

# 14 Noise and Vibration

## Introduction

- 14.1 This chapter of the PEIR provides a preliminary assessment of the effects of noise and vibration arising from the OMSSD project during its construction and operational phases. The preliminary assessment has been undertaken by Ramboll UK Ltd.
- 14.2 The assessment undertaken follows best practice with reference to the Institute of Environmental Management and Assessment (IEMA) Guidelines on Environmental Noise Impact Assessment (2014)<sup>469</sup>; relevant British Standards; the Noise Policy Statement for England (2010)<sup>470</sup> and the relevant noise and vibration aspects contained within section 5.10 of the National Policy Statement for Ports (2012) (NPSfP)<sup>471</sup>.
- 14.3 It should be noted that a preliminary consideration of the potential for underwater noise impacts of the OMSSD project is provided within Chapter 9 of this PEIR.

## Definition of the Study Area

- 14.4 The study area for the preliminary noise and vibration assessment of the construction and operational phases of the OMSSD project encompasses the existing Oikos Facility and the following nearest noise-sensitive receptors.
- Haven Quays – Residential;
  - 62 Haven Road – Residential;
  - Brickhouse Farm – Commercial;
  - 66-73 Hawkesbury Road – Residential; and
  - Concord Rangers Club House – Community / Sports facility.
- 14.5 These are the nearest noise-sensitive receptors to the Oikos Facility. More distant receptors would only need to be assessed if significant effects were predicted at the most distant of these receptors – which as demonstrated within this chapter is not likely to be the case. This approach to the assessment was agreed with Castle Point Borough Council (CPBC) on 29<sup>th</sup> October 2020.

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<sup>469</sup> Institute of Environmental Management & Assessment (IEMA) (2014) Guidelines for Environmental Noise Impact Assessment.

<sup>470</sup> Department of Environment, Food and Rural Affairs (2010) Noise Policy Statement for England.

<sup>471</sup> Department for Transport (DfT) (2012) National Policy Statement for Ports.

- 14.6 Number 62 Haven Road is considered to be a ‘worst case’ representative of all houses on Haven Road and the south end of Ormsby Road that have direct line of sight to Roscommon Way.
- 14.7 The residential premises within the Haven Quays area lie immediately west of the Oikos Facility and are significantly closer to the site of the OMSSD project than other residential receptors.
- 14.8 Consideration has also been given to the noise and vibration impacts during both construction and operational phases on ecological receptors – including the Thames Estuary and Marshes SPA / Ramsar / SSSI, the Holehaven Creek SSSI and the undesignated foreshore area immediately to the south of the Oikos Facility over which the operational jetties of the facility cross. It should be noted, however, that whilst this chapter gives a preliminary view of the noise levels to be generated at these ecological receptors, the implications for the ecological receptors are considered in Chapter 7 (Terrestrial Ecology) of this PEIR.
- 14.9 Additional receptors for the assessment of off-site road traffic noise generated as a result of the construction and operation of the OMSSD project are also included in the study area. Off-site road traffic noise and vibration has been considered for those residential properties closest to the traffic route to and from the Oikos Facility, including property numbers 1, 2 and 5, 6 Waterside Cottages, Great Russell Head Farm and properties at Holland Avenue south east of the junction of Roscommon Way and Canvey Road. These properties are located adjacent to the main highway route between the Oikos Facility and the A13.
- 14.10 The location of the various receptors referred to above are shown on Figures 14.1 and 14.2 contained within Volume 3 of this PEIR.

## Assessment Methodology

### Data and Information Sources

- 14.11 The following data sources have been used in undertaking the preliminary noise and vibration assessment:
- Baseline noise surveys as undertaken by Ramboll in 2019 and 2021 – detailed further in paragraph 14.54 and following;
  - BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites. Noise’ (BS5228-1)<sup>472</sup> for construction plant sound power levels and dredger sound power levels;

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<sup>472</sup> BS 5228-1:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites. Noise’ (BS5228-1)

- BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites. Vibration’ (BS5228-2)<sup>473</sup> for historic data of vibration levels from piling activities;
- Traffic data provided by DTA, the traffic consultants engaged by Oikos on the OMSSD project; and
- Proposed plant sound power levels as provided by dredging operators and manufacturers to Oikos for dredging activities and proposed product pumps.

**Determining Significance of Effects**

14.12 In order to determine the significance of likely effects, the magnitude of the impact and the sensitivity of the receptor / receiving environment are considered together (in accordance with the matrix in Table 14.8). Preliminary mitigation measures are also discussed within this chapter as necessary and the preliminary significance of any residual effects has been identified.

**Sensitivity of receptors**

14.13 The sensitivity of the identified receptors is defined in accordance with the principles of environmental impact assessment as outlined in Table 14.1.

*Table 14.1: Sensitivity of the receiving environment (receptor)*

Sensitivity	Description
High	Receptor / resource has little ability to absorb change without fundamentally altering its present character or is of international or national importance. For example, hospitals, homes, and internationally and nationally designated nature conservation sites which are also known to contain noise sensitive species (noise may change breeding habits or threaten species in some other way).
Medium	Receptors / resource has moderate capacity to absorb change without significantly altering its present character. For example, offices, schools, and play areas. Locally designated nature conservation sites which are also known to contain noise sensitive species (noise may change breeding habits or threaten species in some other way).
Low	Receptor / resource is tolerant of change without detriment to its character or is of low or local importance, for example industrial estates.
Negligible	Receptor / resource is not sensitive to noise.

14.14 For this assessment, residential receptors are considered to have high sensitivity and commercial receptors (farms / sports facilities) are considered to have low sensitivity.

<sup>473</sup> BS 5228-2:2009+A1:2014 ‘Code of practice for noise and vibration control on construction and open sites. Vibration’ (BS5228-2)

**Magnitude of impacts**

14.15 The magnitude of impact is dependent on the activity being assessed as outlined below.

*Construction noise*

14.16 In order to determine the likely effect of noise during demolition and construction of the proposed OMSSD, noise predictions have been carried out in accordance with the procedures presented in BS5228-1 ('Code of practice for noise and vibration control on construction and open sites. Noise'), taking full account of Best Practicable Means (BPM) to be adopted by the proposed development.

14.17 Oikos wish to undertake construction activities 7 days a week with working hours generally Monday to Friday 8am to 6pm and 8am to 4pm on Saturdays and Sundays. Some equipment maintenance or set up work may, however, need to take place outside of the hours specified above.

14.18 The construction traffic flows provided are based upon a 10-hour working day.

14.19 The 'ABC method', as described in BS5228-1 has been applied. This takes the pre-existing ambient noise level, rounded to the nearest 5dB, and uses it to set the threshold value for each time period (Table E.1 of BS5228-1) i.e. day/evening/night. Based on the noise levels measured during the surveys undertaken in 2019 and 2021, which were relatively low, the resulting criteria of relevance to residential receptors are set out in Table 14.2. The adverse effect level is described in accordance with the Noise Policy Statement for England, where:

- NOEL = No Observed Effect Level;
- LOAEL = Lowest Observed Adverse Effect Level; and
- SOAEL = Significant Observed Adverse Effect Level.

