Rivenhall IWMF DCO

Review of Noise Modelling Files

Consultation Response Details

DCO Case Reference	EN010138
Site	Land at Rivenhall Airfield, Coggeshall Road (A120), Braintree CO5 9DF
Proposal	Rivenhall Integrated Waste Management Facility and Energy Centre.
Case Officer	Claire Tomalin
Date of request from ECC	07/06/2024
Date of response	18/06/2024
Jacobs Ref	B3553P13/93
Jacobs Consultee	Adam Baker
Information reviewed	CadnaA noise models: Rivenhall Daytime Oct23_Bssea.cna Rivenhall Evening Oct23_Bssea.cna Rivenhall Night-time Oct23_Bssea.cna

Background

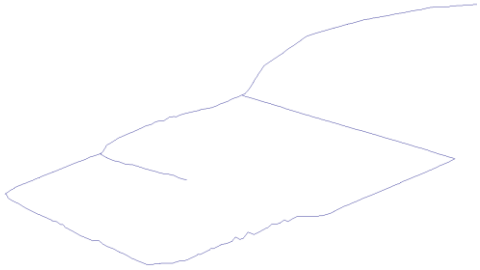
Jacobs have previously provided consultation responses for the PEIR and Environmental Statement stages of this DCO, dated 09 August 2023 and 19 April 2024, respectively. Within our August 2023 response, several comments were made regarding the need for sufficient detail to be provided in the ES to demonstrate that the data used in constructing the noise model is suitably robust and that the noise model files should be made available to allow for a review by third parties. These comments were made in relation to sections 8.3, 8.4 and 8.6 of the PEIR report. Our April 2024 response notes that the noise model files had not been provided with the ES chapter so could not be reviewed. Our response quoted the ES (paragraph 8.4.20), which stated that the '*predicted noise levels*' had been provided by the EPC contractor (HZI) and were based on the '*exact specification of the plant*'. However, the additional data required to allow these *predicted noise levels* to be reviewed and verified was not provided. This was reiterated in our response to paragraph 8.6.2 of the ES and was included as point two of three in the Summary section of our April 2024 response, which said '*It is not considered that sufficient information has been provided at this time to determine the veracity of the noise level predictions presented within the ES. This includes details of the mechanisms to obtain the source noise data and noise model files.*'

Jacobs have also been involved with the DCO hearing held on 4th June 2024.

Modelling/Prediction Methodology

	Comments
Noise receivers and existing buildings etc.	
Position	All noise receivers and existing buildings seem to have been positioned using imported Google map aerial images (not embedded within model). This approach will mean the buildings (and receiver points) will not be accurately positioned (they won't match OS Master Map); however, given the propagation distance between the site and receiver points this discrepancy is unlikely to have a material impact on predicted noise levels. An example of this discrepancy can be seen in the position of the structures ~200m south of the site: 
Structure heights	All existing buildings are assigned a height of 8m, with the exception of the three noted above, positioned ~200m south of the site, which are assigned a height of 4m. NOTE – The Lodge is a bungalow and has been represented by an 8m tall building.
Number of receivers in noise model	13 receiver points, with one assigned to each noise sensitive receptor included in the assessment (12) and Jewitts Way (located south-west of the site) also included in the noise model but not in the ES. The predicted free field night-time noise level at Jewitts Way is ~6 dB lower than that predicted at the worst-affected noise sensitive receptor.
Receiver height	1.5m daytime & evening, and 4.0m night-time NOTE – The Lodge is a bungalow and the night-time receiver height is 4m above ground. If the 4m receiver height has been selected because the property was incorrectly identified as a two-storey property, rather than to represent window(s) at first-floor height on the western façade (i.e. facing the site), then this is likely to result in an over prediction of night-time noise level.
Building external façade absorption	All existing buildings, are assigned a Reflection Loss of 2.0dB (0.37 absorption coefficient). It is not clear what the rationale for this is, but it should be noted that this is a higher level of absorption than is recommended within ISO 9613-2 when this detail of a reflecting surfaces is unknown and could result in an under prediction of noise levels at receiver points.
Site attributable noise	
Calculation software and methodology	CadnaA software package using ISO 9613-2 prediction protocol NOTE – CadnaA updated on 06Jun to implement ISO 9613-2 (2024)
Structures	All structures within the site are represented by buildings, with the exception of the ACC Cooler, which is represented by a barrier. Cylinders would typically be used to represent cylindrical tanks and chimney stacks (as per CadnaA manual examples). However, this is unlikely to have any material effect on predicted noise levels within these noise models

