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Our ref: P18-282-R02
30 October 2018

By email only: Garry.Davies@sra-architects.co.uk

Dear Garry,

Re: Caffyns Audi, Angmering : Post-Occupation Noise Assessment

We have undertaken a noise survey at the above development, which is now fully operational.

The survey relates to the noise-related conditions attached to the planning consent for the above approved development, which are as follows:

15. *The noise rating level of the valet, MOT and workshop bay activities and fixed building services plant at the site shall not exceed the background noise level at Kelston House, at a location 25m west of the east garden boundary. Measurements and assessments shall be made in accordance with BS 4142:2014 - Methods for rating and assessing industrial and commercial sound.*
16. *Prior to the occupation of the premises. a scheme of the mitigation measures, necessary to achieve a rating level not exceeding the background noise level at the location stated in condition 15, shall be agreed in writing with the local planning authority and thereafter carried out in accordance with the approved scheme.*

Within one month of implementation a test shall be carried out and the results submitted to the local planning authority to demonstrate that the attenuation measures specified in the agreed scheme are effective and achieve the levels specified within the scheme. Where necessary, calculations shall be presented to demonstrate noise levels at the assessment location where access to that location is not available. In the event that the specified noise levels have not been achieved, then a further scheme of attenuation works shall be submitted to the local planning authority within 28 days and shall be installed within 2 months of being approved in writing by the local planning authority and thereafter retained.

Condition 15 simply sets out the criterion applicable to Condition 16 and does not require specific separate action or discharge.

Condition 16 was originally presented in a single paragraph but has been split above to highlight the two distinctly separate parts of the condition, to be completed pre- and post-occupation respectively.

We previously provided an assessment to address the pre-occupation aspect of Condition 16, as per Hepworth Acoustics report ref: P18-282-R01, dated 6 June 2018. This was formally approved by Arun District Council in their letter dated 2 October 2018, providing partial discharge of the condition. This letter hence now addresses the post-occupation aspect, with a view to achieving full discharge of the condition.

Condition 15 refers to BS 4142. This standard requires the 'rating' noise level for the operation to be compared with the L_{A90} background noise level in the absence of the operational noise. The 'rating' level is derived based on the 'specific' L_{Aeq} noise level attributable to the operation with an 'acoustic feature' penalty added for any noise sources which give rise to tonal, impulsive, intermittent, or other characteristics readily distinctive against the residual acoustic environment. The noise impacts should be assessed based on a reference time period of 1-hour during the daytime (0700-2300hrs).

A noise survey was undertaken at the site over the morning of Friday 19 October 2018.

As part of this, it was noted that the proprietary acoustic screen that was recommended during the planning stage has been properly installed to the boundary of the site with the garden of Kelston House.

Further to the initial inspection and witnessing of site operations, it was clear that noise attributable to the Caffyns Audi operation is low, especially when considered in comparison to general ambient noise. For that reason, it was not considered practicable to attempt to measure operational noise at the assessment location stipulated in Condition 15 (i.e. 25m west of the east garden boundary of Kelston House, hereafter "the assessment location").

Condition 15 is based on the cumulative noise of the following elements of the operation:

- Fixed building services plant
- MOT and workshop bay activities
- Valet

Over the course of the morning at the site, it was observed that fixed plant noise is inaudible to the west of the building. This was as expected. The fixed building services plant is located at first floor level towards the central part of the east side of the building, and the predicted plant rating noise level at the assessment location, determined as part of pre-occupation assessment work, was 18dB $L_{Ar,1hr}$, hence 30dB below the previously determined representative background noise level.

Similarly, noise break-out from within the MOT and workshop bay was found to be inaudible to the west of the building. Again, this was as expected. There are no doors within the workshop elevation facing towards the assessment location. The pre-occupation predicted rating noise level for the workshop was 35dB $L_{Ar,1hr}$, hence 13dB below the previously determined representative background noise level.

As such, it was not possible to undertake any meaningful noise measurements in relation to plant and workshop noise.

Noise associated with valet operations was audible at the boundary to the Kelston House garden, albeit at a low level, and this was also generally as expected. However, the low level of noise was such that it was necessary to obtain noise measurements even closer to the source to avoid excessive interference from general ambient noise.

Sample noise measurements were undertaken at the measurement location identified in the Figure appending this letter report. The Figure also identifies the assessment location in the form of a 'strip' across the Kelston House garden.

Noise measurements at all locations were undertaken using a Bruel & Kjaer 2260 Type 1 Integrating Sound Level Meter (serial no. 2467014). Calibration checks were carried out before and after the survey periods using a Bruel & Kjaer Acoustic Calibrator, Type 4231 (serial no. 2389221), and no variation in the calibration levels was noted.

