MWP

Chapter 11 Noise and Vibration

Rínn Rua Hotel and Leisure Park
County Kerry

Rínn Rua Holiday Park Ltd

April 2024

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Abbreviations

dB	abbreviation for 'decibel'
dB(A)	abbreviation for the decibel level of a sound that has been A-weighted
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. This parameter is representative of the specific noise from plant when plant is the dominant noise source, i.e. there is no extraneous noise from sources such as traffic.
L_{Amax}	is the instantaneous maximum sound level measured during the sample period.
L_{Amin}	is the instantaneous minimum sound level measured during the sample period.
L_{Aeq}	is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.
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.
NSR	Noise Sensitive Receptor
NML	Noise Monitoring Location

Project No.	Doc. No.	Rev.	Date	Prepared By	Checked By	Approved By	Status
23063	6006		03/05/2024	**KB**	**MT/AR**		**FINAL**

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11. Noise and Vibration

11.1 Introduction

This chapter considers the potential effects on noise and vibration sensitive receptors arising from the proposed development. A full description of the proposed development, development lands and all associated project elements is provided in Chapter 2 of this EIAR. The nature and probability of effects on noise and vibration sensitive receptors arising from the overall project have been assessed herein.

11.1.1 Competency of Assessor

The assessment has been prepared by Kieran Barry (BEng, PgDip) of MWP. Kieran holds a Degree in Civil and Structural Engineering as well a Post Graduate Diploma in Environmental Protection.

Kieran is an experienced environmental consultant with 8 years experience working on environmental projects, including three years experience in the measurement, prediction, assessment, and control of environmental noise He has completed the Institute of Acoustics (IOA) Certificate of Competence in Environmental Noise Measurement course and is currently undertaking the Institute of Acoustics' Diploma in Acoustics and Noise Control.

11.1.2 Fundamentals of Noise

Fundamentally, noise is vibrations of the air which are detectable by the ear. Sound waves radiate out spherically from a sound source in three dimensions. The human ear can detect a very wide range of pressure variations. In order to cope with this wide range, a logarithmic scale (decibel (dB) scale) is used to translate pressure values into manageable numbers from 0 dB to 140 dB. 0 dB is the threshold of hearing and 120 dB is the threshold of pain.

Measuring in decibels means that a 3 dB increase is equivalent to a doubling of the sound energy and a 10 dB increase is a tenfold increase in energy. For broadband sounds which are very similar in all but magnitude, a change or difference in noise level of 1 dB is just perceptible under laboratory conditions, 3 dB is perceptible under most normal conditions and a 10 dB increase generally appears twice as loud.

A healthy human ear is also sensitive to a large range of frequencies (approximately 20 Hz to 20,000 Hz) and varies in sensitivity depending on the frequency. The human ear is not equally sensitive to sound at all frequencies and is less sensitive to sound at low frequencies and high frequencies. A -weighting (dB A) is the main way of adjusting measured sound pressure levels (noise) to take account of the uneven human response to frequencies.

Figure 11-1 illustrates some everyday sounds on the dB(A) scale. A quiet bedroom is around 35 dB(A), a busy office around 60dB(A) and a rock concert around 100 dB(A).

Figure 11-1 The Level of Typical Common Sounds on the dB(A) Scale

11.2 Methodology

The methodology consisted of the following activities:

- An environmental noise survey has been undertaken at the proposed development site to characterise the existing baseline noise environment (refer to Section 11.3.1).
- A review of the most applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development (refer to Section 11.2.3).
- Predicted noise levels have been assessed against relevant noise limit criteria for both the operational and construction phases at the nearest sensitive receptors (refer to Section 11.4).
- Where necessary, mitigation measures to reduce noise and vibration effects are detailed (refer to Section 11.5).

11.2.1 Guidelines and Best Practice

This chapter has been prepared with cognisance to the following best practice and guidance documents related to noise and vibration impact assessment:

- *BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.*
- *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.*
- *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration.*

- *BS 6472 Guide to evaluation of human exposure to vibration in buildings (2008): Part 1 - Vibration sources other than blasting.*
- *BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration.*
- *BS 8233: 2014 Guidance on sound insulation and noise reduction for buildings*
- *Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2*
- *Good Practice Guide for the Treatment of Noise during the Planning of National Road Schemes (NRA, 2014).*
- *Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (EPA, 2016).*
- *National Highways Design Manual for Roads and Brides Part 7 HD 213/11 – Revision 1 Noise and Vibration.*
- *Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment, (IEMA 2014).*
- *ISO 1996: 2017: Acoustics – Description, measurement, and assessment of environmental noise.*
- *ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise (May 2017)*

In addition to the above the assessment methodology had regard to the following EIA guidelines:

- *Guidelines on the information to be contained in Environmental Impact Assessment Reports EIAR (EPA 2022)*

11.2.2 Study Area

The study area comprised of the proposed development site and its immediate environs, refer to **Figure 11-4** in **Section 11.3.1.1**. Noise sensitive receptors that could potentially be affected by noise and vibrations as a result of the proposed development were identified and consisted of residential properties. A detailed description of the proposed development site including maps and figures is provided in **Chapter 2 Project Description**. A description of the existing environment and location of noise sensitive receptors is given in **Section 11.3** and **Section 11.3.1.1**.

11.2.3 Assessment Criteria

11.2.3.1 Construction Phase – Noise Impacts

There is no statutory guidance in Ireland relating to the maximum noise levels permitted during construction works, and in the absence of statutory guidance or other specific limits prescribed by local authorities, the thresholds outlined in the British Standard 5228-1:2009+A1:2009, Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise has been adopted in this assessment. Refer to **Table 11-1.**

Table 11-1 Construction Phase Noise Assessment Criteria

Assessment category and threshold value period (T)	Threshold values, L_{AeqT} dB		
	Category A Note A	Category B Note B	Category C Note C
Night-time (23:00 to 07:00hrs)	45	50	55
Evening and Weekends Note 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 noise levels measured during the baseline noise survey (refer to **Section 11.3.1.5**), determine that Noise Monitoring Location (NML) will be afforded a Category A designation for the daytime and evening periods and a category B for Night-Time Periods. It should be noted however that construction will be limited to daytime hours and therefore Evening and Night-Time limits will not be impacted. If the predicted Daytime construction noise exceeds Category A threshold values (65 dB L_{Aeq}), then this is assessed as a significant effect.

<u>Construction Phase – Additional Traffic on Public Roads</u>

There are no specific Irish guidance or limits relating to existing local traffic sources along the local or surrounding road network. As traffic from the proposed development will make use of these existing roads already carrying traffic volumes it is appropriate to assess the calculated increase in traffic noise levels that will arise because of vehicular movements associated with the development.

In order to assess the potential impact of construction traffic, the following two guidelines are referenced:

- Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Table 11.2 offers guidance on the likely impact associated with any particular change in traffic noise level.

Table 11-2 Magnitude of Impact – Construction Phase Traffic

Change in Sound Level (dB)	DMRB Magnitude of Impact	EPA Significance of Effect
Greater than or equal to 5.0	Major	Significant
Greater than or equal to 3.0 and less than 5.0	Moderate	Moderate
Greater than or equal to 1.0 and less than 3.0	Minor	Not Significant – Slight
Less than 1.0	Negligible	Imperceptible

In accordance with the DMRB Noise and Vibration, construction noise and construction traffic noise impacts shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

- Ten or more days or night in any 15 consecutive day or nights;
- A total number of days exceeding 40 in any 6 consecutive months

11.2.3.2 Construction Phase – Vibration Impacts

According to NRA's 2014 Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, there are two separate considerations for vibration during the construction phase namely 1) that which affects human comfort and 2) that which affects cosmetic or structural damage to buildings.

