

16.0 MATERIAL ASSETS

ARCHAEOLOGY BASELINE STUDY

Archaeological and Historical Background

- 16.1 The following is based on a literature search and desk study. The site of the proposed development is located at Meenaboll, Co Donegal. The terrain consists blanket bog surrounded by forest plantation. The site is located to the north of the Letterkenny to Fintown road approximately 8km east of Fintown.

Methodology

- 16.2 Research was undertaken in two phases. The first phase comprised a desk study of all available archaeological, historical and cartographic sources. The second phase involved a field inspection of the proposed development area.

Prehistoric Period

- 16.3 Approximately 9000 years ago the first settlers came to Ireland. They were a hunting and gathering society. In general the only artefacts found relating to these Mesolithic societies are scattered stone tools or middens, which are usually found on seashores or riverbanks. Some flint objects dating from the Mesolithic have been found in Donegal, particularly Bann Flakes from the Later Mesolithic, and the discovery of a collection of narrow blades, which were found in Raw's Bog near Castlefinn may well date to the Early Mesolithic, c. 5500 BC.
- 16.4 The discovery of so many Mesolithic artefacts near to rivers would suggest that these people were using rivers, such as the Foyle and the Finn, as means of transport. In the late 1800s a possible early Mesolithic axe was found in the vicinity of Dunfanaghy, which would suggest that there have been groups of people inhabiting Donegal from the early Mesolithic to modern times. In the 1960s at Dunaff Bay at the northwest of Inishowen peninsula, near the mouth of Lough Swilly a Mesolithic site was excavated, the only definite site in Donegal.
- 16.5 A number of flints were recovered from the site and the surrounding area. These flints were mainly debitage although a few rough scrapers were also found. It has been suggested that this flint was not found in the locality and so must have been brought in, possibly from Derry or Antrim. This would seem to indicate trade with neighbouring groups and possibly as far inland as the rivers were navigable. It is thought that the settlers whose tools were found at Dunaff Bay discarded them around the same time that the beach itself was forming c. 3500 BC. Those who excavated the site have interpreted it as the site of flint industry or seasonal camp area though no evidence of any structures were uncovered during the course of excavations.

Neolithic Period

- 16.6 Unlike the Mesolithic period, there are numerous sites that have been dated to the Neolithic, particularly megalithic tombs in Donegal (c. 10% of Ireland's megalithic tombs can be found in Donegal). This would certainly suggest both a vibrant population and economy. It was in the Neolithic that the change from hunting and gathering to farming came about. The similarity of artefacts recovered from these tombs both locally and nationwide would indicate that there was a well established communications network in this period. The position of these tombs would suggest that the surrounding land was fertile and so the peaty soils must not have been laid down as yet.
- 16.7 A survey was carried out by Herity (see Lacy, 1983) in an attempt to discover whether there was a preference of locations for the construction of these monuments, and whether the communities that constructed these monuments lived and worked near by. The surroundings of 21 court tombs, 13 portal tombs, 7 wedge tombs, 3 passage tombs and 6 unclassified tombs were examined. Forty-four of these tombs lay beneath 500ft with eighteen between 100 and 200ft. The majority of the tombs were situated on ridges or in valleys with a preference for south facing slopes. More than 65% were located in good agricultural areas. With just three exceptions all the tombs were situated within 200m of fresh water. The results of this survey indicated that the distribution of these tombs corresponded with settlement locations.
- 16.8 Part of the survey included a programme of pollen analysis, the results of which concluded that the pre-Neolithic landscape of southwest Donegal was dominated by mixed deciduous woodland. These woods were cut away probably by the first farmers in land clearance to increase the potential agricultural areas. Pollen samples taken from beneath the tombs indicated a high presence of grasses, plantain, mugwort, dandelion, thistle and legumes at the time of their construction. This would seem to point to the fact that these monuments were built on open areas near to pasture areas. Pollen of cereals found at the site of two of these tombs would indicate cereal production in the immediate locality. Field systems, which were laid out prior to the formation of the bogs reiterate the evidence of a strong agricultural community in Donegal in prehistoric times.

