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REPORT No. 2301061-3 Rev C

Utopia Village
Chalcot Road
Primrose Hill
London
NW1 8LH

PLANT NOISE ASSESSMENT REPORT

PREPARED: 3rd November 2023

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Figure A1: Site Plan

1.0 Introduction

- 1.1 Noico Limited has been commissioned by Jackson Coles Construction Consultancy to undertake a noise assessment of the new mechanical services plant proposed to be installed at the site of Utopia Village in Chalcot Road, London NW1 8LH.
- 1.2 The plant in question comprises several heat pumps which are to be located in two separate locations on the site as follows:
- 1.2.1 Plant area 1 - One large plant item within a newly formed internal plantroom in the south west corner of the site close to its boundary with the residential properties in Chalcot Road.
- 1.2.2 Plant area 2 - Several smaller plant items located within an acoustic enclosure midway along the west edge of the site close to its boundary with the residential properties in Egbert Street.
- 1.3 The purpose of the assessment is to ascertain if the proposed new plant will achieve the design noise criteria detailed in the Environmental Noise Survey Report compiled by Noico Limited dated 10th February 2023 (and hence meet the planning requirements of the local planning authority), or whether noise control measures will be required. It should be noted at the time of the environmental noise survey, the eastern end of the site was largely un-occupied. As such the mechanical plant associated with these buildings had been de-commissioned, giving rise to background noise levels lower than would normally have been experienced in the past, and consequently a lower baseline level for the noise assessment.

2.0 Design noise criteria

- 2.1 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.
- 2.2 In terms of an appropriate external design noise criteria, Camden London Borough Council advise the following within Appendix 3 of the local plan - *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.*
- 2.3 To conform to the above criteria, and in accordance with the noise survey results and recommendations detailed in the above referenced environmental noise survey report, noise from the plant installations should not exceed the following values at the nearest noise sensitive properties which have been identified as follows.

Location 1 – Properties in Egbert Street

Operation period	Sound pressure level
Daytime (07:00 to 19:00 hours)	31dB $L_{Aeq,15min}$
Evening (19:00 to 23:00 hours)	29dB $L_{Aeq,15min}$
Night time (23:00 to 07:00 hours)	25dB $L_{Aeq,15min}$

Location 2 – Properties in Chalcot Road

Operation period	Sound pressure level
Daytime (07:00 to 19:00 hours)	34dB $L_{Aeq,15min}$
Evening (19:00 to 23:00 hours)	30dB $L_{Aeq,15min}$
Night time (23:00 to 07:00 hours)	25dB $L_{Aeq,15min}$

Note: These levels must be achieved cumulatively with all plant operating, and as measured at 1 metre from the window of the nearest affected residential property.

3.0 Plant Noise Assessment

3.1 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 installations:

3.1.1 Plant area 1 - South west corner of the site

No's 1 to 13 Egbert Street to the west
No's 7 to 13 Chalcot Street to the south

The nearest property in Egbert Street in relation to Plant area 1, is No.1 Egbert Street. The nearest windows are assessed to be approximately 10 metres from the nearest façade of the plantroom.

The nearest property in Chalcot Street in relation to Plant area 1, is No.9 Chalcot Street. The nearest windows are assessed to be approximately 6 metres from the nearest façade of the plantroom.

Notes;

- a) The actual distance from the plantroom ventilation openings to the above referenced properties is greater due to the openings being in the centre of the roof (discharge air), and in the eastern façade (inlet air) facing away from the properties.
- b) The other properties in both Egbert Street and Chalcot Street 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.

3.1.2 Plant area 2 - West boundary of site

No's 7, 9 and 13 Egbert Street to the west

The nearest property in Egbert Street in relation to Plant area 2, is No.9 Egbert Street. The nearest windows are assessed to be approximately 8 metres from the edge of the plant area.

Notes;

- a) The other properties in Egbert Street will experience lower levels of plant noise by virtue of the fact they are a greater distance away from the plant.

3.2 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 24/7, however it will be programmed to operate at reduced output (and noise level) during the evening (19:00 to 23:00hrs) and nighttime (19:00 to 07:00hrs), and will form part of the planning conditions.

