26-28 Ely Place

Environmental Noise Survey and Plant Noise Assessment Report

28878/PNA1-Rev9

8 April 2022

For:

CL Investments 2 Ltd

Hann Tucker Associates
Consultants in Acoustics Noise & Vibration

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Hann Tucker Associates

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Document Control

Rev	Date	Comment	Prepared by	Authorised by
9	08/04/2022	Ground floor enclosure drawing included	 Firas Farhan Principal Consultant BSc(Hons), MIOA	
8	04/04/2022	Minor amendments following feedback	Firas Farhan Principal Consultant BSc(Hons), MIOA	
7	28/03/2022	Minor amendments following feedback Updates to various plans	Firas Farhan Principal Consultant BSc(Hons), MIOA	
6	01/03/2022	Attenuators confirmed and new roof plan	Firas Farhan Principal Consultant BSc(Hons), MIOA	
5	28/01/2022	AHU Added	Firas Farhan Principal Consultant BSc(Hons), MIOA	
4	16/09/2021	Plant selection changed	Firas Farhan Principal Consultant BSc(Hons), MIOA	
3	24/06/2021	Change Client address	Firas Farhan Principal Consultant BSc(Hons), MIOA	
2	16/06/2021	Minor amendments to Section 10.0	Firas Farhan Principal Consultant BSc(Hons), MIOA	
1	11/06/2021	Minor amendments following feedback	Firas Farhan Principal Consultant BSc(Hons), MIOA	
0	09/06/2021	First Issue	Firas Farhan Principal Consultant BSc(Hons), MIOA	

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Attachments

1.0 Introduction

It is proposed to install items of building services plant at 26-28 Ely Place.

Hann Tucker Associates have therefore been commissioned to undertake a detailed daytime and night-time fully automated environmental noise survey of the site to establish the currently prevailing noise climate and propose suitable plant noise emission criteria, based on the results of the survey and the requirements of the Local Authority.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window and compare proposed items of plant to this criteria.

This report presents the survey methodology and assessment findings.

2.0 Objectives

To establish by means of an unmanned noise survey the existing $L_{Amax,}$ L_{Aeq} and L_{A90} environmental noise levels at one secure and accessible on-site position, using fully computerised noise monitoring equipment.

Measurement procedures shall be in general accordance with British Standard BS 7445 “Description and measurement of environmental noise”.

Measurement procedures shall be in general accordance with those described in BS 4142: 2014, Method for rating industrial noise affecting mixed residential areas, published by the British Standards Institution.

The survey will enable noise emission limits from the development to be identified with reference to the requirements of the Local Authority to minimise the possibility of noise nuisance to neighbours.

To assess the noise emissions from the proposed plant, based upon data with which we are provided, and comment upon the acceptability.

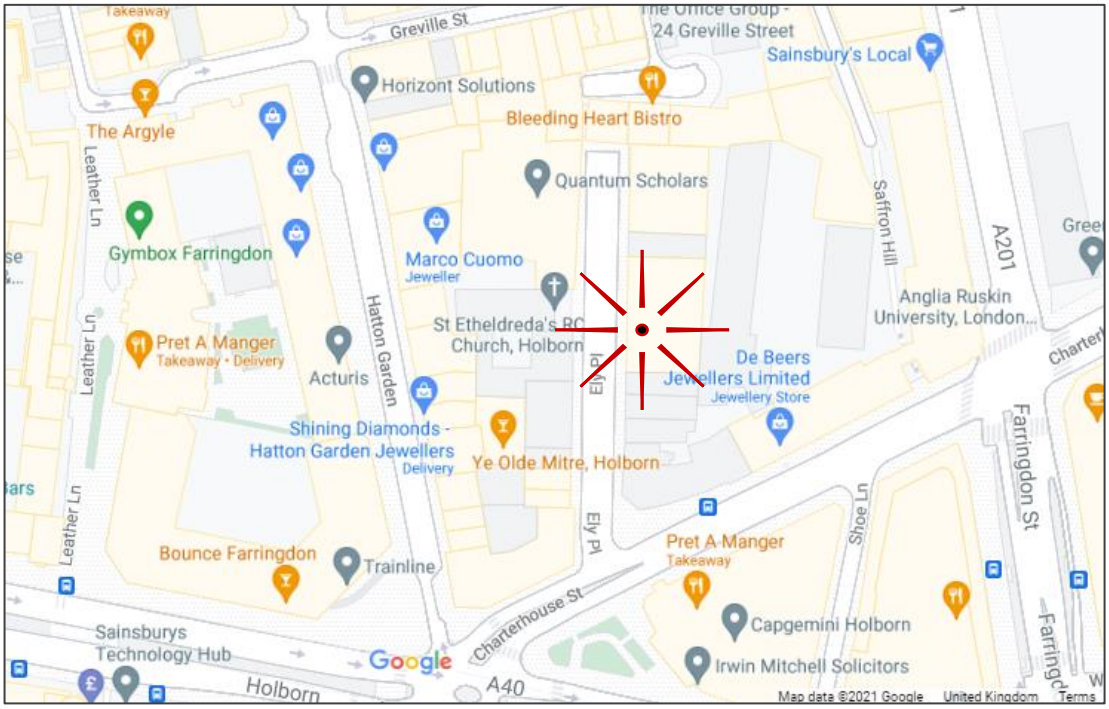
To advise on noise control measures if required with reference to the requirements of the Local Authority

To present our methodology and findings in a detailed Environmental Noise Survey and Plant Noise Impact Assessment Report to accompany the planning application.

