Environmental Impact Assessment Report (EIAR) – Volume 2

Chapter 11 – Terrestrial Noise and Vibration

CHAPTER 11

Proposed ORE Capable Terminal on a 250m Wharf Extension & Ancillary Operational Support Infrastructure

Port of Waterford Company

Port of Waterford, Belview, Co. Kilkenny

MALONE O'REGAN ENVIRONMENTAL

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11 TERRESTRIAL NOISE AND VIBRATION

This Chapter of the EIAR was prepared by the MOR Environmental team and provides a description and assessment of the likely effects of the Proposed Development on terrestrial noise and vibration (above-ground sound (airborne) and in-ground vibration). The likely acoustic effects on subaquatic species will be considered separately in Chapter 12, which covers Underwater Noise and Vibration.

11.1 Introduction

In this chapter, the following is presented:

- Quantification of the existing ambient and background acoustic / sound environment;
- Quantification of the likely construction and operational noise associated with the Proposed Development;
- Assessment of the likely significance of impacts arising from the Proposed Development; and,
- Outline any relevant and proportional mitigation measures to the project design.

11.2 Methodology

A glossary of acoustic terms is presented in Appendix 11-1.

The following acoustic standards and guidance documents were utilised to characterise the baseline conditions and in the assessment of potential acoustic impacts:

- BS5228-1:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites, Noise [1];
- BS5228-2:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites, Vibration [2];
- S.I. No. 549/2018 European Communities (Environmental Noise) Regulations 2018 [3];
- Institute of Acoustics ('IOA') / Institute of Environmental Management and Assessment ('IEMA') *Guidelines for Environmental Noise Impact Assessment*, 2014 [4];
- Acoustic and Noise Consultants ('ANC') Guidelines (Greenbook) Environmental Noise Measurement Guide, 2013 [5];
- Association of Acoustic Consultants of Ireland ('AACI') Environmental Noise Guidelines for Local Authority Enforcement and Planning Sections (Release 2), 2021 [6];
- ISO 1996-1:2016 Acoustics - Description, measurements and assessment of environmental noise - Part 1: Basic quantities and assessment procedures 2003 [7];
- ISO 1996-2:2017 Acoustics - Description, measurement and assessment of environmental noise - Part 2: Determination of sound pressure levels [8];
- ISO 9613-1:1993 Acoustics — Attenuation of sound during propagation outdoors — Part 1: Calculation of the absorption of sound by the atmosphere [9];

- ISO 9613-2:2024 Acoustics — Attenuation of sound during propagation outdoors - Part 2: General method of calculation [10];
- EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), 2016 [11];
- Draft EPA Guidance Note for Noise Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), 2024 [12];
- NRA Guidelines for the treatment of noise and vibration in National Road Schemes, 2004 [13];
- NRA Good practice guidance for the treatment of noise during the planning of National Road schemes, March 2014 [14];
- World Health Organisation's ('WHO') Night noise guidelines for Europe [15];
- WHO Environmental Noise Guidelines for the European Region 2018 [16];
- Kilkenny City and County Development Plan ('KCCDP') 2021-2027 [17];
- Kilkenny Noise Action Plan 2024-2028 [18]; and,
- Port of Waterford Masterplan 2020-2044 [19].

The following policies relating to the assessment of noise for new developments are also contained within the KCCDP 2021-2027:

> ***"Objective 10E** To continue to update noise mapping in accordance with revised or updated thresholds for noise mapping."*

and

> ***"Objective 10F** Develop a priority list of actionable works to mitigate against excessive noise and implement subject to cost-benefit analysis."*

11.2.1 Noise Impact Assessment Criteria

The KCCDP (2021-2027) and KCC Noise Action Plan (2024-2028) do not specify noise limit values for new industrial developments. Both plans recommend that new developments should not exceed normally accepted thresholds [18].

The limits outlined in this chapter will be utilised to ensure that on-site activities will be monitored and control measures implemented. These limits are similar to international criteria for the protection of human health from noise and vibration nuisance. These limits will, therefore, be applied as the criteria within this Chapter for the effects of the Proposed Development.

11.2.1.1 Construction Phase

Construction Phase noise will be assessed utilising the British Standard BS5228-1 [1], which is designed for the assessment of noise arising from construction and open sites.

This standard identifies a methodology (the ABC method, section E.3.2 of the standard) for assigning construction noise limits at sensitive receptors based on the existing ambient noise levels. An excerpt detailing the ABC method is shown in Table 11-1 below.

Table 11-1: BS5228 ABC Method for Assessing Construction Noise Impact

Assessment category and threshold value period (L_{Aeq})	Threshold value, in decibels (dB) ($L_{Aeq,T}$)		
	Category A[A)]	Category B[B)]	Category C[C)]
Night-time (23:00-07:00)	45	50	55

Assessment category and threshold value period (L_{Aeq})	**Threshold value, in decibels (dB) ($L_{Aeq,T}$)**		
	Category A[A)]	**Category B[B)]**	**Category C[C)]**
Evening and weekends [D)]	55	60	65
Daytime (07:00-19:00) and Saturday (07:00-13:00)	65	70	75
Note 1	A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.		
Note 2	If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potentially significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3dB due to the site noise.		
Note 3	Applied to all residential receptors only.		
A)	Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.		
B)	Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as Category A values.		
C)	Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than Category A values.		
D)	19:00-23:00 weekdays, 13:00-23:00 Saturday and 07:00-23:00 Sunday.		

This method requires an understanding of the receiving environment at Noise Sensitive Receptors ('NSRs') to allocate suitable construction noise limits.

11.2.1.2 Operational Site-Specific Noise

The Port of Waterford has noise limits under Planning Permission (Ref. No. PL10.0969325), which are as follows in Table 11-2.

Table 11-2: Port of Waterford Operational Noise Limits

Activity	**Day (07:00 hours to 20:00 hours)**	**Night (20:00 hours to 07:00 hours)**
Gantry Movements	55	45 $L_{Aeq,1hr}$
Crane Mechanism (impulsive)	60	50 $L_{Amax,'F'}$
Road Traffic Noise	65	N/A $L_{A10,18hr}$
Train Noise (No hooter)	N/A	45 $L_{Aeq,1hr}$

The quoted limits are to be applied as

> *"…measured at the façade of any noise-sensitive residential unit in the locality which is not in the ownership of the applicant*."

The limits outlined above are somewhat unusual in that they ascribe restrictions on specific activities/sources rather than a total limit for all port-related noise. This methodology is utilised in areas where boundary or sensitive receptor monitoring is likely to be too strongly affected by ambient source noises.

The permit for dredging at the Port of Waterford provides noise emission limits as set out in the table below. Noise monitoring for any noise-sensitive locations is carried out by a survey in accordance with the provisions of the permit. A 'soft-start' or 'ramp-up' procedure is typically used during activities to ensure that sound energy into the marine environment is gradually increased from levels unlikely to cause significant behavioural impact on marine mammals to the output necessary for completion of activities. The terrestrial noise limits at the permitted prescribed sensitive receptor (ITM 667887, 613740) are presented below in Table 11-3.

Table 11-3: Dredging noise limits

Daytime dB $L_{Ar,T}$ (30 minutes)	Evening Time dB $L_{Ar,T}$ (30 minutes)	Night-time dB $L_{Ar,T}$ (15 minutes)
55	50	45

11.2.1.3 Acoustic Change

Although the Port of Waterford has noise limits, the human perception of noise is generally better reflected through a review of the change to the existing ambient environment by the Proposed Development. Although there are various methodologies in relation to this application, the methodology of the IOA / IEMA *Guidelines for Environmental Noise Impact Assessment* [4] has been followed. Figure 11-1 below presents the relationship between noise impact and noise effect in generating an understanding of the significance of the change to an acoustic environment.

In forming an assessment of the impact, this methodology looks at the following key elements:

- The change from the baseline presented by the Proposed Development;
- Type of noise source;
- Nature of the change; and,
- Other factors.

The guidance further identifies that the impact assessment should consider the following influences:

- Averaging period;
- Time of day;
- Nature of the noise source (intermittency, etc.);
- Frequency of occurrence;
- Spectral characteristics;
- Absolute level of the noise indicator; and,
- Influence of the noise indicator used.

Figure 11-1: IEMA IOA Chart on Magnitude, Significance and Effect

MAGNITUDE (Nature of Impact)		DESCRIPTION OF EFFECT (on a specific sensitive receptor)	SIGNIFICANCE (as required within EIA)
Substantial	BENEFICIAL	**Receptor perception = Marked change** Causes a material change in behaviour and/or attitude, e.g. individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	**More Likely to be Significant** (Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a non-significant effect)
Moderate	BENEFICIAL	**Receptor perception = Noticeable improvement** Improved noise climate resulting in small changes in behaviour and/or attitude, e.g. turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	↕
Slight	BENEFICIAL	**Receptor perception = Just noticeable improvement** Noise impact can be heard, but does not result in any change in behaviour or attitude. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	(Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a significant effect) **Less Likely to be Significant**
Negligible		N/A = No discernible effect on the receptor	**Not Significant**
Slight	ADVERSE	**Receptor perception = Non-intrusive** Noise impact can be heard, but does not cause any change in behaviour or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	**Less Likely to be Significant** (Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a significant effect)
Moderate	ADVERSE	**Receptor perception = Intrusive** Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awakening sleep disturbance[81]. Affects the character of the area such that there is a perceived change in the quality of life.	↕
Substantial	ADVERSE	**Receptor perception = Disruptive** Causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in character of the area.	(Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a non-significant effect) **More Likely to be Significant**
Severe	ADVERSE	**Receptor perception = Physically Harmful** Significant changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	**Significant**

Regarding fauna, Figure 11-2 below presents the relationship between noise impact and noise effect in generating an understanding of the significance of the change to an acoustic environment.

Figure 11-2: IEMA IOA Table on Relationship between Impact and Noise Effect for Fauna

DESCRIPTION OF MAGNITUDE OF IMPACT	EFFECT	SIGNIFICANCE OF EFFECT (if required, e.g. as part of EIA)
Negligible	No reaction	Not significant
Slight	Noise causes a reaction, either physiological or behavioural, but fauna returns to pre-exposure conditions relatively quickly and without continuing effects.	Less Likely to be Significant (Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a significant effect) ↕ (Greater justification needed – based on impact magnitude and receptor sensitivities – to justify a non-significant effect) More Likely to be Significant
Moderate	Noise causes a reaction, either physiological or behavioural, but cause more permanent changes that do not readily allow individuals or communities to return to pre-exposure conditions. Can include temporary nest abandonment.	
Severe	Noise causes demonstrable harm, either injury or death, or causes situations such as permanent nest abandonment.	Significant

11.2.2 Port of Waterford Masterplan

The Port of Waterford Masterplan [19] presents the Environmental Objectives, Targets and Indicators regarding noise, which are detailed in Table 11-4 below.

