CHAPTER 13 - NOISE

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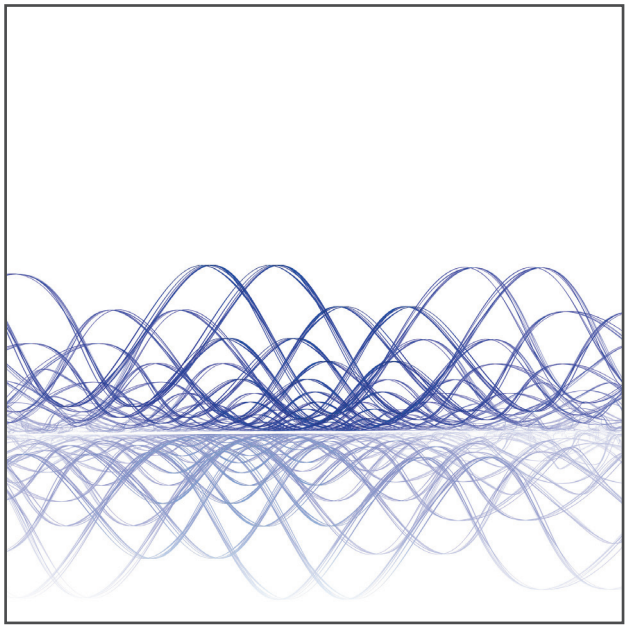

INTRODUCTION

13.1 This Chapter provides an assessment of the noise and vibration impacts associated with the East Stour Solar Farm. The assessment has been prepared by Ion Acoustics Ltd for the Applicant.

13.2 The assessments presented in this chapter include:

- A construction noise assessment;
- An operational noise assessment; and,
- Consideration of the cumulative impacts arising from other developments in the area.

13.3 The site is located in a largely rural area, approximately 6.5km to the south – east of Ashford, Kent. The nearest noise sensitive receptors (dwellings) are relatively close to the site boundary, being around 10m at the closest point.

13.4 The proposed solar farm has an overall site area of approximately 104ha and comprises a number of static solar panels and associated ancillary items i.e. inverters and transformers.

13.5 Construction noise impacts have been considered in line with British Standard BS 5228-1 and include indicative noise calculations for activities associated with construction phase traffic movements and the construction of the frame supports for the solar panels.

13.6 Operational noise levels from the proposed solar farm have been predicted to the nearest noise sensitive receptor locations in accordance with the methodologies detailed in International Standard ISO 9613-2 and compared with absolute noise limits derived from recognised national and international guidance.

Noise from Solar Farms

13.7 Solar farms are not normally considered noisy. Nevertheless, various electrical components, such as inverters and transformers, can emit low levels of noise and can include fans for ventilation and / or cooling/ heating etc. Typically, these noise generating elements are positioned away from the perimeter of the solar farm, increasing the distance between the noise source and the nearest receptor locations. Noise levels are rarely audible outside of the site boundary.

13.8 The nature of solar farms is such that electricity is only generated during daylight hours. During the summer months this may extend into times considered to be part of the night (that is early mornings before 07:00 hours) and evenings (after 19:00 hours).

LEGISLATION AND GUIDANCE

National Legislation

National Planning Policy Framework

13.9 In March 2012 the 'National Planning Policy Framework' (NPPF) was introduced as the current planning policy guidance in England. This document was revised in July 2021. The document is generally not prescriptive and does not provide noise criteria. Instead, it places the onus on local authorities to develop their own local plans and policies.

'174 Planning policies and decisions should contribute to and enhance the natural and local environment by: ……..

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability…….'

13.10 The document further states that:

'185. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason…'

Noise Policy Statement for England (NPSE)

13.11 The Noise Policy Statement for England (NPSE) sets out the government's policy on environmental, neighbourhood and neighbour noise for England. The policy sets out three aims:

- "avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life."

13.12 The NPSE introduces the following terms which are also used in the NPPF:

'NOEL – No Observed Effect Level

This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

LOAEL – Lowest Observed Adverse Effect Level

This is the level above which adverse effects on health and quality of life can be detected.

SOAEL – Significant Observed Adverse Effect Level

This is the level above which significant adverse effects on health and quality of life occur.'

13.13 However, neither the NPSE nor the NPPF defines numeric bounds for NOEL, LOAEL or SOAEL. The limits of each effect level should be defined for each situation and location.