3.0 Site Description

3.1 Location

The Site falls within London Borough of Camden's jurisdiction. The location is shown in the Location Map below.



3.2 Description

26-29 Ely Place is a 5 storey office building. The majority of the buildings on Ely Place are of similar height. Directly opposite the site is St Etheldreda's RC Church. To the rear of the site are residential dwellings. Subjectively the dominant noise sources were noted to be from road traffic on surrounding roads and nearby building services plant.

4.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

5.0 Acoustic Terminology

For an explanation of the acoustic terminology used in this report please refer to Appendix A enclosed.

6.0 Acoustic Standards and Guidelines

6.1 Noise Policy Statement for England

The Noise Policy Statement for England (NPSE) was published in March 2010 (i.e. before the NPPF). The NPSE is the overarching statement of noise policy for England and applies to all forms of noise other than occupational noise, setting out the long term vision of Government noise policy which 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."

"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; and*
- *where possible, contribute to the improvement of health and quality of life."*

The Explanatory Note to the NPSE has three concepts for the assessment of noise in this country:

NOEL – No Observed Effect Level
This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.

LOAEL – Lowest Observable Adverse Effect Level
This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level
This is the level above which significant adverse effects on health and quality of life occur.

None of these three levels are defined numerically and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time

of day/day of the week, etc. The need for more research to investigate what may represent an SOAEL for noise is acknowledged in the NPSE and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

The NPSE concludes by explaining in a little more detail how the LOAEL and SOAEL relate to the three NPSE noise policy aims listed above. It starts with the aim of avoiding significant adverse effects on health and quality of life, then addresses the situation where the noise impact falls between the LOAEL and the SOAEL when *"all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development."* The final aim envisages pro-active management of noise to improve health and quality of life, again taking into account the guiding principles of sustainable development which include the need to minimise travel distance between housing and employment uses in an area.

6.2 National Planning Policy Framework (NPPF)

The following paragraphs are from the NPPF (published July 2021):

185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) 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;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

187. Planning policies and decisions should ensure that new development can 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. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its

vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed."

Paragraph 185 also references the Noise Policy Statement for England (NPSE). This document does not refer to specific noise levels but instead sets out three aims:

- "Avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government 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 NPPF document does not refer to any other documents or British Standards regarding nose other than the NPSE.

Paragraph 2 of the NPPF states that *"planning law required that applications for planning permission must be determined in accordance with the development plan unless material considerations indicate otherwise."*

Paragraph 12 of the NPPF states that *"The presumption in favour of sustainable development does not change the statutory status of the development plan as the starting point for decision making. Where a planning application conflicts with an up-to-date development plan (including any neighbourhood plans that form part of the development plan), permission should not usually be granted. Local planning authorities may take decisions that depart from an up-to-date development plan, but only if material considerations in a particular case indicate that the plan should not be followed."*

6.3 Planning Practice Guidance on Noise

Planning Practice Guidance (PPG) under the NPPF has been published by the Government as a web based resource at http://planningguidance.planningportal.gov.uk/blog/guidance/. This includes specific guidance on Noise although, like the NPPF and NPSE the PPG does not provide any quantitative advice. It seeks to illustrate a range of effect levels in terms of examples of outcomes as set out in the following table:

Perception	Examples of Outcomes	Increasing 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	No specific measures required
		Lowest Observed Adverse Effect Level	
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.	Observed Adverse Effect	Mitigate and reduce to a minimum
		Significant Observed Adverse Effect Level	
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 disruptive	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 hard, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

6.4 Local Authority Requirements

6.4.1 Noise Sensitive Developments

The LB of Camden determines in Policy A4 of their Camden Local Plan (2017) that a noise sensitive development is that which, *"…includes housing, schools and hospitals as well as offices, workshops and open spaces…"*

6.4.2 Building Services Plant Noise Criteria

The site lies within the jurisdiction of the London Borough of Camden. Their policy stated within the *Camden Local Plan (2017)* regarding criteria for atmospheric noise emissions from building service plant is as follows:

"Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Garden used for main amenity (free-field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings	Outside bedroom window (façade)	Night	Rating level' 10dB* below background and no events exceeding 57dBLAmax	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB LAmax	Rating 'Rating level' greater than 5dB above background and/or events exceeding 88dBLAmax

6.5 BS 4142:2014

When setting plant noise emission criteria reference is commonly made to BS 4142: 2014 "*Methods for rating and assessing industrial and commercial sound".*

The procedure contained in BS 4142:2014 provides an assessment of the likely effects of sound on people when comparing the specific noise levels from the source with representative background noise levels. Where the noise contains "a tone, impulse or other characteristic" then various corrections can be added to the specific (source) noise level to obtain the "rating level".