Table 11-4: Excerpt from Table 9.4 from POW Masterplan [19]

Environmental Topic	Objectives	Targets	Indicators	Responsible Authority and Possible Data
Population & Human Health	P1: To maximise positive impacts and minimise the negative impacts of the proposed Master Plan projects to the local communities and mitigate any potential negative effect of development on the local communities.	Noise and air quality impacts arising from the proposed projects (onshore and offshore) shall not exceed statutory and/or recommended guideline values. Increasing direct and indirect employment created by the delivery of the projects set-out in the Master Plan. Implementing corporate social responsibility programmes at local communities.	Noise levels and air quality indicators (primarily dust, NOx, CO, SOx). A long-term employment figures associated with the Port. Implementation of specific community projects or sponsorships.	CSO statistics and Census data POW monitoring, records and reporting Local Authorities

Environmental Topic	Objectives	Targets	Indicators	Responsible Authority and Possible Data
Acoustics	A1: To minimise acoustic impacts to local communities and aquatic environment during construction stage.	Daytime noise emissions, of $L_{ar,T}$, of 55dB and night-time emissions of $L_{Aeq,T}$ of 45dB at sensitive receptors.	Noise Levels	POW monitoring and reporting
	A2: To minimise acoustic impacts to local communities and aquatic environment during the operational stage.	To achieve a 'Good Environmental Status' ('GES') for the acoustic aquatic environment from direct and indirect activities as part of the Master Plan	Underwater acoustics shall comply with the Marine Strategy Framework Directive (2008/56/EC) to 'not adversely affect the marine environment'.	

11.2.3 Vibration Guidance

Limits of transient vibration, above which cosmetic damage could occur, are given numerically in Table 11-5, an extract from BS228-2. Minor damage is possible at vibration magnitudes which are greater than twice those given in Table 11-5, and major damage to a building structure can occur at values greater than four times the tabulated values (definition of the damage categories is presented in BS7385-1-1990 9.9).

Table 11-5: Transient Vibration Guide Values for Cosmetic Damage (BS5228-2)

Type of Building	Peak Particle Velocity PPV (mm/s) in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 mm/s at 4Hz and above	50 mm/s at 15Hz and above
Unreinforced or light-framed structures. Residential or light commercial buildings.	15 mm/s at 4Hz increasing to 20mm/s at 15Hz	20 mm/s at 15Hz increasing so 50mm/s a 40Hz and above.

The values presented in Table 11-5 above relate predominantly to transient vibration, which does not give rise to resonant responses in structures and to low-rise buildings. These guidelines refer to relatively modern buildings; therefore, they should be reduced to 50% or less for more sensitive buildings. The threshold for vibration perceptions is 0.3mm/s from Table B.1 from BS5228-2.

11.2.4 Ecological Receptors Assessment Criteria

The effects of noise on identified species in the vicinity of the Proposed Development have been given additional consideration.

11.2.4.1 Birds

Table 11-6 below details the equivalent noise level criteria detailed within the TIDE Tidal River Development Toolbox 2016 for waterbird disturbance [20]. The Proposed Development will be situated along the Lower River Estuary, and it was therefore considered that the TIDE Tidal River Development Toolbox, which was primarily designed for wading birds, would also represent a worst-case scenario for riverside birds in an inner-city environment.

Table 11-6: Noise Disturbance Threshold for Water Birds [20]

Noise Disturbance Significance Level	Associated Noise Levels/Types
High Noise Level Effects	Sudden noise event of >60dB Prolonged noise event of >72dB
Moderate Noise Level Effects	Occasional noise events >55dB Regular noise events of 60-72dB Long-term regular noise events of >72dB where birds have become habituated
Low Noise Level Effects	Noise events of <55dB

11.2.5 Otters

Otters are considered in the group *Other Marine Carnivores in Air ('OCA') and Water ('OCW') Hearing groups* [21]. The different thresholds for impulsive and non-impulsive noise are presented in Table 11-7 below for both categories. The weighted values are based on auditory weighting functions that were calculated for each hearing group to better describe relative hearing sensitivity within the audible range using the more data-derived, systematic approach of Finneran [22] based on a generic band-pass filter equation.

Table 11-7: Thresholds for Otters exposed to impulsive and non-impulsive noise

Type of noise	Marine mammal hearing group	TTS onset: SEL (weighted) dB	TTS onset: Peak SPL (unweighted) dB	PTS onset: SEL (weighted) dB	PTS onset: Peak SPL (unweighted) dB
Impulsive noise	OCA	146	161	161	167
	OCW	188	226	203	232
Non-impulsive noise	OCA	157	NA	177	NA
	OCW	199	NA	219	NA

SEL – Sound Exposure Levels

SPL – Sound Pressure Levels

TTS – Temporary Threshold Shift may result in a reduction in hearing sensitivity but is not permanent.

PTS – Permanent Threshold Shift may result in auditory injuries and in some cases can lead to death.

SEL thresholds in dB re 1 μPa^2s under water and dB re $(20\ \mu Pa)^2$ s in air (group OCA only); and peak SPL thresholds in dB re 1 µPa under water and dB re 20 µPa in air (group OCA only).

11.2.6 Noise Modelling

This section details the methodology, inputs and assumptions taken regarding the completed noise modelling.

Noise modelling was carried out using iNoise version 2024 software. The noise model has been developed for the Site to incorporate the noise emission sources during the construction of the Proposed Development, and the layout of the local environment. The model only assesses site-specific emissions – i.e., it does not incorporate existing ambient sources such as road traffic.

The model was run utilising ISO 9613 1 & 2 for the basis of sound transmission from the source.

11.2.6.1 Model Calculations

The Noise Model calculation formula is based on ISO 9613 – Parts 1 & 2. Utilising this standard, iNoise calculates the noise level as follows:

$$L|t.per = L_{dW} - C_{m,per} - C_{t,per}$$

$$L_{dw} = L_W + D_c - A$$

$L_{lt,per}$ Long-term average octave (or 1/3-octave) SPL during the evaluation period in dB

L_{dw} Equivalent continuous downwind octave (or 1/3-octave) SPL in dB

$C_{m,per}$ Meteorological correction during the evaluation period in dB

$C_{t,per}$ Correction for the active time of the source during the evaluation period in dB

L_W Sound power level in dB(A) per octave (or 1/3-octave), re 1 pW

D_C Directivity correction in dB

A Attenuation (octave-band) in dB per octave (or 1/3-octave)

The attenuation A is calculated as follows:

$$A = A_{div} + A_{atm} + A_{gr} + A_{bar} + A_{fol} + A_{site} + A_{hous}$$

A_{div} Geometrical divergence in dB

A_{atm} Atmospheric absorption in dB/octave (or 1/3-octave)

A_{gr} Ground effect in dB/octave (or 1/3-octave)

A_{bar} Screening in dB/octave (or 1/3-octave)

A_{fol} Attenuation due to foliage in dB/octave (or 1/3-octave)

A_{site} Attenuation due to installations on an industrial site in dB/octave (or 1/3-octave)

A_{hous} Attenuation due to housing in dB

Modelling inputs and assumptions for the prediction of the site-specific noise impact included the following:

- AutoCAD drawings of the Proposed Development as supplied by the design architects;

- Elevation drawings showing the buildings, road plan and terrain heights within the Proposed Development; and,
- Height contours outside of the Site sourced from Bluesky Maps and LiDAR.

11.2.6.2 Assumptions

The construction noise models have been built on the basis that all relevant plant and equipment would emit a sound level as identified by BS5228-1, whose database of sources is now in excess of 10 years old.

On-site building height data was obtained from the associated elevations, cross sections and plan drawings supplied by the Design Team. Buildings further afield have been placed either through OSI mapping or public mapping suppliers. The derived building heights of these outer buildings were ca. 8m (industrial), 8m (two-storey and dormer buildings) or 4m (single-storey building).

Noise emissions from HGVs on-site were modelled as moving sources following identified traffic routes around the facility. Emission values for the HGVs were obtained from the MOR Environmental library database and then set to account for the average number of vehicles as supplied by the Applicant.

Under normal conditions, all plant will not be operational at the same time, nor necessarily operating to duty capacity. However, to assess a likely worst case, this modelling exercise has assumed this to be the case, a method that ensures the conservative aspect of the results.

The meteorological correction within the model was set at C0 = 5, thereby calculating that conditions are optimal for spreading source noise towards all NSRs. Similarly, although there is agricultural and soft ground surrounding the Site, ground attenuation was set to 0.5.

11.2.7 Noise Monitoring

11.2.7.1 Competent Person

The monitoring and analysis of the data was conducted by a MOR Environmental Acoustician. This monitoring programme, data and report was directed and reviewed by Kenneth Goodwin, Associated Director of Acoustics, who is a full member of the Institute of Acoustics ('IOA') and the Association of Acoustic Consultants of Ireland ('AACI') with over 18+ years' experience in environmental and acoustic consultancy.

11.2.7.2 Measurements

All ambient sound monitoring was conducted in accordance with best practices outlined in the EPA NG4. A competent MOR Environmental acoustician completed the on-site monitoring, data analysis and assessment as per the requirements and specifications of NG4.

Daytime monitoring events were conducted for a time period 'T' of 30 minutes each and repeated once. Giving 60 minutes of data at each monitoring location.

Evening time monitoring events were conducted for a time period 'T' of 30 minutes, with one measurement taken.

Night-time monitoring events were taken for a time period 'T' of 15 minutes and repeated once, for a total of 30 minutes at each monitoring location.

11.2.7.3 Equipment

The Sound Level Meters ('SLMs') used were:

- NTI XL3 Type 1 SLM;
- NTI XL2 Type 1 SLM; and,

- Cirrus Optimus Green Type 1 SLM.

All SLMs were field calibrated utilising a:

- Larson Davis CAL 200 Serial number 20830.

The Larson Davis sound level calibrator was laboratory-calibrated within the last 12 months. Broadband noise levels were measured using the A-weighted network and a fast-sampling interval unless otherwise stated.

Laboratory calibration certificates for the SLMs and the field calibrator are available upon request.

A handheld GPS (Garmin GPS60) was utilised to accurately position the SLM.

