

# **Wylfa Newydd Development Area**

## Analysis of the Noise and Vibration Assessment of the Site Campus

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This document has been prepared and checked in accordance with  
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### **1. Introduction**

- 1.1. This note presents a desk-based review and analysis of the noise and vibration assessment presented within the ES for the Wylfa Newydd Development Area (WNDA). In particular, it considers the acceptability of the assessment of effects on the Temporary Worker Accommodation (TWA) in the proposed Site Campus.
- 1.2. The reports referred to in this document are as follows:
  - APP-125 - 6.4.6 ES Volume D - WNDA Development D6 - Noise and vibration (the "ES")
  - APP-085 - 6.2.20 ES Volume B - Introduction to the environmental assessments App B6-1 - Baseline noise monitoring (the "Baseline Noise Report")
  - APP-237 - 6.4.101 ES Volume D - WNDA Development Figure Booklet - Volume D (Part 1/2)
  - APP-439 - 8.24.4 Site Selection Report - Volume 4 – Temporary Workers' Accommodation (the "Site Selection Report")
- 1.3. The review has been completed by Mark MacLagan a Technical Director with Waterman Infrastructure & Environment Limited (hereafter Waterman). Waterman is a major multi-disciplinary consultancy with a strong track record of helping to deliver large scale projects throughout the United Kingdom (UK).
- 1.4. Mark's academic qualifications include a BSc (hons) in Environmental Science from Nottingham Trent University and a Post Graduate Diploma in Acoustics and Noise Control. Mark is a member of the Institute of Acoustics and has over 14 years' experience in the measurement, analysis and assessment of noise and vibration in relation to large scale regeneration projects throughout the UK.

## 2. Review

### Noise

#### Establishing the Baseline

2.1. The ES states at paragraph 6.4.21, in relation to the siting of the Site Campus, that:

*There are few existing anthropogenic noise sources which affect the location of the proposed Site Campus (construction zone 12), and so baseline noise levels at this location are expected to be low. However, by the time that the Site Campus would be occupied, construction works across the Wylfa Newydd Development Area would be ongoing.*

2.2. However, paragraph 6.3.5 states in relation to the baseline noise environment:

*Noise from the National Grid transformers adjacent to the Existing Power Station included ‘audible tonality’ (i.e. transformer hum), which has been the subject of some adverse community response in the past. This transformer is likely to be retained even though the Existing Power Station has ceased electricity generation. The extent of the contribution of each of these noise sources will vary with weather conditions.*

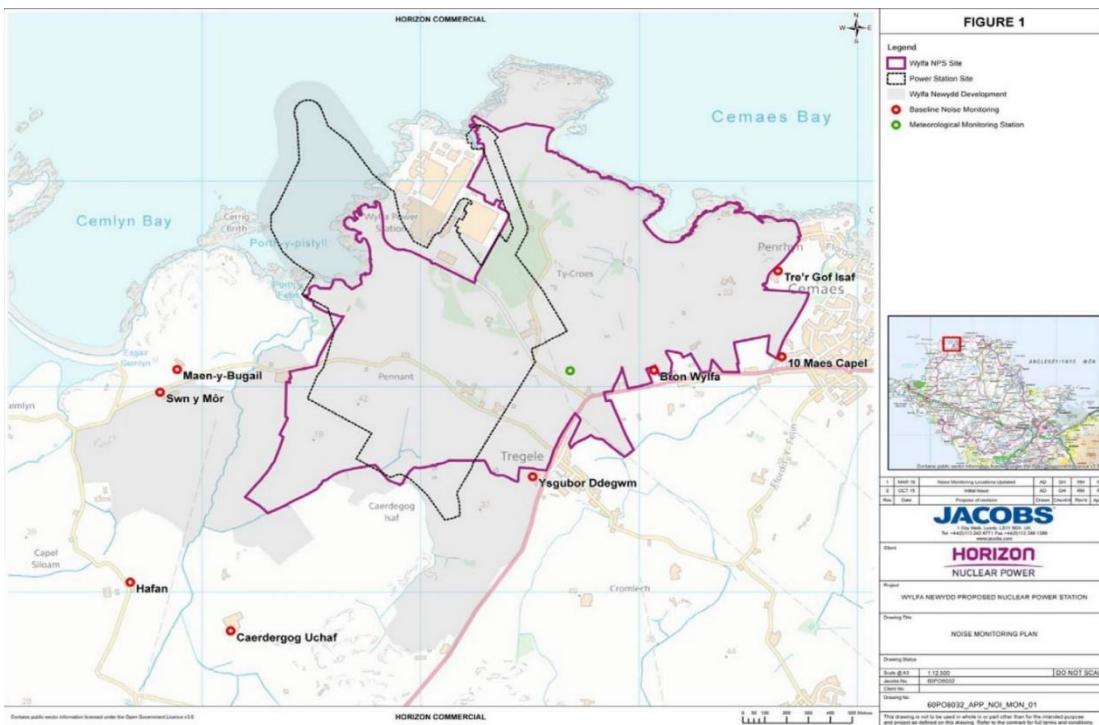
2.3. The implication in paragraph 6.4.21 is that baseline noise levels have been estimated and not measured at the location of the Site Campus and that noise conditions much further from the transformer than the proposed Site Campus have resulted in complaints from the local community. The Site Campus will be positioned very close to the east side of the transformers, with some units potentially within 150m.

