Site Specific Bioaerosol Risk Assessment

Mill Farm Recycling Ltd, Stafford

Client: Earthcare Technical Ltd

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1.0 INTRODUCTION

1.1 Background

1.1.1 Redmore Environmental Ltd was commissioned by Earthcare Technical Ltd to undertake a Site Specific Bioaerosol Risk Assessment (SSBRA) in support of an Environmental Permit Application for Mill Farm Recycling Ltd, Mill Farm, Stone Road, Chebsey, Stafford.

1.1.2 During the operation of the facility there is the potential for bioaerosol emissions and associated impacts at sensitive receptor locations in the vicinity of the site. A SSBRA has therefore been undertaken to identify potential emission sources and evaluate effects in the local area.

1.1.3 The purpose of this Bioaerosol Risk Assessment is to:

- Establish the likely sources of bioaerosols arising from operations at the site;
- Assess the potential for significant risk of impact at sensitive locations due to emissions from the identified sources; and,
- Identify any additional mitigation required to control potential effects.

1.2 Site Location and Context

1.2.1 Mill Farm Recycling Ltd is located on land off Stone Road, Chebsey, Stafford, at approximate National Grid Reference (NGR): 385306, 329458. Reference should be made to Figure 1 for a map of the site and surrounding area.

1.2.2 The site operates as a composting facility and receives approximately 20,000 tonnes per annum (tpa) of green waste. This is processed using a turned open windrow system to produce a PAS100:2018 product for local agriculture and soil blending markets.

1.2.3 Operations at the facility are controlled under an Environmental Permit (No. EPR/XP3198EF) issued by the Environment Agency (EA). An application to vary the permit is being made to the regulator to authorise the following activities at the site which have previously been carried out under Exemptions:

- The Acceptance of non-hazardous waste wood (Grade A wood only);

- Storage of waste wood pending treatment;
- Shredding, milling, chipping, screening of wood;
- Storage of wood products after treatment;
- Drying of wood products utilising heat from on-site biomass boilers; and,
- Dispatch of wood products.

1.2.4 The operation of the facility may result in bioaerosol emissions from a number of activities. These have the potential to cause impacts at sensitive locations within the vicinity of the site and have therefore been assessed within this report.

2.0 PROCESS DESCRIPTION

2.1 Introduction

2.1.1 A brief summary of operations at the facility, incorporating the changes proposed under the Environmental Permit Application, is provided in the following Sections. Reference should be made to Figure 2 and Figure 3 for layout plans showing the upper and lower sections of the site.

2.2 Management

2.2.1 The overall management responsibility for the facility lies with Mill Farm Recycling Ltd. Day to day management is provided by a Site Manager, a team of operators and maintenance staff. All staff have received training in operational procedures including waste acceptance, storage, treatment and record keeping.

2.2.2 In line with Condition 1.1.1 of the Environmental Permit (No. EPR/XP3198EF), the site operates in accordance with an Environmental Management System (EMS)[1] which has been designed to minimise the risk of pollution including those arising from operations, maintenance, accidents and non-conformances.

2.3 Operational Periods and Throughput

2.3.1 The operational periods of the facility are summarised in Table 1.

Table 1 Operating Periods

Day	Operating Hours
Monday to Friday	07:00 - 18:00
Saturday	07:00 - 13:00
Sunday and Public or Bank Holidays	Closed

[1] Environmental Management System Manual Version 6, Mill Farm Recycling Ltd, June 2025.

2.3.2 The facility currently receives approximately 20,000tpa of Grade A wood and approximately 20,000tpa of green waste for composting. The total maximum permitted tonnage is 45,000tpa which is reflected in the planning permission and the Environmental Permit.

2.4 Waste Acceptance

Overview

2.4.1 A summary of the waste acceptance procedures for the facility is provided in the following Sections. It should be noted that the processes described are relevant to both green waste composting and the wood waste treatment operations undertaken at the site.

Waste Pre-acceptance

2.4.2 The permitted wastes are restricted to source segregated organic wastes. The only wastes received at the facility are those which are capable of being recycled to produce a quality soil improver, soil conditioner, topsoil or Grade A wood product.

2.4.3 The pre-waste acceptance controls for the facility include contractual agreements with all clients which include a full explanation of the waste acceptance criteria and terms and conditions.

2.4.4 Prior to receiving waste on site, an appropriate Risk Assessment is carried out to determine the potential for any chemical and/or physical contaminants. Where potential risks are identified, the waste producer is required to provide further information to clarify the nature and composition of the material and identify any additional processing for the waste.

2.4.5 Reference should be made to the EMS[2] for the facility for full details of the pre-acceptance procedures.

[2] Environmental Management System Manual Version 6, Mill Farm Recycling Ltd, June 2025.

Waste Acceptance

2.4.6 All carriers of input materials arriving on site are required to report to the site office and be weighed in on the weighbridge. Waste carrier information, a description of the waste, source and quantities are recorded on the site information system. Once checked in, the deliveries are directed to the waste reception area where a site operator is available to ensure the carrier tips in the appropriate area to allow inspection prior to processing.

2.4.7 All wastes received at the site are visually inspected to confirm that the description and composition conform to the written statement and Waste Code on the relevant Duty of Care Transfer Note. Waste is only accepted if it meets the specified acceptance criteria stated in the relevant Standard Operating Procedure (SOP). Any loads which do not conform are rejected.

2.4.8 All waste received is kept separate from and is not covered by or mixed with other materials until it has been confirmed and recorded for acceptance at the site. Should contamination levels within any consignment of waste received exceed those which are stipulated within the composting SOP (MIL-SOP-01), the load will be rejected. Otherwise, the load will be discharged in the relevant waste reception area.

2.5 Composting Operation

Overview

2.5.1 The facility processes green waste to produce 0mm to 10mm soil conditioner and 0 to 20mm mulch grades. These are used on local agricultural land and within the horticultural industry as a constituent of growing media, as well as a constituent of BS3382 Topsoil.

2.5.2 The composting operation is certified to PAS100:2018 and is operated in accordance with a site-specific Compost Quality Policy and Management system (CQPMS), SOPs and a Hazard Analysis Critical Control Point (HACCP) system.

2.5.3 The composting process is actively managed with temperature and moisture monitoring undertaken routinely through three distinct phases. These are summarised as follows:

- Sanitisation - approximately 3 to 4 weeks. Temperature and moisture monitoring is carried out once per working day as a minimum. Temperatures between 55°C and 70°C are maintained throughout the phase;
- Stabilisation - approximately 2 weeks. Temperature is monitoring carried out once per week. Temperatures between 45°C and 70°C are maintained throughout the phase; and,
- Maturation - to meet customer specific stability requirements. Temperatures between 35°C and 45°C are maintained throughout the phase.

2.5.4 A summary of the specific operations carried out within each phase is provided in the following Sections. Reference should be made to Figure 2 and Figure 3 for site plans showing the locations of composting operations at the facility.

Storage of waste before treatment

2.5.5 After waste acceptance, the feedstock material is further assessed and any potential processing requirements or waste characteristics are noted. Received waste which is suitable for composting is stored in a stockpile for a maximum of 5-days prior to processing.

Feedstock Preparation

2.5.6 Any large objects or oversize material (e.g. tree trunks, root stocks) are removed from the feedstock materials, if appropriate, and stored for processing later or diverted to produce virgin wood biomass. Large items of Grade A wood waste are diverted to the wood waste operation for treatment (see Section 2.6).

2.5.7 Materials which are suitable for composting are transferred to a dedicated section of the reception area where they macerated using a low-speed speed shredding unit prior to formation into windrows. Under normal operating conditions, shredding takes place on a daily basis once sufficient feedstock material has accumulated.

Windrow Formation and Turning

2.5.8 Following preparation, the feedstocks are transferred to the main composting area and formed into piles called windrows. These are monitored regularly throughout the

sanitisation and stabilisation phases using a Compost Manager system in order to evaluate moisture, temperature and oxygen levels and ensure that optimum conditions are maintained for composting.