BS 4142 states that: *"The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific noise can be obtained by the difference of the rating noise level and the background noise level and considering the following:*

• *"Typically, the greater this difference, the greater the magnitude of the impact."*

• *"A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context."*

• *"A difference of around +5dB is likely to be an indication of an adverse impact, depending on*

the context."

• *"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."*

The determination of the "rating level" and the "background level" are both open to interpretation, depending on the context.

In summary it is not possible to set plant noise emission criteria purely on the basis of BS 4142:2014. It is reasonable to infer from the above, however, that a difference of around -5dB corresponds to "No Observed Effect Level" as defined in the Noise Policy Statement for England. It is also reasonable to infer from the above that if the plant noise rating level does not exceed the existing background noise level outside any noise sensitive residential window then the plant noise is of "low impact".

6.6 World Health Organisation Guidelines on Community Noise

BS8233:2014 is based upon the current World Health Organisation (WHO) guidance "*Guidelines on Community Noise".* A summary of the noise guidelines relevant to the proposed scheme is presented in the table below.

Residential Environment	Critical Health Effect(s)	L_{Aeq}	L_{AFmax}	Time Base
Outdoor living area	Serious annoyance, daytime and evening	55	-	07:00-23:00
	Moderate annoyance, daytime and evening	50	-	07:00-23:00
Dwelling, indoors	Speech intelligibility and moderate annoyance, daytime and evening	35	-	07:00-23:00
Inside bedrooms	Sleep disturbance, night-time	30	45	23:00-07:00
Outside bedrooms	Sleep disturbance, window open (outdoor values)	45	60	23:00-07:00

These WHO guidelines are based, in almost all cases, on the lower threshold below which the occurrence rates of any particular effect can be assumed to be negligible.

6.7 British Standard BS8233: 2014

British Standard 8233: 2014 “Guidance on sound insulation and noise reduction for buildings” provides guidance for the control of noise in and around buildings.

BS8233:2014 Section 7.7.2 titled “Internal ambient noise levels for dwellings” states:

“In general for steady external noise sources, it is desirable that internal ambient noise levels do not exceed the following guideline values:

Activity	***Location***	***Desirable Internal Ambient Criteria***	
		07:00 - 23:00	***23:00 - 07:00***
Resting	*Living Rooms*	*35 dB $L_{Aeq,16hour}$*	-
Dining	*Dining Room/Area*	*40 dB $L_{Aeq,16hour}$*	-
Sleeping (Daytime Resting)	*Bedroom*	*35 dB $L_{Aeq,16hour}$*	*30 dB $L_{Aeq,8hour}$*

6.8 BREEAM

BREEAM New Construction 2018 Pol 05 states a credit can be awarded if:

1 There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site.

OR

2 Where there are noise-sensitive areas within the assessed building or noise-sensitive areas within 800 m radius of the assessed site, a noise impact assessment compliant with BS 4142:2014(228) is commissioned. Noise levels must be measured or determined for:

2.a Existing background noise levels:

2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site

2.a.ii including existing plant on a building, where the assessed development is an extension to the building

2.b Noise rating level from the assessed building.

3 The noise impact assessment must be carried out by a suitably qualified acoustic consultant.

4 The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise sensitive development, must be at least 5dB lower than the background noise throughout the day and night.

5 If the noise sources from the assessed building are greater than the levels described in criterion 4, measures have been installed to attenuate the noise at its source to a level where it will comply with the criterion."

6.9 Statutory Noise Nuisance

There is no quantitative definition of statutory noise nuisance. It is generally accepted however, that if the plant noise level is at least 5dB (or 10dB if tonal) below the minimum background $L_{90(15minutes)}$ at 1m from the nearest noise sensitive residential window, then the risk of a statutory noise nuisance is avoided. By adopting this as a design criterion the guidance contained in BS 4142:2014 should also be complied with.

7.0 Survey Methodology

7.1 Procedure

Fully automated environmental noise monitoring was undertaken from approximately 12:00 hours on Tuesday 11 May 2021 to approximately 12:00 hours on Thursday 13 May 2021.

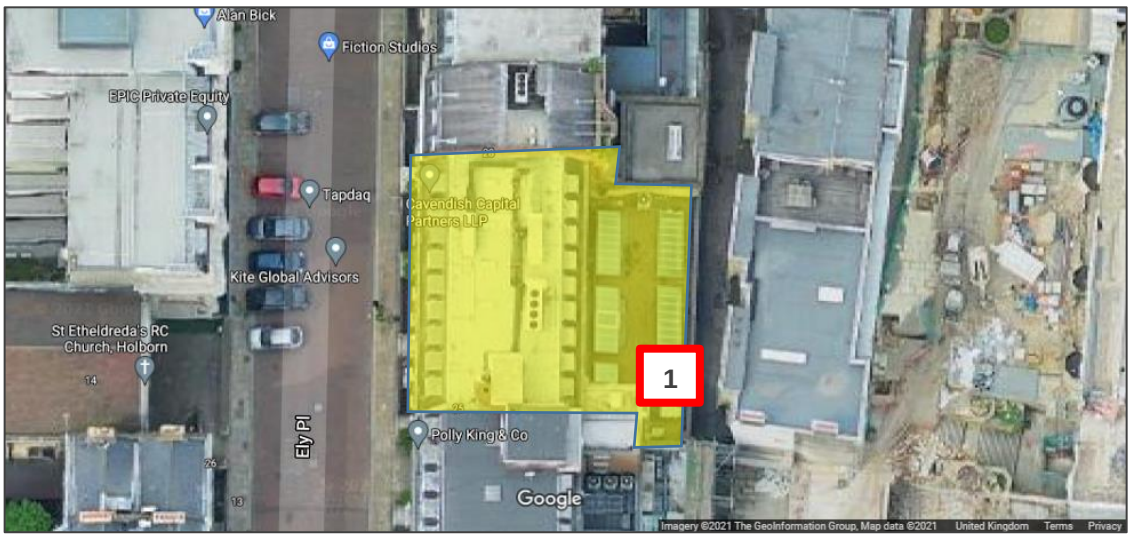
Due to the nature of the survey, i.e. unmanned, it is not possible to accurately comment on the weather conditions throughout the entire survey period. However at the beginning and end of the survey period the wind conditions were moderate. The sky was generally patchy cloud. We understand that generally throughout the survey period the weather conditions were similar to this. These conditions are considered suitable for obtaining representative measurement results.