Early Historic to Modern

- 16.9 Donegal County was occupied from the 5th century on by the northern Ui Neill dynasties, the Cenel Conaill and the Cenel Eogain, before the latter expanded into mid-Ulster. It is from these dynastic families that the County derives the names of its two main parts, Inis Eogain and Tir Conaill. The County name, Donegal, derives from Dun na nGall, and is probably associated with Scandinavian/Viking activity in the area. The Cenel Conaill retained control after the withdrawal of the Normans. In the 12th century the O'Donnells became princes of Tir Conaill. Under the leadership of the O'Donnells, the Cenel Conaill established their main seat in Donegal Town.
- 16.10 The rivalry between the two Ulster families dominated the history of the region until their eventual defeat and conquest by the Elizabethans, with the Cenel Conaill being dominant in the area of Donegal Town and beyond, maintaining control of the strategically important Barnesmore Gap. The Cenel Conaill retained control after the withdrawal of the Normans. In the 12th century the O'Donnells became Princes of Tir Conaill. Under the leadership of the O'Donnells, the Cenel Conaill established their main seat in Donegal Town. The present castle, granted to and adapted by Sir Basil Brook in the 17th Century incorporates the square tower of the castle erected by Red Hugh O'Donnell in 1505. During the 16th century, English garrisons were gradually established throughout the County, and in 1601, the Gaelic Chieftains were finally defeated by the Elizabethan forces. The subsequent 'Flight of the Earls' left the way open for the Elizabethans to confiscate and subsequently colonise the region. The County was sub-divided into plantations, with vast holdings being taken over by speculators. The settlers were, for the main part, Scots and English.

EXISTING BASELINE DATA

The Sites and Monument Record

- 16.11 The RMP is a database recording all archaeological sites in Ireland known to the National Monuments Service. Established under Section 12 of the 1994 National Monuments (Amendment) Act, it is based on the Sites and Monuments Record of each County. The record comprises Ordnance Survey 6" sheets which indicate the location of each monument or place of archaeological interest and files of further documentary and photographic data or information relating to an archaeological event such as a site visit, survey or excavation. These are housed in the National Monuments Services in Dublin. The record is constantly updated and principally focuses on monuments that pre-date 1700.
- 16.12 The Sites and Monuments Record was consulted, early in September 2002 and there are no known archaeological sites within the townland of Meenaboll.

The National Museum of Ireland Topographical Files

- 16.13 The discovery of artefacts can be an important indicator of past levels of activity in an area and therefore a useful guide to the archaeological potential of a site. The National Museum in Dublin houses a national archive of antiquities cataloguing artefacts that were found and reported between 1928 and 1995. They are catalogued by year and accession number.
- 16.14 The NMI topographical files produced no results for the townland of Meenaboll. Figure 16.1 shows the nearest national monuments.

Cartographic evidence

- 16.15 Two maps were consulted during research; the 1834 OS First Edition and Francis Jobson's Map of Ulster, 1590. No new or additional information was obtained.

Previous archaeological work near to the subject site

- 16.16 There have been no excavations or any record of previous archaeological fieldwork in the vicinity of Meenaboll:

Field Inspection

- 16.17 Field inspection is necessary to determine the extent and nature of archaeological remains, and can also lead to the identification of previously unrecorded sites and portable finds through topographical observation and local information.
- 16.18 A field inspection was carried out on the subject site on 9th September 2002. Nothing of archaeological significance was noted during the site visit or during the course of previous archaeological monitoring. No sites or artefacts of archaeological significance are recorded within the development area.

The Development Area

- 16.19 The area under assessment is a proposed waste facility development at Meenaboll, Co Donegal. The terrain consists blanket bog surrounded by forest plantation. The site is located to the north of the Letterkenny to Fintown road approximately 8km east of Fintown.
- 16.20 Along the western seaboard of Ireland there are vast tracts of land covered in a carpet of peat of varying dept from 2-6m. This peatland type is called Atlantic blanket bog although it is also known as low level blanket bog and western blanket bog. Unlike raised bogs the peat is composed of the dead remains of grasses and sedges and contains very little bog moss. The peat is usually dark brown to black in colour and is compact.

ASSESSMENT OF POTENTIAL IMPACTS

Direct Impacts

- 16.21 Due to the size of the proposed development on the subject site it is envisaged that deep and extensive machine excavation would be required. This would have a negative impact on any archaeological features and features and deposits which may survive in this area.
- 16.22 The passage of machinery and vehicles would have a negative impact on any previously unrecorded sub-surface remains that may survive within the proposed development.

Language and Dialect

- 16.23 Tá an laithreán craobhú sa bhaile Mí na Boll I bhfoisceacht míle de gaeltacht Dún na nGall. Ní mbeidh aon iombualadh ar an teanga nó cannúint de thoradh an craobhú seo. Lena rá ar chaoi eile beidh neodrach iombualadh ar an teanga nó cannúint.
- 16.24 The development site in the townland of Meenaboll, is within a mile of the Donegal Gaeltacht. There will be no impact on the language and dialect as a result of this development. In other words there will be a neutral impact on the language and the dialect.

'Do nothing' impact

- 16.25 If the proposed development were not to proceed there would be no negative impact on the archaeological or cultural heritage resource.

'Worst case' impact

- 16.26 In a worst-case scenario, the development of study area would disturb previously unrecorded deposits and artefacts without proper excavation and recording being undertaken.

MITIGATION MEASURES

Direct Impacts

- 16.27 It is recommended that all further groundworks be monitored by an archaeologist, under license to Dúchas, The Heritage Service, with provision made for full recording and excavation of any archaeological features or deposits which may be exposed.

