Table 8.3 Criteria for Assessing Significance of Impact

A Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Major	Severe	Severe	Severe
Localised	Major	Major	Severe	Severe

B Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Major	Major	Severe	Severe
Localised	Moderate	Moderate	Major	Major

C Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Moderate	Moderate	Major	Major
Localised	Minor	Moderate	Moderate	Moderate

D Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Minor	Minor	Moderate	Moderate
Localised	Not Significant	Minor	Minor	Minor

E Sites

	Temporary	Short-term	Medium-term	Long-term
Extensive	Not Significant	Not Significant	Minor	Minor
Localised	Not Significant	Not Significant	Not Significant	Not Significant

Source of Table 8.3 & 8.4: Guidelines for Assessment of Ecological Impacts of National Road Schemes.

Localised impacts on rivers are loosely defined as impacts measurable no more than 250 metres from the impact source. 'Extensive' impacts on rivers are defined as impacts measurable more than 250m from the impact source. Any impact on salmonid spawning habitat or nursery habitat where it is in short supply, would be regarded as an extensive impact as it is likely to have an impact on the salmonid population beyond the immediate vicinity of the impact source.

8.3 EXISTING ENVIRONMENT

8.3.1 CHEMICAL WATER QUALITY

The results of surface water analysis are presented in **Table 8.4** and are reviewed in light of the Environmental Protection Agency's Environmental Quality Standards (EQS) for surface waters.

Table 8.4 Physico-chemical Results of Surface Water Quality Analysis

Parameter	A	B
PH	7.83	7.97
BOD (mg/l)	<2	<2
Suspended solids (mg/l)	10	5
Ammonia (NH_3-N) (mg/l)	0.93	0.06
Nitrate (NO_3-N) (mg/l)	0.02	0.36
Orthophosphate (o-PO_4-P) (mg/l)	0.3	0.3
Total Coliforms (CFU/100ml)	1560	21,870
Faecal Coliforms (CFU/100ml)	1600	13,500
Electrical Conductivity	900	847

The values recorded for pH at both sampling locations (A and B), were below the upper limit of 9.5 given in the EPA's Interim Guideline Values. Conductivity readings were also below the EPA's interim guideline value of 1,000μS/Cm at both locations. Levels recorded for Nitrate were well below the interim guideline value of 25mg/l, while levels of 0.3mg/l orthophosphate did exceed the guide value of 0.03mg/l, at both sampling locations.

Total and Faecal Coliforms were both found to be elevated considerably at both sampling locations when compared to the EPA's interim guideline value of 0 counts per 100ml. However, although both Total and Faecal Coliforms were detected at sampling location A, the levels did not breach the mandatory values detailed in the Quality of Bathing Waters Regulations, 1992 (S.I. No. 155 of 1992). The values recorded at B however, did exceed the mandatory values of 10,000 cfu/100ml and 2,000 cfu/100ml for Total and Faecal Coliforms respectively.

There are no interim guideline values given for either BOD or suspended solids. Instead reference may be made to the Freshwater Fish Directive (78/659/EEC), as compliance with guideline standards specified in this piece of legislation, will generally ensure compliance with the provisions of other relevant legislation, due to its' strict limits and consequent suitability of a watercourse for other uses should it meet these limits. Values recorded for both BOD and suspended solids, at both sampling locations, were below the guideline standards of 3mg/l and 25mg/l respectively given in the Freshwater Fish Directive (78/659/EEC) for Salmonid waters.

The value of 0.06mg/l ammonia recorded at B was below the more stringent guideline value of 0.15mg/l given by the EPA. However, the value of 0.93mg/l ammonia recorded at sampling location A exceeded the EPA's interim guideline value of 0.15 mg/l. This level was however found to be satisfactory when compared to guide value of 1mg/l total ammonium given in the Freshwater Fish Directive (78/659/EEC).

8.3.2 BIOLOGICAL WATER QUALITY

Table 8.5 shows historical biological water quality (Q-ratings) from the Three Rivers Project. The site upstream of A and B was recorded as slightly polluted while the site 100m upstream of Wilkinstown village was unpolluted.

Table 8.5 Biological Water Quality

EPA Site Code	Location re: Chemical sites	River Description	Q-rating	Biological Status
0700	0.5km upstream of A and B	Yellow R (East Branch) at Dowthstown Br	3-4*	Slightly Polluted
0048	Downstream of where drainage ditch on R162 meets Yellow R.	Yellow R (West Branch) 100m upstream of Wilkinstown	4*	Unpolluted

*Q rating carried out 1999. Source: Three Rivers Project

The Water Framework Directive requires the protection of the status of all waters (i.e. no deterioration to be allowed) and the achievement of at least "good status" by 2015 for all waters.

8.3.3 WATER SUPPLY AND DRAINAGE

There is no discharge to water as part of the proposed facility. Surface water run-off from the composting slab falls in a southerly direction and is collected in two tanks, of 6,800 litres (tank A), 16,000 litres (tank B) with water pumped from tank A to B. The water will be recirculated into the windrows where it will maintain optimum moisture levels for the composting process. There will be no excess production of leachate, as the windrows will absorb the leachate produced.

The fertiliser production building and its surrounds have a hardcore surface and there is natural infiltration of surface water runoff. Roof water is directed to an open ditch along the R162 road.

In the short term surface water supply for the site is abstracted from the Yellow River to the west of the site. This is also used to supply the misting system. However the development will be served by mains water and the surface water abstraction will cease.

8.4 POTENTIAL IMPACTS

The degree of impact on water quality will depend on the importance of the watercourse impacted and the duration of impact. Because there are no extensive construction activities on the site apart from the building of a waste reception area and a site access road, there will be no significant impacts on watercourses.

During the operational phase of the proposed development there will be no discharge of leachate or surface runoff from the composting slab to watercourses. The potential significant impacts on water quality in the absence of mitigation will be due to:

1. Pollution by effluent from the composting slab, ancillary structures and facilities (process areas).
2. Pollution by surface water draining from non process area of the site e.g. car parking, roofs, access roads etc., including fuels, lubricants and hydraulic fluids used on the site.
3. Pollution by effluent from toilet, wash facilities, canteen.
4. Abstraction from Yellow (Blackwater).

8.4.1 Process Areas and Associated Facilities

Given the range of potential pollutants contained in the wastes being composted, the potential exists for surface water contamination from accidental spillages. Pollution could potentially arise from a range of sources e.g.:

- Composting areas
- Fuel storage tanks
- Wheel wash
- Weighbridge/ Waste delivery area

Potential pollution before mitigation can be due to organic materials, nutrients, microbial contamination and heavy metals. Other pollutants are sediment, oils, grease and other petroleum products. Sediment can prevent sunlight from penetrating the bottom of surface water bodies, which can smother fish and prevent spawning. Heavy metals can come from natural sources but are more likely to come from vehicles. These can adhere to soil particles and may be toxic if they reach surface water bodies.

All runoff and/or effluent from the composting slab including the wheel wash will be stored and recirculated back into the composting process. As the Yellow River is 180m from the composting slab and there is no scheduled discharge to water from the facility; therefore there will be no significant impact on the river.

8.4.2 Non-Process Areas

Non-process areas include roofs, access roads, car parking and around site buildings and high grade fertiliser shed. The most serious risk posed would be from accidental spillages of transported materials with high B.O.D. or other polluting potential. The main pollutant of concern in runoff would be petrol, fuel oils, lubricating oils and hydraulic fluids.

All fuel storage tanks shall be bunded to prevent spillages reaching watercourses. Spillages may occur as a result of accidents but these cannot be predicted. All vehicles will be covered entering the site. Any wet waste material, e.g. sludge will be transported in enclosed tanker vehicles. With these measures in place there will be no significant impact on the water environment.

8.4.3 Toilet Facilities, etc.

Organic pollution is caused by the introduction of untreated or poorly treated sewage effluent to a watercourse. The breakdown of organic products by bacteria starves the river of oxygen resulting in

the river becoming uninhabitable. The septic tank on site goes to ground percolation and will not have a significant impact on water quality provided mitigation measures are implemented.

8.4.4 Surface Water Abstraction

Currently surface water is being abstracted from the Yellow River for general use at the site and for the on-site misting operation. However, the development will shortly be connected to the local authority mains supply and this abstraction will cease. Therefore there will be no significant impact.

8.5 MITIGATION MEASURES

8.5.1 Construction Mitigation Measures

The new site entrance will be constructed according to Good Codes of Practice and Organic Gold will ensure that construction will take place in dry weather to prevent potential sediment seeping into the surface water discharge point along the R162. During construction a daily inspection of surface water flowing from the discharge point will also be conducted to ensure that there will be no impacts from the construction of the new site entrance.

8.5.2 Operational Mitigation Measures

The following guidelines shall be followed:

- Runoff from the waste composting process (including wheel wash) can contain high levels of pollutants. Precautions shall be taken to prevent direct or indirect pollution through spillages to drains or watercourses. All effluent from the composting slab shall be collected and recirculated and not discharged to ground or surface waters.
- Fuels, lubricants and hydraulic fluids for equipment shall be carefully handled to avoid spillage, properly secured against unauthorised access or vandalism, and provided with spill containment according to codes of practice. Storage tanks shall be bunded.
- Any spillage of fuels, lubricants or hydraulic oils shall be immediately contained and the contaminated soil removed from the site and disposed of in accordance with waste management legislation.
- Fuelling, lubrication and maintenance of equipment should not be carried out within 50m of a watercourse.
- Waste oils and hydraulic fluids shall be collected in leak-proof containers and removed from the site for disposal or recycling.
- Foul drainage from site offices etc. shall be charged to a septic tank system constructed in accordance with SR6:1991 (Standard Recommendation for Septic Tank Systems - National Standards Authority of Ireland).

8.6 RESIDUAL IMPACTS

Provided mitigation measures are implemented there will be no residual impacts on surface waters due to the composting facility.

8.7 REFERENCES

- Fisheries Guidelines for Local Authority Works (1998). Department of the Marine and Natural Resources.
- Guidelines on the Information to be contained in Environmental Impact Statements (2002). Environmental Protection Agency.
- Three Rivers Project data, as requested from Meath Co. Co.
- Guidelines for Assessment of Ecological Impacts of National Road Schemes (2000). Natura Environmental Consultants for the National Roads Authority.
- Environmental Quality Objectives and Environmental Quality Standards, A Discussion Document. (1997). Environmental Protection Agency.

9 TERRESTRIAL ECOLOGY

9.1 INTRODUCTION

This section of the Environmental Impact Statement provides a description of the existing flora and fauna (ecology) of the proposed development and assesses the impacts, if any, on ecology from the proposed development. This section should be read in conjunction with the site layout plans and the project description.

9.2 METHODOLOGY

In preparing the Ecological Impact Assessment, all the studies were carried out with reference, as applicable, to the Environmental Protection Agency's (EPA) Guidelines on the Information to be contained in Environmental Impact Statements (March 2002).

9.3 EXISTING ENVIRONMENT

9.3.1 Designated Sites

Candidate Special Areas of Conservation (cSAC) are protected under the European Union (EU) Habitats Directive (92/43/EEC), as implemented in Ireland by the European Communities (Natural Habitats) Regulations, 1997. Special Protection Areas (SPA) are designated under Directive 79/409/EEC, The Directive on the Conservation of Wild Birds ('The Birds Directive'), and this is now included under the EU Habitats Directive. The nearest areas protected by this legislation are associated with the Boyne River and include the Boyne Coast and Estuary, the Boyne Woods and River Islands. All of these sites are a significant distance away from the development. **Appendix 4, Volume 2** of the report gives further details of these sites.

9.3.2 Recreational and Natural Assets

As part of an E.U. supported project titled S.R.U.N.A. –sustainable recreational use of natural assets, Meath County Council has catalogued a wide variety of natural recreational assets such as walks, viewing points and picnic areas throughout the county. The following sites have been identified within the vicinity of the proposed development.

- Grey Partridge Nature Reserve - Approximately 1.5 km to the east of the development

- Arch Hall - Approximately 2 km to the southwest

9.3.3 Field Survey

The proposed development site was surveyed on the 14th September 2004. The site is divided into three sections - the main fertiliser production shed and yard, a composting slab to the north west of this and a horse paddock to the southeast. The habitats within each section were classified using habitat descriptions and codes published in the Heritage Council's *Guide to Habitats in Ireland* (Fossitt, 2000). Each habitat identified has been given a rating based on the NRA '*Guidelines for the Assessment of Ecological Impacts of National Road Schemes*' (Table 9.1). This runs from a rating of 'A' (internationally important site that would qualify for SAC designation) to 'E' (low value habitat). The structure used for assessing the significance of effects of the proposed development is based on individual impact assessments of each of the areas surveyed criteria also based on the NRA guidelines (Table 9.2).