The measurement microphone was fitted with a windshield. All noise measurements were undertaken at 1.5m above local ground height and in free-field conditions. The weather during the noise survey was dry with a light north-easterly wind of speeds not exceeding 2m/s.

During the survey, the valet bays were in full normal use with doors open. However, noise generation was intermittent. The primary noise sources are the jet wash and vacuum machinery. When in operation both of these items of equipment emit steady and broadband (i.e. not tonal) noise.

Due to the steady and continuous nature of the valet machinery noise when operating, the noise levels used in this assessment are based on the L_{A90} index to minimise the impact of any extraneous noise. For the same reason, short measurement periods were used to coincide with lulls in other ambient noise. The measured noise levels were in the range 47-50dB L_{A90} for the jet wash /vacuum machinery.

Further short-term measurements of the residual L_{A90} noise level were undertaken in the same location during periods of inactivity at the valet, again during lulls in other ambient noise, which were judged to be representative of conditions during the operational noise measurements. These measured noise levels were in the range 45-46dB L_{A90} .

Based on a worst-case interpretation of these values, i.e. by taking the highest operational noise value and the lowest residual noise value, the noise level of valet machinery is taken to be up 48dB L_{pA} at the measurement location.

The valet comprises six bays. Assuming that one machine with the above worst-case noise level is operating in each bay, an overall noise level of 56dB L_{A90} would result at the measurement location. This assumes all machinery being in operation. As such, it is also necessary to correct this value for the 'on-time'. Pre-occupation and planning stage assumptions for value activity were based on each bay being operational for a cumulative 10-minute period in each 1-hour period. This was based on information provided by valet operatives at Caffyns VW Worthing. From observations made at the Audi site, this would appear to be a highly robust estimate. Nonetheless, on this basis an 'on-time' correction of -8dB is applicable, and hence the overall 'specific' noise level at the measurement location is 48dB $L_{Aeq,1hr}$.

To determine the 'specific' noise level at the assessment location, it is necessary to apply a distance correction of -7dB, and an acoustic screening correction at the site boundary, taken for a highly cautious approach as -3dB. Hence the 'specific' noise level at the assessment location is 38dB $L_{Aeq,1hr}$.

To determine the 'rating' noise level at the assessment location, acoustic feature penalties are applicable. A +3dB correction is hence applied for the intermittent nature of the sound. A further a correction is applicable to account for the impulsiveness of the sound, and +3dB is considered adequate based on observations at the site, as this corresponds to *'impulsivity which is just perceptible at the noise receptor'*, in line with BS 4142.

Based on the above, a 'rating' noise level of 44dB $L_{Ar,1hr}$ is derived at the assessment location. This is slightly better than the pre-occupation prediction of 47dB $L_{Ar,1hr}$.

No additional formal background noise monitoring has been carried out during this post-occupation survey. Instead it is considered more appropriate to base this assessment upon the background noise level determined by way of extensive monitoring as part of the planning-stage noise assessment work for the development, as set out in Hepworth Acoustics report ref: P15-397-R03, dated: November 2015. This determined a baseline background noise level of 48dB $L_{A90,1hr}$ representative of the assessment location.

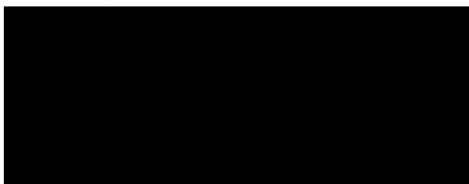
It is noted that the brief residual L_{A90} noise levels mentioned above, in the absence of value noise, were in the range 45-46dB L_{A90} , however these measurements were undertaken over very brief periods during the very quietest lulls in ambient noise, representative of conditions during valet activity noise measurements.

It is nonetheless useful to note that these noise levels indicate that the previously determined background noise level of 48dB $L_{A90,1hr}$ would appear to be still representative, based on a full 1-hour assessment period.

It is therefore concluded that the noise rating level of the valet, MOT and workshop bay activities and fixed building services plant at the site does not exceed the background noise level at Kelston House, at a location 25m west of the east garden boundary, based on measurements and assessments made in accordance with BS 4142.

Consequently, it is concluded that the second part of Condition 16, i.e. the post-occupation requirement, may be discharged.

Yours sincerely,
For Hepworth Acoustics Ltd



Graham Bowland BSc MIOA
Technical Director

Figure: Site Plan Showing Assessment and Measurement Locations

