10. Noise and Vibration

10.1 Introduction

This chapter assesses the potential noise and vibration effects on the surrounding environment associated with the construction and operation of the proposed Ringaskiddy Resource Recovery Centre at Ringaskiddy, County Cork.

The main element of the proposed Ringaskiddy Resource Recovery Centre project is a waste-to-energy facility (waste incinerator).

Other elements will include an upgrade of a section of the L2545 road, a connection to the national electrical grid, an increase in ground levels on part of the site, coastal protection measures above the foreshore on Gobby beach and an amenity walkway to the Ringaskiddy Martello tower

This chapter has been prepared with reference to the most relevant noise and vibration guidance documents applicable to the proposed development.

The specific assessments relating to the potential noise and vibration effects associated with the operational and construction phases are set out in the following sections of this chapter.

10.2 Assessment Methodology

The following methodology has been adopted to assess the potential noise and vibration effects associated with the proposed development.

- An environmental noise survey was conducted in the vicinity of the proposed development, in accordance with the EPA's *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, EPA 2016) and ISO 1996 (2017) *Description Measurement and Assessment of Environmental Noise.* Part 2 *Determination of Environmental Noise Levels*. The purpose of the survey was to determine the prevailing noise environment in the area and to advise the relevant operational noise criteria.
- Noise and vibration effects associated with the construction phase have been calculated in accordance with ISO 9613: *Acoustics: Attenuation of Sound During Propagation Outdoors* (2024) using source data obtained from BS 5228 *Code of Practice for the Control of Noise and Vibration on Construction and Open Sites*. Part 1 – *Noise* and Part 2 – *Vibration* (2009 +A1 2014).
- Noise effects associated with the operational phase have been calculated in accordance with ISO 9613: *Acoustics: Attenuation of Sound during Propagation Outdoors* (2024) and through the use of proprietary acoustic modelling software.
- Road traffic noise effects have been calculated in accordance with the UK's Department of Transport *Calculation of Road Traffic Noise* (CRTN) (1988).
- The results of the predictive assessment have been compared against the relevant criteria adopted for the construction and operational phases, and;
- Mitigation measures, to comply with the adopted criteria have been proposed, where necessary.

10.3 Standards and Guidelines

The assessment has been undertaken with reference to the most appropriate guidance documents relating to environmental noise and vibration which are set out within the following sections and included in the references **Section 10.10**. In addition to specific noise guidance documents, the EPA's *Guidelines on the Information to be contained in Environmental Impact Statements*, (2022) (Hereafter referred to as the EPA EIAR Guidelines (2022)) were consulted for the purposes of the proposed development.

10.3.1 Construction Phase

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local Authorities typically control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion. Reference is made to the following guidelines and standards to inform the most appropriate construction noise and vibration significance thresholds and assessment methodologies:

- British Standard Institute (BSI) British Standard (BS) 5228-1:2009 +A1 2014 Code of Practice for noise and vibration control of construction and open sites - Part 1: Noise (hereafter referred to as BS 5228–1) (BSI 2014a).
- BS 5228-2:2009+A1:2014 Code of Practice for noise and vibration control of construction and open sites - Part 2: Vibration (hereafter referred to as BS 5228 – 2) (BSI 2014b).
- BS 7385: 1993 Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration (hereafter referred to as BS 7385–2). (BSI 1993).
- BS 6472-1: 2008 Guide to evaluation of human exposure to vibration in buildings, Part 1 Vibration sources other than blasting (hereafter referred to as BS 6472–1) (BSI 2008).
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHE 2020); and
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (ISO 1996).

10.3.1.1 Construction Noise

In the absence of statutory guidance or other specific limits prescribed by local authorities, an appropriate best practice measure has been adopted as the standard for this project. Best practice guidelines are taken from BS 5228--1:2009+A1:2014.

Residential and Educational Noise Sensitive Locations

BS 5228--1:2009+A1:2014 sets out an approach for setting appropriate construction noise limits for residential dwellings, but it does not provide guidance for commercial or office buildings. Given the proximity of the National Maritime College of Ireland (NMCI) and the UCC ERI Beaufort Building as educational buildings to the north of the site, the residential criteria have also been used to set significance thresholds at these buildings also. The BS 5228-1 'ABC method' calls for the designation of a noise sensitive location into a specific category (A, B or C) based on existing ambient noise levels in the absence of construction noise. This then sets a Construction Noise Threshold (CNT) that, if exceeded, indicates a potential significant noise effect is associated with the construction activities as summarised in **Table 10.1,** depending on context.

Table 10.1 Example Threshold of Significant Effect at Dwellings

Assessment Category and Threshold Value Period (L_{Aeq})	Threshold Value (dB)		
	Category A [A]	Category B [B]	Category C [C]
Night-time (23:00 to 07:00hrs)	45	50	55
Evenings & Weekends [D]	55	60	65
Daytime (07:00 – 19:00hrs) and Saturdays (07:00 – 13:00hrs)	65	70	75

Note A: Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note B: Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Note C: Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category A values.

Note D: 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

The site start time will ensure that construction workers arrive in the Ringaskiddy area prior to the morning peak hour for traffic on the local network. No construction vehicles will arrive or depart the proposed development site during the morning and evening peak periods (07:00-09:00 and 16:00-18:00) during the construction phase. Typical working hours during the construction phase will be:

- 06:00 – 20:00hrs Monday – Friday
- 07:00 – 13:00hrs Saturday

It will be necessary to work overtime (including at weekends) and night shifts at certain critical stages during the project. Consideration of safety, weather or sub-contractor availability is likely to necessitate working outside normal hours. Over the 31-month construction phase there will be up to 8 weeks of night-time working. Heavy or noisy construction activities will be avoided outside normal hours and the amount of work outside normal hours will be strictly controlled.

Making reference to the baseline noise environment monitored around the development site, the construction noise criteria relating to 'Category A' are used for the construction phase. These are summarised as follows:

- Weekdays (07:00 – 19:00hrs): **65dB $L_{Aeq,\ 1hour}$**
- Saturday (07:00 to 13:00hrs): **65dB $L_{Aeq,\ 1hour}$**
- Evenings and weekends (outside 'normal hours') **55dB $L_{Aeq,\ 1hour}$**
- Night-time (23:00 to 07:00hrs) **45dB $L_{Aeq,\ 1hour}$**

The proposed weekday construction works will commence at 06:00hrs which falls into the defined 'night-time' period. In this instance, in order to control noise levels to the surrounding environment, the lower night-time noise limit of 45dB $L_{Aeq,\ 1hr}$ will apply during the first hour of construction works, i.e. between 06:00 and 07:00hrs.

Similarly, the last hour of weekday construction works will be during 'evening' periods, i.e. between 19:00 and 20:00hrs. In this instance, the lower evening noise limit will apply during this time period, i.e. 55dB $L_{Aeq,1hr.}$

Further assessment relating to construction effects are included in **Section 10.6.2**.

Commercial Receptors

BS 5228--1:2009+A1:2014 gives several examples of acceptable limits for construction noise, the most simplistic being based upon the exceedance of fixed noise limits. Section E.2 notes

"Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed:

- *70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise;*
- *75 decibels (dBA) in urban areas near main roads in heavy industrial areas".*

Making reference to the surrounding environment, the following significance threshold is proposed for all non-residential units in the vicinity of the development site:

- Commercial Receptors: 70 dB $L_{Aeq,T}$

Exceedance of the above CNT is deemed to result in a potentially significant effect, depending on the duration of the effect and margin above the threshold level is calculated.

10.3.1.2 Construction Vibration

Vibration standards come in two varieties: those relating to human comfort, and those relating to cosmetic or structural damage to buildings. For the construction works proposed, vibration is expressed in terms of Peak Particle Velocity (PPV) in millimetres per second (mm/s). There is no expected significant vibration sources associated with the development once the facility becomes operational.

Building Response Criteria

Building Damage Building Response British Standard 7385-2 (1993) gives guidance regarding acceptable vibration in order to avoid damage to buildings. British Standard BS 5228-2 reproduces these guidance values.

These standards differentiate between transient and continuous vibration. Surface construction activities are transient because they occur for a limited period of time at a given location. Risk of cosmetic damage to residential buildings starts at a PPV of 15mm/s at 4Hz. Below 12.5 mm/s PPV, the risk of damage tends to be zero. Important buildings that are difficult to repair might require special consideration on a case-by-case basis, but buildings of historical importance should not (unless they are structurally unsound) be assumed to be more sensitive. If a building is in a very unstable state, then it will tend to be more vulnerable to the possibility of damage arising from vibration or any other ground borne disturbance.

The most significant sources of transient vibration during the construction phase of the development are likely to be from the following activities:

- Rock breaking during excavation
- Breaking of existing road surfaces during road works
- Vibratory rolling during road works, and.
- Piling foundations, depending on the methodologies chosen.

Table 10.2 summarises the vibration levels below which there is no risk of damage to buildings. These limits apply to vibration frequencies below 15Hz where the most conservative limits are required. For protected or potentially vulnerable buildings, the recommended construction vibration limit is reduced by 50%.

Table 10.2 Transient Vibration Effect Criteria for Buildings (conservative criteria below which there is no risk of cosmetic damage).

Category of Building	Threshold of potential significant effect (Peak Particle Velocity - PPV - at building foundation) for Transient Vibration
Structurally sound and non-protected buildings	12 mm/s
Protected and / or potentially vulnerable buildings	6 mm/s

Human Perception

Humans are sensitive to vibration stimuli, and perception of vibration at high magnitudes may cause concern. BS 5228–2 notes that vibration typically becomes perceptible at around 0.15 to 0.3 mm/s and may become disturbing or annoying at higher magnitudes. During surface construction works (piling, rock breaking etc.) the vibration limits set within **Table 10.2** would be perceptible to building occupants and would have the potential to cause subjective effects.

Table 10.3 Presents the significance table relating to potential impacts to building occupants during construction based on guidance from BS 5228–2, DMRB Noise and Vibration (2020) and associated EPA EIAR (2022) guidelines significance ratings.

Table 10.3 Human Response Vibration Significance Ratings

PPV range	Description of Effect	DMRB Impact Magnitude	EPA Significance Ratings
⩾10 mm/s PPV	Vibration is likely to be intolerable for any more than a very brief exposure to this level in most building environments	Major	Very Significant
⩾1 to <10 mm/s mm/s	Increasing likelihood of perceptible vibration in residential environments but can be tolerated at the lower end of the scale if prior warning and explanation has been given to residents	Moderate	Moderate to Significant

PPV range	Description of Effect	DMRB Impact Magnitude	EPA Significance Ratings
⩾0.3 to <1 mm/s	Increasing likelihood of perceptible vibration in residential environments	Minor	Slight
0.14 to <0.3 mm/s PPV	Vibration might be just perceptible in residential environments towards the upper levels in this range	Negligible	Not Significant
<0.14	Vibration is unlikely to be perceptible in even the most sensitive situations for most vibration frequencies associated with construction		Imperceptible

Single or infrequent occurrences of these levels do not necessarily correspond to the stated effect in every case. The values are provided to give an initial indication of potential effects. Construction vibration shall constitute a likely significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding: 1) 10 or more days or nights in any 15 consecutive days or nights; or 2) a total number of days exceeding 40 in any 6 consecutive months.

10.3.1.3 Construction Traffic

Vehicular movement to and from the construction site for the proposed development will make use of the existing road network. In order to assess the potential effect of additional traffic on the human perception of noise, the following two guidelines are referenced DMRB Noise and Vibration (2020) and the EPA Guidelines (2022). For construction traffic, due to the short-term period over which this impact occurs, the magnitude of impacts is assessed against the 'short term' period in accordance with the DMRB Noise and Vibration (2020) document.

Table 10.4 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.4 Classification of Magnitude of traffic noise changes for Construction Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Short-term)	EPA Significance of Effect
Less than 1 dB	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible	Minor	Not Significant to Slight
3 – 4.9	Perceptible	Moderate	Moderate
≥ 5	Up to a doubling of loudness	Major	Significant

10.3.2 Operational Phase

The main potential source of outward noise from the proposed development relate to process and building services noise, on-site vehicular activity and traffic flows to and from the development site onto the public roads. The relevant guidance documents used to assess potential operational noise and vibration effects on the surrounding environment are summarised below.

- BS 8233:2014 Guidance on sound insulation and noise reduction for buildings (hereafter referred to as BS 8233) (BSI 2014c).
- BS 4142: 2014 +A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (hereafter referred to as BS 4142) (BSI 2019).
- Environmental Protection Agency (EPA): Guidance Note for Noise: Licence Application, Surveys and Assessment in Relation to Schedules Activities (NG4) (January 2016) (hereafter referred as EPA NG4 (2016).

- Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014) (hereafter referred to as IEMA Noise Assessment Guidelines).
- ISO 1996-1:2016 Acoustics - Description, measurement and assessment of environmental noise. Part 1: Basic quantities and assessment procedures (hereafter referred to as ISO 1996 – 1) (ISO 2016).
- The UK Department of Transport Calculation of Road Traffic Noise (hereafter referred to as the CRTN) (UK Department of Transport 1988).
- UK Highways Agency (UKHA) Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2 (hereafter referred to as DMRB Noise and Vibration) (UKHA 2020), and;
- International Organization for Standardization (ISO) 9613-2:1996 Acoustics – Attenuation of sound during propagation outdoors - Part 2: General method of calculation (hereafter referred to as ISO 9613 – 2) (ISO 1996).

10.3.2.1 Operational Plant Noise Emissions

EPA Guidance Note for Noise – NG4 (2016)

The operation of the proposed development will be subject to a licence issued by the EPA, if permission is granted and therefore the guidance in the EPA NG4 document has been used to review appropriate limit values relating to the facilities operational phase. This approach is summarised below in accordance with guidance detailed in Section 4 of the NG4 document.

Quiet Area Screening

The proposed development location is not considered a quiet area in this instance as it fails to meet all the criteria outlined in EPA's Guidance. The relevant test criteria are detailed below.

Table 10.5 Quiet Area Screening

Quiet Area Test Criteria	Yes/ No	Comment
Is the site at least 3 km from urban areas with a population >1,000 people	No	Site is located within 3km of various urban areas with population > 1,000 people including Cobh.
Is the site at least 10 km from any urban areas with a population >5,000 people	No	Site is located within 10km of Cobh with population > 5,000 people
Is the site at least 15 km from any urban areas with a population >10,000 people	No	Site is located within 15km of Cobh and Carrigaline with population > 10,000 people
Is the site at least 3 km from any local industry[1]	No	Site is located within 3km of various industrial facilities
Is the site at least 10 km from any major industry centre	No	Site is located within 10km of various industrial facilities
Is the site at least 5 km from any National Primary Route	No	Site is located within 5km of N28 road
Is the site at least 7.5 km from any Motorway or Dual Carriageway	No	Site is located within 7.5km of N28 dual carriageway and the M28 under construction
Quiet Area?	No	

[1] Local industry is taken to include all sources of noise that may be considered industrial in nature, for example: grain drying facilities, creameries and small factories.

As the site does not meet the above criteria, it is not a quiet area as per the Agency definition.

Low Background Noise Screening

In order to establish whether the noise sensitive locations in the vicinity of the site would be considered an area of 'low background noise' (LBN), the noise levels measured during the environmental noise survey need to satisfy all three of the following criteria:

- Arithmetic Average of L_{A90} During Daytime Period ≤40 dB L_{A90}, and
- Arithmetic Average of L_{A90} During Evening Period ≤35 dB L_{A90}, and
- Arithmetic Average of L_{A90} During Night-time Period ≤30 dB L_{A90}.

The results of the baseline study in **Section 10.4** confirm the measured background noise levels do not meet the criteria for an area of low background noise. The specific data and test criteria are set out in **Table 10.14** in **Section 10.4.3**.

Derivation of NG4 Criteria

Following a review of the measured background noise levels at the survey locations, the standard noise criteria will apply to the noise sensitive properties during day, evening and night-time periods.

Table 10.6 summarises the adopted noise emission limits criteria for the operational phase, in line with NG4 guidance.

Table 10.6 NG4 Noise Criteria

Location	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 to 19:00hrs)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 to 23:00hrs)	Night-time Noise Criterion, dB $L_{Ar,T}$ (23:00 to 07:00hrs)
All residential dwellings in vicinity of development	55	50	45
Non-residential dwellings to east (i,e. coastal locations, NMCI)	55	50	n/a

In this instance, the operational noise level at the nearest residential locations to the west of the facility will be limited to noise levels of 55 dB $L_{Aeq,T}$ during daytime periods, 50 dB $L_{Aeq,T}$ for evening periods and 45 dB $L_{Aeq,T}$ during the night-time period.

For sensitive locations to the east of the site including the NCMI, the beach area and other amenity areas in the vicinity with similar baseline noise levels, the standard operational criteria of 55dB $L_{Aeq,T}$ and 50 dB $L_{Aeq,T}$ during day and evening periods respectively will apply.

The time period in this instance is taken to be 15 minutes for all three periods.

10.3.2.2 Operational Traffic Noise

In order to assist with the interpretation of the noise associated with vehicular traffic on public roads, **Table 10.7** offers guidance as to the likely impact associated with changes in traffic noise level based on the DMRB Noise and Vibration (2020) document and the EPA EIAR Guidelines (2022). For operational traffic, the assessment is compared against the long-term classification of impacts from the DMRB table.

Table 10.7 sets out the classification of changes in noise level to impact on human perception based on the guidance contained in these documents.

Table 10.7 Classification of Magnitude of traffic noise changes for Operational Traffic

Change in Sound Level (dB)	Subjective Reaction	DMRB Magnitude of Impact (Long-term)	EPA Significance of Effect
0.0 – 0.9	Inaudible	Negligible	Imperceptible
1 – 2.9	Barely Perceptible		Not Significant
3 – 4.9	Perceptible	Minor	Slight to Moderate
5 – 9.9	Up to a doubling of loudness	Moderate	Significant
10+	Doubling of loudness and above	Major	Very Significant

10.4 Baseline Environment

10.4.1 Receiving Environment

The proposed development occupies an area of approximately 13.55 hectares which is currently covered in scrub with some pockets of trees and open grass areas. The centre of Ringaskiddy village is located approximately 800m to the west of the site of the proposed development. The Ringaskiddy peninsula is industrial in character, and a number of existing industrial facilities are in the proximity of the proposed site, located to the south, west and north-west including the Port of Cork and a vehicle distribution centre located to the northeast of the development site.

The L2545, the main road from Ringaskiddy village to Haulbowline Island forms the northern boundary of the site. The National Maritime College of Ireland (NMCI) and the UCC ERI Beaufort Building is on the northern side of the L2545 road, which forms the northern boundary of the site. Some warehouses are located on the northern side of the L2545 road, to the west of the NMCI. MaREI (Centre for Marine and Renewable Energy) and the Lir National Ocean Test Facility are both located in the UCC ERI Beaufort Building.

The L2545 is an extension of the N28 that leads from Ringaskiddy past the proposed development site and over the bridge to the crematorium on Rocky Island and Haulbowline Naval base. The proposed L2545 upgrade will raise the road level locally at the current access to lands directly across from the entrance to the proposed development.

The eastern boundary of the site extends to the foreshore of Cork harbour along Gobby Beach. The lands to the south are in agricultural use. The section of Gobby Beach where coastal protection works are proposed above the foreshore extends along the eastern boundary of the Indaver site. Refer to **Chapter 4** ***Project Description*** **and Chapter 13** ***Soils, Geology, Hydrogeology, Hydrology and Coastal Recession*** for further details on coastal protection.

The lands over which the entire grid connection will be constructed lie within Indaver's ownership (save for a small section comprising associated works on the adjacent Lough Beg substation owned by ESBN if this substation is chosen as the point of connection by ESBN and a small section on the IDA land to the south if this option is chosen by ESBN). These works will be carried out by ESBN.

The land to the west of the site is in agricultural use. Further to the west there is a single, residential property (Ring House) located approximately 50m from the boundary, set within a field and surrounded by trees. This property is currently unoccupied and is owned by the Port of Cork.

The site encircles the Hammond Lane Metal Recycling Company facility which is located to the west and site and the M28 Cork to Ringaskiddy project is currently being constructed further west. The ESB Networks compound (Lough Beg station) is located adjacent to the eastern boundary of the Hammond Lane facility.

10.4.2 Baseline Noise Survey

Baseline noise surveys have been undertaken in the vicinity of the proposed development during 2018. An updated noise survey was also undertaken during 2025 to supplement and update the previous monitoring data. The M28 Motorway is currently under construction to the west of the proposed development site where the majority of the closest residential Noise Sensitive Locations (NSLs) are located. The baseline survey results from both periods have therefore been used to characterise the baseline noise environment.

10.4.2.1 Selection of Noise Monitoring Locations

Section 6.1 of NG4, which contains guidance on the selection of Survey/Monitoring Locations, states:

The measurement positions should include those positions which will be most affected by the facility's emissions. The following process is recommended:

An initial site inspection should be carried out with a view to identifying all NSLs in the vicinity of the proposed development.

NSLs should be marked onto relevant drawings and the proposed development overlaid.

A total of five measurement attended monitoring locations were selected for noise monitoring, taking into account the site location, and orientation and the proximity of the nearest noise sensitive receptors to the site boundaries. Each location is described below and shown in **Figure 10.1.**

- **Location N1** This monitoring position was within the bounds of the development site along an existing access track and was set back approximately 75m from the L2545 Road. An unattended meter was installed at this location during May 2025 for a period of 6 days. This monitoring position is representative of noise levels along the east and north of the site boundary.
- **Location N2** This monitoring position was outside residential properties (noise sensitive receptors) within Martello Park, approximately 300m to the west of the site boundary (600m from waste-to-energy facility) and was set back approximately 45m from the L2545 Road. An attended noise survey was conducted at this position during 2018. This monitoring position is representative of the closest occupied residential properties to the west of the site. Due to construction activity at the M28 Motorway site area, an updated attended noise survey was not undertaken at this location.
- **Location N3**a This monitoring position was at the gate entrance to an unoccupied dwelling along the L2545 Road approximately 130m the west of the site boundary (400m from waste-to-energy facility). An attended monitoring survey was undertaken during 2018 at a position inside the gate of the property set back at a distance of approximately 10m from the road edge.
- **Location N3b** This monitoring position was within the rear garden of the unoccupied dwelling approximately 45m from the L2545 Road and approximately 130m the west of the site boundary (400m from waste-to-energy facility). An unattended monitoring survey was installed at this location during May 2025 for a period of 6 days. The daytime weekday data has been excluded from the monitoring data set which was influenced by construction activities from the M28 motorway and site compound. The weekday evening and night-time monitoring data and the weekend period day, evening and night-time monitoring data has been used to define the baseline noise environment at the residential dwellings to the west of the site.
- **Location N4** This monitoring position was within the car park of the National Maritime College of Ireland approximately 110m to the north of the proposed site boundary, and was set back approximately 90m from the L2545 Road. An attended noise survey was conducted at this position during the 2018 survey round.

10.4.2.2 Survey Periods

Noise measurements were conducted over the course of the following survey periods:

Unattended Survey at Location N1

- 10:30hrs on 10 April 2025 to 17:30hrs on 16 April 2025

- Unattended Survey at Location N3b
- 10:00hrs on 10 April 2025 to 12:30hrs on 16 April 2025

Attended Surveys at Locations N2 to N4

14:45hrs on 14 November to 18:40hrs on 14 November 2018

21:50hrs on 19 November to 01:55hrs on 19 November 2018

10.4.2.3 Meteorological Conditions

2018 survey

The weather during the daytime and evening survey periods was dry and calm. Temperatures were of the order of 10 – 13 ˚C and wind speeds were <5m/s. During the night-time survey period, conditions were also dry and calm with temperatures of the order of 7 ˚C and wind speeds of <5m/s.

2025 survey

The weather during the 6 day survey periods was dry and calm with wind speeds <5m/s.

10.4.2.4 Instrumentation

AWN Consulting conducted the noise level measurements during all survey periods. The measurements were made using the following equipment:

Table 10.8 Noise Monitoring Equipment Details

Survey Period	Manufacturer	Equipment Model	Serial Number	Calibration date
2018	Brüel & Kjaer	SLM2250	2818080	August 2017
		SLM 2238 & UA1404	2684496	February 2018
		Cal 4321	2460007	October 2017
2025	Rion	NL-42	721071	07 March 2023
		NX-43	630268	29 September 2023

10.4.2.5 Procedure

Unattended Noise Surveys - 2025

At Locations N1 and N3b, the equipment was set to log continuously over 15 minute periods for 6 days. The results were saved to the instrument memory for later analysis. Survey personnel noted all primary noise sources contributing to noise build-up during equipment install and collection.

Attended Noise Surveys - 2018

Attended measurements were conducted on a cyclical basis between the attended monitoring locations. Sample periods were 15 minutes during both the daytime, evening and night-time surveys. During the daytime period, four survey rounds were conducted at the NSLs. One survey round was conducted during the evening period, and three survey rounds were conducted during the night-time periods.

10.4.2.6 Survey Parameters

The noise survey results are presented in terms of the following three parameters:

- **L_{Aeq}** is the equivalent continuous sound level. It is a type of average and is used to describe a fluctuating noise in terms of a single noise level over the sample period.
- **L_{Amax}** is the instantaneous maximum sound level measured during the sample period.
- **L_{A90}** is the sound level that is exceeded for 90% of the sample period. It is typically used as a descriptor for background noise.

The "A" suffix denotes the fact that the sound levels have been "A-weighted" in order to account for the non-linear nature of human hearing.

All sound levels in this report are expressed in terms of decibels (dB) relative to $2x10^{-5}$ Pa.

