

MEMO P22-458-M04v1

Project:	P22-458 – Neptune Mill, Chapeltown Street, Manchester
Date:	10 October 2024
To:	Laura Faulkner – Workspace Design & Build Ltd
From:	Donald Quinn BSc FIOA, Managing Director
Subject:	Approved external plant/equipment – Noise verification measurements re planning condition 6

Following our recent contact, this memo sets out the details and findings of our desktop assessment of noise from approved new external plant/equipment.

Condition 6 of the planning consent for the development (Manchester City Council ref. 136865/FO/2023) relates to new external plant/equipment as follows:

- 6) *Prior to any implementation of any plant associated with (a) the office accommodation and (b) each ground floor commercial use a scheme for the acoustic insulation of any plant including externally mounted ancillary equipment, lift equipment, substation and any emergency plant associated with the development to ensure that it achieves a background noise level of 5dB below the existing background (La90) at the nearest noise sensitive location shall be submitted to and approved in writing by the City Council as local planning authority in order to secure a reduction in the level of noise emanating from the equipment.*

The approved scheme(s) shall be completed before the (a) office accommodation and (b) each ground floor commercial use premises are occupied and a verification report(s) submitted for approval by the City Council as local planning authority for each of (a) and (b) and any non compliance suitably mitigated in accordance with an agreed scheme prior to occupation. The approved details shall be implemented and remain in place for as long as the above uses are operational.

Since the approved equipment is installed and operational, this memo has been prepared specifically in connection with the requirement for a verification report for the approved equipment.

The approved equipment is as generally indicated in Solution Environmental Services drawing ref. SE4676/M19 dated 12.12.23, although the approved equipment has been installed in a slightly different configuration, with the fans instead being installed within the building and only the duct terminations visible from the exterior. This will assist in minimising noise associated with the fans.

Noise Limits

Hepworth Acoustics noise impact assessment report ref. P22-458-R01v2 dated April 2023 included details of a baseline noise survey carried out at the site and the corresponding noise limits for new plant/equipment to be

installed in connection with the approved development. Taking into account the findings of the baseline noise survey as set out in our report, the relevant noise limits to meet the noise control requirements as described in planning condition 6 are as follows:

Table 1: Adopted plant/equipment noise limits in dB L_{Aeq}

Location	Noise limit for all plant combined		
	Day (07:00 – 19:00)	Evening (19:00 – 23:00)	Night (23:00 – 07:00)
Outside dwellings to the front	44	46	42
Outside dwellings to the rear	41	40	40

The nearest apartments to the plant/equipment are those at the nearby Crusader building as follows:

- The nearest apartments to the side/north-east are at the same level as the rooftop plant/equipment. The relevant noise limits for these apartments are the limits that apply to dwellings to the front.
- The nearest apartments to the rear/north-west are at a lower level compared to the rooftop plant/equipment. The relevant noise limits for these apartments are the limits that apply to dwellings to the rear.

On the basis that the equipment will operate in the daytime/evening only, the noise limits are therefore 44 dB for apartments to the side and 40 dB for apartments to the rear.

Approved External Plant/Equipment

The approved plant/equipment, which is located on a small section of flat roof at the north-eastern end of the building is as follows:

The two approved air conditioning condensers, located on the flat roof, are Samsung AM120AXVGGR/EU units.

The two small extract fans, located inside the building, but with atmospheric duct terminations orientated vertically near to the south-eastern edge of the flat roof are:

- 1 no. Systemair KV DUO 315 EC
- 1 no. Systemair KVK Silent 200 EC

Noise Measurements

A site visit and noise measurements were carried out during the afternoon of Monday 9 September 2024. The weather conditions during the measurements were mild, dry and with some light winds (generally below 5m/s, with some elevated gusts from time to time). The noise measurements were taken with a B&K 2250 ‘Class 1’ sound analyser (serial no. 3011706). The analyser was check-calibrated before and after the measurements with no variance observed.

The noise limits are 5 dB below the prevailing background noise levels (which are even further below the prevailing residual noise levels) and hence not readily measurable at the required assessment locations.

Furthermore, the assessment locations were not readily accessible, these being elevated at significant height outside private dwellings. As such, plant/equipment noise measurements were instead taken at locations between the rooftop plant area and the apartments, with the results extrapolated/corrected to obtain the corresponding noise levels outside the apartments.

The sound analyser microphone was fitted with a windshield and mounted onto a pole protruding 2m from the edge of rooftop plant area in the direction of the apartments to the side (Location A) and rear (Location B) as indicated in Figure 1. For Location A, the pole/microphone were level with the plant area since there are apartments at the same level as the rooftop plant area. In respect of Location B, however, the pole/microphone were angled downwards slightly in the direction of apartments windows on the lower floors only. The measurements were taken as a series of short-term measurements including octave band analysis both with and without the plant/equipment operating. An operative from the mechanical consultants/contractors (Solution Environmental Services) was on-hand to force the equipment into operation as required.