	Comments
Source and structure position	No supporting data has been provided to determine whether noise sources / structures are correctly positioned within the site, however, the following general comments are made: 1. no point sources are positioned within buildings 2. all noise sources are above ground
ACC Cooler	The ACC Cooler is represented by two area sources (ACC 004 and 005). These sources are surrounded by a barrier, which is presumably intended to represent the 'container' in which the sources (fans) are located. However, these sources are often 'open' at ground level, rather than fully enclosed, so might be better represented within a floating barrier. The presence of the barrier in the model seems to create a secondary source for ACC 004 and 005 at the diffracting top edges. It is not clear whether this is intended or something that is already accounted for in the sound power level for the noise source, and is therefore effectively being 'double counted' and potentially resulting in a slight over prediction.
Noise emission data (source, quality, spectra)	Much of the noise emission data included in the modelling files is expressed as the sound power level of part of a building façade, i.e. how much noise is coming out of the building (Note these have been spot checked against the data presented in the ES Appendix and match). No details are provided of how these sound power levels of building facades have been derived. In order to fully verify the predicted noise levels, the following data should be provided: • Emission data for the actual source (not the building containing it) • Operating conditions (on-time) • Calculation method for internal noise levels • Acoustic performance of building materials • Calculation method of noise breakout from building Alternatively, it is possible that the noise emission data included in the modelling files is based upon measurements undertaken at another operational site, for example at external locations around the site. These measurements could then be processed to estimate the sound power level of each façade or other noise source. If this is the case, details of the methodology and equipment used, measurement locations, qualifications and experience of staff and approach to data processing should be provided. The supporting data demonstrating the provenance of the noise emission data included in the noise model has not been made available. As such, the noise emission data used has not been fully checked.
Noise emission data (HGVs)	Noise source sound power level is 106 dB and 'Single band'. It would be preferable for the actual (or suitable candidate) noise octave band spectrum to be assigned to the source in the noise source local library. However, as this source is not active in the night-time scenario, the approach to modelling the noise source is unlikely to have a material effect on the assessment.
Source directivity	No sources have been assigned directivity.

	Comments
	This approach is likely to be worst-case for sources that are not propagating in the direction of receivers, i.e. where receivers are positioned off-axis, relative to the direction of the noise emission (e.g. chimney stack). But may not be for sources within the model that are emitting noise in the direction of receivers/on-axis (as could potentially occur for wall mounted louvres / fans etc). It is recommended that directivity is assigned to sources as appropriate to ensure reasonable worst-case conditions are represented in the noise model.
Topography	Height points and contour lines included in the model
Ground effect	Ground absorption set to 0.75, so partially reflective
Free field or façade	Receiver points are positioned 5cm from the façade. Reflector – Receiver distance is 1.00m, so reflections off façade being predicted at are minimal and free field predictions are made.
On-times	No on-times have been added to the individual point sources, lines sources or area sources (i.e. as corrections). However, on-time corrections may have been applied to sources prior to them being imported into the noise model, which cannot be checked without access to the supporting data (e.g. calculation sheets).
Source height and position	Noise source heights appear to be reasonable. The HGV route is fitted to terrain and, due to the detailed topography used at the site, results in an uneven source, particularly at the southern edge of the site. This is unlikely to have a significant impact on predicted noise levels (due to screening between the source and receivers) and unlikely to materially impact on the assessment. However, we would recommend that ground contours at the site that are influencing noise sources are reviewed to ensure they accurately represent the conditions at the site. See below:  Point sources to represent chimney stack opening are 50cm above stack, rather than 5cm within the opening and configuration settings altered to allow noise to radiate out from the chimney (as per CadnaA - Radiation by the Stack's Mouth). This approach to modelling the source is unlikely to materially impact on predicted noise emissions from the source but we would recommend this is reviewed to confirm.
Reflections	3 orders of reflection in model
Building external façade absorption	All buildings at the 'site' are assigned a Reflection Loss of 2.0dB (0.37 absorption coefficient). The barrier representing the ACC Cooler has a lower Reflection Loss of 0.5dB (0.10 absorption coefficient).

	Comments
	As noted earlier, it is not clear what the rationale for the 2.0dB reflection loss is.
Materials (Sound Reduction Indices - SRIs)	There are five SRI entries in the local library. The data sources for these values are not presented. However, these all seem to be redundant and not used in the model. If this is not correct, i.e. they should be used within the model, then they need to be assigned to sources in the model.

Summary

A full review of the noise models has not been possible at this time due to the supporting data (which may include manufacturer datasheets, noise measurement data, internal room noise level calculations, etc.) not being made available. As such, it is not possible for Jacobs to confirm the veracity of the predicted noise levels presented in the ES chapter.

Despite the lack of the supporting data that had been previously requested by Jacobs, it has been possible for some checks to be completed regarding the propagation of noise from the site to the noise receiver at the various noise sensitive receptors and a number of comments have been raised. We would recommend that SLR consider the comments and then review the settings / approaches adopted, as appropriate, to confirm that they represent reasonable worst-case conditions. The most pertinent comments that may be contributing to an under prediction of noise levels are:

- The level of reflection that has been assumed from the surfaces of buildings within the model
- Noise source directivity, particularly if there are examples of noise source propagation from sources to receivers that are on-axis and consequently more likely to result in an increase in prediction noise level at receivers.

There are also potential sources of noise over prediction identified in the review, such as the receiver height at The Lodge (worst-affected receptor) at night and the omission of source directivity for noise sources where the noise propagation path is off-axis.