

**TRANSPORT AND WORKS ACT
TRANSPORT AND WORKS (APPLICATIONS AND OBJECTIONS PROCEDURE)
(ENGLAND AND WALES) RULES 2006**

NORTHUMBERLAND LINE

**PROOF OF EVIDENCE OF RICHARD HINTON BSc (Hons) MIOA
ON BEHALF OF THE BERNICIA GROUP (OBJ 25)**

12th OCTOBER 2021

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1 Witness information

- 1.1 My name is Richard Hinton, Associate Director at Apex Acoustics Limited.
- 1.2 I am a Corporate Member of the Institute of Acoustics and I hold a Bachelor of Science degree (1st Class with honours) in Acoustics, awarded by the University of Salford in 2008.
- 1.3 After graduating I worked at WYG (now part of Tetra Tech Group), Leeds, from July 2008 to June 2009 as an Acoustic Consultant undertaking noise assessments to support planning applications and internal acoustic design for health and educational buildings.
- 1.4 From June 2009 to June 2010 I worked as an Acoustic Consultant for Miller Goodall Environmental Services, Bolton. As well as continuing the types of projects undertaken at WYG, I provided advice to Salford Council Planning on noise issues related to Planning Applications.
- 1.5 Since joining Apex Acoustics in June 2010 I have completed Acoustic Consultancy services for the full range of projects, including assessment of noise impact from new road schemes, internal acoustic design for residential / health / educational / commercial developments, and noise impact assessments for residential / commercial / industrial developments.
- 1.6 In 2017 I was presented with an award by the Association of Noise Consultants for Good Acoustic Design for a circa £45m development in Swanley, Kent, where a residential scheme immediately adjacent to an industrial paper mill was granted planning permission with agreement from the Local Authority Environmental Health Officers, the paper mill, and their acoustic consultant.

2 Summary

- 2.1 My evidence covers the noise effects from both the operation and construction of the Northumberland Line.
- 2.2 I review the noise impact assessment provided to me by AECOM, and have overseen additional assessment to determine the likelihood that the proposals associated with the Northumberland Line result in a diminished quality of life to the residents of the sheltered accommodation, Sleekburn House, Bedlington.
- 2.3 The following three main issues are covered in my evidence:
- Public Address announcements as a result of the new station;
 - Ambient noise changes due to additional train movements; and
 - Construction noise or vibration activities.
- 2.4 The standard used by AECOM to assess the Public Address System is not appropriate, and my assessment highlights that when using this standard the noise impact is likely to be higher than that reported by AECOM. As such a lower noise level target is likely needed to ensure Sleekburn House residents are not disturbed by the system. I have highlighted that consideration of the audibility and number of individual announcements inside Sleekburn House should be considered in determining likely impact. On this basis I have identified that Public Address sound is likely to be heard when windows are closed when the background noise in the room is low i.e. when resting or sleeping, and it is likely that residents will have to keep their windows closed most of the time because of this noise source. Mitigation measures to the Public Address system has been considered by AECOM, however, no quantitative evidence is provided to demonstrate the measures are sufficiently robust to avoid adverse impacts. I have noted that it is questionable if sufficient attenuation can be achieved, considering the Network Rail requirements for the system to be intelligible against background sound.
- 2.5 The change in the ambient noise environment including noise events associated with the increase in train movements is assessed to likely result in occupants of Sleekburn House having to keep their windows shut some of the time to ground floor rooms and most of the time to first floor rooms due to train events. When considering the need to close windows because of Public Address announcement and train events, the duration windows need to be closed would increase significantly compared to that under current acoustic conditions and therefore results in a diminished quality of life to that currently experienced. At present there is no information on the proposed ventilation treatment measures, or quantitative assessment to demonstrate the

proposed ventilation treatment is sufficiently robust to avoid adverse impact on Sleekburn House residents.

- 2.6 In regards to the construction period, conflicting information has been provided on the duration of the works for which the most recent information is not the basis for AECOM noise assessment submitted with the Planning Application. There is no quantitative evidence provided at present to demonstrate that the qualitative mitigation measures outlined by AECOM are sufficiently robust to avoid a significant adverse impact on Sleekburn House residents during the previously proposed, or the currently proposed construction period.

