PLANNING APPLICATION
FOR
IN-VESSEL COMPOSTING
AT
BROWNS ROAD, DAVENTRY
BY
EARTHWORM LIMITED

PLANNING STATEMENT including
DESIGN AND ACCESS STATEMENT
FLOOD RISK ASSESSMENT
AND WASTE MINIMISATION STRATEGY

December 2008
CONTENTS

PLANNING APPLICATION FORMS

DRAWINGS
GPP/BL/BR/08/01 Site Location
GPP/BL/BR/08/02 Site Plan
6109 - 01 Site Survey Plan
6109 - 02A Proposed Site Layout
6109 – 03 Maturation hall floor plan
6109 – 04 Reception building floor plan
6109 – 05 Sections
6109 - 06 Proposed Elevations

1. THE PROPOSED DEVELOPMENT

2 DESCRIPTION OF THE SITE AND ITS SURROUNDINGS

3 THE COMPOST PROCESS

4 PLANNING POLICY CONTEXT
Compliance with national and development plan policies
Design criteria compliance

5 MITIGATION OF ENVIRONMENTAL IMPACTS
Traffic and highway impacts
Landscape and visual impacts
Flood Risk Assessment
Surface and groundwater
Nature and archaeology
Air emissions
Noise
Lighting

6 CONCLUSIONS

DESIGN AND ACCESS STATEMENT
Use
Amount
Layout
Scale
Landscaping
Appearance
Access

APPENDICES
Appendix 1 Photographs of proposed infrastructure
Appendix 2 The VCU plant
Appendix 3 Planning policies and design criteria
Appendix 4 Landscape and visual impact report
Appendix 5 Flood Risk Assessment
Appendix 6 Bioaerosol report
Appendix 7 Waste minimisation strategy
1. **The Proposed Development**

1.1 The proposal is to construct an In-Vessel Composting (IVC) plant for the composting of 21,000 tonnes of mixed biodegradable municipal waste, with kitchen waste included and similar waste collected from commercial sources in and around Daventry. The chosen technology VCU™, originally developed in New Zealand, now manufactured in the UK and in use on 15 sites in the UK and Ireland, meets all of the requirements of the Animal By-Products Regulations (ABPR), with a number of sites having full accreditation.

- The site location is shown on plan GPP/BL/BR/08/01;
- The application boundary is shown on site plan GPP/BL/BR/08/02;
- The detailed site layout is shown on Drawing 6109 – 02A;
- A floor plan of the maturation building is shown on Drawing 6109-03;
- A floor plan of the reception building is shown on Drawing 6109-04;
- Cross sections are shown on Drawing 6109-05;
- Elevations are shown on Drawing 6109-06;
- The proposed infrastructure is shown on Photographs in Appendix 1;
- A detailed description of the composting process is included in Appendix 2;
- Relevant planning polices are set out in full in Appendix 3;
- A PPS 25 Flood Risk Assessment is included in Appendix 4;
- A detailed report on bioaerosols is included in Appendix 5.

1.2 The proposed development comprises the following elements:

- A waste reception building, approximately 36 m by 23m by 8.8m to the ridge. In this building the incoming waste will be emptied out of the delivery vehicle; sorted to remove any obvious contaminants such as plastic, metal; shredded and mixed to produce the best possible combination for composting.
- A fully enclosed conveyor will transfer materials from the reception building to the VCU units.
- There will be 10 VCU’s (Vertical Composting Units).
- A further enclosed conveyor will move materials from the VCU’s to the negatively pressured, biofiltered, maturation building, which will be 32m by 46m by 9.3m to the eaves.
- A biofilter will be installed to control emission of bio-aerosols and odour. This will be sited beneath the conveyor from the VCUs, within the maturation building.
- A further fully enclosed conveyor will run directly between reception building and the maturation building.
- A security fence 2.4m high will be erected around the site boundary, using weldmesh to minimise its visibility.
- The operations will diversify the business of Burnham Landscapes Limited, providing an outlet for materials from their landscaping business, and a service to local business and councils.
• The compost product will be predominantly used by the landscaping business and also spread on the land by local farmers.

2. **Description of the site and its surroundings.**

**Site Location**

2.1 The site presently has planning permission for use as in conjunction with the applicant’s landscaping business, which is run from the office building immediately south of the application site. The site adjoins the Ford premises on the western side of Daventry, and is separated from it by a screening bund; the façade facing the site accommodates the lorry loading bays. Immediately adjacent to the south is the Household Waste Recycling Centre on Brown’s Road. To the west there is a track, which leads to fields beyond, along which runs a public footpath. West of the track the land has been filled and is barren, beyond which there is a farmhouse and buildings, at a distance of 140m. To the north the land is now part of Kentle Wood, which has recently been planted as a community woodland, with public access via the footpath. To the south west there is a sports ground and football pitch.

**Sensitive receptors**

2.2 The nearest residential property is located due west, at a distance of 140m. The offices within the Ford complex are on the far side of the warehouse unit and thus well screened by the building. The leisure facilities are used intermittently and by different people at different times. The Household Waste Recycling site has permanent employees, who will be screened from the development by Burnham Landscapes existing office building.

**Access and highway network**

2.3 The site has access from Browns Road, which has direct access to the strategic highway network around Daventry at the roundabout which is only 500m to the south.

**Sites of ecological interest**

2.4 There are no statutory sites of nature conservation interest within 500m of the site and there are no known water bodies within this distance.

**Sites of historic interest**

2.5 There are no listed buildings or conservation areas within 500m of the site.

**Surface and groundwater**

2.6 There is no surface water within 500m of the site and it is not within groundwater protection zone.
3. The composting process.

3.1 The process involves four main stages; reception and shredding, in-vessel composting; maturation of compost and final screening. A detailed description of the VCU plant is included in Appendix 2.

Housed waste reception and shredding

3.2 All green and catering waste will be received inside the waste reception building. Once the delivery vehicle is inside the building, the waste will be emptied onto the floor of the building, where it will be checked for obvious contamination, in the form of plastics, metal, or other non-biodegradable materials. Any contamination will be removed by hand or machine and placed inside a covered, sealed container that will be sited outside. Air from the building will be vented under the concrete yard into the biofilter in the maturation building, to prevent odour and minimise bioaerosols.

3.3 Materials will then be shredded to 12mm as per the requirements of the ABPR. If the incoming material is very high in Nitrogen (leafy green waste) it will be blended with shredded woody waste that is high in Carbon, to achieve the best possible ratio of C:N, which will maximise the
efficiency of the composting process. The correctly blended mix will then be fed out of the blender into the top of the VCU plant by a fully enclosed conveyor.

**Vertical Composting Unit vessels.**

3.4 Materials will move on the fully enclosed conveyor to the VCUs. Individual batches will remain resident in the vessel for several days, where each daily batch will be required to reach 70 degrees for 1 hour. In practice 10-15% of the volume held in each vessel will be removed from the bottom of the unit each day, giving the material approximately a 7-8 day composting period. This ensures a high quality product at the end of the process. Whilst in the vessel, materials start at the top and gradually work their way down, over the residency period.

**High temperature phase:** Heat energy generated by intense microbial activity in the top part of each chamber, aided by the updraft of warm air from lower down evolves temperatures of over 70°C thus meeting the requirements ABPR. Fats, waxes and cellulose are liquefied at these high temperatures, softening material for microbial degradation.

**High aeration phase:** The bottom of the chamber sits at a relatively constant 40-50°C, as a result of curtailing metabolic activity and higher airflow. With air being drawn through the base of the chamber this phase experiences the highest and freshest airflow. Air will be exhausted to atmosphere. but at high temperature it is not odorous and it will rise rapidly into the atmosphere and be dissipated.

**Maturation**

3.5 Materials that have completed the In-Vessel phase of composting (which due to the processing through the VCU are sanitized in accordance with ABPR) will then be moved by fully enclosed conveyor from the VCU vessels to the maturation building. Here the material will be arranged in windrows, on a concrete pad containing a negative aeration system. This will draw air down through the windrows ensuring that the process remains aerobic. The air drawn down through the compost will then be passed through a biofilter thus removing the likelihood of fugitive emissions from the maturation building. This stage is likely to take 5-6 weeks, depending upon the nature of the end product sought.

**Screening**

3.6 Once the composting process is complete, the material will be screened. This will remove any residual plastic and oversize pieces that have not fully composted to the desired size. For material that will be spread on farmland, the screen will be set to sort product at 0-20mm and 20-40mm particle sizes. Oversize material will be re-introduced into the beginning of the process, so that it can be shredded and re-composted.
Compliance with ABPR and protection of surface and groundwater

3.7 The proposed buildings will be capable of being completely enclosed and sealed, preventing any movement of air, water or vermin/birds in and out. This is also true of the vessels in which the active phase of composting will take place. At the door openings, there will be a 300mm roll-over bund, to prevent any escape of water. The floors will be laid to a drain and thus to an underground tank, which will be capable of collecting all water that drains of delivered material. The buildings will be sealed to minimise the risk of access by birds and vermin, but in the event that vermin get into the building, there will be bait-boxes to trap them.

4 Compliance with planning policy.

4.1 The relevant policies are set out in the Northamptonshire Waste Local Plan (relevant policies are included in full in Appendix 4). The need for a new facility has become apparent in discussions with commercial operations in the locality and the District Council. Although four in-vessel composting plants have been granted planning permission in the county, it is known that the one at Theddington will not now be built and of the remaining, two are near Corby and one near Brackley. There are no facilities in or near Daventry to serve the local market and the District as a whole.

4.2 Composting supports the waste hierarchy, providing a sustainable waste management option for biodegradable municipal and commercial waste. As new in-vessel composting facilities are established around the county, waste will increasingly be dealt with closer to its source of arising, in compliance with the proximity principle and the meeting of local needs.

4.3 The proposal represents composting on a commercial scale.

4.4 By completing the active composting phase inside fully enclosed units and the maturation phase inside a building vented via a biofilter and with all materials movements between stages being via covered conveyors, the risks of generating bioaerosols and odour will be greatly reduced.

4.5 The suitability of the access road will be addressed in the section on traffic impacts.

4.6 Daventry District Plan, which was adopted in 1997 is still the relevant local plan for the site. The site is shown on the Proposals Map as white land, for which no specific policy applies.

Compliance with Waste Management Facilities Strategy

4.7 In accordance with guidance set out in Northamptonshire Council’s Supplementary Planning Document – Development and Implementation Principles the following describes
how the proposal is in compliance. The elements of the strategy, as set out in the SPD, are quoted in italics below.

**Waste hierarchy** – *System of preferential sustainable waste management options where prevention and minimisation are the most preferred, followed by re-use, recycle and composting, energy recovery with disposal to landfill being the least preferred option. The hierarchy acts as a guide and in most circumstances a combination of the above management options may be required to deal appropriately with wastes generated.*

The planning system and the development of new waste facilities cannot easily influence the prevention and minimization of waste.

The composting of biodegradable waste, both commercial and municipal, to produce a useful product will move the treatment up the waste hierarchy.

**Proximity principle** – *Waste should be disposed of as close to its source as possible.*

It should be noted that the Proximity principle is no longer an objective of the National Waste Strategy; it was removed when the Waste Strategy was reviewed and re-issued in 2007. All development plans approved prior to this date have thus been superceded by this change.

The site is close to sources of waste in Daventry and surrounding area, so complies with the proximity principle.