At all monitoring locations, the SLM was positioned to maximise distance from reflective surfaces (> 3m) and mounted on a tripod to a height of ca. 1.2m to 1.5m above ground level.

11.3 Receiving Environment

This section characterises the receiving environment in terms of likely sensitive receptors to noise and to changes in the existing ambient environment, while characterising the existing acoustic environment at identified receptors. Specifically, this section looks at the:

- Identification of noise-sensitive receptors;
- Strategic noise mapping locally;
- Quiet Area Screening; and,
- Baseline acoustic environment locally.

11.3.1 Noise Sensitive Receptors

A review of the locality was conducted utilising OSI online mapping, Google and Bing Aerial Photography.

Based on this research, NSRs were identified in the locality, shown in Figure 11-3 and described in Table 11-6. During the Site survey, a visual check of the locality was completed to identify any new NSRs or any older buildings that had been demolished or changed in use.

Ecological Noise Receptors (‘ENRs’) have been identified and classified into three species: waterbirds, otters, and subaquatic species. These are detailed in Table 11-8 below and shown in Figure 11-4 below. The subaquatic species will be considered in Chapter 12, which covers Underwater Noise and Vibration.

Figure 11-3: NSRs locations

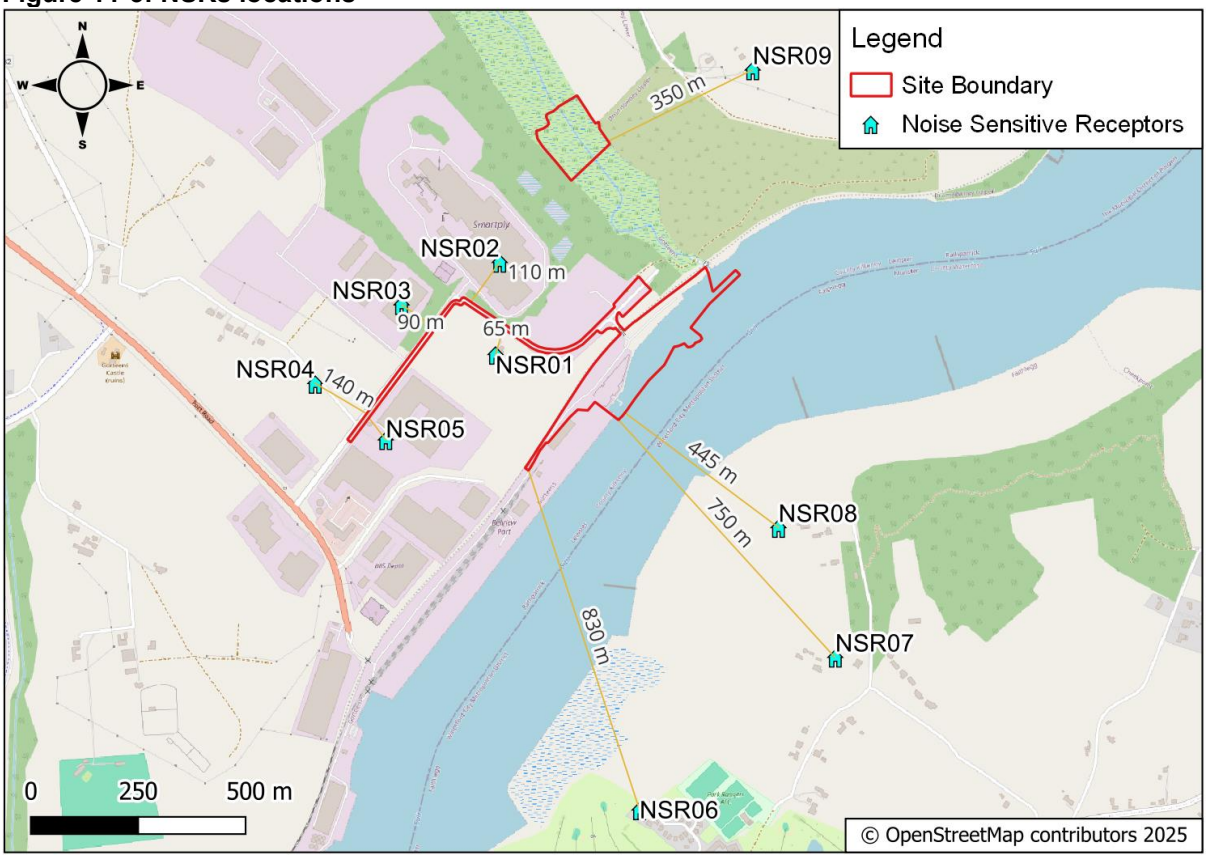
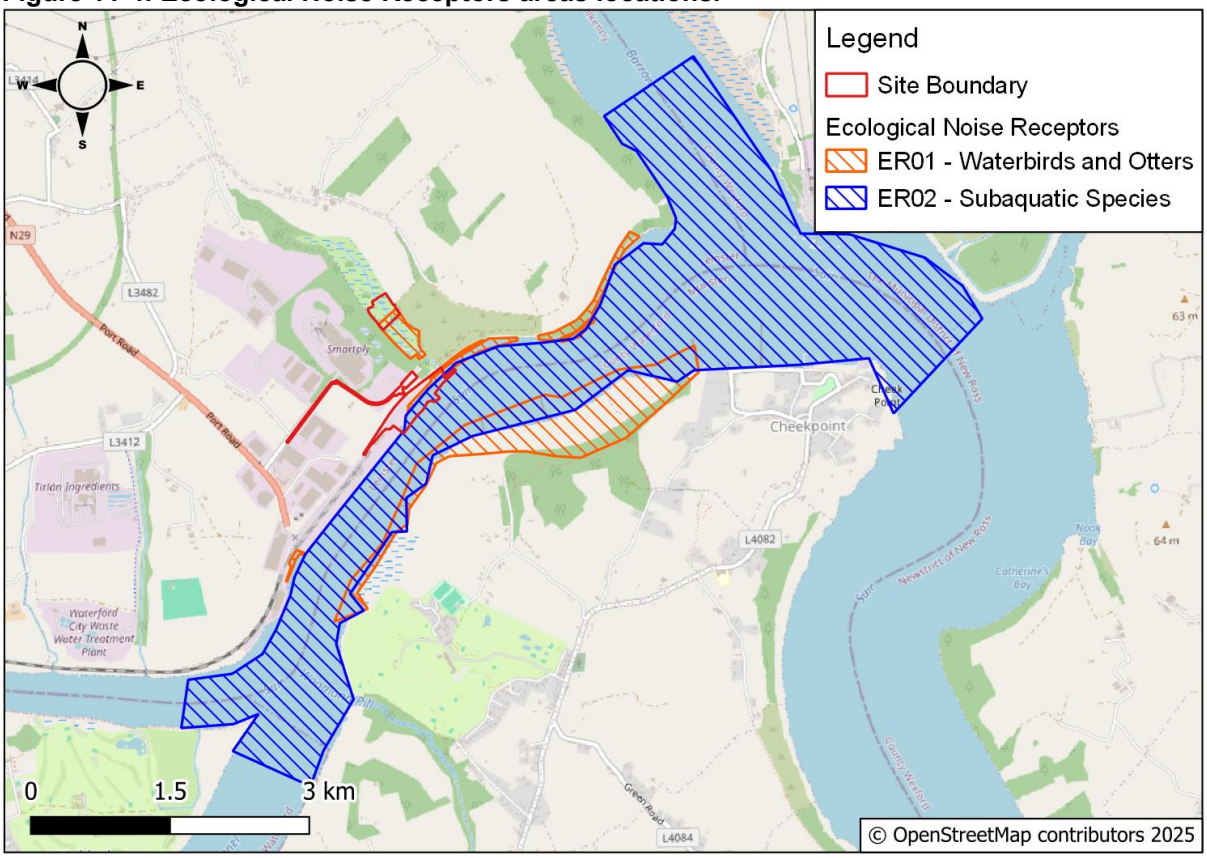


Table 11-8: Noise Sensitive Receptors

NSR ID	Distance from Site Boundary (m)	Easting (ITM)	Northing (ITM)	Description
NSR01	ca. 65m	666070	613620	Residential dwelling located to the west of the Site.
NSR02	ca. 110m	666079	613835	SmartPly Europe located to the north of the Site.
NSR03	ca. 90m	665851	613736	Store-All Logistics BV4 Belview located to the north of the Site.
NSR04	ca. 140m	665650	613553	Residential dwelling located to the west of the Site.
NSR05	ca. 65m	665814	613422	Southeast Port Services Limited located to the west of the Site.
NSR06	ca. 830m	666405	612560	Residential dwelling located to the south of the Site.
NSR07	ca. 750m	666860	612915	Residential dwelling located to the southeast of the Site.
NSR08	ca. 445m	666728	613217	Residential dwelling located to the east of the Site.
NSR09	ca. 375m	666668	614283	Residential dwelling located to the north of the Site.
ENR01	Within the Site Boundary	NA	NA	To represent waterbirds and otters in the Area.

NSR ID	Distance from Site Boundary (m)	Easting (ITM)	Northing (ITM)	Description
ENR02	Within the Site Boundary	NA	NA	To represent subaquatic species in the Area.

Figure 11-4: Ecological Noise Receptors areas locations.



11.3.2 Strategic Road Noise Mapping

The national road, the N25 to the northwest of the Site, qualifies for Strategic Noise Mapping under the Environmental Noise Directive ('END'), as transposed into Irish Law under S.I. No. 549 of 2018 as amended, Environmental Noise Regulations [3].

Under the KCC Noise Action Plan 2024-2028 [18], the N25 national road, located west of the Proposed Development, was identified as a "Major Road", with the road carrying over 3 million vehicle passengers per year.

The N25 is located ca. 2.5km to the northwest of the Site. Therefore, the Site and the identified NSRs to the Site are not overlain by the road contours, and the effects of the N25 road traffic is deemed a not significant contribution to local NSRs. Further detailed assessment of this source is therefore not carried out, though baseline surveying undertaken at the Site does identify where road traffic is audible.

11.3.3 Screening for Quiet Area

Quiet Area is a defined criterion for areas with low intrusion of human activities and has been specified within the Environmental Noise Directive and subsequent S.I. Noise Regulations as areas that should be identified within each Local Authority area for special consideration.

The EPAs noise guidance document, NG4 [11], identifies a specific screening mechanism for Quiet Areas, and the screening process is shown in Table 11-9 below for the Site.