10.4.2.7 Results and Discussion

Unattended Noise Surveys 2025

Location N1

The survey results for Location N1 are summarised in **Table 10.9** below. Full Survey Details are presented in **Appendix 10.1**.

Table 10.9 Summary of Measured Noise Levels at Location N1

Period	Date	Measured Noise Levels (dB re. 2x10-5 Pa)		
		$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Daytime (07:00 to 19:00hrs)	10/04/2025	33 - 47	51 - 70	30 - 43
	11/04/2025	30 - 50	54 - 74	24 - 44
	12/04/2025	36 - 51	53 - 74	33 - 43
	13/04/2025	42 - 50	52 - 70	33 - 45
	14/04/2025	39 - 54	57 - 75	37 - 48
	15/04/2025	41 - 58	59 -79	38 - 53
	16/04/2025	44 - 56	58 - 80	40 - 52
Average		48	64	40
Evening (19:00 to 23:00hrs)	10/04/2025	33 - 47	44 - 71	30 - 37
	11/04/2025	30 - 45	45 - 68	24 - 35
	12/04/2025	36 - 49	48 - 69	33 - 43
	13/04/2025	43 - 48	501 - 66	38 - 45
	14/04/2025	39 - 47	51 - 77	37 - 40
	15/04/2025	41 - 50	53 - 71	38 - 46
Average		44	58	36
	10/04/2025	31 - 56	46 - 57	29 - 50

Period	Date	Measured Noise Levels (dB re. 2x10-5 Pa)		
		$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Night-time (23:00 to 07:00hrs)	11/04/2025	23 -56	35 - 72	22 -48
	12/04/2025	34 - 56	31 - 48	32 - 49
	13/04/2025	34 - 56	39 - 67	33 - 50
	14/04/2025	34 - 57	39 - 69	32 - 49
	15/04/2025	34 - 55		32 - 46
Average		45	51	35

- During the set up and collection at this monitoring position, the main sources of noise noted were the operational activities at the adjacent Hammond Lane metal recycling facility, road traffic noise along local and distant roads in addition to background noise from the coastline. Construction activities from the M28 were audible at low level in the background.
- During the daytime period, measured ambient noise levels were in the range of 30 to 58 dB $L_{Aeq,15min}$ with an average value of 48 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at the site were in the range of 24 to 53 dB $L_{A90,15min}$ with an average value of 40 dB $L_{A90,15min}$ recorded. The background noise environment was predominately governed by distant road traffic, wind turbine noise, coastal noise and operational activities in Hammond Lane. Maximum noise levels recorded at this position during the daytime period were noted to be from road traffic noise and operational activities associated at the adjacent Hammond Lane facility.
- During the evening period, measured ambient noise levels were in the range of 30 to 50 dB $L_{Aeq,15min}$ with an average value of 44 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at the site were in the range of 24 to 46 dB $L_{A90,15min}$ with an average value of 36 dB $L_{A90,15min}$ recorded. The Hammond Lane facility was closed during the evening period, so ambient and background noise levels were dominated by road traffic sources, wind turbine noise, rustling foliage and coastal sounds.
- During the night-time period, measured ambient noise levels were in the range of 23 to 57 dB $L_{Aeq,15min}$ with an average value of 45 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at this location were in the range of 22 to 50 dB $L_{A90,15min}$ with an average value of 35dB $L_{A90,15min}$ recorded. The Hammond Lane facility was closed during the night-time period, so ambient and background noise levels were dominated by road traffic sources, wind turbine noise, rustling foliage and coastal sounds.

Location N3b

The survey results for Location N3b are summarised in **Table 10.10** below. Full Survey Details are presented in **Appendix 10.1**.

Table 10.10 Summary of Measured Noise Levels at Location N3b

Period	Date	Measured Noise Levels (dB re. 2x10-5 Pa)		
		$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Daytime (07:00 to 19:00hrs) Note 1	12/04/2025	42 - 48	55 - 72	35 - 39
	13/04/2025	42 - 57	57 - 93	32 - 44
Average		47	65	38
Evening (19:00 to 23:00hrs)	10/04/2025	36 - 51	48 - 73	32 - 39
	11/04/2025	35 - 49	51 - 71	29 - 34

Period	Date	Measured Noise Levels (dB re. 2x10-5 Pa)		
		$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
	12/04/2025	38 - 52	52 - 78	31 - 47
	13/04/2025	39 - 48	54 - 69	33 - 39
	14/04/2025	39 - 52	51 -76	33 - 46
	15/04/2025	41 - 45	54 - 61	35 - 36
Average		45	61	36
Night-time (23:00 to 07:00hrs)	10/04/2025	28 - 50	40 - 74	27 - 39
	11/04/2025	30 - 52	39 - 72	29 - 49
	12/04/2025	30 - 48	39 - 72	29 - 40
	13/04/2025	33 - 52	39 - 68	31 - 49
	14/04/2025	33 - 54	42 - 72	31 - 46
	15/04/2025	32 - 51	39 - 72	31 - 46
Average		43	54	34

Note 1: Daytime data weekday periods and Saturday morning until 13:00hrs have been excluded from the data set due to the influence from construction activities from the M28 compounds.

The noise monitoring equipment was positioned within the rear garden of this property and screened from the L2545 Road and activities within the adjacent Port of Cork by the property itself and the distance from both these sources. During the set up and collection at this monitoring position, the main sources of noise noted excluding the construction works were traffic along the surrounding road network and background activities within the adjacent Port of Cork.

During the daytime weekend period, measured ambient noise levels were in the range of 42 to 57 dB $L_{Aeq,15min}$ with an average value of 47 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at the site were in the range of 32 to 44 dB $L_{A90,15min}$ with an average value of 38 dB $L_{A90,15min}$ recorded. The background noise environment was predominately governed by distant road traffic, and operational activities from adjacent commercial and industrial facilities.

During the evening period, measured ambient noise levels were in the range of 35 to 52 dB $L_{Aeq,15min}$ with an average value of 45 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at the site were in the range of 29 to 47 dB $L_{A90,15min}$ with an average value of 36 dB $L_{A90,15min}$ recorded.

During the night-time period, measured ambient noise levels were in the range of 28 to 54 dB $L_{Aeq,15min}$ with an average value of 43 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at this location were in the range of 27 to 49 dB $L_{A90,15min}$ with an average value of 34dB $L_{A90,15min}$ recorded.

Attended Noise Surveys 2018

The results of attended noise surveys undertaken during 2018 are presented for Locations N2, N3a, and N4.

Location N2

The survey results for Location N2 are presented in **Table 10.11**.

Table 10.11 Summary of Measured Noise Levels at Location N2

Period	Date	Start Time	Measured Noise Levels (dB re. 2x10-5 Pa)		
			$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Daytime (07:00 to 19:00hrs)	14/11/2018	15:30	55	67	51
		16:28	68	89	49
		17:27	55	68	50
		18:25	54	69	49
Arithmetic Average of L_{A90} (dB)					50
Evening (19:00 to 23:00hrs)	19/11/2018	22:33	43	62	37
Night-time (23:00 to 07:00hrs)	19/11/2018	23:39	45	72	36
		00:40	45	55	40
		01:40	44	54	41
Arithmetic Average of L_{A90} (dB)					39

The main noise sources noted during the survey periods at this location were passing road traffic, wind generated noise, and intermittent road works nearby.

During the daytime period at this location, noise levels were measured in the range of 55 to 68 dB $L_{Aeq,15min}$, the higher being influenced by dog barking. The average ambient noise level recorded was 55 dB $L_{Aeq,15min}$ excluding the higher value influenced by the intermittent event. The background noise levels recorded at the site were in the range of 49 to 51 dB $L_{A90,15min}$ with an average value of 50 dB $L_{A90,15min}$ recorded.

During the evening period, ambient noise levels were measured as 43 dB $L_{Aeq,15min}$ with background noise levels measuring 37 dB L_0. Occasional passing road traffic, wind turbine and industrial plant noise were noted to be the main contributors to the measured noise levels at this location.

During the night-time period measured noise levels were in the range of 44 to 45 dB $L_{Aeq,15min}$. The main contributor to noise levels was occasional passing road traffic, wind turbine and industrial plant noise were noted to be the main contributors to the measured noise levels at this location. The background noise levels recorded were in the range of 36 to 41 dB $L_{A90,15min}$ with an average value of 39 dB $L_{A90,15min}$ recorded.

Location N3a

The survey results for Location N3a are presented in Table 10.12.

Table 10.12 Summary of Measured Noise Levels at Location N3a

Period	Date	Start Time	Measured Noise Levels (dB re. 2x10-5 Pa)		
			$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Daytime (07:00 to 19:00hrs)	14/11/2018	15:03	65	81	49
		16:08	67	84	47
		17:07	65	82	47
		18:07	59	80	46
Arithmetic Average of L_{A90} (dB)					47
Evening (19:00 to 23:00hrs)	19/11/2018	22:07	48	73	38

Period	Date	Start Time	Measured Noise Levels (dB re. 2x10-5 Pa)		
			$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Night-time (23:00 to 07:00hrs)	19/11/2018	23:20	48	71	36
		00:20	57	85	43
		01:19	41	55	38
Arithmetic Average of L_{A90} (dB)					39

The main noise source noted during the survey periods at this location was from passing traffic along the L2545 Road and activities within a vehicle distribution centre along the same road. During traffic lulls in the daytime period, occasional road works and occasional operational activities from Hammond Lane facility was audible at low levels.

During the daytime period, noise levels were measured in the range of 59 to 67 dB $L_{Aeq,15min}$ with an average value of 65 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded were in the range of 46 to 49 dB $L_{A90,15min}$ with an average value of 47 dB $L_{A90,15min}$ recorded.

During the evening period, ambient noise levels were measured as 48 dB $L_{Aeq,15min}$ with background noise levels measuring 38 dB $L_{A90,15min}$. No passing traffic was recorded during this measurement, so noise levels were governed by plant and wind turbine noise from operational industrial facilities in the nearby vicinity.

During the night-time period, measured noise levels were in the range of 41 to 57 dB $L_{Aeq,15min}$. The highest recorded value was associated with two passing HGV's along the L2545 Road. The background noise levels were in the range of 38 to 43 dB $L_{A90,15min}$ with an average value of 39 dB $L_{A90,15min}$ recorded. This was influenced by rustling foliage in addition to plant and wind turbine noise from operational industrial facilities in the nearby vicinity.

Location N4

The survey results for Location N4 are presented in **Table 10.13**.

Table 10.13 Summary of Measured Noise Levels at Location N4

Period	Date	Start Time	Measured Noise Levels (dB re. 2x10-5 Pa)		
			$L_{Aeq,15min}$	L_{Amax}	$L_{A90,15min}$
Daytime (07:00 to 19:00hrs)	14/11/2018	14:45	58	76	50
		15:49	53	67	49
		16:48	53	71	49
		17:48	50	62	46
Arithmetic Average of L_{A90} (dB)					48
Evening (19:00 to 23:00hrs)	19/11/2018	21:50	59	85	41
Night-time (23:00 to 07:00hrs)	19/11/2018	23:01	53	79	38
		00:01	57	86	39
		00:59	43	53	41
Arithmetic Average of L_{A90} (dB)					39

The main noise source noted during the daytime survey periods at this location were from operational activities in the Hammond Lane facility and car park activities and passing traffic along the L2545 Road.

During the evening and night-time periods, the car park access was closed, so measurements were taken at a lay-by outside the car park access gates.

During the daytime period, noise levels were measured in the range of 50 to 58 dB $L_{Aeq,15mins}$ with an average value of 55 dB $L_{Aeq,15min}$ recorded. The background noise levels recorded at the site were in the range of 46 to 59 dB $L_{A90,15mins}$ with an average value of 48dB $L_{A90,15mins}$.

During the evening period, ambient noise levels were measured as 59 dB $L_{Aeq,15min}$ with background noise levels measuring 41dB $L_{A90,15min}$. A small number of cars passed along the L2545 Road during this period. Background noise was influenced by plant and wind turbine noise from operational industrial facilities in the nearby vicinity.

During the night-time period measured noise levels were in the range of 43 to 57 dB $L_{Aeq,15min}$. The highest recorded value was associated with passing vehicles and a passing motorbike along the L2545 Road. Background noise levels were in the range of 38 to 41 dB $L_{A90,15min}$ with an average value of 39 dB $L_{A90,15min}$ recorded. Faint noise from an operational wind turbine was the main background noise source during this period. Background noise was influenced by plant and wind turbine noise from operational industrial facilities in the nearby vicinity.

