



National Cycling Centre, Manchester

Noise Impact Assessment

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Comments	Change to fans of AHU 1 and AHU 2 resulting in lower noise emissions.
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Comments

Disclaimer

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1. Introduction

This report has been prepared by Waterman infrastructure and Environment Ltd. (hereafter 'Waterman') on behalf of ISG (hereafter the 'applicant') in support of the refurbishment works proposed at the National Cycling Centre, Manchester M11 4DQ (hereafter the 'Site'). The Site falls under the local authority jurisdiction of Manchester City Council (MCC).

This report will present an assessment of the potential noise impacts of the new plant area proposed on the northern side of the Site and provide outline mitigation measures to limit any potential noise impacts, where considered appropriate.

A glossary of the acoustic terms referenced within this report is presented as **Appendix A**.

1.1 Site, Setting and Development Proposals

The Site is located adjacent Gibbon Street in Manchester and comprises of the existing National Cycling Centre building and associated facilities. The noise environment at the Site primarily consists of road traffic noise from the surrounding road network (in particular from the nearby A6010) with some minor contributions from Site associated car parking facilities, and a nearby National Grid substation.

The development proposals include the provision of a new plant area on the northern side of the National Cycling Centre Building; the plant area would contain four new air handling units (AHUs), four new air source heat pumps (ASHPs) and an enclosed plant room containing extract fans, pumps and other ancillary plant.

2. Planning Policy, Assessment Criteria & Guidance

2.1 National Planning Policy

In preparation of this assessment, regard has been given to National Planning Policy Framework (NPPF)¹, Noise Policy Statement for England², Noise Planning Practice Guidance³ and local noise-related policies outlined in the following section.

With regard to acoustic design and noise control, the NPPF provides a set of overarching aims, broadly reflecting those already contained in the Noise Policy Statement for England (NPSE). They are directed towards the avoidance of significant adverse impacts and reduction of other adverse impacts on health and quality of life; set within the context of the Government's policy on sustainable development.

2.2 Local Planning Policy (Manchester City Council)

The following documents contain the policies of MCC relevant to this assessment:

- The Manchester Core Strategy (2012)⁴; and
- Saved policies of the Unitary Development Plan for the City of Manchester (1995)⁵

The Core Strategy Development Plan Document 2012 – 2027 ('the Core Strategy') was adopted by the City Council on 11th July 2012. The document replaces significant elements of the Unitary Development Plan (UDP) and sets out the long-term strategic planning policies for Manchester's future development.

In general, the relevant policies of these documents are policies SP1 and DM1 of the Core Strategy and policies DC10 and DC26 of the UDP. These policies all broadly reflect the aims outlined in the NPPF, as stated in **Section 2.1**, requiring that all new developers consider their potential effects of their proposals on the amenity and operations of residents, workers, businesses and the general character of the surrounding area.

2.3 Assessment of Industrial and Commercial Noise Sources

2.3.1 BS 4142:2014+A1:2019 – Methods for Rating and Assessing Industrial and Commercial Sound

When considering noise which is commercial in nature the primary source of guidance is BS 4142:2014+A1:2019⁶. BS 4142 states that the potential impact from industrial / commercial sound is based on the level difference between the source, known as the 'specific sound' level ($L_{Aeq,T}$), compared with the 'background sound' level ($L_{A90,T}$) that exists in the absence of the source in question. Where the sound contains any acoustic characteristics such as tonality, impulsiveness or intermittency, then the specific noise level is adjusted in-line with BS 4142 advice to determine the 'rating' level ($L_{Ar,T}$).

Typically, the greater the difference between the rating level and the background sound level, the greater the potential of an adverse impact. BS 4142 states:

- A difference of +10dB or more is likely to be an indication of a significant adverse impact, depending on the context;
- A difference of +5dB or more is likely to be an indication of an adverse impact, depending on the context;

¹ Ministry of housing, Communities and Local Government. (February 2019) National Planning Policy Framework. HMSO.

² Defra. (2010) *Noise Policy Statement for England*. Crown copyright.

³ <https://www.gov.uk/guidance/noise--2> (Accessed October 2020) Note in process of being updated to reflect revised NPPF.