14.20 This is outlined in greater detail in paragraph 14.517.

*Table 14.2: Magnitude of Impact – Construction Plant Noise*

Threshold value / dB L <sub>Aeq, T</sub>				
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	Evenings (19:00 - 23:00) and weekends (13:00-23:00 Saturdays and 07:00 – 23:00 Sundays)	Night (23:00 – 07:00)	Adverse Effect Level	Magnitude of Impact
> 70	> 60	> 50	SOAEL	Large
65 - 70	55 – 60	45 - 50	LOEAL	Medium
< 65	< 55	< 45	NOEL	Small

14.21 At the Concord Rangers Club House and Brickhouse Farm – non-residential sensitive receptors - large magnitude of impact are predicted if the construction noise (dB L<sub>Aeq,1hour</sub>) is more than 5dB above the existing ambient noise level (as outlined in the '5dB change method' in BS5228-1). It should be noted that a cutoff of 65 dB L<sub>Aeq</sub> in the day, 55dB L<sub>Aeq</sub> in the evenings and 45dB L<sub>Aeq</sub> is applicable to all receptors (i.e. if a 5dB change is less than

65dB L<sub>Aeq</sub> / 55dB L<sub>Aeq</sub> / 45dB L<sub>Aeq</sub> in the day / evening / night respectively the ‘cutoff’ level should be applied)

- 14.22 Details of typical plant equipment and representative periods of operation have been used to predict the expected noise levels for each activity during demolition and construction. This has been carried out in accordance with BS5228-1 ‘Code of practice for noise and vibration control on construction and open sites. Noise’, which accounts for the following variables:
  - Distance attenuation between source and receiver;
  - Percentage operating time of the plant;
  - Ground absorption; and
  - Façade corrections.
- 14.23 Intervening structures, which may change during construction, have not been taken into consideration i.e. no additional screening has been accounted for. The methodology, therefore, forms the ‘worst-case’ scenario.
- 14.24 Sound power levels for each item of equipment have been taken from BS5228-1 and are reproduced in Appendix 14.1.

*Construction Traffic*

- 14.25 Demolition and construction traffic to and from the application site has been assessed using the change in traffic flow on the local road network. This has been modelled using a commercially-available noise-modelling software CadnaA (CadnaA Environmental Noise Prediction Software, from DataKustik). This noise prediction software can be used to predict noise levels from a variety of sources, using different methodologies and time periods.
- 14.26 Demolition and construction traffic on the application site itself has been assessed using the industry standard ISO 9613-1:1993 ‘Acoustics – Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere’ (ISO 9613-1) in CadnaA. The Calculation of Road Traffic Noise “CRTN” method for predicting road traffic noise is used in the calculation to predict the baseline and future noise levels from the traffic data provided. The baseline noise model was calibrated using the noise survey results.
- 14.27 The magnitude of the predicted change in noise levels has used the scale shown in Table 14.3. The criteria are based on the current guidance on short-term changes in traffic noise levels provided in the Design Manual for Roads and Bridges LA111 2020 (DMRB)<sup>474</sup> (Table 3.17).

*Table 14.3: Magnitude of Impact – Construction Traffic*

Change in Traffic Basic Noise Level L <sub>A10,18hr</sub> dB	Adverse Effect Level	Magnitude of Impact
≥ 5	SOAEL	Large

<sup>474</sup> Highways Agency (HA) (2020, Revision 2) Design Manual for Roads and Bridges LA111.

Change in Traffic Basic Noise Level $L_{A10,18hr}$ dB	Adverse Effect Level	Magnitude of Impact
3 to 4.9	LOAEL	Medium
1 to 2.9	NOAEL	Small
<1	NOEL	Negligible

*Construction Vibration*

- 14.28 BS5228-2 states that for the majority of people, vibration levels between 0.14 and 0.3 mm/s Peak Particle Velocity (PPV) are just perceptible. A vibration level of 1.0 mm/s is sufficient to cause complaint, but tolerable with prior warning, whereas a level of 10 mm/s is intolerable for anything more than a very brief exposure. Vibration levels exceeding 15 mm/s PPV are sufficient to result in minor cosmetic damage in light/unreinforced buildings. This magnitude of vibration (>15mm/s) is not considered likely as a result of the proposed construction activities proposed to be undertaken (driven piling at a distance of 20m would be 5 times less than this), and therefore an assessment of building damage has not been undertaken.
- 14.29 Table 14.4 presents the magnitude of impact for levels of demolition and construction vibration.

*Table 14.4: Magnitude of Impact – Construction Vibration*

Effect: Annoyance	Continuous Vibration Level / PPV $mms^{-1}$	Adverse Effect Level	Magnitude of Impact
Vibration is likely to be intolerable for any more than a very brief exposure to this level.	10	SOAEL	Large
It is likely that vibration of this level in residential environments will cause complaints, but can be tolerated if prior warning and explanation has been given to residents	1.0	LOAEL	Medium
Vibration might be just perceptible in residential environments.	0.3	NOAEL	Small
Vibration might be just perceptible in the most sensitive situation for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	0.14	NOEL	Negligible

- 14.30 BS5228-2 ‘Code of practice for noise and vibration control on construction sites. Vibration’ provides historical data of driven piling at various distances, as summarised in Table 14.5. This data can be used to provide an indicative assessment of the distance at which significant vibration impacts could occur. However, the ground conditions on-site would affect the propagation and piling methods employed and therefore this method is suitable for initial estimates only. Other piling methodologies, such as continuous flight auger piling,

have, at this stage, been discounted in respect of the OMSSD project due to ground condition matters.

Table 14.5: Historic data for vibration in clay soils

Piling Method	Distance from source / m	
	20	100
Driven piles*	2.7-3.6 mms <sup>-1</sup>	0.9-1.4 mms <sup>-1</sup>
* Table D.2 No. 18 from BS5228-2.		

14.31 Vibration from future dredging is not considered to be of greater magnitude than that already present from activities at Jetty 1 – see paragraph 14.77.

*Operational Noise from Fixed Plant Installations*

14.32 The type, quantity and location of fixed mechanical and electrical (M&E) plant associated with the proposed operation of the development has not been finalised in complete detail at this stage in the design and hence it is not possible to fully quantify the noise impact generated at the nearest noise sensitive receptors (NSRs) during the operation of the project. This is not an uncommon position in respect of proposed developments that still need to be subject to detailed design.

14.33 However, to address this position within assessments, a common approach is to identify noise rating levels which the finally chosen equipment and detailed design will meet to ensure no unacceptable noise impacts. This is the approach which has been adopted in respect of the OMSSD project – as explained further in later sections of this chapter.