Table 9.1 The Ecological Importance of Sites

Rating	Importance of site
A	**Internationally important** Site qualifying for designation as SAC or SPA under EU Habitats or Birds Directives
B	**Nationally or regionally important** Site proposed for designation as NHA or containing habitats or populations of species that are nationally or regionally significant
C	**High value, locally important** Sites containing semi-natural habitat types with high biodiversity or significant populations of locally rare species
D	**Moderate value, locally important** Sites containing some semi-natural habitat or locally important for wildlife
E	**Low value** Widely found habitats with typical but relatively low species diversity and low wildlife value

Table 9.2 Rating of Impacts on Sites/Features of Ecological Interest

Impact	Value A	Value B	Value C	Value D	Value E
Severe	Any permanent impact	Permanent impact on large part of site			
Major	Temporary impacts on large part of site	Permanent impacts on small part of site	Permanent impacts on large part of site		
Moderate	Temporary impact on small part of site	Temporary impact on large part of site	Permanent impact on small part of site	Permanent impact on large part of site	
Minor		Temporary impact on small part of site	Temporary impact on large part of site	Permanent impact on small part of site	Permanent impact on large part of site
Not significant			Temporary impact on small part of site	Temporary impact on part of site	Permanent impact on part of site

Habitats

Buildings and artificial surfaces – BL3

The majority of the development site fits into this category. The entrance to the site from the R162 from Wilkinstown to Nobber is a gravelled drive way leading to a concreted yard. The yard houses main fertiliser production shed and offices and is 1.2 hectares in size. A laneway leads from this area to the composting area, which comprises a concrete slab and is 1.8 hectares in size. There is no flora and fauna associated with either of these yards. This habitat type is given a classification of 'E' under the classification scheme outlined in Appendix II and is of low ecological value.

Hedgerows (WL1)

The laneway that connects the composing slab and the area housing the site buildings and fertiliser shed is bordered on one side by a hedgerow. The hedge consists of a bank topped by typical hedgerow shrubs and trees. These include immature and mature ash (*Fraxinus excelsior*) and sycamore (*Acer pseudoplatanus*) along with an abundance of brambles (*Rubus fructicosus*) and hawthorn (*Cratageus monogyna*) and some elder (*Sambucus nigra*). Herb species present include ivy (*Hedera helix*), curled dock (*Rumex crispus*), cow parsley (*Anthriscus sylvestris*), hart's tongue (*Asplenium scolopendrium*) and shield fern (*Dryopteris* dilatata) and a variety of grasses. This habitat type is given a classification of 'D' as it is a semi-natural habitat of moderate value.

Improved Agricultural Grassland GA1

The paddock to the south-eastern end of the development site is a typically species poor agricultural grassland. Rye (Pos spp.) grasses are abundant along with clover (Trifolium spp.) and creeping buttercup (Ranunculus repens). Where the area is subject to grazing, some heath bedstraw (Galium saxatile) is found. This habitat type is given a classification of 'E' as it is a widely found habitat with typical but relatively low species diversity and is of low ecological value

Recolonising Bare Ground ED3

An area of the horse paddock adjacent to the area housing the site buildings and fertiliser shed has been used to dump spoil from previous construction. This has been colonised by a variety of grasses and ruderal plants including rye grass (Poa spp.), curled dock (Rumex crispus) and dandelions

(Taraxacum officinale). This habitat type is given a classification of 'E' as it has low species diversity and is of low ecological value.

Other features
An embankment approximately 1 metre in height borders the composting yard. The bank has been planted for screening purposes with a variety of standard trees, both native and non-native. The following tree species have been planted:-

Common Name	*Latin Name*
Norway Maple	Acer platanoides
Rowan	Sorbus aucuparia
Small Leaved Lime	Tilia cordata
Sitka Spruce	Picea sitchensis
Norway Spruce	Picea abies
Scot's Pine	Pinus sylvestris
Hazel	Corylus avellana
Ash	Fraxinus excelsior
Pedunculate Oak	Quercus robur

Fauna
The majority of the site of the proposed development is made up of hard concrete surfaces, sheds and offices, which are of no habitat value to birds and other fauna. The absence of surface water at the site, or in the immediate vicinity of the site, precludes the presence of otters. Similarly, the site is unlikely to be of importance to any species of reptile, amphibian, fish or invertebrate. No signs of fox or badger were observed in the horse paddock or along the hedgerow that borders the laneway between the composting slab and the yard containing the site buildings and fertiliser shed. This hedgerow contains numerous mature trees as well as fruiting shrubs such as hawthorn, and may provide suitable breeding and feeding habitat for birds. This hedgerow may also provide suitable roosting/feeding habitat for bats.

9.4 POTENTIAL IMPACTS

No significant impacts on flora and fauna are envisaged as a result of the proposed development. Construction on site will involve the construction of a waste reception building and an improved site entrance through the paddock area. The waste reception area will be built on a concreted slab with very limited excavations and will have no impact on flora and fauna. A small amount of the agricultural grass and soil may be removed during construction of the new site entrance. Because this paddock area is of low ecological value there will be no impact on flora and fauna associated with the site.

The proposed development will see an increase in the amount of waste received and composted on site. This change in operation will have no direct or indirect impacts on the flora and fauna associated with the development. There will be no direct or indirect effects on the areas of statutory designation or SRUNA sites outlined in section 9.3.2 due to their distance from the development. Any potential impacts on the aquatic environment associated with the Boyne River will be dealt with in the Aquatic Environment section of this EIS. There will be a permanent impact on the area of recolonising bare ground near the horse paddock, as this will be used for landscaping purposes. The level of impact is not significant as this area is of low ecological value. Planting of this area with native trees and shrubs will have an overall positive impact on local fauna and flora, as it will create new habitat.

9.5 MITIGATION MEASURES

Where planting for screening and landscaping purposes is proposed in the landscaping section of this EIS, native trees and shrubs will be used. Appropriate species to be planted will include ash (*Fraxinus excelsior*), hazel (*Corylus avellana*), rowan (*Sorbus aucuparia*), holly (*Ilex aquifolium*), hawthorn (*Crategeus monogyna*), blackthorn (*Prunus spinosa*), elder (*Sambucus nigra*) or any other native Irish tree appropriate to the site. These species will grow to a height of 6 to 15 metres. Other species such as Scots pine (*Picea sylvestris*) and oak (*Quercus robur*) should also be planted as they can reach tall heights of up to 30m.

9.6 RESIDUAL IMPACTS

Recolonising bare ground near the horse paddock will have an overall positive impact on local fauna and flora.

10 AIR QUALITY ODOUR AND CLIMATE

10.1 INTRODUCTION

Odour Monitoring Ireland was commissioned by Organic Gold (Marketing) ltd. to carry out an odour impact assessment study and odour modelling for the proposed development in Wilkinstown, Navan, Co. Meath.

RPS was commissioned by RPS-MCOS to measure ambient dust levels and bioaerosols emissions at the Organic Gold facility. The results of monitoring for these potential emissions are discussed in the following sections.

A section is also included on climate conditions at the site. Potential impacts and mitigation measure are provided.

10.2 SITE DESCRIPTION

The site of the proposed development is located within a predominantly rural area, adjacent to the village of Wilkinstown in County Meath. The site is located 10 km's north of Navan along the R162 to Nobber. The surrounding area is rural and is characterised by agricultural fields, mature hedgerows and trees, narrow winding roads and typical one off housing developments. Agricultural use of land consists of both grazing and tillage.

The development is located on an open and elevated site with a slope gradually to the north and east. The site is bounded to the east by the R162 and to the south and west by a hedgerow bordered lane way. This leads from the village of Wilkinstown to a private dwelling to the west of the development and ends in a cul-de-sac. This is the nearest sensitive receptor and is located 260 metres from the northern boundary of the site. To the south east, the site is bordered by a private dwelling and commercial garage. The remainder of the site is bordered by agricultural land. Another commercial garage and private dwelling is located to the north east of the site.

Access to the development is via a private lane way at the north-eastern boundary, leading from the R162. The laneway is bordered by well maintained fencing. The existing buildings and sheds on the site comprise typical agricultural buildings. The existing main complex of buildings is approximately 9m high at the ridge and 7m at the eaves. The composting slab itself is not visible off site and considerable effort has been made to screen it by the creation of an embankment and the planting of screening trees. The slab is also surrounded by a wall, 1.5 m in height topped by a mesh fence, which is a further 1m in height. The landscaped embankment completely surrounds the slab and fence and also partially encloses the yard that contains the composting sheds. In general, it is approximately 1.5m in height, though it rises to around 2.5 m on the northeastern border of the slab (Refer to Site layout map in **Figure 5.1**).

10.3 ODOUR

10.3.1 Introduction

Odour Monitoring Ireland was commissioned by Organic Gold (Marketing) ltd. to carry out an odour impact assessment of the current and proposed composting operations located at Organic Gold (Marketing) in Wilkinstown, Co Meath. The purpose of this assessment was to determine the potential for the generation of odour impact on the surrounding vicinity. Potential odour sources were identified from consultation with Organic Gold Marketing Ltd and RPS-MCOS were used to construct the bases of the modelling assessment. Results obtained were used to rank odour sources emanating from the different stages of composting and to choose a process which would contain odours at the site to an acceptable level and duration. This section should be read in conjunction with the technical report attached in **Appendix 5, Volume 2** of the report.

10.3.2 Methodology

Odour emission rates were calculated from library based olfactometry data. Dispersion modelling was used to identify the odour impact area of the process, and the effects of proposed odour abatement/minimisation strategies. A worst-case meteorological year and worst-case odour emission data (i.e. stable, low wind conditions) were used to predict any potential odour impact in the vicinity of the proposed waste facility. Odour impact potential was discussed for the current and future operation of the composting process.

The model used was BREEZE Industrial Source Complex version 3. This model is recommended in the Environmental Protection Agency (EPA) guideline on Air Quality Modelling for applications to refinery-like sources and other industrial sources. It is used with meteorological input data from the nearest representative source, in this case Dublin Airport. The most important parameters needed in the meteorological data are wind speed, wind direction, ceiling heights, cloud cover, and Pasquill-Gifford stability class for each hour. ISC ST 3 is run with a sequence of hourly meteorological conditions to predict concentrations at receptors for averaging times of one hour up to a year. It is necessary to use many years of hourly data to develop a better understanding of the statistics of calculated short-term hourly peaks or of longer time averages.

An odour impact criterion based on the odour characteristics was established using commonly used odour annoyance criteria in Ireland, UK and Netherlands. Generally, odour concentrations should be below 6 (Ou_E m^{-3}) for 98th percentile. The 98th percentile represents 98% of the time in which odours should be less than 6 OU's in order to prevent complaints arising from existing intensive pig facilities in Ireland. The 98% percentile also represents 175 hours in one year in which the impact will occur.

As odours from compost facilities are considered more unpleasant than odour from intensive agricultural facilities, it was found be more prudent to limit the possibilities of odour impact and apply an odour impact criterion of ≤ 3 (Ou_E m^{-3}).

Refer to the technical report for more precise details of methodology employed in caring out the odour dispersion modelling which is attached in **Appendix 5, Volume 2** of the report.

10.3.3 Existing Operations

The site of the proposed development is located within a predominantly rural area, adjacent to the village of Wilkinstown in County Meath. The site is located 10 km's north of Navan along the R162 to Nobber. The surrounding area is rural and is characterised by agricultural fields, mature hedgerows and trees, narrow winding roads and typical one off housing developments. Agricultural use of land consists of both grazing and tillage. The development is located on an open and elevated site with a slope gradually to the north and east.

The current composting operation is operated outdoors (i.e. waste acceptance, mixing and windrows formation and composting). The main types of material accepted on site for treatment are sludge, green waste, woodchip and a mixture of other organic waste types. Currently, the composting process takes approximately 8 weeks to complete at which point, a stable and mature compost product is produced.

A Mist Air System has been erected along the boundary of the composting slab with the aim of neutralising odours in the air and also to decrease dust emanating from the site. The odour neutraliser that is used in the misting system is called 'Clean Air' which is a blend of natural oils derived from plants, vegetables and flowers, in an aqueous solution. This was introduced in May/June 2004 and is currently operational at the site. The system is equipped with a wind directional control which allows the misting system to be turned on, on the side of the slab where the wind is blowing and hence reduce odour emissions in that direction. This mechanism also saves on the amount of water that may be consumed by the system. The effectiveness of the Mist Air System will be increased with the introduction of the palisade fencing which will serve to shield the mist spray from the wind. The mist sir system can achieve up to a 20% reduction in odour emissions leaving the site.

The facility is surrounded by agricultural land, and hence residents in this area would generally be less sensitive than those residents located in villages/towns/cities elsewhere. There have been some recorded complaints at the site in the past. Most of these complaints were registered by Meath County Council in the period January – July 2004 and were due to an increase in waste activities and change in operational procedures at the site. These operational changes have since been corrected. Before these changes took place, no significant odour complaints were made to the Council and the facility operated successfully with the Wilkinstown area.

10.3.4 Proposed Development

Because the facility has caused some odour nuisance in the past and in light of proposals to increase the amount of waste accepted on site from approximately 10,000 tonnes to 25,000 tonnnes, Organic Gold though it prudent to hire an Odour Specialist to carry Odour Dispersion Modelling and to use the results to quantify potential odour emissions at nearest receptors using various composting technologies and odour abatement techniques. Organic Gold propose using enclosed in-vessel units for composting for the first stage of composting which have will a duration of approximately 2 weeks. Following this, the compost will be allowed to mature in outdoor composting windrows for a period of approximately 6 weeks. The mist air system will continue to work at the proposed site and the model assumes that the mist air system can achieve up to a 20% reduction in odour emissions leaving the site.