⁴ Manchester City Council (2012). The Manchester Core Strategy 2012 – 2027. Accessed Via: https://secure.manchester.gov.uk/info/200074/planning/6573/core_strategy_2012-2027

⁵ Extant Manchester Unitary Development Plan Policies accessible via: https://secure.manchester.gov.uk/downloads/download/4975/extant_udp_policies

⁶ British Standard Institute (BSI) (2019) BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. BSI.

and

- The lower the rating level is in relation to the background level, the less likely it is that a 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.

BS4142 further states:

'Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.'

Context is an important consideration of a BS4142 assessment, and the impact may require modification due to context, which may include:

- The absolute level of sound;
- The character and level of the residual sound compared to the character and level of the specific sound; and
- The local attitude toward the Proposed Development.

The BS 4142 assessment methodology has been used to determine the potential impacts of the proposed new external building services plant having regard to the guidance provided by the local authority (MCC), and the prevailing background and ambient noise levels.

2.3.2 Manchester City Council – Planning & Noise Technical Guidance

As stated within **Section 1**, the Site falls under the local authority jurisdiction of Manchester City Council and is therefore subject to all relevant local planning policies and guidance. To support developers MCC has produced a technical guidance document in relation to noise planning assessments; the Planning & Noise Technical Guidance (PNTG) document outlines what information, assessments and good design practices are expected from prospective developers in relation to current local and national noise guidance and policy.

In relation to the proposed development, the PNTG states that any application for fixed plant, equipment or machinery must demonstrate that:

'Externally mounted ancillary plant, equipment and servicing shall be selected and / or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location.'

It is considered by MCC that the impacts of a development which achieves the above criteria would be negligible. Additionally, the PNTG also states that additional relevant noise criteria can be employed where considered applicable.

3. Baseline Environmental Condition

3.1 Nearest Sensitive Receptors

Following a review of the site and its surrounds, the nearest sensitive receptors (SRs) to the site have been identified and are presented as **Table 1**.

Table 1: Nearest Potentially Noise Sensitive Receptors.

Receptor	Type of Receptor	Description / Name	Approximate Distance to Site Boundary (m)
SR A	Residential	Residential dwellings adjacent Stuart Street East	Approx. 50m east of proposed plant location
SR B	Residential	Residential apartment blocks adjacent Gibbon Street	Approx. 80m west of proposed plant location
SR C	Residential	Residential apartment blocks adjacent Stuart Street	Approx. 90m west of proposed plant location

It should be noted that where a receptor location represents multiple potentially sensitive buildings, the assessment has been based on the worst-affected building.

In addition to the above receptors, an assessment of the potential noise 'break-back' into the adjacent National Cycling Centre offices has also been undertaken.

3.2 Baseline Noise Environment

3.2.1 Ramboll UK Ltd. Noise Survey – March 2020

In support of a previous assessment of the development, Ramboll UK Ltd. (hereafter 'Ramboll') conducted noise surveys at locations representative of the above SRs. The measurements for night-time and daytime noise were conducted on Wednesday 4th March 2020 and Friday 6th March 2020, respectively. All measurements were attended, with two spot measurements taken at each location during the day and night periods; each individual measurement was taken for a period of 15 minutes during the day and 5 minutes during the night.

The measurement positions are presented as **Figure 1** and described in **Table 2** below.

Table 2: Measurement Locations of Ramboll Noise Survey – March 2020

Measurement (Figure 1)	Location	Description
P1		Free-field noise measurement along Gibbon Street, adjacent apartment block. Microphone positioned at 1.5m above ground level.
P2		Free-field noise measurement along Stuart Street East. Microphone positioned at 1.5m above ground level.

All noise measurements were taken with calibrated precision grade (Class 1) sound level meters to provide a detailed description of the prevailing environmental noise characteristics. Details of the meters used, as reported within the Ramboll report, are included as **Appendix B**.

A summary of the measured noise levels is presented within **Table 3** below.

Table 3: Summary of Baseline Noise Measurements

Measurement Position (Figure 1)	Period	Start Time	L _{Aeq,T} dB	L _{A90,T} dB
P1	Day	06/03/2020 12:01	65.7	47.9
		06/03/2020 12:43	63.8	45.0
	Night	04/03/2020 00:20	56.7	39.8
		04/03/2020 00:46	58.1	39.1
P2	Day	06/03/2020 12:22	50.2	43.4
		06/03/2020 13:02	50.1	43.9
	Night	04/03/2020 00:34	44.5	40.5
		04/03/2020 00:57	49.5	39.1

3.2.2 Consultation with Manchester City Council on Use of Data

To ensure that the data from the Ramboll survey would be suitable for use in this assessment, a request for consultation was sent to the planning department of MCC by Ed Mapplebeck of Ellis Williams Architects on 23rd September 2020. A response was provided by Jennifer Atkinson (Principal Planner) 24th September 2020 confirming that the use of the data within this assessment is considered suitable.

