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# ENVIRONMENTAL IMPACT ASSESSMENT REPORT FOR THE DEMOLITION OF AGRICULTURAL STRUCTURES AND THE DEVELOPMENT OF A MATERIALS RECOVERY FACILITY AT DERRYARKIN, CO. OFFALY

## VOLUME 2 – MAIN BODY OF THE EIAR CHAPTER 12 – NOISE AND VIBRATION

Prepared for: Oxygen Environmental Unlimited Company



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## 12. EXISTING AND PROPOSED DEVELOPMENT

### 12.1 Introduction

This chapter has been prepared to examine the potential significant effects of the proposed development on noise in the local environment, referred to in this chapter as the study area.

#### 12.1.1 Statement of Competency

This Chapter has been prepared by Maureen Marsden, an Acoustic Engineer with a Master of Engineering in Acoustics and Vibration from Southampton University and over 20 years' experience in noise and vibration assessment, including noise prediction modelling and noise impact assessment. She is a member of the Institute of Acoustics and Engineers Ireland.

#### 12.1.2 Description of Development

The proposed development is defined in Chapter 1 and a detailed description of the proposed development is set out in Chapter 4: Existing and Proposed Development.

The significant effects of the proposed development are assessed, having taken account of mitigation measures to reduce or eliminate any residual impacts on the surrounding noise environment. As the nearest vibration sensitive location is over 750m from the proposed site, the effect of vibration on the surrounding environment have been scoped out of this report.

### 12.2 Assessment Methodology

The methodology adopted for this noise and vibration assessment is as follows:

- Review of appropriate guidance, planning conditions applicable to other sites and specification of suitable construction and operational noise / vibration criteria;
- Characterisation of the receiving noise and vibration environment;
- Characterisation of the proposed development;
- Prediction of the noise impact associated with the proposed development;
- Evaluation of noise impacts.

### 12.3 Study Area

The study area includes all noise sensitive locations within 1km of the site boundary as this includes the nearest residential dwellings to the proposed development. There are four residential noise sensitive locations within 1km of the site boundary. The nearest noise sensitive receptor is a one-off dwelling situated ca. 755 metres to the south of the proposed site.





Other one-off dwellings are located ca. 760 metres to the south west of the site and 770 metres to the south of the site and ca. 890 metres to the south west of the site. There are no other sensitive receptors within 1 km of the proposed development site.

## 12.4 Relevant Guidance

A list of relevant guidance documents used in the preparation of this assessment are provided below. These have been referred to where appropriate.

- International Standard Organisation, ISO 1996-1:2016, Acoustics – Description, measurement and assessment of environmental noise -- Part 1: Basic quantities and assessment procedures
- International Standard Organisation, ISO 1996-2:2017, Acoustics – Description, measurement and assessment of environmental noise -- Part 2: Determination of sound pressure levels
- Environmental Protection Agency, Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to. Scheduled Activities (NG4) (2016)
- Environmental Protection Agency, Guidelines on the information to be contained in the Environmental Impact Assessment Reports, 2022.
- International Standard Organisation, ISO 9613-2:1996, Acoustics – Attenuation of Sound During Propagation Outdoors
- British Standard 4142:2014+A1:2019, Methods for rating and assessing industrial and commercial sound
- *BS 7385-2:1993, Evaluation and measurement for vibration in buildings: Guide to damage levels from ground borne vibration*
- *BS 6472-1:2008, Guide to evaluation of human exposure to vibration in buildings: Vibration sources other than blasting*
- *BS 5228-2:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites – Part 1: Noise*
- *BS 5228-2:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration*



## 12.5 Evaluation Criteria

### 12.5.1 Construction Noise Criteria

There is no statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. In the absence of specific noise limits, appropriate emission criteria relating to permissible construction noise levels for a development of this scale may be found in the British Standard BS 5228-1:2009+A1:2014 *Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise*.

The ABC Method from BS 5228-1:2009+A1:2014 is used to derive appropriate noise limits for the proposed development. The threshold limits as defined in Table 12.1 based on existing ambient levels, which if exceeded, signify a significant effect. For the appropriate period (e.g. daytime), the ambient noise level is determined and rounded to the nearest 5 dB.

**Table 12.1: Applicable Construction Noise Limits**

Threshold value period ( $L_{Aeq}$ )	Threshold Value, in decibels (dB)	Threshold Value, in decibels (dB)	Threshold Value, in decibels (dB)
	Category A	Category B	Category C
Night-time (23:00 to 07:00 hrs)	45	50	55
Evenings and weekends <sup>D)</sup>	55	60	65
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75

<sup>D)</sup> 19:00–23:00 weekdays, 13:00–23:00 Saturdays and 07:00–23:00 Sundays.  
 If the ambient noise level exceeds the threshold values given in the table (i.e., the ambient noise level is higher than the above values), then a potential significant effect is deemed to occur if the construction  $L_{Aeq}$  noise level for the period increases by more than 3 dB due to construction activity.

Construction noise has been assessed by comparing predicted construction activities against best practice construction noise criteria at the nearest noise sensitive locations to the construction activities. If the predicted construction noise level meets the relevant BS 5228 noise limits at the nearest locations, compliance at all other more distant residential locations can be inferred.

Table 12.1 presents the applicable BS 5228 daytime limits for construction noise. Based on the noise levels monitored at each location detailed in Section 12.6.1, the Category A limits are appropriate for this site.



### 12.5.2 Operational Noise Criteria

Noise guidance and limits prescribed within the Environmental Protection Agency (EPA) (2016), “Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)” will be applicable at the proposed facility under the prospective WFP (under Phase 1 of operations), and subsequent IE licence (during Phase 2 of operations).

#### Noise Guidance (NG4) Compliance

The EPA’s *Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)* (Environmental Protection Agency, 2016) requires that sites are screened to determine whether they are a ‘quiet area’ in accordance with the EPA publication *Environmental Quality Objectives – Noise in Quiet Areas* (2003) (Step 1 of NG4 Screening) or areas of low background noise (Step 2/3 of the screening). This screening is required to determine the most applicable noise limits for sites.

