

9 NOISE AND VIBRATION

9.1 INTRODUCTION

This assessment will address the potential noise and vibration impacts associated with the proposed Drehid Mechanical Biological Treatment (MBT) Facility. The Drehid MBT Facility will be located within the confines of the Bord na Móna landholding in the townlands of Coolcarrigan and Drummond, Carbury, Co. Kildare. Bord na Móna also operates the permitted Drehid Waste Management Facility within this landholding, approximately 1km north of the proposed MBT Facility location.

The proposed MBT Facility will primarily accept and process municipal solid waste and will provide for an overall capacity of 250,000 tonnes per annum (TPA).

9.1.1 Methodology

This assessment will take cognisance of the existing and future landfill operations within the Bord Na Móna landholding in addition to the operation of the composting facility.

As the composting facility had only commenced operating (at a capacity less than design capacity) when baseline noise monitoring was undertaken for this EIS, the operational phase noise predictions from the EIS which accompanied the Planning Application for the composting facility will be used in combination with the measured baseline noise recordings and predicted noise for the Drehid MBT Facility to forecast the future cumulative impact of all operational activities on the Bord na Móna landholding (post construction of the proposed MBT Facility). An assessment of additional road traffic noise generated by the proposed MBT Facility will also be undertaken herein.

The existing Drehid Waste Management Facility's current planning permission to accept waste is due to expire in 2028 so this study represents the worst case scenario during the operation of the proposed MBT Facility (which will extend beyond 2028).

Outline of Acoustics Terminology

Sound is produced by a mechanical disturbance emanating as a wave motion in air at a speed of about 330 metres per second (the speed of sound in air). Sound waves entering the ear evoke a physiological response, which causes nerve impulses to be transmitted to the brain. The brain interprets these impulses and perceives them as sound. This is characterised by its amplitude, measured in decibels (dB) and its frequency, measured in Hertz (Hz). Noise is unwanted or undesirable sound, it does not accumulate in the environment and is usually localised.

The Decibel Scale

The difficulty in assigning a unit of measurement to sound is the sensitivity of the human ear. Audible sound pressures range from the threshold of hearing and the threshold of pain, which corresponds to a ratio of 1:1,000,000. In order to cover this vast range a logarithmic unit: the

decibel (dB) is used. The decibel scale corresponding to the threshold of hearing and the threshold of pain ranges from 0 to 140dB. A decibel is defined as ten times the base-ten logarithm of a power ratio.

Table 9-1 Decibel scale with indicative noise examples

Decibel	Pressure	Analogy
140dB	200Pa	Threshold of Pain
120dB	20Pa	Jet taking off
100dB	2Pa	Pneumatic Drill
80dB	0.2Pa	Heavy Truck
60dB	0.02 Pa	Business Office
40dB	0.002 Pa	Library
20dB	0.0002 Pa	Quiet Woodland
0dB	0.00002 Pa	Threshold of Hearing

Frequency

The size of the pressure fluctuation is measured using the Decibel, the rate of these fluctuations is measured by cycles per second or Hertz (Hz). Human ears are most sensitive to mid frequencies in the range between 500 Hz to 6 kHz. Sounds with a frequency less than 20 Hz are generally not audible, this type of sound is said to be infrasonic. Above 20 kHz sounds are generally inaudible and the sounds are described as ultrasonic.

'A' Weighting

The human ear can tolerate low frequencies more than middle to high frequencies and one must ensure that any measurement device elicits a numerical value, which matches the ear's response. This is achieved by introducing an electronic filter (called an 'A' weighted filter) into the measuring system. This weighting characteristic provides good correlation with loudness and since its maximum lies in the frequency region where the ear is most sensitive, it takes into account the hearing damage potential of the noise. For this reason environmental noise levels are generally measured in terms of 'A' weighted decibels, dB (A).

A noise level in excess of 85 dB (A) gives a significant risk of hearing damage. A noise level increase of 3 dB (A) is barely perceptible; while an increase in noise level of 10 dB (A) is perceived as a twofold increase in 'loudness'.

Where noise levels vary in time, statistical analysis of the variation can be carried out. The results are usually stated in the form L_N (L for level), where N is the percentage of time a level is equalled or exceeded. Hence if $L_{90} = 40$ dB (A), the noise level equals or exceeds 40 dB (A) for 90% of the time measured period i.e. background noise level is 40 dB (A).

In addition to the statistical units, the equivalent continuous level is also measured. The equivalent continuous level, L_{eq} , is measured in dB (A) and is a notional steady level that has the same sound energy as the real fluctuating sound over the same measurement period. It is

measured using an integrating sound level meter (SLM). L_{eq} is often described as the total noise level for a specified period.

Baseline Survey

Baseline noise refers to the existing noise environment in an area that may be affected by the construction and operation of the proposed development. The baseline noise survey was conducted to provide a context for the assessment of potential future noise impact associated with the proposed MBT Facility.

In order to assess the surrounding environmental noise levels, a daytime and night time noise survey was carried out on the 9th of January 2012 at six noise sensitive locations, as shown on Figure 9.1.

Thirty minute measurements were recorded during the daytime at each monitoring location and 15 minute measurements were carried out during the night period. The measurements taken were deemed to be representative of typical noise levels in the vicinity of the proposed development site during daytime and night time scenarios. The equipment used during this survey was a Larson Davis Type 1, 824 sound level meter.

All measurements were carried out in general accordance with ISO 1996: 'Acoustics-Description and measurement of environmental noise'. Measurements were made placing the microphone at a height of 1.5m above ground level and were free field, measured >2m from reflecting surfaces. Before and after the survey the measurement apparatus was checked and calibrated using a Brüel and Kjaer 4231 calibrator to an accuracy of +/- 0.3dB. Weather conditions during the surveys were in line with the conditions described within ISO 1996, Acoustics 'Description and Measurements of Environmental Noise'.

The measurement results were noted onto survey record sheets immediately following each measurement and also stored in the instrument's internal memory for subsequent analysis, notes were taken in relation to the primary contributors to noise build-up at each location.

Five environmental noise parameters were measured which are defined below.

L_{Aeq} is the A-weighted equivalent continuous steady sound level during the measurement period and effectively represents an average ambient noise value.

L_{Amax} is the maximum A-weighted sound level measured during the measurement period.

L_{Amin} is the minimum A-weighted sound level measured during the measurement period.

L_{A10} is the A-weighted sound level that is equalled or exceeded for 10% of the measurement period and is used to quantify road traffic noise.

L_{A90} is the A-weighted sound level that is equalled or exceeded for 90% of the measurement period and is used to quantify background noise level.

A-weighting is the process by which noise levels are corrected to account for the non-linearity of human hearing. All noise levels quoted are relative to a sound pressure of 2×10^{-5} Pa.