Government Online Planning Guidance

13.14 Further Government planning advice is available online in the Planning Practice Guidance. This refers to the NPPF and NPSE and presents a noise assessment hierarchy table to provide further information on the boundaries between NOEL, LOAEL and SOAEL. This is shown in **Appendix 13.1**.

Local Policy

13.15 A review of the Ashford Borough Council website and their Adopted Development Plan does not indicate any specific noise or noise pollution policy. It does however, reference the potential for noise impacts in a number of policies, most notably, for this assessment, Policy ENV10 – Renewable and Low Carbon Energy which states the following:

'Planning applications for proposals to generate energy from renewable and low carbon sources will be permitted provided that:

b) the development does not generate an unacceptable level of traffic or loss of amenity to nearby residents (visual impact, noise, disturbance, odour);'

13.16 No further pertinent policy relating to noise and vibration were found within the Council's guidance.

Consultation

13.17 The Local Planning Authority (Ashford Borough Council) have provided a screening opinion which indicated that the proposed development would require an Environmental Impact Assessment (EIA). No specific reference to noise and vibration was made in the Council's response to the screening request.

13.18 The applicant's Scoping Report indicated that a desk-based noise assessment (this chapter would be included in the EIA). At the time of writing there has been no response to the Scoping Report and no further consultation was undertaken with the Council as part of this assessment.

ASSESSMENT METHODOLOGY

13.19 This section of the chapter summarises the assessment methodologies used in the production of this chapter. The relevant guidance and standards are summarised below with further, additional detail presented, where appropriate in **Appendix 13.1**.

Construction Noise

13.20 Construction noise will include noise from plant and equipment used on site, and noise from construction traffic on local roads. Construction traffic numbers for each phase of the development have been provided and are considered in detail within this chapter.

13.21 The assessment of noise impacts during the construction phase has been informed by British Standard 5228-1:2009 + A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise. Traffic noise during construction can be calculated with reference to the Department of Transport's Calculation of Road Traffic Noise guidance with the change in noise compared to guidance for short-term change in the Design Manual for Roads and Bridges (DMRB LA111 Noise and Vibration Rev 2).

13.22 There are no noise limits within the main text of BS5228:2009 and in fact,

the preferred approach is to use 'best practicable means' to reduce noise rather than setting limits. This strategy will be adopted here. Nevertheless, a number of possible construction noise significance thresholds are presented within BS5228-1 Annex E for 'projects of significant size such as the construction of a new railway or trunk road'.

13.23 The simplest construction noise criterion is a fixed daytime limit of 70dB(A) for rural, suburban and urban areas away from main road traffic and industrial noise. Where baseline ambient noise levels have been measured, BS5228-1 Annex E Example Method 2 can be used which is applicable for residential buildings as well as community and education buildings:

'Noise levels generated by site activities are deemed to be potentially significant if the total noise (pre-construction ambient plus site noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB $L_{Aeq,T}$ from site noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant effect.'

13.24 The cut-off values given above apply during the following times:

- 65 dB L_{Aeq} Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00);
- 55 dB L_{Aeq} Evenings & Weekends (19:00 – 23:00 Weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays); and
- 45 dB L_{Aeq} Night-time (23:00 – 07:00).

13.25 For this scheme, baseline noise levels are likely to be relatively high given the proximity to the M20 and the Channel Tunnel Rail Link. As such a notional significance threshold of 65 dB L_{Aeq} may be considered as conservative for daytime working. The limit would apply over a 10 to 12 hour working day. There are no proposals for evening or night-time working.

13.26 These limits are much higher than normal noise limits to protect amenity because it is recognized that construction does involve some unavoidable noise and is temporary. Irrespective of the limits, the contractor will be expected to use best practicable means to reduce noise and a construction environmental management plant (CEMP) will be prepared.

Construction Vibration

13.27 Part 2 of BS 5228-2 considers vibration from construction. This is unlikely, but depending on the manner in which the solar panel supports are constructed, there is perhaps the potential for groundborne vibration to be generated i.e. if frame supports are impact driven. That said, it is the recommendation of this report that impact driven piles only be used as a last resort when other means of construction would not be effective.

13.28 The separation distance between the site and the receptors is generally more than 100m though there are a small number of receptors within this distance. The distance between the receptors and the nearest element of site infrastructure is greater than this therefore the significance of any perceived vibration is considered to be low. To that end, no further consideration of groundborne vibration is given in this report.