Due to the fact that all phase 1 composting will be performed in an enclosed in-vessel composting system, which in accordance with the manufacturer will have no odour emissions, it is reasonable to propose an odour impact criterion of 3 (Ou_E m^{-3}) for less than 175 hours in a year for the indoor mixing/blending process and phase 2 windrow composting. Any odours emitted from the second phase composting will be greatly reduced in offensiveness potential due to the pre-composting stage carried out indoors. It is therefore reasonable to suggest an odour impact criterion of 3 (Ou_E m^{-3}) for this process.

10.3.5 Baseline Monitoring Results

Four data sets for odour emission rates were used to determine the potential odour impact of the current/proposed composting operation and design utilising the individual source odour emission data in **Table 10.1**.

Table 10.1 Odour Emission Rate For Each Individual Process Within Current/Proposed Organic Composting Operations

Odour source	Odour emission flux ($Ou\ s^{-1}\ tonne^{-1}$) [1]
Acceptance of waste	57
Mixing and Pre-treatment	104
Windrows formation and Composting	61
Windrows turning	61
Storage of final product	0.6

Note: [1] EPA, 2002, Desktop odour impact study for a biological treatment facility, near Roscommon, Ireland (TES101A); EPA, 2002, Odour report Galway composting plant

Four scenarios were modelled and included:

1. Predicted overall odour emission rate from current composting operations **(Scenario 1)**
2. Predicted overall odour emission rate from current composting operations following implementation of existing odour misting system **(Scenario 2)**
3. Predicted overall odour emission rate from proposed indoor/in-vessel composting operations and outdoor second phase windrows maturation for the increased tonnage of 25,000 tonnes **(Scenario 3)**
4. Predicted overall odour emission rate from proposed indoor/in-vessel composting operations, outdoor second phase windrows maturation and implementation of existing odour misting system for increased waste acceptance of 25,0000 tonnes **(Scenario 4)**

Refer to Dispersion modelling contour mapping results to view potential odour plumes for these four case scenarios, which are included in the technical report in **Appendix 5, Volume 2**.

Note: Odour-modelling was carried out for worst-case meteorological conditions to estimate worst-case odour impact from the current/proposed Organic Gold Marketing Ltd operations.

Scenario 1 - Current Composting Operations Without Use of Mist Air System
Odour plume spread without odour abatement will follow the predominant wind direction with minimum and maximum plume spread of 200 to 600 metres from the composting flag, in a south and north east direction. Seven residences and one shop are incorporated within the 3 ($Ou_E\ m^{-3}$) plume with these residents/shop perceiving an odour concentration of between 3 and 10 ($Ou_E\ m^{-3}$) for 175 hours in a year. In accordance with odour annoyance criterion (outlined in Table 1.3 of the technical report, **Appendix 5, Volume 2**) and in keeping with currently recommended odour annoyance criterion in this country for outdoor composting operations (i.e. mushroom composting industry), these residences may experience odour impacts especially during meteorological conditions that do not facilitate odour dispersion (i.e. stable conditions, slow wind speeds).

Scenario 2 - Current Composting Operations With the Use of Mist Air System
When the odour misting system is in operation, five resident locations and one shop are incorporated within the 3.0 $Ou_E\ m^{-3}$ plume with these residents and shop perceiving an odour concentration of between 3.0 and 6.0 $Ou_E\ m^{-3}$ for less than 175 hours in a year. The odour plume spread ranges from 40 to 450 metres from the facility boundary. The possibility of odour complaint is reduced significantly due to the incorporation of an odour misting system. As this facility is located in a predominant agriculture area odour complaints may be intermittent depending on worst-case meteorological conditions.

Scenario 3 – Future Composting Operations Without the Use of Mist Air System
It is predicted that odour plume spread following the implementation of indoor waste delivery, acceptance/blending and in-vessel composting achieved similar plume spread as the current composting process even though composting production tonnage amount is roughly doubled to 25,000 tonnes. Five residences, and one shop are incorporated within the 3 ($Ou_E\ m^{-3}$) plume with these residents/shop/ perceiving an odour concentration of between 3.0 and 6.5 ($Ou_E\ m^{-3}$) for less than 175 hours in a year. The odour plume spread ranges from 40 to 500 metres from the facility boundary. In accordance with odour annoyance criterion (outlined in Table 1.3 of the technical report in **Appendix**

5, Volume 2) and in keeping with currently recommended odour annoyance criterion in this country, odour complaints could be generated by these residences/shop especially during meteorological conditions that do not facilitate odour dispersion (i.e. stable conditions, slow wind speeds).

Scenario 4 – Future Composting Operations With the Use of Mist Air System
Utilising the odour misting system during future operations at the site, 4 residences and one shop are incorporated within the 3 (Ou_E m^{-3}) plume with these residents and shops perceiving an odour concentration of between 3 and 5 (Ou_E m^{-3}) for less than 175 hours in a year. The odour plume spread ranges up to 480 metres from the facility boundary. The possibility of odour complaint is reduced significantly due to the incorporation of a misting system. Some odour complaints could be received by the regulatory agency during meteorological conditions that do not favour odour dispersion (i.e. stable conditions, slow wind speeds)

10.3.6 Potential Impacts

The odour dispersion modelling modelled the potential impact the proposed facility would have on nearest receptors, working at a full capacity of 25,000 tonnes and during a worst-case scenario i.e. during unfavourable weather conditions.

- Following the implementation of in-vessel composting technology, the building of a waste reception building for waste delivery, mixing and blending, the use of a mist air system and improved odour management practices at the proposed site, the model predicted that the odour plume spread will be similar to current operations with all residences perceiving an odour concentration of less than 6 (Ou_E m^{-3}) for less than 175 hours in a year. Some odour impact may be perceived in the vicinity of the facility during meteorological conditions that do not favour odour dispersion (stable, low wind speed). This however is based on a worst-case scenario and will only occur for a maximum of 175 hours in a year.

10.3.7 Mitigation Measures

Several mitigation measures are outlined in the technical report (**Appendix 5, Volume 2**). The following mitigation measures must be implemented at the site:

- A clear and precise odour management plan will be developed for the site so as to eliminate any significant odour emissions events. This will be integrated into the future environmental management system.

- The proposed use of in-vessel composting units, an enclosed waste reception shed and the mist air system will also help to reduce odour emissions at the site. The material will be greatly reduced in offensiveness after undergoing first stage in-vessel composting.

- That heavy-duty plastic curtains will be installed upon the inlet and outlet door of the waste acceptance/mixing/blending building to reduce open area.

- The mist air system will continue to operate at the boundary of the site and will be regularly maintained to ensure odour reduction at the site.

- Organic Gold Marketing Ltd have agreed in principle that a biofilter will be installed at the proposed facility if negative odour impact occurs.

- Odour management practices at the proposed site will need to be precise to eliminate odour impact and will include the following:

    - All raw material will be removed form the waste reception building within 24 hours and placed in the in-vessel composting units;
    - A closed-door strategy will be maintained upon the waste acceptance/mixing/blending building and only one door will be opened for a maximum of 15 minutes per hour;
    - Application of waste acceptance procedures will ensure that problematic odorous material will not be accepted at the site for treatment;

- All mixing will be carried out in-doors;
- Sufficient bulking material will be kept on-site to be mixed with the incoming raw material.
- Meteorological conditions will be taken into consideration when turning windrows and windrows will be turned regularly to maintain aerated conditions;
- The moisture content, temperature and Carbon:Nitrogen ratio within the windrows will be kept at optimum conditions to favour microbial activity with the piles;
- Leachate will be recycled back into the process in an appropriate manner to avoid conditions that facilitate large inter facial area with recycled liquor (i.e. spraying leachate upon windrows using splash plate or other such techniques). The recycled leachate should be applied evenly and in close proximity to the windrows;
- Monitoring of odour emissions according to future EPA Waste Licence.

10.3.8 Residual Impacts

After applying the mitigation measures outlined above, and during a worst case scenario, the model suggests minor odour impact may be perceived in the vicinity of the facility during meteorological conditions that do not favour odour dispersion (i.e. stable, low wind), and may occur up to a maximum of 175 hours in a year.

10.4 DUST

10.4.1 Introduction

An RPS Consultant visited the Organic Gold site in Wilkinstown, Navan, Co. Meath on 21st April to install four dust gauges at perimeter locations on the site and on the 11th May between 11:00 Hrs and 16:00 Hrs to collect the dust gauges. The findings of the survey are summarised below.

Dust is characterised as encompassing particulate matter with a particle size of between 1 and 75 microns (1-75μm). Deposition typically occurs in close proximity to a site and potential impacts occur within 500 metres of the dust generating activity as dust particles fall out of suspension in the air. Larger particles deposit closer to the generating source and deposition rates will decrease with distance from the source. Sensitivity to dust depends on the duration of the dust deposition, the dust generating activity, and the nature of the deposit. Therefore, a higher tolerance of dust deposition is likely to be shown if only short periods of dust deposition are expected.

Dust controls should minimise the amounts of emissions leaving the site as airborne dust and protect the local environment.

10.4.2 Methodology for Baseline Dust Monitoring

- An ambient dust survey was conducted at the site boundary to gain a profile of the dust levels at the Organic Gold site over a typical operational day. The sampling method follows the Guideline VDI 2119 Sheet 2, as presented by the Constitution of German Engineers (Verein Deutscher Ingenieure). This is a standard method that complies with the TA-Luft requirements. The method determines total dust deposition, including wet deposition by gravimetric weight analysis.

- Bergerhoff Dust Deposit Gauges were installed at appropriate locations within the site boundary namely; DG1, DG2, DG3 & DP4.

- Twenty-day composite samples were collected and the concentration of dust deposited is calculated and expressed in mg/m^2/day. The TA Luft Guidelines Immission Values 'are established to protect against considerable disadvantage or substantial impairment'. The TA Luft Guideline Value for dust is 350 mg/m^2/day.

A description of each monitoring location is included in **Table 10.2** below and a site location map showing dust monitoring locations can be seen in **Figure 10.1**.

Table 10.2 Description of Dust Monitoring Locations

Dust Monitoring Location	Description
DG1	North western boundary of site at corner of Windrows Yard
DG2	Northern boundary of site close to weighbridge
DG3	South eastern boundary of site in Paddock
DG4	At Site Entrance

10.4.3 Baseline Monitoring Results

The results of the dust survey are presented in **Table 10.3** below.

Table 10.3 Results of Dust Survey Measured at Boundary of Site

Location	Exposure Dates	Total Dust Deposition (mg/m^2/day)	TA Luft Guideline Value (mg/m^2/day)
DG1	21/04/04-11/05/04	222.9	350
DG2	21/04/04-11/05/04	49.9	350
DG3	21/04/04-11/05/04	218.2	350
DG4	21/04/04-11/05/04	328.8	350

The higher levels of dust are detected at the locations close to the main operational areas (the Windrows) of the site and at the site entrance where vehicles enter and exit. The lower level of dust detected at DG3 indicates that dust levels decrease as distance from the site increases.

The dust results at all locations are below the TA Luft Guideline Value. However, dust emissions at the site entrance were quire high.

The windrows and the entrance road to the site are the main sources of any fugitive emissions from the site. These emissions are likely to occur during dry and/or windy spells when dust is more friable. The emissions from the windrows will be greatest during turning and formation of the composing piles.

10.4.4 Potential Impacts

Construction Impacts

Construction of a waste reception building and an improved site entrance may cause some dusty conditions to arise at the site. However, seen that the construction is of a small scale and that it is not of a long-term nature, there will not be a significant impact from dust emissions on the local environment, once mitigation measures are applied.

Operational Impacts

The baseline survey showed that levels of dust at all locations are below the TA Luft Guideline Value and should not cause a nuisance at the perimeter of the site and to nearest sensitive receptors.

The greatest dust levels occurred at the site entrance and at the composting slab. Future proposals for the site include the construction of a waste reception building and an improved site entrance. All waste will be delivered to the reception building where it will be mixed and blended before being introduced into the in-vessel units for composting. The enclosed building and the use of enclosed in-vessel units will reduce dust emissions arising at the proposed development during the blending and first stage of composting. After treatment in the in-vessel units the compost material will be allowed to mature outdoors. This material may become dry, especially in dry weather conditions and could potentially cause some dusty conditions to arise at the site.

The improved site entrance will be asphalted and speed restrictions on traffic entering and existing the site will be in place, which will reduce dust emissions at the site. Overall, the improved site entrance will not cause as much dust to arise at the site and will have a positive impact on the local environment.

10.4.5 Mitigation Measures

In order to ensure that no dust nuisance occurs, a series of mitigation measures will be implemented.

- The proposed in-vessel composting units will reduce odour impacts at the site due to greater containment of dust within the units.
- Waste delivery, mixing and blending should be carried out in the waste reception building which will also help to contain dust emissions.
- Windrows in the maturation area should not be allowed to dry out to prevent dusty conditions arising. If this does occur, the windrows will be "wetted down" to prevent dust emissions occurring.
- The improved site entrance will have a significant impact on reducing dust emissions at the site.
- Site roads should be regularly cleaned and maintained as appropriate. Hard surface roads should be swept to remove mud and aggregate materials from their surface. Any un-surfaced roads should be restricted to essential site traffic only. Furthermore, any road that has the potential to give rise to fugitive dust should be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles using site roads should have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road and on hard surfaced roads that site management will dictate that speed is to be restricted to 20 km per hour.
- Public roads outside the site should be regularly inspected for cleanliness, and cleaned as necessary.
- All machinery and waste delivery trucks will be regularly serviced and kept in good working order to prevent further dust emissions.