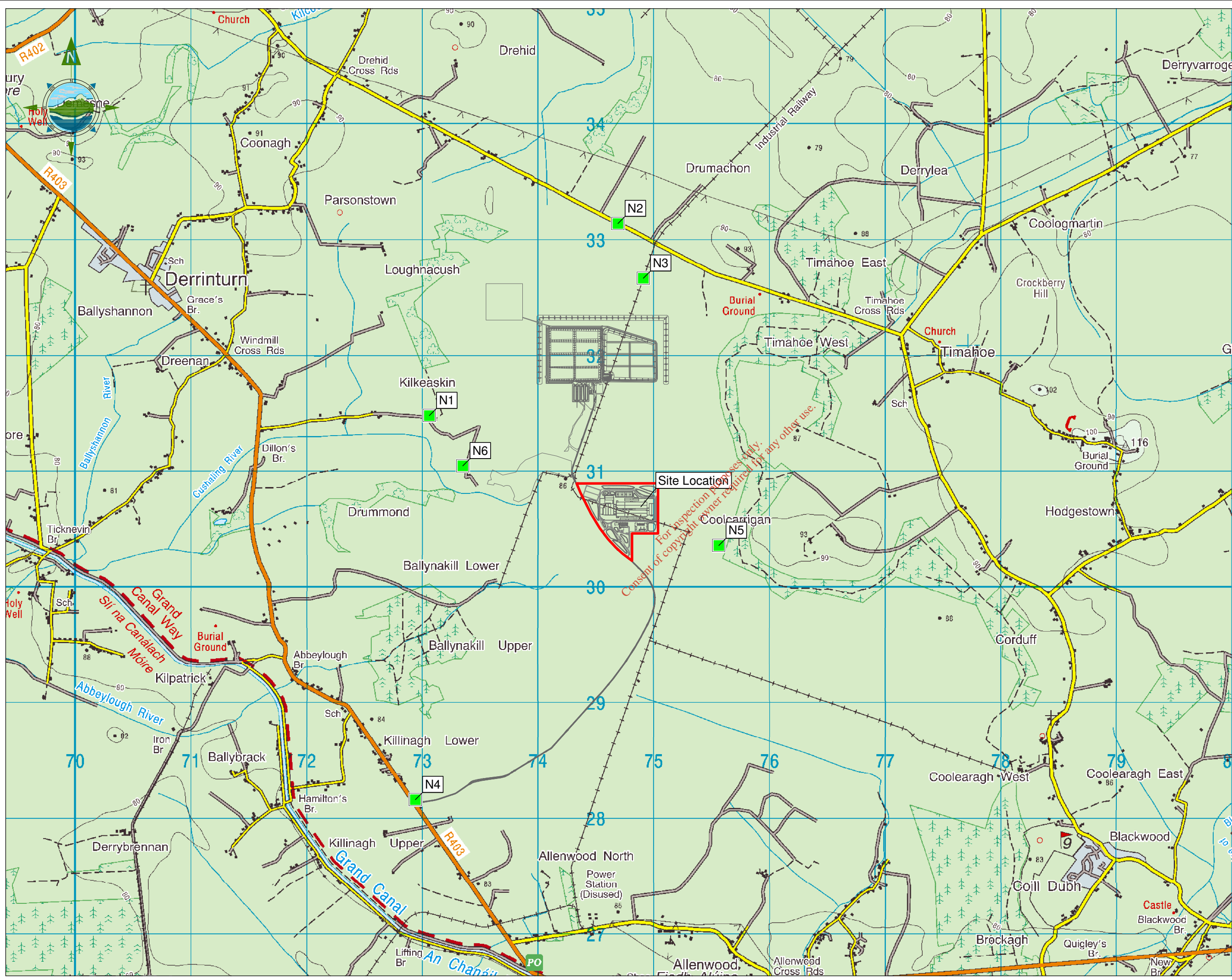
9.2 EXISTING ENVIRONMENT

The existing environment within the Bord Na Móna landholding is a remote location, containing an operational landfill with associated infrastructure and a composting facility. The baseline locations assessed for the purposes of the noise survey are included in Table 9.2 below and in Figure 9.1 and are the same locations as those currently employed for the waste license monitoring and reporting of noise emissions from the Drehid Waste Management Facility to the EPA. These locations include the closest sensitive receptors to the proposed MBT Facility.

Table 9-2 Baseline Noise Survey Locations

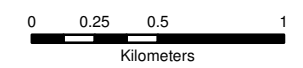
Noise Monitoring Point	Grid Reference	Location
N1	273095, 231446	Noise sensitive receptor located to the west of the landholding (and south west of the existing Drehid Waste Management Facility). The monitoring equipment was installed adjacent to a farmyard next to an occupied dwelling house.
N2	274374, 233202	This monitoring point is located within the Bord na Móna landholding close to the nearest occupied dwelling along the L5025 road.
N3	274933, 232734	This monitoring point is located within the Bord na Móna landholding, to the north east of the existing Drehid Waste Management Facility.
N4	272974, 228094	This monitoring point is located to the south of the Bord na Móna landholding, along the R403 regional road at the entrance to the Drehid Waste Management Facility.
N5	275563, 230238	This monitoring point is located to the east of the MBT Facility activity boundary.
N6	273254, 231287	This noise sensitive receptor is located at a dwelling house, south of N1 to the west of the Bord na Móna landholding.

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Legend

- Site Boundary
- Landownership Boundary
- Noise Monitoring Locations



- NOTES**
1. FIGURED DIMENSIONS ONLY TO BE TAKEN FROM THIS DRAWING
 2. ALL DRAWINGS TO BE CHECKED BY THE CONTRACTOR ON SITE
 3. ENGINEER TO BE INFORMED OF ANY DISCREPANCIES BEFORE ANY WORK COMMENCES
 4. ALL LEVELS RELATE TO ORDNANCE SURVEY DATUM AT MALIN HEAD

Issue	Date	Description	By	Chkd.
A	05.06.12	Issued for Waste License	G.F.	S.T.

Client:
BORD NA MÓNA

Project:
DREHID MECHANICAL BIOLOGICAL TREATMENT (MBT) FACILITY

Title:
NOISE MONITORING LOCATIONS MAP

Scale @ A3: 1:30,000

Prepared by: M. Nolan Checked: S. Tinnelly Date: May 2012

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Figure 9.1 A

Table 9-3 Baseline Noise Survey Results 09/01/2012

Location	Time	L _{Aeq}	L _{AMax}	L _{AMin}	L _{A10}	L _{A90}
N1	12:03	39.2	61.4	32.0	37.6	32.9
	23:27	35.7	55.8	32.2	37.2	33.3
N2	13:51	50.7	77.2	31.2	47.9	32.2
	00:30	50.2	78.9	31.5	35.5	32.0
N3	14:22	52.7	76.2	32.1	53.8	33.2
	00:15	33.8	58.2	31.4	34.6	31.8
N4	15:56	61.1	89.2	35.1	62.4	40.6
	23:00	54.4	81.7	31.0	53.9	31.6
N5	15:16	38.2	56.4	32.4	40.9	33.4
	22:15	34.6	57.8	31.2	35.7	31.2
N6	12:36	35.2	61.3	32.1	35.8	32.5
	23:44	35.0	57.0	32.0	36.5	33.1

Location N1

During the daytime survey the noise climate at Location N1 was dominated by distant road traffic, distant plant noise from the Drehid Waste Management Facility, birdsong and an aircraft overhead. In the night period, the Bord Na Móna activities were inaudible and the distant road traffic noise was the dominant noise source.

Location N2

During the daytime noise surveys at Location N2, occasional passing traffic on the local road was the dominant noise source. Birdsong and distant plant noise (possibly from the Drehid Waste Management Facility) were audible. The traffic on the local road comprised a number of HGVs passing at speed. These HGVs were not derived from the Drehid Waste Management Facility.

In the night-time period, infrequent passing local traffic, birds and distant traffic noise were the dominant sources, there was noise audible from the Drehid Waste Management Facility.

Location N3

The daytime noise climate at Location N3 is characterised by infrequent passing traffic on the local road and distant plant noise from the Drehid Waste Management Facility. Two people on a large quad bike were scrambling on the bog trails, which was a significant noise source.

At night the area was quiet, with infrequent traffic being the main noise source.

Location N4

Road traffic with a significant HGV proportion dominated the noise climate during the daytime survey at Location N4. Some of this was entering/leaving the Drehid Waste Management Facility and some was transiting past on the R403, as the entrance is located on a regional road. Car traffic that passed the site entrance was travelling quite fast at this location and added to measured noise levels.

At night there was no audible noise from the Drehid Waste Management site. A series of loud modified cars travelling up and down the road dominated the night time noise survey.