3 Introduction

- 3.1 I am commissioned by Bernicia Group to review the potential noise impact on Sleekburn House, Bedlington as a result of the Northumberland Line proposals.
- 3.2 Bernicia Group have raised concerns that the delivery of the Line as presently indicated will have a significant impact upon their residents at Sleekburn House. Sleekburn House comprises sheltered accommodation and includes 29 one-bedroom flats, of which 15 have windows with an outlook towards the secluded garden area and the existing railway line. Bernicia Group's Evidence further describes the profile of residents, to put into context the likelihood of increased noise sensitivity of this vulnerable group.
- 3.3 A noise impact assessment has been completed by AECOM, dated 18th January 2021, on behalf of the applicant Northumberland County Council. This assessment has been completed in support of the Planning Application 21/01106/CCD. This report has been presented to Apex Acoustics for review, in addition to their environmental noise model and associated General Arrangement and Section drawings dated 14th May 2021. The report can be found in Appendix A, and the drawings referenced in my evidence can be found in Appendix B.
- 3.4 The noise assessment covers potential noise and vibration impacts due to the increase in passenger trains, the public address (PA) system, changes in traffic flows and construction activities. The noise modelling provided covers the noise impact from new passenger trains and the parking lot. PA noise modelling has been undertaken by Acoustics Plus Limited on behalf of Kilborn Consulting, with relevant sections of the report appended to the AECOM report. No noise modelling has been carried out for potential construction activity impacts.
- 3.5 The surveyor SLC Property acting on behalf of Northumberland County Council has provided a revised land holding drawing as completed by AECOM, dated 2nd September 2021. This drawing indicates a potential change in noise barrier location to that of the general arrangement drawing dated 14th May 2021, with my comparisons

shown in Appendix B. At the time of writing, an updated noise impact assessment based on the current proposals had not been provided to Bernicia. An email from AECOM has been received on 7th October 2021 in response to this matter, as shown in Appendix C. AECOM note there are only minor changes to the noise impact, of which are unlikely to impact on the results presented in this evidence. Due to the time constraint of the submission of this evidence on the 12th October 2021, it has not been possible to review these changes to their updated noise model, or changes to any drawings as a result of this.

- 3.6 Notwithstanding the recent provision of noise data to Bernicia there presently exists significant inconsistencies between the information formally submitted by Northumberland County Council in support of its planning application and that more recently provided. Bernicia expressly reserves its position and right to respond in the event that further submissions or changes are made by Northumberland County Council.

4 Survey data

- 4.1 Baseline noise survey monitoring was undertaken by AECOM from Friday 25th September to Thursday 1st October 2020 at one location in the garden of 26 Blenheim Drive, Bedlington, with results presented in Section 5 of their report. The report considers the measurement position to be representative of existing noise levels at the ground floor level of Sleekburn House.
- 4.2 No noise measurements are reported within Sleekburn House, or for the purpose of quantifying the sound insulation performance of existing glazing and ventilation provision. For the assessment of noise impact on the internal conditions within Sleekburn House, AECOM have assumed an attenuation of 15 dB for a partially open window and 33 dB for a closed window, with guidance of BS 8233: 2014, Reference 1. This is without consideration of the noise via any trickle ventilation openings, or how the windows are used as part of the ventilation strategy at Sleekburn House.
- 4.3 Additional noise survey data has been obtained on my behalf by my colleague Dr Weigang Wei PhD MIOA of Apex Acoustics, and I have undertaken analysis of the data to:
- Determine existing noise levels specific to the Sleekburn House location;
 - Determine sound insulation performance of a partially open window; and
 - Determine the sound insulation performance when windows are closed.
- 4.4 The results of the noise survey, my observations of the existing sound climate and comparisons with AECOM data are presented in Appendix D.