Legend

- Dust Monitoring Location
- Site Boundary

Project *Organic Gold Compost Facility*

Title Dust Monitoring Locations

Figure 10.1

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Issue Details			
Drawn:	SK	Project No.	MDE0202
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10.5 BIOAEROSOLS

10.5.1 Introduction

In order to determine the air quality at the Organic gold Composting facility currently in operation in Wilkinstown, Co. Meath, RPS Group Ltd, were commissioned to carry out a series of air quality test for Bioaerosols. To this end, a suitably qualified consultant from RPS visited the Organic Gold facility to carry out an air quality test for Bioaerosols on the 6th December 2004.

The potential impacts from bioaerosols on human health has been the subject of increased concern over the past five-ten years, as the practice of composting becomes more widespread. Reviews of existing research (Health Effects of Composting, A study of three compost sites and review of past data, UK Environment Agency, 2001) and (Bioaerosols and Composting, A Literature Evaluation, Draft Report by Cré, Composting Association of Ireland) has found that:

Bioaerosols are endemic in the environment and are created by decaying wood, leaves, in fields; the general pubic is generally not at risk since man's natural immune system provides adequate defence

Members of the public with particular susceptibility (weaker immune systems) are more at risk and can be more sensitive to bioaerosols

Bioaerosols are generated by many activities including agricultural harvesting and storage, timber processing, and animal rearing (e.g. poultry houses). Monitoring at these plants has recorded bioaerosol levels as high or higher than waste composting activities.

Workers at composting plants will be more exposed to bioaerosols than the surrounding population. Therefore measures to reduce exposure where possible are advisable, although there appears to be no significant difference in health of compost site workers in general

In general, concentrations of bioaerosols fall off with distance from the composting facility, typically reaching background levels within 250m. (Monitoring the Health Impacts of Waste Composting Plants, UK Environment Agency Technical Report p428, 2001).

This report outlines the methods employed and results obtained in this bioaerosol air quality survey. The results have been used to determine the potential impact to human inhabitants in the vicinity of the plant as a result of fugitive emissions. This section should be read in conjunction with the technical report attached in **Appendix 6, Volume 2** of the report.

10.5.2 Methodology

Samples of ambient air at 7 locations were extracted using an SKC Biostage Impactor operating at a flow rate of 14.15 litres/min for a period of 3 minutes. This is the procedure outlined by the UK National Institute for Occupational Safety and Health (NIOSH) method for Bioaerosol Sampling (Method Reference 0800). All sampling and analytical equipment used in the survey has been specially designed for sampling of workplace air quality for bioaerosols.

Samples were extracted onto 2 pre-prepared plates at each monitoring location and analysed for Mesophilic bacteria after 5 days incubation at 37^0C and Aspergillus species after 7 days incubation at 25^0C. All analysis was carried out at a suitably qualified microbiology laboratory (Cruinn Diagnostics Ltd). In order to determine a broad spectrum of results, the sample plates employed were for general Mesophilic bacteria and Aspergillus species.

A description of the location where samples were extracted from is given in **Table 10.4** also refer to **Figure 10.1** which shows the exact monitoring locations.

Table 10.4 Bioaerosol Monitoring Locations

Location	Description of Location
B1	At nearest sensitive receptor to the south west of the facility
B2	At nearest sensitive receptor to the south east of the facility
B3	At nearest sensitive receptor to the north east of the facility
B4	Indoors, in the fertiliser shed
B5	In the middle of the slab, directly down wind of windrow during turning (worst case scenario)
B6	Most Northern point on the boundary of the slab (Down wind)
B7	Most Southern point on the boundary of the slab (Up wind)

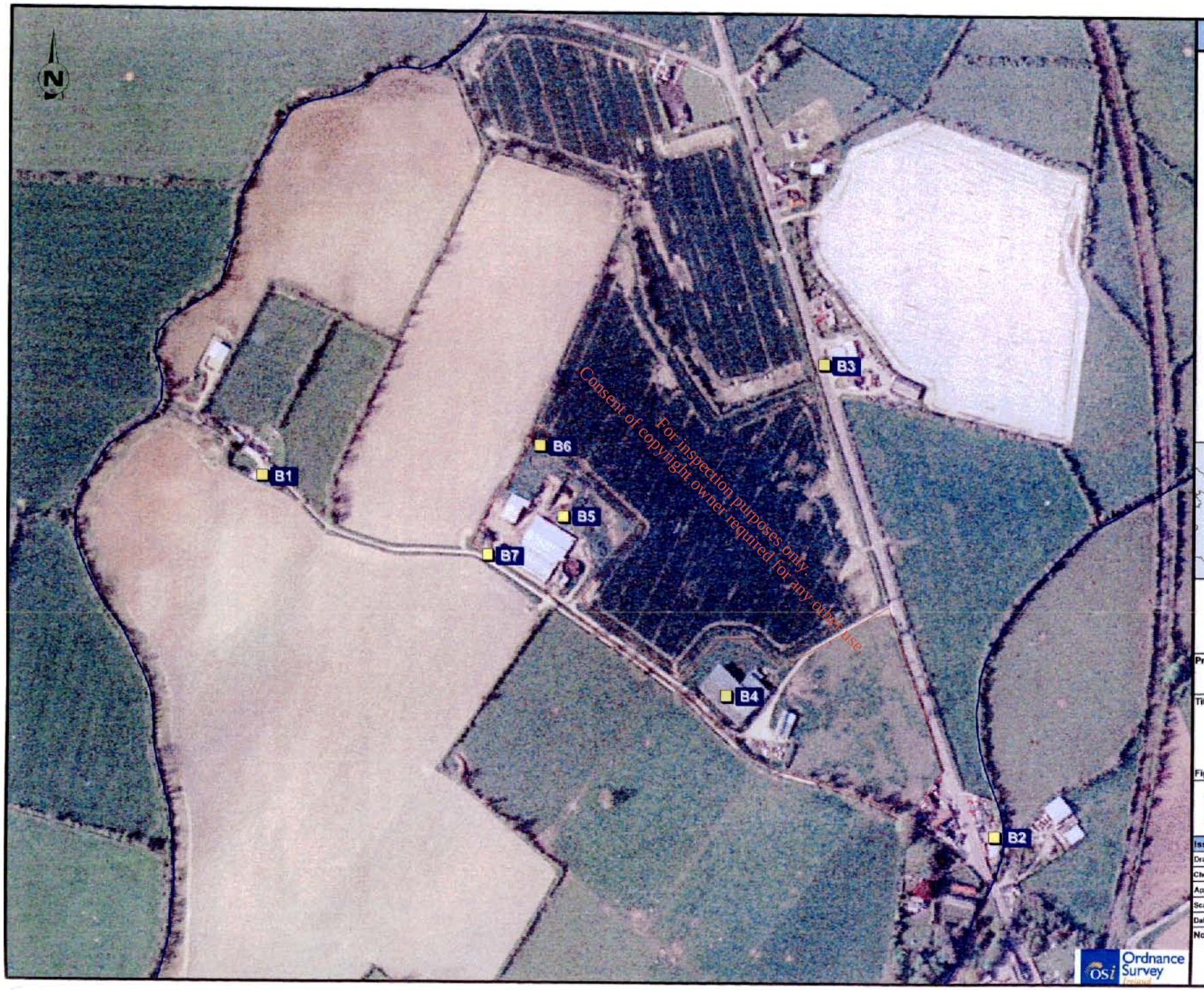
10.5.3 Baseline Monitoring Results

The results of the bioaerosol monitoring carried out at the Organic Gold facility are presented in **Table 10.5**.

Table 10.5 Results of Bioaerosol Monitoring at the Organic Gold Facility

Location	Mesophilic bacteria (cfu/m^3)	Aspergillus Spp (cfu/m^3)
B1	$2.36x10^2$	$2.36x10^3$
B2	$9.42x10^1$	No Growth
B3	$2.36x10^1$	No Growth
B4	No Growth	No Growth
B5	$3.5x10^3$	$7.07x10^3$
B6	$1.4x10^2$	$2.36x10^3$
B7	$1.9x10^2$	$2.36x10^3$

The UK Health and Safety Executive has prepared a Research Report (Ref; 130) entitled "*Occupational and Environmental Exposure to Bioaerosols from composts and potential health effects – A critical review of published data*". In this review there are several references to levels of fungi and bacteria as determined by a number of research studies carried out at ambient sites, organic waste sites, municipal bio-waste treatment sites and composting facilities. These reports were compiled to generate a range of measurement data for various aspects of the domestic waste industry. This information is listed in **Table 10.6** and is supplied to offer some perspective to the results determined in this bioaerosol survey at the Organic Gold composting facility.



Legend

- Bioaerosol Monitoring Location
- Site Boundary

Project *Organic Gold Compost Facility*

Title Bioaerosol Monitoring Locations

Figure 10.2

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Issue Details

Drawn:	SK	Project No.	MDE0202
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Table 10.6 Published Data for Bioaerosol Emissions During a Number of Waste Treatment Activities at Various Waste Handling Facilities

Work Activity	Fungi (*cfu/m^3)	Bacteria (*cfu/m^3)
Handling Domestic Waste	10^4-10^5	10^3-10^4
Domestic Waste Transfer Station	10^6	10^5
Domestic Waste Incineration	10^7	10^7
Domestic Waste Recycling	10^5	10^5
Domestic Waste Landfill Site	10^5	10^6

Fungi were detected at a range of 0–10^3 cfu/m^3. The results (**Refer to Table 10.5**) suggest that the fungal levels determined at the Organic Gold facility are well below the ranges previously determined during a number of specific waste treatment activities (**Refer to Table 10.6**).

Mesophilic bacteria were also detected at a range of 0–10^3 cfu/m^3. The results also suggest that bacterial levels determined at the Organic Gold facility are well below the ranges previously determined at a number of waste processing facilities (Refer to **Table 10.6**).

The levels detected for sample *B5 (*downwind of the windrow during turning) indicate the highest levels of Mesophilic bacteria and Aspergillus species, as expected. This is a worst-case scenario and the elevated concentration of airborne microbes can be attributed to agitation, which occurred during the mechanical turning of the windrow. It is also reasonable to suggest that short exposure may have sampled the peak of a burst of Bioaerosols and may have shown numbers well above those typically found in the sample area.

Bioaerosol concentrations are known to decline with distance from source due to atmospheric dispersion and dilution. Furthermore, concentrations have been shown to decrease to background levels after site activities cease, suggesting that wind blown aerosolisation is insignificant. Bioaerosol concentrations at the Organic Gold facility show a similar trend, with numbers decreasing with distance from the source and concentrations were found to be insignificant at all of the off-site sensitive receptors.

Bioaerosol concentrations determined in the survey represent the worst-case scenario (measured during windrow turning) for exposure to bioaerosols at the Organic Gold facility and typically observed levels outside the site boundary would be expected to be much lower.

Routine sampling at a composting facility should be carried out if a 'sensitive receptor' lies within 200 meters of the site boundary. However, the Organic Gold facility is in excess of 260 metres from the nearest receptor and, as such, the potential for bioaerosol dispersion outside the plant is greatly reduced. Samples were extracted at the area of greatest potential for bioaerosol formation (i.e. on and around the composting slab) after the windrows had been turned by a windrow turner.

10.5.4 Potential Impacts

Bioaerosol emissions, especially *Aspergillus fumigatus* emissions from composting plants have caused some concern amongst residents in the vicinity of the plant. Bioaerosol concentrations detected at the Organic Gold facility indicate that, the highest levels recorded during the survey were well below the ranges previously determined at a number of waste treatment facilities and were recorded during a worst case scenario (i.e. during windrow turning). Furthermore, concentrations decreased even further with distance from source (i.e. moving away form the windrows) and were found to be insignificant at the nearest off-site receptors. Where small quantities did exist, it is difficult to associate these quantities with the composting operations at the existing site as bioaerosols exist naturally in the environment and quantities detected could be due to natural background levels.

Future proposals involve the use of in-vessel composting units for the first stage of rapid enclosed decomposition of the waste material and the delivery and mixing/blending of waste in the enclosed

waste reception building. The enclosed vessels and waste reception building should further decrease bioaerosol emissions at the proposed site. Therefore, it is considered that there will be no negative impact on sensitive receptors at the boundary of the site.

The greatest recording of *Aspergillus spp* was at the windrows yard when the compost was being turned. However, the level recorded was still significantly below concentrations of *Aspergillus spp* measured at other waste treatment facilities. Workers at the Organic Gold composting facility will be exposed to higher than normal bioaerosol concentrations occurring naturally in the environment. There could therefore be a potential impact on employees working at the site, however, the extent to which this occurs is not fully understood at present as people all react in different ways to bioaerosol exposure. Reactions can depend on a number of factors such as prior exposure to bioaerosols, individual susceptibility, bioaerosol concentrations and type and the length of time and frequency that employees are exposed to these emissions.

Exposure to bioaerosols may cause allergies or inflammation of body tissues. Long term effects may result in chronic bronchitis, asthma or alveolitis. These affects are not unique to composting but to many other types of industries such as farming and sawmills. Similar occupational diseases include, Farmers Lung, Mushroom Worker's Lung, Bird Breeder's or Pigeon Fancier's Lung.