Location N5

At Location N5, the daytime noise climate was comprised of distant traffic noise, birdsong and overhead aircraft. There was no significant noise from the Drehid Waste Management Facility at this location. The night survey comprised the same scenario.

Location N6

Distant road traffic noise and birdsong were the main noise sources during the daytime noise survey at this location. There was no significant audible noise from the Drehid Waste Management Facility.

Similarly at night, distant road traffic noise was the main source, the Drehid Waste Management Facility was not audible.

POTENTIAL IMPACTS

There is potential for noise and vibration impacts during both the construction and operational phases of the proposed development.

9.3.1 Potential Construction Phase Impacts of Configuration A (MBT with Composting)

Impact from the construction phase will depend on the number and type of equipment used during the construction of the development. Construction noise sources will result in a temporary impact on the noise climate in the area.

Predicted noise levels have been estimated using the methodology described in *BS: 5228: Noise and control on construction and open sites, 1997*. Predictions are based on typical equipment used during various constructive stages of the development. Predictions are based on an L_{Aeq} 1hour value with all machinery listed below operating for a continual period of 1 hour. Updated, modern noise levels for all plant assessed, as published in a 2009 addendum to BS 5228, have been used in this assessment.

This may be considered a worst-case scenario as machinery may operate for shorter periods and may not work simultaneously.

Additionally, calculations are based on minimum distances between site activities and the nearest noise sensitive locations. The effects of vegetative screening have not been taken into account in calculations.

Table 9-4 Predicted Construction Phase Noise Impacts

CONSTRUCTION PHASE						
BS5228 Calculations	Estimated Construction noise levels at varying distances LAeq 1 hour					
	N1	N2	N3	N4	N5	N6
Plant						
Dump Truck (x2)	36	31	34	29	46	37
Tracked Crane	18	13	16	11	28	19
Dozer (x2)	32	27	30	25	42	33
Road Lorry (x2)	30	25	28	23	40	31
Tracked Excavator (x2)	35	30	33	28	45	36
Piling - Hammer rig (x2)	37	32	35	30	47	38
Combined Level LAeq 1hour	41	37	39	35	52	43

In Ireland, there are no statutory guidelines relating to noise limits for construction activities. These are generally controlled by local authorities and commonly refer to limiting working hours to prevent a noise nuisance. The National Roads Authority (NRA) report entitled 'Guidelines for the treatment of noise and vibration in national road schemes' 2004, has outlined recommended noise levels for construction noise during road works.

Although these guidance documents refer to the construction of road projects, they have been developed in line with typical construction noise limits on general construction projects used previously in Ireland. The limits outlined represent a reasonable compromise between the practical limitations during a construction project and the need to ensure an acceptable ambient noise level for local residents.

As a result, these limits have become the most acceptable standard for construction noise limits for EIS assessments to date. The National Roads Authority does note however that where pre-existing noise levels are particularly low, more stringent levels may be more appropriate. Table 9.5 below details these recommended limits. The recommended levels presented in Table 9.4 are considered reasonable when compared against existing baseline levels.

Table 9-5 Typical maximum permissible noise levels at the façade of dwellings during construction activities (NRA Draft guidelines for the treatment of noise and vibration in national road schemes 2004)

Day & Times	L_{Aeq} (1hr) dB	L_{Amax} dB
Monday – Friday (07:00 to 19:00 hrs)	70	80
Monday – Friday (19:00 to 22:00 hrs)	60 ¹	65 ¹
Saturday (08:00 to 16:30 hrs)	65	75
Sundays and Bank Holidays (08:00 to 16:30 hrs)	60 ¹	65 ¹

¹ Construction activities at these times, other than that required in respect of emergency works, will normally require the explicit permission of the relevant local authority.

The predicted construction noise levels in Table 9.4 are in compliance with the recommended noise levels for construction projects. These predicted values are a worst-case assessment, as no screening, or proprietary noise barrier mitigation is included for in the assessment, therefore the actual noise impact from construction activities is likely to be moderate on noise sensitive locations. The temporary nature of the construction period and the variety of machinery used should ensure that no construction activity is operational for long periods. This phase will therefore result in short term noise impacts. With regard to potential vibration impacts the NRA guidance document described above states that:

“In order to ensure that there is no potential for vibration damage during construction, the Authority recommends that vibration from road construction activities be limited to the values set out in Table 9.5 [sic]. These values have been derived through consideration of the various standards discussed above; compliance with this guidance should ensure that there is little to no risk of even cosmetic damage to buildings”. Table 9.6 below describes these limit values:

Table 9-6 NRA Allowable vibration during road construction in order to minimise the risk of building damage

Allowable vibration velocity (Peak Particle Velocity) at the closest part of any sensitive property to the source of vibration, at a frequency of		
Less than 10Hz	10 to 50Hz	50 to 100Hz (and above)
8 mm/s	12.5 mm/s	20 mm/s

Distance separation of approximately one kilometre from the proposed site of the MBT Facility to the nearest sensitive receptor should ensure that these limit values are complied with.

9.3.2 Potential Construction Phase Impacts of Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The potential noise and vibration impact arising from the construction of the MBT Facility to include dry anaerobic digestion and composting will be the same as that for Configuration A (MBT with Composting).

9.3.3 Potential Operational Phase Impacts of Configuration A (MBT with Composting)

The operational phase noise emission data for all noise emitting plant proposed for use in the proposed MBT Facility have been used to facilitate this assessment. This data, in addition to the attenuation level provided for by the walls of the various buildings and the sound attenuation provided by distance separation, have all been used to calculate a worst case operational phase noise level at each sensitive receptor. Potential noise impact from diesel generators proposed to be used in the event of a loss of power is also included for in these calculations. The calculations have been carried out using spreadsheet modelling employing the methodologies outlined in *BS: 5228: Noise and control on construction and open sites, 1997*, using the updated noise level data as contained in the UK Department for Environment Food and Rural Affairs Document; *Database of noise emissions from equipment used on construction and open sites, 2008*

No attenuation by proposed buildings situated between the source building and the receptor have been accounted for in this assessment, other than the attenuation provided by the walls of the building containing each individual piece of plant, and as such the actual operational noise levels will be less than those described in Table 9.7, and Table 9.8 below.

The target level criterion for the operational phase of the proposed MBT Facility will be set at 55 dB L_{Aeq} for daytime and 45 dB L_{Aeq} for the night period at the façade of the nearest sensitive receptor. The maximum noise level during the operational phase at the most affected nearest sensitive receptor, located at N6 is predicted to be 37 dB (A) L_{Aeq} . The proposed MBT Facility will operate in two shifts, with the second shift finishing at 02:00. SRF drying within the SRF building, and the biological treatment process within the Biological Treatment Building will take place on a 24 hour basis, 7 days a week. The daytime noise levels assessed in Tables 9.7 and 9.8 above are inclusive of all plant operating. While the daytime predicted noise levels will comfortably meet both the day and night time noise limit, the actual night time noise level will be less than that presented in Table 9.8. Cumulative impacts at sensitive receptors will be below the target criterion for both day and night time operations in all scenarios.

