for these locations; typically in line with the noise monitoring data obtained during our initial noise survey in January 2023.

4.0 Design noise criteria

- 4.1 Criteria for mechanical services noise emissions are normally based upon the prevailing level of background noise in the period of concern and may be set against this to a level as normally defined by the local planning authority.
- 4.2 In terms of an appropriate external design noise criteria, Camden London Borough Council's planning advice within Appendix 3 of the local plan states that - *it is expected that BS4142:2014 'Methods for rating and assessing commercial and industrial noise' will be used. For such cases a 'rating level' of 10dB below the background noise level (15dB if tonal elements are present) should be considered as the design criteria.*
- In addition to the above, Camden Council also advise that a rating level of 10dB below background noise level should be considered as the design target in the gardens and terraces of the affected residential dwellings during daytime hours (07:00 to 23:00hrs).
- 4.3 The planning case officer at Camden Council has subsequently confirmed that they accept 30dB $L_{Aeq,15min}$ as a minimum design noise level for practical reasons, and this will also be considered within our assessment.
- 4.4 To conform to the above criteria, and in accordance with the client requested enhanced design basis detailed in section 3.4, noise from the plant installations should not exceed the following values at the nearest noise sensitive properties as follows.

Nearest noise affected properties in Chalcot Road and Egbert Street

Operation period	1 metre from nearest windows	Within gardens and terraces
As planning advice in appendix 3 of Camden's local plan		
Daytime (07:00 to 19:00 hours)	28dB $L_{Aeq,15min}$	28dB $L_{Aeq,15min}$
Evening (19:00 to 23:00 hours)	28dB $L_{Aeq,15min}$	28dB $L_{Aeq,15min}$
Night time (23:00 to 07:00 hours)	21dB $L_{Aeq,15min}$	Not applicable
As Camden's noise criteria for low background noise scenarios		
24 hour	30dB $L_{Aeq,15min}$	30dB $L_{Aeq,15min}$

5.0 Plant Noise Assessment – at windows of nearest noise sensitive properties

5.1 Nearest noise sensitive properties

The site is surrounded by residential properties (primarily three and four storey Victorian terraced town houses) with the rear elevations facing onto the development site. The nearest noise sensitive residential buildings have been identified as follows in relation to the location of the proposed plant installation:

No's 8, 9 and 10 Chalcot Road to the south west
No's 1,2 and 3 Egbert Street to the west

5.1.1 Chalcot Road

The nearest noise affected property in Chalcot Road in relation to the plant area, is No.8 Chalcot Road due to the potential contribution from both the plantroom discharge and inlet ventilation noise. As the discharge air ventilation opening terminates some 7.5 metres above ground level, we have assessed the noise transmission to the upper floor windows of the property as being the critical noise path. The nearest windows are 11 metres from the nearest point of the plantroom

discharge air opening, and some 12 metres from the nearest point of the plantroom inlet air opening. We believe this to be a pessimistic (i.e. "worst case") approach as the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

5.1.2 Egbert Street

The nearest property in Egbert Street in relation to the plant area, is No.1 Egbert Street. As the discharge air ventilation opening terminates some 7.5 metres above ground level, we have assessed the noise transmission to the upper floor windows of the property as being the critical noise path. The nearest windows are 14 metres from the nearest point of the plantroom discharge air opening, and some 22 metres from the nearest point of the plantroom inlet air opening; the latter being 180 degrees away from the windows. Again, we believe this to be a pessimistic approach as the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

Note;

- a) The other properties in both Egbert Street and Chalcot Road will experience lower levels of plant noise by virtue of the fact they are a greater distance away from the plantroom and plantroom ventilation openings.