- 4.5 I have analysed the external ambient noise data obtained by my colleague, and the data is reasonably comparable to that provided by AECOM. As such both sets of data are considered suitable for informing the assessment of noise impact.
- 4.6 I have analysed the measured internal and external noise levels with the top hung windows open by 135 mm at the lower edge to determine the noise attenuation provided. The results are:
- Ground floor window: 13 dB attenuation;
 - First floor window: 11 dB attenuation
- 4.7 The measured sound insulation performance under an open window condition is lower than that assumed by AECOM, and therefore these values are used to inform my assessment. The difference in attenuation between floors is likely due to the top hung window arrangement; as illustrated by the figures in Appendix D, the open area of the window to the first floor has increased line of sight to the tracks, and therefore has a reduced performance compared to ground floor windows.
- 4.8 My analysis of the measured performance of a typical closed window arrangement, with trickle ventilator open for normal use, indicates a worst case attenuation of 26 dB. Due to the relatively low external ambient noise levels, and background noise within the flat, there is some uncertainty with this value and the performance may be higher. As such, it is considered the attenuation could be between the measured 26 dB and the AECOM assumed 33 dB as a worst and best case scenario respectively. Further measurements including a loudspeaker to generate sufficient levels above background sound may be necessary for any further investigation to determine accurate performance levels, when determining if further sound insulation treatment is necessary as part of a mitigation strategy.
- 4.9 The findings from the appended survey are used to inform the three main issues I present evidence upon.

5 Public Address (PA) system announcements

- 5.1 The noise assessment undertaken by Acoustics Plus Limited sets out the requirements for the PA system, assessment methodology and results at Sleekburn House, and is assessed and summarised further by AECOM.
- 5.2 It is identified in the report that there is no specific legislation or guidance relating to the assessment of noise from PA announcements. London Underground guidance document G-148 Manual is cited as an example of where the standard BS 4142 is applied. It is my understanding that this guidance was originally written pre-2014.
- 5.3 Whilst BS 4142: 1997, Reference 2, did not specifically exclude the assessment of public address systems, the updated BS 4142:2014, Reference 3, clarifies the scope

- and states very clearly in Paragraph 1.3 that *“the standard is not intended to be applied to the rating and assessment of sound from: g) public address systems for speech”*.
- 5.4 Therefore it is clear that the standard is not suitable for determination of the significance of noise from this sound source.
- 5.5 I have also reviewed the suitability of the results presented in the BS 4142 assessment, in terms of appropriateness for defining noise limits. On the basis of the noise source data presented in the AECOM report, I have undertaken my own assessment following the principles of BS 4142, with results shown in Appendix E.
- 5.6 Without noise mitigation, AECOM conclude the noise impact would result in “significant adverse impact”. My assessment does not disagree with this conclusion.
- 5.7 BS 4142 defines a process for determining a Rating level. A Rating level is the specific sound level of the source under assessment with corrections applied to take account of the characteristic features of the sound. The standard provides guidance on the correction to be applied in decibels for features including tonality, impulsivity, intermittency and any other readily distinctive characters.
- 5.8 The significance of a sound impact is dependent on the margin by which the Rating level of a source exceeds background sound (when the source is not present), and context in which the sound occurs. Pertinent factors of context include, the absolute level of sound, the character of existing sound environment compared with the new sound environment and sensitivity of the receptor under assessment.
- 5.9 In regards to the determination of the Rated level, my key findings are that no consideration has been provided to the context of the absolute sound level and the sensitivity of the receptor. The acoustic feature penalties adopted for “just perceptible” features are also found not to be appropriate, and that acoustic features would likely be at least “clearly perceptible” or “highly perceptible” for the daytime and night-time periods respectively. This results in a Rating sound impact level that is + 13 dB greater than that report by AECOM. This means that a significantly greater level of attenuation than that stated in the AECOM report is likely required to reduce the external noise to a level that does not cause observed adverse effect on the occupants of Sleekburn House.
- 5.10 There are no indoor noise guidelines on acceptable levels for a sound source of this type. AECOM reference the indoor noise limit guidelines of BS 8233: 2014 and determine indoor time-weighted daytime (07:00-23:00) $L_{Aeq,1\text{ hr}}$ and night-time (23:00-07:00) $L_{Aeq,15\text{ min}}$ BS 4142 specific sound levels, and compare these against the BS 8233 targets.
- 5.11 Paragraph 7.7.1 of BS 8233 states that the guideline limits *“applies to external noise as it affects the internal acoustic environment from sources without a specific*

character...”, and a supporting note to the paragraph states “Noise has a specific character if it contains features such as a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content, in which case lower noise limits might be appropriate.”.