Results

Due to the presence of significant extraneous transient noise at the site, including from construction works at the large residential towers on the opposite side of the Metrolink line to the south, our assessment of the noise levels has been based upon analysis of the L_{90} background noise levels. Because the equipment produces steady noise when in operation, the L_{90} values are considered to be equivalent to the corresponding L_p , and hence L_{eq} values of the plant noise. In this way, the influence of extraneous noise is minimised.

By logarithmic subtraction of the measured octave band noise levels with and without the equipment operating, we have been able to determine the contribution from the equipment only at the measurement locations. Charts 1 and 2 below show the measured/calculated octave band noise levels for each measurement location:

Chart 1: Measured/calculated noise levels at Location A - side

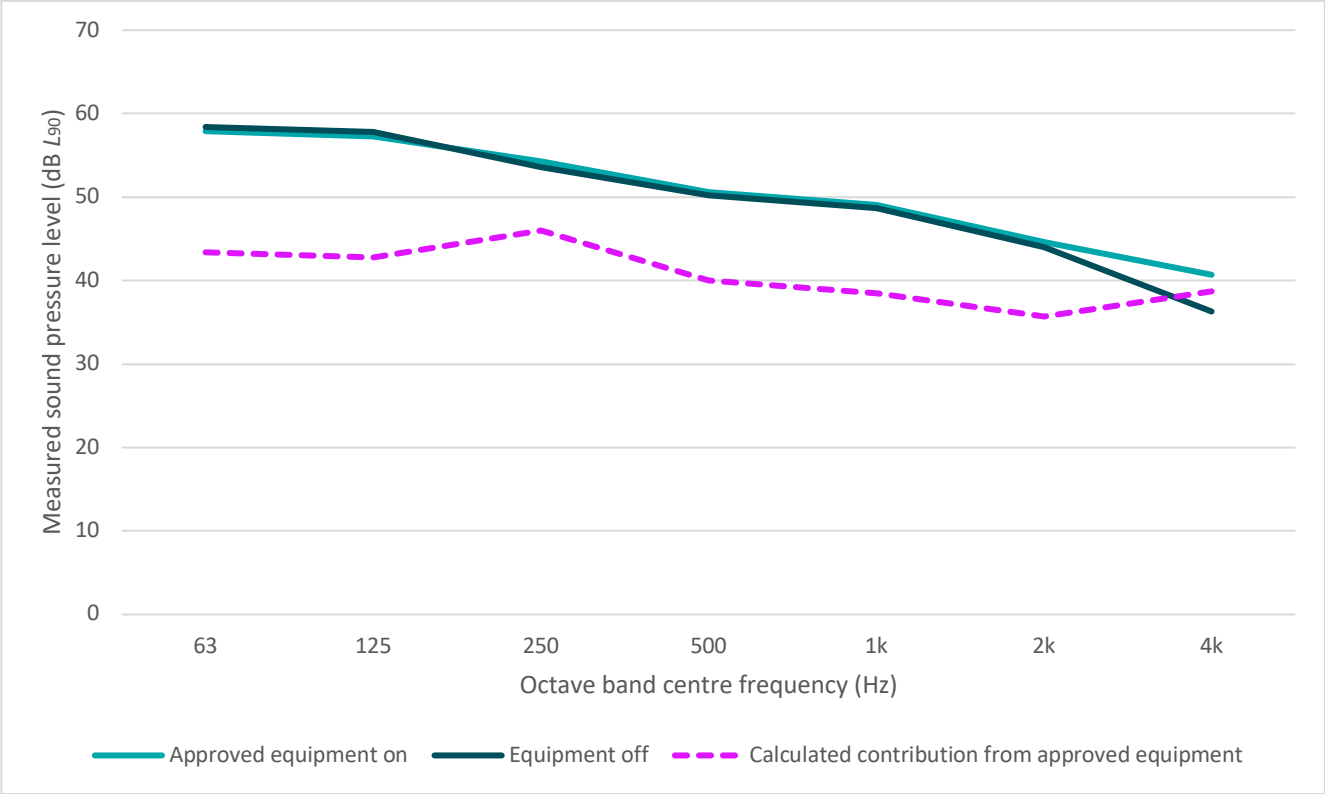
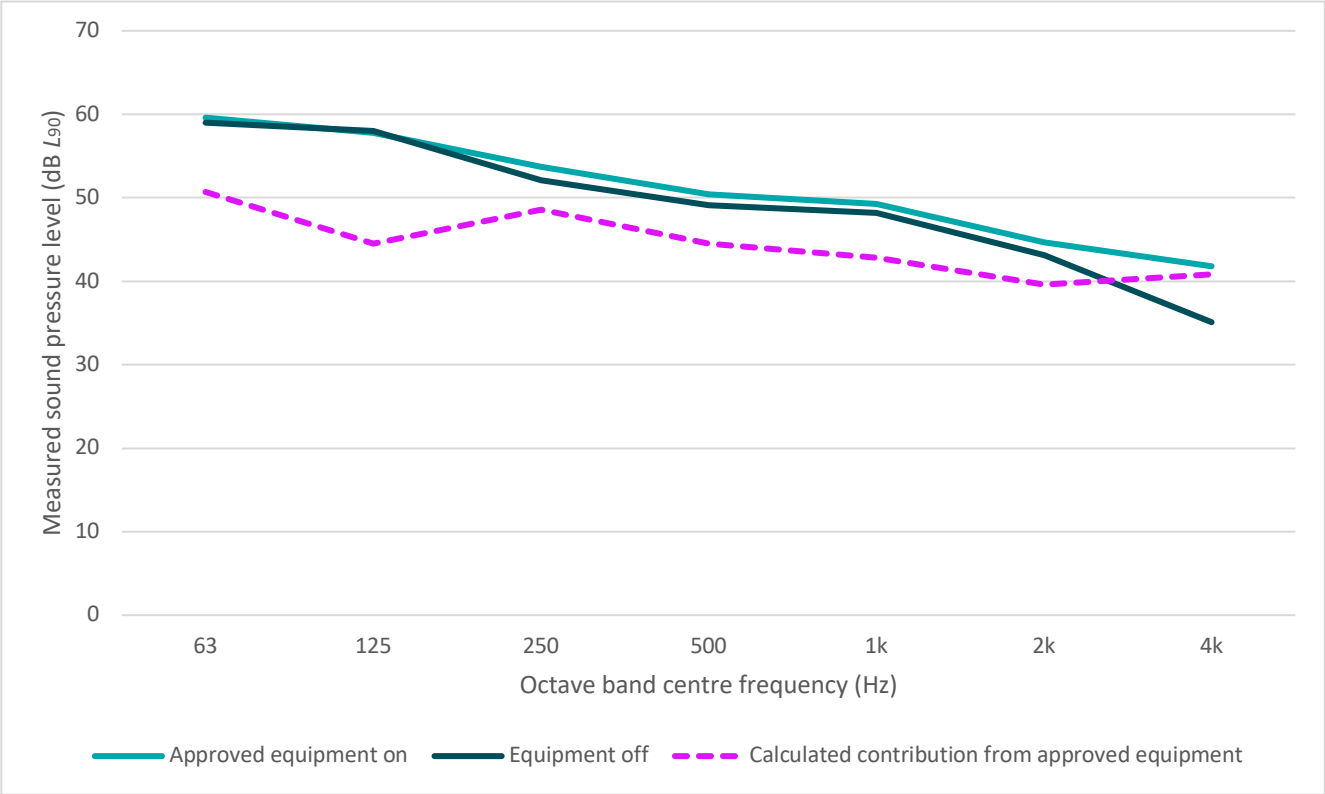