Operational Noise

International Standards Organisation 9613-2 – Attenuation of sound during propagation outdoors

13.29 For this project, operational noise levels have been predicted using ISO 9613-2. The calculation methodology includes consideration of a number of pertinent factors including distance propagation, screening, airborne absorption etc.

13.30 The calculations have been made using the IMMI noise modelling software which is known to faithfully employ the calculation protocols.

British Standard 4142: 2014 +A1:2019 – Methods for rating and assessing industrial and commercial sound

13.31 The standard method for the assessment of commercial and industrial noise affecting nearby housing is British Standard BS 4142. The methodology typically derives the significance of the noise impact from the difference between the plant noise under consideration and the background sound level as represented by the L_{A90} parameter, determined in the absence of the plant noise.

13.32 In instances where the background and rating levels are low, the standard states:

'Where background sound levels and rating levels are low, absolute levels might be as, or more relevant that the margin by which the rating level exceeds the background…'

British Standard 8233:2014 and WHO criteria

13.33 British Standard BS 8233: 2014 and the World Health Organisation (WHO) also provide external noise criteria to protect residential amenity which could be adopted as absolute limits. These are detailed in **Table 13.1**.

Table 13.1 - *WHO / BS 8233: 2014 Guideline Noise Levels*

Location	Critical Health Effect	07:00 to 23:00	23:00 to 07:00
Outside Bedroom Windows	Sleep Disturbance (Windows Open)	--	45dB $L_{Aeq,\ 8hours}$ (1)
Amenity Spaces (Gardens / Patios)	Moderate Annoyance Serious Annoyance	50dB $L_{Aeq,\ 16\ hours}$ (2) 55dB $L_{Aeq,\ 16\ hours}$ (2)	--
Notes: From WHO Community Noise Guidelines (1999) BS 8233: 2014 and WHO Community Noise Guidelines			

13.34 The WHO guideline of 45 dB $L_{Aeq\ 8hr}$ represents an 8-hour L_{Aeq} outside noise-sensitive rooms to prevent sleep disturbance. The WHO limit is a level at 1m from the façade. Therefore, equivalent free field level would be approximately 3dB lower, that is 42dB L_{Aeq}. The limits apply to relatively anonymous noises without character and are commonly applied to traffic noise etc.

Offsite Traffic Noise

13.35 Increased traffic noise may be an issue during construction with the delivery of panels and other components etc. There will be no significant change in traffic during the operational phase.

Calculation of Road Traffic Noise (CRTN)

13.36 The Technical Memorandum, Calculation of Road Traffic Noise (CRTN) (Department of Transport and Welsh Office, 1988) document details an empirical prediction methodology for the calculation of road traffic noise. Factors within the calculation include vehicle flow; speed, road gradient and road surface construction.

Design Manual for Roads and Bridges LA111 – Noise and Vibration (rev 2)

13.37 The Design Manual for Roads and Bridges LA 111 Noise and Vibration (Rev 2) sets out the methodology for assessing and quantifying the potential noise impacts associated with changes to the local road network.

Significance Criteria

13.38 This section of the chapter defines significance criteria associated with the assessment and consideration of noise drawing upon appropriate guidelines and standards.

13.39 Significant impacts will be deemed to occur if the following conditions are met/breached for each of the given phases of the development:

Construction Noise - Significant effects

13.40 Significant construction noise impacts will be deemed to occur if noise generated by construction operations exceeds the proposed noise limits for the locality based upon the example criteria in Annex E BS5228. For daytime periods this is taken as L_{Aeq} 65dB. Noise levels above this limit would be considered to result in an adverse noise impact.

13.41 The Design Manual for Roads and Bridges gives the following significance criteria for short-term changes:

- Negligible – Less than 1.0dB;
- Minor – 1.0dB to 2.9dB;
- Moderate – 3.0dB to 4.9dB; and
- Major – Greater than or equal to 5.0dB

13.42 These noise limits would apply to change in road traffic noise during the construction phase.

Operational Noise – Significant effects

13.43 Given the very low expected noise levels and the separation distance between the site and the nearest receptors, the assessment of operational noise has been undertaken in line with absolute noise limits. The limits are derived from BS8233 and the WHO guideline criteria detailed in **Table 13.1** on **page 309.**

13.44 To ensure the proposed development is not a significant or prohibiting factor in achieving the relevant WHO guideline values at sensitive receptors, noise generated by the development would need to be approximately 10dB below the guidance levels in **Table 13.1** on **page 309.** This would also ensure that cumulative effects are also low.

