

12 NOISE AND VIBRATION

12.1 Introduction

This chapter assesses the likely potential significant effects of noise and vibration associated with reference to key sensitive receptors in proximity to the proposed development. The impacts and mitigation measured for any significant impacts are identified. This chapter should be read in conjunction with the site layout plans and characteristics of the project (**Chapter 5**).

12.2 Methodology

12.2.1 Guidelines

This assessment was prepared having regard for the following guidance:

- Guidelines on the Information to be Contained in Environmental Impact Assessment Reports (EPA, Draft, August 2017);
- Advice Notes for Preparing Environmental Impact Statements (EPA, Draft September 2015);
- Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes (TII, 2014); and
- EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4, January 2016).

12.2.2 Scope of Assessment

This assessment has been undertaken in line with best practice assessment procedures for environmental noise impact. A desk top study was undertaken to review the existing site layout, Google Earth™ imagery and OSI mapping of the surrounding environment to determine the context of the proposal under consideration and the surrounding environment in which it is located. The desk top study identified the main scope of the baseline noise climate and the location of the closest noise sensitive locations to the proposed operations for the impact assessment. A review of annual noise monitoring results surveyed in accordance with the current EPA Waste Licence, was also undertaken.

12.2.3 Information

The following information sources have also been consulted in relation to the assessment of noise and vibration:

- BS 5228-1:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites: Part 1 Noise;
- BS 5228-1:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites: Part 2 Vibration;
- BS6472-1:2008 Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting;
- BS6472-2:2008 Guide to evaluation of human exposure to vibration in buildings. Blast-induced vibration;
- BS7385-2 1993: Evaluation and measurement for vibration in buildings. Guide to damage levels from ground borne vibration;
- Impacts relating to traffic noise were assessed with reference to the UK Department of Transport's Calculation of Road Traffic Noise (CRTN) (1988) document;
- ISO1996-1_2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedure, and;
- British Standard BS 7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.

12.2.4 Assessment Criteria

12.2.4.1 Noise Criteria

The level of environmental noise generated during the construction phase of any development is determined primarily by the exact construction methods employed. The significance of the noise impact of such methods will arise from the specific sound power levels generated by the plant and machinery used, the duration of each particular construction activity, as well as the time and location in which the equipment is used. For the proposed development, the operational phase impacts will be similar in nature to construction impact as the principle sources will be mobile plant and material handling. As such, construction and operation noise are addressed as a single phase.

The potential sources of environmental noise during the construction/operation phase of the proposed development will primarily arise from traffic on the surrounding road network and on-site works where heavy plant and earth moving machinery may be required.

There is no published statutory Irish guidance relating to the maximum permissible noise level that may be generated during the construction phase of a project. Local authorities normally control construction activities by imposing limits on the hours of operation and consider noise limits at their discretion.

However, as the existing facility is currently operated under, and will be required to operate in accordance with, an EPA licence, and the construction works will be undertaken within the licence boundary, the typical EPA noise limits will apply during both construction and operation. Schedule B.4 of the current Waste Licence sets out limit values for ambient noise applicable to the site at the nearest noise sensitive locations and these are shown in **Table 12-1**.

Table 12-1 Noise Emission Limits under Schedule B.4, Licence W0129-02

Daytime dB(A) L_{Aeq} (30 minutes)	Night-time dB(A) L_{Aeq} (30 minutes)
55 <small>Note 1</small>	45 <small>Note 1</small>

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.

Under the revised IE Licence a similar set of noise limits will be applied to the site in addition to a third limit for evening time and these are likely to be updated to the following in line with the NG4 Guidance:

- Daytime (07:00 to 19:00hrs) – 55dB $L_{Ar,T}$;
- Evening (19:00 to 23:00hrs) – 50dB $L_{Ar,T}$; and
- Night-time (23:00 to 07:00hrs) – 45dB $L_{Aeq,T}$.

It should be noted that night time limits are typically presented as standard in a licence even in the case of, like the proposed development, no operations will be undertaken during night time hours.

The World Health Organisation also propose guideline values for the prevention of moderate and serious annoyance in outdoor areas as 50dB L_{Aeq} (16 hour) and 55dB L_{Aeq} (16 hour) respectively although a more appropriate criteria for assessing disturbance or annoyance from noise arising from the site would be related to the significance of changes in noise levels as perceptible to human beings.