2.5.9 During the sanitisation phase, the windrows are mechanically turned using a windrow turner or where necessary, a loading shovel or 360° excavator. This aerates the material and creates maintain optimum pore space for aerobic decomposition. The specific turning frequency is determined by the Site Manager based on data obtained through monitoring using the Compost Manager system. However, turning is undertaken at least once per week.

Sanitisation and Stabilisation

2.5.10 The sanitisation and stabilisation of composting materials is typically achieved over a minimum period of 6-weeks.

2.5.11 Sanitisation involves the virtual elimination of pathogenic organisms and is completed over a period of approximately 3 to 4 weeks. During this phase, temperature and moisture monitoring is carried out once per working day as a minimum to ensure that core temperatures between 55°C and 70°C are maintained.

2.5.12 If temperatures fail to reach 60°C during sanitisation, corrective actions are taken to raise the windrow temperature. These may include increasing the turning frequency of the windrow, addition of water if the compost is too dry and/or the addition of a bulking agent or dry material if the compost has become too moist.

2.5.13 Following sanitisation, stabilisation of the compost takes place over a period of approximately 2-weeks. During this phase, temperature monitoring is carried out once per week to ensure that core temperatures between 45°C and 70°C are maintained.

Maturation and Screening

2.5.14 Following stabilisation, the compost is either immediately screened or actively managed through a maturation phase of 4 to 6-weeks in order to meet specific client criteria for end use, e.g. use as a constituent of growing media.

2.5.15 Composting screening is undertaken within a dedicated area on the northern section of the site using specialised equipment. The screener uses magnets and eddy current separators to remove ferrous and non-ferrous metals. Plastics are extracted through a combination of vacuum systems and manual separation. The screening process separates the material into two principal grades; 0mm to10 mm and 0mm to 20 mm. Oversized fractions are removed and re-incorporated into the composting process.

Storage and Blending of Compost

2.5.16 Compost products are transferred to a dedicated area on the northern section of the facility where they are stored for a period of up to 12-months prior to transfer off-site. Controlled product handling and management ensure that each batch of compost produced is located in a specific storage area.

2.5.17 BS3882 topsoil is also stored within the area and blended with PAS100 compost to enrich it for use in landscaping projects and to meet specific end user criteria.

Leachate Storage

2.5.18 All composting operations are carried out on an impermeable concrete composting pad to prevent or minimise the risks of groundwater and surface water contamination. In addition to the impermeable working surface, site drainage has been designed to control and manage surface water runoff and any leachate that arises from the composting operations.

2.5.19 Leachate and runoff from the composting pad is collected in two underground tanks. This is removed periodically via tanker and applied to the windrows to maintain the optimum moisture levels for composting. If required, leachate can also be removed from the tanks and transferred off-site to a suitably permitted facility such as a local Anaerobic Digestion (AD) Plant or spread to land under a Mobile Plant Permit.

2.6 Wood Waste Operations

Overview

2.6.1 The wood waste operations undertaken at the site include:

- The Acceptance of non-hazardous waste wood (Grade A wood only);
- Storage of waste wood pending treatment;
- Shredding, milling, chipping, screening of wood;
- Storage of wood products after treatment;
- Drying of wood products utilising heat from on-site biomass boilers; and,
- Dispatch of wood products

2.6.2 A summary of the specific operations is provided in the following Sections. Reference should be made to Figure 2 and Figure 3 for site plans showing the locations of the operations.

Wood Waste Reception

2.6.3 Wood waste is delivered to the site and directed to the weighbridge where an initial inspection is conducted to ensure the load consists of timber-only wood. Any loads which do not conform or are found to be heavily contaminated are rejected. If light contamination is determined, the contaminant materials are manually removed before processing.

2.6.4 Grade A wood waste is received and processed to meet end users' specific criteria to produce animal bedding for use in poultry and livestock housing. Any Grade A wood which would be better recovered through the compost process is identified and sent for preparation by shredding for this purpose.

2.6.5 Whole pallets are inspected for suitability for reuse. 20t to 25t of pallets are received on site per week with up to 1,000 pallets a week going off-site for reuse.

Wood Processing

2.6.6 Grade A wood waste and pallets which are not fit for reuse are processed through a series of plant to produce animal bedding. A summary of the process is provided as follows:

- Grade A wood is processed through a dedicated pre-shredder within the main processing building. The timber is then moved to a clean area of the yard where it is stored under cover prior to transfer to the mill;

- The pre-shredded wood is loaded into the mill using a suitable loader with a clean bucket. This reduces the size of the shredded material to 40mm;
- Magnets and an eddy current separator are used to remove metals which are deposited into three skips. These are checked every two hours to ensure that the maximum fill levels are not exceeded;
- After milling and metal removal, the material is transferred to a chip screen which separates it into three grades of bedding. The screens are inspected daily for wear or damage to ensure consistent performance; and,
- The separated grades are deposited into dedicated covered bays for storage prior to removal from the site. The products are tested regularly and if moisture levels exceed 25%, they are placed on a clean empty drying floor. When moisture levels are below 25%, the materials are moved back to the covered product storage bays.

Site Non-waste Activities

2.6.7 Virgin wood is processed to produce a fuel for non-waste wood biomass appliances, including the biomass boilers on site. This is not part of the permitted activities on site and the material is stored and processed separately to waste operations.

2.6.8 Wood chip products to be used as a fuel are produced to a high standard and certificated by Woodsure for Ofgem.

3.0 BIOAEROSOL BACKGROUND

3.1 Bioaerosol Definition

3.1.1 Bioaerosol is a general term for microorganisms suspended in the air. These microorganisms include fungi and bacteria, as well as their components such as mycotoxins, endotoxins and glucans. Bioaerosols are generally less than 100µm in size and are not filtered out by hairs and specialised cells that line the nose. Due to their airborne nature and small size, many bioaerosols can penetrate the human respiratory system, resulting in inflammatory and allergic responses.

3.1.2 Although bioaerosols are ubiquitous, waste and waste management operations provide environments that are conducive to their growth. Bioaerosols are therefore likely to be associated with compositing feedstocks and products, and in particular, handling activities, which release the micro-organisms into the air.

3.2 Health Risks from Bioaerosols

3.2.1 Exposure to bioaerosols has been associated with human health effects. Symptoms can include inflammation of the respiratory system, coughs and fever. Inhalation of bioaerosols may also cause or exacerbate respiratory diseases[3]. In addition, they have been known to cause gastrointestinal illness, eye irritation and dermatitis.

3.2.2 Possible links have also been made between exposure to bioaerosols and organic dust toxic syndrome. This is an acute disease that causes symptoms resembling those of influenza, such as shivering, an increase in body temperature, dry cough and muscle and joint pains. Of particular relevance to waste management facilities are infections caused by Aspergillus fumigatus. Invasive aspergillosis is a particularly severe infection, which may be fatal and is primarily a concern with at risk and immuno-suppressed patients.

3.2.3 Although some data is available, one of the major knowledge gaps for bioaerosols is their associated dose-response relationships. It is not currently possible to state with any certainty that a given concentration will result in a particular health impact. This is due to

[3] Guidance on the evaluation of bioaerosol risk assessments for composting facilities, EA, undated.

the number of bioaerosols that are naturally present within the environment as well as the complexities associated with human responses to different microorganisms.

3.3 Bioaerosol Emissions from Composting Operations

3.3.1 A review of relevant scientific research and industry guidance on bioaerosol emissions from composting operations has been undertaken in order to inform the assessment. The findings are detailed in the following Section.

3.3.2 The EA document 'Health Effects of Composting - A Study of Three Compost Sites and Review of Past Data'[4] summarises the findings of emissions measurement work undertaken at three composting facilities, including two open air turned windrow sites and one IVC plant. The results indicated a well-defined decline in concentrations of bioaerosols with increased distance from source. In most cases, measured concentrations were at or below background levels within 250m of the sources assessed.