6.0 Plant Noise Assessment – within gardens and terrace areas of the nearest noise sensitive properties

6.1 Chalcot Road

The 1st floor external terrace at the rear of No. 10 Chalcot Road is considered to be the nearest outdoor space likely to be affected by noise from the plant installation in Chalcot Road. As the discharge air ventilation opening terminates some 7.5 metres above ground level (approximately 2 metres above the height of the terrace) this location will benefit from the shielding effect from the edge of the plantroom building, and directivity divergence from the plantroom discharge air opening. We have assessed the noise at a midway point on the terrace equating to a distance of 9 metres from the nearest point of the plantroom discharge air opening, and some 11 metres from the nearest point of the plantroom inlet air opening; the latter being approximately 135 degrees horizontally away from the windows. Again, we believe this to be a pessimistic approach as the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

6.2 Egbert Street

The 2nd floor external terrace at the rear of No.2 Egbert Street is considered to be the nearest outdoor space likely to be affected by noise from the plant installation in Egbert Street. As the discharge air ventilation opening terminates some 7.5 metres above ground level (approximately level with the terrace) this location will benefit from an 80-degree directivity divergence from the plantroom discharge air opening. We have assessed the noise at a midway point on the terrace equating to a distance of 12 metres from the from the nearest point of the plantroom discharge air opening, and some 20 metres from the nearest point of the plantroom inlet air opening; the latter facing 180 degrees away from the terrace. Again, we believe this to be a pessimistic approach as the central point of each ventilation opening would normally be used to assess the relative distances from noise source to receptor locations.

7.0 Mechanical Plant details and noise data

Full details of the mechanical plant including the manufacturers certified noise data are detailed as follows. It should be noted that the plant has the capability to operate 24 hours a day.

3No. Daikin model EWYT 090 CZNBA2 – air cooled heat pumps each with a total air flow of 13.4m³/s, and producing the following sound power levels.

Unit sound power levels (dB) - re:10-12 watts

63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
93	89	84	81	79	79	71	64	85

Note, the plant will be contained within a newly formed plantroom in the south west corner of the site which is currently commercial office space (Unit No.15). The discharge air from the heat pump will be ducted up through the roof via a newly formed ventilation opening, and the inlet air to the plantroom will be via an opening at ground floor level in the wall on the east elevation. The control of airborne breakout noise from the plantroom will be treated by incorporating additional internal sound insulation to the plantroom walls and roof.

8.0 Noise Assessment Calculations

8.1 Chalcot Road properties

8.1.1 Noise transmission to windows of nearest affected property – Upper floor windows of No.8 Chalcot Road

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
CHILLER DISCHARGE AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
45 degrees directivity correction	+5	+5	+5	+5	+6	+6	+6	+6	
Distance loss 1m from windows (10m)	-31	-31	-31	-31	-31	-31	-31	-31	
Resultant level at windows	71	66	61	57	56	55	47	39	61
CHILLER INLET AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Losses through inlet coils	-2	-2	-2	-2	-2	-3	-3	-3	
Attenuation from plantroom absorption	-5	-6	-6	-7	-6	-6	-6	-6	
Sound power level at louvre	91	86	81	77	76	75	67	60	
100 degrees directivity correction	-10	-10	-10	-15	-15	-15	-15	-15	
Distance loss 1m from windows (12m)	-33	-33	-33	-33	-33	-33	-33	-33	
Resultant level at windows	48	43	38	29	28	27	19	12	35
Cumulative level at windows	71	66	61	57	56	55	47	39	61
*Precautionary adjustment in case of tonal content									+5
Assessment level									66
Design criteria (07:00 to 19:00 hrs)									28
Required reduction									38
Design criteria (19:00 to 23:00 hrs)									28
Required reduction									38
Design criteria (23:00 to 07:00 hrs)									21
Required reduction									45