The information presented in **Table 12-2** is taken from the ‘Guidelines for Noise Impact Assessment’ produced by the Institute of Environmental Management and Assessment (IEMA). This document replaces the draft guidelines published by the Institute of Acoustics (IOA) and IEMA in April 2002 and shows an appropriate impact rating procedure for noise levels attributable to certain operations based on perception of loudness.

It should be noted that the subjective description outlined in **Table 12-2** applies to relatively continuous noise only. RPS would therefore deem the outlined changes as suitable criteria for assessing noise arising from the subject site, from both onsite and road traffic related noise impacts.

Table 12-2 Likely impact associated with a change in noise level

Change in Noise Level	Subjective Reaction	Impact Guidelines for Noise Impact Assessment Significance	Impact Guidelines on the Information to be contained in EIAR (EPA)
0 dB	No change	None	Imperceptible
0.1 to 2.9 dB	Barely perceptible	Minor	Slight
3.0 to 4.9 dB	Noticeable	Moderate	Moderate
5.0 to 9.9 dB	Up to a doubling or halving of loudness	Substantial	Significant
10 dB or more	More than a doubling or halving of loudness	Major	Profound

12.2.5 Vibration Criteria

Under the site’s current Waste Licence, W0129-02, there are no limits relating to vibration as there are no major sources of vibration existing on the subject site and it is not proposed to introduce vibration sources into the facility during either construction (through blasting or piling) or during operation.

There are generally accepted criteria for vibration levels that would be likely to lead to complaints, and vibration levels that would be likely to lead to structural damage. These levels are outlined in the guidance documents BS6472: 1992 Guide to Evaluation of human exposure to vibration in buildings (1Hz to 80Hz), and BS7385: Part 2 1990: Evaluation and measurement for vibration in buildings - Guide to damage levels from ground-borne vibration.

In the event that unplanned operations with potential for vibration are undertaken, the practices employed should have regard to best practice as recommended in the following standards and guidance:

- BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting;
- BS 7385-1 (1990) Evaluation and Measurement for Vibration in Buildings - Guide for Measurement of Vibration and evaluation of their effects on buildings;
- BS 7385-2 (1993) Evaluation and Measurement for Vibration in Buildings - Guide to damage levels from Groundborne Vibration; and
- BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

12.3 Baseline Conditions

12.3.1 Receiving Environment

The site of the proposed development is approximately 14km north of Dublin Airport and 3km west of the M1. The site is bounded to the north by the Ballough Stream, the remaining boundaries are made up of agricultural land employed for a mixture of pasture and tillage uses.

There are various sensitive receptors (houses, commercial operations) located in the area and these receptors vary in distance from the proposed development. The nearest sensitive residential receptors to the proposed development are the residential dwellings on the LP-1080 (south), LP-1090 (west), Tooman Road (east) and Rowans Road (north).

A small number of commercial operations are within the proposed developments vicinity including some waste operators. The nearest commercial receptors include various operations along the LP-1080 and LP-1090.

The road network around the proposed development is predominantly composed of local roads (L-roads) including the LP-1090 to the west and the LP-1080 to the south that connects the R108 to the

R132 and subsequently the M1 motorway that links to Dublin City Centre. The local and regional roads serve HGVs entering and leaving the M1 for the operations in Hollywood including IMS, Cool Cat Plant Services and Patrick Barrett, which may give rise to increased noise levels.

Under the Environmental Noise Regulations 2006 (S.I. 140 of 2006), FCC is the designated Action Planning Authority with responsibility for preparing a Noise Action Plan for road, railway, major industrial and aircraft noise sources within Fingal County. As a consequence the Noise Action Plan for the Agglomeration of Dublin, December 2018 – July 2023 was prepared in December 2018 in conjunction with the other three Dublin authorities.

The site is located outside of the noise impact zone of the rail and airport infrastructure and the road traffic noise mapping is presented in **Figure 12.1** for daytime noise. The mapping illustrates that the site of the proposed development is in an area of less than 55db(A) L_{den} with limited impact to the south and west from the local road network.

12.3.2 Annual Noise Surveys

Noise surveys have been undertaken annually in general accordance with ISO 1996-2:2007 Acoustics -- Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels (2007) and as per the requirements of Schedule 6.12 of the Waste Licence (W0129-02):

The licensee shall carry out a noise survey of the site operations annually. The survey programme shall be undertaken in accordance with the methodology specified in the 'Environmental Noise Survey Guidance Document' as published by the Agency.