10.4.3 Low Background Noise Screening Summary

Table 10.14 Summary of Background Noise aganst NG4 Low Background Noise Criteria

Location	Period	Average L_{A90} per period	NGG Screening (dB L_{A90})	Satisfies All Criteria for Low Background Noise Area?
Unattended Locations – 2025 Survey				
N1	Daytime	40	≤40	No
	Evening	36	≤35	No
	Night-time	35	≤30	No
N3b	Daytime	38	≤40	No
	Evening	36	≤35	No
	Night-time	34	≤30	No
Attended Locations – 2018 Survey				
N2	Daytime	50	≤40	No
	Evening	37	≤35	No
	Night-time	39	≤30	No
N3a	Daytime	47	≤40	No
	Evening	38	≤35	No
	Night-time	39	≤30	No
N4	Daytime	48	≤40	No
	Evening	38	≤35	No
	Night-time	41	≤30	No

10.5 Characteristics of the Proposed Development

The proposed development will involve two distinct stages, the short-term construction phase and the longer term operational phase.

10.5.1 Construction Phase

The construction phase duration is expected to be approximately 31 months. The main element of works will involve site clearance and bulk excavation, foundations and drainage works, construction of the main waste-to-energy building and the ancillary structures, raising ground levels of the western field, upgrade of a section of the L2545 Road to the north of the site, a connection to the national electrical grid, an increase in ground levels in part of the site, coastal protection measures above the foreshore on Gobby Beach and an amenity walkway towards the Ringaskiddy Martello tower. Construction aspects of the development are identified in **Chapter 5**, ***Construction Activities***.

Due to the nature of the activities undertaken on a large construction site, there is potential for generation of high levels of noise to the surrounding environment. A variety of items of plant will be in use depending on the construction phasing. There will also be vehicular movements to and from the site that will make use of existing roads. Effects of construction traffic are evaluated in **Chapter 7**, ***Roads & Traffic***.

The potential for vibration at neighbouring buildings and residential dwellings will be limited to vibration resulting from excavation works, rock breaking, piling operations and lorry movements on uneven road surfaces. The most potentially significant of these will be the vibration associated with rock breaking and piling operations.

The effects from each of the main construction phases are assessed in **Section 10.6.2**.

10.5.2 Operational Phase

Once operational, it is anticipated that the facility will operate 24 hours per day, seven days per week and 365 days per year. However, waste acceptance will be limited to the hours 06.00 to 20.00 on week days and 09.00 to 14.00 on Saturdays. Operational waste deliveries will be restricted during the AM and PM peak periods (from 07.00-09.00 and 16.00-18.00 respectively) in the scenario where the M28 is not operational. Once the M28 is operational, the need to reduce arrivals and departures in peak hours will not be required.

In terms of process and building services plant, the majority of equipment and processes will be internally housed within the on-site buildings which will significantly reduce the operational noise emissions to the surrounding environment. A full description of the proposed processes and buildings associated with the proposed development is included in **Chapter 4, *Description of the Proposed Development*.**

On review of the details included in **Chapter 4** and the site layout drawings, the primary potential noise sources associated with the waste-to-energy facility are associated with:

- process and building services plant;
- vehicle movements on site, and;
- additional vehicles on public roads.

There is no expected vibration sources associated with the operational phase.

10.6 Potential Effects

10.6.1 Do Nothing Effects

In the event that the proposed development does not proceed, the existing noise environment to the east of the site will remain relatively unchanged assuming no additional development in the area. To the west of the site, the operation of the M28 Cork to Ringaskiddy Motorway Scheme once operational will alter the noise environment. The noise environment from the road scheme (currently under construction) will introduce a new source to the surrounding environment which will increase the ambient and background noise levels at noise sensitive locations in proximity.

The calculations relating to traffic noise along the surrounding road network during the construction and operational phases of the proposed Resource Recovery Centre take account of the M28 Cork to Ringaskiddy Motorway Scheme and traffic forecast volumes and are therefore accounted for within the future baseline noise 'Do Nothing' scenarios.

For the other future developments, these are subject to individual noise and vibration impact assessments and will be required to satisfy all planning conditions relating to noise and vibration control. Further comment relating to potential changes in the noise environment is discussed in **Section 10.8 *Cumulative Effects***.

10.6.2 Construction Phase Noise

87	86	97	98	101	103	96	90

During the construction phase, the potential noise effects will be associated with site preparation works, rock breaking, piling, foundation construction activities, placing of sacrificial beach material, construction activities and construction vehicle movements. Due to the nature of the activities undertaken on a large construction site, there is potential for generation of high levels of noise.

A variety of items of plant will be in use depending on the construction phasing. There will also be vehicular movements to and from the site that will make use of existing roads.

The construction phase will be undertaken over a number of phases from site preparation through to building construction and internal fit out. In terms of the potential noise and vibration effects, the key phases are considered to be:

- Upgrade of L2545 Road
- Site clearance and bulk excavations
- Construction of retaining structures, basement excavations and foundations
- Construction of main and ancillary buildings, and;
- Placing of sacrificial beach material.

The construction phase will be controlled through the use of construction noise limits which the contractor will be required to work within as set out in this chapter and the relevant section of the CEMP. In this regard, the choice of plant, scheduling of works on site, provision of localised screening and other best practice control measures will be employed in order to ensure noise limits are not exceeded. Given the construction involves a number of phases which will encompass a range of different activities on a day to day and week to week basis, it is not possible to calculate with a high degree of accuracy the specific levels of noise associated with each phase. It is possible, however, to determine a range of conservative scenarios which represent the key construction phases.

In consultation with the construction design team and on review of the phasing and methodologies set out in **Chapter 5 *Construction Activities*** of this EIS, an acoustic model was developed for the development site using a proprietary noise calculation package DGMR iNoise. This is an acoustic modelling package for computing noise levels in the vicinity of different types of noise sources. For the construction model, the calculation standard used in the model is the ISO 9613: 2024 Standard *Acoustics: Attenuation of Sound during Propagation Outdoors*. Part 2: *General Method of Calculation.*

The model takes account of the various factors affecting the propagation of sound in accordance with the standard, including:

- the magnitude of the noise source in terms of sound power
- the distance between the source and receiver
- the presence of obstacles such as screens or barriers in the propagation path
- the presence of reflecting surfaces
- the hardness of the ground between the source and receiver

- attenuation due to atmospheric absorption, and;
- meteorological effects such as wind gradient, temperature gradient and humidity (these have significant effect at distances greater than approximately 400m).

The degree of accuracy associated with this prediction method is shown in **Table 10.15.**

Table 10.15 Estimated accuracy for broadband noise of $L_{AT(DW)}$

Height, h	Distance, d	
	0 < d < 100m	**100m < d < 1,000m**
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB
Where: h is the mean height of the source and receiver; d is the mean distance between the source and receiver. Note: these estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.		

The schedule for the construction and commissioning of the Resource Recovery Centre is approximately 31 months and the main stages of construction are described **Chapter 5** ***Construction Activities*** of this EIS. The identified stages of works are grouped into seven 'Activity' stages for the purpose of undertaking construction noise calculations. These are summarised in **Table 10.16**.

Table 10.16 Construction Stages and Combined Activiites for Construction Noise Calculations

Construction Activities and phases of work	Combined 'Activity' for construction noise calculations
Upgrading the section of the L2545 road at the northern boundary, including upgrading the drainage and diversion of services. Construction of new site entrance Construct temporary road to south of existing L2545 road	Activity 1a L2545 Upgrade and Drainage
	Activity 1b L2545 Upgrade – Road Works
Diversion of existing services within the site such as the overhead power lines. Strip topsoil and vegetation, with topsoil stockpiled appropriately in the western field Bulk excavations and general site re-grading, including placing of fill in western field Establish the initial contractor site compound, including the construction phase power supply, fencing and securing of the site Construction of earth retaining structures, which will happen in tandem with bulk excavations and general site re-grading Establish main contractors' compounds and laydown areas	Activity 2 Site Preparation & Excavation
Strip topsoil and vegetation, with topsoil stockpiled appropriately in the western field Bulk excavations and general site re-grading, including placing of fill in western field	Activity 3 Raising of levels in western field
Construction of structural platforms Construction of foundations for main process building Construction of bunker, underground holding tanks and drainage/ underground services Construction of ground floor slab of main process building	Activity 4 Retaining structures and foundations
Installation of plant and equipment, which will be undertaken in tandem with external and internal completions and finishes. Erection of superstructure of main process building	Activity 5 Building Construction & Fit out

Construction Activities and phases of work	Combined 'Activity' for construction noise calculations
Construction of substation, administration building and other ancillary buildings Installation of external plant and equipment Construction of internal roads and parking areas Underground services Surface water drainage system / foul drainage Fit-out and commissioning buildings and equipment Erection of site fencing	
Mobile plant used for placing sacrificial beach material	Activity 6 Placing of sacrificial beach material
Concrete pours for foundations Mechanical and electrical internal fit-outs	Activity 7

Source data for operating construction plant items have been obtained from BS 5228: 2008 + A1 2019 Part 1– *Noise*. This document provides sound power data per octave band which can be used for individual source items. The model takes account of the assumed 'on-time' percentage of equipment on the site as defined by the user. For the purposes of a conservative assessment, the following plant items and their related on-time have been assumed for each of the key construction activities as set out in **Table 10.17**.

Table 10.17 Construction activity assumed for the various activities of the Construction Programme

Construction Programme Phase	Plant Item	No of items	BS 5228 Ref	% On time	Sound Power, L_w dB(A)
Activity 1a L2545 Upgrade and Drainage	Pneumatic breaker	1	C1.6	66%	111
	Wheeled loader	1	C2.26	66%	107
	Dozer	2	C2.10	66%	103
	Dump Truck Tipping fill	2	C2.30	66%	107
	Combined Sound Power, L_w(A)				116
Activity 1b L2545 Upgrade – Road Works	Asphalt Paver & Tipping Lorry (C.5.31)	1	C5.31	66%	105
	Vibration rollers (C5.20)	1	C5.20	50%	103
	Road Rollers (C5.19)	1	C5.19	50%	108
	Dozer C.2.10	2	C2.10	66%	108
	Combined Sound Power, L_w(A)				114
Activity 2 Site Preparation & Excavation	Hand-held pneumatic breaker	2	C1.6	66%	111
	Tracked excavator (dumping/loading)	2	C1.10	66%	113
	Dozer	2	C2.1	66%	103
	Excavator mounted rock breaker	3	C9.12	50%	113
	Tracked semi-mobile crusher	1	C9.14	66%	118
	Combined Sound Power, L_w(A)				123

Construction Programme Phase	Plant Item	No of items	BS 5228 Ref	% On time	Sound Power, L_w dB(A)
Activity 3 Raising of levels in western field	Dozer C.2.10	3	C2.10	66%	108
	Dump Truck Tipping fill	3	C2.30	66%	107
	Tracked excavator	2	C2.23	66%	101
	Combined Sound Power, L_w(A)				116
Activity 4 Retaining structures and foundations	Crane mounted auger	4	C3.16	50%	107
	Tracked excavator	2	C3.23	66%	96
	Concrete pump	1	C3.25	50%	106
	Tracked mobile crane	2	C3.28	66%	95
	Concrete mixer truck	2	C4.20	66%	108
	Dozer	2	C2.10	66%	108
	Tracked mobile drilling rig	2	C.9.4	20%	115
	Combined Sound Power, L_w(A)				121
Activity 5 Building Construction & Fit out	Tracked mobile crane	3	C3.28	40%	106
	Concrete pump	2	C3.25	50%	95
	Concrete mixer truck	3	C4.20	50%	108
	Tower crane	3	C4.48	66%	104
	Wheeled loader	2	C9.7	50%	116
	Angle Grinder (Grinding Steel)	1	C4.93	30%	108
	Combined Sound Power, L_w(A)				121
Activity 6 Placing of sacrificial beach material	Rigid dump truck	2	C9.17	66%	118
	Loading dump truck with pebbles	3	C10.11	66%	113
	Face shovel extracting loader	2	C10.3	66%	111
	Combined Sound Power, L_w(A)				123
Activity 7 Night-works	Tracked excavator	2	C3.23	66%	96
	Concrete pump	1	C3.25	66%	106
	Tracked mobile crane	2	C3.28	66%	95
	Concrete mix truck	2	C4.20	66%	108
	Dozer	2	C2.10	66%	108
	Combined Sound Power, L_w(A)				115

For each of the activities, the total sound power ranges between 114 to 123dB $L_{w(A)}$ which is equivalent to total sound pressure level of the order of 86 to 95dB(A) on site. This assumes that all the items of plant listed for each activity are operating simultaneously.

As noted in **Section 10.3.1.1**, between Monday and Friday construction works will commence at 06:00hrs in order to reduce the effect of construction vehicles on the road network during the peak morning period. In addition, it is expected that up to 8 weeks of night-time works (i.e. between 23:00 and 07:00hrs) will be required.

During any night-time periods, impact generating, percussive and high noise generating activities will be avoided. During weekday periods, the first hour will be used for set up and mobilisation. Activities will be scheduled during this period to ensure the night-time noise criterion of 45dB $L_{Aeq,1hr}$ will not be exceeded. During the 8 week period where night-time construction works are required, the main activity likely to take place will involve concrete pours for foundations and retaining walls. In order to assess the potential effect during this phase, a sound power level of 115dB L_w for night-time works is considered to provide a conservative assessment for potential activities taking place during this time period (See **Table 10.17** above.)