13.45 As such, a target of 32dB L_{Aeq} (free field) is proposed for the solar farm. This is set on the basis of the night-time noise limit to ensure that sleep is protected during early morning periods during the summer when sunrise could be at 5am. During the daytime, even in rural areas, occasions when the background noise would be less than 32 dB L_{Aeq} would be rare and therefore a target of 32dB L_{Ar} in the daytime is also likely to be consistent with a rating of a low impact in accordance with BS4142.

13.46 Using the noise target and the guidance of BS4142, the following impact significance criteria in **Table 13.2** have been derived.

Table 13.2 - *Operational Noise Significance Criteria*

Operational Noise Criteria	Impact Significance
Rating noise level less than or equal to noise limit	Negligible
Rating noise level less than or equal to noise limit +5dB	Minor
Rating noise level less than or equal to noise limit +10dB	Moderate (and significant)
Greater than 10dB above noise limit	Major (and significant)

Off Site Road Traffic Noise

13.47 Offsite traffic noise impacts would be deemed to be significant if a short-term increase in excess of 3dB(A) in the predicted traffic noise level is calculated.

BASELINE ENVIRONMENT

Noise Sensitive Receptors

13.48 The site is in a largely rural location to the south-east of Ashford, in the vicinity of the M20 and the Channel Tunnel Rail Link. The area is relatively sparsely populated though does have a small number of residential receptor locations in the vicinity. The closest noise sensitive receptors are identified in **Table 13.3** on **page 312**, where multiple dwellings, adjoining dwellings or assemblages of dwellings were identified, a representative receptor was used. The information includes an approximate grid reference and relative distance to the site boundary. Note; the distance detailed below is the distance to site boundary rather than the nearest solar panel or other plant item.

13.49 The locations of the receptor are more clearly identified at **Plate 13.1**.on **page 313**.

Table 13.3 - *Receptor Location*

Receptor Location	Approximate OS Grid Co-ordinates, (E, N)		Distance to Site Boundary, (m)
AL01 – Partridge Farm	608871	137499	77
AL02 – Bested House	608187	137761	10
AL03 – Water Farm	608146	138837	203
AL04 – Fairbank	607469	139255	287
AL05 – Evegate Manor	606843	138963	493
AL06 – Park Wood Cottage	606921	138432	482
AL07 – Woodleas Farm	606664	137709	625
AL08 – Hogben Farm	607568	137155	200
AL09 – The Paddock	607703	137286	30
AL10 – Lower Park Farm	608164	136853	365

Plate 13.1 - *Receptor Location Plan*

Baseline Noise Climate

13.50 As indicated in **Plate 13.1**, the site lies in the vicinity of the M20 motorway and the Channel Tunnel Rail Link. The result of this is that the noise climate, particularly in the northern portion of the site would be subject to relatively high levels of road and rail noise. There is also a large electricity substation close to the motorway.

13.51 No noise monitoring has been undertaken as part of this assessment however, indicative noise levels from the major infrastructure (road and rail) is freely available via the Extrium noise mapping website. The Extrium data set is from 2019 and is based on predicted noise modelling of the major roads and rail links in the area. The noise mapping for the area indicates that the ambient noise climate in the vicinity of receptors AL03, AL04 and AL05 would fall within the $L_{Aeq\ 16hr}$ 55dB to 59.9dB from road traffic noise. Park Wood Cottage (AL06) is very close to the train line and, the same Extrium mapping indicates noise levels in this vicinity would lie within the $L_{Aeq,\ 16hr}$ 55dB to 64.9dB.

13.52 While the noise mapping does not extend below the 55dB noise contour it would be reasonable to assume that the noise climate at the other receptors is affected by road and rail traffic noise to some extent. Given this, and the proximity of other minor roads in the area would indicate that the prevailing noise climate is not particularly tranquil and that very low noise levels, during the daytime period are unlikely.

PREDICTED EFFECTS

Construction Noise Effects

13.53 The construction phase of the development has the potential to cause short-term audible noise at nearby receptors. The construction phase is understood to cover a nine-month period and is likely to be phased across the site. To that end, noise impacts are likely to vary through the construction phase. Activities most likely to generate disturbance include:

- site establishment including ground works. This may include works for site access roads and hardstanding's and construction of solar panel support structures; and,
- construction traffic – increases in road traffic movements on the surrounding road network due to construction traffic have the potential to generate short-term noise impacts at receptor locations.