Step 1 of the screening for the subject development is shown in 12.3. For the site to be in a ‘Quiet Area’, the criteria listed in Table 12.2 must be satisfied. In the case of this site, the proposed development site does not meet any of the criteria in Table 12.2 and it is therefore not considered to be a ‘Quiet Area’:

**Table 12.2: Quiet Area Screening Step 1**

Criteria	Response
Is the site >3km away from urban areas with a population >1,000 people?	Yes, there are no urban centres within 3km of the site
Is the site >10km away from urban areas with a population >5,000 people?	Yes, site is more than 10km from the outskirts of Mullingar town with a population of 20,928 (2016 census)
Is the site >15km away from urban areas with a population >10,000 people?	No, site is approximately 15km from the outskirts of Mullingar town with a population of 20,928 (2016 census)
Is the site >3km away from any local industry?	No, the site was previously an intensive pig farm and Kilmurray Quarry is adjacent to the site.
Is the site >10km away from any major industry centre?	No, the site is next to Kilmurray Quarry.
Is the site >5km away from any national primary route?	No, the site is less than 2km from the nearby M6 motorway
Is the site >7.5km away from any motorway or dual carriageway?	No, the site is less than 2km from the nearby M6 motorway

Since the proposed development site is not in a ‘Quiet Area’, NG4 requires the site to be screened to determine if the site is in an ‘area of low background noise’ (NG4 Step 3). Background noise levels are examined to see if they satisfy the following criteria:

- Average Daytime Background Noise Level  $\leq 40\text{dB } L_{AF90}$ , and;
- Average Evening Background Noise Level  $\leq 35\text{dB } L_{AF90}$ , and;
- Average Night-time Background Noise Level  $\leq 30\text{dB } L_{AF90}$ .





For a site to be considered an 'area of low background noise', all three criteria must be satisfied. For sites classed as areas of low background noise the limits in Table 12-3 normally apply. Based on the baseline noise survey, detailed in section 12.6.1, each Noise Sensitive Location (NSL) to the south of the site would generally be classed as being in an 'area of low background noise.' The criteria for areas of low background noise would generally apply at these NSL's, except the immediate environs of the proposed development site is characterized as loud noise environment due to the adjacent quarry and pig farm operations.

**Table 12.3: Guidance Noise NG4 Recommended Noise Emission Limits**

Period	Noise Limit Area of Low Background Noise
Daytime (07:00 to 19:00 Hrs)	45 dB(A) $L_{Ar,T}$
Evening-time (19:00 to 23:00 Hrs)	40 dB(A) $L_{Ar,T}$
Night-time (23:00 to 07:00 Hrs)	35 dB(A) $L_{Aeq,T}$



The NG4 guidance note states that during the daytime and evening periods, rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all noise sensitive locations. A penalty of 5 dB for tonal and/or impulsive elements is applied to the daytime and evening measured  $L_{Aeq,T}$  values to determine the appropriate rating level  $L_{Ar,T}$ . During the night-time no tonal or impulsive noise from the facility should be audible at any noise sensitive location.

Operational Noise Criteria: Adjacent Site

The proposed development site is adjacent to Kilmurray Quarry. This site was recently granted planning permission on 30/03/22 (Planning Reference: PL2/21/247) for a 23-year extension to an existing authorised sand and gravel pit, subject to certain planning conditions.

As part of the planning submission, for this development, noise monitoring was undertaken in August 2020. The local area was not classed as an area of low background noise based on noise levels recorded during this monitoring.

World Health Organisation Criteria

The World Health Organisation sets noise limits for night time noise (Night Noise Guidelines for Europe, 2009). The 40 dB  $L_{night}$ , measured outside, is equivalent to the lowest observed adverse effect (LOAEL) for night-time noise. The  $L_{night}$  is defined as the equivalent outdoor sound pressure level associated with a particular type of noise source during the night-time (at least 8 hours), calculated over a period of a year.

Proposed Site Noise Limits

Based on the above information and given that the area in the immediate vicinity of the site is more industrial in character than the areas where the NSL's are located (i.e. it is an area characterized by substantial, existing quarry and pig farm operation noise, and associated road traffic noise), the noise limits detailed in Table 12-4, as prescribed in the EPA's NG4 Guidance Note for Noise are proposed for the proposed facility.



**Table 12.4: Proposed Site Noise Limits**

Daytime dB LA,r,T (30 minutes)	Evening dB LA,r,T (30 minutes)	Night-time dB LA,r,T (30 minutes)
55	50	45 (Note 1)

Note 1: There shall be no clearly audible tonal component or impulsive component in the noise emission from the activity at any noise sensitive location.

### 12.5.3 Significance of Impact

The criteria for determining the significance of impacts and the effects are set out in Chapter 1 Introduction of Volume 2 of this EIAR.

The EPA guidelines do not quantify the impacts in decibel terms. In absence of such information, reference is made to “Guidelines for Environmental Noise Impact Assessment” (IEMA, 2014). Table 12.5 presents the degree of effect matrix from the IEMA guidelines and Table 12.6 presents the effect descriptions.

**Table 12.5: Degree of Effect Matrix (IEMA, 2014)**



		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude / Scale of Change	Large	Very Substantial	Substantial	Moderate	None
	Medium	Substantial	Substantial	Moderate	None
	Small	Moderate	Moderate	Slight	None
	Negligible	None	None	None	None

**Table 12.6: Effect Descriptions (IEMA, 2014)**

Effect	Description
Very Substantial	Greater than 10 dB LAeq change in sound level perceived at a receptor of great sensitivity to noise
Substantial	Greater than 5 dB LAeq change in sound level at a noise-sensitive receptor, or a 5 to 9.9 dB LAeq change in sound level at a receptor of great sensitivity to noise
Moderate	A 3 to 4.9 dB LAeq change in sound level at a sensitive or highly sensitive noise receptor, or a greater than 5 dB LAeq change in sound level at a receptor of some sensitivity
Slight	A 3 to 4.9 dB LAeq change in sound level at a receptor of some sensitivity
None/Not Significant	Less than 2.9 dB LAeq change in sound level and/or all receptors are of negligible sensitivity to noise or marginal to the zone of influence of the proposals



For this assessment, it has been assumed that dwellings have a high sensitivity. Table 12.7 presents the impact scale adopted in this assessment as well as the corresponding significance of impact based on definitions presented in the “Guidelines on the Information to be contained in Environmental Impact Assessment Reports” (EPA, 2022).

