APPENDIX 2

Noise Prediction Modelling Report

awn consulting

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Michael Wastson
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Dear Michael,

RE: KINGS TREE SERVICES – NOISE ASSESSMENT OF PROPOSED GREEN WASTE COMPOSTING FACILITY

We are pleased to forward the following comments in relation to noise due to the proposed King Tree Services (KTS) Green Waste Corrpositing (GWC) Facility at Coolbeg, Co. Wicklow.

1.0 INTRODUCTION

AWN Consulting Limited has previously issued a report reviewing a baseline noise survey carried out in the vicinity of the proposed development (Ref: BF/04/2169NR02). This document details noise predictions that have been prepared in relation to the site at nearby noise sensitive locations.

The proposed development involves the construction of a green waste cornposting facility at a worked out sand and gravel quarry in the townland of Coolbeg, County Wicklow. The green waste will comprise wood wastes generated by the KTS tree surgery business, garden and park waste produced during improvement and maintenance works by landscape gardeners, grass and shrub trimmings produced by individual householders and timber and wood waste recovered during construction and demolition works.

The site encompasses approximately 2.5 ha and will be occupied by the waste acceptance and cornposting areas, ancillary buildings including the reception office, workshop and weighbridge and parking areas . The majority of the site will, when the facility is operating at maximum capacity, be occupied by the cornposting process areas which will comprise the waste reception area, windrows, maturation area, finished product storage and a leachate storage lagoon.

The cornposting operation will involve pre-treatment to shred and mix the green waste, cornposting in open windrows, maturation and post treatment to remove impurities. The finished product will be suitable for horticultural and agricultural use.

There are three residential properties within 300m of the site. The nearest properties (two semi detached houses) to the site are approximately 150m north east of the northern site boundary. The third house is located across the N11 approximately 300m away to the east. The Beehive Public House is approximately 320m to the south east of the southern site boundary. There is a concrete batching plant located approximately 180m east of the eastern site boundary, between the site and the N1 1.

The proposed normal operational hours are 06:00 to 20:00hrs Monday to Friday and 06:00 to 18:00hrs on Saturday. The facility will not normally open on Sundays. However, due to the nature of the tree surgery business it may, on occasion, be necessary to operate outside these hours (for example to accommodate call outs to remove storm damaged trees and timber debris). Waste will normally be accepted at the facility between the hours of 08:00 and 18:00hrs.

2.0 NOISE CRITERIA

Given the nature of the development under consideration, appropriate guidance is taken from the EPA publication "Guidance Note for Noise *in Relation to Scheduled Activities*" as follows.

... the noise level *at sensitive locations should be kept below an* $L_{Ar,T}$ *value of 55dB(A) by daytime. At night, to avoid disturbance, the* noise *level at* noise *sensitive locations should not exceed an* $L_{Aeq,T}$ *value of 45dB(A).*

In summary, the following criteria apply at the façades of those noise sensitive properties closest to the development:

- Daytime (08:00hrs to 22:00hrs) 55dB $L_{Aeq,30min}$
- Night-time (22:00hrs to 08:00hrs) 45dB $L_{Aeq,30min}$

3.0 PREPARATION OF THE NOISE MODEL

As part of the assessment carried out in relation to this project a site noise model has been developed in order to predict noise levels associated with plant items. Details of the noise model software and the noise prediction calculation have be reproduced in the following sections for clarity and information purposes.

3.1 Noise Propagation Calculation

Brüel & Kjær *Predictor* Type 7810 is a proprietary noise calculation package for computing noise levels in the vicinity of industrial sites. Calculations are based on ISO961 3-2:1996 *Acoustics ▪ Attenuation of sound outdoors ▪ Part 2: General method of calculation.*

This method has the scope to take into account a range of factors affecting the attenuation of sound, including:

- the magnitude of the noise source in terms of sound power;
- the distance between the source and receiver;
- the presence of obstacles such as screens or barriers in the propagation path;
- the presence of reflecting surfaces;
- the hardness of the ground between the source and receiver;

- attenuation due to atmospheric absorption;
- meteorological effects such as wind gradient, temperature gradient, humidity (these have significant impact at distances greater than approximately 400m).