Table 11-9: Quiet Noise Criteria Assessment

Parameter	Quiet Noise Criteria Distance	Criteria Met	Note
Distance to urban area with population >1,000 persons.	>3km	No	Waterford City (population 60,079, CSO 2022) within 3km of Site.
Distance to urban area with population >5,000 persons.	>10km	No	Waterford City (population 60,079, CSO 2022) within 5km of Site.
Distance to urban area with population >10,000 persons.	>15km	No	Waterford City (population 60,079, CSO 2022) within 10km of Site.
Distance to local industry (small or individual activities).	>3km	No	Tirlán ca. 1.4km to the west, SmartPly ca. 500m to the north of Site.
Distance to major industry centre.	>10km	No	The Site is Port of Waterford.
Distance to National Primary Route.	>5km	No	N29 ca. 640m to the west of main Site. N25 ca.2.5km to the northwest of the main Site.
Distance to Motorway or Dual Carriageway.	>7.5km	Yes	M9 ca.8.5km northwest of main Site.
Site locality is 'Quiet Area'		**No**	**Proximity to urban areas, industry and National Roads.**

Based on the screening process completed above, the Site does not qualify as a Quiet Area.

Furthermore, a review of the identification by Kilkenny County Council for Quiet Areas under the END was undertaken. The KCC Noise Action Plan [18] does not identify the Site as a Quiet Area or Priority Important Area.

11.3.4 Baseline Ambient Acoustic Environment Survey

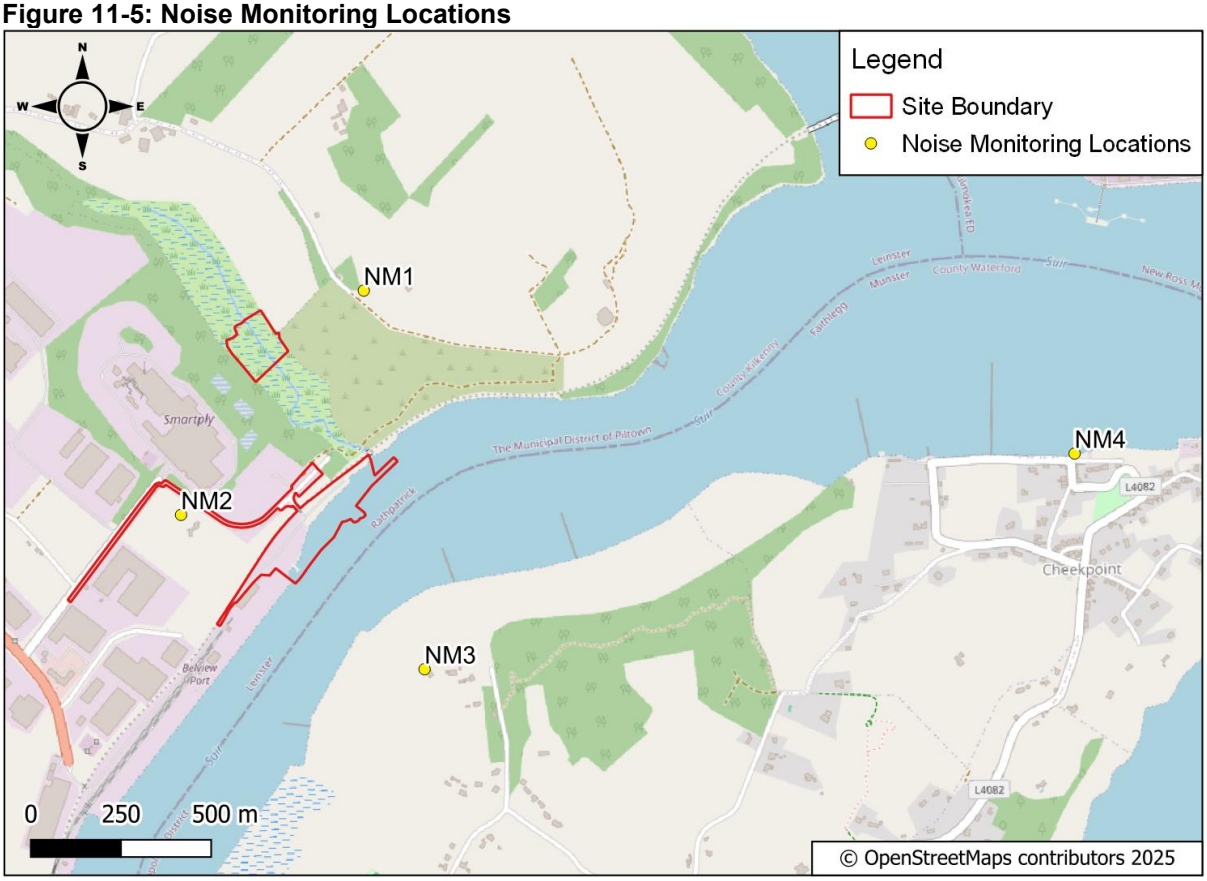
Ambient noise monitoring was conducted by MOR Environmental on 26th May 2023 and 17th July 2023 in the vicinity of the Site.

The monitoring locations are described in Table 11-10 below and are shown in Figure 11-5 below.

Table 11-10: Noise Monitoring Locations

NM ID	Description of the Location	ITM Easting	ITM Northing
NM1	Located on a residential property in the garden to the north of the Site.	666545	614278
NM2	Located on a residential property in the garden to the west of the Site.	666039	613657
NM3	Located on a residential property in the garden to the east of the Site.	666717	613232
NM4	Located at Cheekpoint Pier to the east of the Site.	668515	613827

Figure 11-5: Noise Monitoring Locations



11.3.4.1 Weather Conditions

The ambient attended sound monitoring event was conducted from 26th May to 17th July 2023 during suitable weather conditions by a competent MOR Environmental Acoustician. The ambient continuous sound monitoring event was conducted from 26th May to 27th July 2023.

Weather conditions on site were recorded by a Vantage Vue automated weather station, with weather recorded in 15-minute intervals. These 15-minute intervals recorded wind speed, wind direction and rainfall events. Summaries for the monitoring period are presented in Table 11-11 below. Daily weather summaries for the monitoring period are presented in Appendix 11-2.

11.3.4.2 Baseline Attended Results

Attended noise measurements were conducted during various days for different periods: daytime, evening, and nighttime. The data has been summarised by the different weeks as detailed in Table 11-11, and the period that was measured and the location that was used are shown.

Table 11-11: Summary of the Attended Noise Survey

Week Number	Date	Period	Locations
Week 1	26th May to 1st June	Daytime	NM1, NM2 and NM4
Week 2	2nd June to 8th June	Daytime and Night-time	NM1, NM2, NM3 and NM4
Week 3	9th June to 15th June	Evening	NM1, NM2, NM3 and NM4
Week 4	16th June to 22nd June	Daytime	NM1, NM2, NM3 and NM4

Week Number	Date	Period	Locations
Week 5	23rd June to 29th June	Night-time	NM1, NM2, NM3 and NM4
Week 6	30th June to 6th July	Daytime	NM3 and NM4.
Week 7	7th July to 13th July	Evening	NM1, NM2, NM3 and NM4
Week 8	14th July to 21st July	Daytime	NM3 and NM4

The summary for the attended measurements is presented in Table 11-12 and Table 11-13 below for the parameters $L_{Aeq,T}$ and $L_{A90,T}$, respectively. Full results are presented in Appendix 11-3, detailing the results of the noise monitoring events and a description of the noise sources for daytime, evening, and nighttime periods, respectively.

Table 11-12: Results for the $L_{Aeq,T}$ parameter for the Attended Survey

Location	Daytime		Evening	Night-time					
Week*	1	2	4	6	8	3	7	2	5
NM1	39	41	45	-	-	51	42	34	41
NM2	45	48	48	-	-	43	41	42	39
NM3	-	37	49	40	42	37	49	33	28
NM4	42	40	59	56	44	41	45	39	36

*Refer to Table 11-11 above.
- Data was not recorded.

Table 11-13: Results for the $L_{A90,T}$ parameter for the Attended Survey

Location	Daytime					Evening		Night-time	
Week*	1	2	4	6	8	3	7	2	5
NM1	33	32	42	-	-	39	40	31	38
NM2	43	44	44	-	-	40	40	40	39
NM3	-	31	39	37	38	34	44	29	27
NM4	38	37	38	40	34	35	39	37	33

*Refer to Table 11-11 above.
- Data was not recorded.

11.3.4.3 Baseline Continuous Results

The ambient continuous sound monitoring event was conducted from 26th May to 27th July 2023. The ranges for the different periods at the three locations are summarised in Table 11-14. Full results are presented in Appendix 11-3; data was lost due to storage and battery connections, and the lowest values were discarded.

Table 11-14: Summary for the Continuous attended survey.

Location ID	L_{den} dB	L_{night} dB
NM1	38 - 52	26 - 46

Location ID	L_{den} dB	L_{night} dB
NM2	39 - 57	29 - 48
NM3	44 - 54	32 - 47

11.4 Characteristics & Potential Effects of the Proposed Development

The potential for noise arising from the Proposed Development has two distinct phases:

- Construction Phase; and,
- Operational Phase.

The sources and potential impacts arising from the phases are distinctly different and, therefore, have been discussed separately.

Works to be conducted in the Biodiversity Enhancement Area, northern area of the Site Boundary, refer to Chapter 6. These works are considered not significant in relation to acoustics due to the low intensity and small vehicle size required to complete the works.

11.4.1 Construction Phase Noise

The Construction Phase for this project will be temporary insofar as the Construction Phase will be for a finite period. For the purposes of this assessment, a 24-month Construction Phase was considered as a worst-case scenario.

Construction noise is an unavoidable, though temporary, aspect of any new development or modification of an existing development. The construction process will invariably require the use of noisy plant, including, but not limited to:

- HGVs delivering material to the Site;
- Site Equipment – consaws, cement mixers, breakers, piling, hammering, metal works; and,
- Site Preparation – JCBs, excavators, security and hoarding works.

There are several factors which will influence the type of plant utilised during the construction programme, including the preference of the appointed contractor, construction materials and finishes, ground conditions and time pressures.

The BS5228-1 standard is typically utilised to assess the potential impact arising from construction work.

The order of the Construction Phases and the precise work schedule within each phase are used to predict the noise emissions. Table 11-15 below details the list of equipment. Each phase has a different list of equipment and is detailed in Table 11-16. The predictions below are based on the notable emission sources likely to occur during the construction works at the Proposed Development, using the sound pressure at 10m of plant taken from BS5228-1 and the MOR Environmental acoustic library.