**30dBA minimum target level									30
Required reduction									36

*No evidence of tonal content but a precautionary allowance of 5dB added

** 30dBA minimum target level confirmed by Camden Council

8.1.2 Noise transmission to garden/terrace of nearest affected property – 1st floor terrace of No.10 Chalcot Road

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
CHILLER DISCHARGE AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
100 degrees directivity correction	-10	-10	-10	-15	-15	-15	-15	-15	
Distance loss to terrace (9m)	-30	-30	-30	-30	-30	-30	-30	-30	
Resultant level at windows	57	52	47	38	36	35	27	21	44
CHILLER INLET AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Losses through inlet coils	-2	-2	-2	-2	-2	-3	-3	-3	
Attenuation from plantroom absorption	-5	-6	-6	-7	-6	-6	-6	-6	
Sound power level at louvre	91	86	81	77	76	75	67	60	
135 degrees directivity correction	-15	-15	-15	-15	-15	-15	-15	-15	
Distance loss to terrace (11m)	-32	-32	-32	-32	-32	-32	-32	-32	
Resultant level at windows	44	39	34	30	29	28	20	13	35
Cumulative level at windows	57	52	47	39	37	36	28	22	44
*Precautionary adjustment in case of tonal content									+5
Assessment level									49
Design criteria (07:00 to 19:00 hrs)									28
Required reduction									21
Design criteria (19:00 to 23:00 hrs)									28
Required reduction									21
Design criteria (23:00 to 07:00 hrs)									n/a
Required reduction									n/a
**30dBA minimum target level									30
Required reduction									19

*No evidence of tonal content but a precautionary allowance of 5dB added

** 30dBA minimum target level confirmed by Camden Council

8.2 Egbert Street properties

8.2.1 Noise transmission to windows of nearest affected property – Upper floor windows of No.1 Egbert Street

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
CHILLER DISCHARGE AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
45 degrees directivity correction	+5	+5	+5	+5	+6	+6	+6	+6	
Distance loss to windows (13m)	-33	-33	-33	-33	-33	-33	-33	-33	
Resultant level at windows	69	64	59	55	54	53	45	37	59
CHILLER INLET AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Losses through inlet coils	-2	-2	-2	-2	-2	-3	-3	-3	
Attenuation from plantroom absorption	-5	-6	-6	-7	-6	-6	-6	-6	
Sound power level at louvre	91	86	81	77	76	75	67	60	
180 degrees directivity correction	-15	-15	-15	-15	-15	-15	-15	-15	
Distance loss to windows (21m)	-37	-37	-37	-37	-37	-37	-37	-37	
Resultant level at windows	39	34	29	25	24	23	15	8	30
Cumulative level at windows	69	64	59	55	54	53	45	37	59
*Precautionary adjustment in case of tonal content									+5
Assessment level									64
Design criteria (07:00 to 19:00 hrs)									28
Required reduction									36
Design criteria (19:00 to 23:00 hrs)									28
Required reduction									36
Design criteria (23:00 to 07:00 hrs)									21
Required reduction									43
**30dBA minimum target level									30
Required reduction									34

*No evidence of tonal content but a precautionary allowance of 5dB added

** 30dBA minimum target level confirmed by Camden Council

8.2.2 Noise transmission to garden/terrace of nearest affected property – 2nd floor terrace of No. 2 Egbert Street

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
CHILLER DISCHARGE AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
80 degrees directivity correction	-4	-4	-4	-10	-10	-10	-10	-10	
Distance loss to windows (12m)	-33	-33	-33	-33	-33	-33	-33	-33	
Resultant level at windows	60	55	50	40	38	37	29	21	46
CHILLER INLET AIR									
Unit sound power level (10-12 watts)	93	89	84	81	79	79	71	64	85
3 units operating	+5	+5	+5	+5	+5	+5	+5	+5	
Cumulative sound power level	98	94	89	86	84	84	76	69	90
Losses through inlet coils	-2	-2	-2	-2	-2	-3	-3	-3	
Attenuation from plantroom absorption	-5	-6	-6	-7	-6	-6	-6	-6	
Sound power level at louvre	91	86	81	77	76	75	67	60	
180 degrees directivity correction	-15	-15	-15	-15	-15	-15	-15	-15	
Distance loss to windows (20m)	-37	-37	-37	-37	-37	-37	-37	-37	
Resultant level at windows	39	34	29	25	24	23	15	8	30
Cumulative level at windows	60	55	50	40	38	37	29	21	46
*Precautionary adjustment in case of tonal content									+5
Assessment level									49
Design criteria (07:00 to 19:00 hrs)									28
Required reduction									23
Design criteria (19:00 to 23:00 hrs)									28
Required reduction									23
Design criteria (23:00 to 07:00 hrs)									n/a
Required reduction									n/a
**30dBA minimum target level									30
Required reduction									21