Table 9-7 Predicted Daytime cumulative exterior noise levels from the proposed MBT Facility at 10m from each building (Configuration A (MBT with Composting))

ITEM	Exterior At 10m (dB LAeq)
Mechanical Treatment Building	66.3
SRF Building	66.6
SRF Storage Area	56.0
Biofilter/ Odour Abatement Area No.1 Plant Room	57.3
Biofilter/Odour Abatement Area No.2 Plant Room	57.3
Composting Building No.1 (part of Biological Treatment Building No.1)	38.8
Composting Building No.2 (part of Biological Treatment Building No.2)	38.8
Maturation Building No.1 (part of Biological Treatment Building No.1)	52.1
Maturation Building No.2 (part of Biological Treatment Building No.2)	52.1
Biofilter/Odour Abatement Area No.3 Plant Room	54.9
Refining Building	48.4
Dust Filters	52.8
TOTAL	70.5 dB LAeq

Table 9-8 Predicted noise levels at nearest sensitive receptors (including operating composting facility and operating landfill)

Proposed MBT Configuration A LAeq	N1 (1650m)	N2 (2475m)	N3* (1970)	N4 (2950m)	N5* (625m)	N6 (1150m)
		29	27	29	25	38
Composting Facility and Landfill LAeq	N1 (1425m)	N2 (1468m)	N3 (1049)	N4 (3900m)	N5 (1753m)	N6 (1425m)
	36	38	44	30	32	35
Cumulative LAeq	37	38	44	31	39	37

***Note: While Noise monitoring locations N5 and N3 are noise monitoring points, they are not sensitive receptors**

Road Traffic Noise

The road traffic generated by the proposed MBT Facility is assessed in the Traffic Chapter (Chapter 11). There is a maximum projected increase above current daily activity of 124% for cars and 18% for HGV traffic, within the Drehid Waste Management Facility Boundary.

On the R403 in the vicinity of the site entrance, which is the closest point a receptor will be to the traffic noise, the HGV traffic will increase by a maximum of 5.4% daily and the car

traffic will increase by a maximum of 3.4% daily. Due to the logarithmic nature of the decibel scale, an increase of 100% equates to a decibel increase in decibel level of 3dB, which is perceived by the human ear as a slight increase. This implies that the impact that vehicles associated with the proposed development will have, in terms of traffic noise, can be considered negligible and imperceptible. There will be no perceptible increase in road traffic generated ground vibration. Road traffic generates low levels of ground vibration (<0.1mm peak particle velocity at 20m and these are indistinguishable by humans).

9.3.4 Potential Operational Phase Impacts of Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The potential noise and vibration impact of this MBT Facility with dry anaerobic digestion and composting is assessed as outlined in Table 9.9 below. For the development of the MBT Facility without dry anaerobic digestion noise levels would be slightly less. If dry anaerobic digestion is included within the development, this process (similar to all other processing steps) will take place indoors and the enclosed building will reduce noise emissions arising at the MBT Facility.

Table 9-9 Predicted Daytime cumulative exterior noise levels from the proposed MBT Facility at 10m from each building (Configuration B (MBT with Dry Anaerobic Digestion and Composting))

ITEM	Exterior At 10m (dB LAeq)
Mechanical Treatment Building	66.3
SRF Building	66.6
SRF Storage Area	56.0
GHP Plant	68.0
GAS Flare Compound	48.0
Biofilter/ Odour Abatement Area No.1 Plant Room	57.3
Biofilter/Odour Abatement Area No.2 Plant Room	57.3
Dry AD/Composting Building No.1 (part of Biological Treatment Building No.1)	38.8
Dry AD/Composting Building No.2 (part of Biological Treatment Building No.2)	38.8
Maturation Building No.1 (part of Biological Treatment Building No.1)	52.1
Maturation Building No.2 (part of Biological Treatment Building No.2)	52.1
Biofilter/Odour Abatement Area No.3 Plant Room	54.9
Refining Building	48.4
Dust Filters	52.8
TOTAL	72.5 dB LAeq

Table 9-10 Predicted noise levels at nearest sensitive receptors (including operating composting facility and operating landfill)

Proposed MBT Configuration	N1 (1650m)	N2 (2475m)	N3* (1970)	N4 (2950m)	N5* (625m)	N6 (1150m)
B L _{Aeq}	31	29	31	27	40	35
Composting Facility and Landfill	N1 (1425m)	N2 (1468m)	N3 (1049)	N4 (3900m)	N5 (1753m)	N6 (1425m)
L _{Aeq}	36	38	44	30	32	35
Cumulative L_{Aeq}	37	39	44	32	41	38

***Note: While Noise monitoring locations N5 and N3 are noise monitoring points, they are not sensitive receptors**

The target level criterion for the operational phase of the proposed MBT Facility will be set at 55 dB _{L_{Aeq}} for daytime and 45 dB _{L_{Aeq}} for the night period at the façade of the nearest sensitive receptor. The maximum noise level during the operational phase at the most affected nearest sensitive receptor, located at N6 is predicted to be 38 dB (A) L_{Aeq}. The proposed MBT Facility will operate in two shifts, with the second shift finishing at 02:00. SRF drying within the SRF building, and the biological treatment process within the Biological Treatment Building will take place on a 24 hour basis, 7 days a week.

The daytime noise levels assessed in Tables 9.9 and 9.10 above are inclusive of all plant operating. While the daytime predicted noise levels will comfortably meet both the day and night time noise limit, the actual night time noise level will be less than that presented in Table 9.10. Cumulative impacts at sensitive receptors will be below the target criterion for both day and night time operations in all scenarios.

9.4 MITIGATION MEASURES

The following mitigation measures for potential noise and vibration impacts include both the construction and operational phases of the proposed development.

9.4.1 Construction Phase Mitigation Measures for Configuration A (MBT with Composting)

With regard to construction activities, all plant items used during the construction phase should comply with standards outlined in 'European Communities (Construction Plant and Equipment) (Permissible Noise Levels) Regulations, 1998. Reference should be made to BS5228: Noise control on construction and open sites, which offers detailed guidance on the control of noise from construction activities.

It is proposed that various practices be adopted during construction, including:

- Limiting the hours during which noisy site activities are permitted to 07.00 – 20.00 Monday – Saturday inclusive);
- Appointing a site representative responsible for matters relating to noise; and
- Establishing channels of communication between the contractor/developer, Local Authority and residents.

Furthermore, it is envisaged that a variety of practicable noise control measures will be employed. These may include:

- selection of plant with low inherent potential for generation of noise and/or vibration;
- erection of temporary barriers around items such as generators or high duty compressors. For maximum effectiveness, a barrier should be positioned as close as possible to either the noise source or receiver. The barrier should be constructed of material with a mass of $> 7\text{kg/m}^2$ and should have no gaps or joints in the barrier material. As a rough guide, the length of a barrier should be 5 times greater than its height. A shorter barrier should be bent around the noise source, to ensure no part of the noise source is visible from the receiving location; and
- siting of noisy plant as far away from sensitive properties as permitted by site constraints.

9.4.2 Construction Phase Mitigation Measures for Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The mitigation measures for noise and vibration for the construction phase of the MBT Facility with dry anaerobic digestion and composting will be the same as outlined for the development of Configuration A (MBT with Composting)..

9.4.3 Operational Phase Mitigation Measures for Configuration A (MBT with Composting)

During the operational phase of the proposed MBT Facility, the design and layout of the MBT facility buildings will in itself serve as a mitigation measure by virtue of the fact that all MBT processing equipment will be located within fully enclosed buildings. Potential noise emitting plant will be acoustically treated to prevent a noise nuisance at the nearest noise sensitive properties. This phase of the development is not anticipated to significantly increase noise on its surrounding environment. With regards to noise from possible services plant and sanitary plant (road sweeper etc.) there are various practicable measures, which will be taken into account:

- Siting of noisy plant items away from direct line of sight to noise sensitive locations;
- Siting of outdoor extraction fans at roof level to reduce ground level noise disturbance;
- Ensuring any such external plants (fans etc) has no pure tonal component;
- Duct mounted attenuators on the atmosphere end of all acoustically offending air moving plant;

- Splitter attenuators or acoustic louvers providing free ventilation to internal plant areas;
- Solid barriers screening external ground level plant from sensitive receptors;
- Anti vibration mounts on reciprocating plant; and
- Training of staff to switch off machinery not in use and to operate machinery with potential noise impact in mind.

9.4.4 Operational Phase Mitigation Measures for Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The mitigation measures for noise and vibration for the operational phase of the MBT Facility with dry anaerobic digestion and composting will be the same as outlined for the development of Configuration A (MBT with Composting).

