

## **Biodet**

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Our Ref: GBEDS/17/Q2

Date: 26<sup>th</sup> June 2017

## **BIOAEROSOL MONITORING REPORT**

Log No. 1165

### **BIOAEROSOL MONITORING REPORT FROM GROWING BEDS, RAVENS DEN**

Sampling performed 14<sup>th</sup> June 2017

The composing site at **Growing Beds, Ravensden** was visited on 14<sup>th</sup> June 2017.

Sampling for the enumeration of airborne micro-organisms was undertaken by Richard Smith of Biodet following so far as reasonably practicable, the Standardised Protocol for the Monitoring of Bioaerosols at Open Composting Facilities (Association for Organic Recycling (AfOR), 2009).

All sampling was carried out on a normal working day whilst operational activities were taking place, which are detailed in Appendix 1: Site data during sampling. The prevailing weather conditions (wind direction, wind speed, temperature and humidity) were recorded at the time of sampling.

On-site activity (turning, screening etc.) was recorded.

### **Sampling Points**

Sampling points were chosen to correspond with the criteria of the AfOR Protocol (see page 3: Plan of Site, for further details on the positions):

1. Upwind of the composting activities at approximately 75 metres from the operational boundary, south-east (163° from north) of the centre of the site operations.
2. Downwind of composting activities at approximately 283 metres from the operational boundary, north-west (343° from north) of the site operations.

3. Nearest Receptor\* at approximately 300 metres from the operational boundary, south-south-west (190° from north) of the shredding operation.

\* *A sensitive receptor is defined as ‘any building, structure or installation in which at least one person normally lives or works, other than a building, structure or installation within the same ownership or control as the operator / owner of the composting facility.’ - Standardised Protocol for the Sampling and Enumeration of Airborne Microorganisms at Composting Facilities: [The Composting Association]*

In the case of Growing Beds, the nearest sensitive receptor was determined to be the cottages and farm to the south-west of the site.

The sample points are indicated on the site map (page 3).

Samples were taken at a height of 1.5 metre, using SKC IOM bioaerosol sampling heads at 2.0 litres per minute.

The recovered membranes were tested for mesophilic bacteria and for *Aspergillus fumigatus*. Nutrient agar (NA) was used to culture mesophilic bacteria and the plates were incubated for 2 days at 37 C.

Malt extract agar (MEA) was used to culture *Aspergillus fumigatus* and the plates were incubated for 2 days at 41 C.

Tests were performed in triplicate at each sampling point.

Identification of *Aspergillus fumigatus* was performed by microscopy.