- 5.12 A shorter $L_{Aeq,T}$ reference time interval is also considered more appropriate for this source, considering Note 2 to Paragraph 7.7.2 of BS 8233 which states a shorter interval should be considered where *“local conditions do not follow a typical diurnal pattern...”*.
- 5.13 AECOM have recognised the scope of this standard, but have not provided any assessment to determine if a lower noise limit might be appropriate, considering the specific character and features associated with a PA system announcement, and with regard to the audibility of the sound and sensitivity of the Sleekburn House residents.
- 5.14 AECOM identify that the time-weighted daytime $L_{Aeq,1hr}$ and night-time $L_{Aeq,15min}$ specific sound levels are below the BS 8233 target criteria, but considering that the scope excludes sources with character and there is a lack of specific guidance on what a suitably lower noise level may be, they conclude it is more appropriate to consider BS 4142. As I note in para. 5.3, it is also outside the scope of BS 4142 to assess this sound source.
- 5.15 Considering that noise disturbance would occur indoors and not outdoors, it is considered appropriate that sufficient consideration is given to the likelihood that the PA sound may be heard internally, and cause a change in behaviour, attitude or other physiological response; these are terms consistent with those presented in the noise exposure hierarchy table contained within Planning Practice Guidance Notes on Noise, Reference 4, and reproduced by AECOM in Table 3 of their report.
- 5.16 When considering if the noise may be heard, and how it may relate to the example outcomes in the noise exposure hierarchy table, it is necessary to consider the absolute sound level of each event, not the time-weighted sound level described by BS 4142.
- 5.17 It is identified from the AECOM and Acoustics Plus assessment that the absolute sound level from the PA system outside Sleekburn House ground floor façade would be 61 dB(A), that is 10 dB higher than the reported time-weighted levels that inform their BS 4142 assessment. This sound level applies to ground floor level, and the assessment assumes the same level applies at first floor level; this cannot be validated with the information provided. Based on the Sleekburn House façade sound insulation measurements presented in Appendix D, I have calculated the potential absolute sound level due to the PA within the flats located to the elevation towards the railway

- station. The calculated indoor noise levels, and assessment of those levels is detailed in Appendix F.
- 5.18 When the windows are closed and trickle ventilators open, the internal noise level is calculated to be a worst case 35 dB(A). At this level, and considering the character of sound, it is likely sound can be heard in particular at night, or when occupants are resting during the daytime and there is no background noise from televisions or other internal sound sources.
- 5.19 When the windows are partially open, the internal noise level due to a single announcement is calculated to be 50 dB(A) at first floor level, and 48 dB(A) at ground floor level. The PA announcements would be clearly perceptible at this sound level.
- 5.20 It is understood the occupants of Sleekburn House currently have the ability to open windows for connection to the outside environment. As there is currently only a small number of high noise freight train events as identified in Appendix D and no other noise events such as PA systems, they can open the windows most of the time without risk of adverse noise impacts.
- 5.21 From a ventilation perspective open windows are currently utilised to provide purge ventilation as described by Approved Document F, Reference 5. That is, manually controlled ventilation of rooms or spaces at a relatively high rate to rapidly dilute pollutants and / or water vapour as released from occasional activities, such as painting and decorating or accidental releases such as smoke from burnt food or spillage of water. In particular, Sleekburn House residents hang washing within their flats, and utilise open windows for providing increased ventilation to prevent condensation and mould; this activity can happen often, and for long periods of time. Given the low number of train events currently, that occur for a short period of time, there is a low risk of noise impact when opening a window for this purpose. This risk would increase with the number of noticeable noise events.
- 5.22 Approved Document F of The Building Regulations states that background ventilators are sized for the winter period, and that additional ventilation may be required during warmer months and it is assumed open windows could be used. It is not known if the trickle ventilators at Sleekburn House have been sized such that open windows should be relied upon for providing regulatory minimum whole dwelling ventilation rates in summer months. If this is the case, windows may need to be opened for long periods in the summer to provide what is described by Approved Document F as “*whole dwelling ventilation*” provision. An increase in noticeable noise events would mean the likelihood of an adverse impact increases when windows are open, compared to existing.