The guidelines suggest that human tolerance for daytime blasting and piling, two of the primary sources of construction vibration, limits vibration levels to a peak particle velocity (ppv) of 12mm/s and 2.5mm/s respectively. Blasting and piling is not required during this project.

To avoid the risk of cosmetic damage to buildings, the guidelines suggest that vibration levels should be limited to 8mm/s at frequencies of less than 10Hz, to 12.5mm/s for frequencies of 10 to 50Hz, and to 20mm/s at frequencies of 50Hz and above.

11.2.3.3 Operational Phase – Noise Impacts

There are no specific noise criteria relating to the operation of hospitality or recreational facilities. Operational sources considered are:

- Additional Traffic on Public Roads - Road traffic including changes to traffic flows on the existing road network as a result of the proposed development.
- Inward Impacts – The proposed development will provide self-catering accommodation and facilities with a maximum of 972 beds or 507 bedrooms, all of which will require the absence of noise at nuisance levels.
- Noise breakout from Proposed Development facilities - There will be social functions and music at hotel from time to time. During peak holiday season, there will be a large number of children and adult residents which will generate noise in locality.
- Mechanical Plant and Services - Building services plant items (electrical and mechanical) required to serve the operations

The above sources are expected to be the prominent noise sources with the potential to affect nearby Noise Sensitive Receptors (NSRs).

Operational Phase – Additional Vehicular Activity on Public Roads

Table 11-3 relates to changes in traffic noise level to impacts, for the operational phase of the proposed development and is based on guidance below:

- Design Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2
- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports

Table 11-3 Likely Impact Associated with Change in Traffic Noise Level

Change in Sound Level (dB)	DMRB Magnitude of Impact	EPA Significance of Effect
0	No Impact	Imperceptible
0.1 – 2.9	Negligible	Not significant
3.0 to 4.9	Minor	Slight, Moderate
5 - 9.9	Moderate	Significant
10+	Major	Very Significant

Operational Phase – Inward Impacts

The proposed development will provide self-catering accommodation and facilities with a maximum of 972 beds or 507 bedrooms, all of which will require the absence of noise at nuisance levels.

The Professional Guidance on Planning & Noise (ProPG) document was published in May 2017. The document was prepared by a working group comprising members of the Association of Noise Consultants (ANC), the Institute of Acoustics (IOA) and the Chartered Institute of Environmental Health (CIEH). Although not a UK or Irish government document, since its publication it has been generally considered as a best practice guidance and has been widely adopted in the absence of equivalent Irish guidance.

The ProPG outlines a systematic risk based 2-stage approach for evaluating noise exposure on prospective sites for residential development. The two primary stages of the approach can be summarised as follows:

- Stage 1 – Comprises a high level initial noise risk assessment of the proposed site considering either measured and or predicted noise levels; and,
- Stage 2 – involves a full detailed appraisal of the proposed development covering four "key elements" that include:
    - Element 1 – Good Acoustic Design Process;
    - Element 2 – Noise Level Guidelines;
    - Element 3 – External Amenity Area Noise Assessment, and;
    - Element 4 – Other Relevant Issues.

A summary of the ProPG approach is illustrated in **Figure 11-2**.

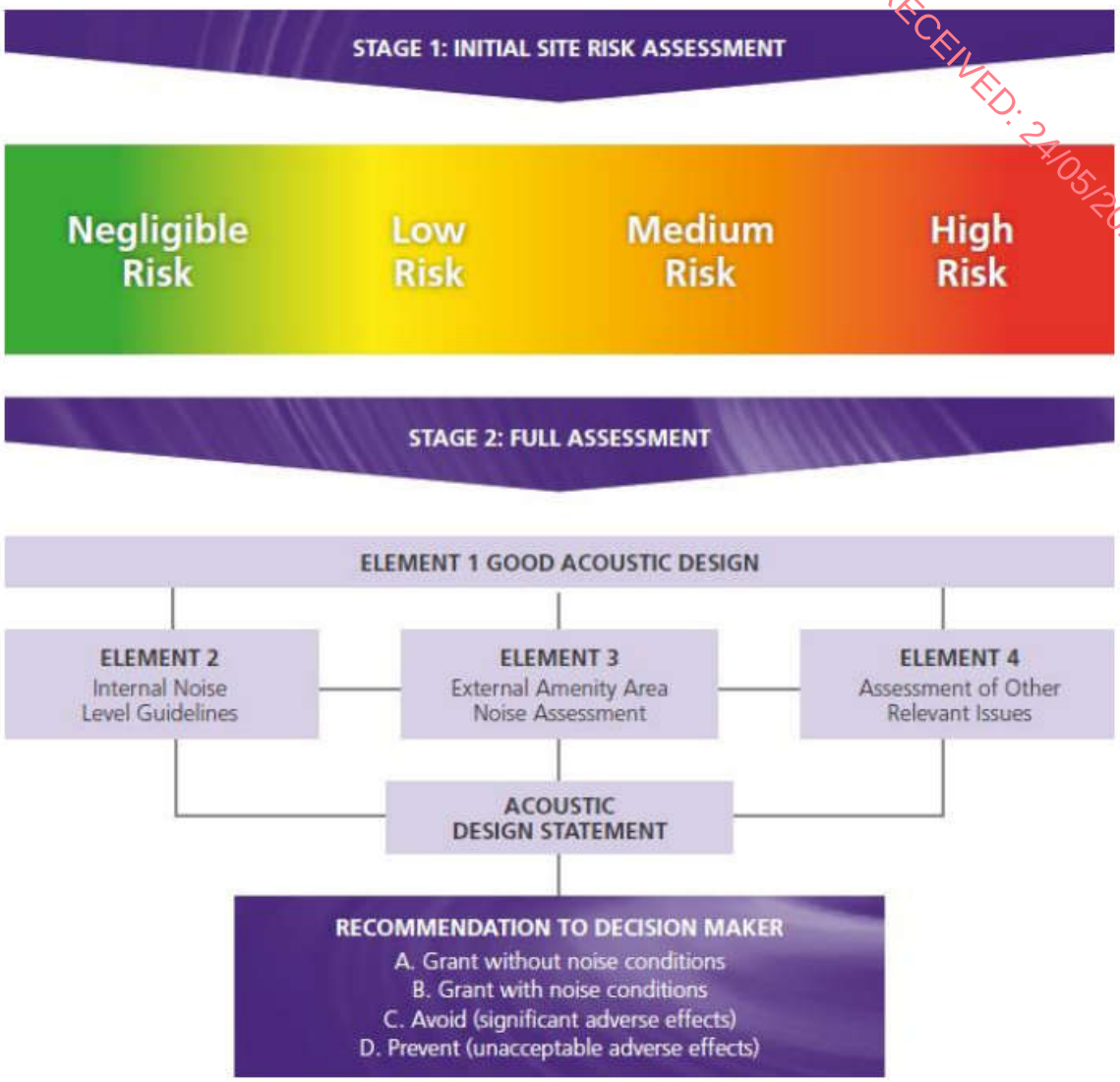

Figure 11-2 ProPG Approach (Source: ProPG)

The initial noise risk assessment is intended to provide an early indication of any acoustic issues that may be encountered. It calls for the categorisation of the site as a negligible, low, medium or high risk based on the pre-existing noise environment. **Figure 11-3** presents the basis of the initial noise risk assessment, it provides appropriate risk categories for a range of continuous noise levels either measured and/or predicted on site.