**Table 12.7: Effect Descriptions (IEMA, 2014 and EPA 2022)**

Noise Level Change dB(A)	IEMA Guidelines	EPA’s Significance of Effects
Less than 2.9	None/Not Significant	Imperceptible
		Not Significant
3.0 - 4.9	Slight	Slight Effects
	Moderate	Moderate Effects
5.0 – 9.9	Substantial	Significant Effects
Greater than 10.0	Very Substantial	Very Significant
		Profound Effects

12.5.4 Traffic Noise Criteria

There is currently no legislation that limits environmental noise levels from traffic to a limit value. Offaly County Council prepared a noise action plan in accordance with the requirements of EU Directive 2002/49/EC (known as the Environmental Noise Directive, or “END”). The most recent version of the Noise Action Plan covers the period 2018 – 2023. It states...

*“to avoid, prevent and reduce, on a prioritised basis the harmful effects, including annoyance due to the long-term exposure to environmental noise. It is the Council policy to consider development which reduce the harmful impacts of noise pollution within the vicinity of sensitive areas, especially residential properties”.*

In absence of specific noise limit values from traffic, the traffic noise impact is assessed with respect to Design Manual for Roads and Bridges LA111 – Noise and vibration Revision 2, UK Highways Agency (2020). This document presents details on the classification of magnitude of noise impacts in the short term (e.g. when a project is opened) and long term (typically 15 years after project opening). A change in road traffic noise of 1 dB in the short term is the minimum that is considered perceptible. In the long term, a 3 dB change is considered perceptible. The significance that can be attached to changes in noise levels (perceptible to human beings) applicable to traffic noise is shown in Table 12.8. However, the changes are subjective and will vary among individuals.



**Table 12.8: Classification of Magnitude of Noise Impacts (Highways Agency, UK)**

Magnitude of Impact	Noise Change, $L_{A10}$ (18 hour) or $L_{night}$	
	Short Term	Long Term
Negligible	less than 1.0	less than 3.0
Minor	1.0 – 2.9	3.0 – 4.9
Moderate	3.0 – 4.9	5.0 – 9.9
Major	Greater than or equal to 5.0	Greater than or equal to 10.0

## 12.6 Baseline Environment

An attended noise survey was undertaken during the daytime on the 30<sup>th</sup> June 2021 and during the evening and night-time periods on the 24<sup>th</sup> to 25<sup>th</sup> August 2021, at two noise monitoring locations. The data from these noise surveys has been used to represent the Do-Nothing effect. The data from these noise surveys in conjunction with noise predictions has been used to determine the noise impact at the nearest dwellings to the site.

All measurements were taken in accordance with ISO 1996 Standards Acoustics - Description and Measurement of Environmental Noise, Part 1 (ISO 1996-1:2016) and Part 2 (ISO 1996-2:2017) and the EPA document NG4: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities.

Attended monitoring was carried out using a Svantek Svan 977A Type 1 Sound Level Meter. The noise meters were fitted with a 1/2" microphone. The microphone was fitted with a windshield. The sound level meter was mounted on a tripod at a height of 1.5 m. The microphone was placed at least 3.5 m from reflecting surfaces to obtain 'free-field' conditions. The sound level meter was set to log a range of noise parameters every 15 minutes. The sound level meter was set to a frequency weighting of 'A' in accordance with international standard IEC 61672:2003 and various national standards relating to the measurement of sound pressure level representative of human hearing and a fast response time. All equipment was calibrated before and after the survey and the drift in calibration was within an acceptable range. Details of the noise monitoring equipment calibration certificates are provided in Appendix 12-1.

### Monitoring Locations

Two noise monitoring locations were identified to the south west and south of proposed site to obtain a detailed representation of the ambient and background noise levels at these NSL's in the study area. Details of the noise monitoring locations are presented in Table 12.9, and the results of the survey are presented in Section 12.6.1. The noise monitoring locations are shown on **Error! Reference source not found.**



**Table 12.9: Noise Monitoring Location Details near proposed site**

Monitoring Location	Location Description	Photograph
N1  ITM  648493, 736007	Located at edge of a local road. In front of Noise Sensitive Location. Approximately 755 meters to the south of the site.	
N2  ITM  647855, 736104	Located at edge of a local road. In front of Noise Sensitive Location. Approximately 890 meters to the south west of the site.	

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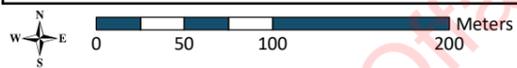




- Legend**
- Planning Boundary
  - X Noise Monitoring Location

  
**PL2 / 22 / 490**  
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<b>TITLE:</b>	Noise Monitoring Locations		
<b>PROJECT:</b>	Oxigen Derryarkin Materials Recovery Facility		
<b>FIGURE NO:</b>	12.1		
<b>CLIENT:</b>	Oxigen Environmental Unlimited Company		
<b>SCALE:</b>	1:4000	<b>REVISION:</b>	0
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### 12.6.1 Baseline Noise Survey

Table 12.10 and 12.11 presents the measured  $L_{Aeq}$ ,  $L_{AFMax}$  and  $L_{AF90}$  noise levels for the monitoring locations representing the nearest noise sensitive dwellings. The main noise sources during the measurement periods are noted:

**Table 12.10: Baseline Survey Results – Monitoring Location N1**

Receiver	Monitoring Location N1				Comments
Period	Date & Start Time	Measured Noise Levels, dB			
		$L_{Aeq}$	$L_{AFMax}$	$L_{AF90}$	
Daytime	30/06/2021 11:14	55	80	37	Mainly quarry noise including loader moving material, reverse hazards, vehicle horns. Some road traffic noise. Livestock noise. Rattling chain at gate in field. Distant hand tool usage at house. Aircraft. Birdsong.
	30/06/2021 12:14	45	68	34	
	30/06/2021 13:15	43	70	33	
	Arithmetic Average of $L_{AF90}$ (dB)			<b>35</b>	
Evening	24/08/2021 20:10	46	69	28	Some road traffic noise. Distant quad bikes in field. Livestock noise. Birdsong. Low rustle of leaves in tree.
Night-time	24/08/2021 23:09	27	54	22	Some road traffic noise. Livestock. Low rustle of leaves in tree.
	25/08/2021 00:03	28	51	22	
	Arithmetic Average of $L_{AF90}$ (dB)			<b>22</b>	