The results of these annual surveys from 2015 to 2020 have been reviewed and summarised in **Table 12-3** and **Table 12-4** to provide a baseline for levels typically encountered at the nearest noise sensitive locations. The locations of the noise monitoring locations assessed in these annual surveys are shown in **Figure 12-2**. Note that night time measurements are undertaken under the licence but there are no on site operations undertaken at the site as will be the case for the proposed development.

Table 12-3 Summary of Daytime Annual Noise Survey Results

Location	Daytime $L_{Aeq, 30mins}$					
	2015	2016	2017	2018	2019	2020
N4 Located close to a residential dwelling to the north of the IMS facility.	56	54	56	52	53	67
N5 Located close to a residential dwelling to the west of the IMS facility.	-	60	62	64	67	80
N6 Located along the local road beyond the southern boundary of the IMS facility at a point close to a number of residential dwellings.	55	54	57	55	62	83
N7 Located along the local road beyond the southern boundary of the IMS facility, close to a residential dwelling.	63	62	64	65	69	82
N8 Located along the local road beyond the southern boundary of the IMS facility in the gateway to a dwelling.	63	65	65	65	70	89

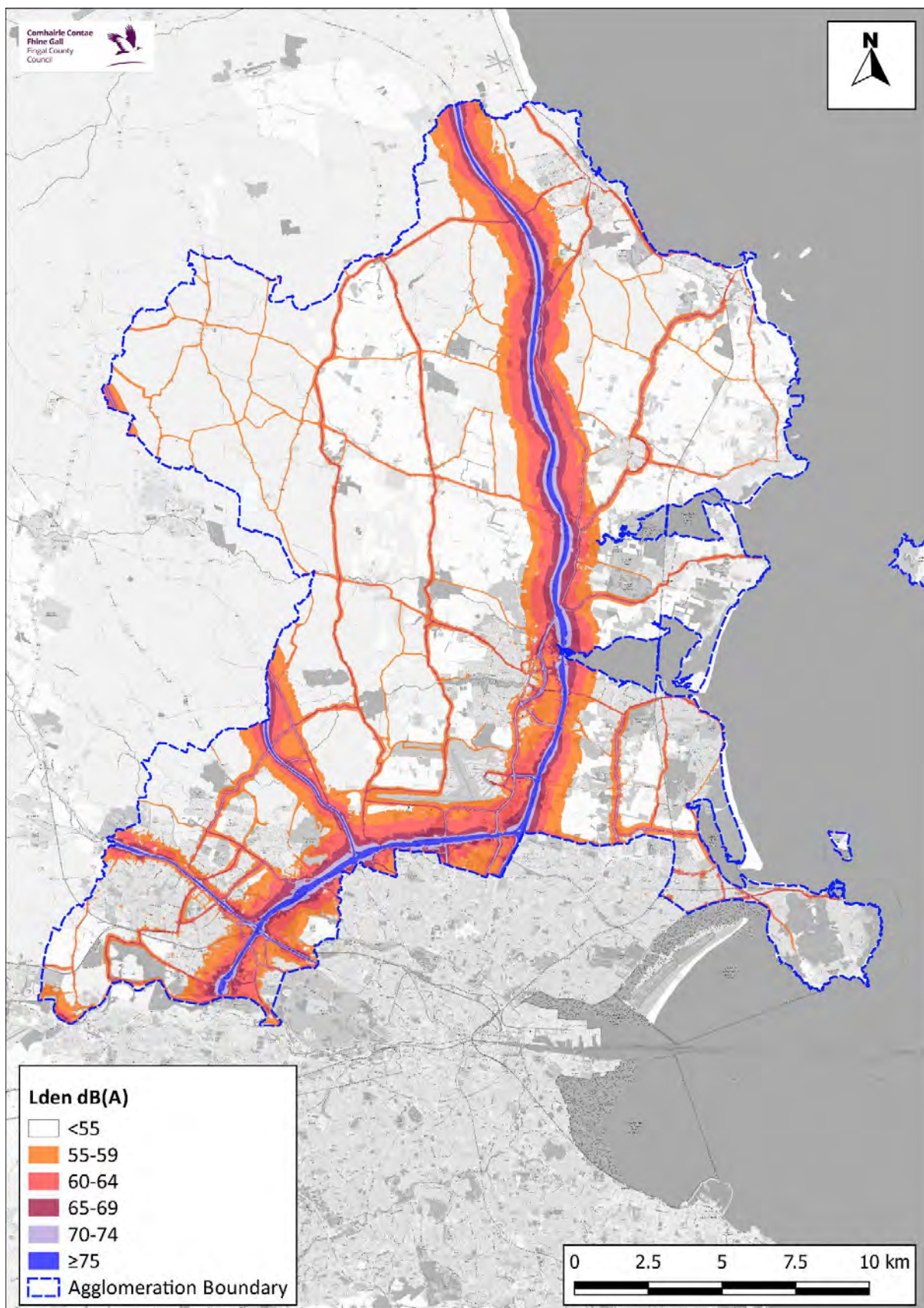