Paragraph 2.9 of ProPG states that,

"The noise risk assessment may be based on measurements or prediction (or a combination of both) as appropriate and should aim to describe noise levels over a "typical worst case" 24 hour day either now or in the foreseeable future".

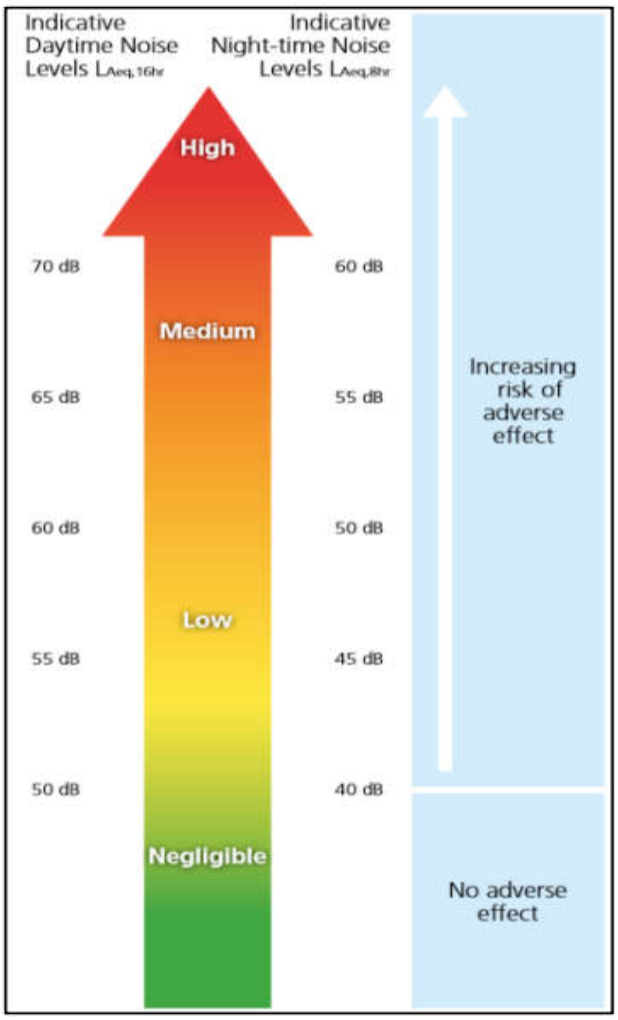

Figure 11-3 ProPG Stage 1 Initial Noise Risk Assessment

Operational Phase – Noise Breakout

As with construction phase noise, there are no national mandatory noise limits applicable to commissioned developments. While a number of guidance documents have been issued with respect to certain sectors, none relate specifically to hospitality industry.

Most environmental noise guidance documents issued across Europe ultimately derive limits from guidance issued by the World Health Organisation (WHO). The WHO document *Guidelines on community noise (1999)* sets out guideline values considered necessary to protect communities from environmental noise. With respect to residential settings, the document notes an outdoor $L_{Aeq\ 16\ h}$ level of 55 dB is an indicator of serious annoyance during daytime and evening hours, with 50 dB being an indicator of moderate annoyance. The 55 dB criterion was first suggested by the WHO in their document *Environmental Health Criteria 12*.

Since 1980, the 55 dB criterion has become the de facto daytime limit applied by most Irish regulatory authorities to commercial and industrial operators. Although the WHO criterion applies to daytime periods of 16 hours, authorities typically specify shorter periods, and thus limits as $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30\ min}$ and $L_{Aeq\ 1\ h}$ are variously applied. In issuing licences to industrial facilities, the EPA typically specifies a daytime limit of 55 dB at NSLs. The EPA currently considers daytime to refer to 0700-1900 h. A similar daytime limit is usually included in noise condition as attached to planning permission by local authorities.

The WHO's 1999 guidance document recommends an external night-time criterion of 45 dB to prevent sleep disturbance. Although the WHO document Night noise guidelines for Europe (2009) makes reference to a 40 dB night-time criterion, this relates to the Lnight, outside parameter, which is the long term average measured throughout a whole year. The 45 dB criterion is considered more appropriate to short term measurement intervals. As before, $L_{Aeq\ 15\ min}$, $L_{Aeq\ 30}$ min and $L_{Aeq\ 1\ h}$ intervals are variously applied by regulatory authorities, rather than the 8 hour period to which the WHO's 45 dB criterion applies. The EPA considers that night-time refers to 2300-0700 h.

Neither of the WHO documents identified above makes reference to evening periods, and indeed their 1999 document assumes that daytime extends to 2300 h. However, a trend towards the separate assessment of evening impacts is currently evident, partly driven by the EPA's NG4 document, the 2012 version of which introduced the evening period 1900-2300 h. The NG4 document recommends an evening criterion of 50 dB, applicable to NSRs.

On the basis of the above, operational phase noise criteria for breakout noise from the proposed development facilities deemed relevant to this assessment may be summarised as follows:

- Daytime (0700-1900h) LAeq T limit of 55 dB, with 5 dB penalty where emissions are tonal and/or impulsive.
- Evening (1900-2300 h) LAeq T limit of 50 dB, with 5 dB penalty where emissions are tonal and/or impulsive.
- Night-time (2300-0700 h) LAeq T limit of 45 dB, with no tones or impulses

The above criteria are considered relevant to external areas of NSRs, and include areas in proximity to NSR facades. It should be noted that none of the criteria is legally obligatory, and the criteria are selected merely as guidance for the purposes of this assessment.

Operational Phase – Mechanical Plant and Services

Once a development of this nature becomes fully operational, a variety of electrical and mechanical plant will be required to service the development. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24 hours a day, and hence would be most noticeable during quiet periods (i.e overnight). Noisy plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest impact. Plant contained within plantrooms has the least potential for impact once consideration.

The most appropriate standard to set operational noise limits relating to fixed item of plant to noise sensitive areas is *BS 4142: 2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound*. This standard describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods described in this standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident.

For an appropriate BS 4142 assessment it is necessary to compare the measured external background noise levels (i.e the $L_{A90,T}$ level measured in the absence of plant items) to the rating level ($L_{Ar,T}$) of the various plant items, when operational. Where noise emission are found to be tonal, impulsive in nature or irregular enough to attract attention, BS 4142 also advises that a penalty be applied to the specific level to arrive at the rating level.

The subjective method for applying a penalty for tonal noise characteristics outlined in BS 4142 recommends the application of a 2 dB penalty for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where is is highly perceptible.

"ambient noise level, LAeq,T" is the noise level produced by all sources including the sources of concern, i.e. the residual noise level plus the specific noise of mechanical plant, in terms of the equivalent continuous A-weighted sound pressure level over the reference time interval [T].

"specific noise level, LAeq, T" is the sound level associated with the sources of concern, ie noise emissions solely from the mechanical plant, in terms of the equivalent continuos A-weighted sound pressure level over the reference time interval [T].

"rating level, LAr,T" is the specific sound level plus any adustments for the characteristic features of the sound (e.g. tonal, impulsive or irregular components);

"background noise level, LA90,T" is the sound pressure level of the residual noise that is exceeded for 90% of the time period T.

If the rated plant noise level is +10dB or more above the pre-existing background noise level then this is likely to be an indication of a significant negative impact, depending on context. A difference of around +5dB is likely to be an indication of an negative impact, depending on the context.

The lower the rating level is relative to the measured background sound level, the less likely it is that specific sound source will have an negative impact of a significant negative impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

11.2.3.4 Operational Phase – Vibration Impacts

There are no sources of vibration associated with the operational phase of the development.