Calculations have been performed in octave bands from 63Hz to 8kHz as well as in overall dB(A) terms.

3.2 Brief Description of ISO9613-2: 1996

ISO9613-2:1996 calculates the noise level based on each of the factors discussed previously in Section 3.1. However, the effect of meteorological conditions is significantly simplified by calculating the average downwind sound pressure level, $L_{AT}(DW)$, for the following conditions:

- wind direction at an angle of ±45° to the direction connecting the centre of the dominant sound source and the centre of the specified receiver region with the wind blowing from source to receiver, and;
- wind speed between approximately 1ms^{-1} and 5ms^{-1}, measured at a height of 3m to 11m above the ground.

The equations and calculations also hold for average propagation under a well developed moderate ground based temperature inversion, such as commonly occurs on clear calm nights.

The basic formula for calculating $L_{AT}(DW)$ from any point source at any receiver location is given by:

$$L_{fT}(DW) = L_W + D_c - A \qquad \textit{(Eqn. 3.2.1)}$$

Where:

$L_{fT}(DW)$	is an octave band centre frequency component of $L_{AT}(DW)$ in dB relative to 20×10^{-5} Pa;
L_W	is the octave band sound power of the point source
D_c	is the directivity correction for the point source;
A	is the octave band attenuation that occurs during propagation, namely attenuation due to geometric divergence, atmospheric absorption, ground effect, barriers and miscellaneous other effects.

The agreement between calculated and measured values of $L_{AT}(DW)$ support the estimated accuracy shown in Table 1.

Height, h*	Distance, d†	
	0 < d < 100m	100m < d < 1,000m
0<h<5m	±3dB	±3dB
5m<h<30m	±1dB	±3dB

* h is the mean height of the source and receiver.
† d is the mean distance between the source and receiver.

N.B. These estimates have been made from situations where there are no effects due to reflections or attenuation due to screening.

Table 1 Estimated accuracy for broadband noise of $L_{AT}(DW)$

3.3 Configuration of the Noise Model

The input to the noise model was an overall site plan, a set of buildings, ground contours and noise sources.

The buildings in the model encompass those on the KTS site and nearby noise sensitive locations and facilities. These were input to the model using drawings supplied by O'Callaghan Moran & Associates as a background and superimposing the buildings.

Each noise source was input as sound power in octave bands. *Predictor* accepts sound power levels in octave bands from 63Hz to 8kHz.

Each source also has its own position, height and directivity.

3.4 Output of the Noise Model

Predicted noise levels are calculated for a grid of receiver points, and coloured iso-contours of the noise levels can be displayed, to give an overall picture of the spatial distribution of noise levels within the grid. Furthermore specific noise levels are predicted at noise sensitive buildings in the vicinity of the site.

4.0 IMPACT ASSESSMENT

In order to assess the impact of the proposed site internal layout changes the following information was used in order to develop the noise model further.

4.1 Building Information

Building extents and elevations based on drawings supplied by O'Callaghan Moran and Associates[1].

4.2 Noise Sources

The following items of plant are proposed for use on site.

Loading Shovel	A loading shovel will be used to transfer materials around the site and to load the finished product onto transport vehicles
Shredder	Waste may be sent through a coarse shredder in advance of the composting to enhance the composting process.
Hydraulic Excavator	An hydraulic excavator will be used to turn the windrows
Mobile Trommel	Compost will be sent through the trommel as part of the refinement process remove unsuitable materials.

[1] 0311701Surrounding Landuse.dwg

The pre-treatment and post treatment screening stages are potential significant sources of noise. To minimise impacts pre-treatment shredding and post treatment screening will be carried out on average 1 to 2 days a week. The waste reception area is designed to accommodate up to 5 days storage of fresh green waste at maximum capacity and the shredder will be of sufficient capacity to ensure that all of the stored material will be shredded in the 1 - 2 day period. Similarly, the screening plant will be of adequate size to ensure that the treatment is limited to 1 to 2 days a week.