3.2.1 Plant in plant area 1 (unit sound power levels re 10-12 watts)

Daikin heat recovery unit model EWYD5504ZXS2 with a total air flow rate of 67.86m³/s.

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

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
Daikin EWYD5504ZXS2 heat recovery unit	101	98	98	100	100	91	83	75	101

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 in the wall of 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.

3.2.2 Plant in plant area 2 (unit sound power levels re 10-12 watts)

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

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
1No.Mitsubishi REYQ16U heat recovery condensing units	94	90	85	85	78	75	73	70	85.6
4No.Mitsubishi REYQ18U heat recovery condensing units	92	84	82	83	77	74	74	70	84

Note, the above plant will be installed in a purpose made acoustic enclosure located in an existing outdoor space mid-way along the west boundary with Egbert Street. The discharge air and inlet air for the plant will via attenuated openings in the roof of the enclosure.

3.3 Calculations – Plant Area 1 - South west corner of the site

3.3.1 Noise transmission to properties at location A – Egbert Street

Chiller discharge air (discharge duct opening situated in centre of roof 12 metres away from the nearest property in Egbert Street)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
Unit sound power level (10-12 watts)	101	98	98	100	100	91	83	75	101
45 degrees directivity correction	+5	+5	+5	+5	+6	+6	+6	+6	
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
Distance loss to windows (12m)	-33	-33	-33	-33	-33	-33	-33	-33	
Resultant level at windows	78	68	68	69	69	59	51	42	71
Design criteria (07:00 to 19:00 hrs)									31
Required reduction									40
Design criteria (19:00 to 23:00 hrs)									29
Required reduction									42
Design criteria (23:00 to 07:00 hrs)									25
Required reduction									46

Chiller inlet air (inlet air opening situated in east elevation building façade)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
Unit sound power level	101	98	98	100	100	91	83	75	101
Losses through inlet coils	-3	-3	-3	-3	-3	-3	-3	-3	
Attenuation from plantroom absorption	-5	-7	-8	-8	-7	-7	-7	-7	
Sound power level at louvre	93	88	87	89	90	81	73	65	
150 degrees directivity correction	-15	-15	-15	-15	-15	-15	-15	-15	
Distance loss to windows (16m)	-35	-35	-35	-35	-35	-35	-35	-35	
Resultant level at windows	43	38	37	39	40	31	23	15	42
Design criteria (07:00 to 19:00 hrs)									31
Required reduction									11
Design criteria (19:00 to 23:00 hrs)									29
Required reduction									13
Design criteria (23:00 to 07:00 hrs)									25
Required reduction									17

3.3.2 Noise transmission to properties at location B – Chalcot Street

Chiller discharge air (discharge duct opening situated in centre of roof 8 metres away from the nearest property in Chalcot Street)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
Unit sound power level	101	98	98	100	100	91	83	75	101
45 degrees directivity correction	+5	+5	+5	+5	+6	+6	+6	+6	
Plenum loss	-1	-2	-2	-3	-3	-4	-4	-5	
Distance loss to windows (8m)	-29	-29	-29	-29	-29	-29	-29	-29	
Resultant level at windows	82	72	72	73	73	63	55	46	75
Design criteria (07:00 to 19:00 hrs)									34
Required reduction									41
Design criteria (19:00 to 23:00 hrs)									30
Required reduction									45
Design criteria (23:00 to 07:00 hrs)									25
Required reduction									50

Chiller inlet air (inlet air opening situated in east elevation building façade)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
Unit sound power level	101	98	98	100	100	91	83	75	101
Losses through inlet coils	-3	-3	-3	-3	-3	-3	-3	-3	
Attenuation from plantroom absorption	-5	-7	-8	-8	-7	-7	-7	-7	
Sound power level at louvre	93	88	87	89	90	81	73	65	
80 degrees directivity correction	-1	-4	-4	-4	-10	-10	-10	-10	
Distance loss to windows (10m)	-31	-31	-31	-31	-31	-31	-31	-31	
Resultant level at windows	61	53	52	54	49	40	32	24	54
Design criteria (07:00 to 19:00 hrs)									34
Required reduction									20
Design criteria (19:00 to 23:00 hrs)									30
Required reduction									24
Design criteria (23:00 to 07:00 hrs)									25
Required reduction									29

3.3.3 Summary

From the calculations detailed above it has been established that the plant requires to be attenuated by a minimum of 50dBA based on 24 hour plant operation to meet the planning noise requirements of Camden London Borough Council.

