
Data Centre Noise Report Review: Ark Estates, Corsham

John Hartley Surveyors Ltd
Corsham

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Executive Summary

A review has been carried out of the noise impact assessment report for the proposed P6 Data Centre operations at Land South of Westwells Road, Corsham, to support a planning application and the subsequent technical note by the noise consultant.

This review shows that neither the report nor the technical note represents an accurate representation of the likely noise impact from the proposed new facility.

The reasons for this conclusion are:

Tonality

The consultant states that there is no evidence that there will be tonal noise. This is incorrect. Not only is noise from the existing data centre the cause of complaints, but analysis of recordings show that it is both objectively and subjectively highly tonal. In addition, low frequency tonal noise is a very common cause of complaints from the plant used in data centres.

Mitigation

The consultant states that the planned mitigation will reduce the noise from the new facility to the lowest level possible. This is incorrect. The consultant has only considered a very limited set of noise control measures and has ignored proven engineering mitigation measures that often represent Best Practicable means (BPM). These would not only be particularly effective to reduce tonal noise but could also improve plant efficiency and cut mitigation costs.

1.0 Introduction

INVC has been asked to review the noise reports that have been submitted to assess the noise impact of the proposed P6 Data Centre operations at Land South of Westwells Road, Corsham, to support a planning application.

The reports and comments in question are:

1. Project Reference: 65204515-007; Document Reference: 65204515-007-SWE-ZZ-XX-T-U-0001; Revision: C02; Prepared For: Ark Estates 4 Limited by SWECO: 17/05/24, Mercedes Astrain
2. Technical Note: responses to comments from Wiltshire Council (WC): 03/10/24: Mercedes Astrain

2.0 Reported Noise Measurements and Predictions

The following sections highlight the serious failings in the consultant report and subsequent comments associated with this planning application.

2.1 Tonality

2.1.1 Baseline noise measurements

All the baseline noise measurements were made based solely on dB(A). This is not best practice given the following facts:

- There is an existing data centre near the site that is the subject of numerous complaints about low frequency tonal noise. As the “A” weighting progressively filters out low frequencies, it should not have been used in isolation to assess the existing noise environment. See <https://invc.com/noise-control/tonal-analysis-adding-simple-low-frequency-tonal-analysis-to-dba/>
- Low frequency tonal noise is a very common cause of noise complaints about data centres. See <https://invc.com/noise-assessment/data-center-noise-regulation-ordinances/> for more information.

Best practice would have been to add narrow band frequency analysis to the baseline measurements. INVC analysis of smartphone video clips taken at 2 locations a c 150m from the centre supplied by John Hartley has objectively shown that the noise from the existing local data centre is highly tonal, see figures 1, 2 and 3. There are numerous tones that are between 10dB and 30dB above the background broadband noise.

Note: while smartphone recordings are not calibrated and include a significant roll-off at lower frequencies, the measured tonal frequencies and the tonal amplitudes above the broadband noise at the same frequency are accurate to the equivalent of Type 1 (IEC 61672-1). Consequently, they are

entirely acceptable to provide an initial diagnosis of tonal content, typically down to around 50Hz or even lower. See <https://invc.com/noise-control/using-tonal-noise-analysis-is-best-practice/#whysmartfft> for more details.



Figure 1: Location 1



Figure 2: Location 2

Analysis of the audio taken from the 2 videos above (screenshots) gives the following result.