**High quality innovative design** – *Waste management facilities should be of high quality, innovative design, sympathetic to surrounding built environment and incorporate sustainable development practices (including materials resource efficiency). Design of facilities should accommodate potential for future change in waste management methods, collection processes and occupation or function of the individual buildings and development.*

**High quality design:**
As far as possible, the detailed design of the complex of new structures will use features that are typical of modern agricultural buildings and structures, so that the complex is not out of keeping when viewed from the open countryside.

**Holistic design:**
The complex and layout of new structures has been designed for maximum efficiency, both in terms of the function of the structures and their use by staff.

**Local distinctiveness:**
The surrounding area is partly open countryside, with fields bordered by hedgerows and a large block of newly planted woodland, and partly commercial with a huge distribution warehouse on the land to the east. The buildings have been designed to fit between the countryside and commercial setting.

**Sustainable development:**
The proposal to carry out in-vessel composting will provide a facility that will facilitate diversion of biodegradable material from landfill and the creation of a product that will provide significant soil enhancement benefits, both of which are fundamental components of sustainable development.

The scheme will collect water that can then be used, as necessary in the composting process, thus minimising the use of mains water.

The choice of a site on the edge of Daventry, but beyond the built-up area minimises the distance travelled by the waste. Compost product is to be used by the operator's landscaping business or for supply to nearby farmers, thus reducing the need for road transport.

**Strategic site layout:**
The footprint of the site has been kept to a minimum, by the following means: using Vertical Composting Units; using a system of forced air maturation in bays within a building, thus eliminating the need for outdoor space for maturation windrows and using conveyors to transport the material from the reception building via the composting units and into the maturation building.

**High quality landscaping and boundary treatments:**
There is limited space within the site to provide additional landscaping, therefore only a small amount of new planting is proposed; this will comprise a hedge on the outside of the security fence, which will include some medium sized trees and some poplars. To provide an effective screen while the hedge becomes established, it is proposed to plant climbers such as clematis, to grow up the security fence. This planting will soften the appearance of the buildings when viewed from the west. The site borders the newly planted community woodland known as Kentle Wood and there is a mature row of poplar trees along the western edge of the track that runs alongside the application site. Within the next 5 – 10 years the new trees within the woodland will grow to a height that will fully screen the proposed buildings from views from the north.

**Effective buffers:**
There is an existing low, grassed bund, approximately 20m wide on the western boundary of the Ford distribution warehouse site, which will provide a buffer to the delivery and collection
operations that take place on the west side of the warehouse complex. The existing office building and car park of Burnham Landscapes will provide a buffer to the Household Waste Recycling site to the south. There is a distance of 140m to the nearest, isolated farmhouse to the west, with open land bounded by hedges and trees in between.

**Lighting:**
See section 3. It is suggested that a detailed scheme be submitted for approval in the event that planning permission is granted.

**Sustainable transport:**
All compost product will be used either within the landscape contractors business or on local farmer’s fields. Compost removed as part of the landscaping business will be taken out on vehicles that would otherwise leave the site empty, therefore the amount of traffic movements generated by this proposal will be minimised. The nature of the waste inputs is such that there is no opportunity to use transport other than lorries.

*Adequate space and access* – Provision of adequate space for, and access to, facilities for separation, storage and collection of waste. Consideration of access to the major transport network (including rail and water facilities) where relevant.

An adequate access can be provided; see plan 6109 – 02. There is adequate space for the public footpath within the length of Browns Road that is owned by the County Council therefore there should be no conflict between walkers and traffic in and out of the application site. A revised access in to the site will be adequate to accommodate the lorry traffic, thus avoiding the need for lorries to wait within Browns Road. No general public access will be permitted to the site, in accordance with the requirements of the Licences to be issued by the Environment Agency and Animal Health Service. However, the public will be encouraged to visit the site for guided tours.

*Provision of complementary facilities* – The provision of waste management facilities should complement and support existing neighbourhood facilities and services and waste management infrastructure network. Adequate provision should be made for ongoing maintenance and management of facilities.

It is not appropriate to seek to locate in-vessel composting operations on sites within urban areas, due to the need to provide buffer zones from sensitive receptors and to have easy access to land on which to spread the compost product. The site is integrated with the town by using existing premises on the built up edge.

*Public safety* – The design, layout and landscaping components associated with waste
management facilities should seek to ‘plan out crime’ by creating safe and secure environments, increasing the risk of detection of criminal or antisocial activity, and make crime more difficult to commit.

The public will not be allowed access to the site, other than as part of organised visits. These visits will be conducted to ensure the safety of the visitors. All new waste facilities require a Permit from the Environment Agency. A standard requirement of any Permit is that the waste site must be secure, to prevent vandalism and the risk of environmental contamination.

**Environmental protection and enhancement** – Avoid adverse impacts on the surrounding environment and human health, or where this is not possible minimize and mitigate where necessary. Ensure that the environment has the capacity to accommodate the development without harm and maximise beneficial outcomes aiming for a net environmental benefit as a result of the new development.

Section 5 of this Supporting Statement sets out the range and type of environmental impacts and how these can be managed and mitigated to avoid adverse impacts.

**Environmental education** – Maximise opportunities for environmental education and promote awareness of sustainable waste management.

In the detailed layout within the building, provision will be made for guided visits by members of the public, school trips and other parties.

5 **Mitigation of environmental impacts.**

**Traffic**

5.1 The proposals will generate the following average numbers of movements;

(Based on assumed average input of 5 tonnes per load.)

Inputs: 21,000 tonnes per annum.

Divided by 286 delivery days (52 weeks at 5.5 working days per week) = 73 tonnes per day

Divided by 5 = 15 per day deliveries

Outputs: Assuming a volume reduction of material of 50% after composting, 10,500 tonnes per annum will be generated. Most of this material will be exported by the landscape contracting business on vehicles that are already accessing the existing site. Some material may need to be moved off site to local farms, which is likely to either be by tractor and trailer or in bulk loads of 20 tonnes. If all of the material was removed in bulk loads this would generate 1.5 loads per day.

Therefore an average of 15 deliveries (30 movements) and 1.5 exports (3 movements) per day
will be expected.

5.2 Due to the seasonal nature of the composting business, especially in connection with greenwaste portion of the inputs, the actual number of daily movements will vary. A suggested maximum of 35 deliveries, and 4 exports (78 movements in total) will occur on any one day. At this level and assuming most activity will take place between 8am and 4pm, the rate would be approximately 5 inbound vehicles per hour.

**Landscape and Visual Impact.**

5.3 The site is situated within the Daventry town area, and as such is not defined as a particular area of landscape within the Northamptonshire Landscape Character Assessment. However, the site adjoins an area of countryside characterised by rolling hills, farmland, and scattered agricultural related built development, hedgerows with trees, and occasional leisure and commercial developments. A detailed assessment is included in Appendix 4.

5.4 In keeping with the predominantly farming activity to the west of the site, the proposed buildings will be designed to have the appearance of modern agricultural buildings, which will be appropriate for the setting between farmland and the backdrop of the large scale industrial use at Ford. Views are, and will be, available from the adjoining footpath, but are in the context of an already developed site, against the background of the Ford premises to the east of the site. To the west, the site is screened by a row of mature poplar trees running north south, 5m to the west of the site boundary.

5.5 There will be no outside activity other than the movements of delivery vehicles; all processing activities are to be carried out indoors.

5.6 The visual impact of the proposal will be limited to the buildings on the site and delivery vehicles. The buildings will be of a style consistent with the agricultural activities on land to the west, and relative to the context of the Ford building to the east of a very small scale.

**Flood Risk Assessment**

5.7 The site is not at risk of flooding, as it is on high ground well clear of any flood plain. A Flood Risk Assessment that complies with the requirements of PPS 25 is included in Appendix 5.

5.8 The additional area of roof will increase the run-off rate, although the yard will be surfaced with permeable block paving underlain with a cellular storm water sustainable storage system for collection and retention of water for on site use in the composting process. The composting process will often require the addition of water and to minimise the use of mains water, as much site water will be collected as possible. Bunding the site surface and collecting the run-off will prevent the escape of water off-site.
Surface and groundwater protection.

5.9 The site is not within a groundwater protection zone. All contaminated water from within the process areas will be collected in a storage tank, re-used in the process, or tankered off site. All run-off from the building will be directed to tanks, and overflow directed to surface water drains, which will be fitted with an interceptor.

5.10 The building will be constructed with measures to prevent water escaping and will drain to an underground, sealed tank, which will collect any water from the waste deposited inside the building. The water from the tank will be used to irrigate dry material when it is put into windrows inside the building, to ensure that the correct moisture level is achieved to ensure optimum composting rates and effectiveness.

Nature and archaeological conservation

5.11 There is no known archaeological interest at the site. The use of the land as a landscaping business’ yard means that there are no plants of nature conservation interest. There are no known badger setts or habitats likely to contain other protected species.

Air emissions

5.12 These impacts will be largely controlled by carrying out the composting operations inside the buildings and enclosed structures, with air from the reception building and maturation building being vented via the biofilter. The process will need a Permit from the Environment Agency and a Licence from the Animal Health Service. The controls imposed by such licences will mean that all of these impacts will be managed to avoid any adverse environmental effects.

5.13 The nearest housing (a farmhouse and buildings) is over 140m away, to the west of the site and therefore generally upwind, and therefore it is unlikely to experience any adverse levels of odour, dust, litter or pests, even were these to escape beyond the site boundaries.

5.14 A full desktop bioaerosol report has been prepared and submitted in conjunction with this application. The report is enclosed at Appendix 7. It concludes that there will be no significant impact upon the potential receptors in the locality.

Noise impacts

5.15 Noise from shredding the incoming waste and turning the windrows will be contained within the proposed buildings. The only noise generated outside will be from delivery vehicles, and from the conveyors transferring materials between the reception building, VCU’s, and Maturation building however as these conveyors are electrically powered the noise generation is minimal. The risk of adverse impacts on the only resident in the locality will be minimised by operating the site within the following hours:
• 07.00 to 19.00 Monday to Friday
• 07.00 to 13.00 Saturday
• 08.00 to 13.00 on occasional Sundays and Bank Holidays for the receipt of waste from Household Waste Recycling sites during the peak periods for green waste collection

**Lighting**

5.16 To enable the site to operate during the winter, floodlights will need to be installed. These will be downward facing, 500w lights mounted on the building. They will only be used during the hours of darkness, when the site is operational; they will be controlled by a timer, which will switch them off at 7.00pm, leaving the site in darkness overnight to avoid adverse impacts on the wildlife. This will have the benefit of not drawing attention to the facility and thus assisting with site security. No fixed lights will be needed in the composting yard, as work here during the dark can be adequately illuminated by headlights on the mobile equipment.

6 **Conclusions**

6.1 The development complies with national, regional and local policies for the diversion of biodegradable waste away from landfill and will assist local authorities to meet their targets for recycling/composting of municipal waste. It will provide a local facility to serve commercial premises in Daventry and its surrounding area.

6.2 The additional buildings will fit in with the Ford industrial buildings, in terms of scale and design.

6.3 The proposed building will be visible from the farm to the west of the site, and the football pitches to the southwest, but will be against the backdrop of the Ford premises which dominates the skyline. Existing trees and hedgerows to the west will minimise the impact of the development from the farm and the new woodland will in a few years time screen the development from the open countryside beyond.
DESIGN AND ACCESS STATEMENT.