**Table 12.11: Baseline Survey Results – Monitoring Location N2**

Receiver	Monitoring Location N2				Comments
Period	Date & Start Time	Measured Noise Levels, dB			
		$L_{Aeq}$	$L_{AFMax}$	$L_{AF90}$	
Daytime	30/06/2021 11:40	42	65	33	Quarry noise dominant but at lower level to N1. Noise from adjacent farm particularly during second measurement (mainly tractor). Livestock noise. Some road traffic. Aircraft. Birdsong.
	30/06/2021 12:35	58	80	34	
	30/06/2021 13:36	46	73	33	
	Arithmetic Average of $L_{AF90}$ (dB)			<b>33</b>	
Evening	24/08/2021 20:34	61	88	32	Distant quad bikes, Some continuous engine noise or similar from adjacent farm, Livestock noise. Dog barking. Some road traffic.
Night-time	24/08/2021 23:31	25	50	21	Low services noise from house. Some road traffic. Livestock noise. Occasional trickle of water at water trough for livestock
	25/08/2021 00:22	27	51	20	
	Arithmetic Average of $L_{AF90}$ (dB)			<b>21</b>	



The results of the noise surveys undertaken have been used to represent the Do-Nothing effect. It is noted that when these noise surveys were undertaken there were no local COVID 19 restrictions in place. The main day time noise source was from the nearby quarry.

### Meteorological Conditions

The weather conditions during the daytime noise survey on the 30<sup>th</sup> July 2021 was overcast. Temperatures ranged from 8 – 12 °C. The average wind speed ranged from 0.5 – 1.1 m/s, gusting up to 3.1m/s. The wind was from a west/north westerly direction during the daytime.

The weather conditions during the night-time noise survey on the 24<sup>th</sup> to 25<sup>th</sup> August 2021 was dry with a light breeze and partially overcast. Temperatures ranged from 12 – 19 °C. The average wind speed ranged from 0.3 to 1 m/s, gusting up to 2.3 m/s. The wind was from a northerly direction.

The meteorological conditions experienced during the noise survey is deemed to be within thresholds outlined in the EPA NG4 document.

## **12.7 Potential Impacts**

### 12.7.1 Construction Phase Impacts

Construction noise levels have been predicted at the nearest noise sensitive locations to the proposed site using data from *BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise*. This standard sets out sound power levels and  $L_{Aeq}$  noise levels for plant items normally employed on construction sites, which enables construction noise from the works to be predicted.

For this assessment it has been assumed that for each of the main activities, all plant will operate simultaneously. For each item of plant, the percentage on time has been assumed, depending on the construction activity. A flat ground surface has been assumed. The agricultural land between the site and nearest noise sensitive location is acoustically soft ( $G=1$ ). A conservative ground cover of  $G=0.75$  has been assumed in the construction model. The proposed development site and adjacent quarry have been assumed to be hard ground ( $G=0$ ).

Construction noise has been assessed against the BS5228-1:2009+2014 noise criteria outlined in section 12.5.1. Predicted noise levels were corrected for façade effect, by adding 3dB, as detailed in the standard.

The proposed construction hours are 07:30 to 18:30 Monday to Saturday. If it is proposed to work outside these hours, then approval will be requested from Offaly County Council . The construction phase is expected to last approximately 12 months.

A full description of the proposed construction works to be undertaken as part of the proposed development is provide in Chapter 4 Existing and Proposed Development of this EIAR.



The main construction activities that have been considered are:

1. Site Preparation, Clearance and Demolition works (one month duration);
2. Site excavation, concrete laying and substructure works (5-month duration);
3. General activities including installation of buildings, mechanical, electrical plant, including solar panels (6-month duration).

The traffic chapter gives a maximum number of 25 HGV's for delivery of materials to the site, with an average of 15 per day. These will be accessed via the private road to the adjacent R400. For this assessment, a maximum of 50 (or 25 2-way) HGV trips per day has been assumed during the construction period. All concrete and stone for construction will be sourced from the adjacent Kilmurray quarry and all inert demolition material from the site will be returned to the Kilmurray site. For the purpose of this assessment it has been assumed that there will be a maximum of 10 deliveries (or 20 two-way trips) per day to the adjacent Kilmurray site.

Table 12.12 provides a breakdown of the main construction activities associated with the construction phase of the proposed development, in line with the construction methodologies defined in Chapter 4.

The predicted noise from the construction activities associated with the site preparation, clearance and demolition works, site excavation, concrete laying and substructure works, and the general site activities are presented in Table 12.12. Noise from construction activities were assessed at the closest noise sensitive location. There are four residential locations within 1km of the main site. R1 and R2 are south west of the site and R3 and R4 are south of the site. Location R4 is the closest residential location to the site at approximately 755 m from the site boundary. Assuming all construction activities required for the site preparation, clearance and demolition works occur simultaneously, the predicted noise level at R4 is 54.7 dB  $L_{Aeq,1hr}$  which is below the 65dB  $L_{Aeq,1hr}$  noise limit. For activities associated with the preparation of the hardstanding ground and foundations, with all works operating simultaneously the noise from construction activities is predicted to be 45.3 dB  $L_{Aeq,1hr}$ . and so within the 65dB  $L_{Aeq,1hr}$  noise limit. For general site activities the predicted noise is 45.3 dB  $L_{Aeq,1hr}$  which is less than the 65dB  $L_{Aeq,1hr}$  noise limit.