11.2.4 Statement on Limitations and Difficulties Encountered

No limitations or difficulties were encountered during the preparation of this chapter.

11.3 Baseline Receiving Environment

This section describes the existing environment in terms of the noise monitoring locations, existing noise sources at these locations and the prevailing background noise levels.

The proposed development site is located at the derelict Waterville Beach Hotel at Reenroe, Waterville, Co. Kerry on the Iveragh Peninsula between the coastal villages of Waterville and Ballinskelligs. The proposed development site is located on a small headland on the northern shore of Ballinskelligs Bay, Co. Kerry, just under 1.0km from the R567 Waterville to Ballinskelligs Coast Road. To the west and east of the headland are the sandy/stony beaches of Ballinskelligs Bay and to the south lies the Bay. The coordinates for the centre of the proposed development site are: 51°50'38.9"N 10°14'11.1"W.

A baseline environmental noise survey was conducted in the vicinity of the proposed development to quantify the existing noise environment at the nearest noise-sensitive locations that may be affected by the proposed development, specifically the nearest residential dwellings.

The main baseline sources of noise at the proposed development location are noise from sea waves from the nearby coast, winds and intermittent traffic from cars which travel the access road to Reenroe Beach and the other further distant surrounding roads. Other noise consists of birdsong and from distant sounds of visitors to the nearby Reenroe Beach.

A baseline survey of vibration at the proposed development was not undertaken as existing levels in the vicinity of the proposed development are not expected to be of a magnitude sufficient to cause disturbance to people or structural damage to property. Furthermore, vibration was not perceptible at the noise survey location.

The survey was conducted in general accordance with ISO 1996: 2017: Acoustics – Description, measurement' and assessment of environmental noise.

11.3.1 Baseline Noise Survey

11.3.1.1 Noise Monitoring Location and Noise Sensitive Receptors

The noise measurement location (NML) was chosen to represent the nearest noise sensitive receptors (NSRs) to the proposed development boundary.

A noise meter was set up at the noise monitoring location, see **Figure 11-4 and Figure 11-5**. The noise monitoring location represents the baseline noise levels at the closest noise sensitive receptors NSR1 to NSR12, refer to **Figure 11-4**.

Weather conditions were variable across the monitoring period, ranging from calm warm conditions to cooler windier conditions. Meteorological conditions did not negatively affect the measured noise levels.

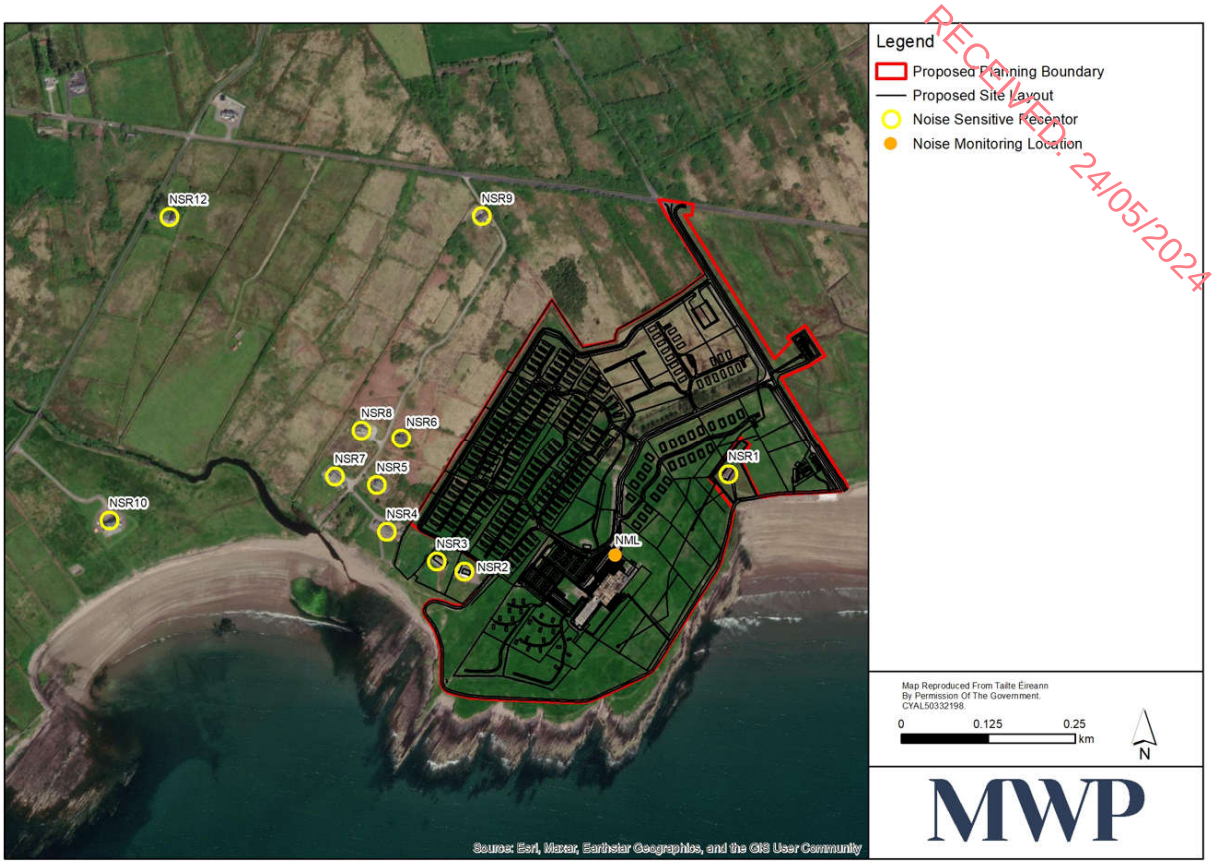

Figure 11-4 Noise Monitoring Location (NML) and Noise Sensitive Receptors (NSRs)

Figure 11-5 Noise Monitoring Location (NML)

11.3.1.2 Survey Period

A daily continuous 24 hour unattended noise survey was conducted between 16th June and 26th June 2023.

11.3.1.3 Personnel and Instrumentation

The noise monitoring was undertaken by Kieran Barry of MWP. Details of equipment used to carry out the survey are detailed in **Table 11-4**. All equipment is fully traceable and in calibration.

Table 11-4 Noise Equipment Details

Manufacturer	Equipment Model	Serial Number	Microphone	Calibration Date
Larson Davis	831	0003826	PCB PCB377B02	10th May 2022

The microphone was protected using a proprietary Larson Davis windshield. Before and after the survey the measurement apparatus was check calibrated using a Larson Davis CAL200 Sound Level Calibrator Serial Number 11262 that produces a sound level of 93.96dB re. 2 x 10-5 PA, at a frequency of 1k Hz.

The calibration certificates are attached as **Appendix 11.1.**

11.3.1.4 Measurement Parameters

The noise survey results are presented in terms of the following five 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. This parameter is representative of the specific noise from plant when plant is the dominant noise source, i.e. there is no extraneous noise from sources such as traffic.

L_{Amax} is the instantaneous maximum sound level measured during the sample period.

L_{Amin} is the instantaneous minimum sound level measured during the sample period.

L_{Aeq} is the sound level that is exceeded for 10% of the sample period. It is typically used as a descriptor for traffic noise.

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" 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.

11.3.1.5 Noise Survey Results and Discussion

The results of the monitoring survey are summarized in **Table 11-5.** The daytime, evening and night-time results are the averaged 30 minute results over the entire monitoring period.