During any one activity, the number and items of plant listed in **Table 10.17** are assumed to operate simultaneously which is highly conservative. There will be a number of overlaps between the construction activities over the course of the construction phase, the most likely of these being activities 2, 3 and 4. In order, therefore, to assess a further conservative assessment, activities 2, 3 and 4 have been modelled to occur simultaneously.

Receiver locations have been positioned at the closest sensitive locations to the north, south, east and west of the site to assess the potential construction noise effects on the surrounding environment. The receiver locations are shown in **Figure 10.2** and described in **Table 10.18.**

Table 10.18 Noise Assessment Receiver Locations

Receiver Location Reference	Description of Receiver Locations
R1	Is located to the north east of the proposed site along the coastal area approximately 50m from the proposed development
R2	Located at the Martello Tower to the south-west of the proposed site at a distance of approximately 180m from construction works
R3	Is located outside the National Maritime College of Ireland approximately 100m north of the proposed development site.
R4	At the façade of the nearest private residence (currently unoccupied), Ring House, approximately 150m west of western field and some 400m west of the WTE facility
R5	At the façade of the Rock Cottage to the west of the proposed facility at a distance of approximately 200m from the western field and 500m from the WTE facility
R6	At the residential properties within Martello Park, located at a distance of approximately 320m from the western field and 670m to the west of the WTE facility.
R7	At the residential properties along Shamrock Place, located at a distance of approximately 380m from the western field and 680m to the west of the proposed development.
R8	Is located outside the UCC ERI Beaufort Building approximately 200m north of the proposed development site.

The calculated results take into account the assumptions set out in **Table 10.17** and include for a standard construction site hoarding of 2.4m around the north, east and western site perimeters.

The calculated construction noise contours during each of the assessed activities are included in **Figures 10.3** to **10.8**. The specific construction noise levels at the assessed noise sensitive locations are summarised in **Table 10.19.**

Table 10.19 Calculated Construction Noise Levels at Nearest Noise Sensitive Locations

Location	Calculated Noise Level, dB $L_{Aeq, 1hr}$					
	Activity 1a	Activity 1b	Activity 2, 3 & 4 combined	Activity 5	Activity 6	Activity 7
R1	56	56	56	58	n/a Note a	53
R2	32	35	47	43	33	38
R3	60	60	62	58	35	52
R4	47	48	54	40	35	54
R5	43	45	49	40	28	38
R6	38	40	44	34	27	35
R7	39	40	44	35	25	29
R8	54	54	61	59	26	30

Note a: The beach area will be closed during periods when sacrificial beach material is being deposited, hence this location is not noise sensitive during this activity.

Activity 1a and Activity 1b

During the L2545 Road upgrade and drainage works (approximately 6 – 8 weeks duration), noise levels are calculated to be highest at Location R3 (NMCI) and R8 (UCC ERI Beaufort Building) which are the closest NSLs to construction works along this section of road. The calculated noise levels at both locations are, however, below the daytime construction noise criterion of 65dB $L_{Aeq,1hr.}$

There is potential for the evening criterion of 55dB $L_{Aeq,1hr}$ to be exceeded at Location R3 depending on the level of construction activity during this period (19:00 to 20:00hrs). Review of the calculated results indicates the use of a ground breaker dominates noise levels during the activity 1a works. Scheduling of works during the evening period will ensure that percussive tools and activities with potential for high noise levels will be restricted during this period to ensure the relevant criteria are not exceeded at the nearest noise sensitive locations. This information will feed into the CEMP.

There is a potential minor exceedance (1 dB) of the evening criterion at Location R1 which is not significant. This location represents one location along the adjacent coastline, assessed as an amenity area. Noise levels will therefore vary along the coastline depending on the proximity to the site boundary and the location of construction activities on site. **Figure 10.3** and **Figure 10.4** display the calculated noise contour plot for construction activities associated with this assessed scenario.

At all other locations, the assessment has indicated that construction activities associated with the L2545 road upgrade and drainage works can be undertaken within the daytime and evening construction noise criteria.

Activities 2, 3 and 4

Construction activities associated with site preparation and excavation, raising ground levels in the western field and the construction of retaining structures and foundations have all been modelled under one scenario in order to assess a highly conservative assessment. This scenario is also representative of the activities and plant items associated with the construction of the grid connection cable between Lough Beg substation and the Indaver site. Given the number of activities assumed during this phase, noise levels associated with this element of works are not expected to generate noise levels over and above those assessed for combined activities 2, 3 and 4.

The calculated noise levels at all receiver locations are below the daytime criterion of 65dB $L_{Aeq, 1hr}$ for this assessed scenario.

The calculated noise levels at all receiver locations are below the evening criterion of 55dB $L_{Aeq, 1hr}$ for this assessed scenario, with the exception of Locations R1 and R3. A small exceedance (1 dB) is calculated at Location R1 at the closest area of the coastline to the works. Noise levels will be lower moving away from the site along the coastline.

Review of the calculated results indicates the use of crushing plant and rock breaking equipment contribute to the highest noise levels at this location for the activities assessed. Scheduling of works during the evening period will ensure that percussive tools and activities with potential to generate high noise levels will be restricted during this period to ensure the relevant criteria are not exceeded at the nearest noise sensitive locations. This information will feed into the CEMP.

It should be noted that the predicted noise levels in **Table 10.17** for this scenario are highly conservative assuming that all items of plant for each activity are occurring at the same time. It is considered that the evening and Saturday construction noise criteria can easily be achieved at this location once works scheduling and on-site mitigation measures are incorporated.

Figure 10.5 displays the calculated noise contour plot for construction activities associated with this assessed scenario

Activity 5

Calculated noise levels associated with the main building construction and fit out works are all well below the daytime construction noise criterion of 65dB $L_{Aeq,1hr}$ at the closest NSLs to the site.

The calculated noise levels at all receiver locations are below the evening criterion of 55dB $L_{Aeq, 1hr}$ for this assessed scenario, with the exception of Location R1 and R3 which are calculated to marginally exceed this criterion. **Figure 10.6** displays the calculated noise contour plot for construction activities associated with this assessed scenario. Similar to the above activities, the scheduling of works will form part of the noise and vibration management of the construction phase to ensure the relevant noise criteria are not exceeded.

Activity 6

During the placing of sacrificial beach material, the calculated noise levels at the nearest noise sensitive building (R3, NMCI), are within the range of construction noise limits set for daytime, evening and weekend periods. During this activity, this section of the beach will be closed off to the public. The expected construction period is of the order of 3 weeks, depending on suitable tidal and weather conditions. The beach amenity area will therefore not be available during these works and hence, is not considered as a NSL.

Activity 7

The range of construction activities listed for Activity 7 are considered to be a reasonable assumptions for typical sound levels during early morning periods between 06:00 and 07:00hrs. As noted in the previous sections, high impact and high noise generating activities and will be avoided during this period.

Full-time night works are likely to take place over a period of 6 to 8 weeks. The likely construction activities during this period will involve concrete pours for foundations, retaining walls etc. The majority of other night-works will involve mechanical and electrical internal fit-outs which will have minimal effect to the surrounding environment. Indicative noise levels calculated at the nearest night-time NSLs (R4 to R7) assessed for Activity 7 all below 45dB $L_{Aeq,1hr}$ assuming the construction sound power levels in **Table 10.17.**

Notwithstanding the above, any planned night-time works will be designed to operate within this limit value.

Note that the predicted noise levels referred to in this section are indicative only and are intended for comparison with the construction noise criteria. Depending upon the number and type of sources operating, the range of construction noise levels will vary to those presented in **Table 10.19**. The use of best practice noise mitigation measures outlined in **Section 10.7.1** of this chapter will, however, be incorporated into the construction works to ensure the construction noise limits are not exceeded.

10.6.3 Construction Phase Traffic

The construction phase will result in increased traffic movements which will make use of the local road network to access and egress the site. **Chapter 7, *Roads and Traffic*** of the EIS details the traffic assessment along a number of access roads in the vicinity of the site. Construction traffic will be scheduled to avoid the existing peak periods on the local road network, hence construction traffic will access the site will be between 06:00 to 07:00hrs, between 09:00 to 16:00hrs and between 18:00 to 20:00hrs. The peak hour proposed over a typical day will be between 06:00 and 07:00hrs and 18:00 to 19:00hrs.

Construction Phase traffic has been assessed for the peak year for construction in 2029. The M28 Cork to Ringaskiddy Road Scheme is due to open in 2028, however, to assess a conservative assessment, construction traffic flows do not take account of the presence of the M28 and hence all traffic is assumed to use the existing road network.

Under the scenario assessed, the construction traffic assessment has indicated that the highest volume of construction traffic will be along the L2545 Haulbowline Road - East of Ferry Port Access Road with the greatest percentage change in traffic flows between the 'with' and 'without' scenarios occurring between the early morning peak between 06:00 and 07:00hrs. The majority of the increased traffic is associated with workforce vehicles (cars and light good vehicles) entering the site for the early morning shift.

During the evening peak period of 18:00 to 19:00hrs, traffic volumes during the base scenario are much higher and hence the percentage increase in traffic is lower during this time period.

The closest noise sensitive locations along the L2545 Haulbowline Road to the east of the ferry port are the residential properties at Martello Park. In order to assess the potential traffic noise level during the peak morning construction period, the specific noise levels associated with passing construction traffic added to the existing baseline has been assessed. This can be done by assessing the noise level associated a passing vehicle movement expressed in terms of its Sound Exposure Level (L_{AX}). The Sound Exposure Level can be used to calculate the contribution of an event or series of events to the overall noise level in a given period.

The appropriate formula is given below.

$$L_{Aeq,T} = L_{AX} + 10\log_{10}(N) - 10\log_{10}(T) + 10\log_{10}(r_1/r_2) \quad dB$$

where:

$L_{Aeq,T}$ is the equivalent continuous sound level over the time period T (in seconds);

L_{AX} is the "A-weighted" Sound Exposure Level of the event considered (dB);

N is the number of events over the course of time period T;

r_1 is the distance at which L_{AX} is expressed;

r_2 is the distance to the assessment location.

The mean value of Sound Exposure Level for a variety of passenger vehicles (i.e. estate, saloon, hatchback, executive) at low to moderate speeds (i.e. 15 to 45kmph) is in the order of 72dB L_{AX} at a distance of 5 metres from the vehicle. The Sound Exposure Level for a HGV at low to moderate speeds (i.e. 15 to 45kmph) is in the order of 85dB L_{AX} at a distance of 5 metres from the vehicle. These figures are based on a series of measurements conducted under controlled conditions.

Using the formula above, traffic noise levels at residential dwellings within Martello Park are calculated using the peak hour morning (two way flows), taking account of traffic along the N28 and the L2545 . Construction traffic includes the HGV traffic volumes assume all construction traffic accessing the site in both directions, the light good vehicles (LGVs) refer to workforce and general site traffic accessing and egressing the site. Please refer to **Chapter 7 *Roads and Traffic*** of this EIS for the full construction traffic analysis.

Table 10.20 presents the calculated traffic noise levels at properties at Martello Park taking account of the future baseline flows and construction traffic.

Table 10.20 Calculated Construction Traffic Impacts along N28 East of Ferry Port

Location	Traffic Noise Impacts Construction Phase 06:00 - 07:00hrs - $L_{Aeq,1\ hr}$			
	Do Nothing 2029	Do Something with Construction Traffic - 2029	Increase. dB	Impact Rating (DMRB short-term)
Martello Park (West)	57	61	+4.7	Moderate
Martello Park (Middle)	53	58	+4.8	Moderate
Martello Park (East)	53	58	+3.6	Moderate

The assessment has determined that during the morning peak hour, noise levels are calculated to increase at residential properties along the L2545 Road east of the ferry port by up to 4.8 dB. A change in noise levels of this magnitude is categorised as moderate change in accordance with the referenced standards and guidelines in **Table 10.4**. The overall effect determined as negative, moderate and temporary. During all other periods outside of this peak hour, effects are lower.

Whilst the calculated increase in traffic noise is categorised as perceptible and of moderate effect, the specific noise level (58 to 61dB $L_{Aeq,\ 1hr}$) is not out of line with traffic noise levels calculated noise levels at NSLs along the N28 west of the ferry port in the absence of any construction traffic

The above assessment assumes the M28 Road is not operational prior to the construction phase of the proposed development. In reality, given the current timeline for completion of this road (2028), once this road becomes operational, construction traffic will access the M28 located immediately west of the proposed development. Under this scenario, construction HGV traffic and the majority of staff vehicle traffic will not use the existing N28 / L2545 Haulbowline Road and hence the effects discussed in **Table 10.4** will not arise.

10.6.4 Construction Phase Vibration

The main potential source of vibration during the construction programme is associated with ground breaking activities, road works and piling, depending on the methodologies proposed.