Introduction
This Design and Access Statement has been produced to accompany the application being made by Earthworm, in accordance with the requirements of Section 42 of the Planning and Compulsory Purchase Act 2004. Reference has been made to DCLG Circular 1/2006 Guidance on Changes to the Development Control System and to the Commission for Architecture and the Built Environment (CABE) publication Design and Access Statements – how to write, read and use them (2006). Together with the Supporting Statement, this Statement forms an integral part of the planning application for the proposed development.

The overall aim for the proposed development is to utilise existing commercial land to create an in-vessel composting facility, which minimises any impact on the main visual receptors and avoids degradation of the landscape character, whilst meeting the operational needs of the facility. The main issues relating to impact are addressed in the Supporting Statement, which should be read alongside this Statement.

The following headings comply with the guidance provided in the CABE publication.

Use of Site.
The existing and proposed activities at the site are described in Sections 1 and 2 of this Supporting Statement.

Amount
The proposal is to construct a waste reception building, with a floor area of 828m², 8.8m to the ridge, a maturation building of floor area 1472m², 9.3m to the ridge. In addition to VCUs will be installed, occupying a total floor area of 85m². A biofilter of 13m x 7.5m x 3m will be positioned inside the maturation building, and a covered conveyor will join these three structures.

Layout
The site is designed to maximise efficiency. The buildings are laid out to enable the process of sorting, shredding, composting, maturation and finally screening to be carried out using the Best Available Technique (BAT) principle to manage impacts on the locality, and produce a high quality product.

Scale
The proposed buildings will have the scale and appearance of a large, modern agricultural building, which when seen in the context of the countryside to the west and the large Ford premises to the east, will fit with its surroundings.
Landscaping
The site is already screened to a degree by the stand of poplars to the west. A fence and hedge will be erected along the western boundary to limit the impact on users of the footpath which runs along this boundary. The site is separated from the Ford premises by a large earth bund covered in grass, which minimises visual intrusion from that direction. To the north, the site is screened by the planting of the new community woodland, which abuts the northern boundary of the site. To the south, the existing building will screen the proposed structures from the users of the household waste recycling centre along with existing landscaping to the southern boundary of the Burnham Landscaping site.
A new hedge will be planted between the lane and the security fence along the western boundary of the site, using the following species:

- Crataegus monogyna – Hawthorn - 60%
- Betula pendula – Silver birch – 10%
- Ilex aquifolium – Holly – 5%
- Corylus avellana – Hazel - 10%
- Prunus spinosa – Blackthorn – 10%
- Acer campestre – Field Maple – 5%

All will be 60-90 Bare Root stock with the exception of the Ilex which will be 2L/3L Container Grown.

Clematis vitalba will be planted along the fence, to provide an screen while the hedge and trees become established.
Alongside the Maturation Building, Carpinus fastigiata – Upright Hornbeam, will be planted at 5m centres, using large standards.

Appearance
The buildings will be designed to reflect the agricultural land and operations to the west. They will be clad in a profiled steel cladding coloured Juniper Green, with a pale grey roof.

Access
It is intended in carrying out the development of the site to enable easy access for vehicles and pedestrians and give good visibility across the entire area. The site is well spaced out giving plenty of manoeuvring room for vehicles. There is to be no general public access to the site, which can be controlled by the weighbridge office near the point of entry to the site. As there will be heavy plant and machinery operating on the site, a large part of the site will be unsuitable for access other than by able-bodied persons. A ramp will be provided, should the need arise, for access to the weighbridge office.

Educational visits will be facilitated, but access would only be in organised parties and guided by the operator.
Appendix 1

Photographs of the proposed infrastructure
- taken at a site in Aberdeen prior to commencement of operations

Building style

Vertical Composting Units
Top of the Vertical Composting Units, showing enclosure.
Inside the reception building

Inside the maturation building
Appendix 2.

The VCU plant

VCU™ System
The VCU™ (Vertical Composting Unit) is an in-vessel, aerobic composting system capable of processing most kinds of organic waste in a safe and cost-effective manner. The process occurs without emitting malodour or leachate from the chamber. Waste is processed on varying cycle times, depending on the application, to produce a product that is odour-stabilised, free of pathogens and seeds. The system is modeled on the natural process of biodegradation, whilst structuring the active mass in such a way that efficiencies of time, space, energy and labour are achieved.

Physical Parameters
The essential component of the VCU™ system is the VCU™ chamber. The dimensions of a single VCU™ chamber are 2.4m x 2.4m x 5.2m. The overall height of a VCU™ system is 10m since the chamber is elevated off the ground and conveyors extend above the chambers for the purpose of feeding. With a throughput of up to 8t per day/per chamber, the low land requirement allows the system to be operated in places where space is a limiting factor.

The chamber is weather, vermin and insect proof, with insulated walls and works on plug flow principles whereby each day waste is fed in and compost is taken out of the chamber. Waste is loaded into the top of the chambers; the product is harvested from the bottom. The amount of material removed dictates the amount of waste that can be fed in. This open-bottomed system allows for air to be drawn through the base. The system does not require agitation, biofiltration, external heating or oxygen injection. This means mechanical inputs are reduced and operational and maintenance costs are kept to a minimum.

VCU™ technology is entirely modular. A standard 30m³ chamber is used to build a multi-chambered facility, so that an 11 chambers row shares the same feed and discharge systems. This allows for significant flexibility, as a facility can be grown as the volume to be processed increases. Increasing capacity is therefore a simple and cost effective exercise. Additionally, independent chambers within the same facility can be run on varying cycle times and on different waste materials.

Mechanical and Control Features
The VCU™ is a robust piece of machinery and plants are built to last for at least 15 years. The chamber framework and conveyor casings are constructed from epoxy-coated mild steel. Chamber walls are made up of specialised insulated sandwich panel that are lined with stainless steel and have weather resistant mild steel outer. The entire system is powered electrically with individual motors for each of the 3 conveyors (incline, distribution and harvest) and for each discharge roller (6 per
chamber). All systems come with a Programmable Logic Controller (PLC). There are two levels of automation depending on the size of the plant.

**Aeration and Mixing Systems**

The vertical orientation of the pile gives rise to a number of unique processing features. Energy efficiency is achieved by removing the need for heat generation, biofiltration, air injection or material agitation, which are provided for by entirely natural means. The high processing temperature in the upper pile is a result of accumulated metabolic heat energy generated by microorganisms below. Rather than dissipating this energy to atmosphere, it is harnessed and used to draw air through the pile by means of a chimney effect. Therefore the system is passively aerated and draws only as much air as it needs.

Passive aeration has another advantage in that microorganisms filter out odorous gases produced in the pile before they reach the exhaust outlet. Organisms identified in the hyperthermic upper pile, known previously from geothermal sites, utilise the high-energy molecules present in the gas stream by oxidising them to their basic elements.

The VCU™ does not require any mechanical input during the processing period. Waste enters the top of the chamber and exits from the bottom, moving only by gravity. Because the chamber is insulated and temperature is consistent from core to wall, the pile does not need to be agitated to expose all material to high temperatures. The inherent high temperature in the upper pile (70°C and higher), means that incoming waste material is immediately subjected to temperatures which will destroy pathogens and seeds in only a few hours.

Emissions from the chamber are negligible, consisting mainly of water, nitrogen and dissolved salts. Although specific rates vary according to the kind of waste material being processed, typical results show 10-20% oxygen, 1-5% CO₂, <10ppm nitrous oxides, 110ppm hydrocarbons and 0.1255ppm hydrogen sulphide. A flow rate of 0.1m³/s is common.

A macerator blender is placed up-stream of the VCU™ chamber. This macerates and blends the collected material with any bulking agent that may be required. The ratio of this mix would be set on full assessment of the in-feed material.

**Overall Control Systems**

As noted above, the VCU™ process is modelled as closely as possible on the natural composting process. Greater control is exercised in setting the correct mix for efficient composting rather than utilising expensive mechanical controls during the process.

The key controls for the VCU™ process are therefore C:N ratio, moisture content and aerobicity. These are gauged during the preparation of the compost mix. The chopper/mixer is fitted with a load-
cell which will enable operators to precisely meet a predetermined ‘recipe’ on each and every input. Weights and mix proportions are automatically stored in the computer.

The VCU™ system’s primary aim is to sanitize waste material to meet the EU ABP regulation and to ‘kick start’ the composting process. Therefore temperature is the key recorded parameter of the process. Temperature is recorded at three points on the outer wall of each chamber.

Airflow is controlled by altering the draw of the exhaust extraction system. This system is responsible for removing excess moisture and exhaust gases from the headspace of each chamber. Speed of extraction is controlled by relative rpm measurements as dictated by a VSD (variable speed drive). Typically, higher temperatures will result in an increased airflow. Elevated moisture in the composting mix as evidenced by the temporary presence of leachate will also require an increase in airflow to remove the excess moisture as steam.

Residence time is assessed by way of establishing daily inputs and outputs of each VCU™ chamber. These are taken by measuring the ‘fill level’ of the chamber. Fill levels are recorded before and after discharging and filling by an ultrasonic level sensor. The sensor records percentage drops and rises in the fill level of the chamber and these are used to extrapolate cubic metre volumes and tonnages.

All parameters are recorded and controlled by the customized software programme on the system PC. The software programme is a Scada system and is tailored to give operators a unique VCU™ composting interface.

**Leachate, recirculation systems and waste water treatment**

Under normal operation there is no leachate produced. The VCU™ can accept organic wastes with a wide array of moisture contents. Materials are blended to give an average moisture content of 55-60%, and at this level processing occurs without the production of leachate. Free moisture in the pile is buoyed by the rising heat as steam, which is then drawn from the top of the chamber as condensate. This can be reticulated, used for irrigation or discharged to storm water drain.

However, the potential for operator error is always a consideration and a leachate trap is installed into the civils. Depending on the site and local legislation this can either be reticulated as part of the feed stock if that is dry, disposed of down suitable sewerage drainage or tankered off site for suitable disposal.
Planning Policies and Design Criteria

National Policy.

The latest national waste policy is set out in the Waste Strategy 2007, which states that the Government wishes to see future waste management decisions based on the Waste Hierarchy. This states that the most effective environmental solution is to reduce the generation of waste; this is the approach at the top of the hierarchy. At the next level is where products and materials can be used again – re-use; where value can be recovered from waste through recycling or composting this is at the level above energy recovery and at the bottom of the hierarchy, waste which has to be disposed of.

The key objectives of the revised Waste Strategy are to

- decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use;
- meet and exceed the Landfill Directive diversion targets for biodegradable municipal waste in 2010, 2013 and 2020;
- increase diversion from landfill of non-municipal waste and secure better integration of treatment for municipal and non-municipal waste;
- secure the investment in infrastructure needed to divert waste from landfill and for the management of hazardous waste; and
- get the most environmental benefit from that investment, through increased recycling of resources and recovery of energy from residual waste using a mix of technologies.

The revised Strategy also sets higher targets for

- recycling and composting of household waste – at least 40% by 2010, 45% by 2015 and 50% by 2020; and
- recovery of municipal waste – 53% by 2010, 67% by 2015 and 75% by 2020.

PPS10 sets out the requirements to be met by waste developments. It advises that

Waste planning authorities should adhere to the following principles in determining planning applications:

- controls under the planning and pollution control regimes should complement rather than duplicate each other and conflicting conditions should be avoided;
- in considering planning applications for waste management facilities before development plans can be reviewed to reflect this PPS, have regard to the policies in this PPS as material considerations which may supersede the policies in their development plan. Any refusal of planning permission on grounds of prematurity will not be justified unless it accords with the
Policy in The Planning System: General Principles.