4. Assessment

4.1 Current Proposals

4.1.1 Plant Equipment and Layout

All proposed plant equipment and manufacturers' reported sound power / pressure levels are presented as **Table 4**. Full manufacturers' noise data for each item is available upon request .

Table 4: Proposed Plant Equipment – Unmitigated

Plant (Unit Quantity)	Reference	Equipment Type	Manufacturer Product Reference	& Noise Source	Manufacturers' Sound Level Data
AHU1 (1)		Air Handling Unit	Airsources - ASV1875-4500 Ext	Combined Outlet / Inlet	95 dB L _{WA}
AHU2 (1)				Casing Radiated	57 dB @ 5m
AHU7 (1)			Airsources - ASV1450-2420 Ext	Combined Outlet / Inlet	90 dB L _{WA}
AHU8 (1)				Casing Radiated	51 dB @ 5m
External Pumps (4)	Heat	Air Source Heat Pump	Climaveneta - FOCS-N-G05 /SL-CA 2722	Heating / Cooling	92 / 91 dB L _{WA}
Internal Heat Pump (1)	Heat	Air Source Heat Pump	Climaveneta - WW-HT /0302	Heating	73 dB L _{WA}
Plantroom Fan (1)	Supply	Fan	Nuair Dave DE7	Outlet	78 dB L _{WA}
				Casing Radiated	63 dB L _{WA}
Other		Other Plant Items	N/A	Containing pumps, expansion Vessels, etc.	75 dBA L _{pA} within Plantroom (assumed) ¹

Notes: ¹ Assumes contributions from the plantroom supply fan and internal heat pump are dominant.

The proposed plant layout is as shown in **Figure 2**. The plant area is comprised of an enclosed plantroom in the centre with two semi-enclosed sections on either side (containing the external heat pumps). All four AHU's are located externally, on the roof of the plantroom.

Casing radiated noise levels from AHUs 1 & 2 have reduced from those stated in previous reports. This is due to new fans installed within the units which are predicted by the manufacturers to reduce the radiated noise levels by approximately 2 dB. Inlet / outlet noise levels are also likely to reduce from the above level however, specific reduction is yet to be calculated by the manufacturer. As such, the above levels will be used for the purpose of this assessment as an indication of worst-case emissions.

4.1.2 Operational Hours

It is currently understood that all plant would be operating during the daytime between the hours of 07:00 – 22:00. In addition to this, a short period of night-time operation is expected between the hours of 06:00 – 07:00 as the heating systems are expected to be operational prior to the opening of the National Cycling Centre each morning.

4.1.3 Proposed Noise Mitigation Measures

The proposals currently include measures designed to mitigate noise at the nearest SRs, these and their function in relation to the noise emissions of the plant are as follows:

- Enclosed plantroom (250mm cavity blockwork construction, noise transmission assumed negligible) – to mitigate the noise of the pumps, expansion vessels, and fan within;
- Inline attenuators to the inlet and outlet of all AHUs – to mitigate noise levels to a minimum of 10 dB below that of the casing radiated noise of the unit;
- Inline attenuator to outlet of the plantroom supply fan – to mitigate noise levels to a minimum of 10 dB below that of the casing radiated noise of the AHUs;
- Attenuation kit to all external heat pumps – to mitigate free-field noise levels to 47 dB L_{pA} at 10m from the units;
- 3.5m high acoustic barrier around the two external heat pump areas (700mm opening at bottom of barrier) – to further mitigate noise levels at the nearest SRs⁷; and
- 3.1m high acoustic barriers either side of the AHU area – to mitigate casing radiated noise at the nearest SRs⁸.

4.2 Limiting Criteria

Limiting criteria have been set for plant noise emissions at each of the SRs. The limits were based upon the survey measurements presented within **Table 3** and the requirements stated within the MCC's noise guidance document (see **Section 2.3.2**). Noise level limits are presented as **Table 5** below.