9.5 CONCLUSION

The proposed MBT Facility is predicted to be in full compliance with all applicable noise and vibration limit values during both the construction and the operational phases of the development during both the day and night scenarios. As such no significant noise and vibration impact is predicted from the proposed scheme.

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10 LANDSCAPE AND VISUAL

10.1 INTRODUCTION

10.1.1 Methodology

The landscape and visual impact assessment of the proposed Drehid Mechanical and Biological Treatment (MBT) Facility in the townlands of Coolcarrigan and Drummond, Carbury, Co. Kildare, will describe the existing landscape character, identify potential sensitive viewpoints and assess the potential effects on viewpoints and general landscape character. The Report is illustrated with Plates and an Analysis Map - Figure 10.1.

There are no significant external differences between Configuration A (MBT with Composting) and Configuration B (MBT with Dry Anaerobic Digestion and Composting), and therefore this assessment of potential landscape and visual effects applies to both configurations.

The methodology of this assessment is based on best practice as described in the guidelines listed in Section 10.1.2.

Firstly, a desk based review was carried out to ascertain an appropriate landscape and visual study area based on the location of the proposed MBT Facility and to identify potential landscape and visual effects.

Fieldwork was then carried out in order to assess and appraise the landscape character of the area. While the Kildare Development Plan was referenced for existing work on landscape character in the area, fieldwork identified smaller scale local landscape character.

A site survey on December 20th 2011 identified the potential visibility of the proposals within the wider landscape, taking into account topography, existing screening vegetation and other localised factors. It should be noted that identified visual effects in this Report represent the 'worst case scenario' as they assess visibility during the winter months. The magnitude of visual effects is often lower during periods of foliage.

10.1.2 Guidance Documents

The following guidelines and documents have determined the methodology, terminology and assessment approach used within this Chapter.

- “Advice Notes on Current Practice in the preparation of EIS” 2003, Environmental Protection Agency, Republic of Ireland;
- “Guidelines for Landscape and Visual Assessment”, Second Edition (2002), edited by The Landscape Institute and Institute of Environmental Management and Assessment;

- “Photography and Photomontage in Landscape and Visual Impact Assessment”, Landscape Institute, Advice Note 01/11, March 2011;
- “Landscape and Landscape Assessment; Consultation Draft of Guidelines for Planning Authorities”, (2000), DoEHLG; and
- Kildare County Development Plan, 2011-2017.

10.1.3 Definition of Terms – Landscape and Visual Effects

Landscape effects are defined as the result of physical changes to the fabric of the landscape resulting from new development. Such physical changes may include the addition, alteration or removal of structures or vegetation. Landscape effects can be temporary and include those caused by temporary access routes, compounds and construction traffic.

Visual effects relate closely to landscape effects but concern changes in views. Visual assessment concerns people’s perception and response to visual amenity. Effects may result from new elements located in the landscape that cause visual intrusion (i.e. interference with or interruption of the view).

10.1.4 Definition of Magnitude and Likelihood of Effects

Table 10-1 Criteria for the assessment of magnitude of effects on landscape character

Level	Typical criteria
Negligible	Very minor loss or alteration to one or more key developments / features / characteristics of the baseline i.e. pre-development landscape or view, and / or introduction of elements that are not uncharacteristic with the surrounding landscape – approximating the “no change” situation.
Low	Minor loss of / or alteration to one or more key elements / features / characteristics of the baseline i.e. pre-development landscape or view, and / or introduction of elements that may not be uncharacteristic when set within the attributes of the receiving landscape.
Moderate	Partial loss of / or alteration to one or more key elements / features / characteristics of the baseline i.e. pre-development landscape or view, and / or introduction of elements that may be prominent but may not necessarily be considered to be substantially uncharacteristic when set within the attributes of the receiving landscape.
High	Total loss of, or major alteration to key elements / features / characteristics of the baseline i.e. pre-development landscape or view, and / or introduction of elements considered as being totally

uncharacteristic when set within the attributes of the receiving environment.

Table 10-2 Definition of magnitude/degrees of visual effects resulting from the proposal

Level	Typical criteria
None	No part of the development, or work or activity associated with it, is discernible
Negligible	Only a small part of the proposals is discernible and / or they are at such a distance that they are scarcely appreciated. Consequently they have very little effect on the scene.
Slight	The proposals constitute only a minor component of the wider view, which might be missed by the casual observer or receptor. Awareness of the proposals would not have a marked effect on the overall quality of the scene.
Moderate	The proposals may form a visible and recognisable new element within the overall scene and may be readily noticed by the observer or receptor.
Substantial	The proposals form a significant and immediately apparent part of the scene that affects and changes its overall character.
Severe	The proposals become the dominant feature of the scene to which other elements become subordinate and they significantly affect and change its character.

10.1.5 Definition of Nature of Effects

The description of the *magnitude* of an effect, as defined above, relates to how much the proposals will alter the landscape character, or the extent of visibility from a particular viewpoint. The *nature* of this alteration can be described as positive (beneficial), negative (adverse) or neutral (no overall change or a balance of positive and negative effects).

10.1.6 Duration of Effects

The Duration of effects is defined as follows:

- **Temporary** Effects lasting one year or less
- **Short Term** Effects lasting one to seven years
- **Medium Term** Effects lasting seven to fifteen years
- **Long Term** Effects lasting fifteen to sixty years
- **Permanent** Effects lasting over sixty years

also

- **Occasional**
- **Intermittent**
- **Continuous**

10.1.7 Summary

In summary, this Report employs recognised guidelines as the basis for landscape assessment, and recognises the assessment process as being a combination of assessment of effects on views from key receptors, and of responses towards the effects of the development on landscape character.

To ensure clarity, it is deemed important to use stated terminology to define effects arising from the proposed development.

10.2 RECEIVING ENVIRONMENT

10.2.1 Site Context

The proposed site is located in the townlands of Coolcarrigan and Drummond, Carbury, Co. Kildare within a Bord na Móna landholding. The proposed MBT Facility site is located approximately 1km south of the existing Drehid Waste Management Facility, 3km west of Timahoe, approximately 3.5km north of Allenwood and approximately 3km east of Derrinturn.

A local road (L5025) traverses the Bord na Móna landholding approximately 0.8km north of the existing Drehid Waste Management Facility (see Plate 10). Minor roads and tracks extend inwards on the Bord na Móna landholding on both sides of this local road. An access road to the existing Drehid Waste Management Facility enters the landholding directly from the R403 regional road and will also facilitate access to the site of the proposed MBT Facility. The R403 regional road runs to the west and south of the lands, via Derrinturn and Allenwood. The R402 regional road runs to the northwest, and the remainder of the study area is served by a local road network. There are residential and farm properties along all of the surrounding roads, with a higher density of settlement around Derrinturn and Allenwood.

The Grand Canal runs 3-4km to the south and southwest of the Bord na Móna landholding, via Allenwood and Robertstown.

10.2.2 Landscape Character

General

Lands surrounding the application site are relatively flat, generally averaging 80-90mOD. The maximum height of land within the study area is 142mOD (Carbury Hill, 7km to the west). The Hill of Allen (219mOD), a landmark within the wider landscape, is located approximately 10km south of the proposed development and is outside of the study area.

The Bord Na Móna landholding is flat (apart from an existing landfill mound) with regenerating vegetation of varying heights (see Plates 3, 4, 7, 8, 10). The existing Drehid Waste Management Facility has opened up the lands at this location via a private access road (4.8km in length) primarily used by trucks. The bog has relatively large continuous land cover and its primarily open nature contrasts with the surrounding agricultural pattered landscape (see Plates 7 and 8). Regenerating vegetation is beginning to enclose some of the views within the bog as shown in Plates 3 and 4.