3.3.3 The ADAS report 'Bioaerosol Monitoring and Dispersal from Composting Sites'[5] provides a summary of the findings from measurement work undertaken at three composting sites. Sampling for bioaerosols was undertaken downwind of a wide range of composting activities including shredding, turning, loading, unloading and screening. The results indicated that 91% of all micro-organisms sampled across all three sites were below 1,000cfu/m^3 at a downwind distance of 125m.

3.3.4 The Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) report 'Measurement and Modelling of Emissions from Three Composting Sites'[6] provides a summary of the findings from monitoring work undertaken at three composting sites, which included two IVC facilities and one open windrow system. The findings indicated that there is the potential for seasonal variation in ambient concentrations of the mould of Aspergillus fumigatus, with concentrations being the highest in the autumn. In most cases, levels of all bioaerosols assessed were at or below background equivalent concentrations within 250m of the sources assessed.

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4 Health Effects of Composting - A Study of Three Compost Sites and Review of Past Data, EA, 2001.

5 Bioaerosol Monitoring and Dispersal from Composting Sites, ADAS, 2005.

6 Measurement and Modelling of Emissions from Three Composting Sites, SNIFFER, 2007.

3.3.5 The Department for Environment Food and Rural Affairs (DEFRA) research report 'Bioaerosols and odour emissions from composting facilities'[7] focusses on the comparability of different sampling methodologies and the influence of spatial and temporal variation on ambient bioaerosol concentrations. Measurements were undertaken at four different composting facilities in England, which represent a range of system types. The results of the study corroborate existing research and suggest that concentrations of bioaerosols generally return to background levels within 250m of the source.

3.3.6 The findings of the review have been considered as appropriate throughout the assessment.

3.4 Legislative Control

3.4.1 Atmospheric emissions from industry are controlled in the UK through the Environmental Permitting (England and Wales) Regulations (2016) and subsequent amendments. The operation of the proposed composting facility is included within the Regulations. As such, the facility is required to operate in accordance with an Environmental Permit issued by the EA.

3.5 Environment Agency Policy

3.5.1 The EA Regulatory Position Statement (RPS) 'Bioaerosol monitoring at regulated facilities - use of M9: RPS 209'[8] outlines the conditions that apply to biological waste treatment facilities in relation to bioaerosol emissions.

3.5.2 The RPS states that if a regulated biological waste treatment facility is located within 250m of a sensitive receptor (a place where people live of work for more than 6-hours at a time), the operator must:

- Monitor bioaerosols in accordance with EA guidance 'M9: environmental monitoring of bioaerosols at regulated facilities'[9];

[7] Bioaerosols and odour emissions from composting facilities, DEFRA, 2013.

[8] Bioaerosol monitoring at regulated facilities - use of M9: RPS 209, EA, 2025.

[9] M9: environmental monitoring of bioaerosols at regulated facilities, EA, 2018.

- Undertake a site specific Bioaerosol Risk Assessment; and,
- Comply with all other conditions set out in your permit.

3.5.3 The conditions outlined within the RPS have been considered as appropriate throughout the assessment.

3.6 Benchmark Levels

3.6.1 In the absence of dose-response data, the EA have adopted a precautionary risk-based approach in determining guidance levels for bioaerosols. The EA position statement 'Composting and potential health effects from bioaerosols: our interim guidance for permit applicants'[10] specifies the following criteria for acceptable concentrations of Aspergillus fumigatus and total bacteria at sensitive receptor locations.

- Aspergillus fumigatus - 500cfu/m^3; and,
- Total bacteria - 1,000cfu/m^3.

3.6.2 The relevant benchmark levels have been considered as appropriate throughout the assessment.

3.7 Best Practice Guidance

3.7.1 The EA guidance 'How to comply with your environmental permit. Additional technical guidance for: composting and aerobic treatment sector'[11] sets out indicative Best Available Technique (BAT) or appropriate measures for the aerobic composting. The document provides practical guidance on how and why bioaerosol emissions occur, as well as measures that can be employed to prevent or minimise release.

3.7.2 The EA guidance for 'Biological waste treatment: appropriate measures for permitted facilities'[12] sets out the factors that should be considered when assessing appropriate measures for biowaste installations.

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10 Composting and potential health effects from bioaerosols: our interim guidance for permit applicants, EA, 2010.

11 How to comply with your environmental permit. Additional technical guidance for: composting and aerobic treatment sector, EA, 2013.

12 Biological waste treatment: appropriate measures for permitted facilities, EA, 2022.

3.7.3 The requirements of the guidance have been considered throughout the assessment.

4.0 PROBLEM DEFINITION

4.1 Introduction

4.1.1 The first stage of any risk assessment is to clearly set out the problem, including what will be addressed and what will not. This determines the scope, level of detail and focus. In particular, the temporal and spatial scales, contaminants to be assessed, persons at risk and the endpoint are identified. These factors are considered in the following Sections.

4.2 Conceptual Model

4.2.1 Potential hazards from bioaerosols are summarised in the conceptual model in Table 2.

Table 2 Conceptual Model

Criteria	Comment
Source	Feedstocks and composting materials on the site as outlined in Section 4.3
Hazard	Potential adverse health impacts as outlined in Section 3.2
Transport Mechanism	Airborne
Medium of Exposure	Inhalation, ingestion, absorption, injection
Receptor	Human receptors as outlined in Section 4.4

4.3 Sources

4.3.1 The operation of the facility may result in bioaerosol emissions from a number of activities. A summary of the sources, emission characteristics and bioaerosol release potential is provided in Table 3. These were identified based on a review of activities undertaken at the facility and information provided by the Operator.

Table 3 Bioaerosol Sources and Emission Characteristics

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
1	Green waste during delivery and storage	Diffuse emissions from exposed materials during unloading and storage	Medium	Partial containment of the feedstocks within delivery vehicles helps to reduce the potential for bioaerosol emissions during transit to the site Disturbance of green waste during unloading within the reception area may lead to medium levels of bioaerosol release Green waste remains stationary within the reception area prior to shredding in order to limit disturbance and the associated potential for bioaerosol emissions
2	Grade A wood waste during delivery and storage	Diffuse emissions from exposed materials during unloading and storage	Low	Grade A wood waste is non-processed clean wood and therefore unlikely to result in significant bioaerosol emissions during unloading and storage Grade A wood waste remains static during storage
3	Pallets during delivery and storage	Diffuse emissions from exposed materials during unloading and storage	Low	Pallets are comprised of non-processed clean wood and are therefore unlikely to result in significant bioaerosol emissions during unloading and storage Pallets remain static during storage
4	Emissions from green waste, wood and oversize material during shredding	Diffuse emissions from exposed materials as a result of loading into and operation of the shredder	Medium	Green waste, wood waste and oversize are loaded into the shredder in bulk loads where practicable to reduce the potential for separation of materials and the overall emitting surface area that is exposed to atmosphere The drop height of material is limited to 1.5m above the shredder in order to minimise disturbance and associated bioaerosol release potential during loading Notwithstanding the stated controls, there still may be the potential for medium levels of bioaerosol release due to material disturbance during loading into and operation of the shredder

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
5	Emissions from shredded green waste, wood and oversize during storage	Diffuse emissions from exposed shredded materials during storage	Low	Shredded green waste, wood and oversize remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions. However, there may be the potential for low levels of bioaerosol release as a result of wind stripping from the exposed surfaces of shredded green waste
6	Emissions from static windrows during composting	Diffuse emissions from exposed compost between turning events	Low to Medium	Temperature and oxygen levels are monitored throughout the composting phase in order to ensure optimum conditions are maintained and that unmanaged decomposition does not occur Between turning events, the windrows remain static in order to limit disturbance and the associated potential for bioaerosol emissions. However, there may be the potential for low to medium levels of bioaerosol release as a result of wind stripping from the exposed surfaces of windrows
7	Emissions from windrows during turning	Diffuse emissions from compost as a result of disturbance during turning	Medium to High	Full training in the use of turning equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times and Turning operations are avoided during dry and windy conditions in order to minimise the potential for bioaerosol release Windrow turning operations are undertaken systematically and over the shortest periods possible in order to limit potential bioaerosol emission durations Notwithstanding the stated controls, there still may be the potential for medium to high levels of bioaerosol release due to material disturbance during turning
8	Emissions from compost during screening	Diffuse emissions from compost as a result of disturbance during screening	Medium	Full training in the use of equipment has been provided to all staff in order to ensure that the correct screening procedures are adhered to at all times The drop height of compost is limited to 1.5m above the screening unit in order to minimise disturbance and associated bioaerosol release potential during loading