Table 11-15: List of Equipment for the Construction Noise Phase

Number	Equipment	Number	Equipment
1	1582T non-powered steel construction barge (Skerchi) 60m x 21.5m x 4m	15	Large Dozers (50T) e.g. Cat D9
2	Barge mounted boom crawler crane to 250T	16	Medium Dozers (23T) e.g. Cat D6

Number	Equipment	Number	Equipment
3	Spud-leg Barge (ACN5)	17	Graders (10T)
4	Impact hydraulic piling hammer e.g. CX85 / CX110	18	Large 18-20T Vibratory Rollers
5	Vibratory piling hammer e.g. ICE 1412 / PVE 38M	19	Small 3-5T Tandem Vibratory Rollers
6	Tugboat	20	Large, tracked excavator (65T) e.g. Cat365
7	Safety boat	21	Medium, tracked excavator (22T) e.g. Cat320
8	Work boats	22	Small, tracked excavator (16T) e.g. Cat316
9	Lighting Towers	23	Mini excavator (1.5-2T) e.g.
10	90T boom crawler crane	24	Wheeled excavator (10T) JCB
11	65T boom crawler crane dragline (dredging/silt removal)	26	Shuttering, scaffoldings etc.
12	Mobile cranes 25T - 160T as required	27	(MEWP) Mobile access platforms
13	Articulated Trucks (30T) e.g. Cat C13	28	Dredger
14	Wheeled Lorries (18T)	29	Telehandler

Table 11-16: Plant for each Construction Phase

Phase	Description	Plant
1	Establish site compound, laydown areas, pre-casting yard for beam elements, access routes	9, 12, 14, 24, 29
2	Site clearance and demolition, removal of accessible silts to fill formation	3, 6, 7, 8, 9, 11, 13, 14, 20, 21
3	Dredging works	3, 6, 7, 8, 9, 11, 14, 28
4a	Land Reclamation Infilling works. (160,000T imported)	7, 8, 12, 13, 14, 15, 16, 18, 20
4b	Commencement of pre-casting where applicable	9, 12, 14, 26, 27, 29
4c	Piling Works	1, 2, 4, 5, 6, 7, 8, 9, 14
5a	Commencement of land-based structures and infrastructure.	7, 8, 9, 10, 13, 14, 16, 19, 21, 27, 29
4d	Placement of Rock Armour	7, 8, 9, 13, 14, 15, 16
4e	Place precast beam elements and in situ tie sections	3, 7, 8, 9, 10, 11, 14, 26, 27, 29
4f	Installation of precast deck sections and Insitu deck elements	3, 7, 8, 9, 10, 11, 14, 26, 27, 29

Phase	Description	Plant
4g	Fender piling	5, 7, 8, 9, 10, 14, 27, 29
4h	Fendering Works and wharf fittings	5, 7, 8, 9, 10, 14, 27, 29
5b	Rear surfacing works structures and infrastructure	9, 11, 14, 16, 17, 19, 21, 22, 24, 27, 29
5c	Ancillary buildings and siteworks	9, 12, 14, 19, 22, 23, 24, 26, 27, 29
6	Wharf Completion	9, 12, 14, 19, 22, 23, 24, 26, 27, 29

As part of this assessment, a noise model using specialist acoustic software iNoise V2024 has been prepared to assess predicted noise emissions at the Site during the construction phase. To represent the worst-case scenario, different scenarios have been modelled with the different active phases. The scenarios are presented in Table 11-17 below.

Table 11-17: Active Phases for each Construction Noise Scenario

Scenario	Active Phases	Scenario	Active Phases
A	1	J	5a, 4d, 4e, 5b, 5c
B	2, 3	K	5a, 4e, 4f, 5b, 5c
C	3,4a	L	4e, 4f, 5c
D	4a	M	4f, 4g, 4h, 5c
E	4a, 4b	N	4g, 4h, 5c
F	4b, 4c	O	4h, 5c
G	4b, 4c, 4d	P	4h, 5c, 6
H	4b, 4c,4d, 5a	Q	5c
I	4b, 4c, 5a, 4d, 4e, 5b		

An assessment based on the ABC method is shown in Table 11-18 below. The ecological receptors do not present an ABC limit; however, the relevant predictions for these receptors have been calculated and presented in Table 11-18 below.

The noise contours for Scenarios I and J of this modelling are presented in Appendix 11-4.

Table 11-18: NSR Construction Limit Values

NSR ID	NML ID (proxy)	Ambient Baseline $L_{Aeq,T}$	Rounded value (closest 5dB)	ABC Limit
NSR01	NM2	45	45	65
NSR02	NM2	45	45	65
NSR03	NM2	45	45	65
NSR04	NM2	45	45	65
NSR05	NM2	45	45	65

NSR ID	NML ID (proxy)	Ambient Baseline $L_{Aeq,T}$	Rounded value (closest 5dB)	ABC Limit
NSR06	NM3	37	35	65
NSR07	NM3	37	35	65
NSR08	NM3	37	35	65
NSR09	NM1	39	40	65

Table 11-19: Construction Phase Noise Impact Assessment

NSR	Predicted Site Specific Sound Pressure Level at NSR Façade $L_{Aeq,T}$ dB	Scenario	Measured Ambient Sound $L_{Aeq,T}$ dB	Combined Noise Level (Predicted + Measured $L_{Aeq,T}$)	'ABC' Threshold Compliant
NSR01	73	I	45	73	No
NSR02	63	I	45	63	Yes
NSR03	60	I	45	60	Yes
NSR04	60	I	45	60	Yes
NSR05	63	J	45	63	Yes
NSR06	62	J	37	62	Yes
NSR07	64	I	37	64	Yes
NSR08	68	J	37	68	No
NSR09	65	I	39	65	Yes
ENR01	65-90	I and J	NA	NA	NA
ENR02	59-67	I and J	NA	NA	NA

Utilising the ABC method, the majority of the NSRs have been predicted to be compliant with construction noise thresholds, as presented in Table 11-19 above. However, NSR01 and NSR08 were non-compliant, with 8dB and 3dB exceedance prior to mitigation, respectively; refer to Section 11.5.1. The scenarios for the exceedances are I and J.

11.4.1.1 Ecological Receptors

For Ecological Receptors, the closest point from the Ecological Noise Receptors areas represented in Figure 11-4 above has been used to represent the worst-case scenario.

For ENR01 (Waterbirds), the predicted range is 65-90dB. As per Table 11-6, prolonged noise events above 72dB will have high noise level effects on waterbirds. After a sudden noise event where waterbirds are affected, normal behaviour will result in leaving the area, and therefore, noise levels will decrease with distance, achieving lower effects.

For ENR01 (Otters), the predicted range is 59-67dB. These values are lower than the thresholds presented in Table 11-7 for otters; therefore, the predicted levels will not cause any

harm to the otters. However, as with waterbirds, animals will attempt to distance themselves from the source following sudden noise events.

11.4.2 Construction Traffic Noise

Based on the assumption of up to 90 HGV movements per day on the haul routes to and from the Site along public roads, the resulting average traffic noise level at the closest receptors was calculated as follows:

The predicted noise levels at any receptor located within 5m of the haul route has been calculated using a standard international acoustical formula as described below.

$$L_{Aeq,T} = SEL + 10\log_{10} N - 10\log_{10} T + 20\log_{10} ({}^{r1}/_{r2})$$

Where:

$L_{Aeq,T}$	is the equivalent continuous sound level over time period (T) (3,600sec)
SEL	is the A-weighted Sound Exposure Level (SEL) of the noise event (77dBA)
N	is the number of events over the time period T, (8.7 HGVs per hour)
r1	is the distance at which SEL is assessed (5m)
r2	is the closest distance to the receptor from the road (10m)

The calculations assumed a maximum scenario of nine truck movements per hour with a maximum SEL of 77dBA for the trucks and a minimum distance between the local road passing by each of the nearest NSRs to the public road of 10m. No attenuation above geometric spreading has been considered within this calculation, which may be considered the worst-case scenario.

The maximum predicted $L_{Aeq,T}$ values as a result of the HGV traffic movement at the nearest NSRs located along the haul route roads were predicted to be 43dBA.

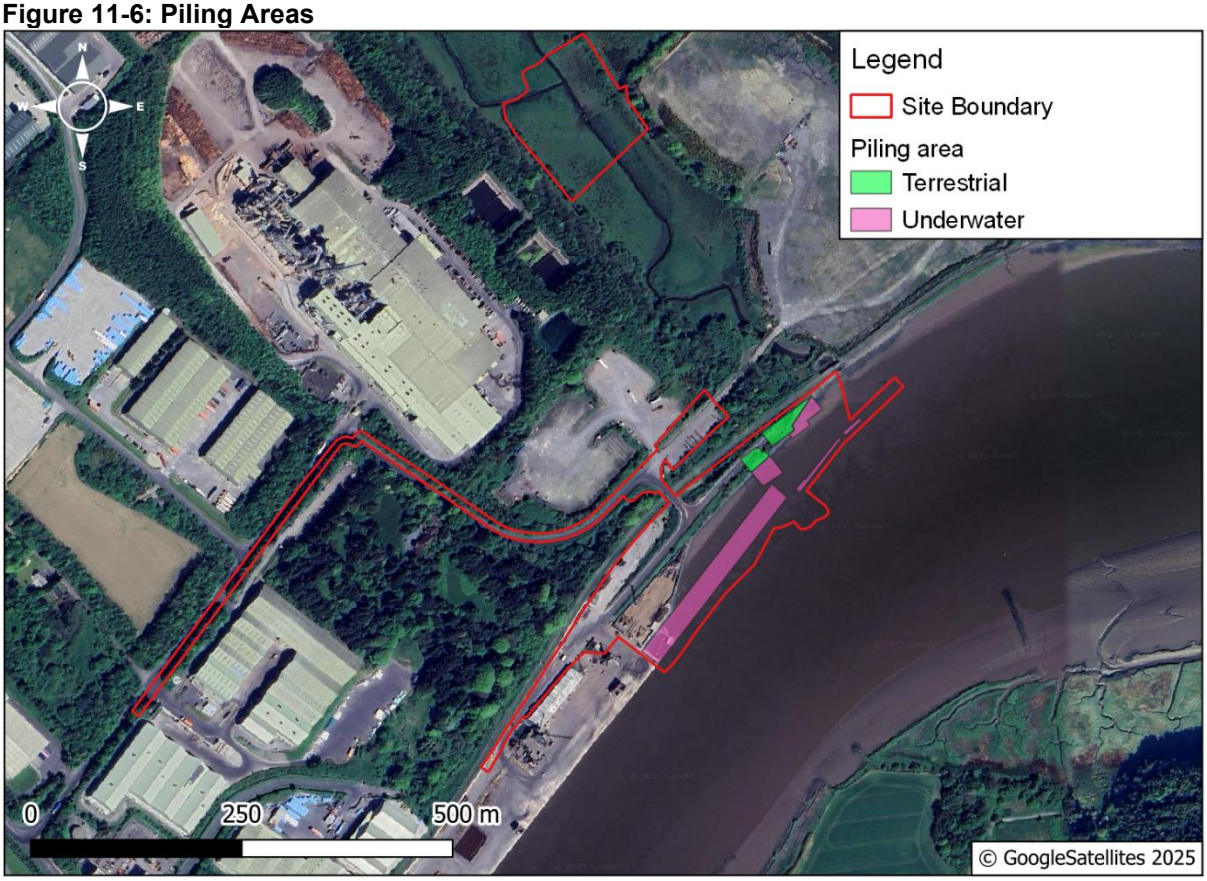
The predicted short-term increase in HGV movements associated with the Construction Phase of the Proposed Development was not predicted to adversely impact on the existing noise climate of the wider area or local receptors.