(Reference: Health & Safety at Composting Sites: A guide for Site Managers, The Composting Association, 2004)

Proposed mitigation measures outlined below must be followed to prevent potential impact on residents and site employees.

10.5.5 Mitigation Measures

Several design and operational measures can be undertaken to reduce exposure to bioaerosols. These include:

- The production of bioaerosols at composting plants are well connected with dust emissions. Dust produced at a composting plant technically is not a bioaerosol. However, it can carry microbial constituents suspended in the air (bioaerosols). So by maintaining dust levels at low concentrations by applying dust mitigation measures outlined in **Section 10.3.4** at the proposed facility, bioaerosol emissions will also be controlled.
- Enclosing the composting system especially during the first stages of waste decomposition.
- Waste delivery, mixing and blending should be carried out in the waste reception building. Maintain moisture content of the windrows in the maturation area.
- Air filters should be present in cabins of mobile equipment such as the windrows turner.
- Organic Gold will provide Personnel Protective Equipment (PPE) for employees to be used while working at the site.
- Regular health screening will be made available for employees.
- Regular monitoring for bioarosols at the nearest residences and at the site should be carried out. This is especially the case for the enclosed waste reception area where there is greater potential for employee exposure to bioaerosols due to enclosed conditions.

10.5.6 Residual Impacts

There will be no negative impact to locals living close to/or in the vicinity of the proposed site. Adhering to proposed mitigation measures will reduce the potential impact to employees employed at the site.

10.6 CLIMATE

Average annual Meteorological conditions was sourced from Met Éireann and climatic conditions for Dublin Airport in relation to wind, temperature and rainfall are described below.

10.6.1 Existing Environment

Wind

The windfield characteristics of the area are important climatological elements in examining the potential for the generation of odour and fugitive dust emissions from the site. Long-term wind observations over the period 1968-1996 indicate that the prevailing wind direction, at Dublin Airport is from a southwesterly direction. The mean annual wind speed expected in the vicinity of the OGF is 5.1m/s (1961-1999, Dublin Airport).

Temperature

The annual mean temperature at Dublin Airport (1961 – 1990) is 9.6°C with a mean daily maximum of 12.8°C and a mean daily minimum of 6.4°C. Given that this is the closest meteorological recording station, and due to the relative proximity to the OGF it is expected that similar conditions would exist at the site.

Rainfall

Precipitation data from the Dublin Airport station (1961 – 1990) indicate a mean annual total of 732.7mm. This is below average for most of the eastern half of Ireland which has between 750 mm and 1000 mm of rainfall in the year. The relatively low rainfall reduces the likelihood of leachate generation from the outdoor composting operations.

10.6.2 Potential Impacts

Impacts on the Macroclimate

Motor vehicles are a major source of atmospheric emissions such as CO_2 thought to contribute to climate change. The amount of Heavy Good Vehicles (HGV's) entering the site will not significantly increase and there will be no potential increase in air pollutants emitted from vehicles at the site. Energy usage at the site will increase due to increase in waste intake and electrical requirement for in-vessel system. Any overall increase will be offset by a reduction in emissions from landfill as a result of recycling or organic waste at the facility.

Impact on Microclimate

Future operation of the facility will have no significant impact on shading, temperature profiles or light distribution at the nearest sensitive receptors.

10.6.3 Mitigation Measures

The proposed facility will have no impact on climate therefore no mitigation measures are proposed.

11 NOISE & VIBRATION

11.1 INTRODUCTION

RPS carried out a Noise Impact Assessment at the Organic Gold (Marketing) Ltd. composting site on 21st April 2004 which included a night time noise survey between 22:30 Hrs and 00:30 Hrs and included a daytime survey on the 11th May 2004 between 11:00 Hrs and 16:00 Hrs.

This chapter summarises the main report and identifies, describes and assesses the impact of the proposed development in terms of its impact on noise on the surrounding environment particularly at nearest sensitive receptors to the site. The full report can be found in **Appendix 7, Volume 2** this report.

The assessment was carried out with reference to the following documentation and methodologies:

- A baseline survey at the nearest noise sensitive locations surrounding the proposed development site was carried out to establish baseline noise levels.
- The survey was carried out in accordance with ISO 1996 Acoustics: *"Description and measurement of environmental noise"*.

11.2 EXISTING ENVIRONMENT

The Organic Gold site is located at the northern end of Wilkinstown, Co.Meath. The site entrance is located along the R162 Navan to Kingscourt road. All site traffic enters and exits the site via this entrance. Agricultural lands surround the remainder of the site. The two nearest noise sensitive locations are situated on the R162, to the north of the site entrance. Measurements were made at both these locations.

The main on-site noise sources from the site are from Heavy Goods Vehicles entering and leaving the site and tractors and windrow turning machinery operating on site. The site only operates during the daytime period between 08:00Hrs and 18:00Hrs.

The site consists of a large agricultural shed with an office attached and the composting windrows are located in the concrete yard to the west of the office. A 1.5 metre high embankment surrounds the yard where earth and tree saplings are landscaped on top of the embankment. There is agricultural land to the north and south of the site. The nearest receptor is located approximately 300 metres from the northern boundary of the composting slab.

11.3 METHODOLOGY

11.3.1 Noise Measurement Parameters

During the baseline noise survey a total of five noise parameters were measured. Theses are defined below:

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

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

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

L_{A10} is the A-weighted sound level that is exceeded for 10% of the sample period; this parameter is typically used to quantify traffic noise.

L_{A90} is the A-weighted sound level that is exceeded for 90% of the sample period; this parameter is typically used to quantify background noise.

A-weighting is the process by which noise levels are corrected to account for the non-linear frequency response of the human ear.

All noise levels are quoted in dB(A) relative to a sound pressure of 20μPa.

11.3.2 Noise Measurement Locations

A noise survey was conducted at the site boundary and the neighbouring residential sites. Four of the monitoring locations are along the site boundary (Positions N1 to N4) and two of the monitoring locations are at nearest sensitive locations (Positions NSL1 and NSL2). Refer to **Figure 11.1**

A description of each monitoring location is included in **Table 11.1** below.

Table 11.1 Description of Noise Monitoring Locations

Noise Monitoring Location	Description
Position N1	North western boundary of site at corner of Windrows Yard
Position N2	Northern boundary of site at corner of Windrows Yard
Position N3	South eastern boundary of site in Paddock
Position N4	At Site Entrance
Position NSL 1	Outside Filling Station to North East of Site
Position NSL 2	Outside Residence to South East of Site

Noise measurements were made during the day and night time period at the locations described above between 11:30 and 01:30hrs. Measurements were 30 minutes during the daytime period and 15 minutes during the nighttime period.

The following equipment was used for the noise survey:

- Brüel & Kjær Type 2260 Investigator Sound Level Meter
- Brüel & Kjær Type 4231 Sound Level Calibrator

Measurements were made at a height of 1.5m above ground level, and measurements were free-field, taken 1-2m from reflecting surfaces. The weather conditions were in accordance with the requirements of ISO 1996: *Acoustics – Description and Measurement of Environment Noise.*

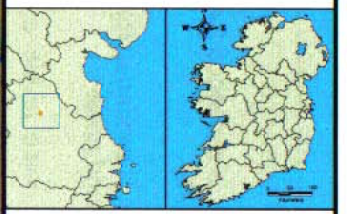
The instrumentation was checked and calibrated before and after the survey period to ensure no drift in the instruments sensitivity had occurred.

11.4 BASELINE NOISE SURVEY RESULTS

The noise survey was carried out to gain a profile of the noise emissions from Organic Gold's site over the day and nighttime periods. The results of noise measurements made at the boundary and noise sensitive locations are presented in **Table 11.2**.

Legend

- Noise Monitoring Location
- Site Boundary



Project *Organic Gold Compost Facility*

Title

Noise Monitoring Locations

Figure 11.1

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Issue Details			
Drawn:	SK	Project No.	MDE0202
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Date:	12/01/2005	MI0012	A01

Notes

1. This drawing is the property of RPS-MCOS. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. All levels are referred to Ordnance Datum, Malin Head.
3. NOT TO SCALE, use figured dimensions only. If in doubt ask.
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Table 11.2 Noise Monitoring Results

Location	Time	L_{Aeq}	L_{Amax}	L_{Amin}	L_{A10}	L_{A90}	Notes
N1	11:00	62	88	28	67	42	Site vehicles & bird song
N2	12:30	63	81	29	68	35	Site vehicles and road traffic
N3	13:00	52	67	34	55	42	Distant site noise, traffic on main road, birdsong
N4	14:00	64	88	34	64	43	Road traffic and some site noise
NSL1	22:15	69	88	31	72	35	Site closed. Road traffic only noise source
	14:30	67	93	30	68	39	Road traffic main noise source
NSL2	22:45	65	90	24	64	27	Site closed. Road traffic main noise source
	15:00	71	91	33	74	47	Road traffic, birdsong and some plant noise from site

Boundary Locations

The noise levels measured along the Organic Gold site boundary vary depending on the proximity to the main noise sources. Locations N1 and N2 are located in the Windrows yard. The dominant noise source here is the plant equipment. The highest noise level recorded here was 63dB L_{Aeq}. The distant road does not have a significant effect on noise levels in the yard.

Location N4 is at the entrance to the site and is close to the main road. The highest level recorded here was 64dB L_{Aeq}. The dominant source here is traffic on the main road and vehicles entering and exiting the site.

Location N3 is located in the paddock away from the main operations and main road. The main noise source is the road traffic. The highest noise level recorded here was 52dB L_{Aeq}.

Noise Sensitive Locations

Measurements were made at the entrance of two nearest receptors to the site boundary (NSL1 & NSL2), over the day and nighttime period.

The noise levels measured at NSL1 were as a result of passing road traffic along the R162 Navan to Kingscourt Road. The daytime ambient noise level was 67dB L_{Aeq}, Road traffic noise measured 68dB L_{A10} during this period. The background noise level measured during this time period was 39dB L_{A90}. During the nighttimes period the L_{Aeq} level measured was 69dB. This level is 2dB above the level measured with the site in operation. This indicates that the site does not contribute to any significant levels at this location. Background noise levels measured 35dB L_{A90}. These results indicate that the main source of noise at NSL1 is road traffic on the R162. The operations on the site have little effect on the noise levels recorded here.

Noise levels measured at NSL2 were again dominated by noise from traffic on the R162 road along with some birdsong and distant noise from the site. The daytime level measured was 71 dB L_{Aeq}. This value was dominated by road traffic noise.

The background L_{A90} value measured at this location may provide a greater indication of noise from the operating plant. During the nighttime period, while the site was closed, the level measured here was 27dB L_{A90}. During the daytime period during normal operation of the plant the level measured was 47dB L_{A90}. Noise from the operation of the site and road traffic were responsible for the small increase in noise emissions and it is thought that operations at the site do not significantly contribute to elevated daytime levels.

In order to assess the presence of tonal noise, 1/3 Octave band data was measured at each location. A peak at 63 Hz was noted during the day and night time period at NSL1 and NSL2. On assessment of the 1/3 Octave band analysis measured within the site, no peak at 63Hz was detected at any of the boundary locations. Additionally, as the site is not operational at night, the measured peak at 63Hz is as a result of an external noise source not associated with the site. Common sources of energy peaks at this frequency are electricity cables/transformers. (Refer to Appendix A and B for complete results of tonal noise assessment in the Noise Monitoring Report attached in **Appendix 3, Volume 3** of the report).

11.5 POTENTIAL IMPACTS

When considering a development of this nature, the potential noise impacts on the surrounding environment must be considered for each of two distinct stages; the short-term impact of the construction phase and the longer term impact of the operational phase.

11.5.1 Construction Phase Impacts

The construction phase will involve the use of a variety of equipment such as excavators, breakers, lifting equipment and dumper trucks. There will be vehicular movements to and from the site that will, out of necessity, make use of existing roads. All of these construction activities have the potential to generate noise and vibration.

Therefore, in order to minimise the impact on nearby sensitive locations, it is usual to limit the times of day and week during which it is permissible to carry out construction work that could create high levels of noise. These are normally set down by the local authority and are typical 08:00 to 18:00 hours Monday to Friday, 09:00 to 13:00 hours on Saturday and none on Sunday or bank / public holidays.

Higher noise levels are generally accepted during the construction phase than the operational phase, as these works are temporary in nature. Furthermore, if construction noise does not exceed the existing ambient noise climate (L_{Aeq}) by more than 10dB, it is unlikely to cause complaint. Daytime ambient noise levels measured at the two nearest sensitive receptors NSL1 and NSL2 were 67dB L_{Aeq} and 71 dB L_{Aeq} respectively.

Although there will be vehicular traffic to and from the site during the construction of the waste reception building and the improved site entrance, the number of additional vehicles is unlikely to have any affect on existing flows on the R162 regional road and consequently the existing noise climate will remain nominally unaffected during this stage.

11.5.2 Operational Phase Impacts

As the facility in tends on increasing the quantities of waste to be composted on site from approximately 10,000 tonnes to 25,000 tonnes there could be additional noise emissions at the site.