2.4. The locations that were subject to baseline noise survey are as presented in Figure 1 on page 11 of the Baseline Noise Report, which is presented as Figure 1 below for ease of reference. The survey locations are at significantly greater distances from the identified noise sources at Wylfa than the proposed Site Campus and this confirms that baseline survey information was not gathered for the location of the TWA.

2.5. The residential property identified as MP1 Tre'r Gof Isaf, which is also to the east of the transformer at the Existing Power Station, was surveyed for baseline noise but is some 1.25km away. At this location the noise survey notes identified an “audible hum and short alarm from direction of Existing Power Station”; this despite the property being over 1km further away than the proposed Site Campus and with “no line of sight to Existing Power Station”. Again, the Site Campus will be within a few hundred meters of the transformers with direct line of sight.

2.6. Given the proposed use of the Site Campus as a residential institution, and given the evidence showing that properties significantly further away have experienced noise from the Existing Power Station transformers to a degree that complaints have been made, our view is that a more robust assessment of the baseline noise environment at the Site Campus location is required in order to confirm its suitability for the proposed use, regardless of the potential construction related noise.

Figure 1 Noise Monitoring Plan



## Suitability of the Site for the Proposed Use

2.7. The ES presents an assessment of construction related noise at section 6.5 of the chapter. This includes a summary of the significance criteria for BS 5228 in Tables D6-16 and D6-17. This section of the assessment considers the impacts of construction noise on all receptors in the surrounding area including high, medium and low sensitivity receptors. The Site Campus is excluded from this assessment and is instead presented separately at the end of this section of the chapter and assessed under a different methodology, for which no explanation is given.

2.8. The ES states at paragraph 6.4.22:

*To establish the site's suitability for the Site Campus, the modelled daytime and night-time noise levels associated with the months 31 to 33 scenario have been used. This is the period in the programme expected to cause the highest construction noise levels at the proposed Campus Site. It is also assumed that parts of the Site Campus will be completed and occupied, but other parts will be under construction; therefore, noise from ongoing Site Campus construction activities within construction zone 12 has been included in the modelled noise levels.*

2.9. In relation to the potential noise levels at the Site Campus during the construction of the WNDA, the ES states at paragraph 6.5.49:

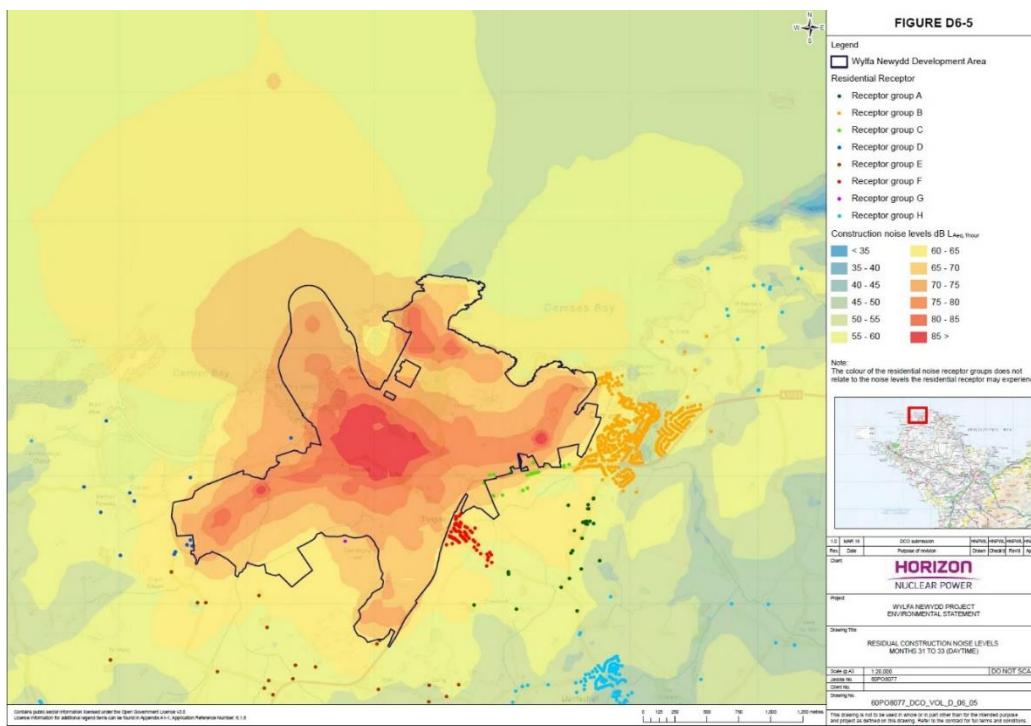
*The predicted construction noise levels at the most exposed facades of the Site Campus are expected to be in the range of between 54dB and 70dB  $L_{Aeq,16-hours}$  during the daytime and between 43dB and 54dB  $L_{Aeq,8-hours}$  at night, corresponding to a large magnitude of change. As such it is considered that the Site Campus would experience a major adverse effect, which is considered to be significant.*

2.10. Figure D6-5, reproduced as Figure 2 below, shows the noise mapping for months 31 to 33, which indicates that the construction noise levels during the daytime at the Site Campus are 70dB – 85dB  $L_{Aeq, 1 hour}$ . Even though this represents noise over a shorter time period than that described above in the ES (quoted above), this is an extremely noisy environment and not obviously compatible with

the objective of providing sleeping accommodation for night shift workers. It is this shorter time period ( $L_{Aeq, 1\text{ hour}}$ ) that is used for the assessment of construction noise for all receptors apart from the Site Campus and which is consistent with the requirements of BS5228-1, the appropriate methodology for this assessment. Further to the above the assessment does not reference the  $L_{Amax,F}$  criteria which is of key importance when considering 'sleep disturbance' and the future amenity of residents.

2.11. It is worth noting that the assessment of the noise impact on residential receptor groups identified large magnitude (major significance) impacts on 22 properties, as shown on Figure D6-5. These were mostly in Receptor Group C (green) and F (red), which are shown as being in a quieter noise zone than that covering the Site Campus. Although this image illustrates the day time scenario, it is worth mentioning again that the Site Campus would have night shift workers sleeping in these conditions during this period of the day.

**Figure 2** Noise Monitoring Plan



2.12. The ES proceeds to classify the noise environment at the Site Campus in terms of its Noise Exposure Category, stating at paragraph 6.5.50:

*... the predicted noise levels would classify the Site Campus in the Technical Advice Note 11 [RD7] noise exposure category (NEC) B during the day and NEC C at night.*

2.13. The NEC category C states that:

*"Planning permission should not normally be granted. Where it is considered that permission should be given, for example, because there are no alternative quieter sites available, conditions should be imposed to ensure a commensurate level of protection against noise."*

2.14. We would note that TAN11 NEC's do not apply to construction noise, which should be assessed in accordance with BS5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites. This approach is explicitly referred to in TAN11. It is unclear why the Site Campus has been assessed in this way. A more appropriate strategy would be to

calculate noise levels using the calculation methodology provided in BS5228-1:2009+A1:2014 to determine likely internal and external noise levels within the Campus.