11.4.3 Construction Phase Vibration

Vibration can arise as an issue where heavy plant, piling or drilling occurs near buildings, particularly older structures whose foundations may be in poor condition. Piling will be a key requirement during the construction works required within the Site.

Two types of piling will be used: impact piling for Phase 4c (Piling works) and vibratory piling for Phase 4g (Fender Piling). As a worst-case scenario, both types of pilings are considered in Terrestrial areas and Underwater areas to establish a worst-case scenario. The different areas of pilings are shown in Figure 11-6 below. The calculations related to underwater are addressed in Chapter 12.

Figure 11-6: Piling Areas



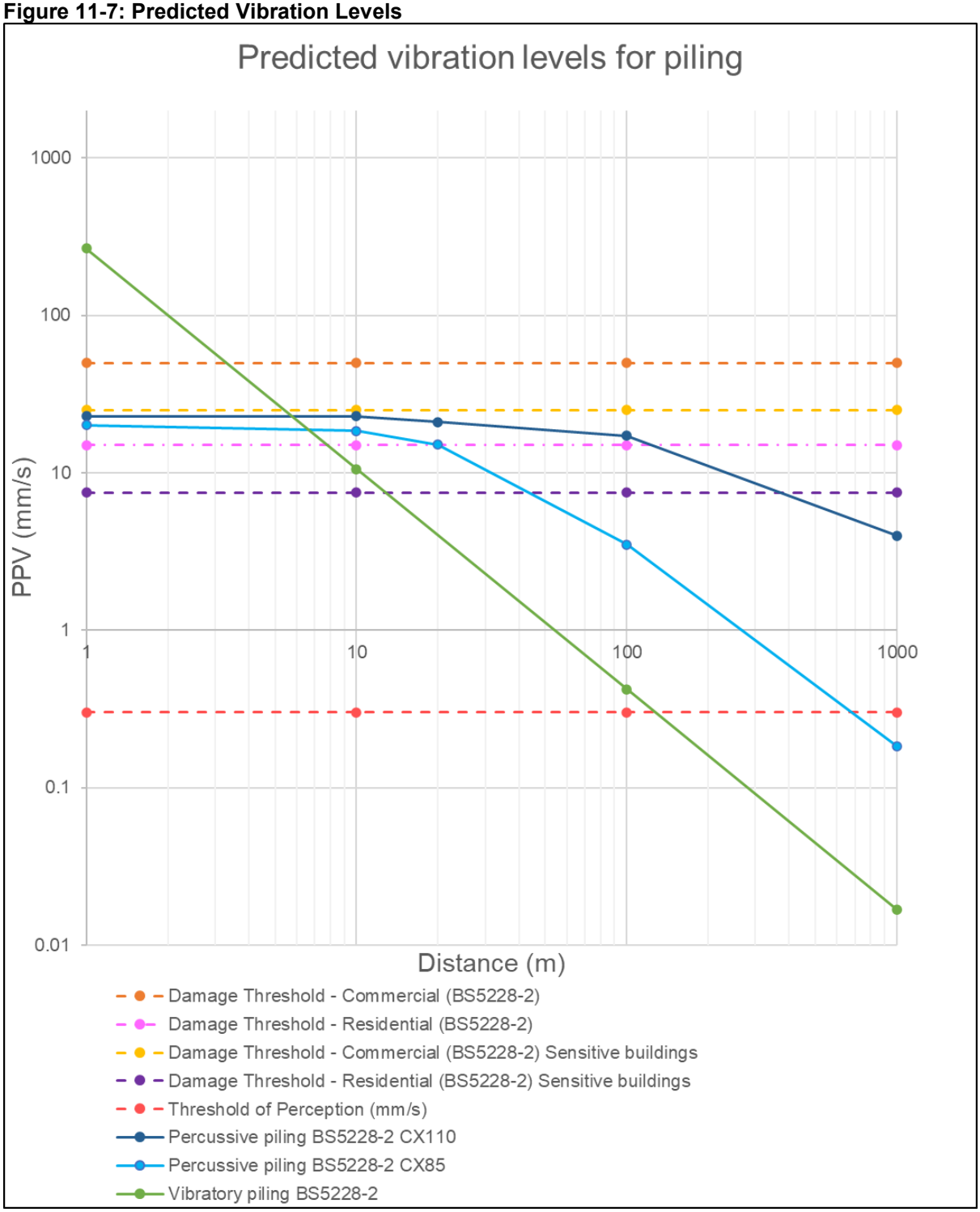
Ground vibration is normally measured as peak particle velocity ('PPV') in mm/second. PPV reduces or attenuates as the distance from the source of vibration increases. The relationship between PPV and distance from source for several types of construction plant has been developed following BS5228-2 guidance.

Equations from Appendix E of BS5228-2 have been used to predict vibration levels for impact and vibratory piling. As presented in Table 11-15 above, for impact piling (Number 4 in Table 11-15), two types are shown; the difference is the energy used: 85kJ or 110kJ. Both have been used in the calculations.

Figure 11-7 below presents the predicted levels for the different types of pilings and the thresholds presented in Section 11.2.2 above. These values represent the worst-case scenario, as a length of 27m and hard rock as the surface have been assumed.

The thresholds presented in Figure 11-7 below are derived from the limits presented in Table 11-5 above. For sensitive buildings, the thresholds are reduced to 50%.

Figure 11-7: Predicted Vibration Levels



From Figure 11-7, the distance where no damage is caused to the different types of nearest buildings and the different types of pilings is summarised in Table 11-20 below. As presented in Section 11.4.1, Phase 4c (Piling works) will occur on land and Phase 4g (Fender Piling) will occur underwater.

Table 11-20: Minimum distance where no damage is caused – Predicted Vibration

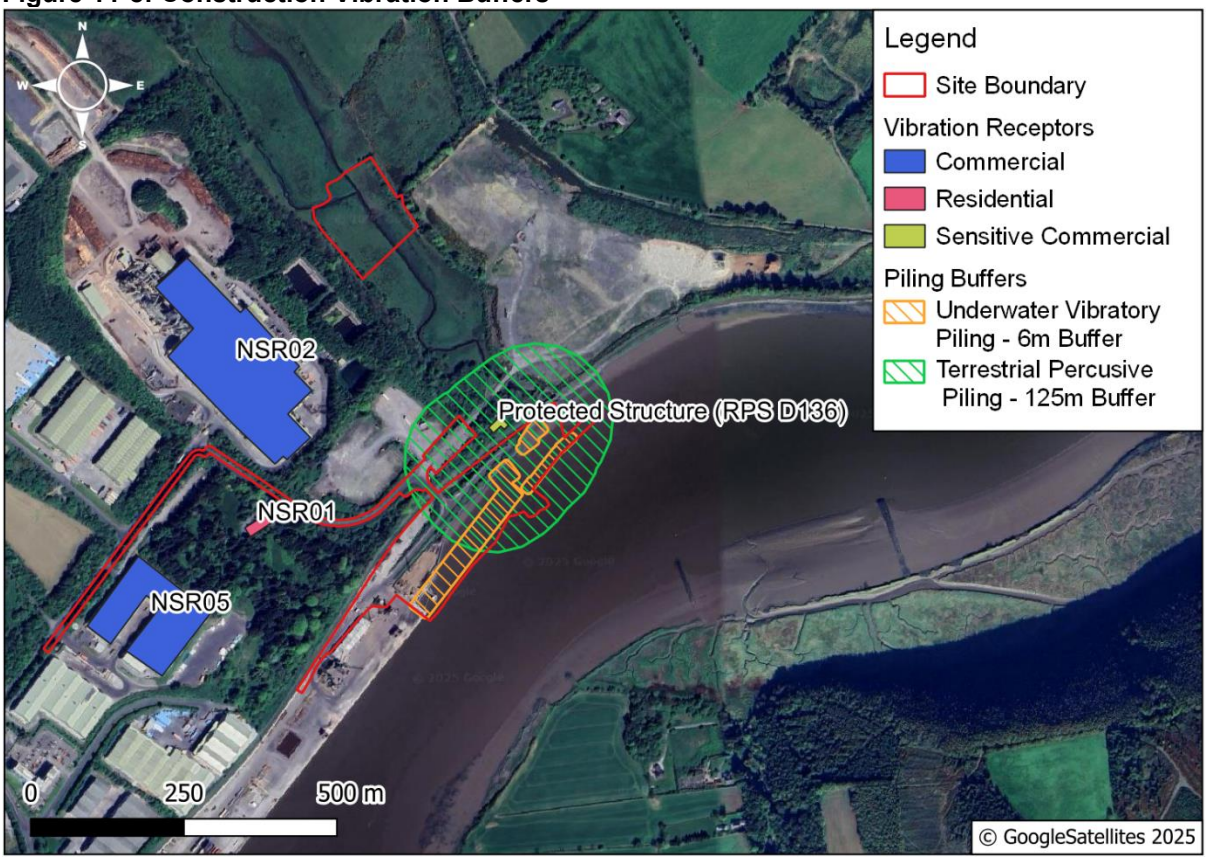
Phase	Type of Piling	Distance where no damage is caused (m)			
		Sensitive Residential Threshold	Residential Threshold	Sensitive Commercial Threshold	Commercial Threshold
Phase 4c (Piling works)	Impact Hydraulic Piling CX-110	400	125	NA	NA
	Impact Hydraulic Piling CX-85	40-50	20	NA	NA
Phase 4c (Piling works) and Phase 4g (Fender Piling)	Vibratory Piling	15	8	6	NA

Protected structures should be considered for the vibration assessment, as presented in Chapter 14. The Gorteens Old Mill (RPS D136) is a protected structure bordering the Site. This location could be classified as a Sensitive Commercial with a 50% reduction of the threshold presented in Table 11-5; therefore, the minimum distance where no damage will be caused would be estimated to be ca. 6m.