If all of the construction activities within Table 12.12 were to occur simultaneously the total cumulative noise is predicted to be 55.6 dB at the nearest noise sensitive location and again within the 65dB  $L_{Aeq,1hr}$  noise limit. Construction activities associated with the development are expected to have a **slight impact** and be **temporary** in duration.



**Table 12.12: Construction Phase Assumed Plant**

Phase	Plant	BS5228 Ref	Activity	% Percentage on time %	Predicted Noise Level at R4
Site Preparation, Clearance and Demolition	Tracked excavator (22t)	C2.3	Clearing Site	80	38.5
	Tracked Excavator (25t)	C2.19 §	Ground excavation/earthworks	50	36
	Tracked Excavator (21t)	C.10.8 §	Loading soil	50	38.7
	Articulated Dump Truck *	C2.33	Delivery and removal of material from Quarry	10 two-way trips per day	30.2
	Articulated Dump Truck (23t)	C2.32	Tipping Fill	80	34.5
	Dozer (14t)	C2.12	Ground excavation/earthworks	80	41.2
	Crane	C4.39	Mobile Crane	80	37.3
	Hand-held hydraulic breaker	C1.7	Breaking up concrete	80	53.8
	Generator	C4.84	Power for site cabins	100%	35.2
	Lorry*	C11.9	Delivery/Removal of material off site	25 two-way trips per day	38.9
<b>Cumulative Noise</b>					<b>54.7</b>
Site excavation, concrete laying, substructure works,	Articulated Dump Truck *	C2.33	Material delivery/removal to adjacent quarry	10 trips per day	32.1
	Lorry *	C11.9	Material delivery off site	25 trips per day	38.3
	Tracked Excavator (25t)	C2.19	Ground excavation/earthworks	80	38
	Dump Truck (29t)	C2.32	Tipping Fill	80	34.5
	Dozer (14t)	C5.12	Spreading chipping/fill	80	37.2
	Vibratory roller	C5.27	Rolling and Compaction	80	27.2



Phase	Plant	BS5228 Ref	Activity	% Percentage on time %	Predicted Noise Level at R4
	Concrete mixer truck + truck mounted concrete pump + boom arm	C4.32	Pumping Concrete	80	38.4
	Generator	C4.84	Power for site cabins	100%	35.2
<b>Cumulative Noise</b>					<b>45.3</b>
General activities including installation of mechanical/electrical plant/including solar panels	Mobile telescopic crane (80t)	C4.39	Lifting Plant/Material	80	37.2
	Telescopic Handler	C4.54	Lifting Plant/Material	80	39.1
	Lorry *	C11.9	Delivery of material off site	25 vehs per day	38.3
	Angles grinder (grinding steel)	C4.93	Grinding Steel	80	41.2
	Lifting Platform (x2)	C4.57	Lifting personnel	80	27.7
	Generator	C4.84	Power for site cabins	100%	3
<b>Cumulative Noise</b>					<b>45.3</b>

### 12.7.2 Operational Phase Impacts

The main activities during the operation of the proposed development are waste acceptance, processing, storage and onward transfer. A detailed description of these activities is provided in Chapter 4 Existing and Proposed Development of this EIA. This assessment considered the facility operating at its maximum capacity (i.e. Phase 2 operations).

A summary of the main activities during Phase 2 of the proposed development are shown below:

- The acceptance, bulk loading and onward transfer of DMR;
- The acceptance, shredding and onward transfer of timber waste;
- The acceptance, processing and onward transfer of C&D / C&I skip wastes;
- The acceptance, processing / pre-treatment, and onward transfer of MSW.

The proposed hours of waste acceptance is between 0500 to 0000, with waste processing occurring between 0700-2200. The operational noise limits for these time periods and the operational activities that have been assumed are presented in Table 12.13.





**Table 12.13: Guidance Noise NG4 Recommended Noise Emission Limits**

Period	Noise Limit at Noise Sensitive Location	Operational Phase
Daytime (07:00 to 19:00 Hrs)	55 dB(A) $L_{Ar,T}$	Waste Acceptance and Processing (07:00 to 19:00)
Evening-time (19:00 to 23:00 Hrs)	50 dB(A) $L_{Ar,T}$	Waste Acceptance and Processing (19:00 to 22:00)
Night-time (23:00 to 07:00 Hrs)	45 dB(A) $L_{Aeq,T}$	Waste Acceptance (05:00 to 07:00, 22:00 to 23:00)

The main noise generating activities that have been assumed as part of the noise assessment for the different operational phases are listed below, with more details of plant detailed within Tables 12.14 and 12.15.

Waste processing and consignment activities:

- C&D and C&I Process line, including small and large trommels, wind shifter, front end loader and tracked excavator.
- MSW Process line, including a shredder and waste screen;
- Timber Processing (Doppstadt Shredder);
- Up to 154 HGV vehicle movement per day for waste acceptance and delivery of processed materials or 7 one-way trips per hour.



Noise from moving vehicles and mobile and stationary plant have been predicted according to the International Standard ISO 9313-2: 1996 *Acoustics - Attenuation of sound during propagation outdoors - Part 2: General Method of calculation* and using Brüel & Kjær Predictor software.

This noise propagation model allows for octave band calculation of noise from multiple sources, including screening and reflection around buildings, terrain and ground effects. This allows all significant noise sources and propagation effects to be accounted for in the model.

For the purpose off the assessment the ground was assumed to be flat. Both the MRF building, and the Administration building were included in the model. For the MRF building the minimum sound insulation performance of the building envelope and roller shutter doors is shown in Table 12.16. The ground factor ranges from 0 for hard reflective surfaces to 1 for soft, porous surfaces. The proposed site was modelled as a hard surface, in addition to the adjacent Kilmurray Quarry. Other surfaces can be described as porous surfaces and would have a ground factor closer to 1. However, a conservative ground factor of 0.75 was used to model the porous surfaces. Atmospheric conditions of 10 °C and 70 % humidity were used as they represent a reasonably low level of air absorption. Receptor heights of 1.5 m and 4 m were modelled, assuming two-storey dwellings.

For the C&D / C&I and MSW process lines, these were assumed to be within the MRF building. Table 12-14 provides the details of the assumed plant, hours of operation, and source of the noise data. Noise data was either from BS5228, Manufacturers data or appropriate sound power data from an in-house database. Table 12-15 provides details of the sound power assumed for the different items of plant.



