

Memo

Date: 1 November 2021

To: Dave Roscoe, Jennifer Atkinson, Rick Knightley

From: Ed Britton (Deloitte)

CC: Pete Mills (RBL), John Cooper (Deloitte), Dave Green (SHP), Matt Fisher (Fisher Acoustics), Alastair Lambert (WSP)

Subject: Trinity Islands – Headline Approach to Acoustic Ventilation Overheating

Introduction:

The following note has been prepared to provide Manchester City Council with a summary of Renaker's approach to applying recently introduced guidance relating to Acoustics, Ventilation and Overheating for their forthcoming residential proposals at Trinity Islands. The approach has been informed by technical input relating to the following disciplines, details of which are contained in the enclosed technical reports:

- TM59 Overheating Assessment (WSP)
- Acoustic Assessment (Fisher Acoustics)
- Façade Design (Simpson Haugh Architects)

To deliver market leading and future proofed residential accommodation, which optimises internal environmental conditions, the proposed designs and operational strategies seek to balance a range of key priorities that comply with TM59 conditions and limit internal noise, whilst also delivering on the full range of wider priorities such as space standards, design quality, energy efficiency and addressing net zero carbon objectives.

Approach to AVO:

Renaker's technical team has developed an operational AVO model that ensures compliance with TM59 overheating at all times of the day, for all proposed dwellings. Please refer to the enclosed TM59 technical note, prepared by WSP.

Due to the need to respond to continuously changing patterns of solar gain and external noise levels (e.g. traffic flows) to achieve compliance with TM59, it is not practical to achieve uniform noise levels for all dwellings across a 24hr period.

In assessing the internal noise levels during times when windows are required to be open, the noise assessment attributes different sensitivities to different rooms at different times of the day. This is in line with the 'Guidelines for Environmental Noise Impact Assessment' published by the Institute of Environmental Management & Assessment (IEMA, 2014), which states:

"Time-of-day sensitivity is related to the activity being undertaken by the individual affected by the noise.

It also can be argued that within the 16-hour period, the evening period (19:00–23:00 hours) is relatively more sensitive than the remaining 12-hour period [07:00 – 19:00 hours]. This is also activity-related, since during the evening people are generally at home relaxing, and children will be going to bed during this time."

The varying sensitivities to noise over the course of the day can be described as follows:

- **Daytime noise levels** (7am – 7pm): Low sensitivity for both living rooms and bedrooms, due to residents either being out of the home, or generally being more active around the home.
- **Evening noise levels** (7pm – 11pm): High sensitivity in living rooms, due to the majority of people using this space for relaxation / leisure time. Medium to low sensitivity in bedrooms, as the majority of people will not be asleep during this period.
- **Night-time noise levels** (11pm – 7am): High sensitivity in bedrooms and low sensitivity in living rooms, due to the majority of residents being asleep during these hours.

Regarding acceptable internal noise levels, the AVO 2020 Guidance recognises there's a balance to be struck between noise and overheating and identifies a suggested upper noise limit of 50dB LAeq,T for living rooms and bedrooms during the day [7am – 11pm]. In particular, paragraph 3.15 of AVO states *"For the daytime period, the upper category in Table 3-3 is defined on the basis that LAeq,T 50 dB represents the upper end of the range for reliable speech communication"*.

"The value of 'T', the averaging period used to determine the 'average' noise level 'LAeq,T', is not defined in the AVO. However, when discussing the further work required to better understand the issue of noise disturbance when windows are opened to control overheating, AVO states that further information is required, including

- o *how long will people tolerate higher noise levels in order to stay cool? One suggestion is to consider the overall average day (16h) and night (8h) time average noise levels. There is some logic to this as we all know that we can tolerate high noise levels for a short duration and moderately high levels for a little longer."*

The identified noise impacts are summarised below and further details are provided within the enclosed Noise Assessment, prepared by Fisher Acoustics.

Headline Results

As noted above, the operational model seeks to comply with TM59 overheating requirements at all times of the day and limits noise levels so far as possible during Evening and Night Time. To achieve optimum results, living room windows are allowed to be open for periods where necessary during the daytime period, between May and September. The model results show that windows to all living rooms are able to remain closed all evening (i.e. post 7pm) within all apartments and at all times overnight, which are considered to be most sensitive periods. Windows to all bedrooms within all apartments can remain closed at all times overnight. Windows to bedrooms are allowed during the day as required.

In Building C1, all rooms requiring open windows to achieve the requirements of TM59 are expected to achieve daytime noise levels ≤ 48 dB LAeq, 16 hrs. In Buildings C2, D1 and D2, all living rooms requiring open windows to achieve the requirements of TM59 are expected to achieve daytime noise levels ≤ 50 dB LAeq, 16 hrs..

It is also important to highlight that the results reflect that fact that noise levels decrease at each story up the building, due to the increased distance from the noise source.

It should be noted that the TM59 models vents being closed when the internal temperature drops back down to 22 Deg C. If the occupant of an apartment chose to close their vent(s) before the internal temperature dropped to 22 Deg C, it could quite often be the case that the internal temperature would not then rise above the 'fail' temperature criterion of TM59 (e.g. during evening periods when solar gain reduces).

Therefore the opening hours of the purge vents are not necessarily the opening hours required to maintain thermal comfort for the occupants. It could therefore be quite possible to achieve thermal comfort with shorter opening hours.

Further Design Considerations

Notwithstanding the internal noise exceedances, the design team has interrogated the feasibility of incorporating louvres into the façade to further reduce noise levels whilst also maintaining compliance with TM59. Unfortunately, it is not possible to incorporate louvres into the design due to the fact that they have not been tested at the heights required and associated warranties and insurance will not be possible to secure. Renaker is also unable to delay this element, in the hope a feasible louvre solution may be found during the construction process, as they will shortly be procuring the façade at risk to avoid rapidly escalating construction materials costs. In the event Renaker were to be significantly delayed around procurement, it would pose a substantial risk of the delivery strategy being jeopardised. For the reasons set out within the enclosed design note, the inclusion of louvres has been discounted.

Conclusions

As outlined above, Renaker's multi-disciplinary technical team have sought to balance the range of competing considerations to optimise the internal environment for future residents at Trinity Islands.

From the analysis undertaken to date, it has been determined that no living rooms across Trinity Islands will experience higher noise levels than the upper noise level identified in AVO guidance. All bedrooms will achieve the night time noise level recommendations as all bedroom windows can remain closed overnight whilst achieving the TM59 overheating criterion.

Due to Renaker's delivery model and the need for certainty of detailed façade design, there is a requirement to avoid a planning condition requiring submission of further AVO information at a later stage. As such, Renaker would like to ensure the LPA and EHO are fully briefed on the approach taken for AVO and seek to reach agreement in-principle prior to the forthcoming submission. Subject to agreement to the approach, a detailed AVO strategy (including all supporting technical analysis) will be submitted with the planning applications and, subject to approval, it is envisaged that this would become an approved document.