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
				Notwithstanding the stated controls, there still may be the potential for medium levels of bioaerosol release due to material disturbance during loading into and operation of the screener
9	Emissions from compost product and topsoil during blending	Diffuse emissions from compost and topsoil as a result of disturbance during blending	Low to Medium	Finished compost is likely to have a low bioaerosol emission potential due to microbial stabilisation which has occurred as part of the composting process Full training in the use of blending equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times The drop height of materials during blending is minimised as far as practicable in order to limit disturbance and the associated potential for bioaerosol release Notwithstanding the stated controls, there still may be the potential for low to medium levels of bioaerosol release due to agitation of the compost and topsoil during blending
10	Emissions from compost product during storage	Diffuse emissions from exposed compost product during storage	Low	Finished compost is likely to have a lower bioaerosol emission potential due to microbial stabilisation which has occurred as part of the composting process Compost product remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions Notwithstanding the stated controls, there may be the potential for low levels of bioaerosol release as a result of wind stripping from exposed surfaces of the compost
11	Emissions from compost during vehicle loading	Diffuse emissions from compost as a result of disturbance during loading into vehicles	Low to Medium	Finished compost is likely to have a low bioaerosol emission potential due to the microbial stabilisation which has occurred as part of the composting process Full training in the use of loading equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
				The drop height of compost is limited to 1.5m above the vehicles in order to minimise disturbance and associated bioaerosol release potential during loading Notwithstanding the stated controls, there still may be the potential for low to medium levels of bioaerosol release due to agitation of the compost during loading
12	Emissions from leachate during storage	Fugitive emissions from leachate within the underground storage tanks	Negligible	Leachate is stored in two underground tanks. Leachate is likely to contain microorganisms. However, the wet nature of the material and containment within the tanks is considered is considered to result in a negligible bioaerosol emission potential for the source
13	Emissions from leachate during windrow application	Diffuse emissions from leachate during application to windrows	Low	If required, leachate is added to the windrows in order to optimise the moisture content The amount of leachate applied to the windrows is limited to the quantity required to optimise moisture content The leachate is added directly to the surfaces of the windrows using a directional hose which allows focussed application As stated previously, leachate is likely to contain microorganisms. However, the wet nature of the material and stated controls are considered to result in a low emission potential for the source
14	Emissions from wood processing activities within the main building	Fugitive emissions from the wood processing building Channelled emissions from the dust abatement plant	Low	As stated previously, unprocessed and clean waste wood is likely to have a low bioaerosol emission potential Wood waste is processed within an enclosed building in order to limit the potential for fugitive bioaerosol release The milling hall includes a dedicated dust extraction unit which can treat up to 27,000m^3/h of air from the building. Following filtration, emissions are discharged to atmosphere at a height of 12m in order to promote effective dilution and dispersion of any residual dust and/or bioaerosol emissions

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
				The maximum dust concentration in exhaust air from the extraction/ filtration unit as specified by HAAS, the manufacturer of the plant, is 3mg/m^3 The Operator has a contract with CJR who carry out annual inspection and maintenance of the extraction/ filtration unit to ensure correct and optimum abatement performance of the plant
15	Emissions from activities within the bedding plant	Fugitive emissions from the bedding plant building Channelled emissions from the bedding plant dust abatement unit	Low	The bedding plant is housed within an enclosed building in order to limit the potential for fugitive bioaerosol release The building includes a dedicated dust extraction unit which can treat up to 15,000m^3/h of air. Following filtration, emissions are discharged to atmosphere at a height of 6.7m in order to promote effective dilution and dispersion of any residual dust and/or bioaerosol emissions The maximum dust concentration in exhaust air from the extraction/ filtration unit as specified by HAAS, the manufacturer of the plant, is 5mg/m^3 The Operator has a contract with CJR who carry out annual inspection and maintenance of the extraction/ filtration unit to ensure correct and optimum abatement performance of the plant
16	Emissions from stored wood chip on the northern section of the site	Diffuse emissions from exposed wood chip during storage	Low	Wood chip is stored under cover in order to ensure that the material remains dry and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur Wood chip remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions
17	Emissions from bedding material on the drying floors	Diffuse emissions from exposed bedding during drying	Low	The floors are covered in order to ensure that the material is dried effectively and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur

Source		Emission Characteristics	Emission Potential	Justification for Emission Potential
				Drying under cover also provides partial containment of the material and limits the potential for wind stripping of bioaerosols from exposed surfaces The material remains static during drying in order to limit disturbance and the associated potential for bioaerosol emissions
18	Emissions from stored bedding product	Diffuse emissions from exposed bedding during storage	Low	Bedding is stored under cover in order to ensure that the material remains dry and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur Storage under cover also provides partial containment of the material and limits the potential for wind stripping of bioaerosols from exposed surfaces Bedding remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions
19	Emissions from bedding product and woodchip during loading	Diffuse emissions from materials as a result of disturbance during loading into vehicles	Low	Clean shredded wood waste and bedding are likely to contain limited quantities of bioaerosols Full training in the use of loading equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times The drop height of waste wood and bedding is limited to 1.5m above the vehicles in order to minimise disturbance and associated bioaerosol release potential during loading

4.4 Receptors

4.4.1 EA guidance 'M9: environmental monitoring of bioaerosols at regulated facilities'[13] defines a sensitive receptor as follows:

> "Nearest sensitive receptor means the nearest place to the permitted activities where people are likely to be for prolonged periods. This term would therefore apply to dwellings (including any associated gardens) and to many types of workplaces. We would not normally regard a place where people are likely to be present for less than 6 hours at one time as being a sensitive receptor. The term does not apply to those controlling the permitted facility, their staff when they are at work or to visitors to the facility, as their health is covered by Health and Safety at Work legislation, but would apply to dwellings occupied by the family of those controlling the facility."

4.4.2 A desk-top study was undertaken in order to identify any sensitive receptors in the vicinity of the site that required specific consideration during the assessment. In accordance the requirements of the EA RPS[14], this focussed on locations within 250m of the facility boundary where people may be present for more than 6-hours at one time. However, sensitive locations situated in excess of 250m were also identified in order to ensure a robust assessment of potential impacts. These are summarised in Table 4.

Table 4 Sensitive Receptors

Receptor		NGR (m)		Distance from Boundary at Closest Point (m)	Direction from Facility
		X	Y		
R1	Mill Farm (owned by Operator)	385382	329571	20	East
R2	The Vicarage / Vicarage Fields	385762	329087	325	East-south-east
R3	Stokes	384875	329694	370	West
R4	The Lodge	384815	329724	435	West
R5	The Old Vicarage	385866	328989	460	East-south-east

[13] M9: environmental monitoring of bioaerosols at regulated facilities, EA, 2017.

[14] Bioaerosol monitoring at regulated facilities - use of M9: RPS 209, EA, 2025.

