Written Representation to the Examining Authority (ExA) regarding the Environmental Statement submitted by Tritax Symmetry (Hinckley) Ltd in respect of their proposed Hinckley National Rail Freight Interchange and with particular reference to Chapter 10: Noise and vibration

Deadline for receipt of Written Representations: Tuesday 10th October 2023

Unique Reference Number: 20040614

Introduction

This Written Representation is with particular reference to Chapter 10: Noise and vibration, reference: 6.1.10, revision 07 [APP-119] and its associated documents.

For reasons of clarity, and also as evidence, I have attached to this Written Representation an extract from my Consultation Response of the 7th April 2022 to Tritax Symmetry in respect of their PEIR Documents, together with their confirmation of receipt of same. You may need to redact some parts of this extract, from which I also quote.

For reasons of brevity, I have in this Written Representation used “Tritax” to refer to the contents of the Applicant’s Environmental Statement.

This Written Representation is a technically-based document that identifies and discusses several serious failures and shortcomings in Tritax’s Noise and vibration report.

Those of you who have read Tritax’s Noise and vibration report will know that there is no index, that the individual Sections, sub-Sections, and sub-sub-Sections are not numbered, and that the individual paragraphs are numbered consecutively from beginning to end and with no reference to the Section, sub-Section, or sub-sub-Section in which they lie. As a result, it is by no means easy to navigate the document or indeed to establish a clear overview of the path Tritax are treading.

In order that the failures and shortcomings that I identify in this Written Representation can be properly viewed in the context of Tritax’s report, I have prepared a simple Section-by-Section Index of Tritax’s report, as shown below. For reasons of accessibility, it uses the very minimum of technical terms.

I apologise that this Written Representation may appear in some parts rather dense, and quite different from what the Examining Authority might often receive from a local resident. In writing it, I have tried to bear in mind that those reading it may already be well acquainted with Tritax’s Noise and vibration report and have a strong technical background, but also that others may not have either advantage. So, where appropriate, I have given a little bit more in the way of explanation to try to make matters clear.

But Tritax have spun a fine web, and some issues are rather challenging to bring out clearly from their sometimes sprawling methodology without the use of detailed prose. Also, despite every attempt, some parts remain rather technical.

Dr David Moore

MA (Cantab) PhD

David Moore is a Chartered Engineer, and a Fellow of the Institution of Mechanical Engineers. He has some 25 years experience in Industrial Design Consultancy. Clients have included 3M, Procter & Gamble, GSK, London Underground, Johnson & Johnson, Ricardo, Monsanto, DePuy, AstraZeneca, BAE Systems, Unilever, Reckitt, Sanofi and Alstom. Now retired, his technical interests include Mechanical Design, Mathematical Modelling, Computational Fluid Dynamics and Digital Signal Processing.

Index

Chapter 10: Noise and Vibration ⑩ ⑪ ⑫

Section	Paragraph Number
INTRODUCTION	10.1 to 10.3
METHODOLOGY AND DATA SOURCES ⑨	10.4 to 10.82

This Section describes the process that was involved in defining the scope of the report, including the consultation process that was followed, and the definition of the geographical study area.

It identifies two assessments: that for Construction Noise and that for Completed Development Operation. For each of these it identifies British and other Standards and Guidelines that Tritax consider relevant, from some of which it imports basic information, principally concerning sensitivity to noise, which is then reproduced in the report mainly in the form of Tables.

It then goes on to identify some twenty-eight noise sensitive receptors, termed NSRs, that are mainly residences local to the proposed HNRFI site that Tritax consider sensitive to noise.

RELEVANT LAW, POLICY AND GUIDANCE	10.83 to 10.84

This short Section identifies National, Local and other Planning Policies, Standards and Guidance documents.

BASELINE CONDITIONS ① ②	10.85 to 10.113

This Section identifies six Noise Monitoring Positions (NMP1 to NMP6) and one Vibration Monitoring Position (VMP1) at which Tritax have performed noise and vibration monitoring respectively, mostly over a period of approximately one week.

NMP3, NMP4 and VMP1 were positioned close by the railway trackside. The remaining NMPs were positioned close by the sides of local roads.

The Measurement Equipment used to perform the monitoring, and the Meteorological conditions prevailing, are described.

The noise and vibration monitoring results are summarised in individual Tables for each of the six NMPs and for the single VMP1.

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS	10.114 to 10.272

This Section is split into two sub-Sections: Construction Noise, and Completed Development Noise.

Construction Noise 3 6 — 10.114 to 10.142

This sub-Section makes assumptions regarding the types and numbers of construction plant that will be used and their percentage on-time, and catalogues the plant in Tables, together with sound level data it has gathered together from published sources for each of the individual items of construction plant.

Then, it makes assumptions about the way that the work will be performed, and goes on to make dependent predictions of the resultant noise that would be generated.

These calculations are performed for each of four identified phases of the Construction work, for each of which Tritax consider their own "worst case" and "average" scenarios. These calculations are performed at the locations of some of the twenty-eight NSRs, and with general reference to BS 5228-1:2009+A1:2014 "Code of practice for noise and vibration control on construction and open sites" - Part 1: Noise.

The results of these calculations are then compared with the noise and vibration monitoring results measured at the six Noise Monitoring Positions (NMPs).

The noise from Construction Traffic is however not included in the above calculations and comparison. Rather, it is calculated separately, and is not compared directly with any of the noise and vibration monitoring results measured at the six NMPs.

Completed Development Noise 4 5 — 10.143 to 10.271

This sub-Section first predicts the "Completed Development" noise. Initially, this follows the same path as described above for Construction noise, in that it assumes the types and numbers of plant that will be used, their positioning on the site, and their individual sound level data, all of which is then tabulated as before. Further assumptions are then made about the way of working, and information is gathered to describe the layout of the buildings, roads and the topology of the Completed Site.

Then, rather than using BS 5228-1:2009+A1:2014 to predict the noise as was done previously, the data is instead input to the CadnaA noise simulation package as a noise model. Within CadnaA, the noise propagation option is selected as: ISO-9613-2-1996 "Acoustics – Attenuation of sound during propagation outdoors" - Part 2: General method of calculation.

Four such models are created, corresponding to "Weekday daytime", "Weekday night-time", "Weekend daytime" and "Weekend night-time" operations respectively.

The results from the four noise models are then compared with the Background noise levels (L_{A90}) deduced from the noise monitoring activities, in particular at the locations of each of the twenty-eight NSRs. The resulting Magnitudes of Impact are High at many of the NSRs.

Those same results from the noise models are then compared instead with the Ambient noise levels (L_{Aeq}) at the locations of each of the twenty-eight NSRs. The resulting Magnitudes of Impact are then much lower.

[Beyond this point within this sub-Section ***Completed Development Noise***, *a large number of sub-sub-Sections appear in turn. This is essentially because the four CadnaA noise models described above are incomplete, and omit various other on-site and off-site noises sources. Instead, these various omitted on-site and off-site noise sources and their respective additional Magnitudes of Impact are now predicted piecemeal. This was obviously done after the Magnitudes of Impact had been finalised for the "Completed Development" noise, and no retrospective changes were made.*

The methodology here appears labyrinthine at best. There is very little in the way of guidance or overview in the report, and what I write here has only been gleaned from lengthy study.

What I have done below is to list the sub-sub-Sections that appear to be most important, together with some brief indication as to their content. Although limited, I hope this will be of some help.]

Assessment of operational maximum noise levels 10.187 to 10.193

This predicts the maximum, L_{AFmax} , noise levels at the individual NSRs generated by the on-site Gantry Cranes and Reach Stackers. These *were included* in the noise models of the "Completed Development".

Noise from fixed plant, equipment and break-out noise ⑥ 10.194 to 10.205

This awards an *additional noise allowance* for the on-site fixed plant and equipment, which was omitted from the noise models of the "Completed Development".
Similarly, it also awards an *additional noise allowance* for the on-site gas-fired combined heat and power plant, which was also omitted from the noise models of the "Completed Development".

Noise from off-site rail movements ⑥⑦⑧ 10.206 to 10.212

This derives a baseline for existing train movements, and by factoring in the additional train movements caused by the Proposed Development, predicts the additional train noise that occurs around the site and along the length of the railway line.

Off-site road traffic noise impacts ⑥ 10.217 to 10.243

Using the CadnaA noise simulation package and a further noise model, this predicts the additional road traffic noise caused by the Proposed Development.

