Mark Batchelor

Boyer Planning

24 Southwark Bridge Road

London

SE1 9HF

27 January 2021

Dear Mark

Arlington Works Public Inquiry – Construction Noise

I have recently received a written response from Aulos Acoustics (#0-03486-1 dated 26 January 2021) to my previous submission (dated 21 January 2021). My responses are covered in the following sections.

Importantly, co-ordination has taken place with the Senior Environmental Health Officer representing London Borough of Richmond upon Thames regarding an agreed form of wording for a draft planning condition.

Assessment

The Appellant has not provided an assessment of construction noise and/or vibration or recommended suitable mitigation measures. It is therefore not possible to fully understand the noise and vibration risk to Twickenham Studios and the consequent level of mitigation required.

Baseline noise measurements were not conducted in proximity to the Studio buildings. Undertaking such measurements is considered best practice given the sensitivity of the Studios to noise and/or vibration ingress.

Importantly, if construction noise limits are to be informed by reference to the prevailing ambient noise level, as advocated by Aulos Acoustics, such baseline measurements would be necessary. Such measurements could have been conducted by the Appellant without requiring access to the physical access to the studio areas.

Noise Consultants Limited
119 Marylebone Road NW1 5PU

Tel 0203 873 4780
Email contact@noiseconsultants.co.uk
www.noiseconsultants.co.uk

Registered No. 10853764 Registered Office: 23 Coldharbour Road, Bristol BS6 7JT

Predictions of construction noise would normally be conducted based on prediction methods and source levels provided in BS5228-1:2009+A1:2014 *'Code of Practice for Noise and Vibration Control on Construction and Open Sites'*. This requires an understanding of construction plant and programme of works. Whilst such details are often unavailable at the time of the planning application, estimates can be made based on previous experience. Given the sensitivity of the Studios it is suggested that this would have been a proportionate approach to take.

In terms of quantifying the likely noise ingress to the studio spaces, as advised previously, a robust level of assessment could have been conducted by the Appellant without physical access to the studio areas. An estimate of the level of noise ingress to the Studios could have been calculated by way of a desk-based assessment based on a visual inspection from outside the building and using aerial imagery as appropriate.

The location and sensitivity of individual spaces within the Studios could have been determined by liaising with the Studios in writing. The Appellant could have derived an approximate internal noise criterion based on the usage of the space and a literature review of applicable standards. For example, the readily available BB93 – *'Acoustic design of schools: performance standards'* suggest an indoor ambient noise level of 30 $dBL_{Aeq,30m}$ for a new-build Recording Studio[1].

Whilst a more nuanced approach in setting noise limits based on based on measurements and listening within the studio spaces is welcomed; providing access to Twickenham Studios remains extremely difficult due to the commercial sensitivities of the work undertaken and consequent contractual constraints. Notably taking such an approach could result in more onerous conditions than those initially proposed by Noise Consultants Ltd.

[1] Importantly standards for professional new build recording studios are more onerous than those advised in BB93. For example, for smaller rooms with live microphones such as audio dubbing and foley a design criterion of $NR20L_{eq}$ (≈$25dBL_{Aeq,T}$) would be considered appropriate. For larger main studio spaces $NR25L_{eq}$ (≈$30dBL_{Aeq,T}$) would be considered appropriate.

Draft conditions proposed by Noise Consultants Ltd

With respect to the second condition suggested by Noise Consultants Ltd, Aulos Acoustics rightly point out typographical errors and interpretive oversights, when read across from the HS2 and Tideway documents. Namely the airborne noise values are free-field and the Ground borne noise value is $L_{Amax,S}$ (slow) – highlighted in yellow.

A corrected version of the draft condition which more precisely reads across from the HS2 and Tideway documents is presented below. The draft condition has been further revised based on co-ordination with the Senior Environmental Health Officer representing London Borough of Richmond upon Thames.

2. *Construction noise and vibration levels shall be mitigated such that the following maximum noise limits are not exceeded at the Twickenham Studios site:*
    - *Airborne noise: 50dB$L_{Aeq,1hr}$[2] as a free-field measurement (or 53dB$L_{Aeq,1hr}$ as a façade level) on any part of the building envelope of the sound theatres T1 or T2 or T3 or T4 as shown in appendix 3 of Mr Vohra's evidence.*
    - *Airborne noise: 60dB$L_{Amax,F}$ as a free-field measurement (or 63dB$L_{Amax,F}$ as a façade level) on any part of the building envelope of the sound theatres T1 or T2 or T3 or T4 as shown in appendix 3 of Mr Vohra's evidence. In the event of failure to meet the airborne noise limit works will cease immediately and investigation undertaken into the cause of the exceedance undertaken to prevent reoccurrence.*
    - *Groundborne noise: 30dB$L_{Amax,S}$ internally within each of the sound theatres T1 or T2 or T3 or T4 as shown in appendix 3 of Mr Vohra's evidence; measured as a spatial average towards the centre the room. It is noted access to the studio(s) may prohibited due to contractual obligations and therefore as an alternative the use of the metric peak particle velocity (ppv) as a surrogate remains acceptable. This would require in-situ trial measurements to ascertain transfer functions to establish suitable vibration limits for continuous monitoring to ensure continuous compliance of the groundborne noise limit.*

[2] T represents the measurement time. Selecting a 1hour period means that longer term averaging cannot be used to excessively mask shorter-term effects.

Notably HS2 guidance is a little vague on the averaging time that should be applied to recording studios , however the averaging time is particularly important in relation to this unique land use. A 1-hour averaging time period is suggested as a reasonable compromise.