Planning applications for sites that have not been identified, or are not located in an area identified, in a development plan document as suitable for new or enhanced waste management facilities should be considered favourably when consistent with Paragraph 21 which states that in deciding which sites and areas to identify for waste management facilities, waste planning authorities should:

(i) assess their suitability for development against each of the following criteria:
- the extent to which they support the policies in this PPS;
- the physical and environmental constraints on development, including existing and proposed neighbouring land uses;
- the cumulative effect of previous waste disposal facilities on the well-being of the local community, including any significant adverse impacts on environmental quality, social cohesion and economic potential;
- the capacity of existing and potential transport infrastructure to support the sustainable movement of waste, and products arising from resource recovery, seeking when practicable and beneficial to use modes other than road transport.

(ii) give priority to the re-use of previously-developed land, and redundant agricultural and forestry buildings and their curtilages.

PPS10 also sets out the locational criteria that should be taken into account in testing the suitability of sites.

a. protection of water resources
Considerations will include the proximity of vulnerable surface and groundwater. For landfill or land-raising, geological conditions and the behaviour of surface water and groundwater should be assessed both for the site under consideration and the surrounding area. The suitability of locations subject to flooding will also need particular care.

b. land instability
Locations, and/or the environs of locations, that are liable to be affected by land instability will not normally be suitable for waste management facilities.

c. visual intrusion
Considerations will include (i) the setting of the proposed location and the potential for design-led solutions to produce acceptable development; (ii) the need to protect landscapes of national importance (National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts).

d. nature conservation
Considerations will include any adverse effect on a site of international importance for nature conservation (Special Protection Areas, Special Areas of Conservation and RAMSAR Sites) or a site with a nationally recognised designation (Sites of Special Scientific Interest, National Nature Reserves).
e. historic environment and built heritage
Considerations will include any adverse effect on a site of international importance (World Heritage Sites) or a site or building with a nationally recognised designation (Scheduled Monuments, Conservation Areas, Listed Buildings, Registered Historic Battlefields and Registered Parks and Gardens).

f. traffic and access
Considerations will include the suitability of the road network and the extent to which access would require reliance on local roads.

g. air emissions, including dust
Considerations will include the proximity of sensitive receptors and the extent to which adverse emissions can be controlled through the use of appropriate and well-maintained and managed equipment and vehicles.

h. odours
Considerations will include the proximity of sensitive receptors and the extent to which adverse odours can be controlled through the use of appropriate and well-maintained and managed equipment.

i. vermin and birds
Considerations will include the proximity of sensitive receptors. Some waste management facilities, especially landfills which accept putrescible waste, can attract vermin and birds. The numbers, and movements of some species of birds, may be influenced by the distribution of landfill sites. Where birds congregate in large numbers, they may be a major nuisance to people living nearby. They can also provide a hazard to aircraft at locations close to aerodromes or low flying areas. As part of the aerodrome safeguarding procedure (ODPM Circular 1/200316) local planning authorities are required to consult aerodrome operators on proposed developments likely to attract birds. Consultation arrangements apply within safeguarded areas (which should be shown on the proposals map in the local development framework).

The primary aim is to guard against new or increased hazards caused by development. The most important types of development in this respect include facilities intended for the handling, compaction, treatment or disposal of household or commercial wastes.

j. noise and vibration
Considerations will include the proximity of sensitive receptors. The operation of large waste management facilities in particular can produce noise both inside and outside buildings. Intermittent and sustained operating noise may be a problem if not kept to acceptable levels and particularly if night-time working is involved.

k. litter
Litter can be a concern at some waste management facilities.

l. potential land use conflict
 Likely proposed development in the vicinity of the location under consideration should be taken into account in considering site suitability and the envisaged waste management facility.
Regional Policy.

The guidance on waste development is set out in the **Regional Waste Strategy** (RWS). The latter includes the following targets:

- By 2010 recycle or compost at least 30% of household waste.
- By 2013 to reduce the amount of biodegradable waste land filled to 80% of what it was in 1995.

The RWS includes a table identifying landfill capacity in Northamptonshire in 2001. The county had a void space of 12,335,000m³, which at the then current annual rate of fill gave a life of 5.4 years. Since this time additional void space has been created by new permissions and the rate of fill has stabilized, however, the implication of this is that there is an urgent need to find alternatives to landfill in the county, for both municipal and commercial waste arisings.

In the RWS, Consultation Draft in February 2005. Priority 2 was stated as “Improving the efficiency of our resource, the reduction and sustainable management of commercial and industrial waste”. This referred particularly to biodegradable waste, as follows:

> Certain industrial sectors in the region have considerable opportunities to improve their performance. In particular the East Midlands has a thriving food and drink industry. Recent research by the Chilled Food Association (CFA) has shown that CFA member food and drink installations in the East Midlands produce in excess of 35% of the waste of all members in the UK. This figure gives a strong indication of the impact this sector has on the region’s C&I waste stream. Of particular concern for the food and drink industry is he need for alternative capacity for the management of biodegradable wastes controlled under the Animal By-Product Regulations 2003.”

Although this statement was not repeated in the adopted version of the RWS, the RWS does include a table which sets out the waste arisings in the region, by weight and percentage. In 2002-3 food/drink/tobacco of the industrial waste sector produced 994,000 tonnes, which represented 27.3% of the total industrial waste arisings. In the same period, hotels and catering produced 238,000 tonnes, which represented over 10% of the commercial sector waste. These two sectors alone therefore produce a huge quantity of compostable material each year, which is of particular relevance to all proposals for the treatment of biodegradable waste in the county of Northamptonshire.

Northamptonshire Waste Policies.
The relevant policies relating to composting are contained in the Adopted Northamptonshire Waste Local Plan. The Council seeks to manage waste in accordance with the waste hierarchy having regard to both the proximity principle and the best practicable environmental option.

Policy 1 establishes the principles of waste development.

“Permission will be granted for waste development which is consistent with:-

• a clearly established need for the development to serve local and regional requirements for the management and disposal of waste;
• reduction in reliance on landfilling;
• the minimisation of, and balance in, the movement of waste across waste planning authority boundaries, except where the development involves specialised provision and is consistent with regional self-sufficiency;
• minimising the transportation of waste from its source;
• the Best Practicable Environmental Option for the waste stream;
• the integration of waste management facilities;
• the minimisation of harm to the environment, human health, natural resources, local amenity and highway safety;”

Policy 18 states that

“Proposals for composting development, either in the open air or within buildings, will be encouraged where they:

(i) represent a community composting scheme;
(ii) form part of a scheme for farm diversification;
(iii) represent composting on a commercial scale;

provided that in each case the site location is consistent with BPEO for the waste stream and with the proximity principle; and that the development would not have an adverse impact on the amenity of neighbouring residential property or workplaces”.

It should be noted that the concept of BPEO is no longer part of national government guidance and therefore should not be a requirement of individual proposals to demonstrate compliance.

**Daventry Adopted Local Plan Policies.**

The site is shown on the Proposals Map as white land, with no specified policies.
Appendix 4

Landscape and Visual Impact Assessment
Appendix 5

FRA Requirements.

The application site is in Zone 1.

PPS25 has the following to say regarding the requirement for FRA, with the element relevant to this site shown in **Bold**. **‘Site-specific Flood Risk Assessments (FRAs)’**

E8. At the planning application stage, an appropriate FRA will be required to demonstrate how flood risk from all sources of flooding to the development itself and flood risk to others will be managed now and taking climate change into account. Policies in LDDs should require FRAs to be submitted with planning applications in areas of flood risk identified in the plan.

E9. **Planning applications for development proposals of 1 hectare or greater in Flood Zone 1** and all proposals for new development located in Flood Zones 2 and 3 (see Table D.1, Annex D) should be accompanied by a FRA. This should identify and assess the risks of all forms of flooding to and from the development and demonstrate how these flood risks will be managed, taking climate change into account. For major developments in Flood Zone 1, the FRA should identify opportunities to reduce the probability and consequences of flooding. A FRA will also be required where the proposed development or change of use to a more vulnerable class may be subject to other sources of...
flooding (see Annex C) or where the Environment Agency, Internal Drainage Board and/or other bodies have indicated that there may be drainage problems.

E10. The FRA should be prepared by the developer in consultation with the LPA. The FRA should form part of an Environmental Statement when one is required by the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 as amended.’

As the site is in Zone 1 and is of less than 1ha in area, there is no requirement under PPS25 for a site specific FRA.

The use, either previously (general industry) or proposed (waste treatment) both fall within the ‘Less Vulnerable’ category as shown below.

<table>
<thead>
<tr>
<th>Less Vulnerable</th>
<th>Buildings used for: shops; financial, professional and other services; restaurants and cafes; hot food takeaways; offices; general industry; storage and distribution; non-residential institutions not included in ‘more vulnerable’; and assembly and leisure.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Land and buildings used for agriculture and forestry.</td>
</tr>
<tr>
<td></td>
<td>Waste treatment (except landfill and hazardous waste facilities).</td>
</tr>
<tr>
<td></td>
<td>Minerals working and processing (except for sand and gravel working).</td>
</tr>
<tr>
<td></td>
<td>Water treatment plants.</td>
</tr>
<tr>
<td></td>
<td>Sewage treatment plants (if adequate pollution control measures are in place).</td>
</tr>
</tbody>
</table>

As seen in the table above, ‘Less Vulnerable’ development in ‘Zone 1’ is classed as appropriate.
Appendix 6

Bioaerosol report
Appendix 7

WASTE MINIMISATION STRATEGY

The following Waste Audit Procedures are provided in accordance with the requirements of Northamptonshire’s Supplementary Planning Guidance: Development and Implementation Principles, March 2007 paragraph 2.25.

a. Identification of Responsible Person

The Responsible Person within Earthworm Ltd is Spencer Burnham, Managing Director. He can be contacted on telephone number 07796 266356 or at the following email address: spencer@burnham-landscapes.co.uk.

b. Description of the Development

The proposed development is for an in-vessel composting facility, which will process up to 50,000 tonnes of household, commercial or industrial waste and produce up to 50,000 tonnes of compost per annum. It should be noted at the outset that the objective of the facility is to convert waste into a useful product.

The 0.4 hectare site will comprise the following built development: a waste reception building, Vertical Composting Units with conveyors, maturation building with biofilters, a weighbridge, an vehicle turning area, with new access constructed alongside the existing workshop and office buildings.

The built development is described in more detail within the Design and Access Statement accompanying this planning application.

c. Estimation of the type and quantity of waste anticipated to be produced at all stages of the development

Construction work on site will involve the following stages and waste arisings:
Construction Stage | Waste Arisings  
---|---  
Site preparation i.e. levelling of site, removal of soil. | Minimal waste generation as materials will be retained on site where possible, with the remainder used on landscaping projects by the owner.  
Concrete bases for built development and yard, including sustainable drainage system will be laid. | Careful ordering of material will be undertaken to minimise waste  
Main construction of the buildings and VCUs commences. | Almost all components are manufactured off site creating minimal wastage / offcuts. However, any waste material will be recycled where possible or disposed of in the most environmentally friendly method available.  

d. Identification of waste management targets (e.g. re-use, recovery, recycling and management of residual waste)  

The facility is specifically designed to breakdown biodegradable waste into compost for use in Burnham Landscape’s business or for use on neighbours agricultural land. One of the prime objectives of the process is to minimise landfill, however where materials have to be disposed of, they will be sent to a local facility. This is fully in accordance with national, regional and local targets to divert biodegradable waste from landfill.  

e. On-site waste minimisation and management methods to be employed with particular emphasis on waste minimisation, including practical measures to be implemented to ensure effective sorting, storage, re-use, recovery, recycling and the provision of facilities to enable this (where facilities are provided layout plans are required)  

During the construction phase it is not anticipated that there will be significant waste generated for the reasons given in section c, above.  