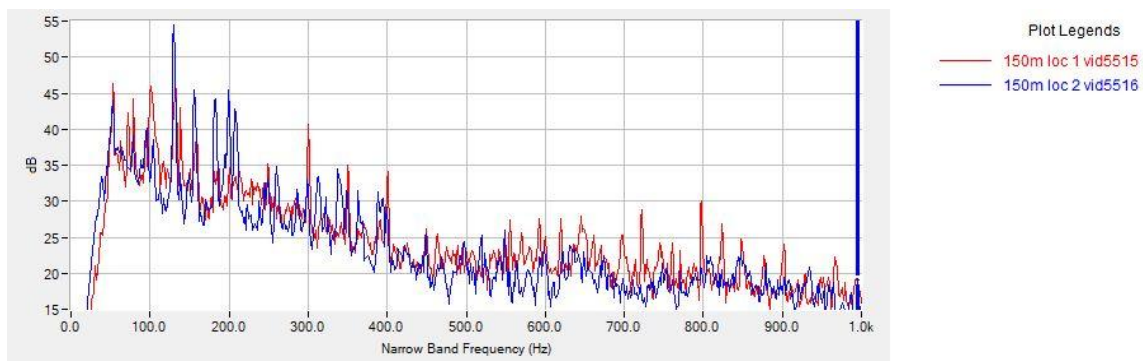


Figure 3: analysis of video audio tracks at locations 1 and 2

This analysis is objective proof that the noise from the existing data centre is highly tonal (including mains hum harmonics). In addition, it is also very obvious from listening to the audio that the sound is subjectively very tonal.

Despite the above facts, there no attempt to carry out any form of frequency analysis of the existing noise environment.

2.1.2 Predicted noise impact assessment – new facility

The supplier data used in the noise model predictions has been assessed on dB(A) and octave band figures only. This is a common practice that ignores the fact that the noise sources installed in data centres will often be highly tonal.

Best practice is to acquire information about the tonality of the equipment by requesting smartphone recordings from the supplier made near similar plant anywhere in the world. If this data is not available,

then it must be assumed that the noise is highly tonal and that the maximum 6dB(A) BS4142 penalty should be applied. Unless the supplier can **prove** the plant noise is not tonal, then it should be assumed to be tonal.

Despite this and the fact that the existing data centre generates highly tonal noise (2.1.1.), the following statement is included in the noise impact assessment report:

“BS4142:2014 advises that when the noise contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific noise level to obtain the L_A,T_r ‘rating noise level’. A correction to include the consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary. It also advises that the assessment of the significance of sound needs to take into account the context in which the sound will occur. Based on the character of the proposed ventilation plant no penalties are considered necessary for intermittency, tonality or impulsivity of the sound arising from the development.”

In addition, the following statements are included in the Technical Note in response to the Wiltshire Council (WC) comments.

“...As stated above, with the 1/1 octave band data provided (1/3 above is understood to be typo) it is not possible to objectively assess the presence of tonality of the sources. It should be also noted that the noise sources, especially the ventilation systems and the AHUs are attenuated, as presented in sections 5.2.1.1, 5.2.1.2, 5.2.2.1, 5.2.2.2 and 5.2.2.3. The attenuation measures included in the design would reduce potential tonality at source.

Additionally, the penalties for tonality should be assessed at the receptor’s locations.

The tonality penalties in BS4142, based on subjective perception, ranges from +2 dB for a tone which is just perceptible at the noise receptor, +4 dB where it is clearly perceptible, and +6 dB where it is highly perceptible.

There is no evidence that the noise from the site would be tonal, and in case it is perceived as a low frequency noise, BS4142 include a penalty of +3 dB for sound characteristics, when the noise is readily distinctive against the residual acoustic environment.

In light with the above, it is deemed that consider a +6 dB penalty would represent a very worst-case and there is no evidence to be adequate for this assessment.”

In particular, the statement that “*There is no evidence that the noise from the site would be tonal*” is incorrect. In fact, there is ample objective and subjective evidence that noise from the site is likely to be highly tonal that could justify a combined penalty of perhaps 9dB.

2.2 Mitigation methods

The noise impact assessment report provides outlines of the noise control methods that would be incorporated in the design of the new facility. These comprise:

- Acoustic louvres
- Silencers
- Acoustic enclosures
- Noise barriers

Given the requirements for airflow and the intrinsic performances of these measures, they generally provide poor attenuation at lower frequencies. Consequently, whilst they can be effective to reduce the overall dB(A), they are often not sufficiently effective to reduce low frequency sound, tones in particular.

The report ignores engineering noise control at source technologies that often represent Best Practical Means (BPM). This is particularly relevant for low frequency noise sources where source control is often the only practical option.

Despite this fact, the Technical Note includes the following statements:

*“Additionally, extensive mitigations are already included in the current design and the noise has been reduced to the **lowest level possible**.”*

...