13.54 A qualitative assessment of construction noise in line with BS5228 has been undertaken, considering potential noise levels from typical construction processes, noise limits and control measures that could be implemented at the closest residential properties should it be necessary.

13.55 A predictive assessment of construction phase traffic impacts has been undertaken in line with CRTN and DMRB LA111, with the relative change in noise level during each month of the construction phase compared with the existing traffic flow on local roads.

13.56 Effects on specific identified receptors during the construction phase are expected to be short-term in duration, although the exact duration over which the construction phase will occur at each receptor is not yet known. Instead, and assessment is made below by considering the worst-case noise level during the installation of the frame supports based on the minimum distances and source data used in other assessments of this nature. In addition, best practicable means will be employed to reduce noise as set out in the mitigation section below. Construction noise and specific best practicable means measure to reduce noise will also be covered within the scope of a Construction Environmental Management Plan (CEMP).

13.57 Construction operations would generally only occur during daytime working hours – typically:

- 07:00 to 19:00hrs Monday to Friday; and
- 07:00 to 13:00 on Saturday.

Construction Noise Predictions – Solar Panel Frame Construction

13.58 As previously stated, exact specifics of and the types of plant likely to be used in the construction of the site are not currently available. However, to provide a robust assessment, it is considered appropriate to present

potential worst-case noise levels from construction activity that would typically be used within a development of this type, specifically those used to construct panel support frames.

13.59 The preferred approach to install the frames is by being pushed into the ground by mobile machinery similar in size to a tractor. The following mode of operation is assumed, assuming the tractor is pushing the posts into ground for half the time (50% on time) and manoeuvring to the next installation point for the rest of the time:

- pushing in frame posts (50% on-time); and
- manoeuvring to the next installation point (50% on-time).

13.60 All predicted noise levels have been based on typical plant source noise levels taken from the appendices of BS5228 or from third party sources. The noise levels used in the construction calculations are detailed in **Table 13.4**.

Table 13.4 - *Construction Noise Sources*

Plant List	No. of Plant Items	L_{Aeq} at 10m	On-time (%)	Effective L_{WA}#
Pushing Panels for Solar Panels and Fence Posts	1	75 dB	50%	100 dB
Tracked excavator (idling)	1	67 dB	50%	92 dB
Effective Sound Power for Activity				101 dB
Data from Clement Acoustics Report ref. 14027-NIA-01 RevE, dated 19th November 2020)				

13.61 The closest receptor is Partridge Farm (AL01) which is approximately 91m from the nearest frame location. Partridge Farm is financially involved in the project, with the solar farm being built on land owned by the farmstead. The rest of the receptors are at distances more than 100m from the nearest frame structure.

13.62 Note that the distances used in the calculations are taken from the residences to the nearest part of the site boundary to provide a worst-case assumption. The majority of construction works will be taking place further away. The surrounding area is largely farmland, and all receivers are some distance away, therefore the following formula for soft ground distance correction from BS5228:2009 +A1:2014 is adopted:

$$K'_s = (25log_{10} R) + 1$$

13.63 The calculations in **Table 13.5** on **page 316** summarise the predicted noise level from push driven frame supports assuming one vehicle operate at closest approach to the receptor and no screening is used.

Table 13.5 - *Construction Noise Calculations*

Receptor ID	Distance to Nearest Frame Structure (m)	Reference Sound Power Level, L_{WA} (dB)	Soft Ground Distance Attenuation (dB)	Calculated Noise Level at Receptor, L_{Aeq} (dB)
AL01 – Partridge Farm	91	101	50	54
AL02 – Bested House	165		56	47
AL03 – Water Farm	250		61	43
AL04 – Fairbank	302		63	41
AL05 – Evegate	505		69	35
AL06 – Park Wood Cottage	482		68	36
AL07 – Woodleas Farm	730		73	31
AL08 – Hogben Farm	280		62	41
AL09 – The Paddock	145		55	49
AL10 – Lower Park Farm	415		66	37

13.64 The calculations above indicate that the worst affected property, Partidge Farm, may see noise levels from construction of up to LAeq,T 54dB. This would fall within the construction noise criteria during the daytime, evening and weekend periods. It is noted that the calculations above represent activity at the closest point of the proposed frame supports to the receptors; this is unlikely to occur for more than one day as the construction work will progress fairly quickly. Note also that there is no shielding assumed in the calculations.