Indirect impacts

- 16.28 The mitigation measures recommended above would also function as a monitoring system to allow the further assessment of the scale of the predicted impacts and the effectiveness of the recommended mitigation measures.

IMPACT ON MARKET VALUE

Introduction

- 16.29 Development of a landfill site can potentially result in a perceived negative impact on commercial investment and property values in the area of the site. An assessment of the impact of the proposed development on surrounding land prices has been undertaken and is set out below. The development is located off the R250 approximately 17Km west of Letterkenny.

Character of Site

- 16.30 The site is located in a rural area with the nearest dwelling approximately 2 Km from the proposed landfill. The adjacent land consists of bogland only suitable for rough grazing and forestry.

Site Management

- 16.31 The site will be operated under an Environmental Protection Agency (EPA) Waste Licence. The development, operation and closure of the proposed development will also be subject to a Waste Licence.

Period of Operation

- 16.32 The estimated capacity of the proposed site is 500,000m³ and based on the maximum annual waste intake of 24,000 tonnes the lifespan of the site will be approximately 20 years.

Traffic

- 16.33 There are no residential properties on the county road between the R250 and the site. However it is proposed to carry out remedial works along the access route to the site to reduce the impact for local road users.

DEFRA UK Study

- 16.34 Studies in relation to the impact of landfills on property prices are not available for the Republic of Ireland or Northern Ireland. However a study to identify and estimate the disamenity costs of landfill in Great Britain was produced by Cambridge Econometrics. Disamenity costs are the local nuisance impacts caused by landfill activity and experienced by households living close to landfill. The local nuisance impacts include odour, dust, litter, noise, vermin and visual intrusion. The report indicates the property values reductions vary dependent upon distance from the landfill but no evidence of reduction was reported at distances greater than ½ mile from the sites.

FIGURES

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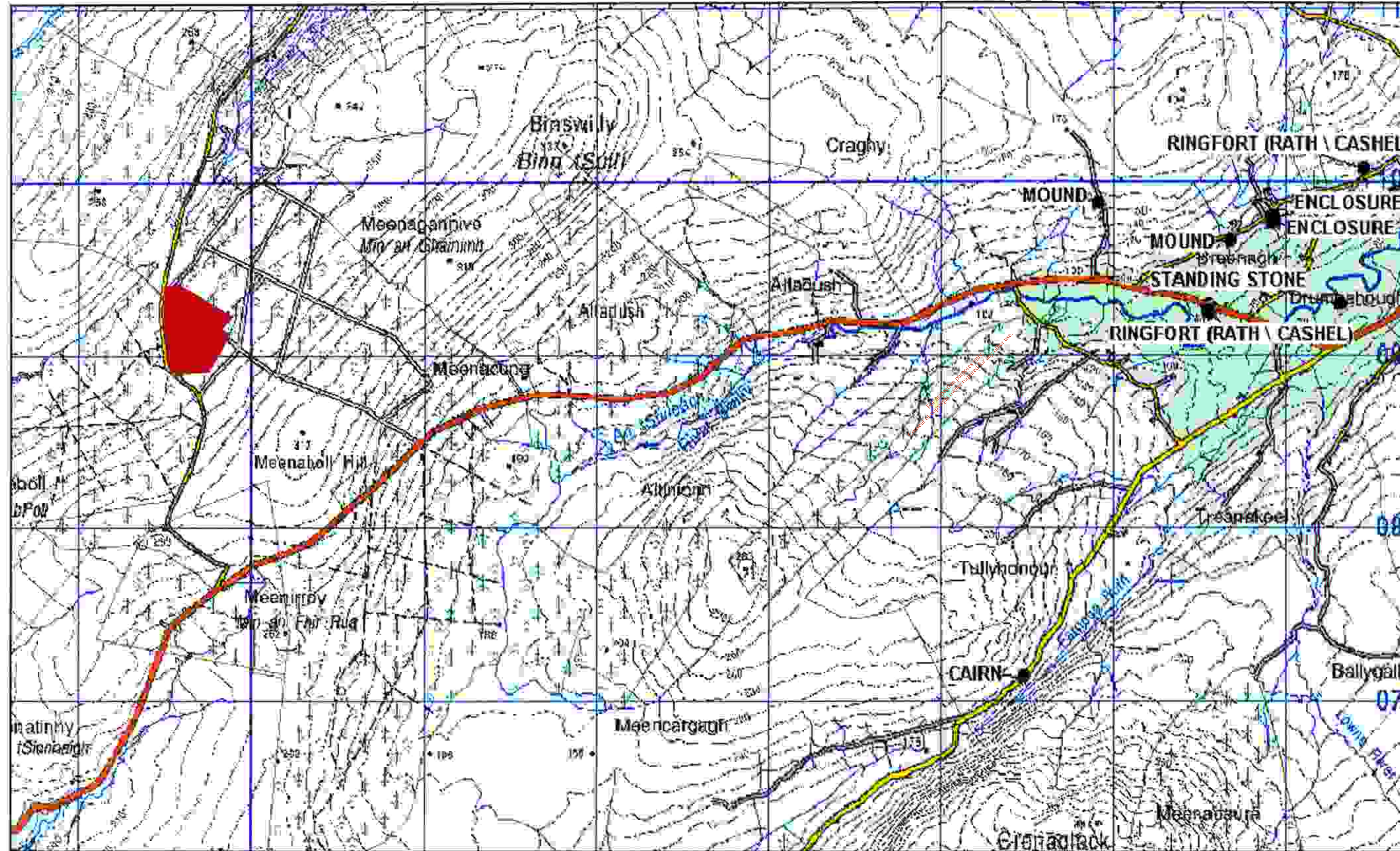
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KEY