Sources of noise during the operational phase of the development are likely to include the following:

- Windrow turner and other operational machinery on site
- Noise emissions from the fans units installed at the back of proposed in-vessel composting units

- Additional vehicular traffic on public roads

From the baseline monitoring results discussed above, it was shown that even close to the composting slab boundary where most noise sources emanate from, during a typical operational day, a noise emission of 42 dB L_{A90} was measured. During the baseline monitoring, noise emissions at the nearest sensitive receptors were shown to be due to existing road traffic and from the more occasional steady plant noise within the site.

At the proposed development the type of noise emissions are expected to remain similar to the existing site apart from the added noise emissions from the fan units at the back of the composting vessels. Simple calculations based on the nominal noise emissions of the air handling units (as supplied by the manufacturer of the Wasteology system) suggests they will not cause an exceedance of the EPA recommended day-time (55 dB) or night time (45 dB) guidance levels for noise.

Noise emissions at the proposed development are not expected to have a significant impact on the nearest sensitive receptors.

11.6 MITIGATION MEASURES

11.6.1 Construction Phase

With regard to construction activities, the main contractor will need to refer to BS5228: *Noise control on construction and open sites*, which offers detailed guidance on the control of noise from construction activities and follow Good Codes of Practice. Controlling noise from construction works at neighbouring dwellings to no more than 10dB greater than the existing ambient (L_{Aeq}) noise levels will normally ensure local residents are not significantly impacted by noise.

Vehicles entering the site during construction should travel at low speeds in order to reduce noise emissions.

11.6.2 Operational Phase

From the recorded results, at current operation levels it is not thought that it will be necessary to carry out any abatement measures. Mitigation measure will include:

- The wall and landscaped embankment surrounding the windrows yard already acts as a noise screen for the nearest sensitive locations. This will be maintained on site to mitigate against potential noise emissions.
- Waste is delivered, mixed and blended in an enclosed waste reception building, which will help to contain any potential noise emissions emanating from these activities.
- The entrance road should be properly maintained and vehicles using it should travel at low speeds in order to reduce noise when entering and exiting the site.
- Plat machinery should be regularly serviced to ensure noise emissions are kept to a minimum.

11.7 RESIDUAL IMPACTS

The development will have no significant residual noise impact on nearest receptors.

12 LANDSCAPE & VISUAL

12.1 INTRODUCTION

This chapter of the EIS provides an assessment of the landscape and visual impacts for the proposed development.

12.2 METHODOLOGY

An assessment of Landscape and Visual impacts of the development was carried out during a site visit to the proposed development by RPS-MCOS on 14th September 2004. The assessment was carried out with regard to the vulnerability of the landscape to change and to the location of visual receptors relative to the proposed scheme. The methodology was based on the EPA Guidelines on Information to be contained in EIS (2002) and Advice Notes on Current Practice in Preparation of EIS (2003). The assessment of impact has been divided into two aspects:

- Landscape Impact Assessment concerns the impact of the proposed work at a landscape level and considers both the character and sensitivity of the area in which the proposed development is located.
- Visual Impact Assessment deals with specific impacts likely to arise from the proposed development as experienced by local residents and passers-by.

Significance Assessment Criteria

Significance criteria used to assess the landscape and visual impact of the proposed scheme have been developed with reference to the EPA document providing guidelines on information to be contained in an EIS. **Table 12.1** details the significance criteria used for the landscape and visual assessment.

Table 12.1 Significance Criteria

Level of Impact		Definition
Neutral Imperceptible or Slight Impact	Not significant	An impact that does not change the quality of the environment, is capable of being measured but without noticeable consequences. Causes changes in the character of the environment that are not significant or profound.
Minor Impact	Significant Impact 'An impact which by its magnitude duration or intensity alters an important aspect of the environment'	Impacts associated with local issues. Unlikely to influence decision making process. May influence detailed design. Mitigation measures should remove most such effects
Moderate Impact		Impacts associated with sites, features or populations of local importance. Unlikely to influence key decision making processes but may influence design process. Mitigation measures are likely to remove some but not all effects.
Major Impact		Impacts associated with sites, features or populations of district or local importance. Of concern to the project, may become key features in the decision making and design process. Mitigation measures are unlikely to remove *all* such effects.
Severe Impact		Impacts generally associated with sites, features or populations of national, regional or district importance. Represent key factors in decision making and design process. Typically mitigation measures are unlikely to remove such effects.

12.3 EXISTING ENVIRONMENT

The site of the proposed development is located within a predominantly rural area, adjacent to the village of Wilkinstown in County Meath. The site is located 10 km's north of Navan along the R162 to Nobber. The surrounding area is rural and is characterised by agricultural fields, mature hedgerows and trees, narrow winding roads and typical one off housing developments. Agricultural use of land consists of both grazing and tillage. The development is located on an open and elevated site with a slope gradually to the north and east. The site is bounded to the east by the R162 and to the south and west by a hedgerow bordered lane way. This leads from the village of Wilkinstown to a private dwelling to the west of the development and ends in a cul-de-sac. To the south east, the site is bordered by a private dwelling and commercial garage. The remainder of the site is bordered by agricultural land.

Access to the development is via a private lane way at the north-eastern boundary, leading from the R162. The laneway is bordered by well maintained fencing. The existing buildings and sheds on the site comprise typical agricultural buildings. The existing main complex of buildings is approximately 9m high at the ridge and 7m at the eaves. The composting slab itself is not visible off site and considerable effort has been made to screen it by the creation of an embankment and the planting of screening trees. The slab is also surrounded by a wall, 1.5 m in height topped by a mesh fence, which is a further 1m in height. The landscaped embankment completely surrounds the slab and fence and also partially encloses the yard that contains the composting sheds. In general, it is approximately 1.5 m in height, though it rises to around 2.5 m on the north eastern border of the slab. Refer to **Plate 8** which shows the boundary surrounding the composting slab.

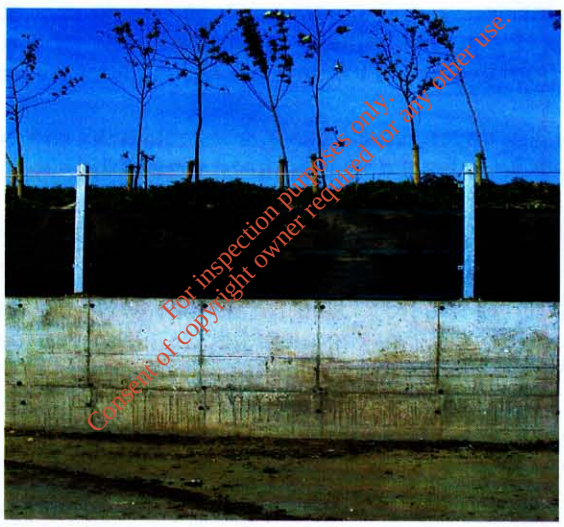

Plate 8 Wall and Earthen Boundary Surrounding the Composting Slab

12.4 PROPOSED DEVELOPMENT

The proposed development will entail composting of up to 25,000 tonnes of organic waste in in-vessel units followed by outdoor windrow maturation on the slab, the construction of a waste reception building on an existing composting slab, and the construction of an improved site entrance through the paddock area.

The proposed new structure will be constructed in the eastern corner of the composting slab, and will be approximately 11 m at the ridge, 9.6 at the eaves and 36 m long. It will be constructed of horizontal Kingspan agricultural cladding, green in colour or similar material.

A new entrance onto the R162 will also be constructed approximately 25 metres to the south of the existing entrance.

12.5 VISUAL QUALITY ZONES

The Meath County Development Plan describes eleven zones of 'Visual Quality' within the county as a whole. The proposed development is situated within one of these zones - Area VQ11: Rural and Agricultural. The County Development Plan provides the following description of this zone: -

'These parts of the county make up the majority of its area in that they comprise normal rolling lowland pastoral landscapes that apart from occasional ridges or prominent areas, are not particularly visually sensitive. These areas can absorb quite effectively appropriately designed and located development in all categories including masts and wind energy installations, afforestation and agricultural structures'.

12.6 VISUAL ANALYSIS

The proposed development is located in an elevated position within an agricultural landscape. Views into the site from the public domain are primarily along the R162. Impacts are limited to the view of the existing sheds as the concrete composting slab is screened from view by an embankment and planted trees. Views of the site from visual receptors along this road are as follows:-

- The site is visible for approximately 400 metres along the R162 from the village of Wilkinstown travelling towards Nobber. It is also visible along the same stretch of road travelling in the opposite direction. The view is intermittent and interrupted by existing hedgerows (see Plates 1 to 3).

- There is a single residence and commercial garage to the south east of the proposed development with a direct and partially interrupted view of the existing sheds and office buildings. The view from this house towards the site is given in Plate 1.

- To the northeast of the development there is a residence and commercial premises (petrol station and shop) with an indirect and interrupted view of the site.

- The development is visible along the adjacent public laneway to the south and west that leads from Wilkinstown.

No other views are afforded of the site from other residences along the R162 or the surrounding third class roads. The topography and the tree-lined hedgerows along the road verges and intermediate fields obscure any view of the development from the residence located to the west.

12.7 POTENTIAL IMPACTS

12.7.1 Construction Phase Impacts

During the construction phase of the proposed development there will be a potential visual impact on the surrounding residences that have uninterrupted views of the site. Visual disturbance will be caused by the introduction of new structures on a site that was previously occupied by a concrete slab. Impacts during the construction phase will be minor and short-term and no specific mitigation measures will be implemented. On completion of construction, the associated temporary disturbance and its impacts will cease to exist.

12.7.2 Operational Phase Impacts

As outlined in the section on the existing environment, the proposed development is situated in typical rolling agricultural landscape. There are no protected views as designated by the County Development Plan in the vicinity. Although the existing structures are sited on an elevated section of the site, the overall impact on the surrounding landscape is not significant. As outlined in the Meath County Development Plan, the type of undulating landscape in this area has a high capacity to readily absorb developments, particularly as the proposed development is in keeping with the agricultural nature of the surrounding countryside. The proposed development forms only a small element in the overall

landscape and substantial screening in the form of topography and vegetation is either already in existence or will be provided as part of the mitigation for visual impacts.

Existing structures present on site have been in place for some time and are in keeping with the agricultural setting. The proposed new waste reception building will be 36m long, 22m wide and 11m high at the ridge and 9.6m at the eaves. It's design and appearance will be simple. It will be built using reinforced concrete walls and a steel portal frame system, with a Kingspan horizontal cladding material or similar. This will be green in colour to ensure that the building fits into the agricultural landscape setting with the fertiliser production shed already on site.

There will be a negative impact from the new building on visual receptors in the area, which will range from minor to moderate. The impact on users of the R162 is considered to be minor as the duration of the view is brief in passing the site and existing hedgerows provide screening. The residence to the southeast of the development has a direct view of the existing site buildings and fertiliser shed, though this is partially obscured by a large mound of dumped spoil. The new structure will be constructed approximately 400m to the northwest of this residence and will be partially screened by the existing buildings. The impact on this receptor is considered to be moderate. The residence and commercial premises to the northeast will be approximately 260m away from the construction. There is a minor impact on the view from these receptors. Impacts on users of the public laneway to the south and west are slight and not significant due to screening provided by existing hedgerows. There will be no significant impact on any visual receptor by moving the site entrance.

Pictures showing views of the site from different locations on the R162 road are attached in **Appendix 8, Volume 2** of the report.

12.8 MITIGATION

The impact of the proposed scheme upon landscape is deemed to be not significant. Visual impact on the other hand has been classified as being significant from three locations as outlined in the previous section. The objective of proposing mitigation measures is to attempt to reduce the level of visual impact at these locations from significant to not significant. This can most easily be achieved by creating screening using tree planting. A significant amount of tree planting has already occurred. Approximately 2,800 native and non-native trees have been planted on an embankment around the composting slab. A planted embankment also partially screens the site buildings and high grade fertiliser shed from the R162. The proposed new structures in the eastern corner of the composting slab will be partially screened from view by the existing embankment along the north eastern boundary of the slab. In time when the trees planted on the embankment mature, the level of impact on receptors along this road will be reduced to slight and not significant. The green colour of the proposed new structure will make them less intrusive in the landscape. Extra screening will be provided by using climbing plants such as ivy (*Hedera helix).*

In order to reduce the level of impact on the residence to the south east, the following mitigation measures will be carried out:-

- The mound of spoil that partially blocks the view of the existing sheds and buildings will be extended and appropriately landscaped and planted with trees.
- Appropriate species to be planted will include
    - Ash (*Fraxinus excelsior)*
    - Hazel (*Corylus avellana*)
    - Rowan (*Sorbus aucuparia*)
    - Holly (*Ilex aquifolium*)
    - Hawthorn (*Crategeus monogyna*)
    - Blackthorn (*Prunus spinosa*)
    - Elder (*Sambucus nigra*)

The species planted such as Norway maple (*Acer platanoides*), rowan (*Sorbus aucuparia*) and hazel (*Corylus avellana*) will grow to a height of 6 to 15 metres. Other species planted, such as Scots pine (*Picea sylvestris*) and oak (*Quercus robur*), may reach a height of up to 30m and will also be planted in the embankment.

If these mitigation measures are carried out, the level of impact on the residence to the southeast will be reduced to slight and not significant.

12.9 RESIDUAL IMPACTS

Once the above mitigation measures are implemented visual impact will be reduced to slight and not significant.