13.65 It is reiterated that the calculations above represent a worst-case assessment assuming construction activities take place at the closest point to the receptor location. These should be taken into account when preparing the CEMP.

Construction Phase Traffic

13.66 Construction vehicles would access / exit the site at two points along Church Lane before joining the A20, and eventually joining the M20 at junction 10A. Church lane is a minor road, being a single carriageway between the site access and the underpass beneath the railway lines. From the substation the road widens to where it meets the A20.

13.67 Traffic information for all the roads is provided in **Chapter 8** of this ES and includes Department for Transport (DfT) traffic count data for the A20 and M20 and additional traffic counts undertaken on Church Lane.

13.68 The baseline data from the DfT count points is presented in **Table 13.6** on **page 317**.

Table 13.6 - *Baseline Traffic Data - DfT Count Points*

Road Link	Average Weekday Traffic Volume (06:00 to 24:00)	Average Weekday HGV* Movements (06:00 to 24:00)	Percentage of HGVs
M20 - Count Point 7869	38416	7429	19
A20 – Count Point 36252	11416	378	3
* Note the definition of HGV in this instance include standard classifications OGV1 and OGV 2			

Table 13.7 - *Baseline Traffic Data - Additional Count Points*

Road Link	Average Weekday (07:00 to 19:00)	Average Weekday (07:00 to 19:00)	Percentage of HGVs
Church Lane North	743	9	1
Church Lane South	660	12	2
* Note the definition of HGV in this instance include standard classifications OGV1 and OGV 2			

13.69 Traffic count data for Church Road is presented in **Table 13.7** above. This includes the data for Church Lane North (central site access point) and Church Lane South (access point near Partridge Plantation).

13.70 Using the data above, it is possible to calculate a Basic Noise Level (BNL) and appropriate correction for speed and percentage of HGVs in accordance with CRTN. This gives an indicative road traffic noise level for each identified link. Note the traffic flow at both count points on Church Lane would be considered low flow according to CRTN.

13.71 Information provided indicates that the construction phase would last for nine months. During that period the site would expect, on average, 8no vehicle movements per day. These include deliveries of materials and technology and other associated components. It is assumed that the deliveries would be made by HGV though it is possible that small elements would be delivered by smaller vehicles. The traffic data for the construction period is summarised in **Table 13.8** on **page 318**.

Table 13.8 - *Construction Phase Daily Traffic Movements*

Programme Month	1	2	3	4	5	6	7	8	9	Daily Average
Average Daily HGV Movements	7	9	11	10	11	10	4	4	5	8

Table 13.9 - *Change in Road Traffic Noise Level – Construction Phase*

Road Link	Baseline (Pre-construction) Road Traffic Noise Level, $L_{A10,1hr}$ dB	Construction Phase Road Traffic Noise Level, $L_{A10,1hr}$ dB	Difference, dB
Church Lane North	55.1	55.2	+0.1
Church Lane South	54.1	54.3	+0.2
A20	70.8	70.8	+/-0.0
M20	79.2	79.2	+/-0.0

13.72 The number of daily HGV movements to / from the site vary depending on the programme month, ranging from 4 movements per day to 11 during the peak delivery months. Using this information and the traffic flow data summarised in **Tables 13.6** and **13.7** on **page 317**, the pre-construction and construction phase road traffic noise levels can be calculated and, by extension, the change in road traffic noise levels calculated. **Table 13.9** above summarises these calculations. Note the calculations are undertaken to a nominal receptor point at a distance of 10m from the carriageway edge.

13.73 The assessment above indicates very little change in road traffic noise level, even for Church Lane where the increase would be less than 1dB for dwellings in the immediate vicinity. Overall, the change in road traffic noise would be considered negligible in accordance with the criteria detailed in **paragraph13.43** on **page 310**.

Predictions of Operational Noise

13.74 Solar farms do not typically generate high levels of noise however there are some noise emissions associated with the associated grid connection apparatus i.e. inverters, transformers, substations etc.

13.75 The assessments presented below assume all noise generating sources are operating at full capacity for 100% of the assessment period. This is typically considered representative of peak summer when the solar farm is generating at maximum capacity and higher ambient air temperatures require any associated cooling / ventilation fans to operate at maximum.

13.76 The predictions have been made using the IMMI computer noise modelling software implementing the ISO 9613-2. Details on the calculation methodology and assumptions made are presented in **Appendix 13.2** of this document.