14.34 Suitable criteria for determining the magnitude of the impact have been based on the guidance in BS 4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS4142)<sup>475</sup>. The basis of BS4142 is a comparison between the existing background noise level at the façade of the nearest NSRs and the plant noise rating level of all new fixed plant sources associated with the proposed development. The relevant parameters in this instance are as follows:

- Background Sound Level –  $L_{A90,T}$  – defined in the Standard as the ‘A’ weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, and quoted to the nearest whole number of decibels;
- Specific Sound Level –  $L_{Aeq,T}$  – the equivalent continuous ‘A’ weighted sound pressure level produced by the specific sound source at the assessment location over a given time interval, T;
- Residual Sound Level -  $L_{Aeq,T}$  – the equivalent continuous ‘A’ weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and

<sup>475</sup> BS 4142: 2014+A1:2019 ‘Methods for rating and assessing industrial and commercial sound’ (BS4142)

- Rating Level –  $L_{Ar,Tr}$  – the specific sound level plus any adjustment made for the characteristic features of the noise.

14.35 The background level and the rating levels are compared, as BS4142 states:

*“Typically, the greater the difference, the greater the magnitude of impact;*

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending upon the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending upon the context; and*
- *The lower the rating level is to the measured background sound level, the less likely it is that the specific sound will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending upon the context.”*

14.36 The magnitude of impact is classified in accordance with BS4142, as outlined in Table 14.6. The criteria are applicable to the nearest NSRs, thereby forming a worst-case scenario as more distant receptors will be subject to lower levels of noise from the proposed development.

Table 14.6: Magnitude of Impact – Operational Plant Noise

Rating level minus background level (dB)	BS 4142 Descriptor	Adverse Effect Level	Magnitude of Impact
≥ 10	Indication of significant adverse effect, depending on context	SOAEL	Large
5 to 9	Indication of adverse effect, depending on context	SOAEL	Medium
0 to 5	Indication of adverse effect, depending on context. The lower the rating level is to the measured level, the less likely there is to be adverse impact.	LOAEL	Small
≤ 0	Indication of low impact	NOAEL	Negligible

*Operational Vibration*

14.37 As outlined in the scoping report, no significant operational vibration from general pumps and associated infrastructure for pumping products for the purpose of import or export activities is expected to be created as a result of the OMSSD project. Thus, operational vibration has not been assessed further.

*Operational Traffic*

- 14.38 Operational road traffic has been assessed by updating the CadnaA baseline noise model (as used for the construction traffic noise assessment) with the future baseline predicted traffic flows, including the traffic predicted to be generated by the proposed OMSSD.
- 14.39 The results have been compared with the baseline noise levels and assessed using the current guidance on long-term changes in traffic noise levels in accordance with Table 3.54b from the DMRB. The magnitude of the predicted change in noise levels was determined by using the scale shown in Table 14.7.

*Table 14.7: Magnitude of Impact – Operational Traffic*

Change in Traffic Basic Noise Level <small>LA10,18hr</small> dB	Adverse Effect Level	Magnitude of Impact
≥ 10	SOAEL	Large
5 to 9.9	LOAEL	Medium
3 to 4.9	NOAEL	Small
<3	NOEL	Negligible
* The ambient noise ( $L_{Aeq}$ ) has been modelled and presented in the results. The change is what is considered crucial; thus the boundary values remain the same.		

**Significance criteria**

- 14.40 The significance of effects are based on the magnitude of impact and the sensitivity of the receptors is given in Table 14.8. This table is taken from IEMA ‘Guidelines for Environmental Noise Impact Assessment’ (2014) page 51 and due to the use of these guidelines the terminology used to describe effects differs from those set out in Chapter 6 of this PEIR. ‘Substantial’ and ‘very substantial’ effects are considered to be significant in ES terms.

*Table 14.8: Significance of effects matrix*

Magnitude of impact (degree of change)	Sensitivity of receptor			
	High	Medium	Low	Negligible
<b>Large</b>	Very substantial	Substantial	Moderate	None
<b>Medium</b>	Substantial	Substantial	Moderate	None
<b>Small</b>	Moderate	Moderate	Slight	None
<b>Negligible / beneficial</b>	None	None	None	None

## Consultation

- 14.41 To date, consultation on noise and vibration matters has been undertaken specifically with Castle Point Borough Council and also through the formal process of obtaining an ES Scoping Opinion from the Planning Inspectorate. The consultation of relevance to noise and vibration matters is summarised in Table 14.9.

Table 14.9: Summary of consultation to date

Consultee	Date	Summary of Response	How comments have been addressed in this Chapter
Castle Point Borough Council	29 <sup>th</sup> Oct 2020 via VC	<ul style="list-style-type: none"> <li>Operational traffic noise at Waterside Cottages to be assessed.</li> <li>General approach on survey and methodology otherwise agreed.</li> </ul>	Noise levels at the Waterside Cottages have been assessed.
Planning Inspectorate (Scoping Opinion)	May 2020	<ul style="list-style-type: none"> <li>Agreed that noise and vibration impacts on ecological receptors to be assessed in the ecology chapter.</li> <li>Vibration impacts arising from dredging should be addressed.</li> <li>No characterisation of marine baseline noise and vibration.</li> <li>BS5228-1 should be considered</li> <li>The noise baseline survey methodology needs to be confirmed with relevant consultation bodies and the methodology should be explained</li> <li>Full data from the base noise survey should be supplied.</li> </ul>	<ul style="list-style-type: none"> <li>Noise and vibration levels have been assessed as appropriate in the terrestrial and marine ecology chapters.</li> <li>There is a capital dredge proposed at Jetty 2, likely to be followed by maintenance dredging in a regime similar to that currently experienced at Jetty 1. Vibration from future dredging for the OMSSD project is not considered to be of greater magnitude than that already present from Jetty 1.</li> <li>Noise levels on the foreshore have been assessed in the ecology chapter. Underwater noise is considered within the relevant marine chapters of this PEIR.</li> <li>BS5228-1 has been used for the construction noise assessment.</li> <li>Noise survey methodology was discussed with Castle Point Borough Council.</li> <li>Baseline noise survey results are presented in Appendix 14.1.</li> </ul>

## Implications of Legislation, Policy and Guidance

14.42 The policy and guidance relevant to the assessment, which has been used for the preliminary Noise and Vibration Impact Assessment reported in this chapter, is summarised below.

### National Policy Statement for Ports (2012)

14.43 The National Policy Statement for Ports (NPSfP) is part of a series of national policy statements to guide the delivery of nationally significant infrastructure proposals. In respect

of noise matters it makes clear that the Government's policy on noise is set out in the Noise Policy Statement for England – which is considered further in paragraphs 14.47 and following (paragraph 5.10.1).