The Bord na Móna landholding is surrounded on all sides by agricultural pastureland with a well-developed pattern of medium-sized and larger fields and an established hedgerow infrastructure. Field hedgerows are predominantly tall and sparse, although lower in some areas, consisting largely of mature trees, including ash. The bogland also continues to the north and a network of bog train tracks remain. The eastern bog edge is bordered along much of its length by mixed coniferous and deciduous tree belts (Plate 9), and there are isolated tree plantations to the west. The site falls within the Western Boglands Landscape Character as indicated in the Kildare County Council County Development Plan 2011-2017.

There are three occupied properties lying within a 1.5km radius of the application site. Within a 4km offset there are numerous properties, in particular to the west and south of the site.

Site Description

Plates 3 and 4 look over the site from the east. The cutover bog at this location is flat and consists predominantly of regenerating scrub, including gorse and birch.

Site Access

The main access to the proposed location site for the MBT Facility is the previously constructed dedicated access road from the R403 regional road to the existing Drehid Waste Management Facility (as shown in Figure 10.1). Site Access and security is detailed in Chapter 2 of this EIS.

10.2.3 Site visibility – General

Visibility of the MBT Facility site is primarily determined by local topography and local screening vegetation both on the boundary of the landholding and in the adjacent areas.

Figure 10.1 shows the location of the application site within the existing landscape and indicates the areas from within which the proposed development could potentially be seen. (Note that the MBT Facility site may not be visible from some residences and roads within

these areas, owing to localised screening topography and vegetation). While visibility may be indicated on Figure 10.1, the effects of distance (greater than 3km) would greatly limit visibility of the proposal.

10.2.4 Site visibility

The main groups which could experience visual effects arising from the proposed development will be residential and farm properties located within the vicinity of the landholding, road users within parts of the study area and users of or workers at the existing Drehid Waste Management Facility. Areas with potential visibility of the proposed development are indicated by a red line on Figure 10.1.

The following currently have views of the proposed location of the MBT Facility Site:

North

Road users and properties on the L5025 road between Timahoe and Drehid Cross Roads where there is no screening intervening vegetation, see Plate 10.

East

The most western end of properties, where there is no screening intervening vegetation, at the end of access tracks leading from the L1019 road south of Timahoe.

West

Road users and properties on the L50222 road leading from the R403 regional road to Kilkeaskin townland, where there is no screening intervening vegetation. Some properties along the R403 regional road, including those located on minor roads with access from the regional road. Some roads and properties on higher ground to the northwest including the upper parts of Carbury Hill (although the effects of distance would greatly reduce visibility from these locations).

South

Some properties along local roads (mainly L1020) north of Allenwood, where there is no intervening vegetation between the property and the proposed site for the MBT Facility.

10.2.5 Vulnerability / Sensitivity of existing views

Existing views are on the whole important, representing a gradually changing local, predominantly agricultural and bogland environment. The greatest cause of visual change in the landscape is the regeneration occurring on the cutover bog, house building and the construction of the Drehid Waste Management Facility.

The views described in 10.2.4 above could on average be deemed to be sensitive to development of the type proposed. Where visible, the MBT Facility will represent high levels of change to existing views when seen from residential and farm properties and from roads located within a radius of 1-2km from the centre of the site.

10.2.6 Planning Context

Western Boglands Landscape Character Area

The site falls within the Western Boglands landscape character area and is described in the Kildare Development Plan as being of Medium Sensitivity. The Development Plan states that “medium sensitivity landscapes can accommodate development pressure but with limitations in the scale and magnitude.” Landscape policies in relation to the Boglands character area are listed below:

LL 1: To recognise that the lowlands are made up of a variety of working landscapes, which are critical resources for sustaining the economic and social well-being of the county.

LL 2: To continue to permit development that can utilise existing structures, settlement areas and infrastructure, whilst taking account of the visual absorption opportunities provided by existing topography and vegetation.

LL 3: To recognise that this lowland landscape character area includes areas of significant landscape and ecological value which are worthy of protection.

LL 4: To recognise that intact boglands are critical natural resources for ecological and environmental reasons.

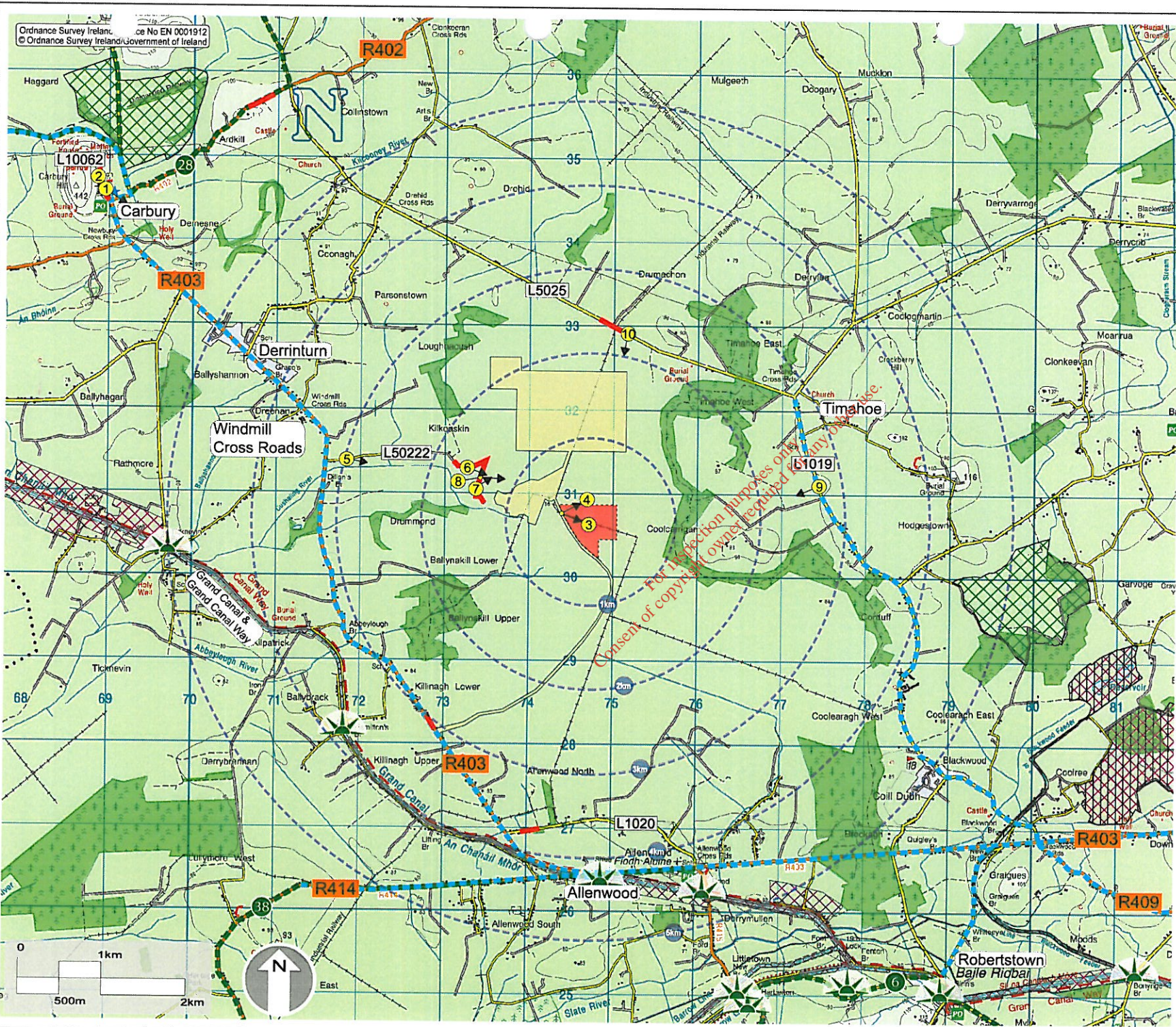
LL 5: To recognise that cutaway and cut-over boglands represent degraded landscapes and/or brownfield sites and thus are potentially robust to absorb a variety of appropriate developments.