*No evidence of tonal content but a precautionary allowance of 5dB added

** 30dBA minimum target level confirmed by Camden Council

8.3 Summary

From the calculations detailed above it has been established that the plant requires to be attenuated by a minimum of 36dBA based on adopting the 30dBA minimum criteria confirmed by the planning officer for Camden London Borough Council.

Based on the 'standard criteria' imposed by Camden London Borough Council, and assuming the plant may operate at full load on a 24 hour basis, the overall plant noise transmission requires to be attenuated by a minimum of 45dBA.

9.0 Noise control measures

We have considered a range of practical noise control measures (i.e attenuator designs etc) required to achieve the design noise criteria, and based on the sound spectrum of the proposed mechanical plant, the pressure drop limitations of the heat pump fans, and the space limitations within the plantroom, the optimum performance that can be achieved from acoustic treatment is as follows, however these figures will need to be verified and achieved by the successful noise control supplier:

Heat pump discharge air path

A 3800mm long high-performance in-line duct attenuator to be fitted on the discharge air side of the heat pump, prior to its termination through the roof of the plantroom. The attenuator shall be connected to the heat pump with an acoustically lined discharge plenum. The acoustic performance of these components is detailed as follows:

Discharge attenuator insertion loss (dB)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Minimum insertion loss (dB)	23	36	50	50	50	50	50	45

Acoustically lined discharge air plenum

Sound absorption performance

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Sound absorption co-efficient (α)	0.18	0.34	0.64	0.82	0.76	0.74	0.65	0.37

Heat pump inlet air path

A 2400mm long high-performance in-line duct attenuator to be fitted to the rear of the plantroom inlet air louvre situated within the east elevation wall of the plantroom. The acoustic performance of the attenuator is detailed as follows.

Inlet air attenuator insertion loss (dB)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Minimum insertion loss (dB)	13	25	39	50	50	50	50	43

Plantroom acoustic wall lining

The walls of the plantroom shall be acoustically lined with a proprietary acoustic lining material to reduce the reverberant build-up of noise internally within the plantroom. The lining shall cover a minimum of 50% of the wall surface area. The required acoustic performance of the lining is detailed as follows together with a typical specification.

Sound absorption performance

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Sound absorption co-efficient (α)	0.18	0.34	0.64	0.82	0.76	0.74	0.65	0.37

The above noise control measures will achieve a maximum resultant noise level at the nearest noise affected windows and within the gardens/terraces of 28dBA, based on the plant operating at full load.

This will clearly meet the 30dBA design target and the more stringent day/evening design targets (28dBA) should they be adopted. If the more stringent nighttime criteria is adopted (21dBA) then further measures will need to be incorporated such as operating the plant at reduced capacity at night and/or introducing alternative means of heating to compensate (such as electric boilers).