For the purposes of this assessment the expected vibration levels during piling have been determined through reference to published empirical data. The British Standard BS 5228 – Part 2*: Vibration*, publishes the measured magnitude of vibration of rotary bored piling using a 600mm pile diameter for bored piling into soft ground over rock, (Table D.6, Ref. No. 106):

- 0.54mm/s at a distance of 5m, for auguring
- 0.22mm/s at a distance of 5m, for twisting in casing
- 0.42mm/s at a distance of 5m, for spinning off, and
- 0.43mm/s at a distance of 5m, for boring with rock auger

Considering the low vibration levels that are experienced at very close distances to the piling rigs, vibration levels at the nearest buildings are not expected to pose any significance in terms of cosmetic or structural damage. In addition, the range of vibration levels is typically below a level which would cause any disturbance to occupants of nearby buildings.

During rock breaking activities and the use vibratory rollers during the road upgrade works, there is also potential for vibration to be generated through the ground. Empirical data for this activity is not provided in BS 5228–2 (BSI 2014b). However, the likely levels of vibration from this activity will be significantly below the vibration criteria for building damage based on monitoring data and experience from other sites. AWN Consulting has previously conducted vibration measurements under controlled conditions, during trial construction works on a sample site where concrete slab breaking was carried out. The trial construction works consisted of the use of the following plant and equipment when measured at various distances:

- 3 tonne hydraulic breaker on small CAT tracked excavator; and
- 6 tonne hydraulic breaker on large Liebherr tracked excavator.

Vibration measurements were conducted during various staged activities and at various distances. Peak vibration levels during staged activities using the 3 tonne breaker ranged from 0.48 to 0.25 PPV (mm/s) at distances of 10m to 50m, respectively, from the breaking activities. Using a 6 tonne breaker, measured vibration levels ranged between 1.49 to 0.24 PPV (mm/s) at distances of 10m to 50m, respectively.

Whilst these measurements relate to a solid concrete slab, the range of values recorded provides some context in relation to typical ranges of vibration generated by construction breaking activity.

Given the distance to the nearest NSLs (>100 north of the site), all construction works are orders of magnitude below limit values associated with any form or cosmetic or structural damage for structurally sound or protected or historical buildings or structures referred to in **Table 10.2** and hence not significant.

Referring to the vibration magnitudes above and the values in **Table 10.3** for human response to vibration, vibration effects during ground breaking activities using heavy breakers will be negative and Not Significant. The overall effect is negative, temporary to short-term and not significant. For all other works, vibration effects will be below those associated with perceptible vibration and will be imperceptible. The overall effect will be negative, short-term and Imperceptible.

Notwithstanding the above, any construction activities undertaken on the site will be required to operate below the recommended vibration criteria set out in **Table 10.2** during all activities. This will be controlled through the use of monitoring during the construction phase. Further details are set out in **Section 10.7.1.**

10.6.5 Operational Phase

There is no expected overlap between the construction and operational phase of the project. Once coastal protection works, road works and building construction works are complete, the main sources of noise during the operational phase relate to the main process building. There is potential for coastal protection works to be undertaken at a future stage during the facilities operation, dependent on monitoring studies in this area for coastal protection works. Noise levels associated with this activity are calculated in **Table 10.19** within **Section 10.6.2.**

The following section discusses the four key sources associated with ongoing activities associated with the operational phase as follows:

- process and building services plant (fixed installations)
- vehicle movements on site (mobile plant)
- car parking on site, and
- additional vehicles on public roads.

The following sections address the predicted noise effects relating to these key sources from the operation of the facility.

Fixed Installations and On-Site Vehicle Movements

A noise model of the proposed waste-to-energy facility was developed to assess the noise contribution from all noise generating operating sources and internal traffic movements. The methodology used to develop the model is the same as that described in **Section 10.5.1** for construction noise calculations.

In order to develop a model of the proposed facility, the following information was obtained:

- OS mapping and 3D Ground contour mapping supplied by the design team
- Building layouts of proposed facility provided by the design team
- Confirmation on the operational noise sources and their location on site by the design team, and
- Traffic volumes using the facility during peak hours, provided by the traffic consultants.

The majority of the processes and associated plant and equipment for the facility are all internally housed within the main process building, waste bunker, ash hall, firewater pumphouse and turbine building. The furnace, boiler and flue gas cleaning equipment will be located in the building. External items of plant include the turbine cooling plant, grate furnace coolers, and the air cooled condensers. The location of these items are located within the south-east area of the facility which are significantly screened from the nearest noise sensitive locations by the on-site adjacent buildings and the ground topography.

The source data used as part of this assessment is taken from measured emissions levels from similar items of plant and equipment at Indaver's waste-to-energy facility at Beveren, Flanders, Belgium. This data was reviewed by the design team and was confirmed valid for the current building design. Sound power data for the key items of plant included in the noise model is given in **Table 10.21.**

Table 10.21 Sound power levels utilised in noise model for process and building services plant

Description	Octave Band Centre Frequency (Hz) – L_W(A)								L_W, dB(A)
	63	125	250	500	1k	2k	4k	8k	
Fan Turbine Building (N façade)	72	78	88	87	82	76	72	64	91
Fan Turbine Building (S façade)	72	78	88	87	82	76	72	64	91
Fan Turbine Building (E façade)	72	78	88	87	82	76	72	64	91
Fan Turbine Building (W façade)	72	78	88	87	82	76	72	64	91
Turbine Cooling No. 1	64	69	72	83	80	77	72	64	86
Turbine Cooling No. 2	64	69	72	83	80	77	72	64	86
Aero Condenser No. 1 Note1	82	87	88	88	93	91	83	80	98
Aero Condenser No. 2 Note1	82	87	88	88	93	91	83	80	98
Aero Condenser No. 3 Note1	82	87	88	88	93	91	83	80	98
Grid Compressor No. 1	74	73	78	82	76	70	65	64	85
Grid Compressor No. 2	74	73	78	82	76	70	65	64	85
Grid Compressor No. 3	74	73	78	82	76	70	65	64	85
Cooling Grate Furnace No. 1	69	74	77	81	80	76	71	63	86
Cooling Grate Furnace No. 2	69	74	77	81	80	76	71	63	86
Chimney stack	82	89	92	79	75	69	70	70	94
ID Fan	93	93	88	83	78	73	71	68	97
Waste Bunker Façade	61	67	62	64	61	55	47	72	75
Ash hall façade	67	65	71	66	68	65	59	51	75

Note[1] The Aero condensers will be located within an acoustic louvered area to the south east of the site. The required insertion loss (IL) of the louvres has been calculated as in indicated in Table 10.18

Table 10.22 IL requirement for ACC louvres

Description	Octave Band Centre Frequency (Hz) - Insertion Loss							
IL for Acoustic Louvers to Aero Condenser area	63	125	250	500	1k	2k	4k	8k
	6	7	10	12	18	18	14	13

In order to incorporate noise emissions relating to on-site traffic into the operational noise model, information relating to the traffic generation to and from the site has been provided by the traffic consultants. Using the calculated worst case HGV traffic movements to and from the site over a typical day, the number of HGV movements entering the site was assessed.

Under a worst-case scenario, a total of 80 HGVs are calculated to access the facility over the operational day, resulting in a total of 160 HGV movements. Of the 160 trips expected, the highest volumes occur during the early morning peak hour (06:00 – 07:00hrs) where 12 HGVs are expected to enter and exit the site, resulting in 24 movements.

For the remaining daytime hours, HGV vehicle trips are typically 12 per hour. During the evening period, a total of 4 HGV per hour are expected between 19:00 and 20:00hrs, beyond 20:00hrs, no HGVs will be permitted on site.

Table 10.23 shows the sound power emission data modelled for HGV movements along the internal site road. This value is highly conservative as it assumes all HGVs entering the site are heavy duty articulated dump trucks.

Table 10.23 Sound Power values used for waste trucks

Description	Octave Band Centre Frequency (Hz) - L_W								L_W dB(A)
	63	125	250	500	1k	2k	4k	8k	
Articulated dump truck	94	101	102	109	107	104	97	91	113

In order to assess noise levels arising from the operational phase, the following scenarios have been modelled:

- **Scenario 1**: Daytime operation with 'peak' HGV on-site movements
- **Scenario 2**: Evening operation with 'peak' HGV on-site movements
- **Scenario 3**: Night-time operation with 'peak' HGV on-site movements (between 06:00 and 07:00hrs)
- **Scenario 4:** Night-time operation with no HGV movements (normal operation)

For the purposes of this appraisal, noise levels have been predicted at the nearest noise-sensitive locations and across a noise contour grid, calculated to a height of 4m. The results of the modelled operational scenarios 1 and 2 for daytime and evening periods are included in **Table 10.24** and presented in **Figures 10.9** and **10.10.**

Table 10.24 Calculated Operational Daytime and Evening Noise Levels

Location	Predicted Noise Levels, dB $L_{Aeq,1hr}$	Relevant Criteria, dB $L_{Aeq,T}$	Predicted Noise Levels, dB $L_{Aeq,1hr}$	Relevant Criteria, dB $L_{Aeq,T}$	Complies?
	Scenario 1 - Daytime		Scenario 2 – Evening		
R1	48	55	47	50	Yes
R2	37	55	37	50	Yes
R3	48	55	40	50	Yes

Location	Predicted Noise Levels, dB $L_{Aeq,1hr}$	Relevant Criteria, dB $L_{Aeq,T}$	Predicted Noise Levels, dB $L_{Aeq,1hr}$	Relevant Criteria, dB $L_{Aeq,T}$	Complies?
	Scenario 1 - Daytime		Scenario 2 – Evening		
R4	33	55	29	50	Yes
R5	34	55	32	50	Yes
R6	27	55	27	50	Yes
R7	30	55	28	50	Yes
R8	43	55	37	50	Yes

The results of the evaluation indicate that the operational noise levels during daytime and evening periods are all comfortably below the relevant noise criteria at the nearest noise sensitive locations. Both scenarios include continuous operational plant and the 'peak' on-site vehicle movements. During periods where no traffic access the site or during 'off peak' traffic periods, noise levels will in turn be reduced.

The results of the modelled operational scenarios for night-time periods are included in **Table 10.25** and presented in **Figures 10.11** and **10.12.**

Table 10.25 Calculated Operational Night-time Noise Levels

Location	Predicted Noise Levels, dB $L_{Aeq,1hr}$ Night-time Scenarios		Relevant Criteria, dB $L_{Aeq,T}$	Complies?
	Scenario 3 – peak traffic	Scenario 4 – no traffic		
R4	35	29	45	Yes
R5	36	31		Yes
R6	27	27		Yes
R7	32	27		Yes

The results of the assessment indicate that the operational noise levels during night-time periods are all comfortably at or below the night-time noise criterion of 45dB $L_{Aeq,T}$ adopted for the facility at the nearest residential noise sensitive locations.

The Scenario 3 assessment relates specifically to the early morning period between 06:00 and 07:00hr only when HGVs will be permitted to enter the site. During all other 'night-time' hours, HGV traffic will not be permitted on the site.

10.6.5.1 Additional Vehicles on Public Roads

For the purposes of assessing the potential noise effect, it is appropriate to consider the relative increase in noise level associated with traffic movements on the surrounding road network with and without the proposed development, given that traffic from the development will make use of the existing and proposed future road network.

The M28 Cork to Ringaskiddy Road Scheme is due to open in 2028. An appraisal of traffic flows along the surrounding road network with and without the M28 in operation has been undertaken for the proposed opening year of 2030. For the project design year of 2045, traffic flows are assessed with the M28 in operation only.

Similar to the Construction Phase, Operational traffic to and from the facility will be scheduled to avoid the existing peak periods on the local road network in the absence of the M28 being operational. It is therefore proposed to restrict development traffic to access the site between 06:00 to 07:00hrs, between 09:00 to 16:00hrs and between 18:00 to 20:00hrs under this scenario.

The peak hours proposed over a typical day will be between 06:00 and 07:00hrs and 14:00 to 15:00hrs. Once the M28 becomes operational, the restrictions on peak hour access to the site will not be required.

A detailed appraisal of potential effects arising from the proposed development on roads and traffic has been prepared by Arup contained in **Chapter 7** ***Roads & Traffic***. The results of this assessment have been reviewed to predict any effect of the proposed development on traffic flows in the area. The calculated change in noise levels during Opening Year (2030) with and without the M28 in operation. The results are summarised in **Table 10.26** and **Table 10.27**.