Draft conditions proposed by Aulous Acoustics

The draft conditions suggested Aulos Acoustics are repeated below and discussed in turn:

Condition 1

1. No development, including works of demolition, shall commence until a Construction Management Plan for protecting Twickenham Studios and residential neighbours from Airborne noise, Groundborne noise and vibration for the duration of the construction phase of the project has been submitted to and approved in writing by the local planning authority which achieves meets the following conditions. The scheme shall then be complied with for all demolition and construction operations.

No objection.

Condition 2

2. Construction noise and vibration level limits and locations shall be submitted to the Local Planning Authority within the Construction Management Plan for approval based on the specific arrangement and conditions at the application site and neighbouring properties to address airborne noise outside the Noise Sensitive Premises and Groundborne Vibration-Induced Noise inside the Noise Sensitive Premises.

It is noted that the impacts upon Twickenham Studios hinge upon the adopted construction noise limits. Such is the risk to the Studios it is therefore suggested that construction noise limits be secured in any conditions (I.e. Noise Consultants Ltd Condition 2 or Aulos Acoustics Condition 6 subject to necessary amendments) or that the mechanism for agreeing such limits in the future or as part of the Construction Management Plan is clearly set out in the condition.

Condition 4 (sic)

4. During periods when the sound theatres are not recording the agreed limits shall not apply. Periods of recording and working are to be agreed with and notified to the studio to minimise Duration of Site Operations for residential property.

It is considered that the first part of this condition would be unworkable because the Studios are in full time use. The second part of the condition requires clarification to respond however by its nature the condition demonstrates a foreseeable impact on the Studios by the Appellant.

Condition 5

5. Continuous noise and vibration monitoring shall be conducted at one or two representative positions with respect to the studios throughout the duration of the construction works. In the event of any exceedance of approved limits, all construction works must be suspended and the Local Planning Authority must be notified immediately. Works shall not resume until remedial measures are implemented and the details of such measures recorded and the Local Planning Authority notified. 1

No objection.

Condition 6

"6. Construction noise and vibration levels shall be mitigated such that the following noise limits are not exceeded at the Twickenham Studios site at agreed points of the building envelope of the sound theatres T1 or T2 or T3 or T4 as shown in appendix 3 of Mr Vohra's evidence:

Airborne noise: the higher of a continuous equivalent sound level $L_{Aeq,T}$ 3dB[3] greater than current ambient noise exposure or 53dB $L_{Aeq,T}$ as a façade measurement where T is 16 hours (07.00-23.00 h)[4]

4 Airborne noise: the higher of a maximum sound pressure level $L_{Amax,FAST}$ 5dB[5] greater than current ambient noise exposure or 63dB as a façade measurement (07.00-23.00 h)

[3] 3dB increase on current ambient sound levels is considered to be a minor change
[4] Arguably this period could be reduced to the daytime hours – 12h 07.00-19.00h – but not to 15min or 1h periods without a requisite change in the sound level itself being an estimated 3-5dB greater.
[5] 5dB increase on current maximum sound pressure levels is considered to be a minor change

Groundborne noise: higher of a maximum sound pressure level $L_{Amax,SLOW}$ equal to the current internal noise exposure or 30dB within each of the sound theatres T1 or T2 or T3 or T4 spatial average towards the centre the room"

The proposed condition reads broadly the same as the corrected second condition suggested by Noise Consultants Ltd, notwithstanding the averaging period. However the proposed wording also seeks to account for prevailing levels of ambient noise, on the premise that if the Studios are already resilient to existing levels of noise that they should be resilient to a modest increase in that noise because of construction activity. Notably, in the absence of baseline noise measurements it is not possible to fully appreciate the potential consequences of such an approach. Additionally, consideration should also be given to the differing character of the two types of noise.

The prevailing noise exposure affecting the rear elevations of Twickenham studios during the day is expected to comprise:

- Regular but predictable train movements comprising a mix of stopping and passing trains; expected to have a similar noise level per pass-by and likely to have a slow onset enabling studio workers to take evasive action if required;
- Continuous distant road traffic at relatively low levels observed for relatively long periods between train movements; and
- Occasional industrial noise from Arlington Works.

It is possible that for some studio spaces it is possible to work around predictable train movements, instead relying upon the quiet periods in between. Therefore, any measurements of prevailing ambient noise should be selected to reflect the character of noise exposure most relevant to the usage of the space. i.e. excludes train movements from the adopted ambient noise level, if the underlying level is more relevant.

Construction noise is likely to comprise:

- Irregular and unpredictable noise exposure including impulsive noise likely to startle and provide little opportunity for studio workers to take evasive action;

- Continuous noise modulating in level to varying degrees throughout the day; and
- The frequency content of the construction noise is likely to be significantly different from the prevailing noise climate likely including more low frequency noise and its consequent risk to the Studios.

Therefore, caution should be taken in relation to any condition which seeks to account for prevailing levels of ambient noise. Firstly, the prevailing level adopted should be selected to reflect the character of noise exposure most relevant to the usage of the space.

With regards to the $L_{Aeq,T}$ metric, it is considered that a 3dB increase could be considered to be minor change if all other things were equal, i.e. a like for like change in road traffic noise. However due to the character of the construction noise subjectively and functionally the 3dB change may be more significant considering the disruption this may have to activities undertaken at the Studios.

With regards to the $L_{Aeq,T}$ metric, we continue to have reservations about the 10-12 hours averaging time period as discussed on page 4. It is noted that averaging time can result in shorter-term effects being excessively masked which is particularly important in relation to this unique land use. A 1-hour averaging time period is suggested as a reasonable compromise.

With regards to the $L_{Amax,F}$ metric, it is considered that a 5dB increase would not be considered to be minor change, especially considering the likely character of the noise. Notably construction activity might be expected to result in a larger number of maximum noise levels events which are more unpredictable than train pass-bys. A 3dB increase would be considered more acceptable.

Regards

William Martin on behalf of Noise Consultants Limited