10.0 Conclusion

- 10.1 Following previous environmental noise surveys and assessments, a further noise survey has been carried out at a location that more closely resembles the background noise level to be expected at the properties and gardens/terraces most likely to be affected from plant noise emissions.
- 10.2 This data along with data previously reported by neighbouring resident(s) own acoustic consultant has been used to set a target design noise criteria in accordance with Camden London Borough Council's planning advice within Appendix 3 of the local plan.
- 10.3 We have also considered the subsequent design noise criteria confirmed by the planning officer that is accepted in low background noise scenarios as applicable to this project.
- 10.4 A detailed plant noise assessment has been carried out based on revised plant selections and design, and compared to the various project design noise criteria referred to above in order to establish the extent of the required noise control measures.
- 10.5 Noise control treatment options have been considered and it has been established that the design criteria confirmed by Camden Council can be achieved throughout. Additionally, the 'standard' criteria detailed within Camden's local plan can be achieved for day and evening plant operation, as can the standard criteria for noise levels within the gardens and terraces.
- 10.6 Should the more stringent nighttime criteria detailed in the local plan be adopted, it will be necessary to operate the plant at reduced capacity at night and introduce alternative means of heating to compensate accordingly.
- 10.7 To summarise the above, we confirm that the proposals meet Camden's requirements and a condition should be imposed as follows to secure this:

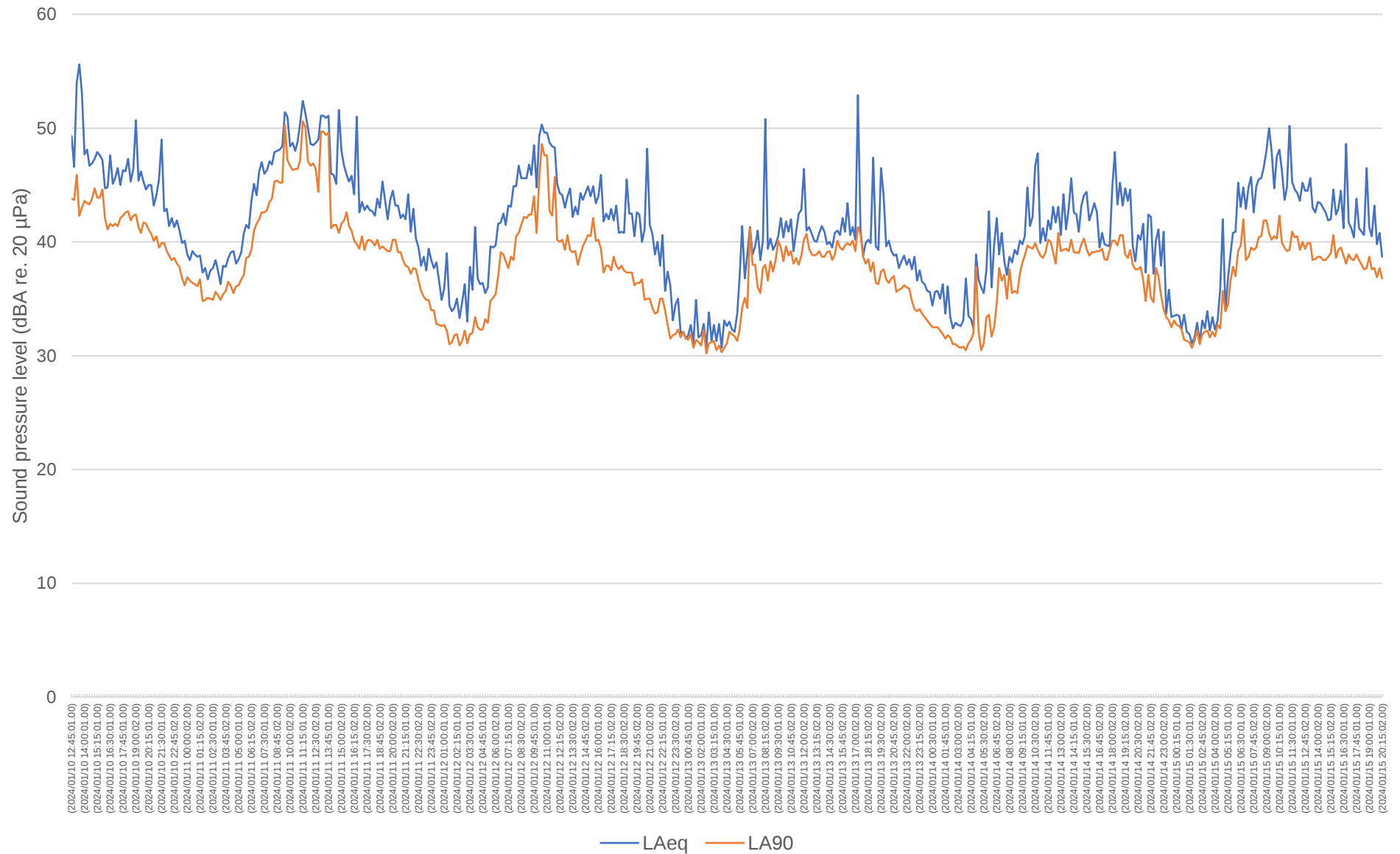
*The noise mitigation and attenuation measures shall ensure that the external noise level emitted from plant, machinery/ equipment will be lower than either the existing background noise level by at least 10dBA, or 30dBA whichever is the greater, as assessed according to BS 4142:2014 "Methods for rating and assessing industrial and commercial sound" at the nearest and/or most affected noise sensitive premises which will include gardens and external amenity spaces, with **all machinery operating together at maximum capacity** and thereafter be permanently retained.*