- 2.15. Given that the NEC Category C definition refers specifically to the consideration of alternative "quieter sites", it appears that this approach has been taken so that it would allow an argument to be formed that the significant noise impacts at the Site Campus were acceptable on the basis that there were no suitable alternative sites.
- 2.16. We would also note that HNP has justified the exclusion of all alternative sites on the basis of the findings of the Site Selection Report. The selection criteria do not include noise as a determining factor in site selection and therefore it would be unreasonable to use the site selection exercise to dismiss the significant identified noise impacts at the Site Campus, even if this were an acceptable methodology under TAN11.
- 2.17. We also note the absence of any assessment of external noise levels at the Site Campus. Shift workers resident at the Campus will be provided with outdoor recreation areas to enable them to relax and recuperate after their shifts. The facilities proposed include a multi-use games areas (MUGA), viewing and seating area, and an informal outdoor exercise space. We observe that these outdoor areas for recreational use will be located in some of the noisiest parts of the Site Campus, with external noise levels in the region of 70-85dB. At the upper end of this scale, noise levels are at the point where hearing protection should be provided under the Noise at Work Regulations.
- 2.18. BS8233 recommends that external noise levels should not exceed 50 dB  $L_{Aeq,T}$  and 55 dB  $L_{Aeq,T}$  should be regarded as the upper limit. Clearly, the noise levels present at the Site Campus are potentially far in excess of these limits and, once again, the suitability of the site for the proposed use has to be seriously questioned.

## Mitigation

- 2.19. The ES does confirm that mitigation will be required at paragraph 6.5.53, *which states that:*

*... additional mitigation measures would be required in the design of Site Campus to achieve suitable internal noise levels and ensure that there will be only minor adverse effects at these dwellings.*
- 2.20. Table D6-32 goes on to state that:

*Acoustic mitigation measures would be provided as part of the building design of the Site Campus to achieve the requirements and guidance provided in BS 8233:2014 [RD17], World Health Organisation Guidelines [RD2] (for LAF,max levels), Approved Document E of the Building Regulations [RD18] and CIBSE Guide B4 [RD19]. Preliminary information indicates that for some bedrooms, mechanical ventilation would be required to provide ventilation without the need for opening windows, and that windows would need to be double glazed with units of appropriate acoustic performance, as per the Design and Access Statement volume 3, appendix 1-2 Associated Developments and Off-Site Power Facilities) (Application Reference Number: 8.2.3).*
- 2.21. Construction work on the WNDA will continue throughout the day and night, meaning that there will be shift workers sleeping within the Site Campus bedrooms throughout the day and night. On that basis, it is reasonable to expect the bedrooms at the Site Campus to achieve internal noise levels corresponding to the guidance for night-time noise levels in internal bedrooms set out in BS 8233, which confirm an average noise level of 30-35 dB  $L_{Aeq,T}$  and a maximum noise level of 45 dB  $L_{AFmax}$  (WHO guideline value). It should be recognised that the guidance outlined above relates to anonymous noise only, that is general transportation noise. Where noise is tonal or intermittent, as in this case, further reductions in internal noise limits should be provided to account for the greater

potential for disturbance from these sources. Alternatively, glazing which has sufficient acoustic qualities to address any tonal content to noise sources should be provided.

- 2.22. Although not strictly applicable to construction noise for reasons as described above, it is considered that achievement of 30dB  $L_{Aeq,T}$  and 45dB  $L_{Amax}$  in bedrooms during both the daytime and night-time periods should allow a reasonable level of residential amenity to be provided for future residents. Based upon the predicted construction noise level for months 31 to 33 presented as Figure 2 of 70 to 85dB  $L_{Aeq,1\text{ hour}}$  the façade of the proposed structures would need to provide a performance of 40 to 55dB  $R_{w+ctr}$ , such an acoustic performance would be difficult to achieve from the lightweight modular construction proposed. In addition, it is likely that high performance acoustic glazing units would be required. Waterman's experience is that such units are available up to circa 50dB  $R_{w+ctr}$  beyond which bespoke façade systems would be required. Mechanical ventilation and potentially comfort cooling would also be required in order to minimise the requirement for residents to open windows for ventilation and cooling.
- 2.23. We would also note HNP's concern for the wellbeing of night workers located in the areas around the WNDA. At Table D6-32, it states:

*"Horizon is committed to a voluntary Local Noise Mitigation Strategy (LNMS) ... Night workers, those needing a particularly quiet home environment to work in, or those that have a medical condition which will be seriously aggravated by construction noise, will also be considered on a case by case basis."*
- 2.24. It is therefore accepted by HNP that night shift workers have the potential to be sufficiently disturbed by the construction work at the WNDA such that they would consider improving sound insulation to existing properties or temporary relocation packages. It seems unusual that they would not take the same considered approach to the wellbeing of their own shift-working contractors and are seeking to locate them as near to noise generating activities as possible.
- 2.25. In relation to external noise at the Site Campus, no mitigation is recommended because the impacts were not assessed in the first instance. Given that the external noise levels will be far in excess of the recommended limits, this is a significant omission from the ES chapter. Mitigation requirements would be substantial and, if large scale acoustic barriers are required, they should have been proposed and assessed as part of the application and the visual impacts considered as well as their acoustic properties.
- 2.26. We would also note that HNP's proposed strategy for the delivery of the Site Campus as 'top up' accommodation, to be delivered as and when required, would exacerbate the potential problems of noise and vibration impacts on construction workers as construction of later phases of accommodation continues around those already in residence.