- LOCATION OF MOUND OR PLACE OF ARCHAEOLOGICAL INTEREST
- PROPOSED SITE



SCALE: 1:30,000



PROJECT

MEENABOLL LANDFILL PROJECT

TITLE

ARCHAEOLOGICAL SITES AND MONUMENTS RECORDS

FIGURE

16.1

17.0 NOISE AND VIBRATION

INTRODUCTION

- 17.1 This noise assessment relates to the development of a landfill site at Meenaboll, County Donegal.
- 17.2 The assessment has been completed based on the requirements for noise impacts assessments as stated in the Guidelines for Environmental Impact Assessment.
- 17.3 Explanations of noise terms used in this assessment are presented in Appendix H.

RECEIVING ENVIRONMENT

- 17.4 The proposed site is situated in an isolated part of Donegal between Letterkenny and Fintown about two miles off the R250. The proposed site is currently in use for second-growth forestry.
- 17.5 The site is situated to the south west of Letterkenny with the closest occupied property being located more than 2 km away. The site is surrounded by hills and therefore hidden from view from road traffic. The land is currently in use by the forestry service.
- 17.6 Existing noise levels were measured on 11th and 12th September 2002 at six boundary locations. Measurement locations are shown on the site plan of Figure 17.1. During the survey there were suitable weather conditions for measurement. All measurements were taken using Type 1 instrumentation, appropriately calibrated, and measurement details and results are presented in Tables 17.1 and 17.2.

Table 17.1 Daytime Measurement Results

Location	GPS	Time	L _{Aeq}	L ₁₀	L ₉₀	L _{Amax}
1	E19959 N40889	08:30	35.1	36.8	32.4	41.9
2	E20035 N40983	09:12	36.6	38.9	32.3	45.2
3	E19996 N40932	09:58	34.3	35.4	32.1	39.6
4	E19951 N40936	10:45	34.8	36.3	30.6	43.6
5	E19970 N40953	11:30	31.5	32.4	29.2	38
6	E19949 N40907	12:08	36.3	36.8	34.6	41.5

Table 17.2 Night-time Measurement Results

Location	GPS	Time	L _{Aeq}	L ₁₀	L ₉₀	L _{Amax}
1	E19959 N40889	01:12	30.8	32.4	29.5	38
2	E20035 N40983	01:19	31.4	33.5	29.7	39.7
3	E19996 N40932	01:45	32.6	33.6	31.4	40.9
4	E19951 N40936	02:10	33.3	34.2	32.3	36.4
5	E19970 N40953	02:15	31.8	33.4	29.5	38.7
6	E19949 N40907	02:30	32.1	33.2	30.2	37.5

17.7 The night-time noise environment consisted of environmental and wind-noise, and, due to the remoteness of the proposed site, no other noise was evident.

SUMMARY OF POTENTIAL NOISE SOURCES

- 17.8 The potential for noise from the proposed development can be usefully split into a number of sections, which are subject to separate assessment.

Landfill Operation

- 17.9 This section will assess the impact of the use and function of the proposed site with regard to the nearest noise sensitive receptor. The level of impact will be assessed with regard to current daytime and night time limits recommended by Environmental Protection Agency.

Vehicle Noise

- 17.10 This section assesses the impact of traffic movement on roads approaching and within the boundaries of the site including the impact of service vehicles.
- 17.11 This will be assessed using the methodology detailed in the "Calculation of Road Traffic Noise" (UK DOT, 1990) and "Design Manual for Roads and Bridges" documents, and, with regard to the "State of the Environment in Ireland" document (EPA, 1996), where possible.

Construction Noise

- 17.12 The impact of the short-term works associated with the site preparation and subsequent construction the E.P.A currently recommend assessment of this impact using BS5228 (1984 and 1997), "Noise Control in Construction and Open Sites".

POTENTIAL IMPACT OF LANDFILL OPERATION

Evaluation Criteria

- 17.13 The target noise level for the nearest residential properties are those currently recommended as appropriate by the E.P.A. Therefore, the following targets are presented as appropriate for the site.