Table 5: Recommended Plant Noise Limits

Measurement Location	Period	Minimum Measured Background Sound Level dB L_{A90}	Plant Noise Limit dB $L_{Ar,Tr}$
SR A	Day	45	≤40
	Night	39	≤34
SRs B & C	Day	43	≤38
	Night	39	≤34

4.3 Assessment of Noise Emissions to SRs

4.3.1 Calculation of Noise Emissions

To determine the likely noise levels at the SRs presented in **Table 1**, the 3-dimensional noise propagation model of the Site and its surrounds was build using the CadnaA software package.

All external sources – such as the heat pumps and the AHUs – were modelled as point sources using the spectral noise levels presented within the manufacturers' datasheets, adjusted as per the mitigation described in **Section 4.3**. To assess the emissions of the equipment contained within the plantroom, the walls and ceiling were modelled as area sources, which assumed an internal reverberant noise level of 75 dB L_{pA} . As stated in the section above, the sound reduction index of the walls and ceiling was assumed to be 25 dB R_w ; this was applied to each of the wall and ceiling area sources. Finally, the outlet of the plantroom supply fan was also modelled as a vertical area source on the northern wall of the plantroom,

⁷ The current manufacturer's specification for the proposed barriers states that the system has a surface mass of ~13 kgm⁻²; this is above the minimum requirement for a functional acoustic barrier and is therefore considered suitable.

⁸ The current manufacturer's specification for the proposed barriers states that the system has a surface mass of ~11 kgm⁻²; this is above the minimum requirement for a functional acoustic barrier and is therefore considered suitable.

using spectral levels presented in **Appendix D**; attenuation was applied as per **Section 4.3**.

The calculation of noise levels for both the day and night-time periods was conducted under the assumption that all plant would be operating at design duty simultaneously, with the assessment period being 1-hour for both the day and night-time. As such, all calculated levels for both day and night are equal.

4.3.2 Noise Model Output

The cumulative noise of all plant has been calculated at each of the SRs and is presented as **Table 6** below. The levels presented are the highest levels predicted at the façade of the worst-affected building representative of each receptor.

Table 6: Predicted Cumulative Plant Noise Level at SRs

Sensitive Receptor	Predicted Cumulative Plant Noise Level (Specific Sound Level), dB L _{Aeq,1hr} rounded to nearest whole dB
SR A (Residential dwellings adjacent Stuart Street East)	32
SR B (Residential apartment blocks adjacent Gibbon Street)	34
SR C (Residential apartment blocks adjacent Stuart Street)	32

4.3.3 Assessment of Plant Noise

As stated in **Section 2.3.1**, the rating level of a specific sound source is determined on the basis of the specific sound level at the SR (presented as **Table 6**) plus any acoustic character corrections applied as per the guidance within BS 4142:2014+A1:2019, then assessed against the criteria of MCC.

Although noise data have been provided by the manufacturers, it is unclear whether the proposed plant would exhibit any acoustic characteristics. However, on the basis of similar noise source, it is likely that these sources would produce some tonality, particularly at low frequencies. As such, a correction of +2 dB has been applied the specific sound level to determine the rating level.

The resulting rating levels and target criteria (**Table 5**) are presented as **Table 7** below.

Table 7: Predicted Cumulative Plant Noise Level at SRs

Sensitive Receptor	Specific Level, dB L _{Aeq,1hr}	Sound	Acoustic Correction, dB	Character	Rating Level, dB L _{Ar,Tr}	Target Criteria, dB L _{Ar,Tr}
SR A (Residential dwellings adjacent Stuart Street East)	32		+2		34	≤38 (Day) ≤34 (Night)
SR B (Residential apartment blocks adjacent Gibbon Street)	34		+2		36	≤40 (Day) ≤34 (Night)
SR C (Residential apartment blocks adjacent Stuart Street)	32		+2		34	≤40 (Day) ≤34 (Night)

As demonstrated by the levels presented above, the target criteria are met for both the daytime and night-time (early morning) period at SR A and C. At SR B the daytime target criteria is satisfied but slightly exceeded during the night-time period. It should be noted that although the MCC limit is slightly exceeded at SR B during the night-time (early morning) period, the absolute value is still lower than the lowest measured background level during both the day and night-time noise surveys. This is, in accordance with BS 4142, an indication that the noise emissions would have a low impact.