Figure 12-1 2017 Noise Exposure Map – All Roads Lden dB(A) FCC (source: Noise Action Plan for the Agglomeration of Dublin, December 2018 – July 2023)

Table 12-4 Summary of Night-time Annual Noise Survey Results

Location	Daytime L _{Aeq, 30mins}					
	2015	2016	2017	2018	2019	2020
N4 Located close to a residential dwelling to the north of the IMS facility.	33	50	57	43	43	-
N5 Located close to a residential dwelling to the west of the IMS facility.	-	48	49	47	45	-
N6 Located along the local road beyond the southern boundary of the IMS facility at a point close to a number of residential dwellings.	40	46	44	36	36	-
N7 Located along the local road beyond the southern boundary of the IMS facility, close to a residential dwelling.	51	51	55	51	45	-
N8 Located along the local road beyond the southern boundary of the IMS facility in the gateway to a dwelling.	53	54	52	51	42	-

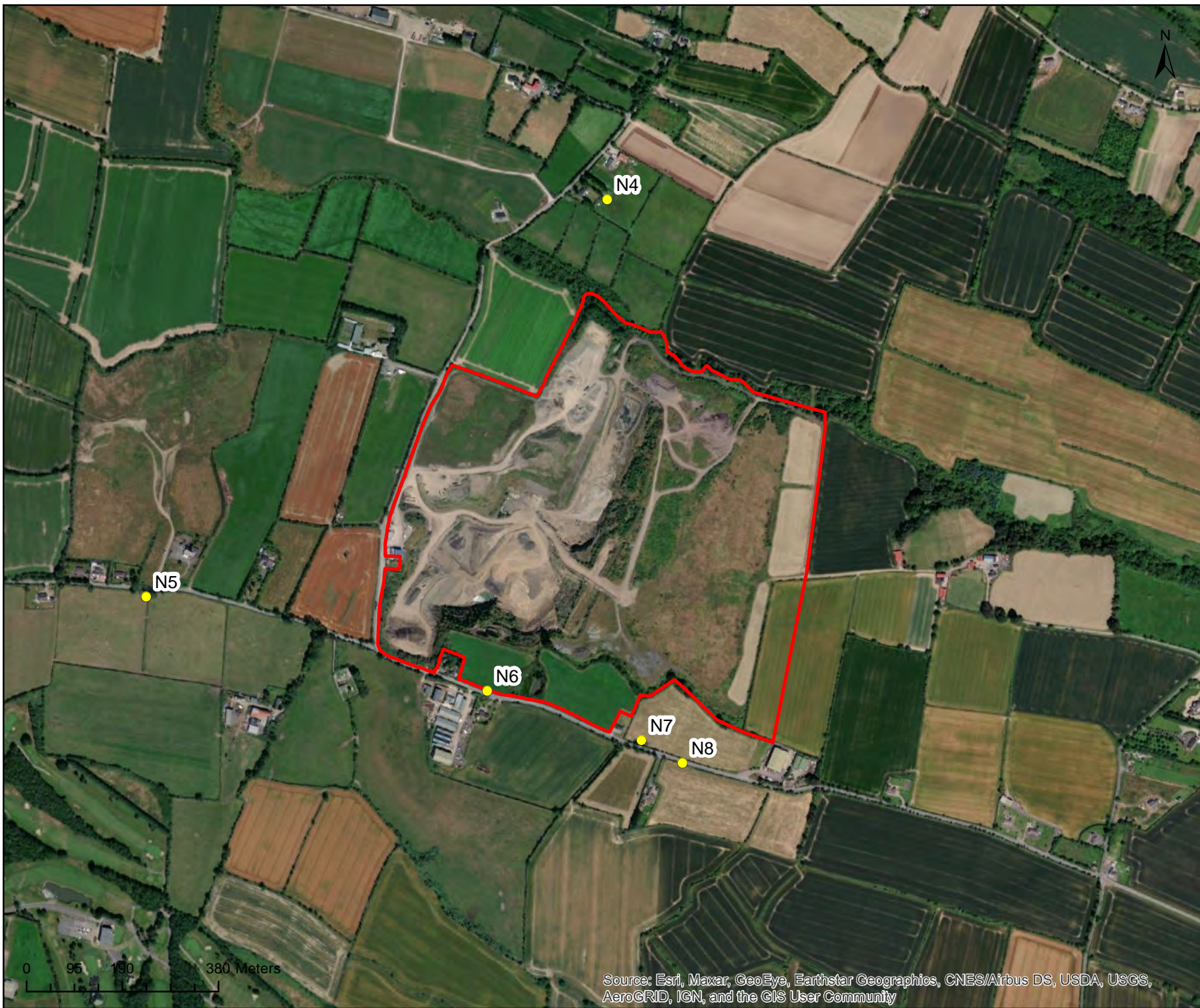
The main sources of noise noted during the annual surveys were from road traffic along the local road network, occasional overhead aircraft noise and rustling foliage. The levels detected at N4, which is more distant from the LP-1080, are lower and more in line with those predicted in the final strategic noise mapping (**Figure 12-1**). The 2020 report indicated that site operations at the IMS facility were not subjectively audible at any of the monitoring locations.