In terms of the operational assumptions, the following were assumed:

- During all periods a maximum of 154 vehicle movements have been assumed per day or 7 No. per hour (in line with predicted development traffic figures contained in Chapter 13 – Traffic and Transportation).
- Daytime: All MSW and C&D/C&I plant operational during the daytime. West facing doors to MRF building closed during the daytime. Outdoor loaders operate for 80% of the time, outdoor excavator operating 100% of the time. Timber shredder assumed to operate 100% of the time.
- Evening: All doors to MRF building closed when C&D/C&I and MSW line equipment is operating. The timber shredder operates 5% of the time during the evening in shredding mode (and 95% time idling).
- Night time assumes only waste acceptance operations. Includes vehicle idling on weighbridge and all unloading activities are being conducted internally in the waste process building with roller shutter doors closed.

Table 12.14: Noise Sources - Details

Noise Source	Number	Hours of Operation	Location	Source of Data
<b>Waste Acceptance</b>				
Waste Vehicle – Travel to and from facility*	8 per hour (maximum during daytime/evening) 4 per hour (maximum during night time)	05:00 to 00:00	Inside and outside MRF building	BS 5228-1 C8.21
Waste Vehicle / other Vehicles – Idling	8 per hour (maximum during daytime/evening) 4 per hour (maximum during night time)	05:00 to 00:00	Weighbridge	BS 5228-1 C4.19 <sup>Ω</sup>
Waste Vehicle– Tipping Fill	8 per hour (maximum during daytime/evening) 4 per hour (maximum during night time)	05:00 to 00:00	Within MRF building	BS 5228-1 C2.30
Front end loader	1	07:00-22:00	Within and outside MRF building	BS5228 C10.3
<b>C&amp;D/C&amp;I Process Line</b>				
Small Trommel	1	07:00-22:00	MRF Building	Based on measurements of similar equipment at an existing site
Front end loader	1	07:00-22:00	Within and outside MRF Building	BS5228 C10.3
Wind shifter	1	07:00-22:00	MRF Building	Based on measurements of



Noise Source	Number	Hours of Operation	Location	Source of Data
				similar equipment at an existing site
Tracked excavator	1	07:00-22:00	Within and outside MRF Building	BS5228 C10.8
Large trommel	1	07:00-22:00	C&D/C&I Process Line	Based on measurements of similar equipment at an existing site
<b>MSW Process Line</b>				
Shredder/bag opener	1	07:00-22:00	MSW Process Line	In-house database
Waste Screen	1	07:00-22:00	MSW Process Line	In-house database
<b>Timber Process Line</b>				
Dopstadt Timber Shredder	1	07:00-22:00	Main yard	Based on measurements of similar equipment at an existing site

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**Table 12-15: Noise Sources – Sound Power Level -  $L_{WA}$ , dB(A)**

Equipment	A-weighted Octave Band Centre Frequency (Hz)								Overall $L_{WA}$
	63	125	250	500	1k	2k	4k	8k	
Waste Acceptance									
Waste Vehicle– Travel to and from facility*	83.8	95.9	97.4	99.8	99	99.2	94	85.9	105.8
Waste Vehicle / Other Vehicles – Idling	78.8	82.9	84.4	89.8	94	95.2	89	77.9	99.1
Waste vehicle– Tipping Fill	86.8	85.9	97.4	97.8	101	103.2	96	89.9	107.1
Front end loader	86.8	94.9	95.4	100.8	103	101.2	101	87.9	108.2
C&D/C&I Process Line									
Small Trommel**	91.7	99.8	104.3	109.7	107.9	109.1	105.9	96.8	115.0
Front end loader	89.8	95.9	100.4	108.8	104.0	99.2	97.0	87.9	111.2
Wind shifter¥	-	-	-	-	-	-	-	-	106.9
Tracked excavator	86.8	94.9	95.4	100.8	103	101.2	101	87.9	108.2
Large trommel**	99.4	107.5	112	117.4	115.6	116.8	113.6	104.5	122.7
MSW Process line									
Shredder/bag opener¥	-	-	102	-	-	-	-	-	102
Waste Screen	85.8	93.9	98.4	103.8	102	103.2	100	90.9	109.1
Wheeled Excavator	65.8	71.9	82.4	88.8	90	86.2	80	71.9	94.0
Timber Process Line									
Doppstadt Timber Shredder (shredding)	94	98	103	115	114	111	104	94	118.7
Doppstadt Timber Shredder (idling)	76	80	85	97	96	93	86	76	100.7
* - Drive-by maximum sound pressure level/ sound power level ¥ - No octave band data available **Trommels no octave band information available. Data based on octave band data from BS5228 C10.15									



**Table 12.16: Minimum sound insulation performance of building elements**

Building element	Minimum Sound insulation Performance							
	Frequency (Hz)							
	63	125	250	500	1k	2k	4k	8k
Main building envelope (as for 3mm steel)	14	19	24	30	36	40	40	40
Roller shutter door	6	12	15	17	20	21	21	20

The predicted noise levels at the four dwellings within 1km of the proposed site are presented in Tables 12.17 - 12.19 for the day, evening and night-time periods. Locations R1 and R2 (known as N2 during baseline monitoring) are the properties south west of the proposed site. R3 (known as N1 during baseline monitoring) and R4 are the properties to south of the site. The predicted noise levels are significantly below the daytime, evening and night time noise limits defined in the EPA's NG4 guidelines for all properties.