Table 2 details the A weighted L_w spectra utilised in the noise model.

Identification	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1k	2k	4k	8k	
Front Loading Trommel	84	98	101	104	103	101	94	86	109
Screen Trommel	46	51	57	71	76	75	71	64	80
Wood Shredder	75	89	92	95	94	92	85	77	100
Front End Loader	76	82	80	94	91	91	87	77	98

Table 2 L_w dB(A) Levels utilised in assessment

Sound data that was inputted into the reconfigured model was based upon the following documentation.

- Information supplied by O'Callaghan Moran & Associates;
- Bies and Hansen, Engineering Noise Control.

4.3 Noise Predictions

4.3.1 Assessment Locations

Noise predictions for the revised layout have been carried out to the following locations detailed in Table 3. Figure 1 details the approximate positions of the assessment locations.

Location	Co Ordinates		Comment
	N	E	
1	328,065	191,338	Semi detached private residences 150m north east of site
2	328,065	191,257	Concrete batching plant 180m east of site
3	328,164	191,017	Private residence 300m east of site
4	328,030	190,761	Beehive Pub 320m south east of site
5	327,506	190,766	Coolbeg House south of site
6	327,201	190,753	Private residence south west of site
7	326,680	191,053	Private residence west of site
8	326,866	191,466	Private residence west of site
9	326,908	191,755	Private residence west of site
10	327,863	192,017	Private residence north of site

Table 3 Noise Assessment Locations

4.3.3 Predicted Noise Levels

Table 4 details the predicted noise levels at Locations 1 through 10.

Location	Octave Band Centre Frequency (Hz)								dB(A)
	63	125	250	500	1000	2000	4000	8000	
1	25	32	34	37	35	31	19	--	42
2	26	34	35	39	37	34	24	--	43
3	28	33	34	38	40	38	24	--	44
4	21	32	34	37	36	32	18	--	42
5	26	32	31	35	39	36	20	--	42
6	23	24	25	29	32	28	8	--	36
7	18	18	20	24	26	20	--	--	30
8	19	19	22	25	28	22	--	--	32
9	18	19	21	25	27	21	--	--	31
10	20	25	30	34	31	25	--	--	37

Table 4 L_p dB(A) Noise Levels at Sensitive Locations

Predicted noise levels from plant items are in the range of 30 to 44dB L_{Aeq}. All predicted levels are within the relevant day and night time criteria detailed in Section 2.0.

4.4 Car Parking On Site

In this instance the car-parking facilities for the development will be provided by means of a surface car park area located on the eastern corner of the proposed site between. Noise level measurements have previously been conducted in the vicinity of car parks in support of other planning applications. The typical noise level 10m beyond the boundary of these car parks during busy daytime periods has been found to be of the order 48dB $L_{Aeq,30min}$

Taking into account the attenuation due to distance and screening, the predicted noise level at the nearest noise sensitive locations (i.e. Location 1) beyond car parking areas is 24dB $L_{Aeq,30min}$.

These levels are within the daytime criterion of 55dB $L_{Aeq,30min}$. It is not anticipated that there will be significant activity within car park areas during night time periods.

In summary, the likely noise impact of car parking on the local environment is not significant.

4.5 Noise Contours

Appendix A details noise contours in relation to the site. Predictions indicate that the proposed site will not result in noise levels at sensitive properties that exceed the relevant criteria.

5.0 SUMMARY

Noise predictions have been prepared for a number of sensitive locations in the vicinity of the site. Predicted noise levels at these locations are within the relevant noise criteria associated with the site.

Noise contours based on noise levels associated with plant items bays have been presented in Appendix A for information purposes.