The nearest residential properties to the site are at N6 along the southern boundary. The noise levels at these properties are low and indicate that the site is not currently having a significant noise impact on residential properties in the area.

It should be noted that there are no existing or proposed night time operations at the site. Night time noise monitoring is carried out for compliance purposes only and the noise levels recorded relate to external sources. The typical ranges of noise levels are presented in **Table 12-5** and these may be used to compare against the baseline noise levels measured at the site.

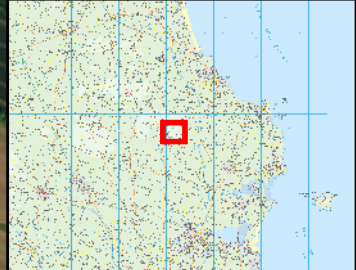
Table 12-5 Typical Noise Levels in the Environment

Sound levels in decibels dB (A)	Description of Activity
0	Absolute silence
25	Very Quiet room
35	Rural night time setting with no wind
55	Day time, busy roadway 0.5km away
70	Busy Restaurant
85	Very busy pub, voice has to be raised to be heard
100	Disco or rock concert
120	Uncomfortably loud, conversation impossible
140	Noise causes pain in ears



Legend

- Noise Monitoring Stations
- Site Boundary



Client
Integrated Materials Solutions (IMS) Limited Partnership

IMS Hollywood 2022 Update

Title

**Figure 12-2:
 Ambient Noise
 Monitoring Locations**

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Issue Details

File Identifier: MDR1492A-RPS-00-XX-DR-Z-AG-0020		
Status: S0	Rev: P01	Model File Identifier:
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Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

12.4 Impact Assessment

The potential noise and vibration impacts of the proposed development have been evaluated for the construction / operational stage to include the following:

- Construction of the new attenuation pond and leachate handling areas (to run concurrent with the operation stage);
- Operation stage importation and deposition of waste materials and circular processing of materials; and
- Restoration stage which comprises the agricultural use of the site following landscaping.

12.4.1 'Do-Nothing' Impact

Under such a scenario, the existing operation would remain unchanged and the baseline levels of noise and traffic in the area would continue in the short to medium term.

12.4.2 Construction Phase

During the construction stage there are two main sources of potential noise impact:

- Noise impact from works and mobile plant operating on the proposed construction works; and
- Traffic noise impact along the proposed haul routes to be employed for the duration of the works.

Given the volume of site won material to be used in this construction, the volume of expected construction traffic is very low and not considered to pose a significant noise impact for receptors located along the local road network. Importation of materials is limited to specialist materials and all aggregates will be site won.