WC comment: “The applicant should engage the noise consultant to look at further remediation measures especially regarding the low frequency noise. If the plant that is proposed duplicates the existing data centre, then maybe information on tonal noise could be gained from measurements of existing sources and further attenuation proposed regarding the new data centre.”

Response: *“The current design includes extensive mitigations which have been developed with the design team. The mitigation measures included in the proposed site are not within any of the existing buildings, and therefore actual noise measurements can’t be carried out to evidence the presence of tonal noise.”* ... list of proposed mitigations... *“The mitigations above have been maximized along with the MEP design team. Further mitigations will have a detrimental effect on the operation, functionality, and capacity of the site. Also, further mitigations may incur in ventilation systems forced producing higher levels of noise, based on the advice from the design team during the assessment at planning stage.”*

As lower cost engineering BPM techniques have been completely ignored (some of which can actually improve the performance of plant e.g. measures that increase fan efficiency in parallel with large noise reductions), these statements cannot be justified, they are incorrect.

See <https://invc.com/noise-control/data-center-noise-attenuation/> for more information.

3.0 Conclusions

Neither the report nor the technical note represents an accurate representation of the likely noise impact from the proposed new facility.

Despite the fact that not only is there is both objective and subjective evidence that the noise from the existing data centre is highly tonal (and there have been numerous complaints) and that low frequency tonal noise from data centres is a very common problem for local communities, the consultant has not only not taken tonality into account, but has positively stated that there is no evidence that it exists or is likely to be generated by the new plant. That is incorrect.

In addition, the consultant has ignored key BPM mitigation measures for the new development that would not only be particularly effective to reduce tonal noise but could also improve plant efficiency and cut mitigation costs. Consequently, the claim that the proposed mitigation will ensure that “...noise has been reduced to the lowest level possible.” is incorrect.

**CV [Peter Wilson](#): Technical Director: INVC (2026)**

BSc Mech.Eng.) MSc (Sound and Vibration – ISVR Southampton)

Member of the Institute of Acoustics (M.I.O.A.)

In addition to a mechanical engineering degree and an MSc in Acoustics and Vibration, he has spent over 40 years honing his practical skills in the field of noise and vibration engineering - initially in the automotive industry (solving problems on both products and for customers). He has acquired a considerable reputation for developing innovative noise and vibration control techniques across a very wide range of applications and industries. This includes the design of the award-winning Echo Barriers, innovative, award-winning fan noise control technology and novel structural vibration dampers.

He also developed the Institute of Occupational Health (IOSH) competency training courses in both noise and vibration (HAVS) and is in demand worldwide for conference and webinar presentations due to expertise and to being both passionate and entertaining (the latter is a spin-off from doing stand-up comedy as a hobby...). In addition, he provided technical support to update the Irish EPA noise guidance documentation in 2024/2025.

Conference Presentations

- British Occupational Hygiene Society: 2025. [Green peace noise control](#)
- World Steel Association: worldwide webinar on noise control. 2025
- Energy Institute: noise control webinar. 2025
- American Conference of Governmental Industrial Hygienists (ACGIH) worldwide webinars on noise and HAVS: 2025
- [Listen Up conference](#), Birmingham: 2024
- Chartered Inst. Env. Health: 2024
- South African Inst. of Occupational Health: noise and HAVS keynote speaker: 2022
- Health and Safety Executive noise control workshops 2017 – 2019
- Norwegian Occupational Hygiene Society: 2019: noise and HAVS
- Malaysian Institute of Occupational health: 2018: noise
- Human Response to Vibration: international conference: 2018: HAVS
- Chartered Institute of Environmental Health: 2018 and 2019: noise
- Occupational Hygiene Society Ireland: 2017: noise
- IOSH conference: 2017: noise
- British Occupational Hygiene Society: 2017: noise
- Australian Institute of Occupational Health: Gold Coast: 2016: HAVS keynote speaker
- Internoise 2017: Germany: 2016: noise control in construction
- Health and Safety Executive Listen Up International Conference: 2016: noise
- British Occupational Hygiene Society: 2016: noise
- Energy Innovations Centre: 2016: noise
- Civil Infrastructure & Technology Exhibition (CITE): 2016: noise
- IOHA London: 2015: noise
- Chartered Institute of Environmental Health: 2014: noise
- British Occupational Hygiene Society: 2014: noise
- Chartered Institute of Environmental Health: 2013: noise
- Highway Authorities and Utilities Committee: 2013: noise
- Institute of Occupational Health: 2013: noise
- BHSEA: 2011: HAVS