- 14.44 The NPSfP also highlights the need for good design and “*use of appropriate technologies [to]...mitigate adverse impacts such as noise*” (paragraph 4.10.2).
- 14.45 The policy emphasises the need to assess both human and ecological receptors. In summary, the following (amongst other things) should be undertaken by the Applicant:
- Characterisation of existing noise environment;
  - Description of noise-generating equipment and assessment of impact to ecological and human receptors; and
  - Prediction of how noise environment will change during construction and operation (temporally specific) and assessment of this change. This includes all transportation noise, including river movements, associated with the development (paragraphs 5.10.4 to 5.10.7).

### **Overarching National Policy Statement for Energy (EN-1): Planning for new energy infrastructure (2011)<sup>476</sup>**

- 14.46 The Overarching National Policy Statement for Energy requires that the noise and vibration impacts of a proposed development must be assessed. The advice to the Applicant in terms of the noise and vibration assessment is not materially different to that outlined in the NPSfP discussed in the preceding paragraphs.

### **Noise Policy Statement for England (2010)**

- 14.47 The Noise Policy Statement for England (NPSE) sets out the long-term vision of Government noise policy as being to promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development (paragraph 1.6).
- 14.48 The NPSE outlines the following three noise policy aims for the effective management and control of environmental, neighbour and neighbourhood noise (paragraph 1.7):
- *“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.”*
- 14.49 The guidance defines three concepts applied to noise impacts (paragraphs 2.20 to 2.21). These are:

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<sup>476</sup> Department of Energy and Climate Change (2011) Overarching National Policy Statement for Energy (EN-1).

- NOEL (No Observed Effect Level) is defined as: *“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) which is defined as: *“This is the level above which adverse effects on health and quality of life can be detected.”*; and
- SOAEL (Significant Observed Adverse Effect Level) which is defined as: *“This is the level above which significant adverse effects on health and quality of life occur.”*

14.50 The NPSE contains the following three aims (paragraphs 2.23 to 2.25):

- The first aim is to avoid noise levels above the SOAEL;
- The second aim considers situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur; and
- The third aim considers situations where noise levels are between the LOAEL and NOEL. In these circumstances, where possible, reductions in noise levels should be sought through the pro-active management of noise.

14.51 The NPSE recognises that it is not possible to have single objective noise-based measures that define the SOAEL, LOAEL and NOEL that are applicable to all sources of noise in all situations. The levels are likely to be different for different noise sources, receptors and at different times of the day.

### **Other relevant policy and guidance**

14.52 Due regard has been had to the following other guidance and policy in undertaking the preliminary assessment:

- Castle Point Adopted Local Plan (1998)<sup>477</sup> – this outlines the need to consider noise with any development plan and notes that there are no EU monitored Noise Agglomerations in the Borough;
- The submission draft Castle Point Local Plan (with October 2020 amendments) – describes specific localities where noise needs to be considered. It notes that there are no EU monitored Noise Agglomerations in the Borough and recognises that the borough has largely separated lands uses i.e. industrial / residential. Noise quality conflicts are not regarded as a major problem, but are required to be considered in relation to planning proposals;

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<sup>477</sup> Castle Point Borough Council (1998) Adopted Local Plan

- BS7445-1:2003<sup>478</sup>: 'Description and measurement of environmental noise. Guide to quantities and procedures' – describes how noise measurements should be carried out. This has been used for the survey methodology;
- BS5228-1:2009+A1:2014: 'Code of practice for noise and vibration control on construction and open sites. Noise' - describes the methods for rating and assessing noise from construction and open sites to human receptors, as well as outlining procedures to minimise this noise. This has been used for the construction noise assessment;
- BS5228-2:2009+A1:2014 ' Code of practice for noise and vibration control on construction and open sites. Vibration' - describes the methods for rating and assessing vibration from construction and open sites to human receptors, as well as outlining procedures to minimise this vibration. This has been used for the construction vibration assessment;
- BS7385-2:1993<sup>479</sup>: 'Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration' – describes the measurement and evaluation procedure for vibration on buildings. This has been used for the construction vibration assessment;
- BS6472-1<sup>480</sup>: 'Guide to evaluation of human exposure to vibration in buildings. Vibration' Part 1: Vibration sources other than blasting – describes how humans respond to vibration and outlines levels of perception based on vibration dose values. This has been used to assess the effects of vibration during construction;
- DMRB LA111 (2020) – This document sets out the requirements for assessing and reporting the effects of highways noise and vibration from construction, operation and maintenance projects. This has been used to define the magnitude of impact from both construction and operational traffic;
- BS4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound' – describes the methods for rating and assessing sound from an industrial and/or commercial nature. This has been used to assess the magnitude of impact from operational plant noise;
- Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment, 2014 – provides assessment methodology guidance. This has been used to determine the significance of effect matrix, as well as providing guidance on general methodology; and

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<sup>478</sup> British Standards Institution (2003) BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures.

<sup>479</sup> British Standards Institution (1993) BS 7385-2:1993 Evaluation and Measurement for Vibration in Buildings – Part 2: Guide to Damage Levels from Groundborne Vibration. BSI.

<sup>480</sup> British Standards Institution (2008) BS 6472:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting. BSI.

- Relevant aspects of Planning Practice Guidance (PPG)<sup>481</sup>.

## Preliminary Description of the Existing Environment

### Description of the Existing Environment

- 14.53 The baseline noise climate has been modelled in noise modelling software CadnaA using the traffic data provided by the traffic consultant for both the day and night-time periods. However, in order to accurately reflect the whole noise climate including road surface conditions and other noise sources, the noise model has been calibrated using results from the noise survey outlined below. Full details of the baseline noise survey are set out in Appendix 14.1.
- 14.54 A noise survey was undertaken in July 2019 to assist in establishing the current baseline conditions. This comprised attended and unattended measurements at the locations shown on Figure 14.1 undertaken in accordance with the following methodology:
- The unattended measurement locations were LT1 (Haven Quays) and LT2 (adjacent to Haven Road at Compound 10). Location LT1 is considered representative of the nearest noise-sensitive receptors to the proposed works (Haven Quays) and LT2 is representative of the nearest residential receptor to the additional predicted HGV movements to / from the Oikos Facility. Measurements were undertaken for a period of 1 week (including a weekend) and comply with BS7445-1:2003 'Description and measurement of environmental noise. Guide to quantities and procedures' (BS7445-1).
  - The attended measurement was undertaken at location ST1 (Thames Road) on Figure 14.1 in order to capture the noise climate representative on the Concord Rangers Club House.
- 14.55 The noise during setup and collection of the noise equipment was observed to be relatively quiet, with traffic along Haven Road being the main contributing noise source. The measurement results are summarised in Table 14.10.