## **Vibration**

- 2.27. In relation to vibration at the Site Campus, the ES states at paragraph 6.5.30:

*"One of the Site Campus buildings would be within 2m of zone 11, where the telescopic leader rig with hydraulic vibratory hammer would be used. If the hydraulic vibratory hammer were to be used within 13m of the building there could be a large magnitude of change, which would be considered a major adverse effect which is significant."*
- 2.28. In order to mitigate the effects of vibration, the ES states in Table D6-32, that:

*"Horizon would undertake a vibration risk assessment as part of the Section 61 application for any construction activity involving vibratory or impact equipment to be used on the Main Site. This assessment would establish safe working distances for receptors in relation to construction vibration. This would ensure that any equipment that is identified as having potentially adverse*

*vibration effects can be located sufficiently away from any sensitive receptors, so that any effects on such receptors can be reduced to negligible. “*

2.29. These conclusions suggest that all impacts would be reduced to negligible and, indeed, the summary of residual effects does not list vibration effects at all, suggesting that they have been fully mitigated. However, the second part of the paragraph in Table D6-32:

*“Where works are required within the safe working distances, alternative equipment or working methods would be investigated and vibration levels would be reduced to the greatest extent practicable.”*

2.30. This is clearly not a commitment to avoiding all vibration impacts to the extent that they become negligible and it is therefore misleading to refer to the impacts following the application of mitigation as negligible and to exclude them from the summary of residual effects. It is highly unlikely that any mitigation measures could reduce an impact of major significance to negligible on a receptor that is just 13m away from the source of the vibration.

### **3. Summary and Conclusions**

3.1. It is our view that the methodology for the assessment of noise and vibration at the Site Campus is deficient in terms of the baseline data gathered, the assessment methodology used and the mitigation measures proposed.

3.2. The baseline noise conditions at the Site Campus location have been assumed and not subject to any survey. Residential premises over 1km from the noise source that is adjacent to the Site Campus has complained about noise from the existing Wylfa transformers. Despite this, the noise levels at the Site Campus, adjacent to the Wylfa transformers, has been assumed to be low. Even before construction related noise has been taken into account, the existing noise from the transformers could present a constraint to the use of this site for the Site Campus and further analysis is required.

3.3. The approach taken to the assessment of construction noise impacts at the Site Campus has been based on guidance recommended for anonymous noise sources such as road traffic, rather than the specific methodology for noise from construction activities recommended in TAN11. All other receptors besides the Site Campus were assessed using the appropriate method and no reason has been given for this inconsistent approach.

3.4. Reference to Noise Exposure Categories is inconsistent with the assessment of construction related noise, but may have been used in an attempt to justify the location of the Site Campus in an unsuitable noise environment on the basis that no alternative sites exist, according to HNP's Site Selection process. It is noted that the Site Selection process did not assess sites on the basis of the noise environment and therefore this is a moot point.

3.5. In terms of mitigation for noise at the Site Campus, no details of the design measures and their noise reducing properties are given but the impact has been assumed to reduce from Major Adverse to Negligible through their application. If the correct assessment methodology had been used, the amount of mitigation required would be even higher than that already accepted by HNP and it is questionable whether internal noise levels in accordance with WHO guidance could be achieved through design alone as there could be a requirement to reduce internal noise levels by around 50dB, which would be difficult to achieve.

3.6. In terms of the vibration assessment, the ES suggests that mitigation measures would be delivered to reduce an identified major adverse effect to negligible, whilst at the same time conceding that this may not be possible, and that mitigation would be delivered to the greatest extent possible.

This is not a firm commitment and it is therefore likely that vibration associated with works at Zone 11 on the Site Campus would represent a significant issue for shift workers.

- 3.7. In conclusion, the noise and vibration anticipated at the Site Campus indicates that the site is unsuitable as a location for Temporary Worker Accommodation and that more analysis and detail on mitigation measures is required in order to prove otherwise. In the absence of such additional evidence the application should not be approved with the Site Campus in its current form.