Table 11-5 Results for Noise Monitoring Location (NML)

Period	Date	Average 30 minute Measured Noise Levels (dB re. 2x10-5 Pa)				
		LAeq	LAFMax	LAMin	LA10	LA90
Daytime	16/06/23 – 26/06/23	44	35	64	45	38
Evening	16/06/23 – 26/06/23	46	37	64	47	40
Night	16/06/23 – 26/06/23	45	39	58	47	42

During the set up and collection at this monitoring location, the main sources of noise noted were a light to moderate breeze as well as a faint noise of waves crashing on the nearby coastline. There was also intermittent traffic noise noted at the access road to Reenroe Beach as well as faint noise from intermittent traffic at distant local roads in the wider area.

During the daytime period, measured noise levels were in the range 33 to 63 dB $L_{Aeq,\ 30\ min}$ with an average value of 44dB $L_{Aeq,\ 30\ min}$. The background noise levels recorded at the site were in the range of 27 to 51dB $L_{90,\ 30min}$ with an average of 38 $L_{90,\ 30min}$ recorded.

During the evening period, measured noise levels were in the range 38 to 53 dB $L_{Aeq,\ 30\ min}$ with an average value of 46dB $L_{Aeq,\ 30\ min}$. The background noise levels recorded at the site were in the range of 30 to 51dB $L_{90,\ 30min}$ with an average of 40 $L_{90,\ 30min}$ recorded.

During the night time period, measured noise levels were in the range 35 to 56 dB $L_{Aeq,\ 30\ min}$ with an average value of 45dB $L_{Aeq,\ 30\ min}$. The background noise levels recorded at the site were in the range of 35 to 58dB $L_{90,\ 30min}$ with an average of 42 $L_{90,\ 30min}$ recorded.

11.4 Assessment of Impacts and Effects

11.4.1 Construction Phase

11.4.1.1 Construction Phase Stages

The project has been divided into four phases, as indicated in Table 11.6.

Table 11-6 Construction Phases

Phase	Construction Activities	Duration
Phase 1	Initial site mobilisation and establishment of construction compound and access road. Access road for neighbours along northern boundary. Hoarding Underground services (water supply and discharge & electricity) WWTP and associated facilities. Landscaping and planting Internal roads and car park Walkways, fencing and gates Play area? Hotel Refurbishment (including restaurant, pub, offices and shop) 53 mobile homes - first three rows closest to main entrance road 11 Holiday Lodges/Cabins (half) Maintenance Building. Relocation of Construction compound for Phase 2.	18 months beginning Jan 2025
July and August Stoppage		2026
Phase 2	47 Mobile Homes 14 Holiday Lodges/Cabins (half) 20 Glamping pods Beach Surf Shop & Cafe	10 months
July and August Stoppage		2027
Phase 3	45 Mobile Homes 6 Hobbit Huts Washroom Camper Parking	10 months
July and August Stoppage		2028
Phase 4	Camping sites Leisure Centre	10 months

The main noise sources during the construction works will include heavy machinery and support equipment used to construct the various elements. This typically means heavy earth moving machinery, generators, and material transport trucks.

11.4.1.2 Construction Phase Works

The noise levels described in the following sections are indicative only and are based on theoretical worst-case assumptions in order to demonstrate that it will be possible to undertake the works without significant noise effects. By their nature the works over each phase are short term and will only potentially affect a small number of receptors at any one time. Construction works will only occur during the off season and therefore holiday home receptors are less likely to be effected. Construction works are intermittent, mobile and vary in intensity from phase to phase and accordingly are difficult to accurately predict for any given time in the future.

During the construction phase, the chief source of noise emissions will be plant used onsite. While sporadic emissions may arise from other sources such as voices and hammering, plant emissions may continue for extended periods of time and may potentially cause nuisance. Consequently, the assessment of noise impacts associated with construction phase emissions relates chiefly to plant sources.

As the development progresses structures themselves can act to screen noise levels depending on the receiving receptors. Best practice is to adopt worst case assumptions using typical sources which tends to overestimate the effect.

Construction plant required onsite at various stages of the proposed development are listed in Table 11-7. The exact equipment to be used is not known at this stage, but the plant and machinery outlined in Table 11-7 are typical of plant commonly used and can provide an accurate assessment of construction noise emissions.

The associated noise levels have been sourced from *BS 5228 Noise and Vibration from open and construction sites*, totalled, and extrapolated to the nearest noise sensitive location. Only attenuation due to distance is accounted for in the prediction of resultant noise levels at different distances. The resultant noise level is then compared against the relevant noise threshold (refer to Table 11-1).

The result is a theoretical worst case, as it assumes all machinery will be operating simultaneously which will not be the case and accounts for attenuation due to distance only. In reality there will be further noise attenuation due to atmospheric absorption, ground absorption, and landform screening. Therefore, the noise levels presented herein are an overestimate.

Using the following equation, noise emissions from the construction site are extrapolated to different distances, in this case 10m, 20m, 40m, 45m and 50m.

$$SPL2 = SPL1 - 20\log(r2/r1)$$

Where:

- Sound Pressure Level 1 (SPL1) = Known noise level at 10m from construction site
- Sound Pressure Level 2 (SPL2) = Unknown noise level at nearest receptor
- r2 = Distance between noise sensitive receptor and construction site
- r1 = 10 m

Table 11-7 Typical Plant and Machinery and associated noise levels for Phase 1 to Phase 4 construction

Activity	ITEM BS5228 Ref	Predicted Sound Pressure Level L_{eq} dB(A)					
		10m	20m	30m	40m	45m	50m
General Construction	Dump Truck (tipping fill) (C2.30)	79	72	67	66	65	64
	Tracked excavator (C2.21)	71					
	Compressor (D7.8)	70					
	Telescopic Handler (C4.54)	79					
	Hand-held Circular Saw (C4.72)	79					
	Diesel Generator (C4.76)	61					
Road Works / Landscaping	Asphalt Paver & Tipping Lorry (C5.30)	75					
	Electric Water Pump (C5.40)	68					
	Vibratory Roller (C5.20)	75					
Total		78					

The theoretical worst case predicted noise levels for show that where works are taking place within 40m of an existing noise sensitive receptor there is the potential for the guideline construction noise thresholds to be exceeded. This would mean all the items of plant identified in **Table 11-7 (Typical Plant and Machinery and associated noise levels to be used during construction)** to be in operation simultaneously and continuously over the course of a 10-hour day. At distances beyond 40m noise levels are predicted to be within acceptable guideline values. There are approximately 4 residential properties within 40m of the proposed development boundary and these are NSR1, NSR2, NSR3 and NSR4. NSR2 to NSR4 are approximately 20 to 30m of the access road works whereas NSR1 is within 40m of the nearest holiday cabin. Therefore it is possible that construction limits will be temporarily exceeded at these points.

The calculations represent a worst case scenario. It is likely however that noise at the proposed development boundary areas, which are the closest points to NSRs will be less than other areas of construction within the site boundary. The main construction works will be located around the main building construction areas such as the hotel/café/restaurant/bar which are located well over 45m from the nearest residential properties in the vicinity of the proposed development.

Construction works will take place outside the holiday peak season. NSR 1, NSR2 and NSR 4 are holiday homes, and therefore they are unlikely to be affected by construction noise. NSR3 is the only permanently occupied receptor within the 45m zone. The appointed contractor will liaise with all residential owners to ensure that works are carried out at suitable times which will not cause nuisance. Full mitigation measures are described in **Section 11.5** and will reduce the potential for significant negative effect.

In the absence of mitigation, the associated construction phase noise effects within 45 metres are **likely** to be **negative**, **moderate to significant, temporary to short-term, local**, **and direct** depending on the timing, location and phase of the construction works. Refer to **Table 11-8**.