Assessment of tranquillity 10.255 to 10.271

This relates to the NSRs on the Local Nature Reserve of Burbage Common, the Site of Special Scientific Interest of Aston Firs, and Freeholt Wood.

PROPOSED MITIGATION ④⑤⑥⑦⑧ 10.272 to 10.341

This lengthy Section, and its many sub-Sections, first describes standard noise mitigation working practices, and then introduces three acoustic noise barriers into the CadnaA noise models. There is also some speculative and non-committal discussion concerning Gantry Cranes, to which it then applies a 10dB noise reduction.

It then essentially repeats the previous Section **POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS** in the same manner as described earlier.

This short Section briefly considers the separate individual effects after mitigation of the following: Construction - the “Completed Development” - Noise from fixed plant, equipment and break-out noise - Noise from off-site rail movements - Off-site road traffic noise impacts.

This short Section very briefly mentions several such possible effects, but considers them all insignificant except for a major, adverse effect at NSR1 due to noise from the new A47 Link Road that forms part of the Proposed Development.

This short Section considers that Climate change is unlikely to have an adverse impact on noise.

This Section summarises and tabulates the results of the Noise and vibration report.

This completes the Index.

Overview of the Written Representation

I go on now to identify and discuss many failures in Tritax's Noise and vibration report. I have listed them in numerical order, and as I have gone along I have, where appropriate, marked up Sections and sub-Sections of the Index to identify clearly those parts of the Noise and vibration report to which they refer.

As an example, in the Index I have marked the Section on **BASELINE CONDITIONS** with a 1.
As you may have noticed, there are many marks in the Index.

As I have progressed through the report, identifying several serious failures as I go, I have found that the effects of such failures progressively accumulate within the report until you reach a point where the conditions that the report is considering, and later goes on to investigate in yet further increasing levels of detail, become fundamentally wrong.

In general terms, this point is arrived at within the lengthy Section on **POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS** where the report suggests that the **Completed Development Noise** should be compared with the Ambient noise levels (L_{Aeq}) at the NSRs.

Nor indeed is this merely a matter of changed numbers. In order to address the true noise conditions, it is anticipated that quite different considerations would apply and different pathways would need to be followed.

In the main then, it therefore serves no real purpose in this Written Representation, and indeed is not meaningful, to focus on and examine matters of fine detail that appear in the later Sections of Tritax's report, as it seems inevitable that the majority will be washed away by the errors already made in the earlier stages.

So, for reasons of clarity, as well as brevity, and also perhaps to avoid this Written Representation appearing as a rant, I have refrained from making such comments in regard to the latter Sections of the report.

The later Sections of this Written Representation are therefore mostly of a more general nature, and refer to the whole of the Noise and vibration report.

1. Failure to Determine Baseline Conditions

At the beginning of their Section on BASELINE CONDITIONS, in paragraph 10.88, Tritax state:

“A baseline noise survey has been undertaken to determine the prevailing noise conditions at locations representative of NSRs associated with or in proximity to the Proposed Development.”

In paragraphs 10.88 to 10.98 Tritax introduce six Noise Monitoring Positions (NMPs), and state that they consider each to be representative of the existing local noise climate.

At the ***end of their Section*** on BASELINE CONDITIONS, in paragraph 10.105 onwards in Tables 10.20 to 10.25, Tritax summarise the noise measurement values they have obtained ***at each of the six Noise Monitoring Positions.***

So concludes their Section on BASELINE CONDITIONS.

The above means, of course, that their Section on BASELINE CONDITIONS fails to describe, or indeed even to mention ***how those values at those six Noise Monitoring Positions might be used to assess the prevailing noise conditions at each of the individual Noise Sensitive Receptors (NSRs).***

In order to see what eventually happens to these sound levels that Tritax measured at those Noise Monitoring Positions, we have to look forwards in the report to the Section on POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS, where the sound levels that have been predicted for the Completed Development at the each of the individual Noise Sensitive Receptors are compared with the existing noise levels at those same individual Noise Sensitive Receptors.

What we find there in the Section on POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS is that, rather than referring back to the Tables 10.20 to 10.25 in the Section on BASELINE CONDITIONS, the report instead introduces two new series of Tables. The first such series comprises Tables 10.39 to 10.42, which display background L_{A90} values. The second series comprises Tables 10.43 and 10.44, which display ambient L_{Aeq} values.

It is easy to miss it, but there is a ***fundamental difference*** between the source Tables 10.20 to 10.25 shown in the Section on BASELINE CONDITIONS, and the two new series of Tables 10.39 to 10.42 and Tables 10.43 to 10.44 shown in the Section on POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS.

The difference is that the source Tables 10.20 to 10.25 ***are described as the measurements at the Noise Monitoring Positions (NMP1 to NMP6).*** But the two new series of Tables 10.39 to 10.42 and Tables 10.43 to 10.44 are described as the ***prevailing noise conditions at each of the individual Noise Sensitive Receptors (NSR 1 to NSR28).***

When you try to compare the contents of the source Tables 10.20 to 10.25 to Tables 10.43 and 10.44 in particular, (these being the tables that display ambient L_{Aeq} values), you find that it is not possible to match up individual values in the two set of tables exactly. This is because the Tables 10.20 to

10.25 typically describe the noise data on each individual day, whereas in Tables 10.43 and 10.44 the noise data has been agglomerated into “weekday” and “weekend” periods. This is presumably done by some type of logarithmic averaging process, although this is not explained or indeed even mentioned in Tritax’s report.

Although it is clouded by Tritax’s agglomeration process, by dint of detailed examination it is quite easy to see that what Tritax have done is taken the L_{Aeq} measurements ***at the Noise Monitoring Positions*** from Tables 10.20 to 10.25 and essentially just copied them straight down into Tables 10.43 and 10.44, and then simply re-badged those Tables 10.43 and 10.44 as ***the Ambient conditions at the Noise Sensitive Receptors.***

This means, for example, that the sound levels L_{Aeq} measured at noise monitoring position NMP4 have been taken and directly imposed upon all of the Noise Sensitive Receptors NSR1, NSR2, NSR3, NSR4, NSR5, NSR6, NSR7, NSR8, NSR24, NSR25 and NSR26.

This is wrong, and is a flagrant, fundamental and extremely grave failing in Tritax’s Noise and vibration report.

It also, as we shall see, renders very much of the remainder of Tritax’s Noise and vibration report invalid, and makes Tritax’s Noise and vibration problem very much worse.

It contravenes every relevant Acoustic Theory.

It is in breach of every British Standard and International Standard.

It also defies common sense.

Because in conditions where the Ambient sound is strongly dependent upon a Specific Sound Source, both the Specific Sound and the Ambient Sound are strongly dependent upon the distance from that Specific Sound Source.

Were it not for the fact that this appears in an Environmental Study for a Strategic Rail Freight Interchange, Tritax’s approach here would be slightly comic. Because it means, for example, that Tritax believe that each one of the eleven NSRs mentioned above all actually experience the same ambient sound level, L_{Aeq} , as the Noise Monitoring Position NMP4 that Tritax placed close by the side of the railway track! Even though some of those NSRs are located in excess of 400 metres away from the railway track!

Or to put it more graphically, it effectively places each of those eleven NSR properties directly at the trackside!

Although the discussion above has referred only to the ambient sound level, L_{Aeq} , the same holds equally true for the maximum sound level, $L_{Amax,f}$, too. This is because both the ambient sound level, L_{Aeq} , and the maximum sound level, $L_{Amax,f}$, are both dependent upon the Specific Sound from the trains, which in both cases is attenuated over distance as it propagates from the track to the NSR.

But, to be clear, it does not apply in the same way to the background sound level, L_{A90} . This is because, by definition, the background sound level only depends upon those periods when the ambient sound is very small, which will inevitably be when there is no audible train close by. With no audible train close by, there is no Specific Sound Source, and so the issue of attenuation with distance does not arise.

As an aid to further understanding here, it is worth looking at the results obtained by Tritax from a single day's recording, as indicated in graphical form in Tritax's Technical Appendix 10.10 "Summary Results" [APP-184]. With reference to, say, page 36, which refers to NMP4 on Saturday the 24th April, the red points are the background values, L_{A90} , the blue points are the ambient values, L_{Aeq} , and the red crosses are the maximum values, $L_{Amax,f}$. Notice how both the ambient and the maximum values are greatly increased if one (or more) trains passes through during any of the 15-minute periods. In contrast, the background values appear unaffected, as they depend only upon those times when no trains are passing. All of this is in accordance with the above description.