Both construction areas are located at significant distances (minimum 350 metres) from the nearest sensitive receptors and with the low levels of mobile plant required to construct the infrastructure, these levels will be negligible relevant to baseline.

12.4.3 Operational Phase

During the operation stage (which will run in parallel) there are two main sources of potential noise impact:

- Noise impact from site operations and mobile plant operating on the site both at the cell infilling and material processing; and
- Traffic noise impact along the proposed haul routes.

Both the on-site and traffic sources are assessed in the following sections.

12.4.3.1 On-Site Sources

Using the method outlined in BS5228, a worst case L_{Aeq} value at the nearest residential property has been calculated for a range of mobile plant and machinery. The nearest residential property lies within the following distances of each of the proposed elements of the works:

- Circa 150 metres from the centroid of infilling of Cells 6, 7, 8;
- Circa 200 metres from the aggregate processing on the central yard area;
- Circa 400 metres from the IBA Maturation area located at Cell 11 area (mobile but this location has been assumed for this analysis); and
- Circa 450 metres from the concrete crushing for end of waste at the top of the capped cells (Cell 5 – again, mobile but this location has been assumed for this analysis).

The typical plant listed in **Table 12-6** has been presented to give an example of the potential cumulative noise levels at this worst case receptor with all aspects of the site operating continuously.

Some allowance for noise attenuation from screening by both the quarry wall from the infilling works and the processing building enclosure have been assumed.

Table 12-6 Sample Fixed and Mobile Plant for Operations

Operation	Noise Source	Sound Power LWA dB	A-weighted Sound Pressure Level LAeq, dB at 10m	Sound Level at Nearest Property (LAeq)
Infilling of Cells 6, 7, 8	3 x Lorry (Ref D.7.121)	98	-	52
	2 x Dump Truck tipping fill (D.3.60)	110	-	
	Wheeled excavator/loader (Ref D.3.61)	104	-	
	Dozer (Ref. D.3.27)	81	-	
Aggregate Processing	Tracked Crusher (C.1.14)	-	82	52
	Screener (C.10.14)	-	81	
	Wheeled Loader (Ref. C.2.28)	-	76	
	Generator (C.4.85)	-	66	
IBA Maturation	2 x Lorry (Ref D.7.121)	98	-	44
	Wheeled excavator/loader (Ref D.3.61)	80	-	
Concrete End of Waste	Wheeled Loader (Ref. C.2.28)	-	76	45
	Tracked Crusher (C.1.14)	-	82	
	Screener (C.10.14)	-	81	

The methodology F.2.4 as outlined in BS 5228-1:2009+A1: 2014 was followed for predicting the noise levels for each aspect of the proposed development operating simultaneously. This methodology relates to the method for mobile plant in a defined area. The prediction of the LAeq from mobile plant operating over a small area or on site can be used for other activities when items of mobile plant are operating in close proximity to the point of interest, taking into account the adjustment of the predicted LAeq for standing and idling time of the plant. It is assumed that over a 1-hour period, all mobile plant will be operational for 80% of the time.

The results of the indicative calculations show that the resultant LAeq (1 hour) noise values using the listed plant and machinery would all be below the daytime limit of 55dBA set in the IE licence. The infilling and aggregate processing are predicted to be above the evening limits of 50dbA and these operations should cease at 19:00 hours unless monitoring can demonstrate that the levels can comply with the requirements of the licence.

Cumulatively, all sources operating simultaneously would generate 55 dB LAeq and therefore not above the day time ambient limit of 55 dB LAeq listed in the existing Waste Licence and which will be applied in the revised IE Licence. As such, the combined proposed development will not have an adverse impact on the noise climate in the vicinity of the site and will comply with the requirements of the revised IE licence.

12.4.3.2 Traffic Noise

Existing noise (excluding the 2019 elevated levels from the Article 27 site) along the LP-1080 is recorded through noise monitoring locations N7 and N8 and illustrate levels at circa 60-65dB(A) during the daytime (**Table 12-3**) and 45-55dB(A) during the night time (**Table 12-4**).

Existing 2022 traffic and proposed AADT volumes on the LP-1080 are presented in **Chapter 13** of this EIAR. These baseline traffic volumes have accounted for existing traffic operating at the applicant site as well as the cumulative traffic from other operators in the area.