The closest NSRs to assess vibration effects will be NSR01, NSR02 and NSR05. NSR01 is a residential dwelling, and it can be classified as a modern building, so the threshold of 15mm/s was deemed applicable. NSR02 and NSR05 are commercial buildings, and the threshold for these types of buildings is 50mm/s, as presented in Table 11-5 above.

Figure 11-8 below shows the buffer zones where no damage has been predicted to be caused due to the impact of the hydraulic piling CX-110 on land and the vibratory piling occurring underwater. Neither of the receptors assessed for vibration, NSR01, NSR02 and NSR05, was predicted to be affected as they are outside the piling buffers as shown in Figure 11-8.

Figure 11-8: Construction Vibration Buffers



11.4.4 Operational Phase Noise

The Operational Phase is detailed in Chapter 3. The dominant noise sources for the Operational Phase for each element have been discussed separately below.

11.4.4.1 250m Wharf Extension - Shipping

The Proposed Development will include a ca. 250m extension to the existing wharves at the container / bulk handling terminal at Belview Port, located at the downstream end of the Belview Port.

As presented in Chapter 10, Section 10.4.2, the Proposed Development's ca. 250m wharf extension will increase berthing capacity at the port by two berths; potential ship numbers would increase by ca. 120 per annum.

The noise sources associated with this activity will be additional docking, loading / unloading and arrival and departure of ships. The Proposed Development's wharf extension will extend activities, 250m northeast along the port and bring these activities closer to receptors located to the east and north. This orientation is captured by the NSRs NSR08 to the east and NSR09 to the north.

Commentary from the attended measurements, as presented in Appendix 11-3, demonstrates that the normal activities from the Port of Waterford are not the primary sound source audible at monitoring locations representing NSR01 and NSR08, respectively.

It was expected that the operational noise from the Proposed Development ship traffic will not result in a change in behaviour / effects with respect to IEMA / IOA guidelines for fauna, as the noise from the ship movements will be similar to the existing noise levels based on the channel dimensions restricting the number of larger ships in or out. However, the Proposed

Development will lead to an increase in the frequency of noise events associated with ship traffic, with the approximate capacity increase of 50% provided by the two new berths.

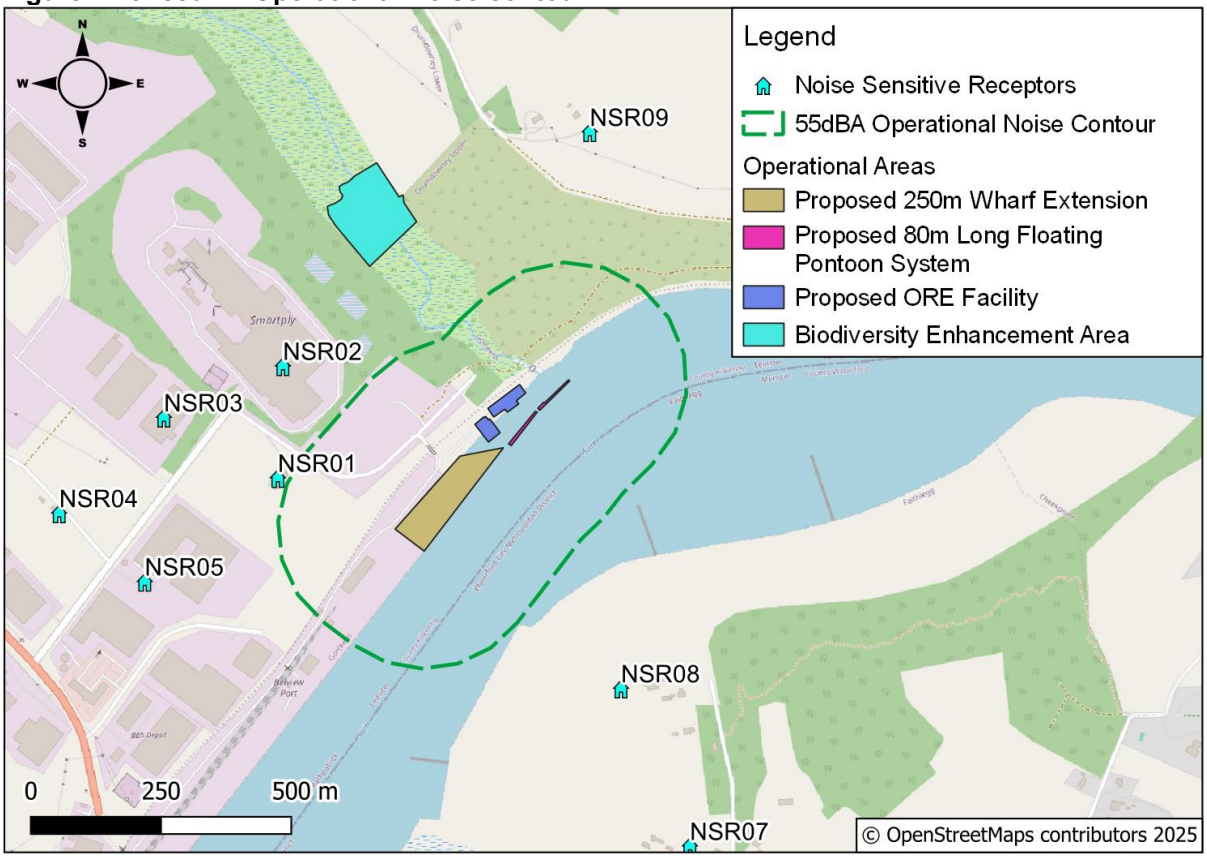
11.4.4.2 250m Wharf Extension – Port Activities

The additional ca. 250m extension to the existing wharf, along with the additional shipping capacity, will also facilitate additional port-side cranage, container storage, stevedore / shunting operations, forklift movements, HGV loading and unloading, along with general workers' movement and communications.

General works on the land side of the wharf are typically controlled to daytime hours of operation (7am to 8pm). The general noise on the wharf is typically $L_{Aeq,T}$ of 40dB to 64dB onsite. These works already occur on the Site; however, the movement of these activities further north and east along the riverside has been assessed. A reference distance of 80m was used to predict the distance to achieve 55dBA. Based on the typical noise arising, a 55dBA contour of the noise emissions from the Site down to typical noise levels is presented in Figure 11-9 below.

Based on the contour, the expansion of the Port landside facilities, all of the NSRs are outside the 55dBA predicted noise contours.

Figure 11-9: 55dBA Operational Noise contour



11.4.4.3 ORE Operator Facilities

ORE developments, as presented in Chapter 3, consist of two warehouses, fuel depot, parking spaces and two berthing pontoons.

The main noise sources associated with the ORE Developments will consist of:

- Two fixed cranes for each operator;
- Forklift movements from the pontoons up to the warehouse and vice versa;

- Traffic movements associated with the workers; and,
- Associated CTV and SOV trips, which will usually occur early morning and in the evening; refer to Chapter 3.

The ORE development marine movements will be departing in the morning and returning in the evenings.

The location NM4, located east of the Proposed Development and near the river, recorded ambient values $L_{Aeq,T}$ in the range of 40-59dB for daytime, 41-56dB for evening and 36-45dB for night-time period and $L_{A90,T}$ values in the range of 37-38dB for daytime, 34-40dB for evening and 33-39dB for night-time period. The higher values in the range were due to construction noise near the SLM at the time of the survey.

The CTV and SOV movements from the ORE Developments at early morning and evening were not predicted to cause behavioural changes or effects under the IEMA / IOA guidelines, as they will be similar to existing noise levels in the vicinity.

The ORE Development traffic flows, as presented in Chapter 16, have been predicted to be 47 trips to the Port at AM peak and 23 trips from the Port at PM peak. For the AM peak, the predicted increase was 15% compared with the existing traffic going to the Port. Based on NRA guidance, the additional traffic for the ORE Development is determined that it will have a negligible effect on traffic noise.

The dominant noise source for the Operational Phase will be the marine and terrestrial traffic from the port.

Additional noise sources, such as fixed and mobile plant, and the replacement of the existing 750V substation, will be present in the Proposed Development, and it was considered that the additional sources will have a negligible effect.

11.4.4.4 Ecological Receptors

Operational noise and vibration can result in behavioural disturbance effects, stress and displacement from feeding grounds for various species.

It was considered that there are ecological receptors located within and near the Proposed Development. However, the Proposed Development will not present new types of noise, and the noise emissions will be similar to existing noise levels recorded in the vicinity. According to the IOA / IEMA Guidance presented in Figure 11-2 above, the potential noise effects from the Proposed Development will be slight, long-term negative effects for the Operational Phase.

11.4.5 Operational Phase Vibration

The Proposed Development Operational activities will be in line with existing activities occurring both port side and river side at Belview Port. Based on a review of these activities during visits to the Site, no significant sources of vibration are present. Therefore, the proposed future operation will not have a vibration impact on the closest receptors.

11.4.6 Unplanned Events

As with all industrial facilities, there will be some risk that accidents or disasters at the Proposed Development may occur. Such events could result in a risk to the environment. However, risks specific to acoustics will be short in duration, arising only during the event and ceasing upon the event coming under control. Emissions, such as emergency service sirens, on-site alarm systems and or venting noise, are possible under such scenarios.

However, as noise is transient, with the removal of the source of the noise, the impact on the environment will be removed. Furthermore, in the situations outlined above, the use of noise to draw attention to the event and the emergency services responding to it, and to support that

a competent response is achieved, generally has a positive impact on on-site and local awareness of the occurrence.

11.5 Proposed Mitigation Measures and/or Factors

The assessment of the Proposed Development has identified that construction stage noise and vibration will be compliant with typical limit values at NSRs. The allocation of mitigation is outlined below under construction and operation, as these are distinct acoustic stages of the Proposed Development with specific characteristics to be assessed.