- 5.23 Open windows are also currently used to provide thermal comfort in warmer summer months; this is currently not controlled by the Building Regulations. The period of time a window may need to be open per annum is unknown; this could be determined by a CIBSE TM59 overheating assessment, Reference 6. There is a greater risk open windows may need to be provided for long periods of time resulting in longer periods of noise exposure, and during more sensitive activities e.g. sleeping or resting. This presents the risk to residents of deciding between two adverse impacts; keeping windows closed and being too hot / receiving poor ventilation, or exposure to high noise levels with windows open. As there are not many high noise events currently, the risk of not being able to open the window is low.
- 5.24 The effects of transportation noise during this condition are described further by the Acoustics, Ventilation and Overheating Residential Design Guide (AVO Guide), Reference 7. My colleagues Jack Harvie-Clark and Nick Conlan of Apex Acoustics were major contributors to this guidance document. This guidance is considered in Section 6 of my evidence.
- 5.25 AECOMs response to Bernica's Objection to the Planning Application, as shown in Appendix C, states: *"The mitigation measures to Sleekburn House have been discussed with the Northumberland County Council Environmental Health Officer, who has recommended that the currently installed trickle ventilators are surveyed to confirm that they provide adequate background ventilation as per the requirements of Part F of the Building Regulations. Assuming that this is the case, opening these ventilators will provide adequate ventilation to the building for most of the time, with windows only needing to be opened to provide purge ventilation."* No reference is made to noise conditions when open windows are required for thermal comfort, and there is no consideration of the impact when purge ventilation is needed. There is also no consideration of the use of opening windows for other non-ventilation purposes i.e. occupants choosing to open windows for a connection to the outside environment. No detail has been provided on the details of the ventilation survey, but I would accept this should also determine if the ventilators have been sized appropriately for the summer condition as discussed in my evidence, paragraph 5.22.
- 5.26 It is reported that PA events may occur for 30 seconds every 5 minutes. That is 12 PA events per hour, and a potential for 192 events in a 16 hour daytime period (07:00-23:00). So as well as additional noticeable train movements (assessed in Section 6 of my evidence) and potential other associated sounds e.g. level crossing warnings, the frequency of noise events has increased substantially. It is noted there is no assessment provided in the AECOM report for increased level crossing warnings, so the impact of this source is currently unknown.

- 5.27 Considering this substantial change in noise events and that sound can be clearly heard with the PA system being the most significant source, the change in acoustic environment it is likely to lead to a change in behaviour, attitude or physiological response e.g. sleep / rest disturbance, and occupants having to keep windows closed most of the time because of noise. The noise risk is considered greater in summer months when there is an increased risk of occupants having to decide between being too hot or having poor ventilation with windows closed, or exposing themselves to a high noise impact with their windows open.
- 5.28 As a result, quality of life to Sleekburn House residents is diminished due to change in the acoustic character of the area, with the PA system announcements being a significant change to that character. I relate this to the Planning Practice Guidance noise exposure hierarchy table that describes this response as *“present and distributive”*, and a *“significant adverse effect”* which should be avoided.
- 5.29 To mitigate the potential for significant adverse impact, AECOM have outlined general considerations for how the noise might be mitigated, as detailed in Section 4.2 and in Section 7.3 of their report.
- 5.30 Section 7.2 of the AECOM report assumes the proposed 3.5 m noise barrier reduces PA noise by 5 dB, should it at least partially block line of sight to the receptor. The Acoustic Plus assessment identifies the PA system is to be mounted on lighting posts at a height of 2.8 m. The specific location has not been provided to me, but it is assumed this will be from platform level. Based on the section drawings provided to me, with an excerpt shown Appendix B, the bottom of the noise barrier is approximately 0.9 m below the platform level, and therefore the top of the noise barrier is 2.6 m above platform level. Therefore, the speaker is likely to be above the noise barrier height with potential for line of sight in particular to first floor windows of Sleekburn House. Therefore, a 5 dB attenuation provided by the barrier is questionable subject to further evidence.
- 5.31 Despite the barrier benefit, AECOM state in Section 7.3 of their report that *“Assuming the PA system sound reductions discussed in Section 7.2, significant adverse impacts are still anticipated at R1, R2, R8 and R9 during the day and night.”* Sleekburn House is receptor “R1”. I do not disagree with this statement, given the noise impact levels presented. A significantly larger attenuation than 5 dB is likely required to reduce the impact to acceptable levels, considering both the AECOM assessment and my own review.
- 5.32 Other mitigation considerations outlined by AECOM include limiting times, noise levels, system control measures and other best practice measures.