13.77 As indicated above, the solar farm would only operate during daylight

hours however, during the summer months it is plausible that the sun could rise at around 05:00. This would be considered part of the night-time and therefore has been assessed against an absolute limit of 32 dB L_{Ar} derived to be 10dB below WHO night-time sleep disturbance criteria.

13.78 The noise predictions are presented in the first instance as a noise contour plot **Figure 13.1** in ES Volume 3, Figures. The figure shows the predicted noise levels (dB L_{Aeq}) in contour bands and the nearest receptor locations. The contours assume that all equipment is running at full capacity, which is only likely to occur in the middle of a sunny day when all plant is operating at 100%. The figure demonstrates that the noise emissions are largely contained within the site area. The lowest contour shown (light green) is the 35dB (A) contour.

13.79 In addition to the noise contours, the model has been used to calculate specific noise levels at the third-party receptor locations shown with red house symbols on the appended figure. These predicted levels have been used to evaluate the noise impact in accordance with the methodology detailed in BS 4142.

Table 13.10 - *Operational Noise Assessment*

Receptor Location	Predicted (Specific) Noise Level LAs dB	Rating Correction dB	Rating Noise Level LAr, dB	Noise Limit dB	Difference dB
AL01 – Partridge Farm	15.5	+2	17	32	-15
AL02 – Bested House	31.0	+2	33	32	+1
AL03 – Water Farm	27.0	+2	30	32	-2
AL04 – Fairbank	15.5	+2	17	32	-15
AL05 – Evegate Manor	15.6	+2	17	32	-15
AL06 – Park Wood Cottage	17.9	+2	20	32	-12
AL07 – Woodleas Farm	12.9	+2	15	32	-17
AL08 – Hogben Farm	20.2	+2	22	32	-10
AL09 – The Paddock	22.7	+2	25	32	-7
AL10 – Lower Park Farm	19.7	+2	22	32	-10

13.80 The predicted specific noise levels are very low at the identified receptor locations. The levels are sufficiently low to assume that any distinguishing features i.e. tonal content or intermittency, would be masked by other environmental noise: road traffic noise, train noise, bird song, wind noise etc. Notwithstanding this, to present very much a worst case, a +2dB rating correction has been applied to account for the potential for a 'just perceptible' tonal content.

13.81 The assessment above demonstrates that the predicted rating noise level from the proposed solar farm, while operating at 100% capacity would generally not exceed the proposed noise limits. The exception to this is receptor AL02, where the predicted rating noise level is 1dB above the noise limit. Notwithstanding this, the

predicted noise level, in absolute terms, is very low and the limits are derived from WHO guidelines to protect sleep during the night-time period and also not significant in terms of BS4142. It is likely that the Solar Farm will only operate at 100% during full sun during the daytime when the sun is high in the sky.

Cumulative Impacts

13.82 A review of the available mapping indicates one adjacent solar farm development which could give rise to cumulative noise impacts. The solar farm is located on land at Partridge Farm and appears to have been constructed and is assumed to be operational.

13.83 The solar farm was originally refused consent under application reference 14/00398/AS. The reasons for refusal did not include any noise concerns. The solar farm was eventually granted planning through appeal in October 2015.

13.84 No noise assessment was submitted with the planning application or any of the subsequent amendments to the consent. As such, it is not possible to assess cumulative noise impact arising from the development. However, given that the worst case element of noise is associated with the construction phase, which has already taken place for this scheme, limited impact is anticipated.

13.85 Additional information indicates a Battery Energy Storage System (BESS) facility is proposed for a parcel of land between the M20 and the train lines, adjacent to the existing electricity substation.

13.86 No planning application has been submitted for the BESS facility at this time, however, it is understood to be imminent. In the absence of any specific details, it is difficult to calculate any particular cumulative impacts. It is noted however that existing noise levels in the area are likely to be high due to the proximity of the motorway, train lines and the existing substation. Noise generated by BESS facilities is generally low and typically only arises from cooling plant and grid connection equipment. In addition, the distance to the nearest noise sensitive receptor location is around +400m. As a result of these factors, the noise impact of the BESS facility is likely to be low at the nearest receptor locations and by extension, the cumulative impact, including noise from the proposed East Stour solar farm, is likely to be low / negligible.

MITIGATION

Construction Phase Mitigation Measures

13.87 The assessments summarised above demonstrate that noise during the construction phase would not exceed the relevant noise limits derived from both BS5228 and the DMRB. Notwithstanding this, some short-term impacts may occur at the closest receptor locations depending on the specifics of the construction programme.