In the last few paragraphs I have, for reasons of brevity, referred specifically to NMP4. However, the description and explanation that I have given also applies equally to all of the Noise Monitoring Positions NMP1 to NMP6, in respect of train noise or road noise as appropriate.

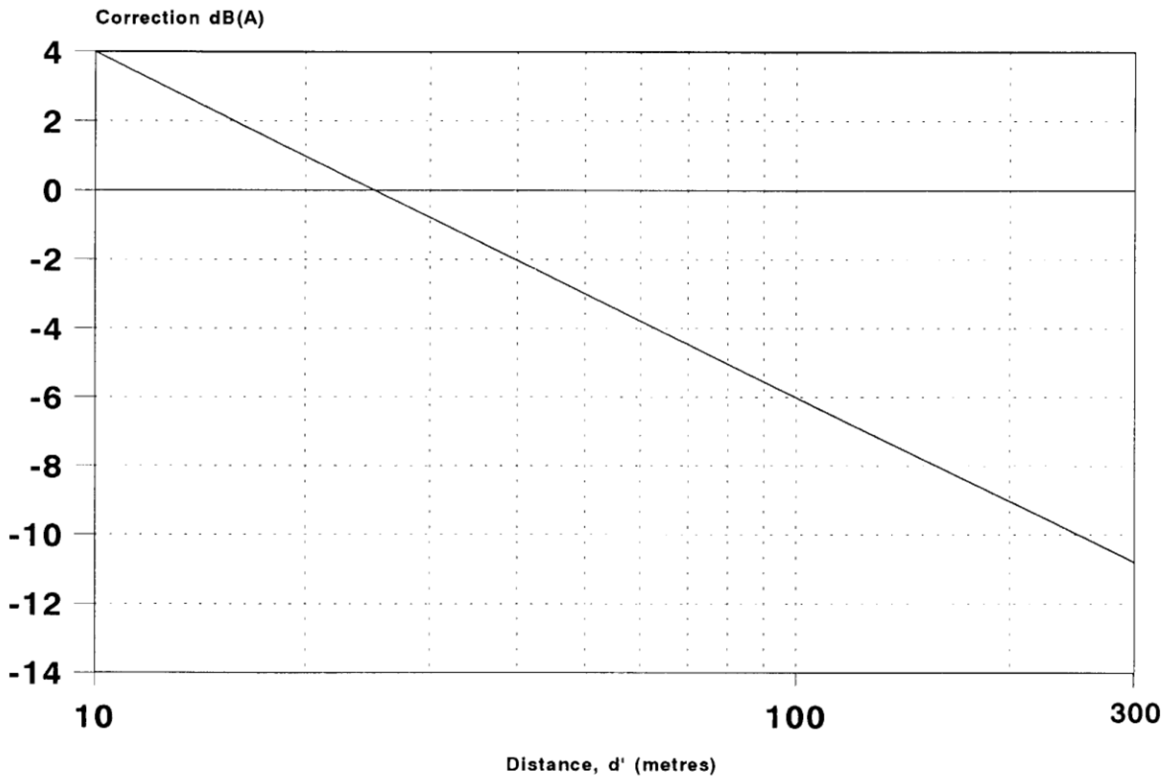
I have spent quite some time looking for yet other ways to depict and disprove Tritax's unaccountable method and behaviour. But, in the end, I have come to the conclusion that it is rather akin to trying to disprove that two and two equals five. In writing. And to someone who probably doesn't want to know.

Having now demonstrated that attenuation needs to be applied to the specific sound received at the NMPs in order to correct it to the specific sound experienced at NSRs some distance away, we need to identify some method that will indicate, for each of the individual NSRs, what that individual attenuation needs to be. Very appropriate documents here are the ubiquitous "Calculation of Railway Noise" (CRN), published by the Department of Transport in 1995, and "Calculation of Road Traffic Noise" (CRNT), published by the Department of Transport , Welsh Office, in 1988. These may be selected appropriately depending upon whether the NMP in question is beside a railway track or a road. Both indicate methods for calculating the attenuation of the specific sound over distance, based upon the distance, topography and conditions at the site.

Simple calculations I have performed in accordance with CRN with respect to NMP4 confirm that the rate of attenuation is such that, at some modest distance from the railway line, the ambient noise value, L_{Aeq} , falls very significantly compared with the ambient noise value that was measured at the Noise Monitoring Position NMP4. This is in accordance with the everyday experience of local residents, and indeed with common sense.

By way of illustration, I show below Chart 3 from CRN which indicates, in broad terms, how train noise is attenuated by distance.

CHART 3.
CORRECTION FOR DISTANCE, d'



Correction = $-10 \log_{10}(d'/25)$ dB(A) Valid for d' ≥ 10m

As an aid to further understanding what is happening here, it is worth looking again at Tritax's Technical Appendix 10.10, page 36, but considering too what we would see at such an NSR that is at some modest distance from the line. Considering first the ambient noise level, L_{Aeq} , indicated by the blue points, what we see on page 36 are the harsh peaks that occur at NMP4 that are caused by the passage of a train. In contrast, at an NSR at some modest distance from the railway line the harsh peaks due to the sound from the passing train would be very much attenuated, so that the blue line would be much smoother and correspond to an ambient noise level, L_{Aeq} , in the typical range of 45dB.

The maximum noise values, $L_{Amax,f}$, which are indicated by the red crosses, would be similarly attenuated by distance.

As already discussed though, the background values, L_{A90} , indicated by the red points, would be essentially unchanged, although a few of the points might be slightly lower for statistical reasons.

Again, although I have referred in the last few paragraphs to NMP4, the description and explanation that I have given also apply equally to all of the other Noise Monitoring Positions NMP1 to NMP6.

From the explanation I have given above, it might be expected that the CRN or CTRN attenuation procedure that I have outlined could be applied, with appropriate rigour, to the specific sound source of the train or road in order to to arrive at the ambient, L_{Aeq} , values and indeed the maximum, $L_{Amax,f}$, values at the individual NSRs. And that the data required to perform such calculations would be no more than the existing noise monitoring data that Tritax already have.

However, deeper examination of Tritax's noise monitoring procedures reveals a yet further problem. The problem here is that Tritax, despite the necessary and copious detail regarding their measuring equipment, ***fail to specify what the actual distances at which every one of the Noise Monitoring Positions NMP1 to NMP6 were placed away from the railway track or road.***

It is of course a matter of common sense and everyday experience that moving a noise sensor (e.g. a microphone) towards a specific sound source will increase the level of the specific sound that is detected by that sensor. So it is with the Noise Monitoring Positions. If they are moved towards the specific sound source (rail or road), then the level of the specific sound will similarly increase. This means that the ambient L_{Aeq} and maximum $L_{Amax,f}$ values that Tritax presented in Tables 10.20 to 10.25 would also increase. And this means in turn that those ambient L_{Aeq} and maximum $L_{Amax,f}$ values in Tables 10.20 to 10.25 ***have no real meaning unless the distances at which the individual Noise Monitoring Positions NMP1 to NMP6 were located are known.***

Looking closely, however, Tritax do provide some indirect information that allows the distance of NMP4 from the track to be assessed. In paragraph 10.99, and referring to the single ***Vibration*** Monitoring Position (VMP1) only, Tritax state that "Vibration equipment was established circa. 12m from the nearside rail of the closest trainline".

Referring now to Tritax's ES Figure 10.2 "Noise and vibration monitoring positions" [APP-271], and zooming in, we can see that VMP1 and NMP4 were located close together and equidistant from the rail track. It is therefore considered that Noise Monitoring Position NMP4 was likewise positioned at 12 metres from the nearside rail of the closest trainline.

Inspection of the local site at which these Noise Monitoring and Vibration Monitoring activities were conducted indicates that the railway boundary is located at very slightly more than 12 metres away from the nearside rail of the closest trainline. This serves to corroborate the statement and assessment above.

Referring back now to the "Calculation of Railway Noise", CRN specifies a standard distance of 25 metres from the nearside railhead of the track, at which noise monitoring measurements may be described as being in accordance with a standard CRN "notional receptor". (For the avoidance of doubt, this means that, in the context of Tritax's description, CRN specifies the noise monitoring to be at 25 metres from the nearside rail of the closest trainline). In their report, Tritax here make no reference to CRN at all.