In accordance with its design objectives, very little waste will be generated from the plant once operational. The process is designed to compost the waste received. Site layout and description of the process proposed are included in this Supporting Statement, to which this is an Appendix.  

Rainwater will be collected and stored for use during the composting process.
f. Off-site waste management methods to be employed, such as recovery and recycling measures and management of residual waste (including waste type and quantity, proposed transport method, distance and estimated number of trips, and identification of waste management sites and contractors used)

Construction Phase
As described in c) above, minimal waste is expected to be generated during the construction phase, however where waste is generated it will be disposed of locally in the most efficient manner possible.

Operational Phase
The proposed facility is itself an efficient waste treatment facility which will be located within close proximity to the main sources of the waste stream it will serve, therefore reducing waste transport miles.

Compost product will be used either by Burnham Landscapes or farmers in the locality, thus minimising the distance travelled to transport the material off-site.

g. Demonstrate how waste management measures identified form the most sustainable option

The development itself is a sustainable treatment process for wastes, producing a compost, which can be used beneficially in agriculture or landscaping.

Section 4 of the Supporting Statement provides a comprehensive description of how the facility complies Local Policies for sustainable waste treatment.

h. Sustainable development measures including materials resource efficiency, use of sustainable materials, percentage (by value) of recycled products used and reduction in pollution potential of unavoidable wastes

The development will make use of recycled products where possible in construction e.g. secondary aggregates. Materials for construction will be sourced from local suppliers where possible in order to minimise transportation.

Process equipment will be of high quality with long life expectancy.

All of the biodegradable waste imported to the site will be converted into a useful product. The only materials to be removed off-site as waste are contaminants in the waste supplied to the site e.g. plastics, metals. The amount of contaminants will depend on the effectiveness of the sorting
operations by householders and businesses; the applicant will assist where possible in educating suppliers about the need to minimise the level of contaminants in the waste.

Potential pollution shall also be minimised during operations through the facility design, by ensuring full containment of the operations.

i. Practical measures to reduce wastage during demolition processes, and support designing for deconstruction

No demolition is involved. The proposed development is for a permanent facility, however it will be constructed from materials that are currently viable to be recovered/recycled. Ferrous and non-ferrous metals, plastics, wood and concrete can be removed and reused or recycled. Other aspects of the development e.g. electronic equipment or machinery will be reused or broken down on decommissioning for recovery of component parts where practicable.

j. Proposed method for transportation of wastes requiring off-site management (including approximate distance and number of trips required)

As described above, the objective of the facility is to minimise waste for disposal. However, all transportation off-site will require use of heavy goods vehicles, as no alternative transport is viable.

k. Identification of mitigation measures to reduce the impact of transportation of waste

Construction
Local sourcing of the construction materials will take place wherever possible.

Operation
Site location has been selected to reduce waste miles and the virtually all of the waste received at the site will be composted for beneficial use.

Deconstruction
Where possible any waste materials produced from the deconstruction of the facility will be transported to local waste management, construction or industrial facilities for re-use, onward treatment or disposal. On site treatment such as crushing and screening will be used to minimise vehicle movements.

l. Demonstrate how the Principles for Development Related Waste Minimisation are to be addressed and practical measures for implementation
Construction
Waste minimisation will be of primary focus during the construction phase. This will be achieved through the selection of suitable materials in construction and through working closely with suppliers to minimise wastage in design.

Operation
The ability of the facility to use waste to create a useful product positions the facility well up the waste hierarchy. The facility is designed to take biodegradable waste from businesses and Local Authorities and therefore waste minimisation strategies should have been implemented further up the supply chain. However, the facility then takes the biodegradable waste and eliminates it from the disposal route.

Management of the facility will seek to prevent and minimise the generation of waste. Water collected on site e.g. from the building roof will be retained for process use.

m. Demonstrate how responsibilities under the Waste Duty of Care have been satisfied

All suppliers removing or importing waste to or from the site are required to have a Waste Carrier’s Licence and this will be audited within Earthworm’s business management system.
A “desk top” bioaerosol assessment
of a proposed in-vessel composting operation
for

Earthworm Ltd

Browns Road,
Daventry,
Northamptonshire
NN11 4NS

Compost Advice and Analysis

Dr John L Burden
The Granary
Mill Lane
South Milford
Leeds
LS25 5AG

Tel: 01977 684693
Fax: 01977 680248
Mobile: 07836 219449
E-Mail: john.burden@compost-advice.co.uk

December 2008
Compost Advice and Analysis
Desk Top Bioaerosol Survey for Earthworm Ltd., Daventry
December 2008
1. Preface

I was commissioned by GP Planning Ltd on behalf of Earthworm Ltd to write a desk top bioaerosol assessment for a proposed in-vessel composting plant at their site on Browns Road, Daventry.

The site is currently owned and used by Burnham Landscapes Ltd, where it is proposed to continue to base its operation on a proportion of the site.

The desk top survey draws on experience gained in my career, literature already published on the subject and the guidelines and findings of the Environment Agency (EA), The Health Protection Agency, The Health and Safety Executive and the manufacturer of the composting vessels (VCU) to be used. As the site is not operational, it was not possible to include recent readings in this survey. However, a background survey will be conducted before activity occurs on the site in order to obtain base levels for the area and site-specific readings can be provided when the site is operational.

My company, Compost Advice and Analysis has been specifically formed to cater for the growing requirement for bioaerosol monitoring and offering general impartial advice for the composting industry. I have a degree in Agricultural Science and Doctorate in Plant Pathology specialising in soil borne organisms. I have worked for the last thirty years within the mushroom industry on the technical and advisory aspects of the crop, working with large and small farms alike, covering topics ranging from farm and compost yard design, raw material procurement, through composting, growing and post harvest problems. Many of the issues associated with mushroom composting are directly applicable to composting of organic wastes and the experience gained within the mushroom composting industry are directly applicable to the waste industry. We have monitored bioaerosols on mushroom farms for decades and have performed the same service to the waste industry for the past five years.
2 A desk top assessment of the likelihood of the generation of bioaerosols and their potential impacts.

2.1 Introduction

The site is currently used by Burnham Landscapes Ltd., as head office and storage facility for machinery, general equipment, materials and plants used in their operations. The proposed composting operation will be within the present curtilage of the site, the current frontage to Browns Road will remain, with the proposed new indoor composting facility being constructed behind the present office complex.

The site has been well chosen and will not impact adversely on the aesthetics of the area, that already have an extensive warehouse building flanking its entire Eastern boundary and a civic amenity waste collection site on its immediate Southern boundary. The land to the South West, West and round to the North is all recreational, wooded or agricultural land.

Bioaerosols are small fractions of organic material that are released into the air from microbial colonies and organic matter in general. In this instance they are a product of the micro-organisms that are involved in the degradation of the materials being composted; they consist of spores, cells and mycelial fragments of fungi, actinomycetes and bacterial cells.

All the organisms involved in the composting process are found naturally in any garden compost heap or on degrading vegetation in the environment at large. If these naturally occurring organisms were not active in the decomposition of vegetation, then it would simply accumulate and the world would be swamped with the material.

The entire process will operate under strict management procedures that will minimise the impact of the facility on the immediate environment. These procedures will meet the requirements of the Environmental Permit issued by the Environment Agency and the licence issued by the State Veterinary Service to comply with the Animal By-Products Regulations.

The composting process will utilise an established in-vessel technology (VCU) that is in operation successfully elsewhere in the Country / Worldwide (Appendix 1). Material will be delivered initially into a reception building, where it will be checked for conformity to specification before being unloaded, sorted, shredded and blended and then fed into the top of the VCU vessels by enclosed conveyors for composting.

When the process is complete the compost is collected from the bottom of the VCU’s and relayed directly to the maturation building by enclosed conveyors where it will be piled on aerated floors within specified bays to mature.
Before despatch as completed compost, the material will be screened and size graded, all necessary tests and conditions will be met for the material to qualify for the compost industry’s Quality Protocol standard.

Both the reception and maturation buildings will be held under negative pressure, with the exhaust air being passed through biofilters.

Bioaerosols in high numbers for extended periods can be detrimental to certain individuals, although it is rare even for personnel working in close proximity to “tumbling” compost to be affected by the material. Indeed surveys to date indicate that the percentage of workers in the composting industry affected adversely by bioaerosols is no higher than in the population at large, indicating that composting operations pose no greater threat than other industrial or agricultural activities.

Studies have shown that concentrations of Aspergillus fumigatus in composting yards are in the lower range of concentrations found in other industries and agricultural activities. This site is near to agricultural activities and another waste management site.

The proposed composting facility should not, if managed effectively, produce levels of bioaerosols and odours that will be detrimental to the environment.

3 The site and the type and quantities of raw materials to be processed.

3.1 The Site

Plans 1a and 1b (Appendix 2), show the location of the site within the Daventry area and more specifically in relation to Browns Road and the topographical features within the immediate vicinity. The area outlined in red denotes the curtilge of the proposed site of the composting facility.

Plan 2 (Appendix 3) is of the site itself and shows the current forecourt, office and warehouse, the bulk material bays and nursery stock plant area, which are to remain. The composting facility will be housed in new buildings behind the existing structures.

The site will be serviced from Browns Road with a new entrance made just to the left of the existing entrance, which will facilitate vehicles entering and leaving the composting facility. There will be a wheel wash facility located at the entrance within the reception building.
The entire Eastern flank of the site is bordered by the large Ford warehouse complex. There is a large wide grassed bund that separates the large lorry loading bay area and the application site.

To the immediate South of the site there is already a Household Waste Recycling Site accessed from Browns Road and four other small industrial units. To the South East of the roundabout and Leamington Road there is the Grange housing estate which is over 450m from the site.

To the South West of Browns Road and the South Eastern edge of the site there are playing grounds, but bordering the composting facility area to the West of the site is an area of land that appears to have been tipped upon for an extended period. Further West is agricultural land and Staverton Park Golf Club and due North and to the West of the Ford warehouse complex is a recently planted woodland and with agricultural land beyond.

3.2 **Materials to be processed**

The facility is designed to process ABPO waste and will meet all the requirements for that material as designated by the relevant authorities.

3.3 **Proposed Volumes**

The planning application will be for 21,000 tonnes per annum

4 **Local environmental conditions in relation to bioaerosol dissemination**

The proposed site is on the Western edge of Daventry. The nearest receptors are tabulated in Table 1 (Appendix 4) and marked on Plan1a & 1b (Appendix 2). The average monthly wind direction for the area is summarised in Wind Rose data collected at Wittering and Coventry airport presented in Appendix 5. Both sites indicate similar readings with the predominant wind direction being between South and West North West. Table 2 in Appendix 5 provides a more detailed monthly breakdown for 2007 and it is these figures that are used in the following text.

From the North, through West to the South, the site is bounded by agricultural land. Immediately due West of the site is Elderstubbs Farm, at a distance of 146m, this would be impacted by direct wind blow for 2.47% of the year. The farm has a resident sheep flock, so bioaerosols generated by the farm itself are likely to be at much the same levels
as those that may reach it from the proposed composting site. There are also mature trees and hedges bordering the composting site and on the Eastern flank of the farm itself so air streams will be more turbulent with consequent dilution of any loading.