13.88 Inherent mitigation measures to reduce construction have been included in the design. For example, an internal access route has been included to avoid traffic using a section of Church Lane.

13.89 In addition it has been shown that informing residents about the nature of work is an important factor in reducing

general complaints. It is recommended that public engagement be undertaken to alert local residents to the planned construction works and provide contact details for a site manager should any noise related complaints arise. Non-acoustic factors which affect the overall level of complaints must also be addressed, e.g. the use of wheel-washing to control mud on roads.

13.90 Further to the above, 'Best Practicable Means' should be employed across the construction phase to ensure impacts are minimised. These measures will be detailed in the CEMP. Examples of best practicable measures include:

- Equipment should be turned off when not in use and no vehicle idling should be permitted within the construction site including construction yards etc;
- Where possible all noisy plant and equipment should be replaced with less noisy alternatives;
- All plant should be properly maintained and all noise control measures be properly employed i.e. exhaust silencers fitted, vehicle panels closed etc;
- All panel frame supports should be push driven as far as possible. Pre-auguring can be used to facilitate this. Where ground conditions do not allow this, alternative methods should be selected with a view on their potential noise emissions. Impact driven supports should be viewed as a last resort;
- Do not drop materials i.e. access road surface materials etc, from excessive heights. Where necessary consider screens around material drop areas;
- Construction traffic should be timed and routed to minimise the impact to local residents; and
- Noise monitoring should be carried out in the event of valid complaints.

Operational Phase Mitigation Measures

13.91 The locations of the sources of noise have been chosen to maximise, wherever possible, separation from potential receptors thereby including for mitigation inherently within the design.

13.92 Given the impact assessment presented in **Table 13.10** on **page 319**, and the very low predicted noise levels, no further noise mitigation measures are proposed for the operational phase of the development.

RESIDUAL EFFECTS

13.93 The short-term effects of the construction phase would be controlled through the CEMP and may include some of the mitigation measures suggested within this chapter. This will ensure the noise impacts during the construction phase are suitably controlled and there are no residual effects due to the short-term nature of the construction phase.

13.94 Noise during the operational phase is likely to be negligible, even on a conservative assessment basis, and there are no residual noise effects.

SUMMARY OF SIGNIFICANCE

Construction Phase

13.95 The worst-case assessments summarised above demonstrate that noise during the construction phase should fall below the appropriate noise limits; therefore, no significant adverse noise impacts are anticipated. The CEMP will provide further detail on construction methods and mitigation once factors such as the phasing, methodology and equipment are known.

13.96 While there may be some noise impacts during the construction phase, with detailed consideration within the CEMP, the impacts are expected to be **negligible** given the short duration of the construction programme.

Operational Phase

13.97 The assessment presented in **Table 13.10** on **page 319** demonstrates that operational noise from the solar farm would generally fall well below the proposed noise limits which are, in turn, significantly below the level at which sleep disturbance etc is likely to occur in accordance with the WHO Guidelines. The impact of this would be **negligible**.

13.98 The exception to the above is the predicted noise levels at receptor AL02 where predicted noise levels would be 1dB above the noise limit, giving a **minor** impact significance which is not significant in terms of BS4142.

Table 13.11 - *Summary of Impact Significance*

Residual Receptor Effect	Sensitivity of Receptor	Magnitude of Impact	Duration	Nature	Significance
Construction Phase					
Construction Noise and Vehicle movements	High	Negligible	Short Term	Adverse	Negligible
Operational Phase					
Daytime Operational Noise	High	Negligible to Minor	Duration of the consent	Adverse	Negligible
Daytime Operational Vibration	High	N/A	N/A	None	Negligible

REFERENCES

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Her Majesty's Stationery Office, Welsh Office, 1988, Calculation of Road Traffic Noise, UK

Highways England, 2020, Design Manual for Roads and Bridges LA111, Noise and Vibration

BS 4142:2014, 2014, Method for rating and assessing industrial and commercial sound, UK.

BS 8233:2014, 2014, Guidance on sound insulation and noise reduction for buildings, UK.

World Health Organisation, 1999, Guidelines for Community Noise,

International Organization for Standardization, 1996, ISO 9613-2, Acoustics - Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation

Extrium Noise Mapping: http://www.extrium.co.uk/noiseviewer.html

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