Scenic Routes

The following scenic routes as described in the Kildare County Development Plan 2011-2017 have been identified within the study area and are indicated on Figure 10.1:

- Scenic Route No. 6 - Views of Robertstown Countryside and Views across the canal;
- Scenic Route No. 28 – Views from county roads (L5017 and L26) of Carbury Castle and Hill: Teelough road junction with the R402 regional road and upland area at Mylerstown;
- Scenic Route No. 38 – Views of Allenwood to Lullymore Local Road; and
- North Kildare Tourist Route - The North Kildare Tourist Route is signposted along some of the roads in the study area and indicated on Figure 10.1.

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KEY

- Viewpoint location (VP 1-10)
- Kilometres distance from centre of site
- Open views towards the site
- Proposed site location
- Existing Waste Management Facility
- Scenic Route and views as outlined in Kildare County Development Plan 2011 - 2017
- Scenic Viewpoints as outlined in Kildare County Development Plan 2011 - 2017
- North Kildare Tourist Route

Natura 2000 sites according to National Parks and Wildlife Service (NPWS)

- Natural Heritage Area (NHA)
- Proposed Natural Heritage Area (pNHA)
- Special Area of Conservation (SAC)

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DREHID MECHANICAL BIOLOGICAL TREATMENT (MBT) FACILITY

VISUAL IMPACT AND PLATE LOCATIONS

FIGURE 10.1 April 2012
 Drawn: MS Checked: DB



Plate 1 (Panoramic): View southeast from the L10062, at the entrance to Carbury Church of Ireland Parish Church.

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Plate 2 (Panoramic): View southeast from the L10062, at the entrance to Carbury Hill site.

Photosheet 1: Views from Carbury Hill



Plate 3 (Panoramic): View southeast towards the proposed site from the Waste Management Facility access road.

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Plate 4 (Panoramic): View northeast towards the proposed site from the Waste Management Facility access road.

Photosheet 2: Views of the application site



Plate 5 (Panoramic): View east from the L50222.



Plate 6 (Panoramic): View southeast from the L50222.

Photosheet 3: Views from areas west of the application site



Plate 7 (Panoramic): View northeast from the L50222. Note existing Waste Management Facility on the horizon.



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Plate 8 (Panoramic): View east from the L50222 towards proposed facility site.

Photosheet 4: Views from areas to the west of the application site



Plate 9 (Panoramic): View west from the L1019, 1km south of Timahoe. Note screening effects of bands of tree plantations in distance.



Plate 10 (Panoramic): View south from the L5025, 2km west of Timahoe towards proposed MBT site. Note existing Waste Management Facility on right side of photograph.

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Scenic Viewpoints

The following scenic viewpoints as described in the Kildare County Development Plan 2011-2017 have been identified within the study area and are indicated on Figure 10.1:

- Views to and from bridges on the Grand Canal.

As well as these specific viewpoints, the Kildare County Development Plan also mentions the sensitivity of views to and from waterways and to and from hills.

Areas designated for Ecological Importance – Natura 2000 sites

Special Areas of Conservation (SACs), proposed Natural Heritage Areas (pNHAs), and Special Protection Areas (SPAs) produced by the NPWS for County Kildare were taken into consideration in relation to designations at national level. While these designations are primarily concerned with ecological issues, their potential amenity value warrants assessment in terms of landscape value. The following Natura 2000 sites are located within the study area and are indicated in Figure 10.1:

Special Areas of Conservation (cSAC)

Ballynafagh Bog	000391
Ballynafagh Lake	001387

Proposed Natural Heritage Areas (pNHAs)

Ballynafagh Bog	001391
Ballynafagh Lake	001387
Grand Canal	002104

Natural Heritage Areas (NHAs)

Carbury Bog	001388
Hodgestown Bog	001393

10.3 POTENTIAL EFFECTS

The proposal is described in detail in Chapter 2 of this EIS. The following aspects of the scheme would potentially have landscape and visual effects on the site and surrounding areas:

- Buildings (maximum height 14.69m) including stacks (maximum 20m in height) and other structures;
- External hard standing areas, car parks and roads;
- Surface water management infrastructure; and
- Increase in traffic (but no physical change to the existing entrance from the R403 regional road).

10.3.1 Potential Effects of Configuration A (MBT with Composting)

10.3.1.1 Visual Effects

The extent of visibility of the proposed development is indicated with red lines on Figures 10.1.

Views in the immediate vicinity of the applicant site

The proposed MBT Facility would be visible at close range from the existing private access road to the Drehid Waste Management Facility within the Bord na Móna landholding as shown on Plates 3 and 4. The visual effects at such close range would be **substantial and negative**, but given the context of the site in the vicinity of the existing Drehid Waste Management Facility, the nature of the visual effects would be **neutral**. Long term visual effects may be mitigated by the retention of existing vegetation and the planting of new vegetation on site, see section 10.4 below.

Views from within 3km of the site

The viewpoints indicated in Plates 6, 7 and 8 and 10 would experience open or partial views of the proposed MBT Facility with resulting **negligible to moderate** visual effects.

The highest visual effects would be on views from the local road (L50222) to the immediate west of the application site. Views of the MBT Facility would be partial for most of this road, due to intervening screening and a viewing distance of over 1km (see Plates 5 and 6) with resulting **negligible** visual effects. However, views open up for the final approximate 500m of this road (see Plates 7 and 8) and as there is little intervening vegetation, open views of the MBT Facility would be possible. While this road is quite remote, there is one recently constructed house at the end of the road. The nature of visibility of the existing Drehid Waste Management Facility is indicated on Plate 7. The MBT Facility would be equally visible on the horizon, though appearing smaller. The resulting visual effects would be **moderate and negative** during construction and on completion of the MBT Facility from this location. The long term visual effects may be mitigated by the retention of existing vegetation, see section 10.4 below.

There is a short stretch of approximately 300m of road, 2km west of Timahoe, where the roadside vegetation opens up to reveal open views of the Bord na Móna landholding, regenerating scrub and the existing Drehid Waste Management Facility as shown in Plate 10. The upper parts of the proposed MBT Facility may be visible over the existing trees in the distance, but the visual effects would be **slight and negative**.

Apart from these two areas, the remainder of the study area, within a 3km radius of the site, would generally not experience any visibility of the MBT Facility. There may be some views of the upper parts of the proposal from the properties on roads along the edges of the bog where there is no intervening vegetation of significance between the viewpoint and the MBT Facility buildings, visual effects in these areas would be **slight and negative**. The forestry plantations ringing most of the Bord na Móna landholding and the flat nature of the landscape would generally screen the MBT Facility from the surrounding areas.

Views from 3km+ radius of the site

Carbury Hill is an elevated area, 7km to the northwest of the application site, within a generally flat landscape and, as such, commands distant views in every direction. Intervening mature vegetation would screen the proposed MBT Facility. This, combined with the effects of distance would render visual effects on this location as **negligible**.

The Hill of Allen, located approximately 10km south of the proposed site, similar to Carbury Hill, commands long distance views in every direction. The visual effects on views north towards the proposed development site is considered **negligible** due to intervening vegetation and the effects of distance.

There would be a **slightly negative** visual effect as a result of an increase in traffic movements at the existing entrance to the Bord na Móna landholding from the R403 regional road. The facility itself would not be visible from the existing entrance or the R403 regional road.

10.3.1.2 Landscape Effects

The landscape contained within the study area is sensitive to change. Any new proposal should avoid significant effects on the existing character of the landscape in terms of location, design and visual prominence.