- 5.33 I do not disagree that the measures discussed may provide benefit. However, there is no quantitative evidence presented at present to demonstrate the measures are sufficiently robust to avoid adverse impact on Sleekburn House residents. It is questionable if sufficient attenuation can be achieved considering the Network Rail requirements for the PA system, and that it has to be intelligible against background sound to serve its purpose.

6 Additional train movements

- 6.1 The AECOM assessment identifies that a high impact is anticipated due to the changing ambient sound $L_{Aeq,16\text{ hr}}$, and indoor noise guidelines would be exceeded without noise mitigation. A significant increase in train movements contributes to the changing ambient sound, amongst the other sound source discussed.
- 6.2 A 3.5 m high noise barrier between Bedlington Station and Sleekburn House has been proposed to reduce the noise impact, in addition to an acoustically absorbent lining to the trackside surface of each platform. I note, I could not see this absorbent lining attributed within the AECOM noise model, and I am unclear on the exact proposals and benefit.
- 6.3 As a result of the mitigation, AECOM assess the reduced noise impact against BS 8233 guideline indoor noise targets, and note that when windows are kept closed noise levels would be below the limits set out in BS 8233. It is recognised that it is not known if the occupants of Sleekburn House need to open their windows to provide adequate ventilation.
- 6.4 The use and noise risks associated with open windows at Sleekburn House has already been discussed in paragraphs 5.20 to 5.24, and is also relevant to the assessment of noise significance as a result in the increased number of train noise events.
- 6.5 Currently a low number of train events occur. AECOM identify between 0 and 10 events per day and 2 events per night. From my analysis in Appendix D, I identify 6-7 events during the daytime hours of 07:00-23:00, and 1-2 trains between 06:00-07:00 hours only. No trains occur during the remainder of the night-time period, defined by noise guidance as 23:00-07:00. As such due to the low number of existing event identified by both surveys, occupants have the ability to open windows most of the time without exposure to high noise event levels.
- 6.6 To determine the noise impact of the proposed additional 60 passenger train movements during the daytime (07:00-23:00) and additional 6 passenger train movements during the night-time (23:00-07:00) as shown by the timetable provided by AECOM in Table 1 of their report, I have undertaken assessment of the likely indoor ambient noise levels with windows open and closed as detailed in Appendix D. The calculation of indoor noise levels are undertaken based on the existing sound

insulation data presented in Appendix B. My assessment of significance under the open window condition is assessed according to the AVO Guide, as previously referenced in paragraph 5.24 of my evidence. This is currently the best available guidance that considers transportation noise risks and ventilation and overheating needs.

- 6.7 When windows are closed, and the trickle ventilator is open for normal use, the daytime and night-time noise impact levels are below BS 8233 guidelines levels for daytime resting and night-time sleeping. The noise levels are not significantly below the guideline levels at first floor, and should the real noise be 3 dB higher than those predicted, the guideline levels would be exceeded; the uncertainty should be factored into determining suitable noise mitigating measures. Achieving these guideline levels may not totally mitigate the risk of occupants noticing the significant change in train events, which may only be feasible when inaudible to all. It indicates that noise could typically be heard, but there is lower likelihood that the noise would cause any change in behaviour, attitude or other physiological response which is typically the target for new build residential schemes adjacent to noisy transportation sound sources.
- 6.8 When windows are open, the calculated indoor ambient noise levels during the daytime are 42 dB $L_{Aeq, 16 \text{ hr}}$ at ground floor level, and 48 dB $L_{Aeq, 16 \text{ hr}}$ at first floor level. During the night-time the calculated indoor ambient noise levels are 36 dB $L_{Aeq, 8 \text{ hr}}$ at ground floor level, and 42 dB $L_{Aeq, 8 \text{ hr}}$ at first floor level.
- 6.9 The assessment in Appendix G according to AVO Guide, indicates a medium noise impact at ground floor and a high impact at first floor.
- 6.10 For the ground floor, according to AVO Guide the example outcomes is: *“As noise levels increase, small behaviour changes are expected e.g. turning up the volume on the television; speaking a little more loudly; having to close windows for certain activities, for example ones which require a high level of concentration. Potential for some reported sleep disturbance. Affects the acoustic environment inside the dwelling such that there is a perceived change in quality of life”.*
- 6.11 For the first floor, according the AVO Guide the example outcome is: *“Avoiding certain activities during periods of intrusion. Having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area”.*
- 6.12 Given the significant increase in noticeable train events, from what is currently typically 10 per day as a worst case, to 4 train movements per hour as typical worst case, and based on the $L_{Aeq,T}$ noise level significance identified by AVO Guide, the change in acoustic environment is likely to result in occupants of Sleekburn House