7.2 Measurement Position

The noise level measurements were undertaken at a single Position at the development site. The measurement position is described in the table below.

Position No	Description
1	The sound level meter was located on the ground floor east of the site. The microphone was attached to a pole approximately 2m above ground level and away from any reflecting surfaces approximately 2m away from the nearest noise sensitive residential window.

The position was selected in order to assess the lowest noise levels at the development site for subsequent use in setting plant noise emission criteria and is shown on the plan below.



7.3 Instrumentation

The instrumentation used during the survey is presented in the table below:

Position	Description	Manufacturer	Type	Serial Number	Calibration
1	Type 1 ½" Condenser Microphone	PCB	377B02	133362	Calibration on 13/09/2019
	Preamp	Larson Davis	PRM902	3318	Calibration on 13/09/2019
	Type 1 Data Logging Sound Level Meter	Larson Davis	824	3699	Calibration on 13/09/2019
-	Type 1 Calibrator	Bruel & Kjaer	4231	2308993	Calibration on 12/08/2020

The sound level meter, including the extension cable, was calibrated prior to and on completion of the survey. No significant change was found to have occurred (no more than 0.1dB).

The sound level meter was located in an environmental case with the microphone connected to the sound level meter via an extension cable. The microphone was fitted with a windshield.

8.0 Results

The results have been plotted on Time History Graphs 28878/TH1.01 enclosed, presenting the 15 minute A-weighted (dBA) L_{90}, L_{eq} and L_{max} noise levels at the measurement position throughout the duration of the survey.

The lowest $L_{A90\ (15\ min)}$ measurements recorded during the survey are presented in the table below:

Lowest Measured $L_{A90(15min)}$ Background Noise Level (dB re 2 x 10^{-5} Pa)			
Position	**Daytime (07:00 – 23:00) Hours**	**Night-Time (23:00 – 07:00) Hours**	**24 Hours**
1	42 dBA	41 dBA	41 dBA

9.0 Discussion Of Noise Climate

Due to the nature of the survey, i.e. unmanned, it is not possible to accurately describe the dominant noise sources, or specific noise events throughout the entire survey period. However at the beginning and end of the survey period the dominant noise source was noted to be from road traffic on surrounding roads and from nearby building services plant.

10.0 Plant Noise Emission Criteria

The site lies within the jurisdiction of the London Borough of Camden. Their policy stated within the *Camden Local Plan (2017)* regarding criteria for atmospheric noise emissions from building service plant is as follows:

"Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise Sensitive Receptor	Assessment Location	Design Period	LOAEL (Green)	LOAEL to SOAEL (Amber)	SOAL (Red)
Dwellings	Garden used for main amenity (free-field) and Outside living or dining or bedroom window (façade)	Day	'Rating level' 10dB* below background	'Rating level' between 9dB below and 5dB above background	'Rating level' greater than 5dB above background
Dwellings	Outside bedroom window (façade)	Night	Rating level' 10dB* below background and no events exceeding 57dBLAmax	'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB LAmax	Rating 'Rating level' greater than 5dB above background and/or events exceeding 88dBLAmax

On the basis of the above and the results of the environmental noise survey, we propose that the following plant noise emission criteria be achieved at 1 metre from the nearest noise sensitive neighbouring window.

Proposed Plant Noise Limit L_{Aeq} dBA at Nearest Noise Sensitive Façade	
Daytime (07:00 – 23:00 hours)	**Night-time (23:00 – 07:00 hours)**
32 dBA	31 dBA

The above criteria are to be achieved with all of the proposed plant operating simultaneously.

It should be noted that the above are subject to the final approval of the Local Authority.

11.0 Plant Noise Impact Assessment

It is proposed to install the following items of building services plant.