The golf course is located between the West and Southern sector but is at the closest distance 457m away, so by all recognised measurements the levels would have returned to background by that distance. SSW to South of the site there are playing fields but close to the composting site there is a mature stand of trees bordering the Western flank of the continuation of Browns Road, which will aid turbulence and therefore increase the dissemination of any bioaerosols in the vicinity of the site. In 2007 wind only blew in that direction for about 10 percent of the period.

Due South of the site is a Household Waste Recycling Site and as that receives green waste it is likely to have as high a bioaerosol count as the proposed site, especially as it is not protected by buildings and biofilters. Also to the SSE direction bordering the Easterly side of Browns Road there are four other buildings involved in a range of activities, one of them being involved in agricultural machinery.

The Grange Estate lies due SSE from the site, the Eastern side of Leamington Way. It is shrouded from the road by a mature stand of trees and is over 457m from the site, so will not be influenced by the site.

Immediately due East of the site behind a grass bund is the extensive Ford warehouse complex, where the lorries are parked 60m from the site. The wind has blown directly onto them in 2007 for 5.21% of the time, though all wind directions from North West through West and on to due South South West would impact on the Ford site and in 2007 the wind has blown from these directions for 52% of the time. However, the grass bund between the two sites and the height of the large warehouse buildings will tend to amplify the dilution of any material leaving the site as the air stream will have to rise over them. So although the composting site is on the boundary of the warehouse complex, any emissions from the biofilter will be vented at roof height and therefore not impinge on any activity at ground level. As the majority of the activity on the Ford site will be within the large warehouse building, and as the levels leaving the biofilter will be low, I do not consider there will be any detrimental effect experienced.
5 A resume of the pertinent aspects of the VCU composting system

Specific details of the VCU system are presented in the Supporting Statement of the planning application and in Appendix 1. Below is a diagrammatic representation of the proposed system.

Diagrammatic Representation of the proposed Composting System

Materials are weighed on arrival
  • Delivered to the Reception building where they are checked for conformity, materials outside of the specification will not be accepted
  • The materials are sorted ready for blending in the reception building
  • Materials are then passed through a macerator to prepare a more homogenous substrate and add bulking agents should that be required with the material being handled.
  • The material is then elevated to the top the VCU chambers via totally enclosed conveyors where it begins the composting process.
  • Compost is removed from the base of the VCU chambers and taken to the maturation building, where it is placed on aerated pads to speed its maturation.
  • The compost is then screened and is ready for despatch

Composting operations that are managed effectively produce few odours and potential problems should be engineered out of the system at the initial design stage. The following resume is presented to highlight the areas within this operation where all effort will be made to compost the materials supplied effectively and efficiently.

The materials to be composted will be checked on arrival and will only be accepted from sources of known quality. The customer will not be permitted to proceed until the necessary Duty of Care documentation has been inspected and found to be in accordance
with legislative requirements. Once accepted, materials will be tipped inside of the building, and then sorted ready for blending.

Composting organisms are ubiquitous; they are not unique to composting operations and will be already present on much of the material delivered to the site. A well constituted mix of the raw materials is an important precursor to effective composting; it is important to achieve a consistent physical structure as well as uniform and balanced nutritional levels, as this will enable the composting organisms to function effectively within the process. Within the VCU chambers the material is in an “open” matrix, which is important to maintain an adequate air flow through the chamber so promoting aerobic composting. The green waste material mixed with food waste will assist in this aspect. Only when these parameters are not optimised will the process become stressed, increasing the risk that unpleasant odours will be released.

Depending on the conformation of the loads, they will be blended with other materials following maceration to produce a suitable physical structure and homogenous matrix with the correct water content ready for composting.

The materials being handled will all contain bioaerosols and in preparing them and moving them around bioaerosols and dust will be released. However, as all of these preparations are to be conducted within the reception building which will be positively extracted via a biofilter, bioaerosol emissions from this operation will be managed effectively.

The material is then elevated and placed into the top of the VCU chambers using enclosed elevators. Here the composting process starts and the natural micro-flora already present on the materials will become activated and the composting process begins.

During the composting process, the predominant micro flora on the materials within the chamber will alter as the temperature of the substrate rises through the psychrophyllic, mesophyllic, and thermophyllic stages of the process. These are terms that indicate the temperature range that certain organisms are active in, psychro up to 20°C, meso 20-37°C thermo 40- 70°C. It is predominantly the organisms in the mesophyllic ranges that can cause concern in the context of bioaerosols, as the optimum range for the composting organisms is the same as that of the human body. However, it is more common to be sensitized to certain proteins or cell content rather than be infected by invading organisms. It is pertinent to re-state at this juncture that all of the organisms involved in composting occur naturally in the environment and we all are exposed to them on a daily basis.
The thermophyllic range occurs in the higher levels of the chamber, the mesophyllic range is found below that and at the bottom most of the activity has dissipated and the temperatures are lower.

One of the advantages of this system is that the air moves passively up through the chamber, so the material itself acts as a sort of biofilter. The mesophyllic range where the most activity occurs is in the centre, so as the spores and particles rise up through the chamber due to convection, they tend to stick to the compost matrix and get nullified and killed by the thermophyllic range in the higher levels of the chamber.

The temperatures within the chamber are monitored regularly by the computer systems installed, in order to provide proof of the temperatures attained, a vital requirement for legislative purposes. Very few bioaerosols will be liberated when the chamber is not being filled or emptied. These chambers are not afforded any building cover so there will be static release of bioaerosols during this time that will be liberated into the atmosphere. Air movement within the chamber will be vertical as warm air rises, so the largest emission would be from the top of the chamber. The top of the chambers are 10.5m high so this will aid dissipation of bioaerosols considerably as the plume will be similar to a chimney discharge and not restricted by the drag experienced by ground airflow from windrow released bioaerosols.

All elevators and conveyors taking material to and from the chambers are totally enclosed, the portals that accept the material and discharge it from the chambers are also closed when not in use, so access to the composting material is restricted.

Each chamber will be fitted with a small fan that can be activated to aid the passage of air through the chamber should it be necessary.

Release of bioaerosols from the chambers will be greatest when they are being filled and emptied; actively moving or tumbling compost will release more than a static pile. There is no capture mechanism for this release, which simply mingles with ambient air flows.

The passage of the compost through the chambers can be modified to suit the materials being processed; process times can vary accordingly between 7 and 24 days.

Once composted, the material is removed from the bottom of the chambers and conveyed into the maturation building where it will be piled on aerated floors to aid the maturation process. By supplying air to the material the process remains aerobic, so no unpleasant odours are produced and the process is speeded up. Before the compost is despatched, the material will be screened to produce a uniform product which will qualify for the Quality Protocol standard. During this screening process, the larger factions are to be
returned to the reception building to be incorporated in future batches via another totally enclosed conveyor.

The maturation building will also be held under negative pressure and the air withdrawn will be passed through a biofilter before discharged to atmosphere.

6 The risks associated with bioaerosols and dust involved with the composting operation.

6.1 General Risks:

Composting processes can result in the production of high concentrations of bioaerosols within the material being composted. In some situations, populations as high as $10^9$ with Bacteria, $10^8$ with Actinomycetes and $10^6$ with Fungi per gram can be recorded on materials being composted. A proportion of these particles can be released into the atmosphere when the compost is moved.

Particles suspended in the atmosphere can be divided by size into:

- **Non inhalable** particles are over 10$\mu$ in size and are caught by the hairs in the nose, so they do not enter the body. The particles can be classified as dust.
- **Inhalable** particles are smaller than 10$\mu$ in size are often not trapped by the hairs and mucous in the nose and the upper parts of the airways and therefore inhaled into the respiratory tract and lung cavity.
- **Respirable** particles are less than 2$\mu$ in size and are so small that they are not trapped by the mechanisms within the respiratory tract and they enter the alveoli, (the air sacs within the lungs where gaseous exchange occurs – carbon dioxide is exchanged for oxygen)

It is the respirable particles that have the potential to cause the greatest problem. Some of the composting micro-flora can also be pathogenic to man, but it is rare for healthy people to succumb to them. Most cases where an organism associated with composting has caused a pathogenic response in humans has occurred with immune suppressed individuals. It is also clear that some individuals can also become sensitised to the proteins that are present within other inhalable particles that get trapped within the upper respiratory tracts. This condition is separate from micro organism that infect individuals, in these instances the initial symptoms are caused by antagonistic reactions between foreign proteins and the bodies natural defence mechanisms. Details of these conditions are documented in numerous medical journals so are not elaborated further here.
Bioaerosols are the smaller micro organisms or fragments of them that are suspended in air and are small enough to be respirable. They can be either Bacterial, Fungal or Actinomycete in origin and are ubiquitous throughout the world on organic matter. They are nature’s way of degrading organic materials to be recycled back into other organisms and therefore into the natural food chain.

Direct exposure to large quantities of certain bioaerosols can be detrimental to health if certain precautions are not taken. When working in the vicinity of high loadings of bioaerosols, where compost is tumbling or being moved, staff should be instructed to wear PPE’s. In this facility, this would be within the reception and maturation buildings and in the close vicinity to the screening operation or matured compost being turned or loaded for despatch. Away from such activity no protection is necessary.

There is ample evidence to show that the risk to operatives working in close proximity to tumbling compost within the composting industry can be mitigated when adequate precautions are taken.

Evidence is available to show that only a very small proportion of the population are sensitized by bioaerosols or other natural fractions within the aerial flora. The same proportion of compost workers are recorded as being affected as those in the general public that are not associated with compost.

Good management and sound process control can and do effectively mitigate the risks even on large composting plants.

6.2 Site Specific Risks

The levels of bioaerosol that will be produced by the composting operation at Earthworm Ltd, Browns Road will be small compared with many of the larger composting operations, and certain other agricultural and industrial activities. (See Table 3 for figures recorded in other industries).

The workers within the reception and maturation building will be potentially exposed the most, but with effective air changes passing through biofilters, the instigation of sound management practices and the use of PPE in certain applications, the risk can easily be mitigated. It can be shown that the risk to workers involved at the “compost face”, is no greater than the population at large with proper working practices. It is also proposed in the working procedures that the bunkers will be covered so that air can be drawn from beneath them directly into the biofilter. This will significantly reduce the levels present in the area. Table 3 highlights the levels that are present in other work places where no such covers are used but the levels can and are mitigated satisfactorily.
Except for the VCU chambers all other operations are handled within buildings to be held at negative pressure and extracted via biofilters; these buildings will contain the vast majority of the material being handled at any one time. Although the VCUs will be venting some bioaerosols from the top of the units, this is only passive emission, (akin to a small static compost pile), and as they are positioned 10.5m in the air the dissipation from source will be much faster.

The nearest receptor is the Ford Warehouse complex that adjoins the site’s boundary. This is a massive complex with the majority of the workers being inside the building. The height of the grass bund along the Western boundary coupled with the height of the warehouse itself will tend to elevate all air streams upwards and cause considerable turbulence / mixing in the vicinity.

The civic waste recycling centre due South of the proposed site also handles general municipal waste, much of it will release bioaerosol particles when material is being deposited, compressed and removed from the site. This will be occurring on a regular basis when material is being deposited at the site and to a lesser extent when the organic material is static in the bays.

All data on bioaerosol dissemination indicates that levels deplete exponentially from the source and that within 250m they generally revert to background levels. So although the distances between site boundary and other receptors are in some instances less than the EA recommendation of 250m, because of the enclosed nature of the VCUs, the reception and maturation buildings being vented through biofilters, the design will effectively engineer out high levels in the vicinity of the site.