Daytime Target Level = 55 dB L_{Aeq}

Night-time Target Level = 45 dB L_{Aeq}

- 17.14 There are two main sources of noise on the site as shown below,
- The dumping of refuse and its consequent spreading and compaction (Tip-Head Activity)
 - The items of fixed plant such as electrical generators, leachate pumping system and gas flare systems

Calculation Methodology

- 17.15 The calculation of noise impact will incorporate the following:

- Existing maximum noise levels recorded on site
- Minimum distance to nearest noise sensitive receptor to ensure a 'worst-case' scenario
- Attenuation by partial or complete visual screening which will provide 5dB or 10dB respectively
- Attenuation by ground absorption will be incorporated where appropriate

17.16 To ensure that a 'worst case' scenario is assessed, the calculation will assume a tip-head activity level of L_{Aeq} 83 dB this figure is the maximum L_{Aeq} level measured on a typical landfill site at a distance of 10 m from tip-head operations. The attenuation by distance will be calculated with reference to the minimum distance between the tip-head and the nearest noise sensitive receptor, as measured from the site-plan.

17.17 As part of the site preparation works including, removal of overfill, it is proposed to use the surplus material to create earth bunds. These have the dual benefit of acting as visual screening barriers and acoustic barriers and where constructed properly can provide between 5dB (A) and 10dB (A) attenuation.

Potential Impact of Tip-Head Activity

17.18	Maximum noise level (As measured)		83 dB L_{Aeq}
	Attenuation by distance	=	$20 \log 2000/10 = 46$ dB
	Attenuation by barriers (Partial Screening)	=	5 dB
	Total available attenuation	=	51 dB
	Potential impact at property facade	=	$85 - 51 = 34$ dB L_{Aeq}

17.19 It is predicted that the potential noise impact from activity noise, at the most proximate residential properties, is below daytime target levels.

Potential Impact of Fixed Plant

17.20 External plant such electrical generators, leachate pumps, gas flares etc will be required over the lifetime of the proposed facility. Manufacturers and installers can silence these items to meet the required target level. Based on the standard attenuation by distance formula, and neglecting any attenuation by ground absorption, the following are established as the maximum permissible noise levels from any item of plant at 10m from source. The leachate plant is approximately 2000 m distant from facade of nearest noise sensitive receptor.

17.21	Daytime target rating level	55 dB LAeq, 1h
	Night-time target rating level	45 dB LAeq, 5min
	Attenuation by minimum distance	$20 \log 2000/10 = 46 \text{ dB}$
	Permissible combined plant noise level, at 10m (daytime use only)	$= 55 + 46 = 101 \text{ LAeq, 1h}$
	Permissible combined plant noise level, at 10m (24 hour use)	$45 + 46 = 91 \text{ dB LAeq, 5min}$

17.22 All plant shall be chosen, sited and silenced/enclosed (if necessary) such that the combined noise level does not exceed the target levels above at any residential property – the daytime target being used for plant operating during daytime only and for emergency plant, and the night-time target for plant which operates over 24 hours.

17.23 Therefore, higher permissible noise levels incorporating screening or increased distance to the nearest property may be assessed at an individual site prior to installation.

17.24 Otherwise, the operator, of the site should be provided with and adhere to, the above criteria to ensure that impact from plant noise is within target levels.

17.25 Typical noise levels from properly maintained and (where necessary) housed or screened units are as follows:

Flare units	65 dB (A) at 10 m
Leachate Treatment*	69 dB (A) at 10 m
Generator (outside enclosure – Measured)*	57 dB (A) at 10 m

** It is noted that the pumps serving the leachate treatment works will be electrical operated and would therefore typically create lower noise levels than presented. It is further noted that the generator and leachate blowers are to be housed in enclosures built into embankments at the landfill. This will further reduce the impact of the plant on the receiving environment.*

17.26 It follows from the above data (and current site conditions) that, with leachate treatment and flare unit operating together, the night time limit will not be exceeded.

Potential Impact of Vehicle Noise

17.27 The impact of HGV movement is best assessed using the haul road calculation from BS5228, *Noise and Vibration Control on Construction and Open Sites* using the formula below.

17.28 Approach Road $L_{Aeq} = \text{Average SWL} - 33 + 10 \log Q - 10 \log V - 10 \log d$

17.29 Traffic consultants for the scheme estimate that during a 'worst case' peak hour there would be 25 deliveries to the development (Q=50), travelling at a speed of 20 km/h (V). Therefore:

17.30 When considering 24,000 tonnes it is assumed that a maximum 7 HGV's will access the site in any one hour.

Determination of Future Impact of H.G.V's on Haul Road

17.31	Average sound power level of HGV	98 dB	
	Calculation correction		- 33
	Correction for number of HGV passes in one hour		+ 10 log 50 = + 11
	Correction for average speed of HGV (in km/h)		- 10 log 20 = - 13
	Attenuation by minimum distance of haul road to property		- 10 log 2000 = - 33
	Potential future impact at nearest properties (unscreened)		= 30 dB $L_{Aeq, 1h}$

17.32 It is predicted that the potential noise impact from 'worst case' HGV movement on the site road will be significantly below the daytime target noise level.