Fortunately, to resolve this issue, Chart 3 of CRN, which I have already shown above, describes how train noise is attenuated over distance. With reference to Chart 3 and also the attending logarithmic formula, it can be seen that in order to convert noise monitoring results at 12 metres to those in accordance with the CRN standard “notional receptor” at 25 metres, a value of 3.2dB needs to be subtracted from the noise monitoring measurements.

What this means in practice is that for the NMP4 measurements, a value of 3.2dB needs to be subtracted from the ambient L_{Aeq} and maximum $L_{Amax,f}$ noise values in Tables 10.20 to 10.25. The background L_{A90} noise levels will in contrast be almost completely unaffected.

Once these reductions have been applied, the values in Tables 10.20 to 10.25 will then have been standardised to CRN’s standard “notional receptor”. This will enable all of the three noise levels (background L_{A90} , ambient L_{Aeq} , and maximum $L_{Amax,f}$) to be routinely calculated using CRN as I have already described earlier and with reference to BS 4142:2014+A1:2019 “Methods for rating and assessing industrial and commercial sound”. No further noise monitoring would be required to perform these calculations.

For other NMPs, similar reductions also need to be applied, depending upon their own individual positioning during Tritax’s NMP measurements. For the roadside measurements, CRTN provides an attenuation Chart 7 corresponding to CRN’s attenuation Chart 3, albeit with different terminology.

Applying these very changed Baseline Conditions to the early stages of this Noise and vibration report will almost inevitably have sweeping effects that will propagate through and lay waste to wide swathes of the study. It seems inevitable that the Noise and vibration study will need to be refashioned to explore the true Baseline Conditions.

2. Failure to Heed Consultation Response Warnings

What makes all of the above even more serious is that this is not the first time that Tritax have been warned about these grave failures.

For reasons of clarity, and also as evidence, I have attached to this Written Representation an extract, running to some four and a half pages, from my Consultation Response of the 7th April 2022 to Tritax in respect of their PEIR Documents, together with Tritax's confirmation of their receipt of same. You may need to redact some parts of this extract.

A major part of my Consultation Response to Tritax was devoted to Tritax's PEIR Chapter 10 Noise and vibration report. It focussed upon the great significance of the noise monitoring in the outcome of the study, and the importance of the placing and use of the noise measuring equipment. It also pointed out and warned against the gross error made in the PEIR study that the noise values measured local to the track were being directly used as the noise values local to the NSRs, and the fundamental and far-reaching consequences this would have throughout the rest of the Noise and vibration report.

As an example (the ***bold italics*** were also in the Consultation Response!), I warned Tritax:

"But there is also a colossal error in the Construction Phase noise study which I shall now describe.

Having settled upon the reduced values (the original extremely high ones being mysteriously rejected as 'worst case') the noise study indicates in Table 10.23 that the noise level at those NSRs that are within 300 metres of the Main HNRFI Site are in the order of 65dB.

10.91 then refers back to the noise monitoring values in Tables 10.17 to 10.20 and attempts to relate these directly with the noise study results in Table 10.23.

This is a gross error. The noise monitoring values in Tables 10.17 to 10.20 are noise values measured ***local*** to the trackside or roadside. They are not the noise values ***local*** to the NSR, and must not be used as such.

For clarity, and by way of example, NSR3 is located some 430 metres from the HNRFI site boundary, and therefore rather further from the track. When a train passes, NSR3 does not experience an L_{Amax} of 96dB! [Sentence redacted for this Written Representation to the Examining Authority] That L_{Amax} of 96dB is ***local*** to the track!

With this accepted, your noise problem becomes a very great deal worse."

and also:

"As the noise analysis develops in subsequent sections, the data from these sensors assumes great importance in the outcome of the study.

It therefore follows that a full and detailed description and justification is required of the practices that have been followed in the placing and use of the noise monitoring equipment, including the methods by which the four different noise parameters given in the Tables 10.17 to 10.20 were derived from the raw data."

It is clear from their Environmental Statement Chapter 10: Noise and vibration submission to the Examining Authority that Tritax have not heeded that Consultation Response warning. And although they now furnish more data in respect of their current noise and vibration monitoring activities, the crucial information regarding the location of every one of their NMPs is conspicuously absent.

Tritax can hold nobody responsible for their current position but themselves.

3. Failure to Determine Construction Noise

In the sub-sub-Section ***Construction Noise*** which begins at paragraph 10.121, Tritax assume construction plant details and list them in Table 10.27, for each of four consecutive phases of construction. With reference to BS 5228-1:2009+A1:2014 "Code of practice for noise and vibration control on construction and open sites" - Part 1: Noise, they then go on to make predictions of the likely noise effects at the NSRs located closest to the site boundaries.

Tritax chose to investigate two different scenarios.

The ***second*** one of these is a "worst-case" scenario, in which the construction plant is operating at the closest point to a given NSR.

The ***first*** one is what they term an "average case" scenario, in which the construction plant is all operating at the approximate centre point of the closest area of construction to each NSR.

Table 10.28 shows Tritax's predicted construction noise levels for ***some of*** the NSRs. It can be seen that the results for the NSRs closest to the site boundary are a "worst-case" L_{Aeq} value of 90 dB, and a much lower "average case" L_{Aeq} value of 58dB.

A first step in assessing to what extent Tritax's "average case" result is a fair and reasonable representation is to establish how far away from the site boundary that "approximate centre point of the closest area of construction" actually is. Clearly, if the "closest area of construction" is very large, then even those NSRs positioned at or very close to the site boundary will be a very long way from ***all*** of the plant that is congregated together at the centre. This would of course mean that the noise from ***all*** the congregated plant would be greatly attenuated over the distance to the boundary, and so the noise result would be unfairly low.

Of course, under these conditions, it might be that any one piece of plant that was close to the site boundary would ***by itself*** generate a much higher level of noise at the NSR than ***all of the others at the centre put together***, but such "rogue" plant would be strictly prohibited under Tritax's "average case" scenario.

Disappointingly, Tritax do not disclose what dimensions they have assumed in their noise calculations for their "closest area of construction".

However, by using the construction plant details in Table 10.27, and with reference to BS 5228-1:2009+A1:2014 "Code of practice for noise and vibration control on construction and open sites" - Part 1: Noise, I was able to repeat Tritax's calculations, both for their "worst-case" and their "average case" scenarios. The "worst case" calculation I performed gives the same result of 90dB as that indicated above, and serves to confirm the validity of the calculations. The "average case" calculation similarly gives an identical result of 58dB ***only when the plant is grouped together at 300 metres from the site boundary.*** This is corroborated by other, similar, calculations for other NSRs listed in Table 10.28.

This means that the area of construction to which Tritax refer must be approximately 600 metres in width, which corresponds in general terms to the prevailing dimensions of the main site.

In fact, BS 5228-1:2009+A1:2014 “Code of practice for noise and vibration control on construction and open sites” - Part 1: Noise makes no mention of any “average case”, or indeed any other particular scenario that might be used to characterise an area with dispersed plant. This method of calculation was entirely Tritax’s decision.

It is appropriate at this point to quote from ISO-9613-2-1996 “Acoustics – Attenuation of sound during propagation outdoors” - Part 2: General method of calculation, which states:

“a group of point sources may be described by an equivalent point sound source situated in the middle of the group, in particular if

a)…..

b)…..and

c) the distance d from the single equivalent point source to the receiver exceeds twice the largest dimension H_{max} of the *sources* ($d > 2H_{max}$)

If the distance d is smaller ($d \leq 2H_{max}$), or if the propagation conditions for the component point sources are different (e.g. due to screening), the total sound source shall be divided into its component point sources.”

In our case, assuming the area is 600 metres square, then the diagonal H_{max} is approximately 850 metres. This means that d, the distance of the NSR from the centre of the site, must be in excess of 1.7 kilometres for Tritax’s “average case” calculation to be applicable! For all the NSRs that are considered here, d is of course in all cases very much less than 1.7 kilometres, and so the items of plant need to be considered individually.

It is, indeed, intuitively obvious Tritax’s “average case” would greatly underestimate the construction noise seen by the NSRs, and most especially those that are the very closest to the site boundary, where the construction noise will inevitably be greatest!

As a way forwards, I have performed simple calculations in accordance with BS5228 Part 1 and based upon more realistic assumptions for the first construction phase. Table 10.27 indicates there would be 10 Tracked Elevators, 10 Wheeled Loaders and 15 Dump Trucks working on the site. It seems reasonable to assume that these would be working stripwise in a direction parallel to the railway line (this would allow the plant to work comfortably to level grade) with the strips being equispaced to cover the site width of 600 metres.