3.4 Calculations – Plant Area 2 - West boundary of site

3.4.1 Noise transmission to properties at location C – Egbert Street

Combined noise level discharge and inlet air via openings in enclosure roof

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz	dBA
REYQ16U sound power level (10-12 watts)	94	90	85	85	78	75	73	70	85.6
REYQ18U sound power level (10-12 watts)	92	84	82	83	77	74	74	70	84
Correction for 4 REYQ18U units	+6	+6	+6	+6	+6	+6	+6	+6	+6
Combined level REYQ18U units	98	90	88	89	83	80	80	76	90
Combined level all units	99	93	90	90	84	81	81	77	91
60 degrees directivity correction	+2	+2	+2	+2	0	0	0	0	
Distance loss to windows (8m)	-29	-29	-29	-29	-29	-29	-29	-29	
Resultant level at windows	72	66	63	63	55	52	52	48	63
Design criteria (07:00 to 19:00 hrs)									31
Required reduction									32
Design criteria (19:00 to 23:00 hrs)									29
Required reduction									34
Design criteria (23:00 to 07:00 hrs)									25
Required reduction									39

3.4.2 Summary

From the calculations detailed above it has been established that the plant requires to be attenuated by a minimum of 39dBA based on 24 hour plant operation to meet the planning noise requirements of Camden London Borough Council.

4.0 Noise control measures

4.1 Plant Area 1 - South west corner of the site

4.1.1 Plant operation period 07:00hrs to 19:00hrs

To achieve the above levels of noise attenuation, the following noise control measures will be required.

Heat pump discharge air path

A 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 required acoustic performance of these components is detailed as follows together with a typical specification.

Discharge attenuator insertion loss (dB)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Minimum insertion loss (dB)	22	36	50	56	56	52	50	49

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 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 required acoustic performance of the attenuator is detailed as follows together with a typical specification.

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

4.1.2 Plant operation period 19:00hrs to 07:00hrs

To achieve the design noise criteria for plant operating between 19:00 hrs and 07:00 hrs the noise control measures detailed above will be required in addition to setting the plant to operate at reduced output and a minimum reduction in sound power level of 6dBA.

4.2 Plant Area 2 - West boundary of site

4.2.1 Plant operation period 07:00hrs to 19:00hrs

To achieve the above levels of noise attenuation, the following noise control measures will be required.

The plant should be housed within a purpose made acoustic enclosure complete with high performance discharge air and inlet air attenuators within the roof of the enclosure. The minimum performance of the enclosure and attenuators shall be as follows:

Attenuator minimum insertion loss performance requirements (dB)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Discharge air attenuator	16	25	42	50	50	50	50	50
Inlet air attenuator	13	21	36	50	50	50	50	50

Acoustic enclosure minimum sound transmission loss performance (dB)

	63Hz	125Hz	250Hz	500Hz	1KHz	2KHz	4KHz	8KHz
Acoustic enclosure	21	22	29	38	47	52	57	56

4.2.2 Plant operation period 19;00hrs to 07;00hrs

To achieve the design noise criteria for plant operating between 19;00 hrs and 07;00 hrs the noise control measures detailed above will be required in addition to setting the plant to operate at reduced output and a minimum reduction in sound power level of 6dBA.

5.0 Conclusion

- 5.1 A noise assessment has been carried out on the new items of plant equipment proposed to be installed Utopia Village, Chalcot Road, London NW1 8LH.
- 5.2 It has been established that based upon the proposed plant selections and locations, and with the inclusion of the noise control measures recommended, the design noise criterion will be achieved at the nearest noise sensitive residential receptors. As such the requirements of the local planning authority (Camden London Borough Council) will be met.

Figure A1