As stated within **Section 2.3.1**, BS 4142 assessment methodology emphasises the use of context with noise impact assessments and advises the use of other relevant guidance where this is applicable. In relation to absolute levels (i.e. the specific sound level), the document states the following:

“Where background sound levels and rating levels are low, absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

Although the most recent version of the guidance is not as prescriptive, the 1997 version defined very low background sound levels as being less than about 30 dB L_{A90} , and low rating levels as being less than about 35 dB $L_{A_{r,Tr}}$. The required night-time rating level based on the MCC criteria is 34 dB $L_{A_{r,Tr}}$, and is therefore considered low in the context of BS 4142 assessment.⁹

Given that noise limits are met during the daytime at all SRs, and that the source would only be operational during the night for a short duration in the early morning period – likely between 06:00 – 07:00 but potentially as early as 05:00 – the primary concern is the potential disturbance to nearby residents who could be sleeping during the proposed operational period.

In relation to the above, BS 8233:2014¹⁰ provides guideline internal ambient noise levels for residential dwellings for both the day and night periods¹¹. These are as follows;

- Daytime (07:00 – 23:00) – 35 dB $L_{Aeq,16hr}$; and
- Night-time (23:00 – 07:00) – 30 dB $L_{Aeq,8hr}$.

It is generally accepted that a partially opened window would afford an outdoor to indoor sound attenuation of ~ 10 – 15 dB. Assuming the minimum attenuation afforded to an open window and applying this to the night-time specific sound level at SRs B, the resulting internal levels would be 24 dB $L_{Aeq,1hr}$. Based on these levels and the guidelines provided within BS 8233:2014, it is considered that noise from the proposals would be unlikely to result in adverse effects to residents sleeping during the early morning operation of the plant.

Considering this context and the resultant rating levels being below the minimum measured background levels during the night-time period for all SRs, it is considered that the potential adverse impacts of the development would be negligible.

A consultation from MCC on the above assessment was requested by Waterman on 29th July 2021. A response was provided by Rebecca Twigg-Purcell of the environmental protection department, confirming that the above assessment and mitigation strategy is considered suitable. Correspondence has been reproduced as Appendix C.

⁹ The Association of Noise Consultants (ANC) Good Practice Working Group have confirmed that these levels are still relevant to the most recent version of BS 4142. ANC. (2020). BS4142:2014+A1:2019 Technical Note. ANC.

¹⁰ BSI (2014) BS8233 ‘Guidance on sound insulation and noise reduction in buildings’. BSI.

¹¹ The guidelines are themselves based on guideline levels issued by the World Health Organisation (WHO) which – in the case of the night-time guidelines – specifically relate to the level at which self-reported sleep disturbance is likely to occur.

5. Conclusion

This noise assessment has been prepared by Waterman on behalf of **ISG** in support of the redevelopment of the National Cycling Centre, Manchester. The report assesses the potential noise emissions of the development proposals in line with accredited guidance and the requirements of Manchester City Council (MCC).

The development proposals include the provision of new external building services plant on the northern side of the existing site. To assess the potential impacts of this, the nearest potentially noise sensitive receptors (SRs) were identified and plant noise limiting criteria were set based on MCC guidance. The assessment considered the cumulative impact of all plant items operating simultaneously for the majority of the daytime period (between 07:00 – 22:00) and for the latter hours of the night-time period (~05:00 – 07:00).

The MCC limits were met at all SRs during the daytime but slightly exceeded at SRs B (residential apartment blocks adjacent Gibbon Street) during the night-time period. Although the levels exceeded the MCC limits, in line with BS 4142:2014+A1:2019 guidance the levels were indicative of low impact.

Further to this, additional context was provided in relation to the absolute noise levels at the receptors. Given that the background levels in the area are relatively low – and that the plant noise emissions are below the minimum measured background sound level – the night-time noise emissions of the plant would be unlikely to cause sleep disturbance when assessed against the recommended internal ambient noise level guidelines contained within BS 8233:2014.

Overall, it is considered that with the current mitigation provided for by the development proposals, the potential impact of the development on the nearest sensitive receptors would be negligible. The development is therefore considered suitable from a noise perspective.