Reason: To ensure that the amenity of occupiers of the development site/ surrounding premises is not adversely affected by noise from mechanical installations/ equipment in accordance with the requirements of policies A1 and A4 of the London Borough of Camden Local Plan 2017

Appendix 1 – Glossary of terms

Decibel, dB	A unit of level derived from the logarithm of the ratio between the value of a quantity and a reference value. For sound pressure level (L_p) the reference quantity is $2 \times 10^{-5} \text{ N/m}^2$. The sound pressure level existing when microphone measured pressure is $2 \times 10^{-5} \text{ N/m}^2$ is 0 dB, the threshold of hearing.
L	Instantaneous value of Sound Pressure Level (L_p).
Frequency	Is related to sound pitch; frequency equals the ratio between velocity of sound and wavelength.
A-weighting	Arithmetic corrections applied to values of L_p according to frequency. When logarithmically summed for all frequencies, the resulting single "A weighted value" becomes comparable with other such values from which a comparative loudness judgement can be made, then, without knowledge of frequency content of the source.
$L_{eq,T}$	Equivalent continuous level of sound pressure which, if it actually existed for the integration time period T of the measurement, would possess the same energy as the constantly varying values of L_p actually measured.
$L_{Aeq,T}$	Equivalent continuous level of A weighted sound pressure which, if it actually existed for the integration time period, T, of the measurement would possess the same energy as the constantly varying values of L_p actually measured.
$L_{n,T}$	L_p which was exceeded for n% of time, T.
$L_{An,T}$	Level in dBA which was exceeded for n% of time, T.
$L_{max,T}$	The instantaneous maximum sound pressure level which occurred during time, T.
$L_{Amax,T}$	The instantaneous maximum A weighted sound pressure level which occurred during time, T.
Background Noise Level	The value of $L_{A90,T}$, ref. BS4142:2014.
Traffic Noise Level	The value of $L_{A10,T}$.
Specific Noise Level	The value of $L_{Aeq,T}$ at the assessment position produced by the specific noise source, ref. BS4142:2014.
Rating Level	The specific noise level, corrected to account for any characteristic features of the noise, by adding a 5 dBA penalty for any tonal, impulsive or irregular qualities, ref. BS4142:2014.
Specific Noise Source	The noise source under consideration when assessing the likelihood of complaint.
Assessment Position	Unless otherwise noted, is a point at 1 m from the façade of the nearest affected sensitive property.