Table 14.10: Summary of noise measurement results July 2019

Measurement Location	Time / Measurement Period	Average Noise Level (dB L <sub>Aeq,T</sub> )	Background Noise Level (L <sub>A90,T</sub> dB)	L <sub>A10</sub> , dB
LT1	Daytime (0700-2300)	49	38	51
	Night-time (2300-0700)	44	35	44

<sup>481</sup> Ministry of Housing, Communities and Local Government (2019) *National Planning Policy Framework*

Measurement Location	Time / Measurement Period	Average Noise Level (dB L <sub>Aeq,T</sub> )	Background Noise Level (L <sub>A90,T</sub> dB)	L <sub>A10</sub> , dB
LT2	Daytime (0700-2300)	62	40	62
	Night-time (2300-0700)	56	32	51
ST1	02/07/2019 14:17-15:17	54	41	54

14.56 An additional noise survey was undertaken in January 2021. This comprised a one 24-hour measurement on Roscommon Way (LT3 on Figure 14.2) and 2 no. 1-hour attended measurements. Attended measurements, were taken at locations ST2 and ST3 on Figure 14.2. It should be noted that the measurements were taken during ‘lockdown’ due to the Covid-19 pandemic. However, traffic levels are not considered to have dropped >25% i.e. the level required to experience a change in noise level, and also corroborate the levels predicted in the noise model.

- The measurement at LT3 was to capture the night-time noise levels along Roscommon Way. This is so that the change in noise level at 62 Haven Road (and the rear of receptors on Coker Road) can be modelled.
- The measurement at ST2 is considered representative of Waterside Cottages (nos. 5 and 6 Waterside Cottages) south of the Canvey Road / B1014 roundabout. The measurement was taken in a layby just south of these properties for safety reasons.
- The measurement at ST3 is considered representative of receptors on Holland Avenue.

Table 14.11: Summary of noise measurement results January 2021

Measurement Location	Time / Measurement Period	Average Noise Level (dB L <sub>Aeq,T</sub> )	Background Noise Level (L <sub>A90,T</sub> dB)	L <sub>A10</sub> , dB
LT3	Daytime (0700-2300)	58	35	62
	Night-time (2300-0700)	50	32	51
ST2	25/01/2021 12:15-13:15	74	60	78
ST3	25/01/2021 13:30-14:30	61	55	62

### Environmental Change without the OMSSD Project

14.57 It is currently considered that there will be minimal change to the noise and vibration climate without the OMSSD project, based on current planning submissions. This position will be

kept under review during the preparation of the final OMSSD ES. If the OMSSD project were not to go ahead, the noise sources of vessels unloading at the operational jetties - Jetty 1 and Jetty 2 - would remain as they are. Any noise sources from HGV traffic using the Oikos Facility would remain with traffic levels broadly similar to existing levels taking account of demand from customers.

## Preliminary Consideration of Likely Impacts and Effects

- 14.58 The OMSSD project has the potential to create sources of ambient noise and vibration during the course of the site preparation and construction activities and upon completion and operation of the proposed development.
- 14.59 Potential noise and vibration impacts and likely effects can be summarised as follows:
- Site preparation and construction plant noise and vibration effects to buildings, building occupants and ecological receptors within the study area;
  - Site preparation and construction traffic noise and vibration effects to existing receptors within the study area;
  - Operational noise effects on local residents and businesses as a result of traffic generated by the proposed development, in particular, the additional HGV movements along the traffic route to and from the site from the additional proposed road loading facilities;
  - Increases to operational ships movements including associated unloading in the context of the existing noise climate resulting in increased noise levels; and
  - Effects of operational plant noise from the proposed development upon existing noise sensitive receptors, including any ecological receptors.
- 14.60 These matters are considered in more detail in the following paragraphs. Offsite ecological works are not considered to generate high-levels of noise as they are small-scale and agricultural in nature.
- 14.61 Phasing of construction works, which has yet to be finally determined, may also contribute to a reduction in noise levels.

### Construction Noise (excluding Capital Dredge)

- 14.62 The construction noise has been modelled for each of the proposed activities as outlined in the methodology. This comprises calculating the sound pressure level from construction activity to the receptor from all plant in operation during that activity (accounting for the proposed time that the plant is operational in a given hour). The locality of each activity has also been taken in consideration and in each case an absolute 'worst-case' (shortest distance) has been used. No reduction for intervening structures, or noise barriers, have been allowed for in this initial assessment.

Table 14.12: Predicted construction noise levels at human receptors

Measurement Location	Pre-existing ambient noise level (L <sub>Aeq,T</sub> dB)	Predicted construction noise level (L <sub>Aeq,1hr</sub> dB)								
		Site Prep	New Workshop Building	Piling	Tank Construction	Firewater / Pipework	Erection of new MLAs, pipeworks & infrastructure Jetty 1	Erection of new MLAs, pipeworks & infrastructure Jetty 2	Office Extension	Road works / Landscaping
Haven Quays	49	70	72	61	73	63	69	62	77	78
62 Haven Road	55	57	49	48	60	54	55	56	57	59
Brickhouse Farm	50	57	48	48	60	53	55	55	56	57
66-73 Hawkesbury Road	48	55	45	46	58	49	53	53	53	53
Concord Rangers Club House	49	55	44	47	58	49	52	53	52	53

14.63 The temporal nature of these works should however be taken into consideration. In particular, activities such as the erection of Marine Loading Arms (MLAs) will have a very short temporary impact.

14.64 Table 14.13 sets out, for completeness, the predicted construction noise levels at the various ecological sites in the vicinity of the Oikos Facility, (including the capital dredge for this purpose). The noise levels are free-field (unlike the façade noise levels presented for the human receptors). Receptors on the foreshore are considered to be at least 20m from the river wall. All other receptors have been considered as located at the nearest point of the specified area to the construction activity. For the avoidance of doubt, the preliminary consideration of the effects of construction noise on these sites is considered within the ecology chapters of this PEIR.

Table 14.13: Predicted noise levels at ecological receptors

Activity	Site Prep	New Workshop building	Piling	Tank construction	Firewater / pipework	Erection of new MLAs, pipework and infrastructure on jetty 2	Jetty 1 MLAs	Office extension	Road works / landscaping	Dredger from capital dredge
Foreshore with sea wall attenuation	51	51	50	63	58	76	74	67	52	62
North ecological	57	46	47	59	55	40	44	53	63	35

West ecological	71	60	54	66	66	42	52	63	61	40
SSSI	59	56	49	61	54	54	67	64	58	50

**Daytime**

14.65 The preliminary results (Table 14.12) show that, in the absence of any mitigation and on the basis of the worst case assumptions made, only the Haven Quays receptors would be likely to experience noise levels >65dB LAeq, and only then in respect of the following.

- Site preparation is predicted to have a medium magnitude of impact i.e. substantial effect.
- Construction of the new workshop building, tank construction closest to Haven Quays, erection of the MLA and pipework on Jetty 1, office extension and roadworks / landscaping activity in close proximity to Haven Quays are predicted to have a large magnitude of impact i.e. very substantial effect.