The results obtained vary slightly depending upon the exact assumptions made. But, allowing for the 50% “on-time” indicated in Table 10.27, the ambient noise, L_{Aeq} , would be in the region of 77dB to 80 dB. The L_{Aeq} noise prevailing during the 50% of the time when the plant was actually “on” would however inevitably be rather higher than this at approximately 80dB to 83dB.

A further consideration is that this identified construction noise, as well as dominating the existing noise climate, will have strong tonality, impulsivity, and intermittency characteristics that are entirely out of character with the true existing noise climate.

It is interesting here to observe that Tritax's failure in their overestimation of existing train noise was to deny that the distance from the rail track to the NSRs had the effect of attenuating the train noise. But, in contrast, here we see that Tritax have overestimated distances from the plant to the NSRs and have immediately factored in the increased attenuation of the plant noise that this overestimation will cause. This beggars belief.

Finally, but by no means least, in paragraph 10.128, Tritax state:

"Table 10.28 sets out the predicted unmitigated construction noise levels at a selection of the nearest NSRs, for the average and worst-case situations as described above. In accordance with BS 5228, caution needs to be given when calculating noise levels at distances greater than 300m, due to the increasing effects of meteorological conditions. Therefore, receptors which are located at a greater distance than 300m from the site boundary have not been included within the following assessment."

There are many things wrong with this statement. Firstly, as we have already seen, the existing noise climate of the surrounding properties is characterised by low background, L_{A90} , levels, and also by ambient, L_{Aeq} , levels that Tritax now need to reassess very strongly downwards from the values indicated in their Noise and vibration report.

Secondly, owing to the gross error in their "average case" scenario, Tritax have introduced an additional distance of 300 metres between the NSRs and all of their Construction plant. That additional distance has no basis in reality, and when it is rightly removed the predicted Construction noise levels will be greatly increased yet further above the existing noise climate.

Thirdly, Tritax's choice of words "In accordance with BS 5228" strongly suggests that BS 5228 specifies that, at distances greater than 300 metres, such receptors should be excluded from assessment. That is emphatically not the case, and BS 5228 makes no mention at all of excluding such receptors.

In truth, in its opening pages BS 5228 states that it "gives recommendations for basic methods of noise control relating to construction sites". Overall, it aims to provide a simple and accessible guide to the noise levels that will prevail around construction and open sites, which are often small and fast-changing, so that elaborate calculations are inappropriate. Accordingly, the guidance that it provides for the attenuation of sound as it propagates over distance is very basic, and amounts to no more than a single chart with two lines corresponding to the two extremes of "hard ground" and "soft ground" conditions respectively. Small wonder, then, that it has reduced accuracy at distance compared with, say, ISO-9613-2-1996 "Acoustics – Attenuation of sound during propagation outdoors" - Part 2: General method of calculation, which might easily be used as an alternative in hand calculations here (the topology being very simple) and has no such propagation distance limitations.

Overarchingly, Tritax's decision to remove NSRs from their Table 10.28 is to be deplored as it effectively disenfranchises those residents from the assessment process.

Moreover, it introduces difficulties if Construction Noise and Completed Development Noise need to be considered together as the Proposed Development evolves.

4. Completed Development Model

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS - Completed development - *Noise model*

In this sub-sub-Section, in paragraph 10.145 when describing the CadnaA noise model for the Completed Development, Tritax's report states:

"To reflect the local ground cover with the Proposed Development in place, ground absorption was set to G = 0.5 (50% acoustically absorptive ground). The absorption was set to 1.0 (100% acoustically absorptive ground) for the area between the SRFI and receptors to the north."

But in contrast, in paragraph 10.220, when describing the CadnaA noise model for Off-site road traffic noise impacts, Tritax's report states:

"For the do something scenarios (i.e. with the Proposed Development), the ground cover across the Proposed Development has been modelled with a ground absorption coefficient of 0 (i.e. acoustically reflective conditions), to reflect the areas of hard standing across the site."

With reference to ES Figure 3.1 "Illustrative Masterplan" [APP-230], it is evident that the Main Site is acoustically reflective, and therefore a ground absorption coefficient of 0.0 should be applied in both CadnaA noise models. And in particular, for that area to the North West of Units 7, 8 and 9, where the Proposed Development will throw noise forward onto the local NSRs, that ground absorption coefficient of 0.0 should be extended beyond the Site Boundary to include the width of the existing railway.

This is one of the very few areas of the CadnaA modelling work that is accessible.

5. Failure to Properly Compare the Completed Development Noise Levels

POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS - Completed Development - *Context*

To set the scene, in the sub-sub-Sections preceding the ***Context*** sub-sub-Section considered here, Tritax's report describes the CadnaA noise models, and uses them to predict noise levels from the "Completed Development" at all of the NSRs, for each of the "weekday daytime", "weekday night-time", "weekend daytime" and "weekend night-time" periods.

Tritax's calculations relate to the noise from ***HGV movements, loading/unloading operations and service yard areas only.***

The report then goes on to compare those CadnaA results with the ***background*** noise, L_{A90} ,that was measured at the Noise Monitoring Positions NMP1 to NMP5. In fact, as I have already discussed, these measured noise values have been transferred from Tables 10.20 to 10.25 to Tables 10.39 to 10.42, where the comparison with the CadnaA results is now made for each of the NSRs in turn.

In making the comparison, however, account needs to be taken of the ***character*** of the noise from the site, which may differ in terms of tonality, impulsivity and intermittency compared with the background noise, and so cause it to be more noticeable. So, and depending also on the level of the site noise compared with the background noise, a rating penalty (+dB) can be added to the site noise.

British Standard BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" describes such procedures.

With rating penalties applied, however, the results are unfavourable, and indicate high "Magnitudes of Impact". Faced with this serious problem, Tritax then look around for other things to do.

I would state in passing here that I strongly disagree with the rating penalties that Tritax have apportioned and consider them to be too low, or far too low, so that the Impacts would in truth be yet more serious than those shown in this report. But because, as we shall see, Tritax quickly forget these results anyway as they move on to other comparisons, I will not pursue this matter any further now, but anticipate that it would arise again in any future report.

Having now, at some length, set the scene, we arrive at last at the sub-sub-Section ***Context*** , and it is fascinating to see what happens next.

What Tritax do in paragraph 10.173 is quote at length from BS 4142:2014+A1:2019 "Methods for rating and assessing industrial and commercial sound" as follows:

"the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs"

And, choosing selectively, in paragraph 10.174, they continue:

"'where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background"

And then, in paragraph 10.175, without attempting to relate their course of action to either of the above, or to justify it in any way, they innocently state:

"The sound rating levels have been compared to the existing noise climate at each receptor where an adverse impact is predicted"

On the face of it, it all sounds so reasonable. The "existing noise climate"? – what could possibly be wrong with that? And so this is duly done in Tables 10.43 and 10.44. And their problems largely go away.

But what Tritax have done here is wrong. And wrong not just for one reason, but four.

1. Firstly, although they have quoted extensively from BS 4142:2014+A1:2019, it is a pity that they did not also make reference to the BS4142:2014+A1:2019 "Technical Note" published by the Association of Noise Consultants Good Practice Working Group in March 2020. As its authors explain in their introduction, it is "designed to assist readers with a reasonable interpretation and application of BS 4142 as a whole".

With respect to the Section 11, often referred to as Clause 11, from which Tritax have quoted, the Technical Note provides extensive assistance, and explains:

"The three types of context set out in Clause 11 are:

1. aspects of the absolute level;

2. aspects of character; and

3. aspects of the receptor, including physical measures designed to reduce noise.

Some comments on each of the three contextual matters raised in Clause 11 are set out here.

Subclause 11(1):

The standard states that the absolute level of sound can be of significance, where the residual values are low and where they are high, and should be taken into account when determining the overall impact of a particular specific sound source.

The second paragraph notes that absolute levels may be as, or more, important than relative outcomes where background and rating levels are low. ***It is important to note that both background and rating levels would need to be low for this particular caveat to apply.***

BS 4142 does not indicate how the initial estimate of impact should be adjusted when background and rating levels are low, only that the absolute levels may be more important than the difference between the two values. It is likely that where the background and rating levels are low, the absolute levels might suggest a more acceptable outcome than would otherwise be suggested by the difference between the values. ***For example a situation might be considered acceptable where***

a rating level of 30dB is 10dB above a background sound level of 20dB, i.e. an initial estimate of a significant adverse impact is modified by the low rating and background sound levels.