Beyond 45 metres construction noise effects are **likely** to be **negative**, **not significant**, **temporary to short-term**, **local** and **direct**. Refer to **Table 11-9**.

Table 11-8 Construction Phase Effect 1: Construction Works Noise within 45m

Construction Noise Effect 1: Construction works noise within 45m						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre – Mitigation	Negative	Moderate to Significant	Local	Temporary to Short-Term	Direct	Likely

Table 11-9 Construction Phase Effect 2: Construction Works Noise Beyond 45m

Construction Noise Effect 2: Construction works noise beyond 45m						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre – Mitigation	Negative	Not significant	Local	Temporary to Short-Term	Direct	Likely

11.4.1.3 Construction Phase – Additional Traffic on Public Road

The increase in AADT generated by construction vehicles is noted in **Chapter 12** of this **EIAR**, **Traffic and Transportation**.

The proposed construction works would increase AADT volumes by up to 82 vehicles, including five heavy vehicles on the R567, during construction Phase 1; and by up 44 vehicles, including four heavy vehicles, during construction Phases 2, 3 and 4. This would equate to AADT increases of up to 8.2% and 4.4%, respectively.

In order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25%.

In a worst case construction traffic scenario, with 100% of all construction traffic either north or south of its R567 junction, the highest increase in AADT volumes on the N70 would be up to 3.5% and 1.9%, respectively, during the peak construction Phase 1 and Phase 2, 3 and 4.

Taking the above traffic increases in to account. there is 0 dB increase on existing traffic noise levels predicted during the construction phases of the proposed development.

Therefore, in the absence of mitigation, the construction traffic noise will **likely** result in a **neutral, imperceptible, temporary to short-term**, **local** and **direct** effect on sensitive receptors.

Table 11-10 Construction Noise Effect 3: Additional Traffic on Public Roads

Construction Noise Effect 2: Additional Traffic on Public Roads						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre – Mitigation	Neutral	Imperceptible	Local	Temporary to Short-Term	Direct	Likely

11.4.2 Operational Phase – Noise

11.4.2.1 Operational Phase Noise - Additional Traffic on Public Roads

Information from **Chapter 12** of this **EIAR**, **Traffic and Transportation**, has been used to determine the predicted change in noise levels in the vicinity of a number of roads in the area surrounding the proposed development, during the operational phase, for the opening year 2026, 2031 and design year 2041.

For the purposes of assessing potential noise impact, it is appropriate to consider the relative increase in noise level associated with traffic movements on existing roads and junctions with and without development. Traffic flow data in terms of the AADT figures has been assessed for the opening and future years. The change in traffic levels during these periods are summarised in **Table 11-11.**

Table 11-11 Operational Phase Traffic Change

Road Link/Location	Year	AADT	
		Total Vehicles (% HGVs)	Change (% Change)
N70 North @ R567	2026	2,322 (2.3%)	+9 (0.4%)
	2031	2,455 (2.5%)	+29 (1.2%)
	2041	2,484 (2.7%)	+29 (1.2%)
N70 South @ R567	2026	3,188 (2.1%)	+79 (2.5%)
	2031	3,503 (2.1%)	+243 (7.5%)
	2041	3,541 (2.3%)	+243 (7.4%)
567 East @ N70	2026	1,082 (2.0%)	+88 (8.9%)
	2031	1,315 (1.8%)	+272 (26.1%)
	2041	1,326 (2.0%)	+272 (25.8%)
Access Road (Site & Reenroe Beach)@ R567	2026	363 (0.7%)	+153 (72.9%)
	2031	696 (0.3%)	+476 (116.4%)
	2041	698 (0.3%)	+476 (114.4%)
Local Road North @ R567/Access Road	2026	198 (0.5%)	0
	2031	207 (0.5%)	0
	2041	210 (1.0%)	0
567 West @ R566	2026	853 (2.3%)	+65 (8.3%)
	2031	1,031 (2.1%)	+204 (24.4%)
	2041	1,041 (2.3%)	+204 24.4(%)
R566 North @ R567	2026	767 (2.5%)	+8 (1.1%)
	2031	821 (2.7%)	+24 (3.0%)
	2041	830 (2.9%)	+24 (3.0%)
R566 South @ R567	2026	1,431 (2.7%)	+57 (4.2%)
	2031	1,621 (2.7%)	+180 (12.5%)
	2041	1,639 (2.9%)	+180 (12.3%)

In order to increase traffic noise levels by 1 dB, traffic volumes would need to increase by the order of 25%. With reference to the calculations above, the Access Road (Site & Reenroe Beach) will experience the largest increase (116%) in traffic. The resultant increase worst case equates to 4 to 5 dB and will result in a slight to moderate impact in accordance with criteria set out in **Table 11-3**. The R567 East @ N70 will experience a 1 dB increase which is considered not significant in accordance with **Table 11-3**. The predicted increase with traffic at the remaining road links is expected to be less than 25% and therefore there will be less than 1 dB increase and the noise effects are considered imperceptible in accordance with **Table 11-3**.

In the absence of mitigation, the operational traffic noise will **likely** result in a **negative, slight to moderate, local, long term**, **local** and **direct** effect of sensitive receptors.

Table 11-12 Operational Noise Effect 1: Additional Traffic on Public Roads

Operational Noise Effect 1: Additional Traffic on Public Roads						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Slight to Moderate	Local	Long-Term	Direct	Likely

11.4.2.2 Operational Phase Noise – Inward Noise

The proposed development will provide self-catering accommodation and facilities with a maximum of 972 beds or 507 bedrooms, all of which will require the absence of noise at nuisance levels. The applicant will be required to ensure that internal noise levels at these locations will be suitable. Background noise level data presented in **Section 11.3.1** may be used to inform the final building details, particularly in relation to glazing selection and ventilation design. Measured data indicate no particular issues are expected here, and that the internal criteria will be readily achieved.

In the UK, most new residential developments are acoustically assessed by reference to ProPG: Planning & Noise – Professional practice guidance on planning & noise -: New residential development (May 2017), jointly issued by the Association of Noise Consultants, the Institute of Acoustics, and the Chartered Institute of Environmental Health. Although the proposed development is not residential, the ProPG guidelines are considered most appropriate to use when assessing inward noise impacts to hotel and self-catering residents. A stage 1 preliminary assessment of noise risk in accordance with the document suggests that the site is low risk, and thus 'the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed'. This process relates to final building design details. The applicant proposes to apply a detailed acoustic design process with respect to building specifications.

During the operation phase of the proposed development, inward noise will **likely** cause a **neutral, imperceptible, local, long-term,** and **direct** effect on the hotel residents and self-catering accommodation residents.

Table 11-13 Operational Nosie Effect 2 – Inward Noise

Operational Noise Effect 2: Inward Noise						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Neutral	Imperceptible	Local	Long-Term	Direct	Likely

11.4.2.3 Operational Phase Noise – Breakout Noise from Proposed Development Facilities

The proposed development will consist of a number of sources throughout the operational phase. It is worth noting here, that the closest receptors to most onsite sources of noise will consist of the proposed onsite hotel residents in accommodation units, hotel apartments or visitors frequenting hotel grounds and employees. Onsite noise sources will be controlled so as to minimise noise impacts at receptors. This in turn will benefit receptors outside site boundaries.