Receptor		NGR (m)		Distance from Boundary at Closest Point (m)	Direction from Facility
		X	Y		
R6	The Grange	384793	329746	460	North-west
R7	Oxleasows Farm	385594	330087	475	North-east
R8	Hilcote Hall (previously a care home, now flats)	384749	329697	490	North-west
R9	Keepers Cottage	384714	329446	520	West
R10	Chebsey Village	385948	328836	610	South-east
R11	Mill Court Farm	385897	328697	650	South-east
R12	Fieldhouse Farm	384633	328959	720	South-west
R13	Manor Farm	386230	329304	745	East
R14	The Leas	384468	329692	760	North-west
R15	Walton Hall Academy	385218	328354	835	South-west
R16	Rodgeley Lodge Farm	386413	329304	930	East
R17	Scamnel Farm	386261	329938	930	North-east

4.4.3 Reference should be made to Figure 4 for a visual representation of the identified receptors.

4.5 Prevailing Meteorological Conditions

4.5.1 The potential for bioaerosol emissions to impact at sensitive locations depends significantly on the meteorology, particularly wind direction, during release. In order to consider prevailing conditions at the site review of historical weather data was undertaken. Shawbury observations station is located at NGR: 354931, 322117, which is approximately 31.2km west of the site. It is considered that conditions are likely to be reasonably similar over a distance of this magnitude and the information is a suitable source of data for an assessment of this nature.

4.5.2 Meteorological data was obtained from Shawbury meteorological station over the period 1st January 2019 to 31st December 2023 (inclusive). The frequency of wind from the eight sectors which best describe the directions which may cause impacts in the vicinity

of the site is shown in Table 5. Reference should be made to Figure 5 for a wind rose of the meteorological data.

Table 5 Wind Frequency Data

Wind Direction (°)	Frequency of Wind (%)
337.5 - 22.5	9.87
22.5 - 67.5	5.17
67.5 - 112.5	11.93
112.5 - 157.5	8.16
157.5 - 202.5	17.14
202.5 - 247.5	18.08
247.5 - 292.5	18.25
292.5 - 337.5	9.48
Sub-Total	98.10
Calms	1.59
Missing/Incomplete	0.32

4.5.3 All meteorological data used in the assessment was provided by Atmospheric Dispersion Modelling Ltd, which is an established distributor of meteorological data within the UK.

4.5.4 As shown in Table 5, the prevailing wind direction at the site is from the west with significant frequencies from the south-west and south. Winds from the north and east are relatively infrequent, which is indicative of conditions throughout the UK.

4.6 Other Sources of Bioaerosols and Cumulative Effects

4.6.1 The immediate area surrounding the facility is predominantly rural, comprising arable agricultural land and non-intensive farms. Arable fields may form sources of bioaerosols if fertilised with animal manures or slurries, as well as during crop harvest periods. In addition, livestock rearing operations at non-intensive farms in the local area may have the potential to result in bioaerosol emissions. However, likely impacts associated with these releases are not considered to be significant and would be expected for any rural location within the UK.

4.6.2 A review of Google Maps Imagery indicated that there are no other immediately apparent bioaerosol sources in the vicinity of the site which may have the potential to contribute to cumulative impacts at the identified receptor locations.

4.7 Barriers to Dispersion

4.7.1 The main composting area of the facility includes bunding and a belt of mature vegetation around the perimeter. These landscaping arrangements are likely to provide screening of bioaerosols emitted by operations undertaken on the southern section of the site and also generate turbulent flow locally. This will help to promote the effective dilution and dispersion of emissions.

5.0 RISK ASSESSMENT METHODOLOGY

5.1 Overview

5.1.1 The Bioaerosol Risk Assessment has been undertaken in accordance with the general principles of EA document 'Guidance on the evaluation of bioaerosol risk assessments for composting facilities'[15]. This included consideration of the following:

- Receptor - what is at risk? What do I wish to protect?
- Source - what is the agent or process with potential to cause harm?
- Harm - what are the harmful consequences if things go wrong?
- Pathway - how might the receptor come into contact with the source?
- Probability of exposure - how likely is this contact?
- Consequence - how severe will the consequences be if this occurs?
- Magnitude of risk - what is the overall magnitude of the risk? and,
- Justification for magnitude - on what did I base my judgement?

5.1.2 Based on the Bioaerosol Risk Assessment outcomes potential mitigation and control options were identified.

5.1.3 Further explanation for the key assessment areas is provided below.

5.2 Receptor

5.2.1 The first step was to consider how the activity could harm the environment. This involved identifying 'receptors' that may be affected and included people, property, and the natural and physical environment.

5.3 Probability of Exposure

5.3.1 The probability of exposure was defined based on the likelihood of exposure of the specific receptor to the identified sources. This depended on several factors, such as:

- Distance between source and receptor;

[15] Guidance on the evaluation of bioaerosol risk assessments for composting facilities, EA, undated.

- Dispersion potential of emission;
- Duration of emission; and,
- Frequency of emission.

5.3.2 Probability was categorised in accordance with the following criteria:

- High - exposure is probable, direct exposure likely with no/few barriers between source and receptor;
- Medium - exposure is fairly probable, barriers less controllable;
- Low - exposure unlikely, barriers exist to mitigate; or,
- Very low - exposure very unlikely, effective and multiple barriers.

5.4 Harm

5.4.1 The severity of harm from a risk depends on:

- How much a person or part of the environment is exposed; and,
- How sensitive a person or part of the environment is.

5.4.2 Some parts of the environment can be very sensitive. For example, serious health effects can occur if humans are exposed to certain chemicals for only short periods of time.

5.4.3 Harm can be described as follows:

- High - severe consequences, evidence that exposure may result in serious damage;
- Medium - significant consequences, evidence that exposure may result in damage that is not severe and is reversible;
- Low - minor consequences, damage not apparent, reversible adverse changes possible; and,
- Very low - negligible consequences, no evidence for adverse changes.

5.5 Magnitude of Risk

5.5.1 The level of risk is a combination of:

- How likely a problem is to occur; and,

- How serious the harm might be.

5.5.2 Risk is highest where both the likelihood of a problem is high and the potential harm is severe. Risk is lowest where a problem is unlikely to occur and the harm that might result is not serious.

5.5.3 Risk was defined based on the interaction between the probability of exposure and potential harm, as outlined in Table 6.

Table 6 Magnitude of Risk

Probability of Exposure	Potential Harm			
	Very Low	Low	Medium	High
High	Low	Medium	High	High
Medium	Low	Medium	Medium	High
Low	Low	Low	Medium	Medium
Very Low	Very Low	Low	Low	Medium

5.6 Further Requirements

5.6.1 Based on the outcomes of the risk assessment the EA document provides guidance on further requirements for different risks. These can be summarised as follows:

- High risks - additional assessment and active management;
- Medium risks - likely to require further assessment and may require either active management or monitoring; and,
- Low and very low risk - will only require periodic review.