Chart 2: Measured/calculated noise levels at Location B - rear



In terms of overall A-weighted noise levels, the results can be summarised as follows:

Table 2: Summary of measured/calculated noise levels in dB L_{A90}

Location	All equipment operating	All equipment off	Calculated contribution from Neptune Mill equipment
A – Side	54	53	45
B – Rear	54	52	49

On the basis that the approved equipment is set back from the edge of the building meaning that the noise measurement locations 2m from the edge of the building were actually around 3.5m from the closest equipment, we have calculated the corresponding noise levels that will prevail immediately outside the apartment windows by adjusting the measured noise levels as follows:

$$L_{Aeq(apartments)} = L_{Aeq(meas)} - 20 \log (d/3.5)$$

Where: $L_{Aeq(meas)}$ is the measured/calculated contribution from the equipment at the measurement position

$L_{Aeq(apartments)}$ is the corresponding noise level outside the apartments

d is the distance from the equipment to the apartments in metres

The calculated plant/equipment specific noise levels outside the apartments to the side and rear are therefore as follows:

Table 3: Calculated plant/equipment specific noise levels outside apartments

Location	$L_{Aeq(meas)}$ in dB	Distance from equipment to apartment - d in m	$L_{Aeq(apartments)}$ in dB
Apartments to side	45	13.5	33
Apartments to rear	49	10.5	39

Whilst the condensers will operate upon demand, they will switch in/out independently of each other and hence there will be no noticeable on/off characteristic. Furthermore, when they operate under worst-case conditions (as was the case for the measurements described above) they produce steady and broadband noise. The fans also produce steady broadband noise. For this reason, and due to the low level of noise from the equipment in the context of the residual noise levels, the noise rating level from the equipment is equal to the specific level. On this basis, the plant/equipment noise is within the relevant noise limit at apartments to the side and rear.

We therefore conclude that noise from the approved rooftop plant/equipment has been controlled to the requirements of planning condition 6 and no noise mitigation measures are warranted.

We nevertheless recommend that the equipment is serviced on a regular basis to ensure that it does not generate any undue noise.



Key:

Not to scale

 - Rooftop equipment area

 - Noise measurement position

hepworthacoustics

Title: Figure 1: Plant/equipment and noise measurement positions

Project: P22-458