Ground Floor Plant				
Plant Description	**Location**	**Qty**	**Plant Make**	**Model Number**
Condenser	Ground	1	Toshiba	MCY-MHP1006HS8-E
Condenser	Ground	1	Toshiba	MMY-MUP1201HT8P-E

Roof Plant				
Plant Description	**Location**	**Qty**	**Plant Make**	**Model Number**
Condenser	Roof	4	Toshiba	MCY-MHP0604HS8-E
Condenser	Roof	3	Toshiba	MCY-MHP1006HS8-E
Condenser	Roof	1	Toshiba	MCY-MHP0806HS8-E
Condenser	Roof	1	Daikin	RXYSQ6T8VB
AHU	Roof	1	M&Y	041

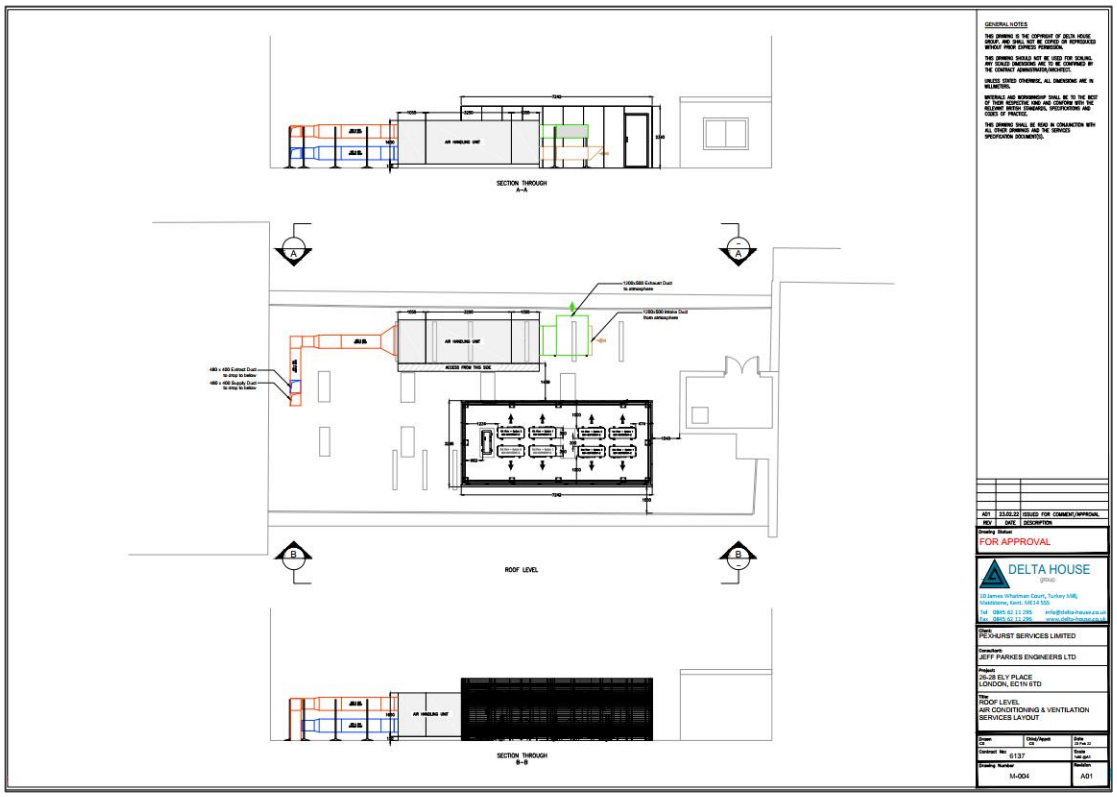
11.1 Plant Noise Data

We understand the manufacturer's noise data for the equipment is as follows:

Plant Model	**Sound Level at Octave Band Centre Frequency (Hz)**								**dBA**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**	
MCY-MHP1006HS8-E L_p @ 1m	65	67	58	59	53	49	43	37	60
MMY-MUP1201HT8P-E L_p @ 1m	67	69	60	61	55	51	45	39	62
MCY-MHP0604HS8-E L_p @ 1m	59	58	57	53	46	42	36	31	54
MCY-MHP0806HS8-E L_p @ 1m	64	66	57	58	52	48	42	36	60
RXYSQ6T8VB L_p @ 1m	56	53	50	47	46	43	39	28	51
041 – Intake L_w	-	59	68	67	59	60	64	53	69
041 – Exhaust L_w	-	63	71	71	72	72	75	66	79
041 – Casing L_p @ 1m	58	57	56	52	46	42	36	31	53

11.2 Location of Plant

It is proposed to install a new AHU in the same position as the existing AHU, nine condensers on the 4th floor roof of the building, and two condensers on the ground floor flat roof to the rear. The nearest noise sensitive residential windows are to the east/rear of the site approximately 6m from the proposed ground floor units and approximately 19m away from the proposed roof units. See plan below:



11.3 Mitigation Measures

In order to control plant noise emissions in line with the proposed criterion, we understand the following is being proposed:

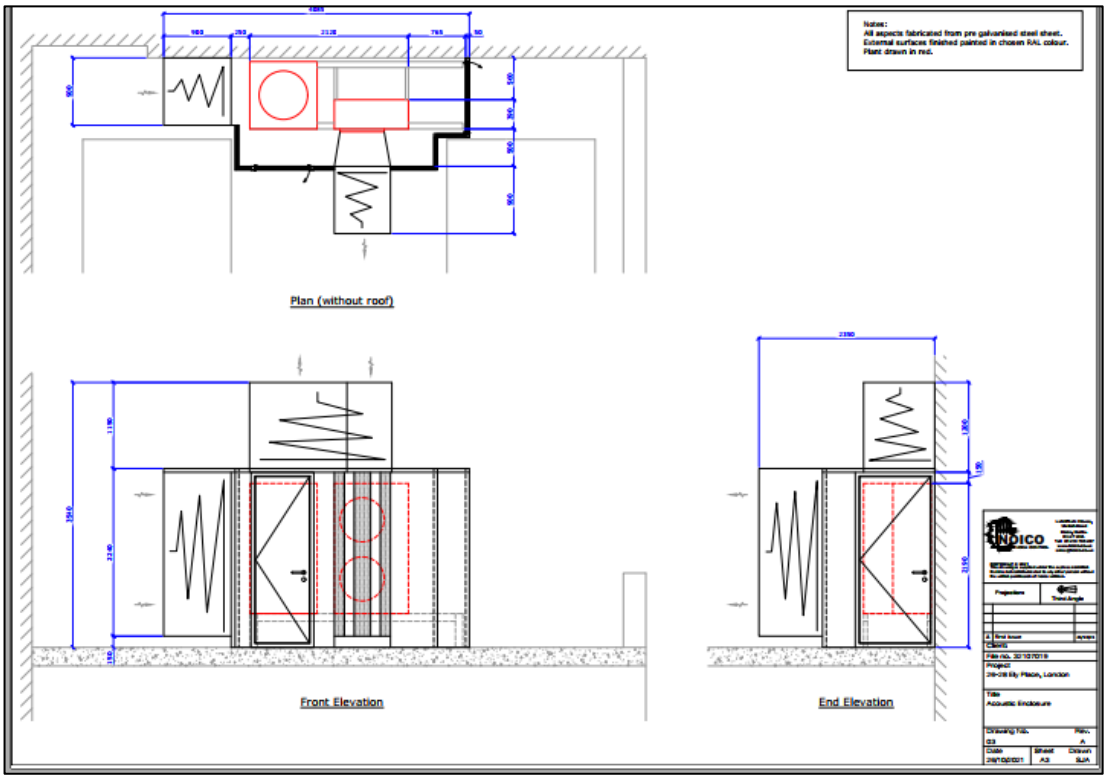
1. Enclosing the ground floor plant in an acoustic enclosure capable of providing no less than 25dBA reduction
2. Installing an acoustic screen around the condensers on the roof.
3. The new AHU will be installed in the same position as the existing AHU outside the enclosure to the east

In addition to the above, we understand it is proposed to install the following attenuators to the intake and exhaust duct.

Minimum Insertion Loss (dB) at The Octave Band Centre Frequencies (Hz)							
63	125	250	500	1k	2k	4k	8k
3	6	14	24	32	25	16	11

11.4 Acoustic Enclosure

We understand from Noico that the proposed acoustic enclosure to the ground floor plant should be capable of achieving no less than 25 dBA reduction. The following drawing shows the proposed enclosure:



11.5 Acoustic Screen

Acoustic screening shall extend:

- continuously around all sides of the plant area.
- from the roof up to a minimum height of 500 mm above the highest part of the plant.

Performance

The acoustic screen shall provide in its as-installed condition the following minimum combined sound reduction indices (SRI's)/Transmission Losses when tested in accordance with BS EN ISO 10140-2:2010:

Minimum Sound Reduction Index (dB) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
20	21	27	37	44	46	51	49

The internal surface of the acoustic screen shall provide in its as-installed condition the following minimum absorption coefficients:

Minimum Absorption Coefficients ($\propto$) at Octave Band Centre Frequency (Hz)							
63	125	250	500	1k	2k	4k	8k
-	0.85	0.95	0.95	0.95	0.95	0.9	0.8

Construction

The acoustic panels shall comprise 100mm thick mineral wool slabs retained between galvanised mild steel sheet – perforated on the plant side with a free area of at least 25%. The outer casing shall be constructed from galvanised sheet steel having a minimum thickness of 1.2mm (16 swg) and fixed at 300mm (max) centres. The slabs shall be retained behind a suitable protective facing such as perforated steel sheet (minimum free area of 23%). Flattened-expanded ("Expamet") sheet shall not be used, unless all edges of the sheet are mechanically fixed to the casing and galvanised steel cover strips are used to prevent rivet heads pulling through the perforated sheet (trapping the Expamet between two solid steel layers).

The inert, rot and vermin proof, non-hygroscopic and non-combustible mineral wool or glass fibre acoustic medium shall be packed to a density of not less than 45kg/m^3. This shall be faced

with a glass fibre cloth, or other approved infill protection membrane. Panels shall be constructed and assembled so that no egress of the acoustic medium will occur.

The acoustic media shall not comprise materials which are generally composed of mineral fibres, either man made or naturally occurring, which have a diameter of 3 microns or less and a length of 200 microns or less or which contain any fibres not sealed or otherwise stabilised to ensure fibre migration is prevented.

Provision shall be made to prevent settling of the acoustic medium. The panels shall be suitably weather protected. In particular panels shall have drain holes as required to avoid soaking of the acoustic medium.