The main sources of noise directly from the built proposed development, during the operational phase will consist of the following:

<u>Deliveries</u>

Deliveries will occur at the proposed development on a regular basis. Several small trucks and vans are expected each working day. Evening or night-time deliveries are not expected. Little or no noise emissions are expected from unloading operations, as these will be small in scale and occur within the enclosed delivery area at the north end of the hotel building. Certain deliveries will require the use of trolleys (e.g. laundry, hand drive pallet trucks, or handcars). None of these are expected to give rise to significant noise emissions. Noise from delivery of kegs may be almost entirely eliminated through use of keg pillows and keg trollies.

<u>Amplified music at premises</u>

The hotel will include function areas and will be fitted with public address systems which allow playing of live and prerecorded music. The system will incorporate amplification. While the leisure complex may play music internally, volumes will be low. Amplified music from function areas of the hotel represent potential offsite noise nuisance due to the timing of emissions (usually late evening) and due to their nature (impulsive low frequency

emissions, particularly rhythmic 'thump thump' associated with contemporary music). Any sources of music will come from areas of the proposed hotel infrastructure area and will be approximately 180 metres from the nearest sensitive receptor. As music sources will be located within the hotel building, there will be a level of noise screening provided by the hotel infrastructure itself. Therefore, significant noise levels from amplified music is not predicted at external receptors including residential receptors and visitors to the Reenroe beach.

Waste Management

Wastes arising at the various facilities onsite will be stored in a designated waste collection areas of the proposed development and collected by a compactor truck operated by a permitted waste collector. Noise emissions from waste collections will be similar to those arising throughout residential areas across surrounding area.

Patrons

Patrons, both adults and children, will congregate on external areas in vicinity of accommodation areas. As the nearest receptors will consist of the onsite hotel bedrooms and self-catering areas, hotel management will be required to ensure that patrons do not give rise to external nuisance onsite.

Vocalisations at the leisure complex

At this zone, vocalisations may arise from children and adults at the swimming pool, gym etc. All such emissions will arise internally only, and will not be audible beyond the building envelope.

From the foregoing, it is evident that emissions from the facility's noise sources will be relatively low, and will not give rise to significant offsite impacts. Modelling of noise emissions is not required, as no emissions of significance, will arise onsite.

In the absence of mitigation measures, the effects from the proposed development facilities noise sources is likely to cause **negative**, **not significant**, **long term**, **local**, and **direct** effects to noise sensitive receptors.

Table 11-14 Operational Noise Effect 3: Noise Breakout from Proposed Development Facilities

Operational Noise Effect 3: Breakout Noise from Proposed Development Facilities						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Not Significant	Local	Long-Term	Direct	Likely

11.4.2.4 Operational Phase Noise - Mechanical Plant and Services

Once a development of this nature becomes operational, a variety of electrical and mechanical plant will be required as part of the proposed development. Most of this plant will be capable of generating noise to some degree. Some of this plant may operate 24 hours a day, and hence would be most noticeable during quiet periods (i.e overnight). Noise generating plant with a direct line-of-sight to noise sensitive properties would potentially have the greatest impact. Some of the plant operating within the proposed development during the operational phase will include the following:

Air handling units:

Air handling units (AHUs) such as fans, vents, air conditioning cassettes, etc. are likely to be installed across the proposed development site. Such units may be installed on external walls and on roofs. The largest concentration of these is expected to occur at the proposed hotel and areas such as the leisure complex. All AHUs will be relatively small, and it will not be necessary to install industrial grade units. As noted above, those most likely to be affected will work at proposed development or will be visitors and accommodation residents.

Boilers

Oil or gas fired boilers may be installed at several units in order to provide space and water heating. Boilers will most likely be required at the proposed hotel, and at the leisure complex. The hotel and leisure centre boilers will be located in internal plant rooms and are expected to be inaudible 20m from the plant rooms. Noise emissions discharged via the boiler flue are unlikely to be significant. In summary, emissions associated with any boilers installed onsite will be negligible.

Generators

One backup generator for the waste water treatment plant is proposed for the development, and one backup generator has been included for the hotel and will be located internally in plant room area. Both backup generators will be enclosed and located inside buildings. Enclosed generators are designed to minimise noise and can have noise levels ranging from 65 to 70 dB, comparable to a vacuum cleaner or busy office environment. The nearest NSR to the WWTP backup generator is NSR1 to the south west at approximately 180m. The hotel backup generator is 180 south west of NSR1. For a generator with a 70dB sound power level, the sound level at 180m would be 17dB. This noise level would not be perceptible at the nearest NSR and is therefore considered negligible.

Landscaping Plant

The proposed site layout will incorporate open spaces between units, around car parking areas and at the site perimeter. Such areas will be grassed, and/or may be planted with trees and shrubs. It is therefore likely that a maintenance contact will be awarded to a local landscaping company. Maintenance activities undertaken at the proposed site may include regular mowing of open green areas, strimming of steeper ground such as banks where mowers cannot access, leaf blowing near tree zones, laying of bark mulch over planted areas, and weed spraying. Use of plant such as mowers and trimmers across the site will be clearly audible offsite. However, these types of emissions are common in a rural environment, particularly during summer when it is common during the daytime/evening to hear at least one mower audible in distance at any time.

Wastewater Treatment Plant

Two pumps will be used to pump foul water from the source areas to the WWTP. These pumps will be located at the south-western corner of the development adjacent to the mobile homes and also adjacent to the hobbit huts. They will be set into the ground and covered by a maintenance cover (manhole cover). Once treated, a pumping station at the waste water treatment plant outlet will pump treated water up to the percolation areas where local pumps will distribute the treated water for infiltration.

At this stage of development, the exact details of plant items have not been procured and therefore specific details of the type and number of plant items serving the WWTP and proposed development are not available. In this instance it is best practice to set appropriate emission limits relating to plant which will be used during the operational phase.

The background noise levels, refer to **Section 11.3.1,** measured during the day, evening and night-time periods were similar with an average background noise level of 38 dBL_{A90} for daytime, 40dBL_{A90} for evening and 42dBL_{A90} for night-time periods. Making reference to the background noise levels, measured during the baseline noise survey and reference to the guidance from the BS 4142 as described in **Section 11.2.3.3,** the cumulative noise levels associated with building services plant items at the façade of the NSRs external to the development site will be designed to not exceed 38dN $L_{Aeq,1hr}$.

These limits have been set in order to preserve the existing noise environment and to set the appropriate limits at NSRs and amenity space within the proposed development site.

Noise levels associated with mechanical plant are expected to be within the adopted day and night-time noise limits set out above, at the NSRs taking into account the site layout, the nature of the proposed development and

distance to NSRs. Note that this applies to the plant required for normal operations; emergency or back-up plant such as a generator and related equipment will not be subject to the same limits. As already mentioned, the noise effects from backup generators are predicted to be negligible given the intervening distance between source and NSRs.

With the implementation of design goals, the resultant noise effects from the source will be **neutral**, **long term**, **imperceptible**, **local**, and **direct** on NSRs.

Table 11-15 Operational Effect 4: Mechanical Plant and Services

Operational Noise Effect 4: Mechanical Plant and Services						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Neutral	Imperceptible	Local	Long-Term	Direct	Likely

11.4.3 Construction Phase – Vibration

There will be no significant, sources of vibration during the construction phase, i.e., piling or blasting. Effects from vibration such as heavy machinery are **likely** to be **negative**, **not significant**, **local**, **temporary to short-term**, and **direct** on sensitive receptors.

Table 11-16 Construction Phase Effect 3: Vibration

Construction Phase Effect 3 : Vibration						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Not Significant	Local	Temporary to Short-Term	Direct	Likely

11.4.4 Operational Phase – Vibration

There will be no significant, sources of vibration during the operational phase. Effects from vibration are **likely** to be **neutral**, **imperceptible**, **local**, **long term**, and **direct** on sensitive receptors.