Environmental noise monitoring - Utopia (Corner rear)



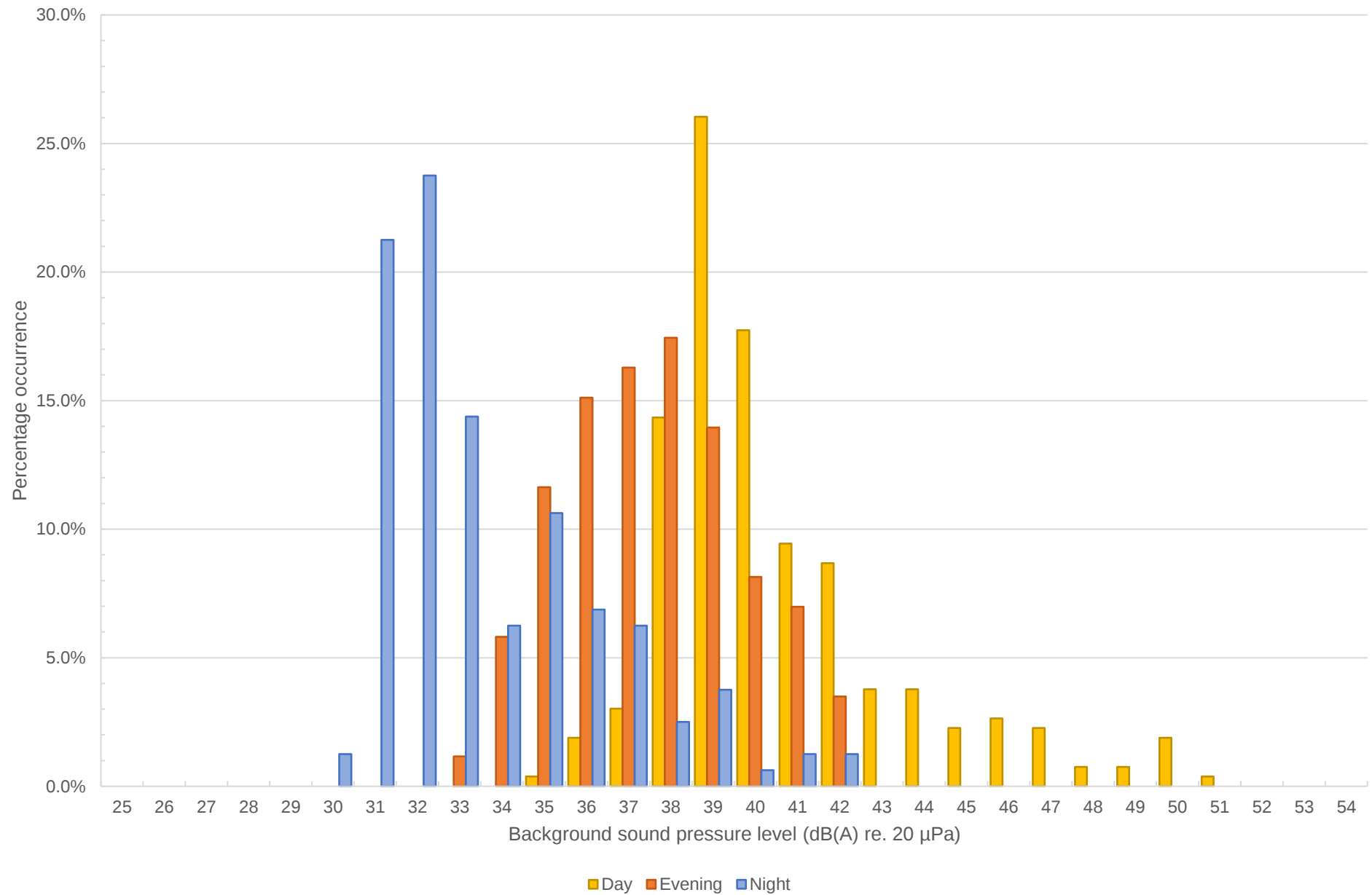


Figure A1