14.66 All other receptors listed in Table 14.12 are predicted to have a small magnitude of impact resulting in a likely overall moderate – but not significant – adverse effect.

14.67 It should be noted, however, that the predicted levels are averages, and that at certain periods the noise levels could exceed the above values. This is particularly relevant to driven piling, which could, for example, result in noise levels of up to 78dBA at the façade / exterior of the residential premises in Haven Quays if 4 piling rigs were to be operating at 95m. One piling rig at 218m would result in noise levels of up to 69dBA.

14.68 Measures which could potentially be put in place to control such activity are discussed further within the mitigation measures section that follows.

**Evenings and Weekends**

14.69 If construction, in the absence of any mitigation measures, is undertaken in accordance with the ‘worst-case’ assumptions which have been made, during evening and weekends, a large magnitude of impact would result at Haven Quays during all construction activities. As the receptors are highly sensitive, this is considered a very substantial effect. As discussed later in this chapter, ‘noisy work’ will, however, be controlled during evening and weekends and additional mitigation is to be put in place.

14.70 Again, in the absence of any mitigation a medium magnitude of impact would likely occur at all other receptors during site preparation, tank construction and erection of the MLAs. Medium magnitude of impact is also predicted at 62 Haven Road and Brickhouse Farm during the office extension and roadworks/landscaping.

14.71 On the basis of the assumptions made in respect of the noise levels predicted, the effects based on the above magnitude of impact and receptor sensitivity would, in summary, in the absence of any mitigation, be:

- Very substantial effect (significant): Haven Quays during all activities.

- Substantial effect (significant): 62 Haven Road during site preparation, tank construction, erection of MLAs, office extension and roadworks/landscaping; 66-73 Hawkesbury Road during site preparation and tank construction; Brickhouse Farm during site preparation, tank construction and erection of the MLAs, office extension and roadworks / landscaping and Concord Rangers Club House during site preparation and tank construction.
- Moderate effect (not significant): 62 Haven Quays and Brickhouse Farm during new workshop building, piling, firewater/pipework; 63-73 Hawkesbury Road and Concord Rangers Club House during new workshop building, piling, firewater/pipework, erection of MLAs, office extension and roadworks/landscaping.

14.72 Even on the basis of the worst case assumptions which have been made in identifying the predicted construction noise levels, the above preliminary assessment demonstrates that the possibility exists to carry out some construction activities on site during the evenings and weekend period which will not have significant noise effects on residential receptors. This matter is discussed further in the following mitigation and residual effects section of this chapter.

**Construction Noise – Capital Dredge**

14.73 In order to consider noise from the capital dredging activity, previous surveys and information of dredging works undertaken elsewhere have been reviewed, including data provided by dredging companies and assessments such as the Southampton Approach Channel Dredge (2008). The capital dredge will be either trailer suction hopper dredger (TSHD) or backhoe dredger. For TSHD, the airborne sound power levels range from 112 to 118 dB. For the Backhoe dredger the sound power levels range from 115 to 118 dB. Thus, a sound power of 118dB has been assumed as a ‘worst-case’ scenario. The low frequency content has also been taken into account.

14.74 The preliminary noise levels predicted at each receptor from the berth pocket dredge of Jetty 2 are given in Table 14.14.

*Table 14.14: Predicted noise level from Capital Dredge activity*

Measurement Location	Pre-existing ambient noise level during the day (dB L <sub>Aeq,T</sub> )	Predicted noise level from Capital Dredge at Berth Pocket of Jetty 2 (dB L <sub>Aeq,T</sub> )
Haven Quays	49	50
62 Haven Road	55	41
Brickhouse Farm	50	33
66-73 Hawkesbury Road	48	32
Concord Rangers Club House	49	37

- 14.75 In accordance with the methodology outlined, the results indicate that there will be a small magnitude of impact. Therefore, a moderate – but not significant - effect is predicted.

### **Construction Vibration (excluding Capital Dredge)**

- 14.76 The main source of construction vibration will be from the piling. Having regard to Tables 14.4 and 14.5, driven piling could potentially generate an impact of medium magnitude in respect of that element of piling undertaken closest to Haven Quays, namely the west side of Compound 1 and Compound X, albeit that such activity will be in the order of 100m away from the receptors at Haven Quays at its closest. If a medium magnitude impact were to occur this would result in a substantial (significant) effect on a limited number of the Haven Quays receptors for the short period that piling was taking place. At greater distances, a small magnitude of impact is predicted, which is not considered significant. The vibration impact from driven piling is expected to have no significant effect at the other (more distant) receptors.

### **Construction Vibration – Capital Dredge**

- 14.77 In the absence of data of vibration from dredging activities, the construction vibration has been assessed relative to the current dredging activities. It is considered that the proposed capital dredge will generate similar levels of vibration to the current maintenance dredging activities / previous dredging at the site. It is, therefore, considered at this stage that there is no significant effect to the marine environment, which would already be accustomed to vibration from existing dredging activities.

### **Construction Traffic Noise**

- 14.78 It is estimated that HGV 2-way movements will be up to 160 movements (two-way) per day i.e. up to 16 HGV movements per hour when the removal of contaminated soil and construction periods overlap. In addition, 196 two-way light vehicle movements per day are predicted. These peak traffic levels have been modelled and compared with the pre-existing noise climate determined by modelling.
- 14.79 The noise modelling assumptions are:
- Each receptor is at a height of 4m, as to represent a 1<sup>st</sup> floor bedroom. However, the Haven Quays receptor (south-east corner of Haven Quays, where the baseline noise survey was undertaken) is at a height of 1.5m as some residential units at this location are static caravans.
  - The baseline AADT traffic data used in both the construction traffic and the operational traffic models was sourced from Oikos' traffic consultant.
  - The traffic speeds have been assumed as 30mph on Haven Road and 50mph on Roscommon Way / Canvey Road / Canvey Way.
  - Soft ground has been assumed on the grassland areas. Hard standing (ground absorption of 0) has been assumed across the Oikos site and on the road network.

- Intervening structures, where applicable, have been accounted for.

14.80 The predicted construction traffic noise levels are given in Table 14.15.

Table 14.15: Predicted traffic noise levels at the NSRs during construction

Measurement Location	Time / Measurement Period	Pre-existing level / dB L <sub>A10</sub>	Change / dB
Haven Quays	Daytime (0700-2300)	51	+0.1
62 Haven Road	Daytime (0700-2300)	62	+0.7
Brickhouse Farm	Daytime (0700-2300)	56	+0.1
66-73 Hawkesbury Road	Daytime (0700-2300)	52	0
Waterside Cottages (south of roundabout)	Daytime (0700-2300)	78	+0.4
Waterside Cottages (north of roundabout)	Daytime (0700-2300)	78	+0.4
Holland Avenue	Daytime (0700-2300)	62	+0.1
Concord Rangers Club House	Daytime (0700-2300)	54	+0.1

14.81 The construction traffic is predicted to have <1dB change at all receptors; this correlates to a negligible magnitude of impact i.e. no significant effect.