Table 10.26 Summary of Change in Noise Level – Opening Year without M28

Road Link	AADT do nothing	% HGV	AADT do something	% HGV	Change in noise level (all vehicles)	Significant of effect
N28 - North of Shannonpark	35,384	7%	35,766	8%	+0.3	Imperceptible
R611 - South of Shannonpark	26,392	4%	26,476	4%	+0.1	Imperceptible
N28 - East of Shannonpark	18,104	13%	18,570	14%	+0.5	Imperceptible
R610 – North of N28	4,730	2%	4,730	2%	0.0	Imperceptible
N28 (East of Raffeen Bridge)	16,336	13%	16,816	15%	+0.5	Imperceptible
Raffeen Rd – North of N28	3,511	0%	3,525	1%	+0.2	Imperceptible
N28 - (East of Shanbally)	15,018	13%	15,500	15%	+0.6	Imperceptible
L2492 Shanbally Link Rd	3,472	2%	3,472	2%	0.0	Imperceptible
R613 Barnahely Rd-South of N28	5,448	5%	5,474	5%	+0.1	Imperceptible
N28 - (West of Ferry Port)	8,640	3%	9,154	7%	+1.8	Not Significant
N28 - (East of Ferry Port)	3,095	9%	3,609	18%	+2.8	Not Significant
Loughbeg Rd-South of N28	4,289	4%	4,289	4%	0.0	Imperceptible

Table 10.27 Summary of Change in Noise Level – Opening Year with M28

Road Link	AADT do nothing	% HGV	AADT do something	% HGV	Change in noise level (all vehicles)	Significant of effect
N28 - North of Shannonpark	9,104	10%	9,138	10%	0.0	Imperceptible
R611 - South of Shannonpark	5,459	4%	5,471	4%	0.0	Imperceptible
N28 - East of Shannonpark	7,150	13%	7,196	12%	0.0	Imperceptible
R610 – North of N28	3,990	2%	3,990	2%	0.0	Imperceptible

Road Link	AADT do nothing	% HGV	AADT do something	% HGV	Change in noise level (all vehicles)	Significant of effect
N28 (East of Raffeen Bridge)	10,611	12%	10,688	12%	0.0	Imperceptible
Raffeen Rd – North of N28	2,882	0%	2,887	0%	0.0	Imperceptible
N28 - (East of Shanbally)	6,442	13%	6,495	13%	0.0	Imperceptible
L2492 Shanbally Link Rd	2,842	2%	2,842	2%	0.0	Imperceptible
R613 Barnahely Rd-South of N28	3,641	5%	3,646	5%	0.0	Imperceptible
N28 - (West of Ferry Port)	3,746	3%	3,793	3%	0.0	Imperceptible
N28 - (East of Ferry Port)	1,269	10%	1,328	9%	+0.1	Imperceptible
Loughbeg Rd-South of N28	3,020	4%	3,020	4%	0.0	Imperceptible

The predicted increase in AADT traffic levels associated with the development are between 0.0 – 2.8 dB(A) in the vicinity of the roads assessed for the Opening Year without the M28 in operation. Highest changes in traffic noise levels are along the N28 east of the Ferry Port where an increase in traffic noise of 2.8 dB is calculated. Reference to **Table 10.7** confirms that the related increases in traffic noise is determined to be Not Significant. Along the other assessed roads, the overall effect is determined to be Negative, long-term and Imperceptible to Not Significant.

Once the M28 Cork to Ringaskiddy Road Scheme becomes operational, all site traffic is forecast to travel along this route and hence no significant traffic volumes will use the existing N28. Under this scenario, the predicted increase in AADT traffic levels associated with the development are between 0.0 – 0.1 dB(A) in the vicinity of the roads assessed. Reference to **Table 10.7** confirms that the related increases in traffic noise is determined to be Imperceptible. The overall effect is Negative, long-term and Imperceptible.

The calculated change in noise levels during Design Year of 2045 with the M28 in operation. The results are summarised in **Table 10.28**.

Table 10.28 Summary of Change in Noise Level Design Year with M28

Road Link	AADT do nothing	% HGV	AADT do something	% HGV	Change in noise level (all vehicles)	Significant of effect
N28 - North of Shannonpark	9,540	10%	9,575	10%	0.0	Imperceptible
R611 - South of Shannonpark	5,708	4%	5,720	4%	0.0	Imperceptible
N28 - East of Shannonpark	7,499	13%	7,546	13%	0.0	Imperceptible
R610 – North of N28	4,169	2%	4,169	2%	0.0	Imperceptible
N28 (East of Raffeen Bridge)	11,129	13%	11,206	13%	0.0	Imperceptible

Road Link	AADT do nothing	% HGV	AADT do something	% HGV	Change in noise level (all vehicles)	Significant of effect
Raffeen Rd – North of N28	3,010	0%	3,015	0%	0.0	Imperceptible
N28 - (East of Shanbally)	6,759	14%	6,811	14%	0.0	Imperceptible
L2492 Shanbally Link Rd	2,969	2%	2,969	2%	0.0	Imperceptible
R613 Barnahely Rd-South of N28	3,807	5%	3,813	5%	0.0	Imperceptible
N28 - (West of Ferry Port)	3,914	3%	3,962	3%	0.0	Imperceptible
N28 - (East of Ferry Port)	1,329	10%	1,388	10%	+0.1	Imperceptible
Loughbeg Rd-South of N28	3,157	4%	3,157	4%	0.0	Imperceptible

During the future design year scenario, the predicted increase in AADT traffic levels associated with the development are between 0.0 – 0.1 dB(A) in the vicinity of the roads assessed. Reference to **Table 10.7** confirms that the related increases in traffic noise is determined to be Imperceptible.

10.6.6 Traffic Vibration

As a vehicle travels along a road, vibration can be generated in the road and potentially propagate towards nearby buildings. Such vibration is generated by the interaction of a vehicle's wheels and the road surface and by direct transmission through the air of energy waves. Some of these waves arise as a function of the size, shape and speed of the vehicle, and others from pressure fluctuations due to engine, exhaust and other noises generated by the vehicle.

It has been found that ground vibrations produced by road traffic are unlikely to cause perceptible structural vibration in properties located near to well-maintained and smooth road surfaces. Potential effects attributable to road traffic vibration can therefore be largely avoided by maintenance of the road surface.

Ground vibration from additional traffic due to the development under consideration would be expected to be orders of magnitude less than that required to cause cosmetic or structural damage to buildings or lead to disturbance of occupiers.

10.7 Mitigation and Monitoring Measures

In order to sufficiently ameliorate potential noise and vibration effects, a schedule of noise and vibration control measures has been formulated for both construction and operational phases, where required.

10.7.1 Construction Phase

The construction phase appraisal has indicated that, during the various key activities proposed as part of this development, construction activities can be undertaken within the proposed noise criteria at the nearest sensitive buildings. During out–of-hours construction periods, or other construction scenarios with high potential for noise and vibration generating activities best practice noise and vibration control measures will be employed by the contractor in order to avoid significant effects at the nearest sensitive buildings. The best practice measures set out in BS 5228 (2009 +A1 2014) Parts 1 and 2 will be complied with. This includes guidance on several aspects of construction site mitigation measures, including, but not limited to:

- selection of quiet plant
- noise control at source

- screening
- liaison with the public, and
- monitoring

Details in relation to these mitigation measures is set out in the following paragraphs. Noise control measures that will be considered include the selection of quiet plant, enclosures and screens around noise sources, limiting the hours of work and noise and vibration monitoring.

As discussed in ***Chapter 5 Construction Activities***, a construction environmental management plan (CEMP) has been prepared prior to construction commencing, refer to **Appendix 5.1.** The Site Environmental Manager (SEM), appointed by the Contractor, will be responsible for the successful development, implementation and maintenance of the CEMP, will carry out environmental inspections.

10.7.1.1 Selection of Quiet Plant

This practice will relate to static plant, such as compressors and generators. Units will be supplied with manufacturers' proprietary acoustic enclosures. The potential for any item of plant to generate noise will be assessed prior to the item being brought onto the site. The least noisy item should be selected. Should a particular item of plant already on the site be found to generate high noise levels, the first action should be to identify whether or not said item can be replaced with a quieter alternative.

10.7.1.2 Noise Control at Source

If required, consideration will be given to noise control "at source". This refers to the modification of an item of plant or the application of improved sound reduction methods in consultation with the supplier. For example, resonance effects in panel work or cover plates can be reduced through stiffening or application of damping compounds; rattling and grinding noises can often be controlled by fixing resilient materials in between the surfaces in contact.

For mobile plant items such as cranes, dump trucks, excavators and loaders, the installation of an acoustic exhaust and or maintaining enclosure panels closed during operation can reduce noise levels by up to 10dB. Mobile plant will be switched off when not in use and not left idling.

- For piling plant, noise reduction will be achieved by enclosing the driving system in an acoustic shroud, where necessary. For steady continuous noise, such as that generated by diesel engines, it is possible to reduce the noise emitted by fitting a more effective exhaust silencer system or utilising an acoustic canopy to replace the normal engine cover.
- For percussive tools such as pneumatic concrete breakers, rock drills and tools a number of noise control measures include fitting muffler or sound reducing equipment to the breaker 'tool' and ensure any leaks in the air lines are sealed. Further reductions in noise levels will be achieved by erecting localised screens around breakers or drill bits when in operation in close proximity to noise sensitive boundaries.
- For concrete mixers, control measures will be employed during cleaning to ensure no impulsive hammering is undertaken at the mixer drum.
- For all materials handling, materials will not be dropped from excessive heights. Drops chutes and dump trucks will be lined with resilient materials.
- For compressors, generators and pumps, these will be surrounded by acoustic lagging or enclosed within acoustic enclosures providing air ventilation, where required.
- All items of plant will be subject to regular maintenance. Such maintenance can prevent unnecessary increases in plant noise and can serve to prolong the effectiveness of noise control measures.

10.7.1.3 Screening

Screening is an effective method of reducing the noise level at a receiver location and can be used successfully as an additional measure to all other forms of noise control. It has been assumed for the purposes of this assessment that a standard construction site hoarding will be erected around the site boundaries of the main building works of the waste to energy building. The site hoarding will be constructed of a material with a mass per unit of surface area greater than 7 kg/m^2 to provide adequate sound insulation.

In addition, careful planning of the site layout will also be considered. Where feasible, site buildings such as offices and stores will be placed between the source and receiver to provide noise screening.

10.7.1.4 Liaison with the Public

The Site Environmental Manager (SEM) will be the designated officer appointed to site during construction works as described in the **Appendix 5.1 *CEMP***. Any noise complaints should be logged and followed up in a prompt fashion by the SEM. In addition, as part of the communication strategy for the project, prior to particularly noisy construction activity or those with potential for perceptible vibration levels, e.g. rock breaking, piling, etc., the SEM will inform the nearest noise sensitive locations of the time and expected duration of the noisy works.

10.7.1.5 Monitoring

Prior to the construction works commencing on site, environmental noise and vibration monitors will be installed at the selected monitoring locations. The SEM will be responsible for this monitoring.

Noise monitoring will be conducted in accordance with the International Standard ISO 1996: 2017: *Acoustics – Description, measurement and assessment of environmental noise*. Vibration monitoring will be conducted in accordance with BS 4866 (2010) *Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures*.

10.7.1.6 Project Programme

The construction programme will be arranged so as to control the amount of disturbance in noise and vibration sensitive areas at times that are considered of greatest sensitivity. If piling or rock breaking works are in progress on a site at the same time as other works of construction that themselves may generate significant noise and vibration, the working programme will be phased so as to prevent unacceptable disturbance.

10.7.2 Operational Phase

10.7.2.1 Fixed Installations and On-Site Vehicle Movements

Practicable noise control measures will be employed to ensure that noise from process and building services plant do not exceed the operational noise limits set out in **Table 10.6**. In addition, the inclusion of an acoustic attenuators to the aero condenser structure will be required to meet, as a minimum, the insertion loss values included in **Table 10.22**.

In addition to the measures outlined above, the following forms of noise control techniques will be employed as standard to ensure operational plant noise levels are kept to a minimum:

- plant will be sited as far away from noise-sensitive locations as is practicable
- duct mounted attenuators will be installed on the atmosphere side of all air moving plant
- splitter attenuators will be installed providing free ventilation to internal plant areas
- anti-vibration mounts will be installed on all reciprocating plant.

10.7.2.2 Additional Vehicles on Public Roads

The noise effect assessment outlined above has demonstrated that mitigation measures are not required.

10.7.2.3 Monitoring

The facility will be licensed by the EPA through an IED licence. As part of the IED licence, annual noise monitoring will be required at the nearest noise sensitive locations to compare against the operational Emission Limit Values (ELV's). Monitoring will be undertaken during day, evening and night-time periods in accordance with the monitoring procedures included within EPA's NG4 2016 document.

Monitoring results will be submitted to the EPA for review and will also be included within the facilities Annual Environmental Report (AER) issued to the EPA.

10.8 Cumulative Effects

The cumulative effects of the proposed development in terms of noise and vibration take account of the existing environment coupled with the proposed resource recovery centre.

10.8.1 Cumulative Noise with Existing Baseline

The existing environment as measured, takes account of existing sources of noise in the surrounding environment (i.e. existing operational industrial, infrastructural, educational, commercial, leisure facilities and road traffic).