11.5.1 Construction Phase

11.5.1.1 Noise

The assessment in Section 11.4.1 has concluded that there will be no significant effect caused by construction noise at the majority of all the NSRs. Only two NSRs, NSR01 and NSR08, are predicted to experience an exceedance of 8dB and 3dB, respectively. These exceedances will be short-term in duration.

In advance of the Construction Phase commencing, the appointed contractor will submit a CEMP to the Council for approval. The following measures that are outlined within BS5228-1 will be specified in this CEMP:

- Turning off / powering down plant when not in use;
- Turning off HGVs when not in use;
- Reduction in drop heights of incoming materials;
- Developing the boundary embankments during early stage of works;
- Appointing project liaison officer to communicate with locals regarding noise works, their duration and organising Construction Phase noise monitoring;
- Strict controls on construction hours to prevent noise works occurring early morning or into the evening period;
- Positioning of hoarding and enclosures around noise works or plant as required;
- Inclusion of response procedure within CEMP to noise complaints and noise breaches.
- All major compressors will be ‘sound-reduced’ models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use;
- Any ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers;
- Machines in intermittent use will be shut down in the intervening periods between work;
- Ancillary plant such as generators, compressors and pumps will be placed behind existing physical barriers, and the direction of noise emissions from plant, including exhausts or engines, will be placed away from sensitive locations, in order to cause minimum noise disturbance;
- Handling of all materials will take place in a manner which minimises noise emissions; and,
- Audible warning systems will be switched to the minimum setting required by the Health & Safety Authority.

The Contractor will ensure these measures required to control noise emissions will be in place and all workers on the Site will be kept aware of them through on-site toolbox talks.

11.5.1.2 Vibration

As discussed in Section 11.4.3 above, no vibration effects were predicted to occur near sensitive receptors. However, in the event of a requirement, due to ground conditions, an alternative piling method will have to be used; it will need to be reviewed by a competent acoustician to ensure that there will be no vibration effects at the nearest buildings, especially protected structures near the Site.

11.5.2 Operational Phase

11.5.2.1 Noise

To ensure that there will be no increase in noise effects from changes to vessel movements, as presented in the Port of Waterford Masterplan [19] regarding the proposed environmental mitigation measures related to noise, it was stated:

Table 11-21: Excerpt from Table 9.5 from POW Masterplan [19]

No.	Topic	Potential Impact	Mitigation
6	Population & Human Health Air Quality Acoustics	Disturbance to the local communities during the construction of development options	Disturbances can be kept to a minimum through effective planning and timing of works in addition to adherence of construction best practices guidelines. Noise-producing activities in sensitive locations should be undertaken in line with the EPA's Guidance Note for Noise in Relation to Scheduled Activities (NG4) and monitoring of these activities should be ongoing. Mitigation measures, such as limited operational hours, will be implemented where necessary. Development of Dust and Noise Minimisation Plan as applicable. Continued liaison with local communities is recommended with regard to complaints related to air, noise and vibration emissions resulting from POW construction works.

Additionally, the following measures will be implemented as part of the Proposed Development:

- All plant (fixed and mobile) associated with the Proposed Development will be maintained to a high standard to reduce any tonal or impulsive sounds;
- Turning off HGVs when not in use; and,
- On-site vehicles associated with the Proposed Development operations will be equipped with white noise/broadband sirens to minimise noise during reversing activities.

In the Environmental Policy, from August 2024 [23] it was stated:

> *"Port of Waterford is committed to reducing the impact of its activities on the environment. To this end, Port of Waterford has implemented an environmental management system to continually improve its environmental performance. In order to meet this commitment Port of Waterford will pursue the following objectives:*
>
> - *To minimise noise and other nuisances;"*

Port of Waterford follows a policy of proactively identifying and mitigating noise at the Site.

11.5.2.2 Vibration

There will be no proposed sources within the design that will result in the creation of vibration at the Proposed Development boundaries during the Operational Phase. Therefore, the proposed future operation will not have a vibration impact at NSRs.

11.6 Cumulative and In-Combinations Effects

The Site is located within an active port that is surrounded by numerous industrial and port-related facilities, which include:

- SmartPly Europe, which manufactures sustainable-timber construction panels and has various warehouses and facilities in the area, including Store All (SmartPly Distribution), is located ca. 170m northwest of the main operational area;
- Southeast Port Services Limited, a shipping agency and storage provider, is located ca. 180m north of the main operational area;
- Target Fertilisers, a wholesaler of grass and tillage fertilisers, is located ca. 60m northwest of the Site;
- Belview Bulk Storage is located ca. 500m southwest of the Site;
- DFDS Waterford (Container Division), a freight shipping service, is located south of the Site;
- Glanway, an Irish waste processor and producer of alternative fuels, is located ca. 550m south of the Site; and,
- O'Brien Cement is located ca. 600m south of the Site.

These facilities operate in tandem with the current Port of Waterford operations. It was considered that during the Construction and Operational Phases of the Proposed Development, these facilities will continue to operate under normal activity levels. Furthermore, it was considered that during the Construction Phase, the port will carry out normal operations, which include shipping traffic, maintenance dredging and port-related activities.

A review was undertaken of the Kilkenny County Council ePlan [24], Waterford City and County Council ePlan [25], Wexford County Council Planning Applications website [26], the National Planning Application Database [27] and An Coimisiún Pleanála Mapping Search [28] to assess any plans or projects that have the potential to result in in-combination effects with the Proposed Development.

It should be noted that the Port of Waterford have previous planning applications that have been granted within the environs of the Site. However, these works have already been undertaken and, as such, are not considered likely to result in any in-combination effects with the Proposed Development.

Therefore, no current or previously granted plans or projects were identified in the immediate vicinity that were considered to have the potential to have any in-combination with the Proposed Development that will result in significant impacts on the integrity of European sites.

Two planning applications that had recently been submitted to Kilkenny County Council were identified during the desk-based review and implementing a precautionary approach as neither has been consented, these applications were assessed for potential in-combination effects with the Proposed Development:

KCC Planning Ref: 2560391

Drumdowney Solar Farm Ltd. submitted an application to Kilkenny County Council on 27th June 2025 for a solar farm with a 40 year operational lifetime that will cover a total area of ca. 189ha and will include solar panels on ground mounted frames, 27 single storey electrical inverter / transformer stations, five single storey spare parts containers, three Ring Main Units, five weather stations, underground electrical ducting, cabling within the development site, private lands and within the public road network to connect solar farm field parcels and associated ancillary works. This application is currently awaiting a decision from Kilkenny County Council. The Noise Impact Assessment assessed the likely effects for construction and operational noises, and it is below the typical noise limits.

Based on the location of the application site and the findings of the supporting acoustic report lodged, the direct effects of this development will not interact with the Proposed Development.

KCC Planning Ref: 2460103

The development will consist of the construction of an integrated plasterboard manufacturing facility, incorporating a production plant with access from the industrial area road infrastructure at Gorteens, Co. Kilkenny. The production facility will have a floor area of 22,400 sq.m, with a height over finished ground level ranging from 19metres to 29metres. Roof mounted solar panels are proposed. The proposed development includes all site development works, landscaping, boundary treatments including earthworks, road works, retaining walls, vehicle entrance, vehicle parking with charging (HGV, cars and bicycles/scooters), gates, fencing, paving, water storage tanks, drainage and lighting. Planted berms are proposed within and along the perimeters of the development site. The development will include for extraction of groundwater for production process purposes. Servicing arrangements include the provision of a constructed surface water attenuation area. Access to connect to the public foul network and to mains water supply is proposed.

The development considers traffic to the Port, and it's already been assessed cumulatively with existing port activities and the Port Master Plan. The direct effects of those developments will not interact with the Proposed Development.

11.7 Interactions with other Environmental Attributes

- Chapter 5 (Population and Human Health). Noise is closely linked with human beings, as residential receptors are the primary noise-sensitive receptors and have been discussed as the primary receptor in this chapter. The assessment has shown that, where identified mitigation is in place, the effects on human nuisance will be controlled and within typical limit values;
- Chapter 6 (Biodiversity). Noise can influence fauna through disturbance of animals, and effects on specific species have been outlined in Chapter 6, where relevant;
- Chapter 14 (Terrestrial Cultural Heritage). Vibration arising from piling work during the construction phase has the potential to effect buildings with cultural heritage value. As per the assessment, no likely significant effects have been predicted arising from vibration during construction works due to the distances from the nearest archaeological features and the type of activities / processes undertaken as part of the Proposed Development during construction and operational phases. The effects of vibration will be not likely and not significant; and,
- Chapter 16 (Material Assets – Traffic and Transport). Noise is influenced by traffic associated with the construction and operation of the Proposed Development. A review of the traffic numbers associated with both stages has been undertaken and has informed the assessment of effect presented in this chapter.

11.8 Indirect Effects

In addition to the direct effects, the Proposed Development includes the noise associated with trucks and employee vehicles accessing / egressing the Site while on public roads. The noise associated with vehicles utilising local and national road infrastructure is a key assessment in the pre-development stage for new roads and major road upgrades. Criteria for triggering mitigation is outlined within the NRA guidance [13] documents for noise on roads.

Road traffic noise is further reviewed by Competent Authorities under their requirements of the END [3], where they are deemed major infrastructure. As per the road traffic assessment undertaken for the Proposed Development, the junction and routes proposed to be utilised by vehicles accessing the Site will remain within design criteria for movement, which is indicative that they will remain within assessment criteria for predicted noise emissions.

Furthermore, the volume of vehicles associated with the Proposed Development will not increase significantly, resulting in a negligible likely effect.

11.9 Residual Effects

No likely significant effect has been predicted arising from vibration during construction works due to the distances to the local NSRs and the type of activities / processes undertaken as part of the Proposed Development during construction and operation.

Following the implementation of mitigation, additional control and awareness of the as-built plant will enable the operation of the Proposed Development to be managed, ensuring noise will be controlled.

Therefore, a long-term, negligible effect on NSRs has been predicted.

This assessment has found no likely significant effect of the Proposed Development on noise or vibration during short-term construction or long-term operation.

11.10 Monitoring

The Port of Waterford has noise limits, presented in Table 11-2 and Table 11-3 above. The Port will continue with the required monitoring during channel maintenance activities and will investigate any noise complaints.

11.11 Reinstatement

Not applicable – noise will be generated through operations onsite. In the event of Site closure, noise emissions will cease.

11.12 Difficulties Encountered in Compiling this Information

Not applicable.

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