### Operational Traffic Noise

- 14.82 The proposed operational traffic has been modelled in commercially available software as outlined in the methodology with the traffic route via Roscommon Way and A130 Canvey Way to the Sadlers Farm roundabout (junction of A13 and A130).
- 14.83 The OMSSD project includes the provision of five additional road loading bays. For the initial assessment, it is assumed that the bays will operate continuously day and night with up to 20 movements per hour across the five loading bays, although as already highlighted, in practical operational terms this certainly will not be the case. This has been used to predict the worst case noise levels at the identified noise-sensitive receptors.

Table 14.16 Predicted traffic noise levels at the NSRs during operation

Measurement Location	Time	Change / dB
Haven Quays (adjacent to existing Oikos car park)	Daytime (0700-2300)	+0.1
	Night-time (2300-0700)	+0.3
62 Haven Road	Daytime (0700-2300)	+1.3
	Night-time (2300-0700)	+4.9
Brickhouse Farm	Daytime (0700-2300)	+0.3
	Night-time (2300-0700)	+0.5
66-73 Hawkesbury Road	Daytime (0700-2300)	0
	Night-time (2300-0700)	+0.1
Waterside Cottages (south of roundabout)	Daytime (0700-2300)	+0.5
	Night-time (2300-0700)	+2.3
Waterside Cottages (north of roundabout)	Daytime (0700-2300)	+0.5
	Night-time (2300-0700)	+2.3
Holland Avenue	Daytime (0700-2300)	+0.1
	Night-time (2300-0700)	+0.7
Concord Rangers Club House	Daytime (0700-2300)	+0.1

- 14.84 The results show that most receptors have <3dB increase during both the day and night-time periods. In accordance with Table 14.7, this is considered a negligible magnitude of impact at these receptors which equates to no significant effect.
- 14.85 The exception is 62 Haven Road during the night-time period. This is predicted to have a 4.9dB increase in noise level, and thus a small magnitude of impact. This is due to the exiting noise climate being significantly quieter than that experienced at other receptors along the road network. Using the approach set out in Tables 14.7 and 14.8 this would equate to a moderate, and therefore, non-significant effect on this receptor.
- 14.86 Furthermore, any change in night-time noise levels will be gradual as road loading operations begin and build up. It is, therefore, highly unlikely that the changes in noise levels predicted in Table 14.16 will occur at a single point in time.

**Operational Plant Noise**

- 14.87 As explained in the earlier paragraphs of this chapter, the precise type, quantity and location of fixed mechanical and electrical (M&E) plant associated with the proposed operation of the development has not been finalised in complete detail at this stage in the design.

14.88 However, to address this position within this preliminary assessment, a common approach has been taken whereby noise rating levels have been identified at different locations which the finally chosen equipment and detailed design will aim to meet to ensure no unacceptable significant noise effects.

14.89 The representative background noise level as measured during the noise survey and the corresponding plant noise limit at each of the nearest NSRs determined at this preliminary assessment stage is outlined in Table 14.17. The plant noise rating level has been set as less than, or equal to, background noise levels to achieve NOAEL in accordance with Table 14.6. The rating noise level is the specific noise level, plus any corrections for intermittency or other sound characteristics outlined in BS4142. It should be noted that this plant noise rating level applies to the cumulative noise levels from all plant installed as part of the proposed development.

Table 14.17: Plant noise emission limits

Receptors	Period	Representative Measured Background Noise Level / dB LA90	Noise Rating Level Limit / dB LAr
Haven Quays	Daytime (0700-2300)	38	38
	Night-time (2300-0700)	35	35
62 Haven Road / Brickhouse Farm / 66-73 Hawkesbury Road	Daytime (0700-2300)	40	40
	Night-time (2300-0700)	32	32
Concord Rangers Club House	Daytime (0700-2300)	40	40

14.90 Suitable plant will be chosen so as to meet the above criteria. Providing the above limits are met, the noise effect of fixed plant installations is predicted to be Negligible, which is not considered significant.

14.91 The fixed plant currently proposed is as follows:

- 3 no. additive injection pumps associated with the Road Loading activities: These are very small units and not considered to generate high levels of noise;
- 4 no. dewatering pumps: These are manually operated to empty water from the sumps within each individual compound. The operation is understood to be similar to that experienced at present at other locations across the site i.e., only one at a time for limited periods. Therefore, no additional assessment has been undertaken;
- Product pumps: The product pumps are sited on 3 separate pump pads. One pad is sited immediately to the west of Compound 8 approx. 500 metres from Haven Quays, the second pad is sited on the east side of Compound 3 approx. 400 metres from Haven Quays. The third pad, containing 2 pumps, is sited on the west side of Compound 1, there are two pumps on this pad, and these are approx.100 metres from

Haven Quays. The sound pressure level of these product pumps is specified as a maximum of 85dBA at 1m;

- Firewater pumps; and
- Vessels unloading: There are already existing unloading activities at both Jetty 1 and Jetty 2 which have been captured as part of the existing noise climate. Additional contributions from Jetty 2 have been accounted to provide a reasonable model of extra unloading activity (MLAs are to double from 2 to 4).

14.92 The firewater pumps have not been assessed in detail as they are considered to be emergency plant. They will each be tested in turn for a period of 20 minutes once per week and will be housed in a solid brickhouse which will attenuate much of the noise at source.

14.93 Table 14.18 provides the plant noise contribution from each source at the receptors. It is assumed that 2 pumps will be operational at any one time. As a ‘worst-case’ these have been located at the west of Compound 1 for all receptors except Hawkesbury Road and Concord Rangers Club House. In these instances, the pumps have been assumed to be located at the south-west corner of compound 8. The plant noise rating level includes a 3dB correction to account for the intermittency of vessels unloading, in accordance with BS4142.

Table 14.18: Plant noise emission levels

Receptors	Plant item	Specific Plant Noise Level / dB L <sub>Aeq</sub>	Noise Rating Level Limit / dB L <sub>Ar</sub>	Does it meet plant noise rating limit?
Haven Quays	Product pumps	29	34	Yes
	Unloading vessels Jetty 2*	27		
62 Haven Road	Product pumps	10	18	Yes
	Unloading vessels Jetty 2*	14		
66-73 Hawkesbury Road	Product pumps	4	13	Yes
	Unloading vessels Jetty 2*	9		
Brickhouse Farm	Product pumps	10	18	Yes
	Unloading vessels Jetty 2*	13		
Concord Rangers Club House	Product pumps	2	16	Yes
	Unloading vessels Jetty 2*	13		

\* Data used for the Deepwater Jetty ES chapter (June 2015) has been used (due to COVID-19 restrictions no additional measurements could be undertaken). During vessels unloading the noise levels were measured as 52dB L<sub>Aeq</sub> on the river wall. Contribution has been modelled as a point source at the river wall.