Table 11-17 Operational Phase Effect 5: Vibration

Operational Phase Effect 5: Vibration						
	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Neutral	Imperceptible	Local	Long Term	Direct	Likely

11.4.5 Do-Nothing

Should the proposed development not proceed the existing noise environment is unlikely to change significantly in the near term. The main contributors to the ambient noise are waves from the sea, wind and intermittent traffic on the local roads in the local vicinity and also from surrounding local roads and adjacent local road accessing the Reenroe beach. The projected increase in traffic over the do-nothing projections is not predicted to increase noise of the existing soundscape at the proposed development site.

11.4.6 Cumulative Effects

Cumulative impacts result from a number of activities in the study area which may impact on the existing noise environment. **Section 1.6.2.5** of **Chapter 1** of this **EIAR** details applications within 10km of the proposed development site and identified around 48 residential dwellings that were granted planning within the last 5 years. The majority of these planning applications in the surrounding area consist of small scale works to existing dwellings or applications to construct new dwellings.

In addition to small scale residential planning applications, 13 non-residential development planning applications were approved in the last 7 years. All are related to tourism activities. Six of these were in the pre-covid period and are likely to be completed and will therefore have no cumulative effect with the proposed development. One of these (No. 1 - the Hogs Head Hotel complex in 2017) and the last two more recently included the provision of new tourism accommodation. This Hogs Head Hotel facility is an operational luxury hotel located within a golf estate on the east side of Waterville town on the banks of Lough Currane. Entry 7 in **Table 1-5** of **Section 1.6.2.5** include the development of six self-catering accommodation units . Three more recent planning applications (see number 9, 12 and 13 in **Table 1-5** of **Section 1.6.2.5**) involve the development of 5, 9 and 7 glamping pods and associated facilities. One of these (number 11 is in Ballinskelligs) and the others in Portmagee and Cahersiveen. One (see No.8) provides a viewing area, path and car park in Ballinskelligs. The two more recent applications involve upgrades and additions to existing tourism businesses that do not include the provision of new tourist accommodation. The decisions on four of these applications are still pending or require further information.

Considering the above developments in combination with the proposed development, there are no significant cumulative noise effects predicted as a result of development other than this proposed development.

11.5 Mitigation and Monitoring Measures

11.5.1 Mitigation Measures

11.5.1.1 Construction Phase

Best practice mitigation techniques as specified in BS 5228:2009+A1 2014 – Noise and Vibration Control on Construction and Open Sites will be implemented during the construction phase. Contractors will be familiar with the measures in this document, in order to implement the best practice measures.

If construction limits are found to be exceeded, noise screens will be utilised around noisy plant and machinery such as generators and cutting stations.

Noise stationary equipment will be located away from sensitive boundaries as far as practicable.

The use of inherently quiet plant is required where appropriate – all compressors and generators will be "sound reduced" or "super silent" models fitted with properly lined and sealed acoustic covers, which will be kept closed whenever the machines are in use, and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers.

Site activities shall be staggered when working in proximity to any receptor. Construction works will be outside of peak season when there are visitors to nearby receptors which are mostly holiday homes. Construction managers will liaise with residents to identify suitable times for construction works. This proposed method of working will provide effective noise management of site activities to ensure that any receptor is not exposed to unacceptably high levels of noise over extended periods.

A nominated person from the appointed contractor will be appointed to liaise with local residents and businesses regarding noise nuisance events.

In the event of out of hours work occurring, for instance it is proposed that delivery of mobile homes will take place at night during the off-season, or due to emergency or other unforeseen circumstance, which will involve the generation of noise levels that are predicted to exceed out of hours noise limit criteria, Kerry County Council will immediately be notified prior to the works commencing.

11.5.1.2 Operational Phase

As part of the detailed design of the development, plant items with appropriate noise ratings and, where necessary, appropriately selected remedial measures (e.g. enclosures, silencers etc.) will be specified in order that the adopted plant noise criteria is achieved at the facades of sensitive properties, including those within the development itself.

A general noise management strategy should be developed as part of the development, including hours of operation, training for staff and signage to notify the public of the potential effect their activities, particularly at night may have on nearby residents.

11.6 Residual Effects

Table 11-18 shows the proposed development Noise and Vibration residual effects after mitigation measures are applied. There will be no significant negative residual noise effects from the construction or operational phase of the proposed development.

Table 11-18 Noise and Vibration Residual Effects

EFFECT (PRE-MITIGATION)	MITIGATION MEASURES	RESIDUAL EFFECT (POST-MITIGATION)					
		QUALITY OF EFFECT	SIGNIFICANCE	SPATIAL EXTENT	DURATION	OTHER RELEVANT CRITERIA	LIKELIHOOD
CONSTRUCTION							
Construction Phase Effect 1: Construction Works Noise within 45m	See Section 11.5.1.1	Negative	Not significant	Local	Temporary to Short Term	Direct	Likely
Construction Phase Effect 2: Construction Works Noise beyond 45m	See Section 11.5.1.1	Neutral	Imperceptible	Local	Temporary to Short Term	Direct	Likely
Construction Phase Effect 3: Additional Traffic on Public Roads	See Section 11.5.1.1	Neutral	Imperceptible	Local	Temporary to Short Term	Direct	Likely
Construction Phase Effect 4 Vibration	See Section 11.5.1.1	Negative	Not Significant	Local	Temporary to Short Term	Direct	Likely
OPERATIONAL							
Operation Phase Effect 1: Additional Traffic on Public Roads	See Section 11.5.1.2	Negative	Slight to Moderate	Local	Long term	Direct Reversible	Likely
Operation Phase Effect 2: Inward Noise	See Section 11.5.1.2	Neutral	Imperceptible	Local	Long Term	Direct	Likely

EFFECT (PRE-MITIGATION)	MITIGATION MEASURES	RESIDUAL EFFECT (POST-MITIGATION)					
		QUALITY OF EFFECT	SIGNIFICANCE	SPATIAL EXTENT	DURATION	OTHER RELEVANT CRITERIA	LIKELIHOOD
Operational Phase Effect 3: Breakout Noise from **Proposed Development Facilities**	See Section 11.5.1.2	Neutral	Imperceptible	Local	Long Term	Direct	Likely
Operational Phase Effect 4: Mechanical Plant and Services	See Section 11.5.1.2	Neutral	Imperceptible	Local	Long Term	Direct	Likely
Operational Phase Effect 5: Vibration	NA	Neutral	Imperceptible	Local	Long Term	Direct	Likely

11.7 References

BS 4142: 2014: Methods for Rating and Assessing Industrial and Commercial Sound.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Noise.

BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 2 – Vibration.

BS 6472 Guide to evaluation of human exposure to vibration in buildings (2008): Part 1 - Vibration sources other than blasting.

BS 7385-2:1993 Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration.

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

Manual for Roads and Bridges (DMRB) Sustainability & Environment Appraisal LA 111 Noise and Vibration Revision 2 (DMRB, 2020)

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

Guidance Note for Noise: License Applications, Surveys and Assessments in Relation to Scheduled Activities (EPA, 2016).

National Highways Design Manual for Roads and Bridges Part 7 HD 213/11 – Revision 1 Noise and Vibration.

Institute of Environmental Management and Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment, (IEMA 2014).

ISO 1996: 2017: Acoustics – Description, measurement, and assessment of environmental noise.

ProPG: Planning & Noise – Professional Practice Guidance on Planning & Noise (May 2017)