**Table 12.17: Predicted Operational Noise Levels Daytime**

Receptor ID	Predicted $L_{Aeq}$ , Noise Levels during Daytime Periods	
	Ground Floor	First Floor
R1	51.3	52.1
R2	49.5	50.4
R3	49.6	50.7
R4	49.6	50.7

**Table 12.18: Predicted Operational Noise Levels Evening**

Receptor ID	Predicted $L_{Aeq}$ , Noise Levels during Evening Periods	
	Ground Floor	First Floor
R1	47.3	48.4
R2	45.7	46.8
R3	47.2	48.3
R4	47.3	48.3

**Table 12.19: Predicted Operational Noise Levels Night time**

Receptor ID	Predicted $L_{Aeq}$ , Noise Levels during night-time Periods	
	Ground Floor	First Floor
R1	37.2	40.1
R2	35.2	35.9
R3	38.6	39.3
R4	38.4	39.1



During daytime period, quarry noise at the nearby quarry was the main noise source, with some road traffic noise from the private access road leading to the site and the M6, and noise from agricultural activities in the surrounding area. Predicted noise will increase noise levels experienced during the day-time at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed day-time noise limit value at NSL's of 55 dB LAeq.

During the evening period, noise was affected by road traffic noise, and noise from a nearby quad bike area. Predicted noise will increase noise levels experienced during the evening at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed evening noise limit value at NSL's of 50 dB LAeq.

During the night period, the measured noise levels were very low, with the only significant noise being from more distant road traffic. Predicted noise will increase noise levels experienced during night-time at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed night-time noise limit value at NSL's of 45 dB LAeq.

### 12.7.3 Noise Impact due to off-site traffic

#### Do Minimum Effect

The proposed facility will accept waste between the hours of 05:00 to 00:00 Monday to Saturday. Waste processing will occur between 07:00 and 22:00 Monday to Saturday. The predicted change in noise from road traffic was modelled using Calculation of Road Traffic Noise (CRTN), Department of Transport Welsh Office, HMSO 1988. Chapter 13 presents the Average Annual Daily Traffic (AADT) and percentage of heavy goods vehicles (%HGV) on the R401, R402 and R442 regional road with (Do-Something) and without (Do-Nothing) the proposed development for the year of opening and the design year of operation.

Table 12.20 presents the difference in off-site traffic noise level between the year of opening and the design year if the development did not go ahead. Without the development, there is a negligible increase in noise level along all sections of road except for along the R400 to the north of M6 where there is a minor decrease in noise level.

#### Do Something Effect

With the proposed operation of the materials recovery facility, there will be an increase in the number of vehicles on the adjacent roads.

Table 12.20 presents the predicted short term and long-term change in noise level on adjacent roads because of increased road traffic from the proposed development. In the short term, at most locations, there is a short-term **imperceptible impact**. At locations along the R400, south of Rhode, and by the M6 eastbound off slip there is a short-term minor impact. In the long term there is an **imperceptible impact** at all properties along all adjacent roads.



**Table 12.20: Change in noise level as a result of traffic increases from the proposed development**

Road		Short Term Do Min Opening Year vs Do Something Opening Year	Long Term Do Min Opening Year vs Do Something Future Year	Non-Project noise change Do Min Future Year vs Do Minimum Opening Year
Road Link	Section			
R441	East of Rhode	0.8	1.6	2.4
R400	South of Rhode	1.1	1.9	0.7
	North of Rhode	0.3	1.0	0.8
	South of L10091	0.2	0.8	0.6
	North of L10091	0.8	1.3	0.7
	North of M6	-0.9	-0.1	-0.1
	North of Rochfortbridge	0.0	0.8	0.8
R446	West of Rochfortbridge	0.0	0.7	1.0
	Rochfortbridge	0.0	0.8	0.8
	East of Rochfortbridge	0.0	0.8	0.8
M6 Junction 3	Eastbound On-slip	0.4	1.5	1.2
	Westbound Off-slip	0.3	1.3	1.0
	Westbound On-slip	1.0	1.8	0.9
	Eastbound Off-slip	1.2	1.8	0.9

### 12.8 Decommissioning Phase

Assuming somewhat of a worse-case scenario, noise generated from activities associated with decommissioning of the proposed facility are expected to have the same impact as construction phase activities (I.e. a **slight impact** which is **temporary** in duration). Decommissioning of the site would most likely involve activities which are of a much lesser scale and magnitude than construction phase activities, however. No demolition activities are proposed during decommissioning of the site.



## 12.9 Cumulative Effects

### Kilmurray Quarry and Skeagh Farms Piggery

Noise emanating from existing Kilmurray Quarry and Skeagh Farms Piggery operations in the vicinity of the site has been considered when carrying out baseline monitoring as part of this assessment. This 'baseline' noise was considered in-combination with predicted noise from the proposed development when evaluating noise impacts associated with the proposed development.

### Yellow River Wind Farm

The cumulative noise from an adjacent proposed Yellow River Windfarm and the proposed development site have been assessed. The windfarm comprises 29 No. turbines and was granted permission in 2014. The site is due to be operational in 2023, with construction commencing in late 2022.

The predicted noise from the Yellow River Windfarm has been summarised from the "Baseline Noise Survey and Amended Impact Statement, Yellow River Wind Farm Co. Offaly, Brendan O Reilly, March 2014." This assessment was furnished alongside with the planning application for this project (Planning File Reference: An Bord Pleanála Planning File Reference: PA0032).

One noise sensitive location has been assessed, House ID 205, as identified in the Windfarm EIA. This location is approximately 480m north west of the junction between the private road from the site and the R400. The predicted noise from the windfarm is normally calculated as an  $L_{A90}$  (background noise) term. Therefore, 2 dB has been added to this, to convert this to  $L_{Aeq}$ , so it can be added to the predicted noise from the proposed development site. The background noise at a location near to this location H87, as identified in the Windfarm EIA, has been used as this provides noise for different windspeeds. No correction has been made to convert the  $L_{A90}$  to the  $L_{Aeq}$ .