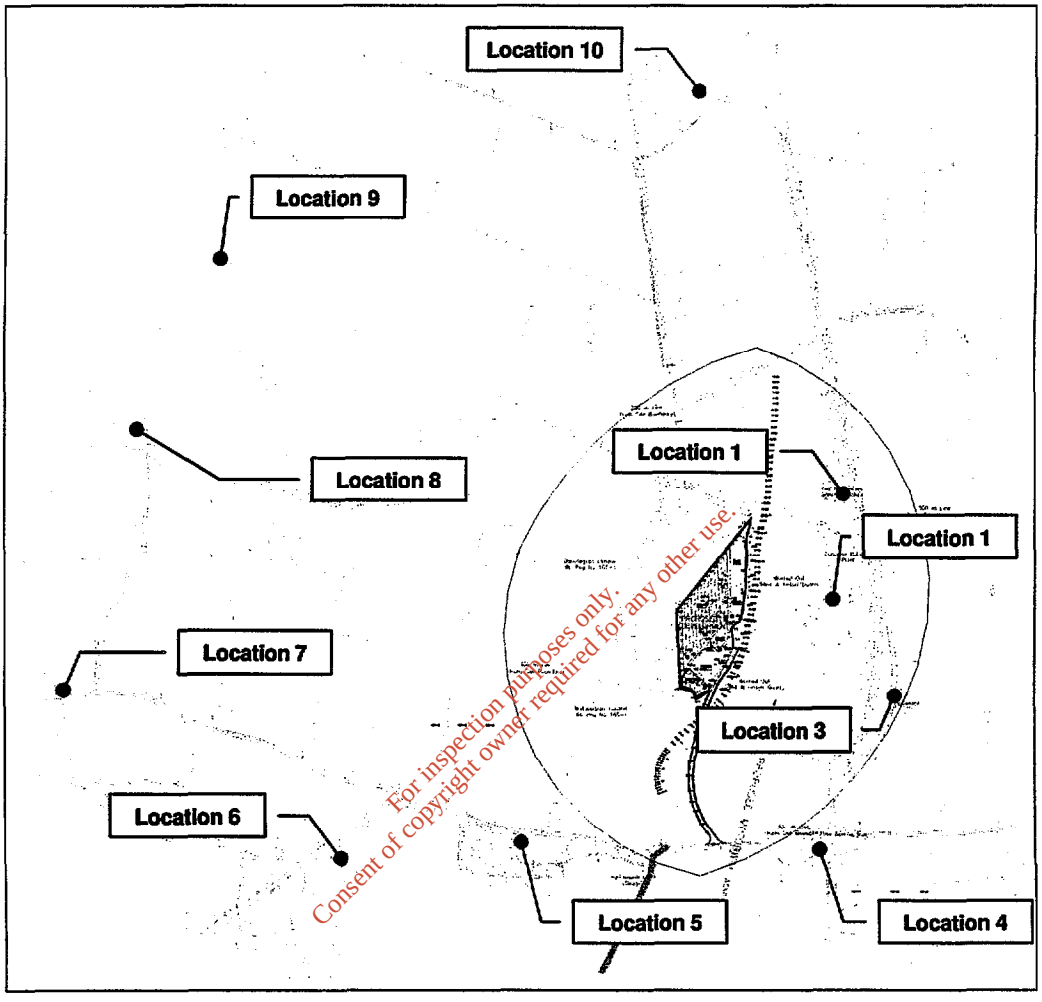
Please do not hesitate to contact this office if you have any further queries in relation to issues highlighted in this document.