- 14.94 Plant noise limits are met in all cases. Thus, on this basis all receptors are calculated to have a negligible magnitude of impact and are therefore no significant effect is predicted.

### **Operational Dredging Activity (maintenance)**

- 14.95 There will be occasional maintenance dredging at Jetty 2; with existing maintenance dredging activity at Jetty 1 unaltered by the OMSSD project.
- 14.96 As outlined by the PLA (2004)<sup>482</sup>: *“These are short-term, infrequent events which will take place during the normal operation of the estuary, and so will be in addition to the noise produced by the passage of the vessel traffic...the noise levels from the dredging, particularly water injection methods, are comparable to, and often lower than, the ongoing noise from routine ship operations”.*
- 14.97 Thus, no significant effect is predicted at the noise-sensitive receptors as a result of the maintenance dredging.

### **Human health**

- 14.98 Noise and vibration can influence human health, particularly if experienced in large doses for long periods of time. The OMSSD project seeks to limit / minimise noise and vibration to well below the level at which significant health impact would be observed. Within this assessment, the effect on human health have been assessed by considering construction and operational noise and vibration activities. On the basis of the preliminary assessment undertaken, it is considered that there will be no significant adverse implications on human health as a result of noise and vibration.

### **Climate change**

- 14.99 Noise and vibration impacts and effects are largely unaffected by climate change. Noise and vibration generated by the proposed OMSSD is also not considered to have any climate change effects.

## **Mitigation Measures**

- 14.100 The following sections sets out the noise and vibration mitigation measures which have been identified at this preliminary assessment stage.
- 14.101 During the site preparation and construction phases, means of best practice will be used to minimise, as far as is reasonably practicable, the level of noise to which operators and others in the neighbourhood of the facility will be exposed.
- 14.102 Such practices will include, for example:

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<sup>482</sup> <http://www.pla.co.uk/Environment/Maintenance-Dredging-Noise-Levels>

- ensuring that construction plant and equipment is kept in good working order and regularly maintained in line with good practice on construction sites, and
- regular liaison with local residents, especially those within the Haven Quays area, about the construction activities.

- 14.103 It is envisaged that such measures will be detailed within a Construction Environment Management Plan (CEMP).
- 14.104 During construction it is also envisaged that careful ongoing analysis of activities will be undertaken by the chosen contractor / contractors to seek to minimise noise through the careful definition of working patterns and phases. In this respect, consideration will also be given to agreeing controls on construction activity with Castle Point Borough Council under section 61 of the Control of Pollution Act<sup>483</sup>. This form of control is likely to be of particular benefit in circumstances where some form of construction activity is proposed to be undertaken during the evening or weekend periods. The contractor will endeavour to programme works so that activities undertaken during evenings / weekends are more distant to Haven Quays and comprise quieter activities.
- 14.105 Oikos are proposing to provide a solid site hoarding / barrier (minimum surface mass 10kg/m<sup>2</sup> and at least 2.4m high) along the western boundary of the Oikos Facility during the extent of the construction process to further minimise noise at Haven Quays. This barrier which will be installed for acoustic purposes, will run long along the west of the current access road in all areas where there is not a concrete wall higher than 2.4m. It is predicted that such a continuous barrier would reduce the noise levels at Haven Quays by around 5 dB.
- 14.106 In addition, Oikos have proposed that localised hoarding or shielding is provided around piling equipment when in operation in proximity to noise sensitive receptors. The resulting noise levels at Haven Quays, with a 5dB reduction, are given in Table 14.19. This shows that only 4 activities exceed the 65dB L<sub>Aeq</sub> threshold for daytime construction noise; namely, tank construction, office extension, new building workshop and roadworks / landscaping. This is primarily due to the relatively short distance from these activities to Haven Quays. The tank construction noise in particular will only occur during works on the closest tanks (compound 1 and compound X) to Haven Quays. Tank construction at greater distances will result in lower levels of noise at Haven Quays. The tank construction at the nearest location to Haven Quays will encompass a relatively short timeframe, as will the office extension, roadworks and landscaping.

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<sup>483</sup> Control of Pollution Act

Table 14.19: Predicted construction noise levels at Haven Quays with mitigation

Measurement Location	Pre-existing ambient noise level (L <sub>Aeq,T</sub> dB)	Predicted construction noise level (L <sub>Aeq,1hr</sub> dB)								
		Site Prep	New Workshop Building	Piling	Tank Construction	Firewater / Pipework	Erection of new MLAs, pipeworks & infrastructure Jetty 1	Erection of new MLAs, pipeworks & infrastructure Jetty 2	Office Extension	Road works / Landscaping
Haven Quays	49	65	67	56	68	58	64	57	72	73

## Limitations

14.107 The construction noise assessment is based on the preliminary proposed activities and equipment as identified by Oikos and its relevant advisors. Work will continue on these matters as the project progresses and any further developments will be taken account of in the final assessment to be reported in the Environmental Statement in due course.

## Preliminary Conclusions on Residual Effects

### Construction

14.108 During daytime construction, the following initial effects, prior to mitigation, are predicted at the receptors:

- Haven Quays: Substantial – Very substantial (significant) effects
- All other receptors: No significant effects

14.109 With mitigation (solid site hoarding), substantial (significant) effect is predicted at Haven Quays during new workshop, tank construction and a very substantial effect (significant) during the office extension and roadworks/landscaping when occurring in close proximity to Haven Quays. This is a ‘worst-case’ scenario, as when activities such as tank construction occur further from Haven Quays than compound 1 and X, noise levels will be lower. Thus, these impacts will only occur for a short time, relative to the construction period. All other receptors will remain with no significant effects.

- 14.110 This estimation does not account for screening from buildings or other obstacles, which could result in lower noise levels.
- 14.111 During evening / weekends, construction activities could result in a substantial or very substantial effect at all residential receptors. With careful consideration of activities to be undertaken during evenings / weekends, the significance of effect will be reduced i.e. by undertaking activities locating further away from Haven Quays, minimising 'noisy works' and agreeing controls on construction activity with Castle Point Borough Council under section 61 of the Control of Pollution Act.
- 14.112 Construction vibration could have substantial (significant) effect on some receptors within Haven Quays, but only in respect of the limited piling work needed within Compound 1 and Compound X. All other receptors are considered to experience no significant effect.
- 14.113 The capital dredge is not predicted to have a significant effect and construction traffic is similarly not predicted to have a significant effect.

### **Operation**

- 14.114 Operational traffic noise is predicted to have no significant effects at any of the receptors.
- 14.115 Plant noise is not predicted to have any significant effect on the receptors.
- 14.116 Maintenance dredging noise is not predicted to have any significant effect on the receptors.