Earthworm Ltd’s composting operation is a high tech proposal with many built in control points. It has also been amply demonstrated at other sites using VCUs that there is no issue with bioaerosols, even in close proximity to other residential and workplace establishments, (Appendix 1 a and b). In common with other composting and waste management sites, good management and sound process control can effectively mitigate the risks so that residents closer than 250m are not put at risk.

The prevailing winds blow towards the nearest inhabited buildings (Elderstubbs farm) 146m away for only 4% of the year, and the farm is likely to be generating higher levels all year round from its own activities. By maintaining good composting practice, good physical structure, adequate temperature and moisture conditions etc within the VCU chambers the process can be adequately controlled.
7 A review of some of the literature pertinent to bioaerosol dissemination

A study carried out for the UK Environment Agency (Casella et al 2001) found that spore concentrations decreased by 80% to 90% within 20-40m from the source. Passman 1983, measuring A.fumigatus found that background levels were reached at 90m downwind. It is clear from all practical standpoints and from agreed practice within the industry that it is only personnel that are working in close proximity to tumbling compost that need protection and in these situations a paper filter mask over the mouth is often sufficient to protect them. Personnel not directly involved in the activity of moving active composts require no protection on the site unless they are immune suppressed individuals.

There have been quite a number of review articles covering potential risks from bioaerosols when composting. The overwhelming base of evidence is that the risk to workers and the general public is minimal and can be managed, if certain procedures are followed (Composting Association of Ireland Teo August 2004, part funded by the EPA). A review by the Environment Agency of the 250m buffer zone, (Report 130 in 2003) states that “there is no published evidence that exposure to bioaerosols disseminated from compost facilities cause respiratory ill health in residents or workers at nearby locations, or that slightly greater than background bioaerosols levels represent a significant excess risk”.

The same report concludes that there should be no change in the 250m limits and indeed in June of this year the Minister for the Environment confirmed in a debate, "It is important to stress that background figures vary from location to location, and with the seasons, ranging from less than 100 to more than several thousand particles per cubic metre. It is correct to say that the dispersal of bioaerosols will vary with atmospheric conditions. That is why the Health and Safety Executive reviewed a range of data from different sites, conditions and modeling techniques." She added “The review, which was published in 2003, found that fungal particles generated at any site would drop to background levels within about 150m. That is why the Health and Safety Executive has proposed a precautionary approach and recommended not 150 m but 250m. By taking a bigger margin than is perhaps considered necessary, the HSE is confident that it has taken account of unexpected or extreme conditions."

A paper by Geisson University (2003) has recently been quoted in a number of cases indicating that levels of bioaerosols can be found higher than background at distances greater than 250m. It is not disputed that where there are rows of houses then air will become channelled and natural dispersion will not be as great as in a normal open field situation. In the EA’s own report 130 (2003) it is stated that under certain atmospheric conditions...
stability classes modelled, representing infrequently encountered worst case conditions, bioaerosol concentrations would not be reduced to the background value within 250m.

In general, references highlight the variability in the situation, in that background levels can vary by magnitudes from area to area and that localised conditions do have a large influence on the matter.

Composting operations are certainly not the most potent source of bioaerosols; other agricultural and industrial activities generate levels much higher than compost sites. (Stetzenbach, L 1997, Crook, 1995 Eduard 1997 and Crook and Swan, 2001) (Table 3)

A recent survey conducted for South West Industrial Crops Ltd (SWICEB) by ADAS UK Ltd on the Bioaerosol Dispersion from Composting Sites 2005 concluded after a very detailed investigation that by 125 m downwind of the source 91% of all microorganisms were below 1,000 cfu/m$^3$ and that by 200m it would appear likely that in the majority of cases the prevailing upwind levels will be achieved. 1,000 cfu/m$^3$ is the guideline level commonly used by authorities, but is not a statutory level.

The literature moots many models for plotting dispersal from point sources, but all agree, especially where boundary layers and movement close to the ground occur, that they are not reliable and not really relevant to the situation. However, the literature is clear that any bund, tree, hedge, building, or any obstruction to air movement greatly increases the turbulence in the vicinity, which in turn increases the mixing, dilution and dispersal of the source. It is also well documented in the plant disease and pest control arena that shelter in the lee of hedges or other obstructions facilitate deposition of higher numbers of pests and pathogens as the particulate materials drop out of the air stream in the quieter air. Britter R.E. 1998, has investigated the same response around compost yards and identified the same effect.

Although A. fumigatus is the accepted organism that is measured for gauging bioaerosol concentration around composting facilities (Gilbert and Ward 1999), it is not the most dominant species. Hryhorczuk et al 2001, Tovalen et al 1998 Heida et al 1995 all found Penicillium spp. and other Aspergillus spp. to be the predominant species at most composting sites. Both genera are of course, present naturally in the atmosphere, in some situations in high numbers. They are a ubiquitous component of the aerial micro flora that we are all subjected to in our homes and the ambient conditions we experience in our daily lives.

It is not disputed that composting operations do generate bioaerosols that in large quantities and with continual exposure could be a risk to health for those working with the material; however, it is also agreed by all that levels dissipate very quickly from the source and are omnipresent in most environments. Although there has been a lot of
recording of the effect on the health of workers within composting operations, there was no documentary evidence of a significant excess of serious chronic work related disease in compost workers compared to those in other industries, (Health and Safety Executive, 2003). The same review article also states that “there is no documented evidence that people living in the vicinity of composting facilities show significant excess of respiratory symptoms compared to controls living away from compost bioaerosols. The article goes on to say that ”most reported studies have found that people living more than 250m from composting sites are exposed to microbial emissions that are similar to “Background”, i.e. are not significantly higher than can occur naturally.

8 Conclusions.

- There is no reason to suppose that the relatively low levels of bioaerosols that would be released from the proposed composting operation conducted at Browns Road would be detrimental to residents and the ambience of the close locality.

- The nearest sensitive residential receptor at Elderstubbs Farm is not close enough to be affected detrimentally by the composting operation and would anyway be subjected to bioaerosols released from its resident animals and from the grass and woodland around.

- As the proposed site is surrounded on the Western side by agricultural or recreational grassland, and that the prevailing wind direction is from this side, the wind will already have its own bioflora that will vary throughout the year.

- Similarly the civic amenity site due South will also have its own bioaerosol characteristics as it receives a wide spectrum of materials including green waste. At certain times of the year, release characteristics from this source could be significant.

- The references, many of them Environment Agency generated, cited in this report show clearly that the natural dilution of particulate matter from a source will dissipate levels to background well within 200-250m. There are no large centres of population closer than The Grange estate. Which is 460m from the proposed site.

- If the site is managed well there is ample evidence around the country that indicates that similar scale composting operations using the same VCU process are an efficient and effective way of composting mixed organic waste and that there is no detrimental effect on health to those living in the locality.
• It is true to say that many people oppose composting sites on aesthetic grounds or because they do not want them in “their” vicinity. Where odours have been generated they have been associated with bad management. The EA has full control over such a situation and can close the facility where the odour is a nuisance.

• If individuals are exposed to high levels of certain organisms for long periods adverse reactions can occur, but even for those operators turning and handling compost on a regular basis, recorded instances of adverse reactions are very rare.

• Many studies have shown that the level of Aspergillus fumigatus, (a potentially troublesome organism in some situations) will be in a lower range on compost yards than is found in many industrial and agricultural activities. In this case the proposed site is close to agricultural land where bioaerosols will also be present.
References

Bohm R, et al 2002 Abfallforum online. 22
Hygienic Relevance of the Extension of Bacteria with the Collection and Treatment of Waste

Britter R.E. 1998 EU publication EUR 18198 EN
Recent Research on the dispersal of hazardous materials.

Casella Science and Environment Ltd, 2001

Composting Association of Ireland cre 2004
Bioaerosols and Composting a Literature Evaluation

Crook B, Olenchock SA. Chapter 19 CRC / Lewis Publ, Boca Raton USA: 531 = 545 1995
Industrial workplaces

Crook B, Swan, JRM, 2001 Harwood Publications 69 - 82
Bacteria and other bioaerosols in industrial workplaces In micro organisms in Home and Indoor Work Environments.

Eduard, W Ann Agric Environ 1997, 4, 179 – 186
Exposure to non infectious micro organisms and endotoxins in Agriculture

Standardised Protocol for the Sampling and Enumeration of Airborne Microorganisms at Composting facilities.

Geisson et al Univ 2003
Occup.Environ.Med.2003;60;336-342

Health and Safety Executive June 2003
A review of the published literature on Bioaerosols

Heida et al 1995 American Industrial Hygiene Association
Occupational exposure and indoor air quality monitoring in a composting facility

**Hryhorczuk et al**  *Ann Agric Environ Med, 2001, 8, 177 – 185*

Bioaerosol emissions from a suburban yard waste composting facility

**Passman, F.J.**  *Mycopathologia 1983, 83, 41 -51*

Recovery of *Aspergillus fumigatus* Aerospora from Municipal Sewage Sludge Composting Operations in the State of Maine.

**Stetzenbach, L**  *American Society fro Microbiology Press, 1997*

Introduction to Aerobiology, Manual of Environmental Microbiology

**SWICEB 2005**

Bioaerosol Monitoring and Dispersion from Composting Sites

**Tovalen et al 1998**  *Waste Management and Research*

Occupational Management in Biowaste Composting
Appendix 1

Compost Advice and Analysis
Desk Top Bioaerosol Survey for Earthworm Ltd., Daventry
December 2008
Compost Advice and Analysis
Desk Top Bioaerosol Survey for Earthworm Ltd., Daventry
December 2008
Appendix: 1a A VCU system showing the fully covered conveyor and close proximity to residential properties

Appendix: 1b View of VCU units showing enclosed delivery system for offering compost to the top of the units.
Appendix: 2  Plan 1a  A general view of the site and the surrounding area

Plan 1b  A closer view of the immediate topography of the area
Appendix : 3  Plan 2  The Proposed Composting Site Plan for Earthworms Ltd, Browns Road, Daventry
## Appendix: 4

### Table 1: Sensitive Receptors and their distance from the proposed site

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Direction from the proposed site</th>
<th>Distance from the proposed site</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ford Warehouse complex</td>
<td>Along the Eastern Boundary</td>
<td>Buildings are 60m</td>
</tr>
<tr>
<td>Elderstubbs Farm</td>
<td>Due West of the site</td>
<td>146m due West</td>
</tr>
<tr>
<td>Household Waste Recycling site</td>
<td>Along the Southern Boundary</td>
<td>53m due south from the reception building</td>
</tr>
<tr>
<td>Grange Estate</td>
<td>Due SSE to SE of site</td>
<td>457m at closest point</td>
</tr>
<tr>
<td>Staverton Park Golf Course</td>
<td>Between West and SSW</td>
<td>566m at closest point</td>
</tr>
</tbody>
</table>

## Appendix: 5a

### Windrose Data for Coventry Airport 2006

[Windrose Diagram Image]
Appendix: 5b  Official wind data from Wittering

WIND ROSE FOR WITTERING
N.G.R: 5042E 3026N  ALTITUDE: 73 metres a.m.s.l.