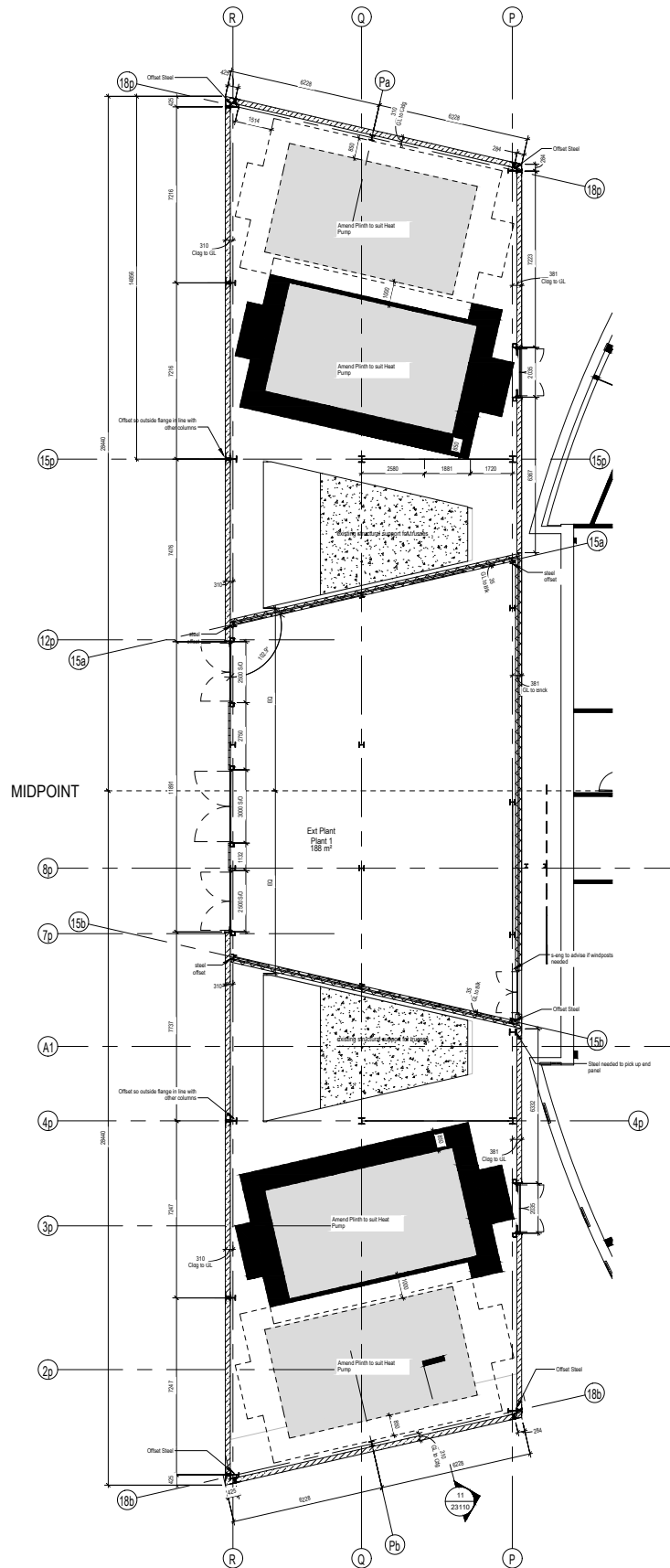
FIGURES

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Figure 1: Noise Monitoring Locations – Ramboll Survey March 2020