The landscape character of the Bord na Móna landholding has undergone change – from an initially intact bog, to large scale peat extraction, to a landscape of regenerating cutover bog and more recently to one which includes industrial waste management. The permitted Drehid Waste Management Facility is located approximately 1km north of the MBT Facility site. The construction of the proposed MBT Facility is therefore not significantly uncharacteristic within the context of recent landscape character change and will therefore have **low to moderate negative** localised effects on landscape character.

Views from outside of the site boundary are limited. However, due to intervening vegetation, effects on the character of the wider landscape are generally negligible. The retention of as much of the existing tree/scrub cover as possible, and minimal interference with the existing

landscape outside of the MBT Facility site boundary, in conjunction with new planting will prove valuable in mitigating the landscape effects.

10.3.2 Potential Effects of Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The difference in the landscape and visual effects between Configuration A (MBT with Composting) and Configuration B (MBT with Dry Anaerobic Digestion and Composting) are considered **negligible and neutral** and therefore the potential effects for Configuration B are the same as the potential effects described in 10.3.1 above.

10.3.3 The do-nothing impact

All components of the environment are constantly changing due to a combination of natural and human processes. When predicting likely effects it is important to remember that there are two available for comparison: the existing environment and the environment as it will be in the future if no development of any kind were to take place – the ‘do nothing ‘ impact.

In landscape terms, if the MBT Facility were not constructed, the bog would continue to regenerate to form an area of established woodland.

10.3.4 Effects on Designated Areas

There will be no effects on any of the designated scenic routes and views and areas listed in section 10.2.6 above.

10.3.5 Construction effects

Short term visual effects during the construction stage would occur in the vicinity of the various scheme elements and along the roads where construction traffic will travel. The effects arising during construction will result from machinery, personnel, excavations and traffic movements and occur over the same areas identified in Section 10.2.3 & 10.2.4 above. The landscape and visual effects at construction stage will be **temporary, slight to moderate** and **negative**.

10.3.6 Cumulative effects

The following definitions are used to determine cumulative effects on visual effects.

Definition of types of cumulative effects
<p>In combination Where two or more features are seen together at the same time from the same place, in the same (arc of) view where their visual effects are combined.</p>
<p>In succession Where two or more features are present in views from the same place (viewpoint) but cannot be seen at the same time, together because they are not in the same arc view – the observer has to turn to see new sectors of view whereupon the other features unfold in succession.</p>
<p>In sequence Where two or more features are not present in views from the same place (viewpoint) and cannot, therefore, ever be seen at the same time, even if the observer moved round the arc of view, the observer has to move to another viewpoint to see the second or more of them, so they will then appear in sequence.</p>

Views from the L50222 road located to the immediate west of the MBT Facility as indicated in Plates 7 and 8 would experience cumulative visual effects in combination as the existing Drehid Waste Management Facility and proposed MBT Facility would both be visible. The resulting cumulative visual effect would be **moderate and negative**.

Views from the L50225 road to the north of the proposed MBT Facility as indicated in Plate 10 would also experience cumulative visual effects in combination as the existing Drehid Waste Management Facility and proposed MBT Facility would both be visible though at a greater distance and with more intervening vegetation. The resulting cumulative visual effect would be **slight and negative**.

Within the Bord na Móna landholding itself, when travelling along the access road to the existing Drehid Waste Management Facility, there would be cumulative effects in combination, succession and in sequence, although given the existing land use within the overall landholding, the cumulative effect would be **moderate and negative**.

10.3.7 Lighting effects

The introduction of lighting around the proposed development would bring a new element into the night landscape.

Landscape effects will be moderate to high and adverse in the immediate vicinity, as a currently dark night landscape would be replaced by a lit environment. The impact on views

from longer distances would reduce as one moves further from the development due to effects of distance, the MBT Facility lighting being seen in the context of the existing lighting at the existing Drehid Waste Management Facility and the screening effects of intervening topography and vegetation.

The visual effects on relevant nearest residences (nearest residence is approximately 1km from the site) with current views of an unlit part of the landholding would be moderate and adverse. There would be no significant effects on longer distance views as the development would be seen in the context with other clusters of built up and lit areas.

10.3.8 Effects arising from plumes being emitted from stacks

It is expected that white plumes will be released by the stacks on an intermittent basis. The visibility of plumes will depend on ambient air conditions and temperatures, which will also vary due to seasonal aspects. It is likely that the plumes would be more visible in winter, when ambient temperatures are lower.

The general landscape effects of the plumes would be moderate and the visual effects of the plumes would be slight-moderate, negative, and intermittent in nature.

10.4 MITIGATION MEASURES

10.4.1 Mitigation Measures for Configuration A (MBT with Composting)

10.4.1.1 Location

The location of the proposed MBT Facility generally provides good screening within the landscape due to its distance to sensitive receptors and the screening effects of intervening vegetation.

10.4.1.2 Landscape design

A landscape plan has been prepared for the site (Landscape Plan Dwg 601). This indicates:

- Retention of a strip of minimum 15m width around the MBT Facility Site boundary to retain and protect existing vegetation including details of fencing to protect existing trees;
- Gaps within the 15m wide strip along the site boundary are to be planted with a Native Woodland Planting Mix as per schedule to enhance existing screening of the site, and to establish a continuous band of woodland around the proposed MBT Facility Site to mitigate potential visibility from surrounding areas;
- Retention of excavated peat and subsoil on site and laid out as low mounds with sloping berms (Minimum slope 1:3). Mounds are to be left to regenerate naturally or to be planted with a Meadow Mixture (Suitable for Peatland or soil with a high peat content) or with shrubs and tree transplants. Where possible,

mounding will take place in spring to allow for the longest time for vegetation to establish before the following winter. All detailed mound design will be checked by a Geotechnical Engineer for stability;

- Areas of new native tree and shrub planting in the vicinity of the Administration and Welfare Building, entrance roundabout and car park;
- Areas to be left to regenerate naturally;

The key views to be screened are from the north and west. The retention and improvement of boundary vegetation along the northern and western parts of the application site will reduce the extent of the facility and facility traffic visible from these areas.

10.4.1.3 Colour, materials and lighting

The colour of the structures will be carefully selected to minimise visibility under the site conditions. A mid brown, or mid grey would be suitable for the main buildings, security fencing and a grey colour for the part of the stacks that extend 5.30m over the buildings in order to minimise visibility at long distances. Timber post with chainlink mesh security fencing will be used. All finishes will be matt.

The lighting design of the proposed development will be designed to minimise the effects of light pollution on adjacent areas.

10.4.2 Mitigation Measures for Configuration B (MBT with Dry Anaerobic Digestion and Composting)

The difference in the mitigation measures for potential landscape and visual effects between Configuration A (MBT with Composting) and Configuration B (MBT with Dry Anaerobic Digestion and Composting) are considered negligible and neutral and therefore the mitigation measures for Configuration B (MBT with Dry Anaerobic Digestion and Composting) are the same as the mitigation measures described in 10.4.1 above.

10.5 CONCLUSION

The most significant landscape and visual effects will occur in the immediate vicinity of the proposed MBT Facility Site, from the private access road leading to the existing Drehid Waste Management Facility and at identified locations between approximately 1 and 2km to the west of the site and 2km to the north of the proposed site.

These localised effects will range from substantial/high in the immediate vicinity of the proposed development site within the landholding and slight/low to moderate in the identified locations within 3km of the site. It is possible to reduce these effects through retention of as much existing vegetation as possible along the site boundary within the proposed MBT

Facility Site and the planting of additional native woodland. A Landscape Plan has been submitted indicating the proposed planting/mitigation proposals. The implementation of the plan will reduce the extent of the facility visible in identified views.

Overall, the site is well screened within the wider landscape and, apart from the locations identified in this Report with higher effects, landscape and visual effect arising from the proposed development is generally negligible.

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