- having to keep their windows shut some of the time to ground floor rooms and most of the time to first floor rooms due to train events. The duration windows need to be closed to ground floor is expected to be greater to that currently experienced, due to the significant increase in audible train events.
- 6.13 AECOMs response to Bernicia's objection to the Planning Application, as shown in Appendix C, states: *"With windows open, the internal noise levels are anticipated to exceed the adopted criterion; however, as discussed above, this should be a relatively infrequent occurrence."* My evidence above disputes this to be an infrequent occurrence.
- 6.14 Restricting use of opening windows reduces the resident's connection to the outside environment, and could have consequences for the Sleekburn House ventilation and cooling strategy. The connection to the outside environment may be a significant loss to the residents, given the occupants are elderly and spend most of their time within the accommodation. As a result, quality of life to Sleekburn House residents is diminished due to change in the acoustic character of the area.
- 6.15 AECOM note that where ventilation needs to be provided with open windows, mitigation could be offered to install an alternative ventilation method to noise-sensitive rooms to first floor level. My results indicate that it is not just first floor level affected, but ground floor too. No reference is made in the AECOM report to providing alternative overheating mitigation, but this condition is likely to give rise to high risks of adverse impact due to the duration which overheating may typically occur. Likewise for the Approved Document F *"whole dwelling ventilation"* condition, if trickle ventilators at Sleekburn House are currently sized for the *"winter condition"*.
- 6.16 Whilst alternative mechanical ventilation and cooling provision may mitigate the frequency the windows need to be opened from solely a ventilation and overheating perspective, there is potentially a greater risk to the residents of Sleekburn House due to the noise generated by new mechanical ventilation systems. Due to the high air flow rates typically required to provide purge ventilation or cooling, this generates high fan noise levels which could lead to greater adverse impact than the noise from the trains when windows are open. The AVO Guide outlines guideline upper noise limits for ventilation services noise, but satisfying these levels does not guarantee complaints won't be received from residents. In my experience of assessing noise from such systems, it can be difficult to achieve these targets and maintain the levels of acceptable noise in the future.
- 6.17 At present there is no information on the proposed ventilation treatment measures, or quantitative assessment to demonstrate the proposed ventilation treatment is sufficiently robust to avoid adverse impact on Sleekburn House residents in the short term and long term.

7 Construction noise and vibration

7.1 The AECOM report identifies a construction schedule based on a 79-hour programme between 22:00 hours Thursday to 5:00 hours Monday. The works at the station are anticipated to last from October 2022 to February 2023. Given the duration and construction times at night, this has the potential to cause significantly adverse impacts on the residents of Sleekburn House.

7.2 Bernicia objected to the Planning Application, highlighting the hours of work are during “sensitive times”. The AECOM response was that *“This is a misunderstanding of the proposed construction hours, which, over the construction schedule, will be between 22:00 on Thursday and 05:00 on the following Monday, potentially including activities during both the daytime and night-time. This includes times which are typically considered less noise sensitive (e.g. during the day).”* The correspondence is shown in Appendix C. As works have the potential to occur throughout Thursday, Friday, Saturday and Sunday nights, this is considered a significant period during sensitive times when occupants would be sleeping. No information has been presented to demonstrate noisy activities will not occur during those periods.

7.3 Further information has been provided on construction periods by SLC Property. The email is shown in Appendix C, with relevant correspondence regarding Bedlington Station repeated below:

Bedlington: 3 months for car parks, 5 months for platforms, preceded by 2-3 months of demolition and site preparation/clearance works. The Park Terrace Car Park will be one of the last sites to be completed, as it is the intention of the contractor to utilise this land as a compound and will only complete construction once those cabins are removed. This means that the construction is likely to be spread over an 18 month window but construction **will not be continuous**.