Figure 2: Proposed Layout of Plant Area

Appendices



APPENDICES

Appendices

A. Acoustic Glossary

Ambient sound	The totally encompassing sound in a given situation at a given time, usually composed of sound from all sources near and far.																		
Assessment period	The period in a day over which assessments are made.																		
A-weighting	A frequency weighting applied to measured or predicted sounds levels in order to compensate for the non-linearity of human hearing.																		
Background noise	Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the L_{90} noise level (see below).																		
Broadband	Containing the full range of frequencies.																		
Decibel [dB]	The level of noise is measured objectively using a Sound Level Meter. This instrument has been specifically developed to mimic the operation of the human ear. The human ear responds to minute pressure variations in the air. These pressure variations can be likened to the ripples on the surface of water but of course cannot be seen. The pressure variations in the air cause the eardrum to vibrate and this is heard as sound in the brain. The stronger the pressure variations, the louder the sound that is heard. The range of pressure variations associated with everyday living may span over a range of a million to one. On the top range may be the sound of a jet engine and on the bottom of the range may be the sound of a pin dropping. Instead of expressing pressure in units ranging from a million to one, it is found convenient to condense this range to a scale 0 to 120 and give it the units of decibels. The following are examples of the decibel readings of every day sounds: <table> <tr> <td>Four engine jet aircraft at 100m</td><td>120 dB</td></tr> <tr> <td>Riveting of steel plate at 10m</td><td>105 dB</td></tr> <tr> <td>Pneumatic drill at 10m</td><td>90 dB</td></tr> <tr> <td>Circular wood saw at 10m</td><td>80 dB</td></tr> <tr> <td>Heavy road traffic at 10m</td><td>75 dB</td></tr> <tr> <td>Telephone bell at 10m</td><td>65 dB</td></tr> <tr> <td>Male speech, average at 10m</td><td>50 dB</td></tr> <tr> <td>Whisper at 10m</td><td>25 dB</td></tr> <tr> <td>Threshold of hearing, 1000 Hz</td><td>0 dB</td></tr> </table>	Four engine jet aircraft at 100m	120 dB	Riveting of steel plate at 10m	105 dB	Pneumatic drill at 10m	90 dB	Circular wood saw at 10m	80 dB	Heavy road traffic at 10m	75 dB	Telephone bell at 10m	65 dB	Male speech, average at 10m	50 dB	Whisper at 10m	25 dB	Threshold of hearing, 1000 Hz	0 dB
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Telephone bell at 10m	65 dB																		
Male speech, average at 10m	50 dB																		
Whisper at 10m	25 dB																		
Threshold of hearing, 1000 Hz	0 dB																		
dB(A): A-weighted decibels	The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the 'A' filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter. The sound pressure level in dB(A) gives a close indication of the subjective loudness of the noise.																		
Façade Noise Level	A noise level measured or predicted at the façade of a building, typically at a distance of 1m, containing a contribution made up of reflections from the façade itself (+3 dB).																		
L_{Amax} noise level	This is the maximum noise level recorded over the measurement period.																		
L_{Amin} noise level	This is the lowest level during the measurement period.																		
$L_{Aeq,T}$ noise level	This is the 'equivalent continuous A-weighted sound pressure level, in decibels' and is defined in British Standard 7445 as the 'value of the A-weighted sound pressure level of a continuous, steady sound that, within a specified time interval, T, has the same mean square sound pressure as a sound under consideration whose level varies with time'. It is a unit commonly used to describe construction noise, noise from industrial premises and is the most suitable unit for the description of other forms of environmental noise.																		
L_{A90} noise level	This is the noise level that is exceeded for 90% of the measurement period and gives an indication of the noise level during quieter periods. It is often referred to as the background noise (or sound) level and is used in the assessment of disturbance from industrial noise.																		

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L_{A10} noise level	This is the noise level which is achieved for 10% of the monitoring period and is often used to describe road traffic noise.
Rating Level	The specific sound level plus any character adjustments / corrections applied as per the methodology of BS 4142:2014+A1:2019.
Sound Reduction Index (R)	The sound reduction index is a single-number rating of the sound reduction through a wall or other building element. Since the sound reduction may be different at different frequencies, test measurements are subjected to a standard procedure which yields a single number that is about equal to the average sound reduction in the middle of the human hearing range.
Specific Sound Level	The L _{Aeq,T} sound pressure level produced by a specific source at the assessment location (as defined in BS 4142:2014+A1:2019).
Weighted Sound Reduction Index (R_w)	Single number rating used to describe the laboratory airborne sound insulation properties of a material or building element over a range of frequencies, typically 100-3150Hz.
C_{TR}	An adjustment to the R _w scale to take account of the lower performance against a typical spectrum of road traffic noise dominated by low frequencies.

Appendices

B. Additional Details of Ramboll Noise Survey

Attended noise level measurements were made on 4th and 6th March 2020 at locations representative of the nearest noise sensitive properties. Measurement locations are indicated on Figure 4 within the body of this report.

The following measurement equipment was used for the attended measurements:

- Bruel & Kjaer 2250 Class 1 Sound Level Meter with windshield (S/N 3002075);
- Bruel & Kjaer 4231 Class 1 Microphone Calibrator.

Attended noise measurements were taken at approximately 1.5 metres above ground level, at a distance of at least 3.5 metres from any façades and are representative of free field measurements.

The calibration of the sound level meters was checked before and after the measurements were taken, and no significant drift was observed.

The weather during the attended survey was calm with no precipitation and dry roads. Wind speeds were generally low, below 5m/s in accordance with BS4142.