A Few HighlightsNoise and Vibration Consultancy

Set up an independent noise and vibration consultancy commercial element for the in-house Lucas Industries Noise Centre in West London. Left Lucas to found the multi-award winning Industrial Noise and Vibration Centre (INVC) in the UK in 1986. The INVC is one of the foremost noise and vibration engineering consultancies and training organisations in Europe.

Co-founded Echo Barrier and designed their award-winning technology to solve the technical problems associated with reducing construction, demolition and infrastructure site noise. The company is now the leading provider of temporary noise control barriers worldwide.

Regulators and Committees

Developed HAVS measurement techniques and put together a dossier of HAVS data submitted to the HSE for inclusion in the database as the basis for the HAVS regulations in the late 1970s.

Developed and runs the environmental noise training courses for the English, Welsh, Scottish and Irish Environment Agency inspectors (the environmental noise regulators). This also extends to Local Authorities across the UK who

are responsible for policing environmental noise and vibration.

Updated the technical elements of the NG4 environmental noise guidance for the Irish Environmental Protection Agency to reflect best practice in 2024/2025.

Invited to tour with the UK Health and Safety Executive (HSE) regulator roadshows to launch the occupational noise and vibration regulations across the UK. He also developed and runs noise control workshops in conjunction with the HSE across the country – a joint HSE HAVS workshop is under development. Ex member of the British Standards Institute (BSI) HAVS committee.

Technical Innovations

- Developed the award-winning Quiet Fan technology that is now best practice across a range of fan noise problems worldwide, replacing silencers with aerodynamic inserts that also can improve fan efficiency.
- Developed a novel design of dynamic vibration absorber used on motors and pipework in the oil and water industries.
- Designed an innovative silencer for high pressure gas release in the gas transmission industry.
- Saved a confectionary company £millions through designing an innovative chocolate coating vibrator which reduced waste and improved quality (also quieter and more efficient).
- Designed a patented quiet, efficient pneumatic nozzle for component ejection.
- Developed a vibration test system to determine hand tool build quality re HAVS.
- Designed widely used noise and vibration analysis software.
- Designed patented petro-chemical oil/gas/water pipeline innovative noise control technology to replace conventional lagging.
- Multiple noise control innovation awards with both INVC and Echo Barrier (including a number of patents).

Environmental Noise and Vibration: Sample Projects

- Responsible for the environmental noise and vibration management programmes for two of the largest, and highest profile, demolition and regeneration projects in the world – Earls Court and Chelsea Barracks in London.
- Noise mitigation at World trade Centre, New York
- Managed noise and vibration monitoring and control for the Shard development in London.
- Heathrow Express station, Heathrow airport: piling vibration monitoring system design and vibration management for new multi-storey carpark above the underground tunnels.
- Saved USA BP refinery site over \$1 million from a fan noise control project previously costing at \$1.25 million.

Industrial Noise and Vibration Projects

- Extensive experience in both noise and vibration control across general industrial, petro-chemical, construction, demolition, infrastructure (road and rail) and high hygiene industries such as pharmaceutical, food/drink and electronics. INVC developed technology reduces typical noise control project costs by 50% - 80% when compared with industry norms.
- Developed Remote Control of Noise technology that allows many noise problems to be diagnosed and solved across the planet via smartphone and email without site visits.
- Wrote the template Digital Noise Assessment open-source noise assessment documentation that is used by 100's of organisations and template Buy Quiet purchasing policy documentation that has been used by 100's of organisations.
- Wrote two of the top ranked internet search result documents for noise control methods (Top 10 Noise Control Techniques).
- Wrote both the IOSH noise competency and the IOSH HAVS competency courses – the INVC is the major provider of noise and vibration training in the UK.