5.6.2 Mitigation to reduce risk can also be applied to avoid the requirement for further assessment and/or monitoring.

6.0 RISK ASSESSMENT

6.1.1 The Bioaerosol Risk Assessment is shown in Table 7.

Table 7 Risk Assessment

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
Green waste during delivery and storage	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Partial containment of the feedstocks within delivery vehicles helps to reduce the potential for bioaerosol emissions during transit to the site Measures are undertaken to reduce the drop height of material during the unloading of delivery vehicles Green waste remains stationary within the reception area prior to shredding in order to limit disturbance and the associated potential for bioaerosol emissions	**Low**	Full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring at the receptors
Grade A wood waste during delivery and storage	**Very Low** at all receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low**	Grade A wood waste is non-processed clean wood and therefore unlikely to result in significant bioaerosol emissions during unloading and storage Measures are undertaken to reduce the drop height of material during the unloading of delivery vehicles Grade A wood waste remains static during storage	**Very Low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
Pallets during delivery and storage	**Very Low** at all receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low**	Pallets are comprised of non-processed clean wood and are therefore unlikely to result in significant bioaerosol emissions during unloading and storage Measures are undertaken to reduce the drop height of material during the unloading of delivery vehicles Pallets remain static during storage	**Very Low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring
Emissions from green waste, wood and oversize during shredding	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Green waste, wood waste and oversize are loaded into the shredder in bulk loads to reduce the potential for separation of materials and the overall emitting surface area that is exposed to atmosphere The drop height of material is limited to 1.5m above the shredder in order to minimise disturbance and associated bioaerosol release potential during loading Training in the use of loading and shredding equipment has been provided to all staff	**Low**	Full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring
Emissions from shredded green waste, wood and oversize	**Very Low** at all receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low**	Shredded green waste, wood and oversize remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions Green waste is incorporated into windows as soon as practicable	**Very Low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
during storage				following shredding in order to ensure that unmanaged decomposition of the material does not occur		
Emissions from static windrows during composting	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Temperature and oxygen levels are monitored throughout the composting phase in order to ensure optimum conditions are maintained and that unmanaged decomposition does not occur Between turning events, the windrows remain static in order to limit disturbance and the associated potential for bioaerosol emissions. However, there may be the potential for low to medium levels of bioaerosol release as a result of wind stripping from the exposed surfaces of the windrows	**Low**	The static nature of materials during, as well as full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring
Emissions from windrows during turning	**Medium** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Medium**	Full training in the use of turning equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times Turning operations are avoided during dry and windy conditions in order to minimise the potential for bioaerosol release Windrow turning operations are undertaken systematically and over the shortest periods possible in order to limit potential bioaerosol emission durations	**Low**	Full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
Emissions from compost during screening	**Medium** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Medium**	Full training in the use of equipment has been provided to all staff in order to ensure that the correct screening procedures are adhered to at all times The drop height of compost is limited to 1.5m above the screening unit in order to minimise disturbance and associated bioaerosol release potential during loading	**Low**	Full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring
Emissions from compost product and topsoil during blending	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Finished compost is likely to have a low bioaerosol emission potential due to microbial stabilisation which has occurred as part of the composting process Full training in the use of blending equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times The drop height of materials during blending is minimised as far as practicable in order to limit disturbance and the associated potential for bioaerosol release	**Low**	Full implementation of the stated control measures is considered to result in a **low** residual risk of impact occurring at the receptors
Emissions from compost	**Very Low** at all receptors due to the emission potential, distance between the	**Medium**	**Low**	Finished compost is likely to have a low bioaerosol emission potential due to microbial stabilisation which has	**Very Low**	Full implementation of the stated control measures is considered to result in

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
product during storage	receptors and the source, as well as the prevailing meteorological conditions			occurred as part of the composting process Compost product remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions		**very low** residual risk of impact occurring
Emissions from compost during vehicle loading	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Finished compost is likely to have a low bioaerosol emission potential due to the microbial stabilisation which has occurred as part of the composting process Full training in the use of loading equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times The drop height of compost is limited to 1.5m above the vehicles in order to minimise disturbance and associated bioaerosol release potential during loading	**Low**	Full implementation of the stated control measures is considered to result in **low** residual risk of impact occurring
Emissions from leachate during storage	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	Leachate is stored in two underground tanks. Leachate is likely to contain microorganisms. However, the wet nature of the material and containment within the tanks is considered is considered to result in a negligible bioaerosol emission potential for the source	**Very Low**	Full implementation of the stated control measures is considered to result in **very low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
Emissions from leachate during windrow application	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	The amount of leachate applied to the windrows is limited to the quantity required to optimise moisture content The leachate is added directly to the surfaces of the windrows using a directional hose which allows focussed application As stated previously, leachate is likely to contain microorganisms. However, the wet nature of the material and stated controls are considered to result in a low emission potential for the source	**Very Low**	Full implementation of the stated control measures is considered to result in **very low** residual risk of impact occurring
Emissions from wood processing activities within the main building	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	Wood waste is processed within an enclosed building in order to limit the potential for fugitive bioaerosol release The milling hall includes a dedicated dust extraction unit which can treat up to 27,000m^3/h of air from the building. Following filtration, emissions are discharged to atmosphere at a height of 12m in order to promote effective dilution and dispersion of any residual dust and/or bioaerosol emissions The maximum dust concentration in exhaust air from the extraction/ filtration unit as specified by HAAS, the manufacturer of the plant, is 3mg/m^3 The Operator has a contract with CJR who carry out annual inspection and maintenance of the extraction/	**Low**	Full implementation of the stated control measures is considered to result in **low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
				filtration unit to ensure correct and optimum abatement performance of the plant		
Emissions from activities within the bedding plant	**Low** at R1 due to the source emission potential, the separation distance between the source and receptor, and the prevailing meteorological conditions **Very Low** at R2 to R17 receptors due to the source emission potential, the separation distance between the source and receptors, and the prevailing meteorological conditions	**Medium**	**Low** or **Medium**	The bedding plant is housed within an enclosed building in order to limit the potential for fugitive bioaerosol release The building includes a dedicated dust extraction unit which can treat up to 15,000m^3/h of air. Following filtration, emissions are discharged to atmosphere at a height of 6.7m in order to promote effective dilution and dispersion of any residual dust and/or bioaerosol emissions The maximum dust concentration in exhaust air from the extraction/ filtration unit as specified by HAAS, the manufacturer of the plant, is 5mg/m^3 The Operator has a contract with CJR who carry out annual inspection and maintenance of the extraction/ filtration unit to ensure correct and optimum abatement performance of the plant	**Low**	Full implementation of the stated control measures is considered to result in **low** residual risk of impact occurring
Emissions from stored wood chip on the northern	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	Wood chip is stored under cover in order to ensure that the material remains dry and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur	**Very low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
section of the site				Wood chip remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions		
Emissions from bedding material on the drying floors	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	The floors are covered in order to ensure that the material is dried effectively and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur Drying under cover also provides partial containment of the material and limits the potential for wind stripping of bioaerosols from exposed surfaces The material remains static during drying in order to limit disturbance and the associated potential for bioaerosol emissions	**Very low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring
Emissions from stored bedding product	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	Bedding is stored under cover in order to ensure that the material remains dry and moisture levels which could lead to decomposition and the associated potential for bioaerosol release, do not occur Storage under cover also provides partial containment of the material and limits the potential for wind stripping of bioaerosols from exposed surfaces	**Very low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring

Source	Probability of Exposure	Harm	Magnitude of Risk	Control Measures	Residual Risk	Justification for Residual Risk
				Bedding remains static during storage in order to limit disturbance and the associated potential for bioaerosol emissions		
Emissions from bedding product and woodchip during loading	**Very Low** at all receptors due to the emission potential, distance between the receptors and the source, as well as the prevailing meteorological conditions	**Medium**	**Low**	Clean shredded wood waste and bedding are likely to contain limited quantities of bioaerosols Full training in the use of loading equipment has been provided to all staff in order to ensure that the correct procedures are adhered to at all times The drop height of waste wood and bedding is limited to 1.5m above the vehicles in order to minimise disturbance and associated bioaerosol release potential during loading	**Very low**	Full implementation of the stated control measures is considered to result in a **very low** residual risk of impact occurring

6.1.2 As shown in Table 7, the results of the assessment indicated residual risk from all sources was determined as **very low** or **low**. As such, it is concluded that no further control measures, other than those specified, are required in order reduce the potential for impacts at sensitive locations in the vicinity of the site.

7.0 CONCLUSION

7.1.1 Redmore Environmental Ltd was commissioned by Earthcare Technical Ltd to undertake a SSBRA in support of an Environmental Permit Application for Mill Farm Recycling Ltd, Mill Farm, Stone Road, Chebsey, Stafford.

7.1.2 During the operation of the facility there is the potential for bioaerosol emissions and associated impacts at sensitive receptor locations in the vicinity of the site. A Risk Assessment was therefore undertaken to identify potential emission sources and evaluate effects in the local area.