Yours sincerely,

DAMIAN KELLY
Senior Acoustic Consultant

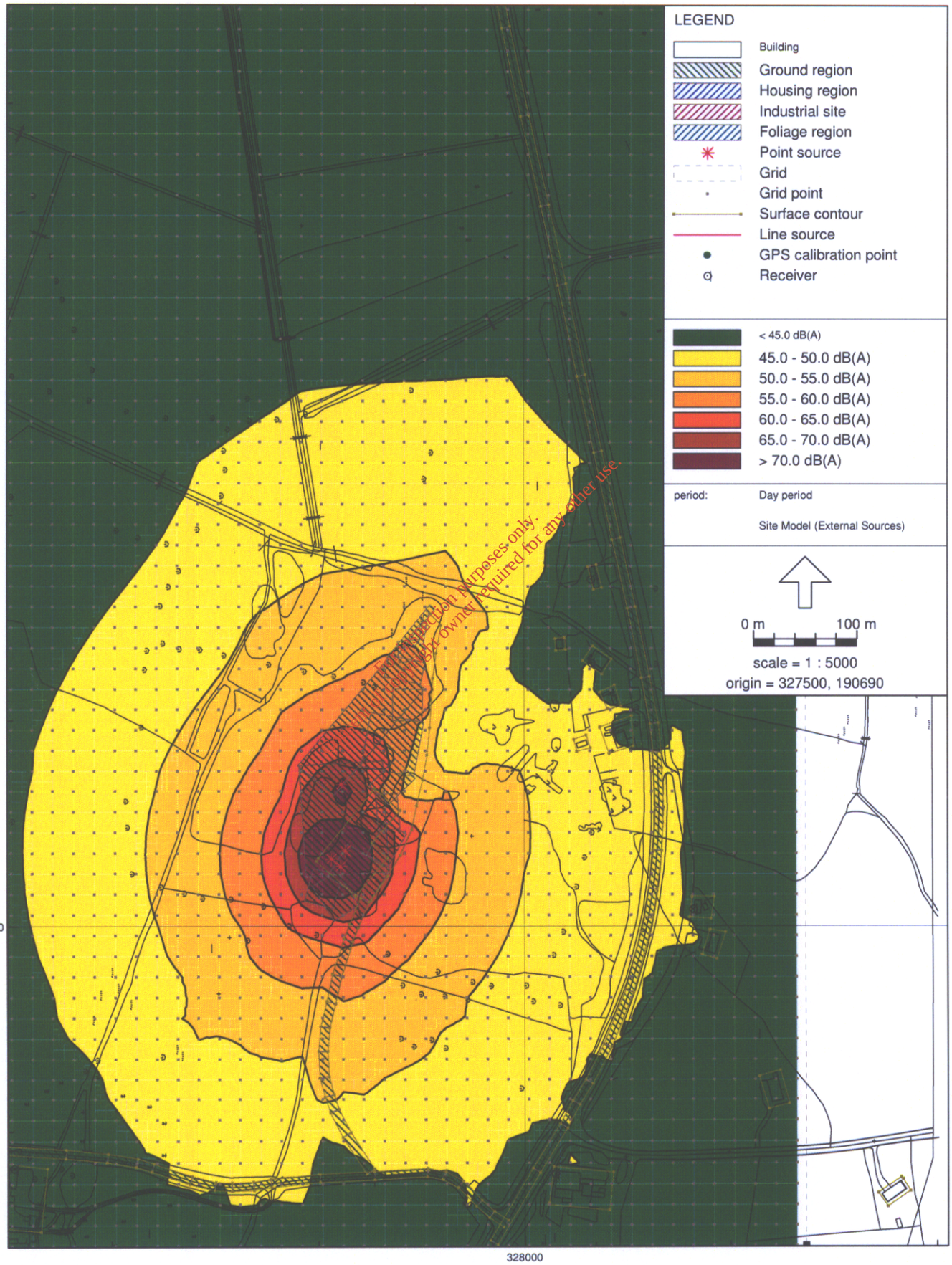
TERRY DONNELLY
Senior Acoustic Consultant

FIGURE 1
ASSESSMENT LOCATIONS



APPENDIX A
SITE NOISE CONTOURS

KTS Green Waste Compsoting Development



Industrial Noise - ISO 9613.1/2, KTS Noise Model - KTS Noise Model - Site Model (External Sources) [C:\DOCUME~1\dkelly\Desktop\DKACTI~1\05_248~1\Model] , Predictor Type 7810 V4.10