Impact of Traffic Increases on Existing Approach Roads

17.33 Traffic impact data for approach routes has been assessed and presented in the traffic impact assessment and this has incorporated predictions for changes in worst case peak hour traffic:

17.34 It is generally accepted in most current reference documents that an increase of 3 dB(A) on existing traffic noise is required before it may be noticed by the public (example ref: UK DOETR "Guidance on the Methodology for Multi-Modal Studies", Paragraph 4.3.5). With reference to the "Calculation of Road Traffic Noise" document (CRTN), and if all other factors remain equal, this would represent an increase in traffic flow of 100%.

17.35 The "Design Manual for Roads and Bridges" document (DMRB) suggests that a 1dB increase in traffic might be perceptible, although it acknowledges that other factors in visual perception and magnitude of traffic levels before increase are relevant. Again with reference to CRTN, a 1dB increase in noise level is approximately equivalent to a traffic number increase of 25%.

17.36 It is predicted in section 18 of the EIS that the hourly traffic increase will be 7 vehicles which represents a percentage of traffic flow increase of 5.6%. Even when considering the sensitivity analysis undertaken in Section 18 where the peak hourly figure is increased to 29 vehicles the percentage increase on the R250 is still less than the 25% referenced in section 17.35 at 24%..

17.37 It is therefore submitted that, with reference to the current guidelines, the increase in traffic on the R250 is likely to be imperceptible.

POTENTIAL IMPACT OF CONSTRUCTION NOISE

17.38 The relevant British Standard for guidance on the prediction, assessment and control of construction noise is BS5228. While this document is not in force in Ireland, it contains a number of guidelines and recommendations, which are considered appropriate, and of good working practice for all construction contracts. These guidelines are detailed in the section on Reductive Measures following and should form the basis of control and limiting of potential impact to noise sensitive locations.

17.39 The main source of noise from the site will be: -

17.40 The preparation and restoration of the site, including any phased lining / levelling.

17.41 It will ultimately be the responsibility of the nominated contractor to specify the plant used and the most efficient methodology, however the following operations are deemed as typical of potential usage.

17.42 BS5228 states typical noise levels (either as sound power level or as L_{Aeq} at 10m) appropriate for the above works and these are tabulated below.

Table 17.3 Noise Levels from Construction Works (ref: BS 5228)

Activity	Plant	L_{Aeq} at 10m
Site clearance/excavation Removal of waste/rubble	Lorries (drive by)	70 dB
	Dozers	87 dB
	HGV and tippers	84 dB
General construction works	Lorries (drive by)	70 dB
	HGV and tippers	84 dB
	Cement mixers	74 dB
	Compressor	81 dB
	Water pump	to 80 dB
Landscaping / Tipping of material	Surfacing/rolling	76 - 86 dB
	HGV and tippers	84 dB

- 17.43 For prediction purposes, it is assumed that at any one stage in construction several activities occur together. Therefore, at equal unscreened distances from a receiver, the 'worst case' construction activity level may become:
- 17.44 Combined maximum activity level (during site preparation) = 90 dB L_{Aeq} at 10m.
- 17.45 It would be expected that such activity would only be occasional in any given day. Other construction activity is typically 80-84 dB L_{Aeq} .
- 17.46 The impact of construction is assessed by considering the 'worst case' combined maximum activity level predicted above, and correcting for the minimum distance from source to receiver. The nearest residential properties to the site are at least 2000m from the extents of works. The attenuation provided by ground absorption has been neglected to provide a margin of safety.
- 17.47 'Worst case' noise level = Combined noise level - Attenuation by distance at property façades
= 90 - $20 \log 2000/10$ = 44 dB $L_{Aeq,1h}$ = 39 dB $L_{Aeq,12hr}$
- 17.48 Typical noise level = Construction noise level - Attenuation by distance
at property façades = 85 - $20 \log 2000/10$ = 39 dB L_{Aeq}
- 17.49 The impact of construction on these properties will typically be 39 dB L_{Aeq} , with levels up to 44 dB $L_{Aeq,1h}$ for site preparation activity at the extent of works.
- 17.50 Presently, in Ireland, there are no fixed noise limits for construction noise and the control of such sources is outside the remit of the EPA. In general it is left to the discretion of the local council authority and An Bórd Pléanala determine if fixed limits are appropriate; such restrictions are rare, and there is little precedent. In Fingal Council Area discussions are underway with the Construction Industry Federation to agree time limits of Monday to Friday daytime, and Saturday morning – but with no restriction on noise levels.
- 17.51 However, in Northern Ireland, common Environmental Health Officers' practice would be to recommend maximum allowable noise levels at noise sensitive properties close to the site during construction as follows:

<u>Monday to Friday</u>	<u>Maximum at Measurement Points</u>
07:00 - 19:00	75 dB L_{Aeq12h}
19:00 - 22:00	65 dB L_{Aeq1h}
22:00 - 07:00	No noise audible

<u>Saturday</u>	<u>Maximum at Measurement Points</u>
08:00 - 13:00	75 dB L_{Aeq12h}
13:00 - 22:00	65 dB L_{Aeq1h}
22:00 - 07:00	No noise audible

Sunday

No Operations

- 17.52 Comparing the computed impact with these criteria, it therefore follows that it will be possible to control noise from construction works to within reasonable levels at noise sensitive locations for the duration of the contract. Some mitigating measures are included to provide additional instruction to contractor.

REMEDIAL OR REDUCTIVE MEASURES

Remedial Measures for landfill Operation Noise

- 17.53 It has been assessed previously that all activity fall within target levels.
- 17.54 Permissible noise levels for fixed plant associated with the development have been calculated above. These are summarised as follows:
- 17.55 At units within 2000m of a residential property there will be a 101 dB (A) limit at 10m unscreened from the plant operating only in the daytime and 91 dB (A) for any plant operating over 24 hours. However, maximum noise levels for operational plant will be designed so as the noise levels will not exceed 65 dB L_{Aeq} at 10m throughout the night-time. In addition the proposed generator for the supply of power to the site will be located within an embankment of the landfill which will provide further noise reduction for this particular element of the operations.
- 17.56 By careful placement of the plant on the non-critical facades, i.e. not facing any noise sensitive properties and the provision of sound proofing container, the attenuation by distance can be increased and a further 10 dB (A) can be afforded through complete visual screening.

Remedial Measures for Construction Noise

- 17.57 BS5228 includes a number of guidelines and recommendations, which are considered appropriate of good working practice for all construction contracts. These are summarised below.

General Measures

- 17.58 The contractor should take note of control measures for relevant plant listed in BS5228 and apply the appropriate measures where practicable, including temporary screening or enclosure of noisy plant, control of "on times" for noisy plant, and positioning of plant as far as possible from noise sensitive locations and properties. Also:

Use of well maintained plant and, where possible, plant maintained under recent EC guidelines for manufacturers.

- Substitution of unsuitable plant.
- Maintenance of silencers and moving components.

Screening

- 17.59 The contractor should endeavour to sequence operations such that spoil mounds or storage areas are located in positions to screen from the nearby county road which is occasionally used by walkers. Such measures can be best assessed during the contract by monitoring. These measures, where possible should also be retained for the operational phases of the development.

Monitoring

- 17.60 Occasional measurement of noise levels generated using a Type 2 or better sound level meter should be conducted to check on the continuing impact of the works.

Responsible Person

- 17.61 It is often recommended that the appropriate party, whether the site operator or appointed contractor should appoint or delegate a responsible person who will be present on site and who will be willing to answer and act upon queries from the local public.

Night Works

- 17.62 If there are items of plant (e.g. dewatering pumps and similar) in use during night-time hours they should be chosen, sited and enclosed such that levels at the nearest properties do not exceed WHO guidelines of 45 dB L_{Aeq} at any residential property. Sound reduction by barrier walls of up to 10 dB (A) is possible and hence any plant could be controlled to within the guidelines indicated. The need for items of plant such as dewatering pumps will be minimised during the construction period as gravity fed drainage systems will be installed in the early stages of the construction works.

PREDICTED IMPACT OF THE PROPOSALS

Predicted Impact of Landfill Operation Noise

- 17.63 It has been shown that with careful positioning, placement of barriers maximum and distance between source and noise sensitive property that strict emission limits set by E.P.A will be met.

Predicted Impact of Vehicle Noise

- 17.64 It is predicted that the potential noise impact from 'worst case' HGV activity on the site roads will be within the day target level at the most proximate residential property. Based in the information provided in the TIA, worst case increase noise levels due to transportation on the local supply roads will be imperceptible.