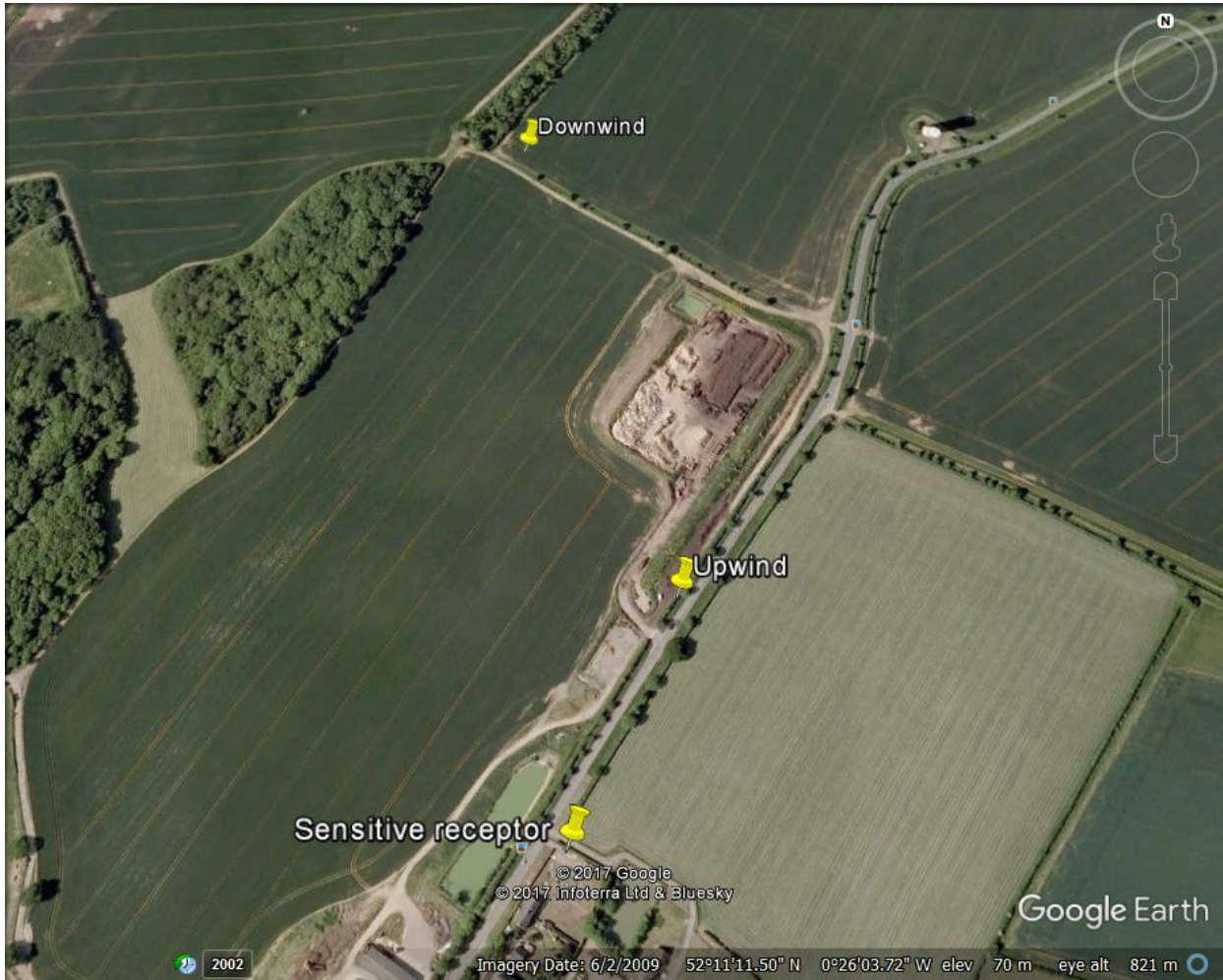
## Results:

Site	Growing Beds, Ravensden
Date of visit:	14 <sup>th</sup> June 2017
Operator:	R. Smith
Wind Direction:	South-south-easterly
Wind Speed:	6-10 mph
Operation:	Shredding & material movement

## Weather:

- Dry and warm.
- Temperature ranged from 27.5 C to 29.6 C, the average was 28.6 C.
- Relative humidity ranged from 33.2% to 38.8%, the average was 36.0%.
- Wind speed ranged from 6 mph to 10 mph, the average was 8 mph.
- Wind direction was on average from the south-south-east

**Growing Beds Plan: 14<sup>th</sup> June 2017**



**Microbiological Results:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 14<sup>th</sup> June 2017</b>			<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>					
Location	Sample ref no.	Distance from site operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/m <sup>3</sup> )	Arithmetic mean of parallel samples (CFU/m <sup>3</sup> )	Comments relating to activities
Upwind	U1	152	12:00-12:45	90	MB	1410	691	Shredding & screening
Upwind	U2	152	12:00-12:45	90	MB	296		
Upwind	U3	152	12:00-12:45	90	MB	370		
Upwind	U1	152	12:00-12:45	90	AF	<74	<74	Shredding & screening
Upwind	U2	152	12:00-12:45	90	AF	<74		
Upwind	U3	152	12:00-12:45	90	AF	<74		
Downwind	D1	346	12:15-13:00	90	MB	1410	2740	Shredding & screening
Downwind	D2	346	12:15-13:00	90	MB	2664		
Downwind	D3	346	12:15-13:00	90	MB	4144		