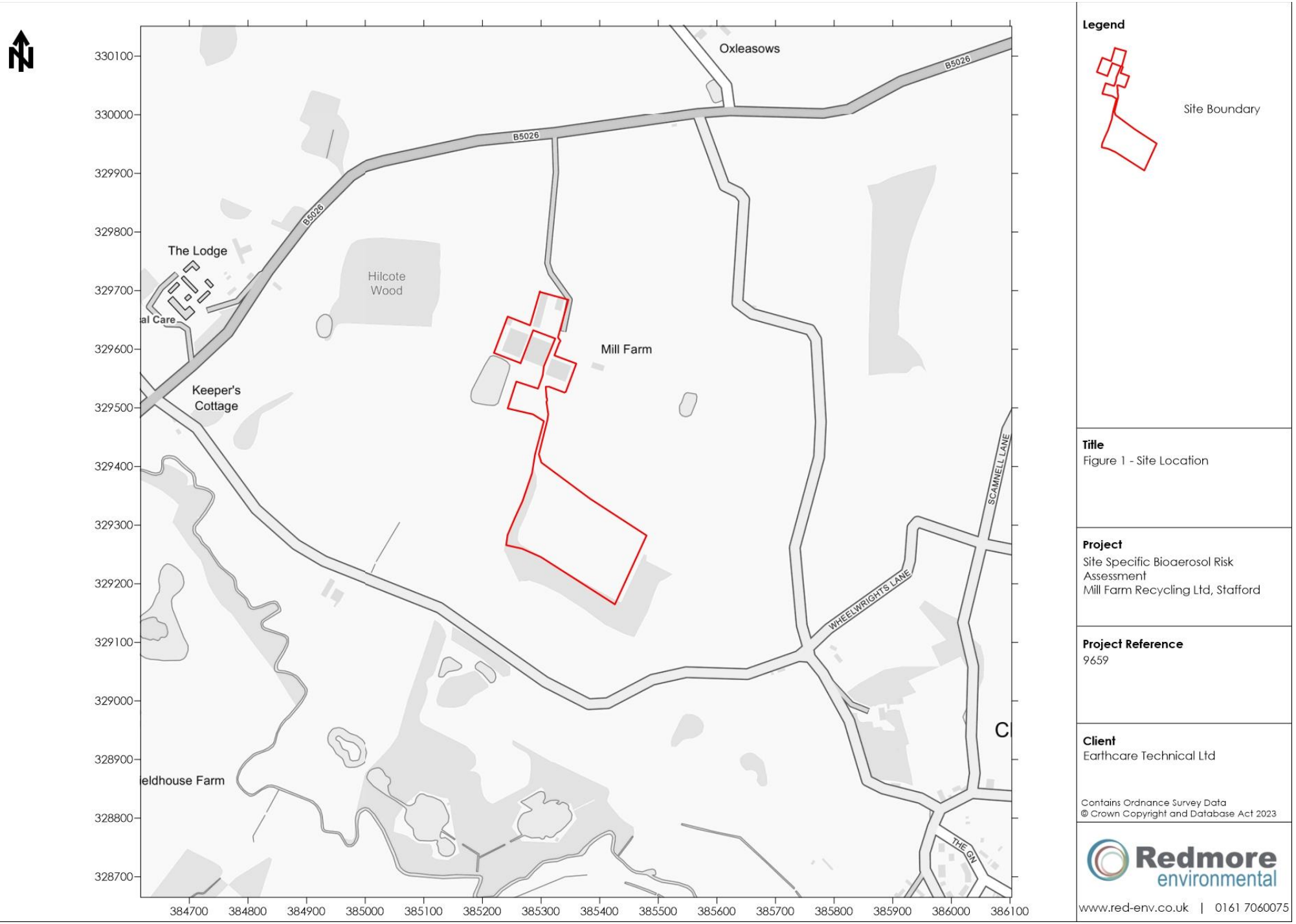
7.1.3 The risk of significant bioaerosol impact at sensitive locations in the vicinity of the site was assessed using a source - pathway - receptor approach. This considered the nature of the potential emission sources, any barriers to dispersion and the severity of harm.

7.1.4 The results of the assessment indicated residual risk from all sources was determined as **very low** or **low**. As such, it is concluded that no further control measures, other than those detailed in the assessment, are required in order reduce the potential for impacts at sensitive locations in the vicinity of the site.

8.0 ABBREVIATIONS

AD	Anaerobic Digestion
BAT	Best Available Technique
BSI	British Standards Institution
CQPMS	Compost Quality Policy and Management system
DEFRA	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EMS	Environmental Management System
HACCP	Hazard Analysis Critical Control Point
IVC	In-Vessel Composting
NGR	National Grid Reference
RCV	Refuse Collection Vehicle
RPS	Regulatory Position Statement
SNIFFER	Scotland and Northern Ireland Forum for Environmental Research
SOP	Standard Operating Procedure
SSBRA	Site Specific Bioaerosol Risk Assessment
TPA	Tonnes per annum

Figures



Legend

Site Boundary

Title
Figure 1 - Site Location

Project
Site Specific Bioaerosol Risk Assessment
Mill Farm Recycling Ltd, Stafford

Project Reference
9659

Client
Earthcare Technical Ltd

Redmore environmental
www.red-env.co.uk | 0161 7060075

ID	Description
1	Woodchip storage bays 3 no. (1a-1c inclusive)
2	Main wood processing building
3	Dust abatement plant for main wood processing building
4	Diesel generator for main wood processing
5a - 5f inc	Drying floor 1 - 6
6	Bedding plant building
7	Dust abatement plant for bedding plant
8	Diesel generator for bedding plant
9	Fuel tank for diesel generator
10	Product storage area 1 (3 No. bays)
11	Product storage area 2 (2 No. bays)
12	Product storage area 3 (4 No. bays)
13	Komtech screening equipment for compost
14	Fire quarantine area with curbed concrete wall (10m x 22m)
15	Topsoil and compost storage
16	Clean water storage lagoon - Source of fire water
17	Weighbridge with swipe card entry
18	Livestock housing
19	Car park
20	Offices and welfare
21	Housing for 3 no. non waste biomass boilers
22	Control unit container
23	Drainage collection sump and pump
24	Above ground water storage tank (1,500m^3)

Legend

Title
Figure 2 - Site Layout - Upper Yard

Project
Site Specific Bioaerosol Risk Assessment
Mill Farm Recycling Ltd, Stafford

Project Reference
9659

Client
Earthcare Technical Ltd

Redmore environmental
www.red-env.co.uk | 0161 7060075

ID	Description
25	Active green waste composting area
26a & 26b	Underground tanks servicing green waste composting area – source of water for fire
27	Underground tank servicing wood waste area – source of water for fire

Waste storage piles with 6m separation distances

Pile ID	Material stored	Width (m)	Depth (m)	Height (m)	Volume (m^3)
28	Unprocessed green waste	8	14	4	448
29	Shredded green waste	8	14	4	448
30	Pallets	17	11	4	748
31	Shredded wood	8	14	4	448

Reception and storage bays (arboricultural (non-waste) & Grade A wood)

Bay ID	Width (m)	Depth (m)	Height (m)	Max height of storage (m)	Max volume stored (m^3)
32	24	8	3	2	384
33	16	14	3	2	448
34	24	6	3	2	288
35	16	14	3	2	448
36	15	12	3	2	360
37	15	12	3	2	360
38	16	14	3	2	448
39	16	14	3	2	448
40	6	12	3	2	144
41	12	12	3	2	288
42	10	12	3	2	240