BS 4142 does not define 'low' in the context of background sound levels nor rating levels. The note to the Scope of the 1997 version of BS 4142 defined very low background sound levels as being less than about 30 dB L_{A90}, and low rating levels as being less than about 35 dB $L_{Ar,Tr}$.

The WG suggest that similar values would not be unreasonable in the context of BS 4142, but that the assessor should make a judgement and justify it where appropriate."

The italics are mine.

The above makes clear that the background levels and rating levels that are discussed in the Technical Note are substantially lower than the background levels and rating levels that have been arrived at in Tables 10.39 to 10.42.

2. The second reason is that, ***even if the background levels and rating levels were substantially lower than they in fact are***, neither BS4142:2014+A1:2019 nor the Technical Note discusses or suggests any such extreme measure as the background noise being completely and directly replaced by some other parameter.

3. The third is that the ***Context*** represented an opportunity for Tritax to openly consider and discuss the acoustic environment, to weigh the factors in play, and to arrive at a justified way forwards. Here, however, the ***Context*** section effectively ends after just those three short paragraphs that conclude with their decision.

4 ***Last, but by no means least***, the ***Context*** steers the predicted site noise values away from comparison with the background, L_{A90}, values, and and instead directs them towards comparison with what Tritax have described as the "existing noise climate". In fact, this "existing noise climate" is none other than the ambient sound, L_{Aeq}, values measured by NMP1 to NMP6, which were initially shown in Tables 10.20 to 10.25 and then more-or-less directly transferred to Tables 10.43 and 10.44 where they were re-branded as the Ambient values at the NSRs! And this, as I have explained at length, was fundamentally wrong!

So here we now arrive at last at those two Tables 10.43 and 10.44, which are ready-loaded with the NMP1 to NMP6 values. And the site noise values are duly compared with them.

So, what the site noise values are actually being compared with in Tables 10.43 and 10.44 is not the background, L_{A90}, levels at the NSRs, *nor even the ambient, L_{Aeq}, levels at the NSRs*, ***but actually the ambient, L_{Aeq}, levels measured at the Noise Monitoring Positions NMP1 to NMP6 close by the sides of the track and roads!***

It is therefore unsurprising, to say the least, that the comparison is more favourable to Tritax. Suddenly, it all looks a lot better, and we only need to apply a little bit of mitigation to see our way home!

And it all looks so plausible from the outside!

In summary, then, the predicted site noise levels are first of all compared with the background noise levels, L_{A90} , at the NSRs. However, the results are unfavourable, indicating high “Magnitudes of Impact”, and the method is abandoned and the results ignored.

Faced with this, the predicted site noise levels are then inappropriately compared with ambient noise levels, L_{Aeq} , which we traced back to actually be the ambient noise levels, L_{Aeq} , measured at the Noise Monitoring Positions NMP1 to NMP6 close by the sides of the track and roads!

Finally, I point out here that ***two separate methodological errors, acting together***, are required to accomplish what has been described above.

6. Failure to Include all Noise Sources caused by the Proposed Development

You may remember that when generating the Index to Tritax's report, I observed that the latter part of the sub-Section **POTENTIAL SIGNIFICANT ENVIRONMENTAL EFFECTS OF THE PROPOSALS - Completed Development Noise** was challenging because the CadnaA models that described the "Completed Development" were actually incomplete. This meant that after the "Magnitudes of Impact" had been finalised for the "Completed Development", various omitted on-site and off-site sources of noise had then to be considered separately.

It was inappropriate to dwell upon that in the Index section, but I return to it now.

In the case of the ***Noise from fixed plant, equipment and break-out noise***, and the ***gas-fired combined heat and power plant*** that both were omitted, these were each awarded an additional noise allowance within which they were both to be constrained during the later stages of design. The obvious question then arises as to where those additional noise allowances came from.

In the case of the ***Noise from off-site rail movements***, we see that Tritax have calculated that these represent an increase of between 1.6dB to 1.8dB along the track and at the NSRs. Tritax have deemed this to be negligible, but the fact remains that it represented a further noise increase over and above that accounted for in the "Completed Development". As such it represents sloppy practice, and circumvents proper accounting in a way that a more structured approach could not.

Very similar arguments apply in the case of the ***Off-site road traffic noise impacts***.

A further shortcoming of Tritax's adopted methodology here is that it gives no insight into the relative magnitudes of the contributions that are actually being made by the various individual noise sources. Another shortcoming is that when, as we shall shortly see, the ***Noise from off-site rail movements*** is shown to be much more significant than Tritax calculated, Tritax's adopted methodology is ill-equipped to deal with the changed circumstances.

Throughout all proper engineering practice, the task (for example, the load that must be borne by a bridge) is always calculated in its entirety. It is not calculated for lorries only, and the plussages for buses and people then judged to be negligible. That way spells disaster.

There is a further matter that I wish to bring up here regarding the treatment of Construction noise.

In the great majority of cases, the Construction and Operation activities at a Proposed Development are performed sequentially. And so it is entirely proper that they should be considered quite separately for the purposes of a Noise and vibration report. It is therefore routinely accepted, often without further thought, that this is how a Noise and Vibration report should be arranged. And given the circumstances pertaining here, it would seem unlikely that Tritax would choose to break the mould and do differently.

But this Proposed Development is different from most. Because, here, the Construction and the Operation activities will inevitably be happening together as the Proposed Development is progressively brought towards maturity, subject to subsequent unknown changes of design. And these dual Construction and Operation activities will continue over an indefinite period of at least several years.

To consider this point further, picture a resident emerging from his NSR some bright morning.
Turning to the South he scowls and says “That’s really noisy”.
And swinging to the North, he grunts “And that’s loud too”.
But then he softens and smiles, and explains to himself “Oh, but I forgot, that one is Operation noise, and the other is Construction. So that’s OK, they are actually in different pots”.

Clearly the above is absurd. And, put like this, it becomes self-evident that the two should be considered together. Appropriate assumptions may need to be made.

Taken together with the earlier parts of this Section, this will finally mean that all of the Noise Sources caused by the Proposed Development will be taken into account together in the Noise and vibration report.

7. Failure to Determine Baseline Train Operations

In the sub-sub-Section ***Noise from off-site rail movements*** which begins at paragraph 10.206, Tritax attempt to determine the baseline for existing train movements.

In paragraph 10.207, Tritax state:

"Realtimetrains (sic) has been used to provide the baseline for the existing movements at the current time on a weekday. This provides a comprehensive timetable detailing the scheduled and actual train movements on a given line for the previous seven days. The movements have been confirmed to be correct by the projects Rail Consultant."

Table 10.49, below, shows Tritax's baseline train movements for a "typical daytime and night-time period".

Table 10.49: Assumptions regarding existing trains

Train type	**Assumed speed (Kph)**	**Assumed composition**	**No. of daytime two-way movements based on known movements**	**No. of night-time two-way movements based on known movements**
Turbostar Class 170	120	2 carriages	64	5
Class 66 with disc braked freight vehicles	105	1 locomotive and 25 wagons	41	21

[40] *http://www.realtimetrains.co.uk*

In order to put these numbers into context, it is worth mentioning that the Class 66 diesel-engined Freight Trains each generate a noise contribution, L_{Aeq} , that is much higher (+10.3dB) than the Turbostar Class 170 Passenger trains. Expressed another way, this means that some 11 Turbostar Passenger trains are required to generate the same noise contribution, L_{Aeq} , as a single Freight train. The maximum sound level, $L_{Amax,f}$, of the Freight trains is also correspondingly higher.

So, in summary, the major factor in play here is the number of Freight trains passing.

The problem with Table 10.49, above, is that Tritax's number of train movements is incorrect. In particular, their number of Freight train movements is wildly wrong, and overstates the actual number of such movements by a factor of between 200 and 250 percent.

The cause of this failure is not difficult to establish. Realtime Trains do indeed provide online a comprehensive timetable of the actual train movements on a given line each day. But that data needs to be properly interpreted if mistakes are to be avoided. Realtime Trains actually operate around a ***timetable template that provides preexisting slots for all of the trains that might conceivably be run on that particular day.*** There is a very large number of such trains. For the Train Operators and Network Rail alike, this template provides a stable framework, to which any exceptional additions may easily be applied on an individual basis.