Predicted Impact of Construction Noise

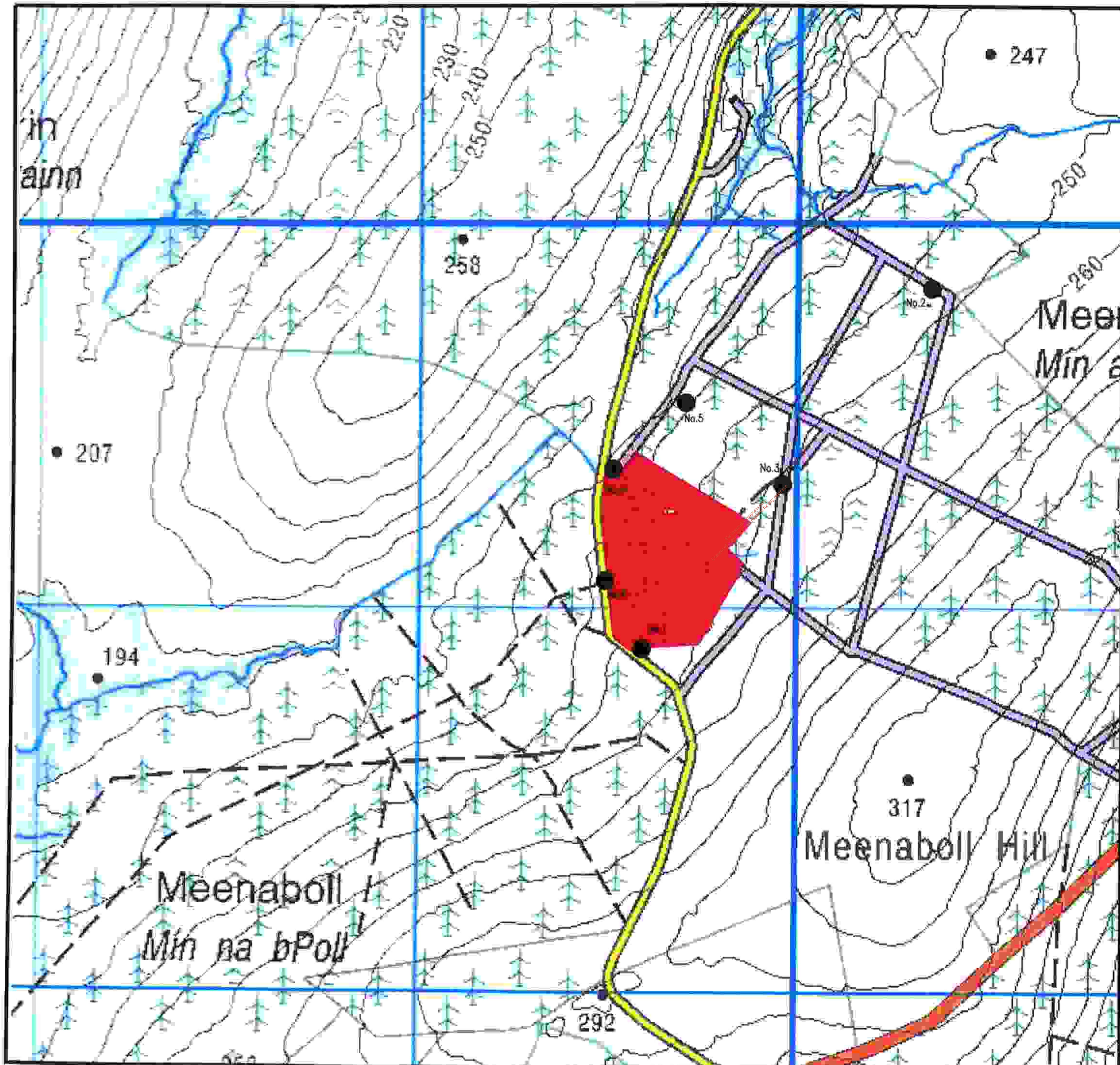
- 17.65 It has been shown that it will be possible to control short-term noise impact from construction works by the good working practice of the contractor, with the incorporation of reductive measures where necessary.

Comment on Noise Impact to Mammals and Birds

- 17.66 Research conducted on the effects of noise disturbance on mammals indicate that sound levels above 90dB are likely to be adverse and are associated with a number of behaviours such as retreat from source, freezing, or a strong startle response. Sound levels below 90dB usually cause much less aversive behaviour. Laboratory studies of domestic animals have indicated that behavioural responses vary with noise types and levels and those domestic mammals appear to acclimatize to some sound disturbances (e.g., Anthony et al 1959; Bond et al. 1963; Ames and Arehart 1972; Espmark et al. 1974; Ames 1978).
- 17.67 Data on the effects of noise on wild bird is limited. However, research completed in North America and Canada suggests the following criteria:
- < 75 dB (A) – No Effect
 - > 80 dB (A) – Flock
- Source: Various Researchers compiled in Environmental Data Handbook
- 17.68 It is further submitted that mammals and birds will adapt relatively quickly to new noise impacts on their surroundings.

FIGURES

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KEY

- SITE AREA
- NOISE MONITORING POINT AND REFERENCE

No.2

ORDNANCE SURVEY LICENCE NO:EN 0029304
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 SCALE: 1:10,000

 KIRK McCLURE MORTON <small>CONSULTING ENGINEERS</small>	 Comhairle Contae Dhún na nGall <small>Dúnail County Council</small>
PROJECT MEENABOLL LANDFILL PROJECT	
TITLE NOISE MONITORING LOCATIONS	FIGURE 17.1