When operating at full capacity, the site will generate a total daily movement of circa 240 vehicles generated onto the local road network. The predicted change in noise climate in the area is presented in **Table 12-7**. It is anticipated that relative to the existing baseline, as there is no additional road traffic noise attributable to the development, there will be no significant increase in the baseline noise environment for properties located along the LP-1080 with other receptors further from the road network experiencing a lower impact.

Table 12-7 Predicted change in road traffic noise on the LP-1080

LP-1080	Existing	Proposed Peak During Operations	Predicted Change in Noise Level (dBA)
	AADT	AADT	
2022 (Base Year)	1,232	-	-
2023 (Opening Year)	1,237	1,237	-
2028 (Opening Year +5 Years)	1,389	1,389	-
2038 (Design Year + 15 Years)	1,536	1,536	-

The change in noise levels and the significance of such changes can be categorised by the Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment. **Table 12-2** summarises the impact/category quantification related to changes in noise levels. Based on the predictions relating to operational traffic noise, the changes in noise levels can be categorised as imperceptible to slight at these properties. The increase in traffic associated with the proposed development scheme is therefore not expected to give rise to significant noise nuisance in the area.

12.5 Mitigation Measures

The following mitigation measures are proposed in order to reduce noise levels from plant and machinery at the applicant site, as well as from HGVs travelling on the LP-1080.

- During the initial phases where construction, restoration and infilling are operating in tandem, every effort should be made to double up on HGV trips in order to reduce the number of empty HGVs travelling to and from the site;
- HGVs will only be allowed to import material to the site during the proposed operational hours;
- All equipment will be regularly maintained to ensure that they are operating effectively and not producing additional noise emissions or potential tonal sources;
- Where practicable, the number of machines in simultaneous operation will be minimised;
- All vehicle engines will be switched off when not in use;
- Plant and machinery used on-site will comply with the EC (Construction Plant and Equipment) Permissible, Noise Levels Regulations, 1988 (S.I. No. 320 of 1988); and
- All contractors will employ the best practicable means to minimise noise emissions and will be obliged to comply with the general recommendations of BS 5228-1: 2009 and ‘*Environmental Good Practice Site Guide*’ 2005 compiled by CIRIA and the UK Environmental Agency.

12.6 Residual Impact

There will be a net positive permanent residual impact on noise as a result of the proposed development as reverting the site to alternative use will result in occasional machinery use, similar in nature to surrounding land uses. Heavy ground moving plant such as dozers and tracked excavators will no longer be in use at the site.

12.7 Monitoring

Schedule 6.12 of the Waste Licence (W0129-02) requires an annual noise monitoring survey to be undertaken to demonstrate that the site remains in compliance with the limits specified in the licence. A similar condition will be imposed in the revised IE Licence (if granted) and annual monitoring will continue to be undertaken and reported to the EPA.

12.8 References

1. Draft Guidelines on the Information to be contained in Environmental Impact Assessment Reports, EPA, (2017).
2. Advice Notes for Preparing Environmental Impact Statements, EPA, (2015).
3. Good Practice Guidance for the Treatment of Noise during the Planning of National Road Schemes, TII, (2014).
4. Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4), EPA, (2016).
5. ISO 1996-2:2007 Acoustics -- Description, measurement and assessment of environmental noise - Part 2: Determination of environmental noise levels (2007).
6. Calculation of Road Traffic Noise (CRTN), UK Department of Transport, (1988).
7. ISO1996-1_2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedure.
8. BS 6472-1 (2008) Guide to evaluation of Human Exposure to Vibration in Buildings - Vibration sources other than Blasting.
9. BS 7385-1 (1990) Evaluation and Measurement for Vibration in Buildings - Guide for Measurement of Vibration and evaluation of their effects on buildings.
10. BS 7385-2 (1993) Evaluation and Measurement for Vibration in Buildings - Guide to damage levels from Groundborne Vibration.
11. BS 5228-1:2009+A1:2014, Code of practice for noise and vibration control on construction and open sites. Noise.
12. BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.
13. Guidelines for Noise Impact Assessment, Institute of Environmental Management and Assessment (IEMA), (2002).
14. EC (Construction Plant and Equipment) Permissible, Noise Levels Regulations, 1988 (S.I. No. 320 of 1988).
15. Environmental Good Practice Site Guide, CIRIA and the UK Environmental Agency, (2005).