Legend

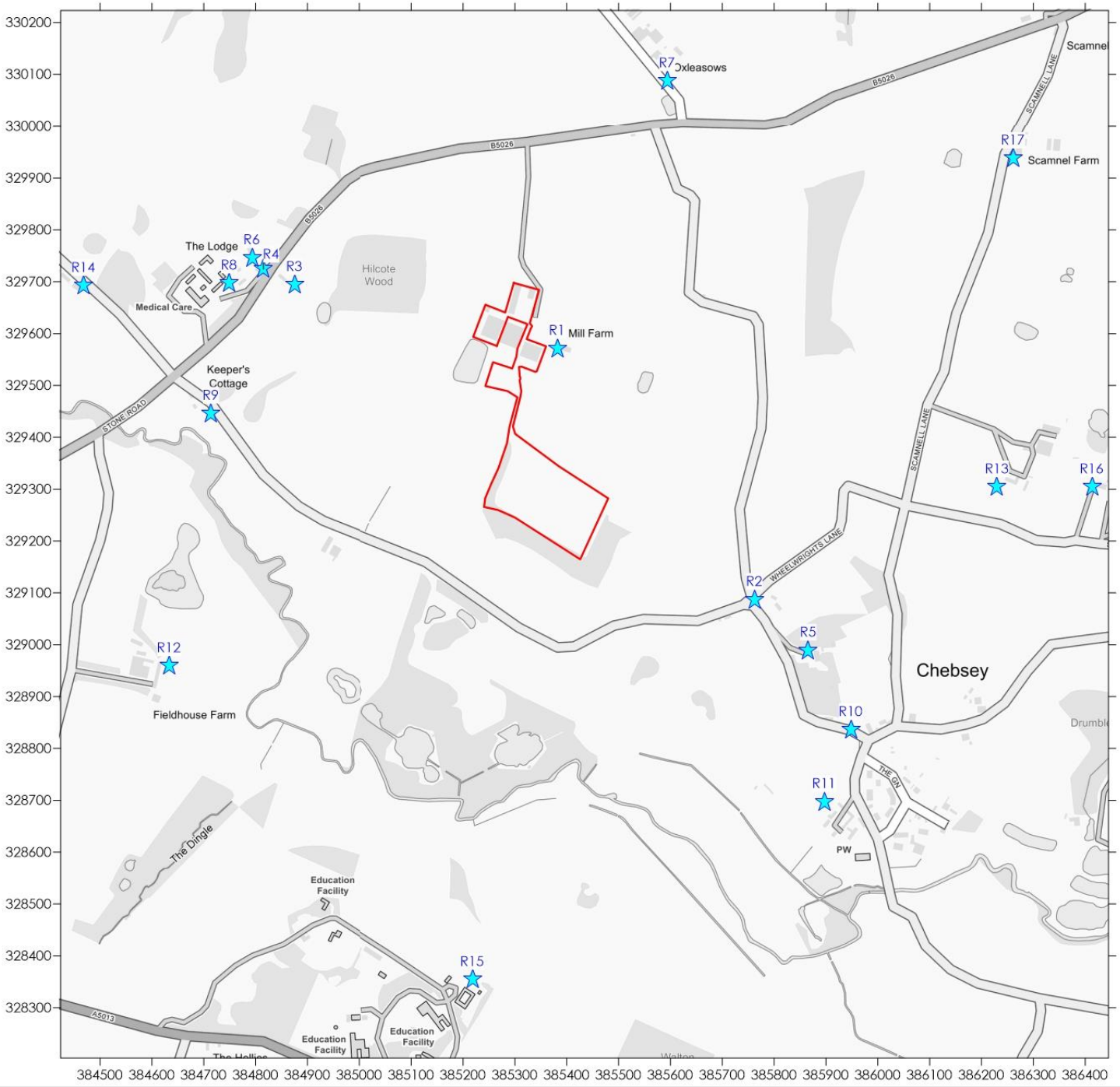
Title
Figure 3 - Site Layout - Lower Yard

Project
Site Specific Bioaerosol Risk Assessment
Mill Farm Recycling Ltd, Stafford

Project Reference
9659

Client
Earthcare Technical Ltd

Redmore environmental
www.red-env.co.uk | 0161 7060075



Legend

Site Boundary

Sensitive Receptor

Title
Figure 4 - Sensitive Receptor Locations

Project
Site Specific Bioaerosol Risk Assessment
Mill Farm Recycling Ltd, Stafford

Project Reference
9659

Client
Earthcare Technical Ltd

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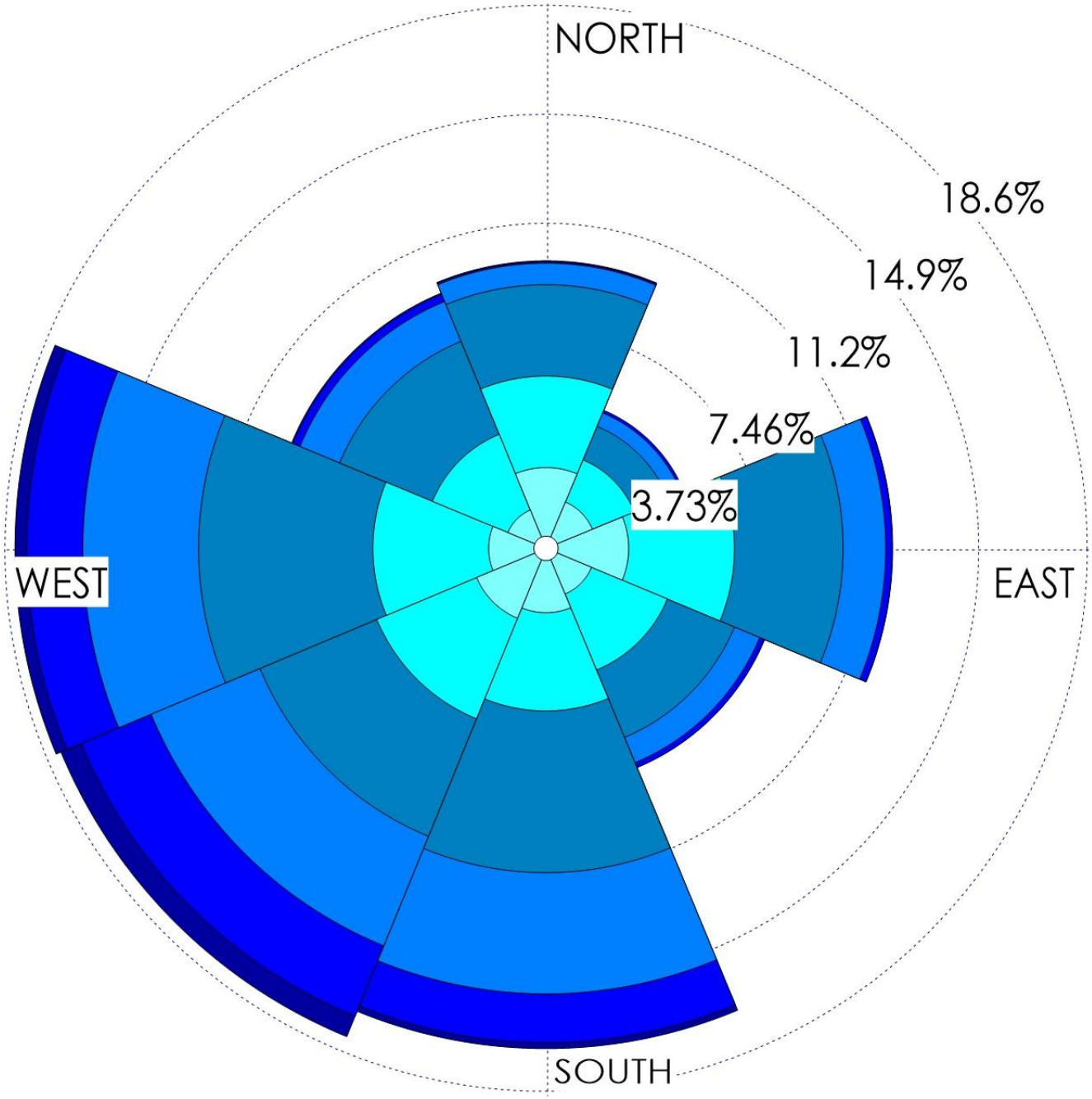

Legend

WIND SPEED (m/s)

- >= 11.10
- 8.00 - 11.10
- 5.70 - 8.00
- 3.60 - 5.70
- 2.10 - 3.60
- 0.50 - 2.10

Calms: 1.59%

Title
Figure 5 - Wind Rose of 2019 to 2023 Shawbury Meteorological Data

Project
Site Specific Bioaerosol Risk Assessment
Mill Farm Recycling Ltd, Stafford

Project Reference
9659

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