Downwind	D1	346	12:15-13:00	90	AF	<74	<74	Shredding & screening
Downwind	D2	346	12:15-13:00	90	AF	74		
Downwind	D3	346	12:15-13:00	90	AF	<74		
S. receptor	S1	346	12:55-13:40	90	MB	962	543	Shredding & screening
S. receptor	S2	346	12:55-13:40	90	MB	370		
S. receptor	S3	346	12:55-13:40	90	MB	296		
S. receptor	S1	346	12:55-13:40	90	AF	<74	<74	Shredding & screening
S. receptor	S2	346	12:55-13:40	90	AF	<74		
S. receptor	S3	346	12:55-13:40	90	AF	<74		

**MB = Mesophilic bacteria, AF = *Aspergillus fumigatus***

**Controls:**

<b>Site: Growing Beds, Ravensden</b> <b>Date: 14<sup>th</sup> June 2017</b>				<b>Site Operator: Mark Evans</b> <b>Commissioning Lab: Biodet, University of Hertfordshire</b> <b>Materials processed on site: Green waste</b>			
Location	Sample ref no.	Distance from shredding operation (m)	Sampling times (hh:min:ss)	Sampling volume (litres)	Microbial type	Calculated concentration of airborne micro organisms (CFU/membrane)	Comments relating to activities
Control 1	C1	n/a	n/a	n/a	MB	<7	Membrane loaded on-site but no air passed through
Control 1	C1	n/a	n/a	n/a	AF	<7	Membrane loaded on-site but no air passed through

**Environmental conditions:**

<b>Site: Growing Beds, Ravensden</b>		<b>Site Operator: Mark Evans</b>	
<b>Date: 14<sup>th</sup> June 2017</b>		<b>Commissioning Lab: Biodet, University of Hertfordshire</b>	
<b>Materials processed on site: Green waste</b>			
<b>Time</b>	<b>Temperature C</b>	<b>Relative humidity %</b>	<b>Wind speed mph</b>
12:00	27.6	38.8	6-10
12:05	27.9	38.2	6-10
12:10	27.5	38.1	6-10
12:15	28.0	37.1	6-10
12:20	28.1	37.4	6-10
12:25	28.2	37.8	6-10
12:30	28.0	38.2	6-10
12:35	28.3	37.4	6-10
12:40	28.7	36.2	6-10
12:45	28.7	36.4	6-10
12:50	29.0	35.7	6-10
12:55	29.1	34.3	6-10
13:00	29.3	34.2	6-10
13:05	29.1	33.5	6-10
13:10	29.5	33.8	6-10
13:15	29.2	34.2	6-10
13:20	29.1	34.7	6-10
13:25	28.9	34.2	6-10
13:30	28.7	34.7	6-10

## Comments:

Bacteria and fungi occur naturally are commonly present in the air. Concentrations are highly variable, but background levels of micro-organisms do not normally exceed 1000 cfu/m<sup>3</sup> (colony forming units per cubic metre).

Environment Agency guidance levels of 1000 cfu/m<sup>3</sup> for bacteria and 500 cfu/m<sup>3</sup> for fungi have been used within this report, when assessing the concentrations of bioaerosols.

### Upwind position

*A. fumigatus* spp was not detected at the upwind position.

Mesophilic bacteria were isolated in significant numbers from the upwind position during the sampling period (691 cfu/m<sup>3</sup>); though concentrations were therefore below the 1000 cfu/m<sup>3</sup> EA reference level. There were no observable reasons for mesophilic bacteria to be in the air.

### Downwind

*A. fumigatus* spp was detected in very low numbers at the downwind position.

Mesophilic bacteria were isolated in high numbers from the downwind position (2740 cfu/m<sup>3</sup>) and were above the 1,000 cfu/m<sup>3</sup> EA reference level. There were no observable reasons for elevated levels of mesophilic bacteria downwind of the site.

### Nearest Receptor

*A. fumigatus* spp was not detected at the sensitive receptor position.

Mesophilic bacteria results were also significant at the nearest receptor position (543 cfu/m<sup>3</sup>) and were below the 1,000 cfu/m<sup>3</sup> EA reference level.



27<sup>th</sup> June 2017

R. SMITH

DATE

DIRECTOR OF BIODET