The complete structure shall be inert, rot and vermin proof, wind and weather resistant to standards agreed with the Client.

Doors, access panels and service penetrations shall be treated so as to maintain the acoustic performance of the assembled screen.

All junctions between the acoustic screen and adjacent structures shall be made good and sealed with a heavy grout and/or dense non-hardening mastic.

The exact design and technical specification for the screen will be agreed with and approved by Hann Tucker Associates.

11.6 Plant Noise Impact Assessment

We understand that the proposed unit will be operational during daytime and night-time hours. The following tables present our calculations relating to the proposed plant installation.

	Sound Pressure Level (dB re 2 x 10^{-5}) at Octave Band Centre Frequency (Hz))							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
MCY-MHP0604HS8-E L_p @ 1m	59	58	57	53	46	42	36	31
4No.	+6	+6	+6	+6	+6	+6	+6	+6
Barrier Loss (ISO 9613-2)	-8	-9	-11	-14	-17	-19	-20	-20
Point Source Distance Loss (1m to 19m)	-25	-25	-25	-25	-25	-25	-25	-25
MCY-MHP1006HS8-E L_p @ 1m	65	67	58	59	53	49	43	37
3No.	+5	+5	+5	+5	+5	+5	+5	+5
Barrier Loss (ISO 9613-2)	-8	-9	-11	-14	-17	-19	-20	-20
Point Source Distance Loss (1m to 6m)	-25	-25	-25	-25	-25	-25	-25	-25
MCY-MHP0806HS8-E L_p @ 1m	64	66	57	58	52	48	42	36
Barrier Loss (ISO 9613-2)	-8	-9	-11	-14	-17	-19	-20	-20
Point Source Distance Loss (1m to 19m)	-25	-25	-25	-25	-25	-25	-25	-25
RXYSQ6T8VB L_p @ 1m	56	53	50	47	46	43	39	28
Barrier Loss (ISO 9613-2)	-8	-9	-11	-14	-17	-19	-20	-20
Point Source Distance Loss (1m to 19m)	-25	-25	-25	-25	-25	-25	-25	-25
041 – Intake L_w	-	59	68	67	59	60	64	53
Proposed Attenuator	-3	-6	-14	-24	-32	-25	-16	-11
Coil/Filter Losses	-4	-5	-6	-6	-6	-6	-6	-6
End Grille and Directivity	-4	-2	0	-4	-7	-7	-7	-7
Point Source Distance Loss (SWL to SPL 0m to 18.8m)	-33	-33	-33	-33	-33	-33	-33	-33
Q11510-04-00 – Exhaust Lw	81	82	70	72	76	70	67	62
Proposed Attenuator	-3	-6	-14	-24	-32	-25	-16	-11
Coil/Filter Losses	-4	-5	-6	-6	-6	-6	-6	-6
End Grille and Directivity	-4	-2	0	-4	-7	-7	-7	-7
Point Source Distance Loss (SWL to SPL 0m to 18.8m)	-33	-33	-33	-33	-33	-33	-33	-33

	Sound Pressure Level (dB re 2 x 10^{-5}) at Octave Band Centre Frequency (Hz))							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Q11510-04-00 – Casing Lp @ 1m	59	58	57	53	47	43	37	32
Point Source Distance Loss (1m to 18.8m)	-25	-25	-25	-25	-25	-25	-25	-25
MUP1201HT8P-E L_p @ 1m	67	69	60	61	55	51	45	39
Proposed Enclosure	-25	-25	-25	-25	-25	-25	-25	-25
Point Source Distance Loss (1m to 6m)	-16	-16	-16	-16	-16	-16	-16	-16
MCY-MHP1006HS8-E L_p @ 1m	65	67	58	59	53	49	43	37
Proposed Enclosure	-25	-25	-25	-25	-25	-25	-25	-25
Point Source Distance Loss (1m to 6m)	-16	-16	-16	-16	-16	-16	-16	-16
Resultant Sound Pressure Level at Nearest Residential Window	**31 dBA**							

Our calculations indicate that the proposed plant, in conjunction with the proposed attenuation, should be capable of achieving the requirements of the Local Authority outlined in Section 10.0.

12.0 Conclusions

An environmental noise survey has been undertaken in order to establish the currently prevailing noise levels.

Plant noise emission criteria have been recommended based on the results of the noise survey and with reference to the Local Authority's requirements.

An assessment has been carried out to determine the plant noise emissions at the nearest noise sensitive window.

The assessment indicates that the proposed plant, in conjunction with the proposed attenuation, should be capable of achieving the proposed environmental noise criteria at the nearest noise sensitive residential window.

Appendix A

The acoustic terms used in this report are defined as follows:

dB — Decibel - Used as a measurement of sound level. Decibels are not an absolute unit of measurement but an expression of ratio between two quantities expressed in logarithmic form. The relationships between Decibel levels do not work in the same way that non-logarithmic (linear) numbers work (e.g. 30dB + 30dB = 33dB, not 60dB).

dBA — The human ear is more susceptible to mid-frequency noise than the high and low frequencies. The 'A'-weighting scale approximates this response and allows sound levels to be expressed as an overall single figure value in dBA. The $_A$ subscript is applied to an acoustical parameter to indicate the stated noise level is A-weighted

It should be noted that levels in dBA do not have a linear relationship to each other; for similar noises, a change in noise level of 10dBA represents a doubling or halving of subjective loudness. A change of 3dBA is just perceptible.