7.4 This is a significant deviation from that assessed in the AECOM report, and as such any conclusions within that assessment cannot be considered as valid.

7.5 I reserve our position pending a definitive statement regarding the proposed construction programme.

7.6 In the AECOM report it is noted that where works are around 6 m from the nearest properties, of which Sleekburn House is closer in parts as shown by the drawings in Appendix B, that it is considered likely without additional mitigation beyond the Best Practical Means outlined in Section 4.1, the threshold values for construction noise would be exceeded, and it is possible moderate or major impacts due to vibration may occur. Considering the construction periods appear to be different to that assessed by AECOM, the significance of the impact is likely to be much greater.

7.7 Further measures are outlined by AECOM in Section 7.1 of their report including boundary acoustic barriers. A noise attenuation of up to 10 dB is claimed, but this is a

best case scenario. For example, the permanent 3.5 m high noise barrier provided to mitigate train noise only provides 5-6 dB attenuation.

- 7.8 A response by SLP Property to Bernicia's objection to the station Planning Application is shown in Appendix C. This response acknowledges *"there will be an increase in noise associated with construction and operation of a railway station at Bedlington. The only feasible and reasonable mitigation option is to erect a barrier to block the line of sight to the nearby Noise Sensitive Receptor (NSRs)."* The response references the 3.5 m high noise barrier assessed in AECOMs noise report to be providing mitigation. I understand from the report that this is for operation noise only, and no specification, location or quantitative assessment of the benefit of a temporary noise barrier is provided in relation to construction noise.
- 7.9 A noise and vibration impact assessment would need to be conducted considering the full scope and guidance of BS 5228-1, Reference 8, accounting for the current construction period as identified by SLC Property, the benefit of the proposed mitigation measures, and identify the eligibility for noise insulation or temporary re-housing as a worst case. In AECOMs response to the Bernicia Planning Objection, shown in Appendix C, they recognise the construction information is currently not available to make assessment to BS 5228-1 to determine if the threshold values would be exceeded. Considering the email from SLC Property, the construction information has clearly changed significantly since the AECOM noise impact assessment was produced for the Planning Application.
- 7.10 I do not disagree that all the measures discussed may provide benefit. However, there is no quantitative evidence provided at present to demonstrate the measures are sufficiently robust to avoid adverse impact on Sleekburn House residents during the previously proposed, or the currently proposed construction period. The sensitivity and vulnerability of the elderly residents would also need to be taken into account when considering the feasibility for noise insulation or temporary re-housing.

8 Statement of truth

8.1 I hereby declare as follows:

- This proof of evidence includes all facts which I regard as being relevant to the opinions that I have expressed and that the inquiry's attention has been drawn to any matter which would affect the validity of that opinion;
- I believe the facts that I have stated in this proof of evidence are true and that the opinions I have expressed are correct; and
- I understand my duty to the inquiry to help it with matters within my expertise and I have complied with that duty.

Richard Hinton

12th October 2021

9 References

- 1 BS 8233:2014: Guidance on sound insulation and noise reduction for buildings.
- 2 BS 4142: 1997 (withdrawn): Method for rating industrial noise affecting mixed residential and industrial areas.
- 3 BS 4142: 2014+A1:2019: Methods for rating and assessing industrial and commercial sound.
- 4 Department of Levelling up, Housing and Communities and Ministry of Housing, Communities & Local Government: Planning System Guidance – Noise. Published 6th March 2014. Updated 22nd July 2019. www.gov.uk/guidance/noise--2
- 5 HM Government, The Building Regulation 2010, Approved Document F. F1 Means of Ventilation. 2010 edition, incorporating 2010 and 2013 amendments.
- 6 CIBSE TM59: Design methodology for the assessment of overheating risk in homes, 2017.
- 7 Association of Noise Consultants (ANC) & Institute of Acoustics: Acoustics Ventilation and Overheating Residential Design Guide. January 2020. Version 1.1.
- 8 BS 5228-1:2009+A1:2014: Code of practice for noise and vibration control on construction and open sites – Noise.