**Table 12.21: Cumulative Daytime noise, including prevailing background, Yellow River Windfarm noise and proposed development noise at Receptor 205**

Noise Source	Windspeeds			
	4 m/s	5 m/s	6 m/s	7 m/s
Noise from Proposed Development Site	37.5	37.5	37.5	37.5
Existing noise	33.6	34.5	36	38.1
Yellow River wind farm noise	33.7	36.7	39.7	40.3
<b>Total</b>	<b>40.1</b>	<b>41.2</b>	<b>42.8</b>	<b>43.6</b>



**Table 12.22: Cumulative Evening noise, including prevailing background, Yellow River Windfarm noise and proposed development noise at Receptor 205**

Noise Source	Windspeeds			
	4 m/s	5 m/s	6 m/s	7 m/s
Noise from Proposed Development Site	36.7	36.7	36.7	36.7
Existing noise	33.6	34.5	36	38.1
Yellow River wind farm noise	33.7	36.7	39.7	40.3
<b>Total</b>	<b>39.7</b>	<b>40.9</b>	<b>42.6</b>	<b>43.4</b>

**Table 12.23: Cumulative Night time noise, including prevailing background, Yellow River Windfarm noise and proposed development noise at Receptor 205**

Noise Source	Windspeeds			
	4 m/s	5 m/s	6 m/s	7 m/s
Noise from Proposed Development Site	33	33	33	33
Existing noise (including quarry)	23.9	25.6	28.3	32
Yellow River wind farm noise	33.7	36.7	39.7	40.3
<b>Total</b>	<b>36.6</b>	<b>38.5</b>	<b>40.8</b>	<b>41.6</b>

The cumulative effect of proposed development noise in combination with wind farm noise is predicted to be slight during day, evening and night-time given that cumulative noise levels will be significantly below EPA day, evening and night-time noise limits at the NSL considered – Receptor 205.



## 12.10 Mitigation Measures

### 12.10.1 Construction Phase Mitigation

The noise impact for construction works traffic will be mitigated by restricting movements along access routes to the standard working hours and exclude Sundays, unless specifically agreed otherwise.

The construction works on-site will be carried out in accordance with the guidance set out in BS 5228:2009+A1:2014, and the noise control measures set out in Appendix 4.2 Construction Environmental Management Plan (CEMP) in Volume 3 of this EIAR.

Construction contractors will be required to comply with the requirements of the Directive 2000/14/EC of the European Parliament and of the Council that relates to the noise emission in the environment by equipment for use outdoors, the Safety, Health and Welfare at Work (Control of Noise at Work) Regulations, 2007, Chapter 1 of Part 5: Control of Noise at Work, and BS 5228-1&2:2009+A1:2014 (Code of practice for noise and vibration control on construction and open sites).

The hours of construction activity will be limited to avoid unsociable hours. Construction operations shall be restricted to between 07:30 hours and 18:30 hours Monday to Saturday, unless specifically agreed otherwise.

Mitigation measures shall be implemented to reduce impacts related to construction noise and vibration. BS 5228-1:2009+A1:2014 provides a detailed list of mitigation measures to minimise the noise impact from construction activities and these recommendations will be implemented. It is recommended that construction activities shall be carried out during normal working hours. A site representative responsible for matters relating to noise should be appointed.

There are many general measures that will be taken to reduce noise levels:

- Avoid unnecessary revving of engines and switch off equipment when not required;
- A speed restriction of 20 km/hr will be applied on-site.
- Training of site staff in the proper use and maintenance of tools and equipment.
- Machines that could be in intermittent use will be shut down between work periods or will be throttled down to a minimum.
- Plant known to emit noise strongly in one direction will, when possible, be orientated so that the noise is directed away from noise-sensitive locations e.
- Select equipment conforming to international standards on noise and vibration;
- Select equipment with quiet and low vibration emissions, and ensure equipment is regularly maintained ensuring it operates in an efficient manner. If possible, all mechanical plant will be fitted with effective exhaust silencers;
- Compressors will be of the “sound reduced” models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers; and
- Drop heights for materials such as gravels will be minimised.
- Locate equipment as far away as noise sensitive receivers as possible within constraints of the site.



### 12.10.2 Operational Phase Mitigation

Operational noise will be limited by the following mitigation measures:

- MSW and C&D/C&I processing activities will be carried out indoors, to attenuate noise associated with these operations.
- All fast-acting roller doors will be closed for the vast majority of the time during MSW and C&D/C&I Process Line operations (except when mobile plant needs to move between site area intermittently).
- Timber shredding operations will be limited to the daytime only.
- The timber shredder will operate in an enclosed location surrounded by a push wall on one side and interlocking blocks on two sides, to attenuate noise associated with its operation.
- During night-time, unloading activities will only be carried out internally with all fast-acting roller doors closed.
- Chutes and hoppers associated with process plant will be lined with a damping layer (rubber lining) to minimize noise output from plant.
- Drop heights will be kept to a minimum to minimize noise arising due to material handling.
- Plant and equipment will be serviced and maintained regularly and in line with manufacturer specifications (e.g. lubrication of equipment, fixing loose parts, proper balancing), so as to minimize excess mechanical type noise.
- The unnecessary revving of engines and the idling of mobile plant and HGV's will be avoided. Engines will be switched off if not moving, in particular at night time.
- Regular noise monitoring will be carried out at NSL's in accordance with the terms of the prospective WFP and subsequent IE licence, to ensure noise levels associated with the facility do not result in a breach of EPA noise limits at NSL's.

### 12.11 Residual Impacts

#### Residual Construction Phase Impacts

Construction phase activities are predicted a **temporary, slight, adverse impact** on the surrounding noise environment. Construction phase activities will not exceed relevant Construction Noise limits and will not have any significant adverse impact on the receiving noise environment.

#### Residual Operational Phase Impacts

The predicted operational phase daytime, evening and night-time noise levels all fall below noise limits for licensed activities prescribed by the EPA in their Noise Guidance document NG4.

Predicted noise will increase noise levels experienced during the day-time at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed day-time noise limit value at NSL's of 55 dB  $L_{Aeq}$ .



Predicted noise will increase noise levels experienced during the evening at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed evening noise limit value at NSL's of 50 dB  $L_{Aeq}$ .

Predicted noise will increase noise levels experienced during night-time at NSL's, however the impact of this increase in noise levels will be **Slight** given that the specific noise from the site experienced at NSL's is predicted to be significantly below the EPA prescribed night-time noise limit value at NSL's of 45 dB  $L_{Aeq}$ .

#### Residual Decommissioning Phase Impacts

Decommissioning phase activities are predicted to have a **temporary, slight, adverse impact** on the surrounding noise environment. These activities will not have a significant adverse impact on the receiving noise environment.

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