SEASON: Annual
Period of data: Jan 1995 - Dec 2004

87175 OBS.
2.3% CALM
0.0% VARIABLE

KNOT
0% 1-10
5% 11-16
10% 17-27
20% 28-33
20% >33
## Table 2 Wind Direction for the Daventry Area in 2007

<table>
<thead>
<tr>
<th>Winds from the Following Directions</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>14</td>
<td>3.84</td>
</tr>
<tr>
<td>NNE</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>9</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>26</td>
<td>7.12</td>
</tr>
<tr>
<td>NE</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>15</td>
<td>4.11</td>
</tr>
<tr>
<td>ENE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>1.92</td>
</tr>
<tr>
<td>East</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>ESE</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>1.10</td>
</tr>
<tr>
<td>SE</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>1.37</td>
</tr>
<tr>
<td>SSE</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>22</td>
</tr>
<tr>
<td>S</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>29</td>
</tr>
<tr>
<td>SSW</td>
<td>13</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>49</td>
</tr>
<tr>
<td>SW</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>WSW</td>
<td>3</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>W</td>
<td>0</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>WNW</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>23</td>
</tr>
<tr>
<td>NW</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>NNW</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>11</td>
<td>3</td>
<td>4</td>
<td>0</td>
<td>51</td>
<td>13.97</td>
</tr>
<tr>
<td>Cairn</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>3</td>
<td>10</td>
<td>2</td>
<td>1</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>365</td>
</tr>
</tbody>
</table>
## Appendix: 6

### Table 3: Some Recorded levels of bioaerosols in various workplaces

<table>
<thead>
<tr>
<th>Work Activity</th>
<th>Bacteria</th>
<th>Fungi</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grain Stores on farms</td>
<td>$10^3$</td>
<td>$10^9$</td>
<td>(Crook 1995)</td>
</tr>
<tr>
<td>Handling mouldy hay</td>
<td>$10^8$</td>
<td>$10^4$</td>
<td>Eduard 1997</td>
</tr>
<tr>
<td>Grain harvesting</td>
<td>$10^7 - 10^8$</td>
<td>$10^3 - 10^8$</td>
<td>Crook &amp; Swan 2001)</td>
</tr>
<tr>
<td>Animal feed mills</td>
<td></td>
<td>$10^3$</td>
<td></td>
</tr>
<tr>
<td>Cattle sheds</td>
<td>$10^3 - 10^5$</td>
<td>$10^4 - 10^5$</td>
<td></td>
</tr>
<tr>
<td>Horse stables</td>
<td>$10^5$</td>
<td>$10^4 - 10^4$</td>
<td></td>
</tr>
<tr>
<td>Pig houses</td>
<td>$10^4 - 10^6$</td>
<td>$10^4 - 10^5$</td>
<td></td>
</tr>
<tr>
<td>Poultry houses</td>
<td>$10^3$</td>
<td>$10^4$</td>
<td></td>
</tr>
<tr>
<td>Handling mushroom compost</td>
<td>$10^7$</td>
<td>$10^3$</td>
<td></td>
</tr>
<tr>
<td>Handling domestic waste (door step collection)</td>
<td>$10^3 - 10^4$</td>
<td>$10^4 - 10^5$</td>
<td></td>
</tr>
<tr>
<td>Domestic waste materials recycling</td>
<td>$10^5$</td>
<td>$10^9$</td>
<td></td>
</tr>
<tr>
<td>Composting operations</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delivery</td>
<td>$1.6 \times 10^4$</td>
<td>$4 \times 10^4$</td>
<td>Bohm et al 2002</td>
</tr>
<tr>
<td>Sorting</td>
<td>$1.4 \times 10^4$</td>
<td>$2.3 \times 10^4$</td>
<td>(2002)</td>
</tr>
<tr>
<td>Turning</td>
<td>$2.8 \times 10^4$</td>
<td>$4.3 \times 10^4$</td>
<td></td>
</tr>
<tr>
<td>Post treatment</td>
<td>$5.4 \times 10^4$</td>
<td>$1.7 \times 10^4$</td>
<td></td>
</tr>
</tbody>
</table>
1. Development Description

1.1. This application seeks to utilise land at the existing Burnham Landscapes site, within which it is intended to construct plant and equipment to manage mixed food and green waste, with a view to diverting it from landfill, producing compost for use on land and incorporation into soils used in the landscaping business.

1.2. The proposed buildings have a footprint of approximately 2300m$^2$. There will be two principal structures, one 9.35m to the ridgeline and one 8.9m to the ridgeline. Both will have eaves heights of 7.7m and will be agricultural in style, being clad in profiled steel sheeting. The walls will be juniper green, and the roof goose wing grey, to match the existing machinery store on site. Additionally there will be ten vertical composting units, or vessels, approximately 9.5m in height, lying between the two buildings, and connected to them by two conveyors.

1.3. Traffic to service the plant, and a weighbridge, will be the only activity external to the building. Service traffic will access the plant from Browns Road, off the A45 and A425 via the roundabout.

2. Site

2.1. The application site is on the Burnham Landscapes site, and is presently used as a yard for storing landscaping materials.

2.2. The site is broadly flat and lies on the industrial North Western fringe of Daventry, between a footpath and the Ford building.

2.3. The site is largely surfaced with hardcore with a small amount of scrubby vegetation internally. Access to the site is through a single gateway, in the South Western corner. The proposed development will lie to the North of the existing buildings; one office and machinery store (approximately 200m$^2$ floor area, 6.5m to the ridge and 5m to the eaves) and a secondary machinery store (45m$^2$ and 4.5m to the ridgeline).

2.4. The boundaries of the site are defined by palisade steel fencing near the gates and on the eastern side, lapboard timber fence on other areas of the site, and at the North Western boundary by a small earth bund.

2.5. The site is situated within the Daventry town area, and as such is not defined as a particular area of landscape within the Northamptonshire Landscape Character Assessment. However, the site adjoins an area of countryside characterised by rolling hills, farmland, and scattered agricultural related built development, hedgerows with trees, and occasional leisure and commercial developments.
2.6. In keeping with the predominantly farming activity to the West of the site, the proposed buildings will be designed to have the appearance of modern agricultural buildings, which will be appropriate for the setting between farmland and the backdrop of the large scale industrial premises at Ford. Views are, and will be, available from the adjoining footpath, but are in the context of an already developed site, against the background of the Ford building to the East of the site. To the West, the site is screened by a row of mature poplar trees running North South, 5m to the West of the site boundary.

2.7. There will be no outside activity other than the movements of delivery vehicles; all processing activities are to be carried out indoors.

2.8. The visual impact of the proposal will be limited to the buildings on the site and delivery vehicles. The buildings will be of a style consistent with the agricultural activities on land to the West, and relative to the context of the Ford building to the East, are of a very small scale.
3. **Surroundings**

3.1. The site lies at the Northern end of Browns Road, just beyond the Household Waste Recycling site (HWRS). To the East lie a large earth bund and the Ford building, one of the largest structures in the country - 600m by 250m. See figure 5 for a sense of scale. To the North is a newly planted belt of woodland, and to the west farmland, separated from the site by a footpath which forms an extension to Browns Road, and some established mature trees. To the South West lies a sports facility. To the South of the site, beyond the HWRS site lie a variety of industrial units.
Figure 5. Aerial view (note this is for information only as the image is circa 2005) The application site is edged in red.
4. Receptors and Views

4.1. The site is bordered to the East by the Ford building, and to the North by the newly planted woodland. To the South lies the HWR site, and Browns Road. The West will be the principal location for visual receptors, either on the footpath, the farmland, or the sports pitches. All of these areas are addressed individually below:

4.2. Viewpoint 1-Ford Building

Views will be available to the proposed development from the Ford building to the East, partially mitigated by the presence of the large screening bund on the Ford land, between Ford and the application site. Therefore only the tops of the proposed structures will be visible. However, as a commercial site, and given that the side of the site facing the application site is solely used for HGV deliveries (no offices or similar have views to the application site) it is not considered a sensitive receptor. Therefore any impact will be of a negligible magnitude.

4.3. Viewpoint 2 – Household Waste Recycling Site

The HWRS site borders the application site to the South, although in practice views to the new development will be largely screened by existing buildings on the application site. There is also mature vegetation along the intervening boundary, which adds to the screening effect. However, as the visitors to the site are only transitory, and it is already in an industrial setting, even were views to be available they would have a negligible impact on the receptors.

4.4. Viewpoint 3 – Browns Road

Traffic approaching the HWRS site and sports pitches from Browns Road will be looking towards the application site as they move North. However, the existing buildings and vegetation will prevent views of the development. The road stops approximately 100m short of the closest element of built development, where it becomes the footpath (The tarmac area will be extended to the site entrance if planning permission is granted). Therefore there will be a negligible effect on receptors.

4.5. Viewpoint 4 - Sports Pitches

Users of the sports pitches, especially the all weather pitch (to the North side) will have a view towards the proposed structures. However, the available view is against the context of the Ford building, generally industrial background. The buildings will represent only a small portion of the view, being partially screened by the mature poplars. Receptors will only be present for relatively short time periods and will be focussed on activities within the sports pitch environment rather than looking outwards as might a pedestrian using the footpath.

4.6. Viewpoint 5 – Elderstubbs Farm

To the West of the site lies Elderstubbs Farm whose buildings lie at a minimum distance of 145m from the proposed built development. Any views are in the context of the industrial fringe of Daventry, and specifically the Ford Building which dwarfs the proposed development. As may be seen in the image below, the farm has few aspects looking directly out at the application site. As such the views, as
shown in figures 6-8 below, are at a distance, only available from one window of the farm, and largely screened by intervening vegetation and landform on the farm boundary.

Figure 6. View of Elderstubbs Farm from application site.

Figure 7 – Maximum available view at present (from 3d model)

Figure 8 – Maximum available view as proposed (from 3d model)
4.7. Viewpoint 6 – Footpath from the South (viewed from southwest corner of site)

The primary sensitive receptor identified is the footpath running down the Western site boundary and its users. The path runs broadly North from the end of Browns Road, and provides access to the newly planted community woodland and beyond. Users of the footpath will be separated from the proposed development site by a wooden fence of approximately 2.5m in height, except where the access to the site is to be provided. At present the available views are limited by the existing fence line and vegetation.

Figure 9 Existing view from footpath over site

Figure 10 Montage showing proposed development from footpath over site
4.8. Viewpoint 7 – Footpath from North (viewed from Northwest corner of site)

On the same footpath, viewed from the North West, the clearest views of the development are available. Looking across the site there is presently a clear view to the mass of the Ford Building. The proposed structures will block this view in the immediate vicinity of the application site, replacing it with the agricultural style buildings of the development. The proposed development will only cast shade over the path during the mornings, and then only for a few hours during the winter. The impact is localised as the path is soon screened off from the development by the mature hedgeline as it turns West. The length of path during which these views are available is approximately 135m. The montage below shows the views' impact at its greatest.

4.9. The proposed development will have a limited impact on the users of the path, but taken against the industrial buildings adjoining the site (Ford's premises), and given the agricultural style of the buildings and short distance for which the views are available, it is considered that the impacts are sufficiently small as to be acceptable.
5. Conclusions

5.1. Although the proposed development will be visible from several locations, none of these are sufficiently sensitive, given the surroundings of the site, to be detrimentally affected. The use of modern agricultural style buildings and confining all activity beyond deliveries to within the built development will blend the site with the adjoining industrial and farming uses.

5.2. The character of the landscape will not be changed by the development. The nature of the landscape is such that there are deemed to be no significant sensitive landscape receptors.

5.3. This report has shown that the development will have a limited impact upon receptors, and that the site will be acceptable in landscape and visual impact terms.