13 HUMAN BEINGS

13.1 INTRODUCTION

This chapter of the Environmental Impact Statement deals with the potential impact of the proposed facility on Human Beings. This chapter is divided into:

Part A - Social & Economic Activity including residential, recreational and commercial properties.

Part B - Nuisance Control including fire, traffic, odour, bioaerosols, dust, litter, vermin and birds and noise.

Part A Social & Economic Activity

RPS-MCOS carried out a study to identify the potential impacts associated with the proposed facility on social and economic activity in the area. Likely significant impacts are assessed and mitigation measures proposed. The social and economic aspects of the study have been appraised with particular attention given at a local level, but also on regional and sub-regional levels.

13.2 METHODOLOGY

The assessment of the socio-economic impact of the proposed development was carried out broadly in accordance with the EPA publications giving *Advice Notes on Current Practice* and *Guidelines on Information to be Contained in Environmental Impact Statements (EIS)* (1995, 2002). Government strategies relating to land use and economic development for the area were consulted, including the Meath County Development Plan (2001). Demographic characteristics of the area were ascertained from the results of the 2002 Census of Population published by the Central Statistics Office.

Existing residential, community, commercial and industrial properties were identified and mapped during two local surveys in July 2004. The map was then used to evaluate the existing environment with regard to socio-economic functioning. Existing land use was determined with the aid of aerial photography, six-inch ordnance survey maps and visual inspections.

13.3 EXISTING ENVIRONMENT

The existing environmental will focus on the regional, sub-regional and local environment in the vicinity of the proposed development.

13.3.1 Regional Environment

The proposed facility is located within the North Eastern Waste Management Region comprising counties Meath, Cavan, Monaghan and Louth. The North East Waste Management Plan was adopted in 2001 by all the local authorities within these counties. The plan specified key targets for the management of waste within the region and included targets for recycling, energy recovery and residual landfill. Composting facilities were to be developed to attain the recycling target of 38.9% of municipal waste. These facilities have not yet been developed. The proposed development therefore is in keeping with regional waste management planning and will provide access to a range of integrated waste facilities, which will be beneficial to the region.

13.3.2 Sub Regional Environment

The proposed facility in Wilkinstown is located approximately 10 kilometres north of Navan Town in County Meath, which is the closest population centre to the proposed development. Navan has a

population of c15,000, which has increased by almost 50% from 1996 and covers an area of 199 hectares.

Navan town is the administrative capital of County Meath and the closest town to Wilkinstown village. It is located at the confluence of the rivers Boyne and Blackwater and is served by the N3 and the three regional roads the R161, R163 and the R162. The Drogheda Kingscourt railway line also passes through the town. A mixture of residential, commercial and industrial developments exists in Navan town. There are also a number of community, recreational, and heritage facilities in the town.

The population of Navan is expected to grow significantly in the future and become one of the primary growth centres in Meath. Due to the increase in population and the increase in water treatment in Meath a marked increase in sludge production is envisaged which will require treatment before being disposed off.

13.3.3 Local Environment

Demography - The proposed facility is located in Wilkinstown, Navan, Co. Meath within the District Electoral Division (DED) of Donaghpatrick, which had a population of 483 in 2002. The population rose by 10% from 1996 to 2002 from 438 to 483 people.

Land Use - Wilkinstown is a small village approximately 10km from Navan town and is an area classified as 'general agricultural land' according to the Meath County Development Plan. A lot of the agricultural land in the area is used for tillage and cereal production. There are a number of private dwellings located along the R162 on either side of Wilkinstown village which follows through for approximately 650 metres to the proposed site and beyond. The location of all dwellings in the vicinity of the site can be seen in **Figure 4.1.** There are also a small number of commercial and community centres in the area.

Economic Activities - There are two garages located in the vicinity of the proposed development. These garages are located to the North East and south east of the facility. A butchers shop is also located within of the garages, which sells groceries along with petrol and diesel. A pub is located southeast of the facility in the village of Wilkinstown. Another pub is located to the south west of the facility. All of these businesses can also be seen on the site location map in **Figure 4.1**.

Community Amenities/ Facilities - There is a primary school located south of Wilkinstown village, approximately 680 metres from the site entrance to the proposed facility. Outside of the village there is a community centre which serves the local community.

Transportation - The village and the proposed facility is served by the Regional road the R162 which runs north of Navan to Kingscourt. The R162 is of good standard in terms of width and alignment.

13.4 POTENTIAL IMPACTS

The proposed development will have an overall positive impact at a regional and sub-regional level by providing access to integrated waste treatment facilities which can improve economic compositeness.

Potential impacts on a local level are discussed below in relation to :

- Demography
- Land use
- Economic Activities
- Community Amenities/ Facilities
- Transportation

Demography - proposed facility will have no impact on demography in the area.

Land Use – The proposed facility is not expected to have any negative impact on land use in the area.
Economic Activities - The facility will provide jobs for eight full-time employees and will add to economic growth within the area. The facility also provides part-time employment to various consulting

companies hired for technical advice and monitoring, laboratories for product analysis, local landscapers and maintenance personnel.

If the future development is not managed properly there could be potential odour problems in the area. Local residents fear that property prices may decrease if there is a serious odour issue in the area. The local petrol station and shop has also expressed concern about the impacts odour emissions can have on trade. The facility must be managed properly and good housekeeping practices adhered to, to prevent odour issues arising in the area.

Community Amenities/ Facilities - There is a local primary school outside of the village and approximately 680 metres from the existing site entrance to the facility. The proposed development may have an impact on children and teachers attending the local primary school due to the release of odorous emissions. There is also a community centre outside of the village, which serves the local community. The new development must be managed in a way that does not severely impact on the local school or facilities in the future. Odour control at the proposed site is therefore of critical importance and odour control measures are discussed in **Section 10.3.7**.

Transportation - As the quantity of waste to be treated on site will increase up to 25,000 tonnes, there will be an associated increase in traffic arriving on site. One way traffic movements at the site will increase from 19 to 29, which represents 1.2% of the total traffic estimated for 2006 for the R162 regional road. The small additional amount of waste trucks which will arrive at the site in the future, will not have a negative impact on local transportation.

13.5 MITIGATION MEASURES

As the facility will have no negative impacts on a regional, or sub-regional basis, no mitigation measures are provided.

On a local level, there is the potential for release of odours from the facility and for them to impact on the local community and economic activities. Measures to mitigate against the intensity and frequency of odours as outlined in **Section 10.3.7** and must be adhered to prevent a significant impact on the community. Resident living in the area are accustomed to agricultural smells and may not be as sensitive to odours emanating from the facility.

13.6 RESIDUAL IMPACTS

The reduction of biodegradable waste going to landfill brought about by the operation of the proposed development will have an overall positive residual impact at national, regional, sub-regional and local level. Once odour mitigation measures are put in place, there will be a slight residual impact on human beings in the local area.

Part B Nuisance Control

13.7 NUISANCE CONTROL

13.7.1 Introduction

This section of the Environmental Impact Statement also deals with potential impacts on human beings examining the likely impacts of the proposed development associated with nuisance. Potential nuisances examined here include: fire, traffic, odour, bioaerosols, dust, litter, vermin and birds and noise.

13.7.2 Fire

Emergency response procedures will be prepared and submitted to the EPA as part of the Environmental Management Programme. All site operators and staff will be made aware of the dangers of fires and how to treat them.

Precautions to be taken in order to ensure fire safety:-

- Fire alarm and defence systems will be fitted in the reception area.
- All operatives will receive basic instruction on fire safety and protocol.
- A number of operatives are to attend fire officer training courses. At least one of these fire officers will be on-site at all operational times.
- A Fire Safety Drill and a Code of Practice will be developed by the site management. All staff will be fully trained with this code.
- The fuel storage area will be positioned a distance from the reception building within a bunded enclosure.
- The phone number of the local fire station will be posted in the reception area at all times.
- If a fire occurs after normal opening hours the local fire station shall have access to the site and all necessary contact details.

13.7.3 Traffic

The following measures will be used to mitigate against the impact of traffic.

- The onsite traffic office will monitor the entrance and exit of vehicles.
- There will be a free flow of traffic into and out of the facility.
- There will be adequate parking spaces on the site of the proposed development.
- A clean and well serviced fleet will be maintained at all times.
- A wheel wash will be pit in place to wash down trucks that may be dirty before leaving the site.

13.7.4 Odour

Refer to **Chapter 10, Section 10.3** of the report.

13.7.5 Dust

Refer to **Chapter 10, Section 10.4** of the report for more details.

13.7.6 Bioaerosols

Refer to **Chapter 10, Section 10.5** of the report for more details.

13.7.7 Litter

As specified in the waste acceptance procedures all waste accepted on site will be delivered to the enclosed waste reception building where it will be blended with woodchip and other organic waste before being placed in the composting units for treatment. All trucks arriving at the site will be enclosed, preventing any potential litter problems. A daily visual inspection for litter around the boundary of the facility will be carried out and any noticeable litter picked up and recycled/ disposed of accordingly. It is not envisaged that there will be any noticeable problem with litter on the site give that the nature of waste streams involved are unlikely to contain much litter.

The EPA Waste Licence sets down conditions for litter control and it is a requirement of the licence that these conditions are adhered to. It is envisaged that there will be no significant impact associated with litter from the proposed facility.

13.7.8 Vermin and Birds

Pests, which are normally more associated with disposal sites and landfills, include rodents, scavenging birds and insects. During the operation of the proposed facility, specific attention will be given to reduce the potential nuisance of pests. The following procedures will be followed to prevent any problems with pests at the site.

Procedures to Prevent Nuisances with Pests:

- All fresh waste will be delivered to the enclosed waste reception building immediately upon delivery.
- Waste will undergo intensive composting which will make it unattractive to pests.
- Working areas will be kept clean and free of waste.
- A programme to prevent pest nuisance will be established by the operator involving poisons/traps. The efficiency of the programme will be monitored and measures revised as required.
- If any difficulties should arise due to birds or vermin actions will be taken to address this. A number of commercial solutions for pest and bird control including specialist contractors are available if required.

As the site will be unsuitable for rodents and given the mitigation measures mentioned above, there will be no significant impact from pests at the proposed site.

13.7.9 Noise

Elevated noise levels associated with day-to-day operations of the proposed development, especially due to vehicles and machinery in operation on the composting slab would be expected. Vehicles to and from the proposed development will also be a source of noise. However, it is not envisaged that the development will significantly impact on local residents (see also **Section 11**).

13.7.10 Health & Safety

Measure to be undertaken to ensure health and safety of employees at the proposed site are outlined in **Section 5.7.3**.

14 ARCHAEOLOGY & CULTURAL HERITAGE

14.1 INTRODUCTION

An archaeological assessment of the Organic Gold (Marketing) Ltd Composting facility was conducted at the request of the Heritage and Planning Division of the Department of Environment, Heritage and Local Government.

This report has been prepared to assess the cultural heritage and archaeological potential of the development site, and takes the form of a desk-based study based primarily on information held in the Record of Monuments and Places of the National Monuments Section of the Department of the Environment, Heritage and Local Government. The sub-consultants report can be found in **Appendix 9, Volume 3** of the report.

The files of the National Museum were also consulted as part of the assessment of the site. The museum maintains a topographically based record of archaeological artefacts recovered from individual townlands throughout the country. The first and second edition Ordnance Survey maps were also consulted. In addition to the documentary research carried out, the site was inspected by fieldwalking.

14.2 FINDINGS OF STUDY

The subject site is situated in the townland of Wilkinstown in the village of the same name, 9 km north of the town of Navan in Co. Meath. Wilkinstown is a village located at the intersection of the R162 and an unknown-numbered rural road.

An investigation of archaeological and historical sources confirmed that the development site at Wilkinstown, Co. Meath is situated within an area which contains archaeological remains dating from the prehistoric to the post-medieval period.

The development site itself does not however contain any recorded archaeological monuments and does not appear to have been the site of any recorded archaeological finds. The most significant artefacts recovered from the surrounding area date to the Iron Age and were recovered from a field over 2 km from the development site. Field inspection of the development site did not reveal any deposits or earthworks likely to be of archaeological significance.

The study recommended that given the absence of recorded archaeological monuments and finds from the immediate vicinity of the site, that the development proceed as proposed without any further archaeological restriction.

14.3 POTENTIAL IMPACTS

Given the absence of recorded archaeological monuments and finds from the immediate vicinity of the site, construction activities and the proposed development will have no archaeological impact.

14.4 MITIGATION MEASURES

Because the facility will not have an archaeological impact no mitigation measures are proposed.

14.5 RESIDUAL IMPACTS

The development will have no residual archaeological impact.

15 MATERIAL ASSETS AND NATURAL RESOURCES

15.1 INTRODUCTION

This section of the Environmental Impact Statement deals with material assets that will be potentially affected by the proposed development. These assets are grouped into:

- Material assets - Agricultural properties
- Material assets - Non-agricultural properties
- Material Assets - Natural Resources

Material assets are generally considered to be the physical resources in the environment which may be of either human or natural origin. The object of the assessment of these resources is to identify the impact of the development on individual enterprises or properties and to ensure that natural resources are used in a sustainable manner in order to ensure availability for future generations.