$L_{90,T}$ — L_{90} is the noise level exceeded for 90% of the period *T* (i.e. the quietest 10% of the measurement) and is often used to describe the background noise level.

$L_{eq,T}$ — $L_{eq,T}$ is the equivalent continuous sound pressure level. It is an average of the total sound energy measured over a specified time period, *T*.

L_{max} — L_{max} is the maximum sound pressure level recorded over the period stated. L_{max} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the L_{eq} noise level.

Sound Pressure Level (L_p) is the sound pressure relative to a standard reference pressure of 2×10^{-5} Pa. This level varies for a given source according to a number of factors (including but not limited to: distance from the source; positioning; screening and meteorological effects).

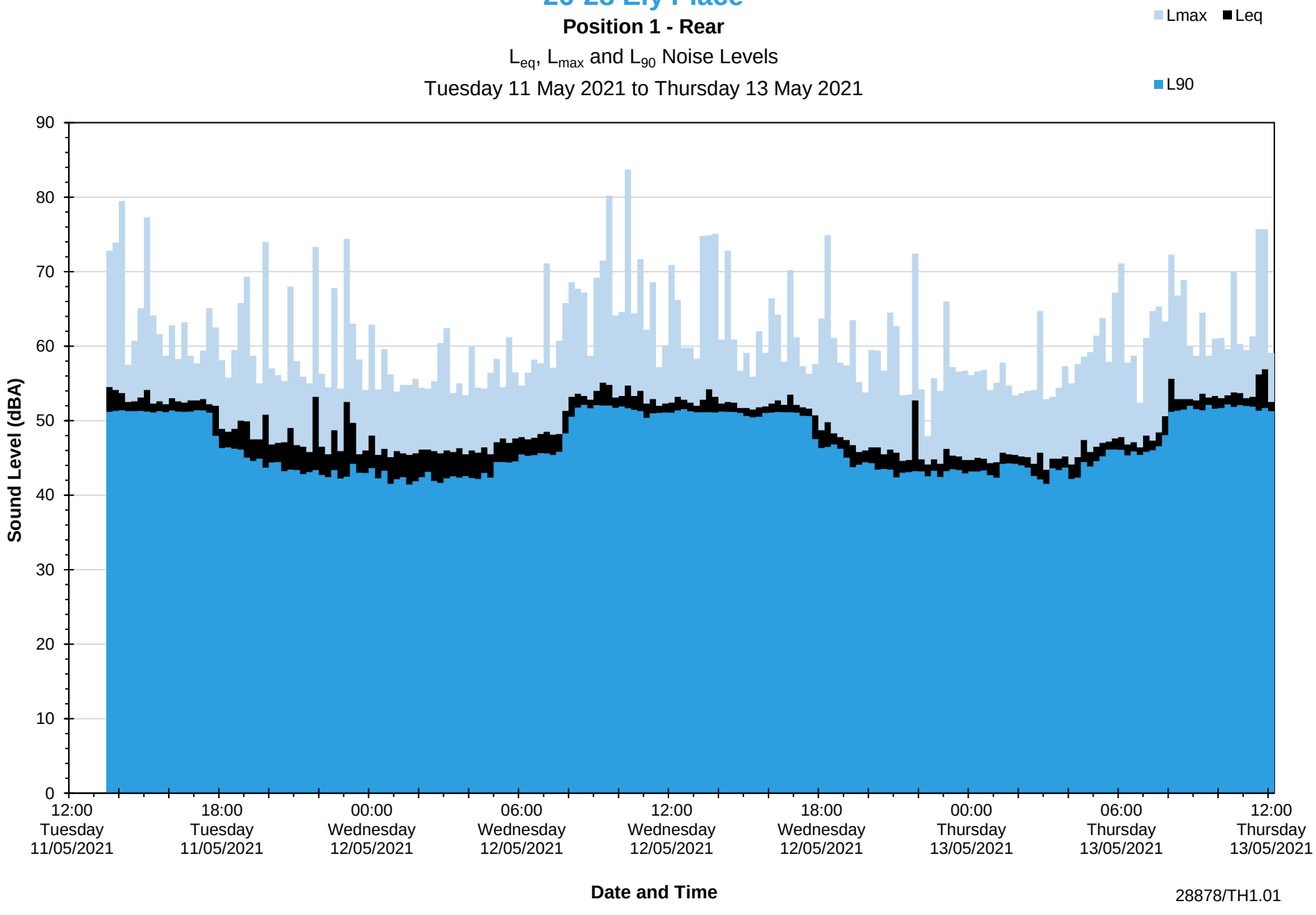
Sound Power Level (SWL or L_w) is the total amount of sound energy inherent in a particular sound source, independent of its environment. It is a logarithmic measure of the sound power in comparison to a specified reference level (usually 10^{-12} W).

26-28 Ely Place

Position 1 - Rear

L_{eq}, L_{max} and L_{90} Noise Levels

Tuesday 11 May 2021 to Thursday 13 May 2021



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