The result of all this is that what Realtime Trains actually put online is the complete list of all the trains that actually did run, but also includes all of those large numbers of trains that might conceivably have run, ***but actually did not run***. All of the trains that did in fact run are identified online by Realtime Trains by an indication of the exact time they stopped at, departed from, or passed through (in this case) Hinckley Station. Those that did not run (the great majority of which are Freight trains) are of course not identified in the same way, and are generally marked with a "(Q)". Realtime Trains uses this "(Q)" to denote that the service runs only when required and has not been activated in a railway computer system to indicate its operation.

By examining the Realtime Trains online list over several weekday daytime (07.00 to 23.00) and night-time (23.00 to 07.00) periods, it is possible to see what Tritax have done. They have simply counted up all of the daytime trains and night-time trains that Realtime Trains have listed, including all the "(Q)" trains, and taken them all to be running trains. The numbers of trains Tritax report in Table 10.49 are exactly in line with the results this practice would yield.

However, in order to be absolutely sure that the numbers of trains that actually did run exactly matches the Realtime Trains online list of identified (ie timed) running trains, it was decided, along with others, to directly and continuously monitor the line at Elmesthorpe over a complete night-time and a complete daytime period.

The first such monitoring period was overnight from 23.00 on Monday the 11th September 2023 through to 07.00 on the Tuesday morning. Over that 8-hour overnight period, each train was logged and its direction and time of passing recorded. There were 8 Freight train passes.

The second monitoring period was the daytime period from 07.00 on Wednesday the 13th September 2023 through to 23.00 late that night. During that 16-hour daytime period, again each train was logged and its direction and time of passing recorded. There were 16 Freight train passes.

Finally, for both of these specified monitoring periods, the observed trains were compared with the Railtime Trains list of identified (i.e. timed) running trains, as these lists became available online. The trains were compared with respect to Passenger-or-Freight, direction, and the time of passing. An allowance of a couple of minutes was made for the train to travel between Hinckley and Elmesthorpe. There was an exact one-to-one match.

Yet another very significant failure to determine baseline train operations is that in Table 10.49, Tritax have confined themselves to weekdays only, and have not investigated weekends at all. Bearing in mind that the site would operate through weekends and both day and night, and that fewer trains run at weekends, especially at night, this is a serious and unaccountable omission.

Examination of Realtime Trains online data for Saturday and Sunday nights between 23.00 and 07.00 indicates that there are typically ***no*** overnight running Freight or Passenger trains at all, until such time as running recommences on the Monday morning from around 04.00 and 06.00 respectively.

Similarly, for the Saturday and Sunday daytime periods between 07.00 and 23.00, the number of Freight trains is greatly reduced compared with weekday running, particularly on the Sunday. Anecdotally, the last Passenger train on Saturday typically passes Elmesthorpe almost exactly at 23.00 and so might, or might not, be categorised as the sole Saturday overnight train!

Tritax's various failures to determine baseline train operations, both weekday and weekend, has diverse implications for this noise study.

Of immediate concern here is that in their Section on BASELINE CONDITIONS, in paragraph 10.106, Tritax state:

"On review of the measured noise levels at NMP4, the ambient noise level ($L_{Aeq,T}$) measured during the night-time on Saturday 24th April is lower than that measured during any of the other night-time periods. A review of the measured trace indicates that there were no trains on the rail line during the night-time period between 2300 hours and 0700 hours. Although it is acknowledged that there may be periods when trains do not run during the night-time period on a Saturday, it is not considered 'typical' of the night-time noise level."

Tritax then go on to remove the data measured on the night of Saturday the 24th April, and replace it with the data measured on the night of Sunday the 25th April, on the grounds that "The ambient noise level measured on a Sunday night, which includes train pass-bys is considered to be more representative of typical conditions….".

As the foregoing has shown, Tritax have failed to determine Baseline Train operations during weekdays, and have not attempted to determine Baseline Train operations during weekends. What Tritax "considered 'typical' " of Saturday nights is based upon Realtime Trains data in which Tritax include many "phantom" trains that do not run!

Tritax should not have replaced the Saturday data by the (noisier!) Sunday data. Doing so has applied an inappropriate skew to the data. And, rather worse, it has removed from the Tritax's Noise and vibration report every shred of evidence that NSRs, and indeed all those residents in both directions along those several kilometres of line, enjoy undisturbed Saturday nights.

But beyond this Chapter 10 Noise and vibration report, these failures are likely to have wider implications too. For example, Tritax have used their incorrect baseline Train operations data in their Chapter 8 Transport and Traffic report. In their Chapter 8 report, in paragraph 8.173, Tritax state:

"The baseline operations on the rail network have been reviewed for the HNRFI operations and data has been taken from the real time train (sic) website to provide a baseline condition for the purposes of this ES Chapter. The average number of two-way daily trains through Hinckley Rail Station as a proxy for the HNRFI site:

• 41 Freight Trains during the day and 21 at night; and

• 64 timetabled day-time passenger trains and 5 night-time passenger trains”

Tritax’s errors may also have implications for traffic queues at level crossings, and perhaps in particular at Narborough Level Crossing. At crossings, because far fewer trains are running than Tritax described, the ***percentage*** increase in running trains caused by Tritax’s Proposed Development may be much higher than was previously thought.

8. Failure to Determine Noise from off-site rail movements

In the sub-sub-Section ***Noise from off-site rail movements*** which begins at paragraph 10.206, Tritax attempt to determine, amongst other things, the noise from off-site rail movements.

As we have already seen, in the first few paragraphs Tritax attempted to determine Baseline Train operations, for weekday operations only. They failed to do this properly, and arrived at the incorrect results given in Table 10.49.

They then move on in paragraph 10.209 to determine the noise from off-site rail movements.

At this point, Tritax introduce the "Calculation of Railway Noise" (CRN), published by the Department of Transport in 1995, which I have already discussed earlier in respect of Tritax's noise monitoring activities. What they have done is here calculate the sound level, L_{Aeq} , that would be generated at a notional receptor located at 25 metres from the nearside rail by the passage of all of the trains, both Passenger and Freight, running at the speeds indicated and the numbers indicated in Table 10.49, over the 16-hour weekday daytime period and the 8-hour weekday night-time period respectively. Their results are shown below in their Figure 10.50.

Table 10.50: Predicted change in rail traffic noise levels as a result of the additional movements

Period	Calculated Noise Level, dB $L_{Aeq,T}$			Change
	Existing	Proposed	Existing + proposed	
16-hour daytime	62.3	58.7	63.9	+1.6
8-hour night-time	61.8	58.9	63.6	+1.8

I have checked these CRN calculations. Based upon a nearside-and-farside track model, and taking into account the necessary corrections needed to convert from the 18-hour daytime period used in CRN to the 16-hour daytime periods commonly used elsewhere, I have found ***the calculations themselves*** to be broadly correct.

But of course those calculations apply to Tritax's Baseline Train operations, indicated in their Table 10.49, which we have already seen to be incorrect. Also the calculations are incomplete, as weekend working has not been investigated. This is unfortunate, as it will evidently be at weekends, and especially weekend night-times, that the additional off-site rail movements will have the greatest impact upon the existing noise environment.

For these reasons, and in accordance with CRN, I have taken steps to reinvestigate the existing weekday noise levels L_{Aeq} . Unsurprisingly, I have found them to be much lower than those declared in Table 10.50. The existing weekend noise levels have been investigated too, and are yet lower still. Referring to Table 10.50, I have calculated the increase in rail traffic noise levels on weekdays to be in the region of 3db to 4dB, rising to 6 to 9dB at weekends. The higher values relate to the increases over the night-time periods. The increase on Saturday night-time in particular is very much higher still.

The increases in noise levels outlined above will of course not be confined to the short length of line local to the main site, but will also apply to the lengths of line stretching onwards in both directions to the North towards Leicester, and to the South towards Hinckley.

For those properties more local to the main site, and of course for the identified NSRs, conditions may however be rather different owing to the presence of local features.

Firstly, in order to allow train movements on and off the site, several sets of railway points must be introduced locally across both of the tracks, which will of course be routinely negotiated at speed by all of the Passenger and through Freight traffic.

Also, the Freight Class 66 diesel-engined haulage locomotives will inevitably be accelerating hard in their (very noisy) Full Power condition throughout the time they rejoin the main line and slowly work up to full speed.