15.2 METHODOLOGY

The proposed site was visited in August 2004 by RPS-MCOS and all properties (commercial and residential) and non-agricultural land was mapped. RPS-MCOS also carried out door to door consultation in the vicinity of the site to discuss issues locals may have with the development. Notes were taken and comments taken into consideration when assessing the potential impact of the development on the various material assets groupings. Information on natural resources consumption was obtained from records retained at the Organic Gold facility. The assessment was also carried out broadly in accordance with the EPA Guidelines 2002 and Advice Notes on EIS 2003.

15.3 AGRICULTURAL PROPERTIES

15.3.1 Existing Environment

Land use in the Wilkinstown area is predominantly used for agricultural purposes. Some farms in the area are used for permanent pasture which supports dairying or other livestock enterprises. Others are used for cereal and other crop production enterprises. The land is typically generally flat and gently undulating lowland. Soils in the vicinity of the proposed facility consist of Grey Brown Podzolics and Gleys.

15.3.2 Impacts

The proposed facility will have no impact on agricultural land in the area.

15.3.3 Mitigation Measures

Because the proposed facility will have no impact on agricultural land, no mitigation measures are proposed.

15.4 NON-AGRICULTURAL PROPERTIES

15.4.1 Existing Environment

There are a number of residential properties in the vicinity of the proposed site. These dwellings are located to the north west, north east and south east of the facility, with the nearest dwelling approximately 260 metres from the northern boundary of the composting slab. There are also two service garages located to the north east and south east of the facility, which are located 310 and 540 metres from the northern boundary of the slab respectively. In the village of Wilkinstown there is a

school, service garage, pub and a number of residential dwellings. The school is located 680 metres from the site entrance.

15.4.2 Impacts

The excising facility has been involved in waste recycling since 1989 and has operated for the most part, without seriously impacting on local residents. However, the facility did cause some odour nuisance in the area from Mid February to the end of June in 2004. The odour was due to the increased waste activities and a change in operational practices.

A number of significant changes will be made to the future development to mitigate against any potential odours and include:

- The construction of an enclosed waste reception building;
- Composting of organic waste in enclosed composting vessels;
- Improved site management and housekeeping procedures;
- Improved waste acceptance procedures;
- Improved screening around the boundary of the composting slab to aid dust and odour suppression.

Once the above mitigation measure and those outlined in **Section 10.3** are adhered to there will be a significant reduction in odours emissions at the site. There may be a minor impact on local residents and business in the area. It must also be realised that the facility is located in an agricultural setting and the fact that there will be seasonal odours from agricultural activities such as slurry and sludge spreading in the area.

Apart from a minor odour impact, no other impacts on non-agricultural properties are envisaged.

15.4.3 Mitigation Measures

All nuisance control (**Section 13.8**) and odour mitigation measures (**Section 10.5**) must be adhered to prevent any negative impacts on residential or commercial dwellings in the area.

15.5 NATURAL RESOURCES

This section of the EIS deals with the impact of the proposed development on Natural Resources. Natural Resources includes excavatable materials as well as considering energy requirements and water usage for the facility.

15.5.1 Energy

Energy is required for lighting purposes and operating machinery on site and generally supplying electricity to the site office. It is estimated that energy requirements for the current development will be approximately 16.8 kilowatts on an annual basis. Because waste quantities to be treated at the site will increase and there will be an energy requirement to run the air-handling units of the in-vessels system, energy requirement will increase at the site.

15.5.2 Water Demand and Usage

All water used on site is currently taken from a shallow surface water well owned by Organic Gold (Marketing) Ltd. However, Organic Gold is awaiting to be connected up to the main water supply. 100mm Class II water mains will run from the site entrance and supply the facility.

Water will be required on site mainly for supplying the mist air system, and for general consumption in the site office. During periods of very dry weather some fresh water may be needed for wetting of the windrows, however, leachate will primarily be used for this purpose.

In case of a fire on site water will also be required. Fire hydrants will be installed near the car parking area at the corner of the office building and one in the composting slab area to protect against any

potential fires on site. Water will also be required for the wheel wash area for washing trucks leaving the site and preventing debris from being carried out onto access roads.

The misting system will use a maximum of 46,000l/day if in full operation. i.e. all four sides of the system will be in operation. Employees and miscellaneous usage will use a maximum of 20,000 l/day. Therefore on a daily basis it is estimated that the maximum waste usage on the site will be approximately 66,000 litres of water. However, average consumption is expected to be far below this.

15.5.3 Excavatabale Materials

A small amount of grass and soil will be stripped from the paddock area in order to lay the new site entrance. A very small amount of material may be excavated from the slab area where the waste reception area will be built. The internal access routes within the site are overlain with a layer of crushed stone, which will be progressively upgraded using asphalt or concrete. Any material excavated or removed during construction or upgrading of the access routes will be retained and reused on site.

15.5.4 Potential Impacts

As recycling operations at the site will divert biodegradable waste from landfill, this will compensate for the consumption of energy at the site. Therefore, it is not expected that the proposed development will have a significant negative impact on natural resources.

15.5.5 Mitigation Measures

Consumption of energy, raw materials and new material should form part of an Environmental Management System to be implemented as part of the future EPA Waste Licence.

16 OTHER IMPACTS AND INTERACTIONS

16.1 INTRODUCTION

In addition to the assessment of impacts on human beings, flora, fauna, soils, the landscape, water quality, air quality, climate, material assets, including architecture, archaeology and cultural heritage, the inter-relationship between these factors was also taken into account as part of the scoping and assessment process. Where the potential exists for interaction between two or more environmental topics the relevant specialists have taken the potential interactions into account when making their assessment.

A matrix of potential environmental impacts which could occur as a result of the proposed development near Wilkinstown in Navan is outlined in **Section 16.2**. The level of interaction likely between the various topics will greatly vary but the table allows the interactions to be recognised and further developed where necessary.

16.2 SIGNIFICANCE OF PREDICTED IMPACTS

The structure used fro assessing the significance of effects of the development is based on specialist sub-consultants reports and the following criterion taken from the EPA "*Draft Guidelines on the information to be contained in Environmental Impact Statements*" (EPA 2002). The EPA classification criterion is outlined in **Table 16.1** below. **Table 16.2** summarises the environmental impacts, outlines measures that will be used in their amelioration and highlights the significance of residual effects i.e. the impact remaining after mitigation.

Table 16.1 EPA Classification Criteria

Impact	Description
Negative	A change which reduces the quality of the environment
Positive	A change which improves the quality of the environment
Neutral	A change which does not affect the quality of the environment
Temporary	Impact lasting for one year or less
Short-term	Impact lasting one to seven years
Medium-term	Impact lasting seven to fifteen years
Long-term	Impact lasting fifteen to sixty years
Permanent	Impact lasting over sixty years
Slight	An impact which causes changes in the character of the environment which are not significant or profound
Significant	An impact which by its magnitude, duration or intensity alters an important aspect of the environment

In this instance, we assume the facility will potentially operate for more than 15 years, therefore impacts due to operation of the facility are classified as 'long term.

Table 16.2 Summary of Potential Environmental Effects

	CATEGORY	POTENTIAL ENVIRONMENTAL ISSUES/EFFECTS	POTENTIAL IMPACT	DURATION	MITIGATION	RESIDUAL IMPACT
NATURAL ENVIRONMENT						
	Air Quality	**Dust**			*Use enclosed in-vessel composting units*	
		Construction	Negative	Temporary	Waste delivery, mixing and blending will be carried out indoors	No Impact
		Operation	Negative	Long-term	Upgrade site entrance and internal access roads	No Impact
					Site roads should be regularly cleaned and maintained	
		Bioerosols	Negative	Long-term	Use enclosed in-vessel composting units	No Impact
		Operation			Waste delivery, mixing and blending will be carried out indoors	
					Air filters should be present in cabins of mobile equipment	
		Odour				
		Operation	Negative	Long-term	Use enclosed in-vessel composting units	Slight
					Enclosed waste reception shed for waste delivery mixing/blending. Use of heavy-duty plastic curtains on doors.	
					Mist air system will help to reduce odour emissions	
					Devise and implement a clear and precise odour management plan	
					Implement strict waste acceptance criteria	

	CATEGORY	POTENTIAL ENVIRONMENTAL ISSUES/EFFECTS	POTENTIAL IMPACT	DURATION	MITIGATION	RESIDUAL IMPACT
NATURAL ENVIRONMENT (CONTD.)	Noise & Vibration	**Noise**			Follow Good Codes of Practice	
		Construction	Negative	Temporary	Noise will be no more than 10dB greater than the existing ambient (L_{Aeq}) noise levels	No Impact
		Operation	Negative	Long-term	Waste to be delivered, mixed and blended in an enclosed waste reception building Upgrade site entrance Low speeds on entrance road Maintenance of vehicles and plant	No Impact
	Geology & Hydrogeology	Leachate	Negative	Long term	Containment of leachate in storage tanks Recirculate leachate into composting process Integrity testing of the concrete slab and leachate tanks	No Impact
	Aquatic Environment	**Construction**				
		Sediment	Negative	Temporary	Site entrance to be constructed according to Good Codes of Practice Daily inspection of surface water flowing from the open discharge point along R162	No Impact
		Operation				
		Surface Water runoff	Negative	Long term	All effluent from the composting slab shall be collected and recirculated Careful handling of Fuels, lubricants and hydraulic fluids Contain spillages appropriately Foul drainage to be charged to Septic Tank	No Impact
	Flora & Fauna	**Construction**				
		Creation of new habitat/screening	Positive	Long-term	Planting of native tress for screening and landscaping purposes	Slight

	CATEGORY	POTENTIAL ENVIRONMENTAL ISSUES/EFFECTS	POTENTIAL IMPACT	DURATION	MITIGATION	RESIDUAL IMPACT
NATURAL ENVIRONMENT (CONTD.)	Landscape	**Construction** Waste Reception Building	Negative	Temporary	Extra screening will be provided by using climbing plants such as ivy (*Hedera helix).* Waste reception building designed to be in keeping with other agricultural building on site and local area	No impact
		Operation Waste Reception Building	Negative	Long-term	Use of non obtrusive colours and design Landscaping of mound of spoil to south east of facility	Slight
	Natural Resources	Use of Energy	Negative	Long-term	Consumption of energy, raw materials and new material will form part of an Environmental Management System to be implemented as part of the future EPA Waste Licence	No Impact
	CLIMATE	Contribution of greenhouse gases	Negative	Long-term	Recycling of organic waste off-sets greenhouse gas emissions.	No Impact
HUMAN BEINGS	COMMUNITY	Odour	Negative	Long-term	Use enclosed in-vessel composting units Enclosed waste reception shed for waste delivery mixing/blending. Use of heavy-duty plastic curtains on doors. Mist air system will help to reduce odour emissions Devise and implement a clear and precise odour management plan Implement strict waste acceptance criteria Improve communications with neighbours	Slight
		Bioaerosols	Negative	Long-term	As above	No Impact
		Dust	Negative	Long-term	As above	No Impact

	CATEGORY	POTENTIAL ENVIRONMENTAL ISSUES/EFFECTS	POTENTIAL IMPACT	DURATION	MITIGATION	RESIDUAL IMPACT
HUMAN BEINGS (CONTD.)		Vermin & Birds	Negative	Long-term	All waste will be delivered to the enclosed waste reception building immediately upon delivery In-vessel intensive composting which will make composing material unattractive to pests Working areas will be kept clean and free of waste A programme to prevent pest nuisance will be established Hire a professional pest control specialist, if required	No Impact
		Economic Employment Damage to house prices and business trade	 Positive Negative	 Long-term Long-term	 Maintain employment of current employees Ensure odour mitigation measures are in applied and that there is no significant impact from odour	Slight No impact
		Recycling of organic waste	Positive	Long-term	N/A	Significant
	Traffic	Construction/Operation of the proposed facility	Positive	Long-term	Construct new improved site entrance Entrance to be designed to Design Manual for Roads and Bridges Standards to ensure traffic safety Double Lane traffic	Slight
		Construction/Operation of the proposed facility	Neutral	Long-term	Proposed facility will not impact on archaeology or cultural heritage in the area	Neutral
	Archaeology and Cultural Heritage					

16.3 INTERACTION OF PREDICTED RESIDUAL IMPACTS

Specialist sub-consultants assessed the environmental factors of the development individually. Therefore, it is necessary that the interactions between these environmental factors be considered to ensure that potential interactive affects of the project can be identified.

Interactions are usually very complex. A change to any one of the environmental factors could affect one or all of the other related factors.

The potential interactions between identified socio/environmental issues and the proposed development are assessed to determine potential effects. **Table 16.3** below illustrates the relevant interactions between impacts and receptors associated with the new facility. A receptor is defined as a factor of the natural or man made environment such as water, air or a plant that is potentially affected by an impact.

Potential interactions identified mainly relate to proposed odour mitigation measures such as construction of the waste reception building, use of an in-vessel composting system and the use of the Mist Air System and the impact they have on the landscape, natural resources and human beings/employees. In order to control odours, other considerations such as visual impact (new building) and noise emissions (in-vessel composting units) arise. Proposed mitigation measures may help to reduce the impact caused.

Some interactions of impacts may result in a positive impact, for example, improved screening and landscaping of a mound of spoil to the south east of the fertiliser shed will result in a positive impact on ecology in the area. The improved site entrance as part of a traffic mitigation measure will result in less dust emissions at the site.