Assuming no change to the existing noise environment (i.e. no increase or decrease in the prevailing noise environment occurs as a result of other developments in the area), the following cumulative effects are calculated at the noise sensitive locations measured during the baseline survey and the calculated noise levels associated with the Resource Recovery Centre (RRC).

Table 10.29 Calculated Cumulative Noise Levels at Baseline Survey Locations

Receptor Location	Baseline Monitoring Location	Measured Existing Noise Levels, dB $L_{Aeq,T}$ Calculated	Calculated RRC Operational Noise Level, dB $L_{Aeq,T}$	Cumulative Noise Level, dB $L_{Aeq,T}$	Increase, dB
		Scenario 1 – Daytime,			
R1	N1	48	48	51	+3
R3	N4	55	48	56	+1
R4	N3b	47	33	47	0
R5	N2	63	34	63	0
Receptor Location	Baseline Monitoring Location	Scenario 2 - Evening			Increase, dB
R1	N1	44	47	49	+5
R3	N4	59	40	59	0
R4	N3b	45	29	45	0
R5	N2	43	32	43	0
Receptor Location	Baseline Monitoring Location	Scenario 3 -Night-time			Increase, dB
R4	N3b	43	35	44	+1

Receptor Location	Baseline Monitoring Location	Measured Existing Noise Levels, dB $L_{Aeq,T}$ Calculated	Calculated RRC Operational Noise Level, dB $L_{Aeq,T}$	Cumulative Noise Level, dB $L_{Aeq,T}$	Increase, dB
		Scenario 1 – Daytime,			
R5	N2	44	36	45	+1
Receptor Location	Baseline Monitoring Location	Scenario 4 -Night-time			Increase, dB
R4	N3b	43	29	43	0
R5	N2	44	31	44	0

The results of the cumulative assessment indicate the operation of the proposed resource recovery centre is not calculated to add to the prevailing ambient noise environment at the nearest residential NSLs in the vicinity of the development site (R4 & R5) during the day and evening periods. During the peak night-time period (06:00 to 07:00hrs) when HGV traffic is along the internal access roads within the site, an increase of 1 dB is calculated above the baseline ambient noise environment.

During the remaining night-time period without site traffic on-site there is no calculated increase in the existing ambient noise level. The effect is not significant and is not considered to pose any significant notable noise effect.

At the closest educational NSL (NCMI, receptor R3), the increase to the ambient noise level is between 0 and 1 dB. The effect is not significant and is not considered to pose any significant notable noise effect.

The highest calculated cumulative effect is at Location R1 along the coastal area in close proximity to the development. Highest potential increase is determined during the evening period where an increase of the order of 5dB(A) is calculated assuming peak traffic using the facility. This increase is based on the ambient noise level measured at Location N1 set within the proposed site. The total noise level at the calculated position, R1, along the coastal area in close proximity to the development for this scenario is 49dB $L_{Aeq,T}$ during the evening period. Whilst an increase in noise levels is calculated, the overall noise level is within the operational criterion for this time period at this location. It is important to note that the calculated noise level at R1 relates to one position along the coastal area to the east of the site. Noise levels at other locations on the shoreline will vary, depending on the distance of the location to the site boundary. Reference to **Figure 10.10** provides a more detailed assessment of noise levels along the closest area of the coastline to the development site which are in the range of 35 to 45dB $L_{Aeq,T}$. At all other locations, the increase in noise levels is 1dB or less which is not significant.

10.8.2 Cumulative Noise with Future Baseline

As noted, the cumulative assessment assumes no change to the baseline noise environment as a result of additional developments in the surrounding area.

In addition to the operation of the proposed resource recovery centre, there are a number of additional projects proposed in the vicinity of Ringaskiddy with the potential to alter the noise environment, namely:

- M28 Cork to Ringaskiddy Motorway Scheme (Planning Ref: HA04.HA0053/ MA04.MA0014)
- Port of Cork development (Container Berth 2, Deepwater Berth Extension, Road improvements and other ancillary works) (Planning Ref: OA04.321875)
- Jansen Sciences Ireland UC, Barnahely Ringaskiddy, - site expansion (Planning Ref: 254704)
- Pfizer Ireland Pharmaceuticals, Ballintaggart & Ballybricken, Ringaskiddy, Co Cork – Construction of new Site Lab Building (Planning Ref: 224834)

- ESB Aghada Generating Station, Ballincarroonig, Aghada, Co Cork

These are discussed in turn below.

10.8.2.1 M28 Cork to Ringaskiddy Motorway Scheme

Chapter 14 of the EIS relating to the proposed N28 Cork to Ringaskiddy Road scheme (2017) includes predicted future operational noise levels associated with the proposed motorway scheme at Martello Park residential properties. Calculated noise levels associated with the proposed road development are between 57 to 60dB L_{den} with night-time noise levels of 43 to 47dB L_{night}. Once operational therefore, the future noise environment will be increased at the rear of these properties.

Given the proposed Resource Recovery Centre will not add to the existing noise environment at these properties which is lower than the potential future noise environment with the M28 in operation, the proposed development will not add to the future noise environment.

10.8.2.2 Port of Cork Development

Review of the Port of Cork EIAR notes that predicted noise levels at the noise sensitive properties to the west of the proposed resource recovery centre (R4-R7) are calculated to be in the range of 49 to 51 dB L_{Aeq} during the daytime period and 48 to 51 dB L_{Aeq} during the night-time period from the Port of Cork development (Port of Cork Assessment locations 2 to 7).

Given the proposed Resource Recovery Centre will not add to the existing noise environment at these properties which is lower than the potential future noise environment with the Port of Cork expansion in operation, the proposed development will not add to the future noise environment.

10.8.2.3 Jansen Sciences UC, Barnahely Ringaskiddy, - Site Expansion

Review of the noise impact assessment within the EIAR for the Jansen Sciences site expansion confirms that there is no increase in the ambient noise environment at any of the NSLs assessed for the proposed Resource Recovery Centre. There is therefore no potential cumulative noise effect from both. (It is noted, any operational noise emissions from the existing facility already forms part of the baseline noise environment measured during the baseline noise surveys).

10.8.2.4 Pfizer Ireland Pharmaceuticals – New Laboratory Building

The Pfizer Ireland Pharmaceuticals Lab building is sufficiently set back (>3km) from the proposed development and the nature of the proposal will not result in any cumulative effect in terms of noise. This is also confirmed in the EIA screening report for that proposed development.

10.8.2.5 ESB Aghada Generating Station

The ESB development and Aghada is set back over 5km from the proposed development and will not add to the cumulative noise environment with the proposed development.

10.8.3 Cumulative Noise Summary

Residential Properties West of Proposed Development

Reference to **Table 10.29** confirms the predicted noise levels associated with the proposed Resource Recovery Centre at the closest residential NSLs to the west of the site are well below those associated with the existing noise environment. When added to the existing noise environment, there is a potential 1 dB increase during night-time period which is not significant.

Once the M28 Cork to Ringaskiddy Road Scheme and the Port of Cork development become operational, the future baseline noise levels will increase at the closet residential NSLs. The proposed Resource Recovery Centre will not add to this future noise environment and is expected to be imperceptible in terms of noise to its surrounding environment.

The contribution from all other developments noted are not significant in terms of their noise contribution at these residential NSLs.

The potential increase in noise to the surrounding environment in **Table 10.29** is therefore a conservative assessment and will be reduced once the other developments in the area become operational. Overall the cumulative effect is Not Significant at the closest residential NSLs.

10.8.3.1 NCMI UCC ERI Beaufort Buildings

The cumulative assessment in **Table 10.29** at the closest educational NSLs (receptor R3), is not predicted to change with the future developments in the area. The effect is not significant and is not considered to pose any significant notable noise effect.

10.8.3.2 Coastal Amenity Area

The cumulative assessment in **Table 10.29** at the closest location along the coastal area (receptor R1), is not predicted to change with the future developments in the area. The effect is not significant along the length of the coastal area and will not cause any significant noise effect.

10.8.4 Cumulative Effect at Cork Harbour SPA

Noise levels associated with the operation of the Resource Recovery Centre are calculated to be imperceptible at distances beyond 400 to 500m from the development site. The closest area of the Cork Harbour SPA is located some 500m to the south of the development site. This particular area of the SPA is located in close proximity to a number of existing industrial facilities (i.e. GSK, De Puy and Hovione) and hence the operation of the RRC will have no effect to noise levels at this area considering the contribution of these adjacent facilities to the existing noise environment. All other areas of the Cork Harbour SPA are located at distances beyond 1.5km from the proposed site and hence the operation of the RRC is determined to have no measurable or perceptible change to the existing noise environment at any of the designated Cork Harbour SPA's. The overall effect is long-term neutral.

10.9 Residual Effects

The predicted residual effects of the development are set out below taking account of the predicted effects and control measures.

10.9.1 Construction Phase

During the construction phase of the project, there will be a slight to moderate short-term effect on nearby noise sensitive properties due to noise emissions from construction works and site traffic. Due to the distance between the construction works and the nearest sensitive receptors, however, the calculated noise effects are within the relevant criterion set for this phase.

Construction works will take place outside of normal working hours for up to 8 weeks. During these working hours, construction noise will be limited to the criteria set within **Section 10.3.1** to avoid any significant effects to the surrounding environment. The implementation of appropriate noise control measures will ensure that noise effect is kept within the recommended criteria.

The application of binding noise limits, monitoring, and controlled working hours, along with implementation of appropriate noise and vibration mitigation measures as set out above, will ensure that noise and vibration effect is sufficiently controlled to within the relevant criteria. The overall noise effect during the construction of the proposed facility at the nearest noise sensitive properties is short term, minor to moderate. Vibration effects during this phase are determined to be temporary and not significant.

Noise levels associated with of the Resource Recovery Centre for the worst case construction scenarios assessed are calculated to be less than 35dB L_{Aeq} at the closest areas of the Cork Harbour SPA to the north of the development site. This particular area of the SPA is located in close proximity to a number of existing industrial facilities (i.e. GSK, De Puy and Hovione) with operational noise limits of 55 dB L_{Aeq} during daytime periods and 45 dB L_{Aeq} during night-time periods. Given that predicted construction noise levels at this location are significantly below the permitted operational noise levels from adjacent facilities, the noise effect from construction activities at the closest area of the SPA are short-term, imperceptible.

All other areas of the Cork Harbour SPA are located at distances beyond 1.5km from the proposed site with lower construction noise levels predicted at these distances, (less than 30dB L_{Aeq}) which is well below typical baseline noise levels in the surrounding environment. Taking the above into consideration, the construction phase of the Resource Recovery Centre is determined to have no significant effect to the existing noise environment at any parts of the designated Cork Harbour SPA. The overall effect is neutral, short-term, imperceptible.

10.9.2 Operational Phase

The proposed waste-to-energy facility has been assessed against the relevant operational noise emission limit values (ELV's) prescribed within the EPA's noise guidance document *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities* (NG4, EPA 2016) at the closest noise sensitive locations the assessment has concluded that due to the distance between the proposed development and the nearest sensitive buildings, the proposed site layout and the recommended noise mitigation measures, the facility can operate within the adopted day, evening and night-time noise limit values.

The overall noise and vibration effect from the operation of the proposed facility is expected to be long term, not significant taking account of the existing noise environment and the predicted effect of the proposal.

10.10 References

British Standard BS 7385 (1993) *Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.*

British Standard BS 5228 (2008 +A1 2014) *Code of Practice for Noise and Vibration Control on Construction and Open Sites. Part 1: Noise and Part 2 Vibration.*

British Standard BS4142: (2014) *Method for Rating and assessing industrial and commercial sound.*

British Standard BS4866 (2010) *Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures.*

Department of Transport Welsh Office, HMSO, (1988) *Calculation of Road Traffic Noise*.

UK Highways Agency (UKHE) *Design Manual for Roads and Bridges (DMRB) LA 111 Sustainability and Environmental Appraisal LA 111 Noise and Vibration Revision 2*.

Environmental Protection Agency (2022) *Guidelines on the Information to be contained in Environmental Impact Statements*

IEMA & IOA (2010) *Guidelines for Noise Impact Assessment*

ISO9613 (2024) *Acoustics – Attenuation of sound during propagation outdoors, Part 2: General method of calculation.*

M28 Cork to Ringaskiddy Project EIS (2017)

National Road Authority (NRA 2004) *Guidelines for the Treatment of Noise in National Road Schemes*

National Road Authority (NRA 2014) *Good Practice Guide for the Treatment of Noise during the Planning of National Road Schemes.*

Ringaskiddy Port Re-development EIA (2025) *Chapter 9: Noise and Vibration*

Janssen Sciences Ireland UC Barnahely, Extension to Existing Biomedicines Manufacturing Facility, EIAR, (2025) *Chapter 8: Noise and Vibration*

Pfizer Ireland Pharmaceuticals, Bld. 124 – Site Lab Building – EIA Screening Report. (2023). *Section 5.8: Noise.*