C. Correspondence of Consultation with MCC on Assessment

Matthew Podesta

From: Rebecca Twigg <rebecca.twigg@manchester.gov.uk>
Sent: 29 July 2021 13:42
To: Matthew Podesta
Cc: Eve Woolstencroft
Subject: Re: 2576 - Velodrome planning issues July '21

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Matthew,

Thank you for your email and further details; the proposal for new fans would be an acceptable solution.

Regards,

Rebecca

Rebecca Twigg-Purcell
Environmental Protection
Environmental Health
Neighbourhoods Directorate
Manchester City Council

Tel: Contact Manchester 0161 234 5004
Email: rebecca.twigg@manchester.gov.uk
Web: Manchester City Council

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For latest news and updates follow us on Twitter [@EnvHealthMcr](https://twitter.com/EnvHealthMcr)

From: Matthew Podesta <matthew.podesta@watermangroup.com>
Sent: 29 July 2021 13:29
To: Rebecca Twigg <rebecca.twigg@manchester.gov.uk>
Subject: Re: 2576 - Velodrome planning issues July '21

Hi Rebecca,

Hope you are well. I am the acoustician working on the Velodrome job and have been asked to get in touch with yourself in relation to the recent planning comments. The main point of discussion is that of the different responses to previous planning submission and the current one.

To provide some context, in both noise impact assessments the predicted BS 4142 rating level at the sensitive receptors to the west of the proposed plant area (residential apartments on Stuart Street and Gibbon Street) met the MCC criteria of 5 dB below background during the daytime, but exceed the criteria at night. Our justification for this was that the night-time noise levels were below the lowest measured background noise level – an indication that adverse impact would be unlikely in accordance with BS 4142 – and would only operate for a short duration in the early morning period, likely between 06:00 – 07:00 but potentially as early as 05:00, rather than for the entire night-time period. Further to this, BS 4142 recommends the following in relation to night-time noise levels where background / rating levels are relatively low:

“Where background sound levels and rating levels are low, absolute levels might be as, or more relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

Although the most recent version of the guidance is not as prescriptive, the 1997 version defined very low background noise levels as being less than about 30 dB L_{A90} and low rating levels as being less than about 35 dB $L_{A_{r,Tr}}$. The required rating level based on the MCC criteria is 34 dB $L_{A_{r,Tr}}$, and is therefore considered low in the context of BS 4142 assessment. As such, the predicted absolute noise emission levels were compared against the guidance provided in BS 8233 and the World Health Organisation's Guidelines for Community Noise. The guideline internal noise levels provided in these documents specifically relate to the level at which self-reported sleep disturbance is likely to occur, and so are considered the most relevant for assessing the impact of the plant during the early morning period, in this context. Calculations were undertaken assuming a partially opened window at the worst-affected apartment, and noise levels were found to be below the BS 8233 / WHO criteria, so would be unlikely to have any significant impact in accordance with the guidance in these documents.

So to summarise, it was considered that there would be low to no impact from the proposed plantroom based on the most relevant guidance. It was my view at the time of the submission that significant mitigation measures had already been applied to several aspects of the plant area and that to achieve the MCC criteria may have required further, more onerous measures such as full or partial enclosure of the AHUs (unlikely to be feasible) or bespoke acoustic casing for several of the units. As the assessment had concluded that there would be no significant material impact based on the current design, it was not considered necessary to include these, or other, measures.

The previous application was accepted based on the above arguments, however the non-compliance with MCC criteria as been flagged as an issue in the most recent submission. The only difference between the two submissions in terms of noise is a new open area beneath the screens surrounding the ASHPs. This does increase noise levels, but only by 0.6 dB at the Stuart Street receptor and 1.5 dB at the Gibbon Street receptor (it should be noted that residential housing to the east meets the MCC criteria in both assessments). In both cases this change was not significant enough to alter the conclusions of the assessment, as outlined above.

So what I would like to establish is if it is necessary for the MCC criteria to be targeted in this instance, or if the current solution would be considered acceptable based on the above context. Additionally, we have recently been in touch with the AHU supplier who has stated that new fans, which could potentially be installed in the AHUs, are approx. 2dB quieter. This would bring noise levels to below that of the original submission, and this is something that can be implemented if it is considered an acceptable solution.

Please feel free to give me a call on the direct no. below if you would like to discuss any of the above.

Kind regards,

Matthew Podesta AMIOA
Senior Acoustic Consultant
Waterman Infrastructure & Environment Ltd

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