Moreover, the (existing + additional) rail traffic noise will now also be reflected from, for example, the faces of the extensive acoustic barriers that are proposed as mitigation measures. Such reflected train noise will be directed in particular towards those local NSRs that lie to the North of the line.

CRN provides guidelines on some such matters, and on the issue of reflective barriers specifies that an additional noise penalty of +1.5dB be applied overall.

9. Failure to Define study area

In Section **METHODOLOGY AND DATA SOURCES,** sub-Section **Definition of study area,** it is described in paragraph 10.12 that, in the early stages of the Noise and vibration study, for off-site rail movements, an initial assessment was undertaken for a notional receptor, 25m from the line, in accordance with "Calculation of Railway Noise" (CRN), published by the Department of Transport in 1995.

Tritax state:

" Where this initial assessment identifies an effect of moderate adverse and above, then the study area would be extended to include Stoney Stanton to the northeast and the outskirts of Hinckley to the southwest."

It has been established that Tritax failed properly to determine both the Baseline Train operations and the noise from off-site rail movements. It therefore appears very likely that this definition of the study area is wrong, and should be reinvestigated.

10. Failure to Consider Context

In their Noise and vibration report, Tritax do not consider ***Context*** at all.

The sole possible exception, as previously discussed, appears in paragraphs 10.173 and 10.174, which alludes, rather indirectly, to the low background levels at the NSRs. That is all there is.

Given the manifold industrial composition and the geographical extent of Tritax's Proposed Development, especially in contrast to the peaceful, secluded, and distinctive nature of the surrounding NSRs, this is a grave omission.

HM Government's website Noise and vibration management: environmental permits - GOV.UK provides the following guidance:

"How the context affects an assessment
The context in which a noise occurs is critical to assessing the severity of the pollution. Not every receptor will have the same response to the same noise pollution."

and:

"Different elements of the context of a situation may sway the assessment outcome in different directions, so you should consider all the elements together."

It then offers a list of key elements the Context should consider.

From this list, the host of adverse Contextual factors that apply to Tritax's Proposed Development virtually spring from the page:

Weekdays rather than weekends?
The Proposed Development will operate 24 hours a day and 7 days a week.
So Weekdays, Weekday night-times, Weekends and Weekend night-times.

What the sound means?
To the Residents and the community, the sound from the Proposed Development will be an unpleasant and incessant reminder of what has been imposed upon them, despite the strongest opposition from themselves, all of the District and Borough Councils, and all of their local MPs in concert.

Time of day?
The Proposed Development will operate 24 hours a day and 7 days a week.
So, again, Weekdays, Weekday night-times, Weekends and Weekend night-times.

Where the sound occurs?
The sound from the Proposed Development will permeate all of the garden spaces and grounds associated with the NSRs, the privately-owned single-tracked access roads between them, and all of public bridleways, footpaths and open spaces.

New industry or new residences?
New industry, where no industry existed before.
Built on open farmland and degrading local amenities.

Intrinsic links between the source and receptor, for example the source is the resident's place of work?
No, none. Elmesthorpe derives no benefit from the Proposed Development.

Local attitudes?
Uniform hostility and loathing.

The residual acoustic environment?
Very quiet.
As already demonstrated, the existing noise environment has been grossly misrepresented in Tritax's report.

Whatever else might be particular to that individual situation?
Yes, plenty! As I shall go on to describe now.

Those familiar with the area will know that it is very quiet. The historic Elmesthorpe Land Settlement area is especially so, and is made up of farm land, interspersed with discrete residential properties having extensive gardens and grounds and dotted along two dead-end private, single-track roads. They are outstanding within the region for the seclusion and tranquillity that they offer, and the area provides an amenity for all.

Most residents have been there for a very long time. Most who were not actually born there were drawn to it long ago by exactly those same attributes that are now threatened by Tritax's Proposed Development.

People there don't often move away, and have largely invested their lives into their properties. Many are now retired, and so remain during the day to take comfort in the surroundings of their homes and gardens. For many, too, their property constitutes their sole major asset into the future.

Owing to the particular history of the Elmesthorpe Land Settlement Association, these properties have a distinctive character, which might best be described as that of a dispersed village. As such, the description offered on the GOV.UK website of an "industrial noise affecting what would otherwise be a very tranquil village" could hardly be more appropriate.

Regarding sound levels, we have already seen that Tritax in their report have grossly misrepresented the area in respect of both the noise environment and the numbers of trains passing.

In the setting of the "tranquil village", the trains might be looked upon as an occasional Church Bell.

Given all of the above, the Context here is telling.

However, what is even more telling, is that Tritax left it out.

11. Failure to Consider Uncertainty

British Standard BS 4142:2014+A1:2019 “Methods for rating and assessing industrial and commercial sound” includes a Section 10 on Uncertainty, and its Annex B also gives a good description of the principles of Uncertainty as they apply to acoustics in particular.

Section 10 on Uncertainty states:

“Consider the level of uncertainty in the data and associated calculations. Where the level of uncertainty could affect the conclusion, take reasonably practicable steps to reduce the level of uncertainty. Report the level and potential effects of uncertainty”.

There is also very good guidance on Uncertainty provided in the BS4142:2014+A1:2019 “Technical Note” published by the Association of Noise Consultants Good Practice Working Group in March 2020, which states:

“The consideration of uncertainty is a fluid process which ought to factor into every stage of the assessment and should be revised with any new information. The consideration of uncertainty should not be left until the assessment is complete; it should be considered from the outset. The early consideration of uncertainties can help to inform the preparation and delivery of the assessment method and ultimately minimise their extent.

The extent to which uncertainty is considered should be proportionate to the scale and nature of the assessment.”

and continues:

“In situations that might be described as marginal, the level of uncertainty is likely to be more important than situations that are clear. This is particularly true where the uncertainty might affect the assessment outcome. ***For example, uncertainty of ±2dB may be of little significance in a situation where the rating level is 15dB below the background sound level, but highly significant where the rating level is 2dB above the background sound level”.***

The bold italics are mine.

Tritax’s Noise and vibration report mentions uncertainty in only one paragraph, and does not address uncertainty in any meaningful way. And this in Tritax’s Noise and vibration report for a Nationally Significant Infrastructure Project.

With regard to the Proposed Development, the Noise and vibration report has been largely based upon the site layout indicated in the ES Figure 3.1 “Illustrative Masterplan” [APP-230], but the actual specification of buildings, equipment and plant has of necessity been assumed, as too have the construction plant and activities.

As a result of all of the above, and the varying and interactive nature of the noise components from many sources, it is inevitable that, ***even setting aside all the errors already identified and also any others that we don't yet know of,*** Tritax's predicted noise values will all be subject to a broad statistical Standard Deviation about the nominal values that Tritax have arrived at in their report.

In the latter Sections of their report in particular, Tritax examine in considerable detail nuanced variations in dB levels. Given that no attention has been given to Uncertainty, these are unlikely to be meaningful.

A simple root-sum-squared analysis might be used.

12. Discussion and Conclusions

Tritax's Noise and vibration report appears impressive at first sight, in terms of its length, technical content and apparent thoroughness. However detailed study reveals it to be a curious, rather shoddy and unstructured document that has several important sections undeveloped or missing.

Moreover, those critical formative sections that are accessible to examination contain fundamental and significant methodological errors. These collectively undermine confidence in the whole, the more so because there are very many other areas in the report that are not accessible in the same way and are typically of a more complex nature.

And it turns out that all of those errors that have been identified would favour the Proposed Development.

Particular attention is drawn to two separate methodological errors that, ***by linking together to misdirect data***, have the effect of invalidating much of the remainder of the report.

In comparison with other similar reports available online that I have studied, this present report stands out as lacking openness, objectivity and professional rigour. Its contents appear to be selective and to follow its own agenda.

I do not yet know how many other Written Representations the Examining Authority may receive in total from Interested Parties regarding Tritax's Noise and vibration report. Nor indeed do I have any notion as to what level of scrutiny the Examining Authority themselves will direct to it, or indeed to any other of Tritax's ES reports.

But if the present procedures for Nationally Significant Infrastructure Projects are not to be undermined, then Applicants have a duty to provide information to the Examining Authority that is fair, objective, rigorous and correct. Such duty should not fall to members of the public, not only because they are often not so equipped, but also because they are inevitably working at a considerable disadvantage.

In its present form, I consider that Tritax's Noise and vibration report does not offer appropriate guidance to the Examining Authority in their assessment of Tritax's Proposed Development.

Dr David Moore